Oxley Holdings Ltd.

Proposed Strategic Housing Development
'The Connolly Quarter'
Rear of Connolly Station,
Sheriff Street Lower,
Dublin 1.

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Volume III - Table of Contents

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 6.1
TRAFFIC SURVEY DATA

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	A to D - R105(N) to R101(S)							Veh. Total	A to C - R105(N) to R105(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	29	3	10	1	0	0	12	55	193	29	26	5	8	5	29	295
07:15	25	3	3	0	0	3	26	60	173	32	28	4	13	7	32	289
07:30	26	2	7	1	0	1	34	71	176	31	26	2	7	9	50	301
07:45	18	0	7	1	0	2	45	73	152	41	31	3	14	12	75	328
08:00	31	1	3	1	0	1	37	74	142	49	16	3	14	20	87	331
08:15	23	5	0	0	0	8	80	116	124	48	20	1	18	16	112	339
08:30	29	7	5	0	0	2	68	111	129	58	14	3	12	16	171	403
08:45	30	7	5	1	0	4	71	118	134	64	12	1	17	23	164	415
09:00	24	7	6	2	1	2	33	75	150	70	13	4	21	13	124	395
09:15	25	4	4	0	0	2	23	58	123	70	28	3	18	9	87	338
09:30	16	7	1	3	0	2	20	49	148	75	28	2	13	13	66	345
09:45	21	5	7	1	1	0	10	45	153	58	30	6	12	4	38	301
10:00	21	5	3	0	0	2	10	41	132	69	31	2	14	6	22	276
10:15	12	7	8	4	0	1	4	36	119	45	15	3	11	4	19	216
10:30	19	1	3	3	0	0	8	34	128	45	24	5	10	6	23	241
10:45	17	5	6	0	0	3	4	35	121	47	29	3	11	3	28	242
11:00	18	7	6	0	0	1	8	40	84	37	26	3	5	2	15	172
11:15	18	1	5	1	0	0	2	27	103	42	15	8	13	3	14	198
11:30	12	7	7	0	1	0	7	34	110	37	31	1	9	8	24	220
11:45	19	1	5	1	0	3	1	30	94	36	15	3	8	5	19	180
12:00	18	4	1	1	0	1	2	27	105	36	25	2	11	2	13	194
12:15	16	1	7	0	0	3	5	32	100	28	17	1	13	6	18	183
12:30	18	5	5	0	0	0	2	30	100	31	20	7	6	5	19	188
12:45	17	8	1	1	0	1	5	33	97	31	23	1	10	8	27	197
13:00	17	3	3	0	0	0	2	25	76	21	19	3	13	3	26	161
13:15	23	3	5	0	0	0	2	33	89	34	21	0	5	5	17	171
13:30	22	2	3	2	0	0	3	32	99	36	22	5	19	6	14	201
13:45	17	5	3	0	1	1	5	32	97	32	18	0	12	1	16	176
14:00	19	3	2	0	0	1	10	35	106	30	16	3	16	5	12	188
14:15	20	2	4	1	0	0	2	29	101	40	15	1	7	5	17	186
14:30	24	2	1	1	0	0	4	32	71	37	15	2	11	6	13	155
14:45	19	1	4	1	2	0	1	28	75	29	11	2	9	2	13	141
15:00	13	7	2	0	0	1	2	25	81	30	12	3	14	4	9	153
15:15	10	8	1	0	0	0	2	21	106	52	13	4	6	5	18	204
15:30	18	5	3	0	0	3	3	32	114	27	9	2	15	3	11	181
15:45	14	5	3	0	0	0	6	28	95	37	20	0	15	5	14	186
16:00	17	3	2	0	0	0	3	25	94	35	15	2	8	4	10	168
16:15	23	4	3	0	1	1	3	35	114	26	19	2	14	2	28	205
16:30	19	2	4	0	0	1	3	29	98	35	20	0	12	4	12	181
16:45	19	6	5	0	0	1	5	36	118	30	17	1	10	1	24	201
17:00	12	3	2	0	1	1	3	22	110	28	11	0	15	3	37	204
17:15	20	4	0	0	0	2	8	34	128	33	8	0	10	5	33	217
17:30	14	8	1	0	0	1	3	27	85	42	6	2	12	4	45	196
17:45	18	2	5	1	0	1	3	30	109	29	8	2	11	4	35	198
18:00	17	3	1	0	0	1	7	29	108	41	10	1	10	2	29	201
18:15	14	2	0	0	0	0	3	19	112	53	12	0	13	3	35	228
18:30	12	1	2	0	0	1	4	20	120	61	4	2	15	0	27	229
18:45	11	1	3	0	0	2	1	18	125	55	10	2	10	1	24	227
Total	914	188	177	28	8	60	605	1980	5521	1982	874	115	570	288	1795	11145

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	A to B - R105(N) to R101(N)							Veh. Total	B to A - R101(N) to R105(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	5	1	2	3	0	0	1	12
07:15	0	0	0	0	0	0	0	0	5	1	3	2	0	0	0	11
07:30	0	0	0	0	0	0	1	1	4	0	1	0	0	1	4	10
07:45	0	0	0	0	0	0	0	0	7	3	3	0	0	0	4	17
08:00	0	0	0	0	0	0	0	0	3	3	5	4	0	0	3	18
08:15	0	0	0	0	0	0	0	0	6	2	3	1	0	0	6	18
08:30	0	0	0	0	0	0	0	0	8	3	3	1	0	0	3	18
08:45	0	0	0	0	0	0	0	0	14	4	0	0	0	0	1	19
09:00	0	0	0	0	0	0	0	0	10	3	3	4	0	0	3	23
09:15	0	0	0	0	0	0	0	0	14	6	4	2	0	1	2	29
09:30	0	0	0	0	0	0	0	0	11	4	6	3	0	1	0	25
09:45	0	0	0	0	0	0	0	0	12	1	3	2	0	0	2	20
10:00	0	0	0	0	0	0	0	0	18	1	7	2	0	1	0	29
10:15	0	0	0	1	0	0	0	1	14	0	3	3	0	3	0	23
10:30	0	0	0	0	0	0	0	0	12	3	3	2	0	0	2	22
10:45	0	0	0	0	0	0	1	1	22	4	7	0	1	0	0	34
11:00	0	0	0	0	0	0	0	0	15	1	9	3	0	0	0	28
11:15	0	0	0	0	0	0	0	0	33	4	14	4	1	0	2	58
11:30	0	0	0	0	0	0	0	0	24	4	2	3	0	0	3	36
11:45	0	0	0	0	0	0	0	0	16	3	5	2	0	0	3	29
12:00	0	0	0	0	0	0	0	0	31	4	2	1	0	1	1	40
12:15	0	0	0	0	0	0	0	0	23	6	4	4	1	1	4	43
12:30	0	0	0	0	0	0	0	0	11	3	5	2	0	0	7	28
12:45	0	0	0	0	0	0	0	0	27	4	3	4	0	1	3	42
13:00	0	0	0	0	0	0	0	0	26	2	6	1	0	2	2	39
13:15	0	0	0	0	0	0	0	0	18	6	9	2	0	0	2	37
13:30	0	0	0	0	0	0	0	0	25	10	2	4	0	2	3	46
13:45	0	0	0	0	0	0	0	0	23	7	8	0	0	1	5	44
14:00	0	0	0	0	0	0	1	1	32	7	7	2	0	1	3	52
14:15	0	0	0	0	1	0	0	1	22	3	3	0	0	0	4	32
14:30	0	0	0	0	0	0	0	0	36	4	4	1	0	1	3	49
14:45	0	0	0	0	0	0	0	0	35	4	8	1	0	2	3	53
15:00	0	0	0	0	0	0	0	0	24	1	6	1	1	2	2	37
15:15	0	0	0	0	0	0	0	0	28	4	7	0	0	1	3	43
15:30	0	0	0	0	0	0	0	0	44	1	7	1	0	2	4	59
15:45	0	0	0	0	0	0	0	0	37	5	7	0	3	0	5	57
16:00	0	0	0	0	0	0	0	0	43	3	5	0	0	1	2	54
16:15	0	0	0	0	0	0	0	0	33	4	6	0	0	2	3	48
16:30	0	0	0	0	0	0	0	0	38	2	9	0	0	3	7	59
16:45	0	0	0	0	0	0	0	0	40	1	7	0	1	2	11	62
17:00	0	0	0	0	0	0	0	0	39	3	5	0	1	3	9	60
17:15	0	0	0	0	0	0	0	0	51	5	7	0	0	3	10	76
17:30	0	0	0	0	0	0	0	0	41	3	4	0	0	6	6	60
17:45	0	0	0	0	0	0	1	1	36	3	3	1	0	1	10	54
18:00	0	0	0	0	0	0	0	0	32	1	1	0	2	2	9	47
18:15	0	0	0	0	0	0	0	0	25	2	1	1	1	3	11	44
18:30	0	0	0	0	0	0	0	0	22	3	2	0	0	4	16	47
18:45	0	0	0	0	0	0	0	0	21	1	3	0	0	1	9	35
25.75	0	0	0	1	1	0	4	6	1116	153	227	67	12	55	196	1826

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	B to D - R101(N) to R101(S)							Veh. Total	B to C - R101(N) to R105(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	99	3	28	4	0	1	32	167	55	2	20	1	1	0	3	82
07:15	83	5	30	5	0	3	40	166	56	5	10	1	0	0	6	78
07:30	100	2	19	4	0	7	48	180	52	2	6	0	1	0	5	66
07:45	103	2	19	2	0	4	57	187	66	2	5	0	1	2	6	82
08:00	81	3	9	1	0	4	56	154	55	3	7	0	0	1	2	68
08:15	97	10	12	7	0	10	83	219	48	2	8	0	1	1	5	65
08:30	95	2	11	1	0	12	105	226	44	3	2	0	2	3	11	65
08:45	94	5	9	1	0	11	116	236	45	5	5	2	0	4	12	73
09:00	86	3	15	4	0	7	78	193	47	11	7	0	1	2	4	72
09:15	65	6	11	3	0	4	48	137	37	13	10	1	0	1	8	70
09:30	58	5	15	3	0	5	26	112	38	14	12	3	0	2	7	76
09:45	55	12	14	3	1	6	21	112	34	11	3	0	0	0	5	53
10:00	45	11	23	1	0	1	8	89	31	13	5	3	1	2	3	58
10:15	58	14	18	11	0	3	7	111	20	15	11	1	0	0	1	48
10:30	42	10	22	5	1	3	4	87	19	18	10	4	0	1	2	54
10:45	44	10	20	7	0	2	6	89	31	11	11	0	1	1	4	59
11:00	48	9	15	6	1	0	5	84	20	7	6	0	2	0	2	37
11:15	43	7	17	4	0	1	9	81	21	13	8	1	1	2	1	47
11:30	56	6	19	6	1	3	7	98	19	13	8	2	0	0	0	42
11:45	50	9	22	6	2	2	4	95	18	9	8	2	1	2	1	41
12:00	60	8	14	2	0	1	8	93	15	8	5	0	0	0	0	28
12:15	47	6	15	5	0	2	7	82	20	16	5	1	2	0	1	45
12:30	62	17	22	4	0	1	5	111	11	9	8	3	1	2	1	35
12:45	47	7	9	1	2	2	6	74	15	10	7	0	0	1	0	33
13:00	51	14	13	3	1	2	2	86	28	23	8	3	0	0	3	65
13:15	54	7	15	3	0	1	4	84	17	5	6	2	0	0	0	30
13:30	46	12	8	3	2	1	3	75	16	12	8	2	0	0	1	39
13:45	52	15	14	6	2	2	8	99	32	7	11	1	3	0	2	56
14:00	52	12	21	4	0	2	5	96	16	10	3	2	0	2	2	35
14:15	54	9	14	2	3	2	5	89	24	14	4	2	0	0	0	44
14:30	44	8	12	3	0	0	7	74	13	12	10	1	2	0	0	38
14:45	53	15	8	5	1	1	12	95	28	8	4	2	1	2	0	45
15:00	38	9	17	4	1	1	4	74	14	13	6	0	2	1	0	36
15:15	52	8	7	5	2	1	11	86	18	4	5	3	1	2	2	35
15:30	59	13	9	1	1	1	9	93	24	7	3	0	1	1	5	41
15:45	44	15	11	2	0	2	9	83	17	15	5	1	0	0	1	39
16:00	52	12	10	3	1	1	5	84	16	3	3	0	0	1	0	23
16:15	59	8	6	0	0	4	9	86	11	3	2	1	1	1	0	19
16:30	75	11	13	2	1	3	15	120	11	11	4	0	0	0	2	28
16:45	65	10	8	1	1	2	14	101	14	7	3	0	1	2	0	27
17:00	55	9	15	1	3	3	15	101	15	7	2	0	1	0	4	29
17:15	72	7	7	1	0	2	13	102	9	6	2	0	3	1	1	22
17:30	51	8	10	0	2	4	18	93	6	8	3	0	1	0	0	18
17:45	77	13	5	2	0	2	9	108	16	4	0	0	1	2	0	23
18:00	51	13	4	2	1	1	12	84	8	7	3	0	1	3	4	26
18:15	92	13	9	1	1	1	0	117	10	3	0	1	3	0	2	19
18:30	57	15	6	0	1	3	5	87	9	8	2	0	2	1	3	25
18:45	55	13	4	0	0	0	7	79	7	5	1	0	0	1	1	15
25.75	2978	441	654	150	32	137	987	5379	1196	417	285	46	40	47	123	2154

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	C to B - R105(S) to R101(N)							Veh. Total	C to A - R105(S) to R105(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	3	3	1	0	0	0	0	7	46	13	12	0	9	0	2	82
07:15	5	2	0	0	0	0	1	8	37	8	5	2	10	1	13	76
07:30	6	2	1	0	0	0	0	9	56	18	5	4	9	2	15	109
07:45	6	0	1	0	0	0	1	8	42	11	8	2	11	0	19	93
08:00	5	0	2	0	0	0	1	8	62	17	5	1	12	1	26	124
08:15	10	3	1	0	0	0	0	14	48	13	6	1	9	3	20	100
08:30	6	1	1	0	0	0	0	8	52	25	5	2	15	5	21	125
08:45	5	3	0	0	0	1	1	10	27	15	3	0	12	1	22	80
09:00	5	1	1	1	0	0	2	10	40	20	7	2	11	0	11	91
09:15	5	3	0	1	1	0	1	11	38	22	7	0	13	1	11	92
09:30	2	6	0	0	0	0	1	9	31	16	4	0	19	3	15	88
09:45	1	2	0	0	0	0	2	5	34	23	4	0	13	2	7	83
10:00	7	5	6	0	0	0	0	18	44	30	12	2	11	1	10	110
10:15	9	7	0	0	1	0	0	17	36	18	6	3	19	3	4	89
10:30	6	4	0	0	0	0	1	11	44	37	15	1	9	4	4	114
10:45	4	3	2	0	0	0	0	9	50	24	11	4	10	3	1	103
11:00	8	6	1	0	0	1	0	16	48	36	11	6	8	2	6	117
11:15	4	6	1	0	0	0	0	11	38	25	18	1	10	4	6	102
11:30	3	2	3	0	0	2	3	13	48	19	12	0	9	2	4	94
11:45	9	4	0	1	0	1	2	17	51	30	16	1	9	4	8	119
12:00	10	7	3	0	0	3	1	24	51	29	13	1	13	4	11	122
12:15	9	4	1	1	0	0	0	15	58	26	17	1	15	3	14	134
12:30	3	3	7	0	0	2	1	16	62	31	15	1	9	0	19	137
12:45	4	4	0	1	1	0	0	10	78	33	9	2	8	2	13	145
13:00	8	1	2	1	1	0	0	13	80	13	9	3	10	6	21	142
13:15	7	3	5	0	0	0	0	15	65	29	12	0	12	6	15	139
13:30	6	0	1	0	0	0	1	8	85	23	15	3	5	2	19	152
13:45	2	3	2	1	0	1	1	10	84	26	12	3	14	2	13	154
14:00	9	4	1	0	0	0	3	17	85	18	14	1	9	3	17	147
14:15	11	7	3	1	0	0	2	24	92	18	11	1	10	2	19	153
14:30	10	2	5	2	1	0	0	20	64	21	16	2	11	5	14	133
14:45	7	5	1	1	0	0	0	14	86	26	19	3	8	5	27	174
15:00	9	0	2	1	0	0	0	12	103	34	22	1	10	3	19	192
15:15	7	5	2	0	1	4	0	19	108	31	25	1	16	4	18	203
15:30	9	2	2	0	0	0	1	14	114	26	23	1	6	2	16	188
15:45	9	4	1	0	0	0	0	14	126	21	27	0	13	7	30	224
16:00	10	2	3	0	0	0	2	17	134	24	24	1	8	6	28	225
16:15	7	5	3	0	0	1	3	19	151	27	21	1	12	12	42	266
16:30	10	1	2	0	0	1	2	16	111	18	19	1	9	8	38	204
16:45	7	1	2	0	1	0	5	16	159	30	18	1	12	14	56	290
17:00	14	0	1	0	1	1	2	19	120	21	20	1	12	6	59	239
17:15	13	4	1	0	1	1	8	28	100	34	9	1	14	6	103	267
17:30	8	1	0	0	0	1	2	12	130	36	19	0	12	11	108	316
17:45	7	1	0	0	0	2	2	12	141	32	15	1	12	8	124	333
18:00	8	5	2	0	0	1	3	19	126	38	12	4	9	13	99	301
18:15	10	3	0	0	0	0	5	18	156	45	15	2	10	10	105	343
18:30	9	2	1	0	0	1	4	17	161	49	12	1	13	5	61	302
18:45	5	1	1	0	0	2	1	10	145	29	7	1	15	3	50	250
25.75	337	143	75	12	9	26	65	667	3847	1208	622	71	535	200	1383	7866

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	C to D - R105(S) to R101(S)							Veh. Total	D to C - R101(S) to R105(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	7	1	5	1	1	0	0	15
07:15	0	0	0	0	0	0	0	0	11	2	1	1	0	0	0	15
07:30	0	0	0	0	0	0	0	0	8	2	3	1	0	0	0	14
07:45	0	0	0	0	0	0	0	0	6	1	5	0	1	0	0	13
08:00	0	0	0	0	0	0	0	0	4	1	2	0	3	0	1	11
08:15	0	0	0	0	0	0	0	0	5	2	2	2	1	0	0	12
08:30	0	0	0	0	0	0	0	0	8	0	0	0	5	0	0	13
08:45	0	0	0	0	0	0	0	0	10	7	1	1	0	0	0	19
09:00	0	0	0	0	0	0	0	0	9	0	0	1	0	1	0	11
09:15	0	0	0	0	0	0	0	0	16	2	1	1	1	0	0	21
09:30	0	0	0	0	0	0	0	0	6	1	4	1	0	1	1	14
09:45	0	0	0	0	0	0	0	0	10	2	3	0	2	1	2	20
10:00	0	0	0	0	0	0	0	0	3	2	6	2	0	0	2	15
10:15	0	0	0	0	0	0	0	0	7	2	4	0	0	0	0	13
10:30	0	0	0	0	0	0	0	0	16	3	4	1	0	1	1	26
10:45	0	0	0	0	0	0	0	0	4	1	6	1	1	1	0	14
11:00	0	0	0	0	0	0	0	0	10	5	6	0	1	0	0	22
11:15	0	0	0	0	0	0	0	0	5	5	8	1	0	0	1	20
11:30	0	0	0	0	0	0	0	0	6	2	2	0	1	0	0	11
11:45	0	0	0	0	0	0	0	0	3	4	6	1	0	0	1	15
12:00	0	0	0	0	0	0	0	0	9	2	1	1	1	0	1	15
12:15	0	0	0	0	0	0	0	0	9	3	1	0	0	0	1	14
12:30	0	0	0	0	0	0	0	0	9	2	7	1	0	0	1	20
12:45	0	0	0	0	0	0	0	0	9	0	5	2	2	0	1	19
13:00	0	0	0	0	0	0	0	0	14	1	4	1	2	0	2	24
13:15	0	0	0	0	0	0	0	0	12	3	4	0	0	0	0	19
13:30	0	0	0	0	0	0	0	0	8	1	7	0	0	1	2	19
13:45	0	0	0	0	0	0	0	0	6	2	7	0	1	0	0	16
14:00	0	0	0	0	0	0	0	0	6	0	5	0	0	0	0	11
14:15	0	0	0	0	0	0	0	0	8	1	0	1	0	0	3	13
14:30	0	0	0	0	0	0	0	0	8	2	0	0	0	0	0	10
14:45	0	0	0	0	0	0	0	0	5	1	3	0	1	1	0	11
15:00	0	0	0	0	0	0	1	1	8	3	3	0	0	0	1	15
15:15	0	0	0	0	0	0	0	0	10	2	4	0	0	0	1	17
15:30	0	0	0	0	0	0	0	0	5	1	3	0	0	1	2	12
15:45	0	0	0	0	0	0	0	0	7	0	2	0	1	1	1	12
16:00	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8
16:15	1	0	0	0	0	0	0	1	7	1	5	0	5	0	1	19
16:30	0	0	0	0	0	0	0	0	10	3	0	0	3	0	0	16
16:45	0	0	0	0	0	0	0	0	8	0	1	0	2	0	0	11
17:00	0	0	0	0	0	0	0	0	11	0	0	1	4	0	1	17
17:15	0	0	0	0	0	0	0	0	8	0	1	0	3	2	1	15
17:30	0	0	0	0	0	0	0	0	12	1	1	0	0	0	2	16
17:45	0	0	0	0	0	0	0	0	9	0	0	1	0	0	2	12
18:00	0	0	0	0	0	0	1	1	6	0	2	0	0	1	2	11
18:15	0	0	0	0	0	0	0	0	11	0	0	0	1	0	1	13
18:30	0	0	0	0	0	0	0	0	8	1	1	0	0	0	0	10
18:45	0	0	0	0	0	0	0	0	6	0	1	0	0	0	0	7
25.75	1	0	0	0	0	0	2	3	391	75	137	23	43	12	35	716

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	D to B - R101(S) to R101(N)							Veh. Total	D to A - R101(S) to R105(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	42	7	7	2	2	2	4	66	0	0	0	0	0	0	0	0
07:15	67	11	11	5	0	0	3	97	0	0	0	0	0	0	1	1
07:30	49	7	9	2	1	1	6	75	0	0	0	0	0	0	0	0
07:45	41	10	7	5	1	3	10	77	0	0	0	0	0	0	3	3
08:00	37	12	11	0	6	1	5	72	0	0	0	0	0	0	2	2
08:15	49	14	7	5	1	1	9	86	0	0	0	0	0	0	0	0
08:30	35	4	6	3	2	0	13	63	0	0	0	0	0	0	0	0
08:45	50	13	9	3	2	3	15	95	0	0	0	0	0	0	0	0
09:00	36	11	9	7	1	3	9	76	0	0	0	0	0	0	0	0
09:15	46	13	7	2	2	1	4	75	0	0	0	0	0	0	1	1
09:30	27	22	8	5	1	2	4	69	0	0	0	0	0	0	0	0
09:45	44	14	10	5	0	2	2	77	0	0	0	0	0	0	3	3
10:00	39	17	6	6	0	1	4	73	0	0	0	0	0	0	0	0
10:15	48	18	9	5	1	1	3	85	0	0	0	0	0	0	1	1
10:30	45	20	17	2	0	0	2	86	0	0	0	0	0	0	0	0
10:45	39	18	12	5	0	0	3	77	0	0	0	0	0	0	0	0
11:00	45	22	9	6	1	1	6	90	0	0	0	0	0	0	1	1
11:15	34	15	11	7	1	1	4	73	0	0	0	0	0	0	0	0
11:30	58	13	13	5	1	1	11	102	0	0	0	0	0	0	2	2
11:45	49	13	12	2	1	1	5	83	0	0	0	0	0	0	0	0
12:00	50	16	15	5	0	3	1	90	0	0	0	0	0	0	0	0
12:15	54	13	21	2	2	0	2	94	0	0	0	0	0	0	0	0
12:30	55	17	17	6	1	3	3	102	0	0	0	0	0	0	0	0
12:45	50	16	8	4	0	3	3	84	0	0	0	0	0	0	2	2
13:00	53	13	18	5	0	2	6	97	0	0	0	0	0	0	1	1
13:15	63	7	10	4	0	1	6	91	0	0	0	0	0	0	3	3
13:30	80	15	12	4	1	2	10	124	0	0	0	0	0	0	2	2
13:45	60	17	9	4	0	2	9	101	0	0	0	0	0	0	0	0
14:00	54	12	19	2	2	2	12	103	0	0	0	0	0	1	1	2
14:15	55	15	19	7	0	3	15	114	0	0	0	0	0	0	4	4
14:30	67	14	17	3	3	4	7	115	0	0	0	0	0	0	2	2
14:45	60	12	20	0	5	6	7	110	0	0	0	0	0	0	3	3
15:00	58	11	13	0	1	4	16	103	0	0	0	0	0	0	2	2
15:15	58	13	19	4	1	0	6	101	0	0	0	0	0	0	1	1
15:30	56	10	16	1	2	1	15	101	0	0	0	0	0	0	2	2
15:45	69	6	9	2	3	5	22	116	0	0	0	0	0	0	0	0
16:00	61	4	17	3	1	2	29	117	0	0	0	0	0	0	1	1
16:15	93	9	23	2	4	6	38	175	0	0	0	0	0	0	5	5
16:30	107	7	22	0	1	6	38	181	0	0	0	0	0	0	7	7
16:45	111	7	11	2	2	6	53	192	0	0	0	0	0	0	7	7
17:00	105	14	15	0	2	9	76	221	0	0	0	0	0	0	6	6
17:15	107	3	7	1	1	5	111	235	0	0	0	0	0	0	8	8
17:30	132	10	14	2	0	21	113	292	0	0	0	0	0	0	12	12
17:45	111	7	11	0	1	7	104	241	0	0	0	0	0	0	17	17
18:00	106	10	10	2	1	6	98	233	0	0	0	0	0	0	12	12
18:15	110	5	10	3	1	5	101	235	0	0	0	0	0	0	15	15
18:30	92	13	11	0	0	4	55	175	0	0	0	0	0	0	16	16
18:45	90	10	7	0	0	4	62	173	0	0	0	0	0	0	10	10
25.75	3047	580	590	150	59	147	1140	5713	0	0	0	0	0	1	153	154

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	To Arm A - R105(N)							Veh. Total	From Arm A - R105(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	51	14	14	3	9	0	3	94	222	32	36	6	8	5	41	350
07:15	42	9	8	4	10	1	14	88	198	35	31	4	13	10	58	349
07:30	60	18	6	4	9	3	19	119	202	33	33	3	7	10	85	373
07:45	49	14	11	2	11	0	26	113	170	41	38	4	14	14	120	401
08:00	65	20	10	5	12	1	31	144	173	50	19	4	14	21	124	405
08:15	54	15	9	2	9	3	26	118	147	53	20	1	18	24	192	455
08:30	60	28	8	3	15	5	24	143	158	65	19	3	12	18	239	514
08:45	41	19	3	0	12	1	23	99	164	71	17	2	17	27	235	533
09:00	50	23	10	6	11	0	14	114	174	77	19	6	22	15	157	470
09:15	52	28	11	2	13	2	14	122	148	74	32	3	18	11	110	396
09:30	42	20	10	3	19	4	15	113	164	82	29	5	13	15	86	394
09:45	46	24	7	2	13	2	12	106	174	63	37	7	13	4	48	346
10:00	62	31	19	4	11	2	10	139	153	74	34	2	14	8	32	317
10:15	50	18	9	6	19	6	5	113	131	52	23	8	11	5	23	253
10:30	56	40	18	3	9	4	6	136	147	46	27	8	10	6	31	275
10:45	72	28	18	4	11	3	1	137	138	52	35	3	11	6	33	278
11:00	63	37	20	9	8	2	7	146	102	44	32	3	5	3	23	212
11:15	71	29	32	5	11	4	8	160	121	43	20	9	13	3	16	225
11:30	72	23	14	3	9	2	9	132	122	44	38	1	10	8	31	254
11:45	67	33	21	3	9	4	11	148	113	37	20	4	8	8	20	210
12:00	82	33	15	2	13	5	12	162	123	40	26	3	11	3	15	221
12:15	81	32	21	5	16	4	18	177	116	29	24	1	13	9	23	215
12:30	73	34	20	3	9	0	26	165	118	36	25	7	6	5	21	218
12:45	105	37	12	6	8	3	18	189	114	39	24	2	10	9	32	230
13:00	106	15	15	4	10	8	24	182	93	24	22	3	13	3	28	186
13:15	83	35	21	2	12	6	20	179	112	37	26	0	5	5	19	204
13:30	110	33	17	7	5	4	24	200	121	38	25	7	19	6	17	233
13:45	107	33	20	3	14	3	18	198	114	37	21	0	13	2	21	208
14:00	117	25	21	3	9	5	21	201	125	33	18	3	16	6	23	224
14:15	114	21	14	1	10	2	27	189	121	42	19	2	8	5	19	216
14:30	100	25	20	3	11	6	19	184	95	39	16	3	11	6	17	187
14:45	121	30	27	4	8	7	33	230	94	30	15	3	11	2	14	169
15:00	127	35	28	2	11	5	23	231	94	37	14	3	14	5	11	178
15:15	136	35	32	1	16	5	22	247	116	60	14	4	6	5	20	225
15:30	158	27	30	2	6	4	22	249	132	32	12	2	15	6	14	213
15:45	163	26	34	0	16	7	35	281	109	42	23	0	15	5	20	214
16:00	177	27	29	1	8	7	31	280	111	38	17	2	8	4	13	193
16:15	184	31	27	1	12	14	50	319	137	30	22	2	15	3	31	240
16:30	149	20	28	1	9	11	52	270	117	37	24	0	12	5	15	210
16:45	199	31	25	1	13	16	74	359	137	36	22	1	10	2	29	237
17:00	159	24	25	1	13	9	74	305	122	31	13	0	16	4	40	226
17:15	151	39	16	1	14	9	121	351	148	37	8	0	10	7	41	251
17:30	171	39	23	0	12	17	126	388	99	50	7	2	12	5	48	223
17:45	177	35	18	2	12	9	151	404	127	31	13	3	11	5	39	229
18:00	158	39	13	4	11	15	120	360	125	44	11	1	10	3	36	230
18:15	181	47	16	3	11	13	131	402	126	55	12	0	13	3	38	247
18:30	183	52	14	1	13	9	93	365	132	62	6	2	15	1	31	249
18:45	166	30	10	1	15	4	69	295	136	56	13	2	10	3	25	245
25.75	4963	1361	849	138	547	256	1732	9846	6435	2170	1051	144	579	348	2404	13131

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	To Arm B - R101(N)							Veh. Total	From Arm B - R101(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	45	10	8	2	2	2	4	73	159	6	50	8	1	1	36	261
07:15	72	13	11	5	0	0	4	105	144	11	43	8	0	3	46	255
07:30	55	9	10	2	1	1	7	85	156	4	26	4	1	8	57	256
07:45	47	10	8	5	1	3	11	85	176	7	27	2	1	6	67	286
08:00	42	12	13	0	6	1	6	80	139	9	21	5	0	5	61	240
08:15	59	17	8	5	1	1	9	100	151	14	23	8	1	11	94	302
08:30	41	5	7	3	2	0	13	71	147	8	16	2	2	15	119	309
08:45	55	16	9	3	2	4	16	105	153	14	14	3	0	15	129	328
09:00	41	12	10	8	1	3	11	86	143	17	25	8	1	9	85	288
09:15	51	16	7	3	3	1	5	86	116	25	25	6	0	6	58	236
09:30	29	28	8	5	1	2	5	78	107	23	33	9	0	8	33	213
09:45	45	16	10	5	0	2	4	82	101	24	20	5	1	6	28	185
10:00	46	22	12	6	0	1	4	91	94	25	35	6	1	4	11	176
10:15	57	25	9	6	2	1	3	103	92	29	32	15	0	6	8	182
10:30	51	24	17	2	0	0	3	97	73	31	35	11	1	4	8	163
10:45	43	21	14	5	0	0	4	87	97	25	38	7	2	3	10	182
11:00	53	28	10	6	1	2	6	106	83	17	30	9	3	0	7	149
11:15	38	21	12	7	1	1	4	84	97	24	39	9	2	3	12	186
11:30	61	15	16	5	1	3	14	115	99	23	29	11	1	3	10	176
11:45	58	17	12	3	1	2	7	100	84	21	35	10	3	4	8	165
12:00	60	23	18	5	0	6	2	114	106	20	21	3	0	2	9	161
12:15	63	17	22	3	2	0	2	109	90	28	24	10	3	3	12	170
12:30	58	20	24	6	1	5	4	118	84	29	35	9	1	3	13	174
12:45	54	20	8	5	1	3	3	94	89	21	19	5	2	4	9	149
13:00	61	14	20	6	1	2	6	110	105	39	27	7	1	4	7	190
13:15	70	10	15	4	0	1	6	106	89	18	30	7	0	1	6	151
13:30	86	15	13	4	1	2	11	132	87	34	18	9	2	3	7	160
13:45	62	20	11	5	0	3	10	111	107	29	33	7	5	3	15	199
14:00	63	16	20	2	2	2	16	121	100	29	31	8	0	5	10	183
14:15	66	22	22	8	1	3	17	139	100	26	21	4	3	2	9	165
14:30	77	16	22	5	4	4	7	135	93	24	26	5	2	1	10	161
14:45	67	17	21	1	5	6	7	124	116	27	20	8	2	5	15	193
15:00	67	11	15	1	1	4	16	115	76	23	29	5	4	4	6	147
15:15	65	18	21	4	2	4	6	120	98	16	19	8	3	4	16	164
15:30	65	12	18	1	2	1	16	115	127	21	19	2	2	4	18	193
15:45	78	10	10	2	3	5	22	130	98	35	23	3	3	2	15	179
16:00	71	6	20	3	1	2	31	134	111	18	18	3	1	3	7	161
16:15	100	14	26	2	4	7	41	194	103	15	14	1	1	7	12	153
16:30	117	8	24	0	1	7	40	197	124	24	26	2	1	6	24	207
16:45	118	8	13	2	3	6	58	208	119	18	18	1	3	6	25	190
17:00	119	14	16	0	3	10	78	240	109	19	22	1	5	6	28	190
17:15	120	7	8	1	2	6	119	263	132	18	16	1	3	6	24	200
17:30	140	11	14	2	0	22	115	304	98	19	17	0	3	10	24	171
17:45	118	8	11	0	1	9	107	254	129	20	8	3	1	5	19	185
18:00	114	15	12	2	1	7	101	252	91	21	8	2	4	6	25	157
18:15	120	8	10	3	1	5	106	253	127	18	10	3	5	4	13	180
18:30	101	15	12	0	0	5	59	192	88	26	10	0	3	8	24	159
18:45	95	11	8	0	0	6	63	183	83	19	8	0	0	2	17	129
25.75	3384	723	665	163	69	173	1209	6386	5290	1011	1166	263	84	239	1306	9359

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	To Arm C - R105(S)							Veh.	From Arm C - R105(S)							Veh.
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C	Total	CAR	TAXI	LGV	HGV	PSV	M/C	P/C	Total
07:00	255	32	51	7	10	5	32	392	49	16	13	0	9	0	2	89
07:15	240	39	39	6	13	7	38	382	42	10	5	2	10	1	14	84
07:30	236	35	35	3	8	9	55	381	62	20	6	4	9	2	15	118
07:45	224	44	41	3	16	14	81	423	48	11	9	2	11	0	20	101
08:00	201	53	25	3	17	21	90	410	67	17	7	1	12	1	27	132
08:15	177	52	30	3	20	17	117	416	58	16	7	1	9	3	20	114
08:30	181	61	16	3	19	19	182	481	58	26	6	2	15	5	21	133
08:45	189	76	18	4	17	27	176	507	32	18	3	0	12	2	23	90
09:00	206	81	20	5	22	16	128	478	45	21	8	3	11	0	13	101
09:15	176	85	39	5	19	10	95	429	43	25	7	1	14	1	12	103
09:30	192	90	44	6	13	16	74	435	33	22	4	0	19	3	16	97
09:45	197	71	36	6	14	5	45	374	35	25	4	0	13	2	9	88
10:00	166	84	42	7	15	8	27	349	51	35	18	2	11	1	10	128
10:15	146	62	30	4	11	4	20	277	45	25	6	3	20	3	4	106
10:30	163	66	38	10	10	8	26	321	50	41	15	1	9	4	5	125
10:45	156	59	46	4	13	5	32	315	54	27	13	4	10	3	1	112
11:00	114	49	38	3	8	2	17	231	56	42	12	6	8	3	6	133
11:15	129	60	31	10	14	5	16	265	42	31	19	1	10	4	6	113
11:30	135	52	41	3	10	8	24	273	51	21	15	0	9	4	7	107
11:45	115	49	29	6	9	7	21	236	60	34	16	2	9	5	10	136
12:00	129	46	31	3	12	2	14	237	61	36	16	1	13	7	12	146
12:15	129	47	23	2	15	6	20	242	67	30	18	2	15	3	14	149
12:30	120	42	35	11	7	7	21	243	65	34	22	1	9	2	20	153
12:45	121	41	35	3	12	9	28	249	82	37	9	3	9	2	13	155
13:00	118	45	31	7	15	3	31	250	88	14	11	4	11	6	21	155
13:15	118	42	31	2	5	5	17	220	72	32	17	0	12	6	15	154
13:30	123	49	37	7	19	7	17	259	91	23	16	3	5	2	20	160
13:45	135	41	36	1	16	1	18	248	86	29	14	4	14	3	14	164
14:00	128	40	24	5	16	7	14	234	94	22	15	1	9	3	20	164
14:15	133	55	19	4	7	5	20	243	103	25	14	2	10	2	21	177
14:30	92	51	25	3	13	6	13	203	74	23	21	4	12	5	14	153
14:45	108	38	18	4	11	5	13	197	93	31	20	4	8	5	27	188
15:00	103	46	21	3	16	5	10	204	112	34	24	2	10	3	20	205
15:15	134	58	22	7	7	7	21	256	115	36	27	1	17	8	18	222
15:30	143	35	15	2	16	5	18	234	123	28	25	1	6	2	17	202
15:45	119	52	27	1	16	6	16	237	135	25	28	0	13	7	30	238
16:00	118	38	18	2	8	5	10	199	144	26	27	1	8	6	30	242
16:15	132	30	26	3	20	3	29	243	159	32	24	1	12	13	45	286
16:30	119	49	24	0	15	4	14	225	121	19	21	1	9	9	40	220
16:45	140	37	21	1	13	3	24	239	166	31	20	1	13	14	61	306
17:00	136	35	13	1	20	3	42	250	134	21	21	1	13	7	61	258
17:15	145	39	11	0	16	8	35	254	113	38	10	1	15	7	111	295
17:30	103	51	10	2	13	4	47	230	138	37	19	0	12	12	110	328
17:45	134	33	8	3	12	6	37	233	148	33	15	1	12	10	126	345
18:00	122	48	15	1	11	6	35	238	134	43	14	4	9	14	103	321
18:15	133	56	12	1	17	3	38	260	166	48	15	2	10	10	110	361
18:30	137	70	7	2	17	1	30	264	170	51	13	1	13	6	65	319
18:45	138	60	12	2	10	2	25	249	150	30	8	1	15	5	51	260
25.75	7108	2474	1296	184	653	347	1953	14015	4185	1351	697	83	544	226	1450	8536

Site No. 1
Location R105(N) / R101(N) / R105(S) / R101(S)
Date 04 October 2018

Time	To Arm D - R101(S)							Veh. Total	From Arm D - R101(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	128	6	38	5	0	1	44	222	49	8	12	3	3	2	4	81
07:15	108	8	33	5	0	6	66	226	78	13	12	6	0	0	4	113
07:30	126	4	26	5	0	8	82	251	57	9	12	3	1	1	6	89
07:45	121	2	26	3	0	6	102	260	47	11	12	5	2	3	13	93
08:00	112	4	12	2	0	5	93	228	41	13	13	0	9	1	8	85
08:15	120	15	12	7	0	18	163	335	54	16	9	7	2	1	9	98
08:30	124	9	16	1	0	14	173	337	43	4	6	3	7	0	13	76
08:45	124	12	14	2	0	15	187	354	60	20	10	4	2	3	15	114
09:00	110	10	21	6	1	9	111	268	45	11	9	8	1	4	9	87
09:15	90	10	15	3	0	6	71	195	62	15	8	3	3	1	5	97
09:30	74	12	16	6	0	7	46	161	33	23	12	6	1	3	5	83
09:45	76	17	21	4	2	6	31	157	54	16	13	5	2	3	7	100
10:00	66	16	26	1	0	3	18	130	42	19	12	8	0	1	6	88
10:15	70	21	26	15	0	4	11	147	55	20	13	5	1	1	4	99
10:30	61	11	25	8	1	3	12	121	61	23	21	3	0	1	3	112
10:45	61	15	26	7	0	5	10	124	43	19	18	6	1	1	3	91
11:00	66	16	21	6	1	1	13	124	55	27	15	6	2	1	7	113
11:15	61	8	22	5	0	1	11	108	39	20	19	8	1	1	5	93
11:30	68	13	26	6	2	3	14	132	64	15	15	5	2	1	13	115
11:45	69	10	27	7	2	5	5	125	52	17	18	3	1	1	6	98
12:00	78	12	15	3	0	2	10	120	59	18	16	6	1	3	2	105
12:15	63	7	22	5	0	5	12	114	63	16	22	2	2	0	3	108
12:30	80	22	27	4	0	1	7	141	64	19	24	7	1	3	4	122
12:45	64	15	10	2	2	3	11	107	59	16	13	6	2	3	6	105
13:00	68	17	16	3	1	2	4	111	67	14	22	6	2	2	9	122
13:15	77	10	20	3	0	1	6	117	75	10	14	4	0	1	9	113
13:30	68	14	11	5	2	1	6	107	88	16	19	4	1	3	14	145
13:45	69	20	17	6	3	3	13	131	66	19	16	4	1	2	9	117
14:00	71	15	23	4	0	3	15	131	60	12	24	2	2	3	13	116
14:15	74	11	18	3	3	2	7	118	63	16	19	8	0	3	22	131
14:30	68	10	13	4	0	0	11	106	75	16	17	3	3	4	9	127
14:45	72	16	12	6	3	1	13	123	65	13	23	0	6	7	10	124
15:00	51	16	19	4	1	2	7	100	66	14	16	0	1	4	19	120
15:15	62	16	8	5	2	1	13	107	68	15	23	4	1	0	8	119
15:30	77	18	12	1	1	4	12	125	61	11	19	1	2	2	19	115
15:45	58	20	14	2	0	2	15	111	76	6	11	2	4	6	23	128
16:00	69	15	12	3	1	1	8	109	69	4	17	3	1	2	30	126
16:15	83	12	9	0	1	5	12	122	100	10	28	2	9	6	44	199
16:30	94	13	17	2	1	4	18	149	117	10	22	0	4	6	45	204
16:45	84	16	13	1	1	3	19	137	119	7	12	2	4	6	60	210
17:00	67	12	17	1	4	4	18	123	116	14	15	1	6	9	83	244
17:15	92	11	7	1	0	4	21	136	115	3	8	1	4	7	120	258
17:30	65	16	11	0	2	5	21	120	144	11	15	2	0	21	127	320
17:45	95	15	10	3	0	3	12	138	120	7	11	1	1	7	123	270
18:00	68	16	5	2	1	2	20	114	112	10	12	2	1	7	112	256
18:15	106	15	9	1	1	1	3	136	121	5	10	3	2	5	117	263
18:30	69	16	8	0	1	4	9	107	100	14	12	0	0	4	71	201
18:45	66	14	7	0	0	2	8	97	96	10	8	0	0	4	72	190
25.75	3893	629	831	178	40	197	1594	7362	3438	655	727	173	102	160	1328	#REF!

Site No. 2
Location R105(N) / Talbot Street / R105(S)
Date 04 October 2018

Time	A to C - R105(N) to R105(S)							Veh.	A to B - R105(N) to Talbot Street							Veh.
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C	Total	CAR	TAXI	LGV	HGV	PSV	M/C	P/C	Total
07:00	248	16	53	4	6	4	25	356	10	3	6	1	4	0	2	26
07:15	220	21	36	3	5	5	38	328	14	6	3	2	13	0	0	38
07:30	219	30	38	0	8	7	42	344	10	5	3	1	4	0	8	31
07:45	184	19	32	3	5	10	59	312	8	10	4	0	11	5	14	52
08:00	185	33	29	1	11	14	74	347	10	9	1	2	11	5	7	45
08:15	173	35	32	2	12	9	88	351	7	8	3	1	13	2	21	55
08:30	177	50	23	3	10	13	162	438	8	5	1	1	10	1	12	38
08:45	159	55	20	2	15	23	149	423	21	13	5	0	10	3	24	76
09:00	153	71	17	1	15	14	107	378	21	8	4	3	9	1	20	66
09:15	139	60	29	6	8	8	74	324	20	9	4	1	15	1	14	64
09:30	180	73	32	1	12	16	57	371	13	16	9	1	8	1	9	57
09:45	160	66	30	6	9	4	46	321	15	14	4	1	13	1	7	55
10:00	146	65	24	5	12	7	20	279	17	13	10	2	11	0	2	55
10:15	116	88	32	3	9	4	17	269	16	10	9	0	9	0	4	48
10:30	133	60	27	3	3	5	17	248	14	10	7	3	12	0	6	52
10:45	123	47	36	5	8	4	22	245	16	16	4	1	9	1	3	50
11:00	102	43	32	2	4	2	14	199	10	11	3	0	7	0	4	35
11:15	99	48	24	6	8	6	16	207	22	6	10	2	12	0	4	56
11:30	105	40	33	3	7	3	19	210	15	15	4	0	8	4	4	50
11:45	92	45	23	3	5	4	17	189	19	8	4	2	11	2	5	51
12:00	118	62	28	1	4	2	13	228	13	6	6	1	8	1	3	38
12:15	105	44	14	2	10	7	14	196	14	10	6	1	11	0	2	44
12:30	104	36	21	8	2	7	20	198	15	10	13	2	8	1	5	54
12:45	95	61	26	3	12	6	15	218	15	12	5	0	7	1	8	48
13:00	75	44	25	5	10	3	17	179	20	3	6	0	9	1	6	45
13:15	92	40	18	1	7	5	13	176	13	13	10	1	6	1	5	49
13:30	93	34	26	7	10	5	10	185	20	9	7	0	9	0	6	51
13:45	94	43	20	4	11	1	14	187	14	8	13	0	3	1	3	42
14:00	100	37	21	3	10	5	17	193	18	8	5	1	12	0	2	46
14:15	97	48	20	3	6	5	16	195	9	4	2	0	8	1	4	28
14:30	77	37	15	2	8	6	14	159	14	5	4	1	7	1	2	34
14:45	71	40	20	4	5	3	10	153	18	13	1	1	5	1	5	44
15:00	77	41	17	1	9	6	5	156	10	8	2	0	11	0	3	34
15:15	117	46	14	4	7	3	14	205	12	6	6	2	8	0	6	40
15:30	94	34	12	3	7	4	10	164	15	9	3	0	14	1	2	44
15:45	93	45	22	0	7	3	18	188	14	17	6	0	11	1	4	53
16:00	92	33	13	2	3	4	6	153	28	9	9	1	8	1	5	61
16:15	103	38	21	1	12	3	23	201	16	5	3	1	14	0	4	43
16:30	97	47	19	0	9	5	7	184	24	6	3	0	12	1	6	52
16:45	107	36	14	1	5	3	26	192	14	5	5	0	13	0	5	42
17:00	110	27	9	0	14	2	41	203	22	7	3	0	11	2	8	53
17:15	119	37	5	1	8	7	34	211	15	5	4	0	11	0	8	43
17:30	80	39	7	3	10	3	42	184	28	13	2	0	11	0	7	61
17:45	94	32	6	1	4	5	30	172	22	9	2	1	11	0	9	54
18:00	114	44	6	1	9	4	33	211	21	10	3	0	9	1	5	49
18:15	115	45	11	1	8	3	34	217	23	12	0	0	13	0	5	53
18:30	121	59	5	1	6	1	22	215	21	14	0	1	12	0	9	57
18:45	116	46	13	2	6	2	21	206	19	7	0	0	4	0	6	36
Total	5883	2140	1050	127	391	275	1602	11468	773	438	227	38	466	43	313	2298

Site No. 2
Location R105(N) / Talbot Street / R105(S)
Date 04 October 2018

Time	B to A - Talbot Street to R105(N)							Veh. Total	B to C - Talbot Street to R105(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
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	3	3	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	2
08:15	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
08:30	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
08:45	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
09:15	0	0	0	0	0	0	1	1	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	2	2	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	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	1	1	0	0	0	0	0	0	2	2
10:45	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	2	2
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	1	1	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
12:00	0	0	0	0	0	0	2	2	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	1	1
13:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
13:30	0	0	0	0	0	0	2	2	0	0	0	0	0	0	1	1
13:45	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	3	3	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	1	1	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	2	2	0	0	0	0	0	0	1	1
15:00	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
15:15	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
16:15	0	0	0	0	0	0	10	10	0	0	0	0	0	0	2	2
16:30	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	2	2	0	0	0	0	0	0	3	3
17:00	0	0	0	0	0	0	5	5	0	0	0	0	0	0	1	1
17:15	0	0	0	0	0	0	8	8	0	0	0	0	0	0	1	1
17:30	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
18:00	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	7	7	0	0	0	0	0	0	2	2
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
18:45	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
25.75	0	0	0	0	0	0	85	85	0	0	0	0	0	0	35	35

Site No. 2
Location R105(N) / Talbot Street / R105(S)
Date 04 October 2018

Time	C to B - R105(S) to Talbot Street							Veh. Total	C to A - R105(S) to R105(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	5	7	2	0	0	0	4	18	66	3	9	0	13	0	5	96
07:15	2	6	2	1	0	1	1	13	58	9	10	2	11	2	11	103
07:30	7	1	1	1	0	2	3	15	67	22	11	1	12	2	14	129
07:45	2	1	2	1	1	0	3	10	51	16	11	2	11	0	18	109
08:00	3	2	4	2	0	0	1	12	68	19	10	1	11	1	24	134
08:15	5	3	3	3	1	3	3	21	63	19	9	0	17	2	14	124
08:30	3	3	3	2	1	2	5	19	58	28	6	1	14	6	25	138
08:45	6	5	5	1	0	0	6	23	38	17	3	0	15	3	24	100
09:00	4	4	1	2	2	0	4	17	47	29	8	3	13	0	15	115
09:15	5	6	0	3	2	3	2	21	45	31	7	1	19	1	14	118
09:30	5	1	1	0	1	0	3	11	36	23	4	0	20	3	18	104
09:45	8	8	2	0	0	0	3	21	52	41	7	1	14	3	10	128
10:00	16	2	0	1	1	1	2	23	53	49	17	3	13	1	7	143
10:15	7	7	2	2	0	0	1	19	70	49	9	2	24	4	8	166
10:30	1	5	5	0	1	0	3	15	52	47	16	2	9	3	6	135
10:45	4	7	6	0	1	0	1	19	58	38	15	4	10	3	2	130
11:00	4	8	4	0	0	0	1	17	61	51	14	7	9	2	6	150
11:15	6	5	6	0	1	1	0	19	56	42	15	1	12	4	5	135
11:30	6	3	3	2	0	0	0	14	58	34	19	2	13	3	5	134
11:45	4	9	0	0	1	0	2	16	72	36	20	2	13	6	13	162
12:00	6	6	5	2	0	1	0	20	68	49	22	3	14	3	10	169
12:15	2	8	1	0	1	0	2	14	70	44	20	2	18	2	13	169
12:30	3	7	3	0	0	0	1	14	66	39	19	2	9	1	19	155
12:45	5	8	3	1	0	0	2	19	89	37	15	7	11	1	13	173
13:00	6	6	3	0	0	0	4	19	100	32	12	3	15	7	12	181
13:15	7	8	3	0	1	1	3	23	85	39	16	2	12	6	14	174
13:30	10	4	1	0	0	0	1	16	98	26	25	3	7	3	15	177
13:45	9	7	2	0	1	0	0	19	94	37	17	5	17	2	13	185
14:00	11	6	1	1	0	0	2	21	114	31	15	0	11	4	22	197
14:15	2	8	2	1	1	0	3	17	110	29	14	2	12	4	15	186
14:30	3	11	3	1	0	0	2	20	83	36	23	6	12	2	14	176
14:45	3	7	5	0	1	0	1	17	109	46	22	3	13	6	24	223
15:00	5	3	2	1	1	1	0	13	134	39	21	1	7	1	18	221
15:15	7	6	2	0	0	1	0	16	117	47	28	1	21	6	18	238
15:30	6	5	1	1	0	1	1	15	136	36	35	0	8	7	19	241
15:45	7	3	1	0	2	1	3	17	151	28	24	3	16	5	19	246
16:00	4	2	0	0	0	0	2	8	146	29	34	1	6	5	31	252
16:15	1	11	0	0	0	0	3	15	180	42	24	1	14	13	40	314
16:30	8	9	1	0	1	0	4	23	183	33	24	2	10	9	45	306
16:45	9	13	1	0	0	2	3	28	183	40	21	1	15	14	57	331
17:00	6	6	1	0	0	0	4	17	152	40	29	1	13	7	52	294
17:15	6	7	1	0	0	2	7	23	155	41	14	1	19	7	108	345
17:30	7	8	1	0	0	0	4	20	172	44	15	0	15	11	103	360
17:45	6	3	2	0	1	0	8	20	184	37	15	2	11	11	116	376
18:00	2	1	1	0	0	1	14	19	173	48	19	0	13	14	104	371
18:15	7	8	0	0	0	0	8	23	186	54	18	1	17	11	98	385
18:30	6	8	1	1	0	0	2	18	199	54	16	0	13	8	65	355
18:45	8	6	1	0	1	0	4	20	164	33	9	0	16	6	47	275
25.75	265	278	100	30	24	24	136	857	4830	1693	786	88	638	225	1368	9628

Site No. 2
Location R105(N) / Talbot Street / R105(S)
Date 04 October 2018

Time	To Arm A - R105(N)							Veh. Total	From Arm A - R105(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	66	3	9	0	13	0	5	96	258	19	59	5	10	4	27	382
07:15	58	9	10	2	11	2	11	103	234	27	39	5	18	5	38	366
07:30	67	22	11	1	12	2	14	129	229	35	41	1	12	7	50	375
07:45	51	16	11	2	11	0	21	112	192	29	36	3	16	15	73	364
08:00	68	19	10	1	11	1	25	135	195	42	30	3	22	19	81	392
08:15	63	19	9	0	17	2	16	126	180	43	35	3	25	11	109	406
08:30	58	28	6	1	14	6	26	139	185	55	24	4	20	14	174	476
08:45	38	17	3	0	15	3	26	102	180	68	25	2	25	26	173	499
09:00	47	29	8	3	13	0	17	117	174	79	21	4	24	15	127	444
09:15	45	31	7	1	19	1	15	119	159	69	33	7	23	9	88	388
09:30	36	23	4	0	20	3	18	104	193	89	41	2	20	17	66	428
09:45	52	41	7	1	14	3	12	130	175	80	34	7	22	5	53	376
10:00	53	49	17	3	13	1	7	143	163	78	34	7	23	7	22	334
10:15	70	49	9	2	24	4	8	166	132	98	41	3	18	4	21	317
10:30	52	47	16	2	9	3	7	136	147	70	34	6	15	5	23	300
10:45	58	38	15	4	10	3	2	130	139	63	40	6	17	5	25	295
11:00	61	51	14	7	9	2	6	150	112	54	35	2	11	2	18	234
11:15	56	42	15	1	12	4	5	135	121	54	34	8	20	6	20	263
11:30	58	34	19	2	13	3	6	135	120	55	37	3	15	7	23	260
11:45	72	36	20	2	13	6	13	162	111	53	27	5	16	6	22	240
12:00	68	49	22	3	14	3	12	171	131	68	34	2	12	3	16	266
12:15	70	44	20	2	18	2	13	169	119	54	20	3	21	7	16	240
12:30	66	39	19	2	9	1	19	155	119	46	34	10	10	8	25	252
12:45	89	37	15	7	11	1	13	173	110	73	31	3	19	7	23	266
13:00	100	32	12	3	15	7	13	182	95	47	31	5	19	4	23	224
13:15	85	39	16	2	12	6	15	175	105	53	28	2	13	6	18	225
13:30	98	26	25	3	7	3	17	179	113	43	33	7	19	5	16	236
13:45	94	37	17	5	17	2	16	188	108	51	33	4	14	2	17	229
14:00	114	31	15	0	11	4	25	200	118	45	26	4	22	5	19	239
14:15	110	29	14	2	12	4	15	186	106	52	22	3	14	6	20	223
14:30	83	36	23	6	12	2	15	177	91	42	19	3	15	7	16	193
14:45	109	46	22	3	13	6	26	225	89	53	21	5	10	4	15	197
15:00	134	39	21	1	7	1	20	223	87	49	19	1	20	6	8	190
15:15	117	47	28	1	21	6	20	240	129	52	20	6	15	3	20	245
15:30	136	36	35	0	8	7	21	243	109	43	15	3	21	5	12	208
15:45	151	28	24	3	16	5	22	249	107	62	28	0	18	4	22	241
16:00	146	29	34	1	6	5	33	254	120	42	22	3	11	5	11	214
16:15	180	42	24	1	14	13	50	324	119	43	24	2	26	3	27	244
16:30	183	33	24	2	10	9	47	308	121	53	22	0	21	6	13	236
16:45	183	40	21	1	15	14	59	333	121	41	19	1	18	3	31	234
17:00	152	40	29	1	13	7	57	299	132	34	12	0	25	4	49	256
17:15	155	41	14	1	19	7	116	353	134	42	9	1	19	7	42	254
17:30	172	44	15	0	15	11	104	361	108	52	9	3	21	3	49	245
17:45	184	37	15	2	11	11	118	378	116	41	8	2	15	5	39	226
18:00	173	48	19	0	13	14	108	375	135	54	9	1	18	5	38	260
18:15	186	54	18	1	17	11	105	392	138	57	11	1	21	3	39	270
18:30	199	54	16	0	13	8	65	355	142	73	5	2	18	1	31	272
18:45	164	33	9	0	16	6	49	277	135	53	13	2	10	2	27	242
25.75	4830	1693	786	88	638	225	1453	9713	6656	2578	1277	165	857	318	1915	13766

Site No. 2
Location R105(N) / Talbot Street / R105(S)
Date 04 October 2018

Time	To Arm B - Talbot Street							Veh. Total	From Arm B - Talbot Street							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	15	10	8	1	4	0	6	44	0	0	0	0	0	0	1	1
07:15	16	12	5	3	13	1	1	51	0	0	0	0	0	0	1	1
07:30	17	6	4	2	4	2	11	46	0	0	0	0	0	0	0	0
07:45	10	11	6	1	12	5	17	62	0	0	0	0	0	0	3	3
08:00	13	11	5	4	11	5	8	57	0	0	0	0	0	0	3	3
08:15	12	11	6	4	14	5	24	76	0	0	0	0	0	0	4	4
08:30	11	8	4	3	11	3	17	57	0	0	0	0	0	0	2	2
08:45	27	18	10	1	10	3	30	99	0	0	0	0	0	0	2	2
09:00	25	12	5	5	11	1	24	83	0	0	0	0	0	0	4	4
09:15	25	15	4	4	17	4	16	85	0	0	0	0	0	0	1	1
09:30	18	17	10	1	9	1	12	68	0	0	0	0	0	0	0	0
09:45	23	22	6	1	13	1	10	76	0	0	0	0	0	0	2	2
10:00	33	15	10	3	12	1	4	78	0	0	0	0	0	0	1	1
10:15	23	17	11	2	9	0	5	67	0	0	0	0	0	0	0	0
10:30	15	15	12	3	13	0	9	67	0	0	0	0	0	0	3	3
10:45	20	23	10	1	10	1	4	69	0	0	0	0	0	0	0	0
11:00	14	19	7	0	7	0	5	52	0	0	0	0	0	0	2	2
11:15	28	11	16	2	13	1	4	75	0	0	0	0	0	0	0	0
11:30	21	18	7	2	8	4	4	64	0	0	0	0	0	0	1	1
11:45	23	17	4	2	12	2	7	67	0	0	0	0	0	0	0	0
12:00	19	12	11	3	8	2	3	58	0	0	0	0	0	0	2	2
12:15	16	18	7	1	12	0	4	58	0	0	0	0	0	0	0	0
12:30	18	17	16	2	8	1	6	68	0	0	0	0	0	0	0	0
12:45	20	20	8	1	7	1	10	67	0	0	0	0	0	0	1	1
13:00	26	9	9	0	9	1	10	64	0	0	0	0	0	0	1	1
13:15	20	21	13	1	7	2	8	72	0	0	0	0	0	0	2	2
13:30	30	13	8	0	9	0	7	67	0	0	0	0	0	0	3	3
13:45	23	15	15	0	4	1	3	61	0	0	0	0	0	0	3	3
14:00	29	14	6	2	12	0	4	67	0	0	0	0	0	0	3	3
14:15	11	12	4	1	9	1	7	45	0	0	0	0	0	0	0	0
14:30	17	16	7	2	7	1	4	54	0	0	0	0	0	0	1	1
14:45	21	20	6	1	6	1	6	61	0	0	0	0	0	0	3	3
15:00	15	11	4	1	12	1	3	47	0	0	0	0	0	0	4	4
15:15	19	12	8	2	8	1	6	56	0	0	0	0	0	0	2	2
15:30	21	14	4	1	14	2	3	59	0	0	0	0	0	0	2	2
15:45	21	20	7	0	13	2	7	70	0	0	0	0	0	0	3	3
16:00	32	11	9	1	8	1	7	69	0	0	0	0	0	0	4	4
16:15	17	16	3	1	14	0	7	58	0	0	0	0	0	0	12	12
16:30	32	15	4	0	13	1	10	75	0	0	0	0	0	0	2	2
16:45	23	18	6	0	13	2	8	70	0	0	0	0	0	0	5	5
17:00	28	13	4	0	11	2	12	70	0	0	0	0	0	0	6	6
17:15	21	12	5	0	11	2	15	66	0	0	0	0	0	0	9	9
17:30	35	21	3	0	11	0	11	81	0	0	0	0	0	0	1	1
17:45	28	12	4	1	12	0	17	74	0	0	0	0	0	0	4	4
18:00	23	11	4	0	9	2	19	68	0	0	0	0	0	0	4	4
18:15	30	20	0	0	13	0	13	76	0	0	0	0	0	0	9	9
18:30	27	22	1	2	12	0	11	75	0	0	0	0	0	0	2	2
18:45	27	13	1	0	5	0	10	56	0	0	0	0	0	0	2	2
25.75	1038	716	327	68	490	67	449	3155	0	0	0	0	0	0	120	120

Site No. 2
Location R105(N) / Talbot Street / R105(S)
Date 04 October 2018

Time	To Arm C - R105(S)							Veh. Total	From Arm C - R105(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	248	16	53	4	6	4	26	357	71	10	11	0	13	0	9	114
07:15	220	21	36	3	5	5	39	329	60	15	12	3	11	3	12	116
07:30	219	30	38	0	8	7	42	344	74	23	12	2	12	4	17	144
07:45	184	19	32	3	5	10	59	312	53	17	13	3	12	0	21	119
08:00	185	33	29	1	11	14	76	349	71	21	14	3	11	1	25	146
08:15	173	35	32	2	12	9	90	353	68	22	12	3	18	5	17	145
08:30	177	50	23	3	10	13	163	439	61	31	9	3	15	8	30	157
08:45	159	55	20	2	15	23	149	423	44	22	8	1	15	3	30	123
09:00	153	71	17	1	15	14	109	380	51	33	9	5	15	0	19	132
09:15	139	60	29	6	8	8	74	324	50	37	7	4	21	4	16	139
09:30	180	73	32	1	12	16	57	371	41	24	5	0	21	3	21	115
09:45	160	66	30	6	9	4	46	321	60	49	9	1	14	3	13	149
10:00	146	65	24	5	12	7	21	280	69	51	17	4	14	2	9	166
10:15	116	88	32	3	9	4	17	269	77	56	11	4	24	4	9	185
10:30	133	60	27	3	3	5	19	250	53	52	21	2	10	3	9	150
10:45	123	47	36	5	8	4	22	245	62	45	21	4	11	3	3	149
11:00	102	43	32	2	4	2	16	201	65	59	18	7	9	2	7	167
11:15	99	48	24	6	8	6	16	207	62	47	21	1	13	5	5	154
11:30	105	40	33	3	7	3	19	210	64	37	22	4	13	3	5	148
11:45	92	45	23	3	5	4	17	189	76	45	20	2	14	6	15	178
12:00	118	62	28	1	4	2	13	228	74	55	27	5	14	4	10	189
12:15	105	44	14	2	10	7	14	196	72	52	21	2	19	2	15	183
12:30	104	36	21	8	2	7	20	198	69	46	22	2	9	1	20	169
12:45	95	61	26	3	12	6	16	219	94	45	18	8	11	1	15	192
13:00	75	44	25	5	10	3	17	179	106	38	15	3	15	7	16	200
13:15	92	40	18	1	7	5	14	177	92	47	19	2	13	7	17	197
13:30	93	34	26	7	10	5	11	186	108	30	26	3	7	3	16	193
13:45	94	43	20	4	11	1	14	187	103	44	19	5	18	2	13	204
14:00	100	37	21	3	10	5	17	193	125	37	16	1	11	4	24	218
14:15	97	48	20	3	6	5	16	195	112	37	16	3	13	4	18	203
14:30	77	37	15	2	8	6	14	159	86	47	26	7	12	2	16	196
14:45	71	40	20	4	5	3	11	154	112	53	27	3	14	6	25	240
15:00	77	41	17	1	9	6	7	158	139	42	23	2	8	2	18	234
15:15	117	46	14	4	7	3	14	205	124	53	30	1	21	7	18	254
15:30	94	34	12	3	7	4	10	164	142	41	36	1	8	8	20	256
15:45	93	45	22	0	7	3	18	188	158	31	25	3	18	6	22	263
16:00	92	33	13	2	3	4	8	155	150	31	34	1	6	5	33	260
16:15	103	38	21	1	12	3	25	203	181	53	24	1	14	13	43	329
16:30	97	47	19	0	9	5	7	184	191	42	25	2	11	9	49	329
16:45	107	36	14	1	5	3	29	195	192	53	22	1	15	16	60	359
17:00	110	27	9	0	14	2	42	204	158	46	30	1	13	7	56	311
17:15	119	37	5	1	8	7	35	212	161	48	15	1	19	9	115	368
17:30	80	39	7	3	10	3	42	184	179	52	16	0	15	11	107	380
17:45	94	32	6	1	4	5	32	174	190	40	17	2	12	11	124	396
18:00	114	44	6	1	9	4	33	211	175	49	20	0	13	15	118	390
18:15	115	45	11	1	8	3	36	219	193	62	18	1	17	11	106	408
18:30	121	59	5	1	6	1	24	217	205	62	17	1	13	8	67	373
18:45	116	46	13	2	6	2	21	206	172	39	10	0	17	6	51	295
25.75	5883	2140	1050	127	391	275	1637	11503	5095	1971	886	118	662	#REF!	#REF!	#REF!

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	A to D - Oriel Street Lower to R101(S)							Veh. Total	A to C - Oriel Street Lower to Oriel Street Upper							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
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	1	0	0	0	0	0	1	2	0	0	1	0	0	0	0	1
08:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
08:15	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
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
09:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
09:15	1	0	0	0	0	0	1	2	0	0	1	0	0	0	0	1
09:30	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1
09:45	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1
10:00	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
10:15	1	0	0	0	0	0	1	2	0	0	0	0	0	0	1	1
10:30	1	0	0	1	0	0	1	3	0	1	0	0	0	0	0	1
10:45	2	0	0	0	0	0	0	2	1	0	0	0	0	0	1	2
11:00	1	0	0	1	0	0	1	3	0	0	0	0	0	0	0	0
11:15	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0
11:30	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
11:45	1	0	0	1	0	0	0	2	0	0	1	0	0	0	0	1
12:00	0	1	0	2	0	0	1	4	1	0	0	0	0	0	0	1
12:15	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12:30	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1
12:45	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
13:00	1	0	1	1	0	0	1	4	1	0	0	0	0	0	0	1
13:15	2	1	0	0	0	0	0	3	1	0	0	0	1	0	0	2
13:30	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
13:45	0	0	2	0	0	1	0	3	1	0	0	0	0	0	0	1
14:00	2	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0
14:15	3	0	1	0	0	0	0	4	0	0	0	1	0	0	0	1
14:30	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
14:45	0	0	0	0	0	0	1	1	1	0	0	0	0	0	3	4
15:00	1	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0
15:15	2	0	1	0	0	0	1	4	0	0	0	0	0	0	0	0
15:30	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
15:45	2	0	0	0	0	0	0	2	3	0	0	0	0	0	0	3
16:00	6	1	0	0	0	0	1	8	1	0	1	0	0	0	0	2
16:15	2	0	0	0	0	0	1	3	1	1	0	0	0	0	0	2
16:30	2	0	0	0	0	0	0	2	1	0	0	0	0	0	1	2
16:45	1	0	0	0	0	0	3	4	3	0	0	0	0	0	4	7
17:00	2	0	0	0	0	0	1	3	0	0	0	0	0	0	2	2
17:15	0	0	1	0	0	0	1	2	3	0	1	0	0	0	2	6
17:30	4	0	0	0	0	0	1	5	1	0	0	0	0	0	1	2
17:45	3	0	0	0	0	0	2	5	2	0	0	0	0	0	1	3
18:00	2	0	2	0	0	0	0	4	1	0	0	0	0	0	0	1
18:15	2	0	0	0	0	0	0	2	0	0	0	0	0	0	1	1
18:30	2	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1
18:45	3	0	0	0	0	0	0	3	2	0	0	0	0	0	1	3
Total	61	4	10	7	1	1	23	107	26	2	6	2	1	0	19	56

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	A to B - Oriel Street Lower to R101(N)							Veh. Total	B to A - R101(N) to Oriel Street Lower							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	1	0	0	0	0	1	4	0	0	1	0	0	0	5
07:15	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
07:30	1	0	0	0	0	0	0	1	2	0	1	0	0	0	0	3
07:45	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	2
08:00	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	2
08:15	1	0	0	2	0	0	0	3	2	0	0	0	0	0	0	2
08:30	1	0	0	0	0	0	0	1	2	0	0	0	0	1	1	4
08:45	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	2
09:00	0	0	0	0	0	0	0	0	2	0	1	0	1	0	0	4
09:15	0	0	0	0	1	0	0	1	4	0	2	0	0	0	0	6
09:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
09:45	2	0	0	0	0	0	0	2	3	1	2	1	1	0	0	8
10:00	2	0	1	1	0	0	0	4	1	0	1	1	0	0	0	3
10:15	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	3
10:30	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	6
10:45	2	0	0	0	0	0	0	2	0	0	1	1	0	0	0	2
11:00	0	1	1	0	0	0	0	2	1	0	0	0	0	0	0	1
11:15	0	0	1	0	0	0	0	1	1	0	1	1	0	0	1	4
11:30	3	0	0	0	0	0	1	4	2	0	1	1	0	0	1	5
11:45	1	0	0	0	0	0	0	1	4	0	0	0	0	0	0	4
12:00	1	0	0	0	0	0	1	2	4	1	2	0	0	0	0	7
12:15	2	0	2	1	0	0	0	5	3	0	0	0	0	0	0	3
12:30	0	1	1	0	0	0	0	2	3	0	0	0	0	0	0	3
12:45	1	0	0	0	0	0	0	1	3	0	0	1	0	0	3	7
13:00	3	0	0	0	0	0	0	3	3	1	0	0	0	0	1	5
13:15	4	1	0	0	0	0	0	5	3	0	1	0	0	0	0	4
13:30	3	0	0	0	0	0	0	3	4	0	2	0	0	0	0	6
13:45	1	1	0	0	0	0	0	2	1	1	3	1	0	1	0	7
14:00	1	0	0	0	0	0	1	2	3	1	0	0	0	0	0	4
14:15	4	1	0	0	0	0	0	5	6	0	1	0	0	0	1	8
14:30	2	0	1	0	0	0	0	3	2	0	2	0	0	0	0	4
14:45	3	0	1	0	0	0	0	4	2	0	0	2	0	0	1	5
15:00	3	1	0	0	0	0	1	5	0	1	0	0	0	1	0	2
15:15	2	0	0	0	0	0	0	2	4	0	0	0	0	0	1	5
15:30	2	0	1	0	0	0	0	3	2	0	1	0	0	0	0	3
15:45	1	0	0	0	0	0	2	3	3	0	0	0	0	0	0	3
16:00	0	0	0	0	0	0	0	0	1	2	0	1	0	0	1	5
16:15	3	0	0	0	0	0	0	3	4	0	3	0	0	0	2	9
16:30	5	0	0	0	0	0	0	5	2	0	0	0	0	0	1	3
16:45	1	0	0	0	0	0	0	1	2	0	2	0	0	0	1	5
17:00	5	0	1	0	0	1	1	8	1	0	0	0	0	0	0	1
17:15	2	0	0	0	0	0	0	2	4	0	0	0	0	0	1	5
17:30	2	0	1	0	0	0	0	3	2	0	2	0	0	0	1	5
17:45	2	0	0	0	0	0	0	2	3	1	0	0	0	0	2	6
18:00	2	2	0	0	0	0	0	4	2	1	0	0	0	0	0	3
18:15	2	0	0	0	0	0	0	2	7	0	1	0	0	0	0	8
18:30	3	0	0	0	0	0	0	3	2	0	0	0	0	0	0	2
18:45	3	0	0	0	0	0	0	3	5	1	1	0	0	0	0	7
25.75	78	8	12	4	1	1	8	112	119	12	35	13	2	3	20	204

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	B to D - R101(N) to R101(S)							Veh. Total	B to C - R101(N) to Oriel Street Upper							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	95	2	31	2	0	1	49	180	38	2	6	3	0	0	1	50
07:15	73	2	25	4	0	4	57	165	29	6	7	0	0	2	3	47
07:30	78	1	20	2	0	7	81	189	42	1	4	4	0	1	9	61
07:45	72	3	15	3	0	4	93	190	40	1	8	0	0	3	1	53
08:00	62	4	13	1	0	5	93	178	44	0	2	0	0	0	3	49
08:15	61	11	9	6	0	12	145	244	54	4	3	1	0	4	12	78
08:30	63	7	9	1	0	12	160	252	51	2	5	0	0	1	19	78
08:45	59	10	8	1	0	13	160	251	64	2	4	1	0	3	20	94
09:00	62	7	14	5	0	10	109	207	51	1	7	2	0	0	9	70
09:15	49	9	9	2	0	5	61	135	29	2	4	1	0	1	5	42
09:30	57	7	15	5	0	5	49	138	25	5	1	0	0	1	4	36
09:45	50	11	15	2	0	6	26	110	17	5	4	1	1	0	4	32
10:00	48	12	19	1	0	3	19	102	9	4	8	0	0	1	3	25
10:15	54	17	17	12	0	3	9	112	8	2	8	2	0	0	1	21
10:30	48	12	16	5	1	3	11	96	6	1	4	2	0	0	0	13
10:45	46	13	18	8	0	4	11	100	15	2	6	0	1	0	2	26
11:00	55	13	20	5	0	1	14	108	8	2	2	1	0	0	0	13
11:15	55	5	19	3	0	2	10	94	11	2	2	0	0	0	0	15
11:30	48	10	19	5	2	1	12	97	10	3	5	1	0	1	0	20
11:45	50	10	23	6	1	4	6	100	9	0	4	0	0	2	0	15
12:00	64	9	13	4	1	1	9	101	17	1	2	0	0	1	0	21
12:15	55	7	19	5	0	2	14	102	13	1	2	0	0	2	2	20
12:30	57	18	19	3	0	1	5	103	12	4	6	1	0	0	0	23
12:45	53	12	9	1	2	2	8	87	16	1	3	0	0	1	1	22
13:00	58	16	16	2	1	1	5	99	5	1	0	1	0	1	1	9
13:15	62	10	12	3	0	1	8	96	10	0	2	0	0	0	1	13
13:30	53	13	9	5	1	1	5	87	11	1	2	0	1	0	0	15
13:45	59	16	14	5	2	1	11	108	12	2	3	0	1	1	0	19
14:00	57	14	19	4	0	2	12	108	11	1	2	0	0	0	1	15
14:15	63	9	14	3	1	1	8	99	8	1	4	0	1	0	0	14
14:30	54	8	9	3	1	2	11	88	10	2	0	0	0	0	1	13
14:45	51	14	9	5	1	0	11	91	16	2	2	0	1	1	0	22
15:00	42	9	18	4	1	1	10	85	8	5	3	0	1	1	0	18
15:15	43	12	4	4	1	0	9	73	9	5	5	0	0	1	3	23
15:30	58	14	8	2	0	2	14	98	15	2	3	0	1	2	0	23
15:45	51	14	11	2	1	2	13	94	4	6	2	0	0	0	1	13
16:00	46	10	9	2	1	1	7	76	9	2	2	0	0	0	0	13
16:15	77	12	5	0	1	5	17	117	17	2	2	0	0	0	0	21
16:30	78	11	15	3	1	3	13	124	12	4	2	0	0	2	0	20
16:45	71	12	8	1	0	2	15	109	12	4	3	0	0	0	1	20
17:00	53	7	17	1	3	3	13	97	15	4	1	0	1	0	1	22
17:15	74	8	6	1	1	3	19	112	18	2	2	0	0	2	2	26
17:30	44	9	7	0	1	5	20	86	20	6	1	0	1	2	1	31
17:45	78	10	7	2	0	2	13	112	15	6	2	0	0	0	1	24
18:00	57	15	2	3	1	3	9	90	11	3	0	0	0	0	1	15
18:15	84	11	7	0	1	4	3	110	18	5	2	1	0	0	0	26
18:30	57	13	7	0	1	2	10	90	10	6	2	0	0	1	0	19
18:45	58	13	3	0	0	0	10	84	7	1	3	0	0	0	1	12
25.75	2842	492	630	147	28	158	1477	5774	901	127	157	22	10	38	115	1370

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	C to B - Oriel Street Upper to R101(N)							Veh. Total	C to A - Oriel Street Upper to Oriel Street Lower							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	5	0	2	1	1	0	0	9	0	0	1	0	0	0	0	1
07:15	7	4	2	0	0	0	0	13	0	0	0	0	0	0	0	0
07:30	9	1	2	0	0	0	0	12	1	0	0	0	0	0	2	3
07:45	5	1	4	1	1	0	0	12	1	0	0	0	0	0	0	1
08:00	4	2	3	0	0	0	0	9	0	0	0	0	0	0	0	0
08:15	6	7	0	0	0	0	0	13	0	0	0	1	0	0	0	1
08:30	6	3	1	0	0	0	1	11	0	0	0	0	0	0	0	0
08:45	10	3	2	0	0	1	0	16	0	0	0	0	0	0	0	0
09:00	10	5	3	0	1	0	2	21	2	0	0	0	0	1	0	3
09:15	8	1	3	2	0	0	0	14	2	0	0	0	0	0	0	2
09:30	3	4	3	0	0	0	0	10	0	0	0	0	0	0	0	0
09:45	10	1	2	0	0	0	0	13	0	0	0	0	0	0	0	0
10:00	4	0	2	1	0	0	1	8	0	0	0	0	0	0	0	0
10:15	3	4	2	0	1	0	1	11	1	0	0	0	0	0	1	2
10:30	6	5	3	1	0	0	0	15	0	1	0	0	0	0	1	2
10:45	2	6	5	1	1	0	0	15	0	0	0	1	0	0	0	1
11:00	7	4	1	0	0	0	0	12	1	2	1	0	0	0	0	4
11:15	11	5	1	2	0	1	0	20	1	0	0	0	0	0	0	1
11:30	6	3	3	1	0	0	3	16	1	0	0	0	0	0	0	1
11:45	7	6	2	0	0	1	0	16	1	0	0	0	0	0	1	2
12:00	8	5	5	1	0	0	0	19	0	0	0	0	0	0	0	0
12:15	14	5	3	0	0	0	0	22	0	0	0	0	0	0	0	0
12:30	16	1	4	1	0	1	0	23	0	0	0	0	0	0	0	0
12:45	6	5	0	0	0	0	1	12	0	0	0	0	0	0	0	0
13:00	10	2	1	1	0	1	0	15	0	0	0	0	1	0	0	1
13:15	13	1	3	1	0	0	1	19	3	2	0	0	0	0	0	5
13:30	16	2	5	1	0	0	0	24	0	0	0	0	0	0	0	0
13:45	15	5	1	0	0	0	0	21	0	0	0	1	0	0	0	1
14:00	18	2	3	0	0	1	1	25	0	0	1	0	0	0	0	1
14:15	11	4	6	0	0	0	0	21	0	0	1	0	0	0	2	3
14:30	15	2	6	0	0	0	2	25	1	0	0	0	0	0	2	3
14:45	9	2	3	0	0	0	0	14	0	0	0	0	0	0	0	0
15:00	14	4	4	0	0	0	1	23	1	0	0	0	0	0	1	2
15:15	11	2	3	0	0	0	1	17	2	0	0	0	0	0	0	2
15:30	19	2	1	0	0	0	2	24	0	0	0	0	0	0	0	0
15:45	25	5	3	0	0	0	1	34	0	0	0	0	0	0	0	0
16:00	20	0	7	0	0	0	4	31	0	0	1	0	0	0	0	1
16:15	24	1	7	0	0	1	4	37	2	0	0	0	0	0	0	2
16:30	30	0	5	0	0	1	7	43	1	0	0	0	0	0	1	2
16:45	40	0	3	0	0	1	2	46	0	0	0	0	0	0	1	1
17:00	38	4	4	0	0	3	6	55	0	0	0	0	0	0	0	0
17:15	45	2	3	0	0	1	10	61	2	0	0	0	0	0	0	2
17:30	31	5	7	0	0	2	10	55	0	0	0	0	0	0	0	0
17:45	33	2	3	1	0	0	8	47	0	0	0	1	0	0	0	1
18:00	37	4	1	0	0	0	10	52	1	0	0	0	0	0	1	2
18:15	29	1	2	0	0	0	9	41	1	0	0	0	0	0	1	2
18:30	27	4	2	0	0	0	7	40	0	0	0	0	0	0	2	2
18:45	25	4	1	0	0	1	3	34	0	0	0	0	0	0	2	2
25.75	728	141	142	16	5	16	98	1146	25	5	5	4	1	1	18	59

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	C to D - Oriel Street Upper to R101(S)							Veh. Total	D to C - R101(S) to Oriel Street Upper							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	1	0	0	0	0	1	25	0	5	2	0	0	0	32
07:15	2	0	0	0	0	0	0	2	31	2	8	1	2	0	0	44
07:30	0	1	0	0	0	0	0	1	33	2	10	1	1	0	1	48
07:45	2	0	2	0	0	0	0	4	33	0	5	0	0	0	0	38
08:00	1	0	1	0	0	0	0	2	39	1	12	3	4	0	0	59
08:15	0	0	1	0	0	0	0	1	28	1	2	1	1	0	0	33
08:30	2	0	1	0	1	1	0	5	25	0	3	1	2	1	1	33
08:45	1	2	0	0	0	0	0	3	39	0	9	2	1	0	1	52
09:00	3	0	0	0	0	0	0	3	34	6	2	1	1	0	1	45
09:15	3	0	0	0	0	0	0	3	58	3	6	1	3	2	0	73
09:30	2	1	1	0	0	0	0	4	30	4	9	0	0	1	1	45
09:45	1	0	1	0	0	0	0	2	22	0	5	0	1	0	0	28
10:00	1	1	2	0	0	0	0	4	16	3	5	0	3	0	0	27
10:15	4	0	3	0	0	0	0	7	14	1	7	1	4	1	0	28
10:30	3	1	0	0	0	0	1	5	15	1	4	0	2	0	0	22
10:45	6	1	1	1	0	0	0	9	11	0	3	1	0	0	1	16
11:00	5	0	0	0	0	0	0	5	14	4	6	2	1	0	0	27
11:15	3	0	2	0	0	0	0	5	10	0	3	0	1	0	0	14
11:30	1	3	3	0	0	1	1	9	7	1	2	0	2	0	1	13
11:45	3	1	0	0	0	0	0	4	8	3	5	1	0	0	1	18
12:00	4	0	2	0	0	0	0	6	7	1	3	0	1	0	0	12
12:15	6	0	1	0	0	0	0	7	14	2	5	1	1	0	0	23
12:30	6	2	3	1	0	0	0	12	5	2	2	1	0	1	2	13
12:45	8	1	1	1	0	0	0	11	3	2	3	0	1	0	0	9
13:00	9	4	1	1	0	0	0	15	9	0	5	1	1	0	0	16
13:15	7	1	1	0	0	0	1	10	7	4	1	1	1	0	0	14
13:30	4	0	0	1	0	0	0	5	8	1	3	1	1	0	1	15
13:45	6	1	2	0	0	0	1	10	7	1	4	1	1	1	0	15
14:00	3	0	0	0	0	0	0	3	9	1	4	0	2	0	0	16
14:15	4	0	0	0	0	0	0	4	13	1	3	0	2	0	0	19
14:30	2	4	1	0	1	0	1	9	8	0	2	0	1	0	2	13
14:45	4	2	3	1	0	0	0	10	6	1	1	2	1	0	0	11
15:00	5	3	2	1	0	0	0	11	7	3	2	1	1	0	0	14
15:15	6	1	2	1	0	0	0	10	8	1	3	0	4	0	0	16
15:30	11	0	5	1	0	0	0	17	8	2	3	0	1	0	0	14
15:45	7	1	2	0	0	0	0	10	4	0	5	0	1	0	0	10
16:00	11	3	4	0	0	0	1	19	7	2	6	0	2	0	0	17
16:15	13	3	4	1	0	0	0	21	8	0	4	1	1	1	0	15
16:30	10	0	0	0	0	0	0	10	9	2	2	0	0	0	0	13
16:45	14	1	1	0	1	0	0	17	8	2	4	0	1	1	0	16
17:00	13	2	5	0	0	1	0	21	11	1	0	0	1	0	1	14
17:15	14	3	3	0	1	0	0	21	9	0	0	0	2	1	4	16
17:30	12	1	0	0	0	0	1	14	12	1	2	1	0	0	1	17
17:45	10	1	1	1	0	1	0	14	7	2	0	0	1	0	1	11
18:00	12	1	2	0	0	0	0	15	4	2	1	0	3	0	0	10
18:15	12	0	3	0	0	0	0	15	14	4	2	0	1	0	1	22
18:30	12	0	0	0	0	0	2	14	5	3	1	0	2	1	1	13
18:45	5	1	0	0	0	0	0	6	11	0	1	0	1	0	0	13
25.75	273	47	68	11	4	4	9	416	720	73	183	29	64	11	22	1102

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	D to B - R101(S) to R101(N)							Veh. Total	D to A - R101(S) to Oriel Street Lower							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	46	8	8	1	2	2	6	73	0	0	0	0	0	0	0	0
07:15	63	8	9	6	0	1	4	91	1	0	0	0	0	0	0	1
07:30	50	9	9	3	1	1	7	80	1	0	0	0	0	0	1	2
07:45	41	9	9	4	2	3	10	78	1	0	0	0	0	0	0	1
08:00	42	11	14	1	8	0	8	84	1	0	0	0	0	0	0	1
08:15	44	9	5	5	3	2	9	77	1	0	0	0	0	0	0	1
08:30	37	5	6	2	6	0	14	70	0	0	0	0	0	0	0	0
08:45	49	12	7	4	2	2	12	88	0	0	0	0	0	0	0	0
09:00	38	7	5	8	0	4	8	70	1	0	0	0	0	0	0	1
09:15	52	13	6	1	2	1	5	80	1	0	0	0	0	0	0	1
09:30	37	19	10	7	1	4	6	84	0	0	0	0	0	0	0	0
09:45	51	15	13	5	2	3	8	97	1	0	0	0	0	0	0	1
10:00	29	21	7	6	0	2	5	70	0	0	0	0	0	0	0	0
10:15	47	14	12	4	0	1	3	81	0	0	0	0	0	0	0	0
10:30	47	18	17	2	0	1	3	88	0	1	0	0	0	0	0	1
10:45	47	15	16	7	1	2	3	91	1	0	0	1	0	0	0	2
11:00	39	20	10	5	1	0	8	83	1	0	0	0	0	0	0	1
11:15	37	15	17	5	1	0	5	80	0	0	0	0	0	0	0	0
11:30	46	11	12	4	2	1	10	86	0	0	0	0	0	0	0	0
11:45	40	11	16	4	1	1	7	80	2	1	0	0	0	0	0	3
12:00	51	15	13	5	2	3	1	90	2	0	0	0	0	0	0	2
12:15	44	9	17	1	2	0	4	77	0	0	0	0	0	0	0	0
12:30	43	17	16	5	0	4	3	88	1	0	0	0	0	0	0	1
12:45	56	14	13	7	2	3	5	100	1	0	0	0	0	0	0	1
13:00	59	9	22	4	2	1	9	106	0	0	0	0	0	0	0	0
13:15	55	7	11	3	0	2	8	86	3	0	0	0	0	0	1	4
13:30	63	15	13	3	1	3	13	111	0	0	0	0	0	0	0	0
13:45	43	13	15	4	1	2	11	89	2	0	0	0	0	0	0	2
14:00	49	10	24	3	2	2	14	104	0	0	1	0	0	0	0	1
14:15	52	13	10	7	0	4	22	108	1	0	0	0	0	0	0	1
14:30	50	11	10	3	3	4	9	90	3	0	0	0	0	0	0	3
14:45	45	11	20	0	6	7	11	100	0	0	0	0	0	0	0	0
15:00	48	11	11	0	1	4	20	95	0	0	1	0	1	0	1	3
15:15	57	11	21	4	0	0	8	101	1	0	0	0	0	0	0	1
15:30	44	9	18	2	3	2	18	96	2	0	0	0	0	0	0	2
15:45	61	2	8	2	4	6	22	105	0	0	0	0	0	0	0	0
16:00	35	7	12	3	1	5	31	94	1	0	1	0	0	0	0	2
16:15	80	6	19	1	9	7	43	165	1	0	0	0	0	0	0	1
16:30	73	9	17	0	4	6	44	153	2	0	0	0	0	0	0	2
16:45	74	9	12	2	4	11	63	175	0	0	0	0	0	0	0	0
17:00	67	8	8	1	6	6	74	170	1	0	0	0	0	0	0	1
17:15	74	2	6	1	4	8	119	214	2	0	0	0	0	0	0	2
17:30	104	5	9	2	0	20	112	252	0	0	0	0	0	0	0	0
17:45	77	6	6	0	2	6	124	221	2	0	0	0	0	0	1	3
18:00	78	4	11	2	0	8	108	211	1	0	0	0	0	0	2	3
18:15	92	5	9	3	2	6	106	223	1	0	1	0	0	0	0	2
18:30	69	12	7	1	0	4	65	158	4	0	0	0	0	0	0	4
18:45	70	7	8	0	0	4	68	157	2	0	1	0	0	0	0	3
25.75	2595	507	574	153	96	169	1276	5370	45	2	5	1	1	0	6	60

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	To Arm A - Oriel Street Lower							Veh. Total	From Arm A - Oriel Street Lower							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	4	0	1	1	0	0	0	6	0	0	1	0	0	0	0	1
07:15	2	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0
07:30	4	0	1	0	0	0	3	8	1	0	0	0	0	0	0	1
07:45	4	0	0	0	0	0	0	4	2	0	1	0	0	0	1	4
08:00	2	0	0	1	0	0	0	3	0	0	0	0	0	0	2	2
08:15	3	0	0	1	0	0	0	4	1	0	1	2	0	0	0	4
08:30	2	0	0	0	0	1	1	4	1	0	0	0	0	0	0	1
08:45	1	0	1	0	0	0	0	2	1	0	0	0	0	0	0	1
09:00	5	0	1	0	1	1	0	8	0	0	0	0	0	0	1	1
09:15	7	0	2	0	0	0	0	9	1	0	1	0	1	0	1	4
09:30	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	2
09:45	4	1	2	1	1	0	0	9	3	0	0	0	1	0	0	4
10:00	1	0	1	1	0	0	0	3	2	0	2	1	0	0	0	5
10:15	3	0	0	0	0	0	2	5	1	0	0	0	0	0	2	3
10:30	3	2	3	0	0	0	1	9	1	1	0	1	0	0	1	4
10:45	1	0	1	3	0	0	0	5	5	0	0	0	0	0	1	6
11:00	3	2	1	0	0	0	0	6	1	1	1	1	0	0	1	5
11:15	2	0	1	1	0	0	1	5	1	1	1	0	0	0	0	3
11:30	3	0	1	1	0	0	1	6	5	0	0	0	0	0	1	6
11:45	7	1	0	0	0	0	1	9	2	0	1	1	0	0	0	4
12:00	6	1	2	0	0	0	0	9	2	1	0	2	0	0	2	7
12:15	3	0	0	0	0	0	0	3	3	0	2	1	0	0	0	6
12:30	4	0	0	0	0	0	0	4	1	1	1	1	0	0	0	4
12:45	4	0	0	1	0	0	3	8	3	0	0	0	0	0	0	3
13:00	3	1	0	0	1	0	1	6	5	0	1	1	0	0	1	8
13:15	9	2	1	0	0	0	1	13	7	2	0	0	1	0	0	10
13:30	4	0	2	0	0	0	0	6	4	0	0	0	0	0	0	4
13:45	3	1	3	2	0	1	0	10	2	1	2	0	0	1	0	6
14:00	3	1	2	0	0	0	0	6	3	0	0	0	0	0	2	5
14:15	7	0	2	0	0	0	3	12	7	1	1	1	0	0	0	10
14:30	6	0	2	0	0	0	2	10	3	0	1	0	0	0	1	5
14:45	2	0	0	2	0	0	1	5	4	0	1	0	0	0	4	9
15:00	1	1	1	0	1	1	2	7	4	1	0	1	0	0	1	7
15:15	7	0	0	0	0	0	1	8	4	0	1	0	0	0	1	6
15:30	4	0	1	0	0	0	0	5	4	0	1	0	0	0	0	5
15:45	3	0	0	0	0	0	0	3	6	0	0	0	0	0	2	8
16:00	2	2	2	1	0	0	1	8	7	1	1	0	0	0	1	10
16:15	7	0	3	0	0	0	2	12	6	1	0	0	0	0	1	8
16:30	5	0	0	0	0	0	2	7	8	0	0	0	0	0	1	9
16:45	2	0	2	0	0	0	2	6	5	0	0	0	0	0	7	12
17:00	2	0	0	0	0	0	0	2	7	0	1	0	0	1	4	13
17:15	8	0	0	0	0	0	1	9	5	0	2	0	0	0	3	10
17:30	2	0	2	0	0	0	1	5	7	0	1	0	0	0	2	10
17:45	5	1	0	1	0	0	3	10	7	0	0	0	0	0	3	10
18:00	4	1	0	0	0	0	3	8	5	2	2	0	0	0	0	9
18:15	9	0	2	0	0	0	1	12	4	0	0	0	0	0	1	5
18:30	6	0	0	0	0	0	2	8	6	0	0	0	0	0	0	6
18:45	7	1	2	0	0	0	2	12	8	0	0	0	0	0	1	9
25.75	189	19	45	18	4	4	44	323	165	14	28	13	3	2	50	275

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	To Arm B - R101(N)							Veh. Total	From Arm B - R101(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	51	8	11	2	3	2	6	83	137	4	37	6	0	1	50	235
07:15	70	12	11	6	0	1	4	104	103	9	32	4	0	6	60	214
07:30	60	10	11	3	1	1	7	93	122	2	25	6	0	8	90	253
07:45	47	10	13	5	3	3	10	91	114	4	23	3	0	7	94	245
08:00	46	13	17	1	8	0	9	94	107	4	15	2	0	5	96	229
08:15	51	16	5	7	3	2	9	93	117	15	12	7	0	16	157	324
08:30	44	8	7	2	6	0	15	82	116	9	14	1	0	14	180	334
08:45	60	15	9	4	2	3	12	105	124	12	13	2	0	16	180	347
09:00	48	12	8	8	1	4	10	91	115	8	22	7	1	10	118	281
09:15	60	14	9	3	3	1	5	95	82	11	15	3	0	6	66	183
09:30	40	23	13	7	1	4	6	94	82	12	16	6	0	6	53	175
09:45	63	16	15	5	2	3	8	112	70	17	21	4	2	6	30	150
10:00	35	21	10	8	0	2	6	82	58	16	28	2	0	4	22	130
10:15	50	18	14	4	1	1	4	92	64	19	25	14	0	3	11	136
10:30	53	23	20	3	0	1	3	103	57	13	23	7	1	3	11	115
10:45	51	21	21	8	2	2	3	108	61	15	25	9	1	4	13	128
11:00	46	25	12	5	1	0	8	97	64	15	22	6	0	1	14	122
11:15	48	20	19	7	1	1	5	101	67	7	22	4	0	2	11	113
11:30	55	14	15	5	2	1	14	106	60	13	25	7	2	2	13	122
11:45	48	17	18	4	1	2	7	97	63	10	27	6	1	6	6	119
12:00	60	20	18	6	2	3	2	111	85	11	17	4	1	2	9	129
12:15	60	14	22	2	2	0	4	104	71	8	21	5	0	4	16	125
12:30	59	19	21	6	0	5	3	113	72	22	25	4	0	1	5	129
12:45	63	19	13	7	2	3	6	113	72	13	12	2	2	3	12	116
13:00	72	11	23	5	2	2	9	124	66	18	16	3	1	2	7	113
13:15	72	9	14	4	0	2	9	110	75	10	15	3	0	1	9	113
13:30	82	17	18	4	1	3	13	138	68	14	13	5	2	1	5	108
13:45	59	19	16	4	1	2	11	112	72	19	20	6	3	3	11	134
14:00	68	12	27	3	2	3	16	131	71	16	21	4	0	2	13	127
14:15	67	18	16	7	0	4	22	134	77	10	19	3	2	1	9	121
14:30	67	13	17	3	3	4	11	118	66	10	11	3	1	2	12	105
14:45	57	13	24	0	6	7	11	118	69	16	11	7	2	1	12	118
15:00	65	16	15	0	1	4	22	123	50	15	21	4	2	3	10	105
15:15	70	13	24	4	0	0	9	120	56	17	9	4	1	1	13	101
15:30	65	11	20	2	3	2	20	123	75	16	12	2	1	4	14	124
15:45	87	7	11	2	4	6	25	142	58	20	13	2	1	2	14	110
16:00	55	7	19	3	1	5	35	125	56	14	11	3	1	1	8	94
16:15	107	7	26	1	9	8	47	205	98	14	10	0	1	5	19	147
16:30	108	9	22	0	4	7	51	201	92	15	17	3	1	5	14	147
16:45	115	9	15	2	4	12	65	222	85	16	13	1	0	2	17	134
17:00	110	12	13	1	6	10	81	233	69	11	18	1	4	3	14	120
17:15	121	4	9	1	4	9	129	277	96	10	8	1	1	5	22	143
17:30	137	10	17	2	0	22	122	310	66	15	10	0	2	7	22	122
17:45	112	8	9	1	2	6	132	270	96	17	9	2	0	2	16	142
18:00	117	10	12	2	0	8	118	267	70	19	2	3	1	3	10	108
18:15	123	6	11	3	2	6	115	266	109	16	10	1	1	4	3	144
18:30	99	16	9	1	0	4	72	201	69	19	9	0	1	3	10	111
18:45	98	11	9	0	0	5	71	194	70	15	7	0	0	0	11	103
25.75	3401	656	728	173	102	186	1382	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Nationwide Data Collection
for
Client

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	To Arm C - Oriel Street Upper							Veh. Total	From Arm C - Oriel Street Upper							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	63	2	11	5	0	0	1	82	5	0	4	1	1	0	0	11
07:15	60	8	15	1	2	2	3	91	9	4	2	0	0	0	0	15
07:30	75	3	14	5	1	1	10	109	10	2	2	0	0	0	2	16
07:45	73	1	14	0	0	3	1	92	8	1	6	1	1	0	0	17
08:00	83	1	14	3	4	0	3	108	5	2	4	0	0	0	0	11
08:15	82	5	5	2	1	4	12	111	6	7	1	1	0	0	0	15
08:30	76	2	8	1	2	2	20	111	8	3	2	0	1	1	1	16
08:45	103	2	13	3	1	3	21	146	11	5	2	0	0	1	0	19
09:00	85	7	9	3	1	0	10	115	15	5	3	0	1	1	2	27
09:15	87	5	11	2	3	3	5	116	13	1	3	2	0	0	0	19
09:30	55	9	11	0	0	2	5	82	5	5	4	0	0	0	0	14
09:45	40	5	9	1	2	0	4	61	11	1	3	0	0	0	0	15
10:00	25	7	13	0	3	1	3	52	5	1	4	1	0	0	1	12
10:15	22	3	15	3	4	1	2	50	8	4	5	0	1	0	2	20
10:30	21	3	8	2	2	0	0	36	9	7	3	1	0	0	2	22
10:45	27	2	9	1	1	0	4	44	8	7	6	3	1	0	0	25
11:00	22	6	8	3	1	0	0	40	13	6	2	0	0	0	0	21
11:15	21	2	5	0	1	0	0	29	15	5	3	2	0	1	0	26
11:30	17	4	7	1	2	1	1	33	8	6	6	1	0	1	4	26
11:45	17	3	10	1	0	2	1	34	11	7	2	0	0	1	1	22
12:00	25	2	5	0	1	1	0	34	12	5	7	1	0	0	0	25
12:15	27	3	7	1	1	2	2	43	20	5	4	0	0	0	0	29
12:30	17	6	8	3	0	1	2	37	22	3	7	2	0	1	0	35
12:45	19	3	6	0	1	1	1	31	14	6	1	1	0	0	1	23
13:00	15	1	5	2	1	1	1	26	19	6	2	2	1	1	0	31
13:15	18	4	3	1	2	0	1	29	23	4	4	1	0	0	2	34
13:30	19	2	5	1	2	0	1	30	20	2	5	2	0	0	0	29
13:45	20	3	7	1	2	2	0	35	21	6	3	1	0	0	1	32
14:00	20	2	6	0	2	0	1	31	21	2	4	0	0	1	1	29
14:15	21	2	7	1	3	0	0	34	15	4	7	0	0	0	2	28
14:30	18	2	2	0	1	0	4	27	18	6	7	0	1	0	5	37
14:45	23	3	3	2	2	1	3	37	13	4	6	1	0	0	0	24
15:00	15	8	5	1	2	1	0	32	20	7	6	1	0	0	2	36
15:15	17	6	8	0	4	1	3	39	19	3	5	1	0	0	1	29
15:30	23	4	6	0	2	2	0	37	30	2	6	1	0	0	2	41
15:45	11	6	7	0	1	0	1	26	32	6	5	0	0	0	1	44
16:00	17	4	9	0	2	0	0	32	31	3	12	0	0	0	5	51
16:15	26	3	6	1	1	1	0	38	39	4	11	1	0	1	4	60
16:30	22	6	4	0	0	2	1	35	41	0	5	0	0	1	8	55
16:45	23	6	7	0	1	1	5	43	54	1	4	0	1	1	3	64
17:00	26	5	1	0	2	0	4	38	51	6	9	0	0	4	6	76
17:15	30	2	3	0	2	3	8	48	61	5	6	0	1	1	10	84
17:30	33	7	3	1	1	2	3	50	43	6	7	0	0	2	11	69
17:45	24	8	2	0	1	0	3	38	43	3	4	3	0	1	8	62
18:00	16	5	1	0	3	0	1	26	50	5	3	0	0	0	11	69
18:15	32	9	4	1	1	0	2	49	42	1	5	0	0	0	10	58
18:30	16	9	3	0	2	2	1	33	39	4	2	0	0	0	11	56
18:45	20	1	4	0	1	0	2	28	30	5	1	0	0	1	5	42
Total	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Site No. 3
Location Oriel Street Lower / R101(N) / Oriel Street Upper / R101(S)
Date 04 October 2018

Time	To Arm D - R101(S)							Veh. Total	From Arm D - R101(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	95	2	32	2	0	1	49	181	71	8	13	3	2	2	6	105
07:15	75	2	25	4	0	4	57	167	95	10	17	7	2	1	4	136
07:30	78	2	20	2	0	7	81	190	84	11	19	4	2	1	9	130
07:45	75	3	17	3	0	4	94	196	75	9	14	4	2	3	10	117
08:00	63	4	14	1	0	5	94	181	82	12	26	4	12	0	8	144
08:15	61	11	11	6	0	12	145	246	73	10	7	6	4	2	9	111
08:30	65	7	10	1	1	13	160	257	62	5	9	3	8	1	15	103
08:45	60	12	8	1	0	13	160	254	88	12	16	6	3	2	13	140
09:00	65	7	14	5	0	10	110	211	73	13	7	9	1	4	9	116
09:15	53	9	9	2	0	5	62	140	111	16	12	2	5	3	5	154
09:30	59	8	16	5	0	5	50	143	67	23	19	7	1	5	7	129
09:45	51	11	16	2	1	6	26	113	74	15	18	5	3	3	8	126
10:00	49	13	22	1	0	3	19	107	45	24	12	6	3	2	5	97
10:15	59	17	20	12	0	3	10	121	61	15	19	5	4	2	3	109
10:30	52	13	16	6	1	3	13	104	62	20	21	2	2	1	3	111
10:45	54	14	19	9	0	4	11	111	59	15	19	9	1	2	4	109
11:00	61	13	20	6	0	1	15	116	54	24	16	7	2	0	8	111
11:15	59	6	21	3	0	2	10	101	47	15	20	5	2	0	5	94
11:30	51	13	22	5	2	2	13	108	53	12	14	4	4	1	11	99
11:45	54	11	23	7	1	4	6	106	50	15	21	5	1	1	8	101
12:00	68	10	15	6	1	1	10	111	60	16	16	5	3	3	1	104
12:15	62	7	20	5	0	2	14	110	58	11	22	2	3	0	4	100
12:30	64	20	22	4	0	1	5	116	49	19	18	6	0	5	5	102
12:45	63	13	10	2	2	2	8	100	60	16	16	7	3	3	5	110
13:00	68	20	18	4	1	1	6	118	68	9	27	5	3	1	9	122
13:15	71	12	13	3	0	1	9	109	65	11	12	4	1	2	9	104
13:30	58	13	9	6	1	1	5	93	71	16	16	4	2	3	14	126
13:45	65	17	18	5	2	2	12	121	52	14	19	5	2	3	11	106
14:00	62	14	19	4	0	2	13	114	58	11	29	3	4	2	14	121
14:15	70	9	15	3	1	1	8	107	66	14	13	7	2	4	22	128
14:30	57	12	10	3	2	2	12	98	61	11	12	3	4	4	11	106
14:45	55	16	12	6	1	0	12	102	51	12	21	2	7	7	11	111
15:00	48	12	20	6	1	1	10	98	55	14	14	1	3	4	21	112
15:15	51	13	7	5	1	0	10	87	66	12	24	4	4	0	8	118
15:30	71	14	13	3	0	2	14	117	54	11	21	2	4	2	18	112
15:45	60	15	13	2	1	2	13	106	65	2	13	2	5	6	22	115
16:00	63	14	13	2	1	1	9	103	43	9	19	3	3	5	31	113
16:15	92	15	9	1	1	5	18	141	89	6	23	2	10	8	43	181
16:30	90	11	15	3	1	3	13	136	84	11	19	0	4	6	44	168
16:45	86	13	9	1	1	2	18	130	82	11	16	2	5	12	63	191
17:00	68	9	22	1	3	4	14	121	79	9	8	1	7	6	75	185
17:15	88	11	10	1	2	3	20	135	85	2	6	1	6	9	123	232
17:30	60	10	7	0	1	5	22	105	116	6	11	3	0	20	113	269
17:45	91	11	8	3	0	3	15	131	86	8	6	0	3	6	126	235
18:00	71	16	6	3	1	3	9	109	83	6	12	2	3	8	110	224
18:15	98	11	10	0	1	4	3	127	107	9	12	3	3	6	107	247
18:30	71	13	7	0	1	2	12	106	78	15	8	1	2	5	66	175
18:45	66	14	3	0	0	0	10	93	83	7	10	0	1	4	68	173
Total	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Site No. 4
Location R101(N) / Guild Street / R101(E)
Date 04 October 2018

Time	A to C - R101(N) to R101(E)							Veh. Total	A to B - R101(N) to Guild Street							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	12	2	9	1	0	0	4	28	78	2	20	0	0	3	40	143
07:15	20	1	9	1	0	1	0	32	54	2	20	4	0	2	60	142
07:30	10	1	5	0	0	1	5	22	59	0	14	2	0	5	72	152
07:45	26	0	5	1	0	1	9	42	46	2	11	1	0	3	83	146
08:00	17	0	4	0	0	0	2	23	48	4	10	2	0	4	85	153
08:15	23	2	5	2	0	0	3	35	47	8	6	2	0	13	140	216
08:30	21	2	4	2	1	0	10	40	42	5	8	1	0	12	150	218
08:45	20	3	3	1	0	1	5	33	31	9	4	0	0	11	149	204
09:00	18	1	3	1	0	0	12	35	47	6	8	3	0	11	105	180
09:15	15	2	2	1	0	1	9	30	32	4	11	2	0	4	62	115
09:30	15	2	6	3	0	0	1	27	41	8	9	2	0	4	46	110
09:45	13	7	2	0	1	1	2	26	47	5	15	2	0	3	26	98
10:00	8	5	1	0	0	0	0	14	38	6	20	0	0	5	15	84
10:15	18	1	8	5	0	0	0	32	42	15	10	7	0	3	9	86
10:30	12	2	8	4	1	1	2	30	41	10	10	3	0	1	10	75
10:45	19	5	4	2	0	0	1	31	39	11	13	7	0	6	10	86
11:00	20	8	8	4	0	1	2	43	40	6	12	1	0	1	12	72
11:15	12	1	5	3	1	0	1	23	45	5	17	1	0	2	9	79
11:30	18	3	11	1	1	1	0	35	33	10	10	4	0	2	10	69
11:45	20	1	10	1	0	0	0	32	36	8	12	5	1	3	4	69
12:00	12	1	5	4	1	1	0	24	51	11	8	3	0	1	9	83
12:15	24	3	0	1	0	0	1	29	30	4	18	2	0	2	12	68
12:30	24	4	8	6	0	0	2	44	41	16	13	0	0	1	6	77
12:45	19	1	3	2	0	0	0	25	40	12	8	1	2	2	8	73
13:00	32	4	9	2	1	0	0	48	43	14	8	2	0	0	3	70
13:15	32	2	3	2	0	0	0	39	35	12	12	1	0	2	5	67
13:30	24	5	1	5	1	1	0	37	38	9	7	0	1	1	6	62
13:45	23	3	6	2	1	1	2	38	45	14	9	3	0	2	11	84
14:00	20	3	10	2	0	0	0	35	41	12	11	2	0	2	13	81
14:15	19	0	7	1	0	0	0	27	49	9	8	2	1	1	7	77
14:30	15	6	2	2	1	0	1	27	49	6	8	1	1	1	8	74
14:45	17	4	5	1	1	0	1	29	38	11	6	5	0	0	8	68
15:00	13	4	8	3	1	0	1	30	28	8	9	3	0	2	8	58
15:15	24	3	7	4	1	0	2	41	34	9	3	2	0	1	4	53
15:30	28	2	11	1	0	0	2	44	39	12	3	2	0	2	7	65
15:45	18	4	7	2	0	2	1	34	41	13	7	0	2	0	7	70
16:00	31	6	9	1	0	0	4	51	36	7	3	1	1	1	6	55
16:15	44	7	6	0	0	2	5	64	48	8	2	1	1	4	8	72
16:30	36	2	7	1	1	0	1	48	55	10	8	1	0	2	10	86
16:45	28	3	2	2	1	3	3	42	53	10	6	0	0	0	14	83
17:00	33	3	7	1	1	1	2	48	38	7	13	0	1	1	9	69
17:15	42	5	3	0	1	2	1	54	45	6	5	1	1	1	17	76
17:30	38	4	6	0	1	1	3	53	30	5	4	0	0	6	18	63
17:45	45	4	4	1	0	1	4	59	42	8	4	2	0	2	8	66
18:00	28	3	4	2	1	1	1	40	37	11	0	1	0	2	11	62
18:15	36	2	6	0	0	0	1	45	53	9	5	0	1	3	4	75
18:30	31	2	3	0	1	1	1	39	47	13	5	0	0	1	9	75
18:45	30	2	2	0	0	0	5	39	44	12	3	0	0	0	6	65
Total	1103	141	263	81	20	26	112	1746	2056	404	436	85	13	141	1339	4474

Site No. 4
Location R101(N) / Guild Street / R101(E)
Date 04 October 2018

Time	B to A - Guild Street to R101(N)							Veh. Total	B to C - Guild Street to R101(E)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	39	6	6	2	2	1	4	60	33	4	3	0	0	0	1	41
07:15	34	10	11	0	0	0	2	57	30	2	6	2	0	0	0	40
07:30	35	8	10	1	0	0	7	61	41	2	13	1	0	0	1	58
07:45	26	6	3	1	0	3	7	46	34	6	4	2	0	1	1	48
08:00	23	10	9	1	0	2	7	52	27	6	7	3	1	0	0	44
08:15	39	6	3	3	1	1	7	60	38	5	6	1	0	0	0	50
08:30	25	5	7	1	0	1	5	44	27	9	8	0	0	2	2	48
08:45	28	11	3	3	2	2	7	56	23	8	4	2	1	3	3	44
09:00	23	9	3	3	0	3	8	49	26	7	8	1	1	2	0	45
09:15	27	11	3	0	0	0	4	45	23	6	4	1	0	0	0	34
09:30	28	15	6	4	1	4	6	64	33	14	7	2	0	0	0	56
09:45	36	13	6	1	0	1	4	61	21	5	10	1	0	2	0	39
10:00	20	15	6	6	0	2	6	55	23	9	4	3	0	0	0	39
10:15	32	14	8	3	1	1	1	60	23	8	6	0	0	0	0	37
10:30	37	17	11	2	0	1	1	69	26	14	12	3	0	1	0	56
10:45	39	18	8	6	0	1	3	75	31	12	6	3	0	1	0	53
11:00	26	17	6	4	0	0	2	55	23	10	12	1	0	1	0	47
11:15	21	13	12	3	1	0	0	50	22	12	14	5	0	0	0	53
11:30	35	9	7	1	1	1	10	64	29	6	19	1	0	2	0	57
11:45	32	11	9	1	3	1	0	57	27	9	13	2	0	5	1	57
12:00	35	14	12	3	0	3	1	68	30	11	12	4	0	3	0	60
12:15	34	12	12	0	0	0	4	62	35	10	14	0	0	2	0	61
12:30	31	15	14	4	0	4	4	72	28	6	6	5	0	0	0	45
12:45	34	12	7	3	0	3	5	64	41	6	10	5	0	1	0	63
13:00	37	8	14	4	1	1	5	70	29	10	8	2	0	4	0	53
13:15	38	5	8	0	0	1	9	61	33	12	12	1	0	1	0	59
13:30	41	16	5	2	1	1	8	74	32	10	6	3	0	0	1	52
13:45	24	11	9	5	0	2	8	59	36	11	12	1	0	0	0	60
14:00	32	12	18	1	0	1	10	74	36	15	13	2	0	0	0	66
14:15	37	11	8	3	0	2	10	71	32	9	15	2	0	1	0	59
14:30	31	10	5	2	0	2	11	61	48	13	10	2	0	0	0	73
14:45	33	8	13	1	3	6	9	73	34	13	13	3	1	1	0	65
15:00	32	6	10	0	1	4	19	72	35	19	9	3	0	0	0	66
15:15	41	10	18	3	0	0	6	78	40	14	22	1	1	0	2	80
15:30	23	8	12	2	1	0	16	62	56	13	11	1	1	3	1	86
15:45	42	3	9	2	0	6	24	86	45	20	16	2	3	0	0	86
16:00	26	7	9	0	0	4	24	70	29	16	13	0	0	0	1	59
16:15	48	4	17	0	1	9	42	121	50	14	8	2	0	3	0	77
16:30	49	7	11	0	0	5	39	111	59	14	13	2	0	4	1	93
16:45	43	8	10	2	0	10	59	132	38	7	15	0	0	3	1	64
17:00	30	9	7	1	0	6	61	114	49	8	11	1	0	1	1	71
17:15	41	2	3	1	0	8	108	163	61	15	5	0	0	3	3	87
17:30	61	3	6	2	0	18	100	190	50	5	14	2	1	4	1	77
17:45	49	5	5	0	0	6	121	186	42	4	2	0	0	2	2	52
18:00	56	5	7	2	0	8	108	186	43	10	3	2	0	5	2	65
18:15	59	3	8	1	1	3	95	170	34	8	3	2	0	2	3	52
18:30	53	10	6	1	0	5	52	127	45	6	2	1	0	1	2	57
18:45	44	2	7	0	0	4	57	114	29	4	2	0	0	3	1	39
25.75	1709	450	407	91	21	147	1106	3931	1679	457	446	83	10	67	31	2773

Site No. 4
Location R101(N) / Guild Street / R101(E)
Date 04 October 2018

Time	C to B - R101(E) to Guild Street							Veh. Total	C to A - R101(E) to R101(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	1	0	1	0	0	0	0	2	35	1	8	2	0	1	1	48
07:15	4	0	1	0	0	0	0	5	61	1	5	6	2	0	1	76
07:30	4	0	1	0	0	0	0	5	46	3	8	4	2	1	0	64
07:45	1	0	0	0	0	0	0	1	49	2	10	2	2	0	1	66
08:00	5	0	1	0	0	0	0	6	63	2	18	3	12	0	1	99
08:15	1	0	0	0	0	0	0	1	37	3	4	3	3	1	0	51
08:30	0	0	1	0	0	1	0	2	39	0	3	2	8	0	7	59
08:45	7	0	0	0	0	3	0	10	52	1	11	3	1	0	3	71
09:00	3	0	0	0	0	0	0	3	54	5	4	6	1	1	1	72
09:15	6	0	0	0	0	0	0	6	79	4	9	3	5	3	1	104
09:30	2	0	0	0	0	1	1	4	43	8	12	2	0	1	1	67
09:45	9	1	2	0	0	0	0	12	37	2	14	4	3	1	1	62
10:00	0	0	1	0	0	0	0	1	25	9	6	1	3	0	0	44
10:15	2	1	0	0	0	0	0	3	30	1	10	1	3	1	0	46
10:30	3	0	0	0	0	0	0	3	23	3	9	0	2	0	0	37
10:45	7	0	1	0	0	0	0	8	19	1	10	3	1	1	0	35
11:00	6	0	0	0	0	0	0	6	24	3	10	2	2	0	1	42
11:15	2	0	1	0	0	0	0	3	23	2	11	2	1	0	0	39
11:30	2	0	1	0	0	0	0	3	18	2	6	3	3	0	0	32
11:45	6	0	1	0	0	0	0	7	19	6	12	4	0	0	3	44
12:00	2	1	1	0	0	0	1	5	19	1	4	4	3	0	1	32
12:15	0	0	0	0	0	0	0	0	20	1	10	1	3	0	2	37
12:30	0	0	0	0	0	1	0	1	23	2	3	1	0	1	2	32
12:45	6	0	5	0	0	0	0	11	27	4	10	4	3	0	2	50
13:00	1	0	0	0	0	0	0	1	26	2	13	2	3	0	2	48
13:15	5	0	1	0	0	0	0	6	24	5	5	3	1	1	3	42
13:30	4	1	1	0	0	0	0	6	25	2	10	2	1	2	3	45
13:45	2	1	3	0	0	0	0	6	29	1	10	1	3	2	1	47
14:00	2	1	0	0	0	0	0	3	19	1	10	1	3	1	7	42
14:15	3	0	1	0	0	0	0	4	31	3	7	4	3	2	8	58
14:30	2	1	0	0	0	0	0	3	29	1	6	1	2	2	2	43
14:45	2	0	0	0	0	0	0	2	17	3	8	1	4	1	0	34
15:00	6	0	1	0	0	0	0	7	28	7	6	1	2	0	0	44
15:15	0	0	0	0	0	0	0	0	17	2	7	2	4	0	1	33
15:30	8	0	1	0	0	0	0	9	25	3	7	0	4	1	3	43
15:45	3	0	3	0	0	0	0	6	28	0	8	1	5	0	0	42
16:00	4	2	2	0	0	0	0	8	13	1	8	2	3	1	4	32
16:15	3	1	0	1	0	0	0	5	33	3	7	2	8	0	3	56
16:30	3	1	1	0	0	0	0	5	30	4	6	0	5	1	3	49
16:45	4	0	0	0	0	0	0	4	39	3	7	0	6	2	4	61
17:00	3	0	0	0	0	0	0	3	40	1	1	0	5	0	12	59
17:15	8	1	0	0	0	0	0	9	40	1	3	0	6	1	8	59
17:30	5	0	0	0	0	0	0	5	54	2	6	1	0	1	13	77
17:45	4	0	0	0	0	0	0	4	46	5	1	0	3	0	8	63
18:00	7	2	0	0	0	0	0	9	30	2	5	1	3	0	7	48
18:15	2	0	0	0	0	0	0	2	47	3	3	1	2	3	9	68
18:30	1	0	0	0	0	0	0	1	25	6	2	0	2	0	5	40
18:45	4	0	0	0	0	0	0	4	41	3	3	0	2	0	9	58
25.75	165	14	32	1	0	6	2	220	1601	131	356	92	143	33	144	2500

Site No. 4
Location R101(N) / Guild Street / R101(E)
Date 04 October 2018

Time	To Arm A - R101(N)							Veh. Total	From Arm A - R101(N)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	74	7	14	4	2	2	5	108	90	4	29	1	0	3	44	171
07:15	95	11	16	6	2	0	3	133	74	3	29	5	0	3	60	174
07:30	81	11	18	5	2	1	7	125	69	1	19	2	0	6	77	174
07:45	75	8	13	3	2	3	8	112	72	2	16	2	0	4	92	188
08:00	86	12	27	4	12	2	8	151	65	4	14	2	0	4	87	176
08:15	76	9	7	6	4	2	7	111	70	10	11	4	0	13	143	251
08:30	64	5	10	3	8	1	12	103	63	7	12	3	1	12	160	258
08:45	80	12	14	6	3	2	10	127	51	12	7	1	0	12	154	237
09:00	77	14	7	9	1	4	9	121	65	7	11	4	0	11	117	215
09:15	106	15	12	3	5	3	5	149	47	6	13	3	0	5	71	145
09:30	71	23	18	6	1	5	7	131	56	10	15	5	0	4	47	137
09:45	73	15	20	5	3	2	5	123	60	12	17	2	1	4	28	124
10:00	45	24	12	7	3	2	6	99	46	11	21	0	0	5	15	98
10:15	62	15	18	4	4	2	1	106	60	16	18	12	0	3	9	118
10:30	60	20	20	2	2	1	1	106	53	12	18	7	1	2	12	105
10:45	58	19	18	9	1	2	3	110	58	16	17	9	0	6	11	117
11:00	50	20	16	6	2	0	3	97	60	14	20	5	0	2	14	115
11:15	44	15	23	5	2	0	0	89	57	6	22	4	1	2	10	102
11:30	53	11	13	4	4	1	10	96	51	13	21	5	1	3	10	104
11:45	51	17	21	5	3	1	3	101	56	9	22	6	1	3	4	101
12:00	54	15	16	7	3	3	2	100	63	12	13	7	1	2	9	107
12:15	54	13	22	1	3	0	6	99	54	7	18	3	0	2	13	97
12:30	54	17	17	5	0	5	6	104	65	20	21	6	0	1	8	121
12:45	61	16	17	7	3	3	7	114	59	13	11	3	2	2	8	98
13:00	63	10	27	6	4	1	7	118	75	18	17	4	1	0	3	118
13:15	62	10	13	3	1	2	12	103	67	14	15	3	0	2	5	106
13:30	66	18	15	4	2	3	11	119	62	14	8	5	2	2	6	99
13:45	53	12	19	6	3	4	9	106	68	17	15	5	1	3	13	122
14:00	51	13	28	2	3	2	17	116	61	15	21	4	0	2	13	116
14:15	68	14	15	7	3	4	18	129	68	9	15	3	1	1	7	104
14:30	60	11	11	3	2	4	13	104	64	12	10	3	2	1	9	101
14:45	50	11	21	2	7	7	9	107	55	15	11	6	1	0	9	97
15:00	60	13	16	1	3	4	19	116	41	12	17	6	1	2	9	88
15:15	58	12	25	5	4	0	7	111	58	12	10	6	1	1	6	94
15:30	48	11	19	2	5	1	19	105	67	14	14	3	0	2	9	109
15:45	70	3	17	3	5	6	24	128	59	17	14	2	2	2	8	104
16:00	39	8	17	2	3	5	28	102	67	13	12	2	1	1	10	106
16:15	81	7	24	2	9	9	45	177	92	15	8	1	1	6	13	136
16:30	79	11	17	0	5	6	42	160	91	12	15	2	1	2	11	134
16:45	82	11	17	2	6	12	63	193	81	13	8	2	1	3	17	125
17:00	70	10	8	1	5	6	73	173	71	10	20	1	2	2	11	117
17:15	81	3	6	1	6	9	116	222	87	11	8	1	2	3	18	130
17:30	115	5	12	3	0	19	113	267	68	9	10	0	1	7	21	116
17:45	95	10	6	0	3	6	129	249	87	12	8	3	0	3	12	125
18:00	86	7	12	3	3	8	115	234	65	14	4	3	1	3	12	102
18:15	106	6	11	2	3	6	104	238	89	11	11	0	1	3	5	120
18:30	78	16	8	1	2	5	57	167	78	15	8	0	1	2	10	114
18:45	85	5	10	0	2	4	66	172	74	14	5	0	0	0	11	104
25.75	3310	581	763	183	164	180	1250	6431	3159	545	699	166	33	167	1451	6220

Site No. 4
Location R101(N) / Guild Street / R101(E)
Date 04 October 2018

Time	To Arm B - Guild Street							Veh. Total	From Arm B - Guild Street							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	79	2	21	0	0	3	40	145	72	10	9	2	2	1	5	101
07:15	58	2	21	4	0	2	60	147	64	12	17	2	0	0	2	97
07:30	63	0	15	2	0	5	72	157	76	10	23	2	0	0	8	119
07:45	47	2	11	1	0	3	83	147	60	12	7	3	0	4	8	94
08:00	53	4	11	2	0	4	85	159	50	16	16	4	1	2	7	96
08:15	48	8	6	2	0	13	140	217	77	11	9	4	1	1	7	110
08:30	42	5	9	1	0	13	150	220	52	14	15	1	0	3	7	92
08:45	38	9	4	0	0	14	149	214	51	19	7	5	3	5	10	100
09:00	50	6	8	3	0	11	105	183	49	16	11	4	1	5	8	94
09:15	38	4	11	2	0	4	62	121	50	17	7	1	0	0	4	79
09:30	43	8	9	2	0	5	47	114	61	29	13	6	1	4	6	120
09:45	56	6	17	2	0	3	26	110	57	18	16	2	0	3	4	100
10:00	38	6	21	0	0	5	15	85	43	24	10	9	0	2	6	94
10:15	44	16	10	7	0	3	9	89	55	22	14	3	1	1	1	97
10:30	44	10	10	3	0	1	10	78	63	31	23	5	0	2	1	125
10:45	46	11	14	7	0	6	10	94	70	30	14	9	0	2	3	128
11:00	46	6	12	1	0	1	12	78	49	27	18	5	0	1	2	102
11:15	47	5	18	1	0	2	9	82	43	25	26	8	1	0	0	103
11:30	35	10	11	4	0	2	10	72	64	15	26	2	1	3	10	121
11:45	42	8	13	5	1	3	4	76	59	20	22	3	3	6	1	114
12:00	53	12	9	3	0	1	10	88	65	25	24	7	0	6	1	128
12:15	30	4	18	2	0	2	12	68	69	22	26	0	0	2	4	123
12:30	41	16	13	0	0	2	6	78	59	21	20	9	0	4	4	117
12:45	46	12	13	1	2	2	8	84	75	18	17	8	0	4	5	127
13:00	44	14	8	2	0	0	3	71	66	18	22	6	1	5	5	123
13:15	40	12	13	1	0	2	5	73	71	17	20	1	0	2	9	120
13:30	42	10	8	0	1	1	6	68	73	26	11	5	1	1	9	126
13:45	47	15	12	3	0	2	11	90	60	22	21	6	0	2	8	119
14:00	43	13	11	2	0	2	13	84	68	27	31	3	0	1	10	140
14:15	52	9	9	2	1	1	7	81	69	20	23	5	0	3	10	130
14:30	51	7	8	1	1	1	8	77	79	23	15	4	0	2	11	134
14:45	40	11	6	5	0	0	8	70	67	21	26	4	4	7	9	138
15:00	34	8	10	3	0	2	8	65	67	25	19	3	1	4	19	138
15:15	34	9	3	2	0	1	4	53	81	24	40	4	1	0	8	158
15:30	47	12	4	2	0	2	7	74	79	21	23	3	2	3	17	148
15:45	44	13	10	0	2	0	7	76	87	23	25	4	3	6	24	172
16:00	40	9	5	1	1	1	6	63	55	23	22	0	0	4	25	129
16:15	51	9	2	2	1	4	8	77	98	18	25	2	1	12	42	198
16:30	58	11	9	1	0	2	10	91	108	21	24	2	0	9	40	204
16:45	57	10	6	0	0	0	14	87	81	15	25	2	0	13	60	196
17:00	41	7	13	0	1	1	9	72	79	17	18	2	0	7	62	185
17:15	53	7	5	1	1	1	17	85	102	17	8	1	0	11	111	250
17:30	35	5	4	0	0	6	18	68	111	8	20	4	1	22	101	267
17:45	46	8	4	2	0	2	8	70	91	9	7	0	0	8	123	238
18:00	44	13	0	1	0	2	11	71	99	15	10	4	0	13	110	251
18:15	55	9	5	0	1	3	4	77	93	11	11	3	1	5	98	222
18:30	48	13	5	0	0	1	9	76	98	16	8	2	0	6	54	184
18:45	48	12	3	0	0	0	6	69	73	6	9	0	0	7	58	153
25.75	2221	418	468	86	13	147	1341	4694	3388	907	853	174	31	214	1137	6704

Site No. 4
Location R101(N) / Guild Street / R101(E)
Date 04 October 2018

Time	To Arm C - R101(E)							Veh. Total	From Arm C - R101(E)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	45	6	12	1	0	0	5	69	36	1	9	2	0	1	1	50
07:15	50	3	15	3	0	1	0	72	65	1	6	6	2	0	1	81
07:30	51	3	18	1	0	1	6	80	50	3	9	4	2	1	0	69
07:45	60	6	9	3	0	2	10	90	50	2	10	2	2	0	1	67
08:00	44	6	11	3	1	0	2	67	68	2	19	3	12	0	1	105
08:15	61	7	11	3	0	0	3	85	38	3	4	3	3	1	0	52
08:30	48	11	12	2	1	2	12	88	39	0	4	2	8	1	7	61
08:45	43	11	7	3	1	4	8	77	59	1	11	3	1	3	3	81
09:00	44	8	11	2	1	2	12	80	57	5	4	6	1	1	1	75
09:15	38	8	6	2	0	1	9	64	85	4	9	3	5	3	1	110
09:30	48	16	13	5	0	0	1	83	45	8	12	2	0	2	2	71
09:45	34	12	12	1	1	3	2	65	46	3	16	4	3	1	1	74
10:00	31	14	5	3	0	0	0	53	25	9	7	1	3	0	0	45
10:15	41	9	14	5	0	0	0	69	32	2	10	1	3	1	0	49
10:30	38	16	20	7	1	2	2	86	26	3	9	0	2	0	0	40
10:45	50	17	10	5	0	1	1	84	26	1	11	3	1	1	0	43
11:00	43	18	20	5	0	2	2	90	30	3	10	2	2	0	1	48
11:15	34	13	19	8	1	0	1	76	25	2	12	2	1	0	0	42
11:30	47	9	30	2	1	3	0	92	20	2	7	3	3	0	0	35
11:45	47	10	23	3	0	5	1	89	25	6	13	4	0	0	3	51
12:00	42	12	17	8	1	4	0	84	21	2	5	4	3	0	2	37
12:15	59	13	14	1	0	2	1	90	20	1	10	1	3	0	2	37
12:30	52	10	14	11	0	0	2	89	23	2	3	1	0	2	2	33
12:45	60	7	13	7	0	1	0	88	33	4	15	4	3	0	2	61
13:00	61	14	17	4	1	4	0	101	27	2	13	2	3	0	2	49
13:15	65	14	15	3	0	1	0	98	29	5	6	3	1	1	3	48
13:30	56	15	7	8	1	1	1	89	29	3	11	2	1	2	3	51
13:45	59	14	18	3	1	1	2	98	31	2	13	1	3	2	1	53
14:00	56	18	23	4	0	0	0	101	21	2	10	1	3	1	7	45
14:15	51	9	22	3	0	1	0	86	34	3	8	4	3	2	8	62
14:30	63	19	12	4	1	0	1	100	31	2	6	1	2	2	2	46
14:45	51	17	18	4	2	1	1	94	19	3	8	1	4	1	0	36
15:00	48	23	17	6	1	0	1	96	34	7	7	1	2	0	0	51
15:15	64	17	29	5	2	0	4	121	17	2	7	2	4	0	1	33
15:30	84	15	22	2	1	3	3	130	33	3	8	0	4	1	3	52
15:45	63	24	23	4	3	2	1	120	31	0	11	1	5	0	0	48
16:00	60	22	22	1	0	0	5	110	17	3	10	2	3	1	4	40
16:15	94	21	14	2	0	5	5	141	36	4	7	3	8	0	3	61
16:30	95	16	20	3	1	4	2	141	33	5	7	0	5	1	3	54
16:45	66	10	17	2	1	6	4	106	43	3	7	0	6	2	4	65
17:00	82	11	18	2	1	2	3	119	43	1	1	0	5	0	12	62
17:15	103	20	8	0	1	5	4	141	48	2	3	0	6	1	8	68
17:30	88	9	20	2	2	5	4	130	59	2	6	1	0	1	13	82
17:45	87	8	6	1	0	3	6	111	50	5	1	0	3	0	8	67
18:00	71	13	7	4	1	6	3	105	37	4	5	1	3	0	7	57
18:15	70	10	9	2	0	2	4	97	49	3	3	1	2	3	9	70
18:30	76	8	5	1	1	2	3	96	26	6	2	0	2	0	5	41
18:45	59	6	4	0	0	3	6	78	45	3	3	0	2	0	9	62
25.75	2782	598	709	164	30	93	143	4519	1766	145	388	93	143	39	146	#REF!

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	A to D - Guild Street to North Wall Quay(E)							Veh. Total	A to C - Guild Street to Samuel Beckett Bridge							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	2	2	0	0	0	0	2	6	76	4	19	4	3	4	41	151
07:15	0	1	1	0	1	3	0	6	78	2	21	3	0	3	56	163
07:30	0	1	1	0	0	0	1	3	67	2	13	7	0	3	89	181
07:45	1	2	1	0	0	0	3	7	76	3	16	3	0	6	94	198
08:00	2	0	2	1	0	0	4	9	64	2	12	4	2	2	95	181
08:15	5	0	1	0	0	0	0	6	69	7	17	4	0	13	140	250
08:30	0	0	0	2	0	0	2	4	50	7	10	2	1	12	143	225
08:45	3	0	0	0	0	0	0	3	55	9	16	2	2	15	169	268
09:00	3	2	1	1	0	2	0	9	51	7	6	1	0	9	104	178
09:15	3	1	1	1	0	0	0	6	58	8	16	4	1	4	75	166
09:30	6	1	1	0	0	0	2	10	70	13	10	6	0	5	47	151
09:45	2	1	1	0	0	0	3	7	69	12	19	6	2	4	31	143
10:00	2	0	3	1	0	0	1	7	47	14	20	4	2	4	15	106
10:15	3	0	0	1	1	0	1	6	52	14	18	5	0	4	11	104
10:30	1	3	0	0	0	0	0	4	53	20	12	5	1	3	11	105
10:45	1	4	3	2	0	0	0	10	46	17	19	6	0	5	3	96
11:00	4	1	0	0	0	0	0	5	57	14	18	4	1	3	11	108
11:15	11	0	1	0	0	0	1	13	52	9	14	3	1	3	8	90
11:30	4	2	6	1	1	0	0	14	42	11	15	3	1	2	0	74
11:45	2	1	2	1	0	0	0	6	53	14	14	7	2	3	6	99
12:00	2	5	6	2	1	0	1	17	59	13	11	3	0	2	0	88
12:15	10	1	0	2	0	0	1	14	41	8	19	3	0	4	13	88
12:30	8	0	2	1	0	0	0	11	55	22	18	3	2	2	9	111
12:45	3	0	3	0	0	0	0	6	55	11	16	0	0	3	6	91
13:00	9	1	0	1	0	0	0	11	61	20	13	2	3	0	8	107
13:15	7	3	2	2	1	0	0	15	49	18	19	0	0	3	7	96
13:30	5	3	2	0	0	0	0	10	52	9	10	1	2	2	5	81
13:45	4	0	0	1	0	0	0	5	56	16	13	2	2	3	12	104
14:00	5	2	1	1	0	0	0	9	58	16	16	4	1	2	11	108
14:15	7	2	0	2	0	1	0	12	59	10	12	4	1	1	10	97
14:30	6	2	0	0	0	0	0	8	75	10	10	2	2	1	11	111
14:45	9	1	1	2	0	0	0	13	45	12	12	1	0	0	8	78
15:00	9	2	4	2	1	0	0	18	43	7	13	2	1	3	13	82
15:15	7	3	1	2	0	1	0	14	45	12	8	2	0	2	6	75
15:30	9	1	4	1	0	0	3	18	56	17	6	3	2	2	6	92
15:45	8	6	4	0	0	0	0	18	62	6	15	0	0	1	9	93
16:00	6	0	1	0	0	0	2	9	63	14	13	1	2	2	16	111
16:15	5	2	1	2	0	0	0	10	76	13	8	1	0	7	12	117
16:30	9	0	2	0	0	1	1	13	75	11	12	0	3	3	15	119
16:45	7	0	0	0	0	0	4	11	81	8	8	1	0	5	25	128
17:00	1	1	0	0	0	0	0	2	79	15	10	0	4	3	27	138
17:15	9	0	1	0	0	0	2	12	80	9	5	2	1	2	34	133
17:30	12	1	0	0	0	0	0	13	78	6	5	1	1	5	44	140
17:45	8	1	0	0	0	0	2	11	61	6	4	3	0	7	38	119
18:00	12	1	0	1	0	0	0	14	97	12	3	0	1	3	28	144
18:15	16	1	1	0	0	2	0	20	63	12	5	0	1	4	25	110
18:30	7	3	1	0	0	0	4	15	82	10	6	0	2	3	21	124
18:45	12	1	0	0	0	0	2	15	70	9	4	1	0	2	13	99
Total	267	65	62	33	6	10	42	485	2961	521	599	125	50	184	1581	6021

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	A to B - Guild Street to North Wall Quay(W)							Veh. Total	B to A - North Wall Quay(W) to Guild Street							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	2	0	0	0	0	0	0	2	4	0	0	0	1	0	2	7
07:15	3	0	0	0	0	0	0	3	3	2	0	0	0	0	2	7
07:30	1	1	0	0	0	0	3	5	2	0	1	0	0	0	4	7
07:45	5	1	0	0	0	0	5	11	3	0	1	1	0	0	5	10
08:00	2	2	0	2	0	0	0	6	1	3	1	0	1	0	0	6
08:15	4	3	0	0	0	0	4	11	2	0	0	0	0	0	2	4
08:30	2	1	1	1	0	0	1	6	1	1	0	0	0	0	5	7
08:45	2	1	1	0	0	0	1	5	3	1	0	0	2	0	1	7
09:00	3	0	1	0	0	0	0	4	1	3	0	0	0	0	3	7
09:15	1	0	0	0	0	0	2	3	0	1	2	0	0	0	1	4
09:30	4	2	2	0	0	0	2	10	6	6	0	0	0	0	1	13
09:45	2	1	1	1	0	0	0	5	1	0	0	0	0	0	2	3
10:00	8	1	1	2	0	0	0	12	3	6	0	1	0	0	3	13
10:15	3	1	0	1	0	1	1	7	4	0	1	1	0	1	0	7
10:30	4	2	2	3	0	0	0	11	5	2	2	0	0	0	1	10
10:45	4	5	1	0	0	0	0	10	3	3	1	0	0	0	3	10
11:00	6	0	1	1	0	0	0	8	4	3	1	1	0	1	2	12
11:15	5	2	4	0	0	1	0	12	2	2	1	0	0	1	2	8
11:30	4	0	1	0	0	0	0	5	3	3	3	0	0	1	2	12
11:45	3	1	4	1	1	0	1	11	0	2	1	0	0	0	2	5
12:00	6	1	5	1	0	0	0	13	1	3	1	0	0	1	2	8
12:15	5	2	2	0	0	1	0	10	4	5	2	0	0	0	2	13
12:30	4	1	0	0	0	0	0	5	2	1	2	0	0	0	0	5
12:45	4	1	0	0	0	0	1	6	2	0	2	0	0	0	1	5
13:00	3	2	1	1	0	1	1	9	3	1	1	0	0	0	1	6
13:15	6	1	3	0	0	0	0	10	2	1	0	0	0	0	2	5
13:30	2	4	1	0	0	0	1	8	3	2	0	0	0	1	2	8
13:45	2	0	1	0	0	0	1	4	1	1	2	0	0	0	1	5
14:00	2	0	0	0	0	0	0	2	5	4	3	0	0	0	1	13
14:15	3	1	1	0	0	1	0	6	5	2	0	0	0	0	1	8
14:30	2	1	3	0	0	0	1	7	2	0	1	0	0	0	0	3
14:45	3	1	3	0	1	0	1	9	3	2	0	0	0	0	1	6
15:00	5	2	0	0	0	0	0	7	5	2	0	1	0	0	0	8
15:15	6	1	0	1	0	0	0	8	3	3	1	0	0	0	0	7
15:30	3	0	1	0	0	0	0	4	4	1	0	0	0	0	1	6
15:45	4	0	3	0	0	1	1	9	6	0	1	0	0	0	0	7
16:00	3	0	2	0	0	0	1	6	1	5	2	0	0	0	0	8
16:15	3	1	1	2	0	1	2	10	1	0	1	0	0	0	0	2
16:30	6	0	0	0	0	0	1	7	6	1	0	0	0	1	1	9
16:45	3	0	0	0	0	0	1	4	4	1	0	0	0	1	1	7
17:00	11	0	1	0	0	0	2	14	1	2	0	0	0	0	0	3
17:15	7	0	1	0	0	2	2	12	3	0	0	0	0	0	1	4
17:30	6	1	0	0	0	0	2	9	3	0	1	0	0	0	2	6
17:45	6	0	0	0	0	2	2	10	5	1	0	0	0	0	2	8
18:00	3	1	0	0	0	2	1	7	4	3	0	0	0	0	1	8
18:15	2	1	1	1	0	1	0	6	5	2	0	0	0	0	2	9
18:30	9	2	0	0	0	1	0	12	7	3	0	0	0	0	3	13
18:45	1	4	0	0	0	1	3	9	3	2	0	0	0	1	2	8
25.75	188	52	50	18	2	16	44	370	145	86	35	5	4	9	73	357

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	B to D - North Wall Quay(W) to North Wall Quay(E)							Veh. Total	B to C - North Wall Quay(W) to Samuel Beckett Bridge							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	55	1	11	9	13	1	5	95	39	4	7	0	1	1	2	54
07:15	35	9	7	6	12	1	12	82	32	8	8	3	1	3	6	61
07:30	36	12	10	5	12	6	29	110	23	4	10	0	0	3	5	45
07:45	39	11	6	0	8	5	19	88	35	4	10	2	4	1	5	61
08:00	49	8	5	3	15	3	32	115	24	6	4	1	2	1	10	48
08:15	30	3	7	7	19	7	25	98	33	5	2	1	2	3	14	60
08:30	31	8	4	2	14	2	40	101	26	6	6	0	3	4	16	61
08:45	28	8	3	1	19	4	30	93	29	6	6	1	1	4	9	56
09:00	25	12	7	3	25	4	23	99	26	10	2	2	2	3	12	57
09:15	19	13	5	2	21	4	16	80	15	10	4	1	7	0	6	43
09:30	21	12	6	2	18	3	20	82	21	20	7	1	4	0	6	59
09:45	27	8	6	10	18	0	9	78	10	18	4	1	8	1	2	44
10:00	35	10	5	1	19	3	4	77	7	13	3	2	3	0	1	29
10:15	18	13	7	7	10	2	4	61	17	9	7	3	1	1	3	41
10:30	14	13	10	8	14	2	3	64	15	10	7	1	4	1	0	38
10:45	27	13	7	7	14	0	3	71	23	13	7	1	3	0	4	51
11:00	19	16	8	3	14	0	2	62	17	10	10	2	5	1	0	45
11:15	30	7	11	6	14	1	9	78	15	10	11	1	3	1	1	42
11:30	20	7	10	12	8	2	6	65	24	11	4	1	4	0	1	45
11:45	36	10	10	4	13	1	4	78	22	8	8	3	3	1	1	46
12:00	28	9	10	6	10	1	5	69	23	10	8	1	3	2	0	47
12:15	27	14	5	5	10	1	4	66	25	11	2	2	2	2	0	44
12:30	26	8	5	4	9	1	3	56	23	9	7	1	3	2	3	48
12:45	43	7	13	12	8	1	9	93	18	14	4	1	3	1	0	41
13:00	40	15	7	6	13	1	4	86	28	11	3	1	5	2	1	51
13:15	33	9	14	7	11	3	6	83	13	9	5	0	2	1	1	31
13:30	35	10	15	5	11	1	6	83	25	6	7	3	4	1	3	49
13:45	33	14	4	2	14	2	5	74	20	12	2	0	3	2	3	42
14:00	36	13	10	7	10	3	4	83	26	7	7	0	3	1	2	46
14:15	31	17	3	5	8	1	7	72	30	11	4	0	2	0	3	50
14:30	32	8	10	4	9	1	5	69	15	7	2	0	3	0	4	31
14:45	43	10	7	7	8	4	7	86	17	13	4	0	2	0	1	37
15:00	43	16	8	11	13	1	3	95	25	8	3	0	4	1	0	41
15:15	42	14	16	9	8	2	1	92	23	7	0	2	5	1	1	39
15:30	56	18	17	2	12	3	7	115	12	18	1	0	3	0	0	34
15:45	37	9	15	5	12	1	2	81	8	15	3	0	2	0	1	29
16:00	49	22	6	2	10	1	10	100	34	12	4	0	3	1	1	55
16:15	45	13	11	2	17	3	5	96	23	7	2	0	2	3	1	38
16:30	48	8	9	4	20	1	13	103	25	7	0	0	2	4	1	39
16:45	46	10	7	2	13	1	17	96	39	5	2	0	2	3	2	53
17:00	42	14	4	2	14	1	16	93	11	4	0	1	2	1	4	23
17:15	24	17	5	1	19	1	11	78	20	3	0	1	1	1	6	32
17:30	28	9	2	7	29	2	25	102	16	10	2	0	2	2	10	42
17:45	32	9	3	4	28	4	29	109	25	3	0	0	4	2	10	44
18:00	35	10	5	4	28	5	19	106	28	10	1	0	2	4	3	48
18:15	33	11	1	0	18	2	15	80	23	5	1	1	2	2	15	49
18:30	44	11	4	4	13	5	5	86	32	16	1	0	3	0	5	57
18:45	30	7	2	0	16	1	9	65	20	17	0	0	5	1	4	47
25.75	1635	526	363	227	691	105	547	4094	1080	452	202	41	140	69	189	2173

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	C to B - Samuel Beckett Bridge to North Wall Quay(W)							Veh. Total	C to A - Samuel Beckett Bridge to Guild Street							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	31	0	5	0	1	0	0	37	76	0	7	1	2	1	6	93
07:15	36	1	2	0	0	1	7	47	82	3	11	1	0	0	2	99
07:30	32	5	5	0	0	1	5	48	68	7	10	0	0	0	11	96
07:45	41	3	3	1	0	2	3	53	75	14	4	1	0	5	16	115
08:00	33	1	1	1	0	3	4	43	60	12	5	2	1	1	15	96
08:15	39	3	0	0	1	3	7	53	83	6	5	1	0	1	13	109
08:30	34	5	0	1	0	0	19	59	48	12	8	0	0	3	16	87
08:45	33	2	2	0	0	4	17	58	56	9	5	2	1	5	23	101
09:00	35	9	1	1	0	2	14	62	44	12	5	2	2	6	19	90
09:15	32	7	4	1	0	2	8	54	53	17	8	1	0	1	11	91
09:30	29	6	4	0	0	0	4	43	47	18	8	3	1	3	9	89
09:45	31	6	4	2	0	2	4	49	57	22	14	3	0	2	6	104
10:00	12	9	1	2	0	0	2	26	41	16	8	3	0	2	5	75
10:15	16	23	1	0	0	2	2	44	52	23	12	3	0	2	4	96
10:30	17	12	1	0	0	1	2	33	62	20	17	0	0	1	3	103
10:45	20	9	7	0	0	0	0	36	51	19	9	4	0	3	1	87
11:00	13	14	6	1	0	1	1	36	50	20	11	3	0	1	3	88
11:15	11	14	5	0	0	0	0	30	33	18	19	6	1	0	5	82
11:30	13	9	2	0	0	0	0	24	56	14	18	0	0	4	6	98
11:45	10	10	2	2	0	0	1	25	60	18	17	3	0	2	2	102
12:00	11	7	5	0	0	0	3	26	60	25	18	6	0	5	3	117
12:15	14	3	7	1	0	2	0	27	52	12	18	1	0	1	2	86
12:30	14	12	6	0	1	0	2	35	58	14	15	9	1	2	3	102
12:45	12	11	4	1	0	1	5	34	54	14	10	6	0	3	4	91
13:00	10	4	2	0	0	0	3	19	57	21	19	5	0	5	3	110
13:15	6	6	7	0	0	2	4	25	59	14	13	1	0	2	2	91
13:30	9	8	3	1	0	2	6	29	63	20	12	3	1	2	6	107
13:45	13	7	10	1	0	0	4	35	47	21	19	3	2	3	9	104
14:00	11	6	4	0	0	1	2	24	59	24	18	3	0	0	5	109
14:15	5	3	7	1	0	1	1	18	58	11	19	2	0	2	8	100
14:30	17	10	2	1	0	1	1	32	69	23	11	4	2	2	7	118
14:45	15	11	3	2	0	0	3	34	57	12	25	2	1	5	6	108
15:00	10	5	2	0	0	0	2	19	56	18	10	2	0	3	7	96
15:15	10	5	3	0	0	0	1	19	67	22	35	3	1	0	4	132
15:30	13	9	5	0	0	0	4	31	62	17	19	2	1	2	9	112
15:45	12	8	10	0	0	1	2	33	54	17	26	4	3	6	16	126
16:00	16	3	4	3	0	1	3	30	54	21	22	1	0	4	9	111
16:15	17	5	3	1	0	3	2	31	70	11	13	3	0	6	18	121
16:30	17	2	4	0	0	1	3	27	72	15	15	1	0	8	19	130
16:45	14	3	6	0	0	1	6	30	59	9	19	3	0	11	31	132
17:00	23	10	3	0	0	0	8	44	53	10	13	1	0	4	34	115
17:15	24	3	4	0	0	2	5	38	70	13	6	1	0	9	61	160
17:30	21	1	1	2	0	2	4	31	70	6	15	2	0	18	68	179
17:45	20	1	2	1	0	3	3	30	69	8	7	0	0	9	65	158
18:00	26	4	2	1	0	2	5	40	64	8	12	3	1	9	62	159
18:15	7	3	1	0	0	1	2	14	44	10	5	2	0	5	42	108
18:30	18	4	2	0	0	3	4	31	67	8	7	0	0	5	34	121
18:45	22	3	1	0	1	1	3	31	52	3	9	0	0	5	26	95
25.75	925	305	169	28	4	55	191	1677	2830	687	631	112	21	179	739	5199

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	C to D - Samuel Beckett Bridge to North Wall Quay(E)							Veh. Total	D to C - North Wall Quay(E) to Samuel Beckett Bridge							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	0	0	0	0	0	0	1	1	6	0	7	1	0	0	7	21
07:15	0	0	0	0	0	0	5	5	10	1	2	0	2	0	10	25
07:30	0	0	0	0	0	0	3	3	14	0	1	1	0	0	11	27
07:45	0	0	0	0	0	0	8	8	9	0	4	0	0	0	21	34
08:00	0	0	0	0	0	0	9	9	5	0	4	0	0	0	25	34
08:15	0	0	0	0	0	0	7	7	9	0	0	1	0	1	48	59
08:30	0	0	0	0	0	0	9	9	11	1	0	0	1	0	46	59
08:45	0	0	0	0	0	0	7	7	7	3	0	1	0	2	43	56
09:00	0	0	0	0	0	0	5	5	7	3	1	0	0	1	38	50
09:15	0	0	0	0	0	0	3	3	7	1	3	1	0	0	19	31
09:30	0	0	0	0	0	0	4	4	11	3	4	1	0	2	21	42
09:45	0	0	0	0	0	0	3	3	5	0	1	0	0	0	7	13
10:00	0	1	0	0	0	0	2	3	3	3	3	0	0	0	5	14
10:15	0	0	0	0	0	0	3	3	6	2	3	0	0	0	4	15
10:30	0	0	0	0	0	0	3	3	3	1	0	0	0	0	5	9
10:45	0	0	0	0	0	0	1	1	4	0	3	0	0	0	2	9
11:00	0	0	0	0	0	0	0	0	6	2	2	0	0	0	1	11
11:15	0	0	0	0	0	0	0	0	4	0	2	1	0	0	1	8
11:30	2	0	0	0	0	0	2	4	5	1	0	0	0	0	4	10
11:45	0	0	0	1	0	0	0	1	1	1	2	1	0	0	1	6
12:00	0	0	0	0	0	0	0	0	1	0	2	0	0	0	8	11
12:15	0	0	0	0	0	0	0	0	6	0	3	0	0	0	0	9
12:30	0	0	0	0	0	0	0	0	8	2	1	0	0	0	4	15
12:45	0	0	0	0	0	0	3	3	4	0	2	0	0	0	11	17
13:00	0	0	0	0	0	0	2	2	6	1	3	2	0	0	5	17
13:15	0	0	0	0	0	0	2	2	3	0	1	0	0	1	7	12
13:30	0	0	0	0	0	0	3	3	7	1	2	0	0	0	8	18
13:45	0	0	0	0	0	0	1	1	3	0	2	0	0	2	9	16
14:00	0	0	0	0	0	0	0	0	3	0	1	0	0	0	5	9
14:15	0	0	0	0	0	0	1	1	4	1	0	0	0	0	2	7
14:30	0	0	0	0	0	0	1	1	5	0	3	1	0	1	7	17
14:45	0	0	0	0	0	0	2	2	2	1	0	0	0	0	5	8
15:00	0	0	0	0	0	0	1	1	2	3	3	0	0	0	5	13
15:15	0	0	0	0	0	0	0	0	5	2	0	0	1	1	5	14
15:30	0	0	0	0	0	0	2	2	4	1	2	0	0	1	9	17
15:45	1	0	0	0	0	0	0	1	5	1	1	1	1	1	3	13
16:00	0	0	0	0	0	0	3	3	5	2	0	0	0	1	19	27
16:15	0	0	0	0	0	0	2	2	7	1	1	0	0	0	13	22
16:30	1	0	0	0	0	0	2	3	6	1	0	0	0	0	22	29
16:45	0	0	0	0	0	0	5	5	3	0	2	1	0	0	32	38
17:00	0	1	0	0	0	0	2	3	2	1	0	0	0	0	37	40
17:15	0	0	0	0	0	0	1	1	3	1	0	0	0	3	50	57
17:30	0	0	0	0	0	0	3	3	3	2	1	0	0	2	56	64
17:45	0	0	0	0	0	0	4	4	5	3	1	0	0	1	59	69
18:00	0	0	0	0	0	0	3	3	2	2	0	0	0	2	43	49
18:15	0	0	0	0	0	0	2	2	5	1	0	0	0	0	24	30
18:30	0	0	0	0	0	0	3	3	4	1	0	0	0	0	20	25
18:45	0	0	1	0	0	0	1	2	2	1	1	0	0	0	19	23
25.75	4	2	1	1	0	0	124	132	248	51	74	13	5	22	806	1219

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	D to B - North Wall Quay(E) to North Wall Quay(W)							Veh. Total	D to A - North Wall Quay(E) to Guild Street							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	22	0	9	10	8	0	1	50	1	0	0	0	0	0	1	2
07:15	15	2	11	5	7	0	4	44	0	0	0	1	0	0	0	1
07:30	30	4	9	8	13	1	9	74	0	0	0	0	0	0	1	1
07:45	18	3	7	5	12	0	5	50	1	0	0	2	0	0	0	3
08:00	27	3	8	6	18	2	5	69	0	0	0	0	0	1	0	1
08:15	21	4	5	3	18	1	13	65	0	0	0	1	0	0	0	1
08:30	39	5	9	4	18	1	13	89	1	0	0	0	0	0	1	2
08:45	32	3	8	7	20	2	13	85	3	1	0	0	0	0	0	4
09:00	30	7	7	10	16	1	15	86	0	0	0	0	0	0	2	2
09:15	35	8	5	10	11	0	6	75	0	0	0	0	0	0	0	0
09:30	23	6	4	4	10	0	9	56	0	2	0	0	0	0	0	2
09:45	18	3	4	5	12	0	4	46	2	1	0	1	0	0	0	4
10:00	18	5	6	1	10	0	6	46	1	1	1	1	0	0	1	5
10:15	40	10	5	4	10	1	2	72	1	0	0	0	0	0	1	2
10:30	34	6	5	6	5	1	7	64	1	1	1	1	0	0	0	4
10:45	33	16	2	4	12	1	2	70	1	1	0	1	0	0	0	3
11:00	22	4	6	5	8	1	6	52	1	1	0	2	0	0	0	4
11:15	24	6	7	3	7	1	1	49	1	0	0	0	0	0	0	1
11:30	30	4	6	7	8	2	4	61	0	1	0	0	0	0	0	1
11:45	29	3	8	6	9	0	3	58	2	0	0	0	0	0	0	2
12:00	27	11	3	3	5	2	8	59	1	0	0	1	0	0	0	2
12:15	25	7	8	5	7	1	5	58	1	0	0	0	0	0	0	1
12:30	35	7	4	5	8	1	3	63	0	0	0	0	0	0	1	1
12:45	35	7	8	3	12	2	8	75	3	1	0	0	0	0	0	4
13:00	31	4	6	6	6	1	6	60	0	0	1	0	0	0	1	2
13:15	37	8	7	4	6	1	9	72	1	0	1	0	0	0	0	2
13:30	23	8	4	6	7	0	5	53	1	1	0	0	0	0	0	2
13:45	31	7	6	6	9	2	3	64	1	0	1	1	0	0	0	3
14:00	20	5	5	3	6	0	2	41	2	0	0	1	0	0	0	3
14:15	27	12	6	5	8	2	3	63	0	1	0	1	0	0	0	2
14:30	19	7	6	3	4	0	6	45	0	1	0	0	0	0	0	1
14:45	14	5	6	2	8	1	6	42	0	2	0	0	1	0	1	4
15:00	39	9	5	3	13	1	5	75	0	3	0	0	0	0	0	3
15:15	21	3	2	4	5	1	4	40	0	0	0	0	0	0	0	0
15:30	28	12	7	3	10	0	3	63	1	1	0	0	1	0	0	3
15:45	24	3	6	1	15	2	6	57	0	1	0	0	0	0	0	1
16:00	13	8	5	3	9	0	21	59	2	1	0	0	0	1	0	4
16:15	18	6	7	4	10	1	10	56	0	0	0	0	0	0	0	0
16:30	22	5	2	1	9	2	15	56	1	0	0	0	0	1	0	2
16:45	26	5	3	1	16	3	14	68	0	0	0	0	0	0	0	0
17:00	21	7	2	3	5	4	33	75	3	1	0	0	0	0	0	4
17:15	19	4	1	1	11	5	26	67	1	1	0	0	0	0	0	2
17:30	26	8	4	1	11	4	22	76	2	0	1	0	0	1	1	5
17:45	38	5	3	0	16	3	21	86	0	1	0	0	0	0	0	1
18:00	31	9	5	1	6	1	28	81	0	0	0	1	0	0	0	1
18:15	28	7	3	3	15	5	12	73	3	0	0	1	0	0	0	4
18:30	29	20	3	2	11	2	14	81	0	1	0	0	0	0	0	1
18:45	31	7	7	2	12	2	10	71	1	0	1	0	0	0	0	2
25.75	1278	308	265	197	492	64	436	3040	40	25	7	16	2	4	11	105

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	To Arm A - Guild Street							Veh. Total	From Arm A - Guild Street							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	81	0	7	1	3	1	9	102	80	6	19	4	3	4	43	159
07:15	85	5	11	2	0	0	4	107	81	3	22	3	1	6	56	172
07:30	70	7	11	0	0	0	16	104	68	4	14	7	0	3	93	189
07:45	79	14	5	4	0	5	21	128	82	6	17	3	0	6	102	216
08:00	61	15	6	2	2	2	15	103	68	4	14	7	2	2	99	196
08:15	85	6	5	2	0	1	15	114	78	10	18	4	0	13	144	267
08:30	50	13	8	0	0	3	22	96	52	8	11	5	1	12	146	235
08:45	62	11	5	2	3	5	24	112	60	10	17	2	2	15	170	276
09:00	45	15	5	2	2	6	24	99	57	9	8	2	0	11	104	191
09:15	53	18	10	1	0	1	12	95	62	9	17	5	1	4	77	175
09:30	53	26	8	3	1	3	10	104	80	16	13	6	0	5	51	171
09:45	60	23	14	4	0	2	8	111	73	14	21	7	2	4	34	155
10:00	45	23	9	5	0	2	9	93	57	15	24	7	2	4	16	125
10:15	57	23	13	4	0	3	5	105	58	15	18	7	1	5	13	117
10:30	68	23	20	1	0	1	4	117	58	25	14	8	1	3	11	120
10:45	55	23	10	5	0	3	4	100	51	26	23	8	0	5	3	116
11:00	55	24	12	6	0	2	5	104	67	15	19	5	1	3	11	121
11:15	36	20	20	6	1	1	7	91	68	11	19	3	1	4	9	115
11:30	59	18	21	0	0	5	8	111	50	13	22	4	2	2	0	93
11:45	62	20	18	3	0	2	4	109	58	16	20	9	3	3	7	116
12:00	62	28	19	7	0	6	5	127	67	19	22	6	1	2	1	118
12:15	57	17	20	1	0	1	4	100	56	11	21	5	0	5	14	112
12:30	60	15	17	9	1	2	4	108	67	23	20	4	2	2	9	127
12:45	59	15	12	6	0	3	5	100	62	12	19	0	0	3	7	103
13:00	60	22	21	5	0	5	5	118	73	23	14	4	3	1	9	127
13:15	62	15	14	1	0	2	4	98	62	22	24	2	1	3	7	121
13:30	67	23	12	3	1	3	8	117	59	16	13	1	2	2	6	99
13:45	49	22	22	4	2	3	10	112	62	16	14	3	2	3	13	113
14:00	66	28	21	4	0	0	6	125	65	18	17	5	1	2	11	119
14:15	63	14	19	3	0	2	9	110	69	13	13	6	1	3	10	115
14:30	71	24	12	4	2	2	7	122	83	13	13	2	2	1	12	126
14:45	60	16	25	2	2	5	8	118	57	14	16	3	1	0	9	100
15:00	61	23	10	3	0	3	7	107	57	11	17	4	2	3	13	107
15:15	70	25	36	3	1	0	4	139	58	16	9	5	0	3	6	97
15:30	67	19	19	2	2	2	10	121	68	18	11	4	2	2	9	114
15:45	60	18	27	4	3	6	16	134	74	12	22	0	0	2	10	120
16:00	57	27	24	1	0	5	9	123	72	14	16	1	2	2	19	126
16:15	71	11	14	3	0	6	18	123	84	16	10	5	0	8	14	137
16:30	79	16	15	1	0	10	20	141	90	11	14	0	3	4	17	139
16:45	63	10	19	3	0	12	32	139	91	8	8	1	0	5	30	143
17:00	57	13	13	1	0	4	34	122	91	16	11	0	4	3	29	154
17:15	74	14	6	1	0	9	62	166	96	9	7	2	1	4	38	157
17:30	75	6	17	2	0	19	71	190	96	8	5	1	1	5	46	162
17:45	74	10	7	0	0	9	67	167	75	7	4	3	0	9	42	140
18:00	68	11	12	4	1	9	63	168	112	14	3	1	1	5	29	165
18:15	52	12	5	3	0	5	44	121	81	14	7	1	1	7	25	136
18:30	74	12	7	0	0	5	37	135	98	15	7	0	2	4	25	151
18:45	56	5	10	0	0	6	28	105	83	14	4	1	0	3	18	123
25.75	3015	798	673	133	27	192	823	5661	3416	638	711	176	58	210	1667	6876

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	To Arm B - North Wall Quay(W)							Veh. Total	From Arm B - North Wall Quay(W)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	55	0	14	10	9	0	1	89	98	5	18	9	15	2	9	156
07:15	54	3	13	5	7	1	11	94	70	19	15	9	13	4	20	150
07:30	63	10	14	8	13	2	17	127	61	16	21	5	12	9	38	162
07:45	64	7	10	6	12	2	13	114	77	15	17	3	12	6	29	159
08:00	62	6	9	9	18	5	9	118	74	17	10	4	18	4	42	169
08:15	64	10	5	3	19	4	24	129	65	8	9	8	21	10	41	162
08:30	75	11	10	6	18	1	33	154	58	15	10	2	17	6	61	169
08:45	67	6	11	7	20	6	31	148	60	15	9	2	22	8	40	156
09:00	68	16	9	11	16	3	29	152	52	25	9	5	27	7	38	163
09:15	68	15	9	11	11	2	16	132	34	24	11	3	28	4	23	127
09:30	56	14	10	4	10	0	15	109	48	38	13	3	22	3	27	154
09:45	51	10	9	8	12	2	8	100	38	26	10	11	26	1	13	125
10:00	38	15	8	5	10	0	8	84	45	29	8	4	22	3	8	119
10:15	59	34	6	5	10	4	5	123	39	22	15	11	11	4	7	109
10:30	55	20	8	9	5	2	9	108	34	25	19	9	18	3	4	112
10:45	57	30	10	4	12	1	2	116	53	29	15	8	17	0	10	132
11:00	41	18	13	7	8	2	7	96	40	29	19	6	19	2	4	119
11:15	40	22	16	3	7	2	1	91	47	19	23	7	17	3	12	128
11:30	47	13	9	7	8	2	4	90	47	21	17	13	12	3	9	122
11:45	42	14	14	9	10	0	5	94	58	20	19	7	16	2	7	129
12:00	44	19	13	4	5	2	11	98	52	22	19	7	13	4	7	124
12:15	44	12	17	6	7	4	5	95	56	30	9	7	12	3	6	123
12:30	53	20	10	5	9	1	5	103	51	18	14	5	12	3	6	109
12:45	51	19	12	4	12	3	14	115	63	21	19	13	11	2	10	139
13:00	44	10	9	7	6	2	10	88	71	27	11	7	18	3	6	143
13:15	49	15	17	4	6	3	13	107	48	19	19	7	13	4	9	119
13:30	34	20	8	7	7	2	12	90	63	18	22	8	15	3	11	140
13:45	46	14	17	7	9	2	8	103	54	27	8	2	17	4	9	121
14:00	33	11	9	3	6	1	4	67	67	24	20	7	13	4	7	142
14:15	35	16	14	6	8	4	4	87	66	30	7	5	10	1	11	130
14:30	38	18	11	4	4	1	8	84	49	15	13	4	12	1	9	103
14:45	32	17	12	4	9	1	10	85	63	25	11	7	10	4	9	129
15:00	54	16	7	3	13	1	7	101	73	26	11	12	17	2	3	144
15:15	37	9	5	5	5	1	5	67	68	24	17	11	13	3	2	138
15:30	44	21	13	3	10	0	7	98	72	37	18	2	15	3	8	155
15:45	40	11	19	1	15	4	9	99	51	24	19	5	14	1	3	117
16:00	32	11	11	6	9	1	25	95	84	39	12	2	13	2	11	163
16:15	38	12	11	7	10	5	14	97	69	20	14	2	19	6	6	136
16:30	45	7	6	1	9	3	19	90	79	16	9	4	22	6	15	151
16:45	43	8	9	1	16	4	21	102	89	16	9	2	15	5	20	156
17:00	55	17	6	3	5	4	43	133	54	20	4	3	16	2	20	119
17:15	50	7	6	1	11	9	33	117	47	20	5	2	20	2	18	114
17:30	53	10	5	3	11	6	28	116	47	19	5	7	31	4	37	150
17:45	64	6	5	1	16	8	26	126	62	13	3	4	32	6	41	161
18:00	60	14	7	2	6	5	34	128	67	23	6	4	30	9	23	162
18:15	37	11	5	4	15	7	14	93	61	18	2	1	20	4	32	138
18:30	56	26	5	2	11	6	18	124	83	30	5	4	16	5	13	156
18:45	54	14	8	2	13	4	16	111	53	26	2	0	21	3	15	120
25.75	2391	665	484	243	498	135	671	5087	2860	1064	600	273	835	183	809	6624

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	To Arm C - Samuel Beckett Bridge							Veh. Total	From Arm C - Samuel Beckett Bridge							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	121	8	33	5	4	5	50	226	107	0	12	1	3	1	7	131
07:15	120	11	31	6	3	6	72	249	118	4	13	1	0	1	14	151
07:30	104	6	24	8	0	6	105	253	100	12	15	0	0	1	19	147
07:45	120	7	30	5	4	7	120	293	116	17	7	2	0	7	27	176
08:00	93	8	20	5	4	3	130	263	93	13	6	3	1	4	28	148
08:15	111	12	19	6	2	17	202	369	122	9	5	1	1	4	27	169
08:30	87	14	16	2	5	16	205	345	82	17	8	1	0	3	44	155
08:45	91	18	22	4	3	21	221	380	89	11	7	2	1	9	47	166
09:00	84	20	9	3	2	13	154	285	79	21	6	3	2	8	38	157
09:15	80	19	23	6	8	4	100	240	85	24	12	2	0	3	22	148
09:30	102	36	21	8	4	7	74	252	76	24	12	3	1	3	17	136
09:45	84	30	24	7	10	5	40	200	88	28	18	5	0	4	13	156
10:00	57	30	26	6	5	4	21	149	53	26	9	5	0	2	9	104
10:15	75	25	28	8	1	5	18	160	68	46	13	3	0	4	9	143
10:30	71	31	19	6	5	4	16	152	79	32	18	0	0	2	8	139
10:45	73	30	29	7	3	5	9	156	71	28	16	4	0	3	2	124
11:00	80	26	30	6	6	4	12	164	63	34	17	4	0	2	4	124
11:15	71	19	27	5	4	4	10	140	44	32	24	6	1	0	5	112
11:30	71	23	19	4	5	2	5	129	71	23	20	0	0	4	8	126
11:45	76	23	24	11	5	4	8	151	70	28	19	6	0	2	3	128
12:00	83	23	21	4	3	4	8	146	71	32	23	6	0	5	6	143
12:15	72	19	24	5	2	6	13	141	66	15	25	2	0	3	2	113
12:30	86	33	26	4	5	4	16	174	72	26	21	9	2	2	5	137
12:45	77	25	22	1	3	4	17	149	66	25	14	7	0	4	12	128
13:00	95	32	19	5	8	2	14	175	67	25	21	5	0	5	8	131
13:15	65	27	25	0	2	5	15	139	65	20	20	1	0	4	8	118
13:30	84	16	19	4	6	3	16	148	72	28	15	4	1	4	15	139
13:45	79	28	17	2	5	7	24	162	60	28	29	4	2	3	14	140
14:00	87	23	24	4	4	3	18	163	70	30	22	3	0	1	7	133
14:15	93	22	16	4	3	1	15	154	63	14	26	3	0	3	10	119
14:30	95	17	15	3	5	2	22	159	86	33	13	5	2	3	9	151
14:45	64	26	16	1	2	0	14	123	72	23	28	4	1	5	11	144
15:00	70	18	19	2	5	4	18	136	66	23	12	2	0	3	10	116
15:15	73	21	8	4	6	4	12	128	77	27	38	3	1	0	5	151
15:30	72	36	9	3	5	3	15	143	75	26	24	2	1	2	15	145
15:45	75	22	19	1	3	2	13	135	67	25	36	4	3	7	18	160
16:00	102	28	17	1	5	4	36	193	70	24	26	4	0	5	15	144
16:15	106	21	11	1	2	10	26	177	87	16	16	4	0	9	22	154
16:30	106	19	12	0	5	7	38	187	90	17	19	1	0	9	24	160
16:45	123	13	12	2	2	8	59	219	73	12	25	3	0	12	42	167
17:00	92	20	10	1	6	4	68	201	76	21	16	1	0	4	44	162
17:15	103	13	5	3	2	6	90	222	94	16	10	1	0	11	67	199
17:30	97	18	8	1	3	9	110	246	91	7	16	4	0	20	75	213
17:45	91	12	5	3	4	10	107	232	89	9	9	1	0	12	72	192
18:00	127	24	4	0	3	9	74	241	90	12	14	4	1	11	70	202
18:15	91	18	6	1	3	6	64	189	51	13	6	2	0	6	46	124
18:30	118	27	7	0	5	3	46	206	85	12	9	0	0	8	41	155
18:45	92	27	5	1	5	3	36	169	74	6	11	0	1	6	30	128
25.75	4289	1024	875	179	195	275	2576	9413	3759	994	801	141	#REF!	#REF!	#REF!	#REF!

Site No. 5
Location Guild Street / North Wall Quay(W) / Samuel Beckett Bridge / North Wall Quay(E)
Date 04 October 2018

Time	To Arm D - North Wall Quay(E)							Veh. Total	From Arm D - North Wall Quay(E)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	57	3	11	9	13	1	8	102	29	0	16	11	8	0	9	73
07:15	35	10	8	6	13	4	17	93	25	3	13	6	9	0	14	70
07:30	36	13	11	5	12	6	33	116	44	4	10	9	13	1	21	102
07:45	40	13	7	0	8	5	30	103	28	3	11	7	12	0	26	87
08:00	51	8	7	4	15	3	45	133	32	3	12	6	18	3	30	104
08:15	35	3	8	7	19	7	32	111	30	4	5	5	18	2	61	125
08:30	31	8	4	4	14	2	51	114	51	6	9	4	19	1	60	150
08:45	31	8	3	1	19	4	37	103	42	7	8	8	20	4	56	145
09:00	28	14	8	4	25	6	28	113	37	10	8	10	16	2	55	138
09:15	22	14	6	3	21	4	19	89	42	9	8	11	11	0	25	106
09:30	27	13	7	2	18	3	26	96	34	11	8	5	10	2	30	100
09:45	29	9	7	10	18	0	15	88	25	4	5	6	12	0	11	63
10:00	37	11	8	2	19	3	7	87	22	9	10	2	10	0	12	65
10:15	21	13	7	8	11	2	8	70	47	12	8	4	10	1	7	89
10:30	15	16	10	8	14	2	6	71	38	8	6	7	5	1	12	77
10:45	28	17	10	9	14	0	4	82	38	17	5	5	12	1	4	82
11:00	23	17	8	3	14	0	2	67	29	7	8	7	8	1	7	67
11:15	41	7	12	6	14	1	10	91	29	6	9	4	7	1	2	58
11:30	26	9	16	13	9	2	8	83	35	6	6	7	8	2	8	72
11:45	38	11	12	6	13	1	4	85	32	4	10	7	9	0	4	66
12:00	30	14	16	8	11	1	6	86	29	11	5	4	5	2	16	72
12:15	37	15	5	7	10	1	5	80	32	7	11	5	7	1	5	68
12:30	34	8	7	5	9	1	3	67	43	9	5	5	8	1	8	79
12:45	46	7	16	12	8	1	12	102	42	8	10	3	12	2	19	96
13:00	49	16	7	7	13	1	6	99	37	5	10	8	6	1	12	79
13:15	40	12	16	9	12	3	8	100	41	8	9	4	6	2	16	86
13:30	40	13	17	5	11	1	9	96	31	10	6	6	7	0	13	73
13:45	37	14	4	3	14	2	6	80	35	7	9	7	9	4	12	83
14:00	41	15	11	8	10	3	4	92	25	5	6	4	6	0	7	53
14:15	38	19	3	7	8	2	8	85	31	14	6	6	8	2	5	72
14:30	38	10	10	4	9	1	6	78	24	8	9	4	4	1	13	63
14:45	52	11	8	9	8	4	9	101	16	8	6	2	9	1	12	54
15:00	52	18	12	13	14	1	4	114	41	15	8	3	13	1	10	91
15:15	49	17	17	11	8	3	1	106	26	5	2	4	6	2	9	54
15:30	65	19	21	3	12	3	12	135	33	14	9	3	11	1	12	83
15:45	46	15	19	5	12	1	2	100	29	5	7	2	16	3	9	71
16:00	55	22	7	2	10	1	15	112	20	11	5	3	9	2	40	90
16:15	50	15	12	4	17	3	7	108	25	7	8	4	10	1	23	78
16:30	58	8	11	4	20	2	16	119	29	6	2	1	9	3	37	87
16:45	53	10	7	2	13	1	26	112	29	5	5	2	16	3	46	106
17:00	43	16	4	2	14	1	18	98	26	9	2	3	5	4	70	119
17:15	33	17	6	1	19	1	14	91	23	6	1	1	11	8	76	126
17:30	40	10	2	7	29	2	28	118	31	10	6	1	11	7	79	145
17:45	40	10	3	4	28	4	35	124	43	9	4	0	16	4	80	156
18:00	47	11	5	5	28	5	22	123	33	11	5	2	6	3	71	131
18:15	49	12	2	0	18	4	17	102	36	8	3	4	15	5	36	107
18:30	51	14	5	4	13	5	12	104	33	22	3	2	11	2	34	107
18:45	42	8	3	0	16	1	12	82	34	8	9	2	12	2	29	96
Total	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Site No. 6
Location Access Road / Sheriff Street Lower(W) / Sheriff Street Lower(S)
Date 04 October 2018

Time	A to C - Access Road to Sheriff Street Lower(S)							Veh. Total	A to B - Access Road to Sheriff Street Lower(W)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	1	1	0	0	0	0	0	2	2	0	0	0	0	0	0	2
07:15	2	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1
07:30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	3
07:45	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
08:00	1	1	1	0	0	0	0	3	1	0	3	0	0	0	0	4
08:15	1	0	1	0	0	0	0	2	0	0	1	0	0	0	0	1
08:30	1	0	1	0	0	0	0	2	0	0	1	0	0	0	0	1
08:45	0	0	2	0	0	0	1	3	1	0	0	0	0	0	0	1
09:00	1	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
09:15	3	0	2	0	0	0	0	5	1	0	1	0	0	0	0	2
09:30	1	1	2	0	0	0	0	4	1	0	1	0	0	0	0	2
09:45	1	0	2	0	0	0	0	3	2	0	0	1	0	0	0	3
10:00	0	0	4	0	0	0	0	4	0	0	1	0	0	0	0	1
10:15	2	0	1	0	0	0	0	3	2	0	3	0	0	1	0	6
10:30	0	0	1	0	0	0	0	1	1	0	1	1	0	0	1	4
10:45	1	1	0	0	0	0	0	2	5	0	0	0	0	0	0	5
11:00	7	0	1	0	0	0	0	8	1	0	1	0	0	2	0	4
11:15	4	0	3	2	0	0	0	9	2	0	3	0	0	0	0	5
11:30	3	0	1	0	0	0	2	6	2	0	0	0	0	0	0	2
11:45	2	0	1	0	0	0	0	3	1	0	1	0	0	0	0	2
12:00	5	0	4	0	0	0	1	10	2	0	1	0	0	0	0	3
12:15	3	0	2	0	0	0	0	5	2	0	0	0	0	0	0	2
12:30	4	0	3	0	0	0	0	7	2	1	1	0	0	0	0	4
12:45	2	2	2	1	0	0	0	7	1	0	0	0	0	0	0	1
13:00	5	0	1	0	0	0	1	7	2	0	1	0	0	0	0	3
13:15	5	0	2	1	0	0	0	8	3	0	1	1	0	0	0	5
13:30	6	0	1	0	0	0	0	7	0	0	0	1	0	0	0	1
13:45	5	0	4	0	0	0	0	9	1	0	0	0	0	0	0	1
14:00	6	0	2	0	0	0	0	8	1	0	1	0	0	0	0	2
14:15	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	2
14:30	7	0	3	0	0	0	0	10	2	0	0	0	0	0	0	2
14:45	4	1	2	0	0	0	0	7	1	0	1	0	0	0	0	2
15:00	1	0	1	0	0	0	0	2	1	0	1	0	0	0	0	2
15:15	4	0	2	0	0	0	0	6	0	0	1	0	0	0	0	1
15:30	7	0	3	1	0	0	1	12	1	0	0	0	0	0	0	1
15:45	4	0	0	0	0	0	0	4	1	0	0	0	0	0	1	2
16:00	12	0	2	0	0	0	2	16	2	0	3	0	0	0	0	5
16:15	6	0	2	0	0	0	1	9	6	0	0	0	0	0	0	6
16:30	11	0	0	1	0	0	1	13	4	0	0	0	0	0	0	4
16:45	10	0	0	0	0	0	0	10	3	0	0	0	0	0	1	4
17:00	10	0	0	0	0	0	1	11	5	0	0	0	0	0	2	7
17:15	18	0	1	0	0	0	0	19	6	0	0	0	0	0	0	6
17:30	16	0	1	0	0	0	0	17	4	0	1	0	0	0	1	6
17:45	14	0	0	0	0	0	1	15	5	0	0	0	0	0	0	5
18:00	17	0	2	0	0	0	0	19	5	0	0	0	0	0	0	5
18:15	6	0	2	0	0	0	1	9	4	0	0	0	0	0	0	4
18:30	6	0	1	0	0	0	1	8	8	0	0	0	0	0	0	8
18:45	12	1	0	0	0	0	0	13	0	0	0	0	0	0	0	0
Total	237	8	68	6	0	0	15	334	98	1	30	6	0	3	7	145

Site No. 6
Location Access Road / Sheriff Street Lower(W) / Sheriff Street Lower(S)
Date 04 October 2018

Time	B to A - Sheriff Street Lower(W) to Access Road							Veh. Total	B to C - Sheriff Street Lower(W) to Sheriff Street Lower(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	4	0	1	0	0	0	1	6	10	1	2	1	0	0	0	14
07:15	2	0	1	0	0	0	1	4	4	2	0	0	0	1	0	7
07:30	3	0	0	0	0	0	0	3	10	5	0	0	0	0	1	16
07:45	4	0	1	0	0	0	1	6	12	2	0	0	1	0	1	16
08:00	6	0	0	0	0	0	0	6	6	0	0	0	0	0	2	8
08:15	6	0	3	0	0	0	0	9	5	2	2	0	0	0	1	10
08:30	4	0	2	0	0	0	0	6	12	1	1	0	0	0	4	18
08:45	9	0	1	0	0	0	0	10	18	3	0	1	0	1	2	25
09:00	7	0	0	0	0	0	1	8	12	3	0	1	0	1	2	19
09:15	2	0	0	0	0	0	0	2	5	2	0	0	0	0	0	7
09:30	3	0	0	0	0	0	0	3	11	4	2	0	0	0	1	18
09:45	1	0	1	0	0	0	0	2	6	1	2	0	0	0	1	10
10:00	1	0	0	0	0	0	0	1	4	3	1	1	0	1	0	10
10:15	0	0	0	0	0	0	0	0	3	2	3	1	0	0	0	9
10:30	1	0	1	0	0	0	1	3	4	4	3	0	0	0	0	11
10:45	1	0	0	0	0	0	0	1	5	3	1	0	0	0	0	9
11:00	2	0	1	0	0	0	0	3	3	2	4	0	0	0	0	9
11:15	1	0	0	0	0	0	0	1	0	3	0	0	0	0	0	3
11:30	1	0	0	0	0	0	0	1	3	2	1	0	0	1	0	7
11:45	1	0	0	0	0	0	0	1	0	2	1	1	0	0	1	5
12:00	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	5
12:15	0	0	0	1	0	0	0	1	5	1	1	0	0	0	1	8
12:30	3	0	1	0	0	0	0	4	3	2	3	0	0	0	0	8
12:45	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0	2
13:00	3	0	0	1	0	0	0	4	4	2	1	1	0	0	2	10
13:15	1	0	0	0	0	0	0	1	4	0	2	0	0	0	1	7
13:30	1	0	0	0	0	0	0	1	6	1	3	1	0	0	1	12
13:45	3	0	1	0	0	0	0	4	5	1	1	0	0	0	3	10
14:00	0	0	1	0	0	0	1	2	1	0	0	0	0	0	0	1
14:15	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	4
14:30	0	1	0	0	0	0	0	1	2	2	1	0	0	0	0	5
14:45	1	0	0	0	0	0	0	1	2	1	2	0	0	0	1	6
15:00	0	0	0	0	0	0	0	0	1	2	0	0	1	0	2	6
15:15	1	0	0	0	0	0	0	1	3	3	0	0	0	1	0	7
15:30	0	0	0	0	0	0	0	0	12	1	2	0	0	1	0	16
15:45	0	0	0	0	0	0	1	1	4	1	0	0	0	0	0	5
16:00	0	0	0	0	0	0	0	0	4	1	3	0	0	0	0	8
16:15	0	0	1	0	0	0	0	1	8	1	2	0	0	1	1	13
16:30	2	0	1	0	0	0	1	4	7	0	0	0	0	0	1	8
16:45	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	7
17:00	3	0	0	0	0	0	0	3	5	0	1	0	0	1	2	9
17:15	1	0	1	0	0	0	0	2	10	0	2	0	0	0	1	13
17:30	1	0	0	0	0	0	0	1	6	0	3	0	0	0	1	10
17:45	0	0	0	0	0	0	0	0	6	0	0	0	0	1	0	7
18:00	0	0	0	0	0	0	1	1	10	1	1	0	0	0	0	12
18:15	0	0	0	0	0	0	0	0	5	0	1	0	0	2	3	11
18:30	2	0	0	0	0	0	0	2	11	1	0	0	0	0	1	13
18:45	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	7
Total	81	1	19	2	0	0	9	112	275	70	57	8	2	12	37	461

Site No. 6
Location Access Road / Sheriff Street Lower(W) / Sheriff Street Lower(S)
Date 04 October 2018

Time	C to B - Sheriff Street Lower(S) to Sheriff Street Lower(W)							Veh. Total	C to A - Sheriff Street Lower(S) to Access Road							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	6	1	1	0	2	0	0	10	11	0	3	1	0	0	0	15
07:15	4	4	4	1	6	0	1	20	12	0	3	0	0	0	0	15
07:30	11	2	0	0	3	0	0	16	15	0	1	1	0	0	0	17
07:45	16	2	0	0	2	0	0	20	18	1	2	0	0	0	0	21
08:00	17	0	5	0	7	0	0	29	18	1	1	0	0	0	1	21
08:15	12	4	2	0	4	0	0	22	19	0	3	0	0	0	0	22
08:30	10	2	1	1	6	1	0	21	17	0	2	0	0	0	1	20
08:45	10	2	4	0	5	0	1	22	16	0	3	0	0	0	1	20
09:00	9	7	1	1	7	1	0	26	14	0	1	0	0	0	3	18
09:15	11	4	3	0	7	1	0	26	11	0	2	1	0	0	1	15
09:30	7	8	3	1	3	0	1	23	6	1	3	0	0	0	1	11
09:45	14	10	5	0	6	0	1	36	2	0	4	0	0	0	0	6
10:00	4	9	3	0	7	0	0	23	3	0	10	0	0	0	0	13
10:15	9	16	3	0	9	0	1	38	5	0	1	1	0	0	0	7
10:30	5	10	3	0	2	0	0	20	5	0	1	0	0	0	0	6
10:45	8	11	1	0	3	1	0	24	2	1	4	0	0	0	0	7
11:00	6	9	6	0	4	0	1	26	4	0	2	2	0	0	0	8
11:15	5	7	5	1	5	0	0	23	8	0	4	0	0	0	0	12
11:30	11	9	0	0	2	0	1	23	0	0	1	0	0	0	0	1
11:45	6	11	2	0	7	0	1	27	0	0	1	0	0	0	1	2
12:00	7	4	3	1	3	2	1	21	3	0	2	0	0	0	0	5
12:15	4	7	4	0	7	1	0	23	1	0	4	1	0	0	0	6
12:30	8	17	3	0	3	2	1	34	6	1	1	1	0	0	0	9
12:45	7	12	3	1	6	0	0	29	5	0	3	0	0	0	0	8
13:00	6	6	2	1	4	0	1	20	2	0	1	1	0	0	1	5
13:15	4	10	3	0	6	0	0	23	4	0	2	0	0	0	0	6
13:30	8	4	1	1	5	0	0	19	1	0	2	1	0	0	0	4
13:45	4	13	2	1	5	1	1	27	7	0	3	0	0	0	0	10
14:00	7	2	2	0	6	0	0	17	3	0	1	0	0	0	0	4
14:15	6	4	2	0	5	0	2	19	5	0	0	0	0	0	0	5
14:30	8	6	4	1	3	1	0	23	3	0	3	0	0	0	0	6
14:45	6	7	0	1	1	0	0	15	2	0	0	0	0	0	0	2
15:00	6	8	1	0	4	0	0	19	3	0	1	0	0	0	0	4
15:15	5	8	2	1	7	0	0	23	0	0	3	0	0	0	0	3
15:30	7	4	3	0	7	0	0	21	1	0	0	0	0	0	0	1
15:45	13	7	8	0	7	0	1	36	3	0	0	0	0	0	0	3
16:00	12	6	8	0	5	1	1	33	4	0	0	0	0	0	0	4
16:15	10	7	4	1	5	0	0	27	7	0	2	0	0	0	0	9
16:30	13	5	2	0	1	0	0	21	3	0	0	0	0	0	1	4
16:45	8	2	4	0	8	0	1	23	0	0	2	0	0	0	1	3
17:00	12	4	4	0	6	1	1	28	0	0	0	0	0	1	0	1
17:15	13	1	1	0	5	0	4	24	2	0	0	0	0	0	0	2
17:30	20	2	4	1	4	0	0	31	4	0	0	0	0	0	1	5
17:45	8	5	2	0	6	0	1	22	1	0	0	0	0	0	0	1
18:00	17	6	2	0	6	0	3	34	3	0	1	0	0	0	0	4
18:15	17	7	1	0	5	0	1	31	2	0	0	0	0	0	1	3
18:30	16	7	0	1	5	0	3	32	2	0	0	0	0	0	0	2
18:45	10	4	0	0	3	0	0	17	1	0	1	0	0	0	0	2
25.75	443	303	127	16	235	13	30	1167	264	5	84	10	0	1	14	378

Site No. 6
Location Access Road / Sheriff Street Lower(W) / Sheriff Street Lower(S)
Date 04 October 2018

Time	To Arm A - Access Road							Veh. Total	From Arm A - Access Road							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	15	0	4	1	0	0	1	21	3	1	0	0	0	0	0	4
07:15	14	0	4	0	0	0	1	19	3	0	0	0	0	0	0	3
07:30	18	0	1	1	0	0	0	20	1	0	0	1	0	0	1	3
07:45	22	1	3	0	0	0	1	27	0	0	1	1	0	0	0	2
08:00	24	1	1	0	0	0	1	27	2	1	4	0	0	0	0	7
08:15	25	0	6	0	0	0	0	31	1	0	2	0	0	0	0	3
08:30	21	0	4	0	0	0	1	26	1	0	2	0	0	0	0	3
08:45	25	0	4	0	0	0	1	30	1	0	2	0	0	0	1	4
09:00	21	0	1	0	0	0	4	26	1	0	0	0	0	0	1	2
09:15	13	0	2	1	0	0	1	17	4	0	3	0	0	0	0	7
09:30	9	1	3	0	0	0	1	14	2	1	3	0	0	0	0	6
09:45	3	0	5	0	0	0	0	8	3	0	2	1	0	0	0	6
10:00	4	0	10	0	0	0	0	14	0	0	5	0	0	0	0	5
10:15	5	0	1	1	0	0	0	7	4	0	4	0	0	1	0	9
10:30	6	0	2	0	0	0	1	9	1	0	2	1	0	0	1	5
10:45	3	1	4	0	0	0	0	8	6	1	0	0	0	0	0	7
11:00	6	0	3	2	0	0	0	11	8	0	2	0	0	2	0	12
11:15	9	0	4	0	0	0	0	13	6	0	6	2	0	0	0	14
11:30	1	0	1	0	0	0	0	2	5	0	1	0	0	0	2	8
11:45	1	0	1	0	0	0	1	3	3	0	2	0	0	0	0	5
12:00	3	0	2	0	0	0	0	5	7	0	5	0	0	0	1	13
12:15	1	0	4	2	0	0	0	7	5	0	2	0	0	0	0	7
12:30	9	1	2	1	0	0	0	13	6	1	4	0	0	0	0	11
12:45	5	0	4	0	0	0	0	9	3	2	2	1	0	0	0	8
13:00	5	0	1	2	0	0	1	9	7	0	2	0	0	0	1	10
13:15	5	0	2	0	0	0	0	7	8	0	3	2	0	0	0	13
13:30	2	0	2	1	0	0	0	5	6	0	1	1	0	0	0	8
13:45	10	0	4	0	0	0	0	14	6	0	4	0	0	0	0	10
14:00	3	0	2	0	0	0	1	6	7	0	3	0	0	0	0	10
14:15	5	0	0	0	0	0	0	5	2	0	2	0	0	0	0	4
14:30	3	1	3	0	0	0	0	7	9	0	3	0	0	0	0	12
14:45	3	0	0	0	0	0	0	3	5	1	3	0	0	0	0	9
15:00	3	0	1	0	0	0	0	4	2	0	2	0	0	0	0	4
15:15	1	0	3	0	0	0	0	4	4	0	3	0	0	0	0	7
15:30	1	0	0	0	0	0	0	1	8	0	3	1	0	0	1	13
15:45	3	0	0	0	0	0	1	4	5	0	0	0	0	0	1	6
16:00	4	0	0	0	0	0	0	4	14	0	5	0	0	0	2	21
16:15	7	0	3	0	0	0	0	10	12	0	2	0	0	0	1	15
16:30	5	0	1	0	0	0	2	8	15	0	0	1	0	0	1	17
16:45	0	0	2	0	0	0	1	3	13	0	0	0	0	0	1	14
17:00	3	0	0	0	0	1	0	4	15	0	0	0	0	0	3	18
17:15	3	0	1	0	0	0	0	4	24	0	1	0	0	0	0	25
17:30	5	0	0	0	0	0	1	6	20	0	2	0	0	0	1	23
17:45	1	0	0	0	0	0	0	1	19	0	0	0	0	0	1	20
18:00	3	0	1	0	0	0	1	5	22	0	2	0	0	0	0	24
18:15	2	0	0	0	0	0	1	3	10	0	2	0	0	0	1	13
18:30	4	0	0	0	0	0	0	4	14	0	1	0	0	0	1	16
18:45	1	0	1	0	0	0	0	2	12	1	0	0	0	0	0	13
25.75	345	6	103	12	0	1	23	490	335	9	98	12	0	3	22	479

Site No. 6
Location Access Road / Sheriff Street Lower(W) / Sheriff Street Lower(S)
Date 04 October 2018

Time	To Arm B - Sheriff Street Lower(W)							Veh. Total	From Arm B - Sheriff Street Lower(W)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	8	1	1	0	2	0	0	12	14	1	3	1	0	0	1	20
07:15	5	4	4	1	6	0	1	21	6	2	1	0	0	1	1	11
07:30	12	2	0	1	3	0	1	19	13	5	0	0	0	0	1	19
07:45	16	2	1	1	2	0	0	22	16	2	1	0	1	0	2	22
08:00	18	0	8	0	7	0	0	33	12	0	0	0	0	0	2	14
08:15	12	4	3	0	4	0	0	23	11	2	5	0	0	0	1	19
08:30	10	2	2	1	6	1	0	22	16	1	3	0	0	0	4	24
08:45	11	2	4	0	5	0	1	23	27	3	1	1	0	1	2	35
09:00	9	7	1	1	7	1	0	26	19	3	0	1	0	1	3	27
09:15	12	4	4	0	7	1	0	28	7	2	0	0	0	0	0	9
09:30	8	8	4	1	3	0	1	25	14	4	2	0	0	0	1	21
09:45	16	10	5	1	6	0	1	39	7	1	3	0	0	0	1	12
10:00	4	9	4	0	7	0	0	24	5	3	1	1	0	1	0	11
10:15	11	16	6	0	9	1	1	44	3	2	3	1	0	0	0	9
10:30	6	10	4	1	2	0	1	24	5	4	4	0	0	0	1	14
10:45	13	11	1	0	3	1	0	29	6	3	1	0	0	0	0	10
11:00	7	9	7	0	4	2	1	30	5	2	5	0	0	0	0	12
11:15	7	7	8	1	5	0	0	28	1	3	0	0	0	0	0	4
11:30	13	9	0	0	2	0	1	25	4	2	1	0	0	1	0	8
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12:00	9	4	4	1	3	2	1	24	3	0	2	0	0	0	0	5
12:15	6	7	4	0	7	1	0	25	5	1	1	1	0	0	1	9
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15:00	7	8	2	0	4	0	0	21	1	2	0	0	1	0	2	6
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16:00	14	6	11	0	5	1	1	38	4	1	3	0	0	0	0	8
16:15	16	7	4	1	5	0	0	33	8	1	3	0	0	1	1	14
16:30	17	5	2	0	1	0	0	25	9	0	1	0	0	0	2	12
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18:45	10	4	0	0	3	0	0	17	7	0	0	0	0	0	0	7
25.75	541	304	157	22	235	16	37	1312	356	71	76	10	2	12	46	573

Site No. 6
Location Access Road / Sheriff Street Lower(W) / Sheriff Street Lower(S)
Date 04 October 2018

Time	To Arm C - Sheriff Street Lower(S)							Veh. Total	From Arm C - Sheriff Street Lower(S)							Veh. Total
	CAR	TAXI	LGV	HGV	PSV	M/C	P/C		CAR	TAXI	LGV	HGV	PSV	M/C	P/C	
07:00	11	2	2	1	0	0	0	16	17	1	4	1	2	0	0	25
07:15	6	2	0	0	0	1	0	9	16	4	7	1	6	0	1	35
07:30	10	5	0	0	0	0	1	16	26	2	1	1	3	0	0	33
07:45	12	2	0	0	1	0	1	16	34	3	2	0	2	0	0	41
08:00	7	1	1	0	0	0	2	11	35	1	6	0	7	0	1	50
08:15	6	2	3	0	0	0	1	12	31	4	5	0	4	0	0	44
08:30	13	1	2	0	0	0	4	20	27	2	3	1	6	1	1	41
08:45	18	3	2	1	0	1	3	28	26	2	7	0	5	0	2	42
09:00	13	3	0	1	0	1	3	21	23	7	2	1	7	1	3	44
09:15	8	2	2	0	0	0	0	12	22	4	5	1	7	1	1	41
09:30	12	5	4	0	0	0	1	22	13	9	6	1	3	0	2	34
09:45	7	1	4	0	0	0	1	13	16	10	9	0	6	0	1	42
10:00	4	3	5	1	0	1	0	14	7	9	13	0	7	0	0	36
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10:45	6	4	1	0	0	0	0	11	10	12	5	0	3	1	0	31
11:00	10	2	5	0	0	0	0	17	10	9	8	2	4	0	1	34
11:15	4	3	3	2	0	0	0	12	13	7	9	1	5	0	0	35
11:30	6	2	2	0	0	1	2	13	11	9	1	0	2	0	1	24
11:45	2	2	2	1	0	0	1	8	6	11	3	0	7	0	2	29
12:00	8	0	6	0	0	0	1	15	10	4	5	1	3	2	1	26
12:15	8	1	3	0	0	0	1	13	5	7	8	1	7	1	0	29
12:30	7	2	6	0	0	0	0	15	14	18	4	1	3	2	1	43
12:45	3	2	3	1	0	0	0	9	12	12	6	1	6	0	0	37
13:00	9	2	2	1	0	0	3	17	8	6	3	2	4	0	2	25
13:15	9	0	4	1	0	0	1	15	8	10	5	0	6	0	0	29
13:30	12	1	4	1	0	0	1	19	9	4	3	2	5	0	0	23
13:45	10	1	5	0	0	0	3	19	11	13	5	1	5	1	1	37
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14:45	6	2	4	0	0	0	1	13	8	7	0	1	1	0	0	17
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15:15	7	3	2	0	0	1	0	13	5	8	5	1	7	0	0	26
15:30	19	1	5	1	0	1	1	28	8	4	3	0	7	0	0	22
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17:30	22	0	4	0	0	0	1	27	24	2	4	1	4	0	1	36
17:45	20	0	0	0	0	1	1	22	9	5	2	0	6	0	1	23
18:00	27	1	3	0	0	0	0	31	20	6	3	0	6	0	3	38
18:15	11	0	3	0	0	2	4	20	19	7	1	0	5	0	2	34
18:30	17	1	1	0	0	0	2	21	18	7	0	1	5	0	3	34
18:45	19	1	0	0	0	0	0	20	11	4	1	0	3	0	0	19
25.75	512	78	125	14	2	12	52	795	707	308	211	26	235	14	44	1545

APPENDIX 6.2
TRAFFIC FLOW DIAGRAMS

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

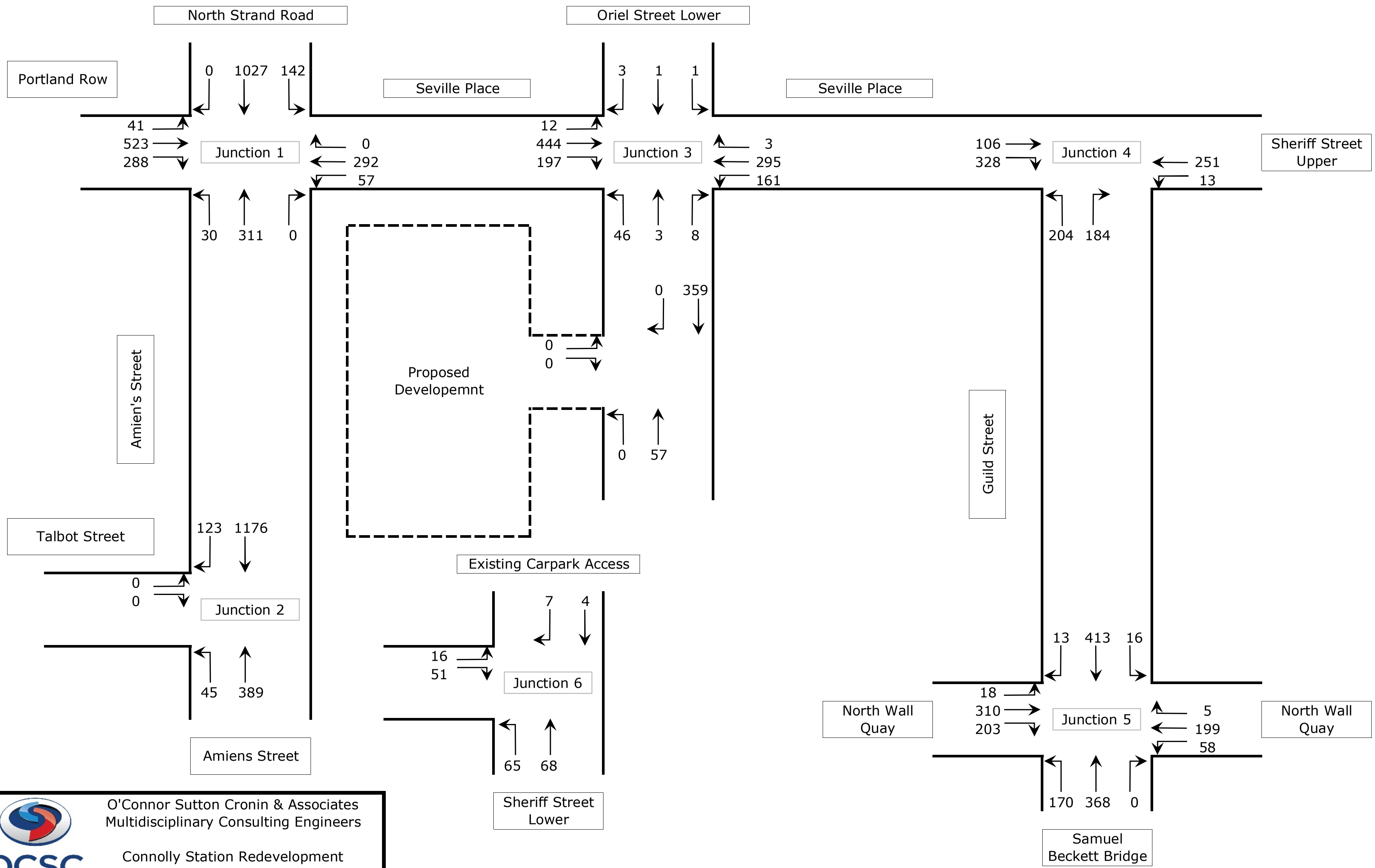

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Diagram 1: 2018 A.M. Peak Hour Base Flows (07:00 – 08:00)

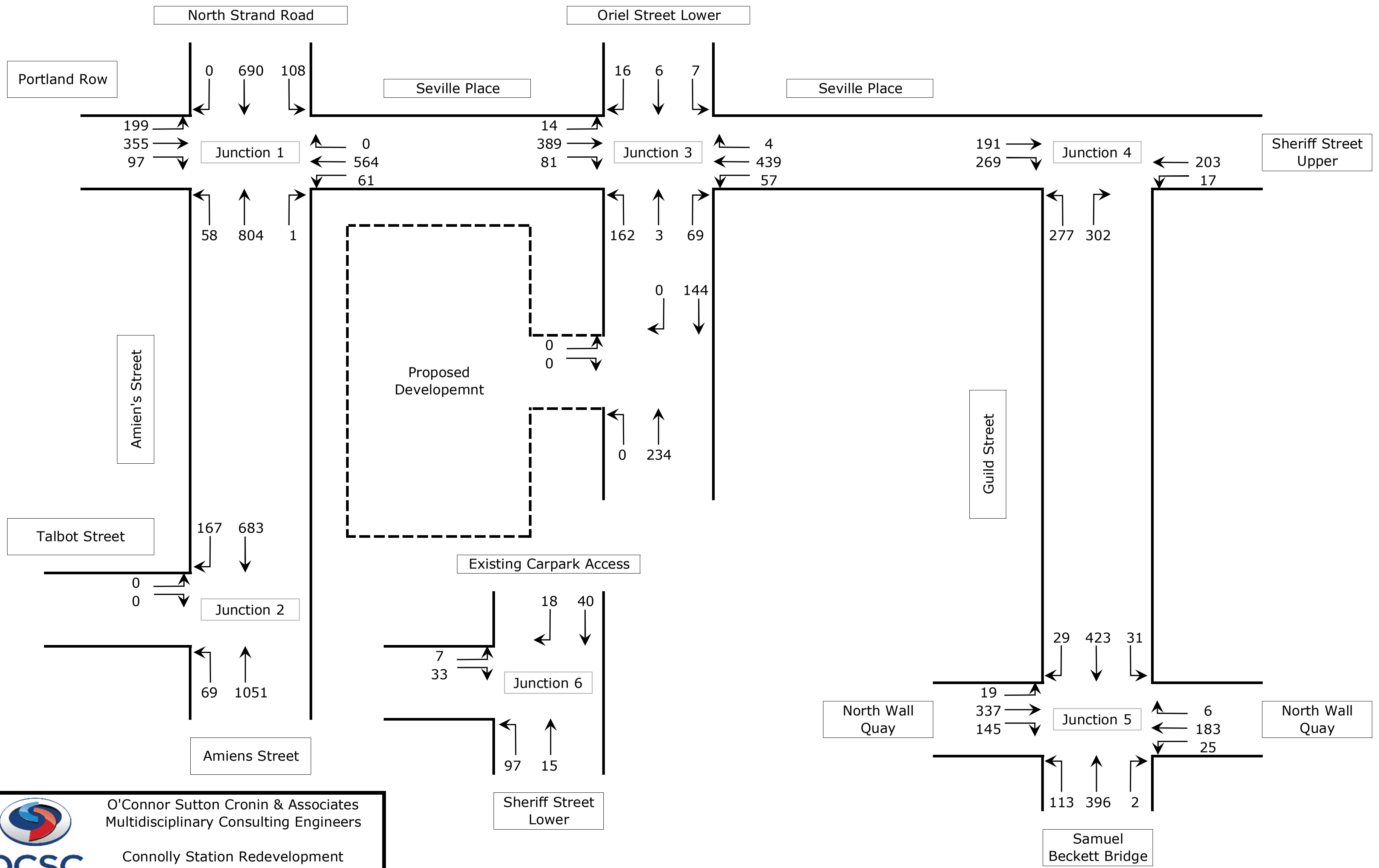

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Diagram 2: 2018 A.M. Peak Hour Base Flows (16:45 – 17:45)

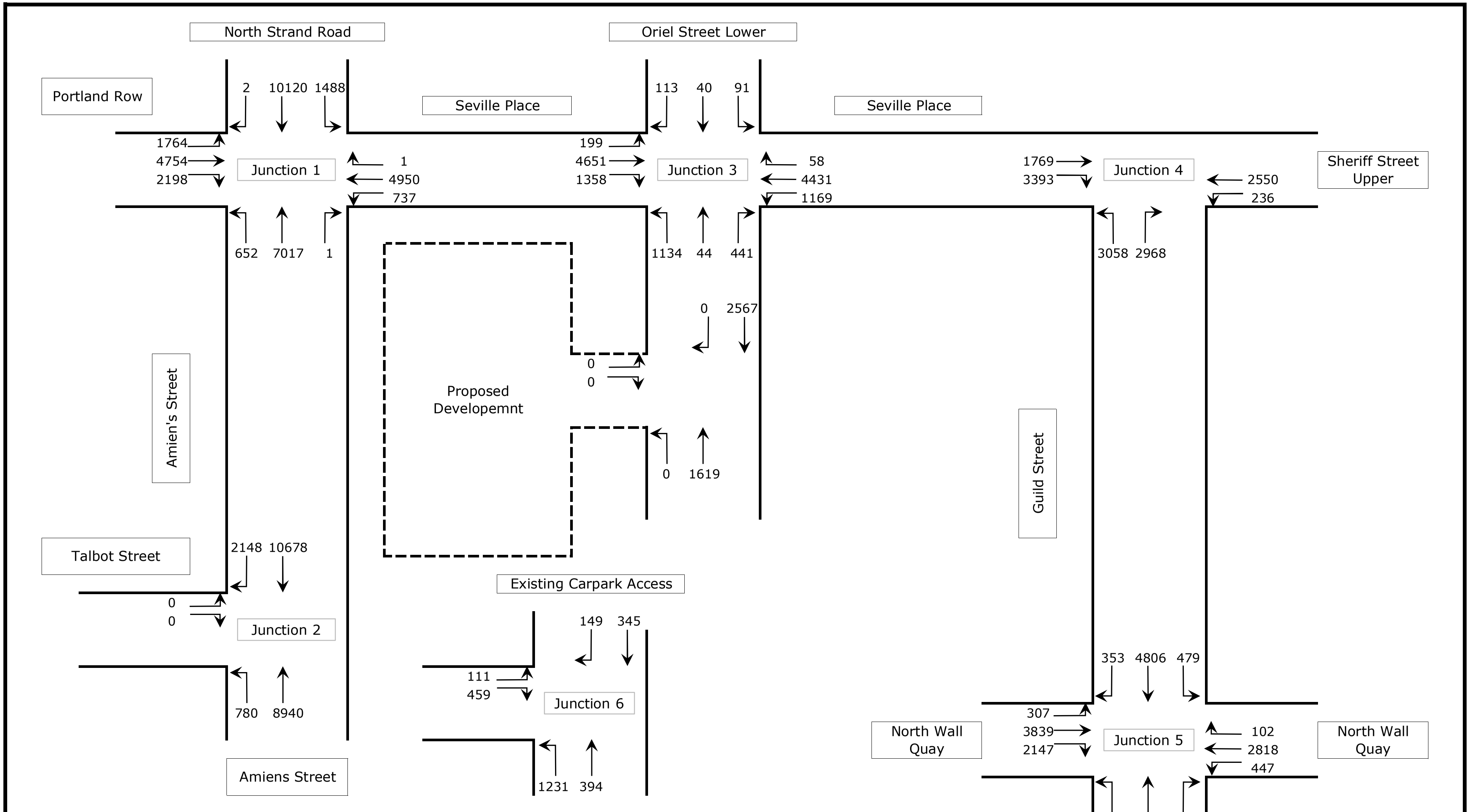

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Diagram 3: 2018 Annual Average Daily Traffic Base Flows

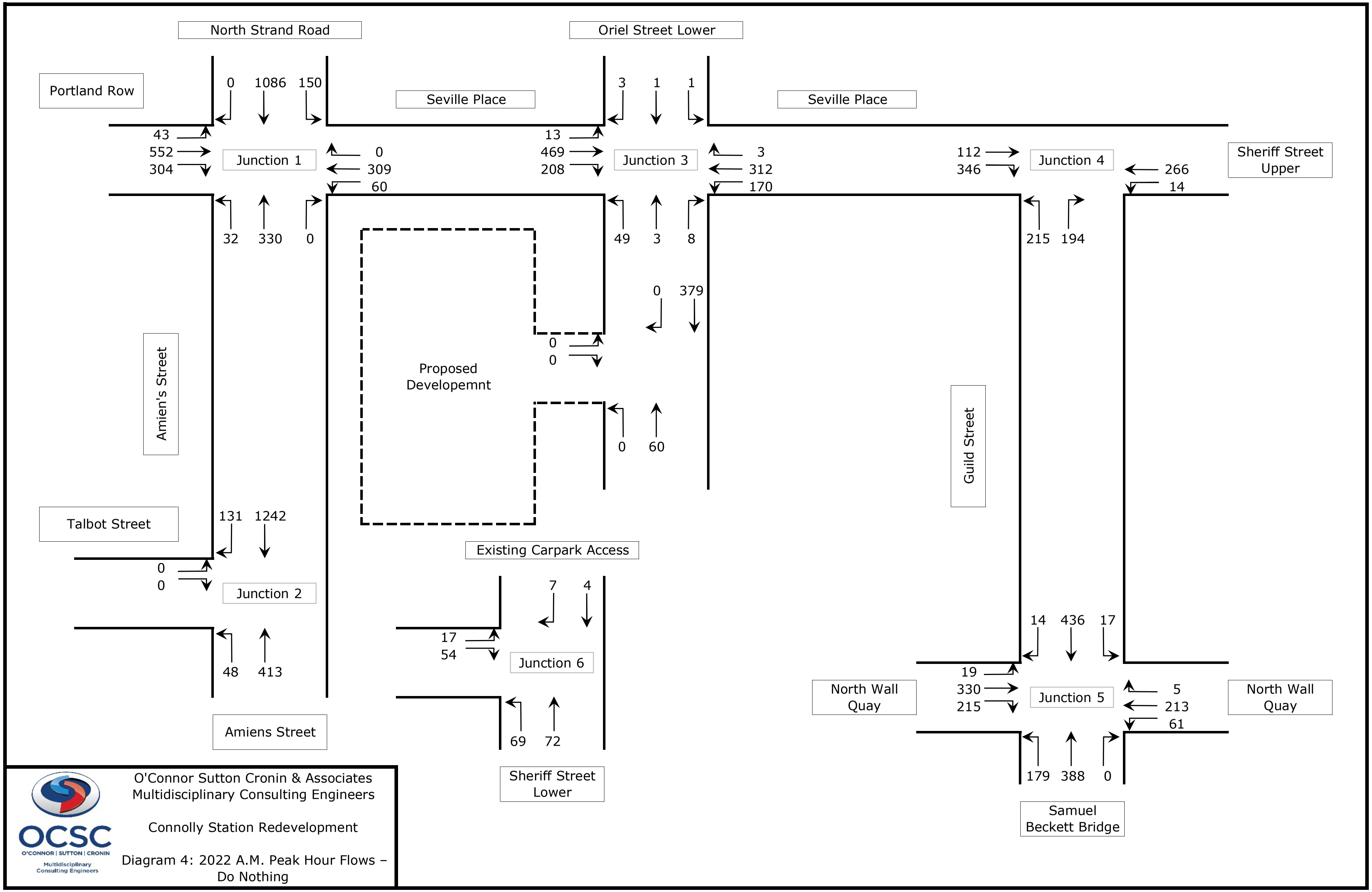

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Diagram 4: 2022 A.M. Peak Hour Flows – Do Nothing

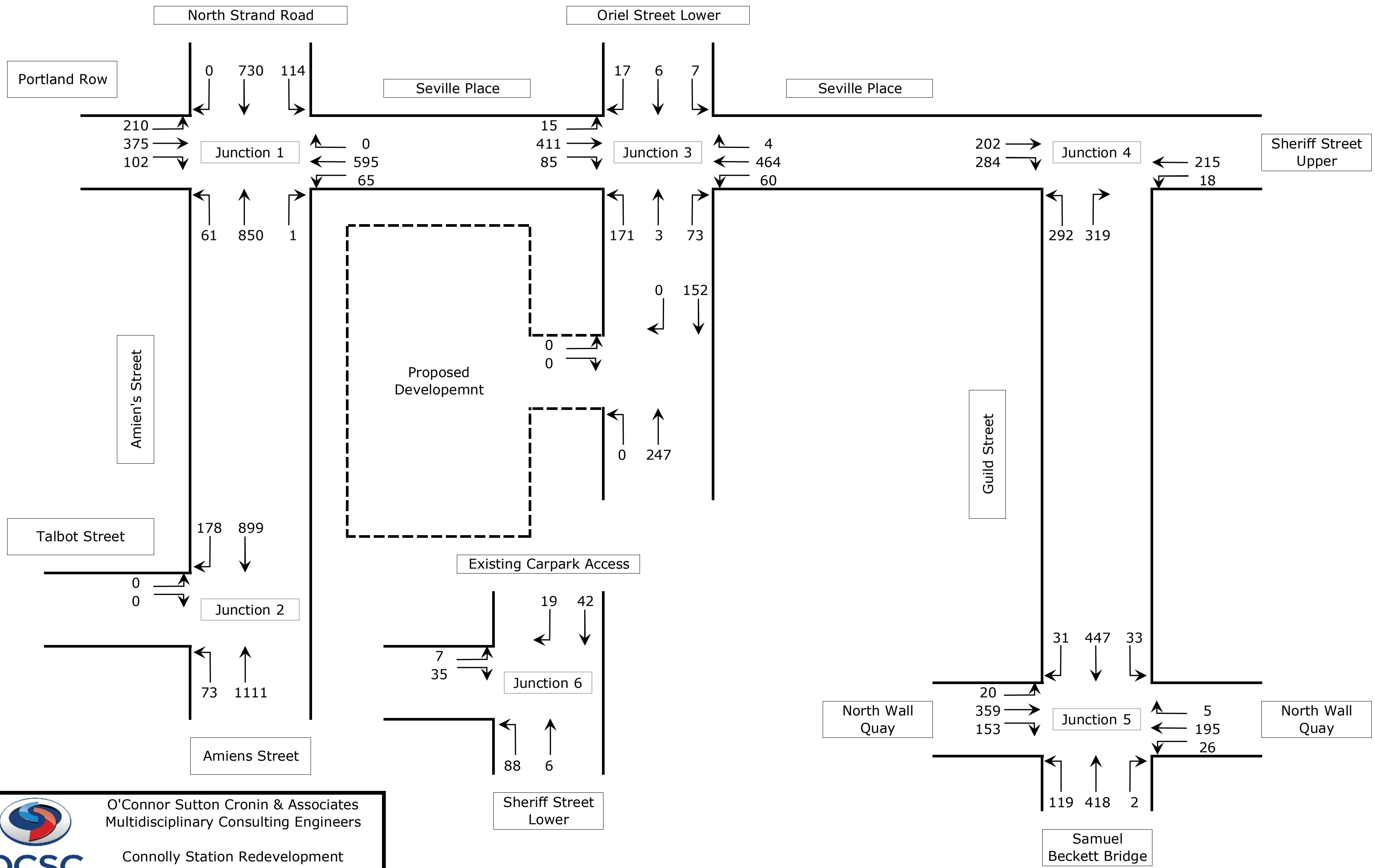

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Diagram 5: 2022 P.M. Peak Hour Flows – Do Nothing

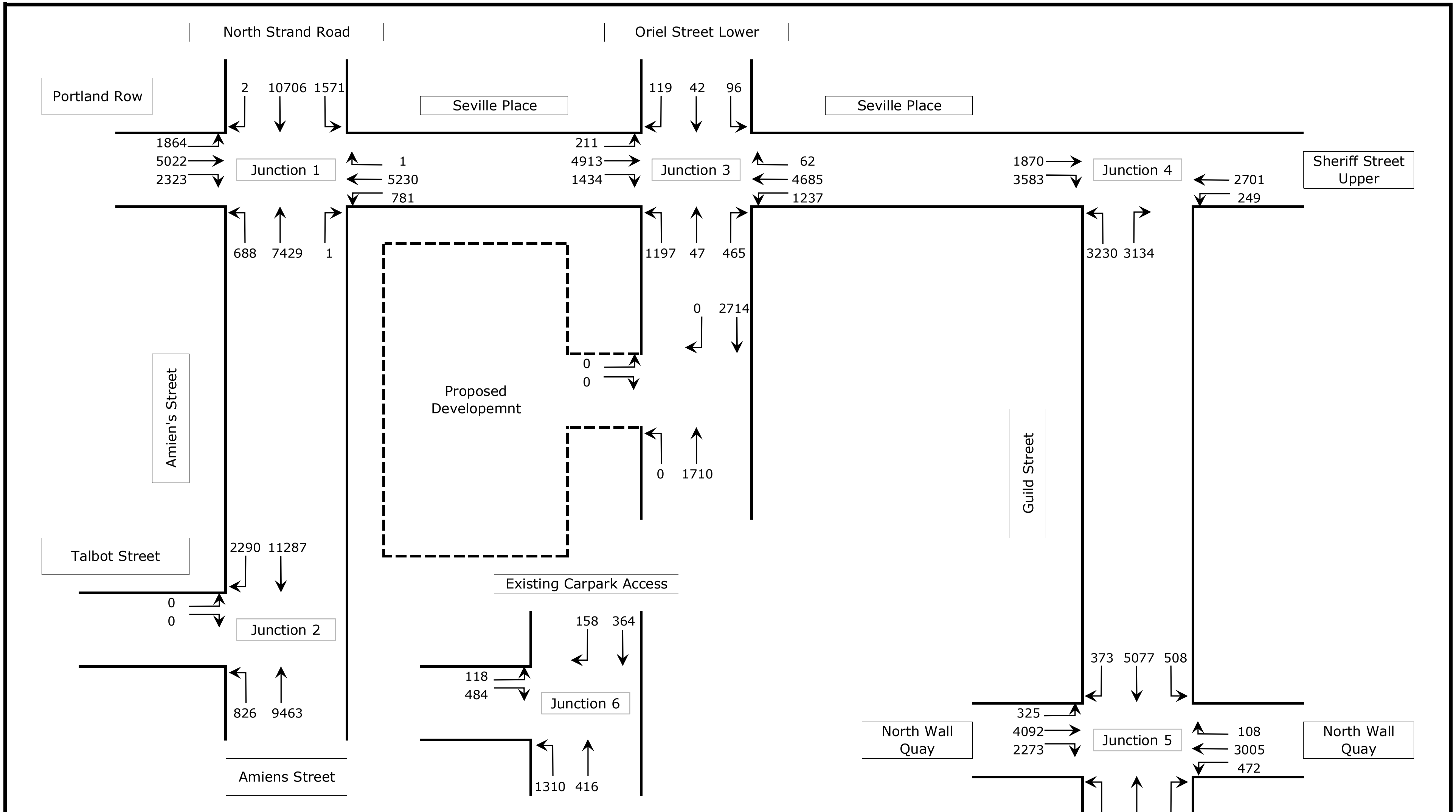

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Diagram 6: 2022 AADT – Do Nothing

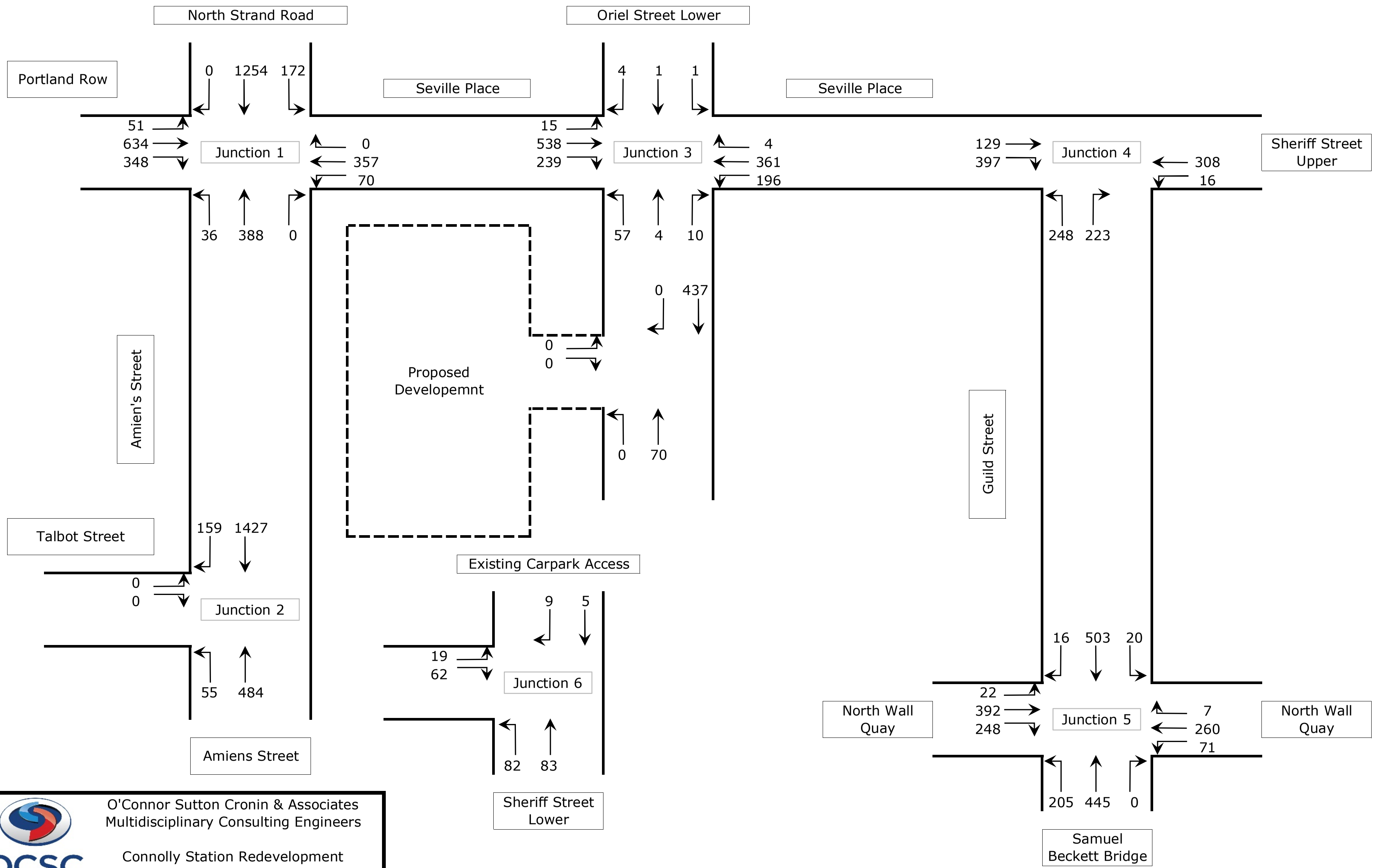

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Diagram 7: 2037 A.M. Peak Hour Flows – Do Nothing

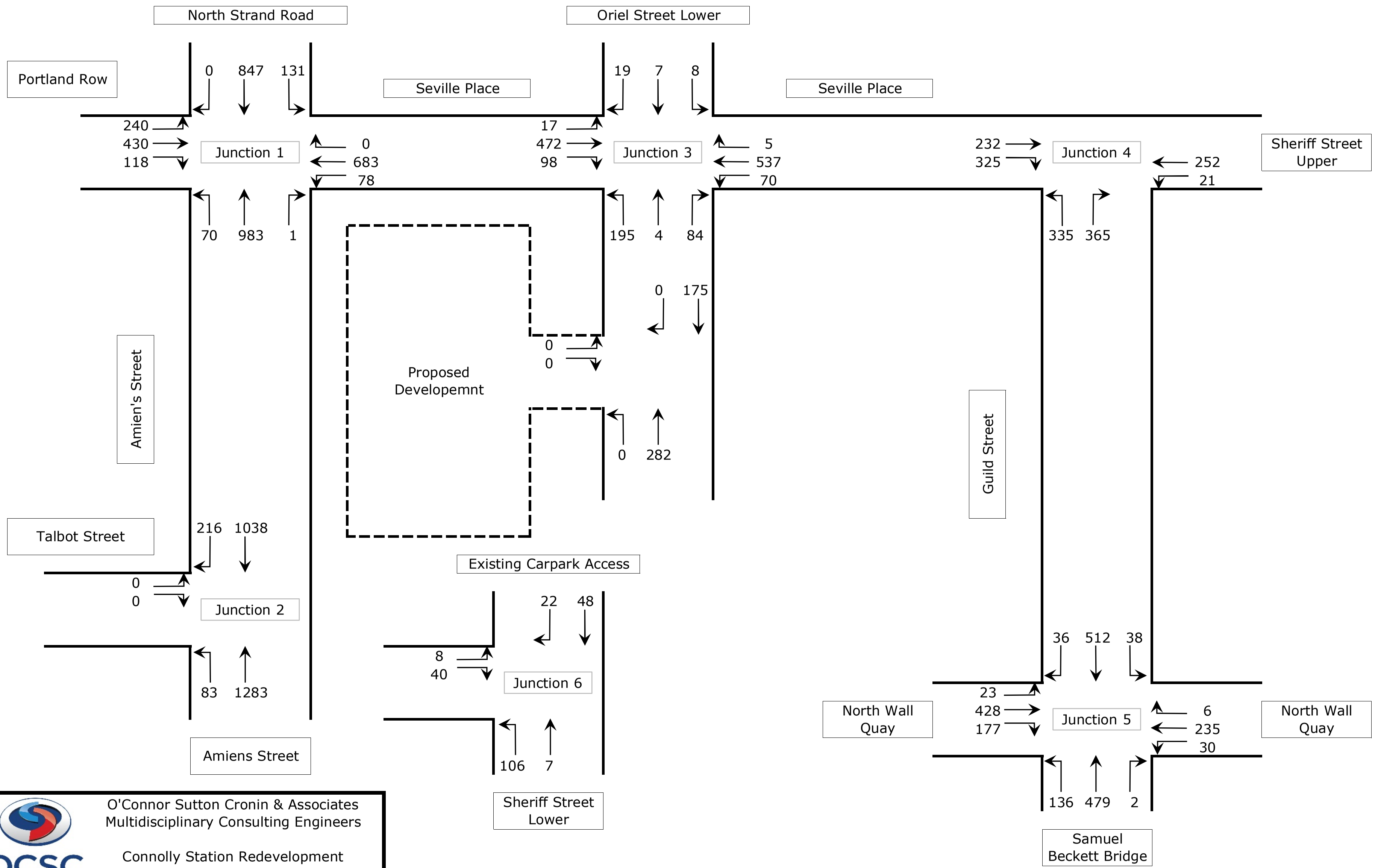

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Diagram 8: 2037 P.M. Peak Hour Flows – Do Nothing

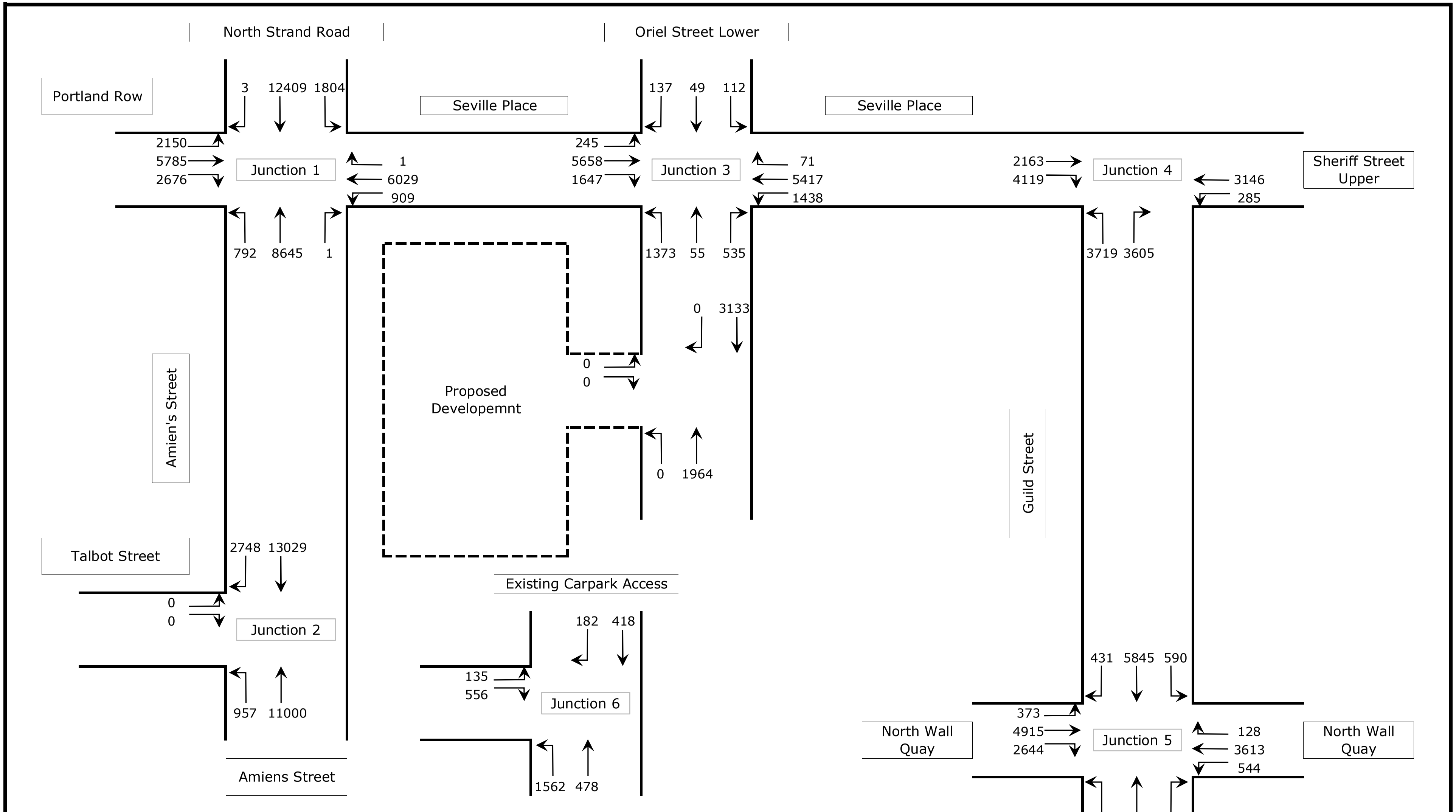

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Diagram 9: 2037 AADT – Do Nothing

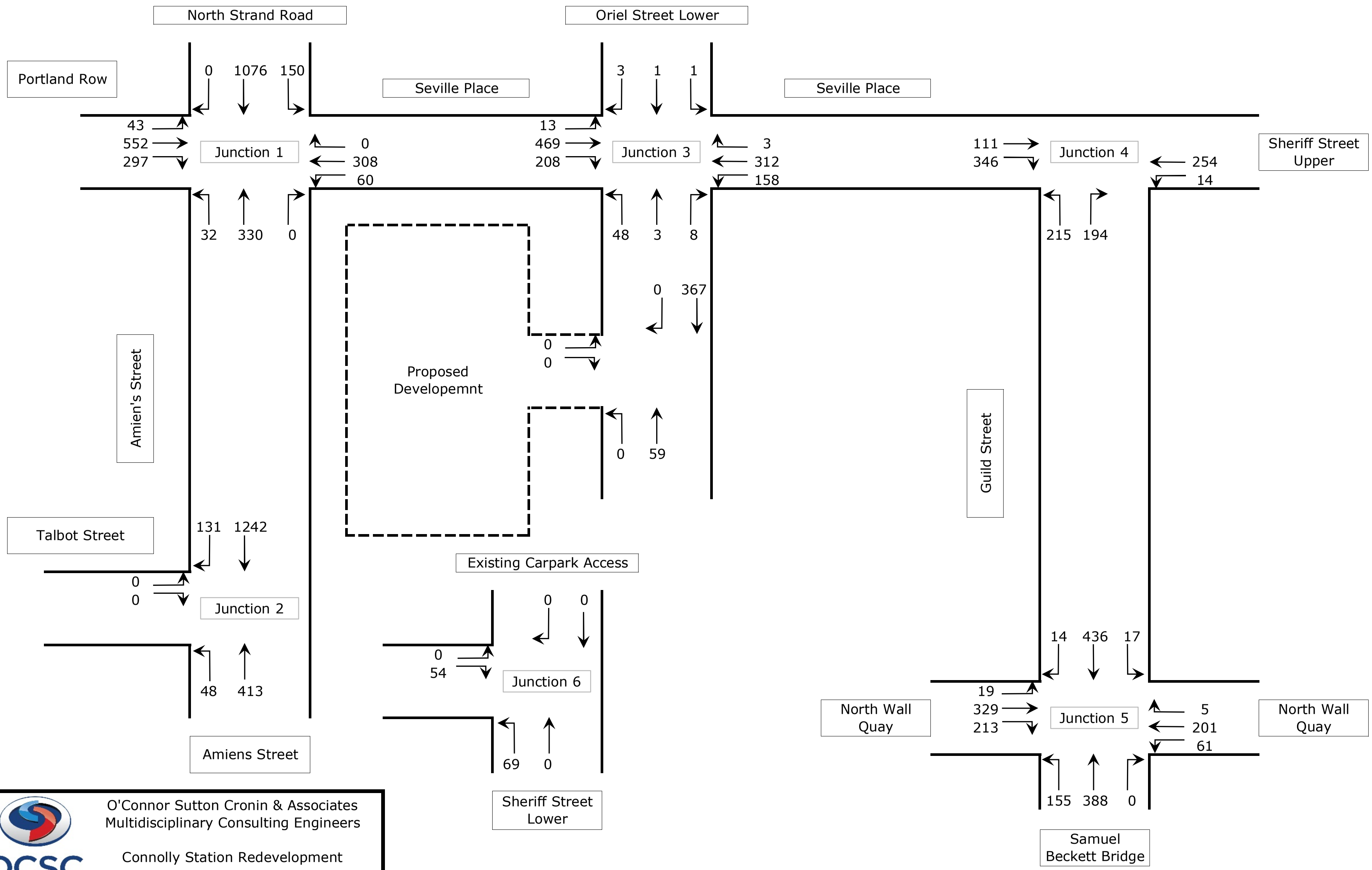

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Diagram 10: 2022 A.M. Peak Hour Flows – Do Nothing Without Existing Carpark

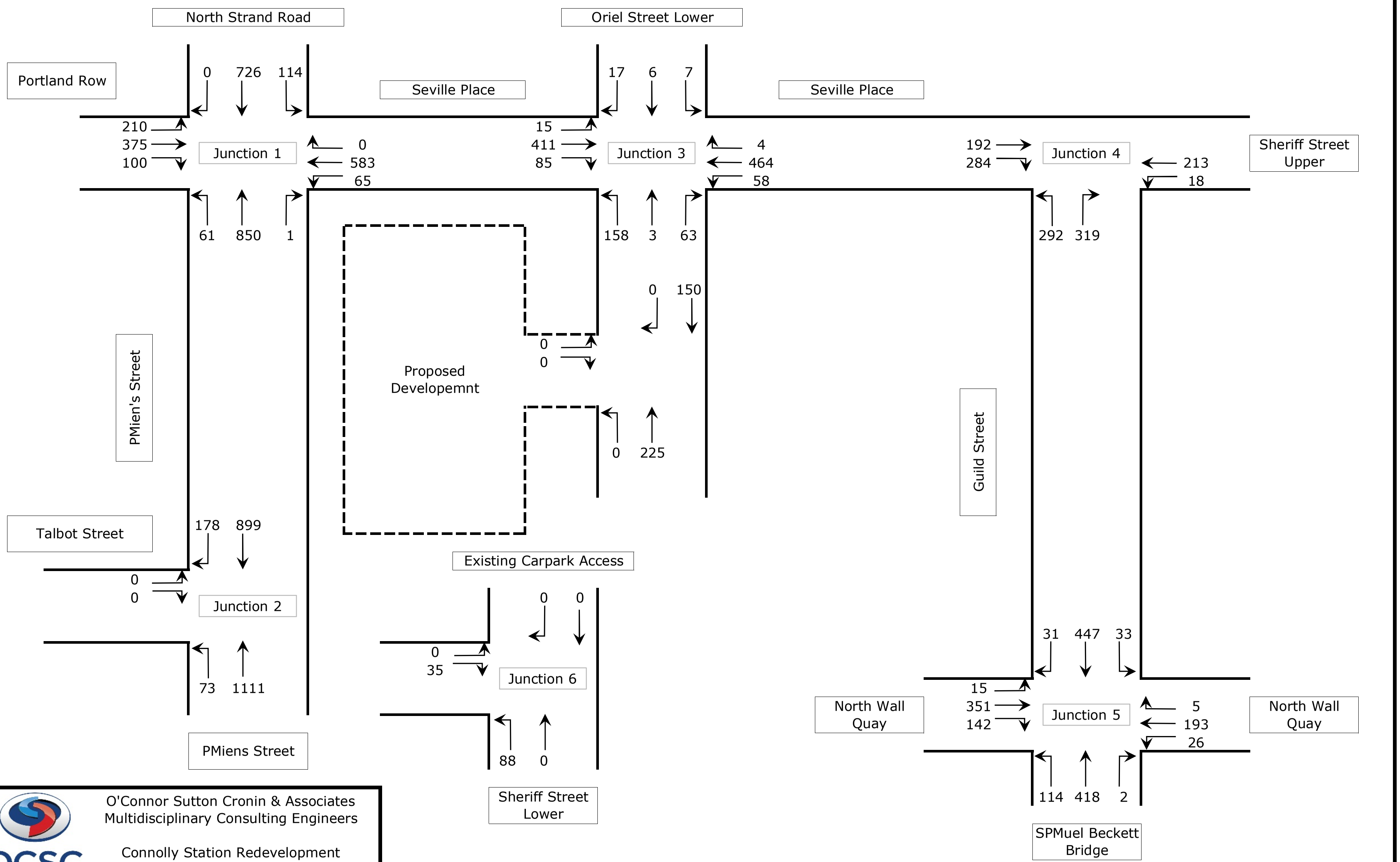

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Diagram 11: 2022 P.M. Peak Hour Flows – Do Nothing Without Existing Carpark

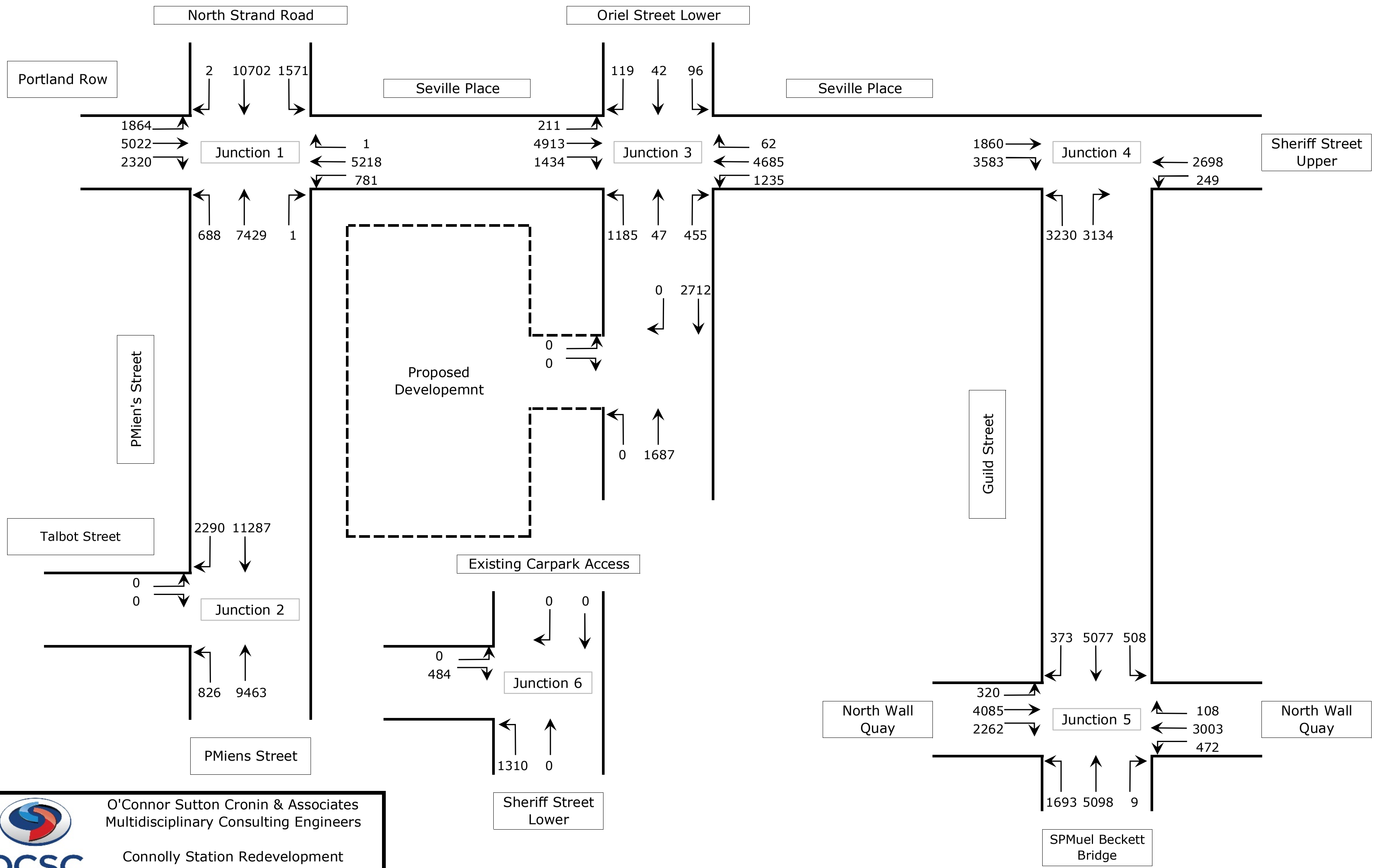

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Diagram 12: 2022 AADT Flows – Do Nothing Without Existing Carpark

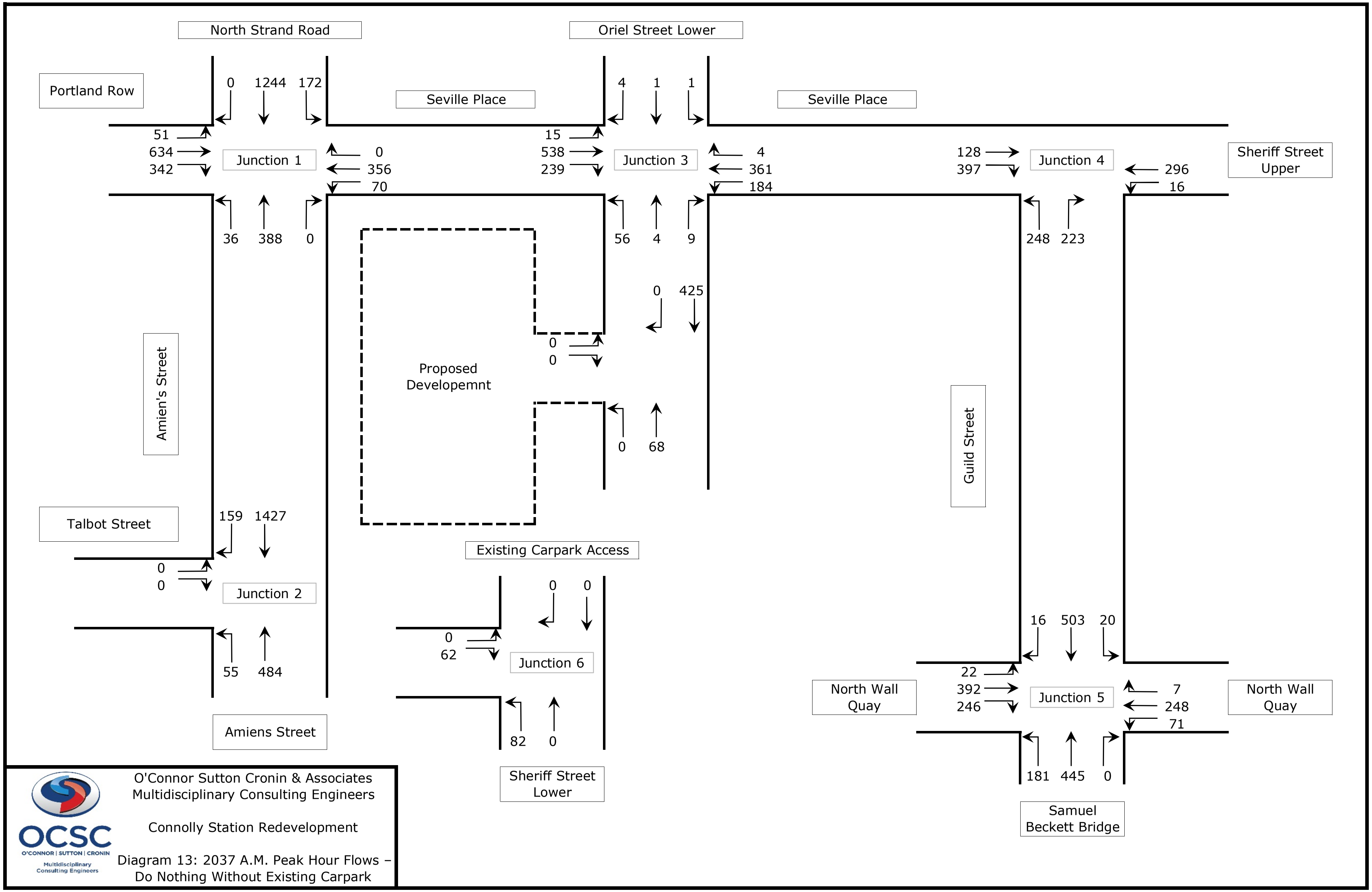

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Diagram 13: 2037 A.M. Peak Hour Flows – Do Nothing Without Existing Carpark

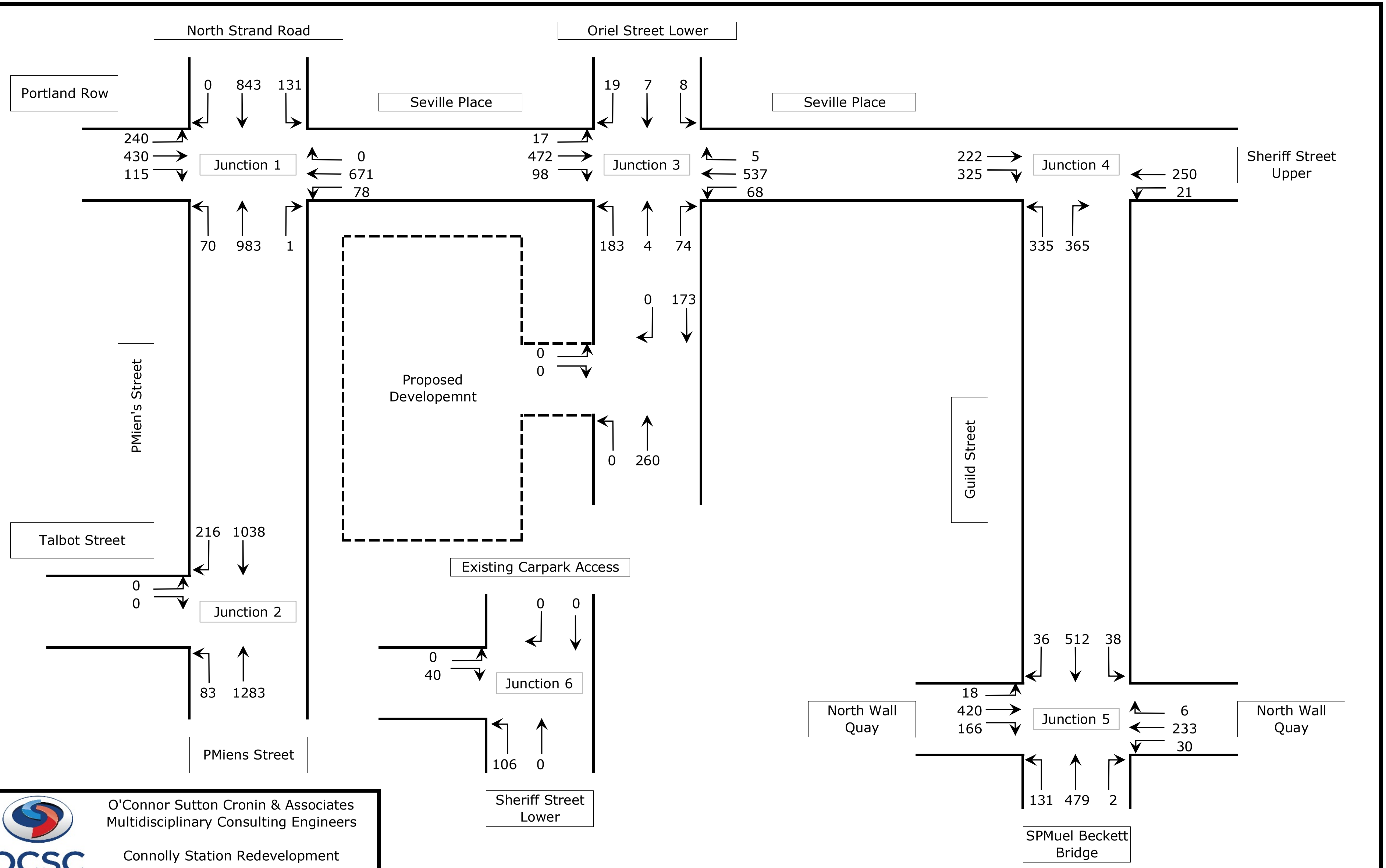

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Diagram 14: 2037 P.M. Peak Hour Flows – Do Nothing Without Existing Carpark

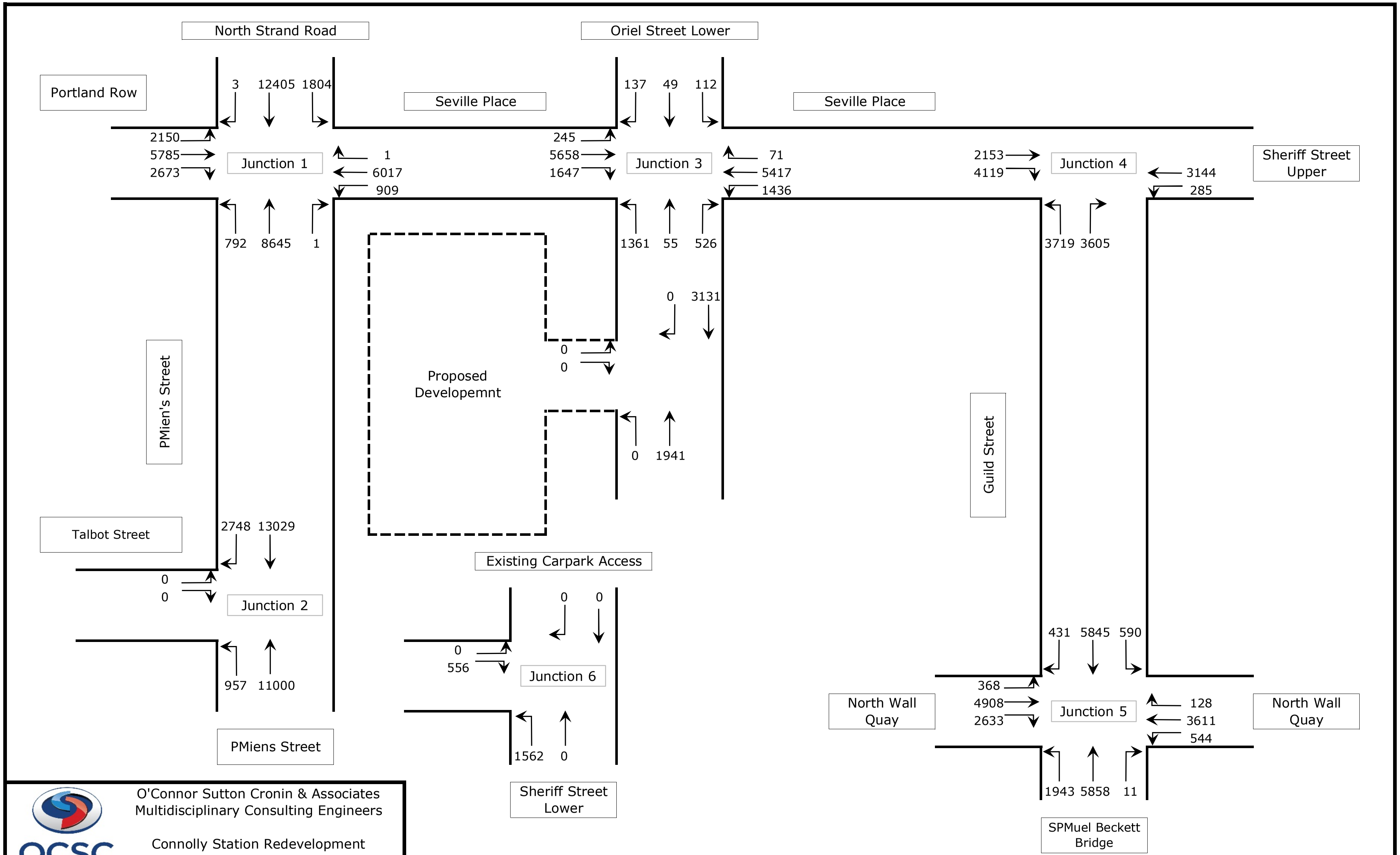

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Diagram 15: 2037 AADT Flows – Do Nothing Without Existing Carpark

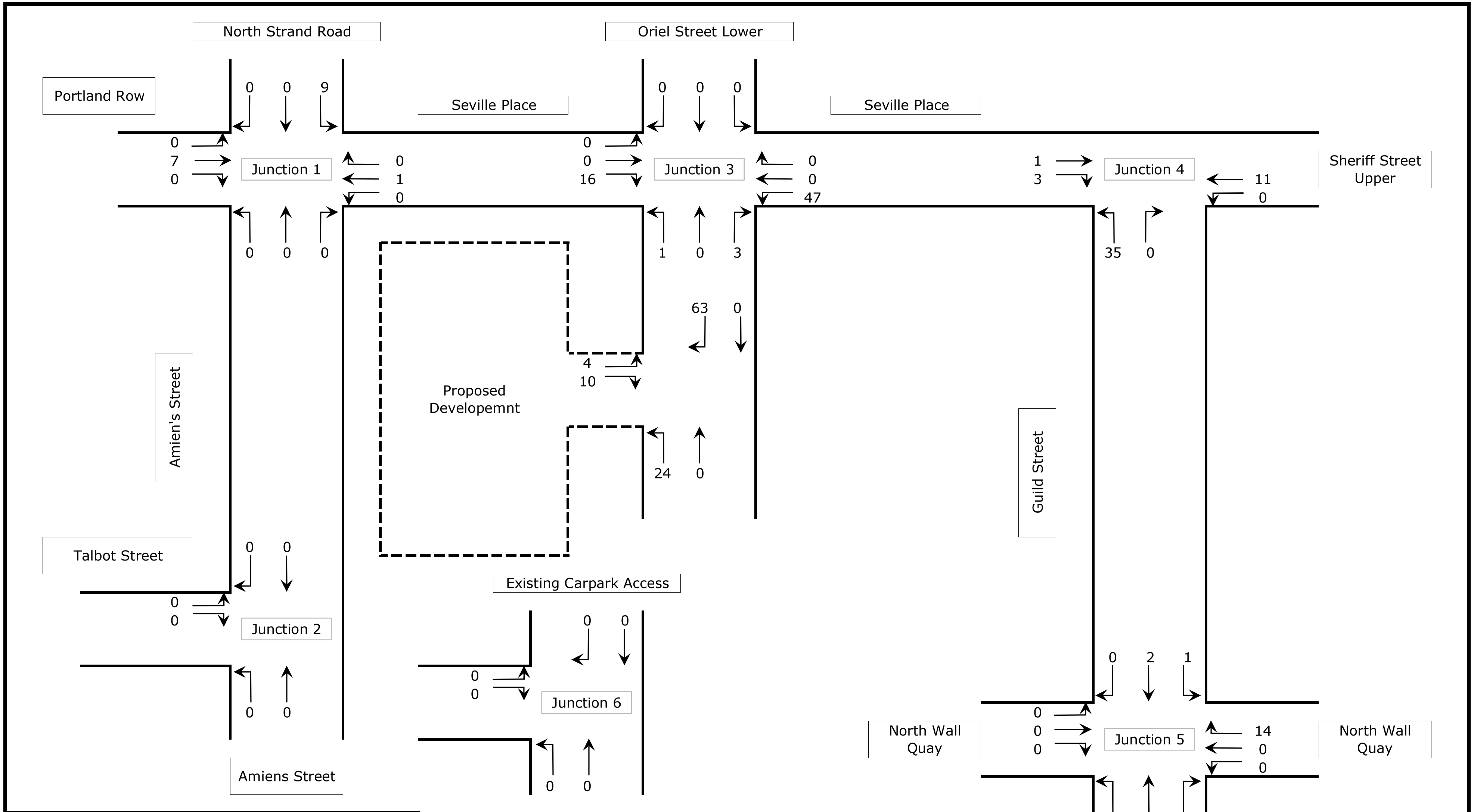

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Diagram 16: Revised Carpark Location A.M. Peak Hour Trip Generation & Assignment

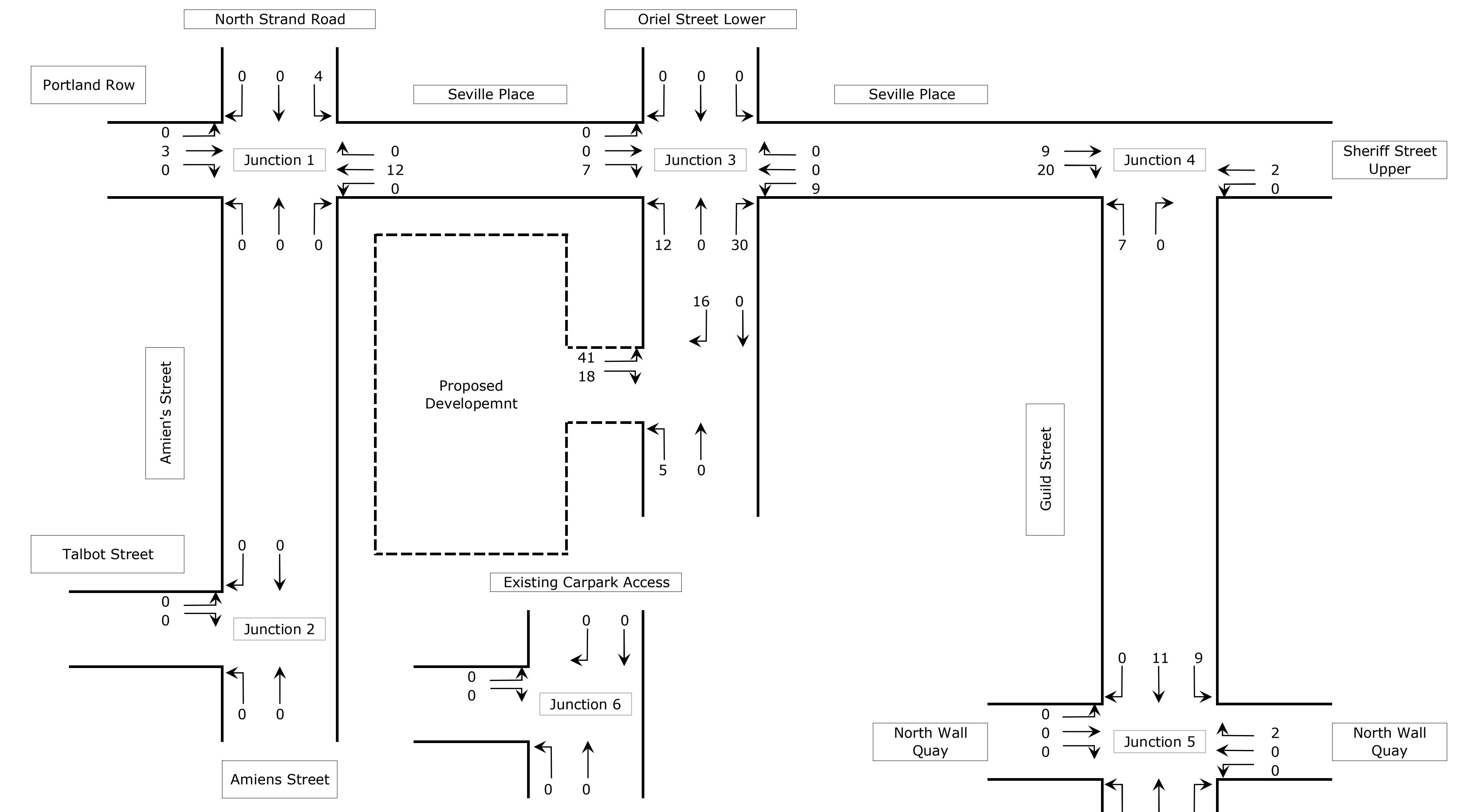

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Diagram 17: Revised Carpark Location P.M. Peak Hour Trip Generation & Assignment

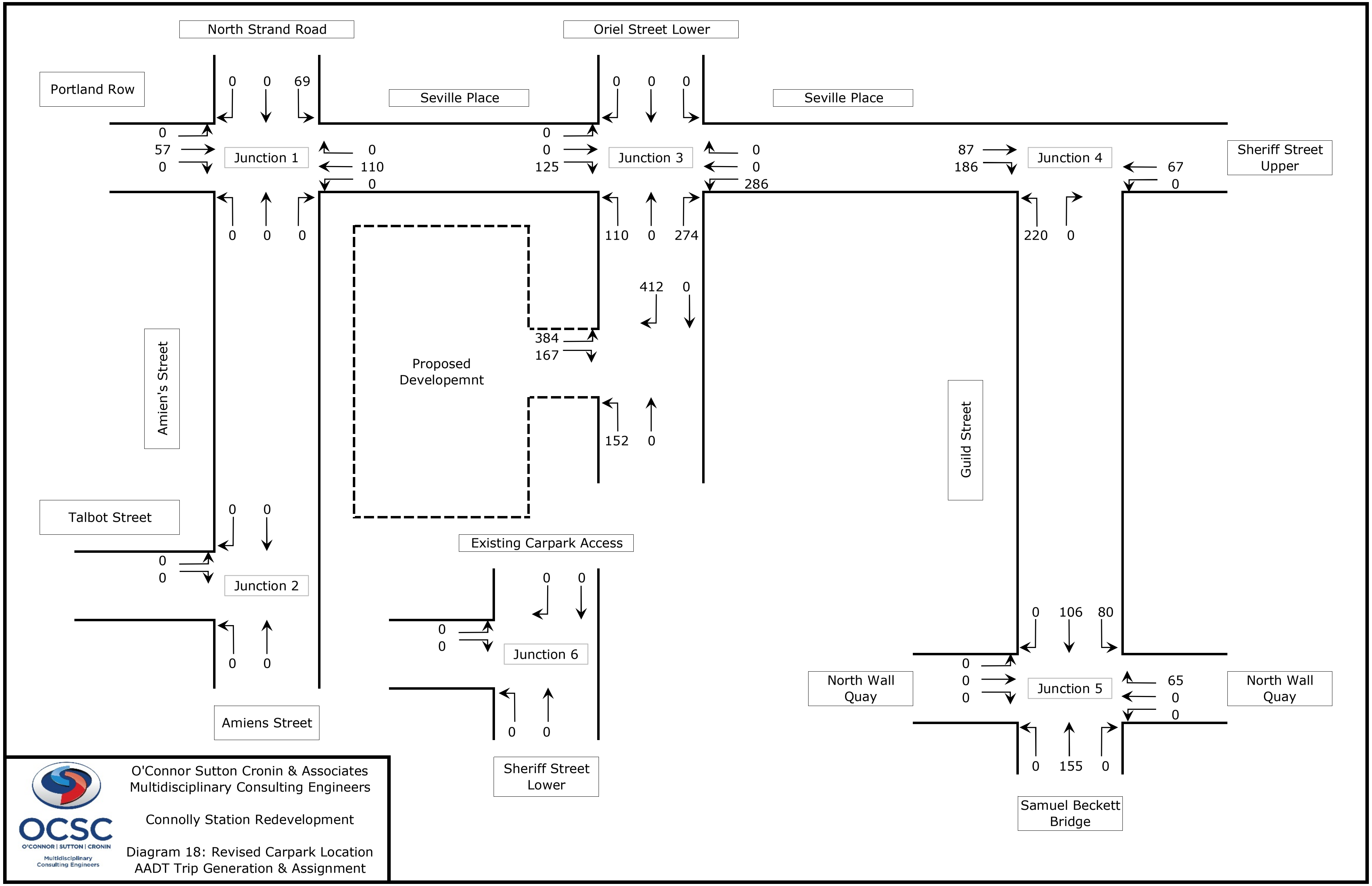

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Diagram 18: Revised Carpark Location
AADT Trip Generation & Assignment

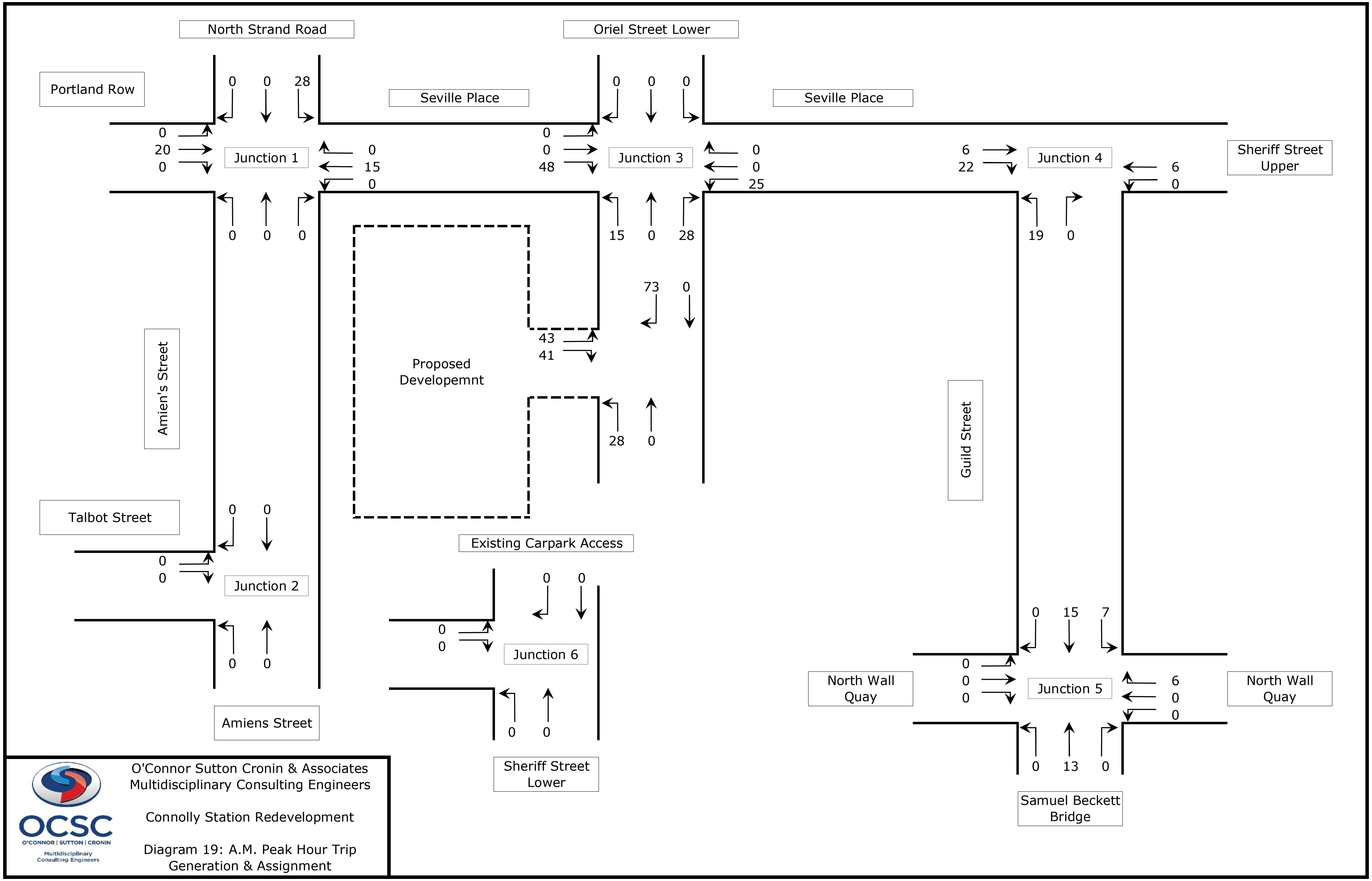

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Diagram 19: A.M. Peak Hour Trip Generation & Assignment

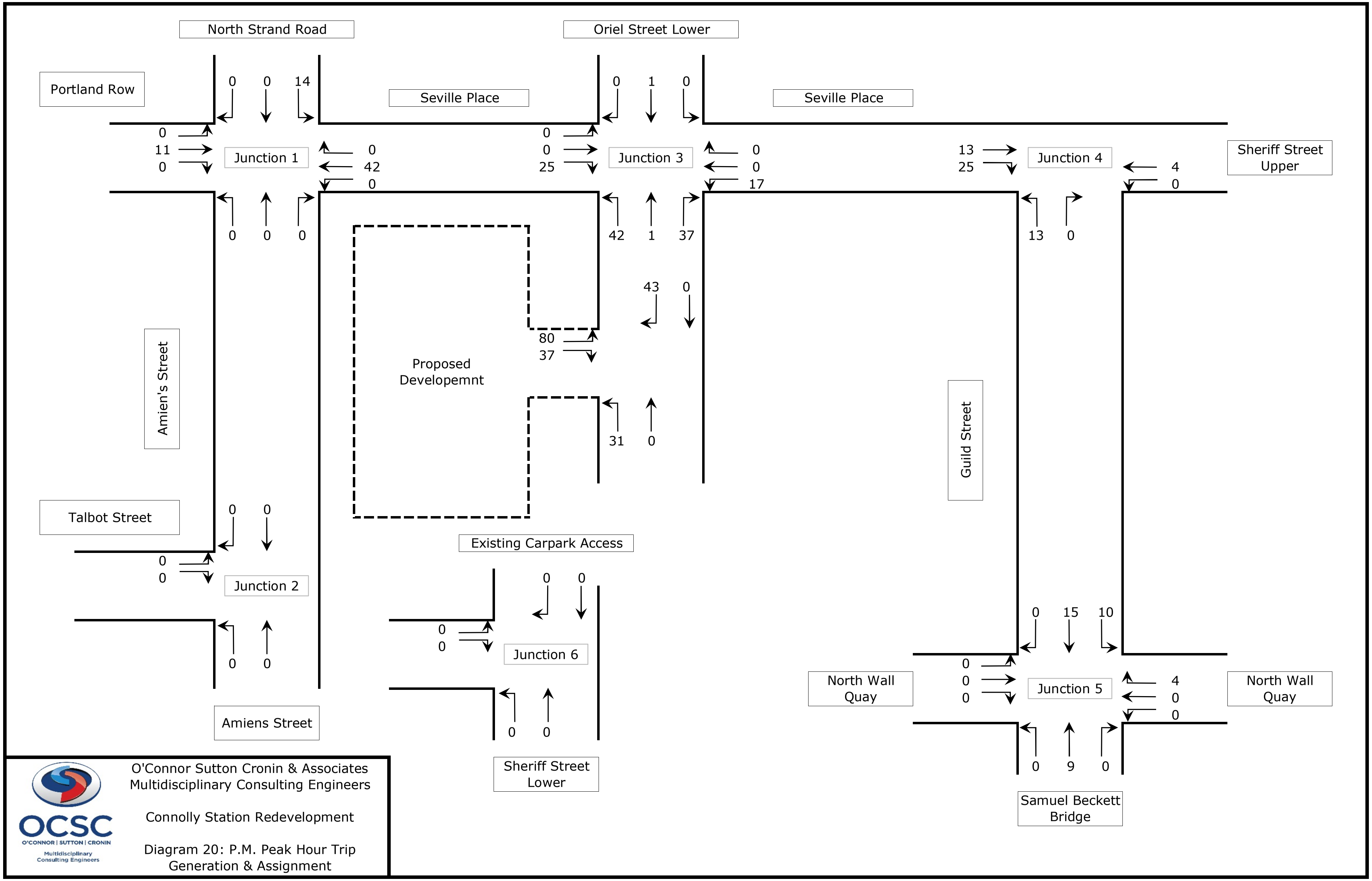

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Diagram 20: P.M. Peak Hour Trip Generation & Assignment

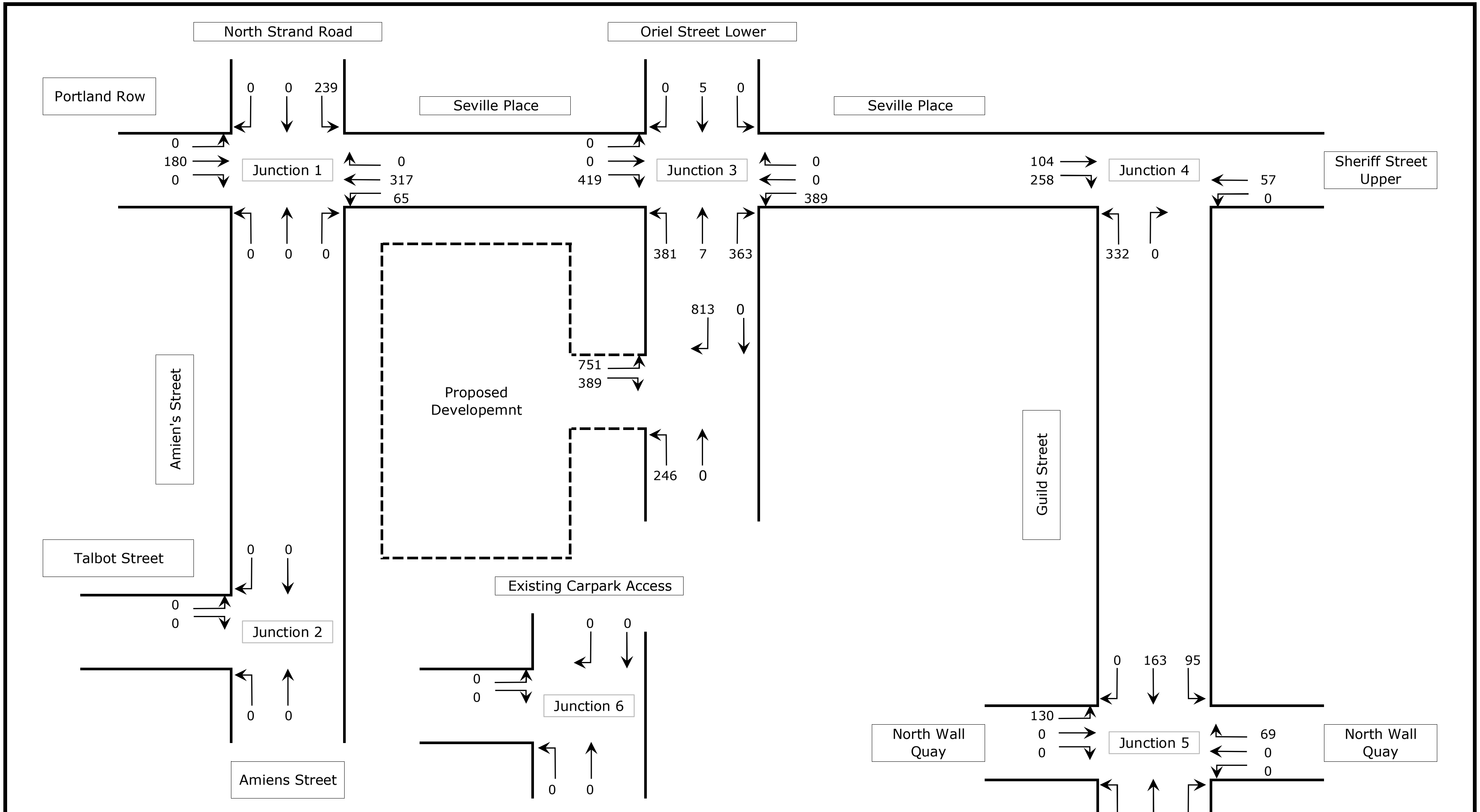

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Diagram 21: AADT Trip Generation & Assignment

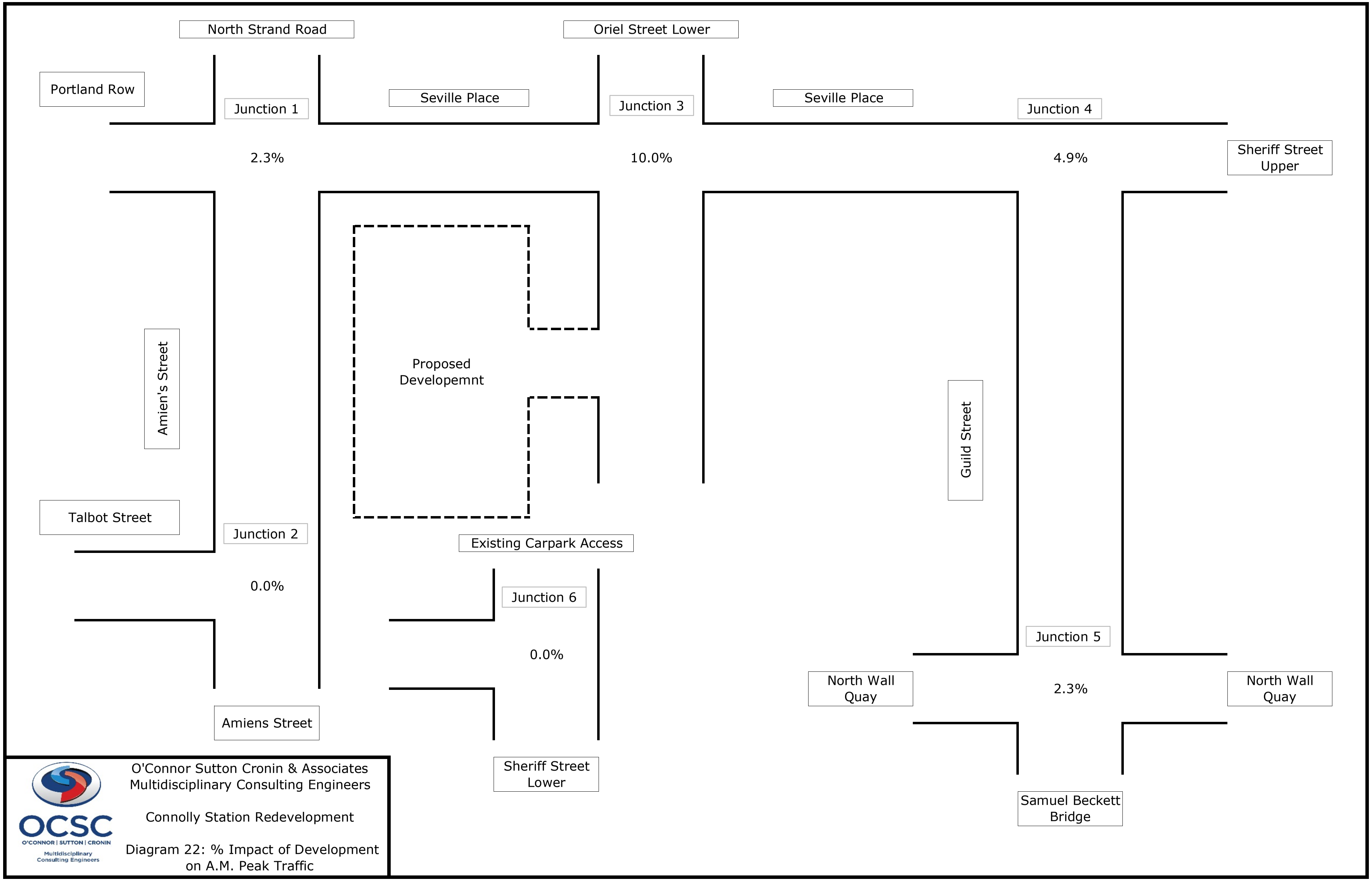

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Diagram 22: % Impact of Development on A.M. Peak Traffic

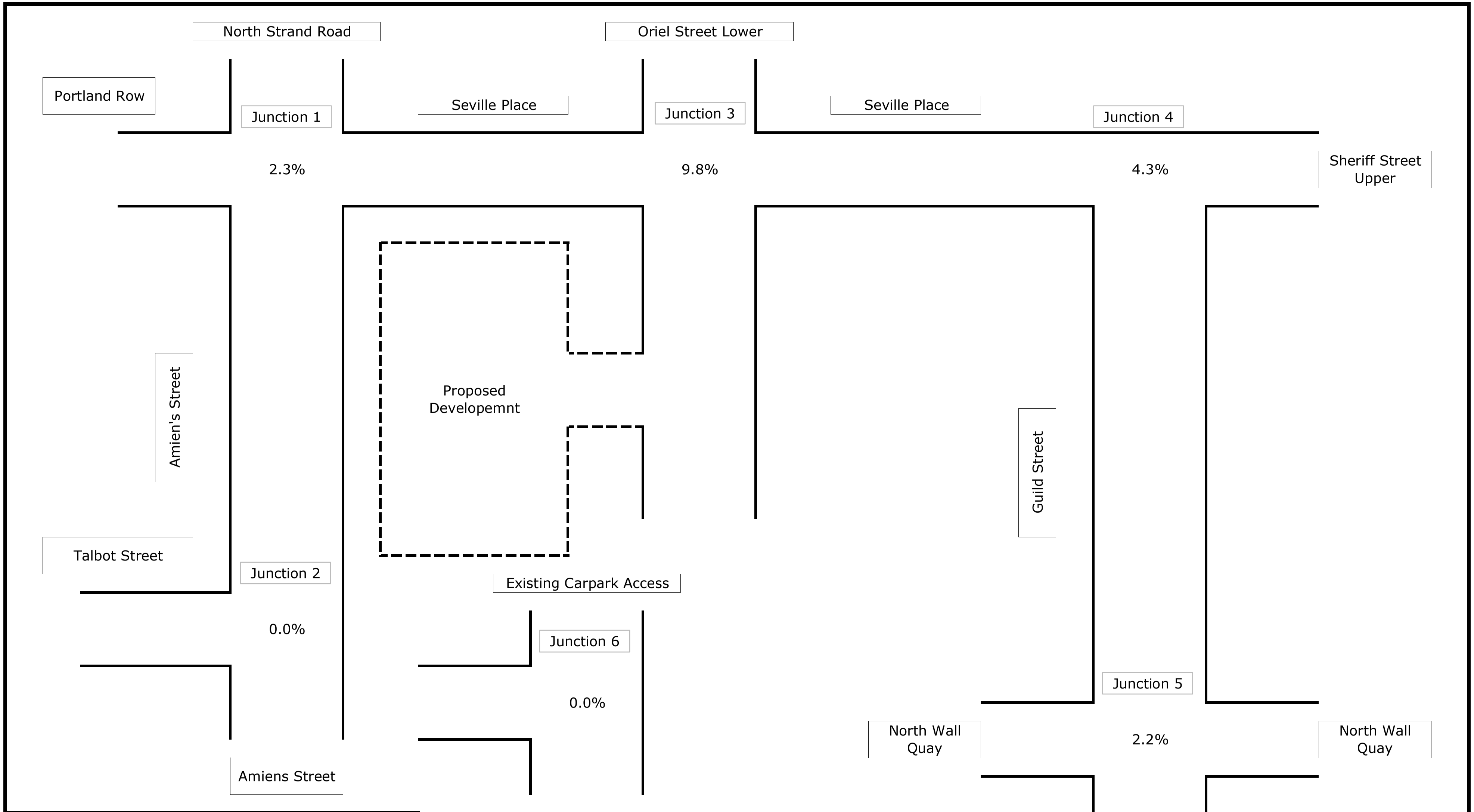

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Diagram 23: % Impact of Development on P.M. Peak Traffic

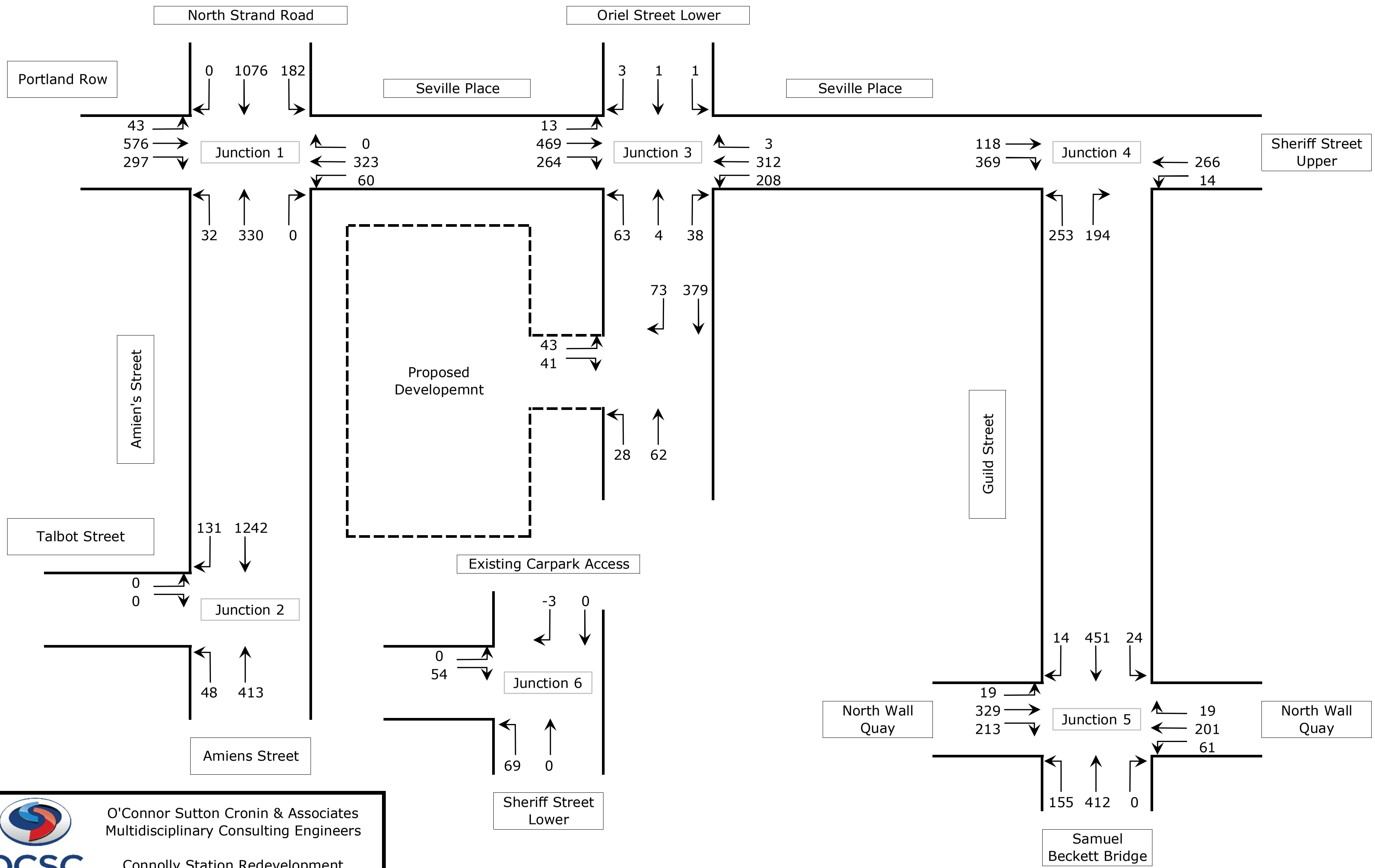

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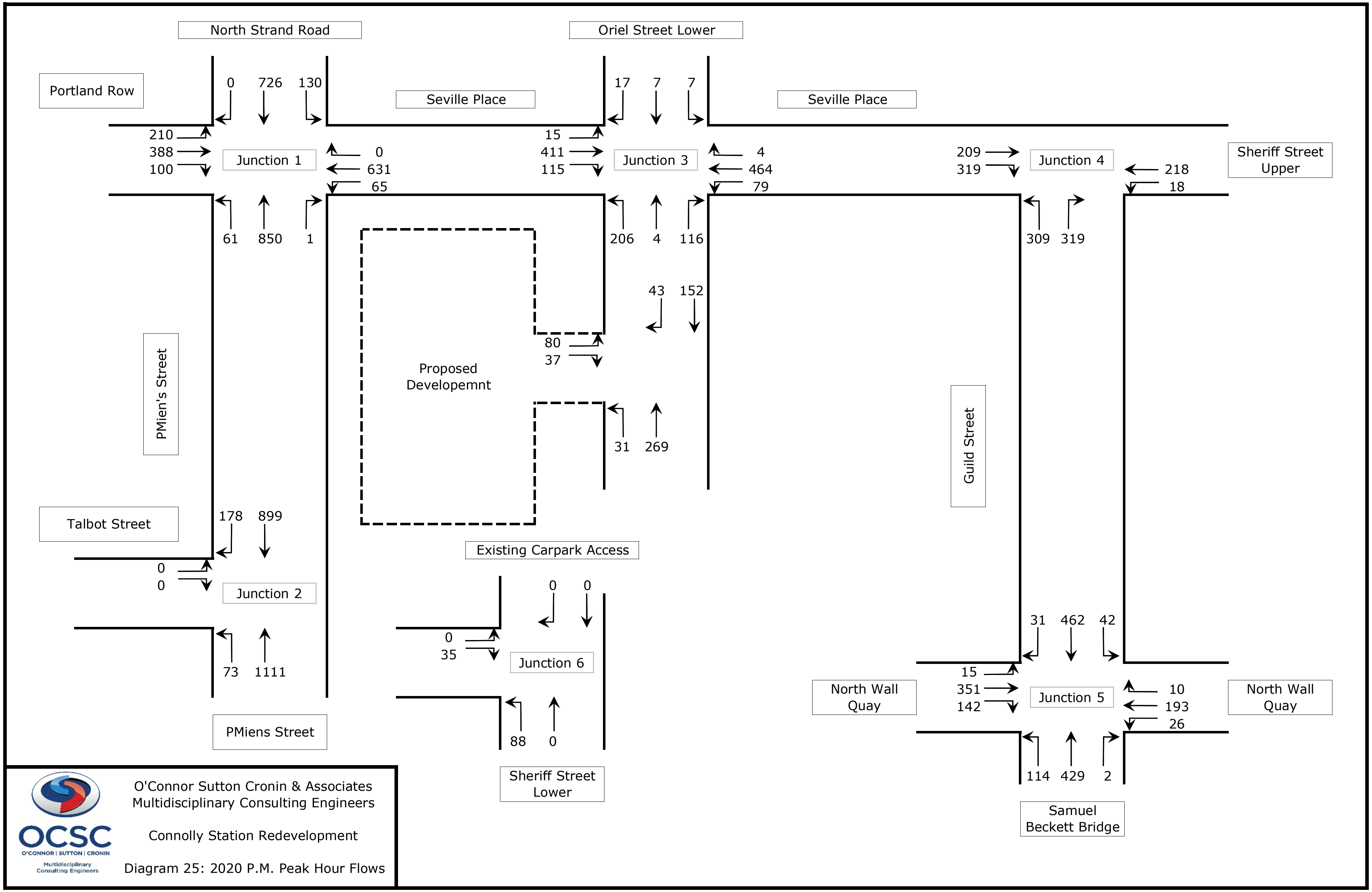
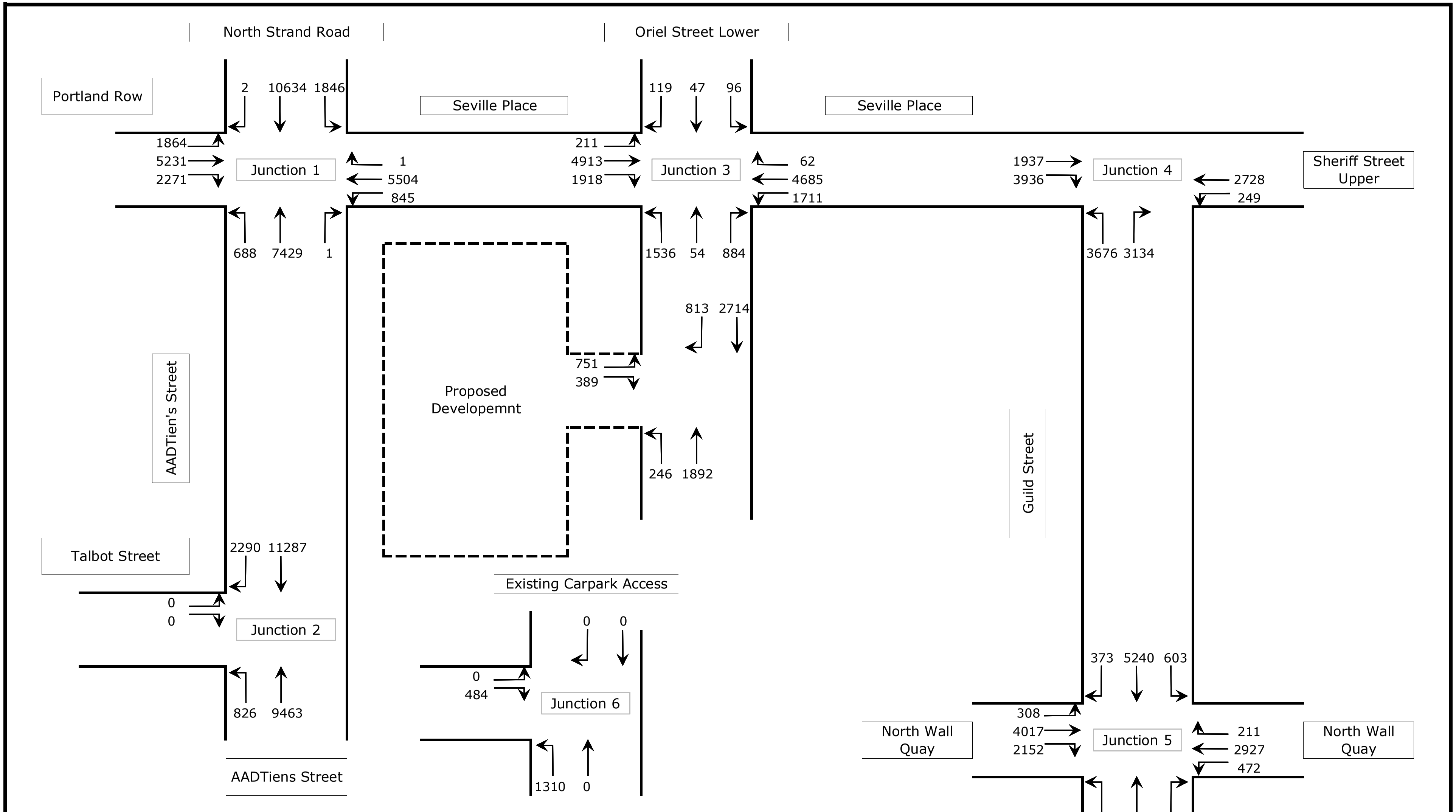
Diagram 24: 2020 A.M. Peak Hour Flows



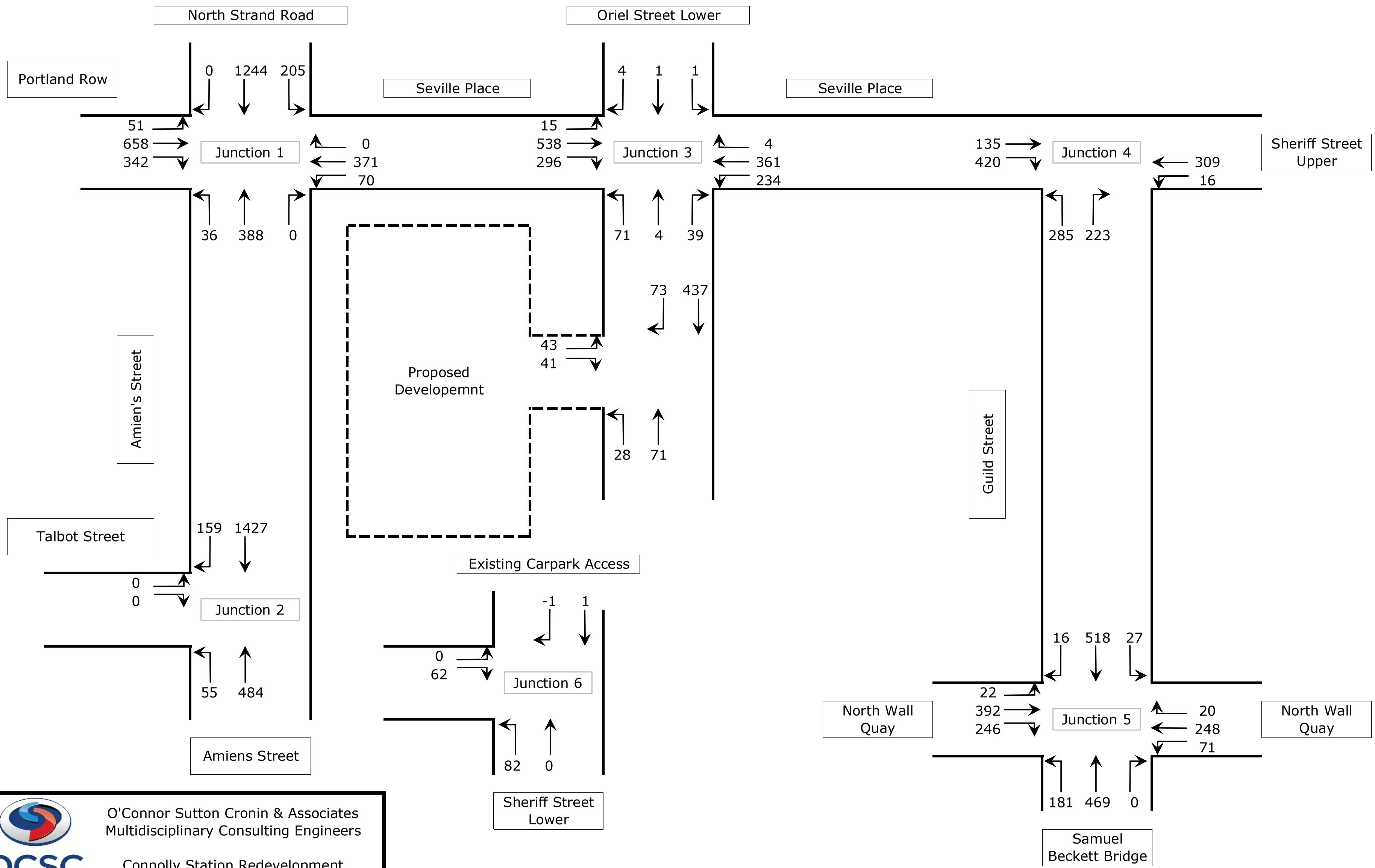
North Strand Road
Oriel Street Lower
Portland Row
0
726
130
Seville Place
17
7
7
Seville Place
210
388
100
Junction 1
0
631
65
15
411
115
Junction 3
4
464
79
209
319
Junction 4
218
18
Sheriff Street Upper
61
850
1
206
4
116
309
319
43
152
80
37
Proposed Developemnt
31
269
PMien's Street
Guild Street
Talbot Street
178
899
0
0
Junction 2
Existing Carpark Access
0
0
73
1111
0
35
Junction 6
31
462
42
15
351
142
Junction 5
10
193
26
North Wall Quay
North Wall Quay
88
0
114
429
2
PMiens Street
Sheriff Street Lower
Samuel Beckett Bridge
O'Connor Sutton Cronin & Associates
Multidisciplinary Consulting Engineers
Connolly Station Redevelopment
Diagram 25: 2020 P.M. Peak Hour Flows



O'Connor Sutton Cronin & Associates
Multidisciplinary Consulting Engineers

Connolly Station RedeveloAADTent

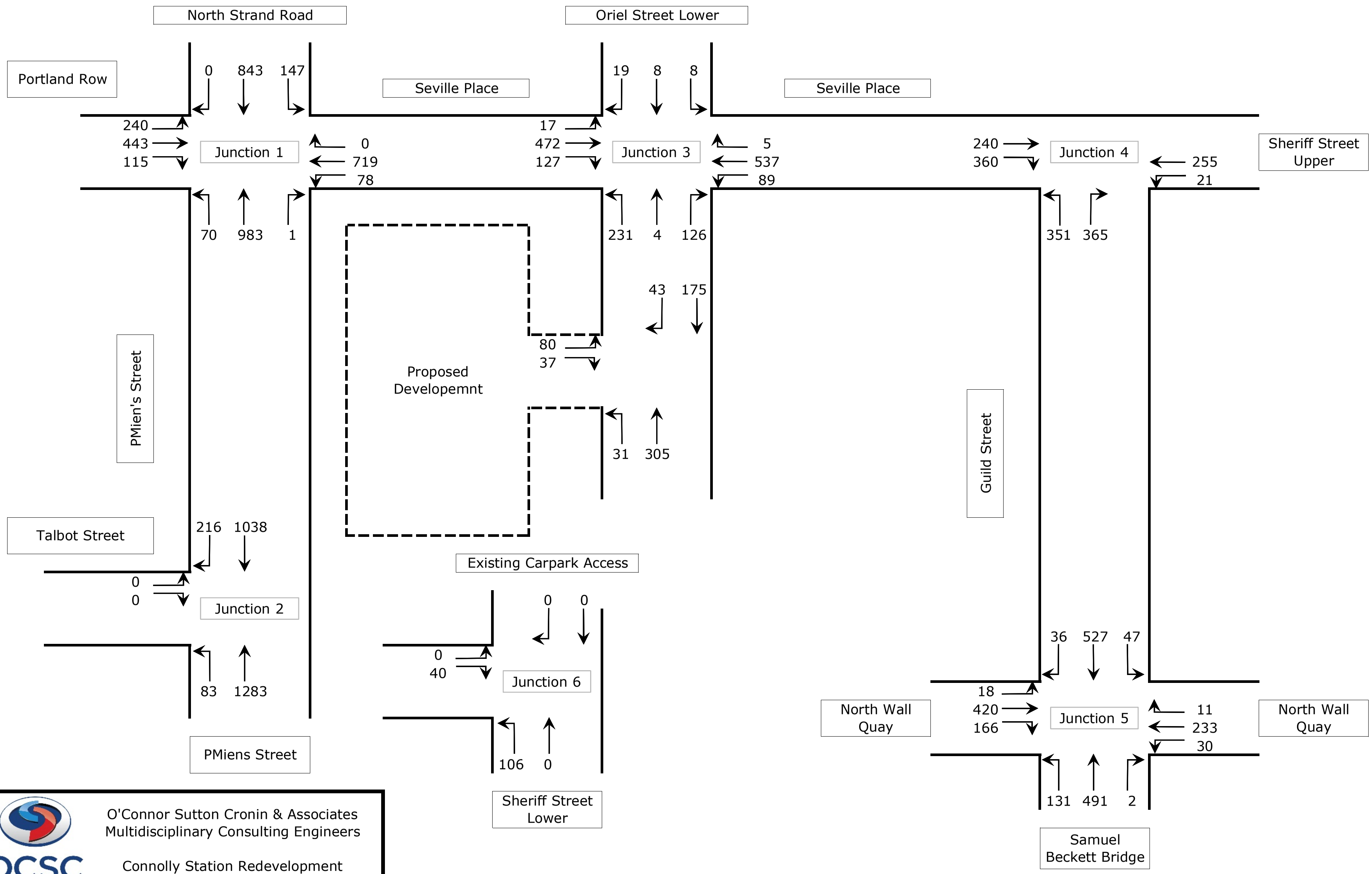
Diagram 26: 2022 AADT



O'Connor Sutton Cronin & Associates
Multidisciplinary Consulting Engineers

Connolly Station Redevelopment

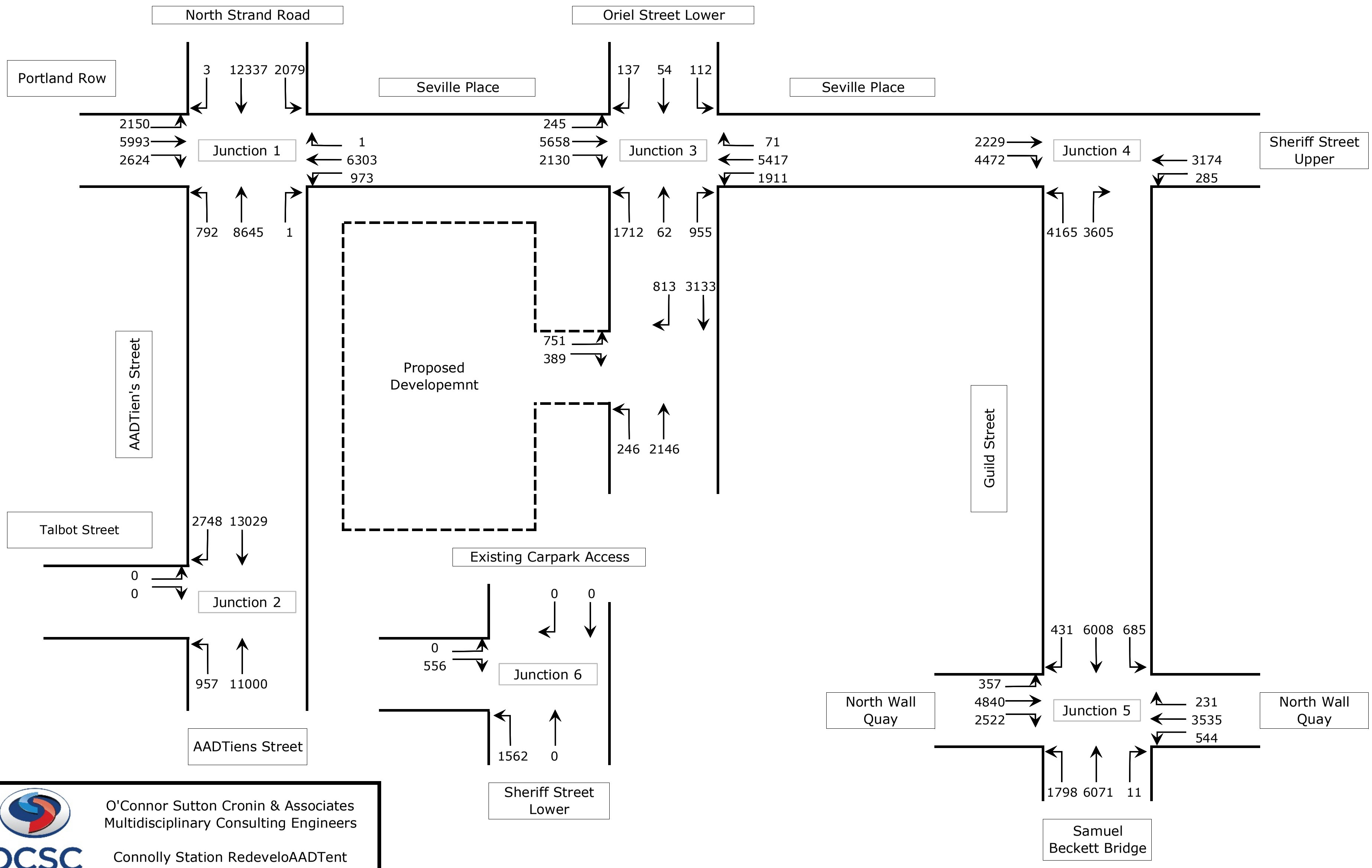
Diagram 27: 2037 A.M. Peak Hour Flows



O'Connor Sutton Cronin & Associates
Multidisciplinary Consulting Engineers

Connolly Station Redevelopment

Diagram 28: 2037 P.M. Peak Hour Flows



O'Connor Sutton Cronin & Associates
Multidisciplinary Consulting Engineers

Connolly Station RedeveloAADTent

Diagram 29: 2037 AADT

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 6.3
TRICS OUTPUT FILES

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Calculation Reference: AUDIT-322901-190307-0308

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 06 - HOTEL, FOOD & DRINK
Category : A - HOTELS
VEHICLES

Selected regions and areas:

01	GREATER LONDON		
	HO	HOUNSLOW	2 days
02	SOUTH EAST		
	EX	ESSEX	1 days
03	SOUTH WEST		
	WL	WILTSHIRE	1 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	1 days
09	NORTH		
	TV	TEES VALLEY	1 days
10	WALES		
	CF	CARDIFF	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 2227 to 9850 (units: sqm)
Range Selected by User: 320 to 20000 (units: sqm)

Parking Spaces Range: Selected: 0 to 500 Actual: 0 to 500

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 11/05/18

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Wednesday	4 days
Thursday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	7 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	5
Edge of Town Centre	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Commercial Zone	2
Retail Zone	1
Built-Up Zone	4

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C1	7 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

5,001 to 10,000	1 days
15,001 to 20,000	1 days
25,001 to 50,000	5 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
125,001 to 250,000	1 days
250,001 to 500,000	2 days
500,001 or More	3 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	3 days
1.1 to 1.5	4 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	7 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days
6a Excellent	2 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 CF-06-A-04 TRAVELODGE CARDIFF
THE FRIARY
CARDIFF

Town Centre
Built-Up Zone
Total Gross floor area: 3500 sqm
Survey date: MONDAY 16/07/12 Survey Type: MANUAL

2 EX-06-A-01 TRAVELODGE ESSEX
CHICHESTER ROAD
SOUTHEND-ON-SEA

Town Centre
Built-Up Zone
Total Gross floor area: 3000 sqm
Survey date: WEDNESDAY 23/10/13 Survey Type: MANUAL

3 GM-06-A-08 IBIS GREATER MANCHESTER
PORTLAND STREET
MANCHESTER

Town Centre
Built-Up Zone
Total Gross floor area: 3600 sqm
Survey date: MONDAY 26/09/16 Survey Type: MANUAL

4 HO-06-A-01 DAYS HOTEL HOUNSLOW
LAMPTON ROAD
HOUNSLOW

Edge of Town Centre
Commercial Zone
Total Gross floor area: 3475 sqm
Survey date: WEDNESDAY 16/06/10 Survey Type: MANUAL

5 HO-06-A-02 ETAP HOTEL HOUNSLOW
STAINES ROAD
HOUNSLOW

Edge of Town Centre
Retail Zone
Total Gross floor area: 4000 sqm
Survey date: WEDNESDAY 16/06/10 Survey Type: MANUAL

6 TV-06-A-04 THISTLE TEES VALLEY
FRY STREET
MIDDLESBROUGH

Town Centre
Commercial Zone
Total Gross floor area: 9850 sqm
Survey date: THURSDAY 03/10/13 Survey Type: MANUAL

7 WL-06-A-02 HOLIDAY INN EXPRESS WILTSHIRE
BRIDGE STREET
SWINDON

Town Centre
Built-Up Zone
Total Gross floor area: 2227 sqm
Survey date: WEDNESDAY 27/11/13 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
CB-06-A-01	high level of parking
CF-06-A-03	high level of parking
CS-06-A-02	Low level of public transport
CS-06-A-03	high level of parking
DN-06-A-01	high level of parking
DS-06-A-02	high level of parking
GR-06-A-03	high level of parking
HI-06-A-04	Low level of public transport
NF-06-A-03	Low level of public transport
NT-06-A-02	high level of parking
NW-06-A-01	high level of parking
TW-06-A-03	high level of parking

MANUALLY DESELECTED SITES (Cont.)

Site Ref	Reason for Deselection
WA-06-A-01	high level of parking

TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/A - HOTELS
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

Time Range	ARRIVALS No. Days	ARRIVALS Ave. GFA	ARRIVALS Trip Rate	DEPARTURES No. Days	DEPARTURES Ave. GFA	DEPARTURES Trip Rate	TOTALS No. Days	TOTALS Ave. GFA	TOTALS Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	7	4236	0.125	7	4236	0.243	7	4236	0.368
08:00 - 09:00	7	4236	0.155	7	**4236**	**0.408**	7	**4236**	**0.563**
09:00 - 10:00	7	4236	0.165	7	4236	0.253	7	4236	0.418
10:00 - 11:00	7	4236	0.182	7	4236	0.172	7	4236	0.354
11:00 - 12:00	7	4236	0.108	7	4236	0.172	7	4236	0.280
12:00 - 13:00	7	4236	0.128	7	4236	0.098	7	4236	0.226
13:00 - 14:00	7	4236	0.128	7	4236	0.105	7	4236	0.233
14:00 - 15:00	7	4236	0.064	7	4236	0.128	7	4236	0.192
15:00 - 16:00	7	4236	0.142	7	4236	0.128	7	4236	0.270
16:00 - 17:00	7	**4236**	**0.189**	7	4236	0.121	7	4236	0.310
17:00 - 18:00	7	4236	0.179	7	4236	0.142	7	4236	0.321
18:00 - 19:00	7	4236	0.132	7	4236	0.108	7	4236	0.240
19:00 - 20:00	7	4236	0.165	7	4236	0.125	7	4236	0.290
20:00 - 21:00	7	4236	0.101	7	4236	0.061	7	4236	0.162
21:00 - 22:00	7	4236	0.071	7	4236	0.040	7	4236	0.111
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.034			2.304			4.338

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	2227 - 9850 (units: sqm)
Survey date date range:	01/01/10 - 11/05/18
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	13

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-322901-190307-0321

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE
VEHICLES

Selected regions and areas:

01	GREATER LONDON		
	CN	CAMDEN	1 days
02	SOUTH EAST		
	EX	ESSEX	1 days
03	SOUTH WEST		
	BR	BRISTOL CITY	1 days
04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	1 days
11	SCOTLAND		
	EB	CITY OF EDINBURGH	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 3960 to 45000 (units: sqm)
Range Selected by User: 186 to 175000 (units: sqm)

Parking Spaces Range: Selected: 0 to 5073 Actual: 0 to 5073

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 04/07/18

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	1 days
Wednesday	3 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	6 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:
Town Centre 6

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:
Built-Up Zone 6

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

B1	6 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

15,001 to 20,000	1 days
25,001 to 50,000	2 days
50,001 to 100,000	2 days
100,001 or More	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

125,001 to 250,000	2 days
250,001 to 500,000	2 days
500,001 or More	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days
1.1 to 1.5	1 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	2 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days
6b (High) Excellent	1 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 BR-02-A-02 PLANNING & ENGINEERING BRISTOL CITY
ST THOMAS STREET
BRISTOL

Town Centre
Built-Up Zone
Total Gross floor area: 5736 sqm
Survey date: FRIDAY 29/11/13 Survey Type: MANUAL

2 CA-02-A-05 OFFICES CAMBRIDGESHIRE
NEW ROAD
PETERBOROUGH

Town Centre
Built-Up Zone
Total Gross floor area: 8793 sqm
Survey date: TUESDAY 16/12/14 Survey Type: MANUAL

3 CN-02-A-03 PLANNING & ENGINEERING CAMDEN
FITZROY STREET
FITZROVIA

Town Centre
Built-Up Zone
Total Gross floor area: 26639 sqm
Survey date: WEDNESDAY 06/12/17 Survey Type: MANUAL

4 EB-02-A-06 REGUS OFFICES CITY OF EDINBURGH
ST ANDREW SQUARE
EDINBURGH

Town Centre
Built-Up Zone
Total Gross floor area: 4500 sqm
Survey date: WEDNESDAY 16/03/16 Survey Type: MANUAL

5 EX-02-A-03 HMRC ESSEX
VICTORIA AVENUE
SOUTHEND-ON-SEA

Town Centre
Built-Up Zone
Total Gross floor area: 45000 sqm
Survey date: WEDNESDAY 23/10/13 Survey Type: MANUAL

6 GM-02-A-08 REGUS GREATER MANCHESTER
FOUNTAIN STREET
MANCHESTER

Town Centre
Built-Up Zone
Total Gross floor area: 3960 sqm
Survey date: MONDAY 26/09/16 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
CI-02-A-02	Low level of parking
CI-02-A-03	Low level of parking
CS-02-A-01	Low level of public transport
CS-02-A-02	Low level of public transport
HM-02-A-01	Low level of parking
MG-02-A-01	No Public Transport
SO-02-A-01	high level of parking
TV-02-A-03	high level of parking
TV-02-A-04	Low level of parking
TW-02-A-07	high level of parking
WH-02-A-02	Low level of parking
WK-02-A-01	high level of parking
WO-02-A-01	Low level of public transport
WY-02-A-04	Low level of public transport

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	6	15771	0.126	6	15771	0.008	6	15771	0.134
07:30 - 08:00	6	15771	0.146	6	15771	0.014	6	15771	0.160
08:00 - 08:30	6	15771	0.154	6	15771	0.010	6	15771	0.164
08:30 - 09:00	6	**15771**	**0.182**	6	15771	0.007	6	15771	0.189
09:00 - 09:30	6	15771	0.148	6	15771	0.011	6	15771	0.159
09:30 - 10:00	6	15771	0.091	6	15771	0.008	6	15771	0.099
10:00 - 10:30	6	15771	0.033	6	15771	0.013	6	15771	0.046
10:30 - 11:00	6	15771	0.026	6	15771	0.007	6	15771	0.033
11:00 - 11:30	6	15771	0.024	6	15771	0.017	6	15771	0.041
11:30 - 12:00	6	15771	0.014	6	15771	0.007	6	15771	0.021
12:00 - 12:30	6	15771	0.013	6	15771	0.010	6	15771	0.023
12:30 - 13:00	6	15771	0.026	6	15771	0.020	6	15771	0.046
13:00 - 13:30	6	15771	0.019	6	15771	0.019	6	15771	0.038
13:30 - 14:00	6	15771	0.012	6	15771	0.005	6	15771	0.017
14:00 - 14:30	6	15771	0.010	6	15771	0.013	6	15771	0.023
14:30 - 15:00	6	15771	0.003	6	15771	0.036	6	15771	0.039
15:00 - 15:30	6	15771	0.013	6	15771	0.073	6	15771	0.086
15:30 - 16:00	6	15771	0.025	6	15771	0.129	6	15771	0.154
16:00 - 16:30	6	15771	0.010	6	15771	0.127	6	15771	0.137
16:30 - 17:00	6	15771	0.014	6	15771	0.139	6	15771	0.153
17:00 - 17:30	6	15771	0.011	6	**15771**	**0.206**	6	**15771**	**0.217**
17:30 - 18:00	6	15771	0.008	6	15771	0.129	6	15771	0.137
18:00 - 18:30	6	15771	0.003	6	15771	0.063	6	15771	0.066
18:30 - 19:00	6	15771	0.024	6	15771	0.031	6	15771	0.055
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			1.135			1.102			2.237

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	3960 - 45000 (units: sqm)
Survey date date range:	01/01/10 - 04/07/18
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	14

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-322901-190307-0331

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : C - FLATS PRIVATELY OWNED
VEHICLES

Selected regions and areas:

01	GREATER LONDON		
	IS	ISLINGTON	1 days
	KN	KENSINGTON AND CHELSEA	1 days
	SK	SOUTHWARK	1 days
03	SOUTH WEST		
	DV	DEVON	1 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
Actual Range: 20 to 294 (units:)
Range Selected by User: 6 to 493 (units:)

Parking Spaces Range: Selected: 0 to 386 Actual: 0 to 386

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 03/07/18

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	1 days
Tuesday	1 days
Thursday	3 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	6 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	2
Edge of Town Centre	4

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Development Zone	1
Residential Zone	2
Built-Up Zone	3

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	6 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

25,001 to 50,000	3 days
50,001 to 100,000	1 days
100,001 or More	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

125,001 to 250,000	1 days
500,001 or More	5 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	2 days
0.6 to 1.0	3 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	2 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	3 days
6a Excellent	2 days
6b (High) Excellent	1 days

This data displays the number of selected surveys with PTAL Ratings.

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED
VEHICLES
Calculation factor: 1 DWELLS
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	6	114	0.012	6	114	0.040	6	114	0.052
08:00 - 09:00	6	114	0.034	6	**114**	**0.087**	6	**114**	**0.121**
09:00 - 10:00	6	114	0.038	6	114	0.044	6	114	0.082
10:00 - 11:00	6	114	0.022	6	114	0.037	6	114	0.059
11:00 - 12:00	6	114	0.040	6	114	0.028	6	114	0.068
12:00 - 13:00	6	114	0.031	6	114	0.035	6	114	0.066
13:00 - 14:00	6	114	0.032	6	114	0.040	6	114	0.072
14:00 - 15:00	6	114	0.023	6	114	0.029	6	114	0.052
15:00 - 16:00	6	114	0.031	6	114	0.029	6	114	0.060
16:00 - 17:00	6	114	0.038	6	114	0.028	6	114	0.066
17:00 - 18:00	6	114	0.048	6	114	0.028	6	114	0.076
18:00 - 19:00	6	**114**	**0.053**	6	114	0.043	6	114	0.096
19:00 - 20:00	3	160	0.048	3	160	0.040	3	160	0.088
20:00 - 21:00	3	160	0.040	3	160	0.027	3	160	0.067
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.490			0.535			1.025

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	20 - 294 (units:)
Survey date date range:	01/01/10 - 03/07/18
Number of weekdays (Monday-Friday):	10
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	4
Surveys manually removed from selection:	21

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 6.4
JUNCTION CALIBRATION SUMMARY

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Site 1		
A.M. Peak Hour Model Calibration Summary		
	Average Queue	Modelled Queue
North Strand Road	10.0	11.5
	23.4	28.2
Portland Row	0.4	0.0
	18.7	18.6
	14.0	9.5
Amiens Street	4.2	3.1
	8.0	5.0
Seville Place	2.6	1.5
	10.9	9.1

Site 1		
P.M. Peak Hour Model Calibration Summary		
	Average Queue	Modelled Queue
North Strand Road	8.6	8.7
	17.1	19.6
Portland Row	1.5	1.5
	12.3	12.6
	4.7	2.6
Amiens Street	6.4	10.1
	19.8	18.5
Seville Place	2.7	1.5
	16.3	10.5

Site 3		
A.M. Peak Hour Model Calibration Summary		
	Average Queue	Modelled Queue
Seville Place (E)	6.3	4.6
Oriel Street Upper	1.0	0.1
Seville Place (W)	15.0	12.7
Oriel Street Lower	1.5	0.1

Site 3		
P.M. Peak Hour Model Calibration Summary		
	Average Queue	Modelled Queue
Seville Place (E)	9.3	5.4
Oriel Street Upper	1.5	0.1
Seville Place (W)	8.6	4.5
Oriel Street Lower	4.3	1.2

APPENDIX 6.5
TRAFFIC MODEL OUTPUT FILES

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

TRANSYT 15

Filename: 2018 Junction 1, 3 & Dev BASE.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 15:43:59

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

A1 - AM Peak
D1 - AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	12/03/2019 15:43:52	12/03/2019 15:43:54	07:00	120	560.36	37.01	97.19	H1/1	1	3	H1/1	I/1	I/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
AM Peak		D1	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
AM				07:00	

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
07:00-08:00	B	1	5	1755	62	1278	120	0.34	0.12	3.52	0.08	0.04	0.12
	Bx	1	0	Unrestricted	373	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	C	1	52	73	665	1279	120	6.07	12.04	60.22	15.92	1.39	17.31
	Cx	1	19	368	368	1915	120	0.22	0.02	0.11	0.32	0.00	0.32
	D	1	1	13572	5	760	120	0.02	0.00	0.00	0.00	0.00	0.00
	Dx	1	0	Unrestricted	19	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	Ex	1	38	140	676	1800	120	0.60	0.11	0.56	1.60	0.00	1.60
	Gx	1	0	Unrestricted	341	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	I	1	0	-100	0	0	120	0.00	0.00	0.00	0.00	0.00	0.00
	Ix	1	0	Unrestricted	0	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J	1	19	362	373	1915	120	0.23	0.02	0.68	0.33	0.00	0.33
	Jx	1	3	2781	62	1985	120	0.03	0.00	0.01	0.01	0.00	0.01
	K	1	3	2680	62	1915	120	0.03	0.00	0.01	0.01	0.00	0.01
	Kx	1	0	Unrestricted	373	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	A1	1	27	229	486	1779	120	0.57	1.38	105.90	1.10	0.03	1.13
	Ax1	1	28	221	458	1940	100	1.06	1.36	104.20	1.92	0.18	2.11
	E1	1	15	502	63	1532	32	33.01	1.46	12.94	8.20	0.52	8.73
	F1	1	30	201	210	1913	43	28.14	5.02	28.88	23.31	1.86	25.17
	Fx1	1	0	Unrestricted	712	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	G1	1	4	2355	48	1309	120	0.06	0.01	0.16	0.01	0.00	0.01
	H1	1	97	-7	676	1897	43	82.79	30.68	88.21	220.75	11.07	231.82
	Hx1	1	10	800	180	1800	120	0.11	0.01	0.07	0.08	0.00	0.08
	A2	1	30	201	486	1940	100	2.54	3.19	24.46	4.86	1.16	6.03
	Ax2	1	24	281	458	1940	120	0.29	0.04	0.21	0.52	0.00	0.52
	E2	1	55	64	311	2055	32	39.89	8.10	71.65	48.94	2.93	51.87
	F2	1	17	437	180	2080	61	15.69	3.17	18.21	11.14	1.17	12.31
	Fx2	1	0	Unrestricted	712	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	G2	1	67	34	534	1915	49	10.08	2.14	123.00	21.24	0.80	22.04
	H2	1	50	81	534	2080	61	20.51	11.81	33.97	43.20	4.31	47.51
	Hx2	1	10	800	180	1800	120	0.12	0.53	6.49	0.08	0.01	0.09
	E3	1	20	361	374	1915	120	0.23	0.02	0.12	0.34	0.00	0.34
	G3	1	69	30	582	1800	120	29.10	15.97	229.59	66.82	5.81	72.62
	Hx3	1	0	Unrestricted	204	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	G4	1	65	38	292	1075	49	47.59	9.36	107.64	54.81	3.48	58.29
	Hx4	1	0	Unrestricted	204	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))	Effective green (s (per cycle))
07:00-08:00	B	1	62	62	0		1278	1278	5		1755	0.00	120	120
	Bx	1	373	373	0		Unrestricted	Unrestricted	0		Unrestricted	0.48	120	120
	C	1	665	665	0		1279	1279	52		73	0.81	120	120
	Cx	1	368	368	0		1915	1915	19		368	0.27	120	120
	D	1	5	5	0		760	760	1		13572	0.00	120	120
	Dx	1	19	19	0		Unrestricted	Unrestricted	0		Unrestricted	0.46	120	120
	Ex	1	676	676	0		1800	1800	38		140	0.81	120	120
	Gx	1	341	341	0		Unrestricted	Unrestricted	0		Unrestricted	1.24	120	120
	I	1	0	0	0		0	0	0		-100	0.00	120	120
	Ix	1	0	0	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	120	120
	J	1	373	373	0		1915	1915	19		362	0.46	120	120
	Jx	1	62	62	0		1985	1985	3		2781	0.00	120	120
	K	1	62	62	0		1915	1915	3		2680	0.00	120	120
	Kx	1	373	373	0		Unrestricted	Unrestricted	0		Unrestricted	0.43	120	120
	A1	1	486	486	0		1779	1779	27		229	0.32	120	120
	Ax1	1	458	458	0		1940	1632	28		221	0.74	100	101
	E1	1	63	63	0		1532	421	15		502	0.27	32	33
	F1	1	210	210	-1		1913	701	30		201	0.00	43	44
	Fx1	1	712	712	-1		Unrestricted	Unrestricted	0		Unrestricted	0.44	120	120
	G1	1	48	48	-1		1309	1309	4		2355	1.04	120	120

	H1	1	676	676	-1		1897	696	97	✓	-7	0.00	43	44
	Hx1	1	180	180	-1		1800	1800	10		800	1.24	120	120
	A2	1	486	486	0		1940	1624	30		201	0.00	100	101
	Ax2	1	458	458	0		1940	1940	24		281	0.76	120	120
	E2	1	311	311	0		2055	565	55		64	0.27	32	33
	F2	1	180	180	-1		2080	1075	17		437	0.00	61	62
	Fx2	1	712	712	-1		Unrestricted	Unrestricted	0		Unrestricted	0.44	120	120
	G2	1	534	534	0		1915	792	67		34	1.04	49	50
	H2	1	534	534	-1		2080	1075	50		81	0.00	61	62
	Hx2	1	180	180	-1		1800	1800	10		800	0.94	120	120
	E3	1	374	374	0		1915	1915	20		361	0.27	120	120
	G3	1	582	582	-1		1800	839	69		30	0.00	120	120
	Hx3	1	204	204	-1		Unrestricted	Unrestricted	0		Unrestricted	1.02	120	120
	G4	1	292	292	0		1075	448	65		38	0.00	49	50
	Hx4	1	204	204	-1		Unrestricted	Unrestricted	0		Unrestricted	0.77	120	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Unweighted cost of delay (£ per hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Uniform stops (Stops per hr)	Random stops (Stops per hr)	Unweighted cost of stops (£ per hr)	Weighted cost of stops (£ per hr)
	B	1	2.40	0.34	0.00	0.00	0.08	0.08	4.94	3.01	0.06	0.04	0.04
	Bx	1	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	C	1	13.80	6.07	0.70	0.42	15.92	15.92	16.71	98.59	12.55	1.39	1.39
	Cx	1	13.80	0.22	0.00	0.02	0.32	0.32	0.00	0.00	0.00	0.00	0.00
	D	1	6.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dx	1	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Ex	1	13.80	0.60	0.00	0.11	1.60	1.60	0.00	0.00	0.00	0.00	0.00
	Gx	1	9.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	I	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Ix	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	J	1	2.40	0.23	0.00	0.02	0.33	0.33	0.00	0.00	0.00	0.00	0.00
	Jx	1	2.40	0.03	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
	K	1	3.60	0.03	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
	Kx	1	6.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	A1	1	1.00	0.57	0.00	0.08	1.10	1.10	0.55	0.38	2.31	0.03	0.03
	Ax1	1	1.00	1.06	0.08	0.05	1.92	1.92	3.95	16.45	1.64	0.18	0.18
	E1	1	7.80	33.01	0.56	0.01	8.20	8.20	66.01	41.20	0.39	0.52	0.52
07:00-08:00	F1	1	12.00	28.14	1.58	0.06	23.31	23.31	70.60	146.35	1.91	1.86	1.86
	Fx1	1	13.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G1	1	2.40	0.06	0.00	0.00	0.01	0.01	0.36	0.15	0.02	0.00	0.00
	H1	1	24.00	82.79	7.02	8.52	220.75	220.75	130.63	650.04	233.00	11.07	11.07
	Hx1	1	5.61	0.11	0.00	0.01	0.08	0.08	0.00	0.00	0.00	0.00	0.00
	A2	1	9.00	2.54	0.28	0.06	4.86	4.86	19.11	90.96	1.91	1.16	1.16
	Ax2	1	12.00	0.29	0.00	0.04	0.52	0.52	0.00	0.00	0.00	0.00	0.00
	E2	1	7.80	39.89	3.11	0.33	48.94	48.94	75.14	223.73	9.95	2.93	2.93
	F2	1	12.00	15.69	0.77	0.02	11.14	11.14	51.74	92.63	0.50	1.17	1.17
	Fx2	1	13.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G2	1	1.20	10.08	0.81	0.69	21.24	21.24	11.98	43.48	20.50	0.80	0.80
	H2	1	24.00	20.51	2.80	0.24	43.20	43.20	64.40	336.59	7.32	4.31	4.31
	Hx2	1	5.67	0.12	0.00	0.01	0.08	0.08	0.34	0.45	0.17	0.01	0.01
	E3	1	13.80	0.23	0.00	0.02	0.34	0.34	0.00	0.00	0.00	0.00	0.00
	G3	1	4.80	29.10	3.93	0.77	66.82	66.82	79.55	439.99	23.01	5.81	5.81
	Hx3	1	5.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G4	1	6.00	47.59	3.26	0.60	54.81	54.81	94.95	259.54	17.72	3.48	3.48
	Hx4	1	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Average storage excess queue (PCU)	Average limit excess queue (PCU)	Excess queue penalty (£ per hr)	Max end of green queue (PCU)	Max end of red queue (PCU)	Wasted time starvation (s (per cycle))	Wasted time blocking back (s (per cycle))	Wasted time total (s (per cycle))	Estimated blocking
	B	1	0.00	0.12	3.48	3.52	0.00	0.00	0.00			0.00	0.00	0.00	
	Bx	1	0.00	0.00	3.48	0.00	0.00	0.00	0.00			17.00	0.00	17.00	
	C	1	0.00	12.04	20.00	60.22	0.00	0.00	0.00			26.00	0.00	26.00	
	Cx	1	0.00	0.02	20.00	0.11	0.00	0.00	0.00			19.00	0.00	19.00	
	D	1	0.00	0.00	8.70	0.00	0.00	0.00	0.00			120.00	0.00	120.00	
	Dx	1	0.00	0.00	17.39	0.00	0.00	0.00	0.00			120.00	0.00	120.00	
	Ex	1	0.00	0.11	20.00	0.56	0.00	0.00	0.00			26.00	0.00	26.00	
	Gx	1	0.00	0.00	13.26	0.00	0.00	0.00	0.00			67.00	0.00	67.00	
	I	1	0.00	0.00	2.61	0.00	0.00	0.00	0.00			120.00	0.00	120.00	
	Ix	1	0.00	0.00	2.61	0.00	0.00	0.00	0.00			120.00	0.00	120.00	
	J	1	0.00	0.02	3.48	0.68	0.00	0.00	0.00			15.00	0.00	15.00	
	Jx	1	0.00	0.00	3.48	0.01	0.00	0.00	0.00			0.00	0.00	0.00	
	K	1	0.00	0.00	5.22	0.01	0.00	0.00	0.00			0.00	0.00	0.00	
	Kx	1	0.00	0.00	8.96	0.00	0.00	0.00	0.00			12.00	0.00	12.00	
	A1	1	0.00	1.38	1.30	105.90	0.00	0.00	0.00			19.00	0.00	19.00	
	Ax1	1	0.00	1.36	1.30	104.20	0.00	0.00	0.00	0.05	0.60	8.00	0.07	8.07	
	E1	1	0.00	1.46	11.30	12.94	0.00	0.00	0.00	0.01	1.39	5.00	0.00	5.00	
07:00-08:00	F1	1	0.00	5.02	17.39	28.88	0.00	0.00	0.00	0.06	4.50	0.00	0.00	0.00	
	Fx1	1	0.00	0.00	19.18	0.00	0.00	0.00	0.00			0.00	0.00	0.00	
	G1	1	0.00	0.01	3.48	0.16	0.00	0.00	0.00			85.00	0.00	85.00	
	H1	1	0.00	30.68	34.78	88.21	0.00	0.00	0.00	8.52	22.80	0.00	0.00	0.00	
	Hx1	1	0.00	0.01	8.13	0.07	0.00	0.00	0.00			74.00	0.00	74.00	
	A2	1	0.00	3.19	13.04	24.46	0.00	0.00	0.00	0.06	2.79	0.00	0.54	0.54	
	Ax2	1	0.00	0.04	17.39	0.21	0.00	0.00	0.00			27.00	0.00	27.00	
	E2	1	0.00	8.10	11.30	71.65	0.00	0.00	0.00	0.33	7.16	0.00	0.00	0.00	
	F2	1	0.00	3.17	17.39	18.21	0.00	0.00	0.00	0.02	2.92	0.00	0.00	0.00	
	Fx2	1	0.00	0.00	19.29	0.00	0.00	0.00	0.00			0.00	0.00	0.00	
	G2	1	0.00	2.14	1.74	123.00	0.23	0.00	0.00	0.69	2.14	0.00	0.36	0.36	
	H2	1	0.00	11.81	34.78	33.97	0.00	0.00	0.00	0.24	8.85	0.00	0.00	0.00	
	Hx2	1	0.00	0.53	8.22	6.49	0.00	0.00	0.00			56.00	0.00	56.00	
	E3	1	0.00	0.02	20.00	0.12	0.00	0.00	0.00			19.00	0.00	19.00	
	G3	1	0.00	15.97	6.96	229.59	2.13	0.00	0.00			0.00	64.03	64.03	
	Hx3	1	0.00	0.00	8.44	0.00	0.00	0.00	0.00			42.00	0.00	42.00	
	G4	1	0.00	9.36	8.70	107.64	0.03	0.00	0.00	0.60	6.28	0.00	0.00	0.00	
	Hx4	1	0.00	0.00	8.69	0.00	0.00	0.00	0.00			25.00	0.00	25.00	

Traffic Stream Results: Journey times

Time Segment	Arm	Traffic Stream	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	JourneyTime (s)

07:00-08:00	B	1	1.24	0.05	26.27	2.74
	Bx	1	7.46	0.25	30.00	2.40
	C	1	76.48	3.67	20.84	19.87
	Cx	1	42.32	1.43	29.52	14.02
	D	1	0.25	0.01	29.88	6.02
	Dx	1	1.90	0.06	30.00	12.00
	Ex	1	77.74	2.70	28.75	14.40
	Gx	1	25.99	0.87	30.00	9.15
	I	1	0.00	0.00	0.00	0.00
	Ix	1	0.00	0.00	0.00	0.00
	J	1	7.46	0.27	27.40	2.63
	Jx	1	1.24	0.04	29.64	2.43
	K	1	1.86	0.06	29.74	3.63
	Kx	1	19.23	0.64	30.00	6.19
	A1	1	3.65	0.21	17.15	1.57
	Ax1	1	3.44	0.26	13.08	2.06
	E1	1	4.10	0.71	5.73	40.81
	F1	1	21.00	2.34	8.97	40.14
	Fx1	1	78.45	2.62	30.00	13.23
	G1	1	0.96	0.03	29.24	2.46
	H1	1	135.20	20.05	6.74	106.79
	Hx1	1	8.41	0.29	29.42	5.72
	A2	1	36.45	1.56	23.40	11.54
	Ax2	1	45.80	1.56	29.30	12.29
	E2	1	20.22	4.12	4.91	47.69
	F2	1	18.00	1.38	13.00	27.69
	Fx2	1	78.92	2.63	30.00	13.31
	G2	1	5.34	1.67	3.19	11.28
	H2	1	106.80	6.60	16.18	44.51
	Hx2	1	8.50	0.29	29.40	5.79
	E3	1	43.01	1.46	29.51	14.03
	G3	1	23.28	5.48	4.25	33.90
	Hx3	1	9.91	0.33	30.00	5.83
	G4	1	14.60	4.35	3.36	53.59
	Hx4	1	10.20	0.34	30.00	6.00

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Unweighted performance index (£ per hr)	Performance Index (£ per hr)
07:00-08:00	B	1	0.00	0.00	✓	0.12			1.00	0.00	0.12	0.12
	Bx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	C	1	0.00	0.00	✓	12.04			1.00	0.00	17.31	17.31
	Cx	1	0.00	0.00	✓	0.02			1.00	0.00	0.32	0.32
	D	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	Dx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	Ex	1	0.00	0.00	✓	0.11			1.00	0.00	1.60	1.60
	Gx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	I	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	Ix	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	J	1	0.00	0.00	✓	0.02			1.00	0.00	0.33	0.33
	Jx	1	0.00	0.00	✓	0.00			1.00	0.00	0.01	0.01
	K	1	0.00	0.00	✓	0.00			1.00	0.00	0.01	0.01
	Kx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	A1	1	0.00	0.00	✓	1.38			1.00	0.00	1.13	1.13
	Ax1	1	0.00	0.00	✓	1.36	0.05	0.60	1.00	0.00	2.11	2.11
	E1	1	0.00	0.00	✓	1.46	0.01	1.39	1.00	0.00	8.73	8.73
	F1	1	0.00	0.00	✓	5.02	0.06	4.50	1.00	0.00	25.17	25.17
	Fx1	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	G1	1	0.00	0.00	✓	0.01			1.00	0.00	0.01	0.01
	H1	1	0.00	0.00	✓	32.72	10.56	24.84	1.00	0.00	231.82	231.82
	Hx1	1	0.00	0.00	✓	0.01			1.00	0.00	0.08	0.08
	A2	1	0.00	0.00	✓	3.19	0.06	2.79	1.00	0.00	6.03	6.03
	Ax2	1	0.00	0.00	✓	0.04			1.00	0.00	0.52	0.52
	E2	1	0.00	0.00	✓	8.10	0.34	7.16	1.00	0.00	51.87	51.87
	F2	1	0.00	0.00	✓	3.17	0.02	2.92	1.00	0.00	12.31	12.31
	Fx2	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	G2	1	0.00	0.00	✓	2.14	0.69	2.14	1.00	0.00	22.04	22.04
	H2	1	0.00	0.00	✓	11.82	0.25	8.85	1.00	0.00	47.51	47.51
	Hx2	1	0.00	0.00	✓	0.53			1.00	0.00	0.09	0.09
	E3	1	0.00	0.00	✓	0.02			1.00	0.00	0.34	0.34
	G3	1	0.00	0.00	✓	15.98			1.00	0.00	72.62	72.62
	Hx3	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	G4	1	0.00	0.00	✓	9.36	0.60	6.28	1.00	0.00	58.29	58.29
	Hx4	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	12/03/2019 15:43:52	12/03/2019 15:43:54	07:00	120	560.36	37.01	97.19	H1/1	1	3	H1/1	I/1	I/1	

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
07:00-08:00	97	-100	11262	3570	11.83	525.59	34.76	560.36

Network Results: Flows and signals

Time	Calculated flow entering	Calculated flow out	Flow discrepancy	Adjusted flow	Degree of	DOS Threshold	Practical reserve	Actual green (s	Effective green (s

Segment	(PCU/hr)	(PCU/hr)	(PCU/hr)	warning	saturation (%)	exceeded	capacity (%)	(per cycle))	(per cycle))
07:00-08:00	11262	11262	-8		97	✓	-100	3570	3580

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Unweighted cost of delay (£ per hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Uniform stops (Stops per hr)	Random stops (Stops per hr)	Unweighted cost of stops (£ per hr)	Weighted cost of stops (£ per hr)
07:00-08:00	10.02	11.83	24.90	12.11	525.59	525.59	24.65	2443.53	332.97	34.76	34.76

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time starvation (s (per cycle))	Wasted time blocking back (s (per cycle))	Wasted time total (s (per cycle))
07:00-08:00	229.59	0.00	1022.00	65.01	1087.01

Network Results: Journey times

Time Segment	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)
07:00-08:00	939.39	68.35	13.74

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Unweighted performance index (£ per hr)	Performance Index (£ per hr)
07:00-08:00	0.00	0.00	✓	1.00	0.00	0.00	560.36	560.36

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		A	B	C	D
From	A	0.0	15.5	27.1	25.1
	B	18.2	0.0	16.8	14.7
	C	34.2	22.3	0.0	31.9
	D	21.5	8.4	20.0	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
4	B	D	3	14.74	3	14.74
5	B	C	51	16.76	51	16.76
7	C	D	13	31.87	13	31.87
8	C	B	203	22.27	203	22.27
10	D	C	3	20.05	3	20.05
11	D	B	1	8.42	1	8.42
14	A	C	314	27.14	314	27.14
15	A	B	169	15.51	169	15.51
20	A	D	3	25.11	3	25.11
21	B	A	8	18.18	8	18.18
22	C	A	449	34.20	449	34.20
23	D	A	1	21.47	1	21.47

Average Journey Time (s) for Local Matrix: 2

		To		
		1	2	3
From	1	0.0	0.0	8.8
	2	0.0	0.0	0.0
	3	6.1	0.0	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	3	373	8.81	373	8.81
2	3	1	62	6.06	62	6.06
3	2	1	0	0.00	0	0.00
4	2	3	0	0.00	0	0.00
5	3	2	0	0.00	0	0.00
6	1	2	0	0.00	0	0.00

Average Journey Time (s) for Local Matrix: 3

		To			
		1	2	3	4
From	1	0.0	0.0	88.9	121.2
	2	42.3	0.0	66.9	59.6
	3	45.6	49.3	0.0	0.0
	4	0.0	70.9	68.1	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	3	2	30	49.28	30	49.28
2	2	3	146	66.90	146	66.90
3	2	3	146	66.82	146	66.82
4	4	2	311	70.87	311	70.87
5	4	3	32	68.07	32	68.07
6	4	3	32	68.15	32	68.15
7	2	4	534	59.59	534	59.59
8	2	1	24	42.19	24	42.19
9	2	1	24	42.37	24	42.37
10	1	4	142	121.19	142	121.19
12	1	3	267	57.82	267	57.82
13	3	1	180	51.68	180	51.68
14	3	1	180	39.48	180	39.48
15	1	3	267	120.02	267	120.02
16	1	3	267	57.74	267	57.74
17	1	3	267	120.10	267	120.10

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	**1**	(untitled)	1			62	1278	120	0.00	5	1755	2.74	0.34	4.94	0.12		100	100	0.00	0.12
Bx	**1**	(untitled)	3			373	Unrestricted	120	17.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	**1**	(untitled)	1			665	1279	120	26.00	52	73	19.87	6.07	16.71	12.04		100	100	0.00	17.31
Cx	**1**	(untitled)	9			368	1915	120	19.00	19	368	14.02	0.22	0.00	0.02		100	100	0.00	0.32
D	**1**	(untitled)	1			5	760	120	120.00	1	13572	6.02	0.02	0.00	0.00		100	100	0.00	0.00
Dx	**1**	(untitled)				19	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	**1**	(untitled)	9			676	1800	120	26.00	38	140	14.40	0.60	0.00	0.11		100	100	0.00	1.60
Gx	**1**	(untitled)				341	Unrestricted	120	67.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	**1**	(untitled)	4			0	0	120	120.00	0	-100	0.00	0.00	0.00	0.00		100	100	0.00	0.00
Ix	**1**	(untitled)				0	Unrestricted	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00		100	100	0.00	0.00
J	**1**	(untitled)	4			373	1915	120	15.00	19	362	2.63	0.23	0.00	0.02		100	100	0.00	0.33
Jx	**1**	(untitled)	3			62	1985	120	0.00	3	2781	2.43	0.03	0.00	0.00		100	100	0.00	0.01
K	**1**	(untitled)	4			62	1915	120	0.00	3	2680	3.63	0.03	0.00	0.00		100	100	0.00	0.01
Kx	**1**	(untitled)				373	Unrestricted	120	12.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	**1**	(untitled)	1			486 <	1779	120	19.00	27	229	1.57	0.57	0.55	1.38 +		100	100	0.00	1.13
Ax1	**1**	(untitled)	2	1	A	458 <	1940	100	8.07	28	221	2.06	1.06	3.95	1.36 +	0.60	100	100	0.00	2.11
E1	**1**	(untitled)	5	2	C	63	1532	32	5.00	15	502	40.81	33.01	66.01	1.46	1.39	100	100	0.00	8.73
F1	**1**	(untitled)	5	2	B	210	1913	43	0.00	30	201	40.14	28.14	70.60	5.02	4.50	100	100	0.00	25.17
Fx1	**1**	(untitled)				712	Unrestricted	120	0.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	**1**	(untitled)	7			48	1309	120	85.00	4	2355	2.46	0.06	0.36	0.01		100	100	0.00	0.01
H1	**1**	(untitled)	5	2	B	676	1897	43	0.00	97	-7	106.79	82.79	130.63	30.68	22.80	100	100	0.00	231.82
Hx1	**1**	(untitled)	3			180	1800	120	74.00	10	800	5.72	0.11	0.00	0.01		100	100	0.00	0.08
A2	**1**	(untitled)	2	1	A	486	1940	100	0.54	30	201	11.54	2.54	19.11	3.19	2.79	100	100	0.00	6.03
Ax2	**1**	(untitled)	10			458	1940	120	27.00	24	281	12.29	0.29	0.00	0.04		100	100	0.00	0.52
E2	**1**	(untitled)	5	2	C	311	2055	32	0.00	55	64	47.69	39.89	75.14	8.10	7.16	100	100	0.00	51.87
F2	**1**	(untitled)	5	2	A	180	2080	61	0.00	17	437	27.69	15.69	51.74	3.17	2.92	100	100	0.00	12.31
Fx2	**1**	(untitled)				712	Unrestricted	120	0.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	**1**	(untitled)	5	2	D	534 <	1915	49	0.36	67	34	11.28	10.08	11.98	2.14 +	2.14	100	100	0.00	22.04
H2	**1**	(untitled)	5	2	A	534	2080	61	0.00	50	81	44.51	20.51	64.40	11.81	8.85	100	100	0.00	47.51
Hx2	**1**	(untitled)	3			180	1800	120	56.00	10	800	5.79	0.12	0.34	0.53		100	100	0.00	0.09
E3	**1**	(untitled)	8			374	1915	120	19.00	20	361	14.03	0.23	0.00	0.02		100	100	0.00	0.34
G3	**1**	(untitled)	6			582 <	1800	120	64.03	69	30	33.90	29.10	79.55	15.97 +		100	100	0.00	72.62
Hx3	**1**	(untitled)				204	Unrestricted	120	42.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	**1**	(untitled)	5	2	E	292 <	1075	49	0.00	65	38	53.59	47.59	94.95	9.36 +	6.28	100	100	0.00	58.29
Hx4	**1**	(untitled)				204	Unrestricted	120	25.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	939.39	68.35	13.74	24.90	12.11	525.59	34.76	0.00	560.36
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	939.39	68.35	13.74	24.90	12.11	525.59	34.76	0.00	560.36

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Filename: 2018 Junction 1, 3 & Dev BASE.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 15:45:49

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

A2 - PM Peak
D2 - PM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	12/03/2019 15:44:49	12/03/2019 15:44:50	16:15	120	513.70	33.67	91.82	H1/1	1	3	H1/1	I/1	I/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
PM Peak		D2	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
PM				16:15	

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
16:15-17:15	B	1	21	327	232	1147	120	1.23	0.94	27.15	1.12	0.29	1.41
	Bx	1	0	Unrestricted	147	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	C	1	34	165	488	1497	120	1.19	1.73	8.66	2.28	0.43	2.71
	Cx	1	32	177	622	1915	120	0.45	0.08	0.39	1.11	0.00	1.11
	D	1	4	2280	28	757	120	0.15	0.01	0.10	0.02	0.00	0.02
	Dx	1	0	Unrestricted	21	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	Ex	1	26	247	466	1800	120	0.36	1.52	7.62	0.67	0.05	0.72
	Gx	1	0	Unrestricted	620	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	I	1	0	-100	0	0	120	0.00	0.00	0.00	0.00	0.00	0.00
	Ix	1	0	Unrestricted	0	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J	1	8	1097	144	1915	120	0.08	0.00	0.09	0.04	0.00	0.04
	Jx	1	12	663	234	1985	120	0.12	0.01	0.23	0.11	0.00	0.11
	K	1	12	637	234	1915	120	0.13	0.01	0.16	0.12	0.00	0.12
	Kx	1	0	Unrestricted	144	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	A1	1	27	229	513	1875	120	0.54	0.08	5.92	1.10	0.00	1.10
	Ax1	1	29	211	471	1940	100	1.19	1.36	104.50	2.20	0.41	2.61
	E1	1	10	822	76	1532	60	15.52	1.45	12.87	4.65	0.47	5.12
	F1	1	90	0	473	1917	32	67.62	18.49	106.33	126.16	6.81	132.97
	Fx1	1	0	Unrestricted	458	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	G1	1	18	402	196	1094	120	0.90	1.47	42.23	0.70	0.08	0.78
	H1	1	92	-2	478	1893	32	73.54	19.56	56.25	138.66	7.17	145.84
	Hx1	1	23	290	415	1800	120	0.30	0.03	0.42	0.49	0.00	0.49
	A2	1	32	185	513	1940	100	2.62	3.36	25.76	5.30	1.25	6.54
	Ax2	1	24	271	471	1940	120	0.30	0.04	0.22	0.55	0.00	0.55
	E2	1	54	67	562	2055	60	21.78	10.46	92.50	48.27	3.93	52.21
	F2	1	48	88	415	2080	49	27.41	10.25	58.93	44.87	3.79	48.66
	Fx2	1	0	Unrestricted	458	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	G2	1	37	144	358	1915	60	7.56	1.56	89.54	10.67	0.59	11.26
	H2	1	43	111	370	2080	49	26.38	8.89	25.57	38.50	3.27	41.77
	Hx2	1	23	290	415	1800	120	0.86	8.68	105.69	1.41	1.37	2.77
	E3	1	38	139	638	1915	120	1.54	2.23	11.13	3.88	0.82	4.70
	G3	1	51	76	554	1800	120	14.81	10.73	154.25	32.37	3.87	36.24
	Hx3	1	0	Unrestricted	513	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	G4	1	34	165	100	580	60	32.71	2.53	29.11	12.90	0.94	13.84
	Hx4	1	0	Unrestricted	513	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Flows and signals

Time Segment	Arm	Traffic Stream	Calculated flow entering (PCU/hr)	Calculated flow out (PCU/hr)	Flow discrepancy (PCU/hr)	Adjusted flow warning	Calculated sat flow (PCU/hr)	Calculated capacity (PCU/hr)	Degree of saturation (%)	DOS Threshold exceeded	Practical reserve capacity (%)	Mean modulus of error	Actual green (s (per cycle))	Effective green (s (per cycle))
16:15-17:15	B	1	232	232	0		1147	1100	21		327	0.00	120	120
	Bx	1	147	147	0		Unrestricted	Unrestricted	0		Unrestricted	0.50	120	120
	C	1	488	488	0		1497	1436	34		165	0.67	120	120
	Cx	1	622	622	0		1915	1915	32		177	0.24	120	120
	D	1	28	28	0		757	741	4		2280	0.00	120	120
	Dx	1	21	21	0		Unrestricted	Unrestricted	0		Unrestricted	0.45	120	120
	Ex	1	466	466	0		1800	1797	26		247	0.67	120	120
	Gx	1	620	620	0		Unrestricted	Unrestricted	0		Unrestricted	0.86	120	120
	I	1	0	0	0		0	0	0		-100	0.00	120	120
	Ix	1	0	0	0		Unrestricted	Unrestricted	0		Unrestricted	0.00	120	120
	J	1	144	144	0		1915	1915	8		1097	0.48	120	120
	Jx	1	234	234	0		1985	1985	12		663	0.00	120	120
	K	1	234	234	0		1915	1915	12		637	0.00	120	120
	Kx	1	144	144	0		Unrestricted	Unrestricted	0		Unrestricted	0.45	120	120
	A1	1	513	513	0		1875	1875	27		229	0.32	120	120
	Ax1	1	471	471	0		1940	1629	29		211	0.62	100	101
	E1	1	76	76	0		1532	779	10		822	0.34	60	61
	F1	1	473	473	0		1917	527	90		0	0.00	32	33
	Fx1	1	458	458	-1		Unrestricted	Unrestricted	0		Unrestricted	0.72	120	120
	G1	1	196	196	-1		1094	1094	18		402	0.77	120	120

	H1	1	478	478	-1		1893	521	92	✓	-2	0.00	32	33
	Hx1	1	415	415	0		1800	1800	23		290	1.41	120	120
	A2	1	513	513	0		1940	1625	32		185	0.00	100	101
	Ax2	1	471	471	0		1940	1940	24		271	0.75	120	120
	E2	1	562	562	0		2055	1045	54		67	0.34	60	61
	F2	1	415	415	0		2080	867	48		88	0.00	49	50
	Fx2	1	458	458	-1		Unrestricted	Unrestricted	0		Unrestricted	0.72	120	120
	G2	1	358	358	0		1915	970	37		144	0.77	60	61
	H2	1	370	370	-1		2080	867	43		111	0.00	49	50
	Hx2	1	415	415	0		1800	1800	23		290	1.14	120	120
	E3	1	638	638	0		1915	1692	38		139	0.24	120	120
	G3	1	554	554	-1		1800	1084	51		76	0.00	120	120
	Hx3	1	513	513	-1		Unrestricted	Unrestricted	0		Unrestricted	1.02	120	120
	G4	1	100	100	0		580	295	34		165	0.00	60	61
	Hx4	1	513	513	-1		Unrestricted	Unrestricted	0		Unrestricted	0.83	120	120

Traffic Stream Results: Stops and delays

Time Segment	Arm	Traffic Stream	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Unweighted cost of delay (£ per hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Uniform stops (Stops per hr)	Random stops (Stops per hr)	Unweighted cost of stops (£ per hr)	Weighted cost of stops (£ per hr)
16:15-17:15	B	1	2.40	1.23	0.04	0.04	1.12	1.12	9.87	21.63	1.26	0.29	0.29
	Bx	1	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	C	1	13.80	1.19	0.03	0.13	2.28	2.28	7.03	26.48	7.84	0.43	0.43
	Cx	1	13.80	0.45	0.00	0.08	1.11	1.11	0.00	0.00	0.00	0.00	0.00
	D	1	6.00	0.15	0.00	0.00	0.02	0.02	0.51	0.11	0.03	0.00	0.00
	Dx	1	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Ex	1	13.80	0.36	0.00	0.05	0.67	0.67	0.87	2.70	1.36	0.05	0.05
	Gx	1	9.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	I	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Ix	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	J	1	2.40	0.08	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.00	0.00
	Jx	1	2.40	0.12	0.00	0.01	0.11	0.11	0.00	0.00	0.00	0.00	0.00
	K	1	3.60	0.13	0.00	0.01	0.12	0.12	0.00	0.00	0.00	0.00	0.00
	Kx	1	6.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	A1	1	1.00	0.54	0.00	0.08	1.10	1.10	0.00	0.00	0.00	0.00	0.00
	Ax1	1	1.00	1.19	0.10	0.06	2.20	2.20	8.63	38.88	1.76	0.41	0.41
	E1	1	7.80	15.52	0.32	0.01	4.65	4.65	49.37	37.37	0.16	0.47	0.47
	F1	1	12.00	67.62	5.50	3.38	126.16	126.16	114.80	446.78	96.24	6.81	6.81
	Fx1	1	13.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G1	1	2.40	0.90	0.03	0.02	0.70	0.70	3.28	5.84	0.59	0.08	0.08
	H1	1	24.00	73.54	5.60	4.16	138.66	138.66	119.71	455.13	117.07	7.17	7.17
	Hx1	1	5.61	0.30	0.00	0.03	0.49	0.49	0.00	0.00	0.00	0.00	0.00
	A2	1	9.00	2.62	0.30	0.07	5.30	5.30	19.40	97.32	2.18	1.25	1.25
	Ax2	1	12.00	0.30	0.00	0.04	0.55	0.55	0.00	0.00	0.00	0.00	0.00
	E2	1	7.80	21.78	3.09	0.31	48.27	48.27	55.81	304.32	9.33	3.93	3.93
	F2	1	12.00	27.41	2.94	0.22	44.87	44.87	72.79	295.51	6.55	3.79	3.79
	Fx2	1	13.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G2	1	1.20	7.56	0.64	0.11	10.67	10.67	13.05	43.48	3.23	0.59	0.59
	H2	1	24.00	26.38	2.55	0.16	38.50	38.50	70.55	256.30	4.74	3.27	3.27
	Hx2	1	5.67	0.86	0.06	0.03	1.41	1.41	26.25	107.91	1.04	1.37	1.37
	E3	1	13.80	1.54	0.16	0.11	3.88	3.88	10.21	61.75	3.41	0.82	0.82
	G3	1	4.80	14.81	2.01	0.27	32.37	32.37	55.73	300.78	7.95	3.87	3.87
	Hx3	1	5.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	G4	1	6.00	32.71	0.82	0.09	12.90	12.90	74.81	72.22	2.59	0.94	0.94
	Hx4	1	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Traffic Stream Results: Queues and blocking

Time Segment	Arm	Traffic Stream	Initial queue (PCU)	Mean max queue (PCU)	Max queue storage (PCU)	Utilised storage (%)	Average storage excess queue (PCU)	Average limit excess queue (PCU)	Excess queue penalty (£ per hr)	Max end of green queue (PCU)	Max end of red queue (PCU)	Wasted time starvation (s (per cycle))	Wasted time blocking back (s (per cycle))	Wasted time total (s (per cycle))	Estimated blocking
16:15-17:15	B	1	0.00	0.94	3.48	27.15	0.00	0.00	0.00			0.00	3.79	3.79	
	Bx	1	0.00	0.00	3.48	0.00	0.00	0.00	0.00			11.00	0.00	11.00	
	C	1	0.00	1.73	20.00	8.66	0.00	0.00	0.00			26.00	4.71	30.71	
	Cx	1	0.00	0.08	20.00	0.39	0.00	0.00	0.00			2.00	0.00	2.00	
	D	1	0.00	0.01	8.70	0.10	0.00	0.00	0.00			119.00	0.99	119.99	
	Dx	1	0.00	0.00	17.39	0.00	0.00	0.00	0.00			120.00	0.00	120.00	
	Ex	1	0.00	1.52	20.00	7.62	0.00	0.00	0.00			26.00	0.18	26.18	
	Gx	1	0.00	0.00	13.26	0.00	0.00	0.00	0.00			19.00	0.00	19.00	
	I	1	0.00	0.00	2.61	0.00	0.00	0.00	0.00			120.00	0.00	120.00	
	Ix	1	0.00	0.00	2.61	0.00	0.00	0.00	0.00			120.00	0.00	120.00	
	J	1	0.00	0.00	3.48	0.09	0.00	0.00	0.00			12.00	0.00	12.00	
	Jx	1	0.00	0.01	3.48	0.23	0.00	0.00	0.00			0.00	0.00	0.00	
	K	1	0.00	0.01	5.22	0.16	0.00	0.00	0.00			0.00	0.00	0.00	
	Kx	1	0.00	0.00	8.96	0.00	0.00	0.00	0.00			13.00	0.00	13.00	
	A1	1	0.00	0.08	1.30	5.92	0.00	0.00	0.00			19.00	0.00	19.00	
	Ax1	1	0.00	1.36	1.30	104.50	0.00	0.00	0.00	0.06	1.35	0.00	0.22	0.22	
	E1	1	0.00	1.45	11.30	12.87	0.00	0.00	0.00	0.01	1.25	25.00	0.00	25.00	
	F1	1	0.00	18.49	17.39	106.33	0.04	0.00	0.00	3.38	14.81	0.00	0.00	0.00	
	Fx1	1	0.00	0.00	19.18	0.00	0.00	0.00	0.00			10.00	0.00	10.00	
	G1	1	0.00	1.47	3.48	42.23	0.00	0.00	0.00			29.00	0.00	29.00	
	H1	1	0.00	19.56	34.78	56.25	0.00	0.00	0.00	4.16	15.71	0.00	0.00	0.00	
	Hx1	1	0.00	0.03	8.13	0.42	0.00	0.00	0.00			83.00	0.00	83.00	
	A2	1	0.00	3.36	13.04	25.76	0.00	0.00	0.00	0.07	3.02	0.00	0.51	0.51	
	Ax2	1	0.00	0.04	17.39	0.22	0.00	0.00	0.00			19.00	0.00	19.00	
	E2	1	0.00	10.46	11.30	92.50	0.00	0.00	0.00	0.31	10.38	3.00	0.00	3.00	
	F2	1	0.00	10.25	17.39	58.93	0.00	0.00	0.00	0.22	8.29	0.00	3.00	3.00	
	Fx2	1	0.00	0.00	19.29	0.00	0.00	0.00	0.00			10.00	0.00	10.00	
	G2	1	0.00	1.56	1.74	89.54	0.00	0.00	0.00	0.11	1.56	0.00	0.24	0.24	
	H2	1	0.00	8.89	34.78	25.57	0.00	0.00	0.00	0.16	7.35	0.00	0.00	0.00	
	Hx2	1	0.00	8.68	8.22	105.69	0.01	0.00	0.00			67.00	0.00	67.00	
	E3	1	0.00	2.23	20.00	11.13	0.00	0.00	0.00			2.00	13.95	15.95	
	G3	1	0.00	10.73	6.96	154.25	0.40	0.00	0.00			0.00	47.70	47.70	
	Hx3	1	0.00	0.00	8.44	0.00	0.00	0.00	0.00			13.00	0.00	13.00	
	G4	1	0.00	2.53	8.70	29.11	0.00	0.00	0.00	0.09	1.73	0.00	0.00	0.00	
	Hx4	1	0.00	0.00	8.69	0.00	0.00	0.00	0.00			0.00	0.00	0.00	

Traffic Stream Results: Journey times

Time Segment	Arm	Traffic Stream	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	JourneyTime (s)

16:15-17:15	B	1	4.64	0.23	19.86	3.63
	Bx	1	2.94	0.10	30.00	2.40
	C	1	56.12	2.03	27.62	14.99
	Cx	1	71.53	2.46	29.05	14.25
	D	1	1.40	0.05	29.27	6.15
	Dx	1	2.10	0.07	30.00	12.00
	Ex	1	53.59	1.83	29.23	14.16
	Gx	1	47.26	1.58	30.00	9.15
	I	1	0.00	0.00	0.00	0.00
	Ix	1	0.00	0.00	0.00	0.00
	J	1	2.88	0.10	29.07	2.48
	Jx	1	4.68	0.16	28.56	2.52
	K	1	7.02	0.24	28.95	3.73
	Kx	1	7.42	0.25	30.00	6.19
	A1	1	3.85	0.22	17.51	1.54
	Ax1	1	3.53	0.29	12.35	2.19
	E1	1	4.94	0.49	10.04	23.32
	F1	1	47.30	10.46	4.52	79.62
	Fx1	1	50.50	1.68	30.00	13.23
	G1	1	3.92	0.18	21.82	3.30
	H1	1	95.60	12.95	7.38	97.54
	Hx1	1	19.40	0.68	28.48	5.91
	A2	1	38.48	1.66	23.24	11.62
	Ax2	1	47.10	1.61	29.27	12.30
	E2	1	36.53	4.62	7.91	29.58
	F2	1	41.50	4.54	9.13	39.41
	Fx2	1	50.80	1.69	30.00	13.31
	G2	1	3.58	0.87	4.11	8.76
	H2	1	74.00	5.18	14.29	50.38
	Hx2	1	19.61	0.75	26.05	6.53
	E3	1	73.37	2.72	26.98	15.34
	G3	1	22.16	3.02	7.34	19.61
	Hx3	1	24.91	0.83	30.00	5.83
	G4	1	5.00	1.08	4.65	38.71
	Hx4	1	25.64	0.85	30.00	6.00

Traffic Stream Results: Advanced

Time Segment	Arm	Traffic Stream	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	Mean Max Queue EoTS (PCU)	Max End of Green Queue EoTS (PCU)	Max End of Red Queue EoTS (PCU)	PCU Factor	Cost of traffic penalties (£ per hr)	Unweighted performance index (£ per hr)	Performance Index (£ per hr)
16:15-17:15	B	1	0.00	0.00	✓	0.94			1.00	0.00	1.41	1.41
	Bx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	C	1	0.00	0.00	✓	1.73			1.00	0.00	2.71	2.71
	Cx	1	0.00	0.00	✓	0.08			1.00	0.00	1.11	1.11
	D	1	0.00	0.00	✓	0.01			1.00	0.00	0.02	0.02
	Dx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	Ex	1	0.00	0.00	✓	1.52			1.00	0.00	0.72	0.72
	Gx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	I	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	Ix	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	J	1	0.00	0.00	✓	0.00			1.00	0.00	0.04	0.04
	Jx	1	0.00	0.00	✓	0.01			1.00	0.00	0.11	0.11
	K	1	0.00	0.00	✓	0.01			1.00	0.00	0.12	0.12
	Kx	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	A1	1	0.00	0.00	✓	0.08			1.00	0.00	1.10	1.10
	Ax1	1	0.00	0.00	✓	1.36	0.06	1.35	1.00	0.00	2.61	2.61
	E1	1	0.00	0.00	✓	1.45	0.01	1.25	1.00	0.00	5.12	5.12
	F1	1	0.00	0.00	✓	18.73	3.62	15.05	1.00	0.00	132.97	132.97
	Fx1	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	G1	1	0.00	0.00	✓	1.47			1.00	0.00	0.78	0.78
	H1	1	0.00	0.00	✓	19.97	4.57	16.12	1.00	0.00	145.84	145.84
	Hx1	1	0.00	0.00	✓	0.03			1.00	0.00	0.49	0.49
	A2	1	0.00	0.00	✓	3.36	0.07	3.02	1.00	0.00	6.54	6.54
	Ax2	1	0.00	0.00	✓	0.04			1.00	0.00	0.55	0.55
	E2	1	0.00	0.00	✓	10.46	0.31	10.38	1.00	0.00	52.21	52.21
	F2	1	0.00	0.00	✓	10.25	0.22	8.29	1.00	0.00	48.66	48.66
	Fx2	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	G2	1	0.00	0.00	✓	1.56	0.11	1.56	1.00	0.00	11.26	11.26
	H2	1	0.00	0.00	✓	8.89	0.16	7.35	1.00	0.00	41.77	41.77
	Hx2	1	0.00	0.00	✓	8.68			1.00	0.00	2.77	2.77
	E3	1	0.00	0.00	✓	2.23			1.00	0.00	4.70	4.70
	G3	1	0.00	0.00	✓	10.73			1.00	0.00	36.24	36.24
	Hx3	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00
	G4	1	0.00	0.00	✓	2.53	0.09	1.73	1.00	0.00	13.84	13.84
	Hx4	1	0.00	0.00	✓	0.00			1.00	0.00	0.00	0.00

Network Results

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	12/03/2019 15:44:49	12/03/2019 15:44:50	16:15	120	513.70	33.67	91.82	H1/1	1	3	H1/1	I/1	I/1	

Network Results: Vehicle summary

Time Segment	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
16:15-17:15	92	-100	12340	3602	9.82	478.16	35.54	513.70

Network Results: Flows and signals

Time	Calculated flow entering	Calculated flow out	Flow discrepancy	Adjusted flow	Degree of	DOS Threshold	Practical reserve	Actual green (s	Effective green (s

Segment	(PCU/hr)	(PCU/hr)	(PCU/hr)	warning	saturation (%)	exceeded	capacity (%)	(per cycle))	(per cycle))
16:15-17:15	12340	12340	-5		92	✓	-100	3602	3612

Network Results: Stops and delays

Time Segment	Mean Cruise Time per Veh (s)	Mean Delay per Veh (s)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Unweighted cost of delay (£ per hr)	Weighted cost of delay (£ per hr)	Mean stops per Veh (%)	Uniform stops (Stops per hr)	Random stops (Stops per hr)	Unweighted cost of stops (£ per hr)	Weighted cost of stops (£ per hr)
16:15-17:15	9.28	9.82	24.20	9.47	478.16	478.16	23.03	2574.52	267.32	35.54	35.54

Network Results: Queues and blocking

Time Segment	Utilised storage (%)	Excess queue penalty (£ per hr)	Wasted time starvation (s (per cycle))	Wasted time blocking back (s (per cycle))	Wasted time total (s (per cycle))
16:15-17:15	154.25	0.00	868.00	75.29	943.29

Network Results: Journey times

Time Segment	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)
16:15-17:15	953.29	65.48	14.56

Network Results: Advanced

Time Segment	Degree of saturation penalty (£ per hr)	Ped gap accepting penalty (£ per hr)	Warmed up	PCU Factor	Cost of traffic penalties (£ per hr)	Controller stream penalties (£ per hr)	Unweighted performance index (£ per hr)	Performance Index (£ per hr)
16:15-17:15	0.00	0.00	✓	1.00	0.00	0.00	513.70	513.70

Point to Point Journey Time

Average Journey Time (s) for Local Matrix: 1

		To			
		A	B	C	D
From	A	0.0	15.6	27.4	25.2
	B	19.0	0.0	17.9	15.6
	C	29.3	17.4	0.0	27.0
	D	21.6	8.6	20.4	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
4	B	D	3	15.63	3	15.63
5	B	C	158	17.88	158	17.88
7	C	D	14	26.99	14	26.99
8	C	B	81	17.39	81	17.39
10	D	C	15	20.40	15	20.40
11	D	B	6	8.55	6	8.55
14	A	C	449	27.41	449	27.41
15	A	B	60	15.56	60	15.56
20	A	D	4	25.16	4	25.16
21	B	A	71	19.04	71	19.04
22	C	A	393	29.28	393	29.28
23	D	A	7	21.61	7	21.61

Average Journey Time (s) for Local Matrix: 2

		To		
		1	2	3
From	1	0.0	0.0	8.7
	2	0.0	0.0	0.0
	3	6.3	0.0	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	1	3	144	8.66	144	8.66
2	3	1	234	6.25	234	6.25
3	2	1	0	0.00	0	0.00
4	2	3	0	0.00	0	0.00
5	3	2	0	0.00	0	0.00
6	1	2	0	0.00	0	0.00

Average Journey Time (s) for Local Matrix: 3

		To			
		1	2	3	4
From	1	0.0	0.0	87.2	111.7
	2	28.8	0.0	52.0	42.5
	3	71.6	88.8	0.0	0.0
	4	0.0	54.1	51.9	0.0

Path Journey Time

Path	From Location	To Location	Normal Calculated Flow (PCU/hr)	Normal journey time (s)	Calculated Total Flow (PCU/hr)	Avg journey time (s)
1	3	2	58	88.77	58	88.77
2	2	3	50	52.02	50	52.02
3	2	3	50	51.94	50	51.94
4	4	2	562	54.07	562	54.07
5	4	3	38	51.89	38	51.89
6	4	3	38	51.97	38	51.97
7	2	4	358	42.54	358	42.54
8	2	1	98	28.74	98	28.74
9	2	1	98	28.91	98	28.91
10	1	4	108	111.69	108	111.69
12	1	3	185	63.69	185	63.69
13	3	1	415	91.35	415	91.35
14	3	1	415	51.94	415	51.94
15	1	3	185	110.78	185	110.78
16	1	3	185	63.61	185	63.61
17	1	3	185	110.85	185	110.85

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			232	1147	120	3.79	21	327	3.63	1.23	9.87	0.94		100	100	0.00	1.41
Bx	1	(untitled)	3			147	Unrestricted	120	11.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			488	1497	120	30.71	34	165	14.99	1.19	7.03	1.73		100	100	0.00	2.71
Cx	1	(untitled)	9			622	1915	120	2.00	32	177	14.25	0.45	0.00	0.08		100	100	0.00	1.11
D	1	(untitled)	1			28	757	120	119.99	4	2280	6.15	0.15	0.51	0.01		100	100	0.00	0.02
Dx	1	(untitled)				21	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			466	1800	120	26.18	26	247	14.16	0.36	0.87	1.52		100	100	0.00	0.72
Gx	1	(untitled)				620	Unrestricted	120	19.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			0	0	120	120.00	0	-100	0.00	0.00	0.00	0.00		100	100	0.00	0.00
Ix	1	(untitled)				0	Unrestricted	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			144	1915	120	12.00	8	1097	2.48	0.08	0.00	0.00		100	100	0.00	0.04
Jx	1	(untitled)	3			234	1985	120	0.00	12	663	2.52	0.12	0.00	0.01		100	100	0.00	0.11
K	1	(untitled)	4			234	1915	120	0.00	12	637	3.73	0.13	0.00	0.01		100	100	0.00	0.12
Kx	1	(untitled)				144	Unrestricted	120	13.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			513	1875	120	19.00	27	229	1.54	0.54	0.00	0.08		100	100	0.00	1.10
Ax1	1	(untitled)	2	1	A	471 <	1940	100	0.22	29	211	2.19	1.19	8.63	1.36 +	1.35	100	100	0.00	2.61
E1	1	(untitled)	5	2	C	76	1532	60	25.00	10	822	23.32	15.52	49.37	1.45	1.25	100	100	0.00	5.12
F1	1	(untitled)	5	2	B	473 <	1917	32	0.00	90	0	79.62	67.62	114.80	18.49 +	14.81	100	100	0.00	132.97
Fx1	1	(untitled)				458	Unrestricted	120	10.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	1	(untitled)	7			196	1094	120	29.00	18	402	3.30	0.90	3.28	1.47		100	100	0.00	0.78
H1	1	(untitled)	5	2	B	478	1893	32	0.00	92	-2	97.54	73.54	119.71	19.56	15.71	100	100	0.00	145.84
Hx1	1	(untitled)	3			415	1800	120	83.00	23	290	5.91	0.30	0.00	0.03		100	100	0.00	0.49
A2	1	(untitled)	2	1	A	513	1940	100	0.51	32	185	11.62	2.62	19.40	3.36	3.02	100	100	0.00	6.54
Ax2	1	(untitled)	10			471	1940	120	19.00	24	271	12.30	0.30	0.00	0.04		100	100	0.00	0.55
E2	1	(untitled)	5	2	C	562	2055	60	3.00	54	67	29.58	21.78	55.81	10.46	10.38	100	100	0.00	52.21
F2	1	(untitled)	5	2	A	415	2080	49	3.00	48	88	39.41	27.41	72.79	10.25	8.29	100	100	0.00	48.66
Fx2	1	(untitled)				458	Unrestricted	120	10.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	1	(untitled)	5	2	D	358	1915	60	0.24	37	144	8.76	7.56	13.05	1.56	1.56	100	100	0.00	11.26
H2	1	(untitled)	5	2	A	370	2080	49	0.00	43	111	50.38	26.38	70.55	8.89	7.35	100	100	0.00	41.77
Hx2	1	(untitled)	3			415 <	1800	120	67.00	23	290	6.53	0.86	26.25	8.68 +		100	100	0.00	2.77
E3	1	(untitled)	8			638	1915	120	15.95	38	139	15.34	1.54	10.21	2.23		100	100	0.00	4.70
G3	1	(untitled)	6			554 <	1800	120	47.70	51	76	19.61	14.81	55.73	10.73 +		100	100	0.00	36.24
Hx3	1	(untitled)				513	Unrestricted	120	13.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	1	(untitled)	5	2	E	100	580	60	0.00	34	165	38.71	32.71	74.81	2.53	1.73	100	100	0.00	13.84
Hx4	1	(untitled)				513	Unrestricted	120	0.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	953.29	65.48	14.56	24.20	9.47	478.16	35.54	0.00	513.70
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	953.29	65.48	14.56	24.20	9.47	478.16	35.54	0.00	513.70

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Filename: 2022 Junction 1, 3 & Dev DN.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 16:11:20

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

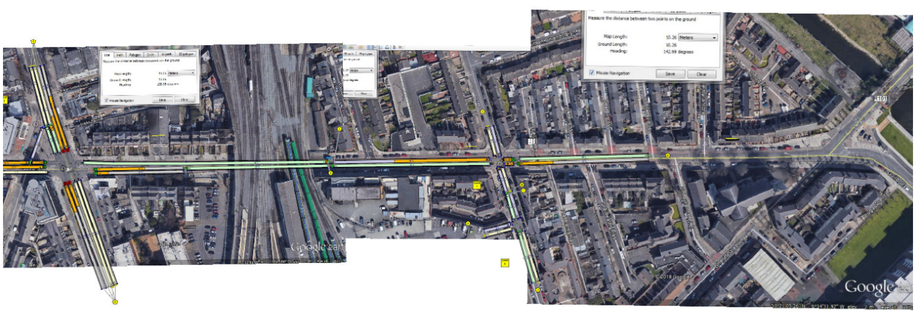
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
1, 1
Diagram produced using TRANSYT 15.5.2.7994

A1 - 2022 AM Peak DN
D1 - AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	12/03/2019 16:11:07	12/03/2019 16:11:08	07:00	120	421.22	27.36	80.88	H1/1	0	0	H1/1	I/1	I/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2022 AM Peak DN		D1	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
AM				07:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1587				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1796	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1596				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1915				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1915				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1915					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1784	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1913			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1897			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	89	6.00	✓	1587
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	32	6.00	✓	1796
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	80	6.00	✓	1596
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800

Gx	**1**	**1**	(untitled)											
I	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915
Ix	**1**	**1**	(untitled)											
J	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.24	✓	1915
Jx	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915
Kx	**1**	**1**	(untitled)											
A1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	35	6.00	✓	1784
Ax1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	14	15.01	✓	1913
Fx1	**1**	**1**	(untitled)											
G1	**1**	**1**	(untitled)											1800
H1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	21	13.82	✓	1897
Hx1	**1**	**1**	(untitled)											1800
A2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	**1**	**1**	(untitled)											
G2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	**1**	**1**	(untitled)											1800
E3	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	**1**	**1**	(untitled)											1800
Hx3	**1**	**1**	(untitled)											
G4	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	**1**	**1**	(untitled)											

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	**1**	1	A	
E1	**1**	2	C	
F1	**1**	2	B	
H1	**1**	2	B	
A2	**1**	1	A	
E2	**1**	2	C	
F2	**1**	2	A	
G2	**1**	2	D	
H2	**1**	2	A	
G4	**1**	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	**1**	Movement					
C	**1**	Movement					
D	**1**	Movement					
I	**1**	Movement	✓	0	✓	7.88	
J	**1**	Movement	✓	0	✓	6.24	
A1	**1**	Movement					
G1	**1**	AllTraffic					
G4	**1**	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	**1**	**1**	Dx/1	1500	1587		100
		2	Cx/1	1500	1587		100
		3	Ax1/1	1400	1587		100
C	**1**	**1**	Dx/1	1800	1796	0	100
		2	Bx/1	900	1796	0	100
		3	Ax1/1	1800	1796	0	100
D	**1**	**1**	Bx/1	1000	1596		100
		2	Cx/1	1000	1596		100
		3	Ax1/1	1000	1596		100
I	**1**	**1**	Jx/1		1915		100
		2	Kx/1		1915		100
J	**1**	**1**	Ix/1		1915		100
		2	Kx/1		1915		100
A1	**1**	**1**	Dx/1	1800	1784	0	100
		2	Cx/1	1800	1784	0	100
		3	Bx/1	1800	1784	0	100
G4	**1**	**1**	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	**1**	**1**	**Dx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	**Cx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0

		3	Ax1/1		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	1	2	Bx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
D	1	1	Bx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
I	1	1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
		2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
G4	1	1	Fx1/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To			
		1	2	3	4
From	1	0	0	5	5
	2	0	0	5	5
	3	6	7	0	0
	4	5	6	0	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	61	41	100	1	7
	2	✓	2	B	41	61	20	1	20
2	1	✓	1	A	16	17	1	1	1
	2	✓	2	A,B	17	72	55	1	7
	3	✓	3	C,D,E	77	10	53	1	7
	4	✓	4	D,E	10	11	1	1	1

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			70	1266	120	0.00	6	1528	2.82	0.42	5.79	0.16		100	100	0.00	0.17
Bx	1	(untitled)	3			394	Unrestricted	120	1.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			702	1273	120	10.74	56	61	20.30	6.50	19.42	12.18		100	100	0.00	19.71
Cx	1	(untitled)	9			390	1915	120	19.00	20	342	14.04	0.24	0.00	0.03		100	100	0.00	0.37
D	1	(untitled)	1			5	745	120	120.00	1	13307	6.02	0.02	0.00	0.00		100	100	0.00	0.00
Dx	1	(untitled)				25	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			714	1800	120	9.00	40	127	14.46	0.66	0.00	0.13		100	100	0.00	1.85
Gx	1	(untitled)				361	Unrestricted	120	47.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			0	0	120	120.00	0	-100	0.00	0.00	0.00	0.00		100	100	0.00	0.00
Ix	1	(untitled)				0	Unrestricted	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			394	1915	120	0.00	21	337	2.64	0.24	0.00	0.03		100	100	0.00	0.38
Jx	1	(untitled)	3			64	1985	120	0.00	3	2691	2.43	0.03	0.00	0.00		100	100	0.00	0.01
K	1	(untitled)	4			64	1915	120	0.00	3	2593	3.63	0.03	0.00	0.00		100	100	0.00	0.01
Kx	1	(untitled)				394	Unrestricted	120	0.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			515 <	1779	120	19.00	29	211	1.62	0.62	0.59	1.39 +		100	100	0.00	1.30

Ax1	**1**	(untitled)	2	1	A	483 <	1940	100	6.14	30	204	2.18	1.18	7.96	1.37 +	1.28	100	100	0.00	2.64
E1	**1**	(untitled)	5	2	C	67	1532	53	16.00	10	826	27.04	19.24	55.23	1.45	1.23	100	100	0.00	5.55
F1	**1**	(untitled)	5	2	B	223	1913	55	0.00	25	260	32.00	20.00	59.44	4.50	4.01	100	100	0.00	19.25
Fx1	**1**	(untitled)				755	Unrestricted	120	0.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	**1**	(untitled)	7			50	1307	120	84.00	4	2252	2.46	0.06	0.27	0.00		100	100	0.00	0.01
H1	**1**	(untitled)	5	2	B	716	1897	55	0.00	81	11	59.77	35.77	90.26	21.95	14.39	100	100	0.00	109.13
Hx1	**1**	(untitled)	3			191	1800	120	62.00	11	748	5.73	0.12	0.00	0.01		100	100	0.00	0.09
A2	**1**	(untitled)	2	1	A	515	1940	100	0.55	32	184	11.63	2.63	19.41	3.37	3.03	100	100	0.00	6.59
Ax2	**1**	(untitled)	10			483	1940	120	25.00	25	261	12.31	0.31	0.00	0.04		100	100	0.00	0.59
E2	**1**	(untitled)	5	2	C	329	2055	53	7.00	36	153	30.24	22.44	56.87	6.24	6.18	100	100	0.00	31.47
F2	**1**	(untitled)	5	2	A	191	2080	56	0.00	19	366	30.66	18.66	56.76	3.68	3.37	100	100	0.00	15.41
Fx2	**1**	(untitled)				755	Unrestricted	120	0.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	**1**	(untitled)	5	2	D	564 <	1915	54	0.36	65	39	9.73	8.53	10.81	2.04 +	2.04	100	100	0.00	19.74
H2	**1**	(untitled)	5	2	A	566	2080	56	0.00	57	57	49.16	25.16	72.27	13.90	10.29	100	100	0.00	61.29
Hx2	**1**	(untitled)	3			191	1800	120	61.00	11	748	5.81	0.14	1.03	1.51		100	100	0.00	0.13
E3	**1**	(untitled)	8			396	1915	120	19.00	21	335	14.04	0.24	0.00	0.03		100	100	0.00	0.38
G3	**1**	(untitled)	6			614 <	1800	120	59.18	67	34	30.36	25.56	75.28	15.87 +		100	100	0.00	67.71
Hx3	**1**	(untitled)				216	Unrestricted	120	30.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	**1**	(untitled)	5	2	E	310 <	942	54	0.00	72	25	49.98	43.98	94.77	9.93 +	6.49	100	100	0.00	57.46
Hx4	**1**	(untitled)				216	Unrestricted	120	30.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	994.94	60.55	16.43	21.95	5.40	388.45	32.77	0.00	421.22
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	994.94	60.55	16.43	21.95	5.40	388.45	32.77	0.00	421.22

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Filename: 2022 Junction 1, 3 & Dev DS.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 16:13:24

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams

(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
1, 1
Diagram produced using TRANSYT 15.5.2.7994

A1 - 2022 AM Peak DS
D1 - AM*

Summary

Data Errors and Warnings
No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	12/03/2019 16:13:16	12/03/2019 16:13:17	07:00	120	462.85	30.12	82.61	H1/1	0	0	H1/1	G3/1	H1/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2022 AM Peak DS		D1	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
AM				07:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1565				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1776	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1596				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1532				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1853				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1790					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1764	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1913			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1891			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	96	6.00	✓	1565
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	37	6.00	✓	1776
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	80	6.00	✓	1596
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800
Gx	1	1	(untitled)											
I	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
Ix	1	1	(untitled)											
J	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	14	6.24	✓	1853
Jx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	28	6.00	✓	1790

Kx	1	1	(untitled)											
A1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	40	6.00	✓	1764
Ax1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	14	15.01	✓	1913
Fx1	1	1	(untitled)											
G1	1	1	(untitled)											1800
H1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	24	13.82	✓	1891
Hx1	1	1	(untitled)											1800
A2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	1	1	(untitled)											
G2	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	1	1	(untitled)											1800
E3	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	1	1	(untitled)											1800
Hx3	1	1	(untitled)											
G4	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	1	1	(untitled)											

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	1	1	A	
E1	1	2	C	
F1	1	2	B	
H1	1	2	B	
A2	1	1	A	
E2	1	2	C	
F2	1	2	A	
G2	1	2	D	
H2	1	2	A	
G4	1	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	1	Movement					
C	1	Movement					
D	1	Movement					
I	1	Movement	✓	0	✓	7.88	
J	1	Movement	✓	0	✓	6.24	
A1	1	Movement					
G1	1	AllTraffic					
G4	1	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	1	1	Dx/1	1500	1565		100
		2	Cx/1	1500	1565		100
		3	Ax1/1	1400	1565		100
C	1	1	Dx/1	1800	1776	0	100
		2	Bx/1	900	1776	0	100
		3	Ax1/1	1800	1776	0	100
D	1	1	Bx/1	1000	1596		100
		2	Cx/1	1000	1596		100
		3	Ax1/1	1000	1596		100
I	1	1	Jx/1		1532		100
		2	Kx/1		1532		100
J	1	1	Ix/1		1853		100
		2	Kx/1		1853		100
A1	1	1	Dx/1	1800	1764	0	100
		2	Cx/1	1800	1764	0	100
		3	Bx/1	1800	1764	0	100
G4	1	1	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	1	1	**Dx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	**Cx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
		3	**Ax1/1**		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	1	2	**Bx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0

				opposing flow									
D	1	1	Bx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
I	1	1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
		2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
G4	1	1	Fx1/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To			
		1	2	3	4
From	1	0	0	5	5
	2	0	0	5	5
	3	6	7	0	0
	4	5	6	0	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	60	40	100	1	7
	2	✓	2	B	40	60	20	1	20
2	1	✓	1	A	16	17	1	1	1
	2	✓	2	A,B	17	73	56	1	7
	3	✓	3	C,D,E	78	10	52	1	7
	4	✓	4	D,E	10	11	1	1	1

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	**1**	(untitled)	1			109	1084	120	6.94	11	725	3.80	1.40	12.86	0.52		100	100	0.00	0.78
Bx	**1**	(untitled)	3			480	Unrestricted	120	7.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	**1**	(untitled)	1			752	1206	120	14.58	68	33	24.37	10.57	29.29	14.20		100	100	0.00	34.11
Cx	**1**	(untitled)	9			404	1915	120	7.00	21	327	14.05	0.25	0.00	0.03		100	100	0.00	0.40
D	**1**	(untitled)	1			5	725	120	120.00	1	12345	6.08	0.08	1.82	0.00		100	100	0.00	0.00
Dx	**1**	(untitled)				21	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	**1**	(untitled)	9			765	1800	120	9.00	43	112	14.54	0.74	0.00	0.16		100	100	0.00	2.23
Gx	**1**	(untitled)				376	Unrestricted	120	48.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	**1**	(untitled)	4			81	971	120	0.00	8	979	1.97	0.17	0.00	0.00		100	100	0.00	0.05
Ix	**1**	(untitled)				92	Unrestricted	120	19.00	0	Unrestricted	1.80	0.00	0.00	0.00		100	100	0.00	0.00
J	**1**	(untitled)	4			460	1816	120	6.00	25	255	2.74	0.34	0.00	0.04		100	100	0.00	0.61
Jx	**1**	(untitled)	3			109	1985	120	0.00	5	1539	2.45	0.05	0.00	0.00		100	100	0.00	0.02
K	**1**	(untitled)	4			93	1790	120	0.00	5	1632	3.66	0.06	0.00	0.00		100	100	0.00	0.02
Kx	**1**	(untitled)				433	Unrestricted	120	2.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	**1**	(untitled)	1			551 <	1760	120	19.00	31	187	1.71	0.71	0.74	1.41 +		100	100	0.00	1.58
Ax1	**1**	(untitled)	2	1	A	512 <	1940	100	4.14	31	187	2.60	1.60	8.06	1.38 +	1.38	100	100	0.00	3.64
E1	**1**	(untitled)	5	2	C	67	1532	52	14.00	10	809	27.58	19.78	54.70	1.45	1.22	100	100	0.00	5.69
F1	**1**	(untitled)	5	2	B	223	1913	56	0.00	25	267	31.37	19.37	58.51	4.44	3.94	100	100	0.00	18.67
Fx1	**1**	(untitled)				747	Unrestricted	120	0.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	**1**	(untitled)	7			50	1306	120	81.00	4	2251	2.46	0.06	0.21	0.00		100	100	0.00	0.01
H1	**1**	(untitled)	5	2	B	742	1891	56	0.00	83	9	60.42	36.42	91.66	23.13	14.88	100	100	0.00	115.11
Hx1	**1**	(untitled)	3			191	1800	120	61.00	11	748	5.73	0.12	0.00	0.01		100	100	0.00	0.09
A2	**1**	(untitled)	2	1	A	551	1940	100	0.69	34	165	11.75	2.75	19.65	3.62	3.28	100	100	0.00	7.34
Ax2	**1**	(untitled)	10			512	1940	120	23.00	26	241	12.33	0.33	0.00	0.05		100	100	0.00	0.67

E2	**1**	(untitled)	5	2	C	344	2055	52	4.00	38	137	31.03	23.23	56.64	6.49	6.43	100	100	0.00	33.96
F2	**1**	(untitled)	5	2	A	191	2080	57	0.00	19	374	30.06	18.06	55.85	3.63	3.31	100	100	0.00	14.95
Fx2	**1**	(untitled)				747	Unrestricted	120	0.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	**1**	(untitled)	5	2	D	585 <	1915	53	0.36	68	32	10.39	9.19	11.14	2.18 +	2.18	100	100	0.00	22.02
H2	**1**	(untitled)	5	2	A	562	2080	57	0.00	56	61	48.21	24.21	70.64	13.47	10.03	100	100	0.00	58.64
Hx2	**1**	(untitled)	3			191	1800	120	60.00	11	748	5.80	0.13	0.98	1.08		100	100	0.00	0.12
E3	**1**	(untitled)	8			411	1915	120	7.00	21	319	14.06	0.26	0.00	0.03		100	100	0.00	0.42
G3	**1**	(untitled)	6			635 <	1800	120	60.29	71	27	32.58	27.78	78.90	17.26 +		100	100	0.00	75.87
Hx3	**1**	(untitled)				216	Unrestricted	120	27.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	**1**	(untitled)	5	2	E	302 <	864	53	0.00	78	16	58.03	52.03	102.12	10.44 +	6.83	100	100	0.00	65.85
Hx4	**1**	(untitled)				216	Unrestricted	120	27.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1031.17	64.52	15.98	23.16	6.96	427.72	35.13	0.00	462.85
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	1031.17	64.52	15.98	23.16	6.96	427.72	35.13	0.00	462.85

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

Filename: 2022 Junction 1, 3 & Dev DN.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 16:12:26

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

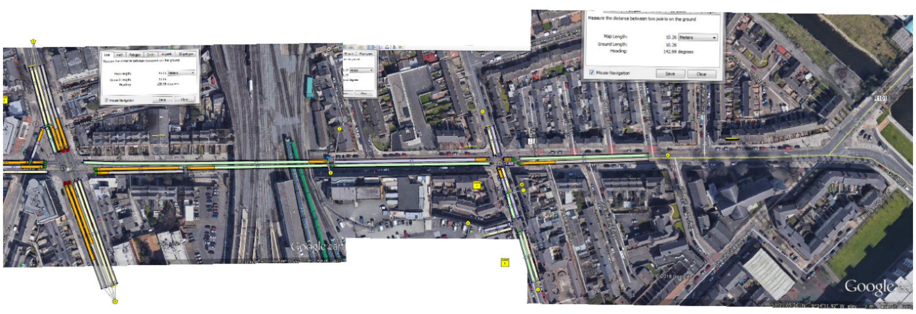
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
2, 2
Diagram produced using TRANSYT 15.5.2.7994

A2 - 2022 PM Peak DN
D2 - PM*

Summary

Data Errors and Warnings
No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	12/03/2019 16:12:21	12/03/2019 16:12:22	16:15	120	392.50	25.29	63.07	E2/1	0	0	E2/1	I/1	I/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2022 PM Peak DN		D2	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
PM				16:15	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1555				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1852	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1599				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1915				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1915				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1915					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1883	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1917			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1893			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	99	6.00	✓	1555
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	19	6.00	✓	1852
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	79	6.00	✓	1599
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800

Gx	**1**	**1**	(untitled)											
I	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915
Ix	**1**	**1**	(untitled)											
J	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.24	✓	1915
Jx	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915
Kx	**1**	**1**	(untitled)											
A1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	12	6.00	✓	1883
Ax1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	12	15.01	✓	1917
Fx1	**1**	**1**	(untitled)											
G1	**1**	**1**	(untitled)											1800
H1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	23	13.82	✓	1893
Hx1	**1**	**1**	(untitled)											1800
A2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	**1**	**1**	(untitled)											
G2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	**1**	**1**	(untitled)											1800
E3	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	**1**	**1**	(untitled)											1800
Hx3	**1**	**1**	(untitled)											
G4	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	**1**	**1**	(untitled)											

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	**1**	1	A	
E1	**1**	2	C	
F1	**1**	2	B	
H1	**1**	2	B	
A2	**1**	1	A	
E2	**1**	2	C	
F2	**1**	2	A	
G2	**1**	2	D	
H2	**1**	2	A	
G4	**1**	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	**1**	Movement					
C	**1**	Movement					
D	**1**	Movement					
I	**1**	Movement	✓	0	✓	7.88	
J	**1**	Movement	✓	0	✓	6.24	
A1	**1**	Movement					
G1	**1**	AllTraffic					
G4	**1**	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	**1**	**1**	Dx/1	1500	1555		100
		2	Cx/1	1500	1555		100
		3	Ax1/1	1400	1555		100
C	**1**	**1**	Dx/1	1800	1852	0	100
		2	Bx/1	900	1852	0	100
		3	Ax1/1	1800	1852	0	100
D	**1**	**1**	Bx/1	1000	1599		100
		2	Cx/1	1000	1599		100
		3	Ax1/1	1000	1599		100
I	**1**	**1**	Jx/1		1915		100
		2	Kx/1		1915		100
J	**1**	**1**	Ix/1		1915		100
		2	Kx/1		1915		100
A1	**1**	**1**	Dx/1	1800	1883	0	100
		2	Cx/1	1800	1883	0	100
		3	Bx/1	1800	1883	0	100
G4	**1**	**1**	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	**1**	**1**	**Dx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	**Cx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0

		3	Ax1/1		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	1	2	Bx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
D	1	1	Bx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
I	1	1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
		2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
G4	1	1	Fx1/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To		
		1	2	3
From	1	0	0	5
	2	0	0	5
	3	6	7	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	89	69	100	1	7
	2	✓	2	B	69	89	20	1	20
2	1	✓	1	A	30	31	1	1	1
	2	✓	2	A,B	31	85	54	1	7
	3	✓	3	C,D,E	90	24	54	1	7

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			245	1123	120	9.90	24	268	4.90	2.50	17.52	1.56		100	100	0.00	2.96
Bx	1	(untitled)	3			155	Unrestricted	120	11.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			515	1494	120	20.89	38	136	15.40	1.60	7.61	1.78		100	100	0.00	3.75
Cx	1	(untitled)	9			659	1915	120	9.00	34	162	14.29	0.49	0.00	0.09		100	100	0.00	1.28
D	1	(untitled)	1			29	740	120	118.98	4	1992	6.44	0.44	5.38	0.07		100	100	0.00	0.07
Dx	1	(untitled)				22	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			492	1800	120	10.18	27	229	14.19	0.39	0.86	1.53		100	100	0.00	0.81
Gx	1	(untitled)				656	Unrestricted	120	4.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			0	0	120	120.00	0	-100	0.00	0.00	0.00	0.00		100	100	0.00	0.00
Ix	1	(untitled)				0	Unrestricted	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			155	1915	120	10.00	8	1012	2.48	0.08	0.00	0.00		100	100	0.00	0.05
Jx	1	(untitled)	3			245	1985	120	0.00	12	629	2.53	0.13	0.00	0.01		100	100	0.00	0.12
K	1	(untitled)	4			245	1915	120	0.00	13	603	3.74	0.14	0.00	0.01		100	100	0.00	0.13
Kx	1	(untitled)				155	Unrestricted	120	10.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			544	1875	120	19.00	29	210	1.59	0.59	0.00	0.09		100	100	0.00	1.26
Ax1	1	(untitled)	2	1	A	497 <	1940	100	0.22	31	195	2.67	1.67	8.28	1.37 +	1.37	100	100	0.00	3.69
E1	1	(untitled)	5	2	C	82	1532	54	20.00	12	671	26.54	18.74	51.49	1.46	1.41	100	100	0.00	6.59

F1	1	(untitled)	5	2	B	502	1917	54	0.00	57	58	38.57	26.57	73.65	12.65	9.44	100	100	0.00	57.24
Fx1	1	(untitled)				486	Unrestricted	120	10.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	1	(untitled)	7			206	1087	120	35.00	19	375	3.30	0.90	3.10	1.47		100	100	0.00	0.81
H1	1	(untitled)	5	2	B	506	1893	54	0.00	58	54	50.92	26.92	74.41	12.77	9.54	100	100	0.00	58.44
Hx1	1	(untitled)	3			440	1800	120	61.00	24	268	5.93	0.32	0.00	0.04		100	100	0.00	0.56
A2	1	(untitled)	2	1	A	544	1940	100	0.58	34	169	11.72	2.72	19.61	3.57	3.24	100	100	0.00	7.16
Ax2	1	(untitled)	10			497	1940	120	19.00	26	251	12.32	0.32	0.00	0.04		100	100	0.00	0.63
E2	1	(untitled)	5	2	C	594	2055	54	7.00	63	43	33.73	25.93	53.92	10.68	10.68	100	100	0.00	64.77
F2	1	(untitled)	5	2	A	440	2080	55	2.00	45	99	35.18	23.18	67.16	10.09	8.01	100	100	0.00	43.94
Fx2	1	(untitled)				486	Unrestricted	120	10.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	1	(untitled)	5	2	D	378	1915	54	0.24	43	108	9.63	8.43	12.80	1.61	1.61	100	100	0.00	13.18
H2	1	(untitled)	5	2	A	392	2080	55	0.00	40	123	46.29	22.29	64.94	8.63	7.11	100	100	0.00	37.65
Hx2	1	(untitled)	3			440 <	1800	120	60.00	24	268	6.50	0.83	23.99	8.60 +		100	100	0.00	2.77
E3	1	(untitled)	8			676	1915	120	30.85	44	104	17.40	3.60	17.37	3.92		100	100	0.00	11.08
G3	1	(untitled)	6			584 <	1800	120	54.60	60	51	25.07	20.27	66.22	13.41 +		100	100	0.00	51.54
Hx3	1	(untitled)				543	Unrestricted	120	0.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	1	(untitled)	5	2	E	106	399	54	0.00	58	55	55.41	49.41	100.81	3.25	2.30	100	100	0.00	22.00
Hx4	1	(untitled)				543	Unrestricted	120	0.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1009.29	58.97	17.12	21.69	3.60	359.17	33.33	0.00	392.50
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	1009.29	58.97	17.12	21.69	3.60	359.17	33.33	0.00	392.50

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Version: 15.5.2.7994

For sales and distribution information, program advice and maintenance, contact TRL:
+44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk

Filename: 2022 Junction 1, 3 & Dev DS.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 16:14:02

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

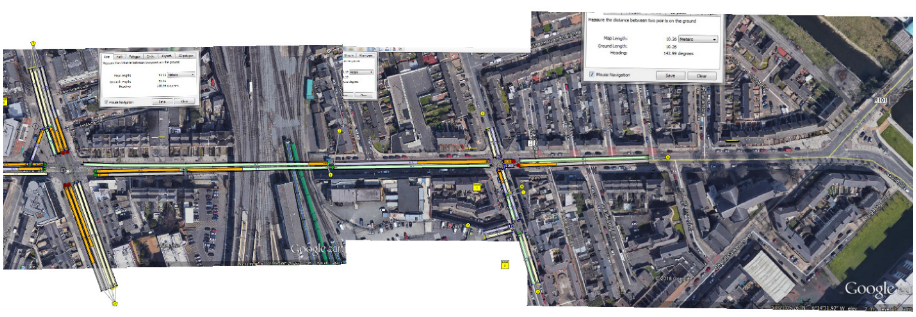
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
2, 2
Diagram produced using TRANSYT 15.5.2.7994

A2 - 2022 PM Peak DS
D2 - PM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	12/03/2019 16:13:53	12/03/2019 16:13:54	16:15	120	430.04	27.63	65.07	E2/1	0	0	E2/1	G3/1	E2/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2022 PM Peak DS		D2	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
PM				16:15	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1555				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1830	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1606				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1532				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1823				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1868					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1870	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1917			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1889			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	99	6.00	✓	1555
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	24	6.00	✓	1830
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	77	6.00	✓	1606
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800

Gx	**1**	**1**	(untitled)											
I	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
Ix	**1**	**1**	(untitled)											
J	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	21	6.24	✓	1823
Jx	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	10	6.00	✓	1868
Kx	**1**	**1**	(untitled)											
A1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	15	6.00	✓	1870
Ax1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	12	15.01	✓	1917
Fx1	**1**	**1**	(untitled)											
G1	**1**	**1**	(untitled)											1800
H1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	25	13.82	✓	1889
Hx1	**1**	**1**	(untitled)											1800
A2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	**1**	**1**	(untitled)											
G2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	**1**	**1**	(untitled)											1800
E3	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	**1**	**1**	(untitled)											1800
Hx3	**1**	**1**	(untitled)											
G4	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	**1**	**1**	(untitled)											

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	1	1	A	
E1	1	2	C	
F1	1	2	B	
H1	1	2	B	
A2	1	1	A	
E2	1	2	C	
F2	1	2	A	
G2	1	2	D	
H2	1	2	A	
G4	1	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	1	Movement					
C	1	Movement					
D	1	Movement					
I	1	Movement	✓	0	✓	7.88	
J	1	Movement	✓	0	✓	6.24	
A1	1	Movement					
G1	1	AllTraffic					
G4	1	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	1	1	Dx/1	1500	1555		100
		2	Cx/1	1500	1555		100
		3	Ax1/1	1400	1555		100
C	1	1	Dx/1	1800	1830	0	100
		2	Bx/1	900	1830	0	100
		3	Ax1/1	1800	1830	0	100
D	1	1	Bx/1	1000	1606		100
		2	Cx/1	1000	1606		100
		3	Ax1/1	1000	1606		100
I	1	1	Jx/1		1532		100
		2	Kx/1		1532		100
J	1	1	Ix/1		1823		100
		2	Kx/1		1823		100
A1	1	1	Dx/1	1800	1870	0	100
		2	Cx/1	1800	1870	0	100
		3	Bx/1	1800	1870	0	100
G4	1	1	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0

		3	Ax1/1		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	1	2	Bx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
D	1	1	Bx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
I	1	1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
		2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
G4	1	1	Fx1/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To		
		1	2	3
From	1	0	0	5
	2	0	0	5
	3	6	7	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	3	103	100	1	7
	2	✓	2	B	103	3	20	1	20
2	1	✓	1	A	29	30	1	1	1
	2	✓	2	A,B	30	83	53	1	7
	3	✓	3	C,D,E	88	23	55	1	7

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			316	1075	120	5.86	31	186	4.88	2.48	16.39	1.95		100	100	0.00	3.74
Bx	1	(untitled)	3			202	Unrestricted	120	15.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			543	1409	120	17.30	41	118	20.17	6.37	40.88	9.18		100	100	0.00	16.42
Cx	1	(untitled)	9			690	1915	120	5.00	36	150	14.33	0.53	0.00	0.10		100	100	0.00	1.44
D	1	(untitled)	1			30	720	120	118.97	4	1962	6.23	0.23	2.00	0.03		100	100	0.00	0.03
Dx	1	(untitled)				23	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			519	1800	120	10.18	29	212	14.22	0.42	0.85	1.54		100	100	0.00	0.91
Gx	1	(untitled)				686	Unrestricted	120	6.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			106	1043	120	0.00	10	785	2.00	0.20	0.00	0.01		100	100	0.00	0.08
Ix	1	(untitled)				71	Unrestricted	120	48.00	0	Unrestricted	1.80	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			196	1685	120	13.00	12	674	2.54	0.14	0.00	0.01		100	100	0.00	0.11
Jx	1	(untitled)	3			338	1985	120	0.00	17	429	2.59	0.19	0.00	0.02		100	100	0.00	0.25
K	1	(untitled)	4			297	1868	120	0.00	16	466	3.78	0.18	0.00	0.02		100	100	0.00	0.21
Kx	1	(untitled)				190	Unrestricted	120	3.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			562	1863	120	19.00	30	198	1.63	0.63	0.00	0.10		100	100	0.00	1.39
Ax1	1	(untitled)	2	1	A	536 <	1940	100	0.22	33	174	2.34	1.34	7.75	1.38 +	1.38	100	100	0.00	3.26
E1	1	(untitled)	5	2	C	82	1532	55	19.00	11	685	25.67	17.87	49.04	1.46	1.34	100	100	0.00	6.28

F1	**1**	(untitled)	5	2	B	502	1917	53	0.00	58	55	39.48	27.48	75.10	12.81	9.61	100	100	0.00	59.14
Fx1	**1**	(untitled)				482	Unrestricted	120	9.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	**1**	(untitled)	7			206	1087	120	34.00	19	375	3.25	0.85	2.74	1.47		100	100	0.00	0.76
H1	**1**	(untitled)	5	2	B	519	1889	53	0.00	61	47	52.32	28.32	76.50	13.45	9.99	100	100	0.00	62.96
Hx1	**1**	(untitled)	3			440	1800	120	62.00	24	268	5.93	0.32	0.00	0.04		100	100	0.00	0.56
A2	**1**	(untitled)	2	1	A	562	1940	100	0.58	35	160	11.78	2.78	19.69	3.70	3.36	100	100	0.00	7.54
Ax2	**1**	(untitled)	10			536	1940	120	19.00	28	226	12.35	0.35	0.00	0.05		100	100	0.00	0.75
E2	**1**	(untitled)	5	2	C	624	2055	55	0.00	65	38	32.94	25.14	51.64	10.75	10.75	100	100	0.00	65.92
F2	**1**	(untitled)	5	2	A	440	2080	54	3.00	46	95	35.95	23.95	68.35	10.22	8.14	100	100	0.00	45.33
Fx2	**1**	(untitled)				482	Unrestricted	120	9.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	**1**	(untitled)	5	2	D	390	1915	55	0.24	44	105	9.34	8.14	12.46	1.62	1.62	100	100	0.00	13.13
H2	**1**	(untitled)	5	2	A	390	2080	54	0.00	41	120	46.97	22.97	65.84	8.70	7.18	100	100	0.00	38.56
Hx2	**1**	(untitled)	3			440 <	1800	120	61.00	24	268	6.52	0.85	24.87	8.70 +		100	100	0.00	2.85
E3	**1**	(untitled)	8			706	1915	120	34.01	49	85	20.28	6.48	32.09	7.86		100	100	0.00	20.88
G3	**1**	(untitled)	6			596 <	1800	120	53.74	60	50	24.88	20.08	66.27	13.69 +		100	100	0.00	52.17
Hx3	**1**	(untitled)				543	Unrestricted	120	0.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	**1**	(untitled)	5	2	E	102	367	55	0.00	60	51	65.68	59.68	105.23	3.63	2.24	100	100	0.00	25.36
Hx4	**1**	(untitled)				543	Unrestricted	120	0.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1045.47	62.51	16.73	23.57	4.06	392.30	37.74	0.00	430.04
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	1045.47	62.51	16.73	23.57	4.06	392.30	37.74	0.00	430.04

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Version: 15.5.2.7994

For sales and distribution information, program advice and maintenance, contact TRL:
+44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk

Filename: 2037 Junction 1, 3 & Dev DN.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 16:14:59

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

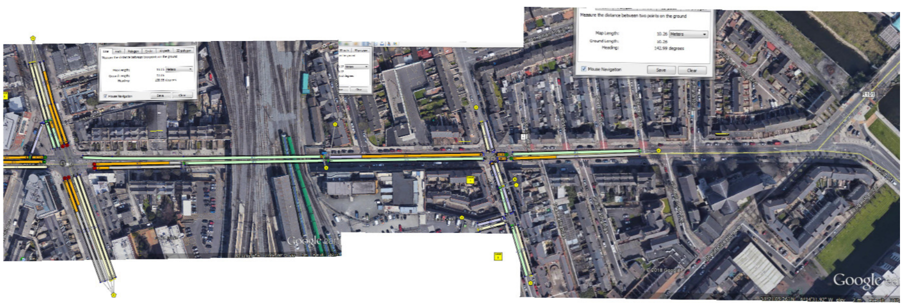
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
1, 1
Diagram produced using TRANSYT 15.5.2.7994

A1 - 2037 AM Peak DN
D1 - AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	12/03/2019 16:14:47	12/03/2019 16:14:47	07:00	120	650.96	42.70	92.45	H1/1	1	3	H1/1	I/1	I/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2037 AM Peak DN		D1	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
AM				07:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1568				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1792	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1586				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1915				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1915				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1915					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1784	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1913			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1897			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	95	6.00	✓	1568
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	33	6.00	✓	1792
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	83	6.00	✓	1586
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800
Gx	1	1	(untitled)											
I	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915
Ix	1	1	(untitled)											
J	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.24	✓	1915
Jx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915

Kx	1	1	(untitled)											
A1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	35	6.00	✓	1784
Ax1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	14	15.01	✓	1913
Fx1	1	1	(untitled)											
G1	1	1	(untitled)											1800
H1	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	21	13.82	✓	1897
Hx1	1	1	(untitled)											1800
A2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	1	1	(untitled)											
G2	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	1	1	(untitled)											1800
E3	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	1	1	(untitled)											1800
Hx3	1	1	(untitled)											
G4	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	1	1	(untitled)											

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	1	1	A	
E1	1	2	C	
F1	1	2	B	
H1	1	2	B	
A2	1	1	A	
E2	1	2	C	
F2	1	2	A	
G2	1	2	D	
H2	1	2	A	
G4	1	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	1	Movement					
C	1	Movement					
D	1	Movement					
I	1	Movement	✓	0	✓	7.88	
J	1	Movement	✓	0	✓	6.24	
A1	1	Movement					
G1	1	AllTraffic					
G4	1	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	1	1	Dx/1	1500	1568		100
		2	Cx/1	1500	1568		100
		3	Ax1/1	1400	1568		100
C	1	1	Dx/1	1800	1792	0	100
		2	Bx/1	900	1792	0	100
		3	Ax1/1	1800	1792	0	100
D	1	1	Bx/1	1000	1586		100
		2	Cx/1	1000	1586		100
		3	Ax1/1	1000	1586		100
I	1	1	Jx/1		1915		100
		2	Kx/1		1915		100
J	1	1	Ix/1		1915		100
		2	Kx/1		1915		100
A1	1	1	Dx/1	1800	1784	0	100
		2	Cx/1	1800	1784	0	100
		3	Bx/1	1800	1784	0	100
G4	1	1	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	**1**	**1**	**Dx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	**Cx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
		3	**Ax1/1**		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	**1**	**2**	**Bx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0

D	1			opposing flow									
		1	Bx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
I	1	1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
		2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
G4	1	1	Fx1/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To			
		1	2	3	4
From	1	0	0	5	5
	2	0	0	5	5
	3	6	7	0	0
	4	5	6	0	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	73	53	100	1	7
	2	✓	2	B	53	73	20	1	20
2	1	✓	1	A	12	13	1	1	1
	2	✓	2	A,B	13	69	56	1	7
	3	✓	3	C,D,E	74	118	44	1	7
	4	✓	4	D,E	118	7	9	1	1

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			77	1202	120	1.96	7	1276	3.14	0.74	8.65	0.26		100	100	0.00	0.31
Bx	1	(untitled)	3			458	Unrestricted	120	3.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			814	1251	120	8.68	68	32	24.23	10.43	26.02	15.75		100	100	0.00	36.13
Cx	1	(untitled)	9			458	1915	120	2.00	24	276	14.10	0.30	0.00	0.04		100	100	0.00	0.53
D	1	(untitled)	1			6	699	120	120.00	1	10386	6.03	0.03	0.00	0.00		100	100	0.00	0.00
Dx	1	(untitled)				25	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			826	1800	120	9.00	46	96	14.65	0.85	0.00	0.19		100	100	0.00	2.76
Gx	1	(untitled)				422	Unrestricted	120	52.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			0	0	120	120.00	0	-100	0.00	0.00	0.00	0.00		100	100	0.00	0.00
Ix	1	(untitled)				0	Unrestricted	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			458	1915	120	3.00	24	276	2.70	0.30	0.00	0.04		100	100	0.00	0.53
Jx	1	(untitled)	3			77	1985	120	0.00	4	2220	2.44	0.04	0.00	0.00		100	100	0.00	0.01
K	1	(untitled)	4			77	1915	120	0.00	4	2138	3.64	0.04	0.00	0.00		100	100	0.00	0.01
Kx	1	(untitled)				458	Unrestricted	120	1.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			603 <	1777	120	19.00	34	165	1.78	0.78	0.72	1.43 +		100	100	0.00	1.91
Ax1	1	(untitled)	2	1	A	559 <	1940	100	4.14	34	163	2.39	1.39	7.45	1.39 +	1.39	100	100	0.00	3.50
E1	1	(untitled)	5	2	C	79	1532	44	19.00	14	554	33.02	25.22	64.58	1.70	1.68	100	100	0.00	8.50
F1	1	(untitled)	5	2	B	266	1913	56	0.00	29	207	32.03	20.03	60.15	5.45	4.72	100	100	0.00	23.02
Fx1	1	(untitled)				878	Unrestricted	120	1.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	1	(untitled)	7			60	1271	120	54.00	5	1806	2.48	0.08	0.15	0.00		100	100	0.00	0.02
H1	1	(untitled)	5	2	B	833	1897	56	0.00	92	-3	74.39	50.39	107.79	30.75	19.42	100	100	0.00	176.84
Hx1	1	(untitled)	3			230	1800	120	61.00	13	604	5.75	0.15	0.00	0.01		100	100	0.00	0.13
A2	1	(untitled)	2	1	A	603	1940	100	0.72	37	142	11.93	2.93	19.88	4.47	3.62	100	100	0.00	8.47
Ax2	1	(untitled)	10			559	1940	120	23.00	29	212	12.38	0.38	0.00	0.06		100	100	0.00	0.83

E2	**1**	(untitled)	5	2	C	386	2055	44	14.00	50	80	39.62	31.82	75.65	9.74	8.87	100	100	0.00	52.10
F2	**1**	(untitled)	5	2	A	230	2080	57	0.00	23	293	30.55	18.55	56.92	4.44	4.00	100	100	0.00	18.47
Fx2	**1**	(untitled)				878	Unrestricted	120	1.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	**1**	(untitled)	5	2	D	653 <	1915	53	0.36	76	18	12.07	10.87	12.11	2.65 +	2.65	100	100	0.00	28.99
H2	**1**	(untitled)	5	2	A	660	2080	57	0.00	66	37	50.86	26.86	76.41	17.12	11.99	100	100	0.00	76.25
Hx2	**1**	(untitled)	3			230	1800	120	60.00	13	604	5.87	0.20	2.81	2.15		100	100	0.00	0.26
E3	**1**	(untitled)	8			465	1915	120	2.00	24	271	14.10	0.30	0.00	0.04		100	100	0.00	0.55
G3	**1**	(untitled)	6			713 <	1800	120	61.21	81	11	38.52	33.72	88.45	21.66 +		100	100	0.00	102.75
Hx3	**1**	(untitled)				260	Unrestricted	120	19.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	**1**	(untitled)	5	2	E	356 <	881	53	0.00	90	0	79.12	73.12	121.42	14.75 +	9.81	100	100	0.00	108.09
Hx4	**1**	(untitled)				260	Unrestricted	120	19.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1160.67	81.42	14.26	28.95	13.75	606.32	44.64	0.00	650.96
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	1160.67	81.42	14.26	28.95	13.75	606.32	44.64	0.00	650.96

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Filename: 2037 Junction 1, 3 & Dev DS.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 16:17:30

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

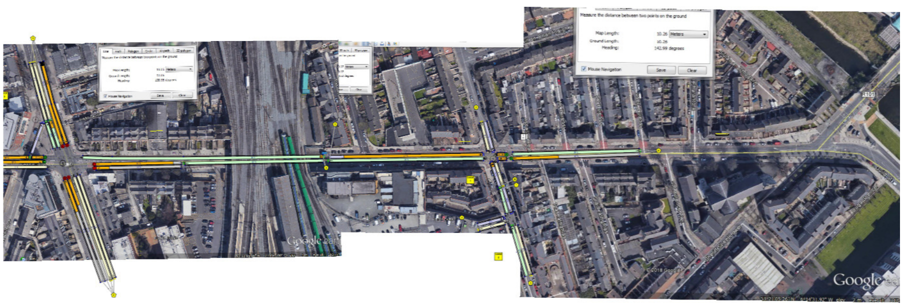
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
1, 1
Diagram produced using TRANSYT 15.5.2.7994

A1 - 2037 AM Peak DS
D1 - AM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
1	12/03/2019 16:17:22	12/03/2019 16:17:23	07:00	120	752.70	49.58	95.63	H1/1	2	6	H1/1	G3/1	H1/1	

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2037 AM Peak DS		D1	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
AM				07:00	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1561				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1776	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1586				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1532				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1857				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1802					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1768	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1913			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1891			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	97	6.00	✓	1561
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	37	6.00	✓	1776
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	83	6.00	✓	1586
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800
Gx	1	1	(untitled)											
I	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
Ix	1	1	(untitled)											
J	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	13	6.24	✓	1857
Jx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	25	6.00	✓	1802

Kx	**1**	**1**	(untitled)											
A1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	39	6.00	✓	1768
Ax1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	14	15.01	✓	1913
Fx1	**1**	**1**	(untitled)											
G1	**1**	**1**	(untitled)											1800
H1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	24	13.82	✓	1891
Hx1	**1**	**1**	(untitled)											1800
A2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	**1**	**1**	(untitled)											
G2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	**1**	**1**	(untitled)											1800
E3	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	**1**	**1**	(untitled)											1800
Hx3	**1**	**1**	(untitled)											
G4	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	**1**	**1**	(untitled)											

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	**1**	1	A	
E1	**1**	2	C	
F1	**1**	2	B	
H1	**1**	2	B	
A2	**1**	1	A	
E2	**1**	2	C	
F2	**1**	2	A	
G2	**1**	2	D	
H2	**1**	2	A	
G4	**1**	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	**1**	Movement					
C	**1**	Movement					
D	**1**	Movement					
I	**1**	Movement	✓	0	✓	7.88	
J	**1**	Movement	✓	0	✓	6.24	
A1	**1**	Movement					
G1	**1**	AllTraffic					
G4	**1**	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	**1**	**1**	Dx/1	1500	1561		100
		2	Cx/1	1500	1561		100
		3	Ax1/1	1400	1561		100
C	**1**	**1**	Dx/1	1800	1776	0	100
		2	Bx/1	900	1776	0	100
		3	Ax1/1	1800	1776	0	100
D	**1**	**1**	Bx/1	1000	1586		100
		2	Cx/1	1000	1586		100
		3	Ax1/1	1000	1586		100
I	**1**	**1**	Jx/1		1532		100
		2	Kx/1		1532		100
J	**1**	**1**	Ix/1		1857		100
		2	Kx/1		1857		100
A1	**1**	**1**	Dx/1	1800	1768	0	100
		2	Cx/1	1800	1768	0	100
		3	Bx/1	1800	1768	0	100
G4	**1**	**1**	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	**1**	**1**	**Dx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	**Cx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
		3	**Ax1/1**		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	**1**	**2**	**Bx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0

				opposing flow									
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
		1	Bx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
D	1			Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
		1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
I	1	2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
		1	Fx1/1		TrafficStream	E1/1			100			0	0
G4	1				TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To			
		1	2	3	4
	1	0	0	5	5
From	2	0	0	5	5
	3	6	7	0	0
	4	5	6	0	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	73	53	100	1	7
	2	✓	2	B	53	73	20	1	20
2	1	✓	1	A	13	14	1	1	1
	2	✓	2	A,B	14	70	56	1	7
	3	✓	3	C,D,E	75	119	44	1	7
	4	✓	4	D,E	119	8	9	1	1

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			120	1019	120	5.91	13	610	4.00	1.60	13.60	0.61		100	100	0.00	0.96
Bx	1	(untitled)	3			545	Unrestricted	120	6.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			864	1191	120	10.82	77	16	29.28	15.48	35.06	18.10		100	100	0.00	56.55
Cx	1	(untitled)	9			473	1915	120	5.00	25	264	14.11	0.31	0.00	0.04		100	100	0.00	0.58
D	1	(untitled)	1			6	678	120	120.00	1	9818	6.05	0.05	0.83	0.00		100	100	0.00	0.00
Dx	1	(untitled)				25	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			877	1800	120	9.00	49	85	14.75	0.95	0.00	0.23		100	100	0.00	3.28
Gx	1	(untitled)				436	Unrestricted	120	53.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			81	899	120	0.00	9	899	2.00	0.20	0.00	0.00		100	100	0.00	0.06
Ix	1	(untitled)				92	Unrestricted	120	20.00	0	Unrestricted	1.80	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			524	1823	120	5.00	29	213	2.80	0.40	0.00	0.06		100	100	0.00	0.82
Jx	1	(untitled)	3			120	1985	120	0.00	6	1389	2.46	0.06	0.00	0.00		100	100	0.00	0.03
K	1	(untitled)	4			104	1802	120	0.00	6	1459	3.66	0.06	0.00	0.00		100	100	0.00	0.03
Kx	1	(untitled)				497	Unrestricted	120	0.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			640 <	1762	120	19.00	36	148	1.88	0.88	0.85	1.46 +		100	100	0.00	2.29
Ax1	1	(untitled)	2	1	A	587 <	1940	100	4.14	36	150	2.48	1.48	7.18	1.41 +	1.41	100	100	0.00	3.86
E1	1	(untitled)	5	2	C	79	1532	44	19.00	14	554	33.86	26.06	65.64	1.73	1.71	100	100	0.00	8.77
F1	1	(untitled)	5	2	B	266	1913	56	0.00	29	207	32.03	20.03	60.15	5.45	4.72	100	100	0.00	23.02
Fx1	1	(untitled)				871	Unrestricted	120	2.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	1	(untitled)	7			60	1271	120	55.00	5	1806	2.47	0.07	0.13	0.00		100	100	0.00	0.02
H1	1	(untitled)	5	2	B	859 <	1891	56	0.00	96	-6	85.13	61.13	117.75	34.80 +	22.39	100	100	0.00	219.82
Hx1	1	(untitled)	3			230	1800	120	61.00	13	604	5.75	0.15	0.00	0.01		100	100	0.00	0.13
A2	1	(untitled)	2	1	A	640	1940	100	0.86	40	128	12.08	3.08	20.84	4.71	3.86	100	100	0.00	9.44
Ax2	1	(untitled)	10			587	1940	120	23.00	30	197	12.40	0.40	0.00	0.07		100	100	0.00	0.93

E2	1	(untitled)	5	2	C	400	2055	44	6.00	52	73	41.02	33.22	76.87	10.25	9.42	100	100	0.00	56.28
F2	1	(untitled)	5	2	A	230	2080	57	0.00	23	293	30.55	18.55	56.92	4.44	4.00	100	100	0.00	18.47
Fx2	1	(untitled)				871	Unrestricted	120	2.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	1	(untitled)	5	2	D	674 <	1915	53	0.36	79	14	12.91	11.71	12.69	2.87 +	2.87	100	100	0.00	32.21
H2	1	(untitled)	5	2	A	656	2080	57	0.00	65	38	50.74	26.74	76.24	17.01	11.91	100	100	0.00	75.45
Hx2	1	(untitled)	3			230	1800	120	60.00	13	604	5.87	0.20	2.81	2.15		100	100	0.00	0.26
E3	1	(untitled)	8			479	1915	120	5.00	25	260	14.11	0.31	0.00	0.04		100	100	0.00	0.59
G3	1	(untitled)	6			734 <	1800	120	61.90	84	7	41.43	36.63	92.18	23.36 +		100	100	0.00	114.54
Hx3	1	(untitled)				260	Unrestricted	120	17.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	1	(untitled)	5	2	E	350 <	838	53	0.00	93	-3	91.90	85.90	130.40	15.72 +	10.76	100	100	0.00	124.31
Hx4	1	(untitled)				260	Unrestricted	120	17.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1197.46	89.53	13.37	30.50	19.08	704.08	48.63	0.00	752.70
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	1197.46	89.53	13.37	30.50	19.08	704.08	48.63	0.00	752.70

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Version: 15.5.2.7994

For sales and distribution information, program advice and maintenance, contact TRL:
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: 2037 Junction 1, 3 & Dev DN.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 13/03/2019 08:25:55

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

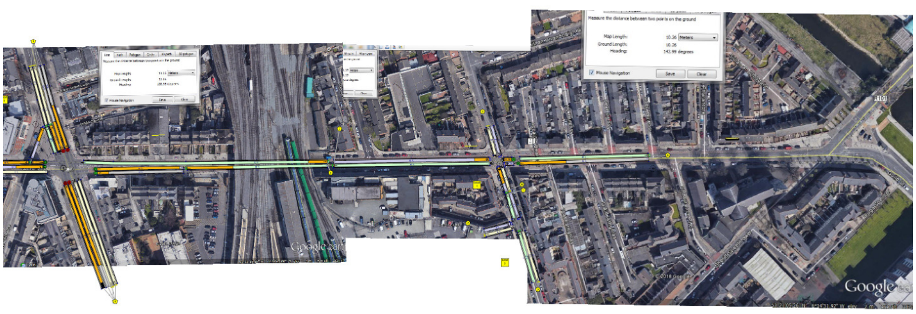
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
2, 2
Diagram produced using TRANSYT 15.5.2.7994

A2 - 2037 PM Peak DN
D2 - PM*

Summary

Data Errors and Warnings

No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	13/03/2019 08:24:52	13/03/2019 08:25:28	16:15	120	534.93	34.59	76.64	H1/1	0	0	H1/1	I/1	I/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2037 PM Peak DN		D2	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
PM				16:15	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1555				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1852	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1599				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1915				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1915				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1915					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1879	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1917			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1895			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	99	6.00	✓	1555
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	19	6.00	✓	1852
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	79	6.00	✓	1599
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800

Gx	**1**	**1**	(untitled)										
I	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915
Ix	**1**	**1**	(untitled)										
J	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	0	6.24	✓	1915
Jx	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	0	6.00	✓	1915
Kx	**1**	**1**	(untitled)										
A1	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	13	6.00	✓	1879
Ax1	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	12	15.01	✓	1917
Fx1	**1**	**1**	(untitled)										
G1	**1**	**1**	(untitled)										1800
H1	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	22	13.82	✓	1895
Hx1	**1**	**1**	(untitled)										1800
A2	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	**1**	**1**	(untitled)										
G2	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	**1**	**1**	(untitled)										1800
E3	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	**1**	**1**	(untitled)										1800
Hx3	**1**	**1**	(untitled)										
G4	**1**	**1**	(untitled)	✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	**1**	**1**	(untitled)										

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	**1**	1	A	
E1	**1**	2	C	
F1	**1**	2	B	
H1	**1**	2	B	
A2	**1**	1	A	
E2	**1**	2	C	
F2	**1**	2	A	
G2	**1**	2	D	
H2	**1**	2	A	
G4	**1**	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	**1**	Movement					
C	**1**	Movement					
D	**1**	Movement					
I	**1**	Movement	✓	0	✓	7.88	
J	**1**	Movement	✓	0	✓	6.24	
A1	**1**	Movement					
G1	**1**	AllTraffic					
G4	**1**	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	**1**	**1**	Dx/1	1500	1555		100
		2	Cx/1	1500	1555		100
		3	Ax1/1	1400	1555		100
C	**1**	**1**	Dx/1	1800	1852	0	100
		2	Bx/1	900	1852	0	100
		3	Ax1/1	1800	1852	0	100
D	**1**	**1**	Bx/1	1000	1599		100
		2	Cx/1	1000	1599		100
		3	Ax1/1	1000	1599		100
I	**1**	**1**	Jx/1		1915		100
		2	Kx/1		1915		100
J	**1**	**1**	Ix/1		1915		100
		2	Kx/1		1915		100
A1	**1**	**1**	Dx/1	1800	1879	0	100
		2	Cx/1	1800	1879	0	100
		3	Bx/1	1800	1879	0	100
G4	**1**	**1**	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	**1**	**1**	**Dx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	**Cx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0

		3	Ax1/1		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	1	2	Bx/1	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
D	1	1	Bx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
I	1	1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
		2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
G4	1	1	Fx1/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To		
		1	2	3
From	1	0	0	5
	2	0	0	5
	3	6	7	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	97	77	100	1	7
	2	✓	2	B	77	97	20	1	20
2	1	✓	1	A	37	38	1	1	1
	2	✓	2	A,B	38	86	48	1	7
	3	✓	3	C,D,E	91	31	60	1	7

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			281	1044	120	10.75	31	192	5.97	3.57	21.77	2.29		100	100	0.00	4.73
Bx	1	(untitled)	3			180	Unrestricted	120	11.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			594	1478	120	21.66	45	101	16.05	2.25	11.16	1.88		100	100	0.00	6.11
Cx	1	(untitled)	9			767	1915	120	9.00	40	125	14.43	0.63	0.00	0.13		100	100	0.00	1.90
D	1	(untitled)	1			34	696	120	118.98	5	1544	6.52	0.52	5.60	0.08		100	100	0.00	0.09
Dx	1	(untitled)				26	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			568	1800	120	10.18	32	185	14.27	0.47	0.85	1.55		100	100	0.00	1.12
Gx	1	(untitled)				756	Unrestricted	120	4.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			0	0	120	120.00	0	-100	0.00	0.00	0.00	0.00		100	100	0.00	0.00
Ix	1	(untitled)				0	Unrestricted	120	120.00	0	Unrestricted	0.00	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			180	1915	120	10.00	9	858	2.50	0.10	0.00	0.00		100	100	0.00	0.07
Jx	1	(untitled)	3			281	1985	120	0.00	14	536	2.55	0.15	0.00	0.01		100	100	0.00	0.17
K	1	(untitled)	4			281	1915	120	0.00	15	513	3.76	0.16	0.00	0.01		100	100	0.00	0.18
Kx	1	(untitled)				180	Unrestricted	120	10.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			637	1870	120	19.00	34	164	1.75	0.75	0.00	0.13		100	100	0.00	1.87
Ax1	1	(untitled)	2	1	A	573 <	1940	100	0.22	35	156	2.63	1.63	7.33	1.40 +	1.40	100	100	0.00	4.11
E1	1	(untitled)	5	2	C	101	1532	60	22.00	13	594	23.30	15.50	44.71	1.51	1.51	100	100	0.00	6.74

F1	**1**	(untitled)	5	2	B	586 <	1917	48	0.00	75	20	48.98	36.98	88.74	17.70 +	12.65	100	100	0.00	91.99
Fx1	**1**	(untitled)				574	Unrestricted	120	7.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	**1**	(untitled)	7			236	1033	120	22.00	23	294	3.26	0.86	1.70	1.48		100	100	0.00	0.85
H1	**1**	(untitled)	5	2	B	593	1895	48	0.00	77	17	62.04	38.04	90.25	18.20	12.92	100	100	0.00	95.68
Hx1	**1**	(untitled)	3			515	1800	120	67.00	29	215	6.01	0.40	0.00	0.06		100	100	0.00	0.81
A2	**1**	(untitled)	2	1	A	637	1940	100	0.72	39	129	12.05	3.05	20.77	4.68	3.84	100	100	0.00	9.32
Ax2	**1**	(untitled)	10			573	1940	120	19.00	30	205	12.39	0.39	0.00	0.06		100	100	0.00	0.88
E2	**1**	(untitled)	5	2	C	685	2055	60	8.00	66	37	29.88	22.08	47.13	10.77	10.77	100	100	0.00	63.71
F2	**1**	(untitled)	5	2	A	515	2080	49	10.00	59	51	42.16	30.16	78.06	13.74	10.45	100	100	0.00	66.31
Fx2	**1**	(untitled)				574	Unrestricted	120	7.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	**1**	(untitled)	5	2	D	437	1915	60	0.24	45	100	8.15	6.95	11.21	1.63	1.63	100	100	0.00	12.60
H2	**1**	(untitled)	5	2	A	462	2080	49	0.00	53	69	52.61	28.61	74.99	11.72	9.29	100	100	0.00	56.48
Hx2	**1**	(untitled)	3			515 <	1800	120	66.00	29	215	7.03	1.36	37.13	12.26 +		100	100	0.00	5.15
E3	**1**	(untitled)	8			786	1915	120	33.79	52	72	19.06	5.26	24.71	6.53		100	100	0.00	18.75
G3	**1**	(untitled)	6			673 <	1800	120	49.84	64	41	23.96	19.16	66.12	15.33 +		100	100	0.00	56.45
Hx3	**1**	(untitled)				633	Unrestricted	120	0.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	**1**	(untitled)	5	2	E	122	350	60	0.00	69	31	62.40	56.40	112.46	4.00	2.71	100	100	0.00	28.86
Hx4	**1**	(untitled)				633	Unrestricted	120	0.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1176.38	73.83	15.93	27.97	6.61	491.13	43.79	0.00	534.93
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	1176.38	73.83	15.93	27.97	6.61	491.13	43.79	0.00	534.93

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

TRANSYT 15

Filename: 2037 Junction 1, 3 & Dev DS.t15
Path: C:\Users\shane.mcgivney\Desktop
Report generation date: 12/03/2019 16:18:00

File summary

File description

File title	(untitled)
Location	
Site number	
UTCRegion	
Driving side	Left
Date	06/12/2011
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	OCSC\shane.mcgivney
Description	

Model and Results

Enable controller offsets	Enable fuel consumption	Enable quick flares	Display journey time results	Display level of service results	Display blocking and starvation results	Display end of red and green queue results	Display excess queue results	Display separate uniform and random results	Display unweighted results	Display TRANSYT 12 style timings	Display effective greens in results	Display Red-With-Amber	Display End-Of-Green Amber
			✓		✓	✓	✓	✓	✓	✓	✓		

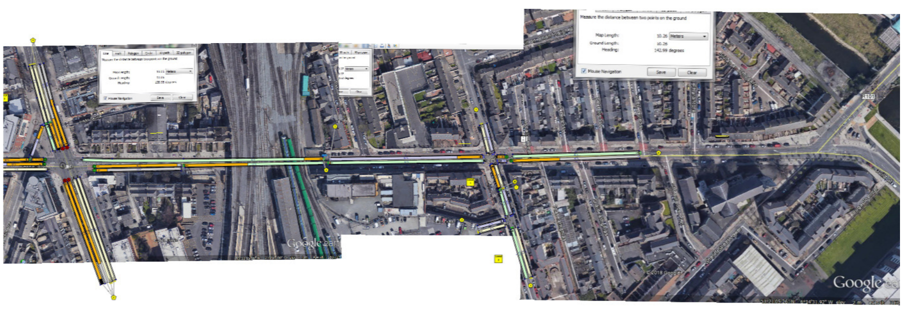
Units

Cost units	Speed units	Distance units	Fuel economy units	Fuel rate units	Mass units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
£	kph	m	mpg	l/h	kg	PCU	PCU	perHour	s	-Hour	perHour

Sorting

Show names instead of IDs	Sorting direction	Sorting type	Ignore prefixes when sorting	Analysis/demand set sorting	Link grouping	Source grouping	Colour Analysis/Demand Sets
	Ascending	Numerical		ID	Normal	Normal	✓

Network Diagrams



(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
2, 2
Diagram produced using TRANSYT 15.5.2.7994

A2 - 2037 PM Peak DS
D2 - PM*

Summary

Data Errors and Warnings
No errors or warnings

Run Summary

Analysis set used	Run start time	Run finish time	Modelling start time (HH:mm)	Network Cycle Time (s)	Performance Index (£ per hr)	Total network delay (PCU-hr/hr)	Highest DOS (%)	Item with highest DOS	Number of oversaturated items	Percentage of oversaturated items (%)	Item with worst signalised PRC	Item with worst unsignalised PRC	Item with worst overall PRC	Network within capacity
2	12/03/2019 16:17:53	12/03/2019 16:17:54	16:15	120	579.71	37.58	82.85	G4/1	0	0	G4/1	G3/1	G4/1	✓

Analysis Set Details

Name	Description	Demand set	Include in report	Locked
2037 PM Peak DS		D2	✓	

Demand Set Details

Name	Description	Composite	Demand sets	Start time (HH:mm)	Locked
PM				16:15	

Network Options

Network timings

Network cycle time (s)	Restrict to SCOOT cycle times	Time segment length (min)	Number of time segments	Modelled time period (min)
120		60	1	60

Signals options

Start displacement (s)	End displacement (s)
2	3

Advanced

Phase minimum broken penalty (£)	Phase maximum broken penalty (£)	Intergreen broken penalty (£)	Starting Red-with-Amber (s)
10000.00	10000.00	10000.00	2

Traffic options

Traffic model	Vehicle flow scaling factor (%)	Pedestrian flow scaling factor (%)	Cruise times or speeds
Platoon Dispersion (PDM)	100	100	Cruise Speeds

Advanced

Resolution	DOS Threshold (%)	Cruise scaling factor (%)	Use link stop weightings	Use link delay weightings	Exclude pedestrians from results calculation	Random delay mode	Type of Vehicle-in-Service	Type of random parameter	PCU Length (m)	Calculate results for Path Segments	Generate PDM Profile Data
1	90	100	✓	✓		Complex	Uniform (TRANSYT)	Uniform (TRANSYT)	5.75		✓

Normal Traffic parameters

Dispersion type	Dispersion coefficient	Travel time coefficient
Default	35	80

Normal Traffic Types

Name	PCU Factor
Normal	1.00

Bus parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Bus	1.00	Default	0.94	30	85

Tram parameters

Name	PCU Factor	Dispersion type	Acceleration (ms^[-2])	Stationary time coefficient	Cruise time coefficient
Tram	1.00	Default	0.94	100	100

Pedestrian parameters

Dispersion type
Default

Optimisation options

Enable optimisation	Auto redistribute	Optimisation level	Enable OUT Profile accuracy
✓	✓	Offsets And Green Splits	

Advanced

Optimisation type	Hill climb increments	OUTProfile accuracy	Use enhanced optimisation	Auto optimisation order	Optimisation order	Master controller	Offsets relative to master controller	Master controller offset after each run
Hill Climb (Fast)	15, 40, -1, 15, 40, 1, -1, 1	50, 50, 5, 5, 0.5, 0.5, 0.05, 0.05		✓	1, 2			Do nothing

Economics

Vehicle Monetary Value Of Delay (£ per PCU-hr)	Vehicle Monetary Value Of Stops (£ per 100 stops)	Pedestrian monetary value of delay (£ per Ped-hr)
14.20	2.60	14.20

Arms and Traffic Streams

Arms

Arm	Name	Description	Traffic node
B	(untitled)		1
Bx	(untitled)		3
C	(untitled)		1
Cx	(untitled)		9
D	(untitled)		1
Dx	(untitled)		
Ex	(untitled)		9
Gx	(untitled)		
I	(untitled)		4
Ix	(untitled)		
J	(untitled)		4
Jx	(untitled)		3
K	(untitled)		4
Kx	(untitled)		
A1	(untitled)		1
Ax1	(untitled)		2
E1	(untitled)		5
F1	(untitled)		5
Fx1	(untitled)		
G1	(untitled)		7
H1	(untitled)		5
Hx1	(untitled)		3
A2	(untitled)		2
Ax2	(untitled)		10
E2	(untitled)		5
F2	(untitled)		5
Fx2	(untitled)		
G2	(untitled)		5
H2	(untitled)		5
Hx2	(untitled)		3
E3	(untitled)		8
G3	(untitled)		6
Hx3	(untitled)		
G4	(untitled)		5
Hx4	(untitled)		

Traffic Streams

Arm	Traffic Stream	Name	Description	Auto length	Length (m)	Has Saturation Flow	Saturation flow source	Saturation flow (PCU/hr)	Auto-calculate cell saturation flow	Cell saturation flow (PCU/hr)	Is signal controlled	Is give way	Traffic type	Allow Nearside Turn On Red
B	1	(untitled)			20.00	✓	Sum of lanes	1555				✓	Normal	
Bx	1	(untitled)			20.00								Normal	
C	1	(untitled)			115.00	✓	Sum of lanes	1835	✓	1800		✓	Normal	
Cx	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
D	1	(untitled)			50.00	✓	Sum of lanes	1606				✓	Normal	
Dx	1	(untitled)			100.00								Normal	
Ex	1	(untitled)			115.00	✓	Sum of lanes	1800	✓	1800			Normal	
Gx	1	(untitled)		✓	76.23								Normal	
I	1	(untitled)			15.00	✓	Sum of lanes	1532				✓	Normal	
Ix	1	(untitled)			15.00								Normal	
J	1	(untitled)			20.00	✓	Sum of lanes	1831				✓	Normal	
Jx	1	(untitled)			20.00	✓	Sum of lanes	1985					Normal	
K	1	(untitled)			30.00	✓	Sum of lanes	1873					Normal	
Kx	1	(untitled)		✓	51.55								Normal	
A1	1	(untitled)			7.50	✓	Sum of lanes	1870	✓	1800		✓	Normal	
Ax1	1	(untitled)			7.50	✓	Sum of lanes	1940	✓	1800	✓		Normal	
E1	1	(untitled)			65.00	✓	Sum of lanes	1532	✓	1800	✓		Normal	
F1	1	(untitled)			100.00	✓	Sum of lanes	1917			✓		Normal	
Fx1	1	(untitled)		✓	110.26								Normal	
G1	1	(untitled)			20.00	✓	Sum of lanes	1800	✓	1800		✓	Normal	
H1	1	(untitled)			200.00	✓	Sum of lanes	1891			✓		Normal	
Hx1	1	(untitled)		✓	46.74	✓	Sum of lanes	1800					Normal	
A2	1	(untitled)			75.00	✓	Sum of lanes	1940	✓	1800	✓		Normal	
Ax2	1	(untitled)			100.00	✓	Sum of lanes	1940	✓	1800			Normal	
E2	1	(untitled)			65.00	✓	Sum of lanes	2055	✓	1800	✓		Normal	
F2	1	(untitled)			100.00	✓	Sum of lanes	2080			✓		Normal	
Fx2	1	(untitled)		✓	110.92								Normal	
G2	1	(untitled)			10.00	✓	Sum of lanes	1915	✓	1800	✓		Normal	
H2	1	(untitled)			200.00	✓	Sum of lanes	2080			✓		Normal	
Hx2	1	(untitled)		✓	47.25	✓	Sum of lanes	1800					Normal	
E3	1	(untitled)			115.00	✓	Sum of lanes	1915	✓	1800			Normal	
G3	1	(untitled)			40.00	✓	Sum of lanes	1800					Normal	
Hx3	1	(untitled)		✓	48.56								Normal	
G4	1	(untitled)			50.00	✓	Sum of lanes	1937			✓	✓	Normal	
Hx4	1	(untitled)		✓	49.99								Normal	

Lanes

Arm	Traffic Stream	Lane	Name	Description	Use RR67	Surface condition	Site quality factor	Gradient (%)	Width (m)	Use connector turning radius	Proportion that turn (%)	Turning radius (m)	Nearside lane	Saturation flow (PCU/hr)
B	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	99	6.00	✓	1555
Bx	1	1	(untitled)											
C	1	1	(untitled)		✓	N/A	N/A	0	3.25	✓	23	6.00	✓	1835
Cx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
D	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	77	6.00	✓	1606
Dx	1	1	(untitled)											
Ex	1	1	(untitled)											1800
Gx	1	1	(untitled)											
I	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
Ix	1	1	(untitled)											
J	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	19	6.24	✓	1831
Jx	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	100	42.47		1985
K	1	1	(untitled)		✓	N/A	N/A	0	3.00	✓	9	6.00	✓	1873

Kx	**1**	**1**	(untitled)											
A1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	15	6.00	✓	1870
Ax1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	100	6.00	✓	1532
F1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	12	15.01	✓	1917
Fx1	**1**	**1**	(untitled)											
G1	**1**	**1**	(untitled)											1800
H1	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	24	13.82	✓	1891
Hx1	**1**	**1**	(untitled)											1800
A2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
Ax2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00	✓	1940
E2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00		2055
F2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Fx2	**1**	**1**	(untitled)											
G2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
H2	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	0	99999.00		2080
Hx2	**1**	**1**	(untitled)											1800
E3	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.00	✓	0	99999.00	✓	1915
G3	**1**	**1**	(untitled)											1800
Hx3	**1**	**1**	(untitled)											
G4	**1**	**1**	(untitled)		✓	N/A	N/A	0	3.25	✓	100	20.27		1937
Hx4	**1**	**1**	(untitled)											

Signals

Arm	Traffic Stream	Controller stream	Phase	Second phase enabled
Ax1	**1**	1	A	
E1	**1**	2	C	
F1	**1**	2	B	
H1	**1**	2	B	
A2	**1**	1	A	
E2	**1**	2	C	
F2	**1**	2	A	
G2	**1**	2	D	
H2	**1**	2	A	
G4	**1**	2	E	

Give Way Data

Arm	Traffic Stream	Opposed traffic	Use Step-wise Opposed Turn Model	Number of storage spaces	Use connector turning radius	Radius of turn (m)	Visibility restricted
B	**1**	Movement					
C	**1**	Movement					
D	**1**	Movement					
I	**1**	Movement	✓	0	✓	7.88	
J	**1**	Movement	✓	0	✓	6.24	
A1	**1**	Movement					
G1	**1**	AllTraffic					
G4	**1**	Movement	✓	0	✓	20.27	

Give Way Data - All Movements - Conflicts

Traffic Stream	Description	Controlling type	Controlling traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
1		TrafficStream	Hx1/1	100	0.10		0	0
		TrafficStream	Hx2/1	100	1.00		0	0

Give Way Data - Movements

Arm	Traffic Stream	Movement	Destination traffic stream	Max Flow (Opposed) (PCU/hr)	Max Flow (Unopposed) (PCU/hr)	Max congested capacity (PCU/hr)	Percentage opposed (%)
B	**1**	**1**	Dx/1	1500	1555		100
		2	Cx/1	1500	1555		100
		3	Ax1/1	1400	1555		100
C	**1**	**1**	Dx/1	1800	1835	0	100
		2	Bx/1	900	1835	0	100
		3	Ax1/1	1800	1835	0	100
D	**1**	**1**	Bx/1	1000	1606		100
		2	Cx/1	1000	1606		100
		3	Ax1/1	1000	1606		100
I	**1**	**1**	Jx/1		1532		100
		2	Kx/1		1532		100
J	**1**	**1**	Ix/1		1831		100
		2	Kx/1		1831		100
A1	**1**	**1**	Dx/1	1800	1870	0	100
		2	Cx/1	1800	1870	0	100
		3	Bx/1	1800	1870	0	100
G4	**1**	**1**	Fx1/1		1937		100
		2	Fx2/1		1937		100

Give Way Data - Movements - Conflicts

Arm	Traffic Stream	Movement	Destination traffic stream	Description	Controlling type	Controlling traffic stream	Controlling from traffic stream	Controlling to traffic stream	Percentage opposing (%)	Slope coefficient	Upstream signals visible	Conflict shift	Conflict duration
B	**1**	**1**	**Dx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
		2	**Cx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.10		0	0
		3	**Ax1/1**		TrafficStream	C/1			100	0.10		0	0
					TrafficStreamMovement		D/1	Bx/1	100	0.10		0	0
					TrafficStreamMovement		D/1	Ax1/1	100	1.00		0	0
					TrafficStream	A1/1			100	1.00		0	0
C	**1**	**2**	**Bx/1**	Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0

D	1	1	Bx/1	opposing flow									
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Bx/1	100	0.25		0	0
		2	Cx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Bx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		A1/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Cx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Dx/1	100	0.25		0	0
				Crossroads opposing flow	TrafficStreamMovement		B/1	Ax1/1	100	0.25		0	0
		3	Ax1/1		TrafficStreamMovement		C/1	Ax1/1	100	0.25		0	0
I	1	1	Jx/1		TrafficStreamMovement		K/1	Jx/1	100			0	0
		2	Kx/1		TrafficStream	J/1			100			0	0
					TrafficStreamMovement		K/1	Jx/1	100			0	0
J	1	1	Ix/1		TrafficStream	K/1			100			0	0
A1	1	1	Dx/1	Crossroads opposing flow	TrafficStreamMovement		C/1	Dx/1	100	0.10		0	0
				Crossroads opposing flow	TrafficStreamMovement		C/1	Ax1/1	100	1.00		0	0
					TrafficStreamMovement		C/1	Bx/1	100	0.10		0	0
G4	1	1	Fx1/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0
		2	Fx2/1		TrafficStream	E1/1			100			0	0
					TrafficStream	E2/1			100			0	0

Signal Timings

Network Default: 120s cycle time; 120 steps

Interstage Matrix for Controller Stream 1

		To	
		1	2
From	1	0	0
	2	0	0

Interstage Matrix for Controller Stream 2

		To		
		1	2	3
From	1	0	0	5
	2	0	0	5
	3	6	7	0

Resultant Stages

Controller stream	Resultant Stage	Is base stage	Library Stage ID	Phases in this stage	Stage start (s)	Stage end (s)	Stage duration (s)	User stage minimum (s)	Stage minimum (s)
1	1	✓	1	A	64	44	100	1	7
	2	✓	2	B	44	64	20	1	20
2	1	✓	1	A	37	38	1	1	1
	2	✓	2	A,B	38	84	46	1	7
	3	✓	3	C,D,E	89	31	62	1	7

Final Prediction Table

Traffic Stream Results

				SIGNALS		FLOWS		PERFORMANCE				PER PCU			QUEUES		WEIGHTS		PENALTIES	P.I.
Arm	Traffic Stream	Name	Traffic node	Controller stream	Phase	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Wasted time total (s (per cycle))	Degree of saturation (%)	Practical reserve capacity (%)	JourneyTime (s)	Mean Delay per Veh (s)	Mean stops per Veh (%)	Mean max queue (PCU)	Max end of red queue (PCU)	Delay weighting multiplier (%)	Stop weighting multiplier (%)	Cost of traffic penalties (£ per hr)	P.I.
B	1	(untitled)	1			351 <	992	120	11.76	41	118	7.70	5.30	27.67	3.53 +		100	100	0.00	8.55
Bx	1	(untitled)	3			227	Unrestricted	120	12.00	0	Unrestricted	2.40	0.00	0.00	0.00		100	100	0.00	0.00
C	1	(untitled)	1			622	1402	120	16.62	50	80	16.57	2.77	9.76	3.28		100	100	0.00	7.55
Cx	1	(untitled)	9			797	1915	120	10.00	42	116	14.47	0.67	0.00	0.15		100	100	0.00	2.10
D	1	(untitled)	1			35	676	120	118.98	6	1446	6.61	0.61	6.35	0.09		100	100	0.00	0.11
Dx	1	(untitled)				26	Unrestricted	120	120.00	0	Unrestricted	12.00	0.00	0.00	0.00		100	100	0.00	0.00
Ex	1	(untitled)	9			595	1800	120	10.17	33	172	14.31	0.51	0.85	1.56		100	100	0.00	1.25
Gx	1	(untitled)				786	Unrestricted	120	4.00	0	Unrestricted	9.15	0.00	0.00	0.00		100	100	0.00	0.00
I	1	(untitled)	4			106	983	120	0.00	11	735	2.02	0.22	0.00	0.01		100	100	0.00	0.09
Ix	1	(untitled)				71	Unrestricted	120	35.00	0	Unrestricted	1.80	0.00	0.00	0.00		100	100	0.00	0.00
J	1	(untitled)	4			221	1686	120	11.00	13	587	2.56	0.16	0.00	0.01		100	100	0.00	0.14
Jx	1	(untitled)	3			374	1985	120	0.00	19	378	2.61	0.21	0.00	0.02		100	100	0.00	0.31
K	1	(untitled)	4			333	1873	120	0.00	18	406	3.81	0.21	0.00	0.02		100	100	0.00	0.27
Kx	1	(untitled)				215	Unrestricted	120	7.00	0	Unrestricted	6.19	0.00	0.00	0.00		100	100	0.00	0.00
A1	1	(untitled)	1			655	1862	120	19.00	35	156	1.79	0.79	0.00	0.14		100	100	0.00	2.03
Ax1	1	(untitled)	2	1	A	613 <	1940	100	0.22	38	139	2.66	1.66	6.94	1.42 +	1.42	100	100	0.00	4.45
E1	1	(untitled)	5	2	C	101	1532	62	13.00	13	617	22.13	14.33	42.27	1.46	1.42	100	100	0.00	6.25
F1	1	(untitled)	5	2	B	586 <	1917	46	0.00	78	15	52.29	40.29	92.36	18.44 +	13.24	100	100	0.00	99.91
Fx1	1	(untitled)				570	Unrestricted	120	6.00	0	Unrestricted	13.23	0.00	0.00	0.00		100	100	0.00	0.00
G1	1	(untitled)	7			236	1036	120	19.00	23	295	3.18	0.78	1.43	1.48		100	100	0.00	0.77
H1	1	(untitled)	5	2	B	606	1891	46	0.00	82	10	67.21	43.21	96.13	19.78	14.06	100	100	0.00	110.59
Hx1	1	(untitled)	3			515	1800	120	69.00	29	215	6.01	0.40	0.00	0.06		100	100	0.00	0.81
A2	1	(untitled)	2	1	A	655	1940	100	0.72	40	123	12.12	3.12	21.28	4.81	3.96	100	100	0.00	9.80
Ax2	1	(untitled)	10			613	1940	120	19.00	32	185	12.43	0.43	0.00	0.07		100	100	0.00	1.04
E2	1	(untitled)	5	2	C	715	2055	62	0.00	66	36	28.57	20.77	45.16	10.77	10.67	100	100	0.00	62.63
F2	1	(untitled)	5	2	A	515	2080	47	11.00	62	45	44.20	32.20	80.78	14.09	10.80	100	100	0.00	70.63

Fx2	**1**	(untitled)				570	Unrestricted	120	6.00	0	Unrestricted	13.31	0.00	0.00	0.00		100	100	0.00	0.00
G2	**1**	(untitled)	5	2	D	449	1915	62	0.24	45	101	7.76	6.56	10.89	1.63	1.63	100	100	0.00	12.24
H2	**1**	(untitled)	5	2	A	460	2080	47	0.00	55	63	54.40	30.40	77.53	12.10	9.54	100	100	0.00	59.63
Hx2	**1**	(untitled)	3			515 <	1800	120	68.00	29	215	7.09	1.42	39.03	12.70 +		100	100	0.00	5.41
E3	**1**	(untitled)	8			816	1915	120	19.10	46	95	16.99	3.19	27.05	9.07		100	100	0.00	13.04
G3	**1**	(untitled)	6			685 <	1800	120	48.58	64	41	22.99	18.19	64.49	15.41 +		100	100	0.00	54.70
Hx3	**1**	(untitled)				633	Unrestricted	120	0.00	0	Unrestricted	5.83	0.00	0.00	0.00		100	100	0.00	0.00
G4	**1**	(untitled)	5	2	E	118	271	62	0.00	83	9	99.33	93.33	131.87	5.40	3.53	100	100	0.00	45.39
Hx4	**1**	(untitled)				633	Unrestricted	120	0.00	0	Unrestricted	6.00	0.00	0.00	0.00		100	100	0.00	0.00

Network Results

	Distance travelled (PCU-km/hr)	Time spent (PCU-hr/hr)	Mean journey speed (kph)	Uniform delay (PCU-hr/hr)	Random plus oversat delay (PCU-hr/hr)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Excess queue penalty (£ per hr)	Performance Index (£ per hr)
Normal traffic	1212.43	78.03	15.54	28.86	8.72	533.66	46.04	0.00	579.71
Bus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pedestrians									
TOTAL	1212.43	78.03	15.54	28.86	8.72	533.66	46.04	0.00	579.71

- *< = adjusted flow warning (upstream links/traffic streams are over-saturated)*
- ** = Traffic Stream - Normal, Bus or Tram Stop or Delay weighting has been set to a value other than 100%*
- *^ = Traffic Stream - Normal, Bus or Tram Stop or Delay Path weighting has been set to a value other than 100%*
- *+ = average link/traffic stream excess queue is greater than 0*
- ***P.I. = PERFORMANCE INDEX***

APPENDIX 8.1
OCSC GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA) REPORT

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

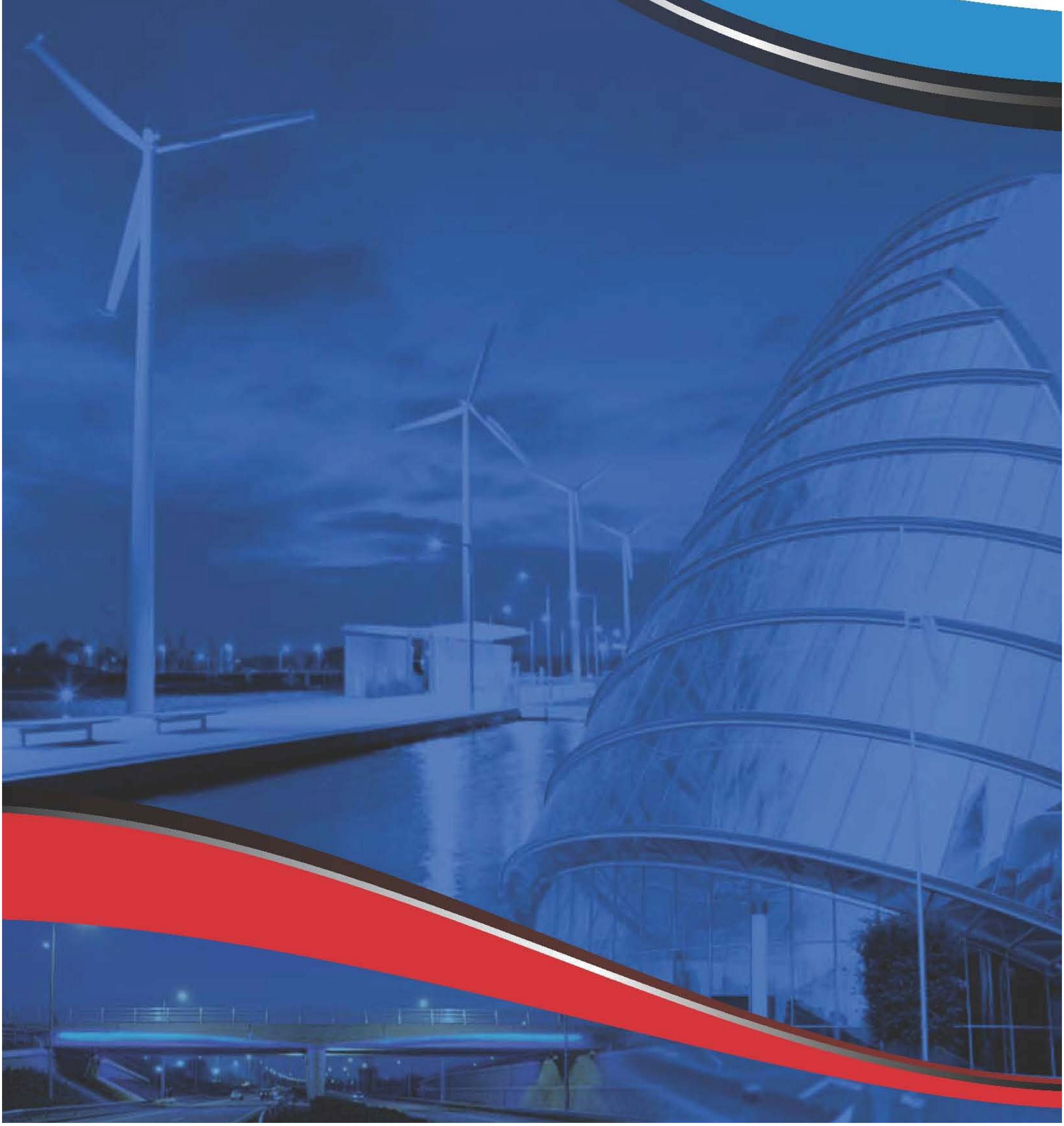
PROPOSED STRATEGIC HOUSING DEVELOPMENT 'THE CONNOLLY QUARTER': ENVIRONMENTAL SITE ASSESSMENT AND GENERIC QUANTITATIVE RISK ASSESSMENT

OXLEY HOLDINGS LIMITED

PROJECT NO. B909

OCTOBER 2019

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary Consulting Engineers



Environmental Site Assessment and Generic Quantitative Risk Assessment

Connolly Station Car Park, Dublin 1

for

Oxley Holdings Limited.

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary Consulting Engineers

OCSC Job No.:	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
B909	B909	OCSC	XX	XX	RP	ENV	0001	S0	P01

Rev.	Status	Authors	Checked	Authorised	Issue Date
2	FINAL	ATA	EB	TH	04.10.19
1	FINAL	ATA	EB	TH	30.09.19
0	DRAFT	ATA /RB	EB	TH	24.01.19

NOTICE

This document represents the findings from an Environmental Site Assessment (ESA) and Generic Quantitative Risk Assessment (GQRA) conducted at the above referenced site. Best practice was followed at all times and within the limitations stated. This document has been produced by O'Connor Sutton Cronin & Associates for its client Oxley Holdings Limited. It may not be used for any purpose other than that specified by any other person without the written permission of the authors.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

Appendix C: HazWasteOnline (HWOL) Assessment

EXECUTIVE SUMMARY

The site for assessment is the Connolly station car park, bordered by Seville Place and Oriel Hall to the north; Sheriff Street Lower to the south; Oriel Street Upper to the east; and Connolly Station (Protected Structure) to the west, and is located in Dublin 1. O'Connor Sutton Cronin & Associates Ltd. (OCSC) were appointed by Oxley Holdings Limited (the Client) who is planning to apply for planning permission to re-develop the site for mixed use development (residential and commercial landuse) to include a basement carpark and ancillary site development proposals. There are 2No. protected structures (11No. Arches and an office building) within the site which will be retained and integrated within the new development. A survey carried out in 2018 by Murphy surveys to map existing services and the topography of the site, show there are 11No. arches along Sheriff Street Lower, that 6No. of these arches extend circa 35m into the site, and 5No. arches extend circa 17.5m into the site.

The site is c. 2.88 hectares in area and the historical Ordnance Survey 1888-1913 mapshow that the site was formerly used as a Goods Shed. The 1888-1913 map also shows an oil tank located near the intersection of Oriel Street Upper with Sheriff Street Lower. Current on-site activities of concern are the 2No. railway tracks serving Connolly station depot and the on-site fuel tank located along the boundary with Oriel Street Upper.

Under the supervision of Buro Happold (BH), Glover Site Investigations Ltd. undertook a preliminary site investigation during July to September 2008 that included the progression of 12No. windowless sample boreholes and 7No. cable percussion boreholes (with 3No. rotary core borehole follow on). The original Ground Investigation report was not made available to OCSC at the time of writing this report and therefore the geology and hydrogeology have been inferred from the Buro Happold interpretative report which was made available to OCSC and which have been relied upon as true and accurate. Fourteen (14No.) boreholes were converted to groundwater and/or gas monitoring wells. The environmental monitoring undertaken at the site included the collection of 40No. soil samples and 25No. groundwater samples, which were submitted to the laboratory for analysis. Geology of the site was proven to be a circa 7.2m thick layer of Made Ground overlying a glacial till layer comprising of Gravel embedded among or between a layer of Sandy Gravelly Clay (Dublin Boulder Clay). Rock head was not encountered throughout the site investigation even though the 3No. rotary core boreholes progressed to a maximum depth of 42.3m below ground level. The site investigation carried did not identify any Dense Non-Aqueous Phase Liquid (DNAPL) and/or Light Non-Aqueous Phase Liquid (LNAPL) present beneath the site. Asbestos fibres were not detected in the 35No. soil samples screened for asbestos.

A Generic Quantitative Risk Assessment (GQRA) was completed using the available results to assess the risk to future users (Residential without plant uptake, Public Open Space and Commercial). A number of locations exceeded the Generic Assessment Criteria (GAC) for residential, public open space and commercial receptors for contaminants particularly lead, and PAHs (residential and commercial).

The Buro Happold interpretative report contains 40No. analyses of samples taken from 17No. locations during site investigations. Of those 17No. locations, 2No. locations are significantly outside the site. The list of parameters analysed were not consistent across the 40No. samples. Of these 40No. samples, 15No. samples from 10No. locations within the site were subjected to leaching tests. Again the list of leachate parameters tested for were not consistent across the 15No. samples.

The number of sampling locations, consistency of analysed parameters, and depth of sampling are such that any assessment for soil waste management based on them should only be considered indicative. Consequently the assessment made on this data is considered not to be fully representative of the site. Further site investigations and sample analyses will be required to provide a robust assessment in line with industry standard operating procedures.

The waste soil assessment made on this limited data set, indicates that the upper part of the soil is

- Potentially predominantly non-hazardous, with a hotspot hazardous nature resultant of lead and copper content. There is not sufficient data to exclude the potential for TPH hotspots, however it is considered probably unlikely.
- Probably unlikely to be acceptable at an inert soil disposal or recovery facility. It is expected that excepting the potential for heavy metal hotspots the soil would generally be acceptable at a non-hazardous landfill.

All soil samples analysed were from shallow depths with the deepest sample being from 6.5mbGL. Development plans show that the current site elevation ranges between 7.5-8.0mOD; ground floor of the development will be at 1mOD which is the same level as the Sherriff Street Lower. The basement floor level will be -2.585mOD and its footprint is shown in Figure 1.3. The proposed plans indicate that there will be a 10m dig depth across certain sections of the site, hence the removal of all Made Ground.

During the basement construction, and after the Made Ground has been excavated, it is possible that water ingress will occur as the dig progresses into the glacial till layer; therefore, a discharge licence will likely be required to enable discharge of water to sewer to keep the excavation dry. Excavation and disposal will also likely be used as part of the design measures and will remove a large volume of contaminated material including the more shallow material. However, the final remedial strategy will only be determined once the deeper soils which will be in contact with the basement, have been fully characterised, and further information on the hydrogeological regime and geological profile has been evaluated.

It is recommended that:

- Additional site investigations and monitoring is completed for waste classification purposes to classify the soils beneath the site which will be excavated as part of the development;
- Sampling of the deeper soils which are within the glacial till and within which the basement will be founded in order to assess if any risk is present from this layer from a human health or environmental perspective;
- Additional gas and groundwater monitoring should be carried out; and
- Decommissioning of the oil tank currently present on-site prior to re-development of the site.

1. INTRODUCTION

1.1. Project Contractual Basis & Parties Involved

This report has been prepared by O'Connor Sutton Cronin & Associates Ltd. (OCSC) at the request of their Client Oxley Holdings Limited. The project brief and terms were set out in OCSC proposal dated 6th July 2018.

The site for assessment is an area incorporating Connolly station car park and some warehouse buildings located to the east side of the intersection of Oriel Street Upper with Seville Place, Dublin 1. It is proposed that the site will be developed for mixed use incorporating commercial and residential use. The Regulating Authority for the site is Dublin City Council (DCC).

The report was completed by Ahmed Thamer, Environmental Engineer with OCSC. Assistance was provided by Ross Begg, Graduate Environmental Consultant with OCSC. The report was reviewed by Eleanor Burke who is the OCSC Environmental Division Manager. The Project Director is Tony Horan CEng, FIEI, Chartered Engineer and Managing Director of OCSC.

Other documents relevant to this report are:

- Geotechnical & Geo-environmental interpretative report: Contaminated Land Generic Quantitative Risk Assessment - A report by Buro Happold Limited for Córas Iompair Éireann (CIE) (2008).

1.2. Background Information

The site for assessment is bounded by Seville Place and Oriel Hall to the north; Sheriff Street Lower to the south; Oriel Street Upper to the east; and Connolly Station (Protected Structure) to the west, Dublin 1 (see Figure 1.1). The site currently comprises of the existing CIE car park, CIE Group buildings, Rolling stock maintenance shed, and part of existing railway lines / sidings.

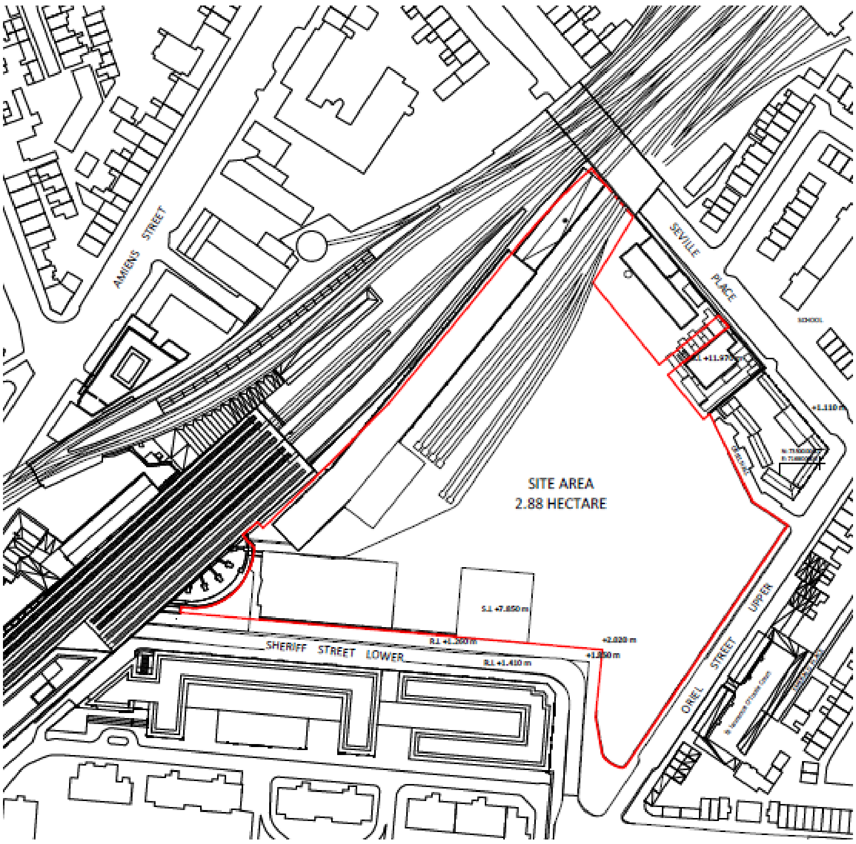


Figure 1.1: Site Location and approximate site boundary

Figure 1.2: Aerial Image of the site (Source: GoogleMaps)

1.3. Proposed Development

At the time of writing this report, OCSC understand that Oxley Holdings Ltd. intend to apply to An Bord Pleanála for permission for a Strategic Housing Development at this site (c. 2.88 hectares) to the rear of Connolly Station, Sherriff Street Lower, Dublin 1, Eircode D01 V6V6.

The development will consist of;

- the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;
- the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;
- Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);
- Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51);
- Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);
- Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);
- Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);
- Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);
- Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);
- Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);
- residential support amenities including 1 no. gyms, a resident's lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;

- change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);
- a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)
- 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);
- 'other uses' including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;
- A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;
- A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE's transport needs at Connolly Station;
- Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sherriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;
- All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and
- Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance.

The site is currently higher than the surrounding Sheriff Street Lower by about 7m and it is proposed that the ground floor of the development will be at approximately the same level as the street level at +1.850mOD with the finished floor level of the basement at circa -2.585mOD. The basement will occupy approximately 30% of the site footprint, see section 2.21. The basement and the buildings will be formed and supported using a secant piled wall and piles of 900mm diameter which will extend to the top of rock which is located at depth (greater than 41metres below ground level). It also planned that Irish Rail will divert the 2No. railway tracks currently within the site boundary and move them further north prior to the redevelopment of the site. The overall development layout plan is still under discussion/ study by the design team.

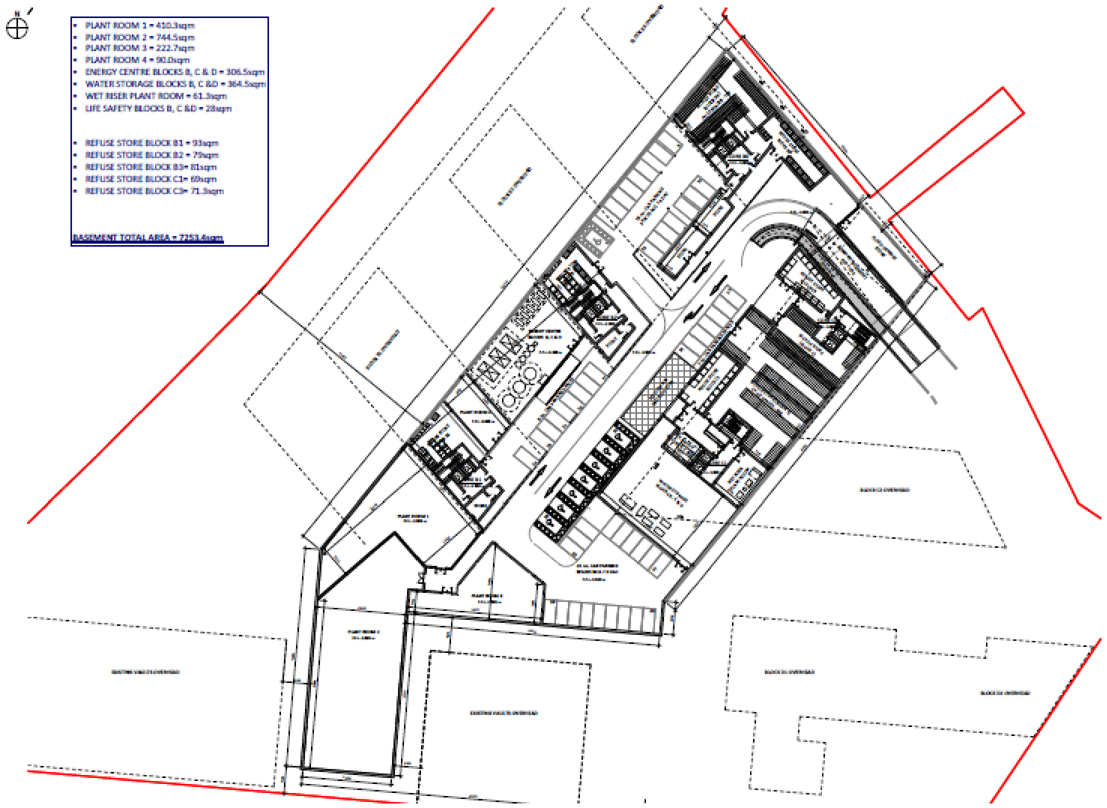


Figure 1.3: Basement footprint proposed

1.4. Previous Reports

Buro Happold (BH) undertook a Phase II site investigation in 2008 which included the installation of a number of intrusive site investigation locations. Key conclusions from the report included:

- The site's proven geology is Made Ground. This Made Ground compromises of a mixture of clay, sand and gravel containing cobbles and occasional boulders along with pieces of glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery. This made ground is located over a layer of glacial till which is composed of sandy GRAVEL embedded among or between a layer of sandy gravelly CLAY. There is a discontinuous layer of sandy SILT with sea shells in the southern end of the site towards Sherriff Street Lower, bedrock was not encountered;
- Significant ground gas concentrations of Carbon Dioxide (CO_2) and Methane (CH_4) were recorded across the site, albeit at low flow rates (<1 l/h). In accordance to BS8485:2015, the site would be categorized into 'Characteristic Situation 2' (CS2);
- Significant Dense Non-Aqueous Phase Liquid (DNAPL) or Light Non-Aqueous Phase Liquid (LNAPL) contamination was not encountered during the site investigation. Hydrocarbon odours were encountered in WS11 at a depth of 2mbGL, however no visual/olfactory evidence of contamination was recorded at any other exploratory hole locations;
- Metals concentration in the soils across the site were elevated, particularly Lead, being above the GAC limit for residential without plant uptake for about 60% of the soil samples analysed;
- No asbestos was detected in the soil samples taken from all exploratory hole locations. An asbestos survey had not been undertaken to investigate the potential for asbestos to be present in the above ground structures on-site;

- Groundwater was observed to be within the GRAVEL layer of the glacial till and the water table was found to be relatively flat and at circa 0mOD;
- Laboratory analysis of the groundwater beneath the site found it to be impacted by petroleum hydrocarbons and PAHs. In addition, chloride, sulphate and ammoniacal nitrogen concentrations were also relatively elevated;
- The report concluded that the significant amount of soils to be excavated as part of basement formation, the incorporation of gas protection measures according to 'CS2' of BS8485 and the implementation of an Environmental Management Plan will reduce the risk to construction workers and future site users to an 'acceptable' low risk;
- The report also recommended further investigation and monitoring of groundwater regime before and after development to provide evidence in support of natural attenuation occurring on site.

1.5. Project Objectives

The overall project objectives include:

- Provide environmental information on the site focusing on its environmental setting and past site activities including a review of all up to date mapping ;
- Assess any obvious environmental liabilities;
- Assess current soil and groundwater quality at the project site in terms of contamination and to inform the Client of any risk posed by contamination if present in the context of the proposed future use – commercial and residential use;
- Formulate initial Conceptual Site model;
- Undertake a generic quantitative risk assessment (GQRA) using up to date Generic Assessment Criteria (GAC); and
- Make recommendations for any further assessments/site investigations, if required.

1.6. Methodology and Approach

The methodology and approach for the proposed work will follow:

- BS 10175:2011+A1:2013, Investigation of potentially contaminated sites, Code of Practice;
- EPA, 2015, Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-hazardous;
- EPA 2013, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites;
- EPA 2007, Code of Practice, Environmental Risk Assessment for Unregulated Waste Disposal Sites;
- EA, 2015, Guidance on the classification and assessment of waste, Technical Guidance WM3;
- EA, 2004, Model Procedures for the Management of Land Contamination (CLR11);
- The LQM/CIEH S4ULs for Human Health Risk Assessment (2015);
- SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination CL:AIRE (2014);
- EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment (2010);

- 2010 European Communities Environmental Objectives (Groundwater) Regulations (Statutory Instrument No. 9 of 2010);
- 2016 European Communities Environmental Objectives (Groundwater) (Amendment) Regulations (Statutory Instrument No. 366 of 2016);
- EPA (2003) Towards Setting Guideline Values for the Protection of Groundwater in Ireland (2003);
- Environmental Liability Regulations (S.I. 547 of 2008);
- Environment Agency (2000) Guidance on the Assessment and Monitoring of Natural Attenuation of Contaminants in Groundwater;
- Environment Agency (2004) Model Procedures for the Management of Land Contamination. Contaminated Land Report 11;
- FRTR (2009) Remediation Technologies Screening Matrix and Reference Guide Version 4.0; and
- US EPA (2004) How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers, EPA 510-R-04-002.
- List of Waste & Determining if Waste is Hazardous or Non-Hazardous (EPA, 2015) and European Waste Catalogue (Commission Decision 2014/955/EU);
- European Waste Framework Directive (2008/98/EC);
- Guidance on the classification and assessment of waste, Technical Guidance WM3 v1.1 (EA et al, 2018);
- S.I. 233 of 2015 EU (Properties of Waste which Render it Hazardous) Regulation;
- Landfill Directive 1999/31/EC (2003/33/EC);
- Waste Management Act 1996 (as amended);
- S.I. 126/2011 – European Community (Waste Directive) Regulations;
- Classification, Labelling & Packaging Regulations EC/1272/2008;

The proposed end-use defines the level of environmental risk assessment required and in this instance, the development will consist of the redevelopment of the site to provide a mixed commercial, residential, community and leisure development.

1.7. Scope of Works

To meet the project objectives the following scope of works were completed:

- Undertake and present a historical site and area review, primarily referring to old Ordnance Survey Maps but utilising other sources as appropriate and readily available including previous site investigations and data available;
- Review third party interpretative report and identify if any gap(s) exists;
- Present a discussion of the current site status and key environmental influences around the site;
- Present a discussion of the general soil and groundwater conditions within the topographical and area context;
- Evaluate the results spatially to determine whether any subsurface pathways exists at the site and evaluate the distribution of contamination encountered, if any;

- Evaluate the results against Generic Quantitative Risk Assessment (GQRA) criteria as a first screen to evaluate if the concentrations on site present a risk to future site users (human health) or the environment; and

Based on the results of the above assessment the requirement for further detailed site investigation or more site specific Detailed Quantitative Risk Assessment (DQRA) will be discussed.

1.8. Limitations

This Environmental Site Assessment (ESA) and Generic Quantitative Risk Assessment Report (GQRA) has been prepared for the sole use of Oxley Holdings Limited ("the Client"). No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by OCSC. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of OCSC.

This assessment is based on a review of available historical information, environmental records, consultations, relevant information and reports from third parties. All information received has been taken in good faith as being true and representative.

This report has been prepared in line with best industry standards. The methodology adopted and the sources of information used by OCSC in providing its services are outlined in this Report. The assessment undertaken by OCSC is based on the Buro Happold Report (2008). The scope of this Report and the services are accordingly factually limited by these circumstances.

OCSC disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to OCSC's attention after the date of the Report.

The conclusions presented in this report represent OCSC's best professional judgement based on review of the relevant information available at the time of writing. The opinions and conclusions presented are valid only to the extent that the information provided was accurate and complete.

2. ENVIRONMENTAL SITE SETTING

2.1. Site Location

The site is located within the Connolly Station carpark which is near the International Financial Services Centre (IFSC) in the Dublin Docklands. The site and surrounding area has an industrial past and has a number of known contamination issues. The site is located between Seville Place and Sheriff Street Lower. In 2008, Córas Iompair Éireann (CIÉ), initiated a study to investigate the potential to redevelop Connolly Station car park to include retail, residential and commercial properties together with community green space and a transport interchange. It was also proposed to retain the existing railway arches.

The regional site location is illustrated on Figure 2.1.

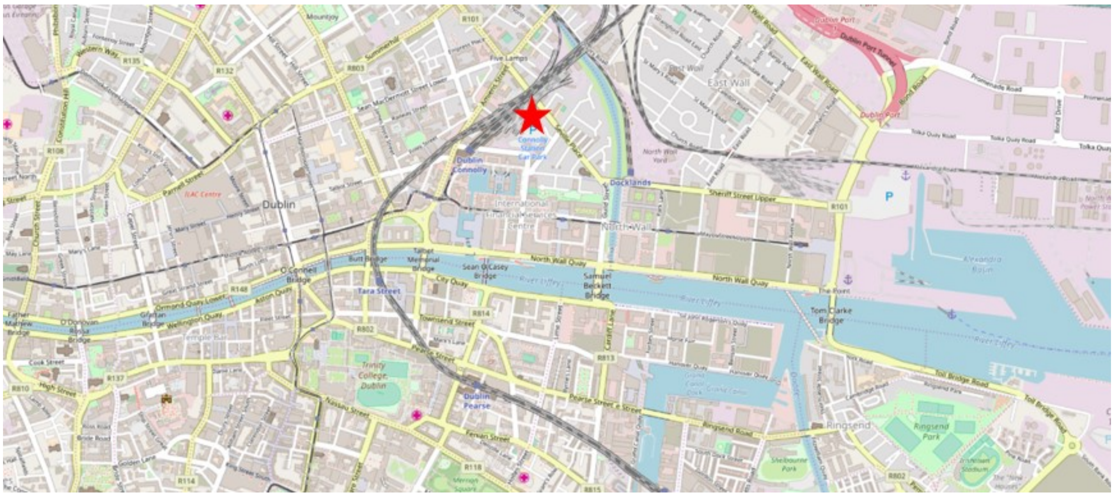


Figure 2.1 Regional Site Location

The site is located about 340m north of the of the River Liffey and 215m to the West of the Royal Canal. It is 2.88 hectares (ha) in area. The Ordnance Survey of Ireland (OSI) Easting Northing Coordinates for the site are 716812, 735003.

2.2. Surrounding Land Use

The site's surrounding area is urban in nature. The site is bordered by Seville Place and Oriel Hall to the north; Sheriff Street Lower to the south; Oriel Street Upper to the east; and Connolly Station (Protected Structure) to the west, Dublin 1. Refer to Figure 1.2 in Section 1 for an aerial photograph of the site. The adjacent land uses are listed in Table 2.1.

Table 2.1 – Adjacent Land Uses

BOUNDARY	LAND USE
North	Residential properties and the Royal Canal.
South	Custom House Harbour apartments building, and the Harbourmaster place mixed used development further South.
East	Residential properties, St Laurence O'Toole's Catholic Church and the Royal Canal further East.
West	Connolly station railway lines, platforms and building, residential buildings and a Top Service station, Fáilte Ireland Headquarters along Amiens Street.

2.3. Site History

An understanding of the site history was gained by undertaking a review of the following primary sources including:

- a review of available extracts of historical Ordnance Survey of Ireland (OSI) maps;
- National Monuments Service (NMS) viewer;
- a review of information held by the Environmental Protection Agency (EPA) EnVision online Mapping;
- aerial images available of the site (OSI, Google and Bing);
- the Geological Survey of Ireland (GSI) online map tool;
- the National Parks and Wildlife Service online map tool; and
- Information provided by the client including:
    - Geotechnical & Geoenvironmental Interpretative Report, 023956 Connolly Station, Dublin – Burro Happold (Revision 01, October 2008)

2.4. Site Development

Aerial images of the site from 1995 and 2000 show the site layout as it is today. Currently, the site consists of a CIE car park, CIE Group buildings, Rolling stock maintenance shed, and part of existing railway lines / sidings.

The 6" historical map (1837-1842) shows the site to be occupied by agricultural lands/pastures.

Development of the area surrounding the site continued throughout the 1800s and then around 1847 the Drogheda Railway Terminus was built (known today as 'Connolly Station'). Railway lines, goods sheds, warehouses and an oil tank shown occupying the site on the 25'' OSI maps 1888-1913. Around the early 1980's the site was developed as a car park for the Connolly station. The area surrounding the site is known for its industrial heritage such as vinegar works, coal yards, tobacco factories, railway depots, chemical works, timber yards, cattle yards and goods sheds'.

Figure 2.2. Approximate Location of the proposed development on 1837-1842 6 Inch OS Map (Source: Ordnance Survey Ireland)

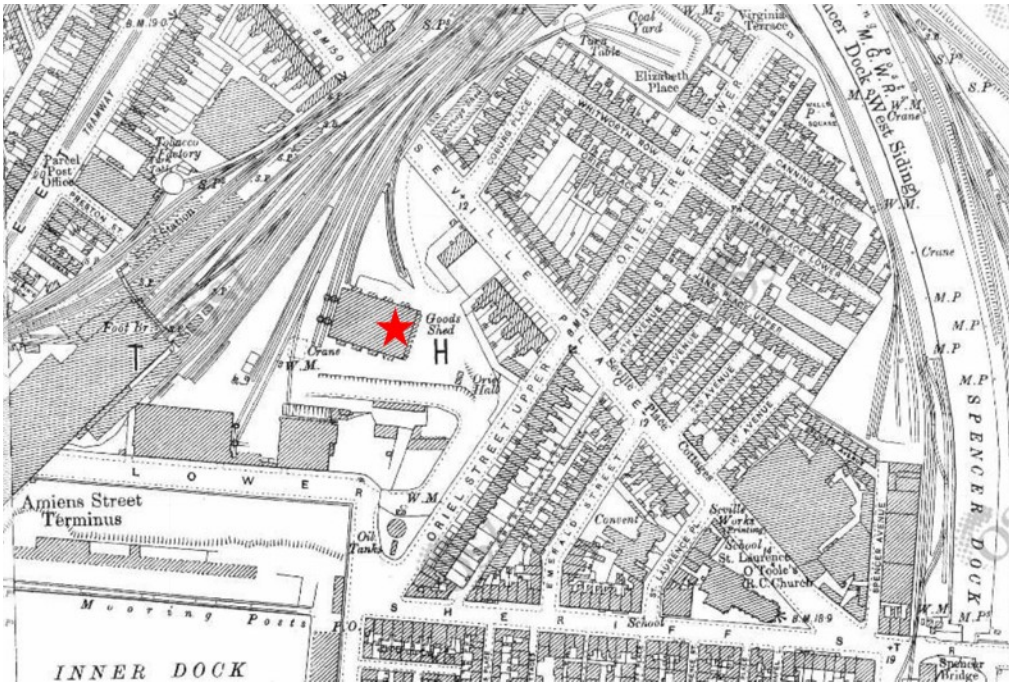


Figure 2.3. Approximate Location of the proposed development on 1888-1913 25 Inch OS Map (Source: Ordnance Survey Ireland)

2.5. Site Physical Setting

Information regarding the site topography, hydrology, geology, hydrogeology and ecology of the area has been obtained from records held by the Geological Survey of Ireland (GSI), Environmental Protection Agency (EPA) Envision online mapping tool, Ordnance Survey of Ireland (OSI), Water Framework Directive Maps and National Parks and Wildlife Service (NPWS) databases.

2.5.1. Topography

The regional topography of the area is urban and generally flat but the site itself can be described as an area of raised land running alongside the elevated railway tracks . The site generally slopes north-south from an average of 8mOD at the Seville Place boundary to 6mOD at the centre of the site, before rising again to 8mOD in the southern portion of the site bordering Sheriff Street Lower. The site also slopes west-east from 8mOD bordering Connolly Station to 2.5mOD at the Oriel Street Upper boundary.

It is also important to note, the southern boundary with Sheriff Street Lower drops suddenly from 8mOD to 1mOD at the road surface below. In the north-eastern portion of the site, the elevation of the car park drops significantly at the boundary with Oriel Hall from 6.5mOD to 1mOD at the road surface. Similarly, at the northern boundary with Seville Place, the elevation at boundary wall drops from 8mOD to 1mOD at the road surface below.

2.5.2. Area of Geological Interest

The Geological Survey of Ireland (GSI) online mapping service was consulted regarding areas of geological interest in the area of the site. The nearest area of geological heritage is the 'General Post Office (GPO)' on O'Connell Street which is located approximately 1.1km west of the site. The reason for this listing is 'The sole use of three classic Irish marble types is a good example of building stone use'. Given the distance to the building and its nature it is considered to be outside of the zone of influence of the proposed development.

2.5.3. Unconsolidated Geology

Teagasc Topsoils and Subsoils

The topsoil and subsoil beneath the site has been classified into one main category, made ground. This is as expected given the urban nature of the area.

The site surrounds also consists of made ground. Refer to Figure 2.4 from the GSI online mapping for further information.

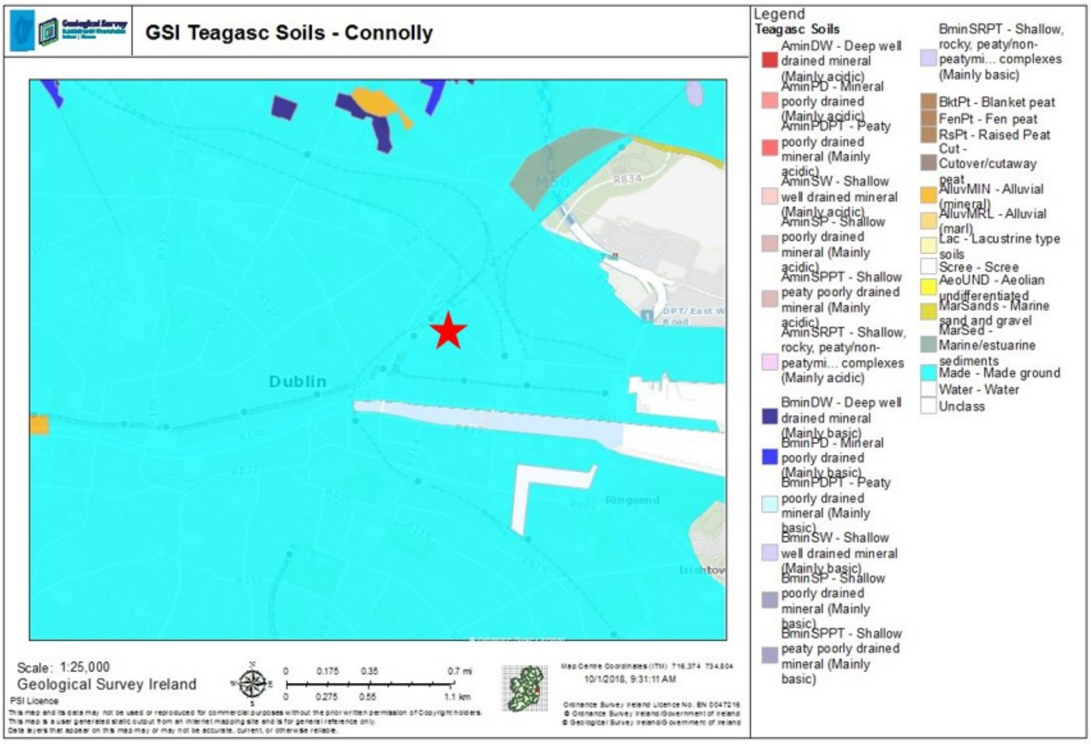


Figure 2.4 Teagasc Topsoils and Subsoils

2.5.4. Geology

The bedrock beneath the site and the greater surrounding area consists of Dinantian Upper Impure Limestones (DUIL) which is described as 'Dark grey to black Limestone and Shale'. This is colloquially known as Calp Limestone and is known to contain areas of mudstone and occasionally pyrites. The local geology mapped by the GSI is illustrated on Figure 2.5.

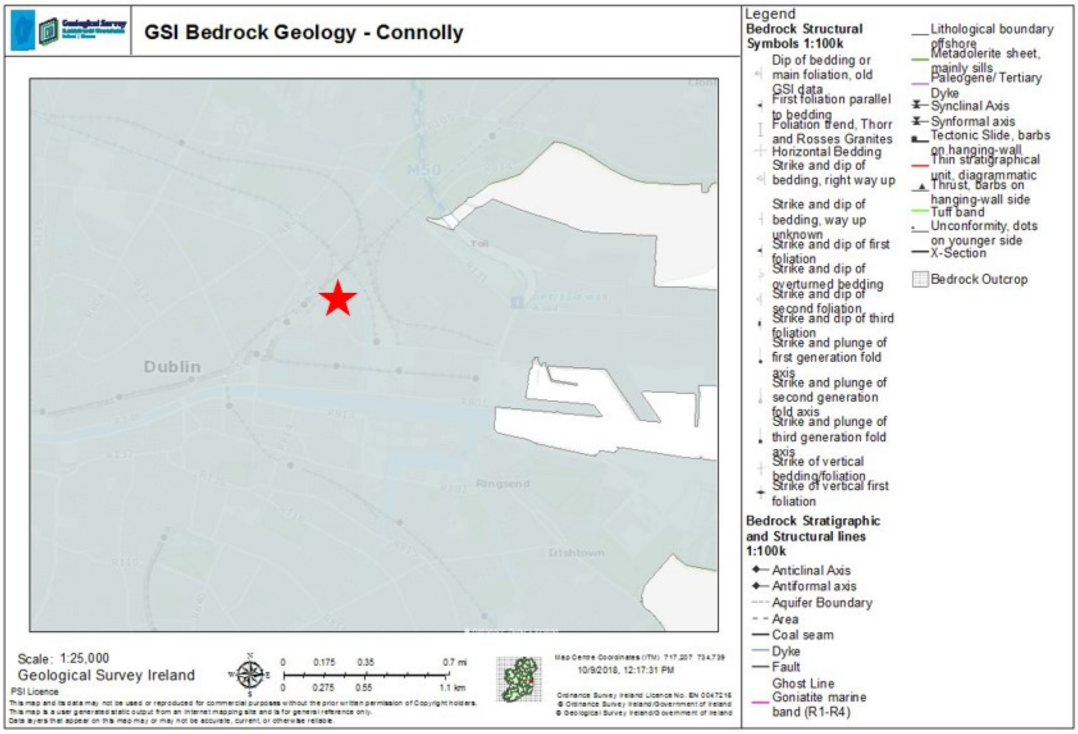


Figure 2.5 Geology

2.5.5. Aquifers

The GSI provides a methodology for aquifer classification based on resource value (Regionally Important, Locally Important and Poor) and vulnerability (Extreme, High, Moderate or Low). Resource value refers to the scale and production potential of the aquifer whilst vulnerability refers to the ease with which groundwater may be contaminated by human activities (vulnerability classification primarily based on the permeability and thickness of subsoils). The aquifer beneath the site is a bedrock aquifer which is described as a Locally Important aquifer (LI) which is moderately productive in local zones only (Refer to Figure 2.6). The aquifer covers an area of 1309km^2 and covers the City of Dublin and surrounding area. There is no gravel aquifer mapped in Dublin City Centre however there are known gravel deposits in the area particularly in the docklands. These have not been designated as aquifers given their urban and coastal nature which make them generally unsuitable for potable use. They are however likely to contain significant volumes of water.

The limestone is part of the Dublin Urban Ground Water Body (GWB) which is described as poorly productive. The GWB covers an area of 837km^2 over the Dublin area and towards Kildare. The GSI Summary Characteristics of the Dublin GWB identify that the permeability of these rock units are likely to be low (1-10m^2/d).

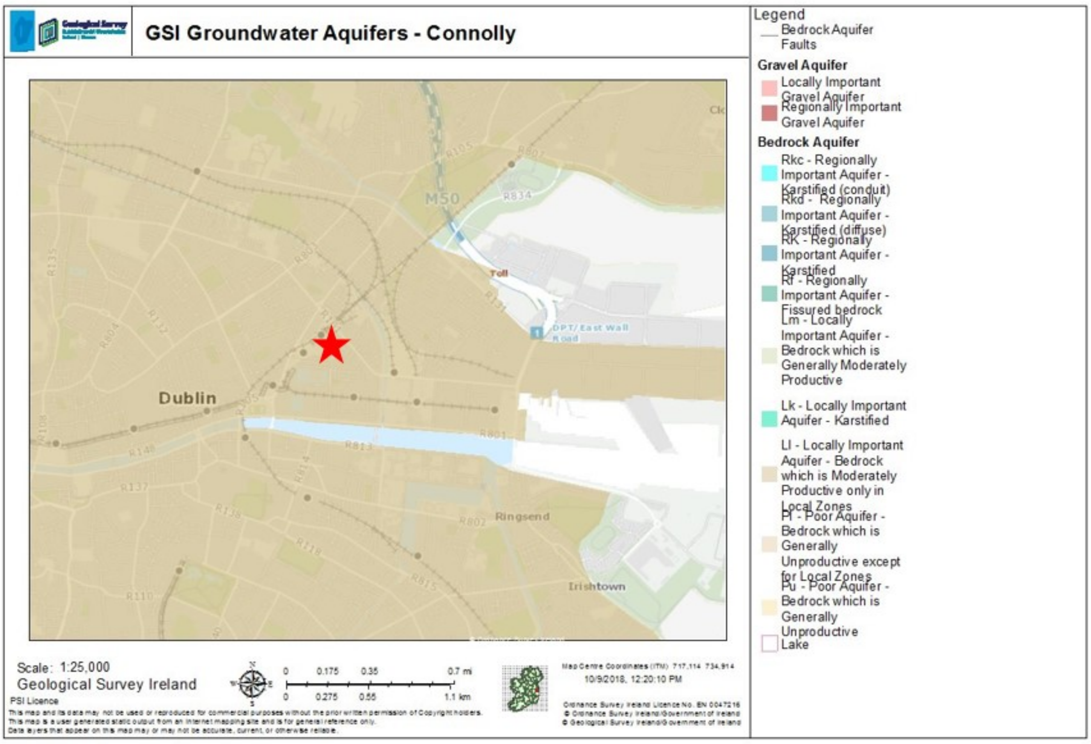


Figure 2.6 Aquifers

2.5.6. Aquifer Vulnerability

The groundwater vulnerability beneath the proposed site is Low; refer to Figure 2.7 (GSI, 2016). Vulnerability ratings are related to a function of overburden thickness and permeability which might offer a degree of protection and/or attenuation to the underlying aquifer from surface activities and pollution. Bedrock was not encountered in the previous site investigation even though 3No. Rotary core boreholes extended to a depth between 39.5 and 42.3mbGL; which suggest a thick layer of overburden exists below the site.

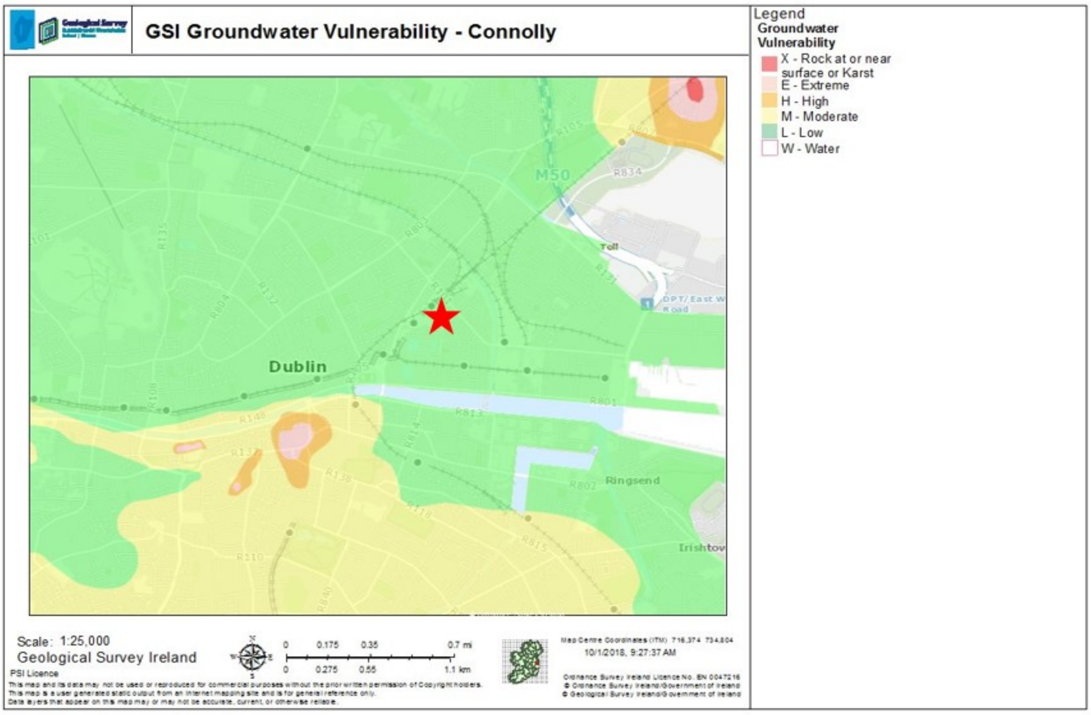


Figure 2.7 Aquifer Vulnerability

There were no karst features identified adjacent to the site.

2.5.7. Groundwater Status

An assessment carried out under the Water Framework Directive 2010-2015 groundwater body (EPA, 2018) has concluded that the groundwater within the bedrock aquifer is presently of "Good status". The objective is to protect the "Good status" by recognizing that the quality of the groundwater is at risk due to point and diffuse sources of pollution.

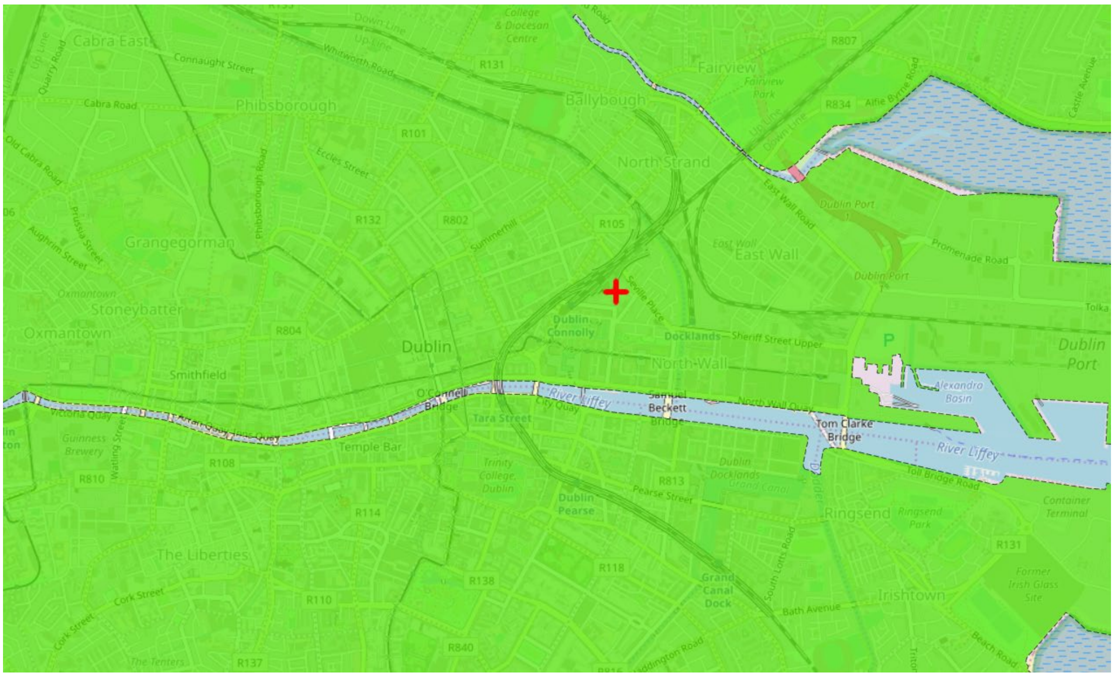


Figure 2.8 WFD Status 2010-2015

The Groundwater Bodies risk status is 'Not At Risk' assigned to the Dublin bedrock aquifer (see Figure 2.9).

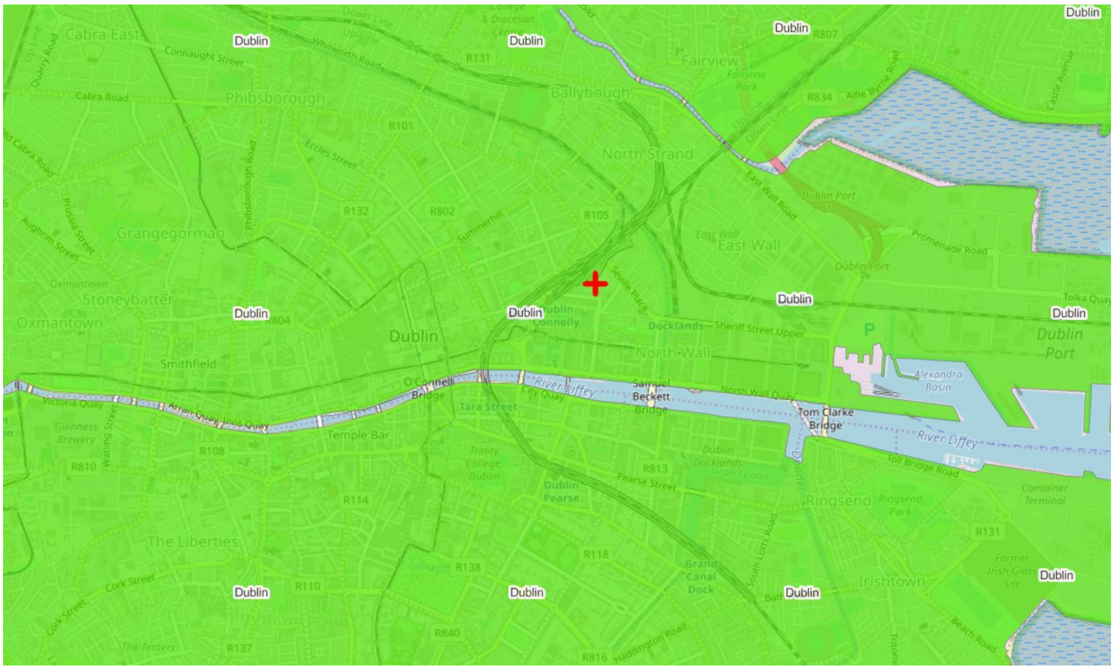


Figure 2.9 Ground Waterbodies Risk Status

2.5.8. Groundwater Recharge

Diffuse recharge generally occurs via rainfall percolating through the subsoil being higher in areas where subsoil is thinner and/or more permeable. The proportion of the effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil and subsoil, and by the slope. On this site only a small percentage of recharge will occur due to a significant percentage of hardstanding and building coverage on site.

The GSI's groundwater recharge model parameters for the site are summarised in Table 2.2. Figure 2.10 contains a drawing from the GSI indicating the recharge zone.

Table 2.2 GSI Groundwater Recharge Parameters

Groundwater Recharge Parameters	
Average Recharge (mm/yr):	60
Hydrogeological Setting:	4m
Hydrogeological Setting Description:	Made ground
Soil Drainage:	MADE
Subsoil Type:	Made
Subsoil Description:	Made ground
Subsoil Permeability:	L
Subsoil Permeability Description:	Low
GW Vulnerability:	L
GW Vulnerability Description:	Low
Aquifer Category:	LI

Groundwater Recharge Parameters	
Aquifer Category Description:	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
Recharge Coefficient (%):	20
Maximum Recharge Capacity (mm/yr):	200
Effective Rainfall (mm/yr):	302

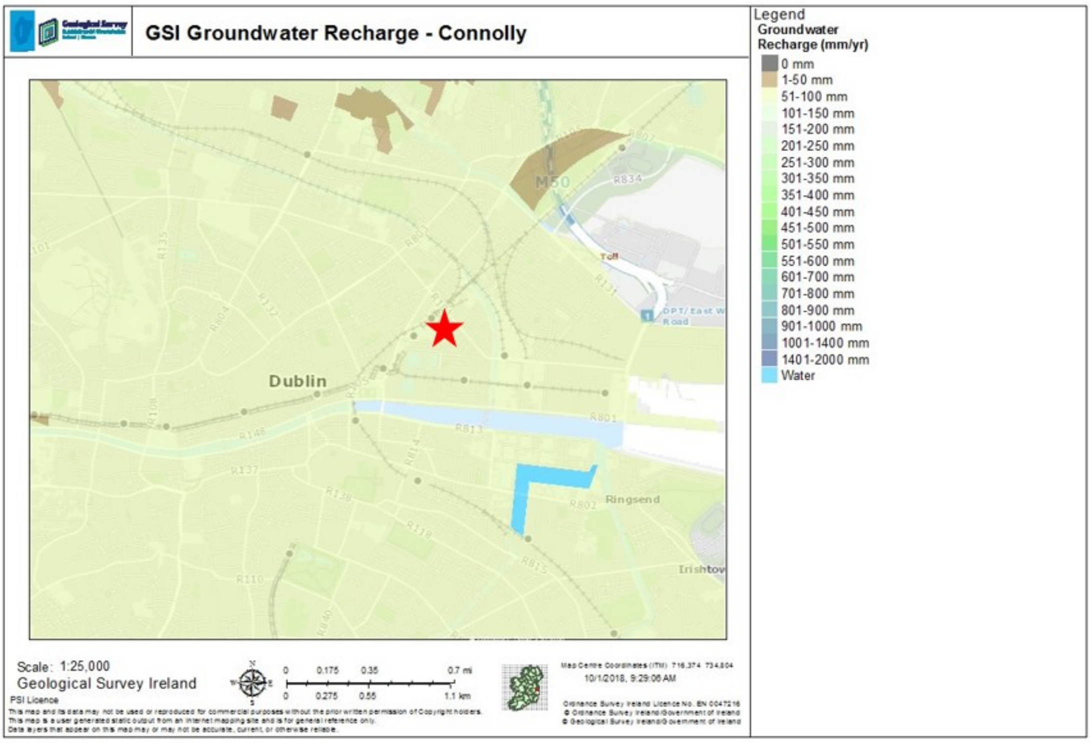


Figure 2.10 Groundwater Recharge

2.5.9.Wells & Springs

A search of the GSI groundwater well database was conducted to identify registered wells in the surrounding area. None of the wells identified had any drilling details, or depth to water. The 2No. wells identified to the East of the site are noted to be 50mm in diameter and hence are assumed to be an SI Geotechnical/Groundwater monitoring wells. The well (GSI Name: 2923SEW012) which is located around Parnell Street to the west of the site on located at E315950, N235050, was drilled in 1899 and has a total depth of 137mbGL. It was also noted to have a yield of 163.6m^3/day and a depth to rock of 9.1mbGL. Mapped wells and springs in the general vicinity of the site identified by the GSI are illustrated on Figure 2.11.

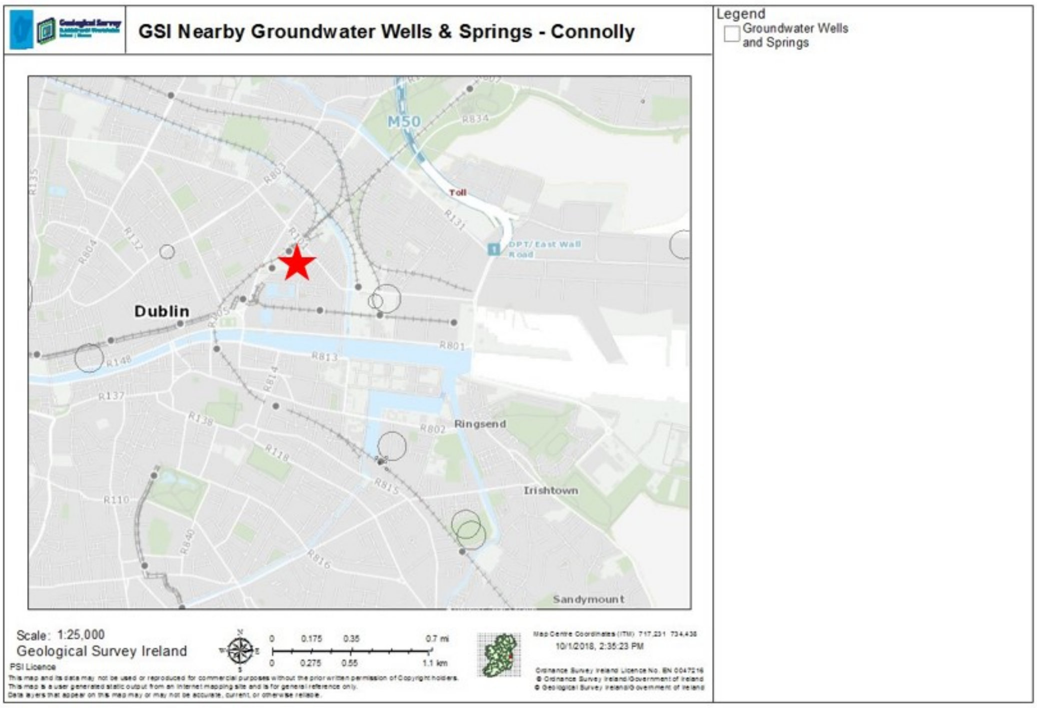


Figure 2.11 Wells and Springs

The GSI (1999) also provides a framework for the protection of groundwater source zones (e.g. areas of contribution to water supply bores). There are no reported source protection zones (SPZs) within a 2km radius of the proposed site.

Based on a review of available information local groundwater flow is expected to the South/Southeast.

2.5.10. Hydrology

There are no surface water features within the site.

The largest adjacent surface water feature, the River Liffey, is a transitional water body given it is tidally influenced. Based on the most recent water quality information 2010-2015 (EPA, 2018) the water body south of the site, Liffey Estuary Lower, has been designated as unpolluted, however further upstream it has been designated as eutrophic (refer to Figure 2.12).

Under the Water Framework Directive the River Liffey has been designated as 'Good' status for transitional waters (Figure 2.14) whereas the Liffey Estuary Upper has been designated as 'Moderate'. Additionally, both the Liffey Estuaries Lower and Upper have been identified as 'at risk of not achieving good Status' under the WFD Risk Score (Figure 2.14).

The North Dock Harbour is also located immediately to the south of the site linked with Georges Dock which is in turn connected to the River Liffey. Both docks are sealed from the Liffey by a historical lock located to the north of Scherzers Bridge on Custom House Quay.

Figure 2.12 Surface Water Quality (EPA, 2018)

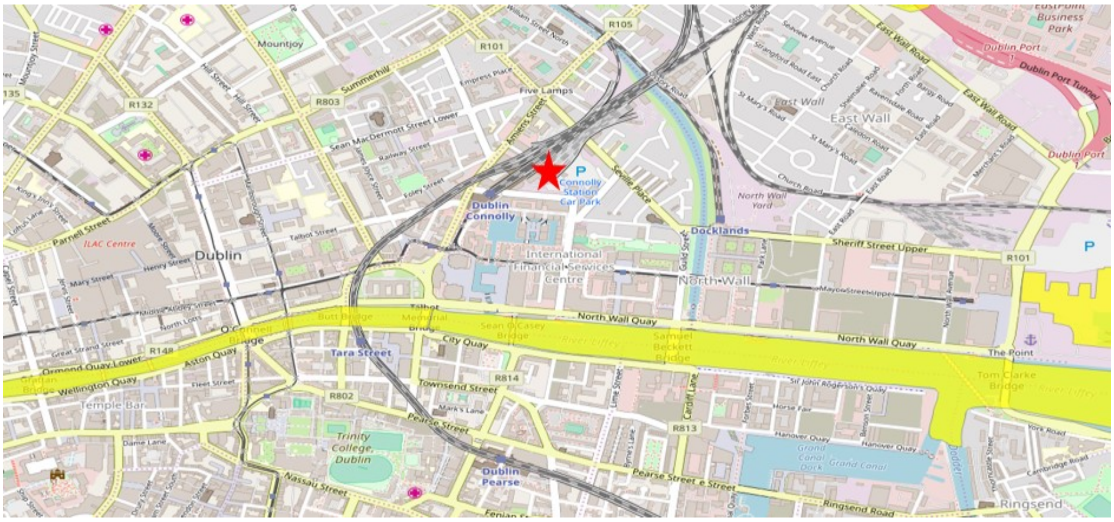


Figure 2.13 WFD Status (EPA, 2018)

Figure 2.14 WFD Risk Scores (EPA, 2018)

2.5.11. Radon

According to the EPA (now incorporating the Radiological Protection Institute of Ireland) between one and five per cent of the homes in this 10km grid square are estimated to be above the Reference Level of 200 Bq/m^3. The Building Regulations in Ireland only require radon protection to be installed in areas of high radon risk (10% to 30% of homes exceed reference level). Refer to Figure 2.15.

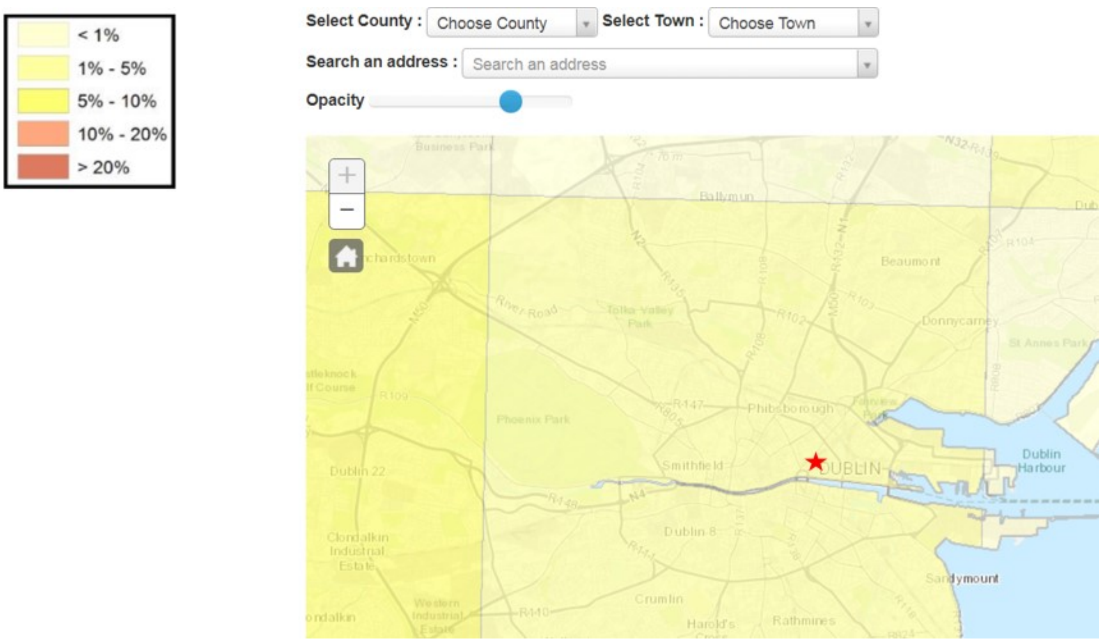


Figure 2.15 Radon Map (EPA, 2018)

2.5.12. Designated Area of Conservation

The nearest designated area of conservation is the South Dublin Bay and River Tolka Special Area of Conservation (SAC) Site Code 000210 and Special Protection Area (SPA) Site code 004024 located approximately 1.5km east of the site (NPWS, 2018).

Figure 2.16 NPWS Designated Area (Source: NPWS MapViewer)

2.5.13. Nearby Site Investigations

The site is located in a well investigated area in Dublin City of which the Geological Survey of Ireland (GSI) have compiled a database from site investigations previously carried out in Ireland. Figure 2.17 identifies the site investigation locations with the vicinity of the site. For the Connolly station site, the most relevant GSI reports for nearby investigations include R856, R2489, and R3464 which are attached in the appendices. A slight discrepancy exists between the findings of the intrusive works undertaken at the site and the nearby site investigations completed. The nearby site investigations show that the geology consists of Made Ground overlaying Gravels which are underlain by Boulder Clay. Whereas, the Buro Happold report states that the site's geology is comprised of Made Ground underlain by a layer of glacial tills (gravels embedded among or between the Boulder Clay layer). This discrepancy exists due to the fact that the site investigation boreholes carried out in 2008 by Buro Happold extended to deeper depths than the other nearby boreholes, hence, the nearby boreholes didn't encounter the deeper gravel layers encountered on the Connolly Station car park site.

The nearby site investigation undertaken just to the south-west of the site consisted of 2No. cable percussion boreholes which were carried out prior to the development of the apartment block on the intersection of Oriel Street Upper with Sheriff Street Lower. These 2No. boreholes had a maximum depth of 5mbGL and indicated that the site was underlain by a layer of 'Made Ground Fill' of 1m thickness overlaying a 1.2m layer of 'Soft Black very Silty CLAY' which is lying over a 2.8m thick layer of 'Fine to Coarse sandy GRAVEL'. Bedrock was not encountered during these works.

Site investigation records from the Custom House Harbour apartment blocks, located to the south of the site, show that the site was underlain by about 2.5m thick layer of 'Made Ground FILL' followed by a layer 3.5m thick of 'Fine to Coarse Sandy GRAVEL' which is overlying a 'very hard to stiff black gravelly silty CLAY' layer which is about 3.5m thick. The site investigation at the Custom House Harbour site consisted of 6No. cable percussion boreholes advancing to a maximum depth of 10mbGL; bedrock was not encountered during the works.

Finally, a site investigation consisting of 6No. cable percussion boreholes within the Connolly Station development which might have been from the LUAS station investigation, shows the site to be underlain by an average of 2m thick layer of 'Made Ground' over a layer of 'Fine to Coarse sandy GRAVEL' which had an average of 10m thickness. In 4No. out of 6No. boreholes, a layer of 'Fine to Coarse SAND' was encountered sandwiched between the GRAVEL layers. The 'SAND' layer had an average thickness of 3m when it was encountered. Bedrock was not encountered during the works.

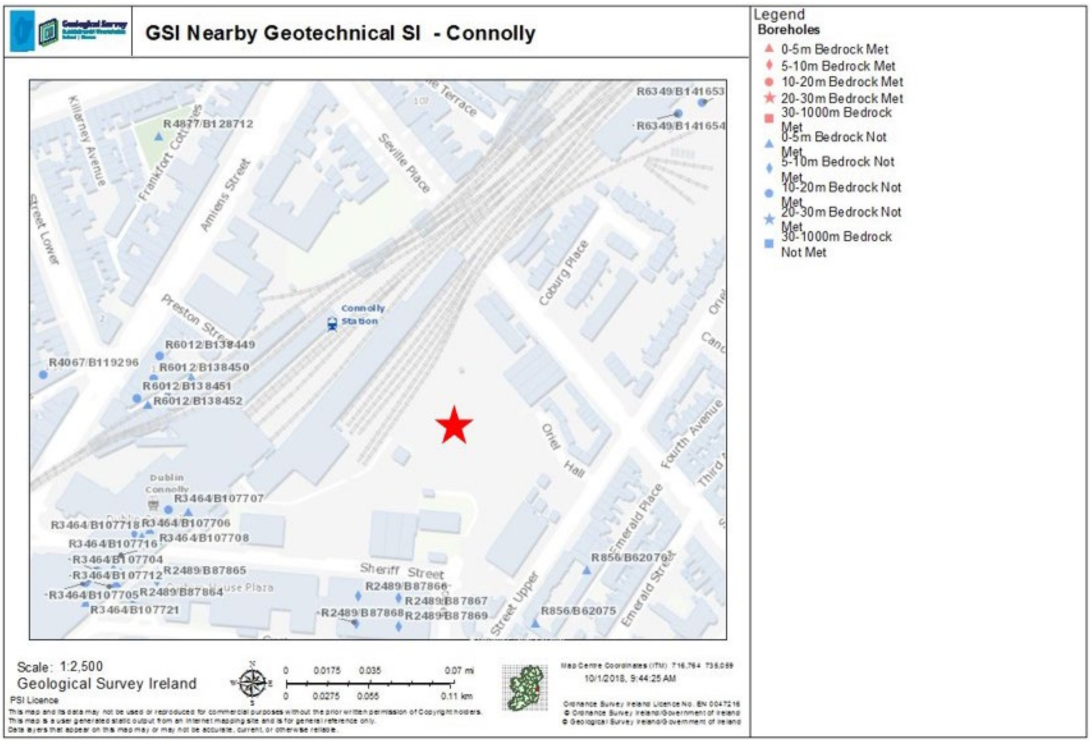


Figure 2.17 nearby Site Investigations (Source: GSI Geotechnical Viewer)

2.5.14. Summary of the Physical Site Setting

Summary of the site physical setting are outlined in Table 2.3.

Table 2.3 Summary Site Setting

FEATURE	DETAILS & COMMENTS
Topography	Urban
Geology	**Topsoil and Subsoil:** Made ground.
	Solid Geology: According to GSI data, the bedrock geology beneath the site is underlain by Dinantian Upper Impure Limestones.
Hydrogeology	**Aquifer Classification:** The bedrock aquifer underlying the site is classified as a Locally Important Aquifer (LI) which is moderately productive in local zones only.
	Vulnerability & Recharge: The vulnerability has been classified as Low. The average recharge has been modelled at 60 mm/year.
	Groundwater Flow: The regional groundwater flow direction can be expected to be to the southeast/ east.

	Well Search: There were no Source Protection Zones identified and therefore the assumption is that there are no public supply wells within a 2km zone. A number of probable geotechnical site investigation boreholes were recorded within the general vicinity of the site, near IFSC and Spencer Dock, however none of these provided any detail on depth to bedrock or water level. GSI maps also identify a high yielding borehole located on Parnell Street just 900m to the west of the site; the borehole was drilled in 1899 and its usage is not known.
Hydrology	**Surface Water Courses:** There are no surface water features on site. The nearest surface water features are the River Liffey located south of the site, the Royal Canal located to the east of the site and north, and Georges Docks immediately to the south.
Designated sites	The nearest designated site is the South Dublin Bay and Tolka River SAC (Site Code 000210) and SPA (Site Code 004024) located approximately 1.5km east of the site.

2.6. Site Walkover

A site walkover have not been carried out by OCSC at the time of writing this report as the purpose of this report is to revise the previous work completed up to current standards.

2.6.1.External Infrastructure

The majority of the site is under hardstanding which comprised of a tarmac covered surface car park. The site is bounded by an elevated stone wall with an access gate from Sheriff Street Lower.

2.6.2.Oil/Liquid Storage Infrastructure

There are visible oil storage tanks infrastructure on site, a minimum of 1 No. oil tanks can be seen currently on site from Google Earth images, the location of the historical oil tank is also shown in Figure 2.18 below. The latest 2018 Google maps aerial viewer shows the oil tank to be still present. It is recommended that the oil tank is to be decommissioned prior to re-development of the site.

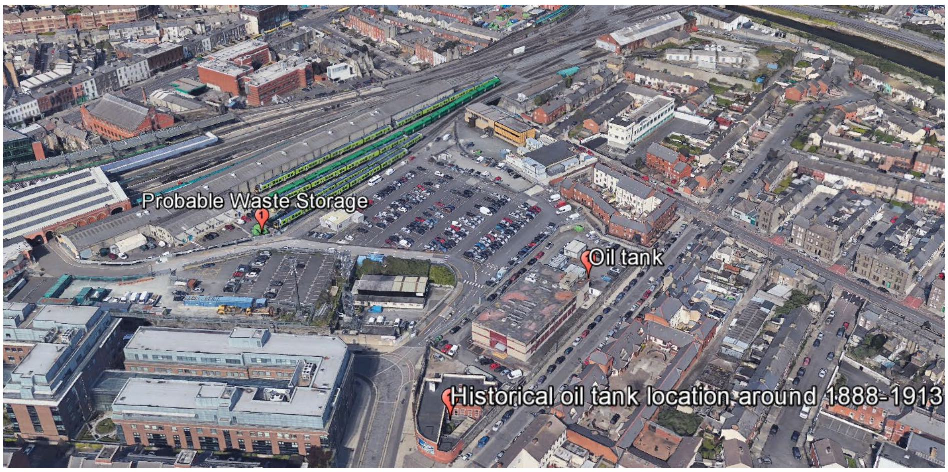


Figure 2.18 Potential areas of concern/contamination (Source: GoogleEarth)

2.6.3. Asbestos

An asbestos survey was not available for review and should be completed prior to the commencement of any demolition works.

2.7. Protected structures

National Monuments Service (NMS) maps show that there are 2No. protected structures within the site boundary as shown in Figure 2.19 below; below are the descriptions:

- Arches

The 11No. railway arches consisting of Calp limestone walls and piers built in 1840 are categorised as an Architectural Technical structure of special interest enhancing the industrial character of the streetscape as part of the Connolly Station. A recent survey showed that 6No. of the arches extend circa 35m into the site and 5No. extend circa 17.5m into the site.

- Office

The former Great Northern Railways office located between Sheriff Street Upper and Oriel Street Lower built in 1915 is deemed as an Architectural structure of special interest due to use of classical devices such as stone cornicing and symmetry.

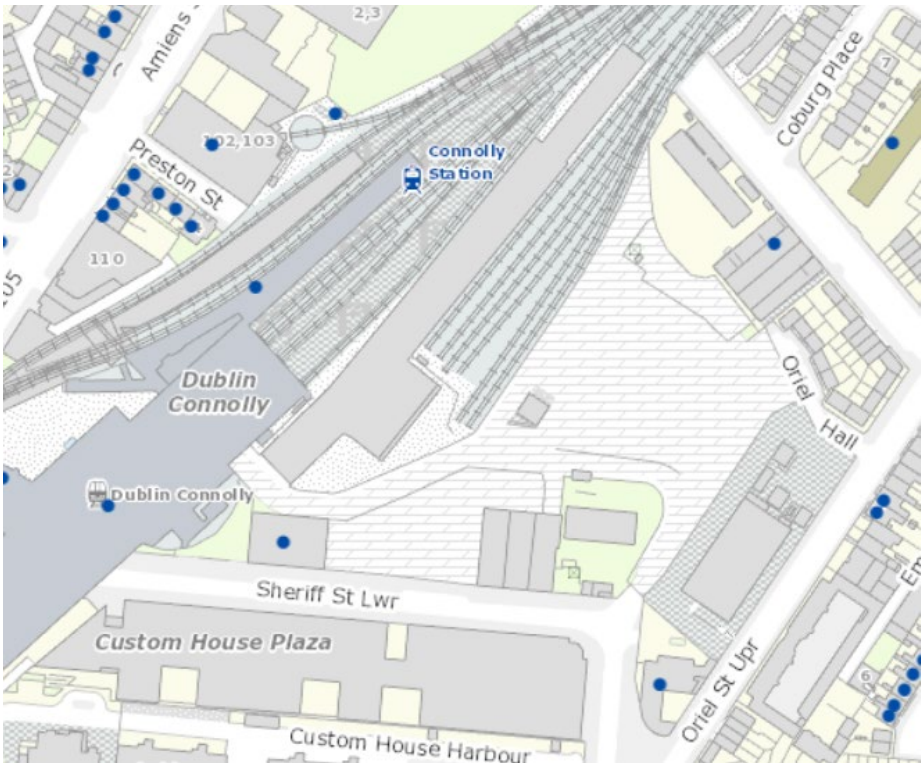


Figure 2.19 Protected structures within and surrounding site's boundary

3. PRELIMINARY CONCEPTUAL SITE MODEL

3.1. Risk Assessment Methodology

Currently there is no specific legislation addressing contaminated land in Ireland and therefore this report has been prepared considering the most relevant guidance published by the Irish Environmental Protection Agency (EPA) and the UK Environment Agency (EA) guidance as referenced in Section 1.6. Both authorities advocate a risk-based assessment when dealing with contaminated land and groundwater issues and this is considered best practice as well as being a requirement under the Environmental Liability Regulations (S.I. 547 of 2008).

A critical element of the risk assessment process is the establishment of a Conceptual Site Model (CSM) for the site. A CSM describes the potential sources of contamination at a site, the migration pathways it may follow and the receptors it could impact. If a complete source-pathway-receptor scenario existss then there is a potential pollutant linkage that needs to be characterised and assessed (via formal risk assessment). All three elements need to be present for a viable risk to exist (e.g. if a source and receptor exist but no pathway is present then there is no pollutant linkage and hence no risk). The CSM is updated and refined as more information becomes available.

3.2. Contamination Sources

Following the Phase I review the areas of concern which are considered as potential pollutant sources are summarised in Table 3.1:

Table 3.1 Potential Areas of Concern

AREA/ ASPECT	DETAILS & COMMENTS	SIZE/ MAGNITUDE	POTENTIAL FUTURE RISK
Made Ground	Any contaminants within the material used to fill the site historically.	Unknown	Low
Previous site use – Goods shed.	Any contaminants within the material associated with the past site use.	Small - medium	Low
Present site use – railway tracks and oil tanks.	There are 2No. railway tracks within the site boundary and there is a possibility that contaminants have seeped through the ballast material below the tracks and infiltrated into the Made Ground and subsequently to the gravels. There is also the potential for spills from oil tanks to have occurred.	Medium-large	Low
Offsite contaminant sources	Activities associated with offsite sources, in particular coal yards, bonded stores, goods shed, railway lines and depots in the vicinity of the site.	Medium-large	Low

NOTE: future risk assumes design/remedial measures are completed prior to development.

3.3. Outline Conceptual Site Model

Based on the preliminary assessment, several possible pollution linkages were identified for the site (Refer Table 3.2).

Table 3.2 Preliminary Conceptual Site Model

SOURCE	PATHWAY	RECEPTOR	POTENTIAL POLLUTANT LINKAGE Y/N
Environmental			
Migration of contamination from adjacent properties such as historic timber treatment, coal yards and in particular the adjacent railway lines and depots.	Migration of contaminants from made ground and soils	Groundwater in the Gravel and/or bedrock aquifer	Y
Potential historical on-site spills - Potential contamination within shallow subsoil materials from historic activities (railway lines, oil tanks and associated maintenance yards) and from unknown source of material which could have been contaminated during original filling.			Y
			Y
Potential contamination within groundwater	Migration of contaminants in the subsoil & bedrock aquifer and/or also via discharge to sewer	Potential surface watercourses (River Liffey) via groundwater baseflow and sewers if discharge to sewer occur during basement excavation.	Y
Human Health			
Migration of contamination from adjacent properties such as coal yards, timber yards, and in particular the adjacent railway lines and depots.	Vapour migration to indoor and outdoor air	Onsite Residents and Commercial Future Users.	Y
Potential historical on-site spills - Potential contamination within shallow subsoil materials from historic activities (Coal Yard, Tobacco Factory) and from unknown source of material which could have been contaminated during original filling.			

Migration of contamination from adjacent properties such as historic coal yards, tobacco factories, railway lines, and railway depots.	Inhalation/ dermal contact/ ingestion of soils/ dusts	Onsite Residents and Commercial Future Users.	Y
Potential historical on-site spills - Potential contamination within shallow subsoil materials from historic activities (Coal Yards, Railway Depots and Lines) and from unknown source of material which could have been contaminated during original filling.			
Potential contamination within groundwater	Migration of contaminants in the bedrock aquifer	Groundwater users.	Y

Note: Generic risk assessments do not assess risks to construction workers who are managed under the Safety and Welfare at Work Regulations.

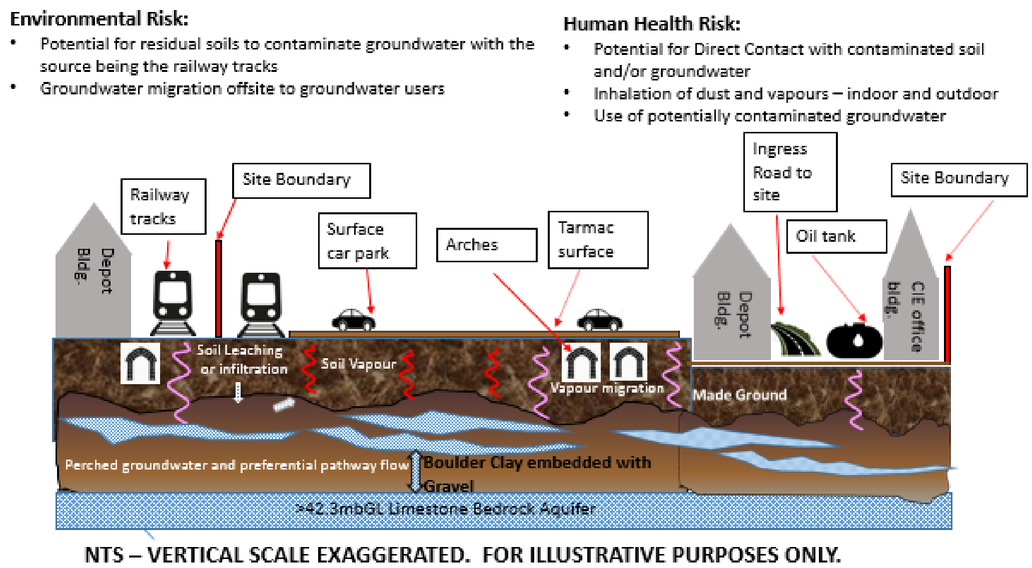


Figure 3.1 Preliminary Conceptual Site Model

4. SITE INVESTIGATION - METHODOLOGY

4.1. Buro Happold – Preliminary Investigation (2008)

Burro Happold undertook a preliminary site investigation of the Connolly Station car park site between July and September 2008. All of the intrusive investigation works were carried out by Glover. The intrusive investigation completed included the following:

- Drilling of 12No. windowless sample boreholes:
  - WS1-WS12
- Drilling of 7No. cable percussion boreholes:
  - BH01-BH07
- Drilling of 3No. rotary core follow on borehole to prove bedrock.
- Convert 14No. boreholes as gas and/or groundwater monitoring wells:
  - BH01, BH02, BH03, BH04, BH05, BH06, BH07, WS3, WS6, WS9, WS10, WS12.
- Sampling and analysis of soil from the boreholes.
- Sampling and analysis of water from the boreholes.

4.2. Laboratory Analysis – Soil

Forty (40No.) soil samples were collected in total and submitted to ALcontrol Geochem Laboratories, a UKAS accredited laboratory. From these 40No. of soil samples, 38No. were tested for metals, 15No. for TPHs, 32No. for PAHs, 9No. for PCBs, 35No. for Organics and 35No. for Inorganics. Only 5No. of samples were sufficiently tested to be deemed as a comprehensive analysis as outlined in Table 4.1 below which further outlines the analytical suites used;

Table 4.1 Soil Analytical Suites

Analytical Suite	No. of Samples tested
Full Suite*	5
Metals, TPHs, PAHs, Organics & Inorganics	7
Metals, PAHs, Organics & Inorganics	17
Metals, PAHs, PCBs, Organics & Inorganics	2
Metals, Organics & Inorganics	3
Metals, PCBs, Organics & Inorganics	1
TPHs	2
Metals, TPHs, Organics & Inorganics	1
Metals	2

*= Metals, TPHs, PAHs, PCBs, Organics & Inorganics

An Asbestos screen was performed for all samples with the exception of WS11 (0.50), BH3 (1.0) and BH4(5.0-5.3 & 6.0 -6.3). Leachability testing was also performed 20No. soil samples.

Samples were collected from surface level with the shallowest sample collected from a depth of 0-0.5 meters below ground level (mbGL) to a maximum depth of 7.2mbGL.

4.3. Laboratory Analysis – Water

Groundwater was sampled from nine locations (BH1-BH7, WS7 and WS11) on two to three occasions between 29th August 2008 and 17th September 2008. An interface probe was used to monitor groundwater levels as well as light and dense non-aqueous phase liquid (LNAPL & DNAPL). No LNAPL or DNAPL was detected in any of the sampling locations during the monitoring period.

As described in the Buro Happold report, during groundwater sampling hydrocarbon odours were recorded in water purged from WS11, BH03 and BH02 and a slight hydrocarbon odour was noted in purged water from BH06 and WS7. In addition, a slight hydrocarbon sheen was observed on water purged from WS11, BH02, BH06 and BH03. Foam was also observed on BH03. Purged groundwater from all boreholes, except from BH02, was high in suspended solids. No information was provided on the purging or sampling methods used, sample interval, whether field parameters were recorded or the volume purged from each well prior to sampling.

Twenty five (25No.) groundwater samples were collected and submitted to ALcontrol Geochem Laboratories, a UKAS accredited laboratory.

Table 4.2 Groundwater Analytical Suites

Analytical Suite	No. of Samples tested
Full Suite*	2
Metals, TPHs, PAHs, Organics & Inorganics	23
Metals	1

*= Metals, TPHs, PAHs, PCBs, Organics & Inorganics

The 1No. sample tested for just metals in Table 4.2 was a retest due to laboratory contamination. A further breakdown of chemical analysis is outlined below;

- Heavy metals (antimony, arsenic, boron, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, hexavalent chromium);
- Volatile Organic Compounds (VOCs) including tentative identified compounds (TICs);
- Semi-VOCs (sVOCs);
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG);
- Speciated Polychlorinated biphenyl (PCBs);
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and Methyl-Tert-Butyl-Ether (MTBE);
- Phenols;
- Sulphates, chloride, ammoniacal nitrogen as N, total alkalinity as $CaCO_3$,
- Free cyanides;
- BOD, COD, pH, Total Organic Carbon, Total Dissolved Solids and Total Suspended Solids;
- Total Cations and Total Anions.

4.4. Groundwater Level Monitoring

Groundwater levels were measured on seven occasions during the investigation by Glovers (2008). Levels were also measured on four occasions during post ground investigation monitoring undertaken by ALcontrol Dublin. From these observations, it is stated by Buro

Happold report that the groundwater table is located within the gravel layers of the Glacial Till at approx. 2.5m below the existing road level (Malin Head 0 mOD). The report also states that the groundwater table is relatively flat across the site.

BH01, BH02 and BH03 were subject to falling head tests which indicated that the permeability of the gravel layer ranged from $2.3x10^{-5}$ – 1.1×10^{-6} m/s while the boulder clay recorded a permeability of 4.0×10^{-6} m/s. The monitoring data was not available to OCSC for review at the time of writing this report.

5. SITE INVESTIGATION – FINDINGS

5.1. Conditions Encountered – Geology

The geology of the site from the intrusive investigation can be summarised to be as follows:

- Made Ground comprising of '*a mixture of clay, sand and gravel containing cobbles and occasional boulders along with pieces of glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery*'. The Made Ground varied in thickness from 0.1m to 7.2m. The thickness of Made Ground is expected given that the site is higher than Sheriff Street Lower by at least 5m. Standard Penetration Test (SPT) N value ranged between 3 to 24 in this layer;
- A discontinuous layer of Estuarine Deposit layer comprising of '*grey gravelly sandy SILT with sea shells*' was encountered in 5No. locations mainly located in the lower half of the site towards the Sheriff Street Lower side. The thickness of this layer varied between 0.5 and 3.2m when it was encountered, No SPT N values were taken in this layer;
- In addition, a layer up to 1.9m thick of dark grey/black sandy silt with fibres and an organic odour below the Made Ground in WS03 and BH02. Hydrocarbon odours were noted within this strata in WS11 at depth of circa 2mbGL; the odour did not extend to the underlying glacial till layer;
- A glacial till layer of '*Dense dark grey sandy GRAVEL*' embedded among or between a frequent layer of '*firm to stiff brown/dark grey sandy gravelly CLAY with occasional cobbles* (Boulder Clay)' was encountered across the site. The layer of the GRAVEL ranged in thickness between 1.7 and 17m while the layer of the sandy gravelly CLAY ranged between 0.6 to 7m. The total thickness of this layer has not been proven but it extended to a maximum investigation depth of 42.3mbGL. SPT N values ranged between 22 to 68 for the GRAVEL layer and from 12 to 48 for the CLAY layer;
- Bedrock was not encountered throughout the SI, the bedrock geology is expected to be *LIMESTONE*.

6. GENERIC QUANTITATIVE RISK ASSESSMENT

6.1. Generic Assessment Criteria

A risk-based approach has been adopted for the assessment of data obtained from the Burro Happold Geotechnical & Geoenvironmental Interpretive Report. In order to assess the human health and environmental risks posed by potential contaminants within the underlying soils and groundwater, a comparison of the laboratory analytical results for soil and groundwater samples using Generic Assessment Criteria (GAC) was carried out.

Constituent concentrations in soil and groundwater at the site were deemed 'potentially significant' where they exceeded the generic values. These generic values are used for initial assessment of contaminant concentrations for the purpose of providing an initial indication of impacts at a site. Comparison with GACs is a means of evaluating the compounds that could proceed to a more detailed assessment. It should be noted that generic exceedances are not an indication of the requirement for remediation and instead are indicative of the need for further assessment or Detailed Quantitative Risk Assessment (DQRA).

Additionally, where further risk assessment is considered necessary, use of more site-specific information in the assessment can often lead to the conclusion that the observed concentrations are present at levels which represent an acceptable level of risk, considering the actual or proposed end use of a site (although each site assessment has to be considered on an individual basis).

The risk to construction workers is not considered under the CLEA methodology. It is assumed that health and safety guidelines will be adhered to and appropriate health and safety planning/assessments will be undertaken in advance of any on-site works.

6.2. Soil Screening Criteria

The soil analytical data was compared with a set of standard GAC for Residential Use without Plant Uptake in addition to Commercial/Industrial Land Use – The LQM/CIEH S4ULs for Human Health Risk Assessment (2015) in addition to the SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination CL:AIRE (2014) and the EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment (2010). The reason that two different scenarios are used is to put the concentrations observed into context given that the site will be used for both residential and commercial landuse.

The use of standard residential without plant uptake GACs to assess residential risk in this scenario is conservative given that these are apartments with no gardens and additionally the receptors have the added protection of an underground basement, however as an initial generic assessment this will allow the screening out of significant contaminants of concern.

In general GACs are conservative screening criteria protective of human health. If the concentrations are below the GAC, then the risks to human health are considered negligible. If the concentrations are above the GAC, a potential risk to human health is identified and further assessment is required. The GACs are consistent with the principles of human health protection in Irish EPA, UK DEFRA and UK Environment Agency guidance.

The active exposure pathways considered under the commercial/industrial scenario are:

- Ingestion of soil and dust;
- Dermal contact with soils and dust;
- Inhalation of dusts; and
- Inhalation of vapours (indoor and outdoor air).

6.3. Groundwater Screening Criteria

In terms of protected waters (i.e. the underlying groundwater and nearby surface waters), there is the potential for contaminated soils (if present) to impact these via leaching. However, estimated soil GACs using a partitioning equation result in theoretical values that are likely to be very conservative. Greater reliance is therefore placed on measured groundwater contaminant results to assess the potential risks to waters (surface and ground) in the vicinity of the site.

Groundwater data has been compared with the overall threshold value range identified in the 2016 European Communities Environmental Objectives (Groundwater) Regulations (Statutory Instrument No 366 of 2016). In the event that there is no overall threshold value range identified for a parameter and where one is available as an Interim Guideline Values (IGV) published by the Environmental Protection Agency in the Guidance Document titled 'Towards Setting Guideline Values for the Protection of Groundwater in Ireland' (2003) an IGV has been provided instead.

It is noted that the comparison of groundwater analytical results with the Groundwater Regulations is not representative of actual risk and is used as a guide to the potential risks posed. Contaminant concentrations below the GACs are considered not to warrant further risk assessment. However, concentrations above the generic screening criteria may require further consideration through either qualitative or quantitative assessment.

To determine the vapour risk from groundwater, the newly published Society of Brownfield Risk Assessment – Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater February 2017 were used to assess potential risks from volatile compounds in on site groundwater.

6.4. Soil Assessment

The soil analytical results are presented in Table 1 along with the GAC values. During the SI works, a total of 40No. of soil samples were obtained from the window samples and boreholes. From the 40No. samples, 26No. samples were determined to display GAC exceedances. GAC exceedances consisted mostly of PAHs but also some metals. PAH exceedances included Benzo(a)pyrene, Dibenzo(ah)anthracene, Benzo(a)anthracene and Naphthalene. GAC exceedances for the metals were in the form of Arsenic, Lead and one incidence of Mercury.

6.4.1. Total Petroleum Hydrocarbons, BTEX and MTBE

No samples exceeded the Residential, Public Open Space or Commercial GAC values for TPH, BTEX or MTBE.

6.4.2. Polycyclic Aromatic Hydrocarbons

Trace concentrations of some PAH compounds were reported for a number of samples across the site primarily associated with the upper made ground.

The analytical results for PAHs were below the Residential and Public Open Space GACs protective of human health in all of samples with the exception of:

- Benzo(a)pyrene (Public Open Space GAC 5.7mg/kg) in 2No. samples including WS9 (1.0m) at 7.209mg/kg and BH06 (2.0m) at 16.122mg/kg. Both values also exceeded the residential GAC (3.2mg/kg) along with WS9 (0.5m) at 4.355mg/kg.

- Dibenzo(ah)anthracene (Public GAC 0.58mg/kg) in 6No. samples including WS1 (1.0m) 3.2mg/kg, WS2 (1.0m) 1.239mg/kg, WS3 (0.5m & 4.0m) 0.836mg/kg & 1.081mg/kg, WS9 (0.5m) 2.137mg/kg and BH04 (1.0m) 0.678mg/kg. The above samples also exceeded the residential GAC along with 8No. samples including WS12 (0.5m) 0.317mg/kg, WS1 (5.0m) 0.525mg/kg, WS2 (3.0m) 0.483mg/kg, WS8 (2.0m)

0.36mg/kg, WS11 (2.0m) 0.363mg/kg, BH03 (0.5m), BH05 (2.0m) 0.348mg/kg and BH06 (1.0m) 0.455mg/kg. Note that 2No. samples including WS9 (1.0m) 3.874mg/kg and BH06 (2.0m) 10.344mg/kg also exceeded the Commercial GAC (3.6mg/kg).

- Benzo(a)anthracene (Resi GAC 2.3mg/kg) in 1No. sample from BH06 (2.0m) 21.06mg/kg. The sample did not exceed the Commercial GAC.

- Naphthalene (Resi GAC 2.3mg/kg) in 1No. sample from BH06 (2.0m) 5.377mg/kg. The sample did not exceed the Commercial GAC.

6.4.3. Metals

The analytical results for metals in samples were below the Residential and Public Open Space GACs protective of human health with the exception of:

- Arsenic in 2No. samples including WS1 (5.0m) 124mg/kg and WS2 (5.0m) 150mg/kg exceeded the Public Open Space GAC of 79mg/kg. Both of these samples also exceeded the Residential GAC of 40mg/kg along with WS2 (3.0m) 71mg/kg. The samples did not exceed the Commercial GAC of 640mg/kg.

- Lead (Public GAC 630mg/kg) in 11No. samples including WS1 (1.0m & 5.0m) 650mg/kg & 1402mg/kg, WS2 (3.0m & 5.0m) 972mg/kg & 1425mg/kg, WS3 (0.5m) 821mg/kg, WS5 (0.5m & 2.0m) 829mg/kg & 2263mg/kg, WS7 (3.0m) 739mg/kg, WS8 (2.0m) 1118mg/kg, WS12 (1.0m) 937mg/kg and BH06 (2.0m) 1187mg/kg. These samples also exceeded the Residential GAC (310mg/kg) in addition to 11No. of other samples including WS1 (3.0m) 365mg/kg, WS2 (1.0m) 408mg/kg, WS6 (1.0m) 606mg/kg, WS12 (0.5m) 481mg/kg, BH01 (2.0m) 362mg/kg, BH03 (0.5m) 466mg/kg, BH04 (1.0m, 5.0-5.3m & 6.0-6.3m) 392mg/kg, 430mg/kg & 480mg/kg, BH05 (2.0m) 602mg/kg and BH06 (1.0m) 439mg/kg. All samples did not exceed the Commercial GAC of 2,300mg/kg.

- Mercury in 2No. samples exceeded the Residential GAC (56mg/kg) including WS1 (5.0m) 308mg/kg and WS2 (5.0m) 320mg/kg. Both of these samples also exceeded the Public Open Space GAC (16mg/kg) in addition to WS7 (3.0m) 16mg/kg.

6.4.4. PCBs

No samples tested positive for PCBs above the laboratory limits of detection.

6.5. Groundwater Assessment

The risk to groundwater has been assessed from soil leachate values and their direct comparison to Groundwater Threshold Values and, in their absence, to IGV values. The groundwater analytical results for the site are presented in Table 3 along with Environmental GAC values, while results are compared to the SoBRA Human health GAC values in Table 4.

A total of 25No. groundwater samples were collected with GAC exceedances reported for 24No. samples. As stated in the original Buro Happold report, highly elevated concentrations of Chromium, Lead, Nickel and Zinc were recorded for BH04 on the 04/09/2008 which were suspected to have been cross contamination/lab error. Further laboratory analysis confirmed the contamination. Chromium results which had original displayed a concentration of 126 µg/l, reduced to 6 µg/l upon retesting. Therefore no further comment will be given on the heavy metal contaminant levels in the sample from BH04 taken on the 04/09/2008 as it is stated in the Buro Happold report that laboratory contamination was confirmed.

In terms of the 23No. remaining samples displaying GAC exceedances, exceedances consisted of Metals, PAHs, TPH, BTEX, MTBE and some indicator parameter such as Chloride, Sulphate, Total Hardness and Ammoniacal Nitrogen.

In terms of the Society of Brownfield Risk Assessment (SoBRA) which was set up to develop a methodology for assessing chronic risk to human health via inhalation of groundwater-derived vapours and also to derive generic assessment criteria (GAC) for selected contaminants. From the analytical results, 7No. samples were noted for exceedances for Aliphatics and 3No. samples for Aromatics.

6.5.1. LNAPL & DNAPL Samples

No visual, olfactory, or interface probe evidence of the presence of LNAPL or DNAPL during the investigation and/or sampling.

6.5.2. TPH, BTEX and MTBE

Groundwater samples were submitted to the laboratory for a suite of analysis to determine if there was widespread contamination within the groundwater beneath the site. In that context, total petroleum hydrocarbons (criteria working group carbon banding), BTEX and MTBE (an additive in petrol) was scheduled for all samples. Detected TPH concentrations were consistently elevated in BH02 and WS11. Concentrations ranged from 15,148.8-41,193µg/l which exceeded the EPA Interim value (IGV) and Groundwater regulations. TPH concentrations were occasionally elevated in BH03 (29/08/2008 & 10/09/2008), BH04 (29/08/2008), BH05 (29/08/2008 &10/09/2008, BH06 (10/09/2008), BH07 (29/08/2008) and WS7 (29/08/2008). Concentrations ranged from 112-48,320µg/l on the dates noted above, during which concentrations exceeded the EPA IGV and Groundwater regulations. TPH concentrations were consistently reported below the laboratory MDL only for BH01.

VOC analytical results for the groundwater samples were below the EPA IGV and Groundwater regulations with the exception of samples from WS11 which produced exceedances for the following:

- MTBE in 2No. samples on the 04/09/2008 (14µg/l) and 10/09/2008 (17µg/l) exceeding only the Groundwater regulation threshold (14µg/l);
- Benzene in 1No. sample on the 04/09/2008 (31µg/l) exceeding both the Groundwater regulation (0.75µg/l) and EPA IGV (1µg/l);
- Toluene in 1No. sample on the 29/09/2008 (19µg/l) exceeding the EPA IGV (10µg/l) threshold only;
- Ethylbenzene in 3No. samples on the 29/08/2008 (211µg/l), 04/09/2008 (13µg/l) and 10/09/2008 (15µg/l) exceeding the EPA IGV (10µg/l);
- Xylene in 3No. samples on the 29/08/2008 (527µg/l), 04/09/2008 (35µg/l) and 10/09/2008 (23µg/l) exceeding the EPA IGV (10µg/l).

SoBRA 2017 GACs

No exceedances were noted in any of the samples with the exception of BH03 and WS11. Aliphatic exceedances were noted which included the following:

- C6-C8 in 1No. sample from WS11 (04/09/2008 – 1,927µg/l);

- C8-C10 consistently in 3No. samples from WS11 across each of three sampling dates with concentrations of 948.8µg/l, 1,649.6µg/l and 315.6µg/l);

- C10-C12 consistently in 3No. samples from WS11 across each of the three sampling rounds with concentrations of 1,272.8µg/l, 1,403.2µg/l and 344.4µg/l.

Some significant exceedances in Aromatics were also noted which included the following;

- EC12-EC16 in 1No. sample from BH03 (29/08/2008 – 48,320µg/l);

- EC8-EC10 in 2No. samples from WS11 (29/08/2008 – 2161.2µg/l & 04/09/2008 – 2,522.4µg/l).

6.5.3.PAHs

All PAHs were below the laboratory MDL in BH01. The PAH analytical results for the remaining groundwater samples did not exceed the EPA IGV or Groundwater regulations with the exception of:

- Fluoranthene in 4No. samples exceeding the EPA IGV (1µg/l) including BH02 (10/09/2008 – 2.407µg/l), BH03 (10/09/2008 – 1.135µg/l), BH06 (17/09/2018 – 1.318µg/l) and WS11 (29/08/2008 – 1.792µg/l);

- Benzo(bk)fluoranthene in 3No. samples exceeding the EPA IGV (0.5µg/l) including BH02 (10/09/2008 – 2.07µg/l), BH03 (10/09/2008 – 0.903µg/l) and WS11 (29/08/2008 – 0.551µg/l);

- Benzo(a)pyrene in 6No. samples including BH02 (10/09/2008 – 0.714µg/l), BH03 (10/09/2008 – 0.453µg/l), BH05 (29/08/2008 – 0.015µg/l), BH06 (17/09/2008 – 0.148µg/l), WS7 (29/08/2008 – 0.053µg/l) and WS11 (29/08/2008 – 0.206µg/l). All the samples mentioned exceeded the Groundwater regulation value of 0.0075µg/l and EPA IGV of 0.01µg/l;

- Indeno(123cd)pyrene in 4No. samples exceeding the EPA IGV (0.05µg/l) including BH02 (10/09/2008 – 0.204µg/l), BH03 (10/09/2008 – 0.252µg/l), BH06 (17/09/2008 – 0.069µg/l) and WS11 (29/08/2008 – 0.117µg/l);

- Benzo(ghi)perylene in 5No. samples exceeding the EPA IGV (0.05µg/l) including BH02 (10/09/2008 – 0.248µg/l), BH03 (10/09/2008 – 0.217µg/l), BH06 (17/09/2008 – 0.082µg/l), WS7 (29/08/2008 – 0.057µg/l) and WS11 (29/08/2008 – 0.128µg/l);

- Total 16 EPA PAHs in 12No. samples including BH02 (10/09/2008 – 25.399µg/l & 17/09/2008 – 6.57µg/l), BH03 (29/08/2008 – 48.871µg/l & 10/09/2008 – 15.304µg/l), BH04 (29/08/2008 – 0.208µg/l), BH05 (29/08/2008 – 0.608µg/l) and BH06 (10/09/2008 – 0.347µg/l & 17/09/2008 – 12.445µg/l), BH07 (29/08/2008 – 0.149µg/l), WS7 (29/08/2008 – 1.105µg/l) and WS11 (29/08/2008 – 17.734µg/l & 10/09/2008 (0.275µg/l). All exceedances were for the EPA IGV (0.1µg/l).

6.5.4.Metals and Indicator Parameters

Chloride was detected above the GAC interim (30mg/l) and Groundwater regulations (187.50mg/l) thresholds for BH01, BH02, BH03, BH04, BH07 and WS7 on multiple sampling dates with concentrations as high as 1,986mg/l. Similarly BH05 displayed high chloride concentrations however only exceeding the Interim GAC value. Note BH06 and WS11 did not exceed GAC thresholds for Chloride. However regardless, these high concentrations are likely naturally occurring due to the location of the site in close proximity to the tidally influenced River Liffey.

Sulphate concentrations were detected above both the GAC interim (200mg/l) and Groundwater regulations (187.50mg/l) thresholds on each round of sampling for BH01, BH02, BH005, BH07 and WS7 with concentrations ranging from 261-1,021mg/l. BH03 (29/08/2008) and BH04 (29/08/2008) similarly exceeded both GAC values however only on one sampling occasion.

With the exception of BH03 and BH04 which exceeded the Interim GAC value of 200mg/l for Total Hardness on the one of three (29/08/2008) and three of four (29/08/2008, 04/09/2008 & 10/09/2008) sampling rounds respectively, all other locations exceeded the GAC value during each of the sampling dates.

The analytical results for metals in the groundwater samples were below the EPA interim guideline values and Groundwater regulations with the exception of:

- Dissolved Arsenic (Groundwater Regs 7.5µg/l) in;
    - BH05 on the 29/08/2018 (10µg/l), 17/09/2008 (10µg/l) and 10/09/2008 (9µg/l). BH05 samples from the 29/08/2008 and 17/09/2008 also exceeded the EPA interim value.
    - BH07 on the 04/09/2008 (8µg/l) and 10/09/2008 (8µg/l).
    - WS7 – 04/09/2008 (8µg/l).

- Dissolved Zinc (Groundwater Regs 75µg/l) in;
    - BH01 – 10/09/2008 (151µg/l);
    - WS11 – 29/08/2008 (76µg/l);

  Note the sample from BH01 also exceeded the EPA interim value.

- Dissolved Lead (Groundwater Regs 7.50µg/l) in;
    - BH01 – 10/09/2008 (16µg/l);
    - BH03 – 04/09/2008 (19µg/l);
    - WS7 – 04/09/2008 (35µg/l);
    - WS11 – 04/09/2008 (62µg/l);

All of the samples above for dissolved lead also exceeded the EPA interim guideline value of 10µg/l.

Elevated levels of Ammoniacal Nitrogen were recorded during all sampling rounds for BH02, BH05, BH06, BH07, WS7 and WS11 which all exceeded the Groundwater regulations of 0.18mg/l significantly with concentrations ranging from 0.8 - 39.4mg/l. Additionally, an elevated pH value of 10.05 was determined for BH04 on the 29/09/2008.

6.5.5. Volatile Organic Carbons (VOCs, sVOCs), Phenols and PCBs

Other than BTEX no other VOCs, phenols, phthalates or sVOCs, were identified.

6.5.6. Vapours from Groundwater

The groundwater results were compared to the SoBRA GACs (2017) for residential and commercial use as a screening exercise to evaluate whether the concentrations on site present a potential risk to human health onsite and offsite. Table 6.1 outlines the SoBRA GACs for residential developments exceedances for the site. Some of these exceedances were significant but there were no exceedances of the commercial GAC.

In addition to the compounds outlined in Table 6.1, MTBE, Benzene, Toluene, Ethylbenzene, Xylene, Fluoranthene and Benzo(a)pyrene were identified in the groundwater exceeding the EPA IGV. These chemicals are sufficiently volatile and toxic and may require additional assessment to determine if they present a risk to indoor or outdoor air from volatilisation.

Table 6.1 SoBRA GAC screened values

Location ID	Date Sampled	Parameter	Concentrations (µg/l)	SoBRA Res GAC (µg/l)
WS11	04/09/2008	C6 – C8	1927	1500
	29/08/2008	C8 – C10	948	57
	04/09/2008		1649.6	
	10/09/2008		315.6	
	29/08/2008	C10 – C12	1272.8	37
	04/09/2008		1403.2	
	10/09/2008		344.4	
	29/08/2008	EC8-EC10	2161.2	1900
	04/09/2008		2522.4	
BH03	29/08/2008	EC12 – EC16	48320	39000

6.6. Ground Gas Assessment

Ground gas (Carbon Dioxide and Methane) monitoring was undertaken at 7No. locations across the site comprising of four visits at weekly intervals between 29th August and 17th of September 2008. The sampling visits were conducted during periods when atmospheric pressure ranged from 990-1019nPa. Sample locations included WS6, WS9, WS10, WS12, WS3, WS7 and WS11 with response zones ranging from made ground to estuarine deposits and boulder clay. Gas samples were collected from WS3, WS10 and WS11 on one occasion and analysed in a laboratory to confirm the readings recorded on site. Oxygen and carbon dioxide concentrations were consistent with laboratory analysis however methane concentrations for WS11 (5.7%) were slightly higher than the laboratory results (4.2%). The gas monitoring equipment used was a GA2000 gas analyser which is a certified methane analyser, recording/monitoring of Hydrogen Sulfide (H2S) and Carbon Monoxide (CO) was not carried out. The GA2000 will give accurate methane readings however only when no other hydrocarbons are present. Elevated gas levels for carbon dioxide and methane are outlined in Table 6.5.

Table 6.5 Gas monitoring results

Gas	Flow Rate (l/hr)	Atmospheric Pressure (mb)	Location ID	Response Zone Stratum	Date Sampled	Concentration (% Air)
Carbon Dioxide	0	1019	WS6	MG	17/09/2008	6.4
	0.2	1017	WS3	MG/SLT	29/08/2008	7.7
	0.2	990			04/09/2008	9.4
	0.1	999			10/09/2008	10.6
	0.2	1019			17/09/2008	10.2
	0.1	991	WS11	SLT/BC	04/09/2008	9.3
	0.2	1001			10/09/2008	5.7
	0.1	1019			17/09/2008	8.7
Methane	0	1019	WS10	MG	17/09/2008	5.6
	0.1	991	WS11	SLT/BC	04/09/2008	100
	0.2	1001			10/09/2008	1.2
	0.1	1019			17/09/2008	69.7

SLT – Silt BC – Boulder Clay MG – Made Ground

6.6.1.Possible Sources

The previous site investigations demonstrated that the Connolly site is underlain by a significant volume of made ground of up to 7.2 metres thick in places. Made ground can contain some putrescible anthropogenic materials such as cloth and wood fragments, but this is not considered to be at a level sufficient to produce volumes of ground gas that would be at risk to new buildings. There is no record of putrescible waste being deposited on the site, nor any evidence from the site investigation to indicate any significant amount of putrescible waste having been deposited in the site.

There is potential evidence of volatilisation of aliphatic hydrocarbons from the groundwater with site investigation location WS11 demonstrating elevated methane and carbon dioxide levels in conjunction with elevated levels of aliphatics and other hydrocarbons in the soil and groundwater. Hydrocarbon odours were noted during the site investigation below 2.0m at WS11 however no visual/olfactory evidence was recorded. Similarly during groundwater sampling, hydrocarbon odours were noted in water purged from WS11, BH03 and BH02 and a slight hydrocarbon sheen was noted in the purged water from WS11, BH02, BH06 and BH03.

The desk study indicated previous possible sources of hydrocarbons from fuel storage tanks onsite, chemicals/lubricants associated with train maintenance and it is also possible that an additional source of hydrocarbons may be external to the site as previous surroundings land uses have been indicted to include timber yards and fuel storage facilities such as coal yards and tobacco factories.

As noted by the authors of CIRIA C665 (2007) glacial tills with no other ground gas source can yield gas concentrations of CO_2 in the order or 5%. It is noted that the maximum recorded CO_2 during the monitoring was 10.6%. Furthermore, these authors indicate that experience has shown that where natural ground is disturbed it is common to see a fall in gas concentration with increased time from disturbing the ground. This is not the case where there is a gas producing source.

Therefore, the credible sources of CO_2 and Methane are:

- Made Ground;
- Underlain Natural Ground;
- Onsite hydrocarbon contamination of soil and groundwater;
- Migration of Carbon Dioxoide/Methane from offsite sources.

6.6.2. Possible Receptors

The receptors that have been considered during this assessment are the onsite residential receptors of the redevelopment. The proposed development best fits a type B building; i.e. private or commercial property with central building management control of any alterations to the building or its uses but limited to central building management control of the maintenance of the building, including gas protection measures. Type B buildings can consist of small to medium size rooms with passive ventilation. May be of conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.

6.6.3. Possible Pathways

The dominant lithology on the site is gravelly clay. Pathways for gas migration through the clays are potentially via:

- Macropores such as land drains, glacial fractures, or deep root voids;
- Gravel and sand lenses and bands within the clays;
- Volatilisation of gas dissolved within groundwater.

Pathways for ingress of ground gas into buildings are:

- Services, but given that the proposed development is a new build, services can be cast into the slab and be sealed to ensure they are waterproof therefore gas migration will not be significant.
- Vertical migration through cracks in the floor slab.
- Accumulation in voids beneath floor slab.

Ground gas ingress into buildings will be prevented by risk appropriate measures built into the basement and slab design and construction methodology thus breaking the source pathway receptor linkage. The building will be supported on piled foundations, measuring approximately 900mm in diameter and extended into the Limestone bedrock, which underlies the site at depth. The piles will be constructed using bored techniques, which form an intimate skin friction and limit ground disturbance. All piles will be embedded into the pile caps / ground beams. Thus, the piles do not create voids in the soil around them nor do they increase the permeability of the soil. Therefore, they do not form preferential pathways for vapour/gas migration.

6.6.4. Ground Gas Risk

The soil data has been assessed with reference to CIRIA report C665. Consideration has therefore been given to both methane and carbon dioxide concentrations as well emission (flow) rates.

As the possibility of an offsite source of dissolved gas volatilising within the site from contaminated groundwater cannot be discounted, and as the monitoring data set is both temporally and spatial limited, as recommended by the BS8485:2015 standard, the worst case Gas Screening Value (GCV) was derived, i.e. the maximum recorded flow for any monitoring well multiplied by the maximum recorded concentration of any gas. This gives the site a characteristic GSV of 0.2 litres/hour (l/hr). As specified in Table 2 of the CIRIA C665 report, resultant from this derived GSV and because gas flow is less than <70l/hr, the site has a characteristic gas situation (CS) at a level of CS2 which is a low hazard potential.

As specified in Table 3 of the standard, the proposed development best fits a Type B characterisation, as a consequence mitigation measures put in place for the management of ground gas should as specified in Table 4, obtain a Minimum Gas Protection Score (MPGS) of 3.5. A combination of two or more of the following types of protection measures should be used to achieve that score:

- The structural barrier of the floor slab, or of the basement slab and walls if a basement is present;
- Ventilation measures; and
- Gas resistant membrane

This is a very conservative assessment, and if gas protection measures used do not meet the MPGS of 3.5 then further investigation of ground gas should be undertaken to assess the risk of the designed gas protection measures.

As part of the proposed development, a significant volume of the made ground and natural material will be excavated and removed offsite to a suitable waste facility. However the structure of the railway arches along Sheriff Street Lower will be retained. A ground gas methane reading of 5.6% was recorded in the vicinity of this area. Therefore additional consideration will have to be given to this area in relation to ground gas protection measures. Further ground gas investigation may also be required which may be in the form of a more extensive ground gas monitoring programme or DQRA.

7. REFINED CONCEPTUAL SITE MODEL (CSM)

Based on the findings of the soil and groundwater assessment i.e. the results of the GQRA, potential contamination source areas have been identified for the site. The CSM can now be refined using site specific information and the potential risk to human health can be assessed taking into account the proposed redevelopment of the site as outlined in Section 1.3.

7.1. Source – Made Ground – from previous site use or original source.

The exceedances of the GAC for metals (arsenic and lead) for residential without plant uptake were typically associated with the made ground. All samples analysed are from the top 6.5m layer of soil, based on the proposed plans discussed in Section 1.3, there will be a 10m dig within the basement footprint and hence all risk associated with the Made Ground within the basement footprint will be removed. Sampling of the soils (Natural Ground) which will be directly beneath and in contact with the basement is recommended.

Outcome: Further assessment required.

7.2. Source – Ground Gas/Vapour Risk.

Significant concentrations of ground gas were measured across the site in the 2008 sampling events. Elevated concentrations of hydrocarbons in the groundwater might pose a vapour intrusion risk to the future development. It is recommended that standpipes are to be installed and screened across the layers of soil which are to remain on-site post development, to investigate the risks associated with ground gas and/or vapour intrusion risks.

Outcome: Further assessment required.

7.3. Source – Offsite Sources

As identified in the initial CSM, migration of contamination from adjacent properties historically used as timber yards, coal yards, railway lines and associated depots is a significant concern. However as part of the design for the site, a secant pile wall is proposed for the entirety of the basement footprint.

Based on the above, the migration pathway is broken after construction as a result of the pile wall and therefore no further mitigation is required. Note. Migration pathway to the areas associated with the Arches which will remain outside of the pile wall will require additional assessment and consideration at design.

Outcome: Further assessment required.

7.4. Source – On-Site Oil Tanks

The presence of oil tank require further investigation, the tank should be decommissioned prior to redevelopment of the site, and the area surrounding its location should be investigated if additional site investigation takes place.

Outcome: Further assessment required.

7.5. Source – Groundwater

The sampling exercise in 2008 show that groundwater across the site is impacted by Polycyclic Aromatic Hydrocarbons (PAHs), BTEX, Phenols and Total Petroleum Hydrocarbons.

Based on the above, additional evaluation and assessment is required during the next phase of works.

Outcome: Further assessment required.

7.6. Refined CSM

Table 7.1 Summary Revised Conceptual Site Model

<table>
<tr><th>SOURCE</th><th>PATHWAY</th><th>RECEPTOR</th><th>POTENTIAL POLLUTANT LINKAGE Y/N</th></tr>
<tr><td colspan="4">Environmental</td></tr>
<tr><td>Migration of contamination from adjacent properties such as historic timber treatment, coal yards and in particular the adjacent railway lines and depots.</td><td rowspan="2">Migration of contaminants from natural soils</td><td rowspan="2">Groundwater in the Gravel and/or bedrock aquifer</td><td>N</td></tr>
<tr><td>Potential historical on-site spills - Potential contamination within deep subsoil materials from historic activities (railway lines, oil tanks and associated maintenance yards) and from unknown source of material which could have been contaminated during original filling.</td><td>Y</td></tr>
<tr><td>Potential contamination within groundwater</td><td>Migration of contaminants in the subsoil and bedrock aquifer</td><td>Potential surface watercourses (River Liffey) via groundwater baseflow.</td><td>Y</td></tr>
<tr><td colspan="4">Human Health</td></tr>
<tr><td>Migration of contamination from adjacent properties such as coal yards, timber yards, and in particular the adjacent railway lines and depots.</td><td>Vapour migration to indoor and outdoor air</td><td>Onsite Residents and Commercial Future Users.</td><td>N</td></tr>
<tr><td>Migration of contamination from adjacent properties such as historic coal yards, tobacco factories, railway lines, and railway depots.</td><td rowspan="2">Inhalation/ dermal contact/ ingestion of soils/ dusts</td><td rowspan="2">Onsite Residents and Commercial Future Users.</td><td rowspan="2">Y</td></tr>
<tr><td>Potential historical on-site spills - Potential contamination within deep subsoil materials from historic activities (Coal Yards, Railway Depots and Lines) and from unknown source of material which could have been contaminated during original filling.</td></tr>
<tr><td>Potential contamination within groundwater</td><td>Migration of contaminants in the bedrock aquifer</td><td>Groundwater users.</td><td>N</td></tr>
</table>

Note: Generic risk assessments do not assess risks to construction workers who are managed under the Safety and Welfare at Work Regulations.

A simple pictorial illustration of the revised CSM following the design measures is included in Figure 7.1.

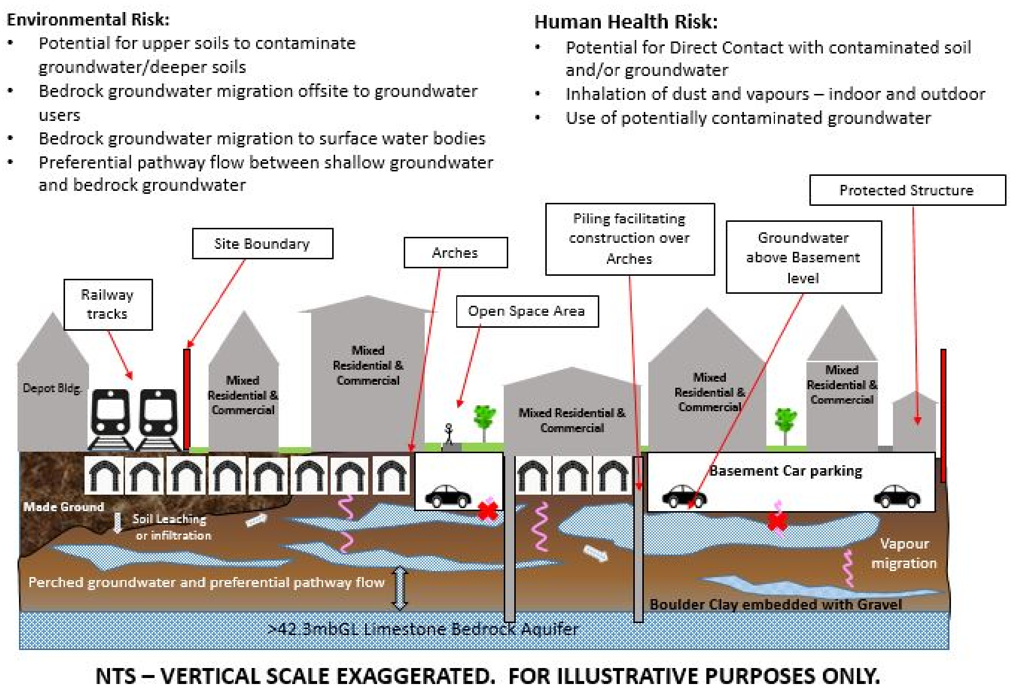


Figure 7.1 Revised Conceptual Site Model

8 WASTE SOIL CLASSIFICATION

The following classification is based on tabulated third party data. The laboratory certificates are not available to this classification. The number of sampling locations, consistency of analysed parameters, and depth of sampling are such that any assessment for soil waste management based on them should only be considered indicative. Consequently, the assessment made on this data is considered not to be fully representative of the site. Further site investigations and sample analyses will be required to provide a robust assessment in line with industry standard operating procedures.

8.1 Hazardous Waste Assessment

To comply with the European Waste Framework Directive (2008/98/EC), S.I. 233 of 2015 and S.I. 126 of 2011; a hazardous waste assessment was carried out utilising HazWasteOnline software using classification engine WM3.v1.1 (2018). The software enables the user to review the total pollutant content analysis in terms of any Hazardous Properties (as defined in the Regulations) the material may have. The material is assessed against an array of hazardous property thresholds as prescribed in the relevant Regulations and Guidance (Section 1.6).

Of the analyses for the 40 No. samples presented only one sample is assessed as being Hazardous; specifically:

- 0No. (zero) samples have been assessed for total metal soil concentrations for Antinomy Barium, Molybdenum;
- 37 No. samples were assessed for other metal species of which only one sample from 2mbGL in WS5 was hazardous for Lead and Copper;
- 35No. samples were assessed for PAHs of which all were analysed to contain Non hazardous concentrations;
- 15No samples were assessed for TPH(C6-C40) of which 11No.samples had concentrations greater than the limit of detection. As there was no free draining liquid waste reported to be within the soil, and as the concentration in all samples was so low, all these 15No.samples are assessed as containing Non-hazardous concentrations of TPH;
- 19No samples were assessed for BTEXs of which 2No.samples had concentrations greater than the limit of detection. As there was no free draining liquid waste reported to be within the soil, and as the concentration in all samples was so low, all these 19No.samples are assessed as containing Non-hazardous concentrations of BTEXs;
- 19No samples were assessed for PCBs of which no samples reported concentrations above limit of detection. All these 19No.samples are assessed as containing Non-hazardous concentrations of PCBs;

8.2 Waste Acceptance Criteria Assessment

20No. samples were subjected to a leaching test. The leaching results and a selection of total pollutant content results have been compared with the thresholds for acceptance of waste at inert, non-hazardous and hazardous facilities as prescribed in the Landfill Directive. An additional category was included which is based on the integrated Material Solutions Hollywood waste acceptance criteria which are the same as the inert criteria with the exception of total PAHs (100mg/l). The classification categories are outlined in Table 8.1

Table 8.1 Classification Categories

WASTE CATEGORY	TITLE	CLASSIFICATION CATEGORY	POTENTIAL OUTLET
Category A	Inert Waste Criteria	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). Results found to be non-hazardous using the HazWasteOnline application.	Reuse or recovery subject to Planning and/or Waste Permissions. Inert Landfills e.g. Murphy Gormanston, Roadstone Huntstown. If material constitutes MADE ground acceptance needs to be confirmed in advance with landfill.
Category B	Inert (IMS Acceptance Criteria)	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)**. Results found to be non-hazardous using the HazWasteOnline application.	Disposal at Integrated Materials Solutions Naul Facility.
Category C1	Non-Haz Criteria	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**. Results found to be non-hazardous using the HazWasteOnline application.	Disposal/Recovery at licensed Landfill (Ballynagran, Knockharley, Drehid). Material can be sent for recovery as engineering material rather than disposed of (no landfill tax).
Category C2	**Non-Haz Criteria but with trace asbestos**	Results as per C1 but with trace asbestos	Material will need to be disposed of at a licensed landfill if trace asbestos confirmed. If asbestos level is quantifiable then it may have to be disposed in N. Ireland.
Category D	Hazardous	Analytical results found to be hazardous using the HazWasteOnline application.	None in Ireland (export).

NOTE: HazWasteOnline accessed through http://www.hazwasteonline.com. Application developed by One Touch Data Limited based on Regulation (EC) No. 1272/2008: the classification, labelling and packaging of substances and mixtures (CLP) and the latest UK Environment Agency guidance, WM3 v1.1 (2018). The EPA have stated that the HazWasteOnline tool is acceptable for the classification of wastes in Ireland and they have a licence for the application to review results if required.
NOTE: Where material is sent for RECOVERY it does not incur the landfill tax (currently €75/tonne)
NOTE: While waste soil is classified based on the EU Council Decision 2003/33/EC, waste acceptance criteria may vary at each potential Waste Receiver site and further assessment and consultation may be required with the proposed Waste Receiver to confirm suitability for disposal. In terms of permitted sites, further assessment in terms of potential impact to the environment may be required or inert waste comprising made ground may not be acceptable. The Regulations also allow Waste Receivers to agree increased specific limits (e.g. TOC, sulphates) following Risk Assessment, agreement with the EPA and notification of the EC.

The assessment for each sample is contained in the Waste Classification Table which is attached in Table 6 at the end of this report.

While OCSC provide an opinion on which potential Waste Receivers may accept any particular type of material, it is up to the individual Waste Receivers whether they can accept the material (based on results, site acceptance criteria, void space, percentage of non-natural materials within made ground etc).

8.3 Waste Codes

The code for soil and stone material as per the List of Waste is:

- 17 05 04 soil and stone other than those mentioned in 17 05 03

For made ground there is often a portion of the material which is not soil and stone (e.g. brick fragments, concrete, clinker, timber etc). There is no guidance available on what proportion of other materials is acceptable when classifying a single waste stream although a standard industry guideline of 5% maximum visible contamination with other waste types is often employed. Some facilities have specific limits in their licence (e.g. for non-greenfield sites soil and stone to have <2% contamination with non-natural materials). Therefore it is required to confirm the acceptable levels of contamination of non-natural materials with the Waste Receiver in advance of exporting material to site.

The code for soil and stone which has been classified as hazardous is:

- 17 05 03* soil and stones containing hazardous substances

There are no hazardous waste landfills in Ireland; however, there is one facility licensed to treat hazardous material (Enva Portlaoise). All hazardous material which cannot be treated at Enva is exported to an appropriately permitted facility in the EU via a Waste Broker or direct under Transfrontier Shipment (TFS).

8.4 Summary of Waste Classification to Date

Table 8.2 summarises the waste assessment carried out on site investigation samples (i.e. from boreholes and window samples). Note not all of the 20No. samples were tested for the same parameters.

Table 8.2 Waste Classification Results

	A Inert	B Inert (MEHL)	C1 Non-Haz	C2 Non-Haz w/ trace asbestos	D Hazardous
No. of samples	0	0	19	0	1

Of the 19 No. samples classifiable as C1 – Non-Hazardous:

- 11No. of 17No. samples showed Total Organic carbon concentration in excess of the Inert limit;
- 10No. of 18No. samples showed PAH (sum of 6) in excess of the Inert limit;
- 5No. of 20No. samples showed dissolved Antinomy in excess of the Inert limit;
- 5No. of 20No. samples showed dissolved Selenium in excess of the Inert limit;
- 2No. of 16No. samples showed dissolved Fluoride in excess of the Inert limit;
- 3No. of 16No. samples showed dissolved Sulphate in excess of the Inert limit;
- 3No. of 16No. samples showed Total Dissolved Solids in excess of the Inert limit;
- 3No. of 20No. samples showed dissolved Arsenic in excess of the Inert limit;
- 2No. of 20No. samples showed dissolved Chromium in excess of the Inert limit;
- 3No. of 20No. samples showed dissolved Molybdenum in excess of the Inert limit;
- 3No. of 20No. samples showed dissolved Nickel in excess of the Inert limit;
- 1No. of 16No. samples showed dissolved Chloride in excess of the Inert limit.

The waste soil assessment made on this limited data set, indicates that the upper part of the soil is probably unlikely to be acceptable at an inert soil disposal or recovery facility. It is expected that excepting the potential for heavy metal hotspots the soil would generally be acceptable at a non-hazardous landfill. The HazWasteOnline Assessment is attached in Appendix C.

8.5 Asbestos

Of the 40No. samples, 35No. samples were subjected to Asbestos screening. 0No. (zero) samples of those 35No. samples contained detectable asbestos fibres.

8.6 Dig Plans

Only a limited and incomplete set of samples were collected for Waste Acceptance Criteria (WAC) during the 2008 investigation. There is an insufficient sampling density available to create a Dig Plan for the Site. It is strongly recommended that additional site works are undertaken post planning to facilitate the most cost-effective disposal of material and facilitate their acceptance to a licenced waste facility.

It should be noted that the Dig Plans indicate waste soil classifications to enable excavations and assume that the analytical sample results for the key components from that cell are representative for the entire volume of the cell. This is an accepted industry practice and the Contractor will also be informed of the Watching Brief and Discovery Strategy (contained in the Construction Demolition Waste Management Plan (CDWMP) in the event of any unexpected visual or olfactory contamination hot-spots being encountered.

8.7 Contractor Requirements regarding Waste Soil & Groundwater Management

The management of waste soils, hazardous materials and groundwater during construction must comply with all relevant environmental and waste regulations (see Section 1.6 for a non-exhaustive list).

A Soil and Groundwater Management Plan should submitted with the planning applications for the site. This report outlines requirements and recommendations regarding the management of Soil and Groundwater during the construction phase. The designated Contractors will be required to adopt and amend these plans in advance of works starting on site.

The following section outlines requirements and recommendations which the Contractor is required to implement regarding the management of waste soil throughout the project.

8.7.1 Watching Brief

It is possible that unknown isolated hotspot areas which could contain potential contamination (either physical such as waste, underground storage tanks, asbestos or chemical such as hydrocarbons) could be present on site.

Should the contractor encounter any ground conditions which differ from those outlined in this report and/or the ground investigation reports they should suspend works in that area and notify the Client or their representative.

The contractor is required to ensure that no cross-contamination and/or mixing of materials of different waste categories occurs on site.

8.7.2 Hazardous Cells

There are no hazardous cells identified by the site investigations. Should however it become evident for any reason that contamination is or suspected to be present in the soil then the contractor should suspend works in that area, notify the Client or their representative, and request that the dig plans be revised including if appropriate further site investigation.

8.7.3 Export from Site

All excavated soil and wastes requiring export from the site, for recovery or disposal offsite, shall require waste classification. Waste classification shall be carried out by a suitability qualified and experienced person via sampling and analysis following best industry practice and relevant legislation including:

- List of Waste & Determining if Waste is Hazardous or Non-Hazardous (EPA, 2015);
- European Waste Framework Directive (2008/98/EC);

- Guidance on the classification and assessment of waste, Technical Guidance WM3 (EA et al, 2015);
- EU Council Decision 2003/33/EC and 1999/31/EC (2002);
- European Union (Properties of Waste which render it Hazardous) Regulations 2015 – S.I. 233 of 2015; and
- EC Classification, Labelling & Packaging Regulations (No. 1272/2008).

Written confirmation shall be obtained from the proposed Receiver (either under an Article 27 Declaration or Waste Permission) in advance of materials being removed from site. All Waste Receivers and Waste Hauliers shall hold valid and appropriate permissions and shall be preapproved by the Client or their Representative.

Where material is to be exported out of the State it shall be carried out with the agreement of the TFS office in DCC and in accordance with all relevant legislation including:

- Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998);
- The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations, 1988 (S.I. No. 248 of 1988);
- The Basel Convention; and
- European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011).

Where material is awaiting classification and/or acceptance by a Waste Receiver it shall either be; left in-situ or; excavated and stockpiled in an appropriate manner, which means, as a minimum, that:

- A temporary storage area shall be designated;
- All stockpiles to be assigned an identifier number;
- Excavation and stockpile formation shall be carried out in a controlled manner to ensure cross-contamination is avoided;
- Non-hazardous and hazardous soil shall be stockpiled only on hard-standing or high-grade plastic to prevent leaching and cross contamination of underlying soils; and
- Stockpiles shall be covered with high-grade plastic sheeting to avoid leachate and dust generation. The plastic sheeting must be adequately weighted on tied down to prevent being blown off by the wind.

Stockpile sampling shall be carried out by a competent person following a documented sampling procedure or recognised standard[1]. Once a stockpile has been sampled it is considered complete and no more material shall be added to it.

An excavation/stockpile register shall be maintained showing as a minimum the following information:

- Stockpile number;
- Origin;
- Approximate volume of material;

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[1] eg. ISO 10381-8:2006 Soil quality – Sampling- Part 8: Guidance on sampling of stockpiles or WM3 Guidance

- Date of creation;
- Date of sampling;
- Description of material;
- Classification;
- Removal date and destination; and
- Photograph.

8.7.4 Monitoring Requirements

The Contractor shall ensure that all waste materials associated with the project are appropriately classified and documented and shall include in the CDWMP appropriate measures such as:

- Arrange for soil samples to be collected either prior to excavation (in situ) and/or from the stockpiles of material before disposal;
- Arrange for samples to be analysed at an accredited laboratory for an appropriate and approved suite of parameters;
- Assess the results against the appropriate criteria to classify the waste; and
- Maintain copies of all sample details, results, assessments and provide copies of same to the Client or its Representatives.

8.7.5 Documentation

Waste disposal shall be documented within a Waste Documentation System which shall be developed by the Contractor within the overall document management system for the works and shall be included in the Construction Management Plan (CMP). The documentation to be maintained in relation to wastes shall include the following:

- Details of all parties involved in the transport of material (including. Hauliers, Agents, Shipping details etc.);
- Details of the Waste Receivers including any intermediary facilities;
- Written confirmation of the acceptance and recovery/disposal of any hazardous waste consignments;
- The tonnages and Waste Code for all waste materials;
- Details of each individual consignment of waste including:
    - Docket number of consignment
    - Date and time;
    - Name of Haulier, vehicle registration and Driver;
    - Volume/weight of consignment;
    - Description of material and origin (stockpile or cell number);
    - Name of receiving facility;
    - Date and time of arrival at receiving facility; and
    - Docket/weighbridge ticket number from receiving facility;
- All Waste Transfer Forms for hazardous waste;

The Contractor shall maintain an electronic register with the aforementioned details, as well as copies of all dockets from hauliers, and receivers. The Contractor shall provide regular reports to the Client or its representative including copies of the register and dockets if required.

9 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The site currently comprises of a CIE car park, CIE Group buildings, Rolling stock maintenance shed, and part of existing railway lines / sidings. The site had been granted planning in 2012 for a mixed-use development to include commercial offices, leisure centre and residential properties overlying a basement carpark. An outline of what is proposed as part of the new planning permission is outlined in section 1.3. This new planning permission is currently undergoing feasibility study. A summary of the Environmental Site Assessment (ESA) and Generic Quantitative Risk Assessment (GQRA) findings are detailed below:

- The site is bounded by Seville Place and Oriel Hall to the north; Sheriff Street Lower to the south; Oriel Street Upper to the east; and Connolly Station (Protected Structure) to the west, Dublin 1. The River Liffey is 340m to the south of the site while the Royal Canal is 215m east.
- The site was historically infilled, and then used as a Goods Shed. An oil tank can be seen in southern portion of the site on the OSI maps (1888-1913). Adjacent historic activities include tobacco factory, coal yard, Amiens street terminus, bonded stores, and timber yards.
- Historic investigations showed the site's proven geology to be Made Ground over a layer of glacial till, the glacial till layer is composed of sandy GRAVEL embedded among or between a layer of sandy gravelly CLAY. There is a discontinuous layer of sandy SILT with sea shells in the southern end of the site towards Sherriff Street Lower and bedrock was not encountered.
- The conceptual site model identified the receptors as future residential and commercial receptors on-site and offsite human health and environmental receptors.
- The site investigation works carried out included the collection of a number of soil samples, very few samples were analyzed thoroughly to enable the characterization of the material for waste classification purposes.
- A GQRA was undertaken using residential without plant uptake to assess the risk to the residential receptors while commercial GACs were used to assess the risk to future commercial users. This is a conservative assumption given the designed presence of a basement beneath the occupied spaces. Further information will be required in order to refine the Generic Quantitative Risk Assessment (GQRA) as to whether the basement will be occupied or not in order to evaluate the risk more thoroughly.
- Soil analytical results show that the samples collected do not exceed the GAC limit for commercial except for WS9 (1m), WS12 (0.5m) and BH06 (2m), those samples had elevated Polycyclic Aromatic Hydrocarbons (PAHs). If a shallow basement (4m deep) is proposed and it is to be located within the footprint of the above SI points, then, the risk will be removed from a commercial perspective.
- Soil analytical results show that a significant number of samples exceed the GAC limit for residential without plant uptake. However, majority of those samples are from the upper 3mbGL, except for WS1 (5m), WS2 (5m) and BH04 (5-5.3 and 6-6.3m), those samples had elevated metals and/or Polycyclic Aromatic Hydrocarbons (PAHs). If a shallow basement (4m deep) is proposed and it is to be located within the footprint of the above SI points, then, the risk will be removed from a residential perspective.
- The generic prevalent contaminants in the soil across the site are elevated metals (Lead) and PAHs (Dibenzo(ah)anthracene).

- The sampling exercise show that groundwater across the site is impacted by Polycyclic Aromatic Hydrocarbons (PAHs), BTEX, Phenols and Total Petroleum Hydrocarbons, both WS11 and BH03 show concentrations above the SOBRA 2017 GACs for residential. The maximum TPHs and PAHs concentration recorded across the site was 48.32 mg/l and 48.871 µg/l respectively in BH03. The maximum BTEX and Phenols concentrations across the site were 757 µg/l and 0.18 µg/l in WS11 and BH01 respectively.

- No LNAPL (floating hydrocarbon) or DNAPL (settled/sinking hydrocarbon) layer was observed and/or sampled throughout the 2008 study.

- Significantly elevated ground gas (methane and carbon dioxide) was identified during the limited sampling undertaken in 2008. Based on the 2008 results, there is a requirement identifying remedial works for Characterisation Situation 2 (CS2).

- It is anticipated that a number of the pathways of concern such as direct contact from metals will be broken due to the basement construction i.e. the removal of some material as a result of design measures and breaking the pathway by the use of concrete however, an updated GQRA will be required following the completion of any additional site investigation to further characterize the risks associated with the development.

- The number of sampling locations, consistency of analysed parameters, and depth of sampling are such that any assessment for soil waste management based on them should only be considered indicative. Consequently the assessment made on this data is considered not to be fully representative of the site. Further site investigations and sample analyses will be required to provide a robust assessment in line with industry standard operating procedures.

  The waste soil assessment made on this limited data set, indicates that the upper part of the soil is

  - Potentially predominantly non-hazardous, with a hotspot hazardous nature resultant of lead and copper content. There is not sufficient data to exclude the potential for TPH hotspots.
  - Probably unlikely to be acceptable at an inert soil disposal or recovery facility. It is expected that excepting the potential for heavy metal hotspots the soil would generally be acceptable at a non-hazardous landfill.

9.1 Recommendations

It is recommended that the following works are completed:

- A further more robust soil waste classification exercise should be carried out in advance of any excavation works to classify the soils according to the relevant statutory requirements such as 2003/33/EC. OCSC recommend the site to be divided into 50m square grids and a borehole should be drilled in each grid, with samples taken at each 1m depth intervals across the proposed dig depth. Majority of licenced waste facilities require 1No. representative sample for each 1500-2000 tonnes to be disposed of;

- All samples for waste classification purposes should be analysed for a full suite of waste acceptance criteria parameters with an MCERTS/UKAS accredited laboratory.

- It is recommended that due to the large area of the site, the soil waste classification exercise should be carried out prior to the start of the basement excavation in order to identify suitable licenced waste facilities to accept it, hence avoiding the need to store large soil stockpiles on site;

- It is recommended that if a car park basement is proposed, and that a secant piled wall is be used to form the basement, the depth to bedrock should be proven with the means of an additional site investigation which should/preferably coincide with the waste classification exercise in order to optimise time and/or cost associated with the works;
- Heavy metal contamination identified in the made ground, particularly in the upper layers, has the potential to create an unacceptable risk to human health, depending on the development. This needs to be assessed against the proposed development layout (such as basement depth, footprint and etc) to ensure the design breaks any source pathway receptor linkage identified, particularly in the case if some of the made ground is left on site after development;
- A Vapour Intrusion Risk Assessment (VIRA) was not completed as part of the previous assessment. A VIRA assesses risk to indoor and outdoor air from contamination on site. Given the presence of contamination in the soils and groundwater on site this should be undertaken to ensure that the appropriate mitigation measures are identified and included;
- Due to the presence of a water bearing GRAVEL layer, any dewatering scheme proposed during the basement excavation needs to take into account the elevated concentrations of PAHs, TPHs, Phenols and BTEX in the groundwater across the site. Also, these should be taken account of for the purpose of discharge licence requirements and potential onsite treatment if discharge to sewer is going to occur;
- Significantly elevated ground gas (methane and carbon dioxide) was identified during the limited sampling undertaken in 2008. Within the 2008 report there is a requirement identifying remedial works for Characterisation Situation 2 (CS2). It is recommended that additional gas monitoring is carried out and if required at that time a detailed gas risk assessment is undertaken. This detailed assessment could remove the requirement for mitigation to be incorporated into the development.

Respectfully submitted

on behalf of OCSC Multidisciplinary Consulting Engineers

Eleanor Burke

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O'CONNOR | SUTTON | CRONIN

Multidisciplinary Consulting Engineers

Figures

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Consulting Engineers

Tables

Appendix A

Buro Happold Report – 2008

Appendix B

Nearby Site Investigation Records

Appendix C

HazWasteOnline (HWOL) assessment

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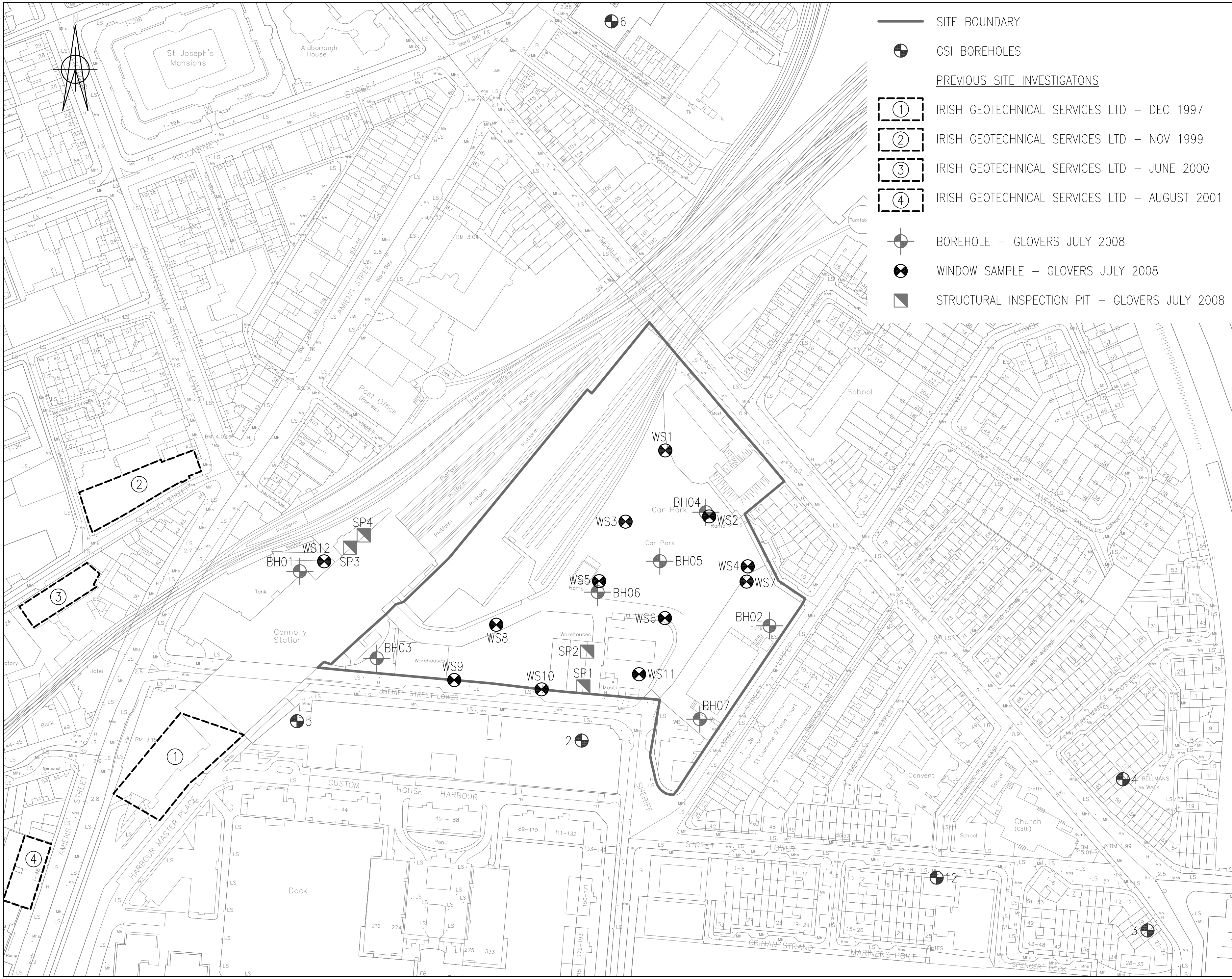
Figures



DO NOT SCALE THIS DRAWING.

Notes

Rev Description/Date | Drn/Chk

INFORMATION

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Architect	P&W
Project	CONNOLLY STATION, DUBLIN
Drg Title	EXPLORATORY HOLE LOCATION PLAN
Scales@A3	1:2000
Drawn by	NG
Checked by	SB
Date	OCT 2008
Job No.	023956
Drg No.	FIGURE 2
Rev	00

Tables

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

CAS Number	Test	GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%	Method	Units	LOD	WS1			WS2			WS3		WS4	
										Sample ID		WS1			WS2			WS3		WS4	
										Depth		1.00	3.00	5.00	1.00	3.00	5.00	0.50	4.00	0.50	2.00
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
7440-38-2	Arsenic	40	40	40	79	640	640	640	TM30/PM15	mg/kg	<0.5	33.00	26.00	124.00	18.00	71.00	150.00	18.00	9.00	7.00	15.00
7440-43-9	Cadmium	85	85	85	120	190	190	190	TM30/PM15	mg/kg	<0.1	2.00	1.00	41.00	1.00	1.00	35.00	1.00	1.00	1.00	1.00
7440-47-3	Chromium								TM30/PM15	mg/kg	<0.5	32.00	44.00	41.00	32.00	23.00	44.00	22.00	25.00	34.00	18.00
7440-50-8	Copper	7,100	7,100	7,100	12,000	68,000	68,000	68,000	TM30/PM15	mg/kg	<1	95.00	134.00	222.00	136.00	238.00	292.00	113.00	13.00	47.00	134.00
7439-92-1	Lead*	310	310	310	630	2,300	2,300	2,300	TM30/PM15	mg/kg	<5	650.00	364.00	1402.00	408.00	972.00	1425.00	821.00	183.00	168.00	289.00
7439-97-6	Mercury	56	56	56	16	1,100	1,100	1,100	TM30/PM15	mg/kg	<0.1	<0.3	<0.3	308.00	<0.3	9.00	320.00	3.00	<0.3	<1	<1
7440-02-0	Nickel	180	180	180	230	980	980	980	TM30/PM15	mg/kg	<0.7	41.00	61.00	131.00	37.00	64.00	173.00	33.00	18.00	48.00	30.00
7782-49-2	Selenium	430	430	430	1,100	12,000	12,000	12,000	TM30/PM15	mg/kg	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1
JEL1045	Total Sulphate								TM50/PM29	mg/kg	<50	2200.00	980.00	8800.00	280.00	1200.00	5300.00	1000.00	1400.00	240.00	530.00
7440-42-8	Water Soluble Boron								TM74/PM32	mg/kg	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
7440-66-6	Zinc	40,000	40,000	40,000	81,000	730,000	730,000	730,000	TM30/PM15	mg/kg	<5	334.00	164.00	841.00	259.00	312.00	1124.00	256.00	79.00	207.00	124.00
	PAH MS																				
91-20-3	Naphthalene	2.3	5.6	13	4,900	190	460	1,100	TM4/PM8	mg/kg	<0.04	0.51	0.059	0.139	0.389	0.23	0.05	0.225	0.068	0.056	0.036
208-96-8	Acenaphthylene	2,900	4,600	6,000	15,000	83,000	97,000	100,000	TM4/PM8	mg/kg	<0.03	0.566	0.063	0.059	0.209	0.168	0.029	0.17	0.316	0.049	0.013
83-32-9	Acenaphthene	3,000	4,700	6,000	15,000	84,000	97,000	100,000	TM4/PM8	mg/kg	<0.05	0.545	0.045	0.048	0.818	0.054	0.036	0.156	0.051	0.037	0.016
86-73-7	Fluorene	2,800	3,800	4,500	9,900	63,000	68,000	71,000	TM4/PM8	mg/kg	<0.04	0.827	0.034	0.029	0.784	0.065	0.019	0.147	0.11	0.036	0.007
85-01-8	Phenanthrene	1,300	1,500	1,500	3,100	22,000	22,000	23,000	TM4/PM8	mg/kg	<0.03	8.748	0.596	1.047	9.251	1.006	0.457	2.073	2.835	0.339	0.221
120-12-7	Anthracene	31,000	35,000	37,000	74,000	520,000	540,000	540,000	TM4/PM8	mg/kg	<0.04	1.899	0.098	0.124	0.905	0.268	0.057	0.338	0.84	0.116	0.068
206-44-0	Fluoranthene	1,500	1,600	1,600	3,100	23,000	23,000	23,000	TM4/PM8	mg/kg	<0.03	15.473	0.669	0.508	6.391	1.087	0.3	2.56	0.41	0.564	0.234
129-00-0	Pyrene	3,700	3,800	3,800	7,400	54,000	54,000	54,000	TM4/PM8	mg/kg	<0.03	12.491	0.614	0.455	5.351	0.974	0.259	2.259	3.672	0.568	0.247
56-55-3	Benzo(a)anthracene	11	14	15	29	170	170	180	TM4/PM8	mg/kg	<0.06	7.249	0.44	0.461	2.467	0.726	0.224	1.236	2.38	0.499	0.315
218-01-9	Chrysene	30	31	32	57	350	350	350	TM4/PM8	mg/kg	<0.02	4.508	0.497	0.542	3.051	0.842	0.292	1.408	2.222	0.46	0.285
BEN-BK-FLUORAN	Benzo(bk)fluoranthene								TM4/PM8	mg/kg	<0.07	7.205	0.743	1.074	4.16	1.513	0.583	2.281	3.591	0.822	0.315
50-32-8	Benzo(a)pyrene	3.2	3.2	3.2	5.7	35	35	36	TM4/PM8	mg/kg	<0.04	3.134	0.385	0.543	2.268	0.765	0.297	1.158	2.097	0.614	0.151
193-39-5	Indeno(123cd)pyrene	45	46	46	82	500	510	510	TM4/PM8	mg/kg	<0.04	3.955	0.271	0.551	1.342	0.534	0.284	1.036	1.235	0.764	0.155
53-70-3	Dibenzo(ah)anthracene	0.31	0.32	0.32	0.58	3.5	3.6	3.6	TM4/PM8	mg/kg	<0.04	3.28	0.242	0.525	1.239	0.483	0.246	0.836	1.081	0.273	0.081
191-24-2	Benzo(ghi)perylene	360	360	360	640	3,900	4,000	4,000	TM4/PM8	mg/kg	<0.04	5.999	0.337	0.708	1.705	0.722	0.378	1.238	1.334	0.729	0.139
191-07-1	Coronene								TM4/PM8	mg/kg	<0.04	1.036	N/A	N/A	0.477	N/A	N/A	N/A	0.342	N/A	N/A
PAH_6_TOTAL	PAH 6 Total								TM4/PM8	mg/kg	<0.22	35.766	2.405	3.384	15.866	4.621	1.842	8.273	8.667	3.493	0.994
PAH_17_TOTAL	PAH 17 Total								TM4/PM8	mg/kg	<0.64	77.419	5.093	6.813	40.807	9.437	3.511	17.121	22.584	5.926	2.283
	PAHs																				
INTERPRETATION	EPH CWG Interpretation								TM5/PM16	None		Possible PAHs	N/A	N/A	Possible PAHs	N/A	N/A	N/A	Possible PAHs	N/A	N/A
MINOIL_10-40	Mineral Oil (C10-C40)								TM5/PM16	mg/kg	<30	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
	TPH CWG																				
	Aliphatics																				
GTC05C06AL	>C5-C6	42	78	160	600,000	3,200	5,900	12,000	TM36/PM12	mg/kg	<0.1	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTC06C08AL	>C6-C8	100	230	530	620,000	7,800	17,000	40,000	TM36/PM12	mg/kg	<0.1	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTC08C10AL	>C8-C10	27	65	150	13,000	2,000	4,800	11,000	TM36/PM12	mg/kg	<0.1	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTC10C12AL	>C10-C12	130	330	770	13,000	9,700	23,000	47,000	TM5/PM16	mg/kg	<0.2	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTC12C16AL	>C12-C16	1,100	2,400	4,400	13,000	59,000	82,000	90,000	TM5/PM16	mg/kg	<4	N/A	<0.1	N/A	N/A	<0.1	N/A	N/A	<0.1	15.00	N/A
GTC16C21AL	>C16-C21								TM5/PM16	mg/kg	<7	N/A	<0.1	N/A	N/A	<0.1	N/A	N/A	<0.1	62.00	N/A
GTC21C35AL	>C21-C35								TM5/PM16	mg/kg	<7	N/A	<0.1	N/A	N/A	<0.1	N/A	N/A	<0.1	311.00	N/A
GTC05C40AL	Total aliphatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	N/A	<0.1	N/A	N/A	<0.1	N/A	N/A	<0.1	389.00	N/A
	Aromatics																				
GTEC05EC07AR	>C5-EC7	370	690	1,400	56,000	26,000	46,000	86,000	TM36/PM12	mg/kg	<0.1	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTEC07EC08AR	>EC7-EC8	860	1,800	3,900	56,000	56,000	110,000	180,000	TM36/PM12	mg/kg	<0.1	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTEC08EC10AR	>EC8-EC10	47	110	270	5,000	3,500	8,100	17,000	TM36/PM12	mg/kg	<0.1	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTEC10EC12AR	>EC10-EC12	250	590	1,200	5,000	16,000	28,000	34,000	TM5/PM16	mg/kg	<0.2	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
GTEC12EC16AR	>EC12-EC16	1,800	2,300	2,500	5,000	36,000	37,000	38,000	TM5/PM16	mg/kg	<4	N/A	2.12	N/A	N/A	3.63	N/A	N/A	8.24	<0.1	N/A
GTEC16EC21AR	>EC16-EC21	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	N/A	1.95	N/A	N/A	3.62	N/A	N/A	9.42	<0.1	N/A
GTEC21EC35AR	>EC21-EC35	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	N/A	0.58	N/A	N/A	1.20	N/A	N/A	2.41	<0.1	N/A
GTEC05EC40AR	Total aromatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	N/A	4.65	N/A	N/A	8.45	N/A	N/A	20.07	<0.1	N/A
GTEC06EC10AR	>EC6-EC10								TM36/PM12	mg/kg	<0.1	271.00	N/A	N/A	60.00	N/A	N/A	N/A	111.00	N/A	N/A
1634-04-4	MTBE*							24,000	TM31/PM12	mg/kg	<0.05	N/A	<0.01	N/A	N/A	<0.01	N/A	N/A	<0.01	<0.01	N/A
71-43-2	Benzene	380	700	1,400	73,000	27,000	47,000	90,000	TM31/PM12	mg/kg	<0.05	<0.01	<0.01	N/A	<0.01	<0.01	N/A	N/A	<0.01	<0.01	N/A
108-88-3	Toluene	880,000	1,900,000	3,900,000	56,000,000	56,000,000	110,000,000	180,000,000	TM31/PM12	mg/kg	<0.05	<0.01	<0.01	N/A	<0.01	<0.01	N/A	N/A	<0.01	<0.01	N/A
100-41-4	Ethylbenzene	83,000	190,000	480,000	25,000,000	5,700,000	13,000,000	27,000,000	TM31/PM12	mg/kg	<0.05	<0.01	<0.01	N/A	<0.01	<0.01	N/A	N/A	<0.01	<0.01	N/A
XYLENE	Xylene	79,000	180,000	430,000	43,000,000	5,900,000	14,000,000	30,000,000	TM31/PM12	mg/kg	<0.05	<0.01	<0.01	N/A	<0.01	<0.01	N/A	N/A	<0.01	<0.01	N/A

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

		GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%		Sample ID		WS1			WS2			WS3		WS4	
										Depth		1.00	3.00	5.00	1.00	3.00	5.00	0.50	4.00	0.50	2.00
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
CAS Number	**Test**								**Method**	**Units**	**LOD**										
7012-37-5	PCB 28								TM17/PM8	ug/kg	<5	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35693-99-3	PCB 52								TM17/PM8	ug/kg	<5	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
37680-73-2	PCB 101								TM17/PM8	ug/kg	<5	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
31508-00-6	PCB 118								TM17/PM8	ug/kg	<5	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35065-28-2	PCB 138								TM17/PM8	ug/kg	<5	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35065-27-1	PCB 153								TM17/PM8	ug/kg	<5	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35065-29-3	PCB 180								TM17/PM8	ug/kg	<5	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
PCB_7_CON_TOTAL	Total 7 PCBs ^	1,000	1,000	1,000		1,000	1,000	1,000	TM17/PM8	ug/kg	<35	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
18540-29-9	Hexavalent Chromium	6	6	6	7.7	33	33	33	TM38/PM20	mg/kg	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
108-95-2	Phenol	750	1,300	2,300		760	1,500	3,200	TM26/PM21	mg/kg	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
MOIST_CONT_DRY	Natural Moisture Content								PM4/PM0	%	<0.1	24.60	25.20	48.30	18.50	30.90	55.60	14.30	21.00	7.80	20.50
57-12-5	Total Cyanide								TM89/PM45	mg/kg	<0.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<1	<1
TOC	Total Organic Carbon								TM21/PM24	%	<0.02	7.60	8.30	N/A	5.40	11.20	N/A	N/A	1.70	N/A	3.60
SULPHIDE	Sulphide								TM106/PM45	mg/kg	<10	<5	<5	<5	<5	<5	<5	9.00	16.00	<5	17.00
PH	ph								TM73/PM11	pH units		8.30	8.35	7.61	8.35	8.24	7.72	8.10	7.99	8.71	8.69
	Asbestos Screening								TM65/PM42	None		No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected

Notes:
GACs Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3583. All rights reserved. Averge site specific Soil Organic Matter (SOM) is 8.24%.
*Indicates GAC values from SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Companion Document published in 2014.
NAD = No Asbestos Detected. NA = Not Available.
# EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment published in 2010.
+ GAC S4ULs EC >35- 44 were used in the absense of suitable for use levels for EC>35-40
^ Indicates Intervention Values taken from **DUTCH INTERVENTION 2009**

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

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CAS Number	Test	GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%	Method	Units	LOD	WS5			WS6		WS7			WS8	WS9	
										Sample ID		WS5			WS6		WS7			WS8	WS9	
										Depth		0.50	2.00	5.00	1.00	4.00	1.00	3.00	5.00	2.00	0.50	1.00
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
7440-38-2	Arsenic	40	40	40	79	640	640	640	TM30/PM15	mg/kg	<0.5	20.00	31.00	9.00	35.00	13.00	11.00	19.00	3.00	26.00	16.00	13.00
7440-43-9	Cadmium	85	85	85	120	190	190	190	TM30/PM15	mg/kg	<0.1	<1	1.00	<1	<1	<1	2.00	1.00	1.00	1.00	1.00	1.00
7440-47-3	Chromium								TM30/PM15	mg/kg	<0.5	20.00	37.00	16.00	33.00	12.00	17.00	21.00	22.00	15.00	20.00	18.00
7440-50-8	Copper	7,100	7,100	7,100	12,000	68,000	68,000	68,000	TM30/PM15	mg/kg	<1	96.00	1179.00	10.00	66.00	22.00	31.00	89.00	19.00	544.00	55.00	77.00
7439-92-1	Lead*	310	310	310	630	2,300	2,300	2,300	TM30/PM15	mg/kg	<5	829.00	2263.00	99.00	606.00	125.00	109.00	739.00	24.00	1118.00	236.00	243.00
7439-97-6	Mercury	56	56	56	16	1,100	1,100	1,100	TM30/PM15	mg/kg	<0.1	<1	<1	<1	<1	<1	<1	16.00	<1	<0.3	<0.3	1.00
7440-02-0	Nickel	180	180	180	230	980	980	980	TM30/PM15	mg/kg	<0.7	38.00	48.00	9.00	66.00	11.00	45.00	47.00	35.00	40.00	25.00	18.00
7782-49-2	Selenium	430	430	430	1,100	12,000	12,000	12,000	TM30/PM15	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5
JEL1045	Total Sulphate								TM50/PM29	mg/kg	<50	1900.00	4500.00	2000.00	370.00	1600.00	2300.00	11000.00	360.00	3000.00	3000.00	6100.00
7440-42-8	Water Soluble Boron								TM74/PM32	mg/kg	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
7440-66-6	Zinc	40,000	40,000	40,000	81,000	730,000	730,000	730,000	TM30/PM15	mg/kg	<5	120.00	296.00	42.00	142.00	59.00	96.00	122.00	70.00	419.00	116.00	115.00
	PAH MS																					
91-20-3	Naphthalene	2.3	5.6	13	4,900	190	460	1,100	TM4/PM8	mg/kg	<0.04	0.046	0.051	0.077	0.055	0.055	<1	<1	<1	0.037	0.21	0.496
208-96-8	Acenaphthylene	2,900	4,600	6,000	15,000	83,000	97,000	100,000	TM4/PM8	mg/kg	<0.03	0.044	0.013	0.021	0.024	0.013	<1	<1	<1	0.07	0.106	0.228
83-32-9	Acenaphthene	3,000	4,700	6,000	15,000	84,000	97,000	100,000	TM4/PM8	mg/kg	<0.05	0.029	0.031	0.045	0.035	0.035	<1	<1	<1	0.034	1.23	2.203
86-73-7	Fluorene	2,800	3,800	4,500	9,900	63,000	68,000	71,000	TM4/PM8	mg/kg	<0.04	0.04	0.018	0.122	0.024	0.077	<1	<1	<1	0.049	0.662	1.621
85-01-8	Phenanthrene	1,300	1,500	1,500	3,100	22,000	22,000	23,000	TM4/PM8	mg/kg	<0.03	0.68	0.326	0.554	0.327	0.363	<1	<1	<1	0.352	7.987	20.568
120-12-7	Anthracene	31,000	35,000	37,000	74,000	520,000	540,000	540,000	TM4/PM8	mg/kg	<0.04	0.175	0.093	0.248	0.09	0.131	<1	<1	<1	0.086	1.073	2.39
206-44-0	Fluoranthene	1,500	1,600	1,600	3,100	23,000	23,000	23,000	TM4/PM8	mg/kg	<0.03	1.136	0.41	0.553	0.281	0.454	<1	<1	<1	0.179	9.923	20.578
129-00-0	Pyrene	3,700	3,800	3,800	7,400	54,000	54,000	54,000	TM4/PM8	mg/kg	<0.03	0.801	0.364	0.411	0.251	0.318	<1	<1	<1	0.19	9.612	18.2
56-55-3	Benzo(a)anthracene	11	14	15	29	170	170	180	TM4/PM8	mg/kg	<0.06	0.257	0.182	0.154	0.503	0.298	<1	<1	<1	0.191	4.413	8.172
218-01-9	Chrysene	30	31	32	57	350	350	350	TM4/PM8	mg/kg	<0.02	0.569	0.399	0.375	0.34	0.186	<1	<1	<1	0.229	5.104	8.739
BEN-BK-FLUORAN	Benzo(bk)fluoranthene								TM4/PM8	mg/kg	<0.07	0.751	0.796	0.339	0.535	0.218	<1	<1	<1	0.498	7.529	12.56
50-32-8	Benzo(a)pyrene	3.2	3.2	3.2	5.7	35	35	36	TM4/PM8	mg/kg	<0.04	0.428	0.406	0.213	0.277	0.124	<1	<1	<1	0.311	4.355	7.209
193-39-5	Indeno(123cd)pyrene	45	46	46	82	500	510	510	TM4/PM8	mg/kg	<0.04	0.278	0.434	0.122	0.272	0.077	<1	<1	<1	0.297	2.67	4.377
53-70-3	Dibenzo(ah)anthracene	0.31	0.32	0.32	0.58	3.5	3.6	3.6	TM4/PM8	mg/kg	<0.04	0.16	0.22	0.091	0.186	0.04	<1	<1	<1	0.36	2.137	3.874
191-24-2	Benzo(ghi)perylene	360	360	360	640	3,900	4,000	4,000	TM4/PM8	mg/kg	<0.04	0.279	0.429	0.127	0.247	0.079	<1	<1	<1	0.548	3.446	5.605
191-07-1	Coronene								TM4/PM8	mg/kg	<0.04	N/A	0.196	N/A	N/A	0.04	N/A	N/A	N/A	0.198	N/A	N/A
PAH_6_TOTAL	PAH 6 Total								TM4/PM8	mg/kg	<0.22	2.872	2.475	1.354	1.612	0.952	<1	<1	<1	1.833	27.923	50.329
PAH_17_TOTAL	PAH 17 Total								TM4/PM8	mg/kg	<0.64	5.673	4.368	3.452	3.447	2.508	N/A	n/A	N/A	3.629	60.457	116.82
	PAHs																					
INTERPRETATION	EPH CWG Interpretation								TM5/PM16	None		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Possible natural occuring products	N/A	N/A
MINOIL_10-40	Mineral Oil (C10-C40)								TM5/PM16	mg/kg	<30	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
	TPH CWG																					
	Aliphatics																					
GTC05C06AL	>C5-C6	42	78	160	600,000	3,200	5,900	12,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC06C08AL	>C6-C8	100	230	530	620,000	7,800	17,000	40,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC08C10AL	>C8-C10	27	65	150	13,000	2,000	4,800	11,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC10C12AL	>C10-C12	130	330	770	13,000	9,700	23,000	47,000	TM5/PM16	mg/kg	<0.2	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC12C16AL	>C12-C16	1,100	2,400	4,400	13,000	59,000	82,000	90,000	TM5/PM16	mg/kg	<4	N/A	N/A	N/A	N/A	<0.1	N/A	<0.1	N/A	<0.1	N/A	N/A
GTC16C21AL	>C16-C21								TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	<0.1	N/A	<0.1	N/A	<0.1	N/A	N/A
GTC21C35AL	>C21-C35								TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	<0.1	N/A	<0.1	N/A	<0.1	N/A	N/A
GTC05C40AL	Total aliphatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	N/A	N/A	N/A	N/A	<0.1	N/A	<0.1	N/A	<0.1	N/A	N/A
	Aromatics																					
GTEC05EC07AR	>C5-EC7	370	690	1,400	56,000	26,000	46,000	86,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC07EC08AR	>EC7-EC8	860	1,800	3,900	56,000	56,000	110,000	180,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC08EC10AR	>EC8-EC10	47	110	270	5,000	3,500	8,100	17,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC10EC12AR	>EC10-EC12	250	590	1,200	5,000	16,000	28,000	34,000	TM5/PM16	mg/kg	<0.2	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC12EC16AR	>EC12-EC16	1,800	2,300	2,500	5,000	36,000	37,000	38,000	TM5/PM16	mg/kg	<4	N/A	N/A	N/A	N/A	1.40	N/A	<0.1	N/A	0.99	N/A	N/A
GTEC16EC21AR	>EC16-EC21	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	0.80	N/A	<0.1	N/A	1.22	N/A	N/A
GTEC21EC35AR	>EC21-EC35	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	0.12	N/A	<0.1	N/A	0.91	N/A	N/A
GTEC05EC40AR	Total aromatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	N/A	N/A	N/A	N/A	2.00	N/A	<0.1	N/A	3.11	N/A	N/A
GTEC06EC10AR	>EC6-EC10								TM36/PM12	mg/kg	<0.1	N/A	<1	N/A	N/A	49.00	N/A	N/A	N/A	108.00	N/A	N/A
1634-04-4	MTBE*							24,000	TM31/PM12	mg/kg	<0.05	N/A	N/A	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
71-43-2	Benzene	380	700	1,400	73,000	27,000	47,000	90,000	TM31/PM12	mg/kg	<0.05	N/A	<0.01	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
108-88-3	Toluene	880,000	1,900,000	3,900,000	56,000,000	56,000,000	110,000,000	180,000,000	TM31/PM12	mg/kg	<0.05	N/A	<0.01	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
100-41-4	Ethylbenzene	83,000	190,000	480,000	25,000,000	5,700,000	13,000,000	27,000,000	TM31/PM12	mg/kg	<0.05	N/A	<0.01	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
XYLENE	Xylene	79,000	180,000	430,000	43,000,000	5,900,000	14,000,000	30,000,000	TM31/PM12	mg/kg	<0.05	N/A	<0.01	N/A	N/A	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

		GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%		Sample ID		WS5			WS6		WS7			WS8	WS9	
										Depth		0.50	2.00	5.00	1.00	4.00	1.00	3.00	5.00	2.00	0.50	1.00
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
CAS Number	Test								Method	Units	LOD											
7012-37-5	PCB 28								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35693-99-3	PCB 52								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
37680-73-2	PCB 101								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
31508-00-6	PCB 118								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35065-28-2	PCB 138								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35065-27-1	PCB 153								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
35065-29-3	PCB 180								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
PCB_7_CON_TOTAL	Total 7 PCBs ^	1,000	1,000	1,000		1,000	1,000	1,000	TM17/PM8	ug/kg	<35	N/A	<1	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A
18540-29-9	Hexavalent Chromium	6	6	6	7.7	33	33	33	TM38/PM20	mg/kg	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
108-95-2	Phenol	750	1,300	2,300		760	1,500	3,200	TM26/PM21	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A
MOIST_CONT_DRY	Natural Moisture Content								PM4/PM0	%	<0.1	15.10	23.10	19.70	33.50	21.00	10.90	22.50	13.80	25.20	20.30	20.50
57-12-5	Total Cyanide								TM89/PM45	mg/kg	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<2.5	<2.5	<2.5
TOC	Total Organic Carbon								TM21/PM24	%	<0.02	N/A	5.30	N/A	7.50	1.60	N/A	N/A	N/A	8.30	N/A	N/A
SULPHIDE	Sulphide								TM106/PM45	mg/kg	<10	10.00	35.00	541.00	8.00	47.00	<5	<5	11.00	<5	<5	<5
PH	ph								TM73/PM11	pH units		8.51	8.32	8.41	8.66	8.04	8.13	7.71	8.65	8.32	8.04	8.16
	Asbestos Screening								TM65/PM42	None		No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected

Notes:

 Averge site specific Soil Organic Matter (SOM) is 8.24%.

*Indicates GAC values from SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Companion Document published in 2014

NAD = No Asbestos Detected. NA = Not Available.

EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment published in 2010.

+ GAC S4ULs EC >35- 44 were used in the absense of suitable for use levels for EC>35-40

^ Indicates Intervention Values taken from **DUTCH INTERVENTION 2009**

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

OCSC O'CONNOR | SUTTON | CRONIN Multidisciplinary Consulting Engineers

CAS Number	Test	GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%	Method	Units	LOD	WS11			WS12		BH1	BH3		
										Sample ID		WS11			WS12		BH1	BH3		
										Depth		0.50	2.00	3.00	0.50	1.00	2.00	2.0	0.50	1.00
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
CAS Number	Test								Method	Units	LOD									
7440-38-2	Arsenic	40	40	40	79	640	640	640	TM30/PM15	mg/kg	<0.5	N/A	7.00	3.00	27.00	27.00	11.00	8.00	30.00	N/A
7440-43-9	Cadmium	85	85	85	120	190	190	190	TM30/PM15	mg/kg	<0.1	N/A	<1	2.00	1.00	1.00	<0.5	<0.5	<0.5	N/A
7440-47-3	Chromium								TM30/PM15	mg/kg	<0.5	N/A	11.00	32.00	22.00	19.00	10.00	16.00	16.00	N/A
7440-50-8	Copper	7,100	7,100	7,100	12,000	68,000	68,000	68,000	TM30/PM15	mg/kg	<1	N/A	14.00	26.00	306.00	610.00	28.00	7.00	91.00	N/A
7439-92-1	Lead*	310	310	310	630	2,300	2,300	2,300	TM30/PM15	mg/kg	<5	N/A	77.00	25.00	481.00	937.00	362.00	30.00	466.00	N/A
7439-97-6	Mercury	56	56	56	16	1,100	1,100	1,100	TM30/PM15	mg/kg	<0.1	N/A	<1	<1	<0.3	<0.3	<0.3	<0.3	<0.3	N/A
7440-02-0	Nickel	180	180	180	230	980	980	980	TM30/PM15	mg/kg	<0.7	N/A	9.00	51.00	60.00	38.00	14.00	16.00	46.00	N/A
7782-49-2	Selenium	430	430	430	1,100	12,000	12,000	12,000	TM30/PM15	mg/kg	<1	N/A	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	N/A
JEL1045	Total Sulphate								TM50/PM29	mg/kg	<50	N/A	790.00	210.00	1600.00	2300.00	1500.00	560.00	1800.00	N/A
7440-42-8	Water Soluble Boron								TM74/PM32	mg/kg	<0.1	N/A	<1	<1	<1	<1	<1	<1	<1	N/A
7440-66-6	Zinc	40,000	40,000	40,000	81,000	730,000	730,000	730,000	TM30/PM15	mg/kg	<5	N/A	45.00	105.00	233.00	228.00	62.00	59.00	98.00	N/A
	PAH MS																			
91-20-3	Naphthalene	2.3	5.6	13	4,900	190	460	1,100	TM4/PM8	mg/kg	<0.04	N/A	0.351	N/A	0.056	0.047	0.075	<1	0.077	0.007
208-96-8	Acenaphthylene	2,900	4,600	6,000	15,000	83,000	97,000	100,000	TM4/PM8	mg/kg	<0.03	N/A	0.206	N/A	0.08	0.026	0.019	<1	0.065	0.003
83-32-9	Acenaphthene	3,000	4,700	6,000	15,000	84,000	97,000	100,000	TM4/PM8	mg/kg	<0.05	N/A	0.337	N/A	0.068	0.083	0.066	<1	0.038	0.019
86-73-7	Fluorene	2,800	3,800	4,500	9,900	63,000	68,000	71,000	TM4/PM8	mg/kg	<0.04	N/A	0.721	N/A	0.062	0.041	0.105	<1	0.045	0.002
85-01-8	Phenanthrene	1,300	1,500	1,500	3,100	22,000	22,000	23,000	TM4/PM8	mg/kg	<0.03	N/A	2.456	N/A	0.02	0.503	0.559	<1	0.618	0.052
120-12-7	Anthracene	31,000	35,000	37,000	74,000	520,000	540,000	540,000	TM4/PM8	mg/kg	<0.04	N/A	0.65	N/A	0.149	0.141	0.179	<1	0.251	0.012
206-44-0	Fluoranthene	1,500	1,600	1,600	3,100	23,000	23,000	23,000	TM4/PM8	mg/kg	<0.03	N/A	2.634	N/A	0.505	0.566	0.393	<1	0.76	0.032
129-00-0	Pyrene	3,700	3,800	3,800	7,400	54,000	54,000	54,000	TM4/PM8	mg/kg	<0.03	N/A	2.395	N/A	0.36	0.52	0.298	<1	0.764	0.027
56-55-3	Benzo(a)anthracene	11	14	15	29	170	170	180	TM4/PM8	mg/kg	<0.06	N/A	2.016	N/A	0.457	0.537	0.179	<1	0.247	0.032
218-01-9	Chrysene	30	31	32	57	350	350	350	TM4/PM8	mg/kg	<0.02	N/A	1.52	N/A	0.604	0.555	0.147	<1	0.624	0.036
BEN-BK-FLUORAN	Benzo(bk)fluoranthene								TM4/PM8	mg/kg	<0.07	N/A	1.538	N/A	1.007	0.537	0.181	<1	0.937	0.036
50-32-8	Benzo(a)pyrene	3.2	3.2	3.2	5.7	35	35	36	TM4/PM8	mg/kg	<0.04	N/A	0.828	N/A	0.544	0.385	0.135	<1	0.46	0.007
193-39-5	Indeno(123cd)pyrene	45	46	46	82	500	510	510	TM4/PM8	mg/kg	<0.04	N/A	0.539	N/A	0.387	0.179	0.061	<1	0.381	0.014
53-70-3	Dibenzo(ah)anthracene	0.31	0.32	0.32	0.58	3.5	3.6	3.6	TM4/PM8	mg/kg	<0.04	N/A	0.363	N/A	0.317	0.116	0.051	<1	0.398	0.006
191-24-2	Benzo(ghi)perylene	360	360	360	640	3,900	4,000	4,000	TM4/PM8	mg/kg	<0.04	N/A	0.535	N/A	0.537	0.218	0.095	<1	0.701	0.022
191-07-1	Coronene								TM4/PM8	mg/kg	<0.04	N/A	0.205	N/A	N/A	N/A	N/A	N/A	N/A	0.008
PAH_6_TOTAL	PAH 6 Total								TM4/PM8	mg/kg	<0.22	N/A	6.074	N/A	2.98	1.885	0.865	<1	3.239	0.111
PAH_17_TOTAL	PAH 17 Total								TM4/PM8	mg/kg	<0.64	N/A	17.294	N/A	5.153	4.454	2.543	N/A	6.366	0.315
	PAHs																			
INTERPRETATION	EPH CWG Interpretation								TM5/PM16	None		N/A	Possible highly degraded Diesel	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MINOIL_10-40	Mineral Oil (C10-C40)								TM5/PM16	mg/kg	<30	N/A	217.00	N/A	N/A	N/A	N/A	N/A	N/A	<1
	TPH CWG																			
	Aliphatics																			
GTC05C06AL	>C5-C6	42	78	160	600,000	3,200	5,900	12,000	TM36/PM12	mg/kg	<0.1	<0.01	1.00	0.30	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC06C08AL	>C6-C8	100	230	530	620,000	7,800	17,000	40,000	TM36/PM12	mg/kg	<0.1	<0.01	6.00	3.00	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC08C10AL	>C8-C10	27	65	150	13,000	2,000	4,800	11,000	TM36/PM12	mg/kg	<0.1	<0.01	4.00	3.00	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC10C12AL	>C10-C12	130	330	770	13,000	9,700	23,000	47,000	TM5/PM16	mg/kg	<0.2	<0.01	7.00	8.00	N/A	<0.01	N/A	<0.01	N/A	N/A
GTC12C16AL	>C12-C16	1,100	2,400	4,400	13,000	59,000	82,000	90,000	TM5/PM16	mg/kg	<4	<0.1	194.00	<0.1	N/A	<0.1	N/A	<0.1	N/A	N/A
GTC16C21AL	>C16-C21								TM5/PM16	mg/kg	<7	<0.1	301.00	<0.1	N/A	<0.1	N/A	<0.1	N/A	N/A
GTC21C35AL	>C21-C35								TM5/PM16	mg/kg	<7	<0.1	88.00	<0.1	N/A	<0.1	N/A	<0.1	N/A	N/A
GTC05C40AL	Total aliphatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	<0.1	601.00	14.00	N/A	<0.1	N/A	<0.1	N/A	N/A
	Aromatics																			
GTEC05EC07AR	>C5-EC7	370	690	1,400	56,000	26,000	46,000	86,000	TM36/PM12	mg/kg	<0.1	<0.01	0.02	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC07EC08AR	>EC7-EC8	860	1,800	3,900	56,000	56,000	110,000	180,000	TM36/PM12	mg/kg	<0.1	<0.01	0.10	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC08EC10AR	>EC8-EC10	47	110	270	5,000	3,500	8,100	17,000	TM36/PM12	mg/kg	<0.1	<0.01	6.38	4.00	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC10EC12AR	>EC10-EC12	250	590	1,200	5,000	16,000	28,000	34,000	TM5/PM16	mg/kg	<0.2	<0.01	11.00	12.00	N/A	<0.01	N/A	<0.01	N/A	N/A
GTEC12EC16AR	>EC12-EC16	1,800	2,300	2,500	5,000	36,000	37,000	38,000	TM5/PM16	mg/kg	<4	286.00	9.40	<0.1	N/A	1.88	N/A	<0.1	N/A	N/A
GTEC16EC21AR	>EC16-EC21	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	73.00	5.60	<0.1	N/A	1.81	N/A	<0.1	N/A	N/A
GTEC21EC35AR	>EC21-EC35	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	37.00	0,9	<0.1	N/A	0.33	N/A	<0.1	N/A	N/A
GTEC05EC40AR	Total aromatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	396.00	33.00	17.00	N/A	4.02	N/A	<0.1	N/A	N/A
GTEC06EC10AR	>EC6-EC10								TM36/PM12	mg/kg	<0.1	N/A	1086.00	N/A	N/A	N/A	N/A	N/A	N/A	<1
1634-04-4	MTBE*							24,000	TM31/PM12	mg/kg	<0.05	<0.01	0.14	<0.01	N/A	<0.01	N/A	<0.01	N/A	N/A
71-43-2	Benzene	380	700	1,400	73,000	27,000	47,000	90,000	TM31/PM12	mg/kg	<0.05	<0.01	0.02	<0.01	N/A	<0.01	N/A	<0.01	N/A	<0.01
108-88-3	Toluene	880,000	1,900,000	3,900,000	56,000,000	56,000,000	110,000,000	180,000,000	TM31/PM12	mg/kg	<0.05	<0.01	0.10	<0.01	N/A	<0.01	N/A	<0.01	N/A	<0.01
100-41-4	Ethylbenzene	83,000	190,000	480,000	25,000,000	5,700,000	13,000,000	27,000,000	TM31/PM12	mg/kg	<0.05	<0.01	0.04	0.02	N/A	<0.01	N/A	<0.01	N/A	<0.01
XYLENE	Xylene	79,000	180,000	430,000	43,000,000	5,900,000	14,000,000	30,000,000	TM31/PM12	mg/kg	<0.05	<0.01	0.17	0.05	N/A	<0.01	N/A	<0.01	N/A	<0.01

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

		GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%		**Sample ID**		WS11			WS12		BH1	BH3		
										Depth		0.50	2.00	3.00	0.50	1.00	2.00	2.0	0.50	1.00
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
CAS Number	**Test**								**Method**	**Units**	**LOD**									
7012-37-5	PCB 28								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
35693-99-3	PCB 52								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
37680-73-2	PCB 101								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
31508-00-6	PCB 118								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
35065-28-2	PCB 138								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
35065-27-1	PCB 153								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
35065-29-3	PCB 180								TM17/PM8	ug/kg	<5	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
PCB_7_CON_TOTAL	Total 7 PCBs ^	1,000	1,000	1,000		1,000	1,000	1,000	TM17/PM8	ug/kg	<35	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1
18540-29-9	Hexavalent Chromium	6	6	6	7.7	33	33	33	TM38/PM20	mg/kg	<0.01	N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	N/A
108-95-2	Phenol	750	1,300	2,300		760	1,500	3,200	TM26/PM21	mg/kg	<0.01	N/A	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MOIST_CONT_DRY	Natural Moisture Content								PM4/PM0	%	<0.1	8.20	23.80	10.70	21.70	14.00	33.30	23.50	24.30	24.40
57-12-5	Total Cyanide								TM89/PM45	mg/kg	<0.5	N/A	<1	<1	<2.5	<2.5	<1	<1	<1	N/A
TOC	Total Organic Carbon								TM21/PM24	%	<0.02	N/A	2.20	N/A	N/A	N/A	N/A	1.50	N/A	1.10
SULPHIDE	Sulphide								TM106/PM45	mg/kg	<10	N/A	189.00	12.00	<5	8.00	93.00	<5	6.00	N/A
PH	ph								TM73/PM11	pH units		N/A	8.67	8.70	8.21	8.01	8.63	8.93	8.98	N/A
	Asbestos Screening								TM65/PM42	None		N/A	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	N/A

Notes:

 Averge site specific Soil Organic Matter (SOM) is 8.24%.

*Indicates GAC values from SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Companion Document published in 2014

NAD = No Asbestos Detected. NA = Not Available.

EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment published in 2010.

+ GAC S4ULs EC >35- 44 were used in the absense of suitable for use levels for EC>35-40

^ Indicates Intervention Values taken from **DUTCH INTERVENTION 2009**

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

		GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%		Sample ID		BH4				BH5	BH6		BH7		
										Depth		1.00	5.0-5.3	6.0-6.3	7.20	2.00	1.00	2.00	0.5	3	6.50
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
CAS Number	**Test**								**Method**	**Units**	**LOD**										
7440-38-2	Arsenic	40	40	40	79	640	640	640	TM30/PM15	mg/kg	<0.5	26.00	18.00	22.00	17.00	15.00	15.00	27.00	27.00	N/A	8.00
7440-43-9	Cadmium	85	85	85	120	190	190	190	TM30/PM15	mg/kg	<0.1	1.00	1.00	1.00	1.00	<0.5	1.00	1.00	<1	N/A	1.00
7440-47-3	Chromium								TM30/PM15	mg/kg	<0.5	28.00	14.00	17.00	16.00	30.00	15.00	20.00	23.00	N/A	17.00
7440-50-8	Copper	7,100	7,100	7,100	12,000	68,000	68,000	68,000	TM30/PM15	mg/kg	<1	237.00	270.00	250.00	42.00	145.00	42.00	99.00	29.00	N/A	18.00
7439-92-1	Lead*	310	310	310	630	2,300	2,300	2,300	TM30/PM15	mg/kg	<5	392.00	430.00	480.00	222.00	602.00	439.00	1187.00	183.00	N/A	22.00
7439-97-6	Mercury	56	56	56	16	1,100	1,100	1,100	TM30/PM15	mg/kg	<0.1	<0.3	1.50	2.10	<0.3	<0.3	<0.3	5.00	<1	N/A	<1
7440-02-0	Nickel	180	180	180	230	980	980	980	TM30/PM15	mg/kg	<0.7	40.00	29.00	40.00	26.00	29.00	18.00	35.00	16.00	N/A	28.00
7782-49-2	Selenium	430	430	430	1,100	12,000	12,000	12,000	TM30/PM15	mg/kg	<1	<0.5	<3	<3	<0.5	<0.5	<0.5	<0.5	<1	N/A	<1
JEL1045	Total Sulphate								TM50/PM29	mg/kg	<50	2000.00	N/A	N/A	1500.00	5800.00	500.00	1700.00	1000.00	N/A	620.00
7440-42-8	Water Soluble Boron								TM74/PM32	mg/kg	<0.1	<1	<1	<1	<1	<1	<1	<1	<1	N/A	<1
7440-66-6	Zinc	40,000	40,000	40,000	81,000	730,000	730,000	730,000	TM30/PM15	mg/kg	<5	153.00	260.00	240.00	95.00	103.00	91.00	139.00	118.00	N/A	72.00
	PAH MS																				
91-20-3	Naphthalene	2.3	5.6	13	4,900	190	460	1,100	TM4/PM8	mg/kg	<0.04	0.072	N/A	N/A	0.039	0.074	0.108	5.377	0.002	N/A	<1
208-96-8	Acenaphthylene	2,900	4,600	6,000	15,000	83,000	97,000	100,000	TM4/PM8	mg/kg	<0.03	0.101	N/A	N/A	0.009	0.044	0.201	2.351	0.004	N/A	<1
83-32-9	Acenaphthene	3,000	4,700	6,000	15,000	84,000	97,000	100,000	TM4/PM8	mg/kg	<0.05	0.054	N/A	N/A	0.027	0.03	0.079	0.994	0.016	N/A	<1
86-73-7	Fluorene	2,800	3,800	4,500	9,900	63,000	68,000	71,000	TM4/PM8	mg/kg	<0.04	0.068	N/A	N/A	0.025	0.021	0.118	3.38	0.001	N/A	<1
85-01-8	Phenanthrene	1,300	1,500	1,500	3,100	22,000	22,000	23,000	TM4/PM8	mg/kg	<0.03	1.062	N/A	N/A	0.34	0.49	1.969	27.765	0.005	N/A	<1
120-12-7	Anthracene	31,000	35,000	37,000	74,000	520,000	540,000	540,000	TM4/PM8	mg/kg	<0.04	0.26	N/A	N/A	0.033	0.19	0.699	10.691	0.002	N/A	<1
206-44-0	Fluoranthene	1,500	1,600	1,600	3,100	23,000	23,000	23,000	TM4/PM8	mg/kg	<0.03	1.407	N/A	N/A	0.113	0.879	3.233	34.308	0.078	N/A	<1
129-00-0	Pyrene	3,700	3,800	3,800	7,400	54,000	54,000	54,000	TM4/PM8	mg/kg	<0.03	1.379	N/A	N/A	0.092	0.941	2.372	28.495	0.153	N/A	<1
56-55-3	Benzo(a)anthracene	11	14	15	29	170	170	180	TM4/PM8	mg/kg	<0.06	0.86	N/A	N/A	0.117	1.257	3.324	21.106	0.08	N/A	<1
218-01-9	Chrysene	30	31	32	57	350	350	350	TM4/PM8	mg/kg	<0.02	0.932	N/A	N/A	0.171	0.826	1.387	16.33	0.061	N/A	<1
BEN-BK-FLUORAN	Benzo(bk)fluoranthene								TM4/PM8	mg/kg	<0.07	1.808	N/A	N/A	0.193	1.417	1.963	28.064	0.085	N/A	<1
50-32-8	Benzo(a)pyrene	3.2	3.2	3.2	5.7	35	35	36	TM4/PM8	mg/kg	<0.04	1.039	N/A	N/A	0.078	0.816	1.366	16.122	0.047	N/A	<1
193-39-5	Indeno(123cd)pyrene	45	46	46	82	500	510	510	TM4/PM8	mg/kg	<0.04	0.896	N/A	N/A	0.071	0.501	0.781	10.079	0.058	N/A	<1
53-70-3	Dibenzo(ah)anthracene	0.31	0.32	0.32	0.58	3.5	3.6	3.6	TM4/PM8	mg/kg	<0.04	0.678	N/A	N/A	0.086	0.348	0.455	10.344	0.021	N/A	<1
191-24-2	Benzo(ghi)perylene	360	360	360	640	3,900	4,000	4,000	TM4/PM8	mg/kg	<0.04	1.117	N/A	N/A	0.137	0.678	0.857	10.027	0.062	N/A	<1
191-07-1	Coronene								TM4/PM8	mg/kg	<0.04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
PAH_6_TOTAL	PAH 6 Total								TM4/PM8	mg/kg	<0.22	6.267	N/A	N/A	0.592	4.291	8.2	98.6	0.33	N/A	<1.6
PAH_17_TOTAL	PAH 17 Total								TM4/PM8	mg/kg	<0.64	11.733	N/A	N/A	1.531	8.512	18.912	225.433	0.675	N/A	<1
	PAHs																				
INTERPRETATION	EPH CWG Interpretation								TM5/PM16	None		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MINOIL_10-40	Mineral Oil (C10-C40)								TM5/PM16	mg/kg	<30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
	TPH CWG																				
	Aliphatics																				
GTC05C06AL	>C5-C6	42	78	160	600,000	3,200	5,900	12,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTC06C08AL	>C6-C8	100	230	530	620,000	7,800	17,000	40,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTC08C10AL	>C8-C10	27	65	150	13,000	2,000	4,800	11,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTC10C12AL	>C10-C12	130	330	770	13,000	9,700	23,000	47,000	TM5/PM16	mg/kg	<0.2	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTC12C16AL	>C12-C16	1,100	2,400	4,400	13,000	59,000	82,000	90,000	TM5/PM16	mg/kg	<4	N/A	N/A	N/A	N/A	<0.1	N/A	N/A	N/A	<0.1	N/A
GTC16C21AL	>C16-C21								TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	<0.1	N/A	N/A	N/A	<0.1	N/A
GTC21C35AL	>C21-C35								TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	<0.1	N/A	N/A	N/A	<0.1	N/A
GTC05C40AL	Total aliphatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	N/A	N/A	N/A	N/A	<0.1	N/A	N/A	N/A	<0.1	N/A
	Aromatics																				
GTEC05EC07AR	>C5-EC7	370	690	1,400	56,000	26,000	46,000	86,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTEC07EC08AR	>EC7-EC8	860	1,800	3,900	56,000	56,000	110,000	180,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTEC08EC10AR	>EC8-EC10	47	110	270	5,000	3,500	8,100	17,000	TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTEC10EC12AR	>EC10-EC12	250	590	1,200	5,000	16,000	28,000	34,000	TM5/PM16	mg/kg	<0.2	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
GTEC12EC16AR	>EC12-EC16	1,800	2,300	2,500	5,000	36,000	37,000	38,000	TM5/PM16	mg/kg	<4	N/A	N/A	N/A	N/A	2.60	N/A	N/A	N/A	<0.1	N/A
GTEC16EC21AR	>EC16-EC21	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	4.00	N/A	N/A	N/A	<0.1	N/A
GTEC21EC35AR	>EC21-EC35	1,900	1,900	1,900	3,800	28,000	28,000	28,000	TM5/PM16	mg/kg	<7	N/A	N/A	N/A	N/A	1.00	N/A	N/A	N/A	<0.1	N/A
GTEC05EC40AR	Total aromatics C5-40								TM5/TM36/PM12/PM16	mg/kg	<26	N/A	N/A	N/A	N/A	7.60	N/A	N/A	N/A	<0.1	N/A
GTEC06EC10AR	>EC6-EC10								TM36/PM12	mg/kg	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
1634-04-4	MTBE*							24,000	TM31/PM12	mg/kg	<0.05	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	N/A
71-43-2	Benzene	380	700	1,400	73,000	27,000	47,000	90,000	TM31/PM12	mg/kg	<0.05	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	<0.01
108-88-3	Toluene	880,000	1,900,000	3,900,000	56,000,000	56,000,000	110,000,000	180,000,000	TM31/PM12	mg/kg	<0.05	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	<0.01
100-41-4	Ethylbenzene	83,000	190,000	480,000	25,000,000	5,700,000	13,000,000	27,000,000	TM31/PM12	mg/kg	<0.05	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	<0.01
XYLENE	Xylene	79,000	180,000	430,000	43,000,000	5,900,000	14,000,000	30,000,000	TM31/PM12	mg/kg	<0.05	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	N/A	<0.01	<0.01

Table 1: Soil Analytical Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

		GAC S4UL Residential without plant uptake End Use 1%	GAC S4UL Residential without plant uptake End Use 2.5%	GAC S4UL Residential without plant uptake End Use 6%	GAC S4UL Public Open Space Residential 6% SOM	GAC S4UL commercial End Use 1%	GAC S4UL Commercial End Use 2.5%	GAC S4UL Commercial End Use 6%		Sample ID		BH4				BH5	BH6		BH7		
										Depth		1.00	5.0-5.3	6.0-6.3	7.20	2.00	1.00	2.00	0.5	3	6.50
										Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
CAS Number	**Test**								**Method**	**Units**	**LOD**										
7012-37-5	PCB 28								TM17/PM8	ug/kg	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
35693-99-3	PCB 52								TM17/PM8	ug/kg	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
37680-73-2	PCB 101								TM17/PM8	ug/kg	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
31508-00-6	PCB 118								TM17/PM8	ug/kg	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
35065-28-2	PCB 138								TM17/PM8	ug/kg	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
35065-27-1	PCB 153								TM17/PM8	ug/kg	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
35065-29-3	PCB 180								TM17/PM8	ug/kg	<5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
PCB_7_CON_TOTAL	Total 7 PCBs ^	1,000	1,000	1,000		1,000	1,000	1,000	TM17/PM8	ug/kg	<35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
18540-29-9	Hexavalent Chromium	6	6	6	7.7	33	33	33	TM38/PM20	mg/kg	<0.01	<0.1	N/A	N/A	<0.1	<0.1	<0.1	<0.1	<0.1	N/A	<0.1
108-95-2	Phenol	750	1,300	2,300		760	1,500	3,200	TM26/PM21	mg/kg	<0.01	N/A	N/A	N/A	N/A	<0.01	N/A	N/A	<0.01	N/A	<0.01
MOIST_CONT_DRY	Natural Moisture Content								PM4/PM0	%	<0.1	9.50	N/A	N/A	40.90	23.20	15.00	27.20	3.90	17.80	7.80
57-12-5	Total Cyanide								TM89/PM45	mg/kg	<0.5	<2.5	N/A	N/A	<2.5	N/A	<2.5	<2.5	<1	N/A	<1
TOC	Total Organic Carbon								TM21/PM24	%	<0.02	7.60	N/A	N/A	N/A	3.10	N/A	N/A	N/A	N/A	0.50
SULPHIDE	Sulphide								TM106/PM45	mg/kg	<10	7.00	N/A	N/A	35.00	<5	17.00	<5	24.00	N/A	16.00
PH	ph								TM73/PM11	pH units		8.49	N/A	N/A	7.84	8.13	8.45	8.38	9.21	N/A	8.67
	Asbestos Screening								TM65/PM42	None		No Fibres Detected	N/A	N/A	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	N/A	No Fibres Detected

Notes:

 Averge site specific Soil Organic Matter (SOM) i 8.24%.

*Indicates GAC values from SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Policy Companion Document published in 2014

NAD = No Asbestos Detected. NA = Not Available.

EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment published in 2010.

+ GAC S4ULs EC >35- 44 were used in the absense of suitable for use levels for EC>35-40

^ Indicates Intervention Values taken from **DUTCH INTERVENTION 2009**

Table 2: Soil Samples SVOCs and VOC Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

								Sample ID			WS6	WS11	WS6	WS11	BH5
								Depth			4	3	4	3	2
								Sample Type			Soil	Soil	Soil	Soil	Soil
								Sampled Date			Unknown	Unknown	Unknown	Unknown	Unknown
CAS Number	**Test**	**GAC S4UL Residential without plant uptake End Use 1%**	**GAC S4UL Residential without plant uptake End Use 2.5%**	**GAC S4UL Residential without plant uptake End Use 6%**	**GAC S4UL commercial End Use 1%**	**GAC S4UL Commercial End Use 2.5%**	**GAC S4UL Commercial End Use 6%**	**Method**	**Units**	**LOD**					
	Total Organic Carbon							TM21/PM24	%	<0.02	1.6	-	1.6	-	3.1
	Soil Organic Matter								%	<0.02	0.928	-	0.928	-	1.798
	SVOC MS														
	Phenols														
95-57-8	2-Chlorophenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
95-48-7	2-Methylphenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
88-75-5	2-Nitrophenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
120-83-2	2,4-Dichlorophenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
105-67-9	2,4-Dimethylphenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
95-95-4	2,4,5-Trichlorophenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
88-06-2	2,4,6-Trichlorophenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
59-50-7	4-Chloro-3-methylphenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
106-44-5	4-Methylphenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
100-02-7	4-Nitrophenol							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Sum of Mono to Tetra Chlorophenols	94,000	150,000	210,000	3,500,000	4,000,000	4,300,000								
87-86-5	Pentachlorophenol	27,000	29,000	31,000	400,000	400,000	400,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
108-95-2	Phenol	750,000	1,300,000	2,300,000	760,000	1,500,000	3,200,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Phthalates														
117-81-7	Bis(2-ethylhexyl) phthalate							TM16/PM8	ug/kg	<100	<100	1663	-	-	-
85-68-7	Butylbenzyl phthalate							TM16/PM8	ug/kg	<100	<100	<100	-	-	-
84-74-2	Di-n-butyl phthalate	450,000	450,000	450,000	15,000,000	15,000,000	15,000,000	TM16/PM8	ug/kg	<100	<100	<100	-	-	-
117-84-0	Di-n-Octyl phthalate	3,400,000	3,400,000	3,400,000	89,000,000	89,000,000	89,000,000	TM16/PM8	ug/kg	<100	<100	<100	-	-	-
84-66-2	Diethyl phthalate	1,800,000	3,500,000	6,300,000	150,000,000	220,000,000	290,000,000	TM16/PM8	ug/kg	<100	<100	<100	-	-	-
131-11-3	Dimethyl phthalate							TM16/PM8	ug/kg	<100	<100	<100	-	-	-
	Other SVOCs														
95-50-1	1,2-Dichlorobenzene	24,000	57,000	130,000	2,000,000	4,800,000	11,000,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
120-82-1	1,2,4-Trichlorobenzene	2,600	6,400	15,000	220,000	530,000	1,300,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
541-73-1	1,3-Dichlorobenzene	440	1,100	2,500	30,000	73,000	170,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
106-46-7	1,4-Dichlorobenzene	61,000	150,000	350,000	4,400,000	10,000,000	25,000,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
88-74-4	2-Nitroaniline							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
121-14-2	2,4-Dinitrotoluene	170,000	170,000	170,000	3,700,000	3,700,000	3,800,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
606-20-2	2,6-Dinitrotoluene	78,000	84,000	87,000	1,900,000	1,900,000	1,900,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
99-09-2	3-Nitroaniline							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
101-55-3	4-Bromophenylphenylether							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
106-47-8	4-Chloroaniline							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
7005-72-3	4-Chlorophenylphenylether							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
100-01-6	4-Nitroaniline							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
103-33-3	Azobenzene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
111-91-1	Bis(2-chloroethoxy)methane							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
111-44-4	Bis(2-chloroethyl)ether							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
86-74-8	Carbazole							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
132-64-9	Dibenzofuran							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
118-74-1	Hexachlorobenzene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-

Table 2: Soil Samples SVOCs and VOC Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

										Sample ID	WS6	WS11	WS6	WS11	BH5
										Depth	4	3	4	3	2
										Sample Type	Soil	Soil	Soil	Soil	Soil
										Sampled Date	Unknown	Unknown	Unknown	Unknown	Unknown
87-68-3	Hexachlorobutadiene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
77-47-4	Hexachlorocyclopentadiene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
67-72-1	Hexachloroethane	220	540	1,300	22,000	53,000	120,000	TM16/PM8	ug/kg	<10	<100	<100	-	-	-
78-59-1	Isophorone							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
621-64-7	N-nitrosodi-n-propylamine							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
98-95-3	Nitrobenzene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
321-60-8	Surrogate Recovery 2-Fluorobiphenyl							TM16/PM8	%	<0					
1718-51-0	Surrogate Recovery p-Terphenyl-d14							TM16/PM8	%	<0					
	Naphthalene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Acenaphthylene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Acenaphthene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Fluorene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Phenanthrene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Anthracene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Fluoranthrene							TM16/PM8	ug/kg	<10	163	185	-	-	-
	Pyrene							TM16/PM8	ug/kg	<10	130	153	-	-	-
	Benzo(a)anthracene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Chrysene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Benzo(b)fluoranthene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Benzo(k)fluoranthrene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Benzo(a)pyrene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Indeno(1,2,3-cd)pyrene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Dibenzo(a,h)anthracene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	Benzo(ghi)perylene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	2-Chloronaphthalene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	2-Methylnaphthalene							TM16/PM8	ug/kg	<10	<100	<100	-	-	-
	VOC MS														
75-71-8	Dichlorodifluoromethane							TM15/PM10	ug/kg	<2	-	-	<2	<2	<2
1634-04-4	Methyl Tertiary Butyl Ether	73,000	120,000	220,000	7,900,00	13,000,000	24,000,000	TM15/PM10	ug/kg	<2	-	-	<3	<3	<3
74-87-3	Chloromethane	8.5	9.9	13	1,000	1,200	1,600	TM15/PM10	ug/kg	<3	-	-	<3	<3	<3
75-01-4	Vinyl Chloride	0.77	1	1.5	59	77	120	TM15_A/PM10	ug/kg	<2	-	-	<3	<3	<3
74-83-9	Bromomethane						120,000	TM15/PM10	ug/kg	<1	-	-	<5	<5	<5
75-00-3	Chloroethane	8,400	11,000	18,000	960,000	1,300,000	2,100,000	TM15/PM10	ug/kg	<2	-	-	<2.5	<2.5	<2.5
75-69-4	Trichlorofluoromethane							TM15/PM10	ug/kg	<2	-	-	<1.5	<1.5	<1.5
75-35-4	1,1-Dichloroethene (1,1 DCE)	230	410	820	26,000	46,000	92,000	TM15/PM10	ug/kg	<6	-	-	<2	<2	<2
75-09-2	Dichloromethane (DCM)	2,100	2,800	4,500	270,000	360,000	560,000	TM15/PM10	ug/kg	<30	-	-	<4	<4	<4
156-60-5	trans-1-2-Dichloroethene							TM15/PM10	ug/kg	<3	-	-	<2	<2	<2
75-34-3	1,1-Dichloroethane	2,500	4,100	7,700	280,000	450,000	850,000	TM15/PM10	ug/kg	<3	-	-	<2	<2	<2
156-59-2	cis-1-2-Dichloroethene	120	200	390	14,000	24,000	47,000	TM15/PM10	ug/kg	<3	-	-	<2	<2	<2
594-20-7	2,2-Dichloropropane							TM15/PM10	ug/kg	<4	-	-	<3	<3	<3
74-97-5	Bromochloromethane							TM15/PM10	ug/kg	<3	-	-	<6	<6	<6
67-66-3	Chloroform	1,200	2,100	4,200	99,000	170,000	350,000	TM15/PM10	ug/kg	<3	-	-	<2	<2	<2
71-55-6	1,1,1-Trichloroethane	9,000	18,000	40,000	660,000	1,300,000	3,000,000	TM15/PM10	ug/kg	<3	-	-	<1.5	<1.5	<1.5
563-58-6	1,1-Dichloropropene							TM15/PM10	ug/kg	<3	-	-	<2	<2	<2
56-23-5	Carbon tetrachloride							TM15/PM10	ug/kg	<4	-	-	<1	<1	<1
107-06-2	1,2-Dichloroethane	9.2	13	23	670	970	1,700	TM15/PM10	ug/kg	<4	-	-	<5	<5	<5
71-43-2	Benzene	380	700	1,400	27,000	47,000	90,000	TM15/PM10	ug/kg	<3	-	-	<2	<2	<2

Table 2: Soil Samples SVOCs and VOC Results - Site Investigation 2008

Connolly Station Car Park, Dublin 1

								Sample ID			WS6	WS11	WS6	WS11	BH5
								Depth			4	3	4	3	2
								Sample Type			Soil	Soil	Soil	Soil	Soil
								Sampled Date			Unknown	Unknown	Unknown	Unknown	Unknown
79-01-6	Trichloroethene (TCE)	17	36	80	1,200	2,600	5,700	TM15/PM10	ug/kg	<3	-	-	<2	<2	<2
78-87-5	1,2-Dichloropropane	24	42	85	3,300	5,900	12,000	TM15/PM10	ug/kg	<6	-	-	<3	<3	<3
74-95-3	Dibromomethane							TM15/PM10	ug/kg	<3	-	-	<8	<8	<8
75-27-4	Bromodichloromethane							TM15/PM10	ug/kg	<3	-	-	<3	<3	<3
10061-01-5	cis-1-3-Dichloropropene							TM15/PM10	ug/kg	<4	-	-	<3.5	<3.5	<3.5
108-88-3	Toluene	880,000	1,900,000	3,900,000	56,000,000	110,000,000	180,000,000	TM15/PM10	ug/kg	<3	-	-	<1	<1	<1
10061-02-6	trans-1-3-Dichloropropene							TM15/PM10	ug/kg	<3	-	-	<4	<4	<4
79-00-5	1,1,2-Trichloroethane	880	1,800	3,900	94,000	190,000	400,000	TM15/PM10	ug/kg	<3	-	-	<4.5	<4.5	<4.5
127-18-4	Tetrachloroethene (PCE)	180	400	920	19,000	42,000	95,000	TM15/PM10	ug/kg	<3	-	-	<1	<1	<1
142-28-9	1,3-Dichloropropane							TM15/PM10	ug/kg	<3	-	-	<5	<5	<5
124-48-1	Dibromochloromethane							TM15/PM10	ug/kg	<3	-	-	<4	<4	<4
106-93-4	1,2-Dibromoethane							TM15/PM10	ug/kg	<3	-	-	<5	<5	<5
108-90-7	Chlorobenzene	460	1,000	2,400	56,000	130,000	290,000	TM15/PM10	ug/kg	<3	-	-	<1	<1	<1
630-20-6	1,1,1,2-Tetrachloroethane	1,500	3,500	8,200	110,000	250,000	560,000	TM15/PM10	ug/kg	<3	-	-	<2	<2	<2
100-41-4	Ethylbenzene	83,000	190,000	480,000	5,700,000	13,000,000	33,000,000	TM15/PM10	ug/kg	<3	-	-	<1	<1	<1
P_M_XYLENE	p/m-Xylene	161,000	370,000	880,000	12,100,000	28,000,000	61,000,000	TM15/PM10	ug/kg	<5	-	-	<2	18	<2
95-47-6	o-Xylene	88,000	210,000	480,000	6,600,000	15,000,000	33,000,000	TM15/PM10	ug/kg	<3	-	-	<1	<1	<1
100-42-5	Styrene	35,000	78,000	170,000	3,300,000	6,500,000	11,000,000	TM15_A/PM10	ug/kg	<3	-	-	<1	<1	<1
75-25-2	Bromoform	5,200	11,000	23,000	760,000	1,500,000	3,100,000	TM15/PM10	ug/kg	<3	-	-	<7	<7	<7
98-82-8	Isopropylbenzene	12,000	28,000	67,000	1,400,000	3,300,000	7,700,000	TM15/PM10	ug/kg	<3	-	-	<1	5	<1
79-34-5	1,1,2,2-Tetrachloroethane	3,900	8,000	17,000	270,000	550,000	1,100,000	TM15/PM10	ug/kg	<3	-	-	<8	<8	<8
108-86-1	Bromobenzene	910	2,100	4,900	97,000	220,000	520,000	TM15/PM10	ug/kg	<2	-	-	<2	<2	<2
96-18-4	1,2,3-Trichloropropane							TM15/PM10	ug/kg	<4	-	-	<8	<8	<8
103-65-1	Propylbenzene	40,000	97,000	230,000	4,100,000	9,700,000	21,000,000	TM15/PM10	ug/kg	<4	-	-	<1	10	<1
95-49-8	2-Chlorotoluene							TM15/PM10	ug/kg	<3	-	-	<1	<1	<1
108-67-8	1,3,5-Trimethylbenzene							TM15/PM10	ug/kg	<3	-	-	<1	11	<1
106-43-4	4-Chlorotoluene							TM15/PM10	ug/kg	<3	-	-	<1	<1	<1
98-06-6	tert-Butylbenzene							TM15/PM10	ug/kg	<5	-	-	<1	<1	<1
95-63-6	1,2,4-Trimethylbenzene	410	990	2,300	42,000	99,000	220,000	TM15/PM10	ug/kg	<6	-	-	<1	71	<1
135-98-8	sec-Butylbenzene							TM15/PM10	ug/kg	<4	-	-	<1	3	<1
99-87-6	4-Isopropyltoluene							TM15/PM10	ug/kg	<4	-	-	<1	<1	<1
541-73-1	1,3-Dichlorobenzene	440	1,100	2,500	30,000	73,000	170,000	TM15/PM10	ug/kg	<4	-	-	<1	<1	<1
106-46-7	1,4-Dichlorobenzene	61,000	150,000	350,000	4,400,000	10,000,000	25,000,000	TM15/PM10	ug/kg	<4	-	-	<3	<3	<3
104-51-8	n-Butylbenzene							TM15/PM10	ug/kg	<4	-	-	<2	<2	<2
95-50-1	1,2-Dichlorobenzene	24,000	57,000	130,000	2,000,000	4,800,000	11,000,000	TM15/PM10	ug/kg	<4	-	-	<2	<2	<2
96-12-8	1,2-Dibromo-3-chloropropane							TM15/PM10	ug/kg	<4	-	-	<13	<13	<13
120-82-1	1,2,4-Trichlorobenzene	2,600	6,400	15,000	220,000	530,000	1,300,000	TM15/PM10	ug/kg	<7	-	-	<3	<3	<3
87-68-3	Hexachlorobutadiene	320	780	1,800	31,000	66,000	120,000	TM15/PM10	ug/kg	<4	-	-	<2	<2	<2
91-20-3	Naphthalene	2,300	5,600	13,000	190,000	460,000	1,100,000	TM15/PM10	ug/kg	<27	-	-	<4	<4	<4
87-61-6	1,2,3-Trichlorobenzene	1,500	3,700	8,800	102,000	250,000	590,000	TM15/PM10	ug/kg	<7	-	-	<2.5	<2.5	<2.5

Notes:

EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment published in 2010.
- = Not tested

Table 3: Groundwater Environmental Risk Site Investigation 2008
Connolly Station Car Park, Dublin 1

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary Consulting Engineers

CAS Number	Test	Groundwater Regulations	EPA Interim Guideline Values	Method	Units	LOD	BH1	BH1	BH1	BH2	BH2	BH3	BH3	BH3	BH4	BH4	BH4	BH4	BH5	BH5	BH5	BH6	BH6	BH7	BH7	BH7	WS7	WS7	WS7	WS11	WS11	WS11
					Depth		Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
					Sample Type		Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sampled Date		04/09/2008	10/09/2008	17/09/2008	10/09/2008	17/09/2008	29/08/2008	04/09/2008	10/09/2008	29/08/2008	04/09/2008	04/09/2008	10/09/2008	29/08/2008	10/09/2008	17/09/2008	10/09/2008	17/09/2008	29/08/2008	04/09/2008	10/09/2008	29/08/2008	04/09/2008	10/09/2008	29/08/2008	04/09/2008	10/09/2008
		2016	2003																													
7440-36-0	Dissolved Antimony			TM30/PM14	ug/l	<2	1	<1	2	<1	3	3	1	<1	5	<1	N/A	<1	3	3	4	<1	<1	<1	<1	1	11	21	20	<1	3	2
7440-38-2	Dissolved Arsenic	7.50	10	TM30/PM14	ug/l	<2.5	1	<1	2	2	3	3	<1	<1	5	2	N/A	<1	10	9	10	2	3	5	8	8	3	8	1	2	6	4
7440-43-9	Dissolved Cadmium		5	TM30/PM14	ug/l	<0.5	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	0.5	<0.4	<0.4	0.5	N/A	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	1.6	1.3	1.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
7440-47-3	Total Dissolved Chromium	37.50	30	TM30/PM14	ug/l	<1.5	<1	1	<1	<1	1	4	3	<1	2	126	6	1	13	1	1	<1	<1	7	2	3	7	1	<1	9	<1	<1
7440-50-8	Dissolved Copper		30	TM30/PM14	ug/l	<7	2	3	1	3	2	3	7	4	5	15	N/A	5	4	5	5	<1	2	8	8	4	5	9	5	4	9	1
7439-92-1	Dissolved Lead	7.50	10	TM30/PM14	ug/l	<5	1	16	<1	<1	<1	<1	19	1	2	34	N/A	1	2	4	<1	<1	3	<1	4	1	2	35	2	6	62	2
7439-97-6	Dissolved Mercury	0.75	1	TM30/PM14	ug/l	<1	N/A	<0.05	<0.05	<0.05	<0.05	0.08	N/A	<0.05	0.05	N/A	N/A	0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	N/A	0.06	<0.05	N/A	<0.05	<0.05	N/A	<0.05
7440-02-0	Dissolved Nickel		20	TM30/PM14	ug/l	<2	6	6	4	7	4	5	7	2	4	68	N/A	2	17	17	19	7	10	14	13	13	10	10	8	8	15	12
7782-49-2	Dissolved Selenium			TM30/PM14	ug/l	<3	12	8	11	3	10	16	<1	3	8	2	N/A	<1	<1	<1	2	<1	<1	31	28	27	1	10	<1	<1	<1	2
7440-66-6	Dissolved Zinc	75.00	100	TM30/PM14	ug/l	<3	21	151	<1	32	<1	32	45	22	34	104	N/A	18	57	55	32	27	27	35	25	17	34	36	23	76	72	15
VOCTIC	**VOC TICs**			TM15/PM10	None																											
1634-04-4	Methyl Tertiary Butyl Ether	10.00	30	TM15/PM10	ug/l	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	14	17
71-43-2	Benzene	0.75	1	TM15/PM10	ug/l	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	31	<0.01
108-88-3	Toluene	525.00	10	TM15/PM10	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	19	<0.01	<0.01
100-41-4	Ethylbenzene		10	TM15/PM10	ug/l	<1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	211	13	15
XYLENE	Xylene		10	TM15/PM10	ug/l	<2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	527	35	23
	SVOC MS																															
108-95-2	Phenol		0.5	TM16/PM30	ug/l	<1	0.02	<0.01	0.18	<0.01	0.13	N/A	0.03	<0.01	N/A	0.03	N/A	<0.01	N/A	<0.01	0.09	<0.01	0.03	N/A	<0.01	<0.01	N/A	0.02	<0.01	N/A	0.03	<0.01
	PAHs																															
91-20-3	Naphthalene		1	TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.117	0.013	0.531	<0.01	0.07	0.028	<0.01	N/A	<0.01	0.02	<0.01	<0.01	0.013	0.382	0.031	<0.01	<0.01	0.037	<0.01	<0.01	0.617	<0.01	<0.01
208-96-8	Acenaphthylene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	4.631	5.201	33.067	<0.01	3.775	0.023	<0.01	N/A	<0.01	0.011	<0.01	<0.01	0.013	1.147	<0.01	<0.01	<0.01	0.018	<0.01	<0.01	2.35	<0.01	0.018
83-32-9	Acenaphthene			TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	1.836	1.222	6.966	<0.01	1.099	0.022	<0.01	N/A	<0.01	0.029	<0.01	<0.01	0.038	1.693	0.011	<0.01	<0.01	0.032	<0.01	<0.01	2.996	<0.01	0.045
86-73-7	Fluorene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	2.027	0.031	1.611	<0.01	1.552	0.016	<0.01	N/A	<0.01	0.04	<0.01	<0.01	0.047	1.781	0.025	<0.01	<0.01	0.079	<0.01	<0.01	1.73	<0.01	0.045
85-01-8	Phenanthrene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	3.303	0.067	2.803	<0.01	2.106	0.034	<0.01	N/A	<0.01	0.159	<0.01	<0.01	0.088	3.062	0.04	<0.01	<0.01	0.187	<0.01	<0.01	3.956	<0.01	0.061
120-12-7	Anthracene		10,000	TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.901	0.019	2.221	<0.01	1.396	0.013	<0.01	N/A	<0.01	0.043	<0.01	<0.01	0.029	0.596	<0.01	<0.01	<0.01	0.086	<0.01	<0.01	0.48	<0.01	0.025
206-44-0	Fluoranthene		1	TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	2.407	<0.01	0.578	<0.01	1.135	0.011	<0.01	N/A	<0.01	0.083	<0.01	<0.01	0.045	1.318	<0.01	<0.01	<0.01	0.141	<0.01	<0.01	1.792	<0.01	0.037
129-00-0	Pyrene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.975	<0.01	1.094	<0.01	0.982	0.011	<0.01	N/A	<0.01	0.075	<0.01	<0.01	0.041	1.075	<0.01	<0.01	<0.01	0.117	<0.01	<0.01	1.554	<0.01	0.03
56-55-3	Benzo(a)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.867	<0.01	<0.01	<0.01	0.647	<0.01	<0.01	N/A	<0.01	0.027	<0.01	<0.01	0.013	0.43	<0.01	<0.01	<0.01	0.085	<0.01	<0.01	0.635	<0.01	<0.01
218-01-9	Chrysene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.908	<0.01	<0.01	<0.01	0.632	<0.01	<0.01	N/A	<0.01	0.026	<0.01	<0.01	0.01	0.311	<0.01	<0.01	<0.01	0.083	<0.01	<0.01	0.545	<0.01	<0.01
BEN-BK-FLUORAN	Benzo(bk)fluoranthene*		0.5	TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	2.07	<0.01	<0.01	<0.01	0.903	0.017	<0.01	N/A	<0.01	0.036	<0.01	<0.01	0.01	0.321	<0.01	<0.01	<0.01	0.06	<0.01	<0.01	0.551	<0.01	<0.01
50-32-8	Benzo(a)pyrene	0.0075	0.01	TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.714	<0.01	<0.01	<0.01	0.453	<0.01	<0.01	N/A	<0.01	0.015	<0.01	<0.01	<0.01	0.148	<0.01	<0.01	<0.01	0.053	<0.01	<0.01	0.206	<0.01	<0.01
193-39-5	Indeno(123cd)pyrene		0.05	TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.204	<0.01	<0.01	<0.01	0.252	<0.01	<0.01	N/A	<0.01	0.012	<0.01	<0.01	<0.01	0.069	<0.01	<0.01	<0.01	0.041	<0.01	<0.01	0.117	<0.01	<0.01
53-70-3	Dibenzo(ah)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.19	<0.01	<0.01	<0.01	0.086	<0.01	<0.01	N/A	<0.01	0.018	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.029	<0.01	<0.01	0.077	<0.01	<0.01
191-24-2	Benzo(ghi)perylene		0.05	TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.248	<0.01	<0.01	<0.01	0.217	<0.01	<0.01	N/A	<0.01	0.014	<0.01	<0.01	<0.01	0.082	<0.01	<0.01	<0.01	0.057	<0.01	<0.01	0.128	<0.01	<0.01
	Total 16 EPA PAHs		0.1		ug/l	<1	<0.01	<0.01	<0.01	25.399	6.576	48.871	<0.01	15.304	0.208	<0.01	N/A	<0.01	0.608	<0.01	<0.01	0.347	12.445	0.149	<0.01	<0.01	1.105	<0.01	<0.01	17.734	<0.01	0.275
	TPH CWG																															
	Aliphatics																															
GTC05C06AL	>C5-C6			TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	138	1004	34
GTC06C08AL	>C6-C8			TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1453	1927	454
GTC08C10AL	>C8-C10			TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	948.8	1649.6	315.6
GTC10C12AL	>C10-C12			TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1272.8	1403.2	344.4
GTC12C16AL	>C12-C16			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	226	<0.01	<0.01	<0.01	111	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1734	103.1	1152
GTC16C21AL	>C16-C21			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	1088	<0.01	<0.01	<0.01	761	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	444	66.7	443
GTC21C35AL	>C21-C35			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	15312	<0.01	<0.01	<0.01	8376	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC05C35AL	Total aliphatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	16626	<0.01	<0.01	<0.01	9248	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5990.6	6153.6	2743
	Aromatics																															
GTEC05EC07AR	>C5-EC7			TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	31	<0.01
GTEC07EC08AR	>EC7-EC8			TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	19	<0.01	<0.01
GTEC08EC10AR	>EC8-EC10			TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2161.2	2522.4	511.4
GTEC10EC12AR	>EC10-EC12			TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1909.2	2104.8	516.6
GTEC12EC16AR	>EC12-EC16			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	18080	6553	48320	<0.01	12045	130	<0.01	N/A	<0.01	445.2	<0.01	261	301	<0.01	99	<0.01	<0.01	660	<0.01	183	14858	4337	10672
GTEC16EC21AR	>EC16-EC21			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	6049	<0.01	<0.01	<0.01	2434	35	<0.01	N/A	<0.01	101	<0.01	<0.01	35	<0.01	13	<0.01	<0.01	269	<0.01	61	1848	<0.01	1131
GTEC21EC35AR	>EC21-EC35			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	438	<0.01	<0.01	<0.01	303	10	<0.01	N/A	<0.01	32	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	86	<0.01	24	105	<0.01	112
GTEC05EC35AR	Total aromatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	24567	6553	48320	<0.01	14782	175	<0.01	N/A	<0.01	578.2	<0.01	261	336	<0.01	112	<0.01	<0.01	1015	<0.01	268	20900.4	8995.2	12943
GTC05C35ALAR	Total TPH C2-C40	7.50	10	TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	41193	6553	48320	<0.01	24030	175	<0.01	N/A	<0.01	578.2	<0.01	261	336	<0.01	112	<0.01	<0.01	1015	<0.01	268	26891	15148.8	15686
7012-37-5	PCB 28			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35693-99-3	PCB 52			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
37680-73-2	PCB 101			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31508-00-6	PCB 118			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-28-2	PCB 138			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-27-1	PCB 153			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-29-3	PCB 180			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCB_7_CON_TOTAL	Total 7 PCBs		0.01	TM17/PM30	ug/l	<0.7	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16984-48-8	Fluoride			TM173/PM0	mg/l	<0.3																										
14808-79-8	Sulphate as SO4	187.50	200	TM38/PM0	mg/l	<0.5	393	342	313	308	261	268	39	19	302	183	N/A	128	952	1021	976	91	89	841	1003	992	777	826	770	72	73	101
16887-00-6	Chloride	187.50	30	TM38/PM0	mg/l	<0.3	841	800	672	1,792	1,214	1,790	62	38	925	624	N/A	493	29	35	29	20	15	6475	7208	7750	15	2011	16	14	17	17
CYANIDE_FREE	Free Cyanide			TM89/PM0	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
AMM_NITROGEN_N	Ammoniacal Nitrogen as N	0.18		TM38/PM0	mg/l	<0.03	<0.2	<0.2	<0.2	36	39.4	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	8.9	9.6	8.9	17.4	0.8	2	5.3	1.5	6.8	4.9	2	3.4	4	20.6
ALK_TOT_CACO3	Total Alkalinity as CaCO3		200	TM75/PM0	mg/l	<1	472	520	508	799	701	573	162	90	610	391	N/A	281	1610	1564	1552	776	455	1986	1806	1906	1182	1337	982	450	548	748
JEL575	BOD (Settled)			TM58/PM0	mg/l	<1	<2	<2	<2	<2	<2	43	9	<2	4	2	N/A	<2	<2	93	<2	<2	<2	2	<2	<2	18	<2	<2	4	4	<2
COD	COD (Settled)			TM57/PM0	mg/l	<7	204	366	<15	178	42	73	144	593	<15	129	N/A	229	897	280	<15	402	327	72	350	660	2242	696	574	912	339	35
TOC	Total Organic Carbon			TM60/PM0	mg/l	<2	<2	<2	3	9	10	6	<2	12	6	<2	N/A	3	7	7	7	7	14	4	<2	3	7	<2	7	10	<2	7
	pH		>6.5 & <9.5		pH units		7.59	7.71	7.68	7.29	7.86	7.76	7.89	7.92	10.05	7.57	N/A	7.8	7.07	7.02	7.58	7.14	7.42	7.37	7.95	7.54	7.33	7.58	7.57	7.14	7.61	7.51

Notes:
N/A = Not Analysed/ No Analytical Results

Table 4: Groundwater Human health Risk Site Investigation 2008

Connolly Station Car Park, Dublin 1

						Sample ID	BH1			BH2		BH3		
						Depth	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
						Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
						Sampled Date	04/09/2008	10/09/2008	17/09/2008	10/09/2008	17/09/2008	29/08/2008	04/09/2008	10/09/2008
CAS Number	**Test**	**SoBRA 2017 Residential Development GACs**	**SoBRA 2017 Commercial Development GACs**	**Method**	**Units**	**LOD**								
7440-36-0	Dissolved Antimony			TM30/PM14	ug/l	<2	1	<1	2	<1	3	3	1	<1
7440-38-2	Dissolved Arsenic			TM30/PM14	ug/l	<2.5	1	<1	2	2	3	3	<1	<1
7440-43-9	Dissolved Cadmium			TM30/PM14	ug/l	<0.5	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	0.5	<0.4
7440-47-3	Total Dissolved Chromium			TM30/PM14	ug/l	<1.5	<1	1	<1	<1	1	4	3	<1
7440-50-8	Dissolved Copper			TM30/PM14	ug/l	<7	2	3	1	3	2	3	7	4
7439-92-1	Dissolved Lead			TM30/PM14	ug/l	<5	1	16	<1	<1	<1	<1	19	1
7439-97-6	Dissolved Mercury (sol)	1	95	TM30/PM14	ug/l	<1	N/A	<0.05	<0.05	<0.05	<0.05	0.08	N/A	<0.05
7440-02-0	Dissolved Nickel			TM30/PM14	ug/l	<2	6	6	4	7	4	5	7	2
7782-49-2	Dissolved Selenium			TM30/PM14	ug/l	<3	12	8	11	3	10	16	<1	3
7440-66-6	Dissolved Zinc			TM30/PM14	ug/l	<3	21	151	<1	32	<1	32	45	22
VOCTIC	**VOC TICs**			TM15/PM10	None									
1634-04-4	Methyl Tertiary Butyl Ether	83,000	7,800,000	TM15/PM10	ug/l	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
71-43-2	Benzene	210	20,000	TM15/PM10	ug/l	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
108-88-3	Toluene (sol)	230,000	21,000,000	TM15/PM10	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
100-41-4	Ethylbenzene (sol)	10,000	960,000	TM15/PM10	ug/l	<1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
P_M_XYLENE	Xylene (sol) (m)	9,500	940,000	TM15/PM10	ug/l	<2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	SVOC MS													
108-95-2	Phenol			TM16/PM30	ug/l	<1	0.02	<0.01	0.18	<0.01	0.13	N/A	0.03	<0.01
	PAHs													
91-20-3	Naphthalene	220	23,000	TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.117	0.013	0.531	<0.01	0.07
208-96-8	Acenaphthylene (sol)	220,000	20,000,000	TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	4.631	5.201	33.067	<0.01	3.775
83-32-9	Acenaphthene (sol)	170,000	15,000,000	TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	1.836	1.222	6.966	<0.01	1.099
86-73-7	Fluorene (sol)	210,000	18,000,000	TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	2.027	0.031	1.611	<0.01	1.552
85-01-8	Phenanthrene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	3.303	0.067	2.803	<0.01	2.106
120-12-7	Anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.901	0.019	2.221	<0.01	1.396
206-44-0	Fluoranthene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	2.407	<0.01	0.578	<0.01	1.135
129-00-0	Pyrene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.975	<0.01	1.094	<0.01	0.982
56-55-3	Benzo(a)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.867	<0.01	<0.01	<0.01	0.647
218-01-9	Chrysene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	1.908	<0.01	<0.01	<0.01	0.632
BEN-BK-FLUORAN	Benzo(bk)fluoranthene			TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	2.07	<0.01	<0.01	<0.01	0.903
50-32-8	Benzo(a)pyrene			TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.714	<0.01	<0.01	<0.01	0.453
193-39-5	Indeno(123cd)pyrene			TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.204	<0.01	<0.01	<0.01	0.252
53-70-3	Dibenzo(ah)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.19	<0.01	<0.01	<0.01	0.086
191-24-2	Benzo(ghi)perylene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.248	<0.01	<0.01	<0.01	0.217
	Total 16 EPA PAHs						<0.01	<0.01	<0.01	25.399	6.576	48.871	<0.01	15.304

Table 4: Groundwater Human health Risk Site Investigation 2008

Connolly Station Car Park, Dublin 1

CAS Number	Test	SoBRA 2017 Residential Development GACs	SoBRA 2017 Commercial Development GACs	Method	Units	LOD	BH1			BH2		BH3		
					Sample ID		BH1			BH2		BH3		
					Depth		Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
					Sample Type		Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sampled Date		04/09/2008	10/09/2008	17/09/2008	10/09/2008	17/09/2008	29/08/2008	04/09/2008	10/09/2008
	TPH CWG													
	Aliphatics													
GTC05C06AL	>C5-C6 (sol)	1,900	190,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC06C08AL	>C6-C8 (sol)	1,500	150,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC08C10AL	>C8-C10 (sol)	57	5,700	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC10C12AL	>C10-C12 (sol)	37	3,600	TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC12C16AL	>C12-C16			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	226	<0.01	<0.01	<0.01	111
GTC16C21AL	>C16-C21			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	1088	<0.01	<0.01	<0.01	761
GTC21C35AL	>C21-C35			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	15312	<0.01	<0.01	<0.01	8376
GTC05C35AL	Total aliphatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	16626	<0.01	<0.01	<0.01	9248
	Aromatics													
GTEC05EC07AR	>C5-EC7 (sol)	210,000	20,000,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC07EC08AR	>EC7-EC8 (sol)	220,000	21,000,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC08EC10AR	>EC8-EC10 (sol)	1,900	190,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC10EC12AR	>EC10-EC12 (sol)	6,800	660,000	TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC12EC16AR	>EC12-EC16 (sol)	39,000	3,700,000	TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	18080	6553	48320	<0.01	12045
GTEC16EC21AR	>EC16-EC21			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	6049	<0.01	<0.01	<0.01	2434
GTEC21EC35AR	>EC21-EC35			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	438	<0.01	<0.01	<0.01	303
GTEC05EC35AR	Total aromatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	24567	6553	48320	<0.01	14782
GTC05C35ALAR	Total TPH C2-C40			TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	41193	6553	48320	<0.01	24030
7012-37-5	PCB 28			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
35693-99-3	PCB 52			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
37680-73-2	PCB 101			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
31508-00-6	PCB 118			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
35065-28-2	PCB 138			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
35065-27-1	PCB 153			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
35065-29-3	PCB 180			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
PCB_7_CON_TOTAL	Total 7 PCBs			TM17/PM30	ug/l	<0.7	N/A	N/A	N/A	N/A	N/A	N/A	<0.01	<0.01
16984-48-8	Fluoride			TM173/PM0	mg/l	<0.3								
14808-79-8	Sulphate as SO4			TM38/PM0	mg/l	<0.5	393	342	313	308	261	268	39	19
16887-00-6	Chloride			TM38/PM0	mg/l	<0.3	841	800	672	1792	1214	1790	62	38
CYANIDE_FREE	Free Cyanide			TM89/PM0	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AMM_NITROGEN_N	Ammoniacal Nitrogen as N			TM38/PM0	mg/l	<0.03	<0.2	<0.2	<0.2	36	39.4	<0.2	<0.2	<0.2
ALK_TOT_CACO3	Total Alkalinity as CaCO3			TM75/PM0	mg/l	<1	472	520	508	799	701	573	162	90
JEL575	BOD (Settled)			TM58/PM0	mg/l	<1	<2	<2	<2	<2	<2	43	9	<2
COD	COD (Settled)			TM57/PM0	mg/l	<7	204	366	<15	178	42	73	144	593
TOC	Total Organic Carbon			TM60/PM0	mg/l	<2	<2	<2	3	9	10	6	<2	12
PH	pH				pH units		7.59	7.71	7.68	7.29	7.86	7.76	7.89	7.92

Notes:
N/A = Not Analysed/ No Analytical Data

Table 4: Groundwater Human health Risk Site Investigation 2008
Connolly Station Car Park, Dublin 1

CAS Number	Test	SoBRA 2017 Residential Development GACs	SoBRA 2017 Commercial Development GACs	Method	Units	LOD	BH4				BH5			BH6	
					Depth		Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
					Sample Type		Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sampled Date		29/08/2008	04/09/2008	04/09/2008	10/09/2008	29/08/2008	10/09/2008	17/09/2008	10/09/2008	17/09/2008
7440-36-0	Dissolved Antimony			TM30/PM14	ug/l	<2	5	<1	N/A	<1	3	3	4	<1	<1
7440-38-2	Dissolved Arsenic			TM30/PM14	ug/l	<2.5	5	2	N/A	<1	10	9	10	2	3
7440-43-9	Dissolved Cadmium			TM30/PM14	ug/l	<0.5	<0.4	0.5	N/A	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
7440-47-3	Total Dissolved Chromium			TM30/PM14	ug/l	<1.5	2	126	6	1	13	1	1	<1	<1
7440-50-8	Dissolved Copper			TM30/PM14	ug/l	<7	5	15	N/A	5	4	5	5	<1	2
7439-92-1	Dissolved Lead			TM30/PM14	ug/l	<5	2	34	N/A	1	2	4	<1	<1	3
7439-97-6	Dissolved Mercury (sol)	1	95	TM30/PM14	ug/l	<1	0.05	N/A	N/A	0.05	<0.05	<0.05	<0.05	0.07	<0.05
7440-02-0	Dissolved Nickel			TM30/PM14	ug/l	<2	4	68	N/A	2	17	17	19	7	10
7782-49-2	Dissolved Selenium			TM30/PM14	ug/l	<3	8	2	N/A	<1	<1	<1	2	<1	<1
7440-66-6	Dissolved Zinc			TM30/PM14	ug/l	<3	34	104	N/A	18	57	55	32	27	27
VOCTIC	**VOC TICs**			TM15/PM10	None										
1634-04-4	Methyl Tertiary Butyl Ether	83,000	7,800,000	TM15/PM10	ug/l	<0.1	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
71-43-2	Benzene	210	20,000	TM15/PM10	ug/l	<0.5	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
108-88-3	Toluene (sol)	230,000	21,000,000	TM15/PM10	ug/l	<5	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
100-41-4	Ethylbenzene (sol)	10,000	960,000	TM15/PM10	ug/l	<1	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
P_M_XYLENE	Xylene (sol) (m)	9,500	940,000	TM15/PM10	ug/l	<2	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	SVOC MS														
108-95-2	Phenol			TM16/PM30	ug/l	<1	N/A	0.03	N/A	<0.01	N/A	<0.01	0.09	<0.01	0.03
	PAHs														
91-20-3	Naphthalene	220	23,000	TM16/PM30	ug/l	<1	0.028	<0.01	N/A	<0.01	0.02	<0.01	<0.01	0.013	0.382
208-96-8	Acenaphthylene (sol)	220,000	20,000,000	TM16/PM30	ug/l	<0.5	0.023	<0.01	N/A	<0.01	0.011	<0.01	<0.01	0.013	1.147
83-32-9	Acenaphthene (sol)	170,000	15,000,000	TM16/PM30	ug/l	<1	0.022	<0.01	N/A	<0.01	0.029	<0.01	<0.01	0.038	1.693
86-73-7	Fluorene (sol)	210,000	18,000,000	TM16/PM30	ug/l	<0.5	0.016	<0.01	N/A	<0.01	0.04	<0.01	<0.01	0.047	1.781
85-01-8	Phenanthrene			TM16/PM30	ug/l	<0.5	0.034	<0.01	N/A	<0.01	0.159	<0.01	<0.01	0.088	3.062
120-12-7	Anthracene			TM16/PM30	ug/l	<0.5	0.013	<0.01	N/A	<0.01	0.043	<0.01	<0.01	0.029	0.596
206-44-0	Fluoranthene			TM16/PM30	ug/l	<0.5	0.011	<0.01	N/A	<0.01	0.083	<0.01	<0.01	0.045	1.318
129-00-0	Pyrene			TM16/PM30	ug/l	<0.5	0.011	<0.01	N/A	<0.01	0.075	<0.01	<0.01	0.041	1.075
56-55-3	Benzo(a)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	N/A	<0.01	0.027	<0.01	<0.01	0.013	0.43
218-01-9	Chrysene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	N/A	<0.01	0.026	<0.01	<0.01	0.01	0.311
BEN-BK-FLUORAN	Benzo(bk)fluoranthene			TM16/PM30	ug/l	<1	0.017	<0.01	N/A	<0.01	0.036	<0.01	<0.01	0.01	0.321
50-32-8	Benzo(a)pyrene			TM16/PM30	ug/l	<1	<0.01	<0.01	N/A	<0.01	0.015	<0.01	<0.01	<0.01	0.148
193-39-5	Indeno(123cd)pyrene			TM16/PM30	ug/l	<1	<0.01	<0.01	N/A	<0.01	0.012	<0.01	<0.01	<0.01	0.069
53-70-3	Dibenzo(ah)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	N/A	<0.01	0.018	<0.01	<0.01	<0.01	0.03
191-24-2	Benzo(ghi)perylene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	N/A	<0.01	0.014	<0.01	<0.01	<0.01	0.082
	Total 16 EPA PAHs						0.208	<0.01	N/A	<0.01	0.608	<0.01	<0.01	0.347	12.445

Table 4: Groundwater Human health Risk Site Investigation 2008

Connolly Station Car Park, Dublin 1

CAS Number	Test	SoBRA 2017 Residential Development GACs	SoBRA 2017 Commercial Development GACs	Method	Units	LOD	BH4				BH5			BH6	
						Sample ID	BH4				BH5			BH6	
						Depth	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
						Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
						Sampled Date	29/08/2008	04/09/2008	04/09/2008	10/09/2008	29/08/2008	10/09/2008	17/09/2008	10/09/2008	17/09/2008
	TPH CWG														
	Aliphatics														
GTC05C06AL	>C5-C6 (sol)	1,900	190,000	TM36/PM12	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC06C08AL	>C6-C8 (sol)	1,500	150,000	TM36/PM12	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC08C10AL	>C8-C10 (sol)	57	5,700	TM36/PM12	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC10C12AL	>C10-C12 (sol)	37	3,600	TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC12C16AL	>C12-C16			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC16C21AL	>C16-C21			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC21C35AL	>C21-C35			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC05C35AL	Total aliphatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Aromatics														
GTEC05EC07AR	>C5-EC7 (sol)	210,000	20,000,000	TM36/PM12	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC07EC08AR	>EC7-EC8 (sol)	220,000	21,000,000	TM36/PM12	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC08EC10AR	>EC8-EC10 (sol)	1,900	190,000	TM36/PM12	ug/l	<10	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC10EC12AR	>EC10-EC12 (sol)	6,800	660,000	TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTEC12EC16AR	>EC12-EC16 (sol)	39,000	3,700,000	TM5/PM16/PM30	ug/l	<10	130	<0.01	N/A	<0.01	445.2	<0.01	261	301	<0.01
GTEC16EC21AR	>EC16-EC21			TM5/PM16/PM30	ug/l	<10	35	<0.01	N/A	<0.01	101	<0.01	<0.01	35	<0.01
GTEC21EC35AR	>EC21-EC35			TM5/PM16/PM30	ug/l	<10	10	<0.01	N/A	<0.01	32	<0.01	<0.01	<0.01	<0.01
GTEC05EC35AR	Total aromatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	175	<0.01	N/A	<0.01	578.2	<0.01	261	336	<0.01
GTC05C35ALAR	Total TPH C2-C40			TM5/TM36/PM12/PM16/PM30	ug/l	<10	175	<0.01	N/A	<0.01	578.2	<0.01	261	336	<0.01
7012-37-5	PCB 28			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35693-99-3	PCB 52			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
37680-73-2	PCB 101			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31508-00-6	PCB 118			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-28-2	PCB 138			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-27-1	PCB 153			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-29-3	PCB 180			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCB_7_CON_TOTAL	Total 7 PCBs			TM17/PM30	ug/l	<0.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16984-48-8	Fluoride			TM173/PM0	mg/l	<0.3									
14808-79-8	Sulphate as SO4			TM38/PM0	mg/l	<0.5	302	183	N/A	128	952	1021	976	91	89
16887-00-6	Chloride			TM38/PM0	mg/l	<0.3	925	624	N/A	493	29	35	29	20	15
CYANIDE_FREE	Free Cyanide			TM89/PM0	mg/l	<0.01	0.01	<0.01	N/A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AMM_NITROGEN_N	Ammoniacal Nitrogen as N			TM38/PM0	mg/l	<0.03	<0.2	<0.2	N/A	<0.2	8.9	9.6	8.9	17.4	0.8
ALK_TOT_CACO3	Total Alkalinity as CaCO3			TM75/PM0	mg/l	<1	610	391	N/A	281	1610	1564	1552	776	455
JEL575	BOD (Settled)			TM58/PM0	mg/l	<1	4	2	N/A	<2	<2	93	<2	<2	<2
COD	COD (Settled)			TM57/PM0	mg/l	<7	<15	129	N/A	229	897	280	<15	402	327
TOC	Total Organic Carbon			TM60/PM0	mg/l	<2	6	<2	N/A	3	7	7	7	7	14
PH	pH				pH units		10.05	7.57	N/A	7.8	7.07	7.02	7.58	7.14	7.42

Notes:
N/A = Not Analysed/ No Analytical Data

Table 4: Groundwater Human health Risk Site Investigation 2008

Connolly Station Car Park, Dublin 1

OCSC O'CONNOR | SUTTON | CRONIN Multidisciplinary Consulting Engineers

						Sample ID	BH7			WS7			WS11		
						Depth	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
						Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
						Sampled Date	29/08/2008	04/09/2008	10/09/2008	29/08/2008	04/09/2008	10/09/2008	29/08/2008	04/09/2008	10/09/2008
CAS Number	**Test**	**SoBRA 2017 Residential Development GACs**	**SoBRA 2017 Commercial Development GACs**	**Method**	**Units**	**LOD**									
7440-36-0	Dissolved Antimony			TM30/PM14	ug/l	<2	<1	<1	1	11	21	20	<1	3	2
7440-38-2	Dissolved Arsenic			TM30/PM14	ug/l	<2.5	5	8	8	3	8	1	2	6	4
7440-43-9	Dissolved Cadmium			TM30/PM14	ug/l	<0.5	1.6	1.3	1.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
7440-47-3	Total Dissolved Chromium			TM30/PM14	ug/l	<1.5	7	2	3	7	1	<1	9	<1	<1
7440-50-8	Dissolved Copper			TM30/PM14	ug/l	<7	8	8	4	5	9	5	4	9	1
7439-92-1	Dissolved Lead			TM30/PM14	ug/l	<5	<1	4	1	2	35	2	6	62	2
7439-97-6	Dissolved Mercury (sol)	1	95	TM30/PM14	ug/l	<1	<0.05	N/A	0.06	<0.05	N/A	<0.05	<0.05	N/A	<0.05
7440-02-0	Dissolved Nickel			TM30/PM14	ug/l	<2	14	13	13	10	10	8	8	15	12
7782-49-2	Dissolved Selenium			TM30/PM14	ug/l	<3	31	28	27	1	10	<1	<1	<1	2
7440-66-6	Dissolved Zinc			TM30/PM14	ug/l	<3	35	25	17	34	36	23	76	72	15
VOCTIC	**VOC TICs**			TM15/PM10	None										
1634-04-4	Methyl Tertiary Butyl Ether	83,000	7,800,000	TM15/PM10	ug/l	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	14	17
71-43-2	Benzene	210	20,000	TM15/PM10	ug/l	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	31	<0.01
108-88-3	Toluene (sol)	230,000	21,000,000	TM15/PM10	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	19	<0.01	<0.01
100-41-4	Ethylbenzene (sol)	10,000	960,000	TM15/PM10	ug/l	<1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	211	13	15
P_M_XYLENE	Xylene (sol) (m)	9,500	940,000	TM15/PM10	ug/l	<2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	527	35	23
	SVOC MS														
108-95-2	Phenol			TM16/PM30	ug/l	<1	N/A	<0.01	<0.01	N/A	0.02	<0.01	N/A	0.03	<0.01
	PAHs														
91-20-3	Naphthalene	220	23,000	TM16/PM30	ug/l	<1	0.031	<0.01	<0.01	0.037	<0.01	<0.01	0.617	<0.01	<0.01
208-96-8	Acenaphthylene (sol)	220,000	20,000,000	TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.018	<0.01	<0.01	2.35	<0.01	0.018
83-32-9	Acenaphthene (sol)	170,000	15,000,000	TM16/PM30	ug/l	<1	0.011	<0.01	<0.01	0.032	<0.01	<0.01	2.996	<0.01	0.045
86-73-7	Fluorene (sol)	210,000	18,000,000	TM16/PM30	ug/l	<0.5	0.025	<0.01	<0.01	0.079	<0.01	<0.01	1.73	<0.01	0.045
85-01-8	Phenanthrene			TM16/PM30	ug/l	<0.5	0.04	<0.01	<0.01	0.187	<0.01	<0.01	3.956	<0.01	0.061
120-12-7	Anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.086	<0.01	<0.01	0.48	<0.01	0.025
206-44-0	Fluoranthene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.141	<0.01	<0.01	1.792	<0.01	0.037
129-00-0	Pyrene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.117	<0.01	<0.01	1.554	<0.01	0.03
56-55-3	Benzo(a)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.085	<0.01	<0.01	0.635	<0.01	<0.01
218-01-9	Chrysene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.083	<0.01	<0.01	0.545	<0.01	<0.01
BEN-BK-FLUORAN	Benzo(bk)fluoranthene			TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.06	<0.01	<0.01	0.551	<0.01	<0.01
50-32-8	Benzo(a)pyrene			TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.053	<0.01	<0.01	0.206	<0.01	<0.01
193-39-5	Indeno(123cd)pyrene			TM16/PM30	ug/l	<1	<0.01	<0.01	<0.01	0.041	<0.01	<0.01	0.117	<0.01	<0.01
53-70-3	Dibenzo(ah)anthracene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.029	<0.01	<0.01	0.077	<0.01	<0.01
191-24-2	Benzo(ghi)perylene			TM16/PM30	ug/l	<0.5	<0.01	<0.01	<0.01	0.057	<0.01	<0.01	0.128	<0.01	<0.01
	Total 16 EPA PAHs						0.149	<0.01	<0.01	1.105	<0.01	<0.01	17.734	<0.01	0.275

Table 4: Groundwater Human health Risk Site Investigation 2008

Connolly Station Car Park, Dublin 1

CAS Number	Test	SoBRA 2017 Residential Development GACs	SoBRA 2017 Commercial Development GACs	Method	Units	LOD	BH7			WS7			WS11		
						Depth	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
						Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
						Sampled Date	29/08/2008	04/09/2008	10/09/2008	29/08/2008	04/09/2008	10/09/2008	29/08/2008	04/09/2008	10/09/2008
	TPH CWG														
	Aliphatics														
GTC05C06AL	>C5-C6 (sol)	1,900	190,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	138	1004	34
GTC06C08AL	>C6-C8 (sol)	1,500	150,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1453	1927	454
GTC08C10AL	>C8-C10 (sol)	57	5,700	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	948.8	1649.6	315.6
GTC10C12AL	>C10-C12 (sol)	37	3,600	TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1272.8	1403.2	344.4
GTC12C16AL	>C12-C16			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1734	103.1	1152
GTC16C21AL	>C16-C21			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	444	66.7	443
GTC21C35AL	>C21-C35			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GTC05C35AL	Total aliphatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5990.6	6153.6	2743
	Aromatics														
GTEC05EC07AR	>C5-EC7 (sol)	210,000	20,000,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	31	<0.01
GTEC07EC08AR	>EC7-EC8 (sol)	220,000	21,000,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	19	<0.01	<0.01
GTEC08EC10AR	>EC8-EC10 (sol)	1,900	190,000	TM36/PM12	ug/l	<10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2161.2	2522.4	511.4
GTEC10EC12AR	>EC10-EC12 (sol)	6,800	660,000	TM5/PM16/PM30	ug/l	<5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1909.2	2104.8	516.6
GTEC12EC16AR	>EC12-EC16 (sol)	39,000	3,700,000	TM5/PM16/PM30	ug/l	<10	99	<0.01	<0.01	660	<0.01	183	14858	4337	10672
GTEC16EC21AR	>EC16-EC21			TM5/PM16/PM30	ug/l	<10	13	<0.01	<0.01	269	<0.01	61	1848	<0.01	1131
GTEC21EC35AR	>EC21-EC35			TM5/PM16/PM30	ug/l	<10	<0.01	<0.01	<0.01	86	<0.01	24	105	<0.01	112
GTEC05EC35AR	Total aromatics C5-35			TM5/TM36/PM12/PM16/PM30	ug/l	<10	112	<0.01	<0.01	1015	<0.01	268	20900.4	8995.2	12943
GTC05C35ALAR	Total TPH C2-C40			TM5/TM36/PM12/PM16/PM30	ug/l	<10	112	<0.01	<0.01	1015	<0.01	268	26891	15148.8	15686
7012-37-5	PCB 28			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35693-99-3	PCB 52			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
37680-73-2	PCB 101			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31508-00-6	PCB 118			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-28-2	PCB 138			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-27-1	PCB 153			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35065-29-3	PCB 180			TM17/PM30	ug/l	<0.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCB_7_CON_TOTAL	Total 7 PCBs			TM17/PM30	ug/l	<0.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16984-48-8	Fluoride			TM173/PM0	mg/l	<0.3									
14808-79-8	Sulphate as SO4			TM38/PM0	mg/l	<0.5	841	1003	992	777	826	770	72	73	101
16887-00-6	Chloride			TM38/PM0	mg/l	<0.3	6475	7208	7750	15	2011	16	14	17	17
CYANIDE_FREE	Free Cyanide			TM89/PM0	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
AMM_NITROGEN_N	Ammoniacal Nitrogen as N			TM38/PM0	mg/l	<0.03	2	5.3	1.5	6.8	4.9	2	3.4	4	20.6
ALK_TOT_CACO3	Total Alkalinity as CaCO3			TM75/PM0	mg/l	<1	1986	1806	1906	1182	1337	982	450	548	748
JEL575	BOD (Settled)			TM58/PM0	mg/l	<1	2	<2	<2	18	<2	<2	4	4	<2
COD	COD (Settled)			TM57/PM0	mg/l	<7	72	350	660	2242	696	574	912	339	35
TOC	Total Organic Carbon			TM60/PM0	mg/l	<2	4	<2	3	7	<2	7	10	<2	7
PH	pH				pH units		7.37	7.95	7.54	7.33	7.58	7.57	7.14	7.61	7.51

Notes:
N/A = Not Analysed/ No Analytical Data

Table 5: Gas Monitoring Results
Connolly Station Car Park, Dublin 1

Borehole ID	Date	Sample Time	Response Zone stratum	Stable CH4 %	CH4% Peak	Stable CO2 %	CO2% Peak	O2 %	Bal %	H2S stable ppm	H2S peak ppm	CO stable ppm	CO peak ppm	Atmospheric Pressure mb	Relative pressure mb	Flow l/hr	Groundwater level mbGL
WS6	29/08/2008	-	MG	-	0.10	-	2.90	17.20	-	-	-	-	-	1017.00	-	0.20	-
	04/09/2008	-		-	0.10	-	5.00	13.10	-	-	-	-	-	990.00	-	0.20	-
	10/09/2008	-		-	0.10	-	3.50	14.50	-	-	-	-	-	1000.00	-	0.00	-
	17/09/2008	-		-	0.10	-	6.40	8.50	-	-	-	-	-	1019.00	-	0.00	-
WS9	29/08/2008	-	MG	-	0.10	-	1.90	18.60	-	-	-	-	-	1016.00	-	0.00	-
	04/09/2008	-		-	0.10	-	1.90	18.60	-	-	-	-	-	991.00	-	0.20	-
	10/09/2008	-		-	0.10	-	0.70	19.90	-	-	-	-	-	999.00	-	0.10	-
	17/09/2008	-		-	0.20	-	0.70	20.00	-	-	-	-	-	1019.00	-	0.10	-
WS10	29/08/2008	-	MG	-	0.10	-	0.10	20.30	-	-	-	-	-	1017.00	-	0.00	-
	04/09/2008	-		-	0.10	-	0.10	20.10	-	-	-	-	-	992.00	-	0.10	-
	10/09/2008	-		-	0.10	-	0.10	20.10	-	-	-	-	-	999.00	-	0.00	-
	17/09/2008	-		-	5.60	-	0.20	19.20	-	-	-	-	-	1019.00	-	0.00	-
WS12	04/09/2008	-	MG	-	0.40	-	1.50	19.60	-	-	-	-	-	992.00	-	0.10	-
	10/09/2008	-		-	0.10	-	1.50	19.10	-	-	-	-	-	998.00	-	0.10	-
	17/09/2008	-		-	0.10	-	1.30	19.30	-	-	-	-	-	1019.00	-	0.10	-
WS3	29/08/2008	-	MG/SLT	-	0.10	-	7.70	9.10	-	-	-	-	-	1017.00	-	0.20	-
	04/09/2008	-		-	0.10	-	9.40	7.60	-	-	-	-	-	990.00	-	0.20	-
	10/09/2008	-		-	0.10	-	10.60	7.80	-	-	-	-	-	999.00	-	0.10	-
	17/09/2008	-		-	0.10	-	10.20	7.50	-	-	-	-	-	1019.00	-	0.20	-
WS7	29/08/2008	-	MG/BC	-	0.10	-	3.00	15.70	-	-	-	-	-	1016.00	-	0.10	-
	04/09/2008	-		-	0.10	-	2.60	16.10	-	-	-	-	-	990.00	-	0.00	-
	10/09/2008	-		-	0.10	-	0.20	20.20	-	-	-	-	-	1001.00	-	0.00	-
	17/09/2008	-		-	0.10	-	2.50	16.20	-	-	-	-	-	1019.00	-	0.00	-
WS11	29/08/2008	-	SLT/BC	-	0.20	-	3.80	15.00	-	-	-	-	-	1017.00	-	0.20	-
	04/09/2008	-		-	100.00	-	9.30	0.00	-	-	-	-	-	991.00	-	0.10	-
	10/09/2008	-		-	1.20	-	5.70	10.00	-	-	-	-	-	1001.00	-	0.20	-
	17/09/2008	-		-	69.70	-	8.70	0.10	-	-	-	-	-	1019.00	-	0.10	-

MG : Made Ground SLT : Silt Clay BC : Boulder Clay
- : No data available

Table 6: Waste Soil Classification Table

B909 Connolly Station Car Park, Dublin 1

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary Consulting Engineers

Analyte	A Inert	B Inert (IMS)	C1 Non-Haz	C2 Non-Haz with Asbestos	D Hazardous	LOD	Unit
HazWaste Assessment Result							
Overall Assessment Result							
Solid Waste Analysis							
Total Organic Carbon#	3	3	-	-	6		%
Sum of BTEX	6	6	see HWOL	see HWOL	see HWOL		mg/kg
Sum of 7 PCBs#	1	1	see HWOL	see HWOL	see HWOL		mg/kg
PAH Sum of 6#	2	-	see HWOL	see HWOL	see HWOL		mg/kg
PAH Sum of 17	6	100	see HWOL	see HWOL	see HWOL		mg/kg
Mineral Oil Calculation	-	500	see HWOL	see HWOL	see HWOL		mg/kg
CEN 10:1 Leachate							
Dissolved Antimony (A10)	0.06	0.06	0.7	0.7	5		mg/kg
Dissolved Arsenic (A10)	0.5	0.5	2	2	25		mg/kg
Dissolved Barium (A10)	20	20	100	100	300		mg/kg
Dissolved Cadmium (A10)	0.04	0.04	1	1	5		mg/kg
Dissolved Chromium (A10)	0.5	0.5	10	10	70		mg/kg
Dissolved Copper (A10)	2	2	50	50	100		mg/kg
Dissolved Lead (A10)	0.5	0.5	10	10	50		mg/kg
Dissolved Molybdenum (A10)	0.5	0.5	10	10	30		mg/kg
Dissolved Nickel (A10)	0.4	0.4	10	10	40		mg/kg
Dissolved Selenium (A10)	0.1	0.1	6	6	7		mg/kg
Dissolved Zinc (A10)	4	4	50	50	200		mg/kg
Mercury Dissolved by CVAF	0.01	0.01	0.2	0.2	2		mg/kg
Phenol	1	-	-	-	-		mg/kg
Fluoride	10	10	150	150	500		mg/kg
Chloride	800	800	15000	15000	25000		mg/kg
Sulphate	1000	1000	20000	20000	50000		mg/kg
Mass of raw test portion	-	-	-	-	-		kg
Leachant Volume	-	-	-	-	-		l
Eluate Volume	-	-	-	-	-		l
Dissolved Organic Carbon	500	500	800	800	1000		mg/kg
pH	-	-	-	-	-		pH units
Total Dissolved Solids	4000	4000	60000	60000	100000		mg/kg
Asbestos Testing							
Asbestos Screen	-	-	-	-	-	-	None

Sample Identity	WS1	WS1	WS1	WS2	WS2	WS2	WS3	WS4	WS5	WS6
Depth (mbGL)	1	3	5	1	3	5	4	2	2	1
HazWaste Assessment Result	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Hazardous	Non-Haz
Overall Assessment Result	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	D Hazardous	B Non-Haz
Solid Waste Analysis										
Total Organic Carbon#	7.6	8.3		5.4	5.4	11.2	1.7	3.6	5.3	7.5
Sum of BTEX	<0.04	<0.04		<0.04	<0.04	<0.04	N/A	<0.04	<0.04	<0.04
Sum of 7 PCBs#	<1	N/A		<1	N/A	N/A	<1		<1	<1
PAH Sum of 6#	35.766	2.405	3.384	15.866	4.621	1.842	8.2	0.994	2.5	1.612
PAH Sum of 17	77.419	5.093	6.812	40.825	9.437	3.513	22.756	2.283	4.368	3.447
Mineral Oil Calculation	<1	N/A		<1			<1		<1	
CEN 10:1 Leachate										
Dissolved Antimony (A10)	0.07	0.05	0.03	0.04	0.04	0.04	0.06	0.07	0.02	0.04
Dissolved Arsenic (A10)	0.09	0.08	<0.01	0.1	0.12	<0.01	0.02	0.14	<0.01	0.04
Dissolved Barium (A10)	2.49	2.36	2.5	2.05	2.14	2.47	3.22	1.8	2.53	1.81
Dissolved Cadmium (A10)	<0.004	<0.004	0.012	<0.004	<0.004	0.007	<0.004	<0.004	<0.004	<0.004
Dissolved Chromium (A10)	0.02	0.03	0.03	0.02	0.04	0.02	0.02	0.08	0.04	<0.01
Dissolved Copper (A10)	0.36	0.53	0.32	0.22	0.28	0.28	0.57	0.34	0.41	1.12
Dissolved Lead (A10)	<0.01	<0.01	0.07	<0.01	<0.01	0.01	<0.01	0.04	0.03	0.06
Dissolved Molybdenum (A10)	0.12	0.23	0.37	0.33	0.18	0.29	0.39	0.03	0.32	0.06
Dissolved Nickel (A10)	<0.01	<0.01	0.08	<0.01	<0.01	0.03	0.04	0.17	0.12	0.08
Dissolved Selenium (A10)	0.04	0.02	<0.01	0.04	0.02	0.01	0.03	<0.01	<0.01	<0.01
Dissolved Zinc (A10)	0.15	0.17	1.33	0.04	0.11	0.96	0.85	0.17	0.44	0.28
Mercury Dissolved by CVAF	<0.0005	<0.0005	<0.0005	<0.0005			<0.0005	<0.0005	<0.0005	<0.0005
Phenol	<0.1	<0.1	N/A	<0.1	<0.1	N/A	<0.1	<0.1	<0.1	<0.1
Fluoride	20	7	N/A	12	9	N/A	7	6	2	8
Chloride	37	24	N/A	23	22	N/A	44	12	20	14
Sulphate	54	108	N/A	50	110	N/A	2302	42	4278	53
Mass of raw test portion	N/A			N/A			N/A		N/A	
Leachant Volume	N/A			N/A			N/A		N/A	
Eluate Volume	N/A			N/A			N/A		N/A	
Dissolved Organic Carbon	31	<20		20	21	N/A	30	<20	<20	<20
pH	8.3			8.35			7.99		8.32	
Total Dissolved Solids	1040	1140	N/A	980	980	N/A	4580	940	6460	1060
Asbestos Testing										
Asbestos Screen	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD

Sample Identity	WS6	WS8	WS11	BH3	BH3	BH4	BH4	BH4	BH5	BH7
Depth (mbGL)	4	2	2	1	2	1	5-5.3	6-6.3	2	6.5
HazWaste Assessment Result	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz	Non-Haz
Overall Assessment Result	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz	B Non-Haz
Solid Waste Analysis										
Total Organic Carbon#	1.6	8.3	2.2	1.1	1.5	7.6	N/A	N/A	3.1	0.5
Sum of BTEX	<0.04	<0.04	0.33	<0.04	<0.04	<0.04	N/A	N/A	<0.04	<0.04
Sum of 7 PCBs#	<1	<1	<1	<1	N/A	<0.001	N/A	N/A		<1
PAH Sum of 6#	0.952	1.833	6.1	0.111	<1	6.267	N/A	N/A	4.291	<1.6
PAH Sum of 17	2.508	3.629	17.294	0.315	6.366	11.733	N/A	N/A	8.512	<1
Mineral Oil Calculation	<1	<1	<1	<1						<1
CEN 10:1 Leachate										
Dissolved Antimony (A10)	0.11	0.09	0.13	0.07	0.04	0.03	1.3	<0.075	0.01	0.04
Dissolved Arsenic (A10)	0.04	0.14	0.01	2.43	1.51	0.02	0.73	0.29	<0.01	<0.01
Dissolved Barium (A10)	3	2.31	2.71	7.14	8.86	2.33	3.2	3	2.42	3.15
Dissolved Cadmium (A10)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.022	<0.022	<0.004	<0.004
Dissolved Chromium (A10)	<0.01	0.02	<0.01	3.74	2.15	0.04	<0.1	<0.1	<0.01	<0.01
Dissolved Copper (A10)	0.5	0.5	0.38	2.37	0.4	0.26	0.27	0.57	0.38	0.34
Dissolved Lead (A10)	0.06	<0.01	0.03	0.05	0.03	<0.01	0.17	0.04	0.01	0.01
Dissolved Molybdenum (A10)	0.64	0.26	0.48	0.06	0.04	0.13	4.5	2.4	0.17	0.11
Dissolved Nickel (A10)	0.11	<0.01	0.13	3.75	3.39	<0.01	0.39	0.87	0.06	0.14
Dissolved Selenium (A10)	<0.01	0.03	<0.01	0.67	0.53	0.02	0.5	0.5	<0.01	0.19
Dissolved Zinc (A10)	0.39	0.09	0.73	0.83	0.49	0.07	<0.5	<0.5	0.48	0.19
Mercury Dissolved by CVAF	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.002	<0.0005	<0.0005
Phenol	<0.1	<0.1	<0.1	N/A		<20	N/A	N/A	<0.1	<0.1
Fluoride	3	9	3	5	2	5	N/A	N/A	3	4
Chloride	22	33	35	83	20	32	N/A	N/A	37	823
Sulphate	409	184	721	130	241	425	N/A	N/A	4668	335
Mass of raw test portion	N/A	N/A	N/A	N/A						N/A
Leachant Volume	N/A	N/A	N/A	N/A						N/A
Eluate Volume	N/A	N/A	N/A	N/A						N/A
Dissolved Organic Carbon	74	35	80	<20	27	<20	N/A	N/A	<20	<20
pH	8.04	8.32	8.67	N/A						8.67
Total Dissolved Solids	1200	1400	3060	1220	1260	1260	N/A	N/A	5900	2040
Asbestos Testing										
Asbestos Screen	NAD	NAD	NAD	N/A	NAD	NAD	N/A	N/A	NAD	NAD

NOTES:
Categories explained in OCSC Waste Categories Table
Hazardous classes subject to confirmation with waste facility
Hazardous hotspot areas are isolated and may be reduced in size following further testing
NAD = no asbestos detected
N/A = not analysed
HWOL = HazWasteOnline

HazWasteOnline accessed through http://www.hazwasteonline.com. Application developed by One Touch Data Limited based on Regulation (EC) No. 1272/2008: the classification, labelling and packaging of substances and mixtures (CLP) and the latest UK Environment Agency guidance, WM3 v1.1 (2018). The EPA have stated that the HazWasteOnline tool is acceptable for the classification of wastes in Ireland and they have a licence for the application to review results if required.

While waste soil is classified based on the EU Council Decision 2003/33/EC, waste acceptance criteria may vary at each potential Waste Receiver site and further assessment and consultation may be required with the proposed Waste Receiver to confirm suitability for disposal. In terms of permitted sites, further assessment in terms of potential impact to the environment may be required or inert waste comprising made ground may not be acceptable.

Appendix A
Buro Happold Report – 2008

Buro Happold

023956 Connolly Station, Dublin

Geotechnical & Geoenvironmental Interpretative Report

October 2008

Revision 01

Revision	Description	Issued by	Date	Checked
00	Draft	SB	10/10/08	KL/HM
01	Final Issue	SB	16/10/08	KL/HM

O:\023956 - Connolly Station, Dublin (Transportation)\F09 - Geotech + SI\Reports\Interpretative Report\081010 SB 023956 Geotechnical & Geoenvironmental Interpretative Report 00rev1.doc

This report has been prepared for the sole benefit, use and information of Coras Iompair Eiram (CIE) for the purposes set out in the report or instructions commissioning it. The liability of Buro Happold Limited in respect of the information contained in the report will not extend to any third party.

author	**Sarah Bear**
signature	
date	**16 October 2008**
approved	**Kenny Lyons/Hugh Mallett**
signature	
date	**16 October 2008**

Contents

Executive Summary

General

Coras Iompair Éireann (CIE) is proposing to redevelop a 3.5ha site adjacent to Connolly Station in Dublin. On the instruction of CIE, Buro Happold has carried out a contaminated land Generic Quantitative Risk Assessment in accordance with current good practice guidance together with a geotechnical assessment as part of the overall master planning for the area. This report also presents an assessment of the waste classification of the likely arisings from proposed earthworks.

Background

The site is located adjacent to Connolly Station, Dublin at the approximate National Grid Reference E316 611 N234 866. The land has been built up above the surrounding area, sloping upwards from road level in the south-east to approximately 8m above this in the north-west and is currently occupied by the station carpark, along with various commercial/industrial buildings. The site has been previously occupied by various workshops, storage and goods sheds, sidings, railway lines, cattle pens and buildings until 1981 when the site had been fully developed into its current condition.

The current development proposal for the site consists of retail, residential and commercial properties together with community green space and a transport interchange. Existing railway arches are to be retained

Ground conditions

The geological sequence beneath the site consists of made ground (up to 7.2m thick) overlying a thin, discontinuous layer of estuarine deposits (sandy silt) overlying or inter-bedded with the upper Glacial Till (inter-layered gravelly clay and gravel deposits). Limestone underlies the site at depth but was not encountered during the investigation.

Ground chemistry

Elevated concentrations of heavy metals (principally lead and arsenic) were recorded above relevant guideline values. Occasionally elevated concentrations of other metals (cadmium, mercury, nickel) and benzo(a)pyrene were recorded. The maximum recorded concentrations of arsenic, lead, nickel and mercury were very highly elevated in occasional samples. Asbestos not detected in any of the soil samples but is potentially present in the made ground. Locally strong hydrocarbon odours were recorded in soil (at water table level) and chemical analyses identified elevated concentrations of petroleum hydrocarbons (typical of highly degraded diesel).

Water quality

The groundwater table is fairly shallow beneath the site (approximately 2.5m below existing road level) and is likely to be in hydraulic continuity with the Docks located approximately 90m south of the site. Groundwater flow appears to be reasonably flat across the site.

Heavy metal concentrations are not highly elevated in groundwater, but elevated concentrations of petroleum hydrocarbons and polyaromatic hydrocarbons were recorded in groundwater within southern and eastern portion of site. Chloride, sulphate and ammoniacal nitrogen concentrations are also relatively elevated.

Ground gas

A limited ground gas monitoring programme was undertaken which recorded elevated concentrations of methane (>5%) and carbon dioxide (>10%) but at low flow rates (<1l/hr) indicating that the suite would fall into "Characteristic Situation 2" (as defined in good practice guidance).

Risk assessment

The generic quantitative risk assessment carried out on the basis of both existing and recently acquired data indicates that there are potentially significant risks to people and the environment under the currently existing conditions.

The proposed development of the site will give rise to some temporary risks, most notably to construction workers during its development. Short-term risks to the groundwater and the Docks are likely to increase during the excavation works. This is primarily because of the potential for runoff and leaching from stockpiles, and enhanced mobilisation of contaminants in groundwater. These potential risks can be mitigated by appropriate environmental management during construction. In the long term, provided appropriate mitigation measures are constructed and the recommendations below adopted, the risks to people and the environment can all be mitigated to acceptably low levels.

Risks to the groundwater are considered to be partially mitigated by the proposed development, which will consist of the excavation of the majority of made ground and contaminated soil material. It is therefore considered likely that with this reduction in the residual source, natural attenuation processes will be occurring at rates sufficient to be protective of human health and controlled waters. Some long term monitoring may be required to demonstrate satisfactory risk reduction is occurring by such processes.

Waste management

The results of the waste assessment indicate that the majority of the soils should be considered acceptable at the KTK Landfill site. Provision should however be made for the off-shore disposal of some hazardous waste

from the site based on visual/olfactory evidence of hydrocarbon contamination in the southern and eastern portion of the site, along with occasional exceedances of TPH and PAH for both Murphy and KTK waste acceptance criteria. It should be noted that it is the excavation contractor's responsibility, in association with the operator/owner of the receiving landfill site, to classify the materials for disposal/reuse prior to disposal.

Foundations and Sub Structure

Low rise structures (up to two storeys in height) could be supported by shallow foundations in the glacial till beneath basement slab level. For medium rise structures (up to ten storeys in height) the structure could be supported by a raft foundation. Structures greater than ten storeys in height could be supported by bored pile foundations. As the basement substructure is below ground water level, the basement and buildings will require appropriate design to resist uplift. Retaining walls will be necessary to support the basement around the site. Construction of a secant wall is proposed to form the basement. In order to maintain stability of the basement and excavation, and to provide dry working conditions for construction of the sub structure, a temporary pumped dewatering system will need to be installed to lower the ground water table. It is recommended that intrusive coring is carried out to determine the arch construction to allow a structural assessment of the arch to be made. All foundations are to be designed for an ACEC classification AC-5.

Recommendations

It is recommended that the following measures are implemented to mitigate the potential risks related to the proposed development;

- A rigorous health & safety regime (including PPE and personal hygiene) should be implemented by the construction work force;
- Construction workers should remain vigilant of ground conditions at all times and should report any suspect areas of potential contamination (especially hydrocarbon contamination);
- Stockpiling of grossly contaminated soils should be avoided if possible and where necessary, stockpiles should be covered when not in use.
- Gas protection measures (appropriate for Characteristic Situation 2) should be incorporated into all new buildings where excavation of all made ground has not been undertaken;
- Further investigation and monitoring of the groundwater regime should be carried out during and post construction in order to provide evidence of natural attenuation of hydrocarbon contamination;
- All foundations are to be designed for an ACEC classification AC-5.
- Further liaison with Dublin City Council as to disposal options for water during temporary works;
- Further intrusive investigation to determine stability of the existing railway arches;
- Pump testing to determine site specific hydraulic conductivities for dewatering works design.

1 Introduction

Coras Iompair Éireann (CIE) is proposing to redevelop a 3.5ha site adjacent to Connolly Station in Dublin. On the instruction of CIE, Buro Happold has carried out a contaminated land Generic Quantitative Risk Assessment (GQRA) and geotechnical assessment as part of the overall master planning for the area.

1.1 Scope

This report presents a summary of the current ground investigation information and makes recommendations based on both geotechnical and geoenvironmental findings. It also presents an assessment of the likely waste classification of arisings from the proposed excavation works. This report has been prepared in general accordance with CLR11 – 'Model Procedures for the Management of Land Contamination', Environment Agency (UK), September 2004 (ref 1). The Irish Environmental Protection Agency (IEPA) and Dublin City Council have generally adopted the UK Model Procedures as good practice guidance appropriate for Ireland.

The objectives of this report are:

- To assess the potential for significant risks to both human and environmental receptors from contaminants identified within the made and natural ground during construction and for the finished site development;
- To identify key areas of geotechnical risk with respect to ground conditions;
- To determine the likely waste classes for excavated material; and
- To determine the need for and scope of any remediation.

1.2 Existing Information and Reporting

The following should be read in conjunction with this report:

- Buro Happold Ground Engineering 'Site Appraisal Report' Connolly Station, Dublin job: 023956, March 2008.

1.3 Limitations

The ground investigations carried out to date have been undertaken in general accordance with good practice guidance, relevant standards and established good practice. The scope and design of the site investigation has been based upon the known history of site use, the results of previous studies and investigations and on the development plan. On this basis the spacing of the exploratory holes and the sampling and analysis plan for this investigation is considered to have provided a reasonable level of certainty about the ground conditions.

However it is important to recognise that contamination can be both widespread and relatively localised, depending upon its source and nature etc. No investigation, however comprehensive can be expected to determine absolutely the nature and extent of all the contamination which could be present on any site. There will always be an element of uncertainty about the ground conditions including contamination. This potential for currently undetected contamination to be present must therefore be taken into account in consideration of future development activities, in the risk assessment, in the design of the remedial strategy, the health and safety planning, the financial planning and financial risk management and in the implementation of the below ground works during construction.

2 Proposed Development

The proposed redevelopment of Connolly Station is to include retail, residential and commercial properties together with community green space and a transport interchange. Existing railway arches are to be retained

There are currently 9 blocks proposed as part of the development varying in height from 2 to 27 storeys.

A single storey basement is to be provided throughout most of the site footprint with basements used for car parking, plant and equipment. Along Sheriff Street the basement a two storey basement is proposed. No basements are proposed beneath heritage structures.

3 Site Description and Environmental Setting

A detailed review of the environmental setting for the site is provided in the Site Appraisal Report (Buro Happold, March 2008). A summary of this information (updated with reference to recently acquired site investigation data) is presented in the following sections.

3.1 Site Location and Topography

The site is located adjacent to Connolly Station, Dublin at the approximate National Grid Reference E316 611 N234 866 (Figure 1). It is irregular in shape covering an area of approximately 3.5 hectares. The site has been built up above the surrounding area, sloping upwards from road level in the south-east to approximately 8m above this in the north-west. The site is bounded to the south by Sheriff Street Lower, to the south-east by Oriel Street Upper, to the north-east by Seville Place and to the north-west and west by Connolly Station and associated platforms and railway lines (Figure 2). The entire site is covered mainly in hardstanding, incorporating a mixture of tarmac and concrete with a gravel cover surrounding the railway lines. The site is surrounded by a mixture of commercial/industrial and residential land use.

3.2 Current Site Use

At present, the site is occupied by Connolly Station, a rolling stock maintenance yard, various CIE Group buildings, IE building maintenance and fastrack facilities, CTC buildings and associated car parking. Disused, derelict railway arches (former goods sheds) run along Sheriff Street Lower, Seville Place and beneath Connolly Station and associated railway lines off Amiens Street.

Numerous heating oil tanks are present across the site, along with an electricity substation in the south-west corner. Activities undertaken within the locomotives maintenance building and yard to the north of the site include re-fuelling, cleaning and light servicing.

3.3 Previous Site Use

The majority of the site was open/agricultural land prior to 1838, with Connolly Station (then the Drogheda Railway Terminus) built by 1847. Various workshops, storage and goods sheds, sidings, railway lines, cattle pens and buildings occupied the site until 1981 when the site was fully developed into its current condition.

The majority of the area surrounding the site was covered by commercial and residential land uses from at least 1838. Significant surrounding historical land uses include gasometers (east of Oriel Street Upper), timber yards, tobacco, whiskey, sugar and tea stores, tobacco works, a tank, tobacco warehouse, storehouses and coal yards.

3.4 Geology, Hydrogeology and Hydrology

The geological sequence for the site, as obtained from the Geological Survey of Ireland (GSI) website (ref. 2) Geology of Dublin, Sheet 16, 1992, comprises Alluvium overlying Glacial Till (boulder clay) and Dublin Limestone (Calp). Much of the site, generally from the main car park area towards Connolly Station, is built up (up to 8m) above the surrounding ground level. It is therefore expected that a large thickness of made ground is present across this part of the site, potentially sourced from cuttings and workings during the construction of the station in the early 1840s.

Taking into account the geological map from the GSI website (ref. 4), GSI borehole records and ground observations made during the site walkover (refer Buro Happold Site Appraisal Report), the expected geology underlying the site can be summarised as indicated in Table 3.1 below.

Table 3.1. Summary of Geology and Hydrogeology

Name	Description	Thickness	Aquifer type
Made ground	Fill material, possibly reworked alluvium and glacial till materials containing demolition and railway materials.	Approx. 5-8m	Not classified (perched water likely)
Glacial Till	Sand, gravel, cobbles and boulders.	Approx. 12m	Unclassified aquifer
	Firm to stiff grey brown gravelly sandy CLAY containing limestone boulders. Becoming dark grey / black and very stiff with depth. Contains frequent lenses or layers of fluvio-glacial sands and gravels.	Typically 10-15m from previous BH investigations	Not classified (aquitard)
Calp	Dublin Limestone	Unproven	Locally Important Aquifer (LI)

Note: updated with reference to recently acquired site investigation data.

The hydrogeological system for the site and surrounding areas comprises possible perched water in the made ground, with groundwater residing within the granular glacial till deposits (sand and gravel) and the Limestone.

Groundwater present within the glacial till can be important for local supplies and is likely to supply the base flow to nearby surface waters. The direction of groundwater flow is likely to be southerly, towards the Docks and the River Liffey. The layer of low permeability glacial till (gravelly clay) is likely to act as an aquitard, limiting vertical migration and effectively confining the Limestone aquifer from the granular glacial till deposits.

The Limestone Aquifer has been designated as a Locally Important Aquifer (LI) and is therefore likely to be important for local supplies. The site does not lie within a Source Protection Zone (SPZ), however it does lie within a drinking water protected area (DWPA) for groundwater. The IEPA currently do not require licences for groundwater abstraction.

The nearest surface water feature is the Docks located approximately 90m south of the site. The Docks connect with the Liffey Estuary and River approximately 440m south of the site. The Liffey Estuary has been designated as a nutrient sensitive area.

4 Ground Investigation

4.1 Site works

The ground investigation was undertaken by Glovers on behalf of Buro Happold and contamination testing was undertaken by Alcontrol Geochem, Dublin, a specialist analytical soils and groundwater laboratory. The site works took place between 8 July and 17 September 2008 and comprised the following:

- Drilling of 7 No. boreholes using cable percussion tool techniques (between 6.7 and 15.8m depth);
- Progression of 3 No. boreholes (following on from cable percussion) using rotary coring techniques (between 39.5 and 42.3m depth);
- Progression of 12 No. window sample boreholes (up to 5.0m depth);
- Installation of groundwater and gas monitoring standpipes in 14 No. boreholes
- Excavation of 4 No. structural inspection pits;
- Soil logging and sampling from all exploratory holes for geotechnical and geoenvironmental purposes;
- Geophysical trial survey above and within railway arches; and
- Groundwater and ground gas monitoring and sampling.

The locations of the exploratory holes are shown as Figure 2. Logging and soil sampling was undertaken by a Glovers engineer. The ground conditions encountered in all exploratory holes were logged in accordance with BS 5930:1999. Logs for the boreholes, window samples and structural inspection pits are provided in the Glovers Factual Report September 2008.

4.2 Geotechnical sampling

Standard penetration tests (SPT) were conducted as per BS5950 in all boreholes, with disturbed (bag) samples collected at 1m intervals.

4.3 Getoechnical laboratory testing

Geotechnical laboratory testing was scheduled by Buro Happold. Results of the geotechnical testing are included in the Glovers factual report.

The geotechnical testing schedule for soils comprised the following testing:

- Atterberg limits determination (liquid limit, plastic limit and plasticity index)
- Particle size distribution
- Chemical testing to determine total sulfate, soluble sulfate, total sulfur, and pH in accordance with BRE SD1 (ref 2)

4.4 Geoenvironmental sampling

Representative disturbed soil samples were obtained from boreholes and window samples (in plastic liners) for examination and laboratory chemical analysis. An average of four samples were collected per location. At least one of the samples was taken within the top 1.0 m of the borehole. Further samples were taken where a change in lithology was noted or where significant visual/olfactory evidence of contamination was identified.

4.5 Geoenvironmental laboratory testing

Geoenvironmental laboratory testing was scheduled by Buro Happold. All contamination analysis was undertaken by ALcontrol Geochem. Details of the specific suites of analysis for soil samples can be found in this document. Analysis was undertaken using methods approved under the MCERTS performance standard for soils where possible. The number of samples analysed for each of the analytical suites is given in Table 4-1.

The analytical data is presented in Appendix B and discussed in Sections 7 and 8.

Table 4-1 – Number of samples analysed; Suites of analysis

Suite	Soil	Groundwater
General Suite	35	25
Heavy metals only	2	-
TPHCWG	13	-
VOC	3	-
SVOC	6	-
Leachate	9	-
Murphy/KTK	9	-

5 Ground Conditions

5.1 Geology

The ground investigation generally confirmed the geological sequence described in the published geology, however a thin layer of estuarine deposits (sandy silt) was recorded overlying or inter-bedded with the upper Glacial Till. Limestone was not encountered during the investigation.

The ground profile disclosed by the investigation is summarised in the Table 6.1 below, and is illustrated in the geological sections presented in Figure 3.

Table 6.1. Summary of site specific ground conditions

Stratum	Depth to top of stratum (mbgl)	Level of top of stratum (m OD)	Thickness (m)	General description
Made ground	GL	+1.6- -7.9	0.1-7.2	Mixture of clay, sand and gravel containing cobbles and occasional boulders
Estuarine Deposits	2.4-6.9	+4- -7.4	0.5-3.2	Grey, locally gravelly sandy silt with sea shells.
Glacial Till	0.1-7.2	+1.7- -7.2	Not proven likely to be 40m	Firm dark grey sandy gravel inter-bedded with layers of firm gravelly clay.
Calp (Limestone)	>42.5	> -38.24	Not proven	-

5.2 Made ground

Made ground across the entire site ranged from 0.1 to 7.2m thick. Much of the site, generally from the main car park area towards Connolly Station, is built up (up to 8m) above the surrounding ground level. A large thickness of made ground is therefore present across this part of the site, recorded thicknesses ranging from 3 to 7.2m. The thickness of made ground at road level was approximately 2.6m.

Made ground was recorded as a mixture of clay, sand and gravel containing cobbles and occasional small boulders along with pieces of glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery. Gravel is sub-angular to sub-rounded, fine to coarse.

Standard penetration tests (SPT) N values ranged between 3 and 24 in made ground, generally being higher in the gravel stratum, recording less than 12 in the sand and clay.

5.3 Estuarine Deposits

Estuarine deposits were encountered in borehole BH06 and window samples WS05, WS06 and WS11 in the south of the site and in WS12 in the far north. The deposits comprise grey, locally gravelly, sandy silt with sea shells. Sand is fine to coarse grained and gravel sub-rounded, fine to medium. No SPTs were taken within the Estuarine Deposits.

A layer of dark grey/black sandy silt with fibres and an organic odour (up to 1.9m thick) was recorded beneath made ground in window sample WS03 and borehole BH02.

5.4 Glacial Till

Glacial Till was encountered across the entire site, comprising dense dark grey sandy gravel interbedded with frequent layers of firm to stiff brown/dark grey sandy gravelly clay with cobbles. Gravel is sub-angular to sub-rounded, fine to coarse.

The thickness of Glacial Till was not proven, recorded down to at least 42.3m below ground level (-36.24mOD). Layers of gravelly clay within the Glacial Till ranged between 0.6 to 7m thick. SPT N values ranged from 12 to 48 within the boulder clay with the higher N-values likely to be attributed to the presence of cobbles and boulders within this stratum or an underlying gravel layer.

The gravel deposits ranged in thickness from 1.7 to 17m, with SPTs ranging from 22 to 68. with SPT's generally increasing with depth.

5.5 Limestone

Limestone was not encountered during the investigation.

5.6 Visual/Olfactory Evidence of Contamination

Hydrocarbon odours were recorded within the Estuarine Deposits in window sample WS11 at approximately 2.0m below ground level (bgl). No odour was recorded in the underlying gravelly clay (Glacial Till). No visual/olfactory evidence was recorded at any of the other exploratory hole locations.

5.7 Groundwater

Groundwater levels were measured on seven occasions during the recent investigation by Glovers (refer Glovers Factual Report September 2008) and on four occasions during the post ground investigation (GI) monitoring undertaken by ALcontrol Dublin. From observations made in the field and the monitoring data, it appears that the groundwater table is located within the gravel layers of the Glacial Till at approximately 2.5m below existing road level (0 OD Marlin Head). From monitoring data collected to date, groundwater flow is relatively flat across the site (refer Figure 3).

Falling head tests were carried out by Glovers in three boreholes (BH01, BH02 and BH03) during the field works. The permeability of the gravel layers ranged from 2.3×10^{-5} - 1.1×10^{-6}m/s while the boulder clay recorded a permeability of 4.0×10^{-6} m/s.

6 Geotechnical Assessment

6.1 Foundations

General

The proposed development involves the construction of 9 structures varying in height form 2 to 27 storeys. A single level basement is proposed over most of the site foot print. For the foundation assessment it has been assumed that made ground has been removed as part of the basement works with formation level within the natural soils beneath the site.

Shallow Foundations

Low rise structures up to say 2 storeys in height could be supported by shallow foundations in the natural glacial sands and gravels beneath basement slab level. An allowable bearing capacity of 150KPa can be adopted for preliminary design.

Raft Foundations

For medium rise structures up to say 10 storeys in height, the structure could be supported by a raft foundation at basement level founded within the natural glacial sands and gravels. Raft thicknesses varying from 600mm to 1000mm are likely to be required to evenly distribute column loads through the raft.

Pile Foundations

For structures greater than 10 storeys in height, the structure can be supported by pile foundations. Due to the nature of the ground and location of existing structures, a bored replacement pile is considered to be a suitable piling method for the development.

Assuming piles carry load in shaft friction, the following pile diameters and lengths may be adopted for preliminary design.

Bored Pile Diameter	Length	Safe Working Load
600mm	20m	1500KN
750mm	20m	1800KN
900mm	20m	2200KN

6.2 Buoyancy

As the basement substructure is below ground water level, the basement and buildings will require to be designed to resist uplift. For a single level basement 5m below ground level, assuming water is at or near existing ground level, an uplift pressure of 50kPa can develop beneath the basement slab. Assuming a minimum factor of safety against uplift of 1.4In accordance with BS8110, a downward load of 70kPa will be required to provide an adequate factor of safety against uplift.

The uplift can be resisted by providing bar anchors or micro piles in the basement slab. Preliminary calculations indicate 12m long, 300mm diameter micro piles installed in 3m grid could provide the required resistance against uplift. The micro piles will require to be reinforced over the full length with approximately 2% reinforcement by pile area

To control uplift pressures an under drainage system with pumping could be adopted as part of the permanent works Due to the maintenance requirements and likely licensing issues for discharging water, this option has not been considered further.

6.3 Basement Retaining Walls

Retaining walls will be required to support the basement around the site. Retained heights vary from 12m adjacent to the existing railway sidings at Connolly to station to 4m. To maximise space within the basement and provide an open working area for construction it is proposed to construct embedded retaining walls to form the basement. To control water seepage into the basement and limit noise and vibration during construction, it is recommended that a secant piled wall system is adopted for the basement works.

Preliminary calculations indicate that a 900mm diameter secant wall up to15m long will be required to support the 4m deep single level basement excavation. For the 12m high retaining wall supporting the existing railway, a 1500mm diameter secant wall tied back with 3 rows anchors will be required to support the excavation and limit movements of the adjacent railway infrastructure.

6.4 Dewatering during Construction

In order to maintain stability of the basement excavation and provide dry working conditions for construction of the sub structure, a pumped dewatering system will require to be installed to lower the ground water table

There are various methods available for lowering the ground water table. The choice of method depends on the nature and permeability of the ground, the extent of the area to be dewatered and required reduction in ground water level.. Based on these factors it is considered that a well point system could be adopted to control groundwater during construction.

Wellpointing systems are among the most common methods of dewatering excavations and consist of shallow wells comprising small well screens of about 50mm diameter by about 0.5m to 1.0m long. The well screens are connected to a common header pipe where water is pumped to a discharge point. The design of the temporary dewatering system will be the responsibility of the contractor.

6.5 Railway arches

A trial geophysical survey was carried out on 3 and 5 July above the railway arches along Sheriff Street Lower to determine the presence and plan extent of hollow arches. The results from these surveys are presented in Appendix H of Glovers Factual Report (September 2008).

The results were not conclusive and the construction of the arches could not be determined. It is recommended that intrusive coring is carried out to determine the arch construction to allow a structural assessment of the arch to be made.

Four inspection pits were excavated adjacent to the existing arches to determine the geometry of the arch foundations. The trial pits are detailed in Appendix G of the contractors report. The results indicate the arches are founded on shallow brick or masonry foundations. The base of the foundations could not be proved during the ground investigation however probing at the base of each trial pit indicates the foundations to be at depths greater than 1.45m below ground level.

6.6 Buried concrete

Classification of buried concrete against sulphate attack has been carried out through the assessment of chemical test results on various strata and various levels to the current guidance BRE SD1:2005 (ref 2). In summary the soils and groundwater results for made ground give a design sulphate class of DS-4 and DS-5 respectively. The soils and groundwater results for Glacial till also give a design sulphate class of DS-4 and DS-5 respectively.

The DS-Class converts into a classification of the aggressive chemical environment for concrete (ACEC) once the pH and mobility of groundwater are taken into consideration. The characteristic pH value for both soil and groundwater has been taken as 7.1 for both made ground and for Glacial Till. For all foundations an ACEC classification of AC-5 has been determined assuming groundwater is mobile.

7 Soil Data Assessment

7.1 Approach

The current land use of the Connolly Station site is commercial/industrial, and is likely to remain so in the future development with possible residential land use (without plant uptake). An assessment of soil contaminant concentrations in relation to the future (more conservative) condition will be carried out to assess potential risks to both current and future human receptors using the site. Due to existing topography, site redevelopment will require a significant programme of earthworks to excavate the majority of the site to approximately two stories below the existing road level. An assessment of soil contaminant concentrations in relation to the enabling works/construction phase condition will be carried out to assess potential risks to human receptors using the site, principally construction workers.

The IEPA have generally adopted the UK assessment of risk as good practice guidance appropriate for Ireland. This approach has therefore been adopted for this report. Recently (August 2008) the Environment Agency published its revised contaminated land exposure assessment technical guidance (commonly known as "CLEA") and associated CLEA software model. The new CLEA software [Version 1.03 (beta)] has been published for a three month evaluation period for comment (period ends at the end of November). Currently, work is underway to generate screening values using this new software. In the meantime, Buro Happold is continuing to use the published SGVs (ref. 3 & 4) as initial screening criteria. However, the subsequent risk assessment has recognised the current uncertainty with respect to these values.

Human health threshold values (Generic Assessment Criteria) for cyanide, benzene, xylene, naphthalene, benzo(a)pyrene and total petroleum hydrocarbon (TPH) bands in accordance with Science Report P5-080/TR3 (ref 5) have been derived using the CLEA UK (beta version) risk assessment model. Generic Assessment Criteria (GAC) for benzo(a)pyrene and naphthalene were derived using toxicological data from the TOX reports published by the Environment Agency. For TPH bands given in aliphatic and aromatic bands, toxicological values reported in the EA publication "The UK approach for evaluating human health risks from petroleum hydrocarbons in soils" have been adopted. Potentially phytotoxic metals have been assessed against Dutch Values (ref. 6) (for ecotoxic risk) in the absence of suitable generic assessment criteria.

Statistical analysis of the soil analytical results has been carried out in general accordance with the 'Guidance on Comparing Soil Contaminant Data with Critical Concentrations' (ref 7). An estimate of the true population mean has been calculated (upper confidence limit of the sample mean) for all contaminants where a sample has exceeded relevant screening criteria. The "conservative mean" contaminant concentration (US95) is then compared against the screening criteria. This approach is intended to assess the average exposure to a contaminant rather than looking at solely worst case values. Outlier testing has been carried out to indicate whether or not a data point is likely to form part of the same statistical distribution. Where a maximum concentration has been determined as an outlier (confirmed by visual/olfactory evidence or the result of an error) this concentration has not been included in the US95 calculation, but has been separately assessed.

Division relevant to receptor

The analytical data has been assessed with respect to:

- Chronic risks to human health;
- Acute risks to human health;
- Risks to flora;
- Risks to buildings/ structures; and
- Risks to controlled waters (considered in Section 8).

Division relevant to source material

The analytical data has been characterised with respect to the two different soil types encountered; (i) made ground and (ii) natural materials (including Estuarine Deposits and Glacial Till).

7.2 Chronic risks to human health

7.2.1 Made ground

A total of twenty eight samples of made ground were analysed for a suite of inorganic and organic determinands given in Table 1 of Appendix B. Determinands showing one or more exceedance of a relevant threshold value have been subjected to statistical analysis as defined above. This data is summarised in Table 7.1 below.

Table 7.1 Made ground- Determinands showing exceedances of thresholds

Determinand	No of samples	SGV (No. of samples exceeding SGV/GAC)		Max	Min	US95 (exc. Outlier)	Outliers
		Residential without plant uptake	Commercial industrial				
Arsenic (mg/kg)	26	20 (**15**)	500 (0)	150	3	41	-
Cadmium (mg/kg)	26	30 **(2)**	1400(0)	41	<1	3	-
Lead (mg/kg)	26	450 **(15)**	750 **(9)**	2263	30	980	-
Mercury (mg/kg)	26	15 **(3)**	480 (0)	320	<1	6	-
Nickel (mg/kg)	26	75 **(2)**	5000 (0)	173	11	62	-
Benzo(a)pyrene (mg/kg)	26	1.4* **(4)**	31* (0)	7.2	<0.001	2.09	-

*Generic Assessment Criteria

The majority (54%) of samples of made ground recorded concentrations of arsenic above the SGV for residential with and without plant uptake. The US95 for arsenic was also above the SGV for residential without plant uptake by a factor of two. One third of samples recorded concentrations of lead above the commercial/industrial SGV for lead, with 58% of samples elevated above the SGV for residential without plant uptake. The US95 for lead was also elevated above the SGV for both residential and commercial/industrial landuse.

A small proportion of samples recorded concentrations of cadmium, mercury, nickel and benzo(a)pyrene above the SGV for residential without plant uptake. The US95 for all of these determinands, with the exception of benzo(a)pyrene (which exceeded the SGV by 50%), was however below the SGV for residential without plant uptake.

Slightly elevated concentrations of TPH (up to 389mg/kg) were recorded in occasional samples of made ground. TPH results depict predominantly 'heavy end' aromatic hydrocarbons, however occasional aliphatic hydrocarbons were also recorded. The majority of VOC and SVOC were recorded below limits of detection although occasional concentrations above detection limits were recorded.

7.2.2 Natural ground

A total of nine samples of natural materials were analysed for a suite of inorganic and organic determinands. With one exception, all samples recorded concentrations of all determinands below relevant screening values.

A single sample of natural material showed a slight exceedance of the residential without plant uptake SGV for benzo(a)pyrene (WS3 at 4.0m). The sample size (six) for benzo(a)pyrene was considered to be too small to calculate the US95.

Strong hydrocarbon odours were recorded in natural soil at the approximate water table level within WS11 (located within the building maintenance yard). Samples collected from WS11 recorded elevated TPH concentrations (up to 635mg/kg) with higher concentrations within the heavier carbon banded range. Laboratory characterisation suggests this concentration is typical of highly degraded diesel. TPH concentrations within this location reduced considerably with depth as expected due to the relatively shallow water table level (approximately 2m bgl). That is, this contamination appears to be representative of 'smear' at or about the zone of groundwater fluctuation.

7.3 Acute Risks to Human Health

Soil concentrations

There are no guidance values for assessing acute risk related to soil contamination. Because such risks are associated with short term exposure, consideration of maximum concentrations (and not the "average" concentration which is relevant to chronic, or long term risk) is required. Comparison of these maximum concentrations has been made with the various SGVs and other screening values which will provide a conservative benchmark for such short term risks (as the SGVs etc are based upon a long term exposure).

The maximum values recorded for some inorganic determinands are highly elevated. With the exception of lead, these maximum concentrations have been recorded in two single samples located in the northern corner of the site in the vicinity of the CTC building. The maximum recorded concentration of arsenic was approximately 7.5 times the SGV for residential without plant uptake, the maximum recorded concentration of mercury was 21 times the SGV and nickel was 2 times the SGV. The maximum recorded concentration of lead was 3 times the SGV for commercial/industrial land use and 5 times the SGV for residential landuse (without plant uptake).

Asbestos

Asbestos screening was undertaken on twenty six samples of made ground and nine samples of natural material. Asbestos fibres were not recorded in any of the samples analysed.

7.4 Risks to Flora

Phytotoxic effects with respect to *flora* have been assessed by statistical evaluation of the datasets of the phytotoxic elements copper and zinc. Results are summarised in Table 7.2.

Table 7.2 – Phytotoxicity assessment

Material	Determinand	No of samples	Dutch Intervention Value (DIV)	Max	Min	US95 (exc. Outliers)	Outliers
Made ground	Copper (mg/kg)	28	190 **(10)**	1179	7	258	-
	Zinc (mg/kg)	28	720 **(2)**	1124	59	306	-

Over one third of the samples of made ground recorded elevated concentrations of copper above relevant thresholds. Elevated concentrations of zinc were recorded in less than 10% of samples. The US95 for copper was above the DIV, but the US95 for zinc was below.

Copper and zinc concentrations were below the relevant thresholds in natural ground.

7.5 Risks to buildings/structures

Classification of buried concrete against sulphate attack has been carried out through the assessment of chemical test results on various strata and various levels to the current guidance BRE SD1:2005 (ref 2). In summary the soils and groundwater results for made ground give a design sulphate class of DS-4 and DS-5 respectively. The soils and groundwater results for Glacial till also give a design sulphate class of DS-4 and DS-5 respectively.

The DS-Class converts into a classification of the aggressive chemical environment for concrete (ACEC) once the pH and mobility of groundwater are taken into consideration. The characteristic pH value for both soil and groundwater has been taken as 7.1 for both made ground and for Glacial Till. For all foundations an ACEC classification of AC-5 has been determined assuming groundwater is mobile.

In order to assess the risks to conventional water pipe material from made ground found onsite, contaminant concentrations have been compared against threshold values derived by Water Regulations Advisory Scheme (WRAS) (ref 8). Where soil concentrations exceed these threshold values, it is likely that special consideration of material selection will be required.

Determinands showing one or more exceedance of a WRAS material selection threshold are summarised in Table 7.3. Numerous concentrations of arsenic, lead, sulphate and pH were elevated above WRAS material selection threshold values in made ground. Arsenic and lead are classed as a toxic contaminant, whereas sulphate and pH are corrosive. Occasional concentrations of cadmium, mercury, and organic contaminants (PAH) were also elevated above WRAS material selection threshold values.

Occasional concentrations of corrosive (pH), toxic (arsenic) and organic (TPH) contaminants were recorded concentrations above WRAS material selection threshold values in natural material.

With reference to Table 3 of WRAS Information and Guidance Note: No 9-04-03 (ref 8), suitable pipe materials for organic and corrosive environments include wrapped iron or polythene/aluminium/polythene. Suitable pipe materials for toxic contaminants include metallic or plastic. The WRAS Guidance Note however recommends that the laying of water pipes across land where arsenic is identified or suspected is unacceptable without site remediation.

8 Groundwater Assessment

8.1 Approach

For the groundwater assessment, contaminant concentrations have been compared with Irish Interim Guideline Values (ref 9). These values have been recommended by the Irish Environmental Protection Agency (IEPA) and are based upon a combination of both Drinking Water Standards (ref 10) as well as Freshwater Environmental Quality Standards derived under the requirements of the EC Dangerous Substances Directive (ref 11). It is recognised that these substances may require further review against site specific thresholds derived using quantitative risk assessment, if potentially significant risk is identified.

8.2 Risks to Controlled Waters

Potential risks to controlled waters have been assessed by examining soil leachability and groundwater data. A total of twenty one soil samples were scheduled for leachability testing. Groundwater was sampled from nine locations (BH01-BH07, WS7 and WS11) on two to three occasions between 29 August and 17 September 2008. Soil leachability and groundwater data are presented in Appendix B as Tables 2 and 3 respectively.

8.2.1 Leachability

The leachate from numerous soil samples recorded concentrations of copper and barium above Irish Interim Guideline Values (IIGV). Occasional concentrations of arsenic, chromium, nickel, fluoride and sulphate were also elevated above IIGV in leachate. Leachable metals (particularly arsenic and mercury) in samples where elevated soil concentrations were recorded were low in comparison.

8.2.2 Groundwater

8.2.2.1 Field observations

During groundwater sampling, hydrocarbon odours were recorded in water purged from WS11, BH03 and BH02 and a slight hydrocarbon odour was noted in purged water from BH06 and WS7. A slight hydrocarbon sheen was observed on water purged from WS11, BH02, BH06 and BH03. Foam was also observed on BH03. Purged groundwater from all boreholes, except from BH02, was high in suspended solids.

An interface probe was used to monitor groundwater levels as well as levels of light and dense non-aqueous phase liquids (LNAPL and DNAPL). No LNAPL or DNAPL was detected in any of the boreholes during the monitoring period.

Inorganics

Occasional concentrations of dissolved boron and lead were recorded above Irish Interim Guideline Values (IGV). Highly elevated concentrations of chromium, lead, nickel and zinc were recorded on one occasion in groundwater sampled from BH04. Concentrations of these metals were below IGV during the other two sampling rounds. Investigation undertaken by the laboratory (ALcontrol) indicated that there was a possibility that this sample was contaminated during analysis. Re-analysis for dissolved chromium confirmed sample contamination, reporting concentrations much lower than the initial results obtained. The metal concentrations from this sample have therefore not been included in this assessment.

Consistently elevated concentrations of chloride, sulphate, ammoniacal nitrogen, and total hardness were recorded above IGV. The pH recorded on one occasion in BH04 was elevated above the IGV (i.e. alkaline).

Organics

Total petroleum hydrocarbon (TPH) concentrations (up to 48.32mg/l) in groundwater sampled from BH02, BH03, BH05, WS7 and WS11 were consistently elevated above IGV. Occasional concentrations of TPH were recorded in groundwater sampled from BH04, BH06 and BH07. TPH concentrations were generally within the aromatic C_{12}-C_{35} hydrocarbon range. Occasional concentrations of TPH within the alliphatics C_{12}-C_{35} range were recorded in BH02 and BH03. The full range of hydrocarbons were recorded in groundwater sampled from WS11.

Consistently elevated concentrations of ethylbenzene and total xylenes were recorded above IGV in WS11. Occasionally elevated concentrations of benzene and toluene were also recorded above IGV at this location.

Consistently elevated concentrations of total PAH were recorded above IGV in groundwater sampled from BH02, BH03, BH06 and WS11. Occasionally elevated total PAH concentrations were recorded in groundwater sampled from BH04, BH05, BH06 and WS7. Occasional concentrations of fluoranthene, benzo(b) + benzo(k)fluroanthene, benzo(a)pyrene, indeno(123cd)pyrene and benzo(ghi)perylene were recorded in groundwater.

All organic determinands were recorded below IGVs in groundwater sampled from BH01. PCB concentrations were recorded below the laboratory detection limit in groundwater sampled from BH03 (within vicinity of electricity substation).

9 Ground Gas Assessment

9.1 Programme

Ground gas monitoring was undertaken at four locations in made ground, two locations within made ground and natural material (alluvial deposits and boulder clay) and one location in natural material (estuarine deposits and boulder clay) across the site. This monitoring programme comprised four visits at weekly intervals between 29 August and 17 September 2008. Visits were undertaken during periods of both high and low atmospheric pressure. Gas samples were collected on one occasion and analysed in the laboratory to confirm the readings recorded on site. Table 9.1 shows a summary of the results from the monitoring.

Table 9.1 Summary of ground gas monitoring

Strata	Flow Rate (l/hr)	VOCs (ppm)	CO_2 (% of samples > 5%) % v/v	CH_4 (% of samples > 5%) % v/v
Made ground	0-0.2	10-272	<0.1-6.4 (0.07)	<0.1-5.6 (0.07)
Made ground and natural deposits (alluvial deposits and glacial till)	0-0.2	32.9-388	2.6-10.6 (50%)	<0.1 (0)
Natural deposits (estuarine deposits and glacial till)	0.1-0.2	95-1980	3.8-9.3 (50%)	0.2-100 (50%)

Highly elevated concentrations of methane up to 100% v/v were recorded in natural deposits (WS11) and up to 9.4% v/v carbon dioxide (WS03). This elevated concentration of methane is likely to be associated with the hydrocarbon contamination recorded in soil and groundwater within WS11 (confirmed by chemical analysis of groundwater). The second highest methane concentration recorded (not associated with hydrocarbon contamination) was 0.4% v/v (WS12). A photoionisation detector (PID) was used to provide a screen for Volatile Organic Compounds (VOCs) present in the soil gas during the monitoring period. VOC readings of up to 111ppm (WS11) were recorded.

Occasional concentrations of carbon monoxide and hydrogen sulphide were recorded throughout the monitoring period. Carbon monoxide concentrations ranged from <0.1-6ppm and hydrogen sulphide concentrations from <0.1ppm-1ppm.

Consistently low flow rates were observed, ranging from 0l/hr up to 0.2/hr. Flow rates also did not differ significantly between response zone stratum. Chemical analysis of ground gas compared to field measurements is shown in Table 9.2.

Table 9.2 Chemical analysis of ground gas compared to field results

		FIELD RESULTS					LAB RESULTS		
	Date Monitored & Sampled	Flow Rate (l/hr)	Atmos Pres (mb)	Min O_2 (%) air	Max CO_2 (% air)	Max CH_4 (% air)	O_2 (%) air	CO_2 (% air)	CH_4 (% air)
WS3	10/09/2008	0.1	999	7.8	10.6	<0.1	9	8	<0.05
WS10	10/09/2008	0	999	20.1	<0.1	<0.1	21	0.4	0.1
WS11	10/09/2008	0.2	1001	10	5.7	1.2	11	4.2	0.1

Oxygen and carbon dioxide concentrations recorded in the field were consistent with laboratory analysis, however methane concentrations recorded in the field (WS11) were slightly higher than those recorded in the laboratory. The GA2000 gas analyser is calibrated using certified methane mixtures and will give correct readings provided there are no other hydrocarbons present within the sample. If there are other hydrocarbons present, the methane reading will be higher (never lower) than the actual methane concentration being monitored. On this basis, and taking into consideration the significantly elevated levels of methane (up to 100%v/v) recorded in WS11 (which contains hydrocarbon impacted soil and groundwater), the elevated methane concentrations recorded in WS11 is likely to be due to elevated VOC vapours and not solely methane.

9.2 Assessment

The soil data has been assessed with reference to CIRIA report C665 (ref 12). Consideration has therefore been given to both methane and carbon dioxide concentrations as well as emission (flow) rates. The Gas Screening

Value (GSV) is defined as the product of gas concentration multiplied by flow rate. The GSV is then considered with other parameters/limiting conditions to define a Characteristic Situation. The Characteristic Situation in turn identifies the need for and scope of any necessary gas protection measures. Assessment of the ground gas results is provided in Appendix B – Table 4.

As part of the proposed development, most of the made ground across the site, and a significant volume of natural material (including that contaminated with hydrocarbons) will be excavated and removed offsite in order to facilitate development. Gas protection measures across this part of the site are therefore not required as the source will have been removed. In addition, the proposed below ground car-park is considered to provide adequate ventilation in this area. The railway arches along Sheriff Street Lower are however being retained and therefore the ground gas regime in this area (and for any buildings where no-excavation is proposed) has been assessed.

The highest concentration of methane (5.6% v/v) and the highest flow rate (0.2 l/hr) recorded within the arches along Sheriff Street Lower produce a GSV of 0.1 indicating that the ground gas regime beneath the site (under a worst case scenario) falls within Characteristic Situation 2 (Table 8.5, CIRIA Report C665). Taking into consideration the limited monitoring period, the likely maximum concentrations should further monitoring be carried out, recorded flow rates, and uncertainties in the data, gas protection measures typical of Characteristic Situation 2 are recommended within the former railway arches and any new buildings where no excavation is proposed.

Should the proposed development change elsewhere on the site, gas protection within any new buildings and services onsite needs to be seriously considered. Further ground gas monitoring and sampling should be undertaken to fully assess the ground gas regime across the site, and to verify the highly elevated methane levels recorded.

9.3 Radon

Technical Guidance document C published by the Department of the Environment (DoE) in support of the 1997 Building Regulations provides guidance on the radon protection measures required for new and existing buildings where extensions or material changes of use are planned. Box 9.1 below details the specific guidance with respect to radon protection measures required. Discussions with the National Radiological Protection Institute for Ireland (NRPI) indicate Dublin is not in a High Radon Area.

Gas protection measures typical of CS2 are considered to be sufficient to protect against the build up of radon iwithin the former railway arches and any new buildings where no basement car-park is proposed. Radon protection measures are not considered necessary within the proposed basement car-park, on the basis that this should provide adequate ventilation to prevent the build up of radon, combined with the depth to the potential source of radon (>40m below ground level).

2.10 Dwellings or other long –stay residential buildings

(a) High Radon Areas: measures should be taken to protect the building from Radon in the ground. For example, in the case of a non-complex building of normal design and construction, a fully sealed membrane of low permeability over the entire footprint of the building and a potential means of extracting Radon from the substructure such as a standby Radon sump or sumps with connecting pipework or other appropriate certified systems should be provided.

(b) Areas other than High Radon Areas: the building should be provided with a potential means of extracting Radon from the substructure should that prove necessary after construction. For example in the case of a non-complex building of normal design and construction, the provision of a standby Radon sump or sumps with connecting pipework or other appropriate certified systems should be adequate.

2.11 Other Buildings

The designer should consider the provision of measures to protect buildings against high Radon concentrations. In the absence of specific guidance, provisions similar to those in 2.10 may be adopted.

Box 9.1 Guidance on radon protection measures, page 8, Technical Guidance Document C, DoE, 2002.

10 Contaminated Land Risk Assessment

10.1 General approach

The UK source-pathway-receptor approach to the assessment of risk from has been adopted for this report as this is considered good practice in Ireland. If one of these three elements is absent it is considered that there is no risk of harm. If, however, there is considered to be a linkage between any given source and any given target/receptor then a risk-based approach is used to assess the significance or impact of any such linkage.

Source – The contaminants that have the potential to negatively affect human health and/or the health of the environment (i.e. the hazard).

Pathway – The potential route by which a receptor may come into contact with the source.

Receptor – The specific group of human beings or aspect of the environment (e.g. controlled waters) that could be affected by the source.

Risks are defined as the probability of an event occurring combined with the severity of the consequence of that event occurring. Particularly, to assess the risk to site end users posed by any given source, the sensitivity of each receptor is considered. For example, the concentration of contamination acceptable at a site to be developed as a residential property with a garden used to grow vegetables and accessible to young children is set lower than that for a commercial site where soil is exposed in minor areas of landscaping and the only long-term users of the site are adults. Similarly, a site overlying a major aquifer supplying potable water to a large population will be considered more stringently than a site overlying an impermeable geology with only minor seepages of groundwater.

10.2 Conceptual Site Model

The potential risks posed to human health and the environment by ground contamination at this site have been evaluated using a generic quantitative risk assessment which incorporates the 'source-pathway-receptor' identification and assessment methodology in accordance with good practice guidance (ref 1). The risk assessment process therefore involves the identification of each site specific source based on both desk based and chemical information obtained from the site investigation together with identification of each relevant exposure pathway and each potential receptor. The potential risks to the receptor are then assessed by considering the potential effect of the source on the receptor as well as the likelihood of a pathway linking the two, i.e. a pollutant linkage as discussed above.

10.2.1 Potential Sources

Based on the desk based and site investigation data obtained to date, the potential sources of contamination that may reasonably affect receptors on the site are summarised in Table 10.1 below.

Table 10.1: Principal sources of contamination in existing condition and during construction

Potential Source(s)	Location	Potential Contaminants of Concern/Comments
Made ground	Site wide	Clays, sands and gravels containing glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery in some locations. Arsenic (50% samples) recorded above residential without plant uptake. Lead (30% samples) recorded above commercial/industrial SGV. The US95 values for arsenic and lead > SGV. Occasional concentrations of other metals (Cd, Hg, Ni) and benzo(a)pyrene recorded > SGV for residential without plant uptake. US95 > SGV for benzo(a)pyrene only. Maximum recorded concentrations of As, Pb, Ni and Hg very highly elevated in occasional samples. Numerous concentrations of As, Pb, sulphate and pH > WRAS material selection threshold values. Asbestos not detected, but potentially present. Leachability: Metals are not highly leachable based on the analytical results. Ground Gas: Limited monitoring programme undertaken. Maximum concentrations of methane (5.6%v/v) and carbon dioxide (10.6%v/v) recorded. Consistently low flow rates (<0.2l/hr). Gas protection measures typical of Characteristic Situation 2 recommended within arches.

Potential Source(s)	Location	Potential Contaminants of Concern/Comments
Hydrocarbon contaminated soil	South of site	Strong hydrocarbon odours were recorded in soil at the approximate water table level within the building maintenance yard. Elevated TPH concentrations (up to 635mg/kg) recorded. Laboratory characterisation suggests this is typical of highly degraded diesel. Ground Gas: Limited monitoring programme. Maximum concentrations of methane (100%v/v) and carbon dioxide (9.3%v/v) recorded in the area. Consistently low flow rates (<0.2l/hr).
Residual hydrocarbon contaminated groundwater	South to east	Very high hydrocarbon odours and a slight sheen were recorded in groundwater during sampling. Consistently elevated concentrations of TPH (up to 48mg/l) and PAH (up to 25ug/l) in groundwater within southern and eastern portion of site. TPH concentrations recorded are predominantly within C_{12}-C_{35} range. BTEX compounds elevated in groundwater sampled from WS11.

10.2.2 Proposed development – influences on sources

The proposed development involves the excavation of the majority of made ground across the site, and a large proportion of natural soil as part of the construction of a two storey basement. The only area that will not be excavated is beneath the railway arches along Sheriff Street Lower. The sources of made ground and hydrocarbon contaminated soil will therefore be considerably reduced in the final development.

10.3 Potential Receptors and Pathways

Site specific pathway receptor linkages have been identified for the site (Table 10.2) with respect to the sources outlined above, and with respect to the anticipated future uses of the site as described in Section 4.3.

Table 10.2 – Site Specific Receptors & Pathways

Receptor		Pathway
Human Health	Current site users (commercial/industrial)	Direct contact and dermal uptake, soil ingestion, gas and vapour inhalation (outdoor air)
	Enabling works and construction phase workers.	Direct contact and dermal uptake, soil and dust ingestion including asbestos fibres, gas and vapour inhalation. Migration of ground gas *via* permeable strata and accumulation in enclosed spaces.
	Site end users (commercial/industrial and residential)	Direct contact and dermal uptake, soil and dust ingestion including asbestos fibres, gas and vapour inhalation. Ingestion of contaminated water supplies. Migration of ground gas *via* permeable strata and accumulation in enclosed spaces.
	Offsite users (local residents and commercial/industrial)	Soil and dust ingestion during enabling works/construction including asbestos fibres, gas and vapour inhalation, ingestion of contaminated water supplies. Migration of ground gas *via* permeable strata and accumulation in enclosed spaces.
Controlled Waters	Docks	Leaching and migration via permeable strata. Surface runoff.
	Gravel layers within Glacial Till Limestone	Leaching and migration *via* permeable strata.
Flora		Direct contact and up-take *via* root system.
Buildings/services	On site structures (including water supply pipes)	Direct contact/ permeation of plastic pipe work by contaminants in soil and leachate. Migration of ground gas *via* permeable strata and accumulation in enclosed spaces.

10.4 Risk Assessment

The details of the Generic Quantitative Risk Assessment are presented in Appendix A – Table 1 (existing site condition), Table 2 (enabling works/construction phase condition), and Table 3 (proposed site condition) and the results/ conclusions discussed in Section 13.

It should be noted that this risk assessment has been completed without consideration of potential remedial measures however does assume use of standard site health and safety procedures and appropriate personal protective equipment (PPE) and site management practices (stockpile management, surface drainage etc). A summary of key details with respect to the existing, construction phase and proposed development conditions is provided below:

Existing condition: Car park and commercial uses [Appendix A - Table 1].

Enabling works/construction phase: Significant excavation to majority of site, de-watering and demolition of existing structures [Appendix A- Table 2]; and

Proposed development: Mixed use development including a two storey basement across majority of site, retail blocks, car parking and residential uses [Appendix A – Table 3].

10.4.1 Summary of risk assessment under current conditions

Risks to human health

The human receptors potentially at risk under current conditions are the people who visit/use the site (i.e. railway commuters and commercial users) together with residents of neighbouring properties. The potential risks to site users associated with ground gases are assessed as Moderate. This reflects the nature of the soil gas regime and the current absence of gas protection measures onsite. Risks to people off-site associated with ground gases are assessed as Low, taking into consideration the nature of the soil gas regime but also the level of the site above surrounding land and presence of retaining walls inhibiting ground gas migration.

The assessment of the potential risks to visitors/users of the site and adjacent site users associated with solid contamination (in both the made ground and natural materials) is assessed as Low, reflecting the recorded concentrations, limited period of exposure and limited presence of soft landscaping.

Risks to controlled waters

There are currently potential risks to groundwater related to the made ground, hydrocarbon contaminated soils and residual hydrocarbon contamination in groundwater. The risks to groundwater are range from Moderate/Low to Moderate reflecting the presence of contamination in the made ground and natural soils, the shallow depth to groundwater, the proven presence of contaminants in the groundwater and the designation of this receptor as drinking water protected area (relating to the Limestone Aquifer underlying the site at depth).

The risks to surface water (Docks) vary from Low to Moderate/Low. This reflects the discussion above regarding groundwater, but also the distance of the Docks to the site (approx 90m south) and lower sensitivity of this receptor.

10.4.2 Summary of risk assessment during development.

Risks to human health

During the development of the site, the human receptors potentially at risk are the construction workers and residents of neighbouring properties. It has been assumed that during development, the active part of the site will be secured by the contractor.

The potential risks to construction workers from soil contaminants in made ground and residual hydrocarbon contamination in groundwater are assessed as Moderate/Low. Potential risks related to ground gases are also assessed as Moderate/Low. This assessment reflects both the nature of the materials, ground gas regime and construction methods, the potential for direct contact, dust inhalation etc, but also the assumed use of standard health and safety procedures. All of these potential risks are capable of mitigation by means of an appropriately rigorous health and safety/hygiene regime.

The potential risks to adjacent site users are generally assessed as Low. However, there are potential risks greater than Low related to dust generation of made ground. These potential risks are capable of mitigation by the employment of an appropriate environmental management regime.

Risks to controlled waters.

During development there are potentially significant risks to both groundwater and the docks related to the excavated materials (made ground and contaminated natural material) and residual hydrocarbon contamination. The potential risks to groundwater are assessed as Moderate reflecting the presence of recorded contaminants in soil and groundwater, the possible temporary local increase in leachate migration due to excavations and groundwater abstraction during dewatering.

Risks to the Docks are assessed as Moderate/Low. This reflects the discussion above regarding groundwater, the potential for enhanced leaching of contaminants from stockpiles, the distance of the Docks to proposed earthworks (<90m), and the scale of the proposed earthworks.

Risks to controlled waters can be mitigated by the adoption of safe working practices such as pre-planned stockpile management; measures to control run off, leachate collection etc.

10.4.3 Summary of risks on completion of the final development

Risk to human health

In the final development, the majority of made ground and a large proportion of natural soil across the site will be excavated and removed offsite, with the construction of a two storey basement (to an approximate maximum depth of 10m below existing ground level). Material beneath the arches along Sherriff Street Lower will remain in-situ. The majority of the source of contamination across the site (made ground and hydrocarbon contaminated soil) will therefore have been removed. The potential risks to site users and occupiers of adjacent sites from ground gas migration and accumulation have therefore been assessed as Very Low.

The entire site will be covered in hardstanding in the final development. On this basis, there is no plausible exposure pathway and thus no risks to site users and occupiers of adjacent sites from contamination present in the remaining made ground or natural soil beneath the site.

Risks to controlled waters

As discussed above, in the final development the majority of made ground and a large proportion of natural soil across the site will be excavated and removed offsite. A small proportion of material will remain beneath the arches along Sherriff Street Lower. On this basis, the majority of the source of contamination across the site (made ground and hydrocarbon contaminated soil) will have been removed. Accordingly potential risks to groundwater in the long term, from residual hydrocarbon contamination will be partly mitigated by the proposed development (i.e due to the excavation of majority of contaminated made ground and soil). However, the potential risks to groundwater have been assessed as Moderate/Low reflecting the level of contamination and the sensitivity of this receptor (drinking water protected area).

It is considered likely that natural attenuation processes on the residual contamination will be occurring at rates sufficient to be protective of human health and controlled waters. Three lines of evidence would need to be used to support natural attenuation of hydrocarbon contamination including:

- Observed reduction in contaminant concentrations down-gradient of the source;
- Documented loss of contaminant mass using chemical and geochemical data (e.g. depletion of electron acceptors and donors, and increasing metabolic by-products); and
- Microbiological laboratory data that support the occurrence of biodegradation.

At the minimum the first two lines of evidence must be obtained and ideally all three lines of evidence should be confirmed to demonstrate the occurrence of natural attenuation. It is recommended that a programme of monitoring is carried out during and post construction to provide evidence to support the occurrence of natural attenuation.

11 Waste Management

The proposed development will require the off-site disposal of arisings from the site of approximately 67,000m^3.

In order to determine the likely waste classes, soil and leachate test results require screening against Waste Acceptance Criteria that have been derived by Irish Landfill facilities using guidance generated by the European Council decision 2003/33/EC. More specifically local landfill waste acceptance criteria are considered, namely the criteria currently used at the Murphy Concrete Manufacturing Ltd. Landfill located at Hollywood Great, the Naul, Co Dublin (waste licence reference no. W0129-01) for the acceptance of Inert waste and the waste acceptance criteria used at the KTK landfill Ltd site located in Kilcullen, Co Kildare (waste licence reference no. W082-03) for the acceptance of non-hazardous waste. The results of this assessment are shown in Appendix C and Table 1 of Appendix B. It is important to note that the acceptance criteria are subject to change and the landfill capacity at both sites is limited in accordance with their respective licences.

Based on the results for both soil and soil leachability testing, numerous samples analysed exceed the inert (Murphy) waste acceptance criteria for antimony. Occasional exceedances of inert waste acceptance criteria were also recorded for chloride, fluoride, sulphate, total dissolved solids, total PAH and TPH. Occasional concentrations of PAH (Dutch 10) and diesel range organics were recorded above hazardous waste acceptance criteria for the KTK landfill. Soil sampled from BH3 recorded elevated leachable metals (As, Cr, Mo, Ni) above inert waste acceptance criteria, and leachable arsenic and selenium above non-hazardous waste acceptance criteria (KTK). Made ground sampled at this location is not visually different from the rest of the site and would therefore be impossible to separate during excavation works. The concentrations are only marginally above KTK non-hazardous waste acceptance criteria and it is therefore recommended that discussions with the landfill are held as it is likely that this material will be accepted.

The results of this assessment indicate that the majority of the soils should be considered acceptable at the KTK Landfill site. Provision should however be made for the off-shore disposal of some hazardous waste from the site based on visual/olfactory evidence of hydrocarbon contamination in the southern and eastern portion of the site, along with occasional exceedances of TPH and PAH for both Murphy and KTK waste acceptance criteria.

Notwithstanding the above, it should be noted that it is the excavation contractor's responsibility, in association with the operator/owner of the receiving site, to classify the materials for disposal/reuse using the test data obtained during both the recent and previous site investigations.

12 Conclusions

12.1 Ground conditions

The geological sequence beneath the site consists of made ground (up to 7.2m thick) overlying a thin, discontinuous layer of estuarine deposits (sandy silt) overlying or inter-bedded with the upper Glacial Till (inter-layered boulder clay and gravel deposits). Limestone underlies the site at depth but was not encountered during the investigation.

Strong hydrocarbon odours were recorded in soil at the approximate water table level within the building maintenance yard in the south of the site. Elevated TPH concentrations (up to 635mg/kg) were recorded in samples anlaysed. No other visual/olfactory evidence of contamination was recorded. Metal concentrations were recorded below commercial/industrial landuse acceptance criteria with the exception of lead. Maximum recorded concentrations of metals (As, Pb, Ni and Hg) were however very highly elevated. Asbestos was not detected in any of the samples analysed, but there is potential that such material could be present within the made ground.

12.2 Controlled waters

Metals to not appear to be highly leachable based on the analytical results, and metal concentrations are not highly elevated in groundwater. Groundwater beneath the site is impacted by petroleum hydrocarbons and PAHs. Chloride, sulphate and ammoniacal nitrogen concentrations are also relatively elevated.

The groundwater table is fairly shallow beneath the site (approximately 2.5m below existing road level) and is likely to be in hydraulic continuity with the Docks located approximately 90m south of the site. The groundwater level appears to be reasonably flat across the site.

12.3 Ground gas

The ground gas regime is characterised by elevated concentrations of methane and carbon dioxide (although gas flow rates are very low). As part of the proposed development, most of the made ground across the site, and a significant volume of natural material (including that contaminated with hydrocarbons) will be excavated and removed offsite. The railway arches along Sheriff Street Lower are however being retained. Gas protection measures typical of Characteristic Situation 2 are therefore recommended within the former railway arches. Should the proposed development change, gas protection within any new buildings and services onsite will need to be re-assessed. Further ground gas monitoring and sampling should be undertaken to fully assess the ground gas regime across the site.

12.4 Risk assessment

A summary of the risk assessment for each of the three scenarios (current, during development and future use) is presented in Table 13.1 and discussed in more detail in the following text.

Table 13.1 Summary of risk assessment

Receptor	Source	Current risk	Risk during construction	Future risk
People onsite	Made ground	Low	n/a	Very Low
	Ground gas (made ground, hydrocarbon impacted soil and groundwater)	Moderate	n/a	Moderate/Low
	Hydrocarbon contaminated soil	Low	n/a	Very Low
People offsite	Made ground	Very Low	Moderate/Low	Very Low
	Ground gas (made ground, hydrocarbon impacted soil and groundwater)	Moderate /Low	Moderate/Low	Very Low
	Hydrocarbon contaminated soil	Very Low	Low	Very Low
Construction workers	Made ground	n/a	Moderate/Low	n/a
	Ground gas (made ground, hydrocarbon impacted soil and groundwater)	n/a	Moderate	n/a
	Hydrocarbon contaminated soil	n/a	Low	n/a
	Hydrocarbon contaminated groundwater	n/a	Moderate/Low	n/a
Flora	Made ground	Low	n/a	n/a
	Hydrocarbon contaminated soil	Low	n/a	n/a

Receptor	Source	Current risk	Risk during construction	Future risk
Groundwater	Made ground	Moderate/Low	Moderate	Low
	Hydrocarbon contaminated soil	Moderate/Low	Moderate	Low
	Hydrocarbon contaminated groundwater	Moderate	Moderate	Moderate/Low
Docks	Made ground	Low	Moderate/Low	Very Low
	Hydrocarbon contaminated soil	Low	Moderate/Low	Very Low
	Hydrocarbon contaminated groundwater	Moderate/Low	Moderate/Low	Low
Buildings /services	Made ground	Moderate/Low	n/a	Low
	Hydrocarbon contaminated soil	Moderate/Low	n/a	Low

The generic quantitative risk assessment carried out on the basis of both existing and recently acquired data indicates that there are potentially significant risks to people and the environment under the currently existing conditions.

The proposed development of the site will give rise to some temporary risks, most notably to construction workers during its development. Short-term risks to the groundwater and the Docks are likely to increase during the excavation works. This is primarily because of the potential for runoff and leaching from stockpiles, and enhanced mobilisation of contaminants in groundwater. These potential risks can be mitigated by appropriate environmental management during construction. In the long term, provided appropriate mitigation measures are constructed and the recommendations in Section 14 adopted, the risks to people and the environment can all be mitigated to acceptably low levels.

Risks to the groundwater are considered to be partially mitigated by the proposed development, which will consist of the excavation of the majority of made ground and contaminated soil material. It is therefore considered likely that with this reduction in the residual source, natural attenuation processes will be occurring at rates sufficient to be protective of human health and controlled waters. Some long term monitoring may be required to demonstrate satisfactory risk reduction is occurring by such processes.

12.5 Waste management

The results of this assessment indicate that the majority of the soils should be considered acceptable at the KTK Landfill site. Provision should however be made for the off-shore disposal of some hazardous waste from the site based on visual/olfactory evidence of hydrocarbon contamination in the southern and eastern portion of the site, along with occasional exceedances of TPH and PAH for both Murphy and KTK waste acceptance criteria. It should be noted that it is the excavation contractor's responsibility, in association with the operator/owner of the receiving landfill site, to classify the materials for disposal/reuse prior to disposal.

12.6 Foundations

Low rise structures (up to two storeys in height) could be supported by shallow foundations in the glacial till beneath basement slab level. An allowable bearing capacity of 150KPa can be adopted for preliminary design. Medium rise structures (up to ten storeys in height) could be supported by a raft foundation at basement level, founded in the glacial sands and gravels. Raft thicknesses varying from 600mm to 1000mm are likely to be required to evenly distribute column loads through the raft. For structures greater than ten storeys in height, the structure could be supported by bored pile foundations.

12.7 Buoyancy

As the basement substructure is below ground water level, the basement and buildings will need to be designed to resist uplift. The uplift can be resisted by providing bar anchors or micro piles in the basement slab.

12.8 Basement Retaining Walls

Retaining walls will be required to support the basement around the site. To maximise space within the basement and provide an open working area for construction and control seepage it is proposed to construct a secant wall to form the basement. For retained heights greater than 4m the retaining wall will require to be propped by struts or tied back with ground anchors.

12.9 Dewatering

In order to maintain stability of the basement excavation and provide dry working conditions for construction of the sub structure, a pumped dewatering system will require to be installed to lower the ground water table

12.10 Railway arches

It is recommended that intrusive coring is carried out to determine the arch construction to allow a structural assessment of the arch to be made.

12.11 Buried concrete

For all foundations an ACEC classification of AC-5 has been determined assuming groundwater is mobile

13 Recommendations

The proposed development includes a number of measures necessary to mitigate the potential risks. In summary these comprise:

- The implementation of a rigorous health & safety regime (including PPE and personal hygiene) by the construction work force;
- Construction workers should remain vigilant of ground conditions at all times and should report any suspect areas of potential contamination (especially hydrocarbon contamination);
- Stockpiling of grossly contaminated soils should be avoided if possible and where necessary, stockpiles should be covered when not in use.
- Incorporation of gas protection measures typical of CS2 into all new buildings where no excavation has been undertaken;
- Further investigation and on-going monitoring of the groundwater regime during and post construction in order to provide evidence in support of natural attenuation.
- Further liaison with Dublin City Council as to disposal options for water during temporary works.
- Further Intrusive investigation to determine stability of the existing railway arches.
- Pump testing to allow dewatering works to be designed.

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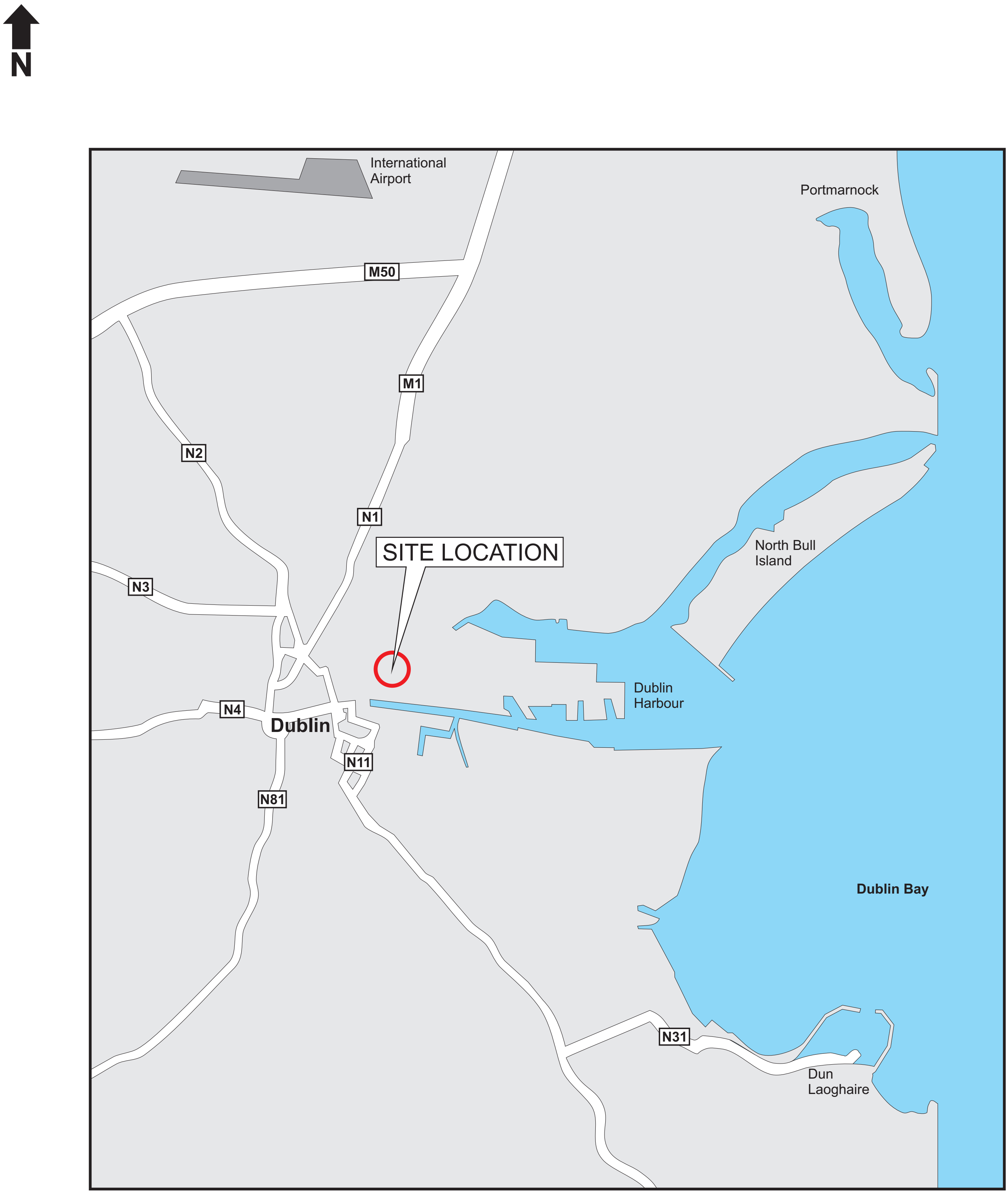
Figures



Project: Connolly Station, Dublin

SITE LOCATION PLAN

Scale: NTS	Drawn: NG	Chk: SB	Date: Oct 2008	Job No: 023956	Drawing No: FIGURE 1	Rev: 00

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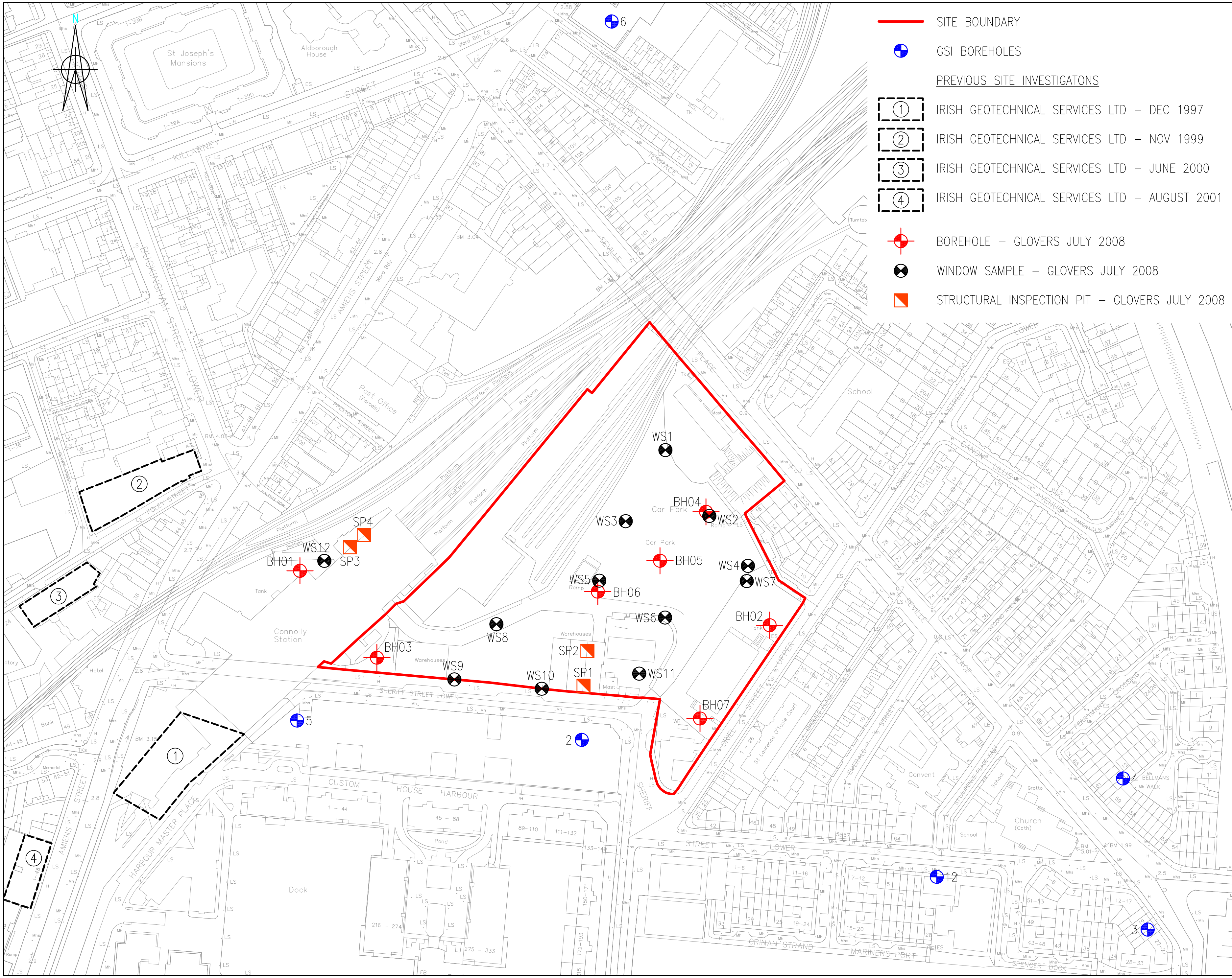

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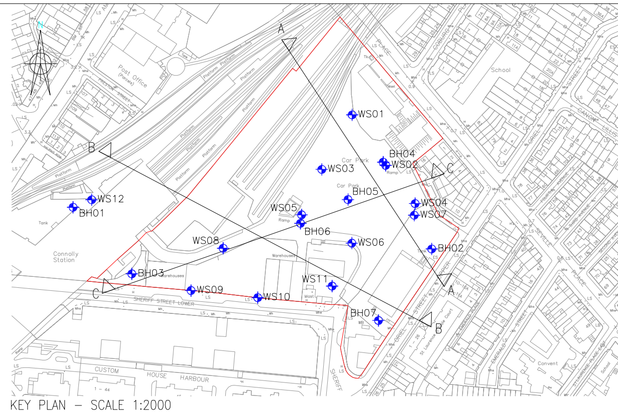
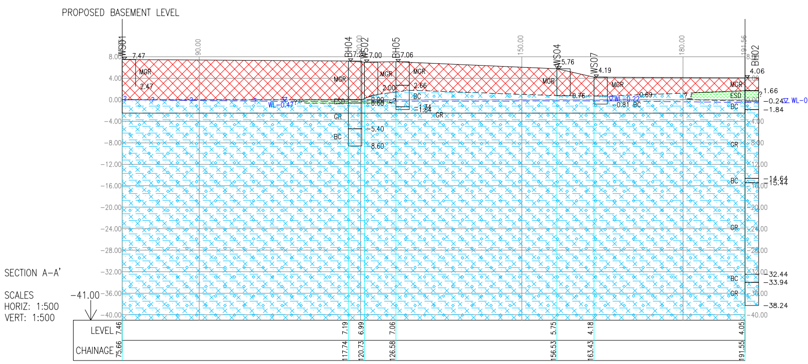
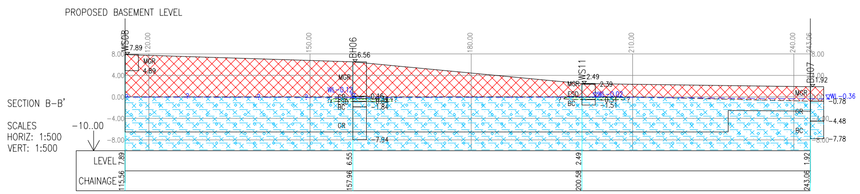
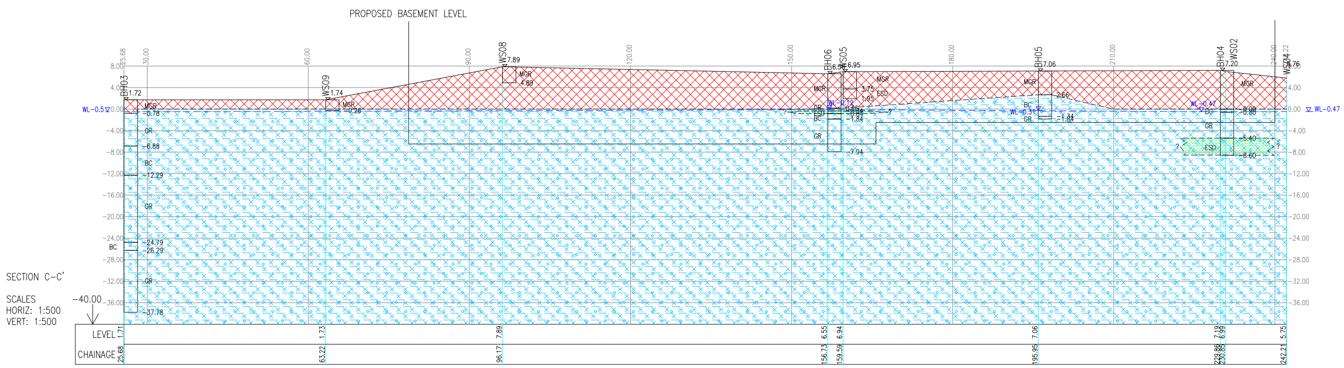
Project	CONNOLLY STATION, DUBLIN
Drg Title	EXPLORATORY HOLE LOCATION PLAN
Scales@A3	1:2000
Drawn by	NG
Checked by	SB
Date	OCT 2008
Job No.	023956
Drg No.	FIGURE 2
Rev	00









MGR MADE GROUND
ESD ESTUARINE DEPOSITS
GR GLACIAL TILL - GRAVELS
BC GLACIAL TILL - BOULDER CLAY

MADE GROUND
ESTUARINE DEPOSITS
GLACIAL TILL
GROUNDWATER
WATER LEVEL
BASEMENT LEVEL

DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

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Project **CONNOLY STATION, DUBLIN**

Drg Title GEOLOGICAL CROSS SECTIONS A-A', B-B' & C-C'

Scales@A1	AS SHOWN	Job No.	023956
Drawn by	NG	Drawing No.	FIGURE 3
Checked by	SB		
Date	OCT 2008	Rev	00

Neil Gibson P:\023956\09 - Geotechnics\Sheet\Interp Report\Figure 3.dwg 28/02/2008 DWF6 EPlot.pc3

Appendix A: Generic Quantitative Risk Assessment

Table 1 Existing Condition

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Made ground	Heavy metals, PAH, mineral oils, sulphate, pH, asbestos.	Site wide						**Clay bound gravels containing glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery.** **Arsenic (50% samples) recorded above residential without plant uptake. Lead (30% samples) recorded above commercial/industrial SGV. The US95 values for arsenic and lead > SGV. Occasional concentrations of other metals (Cd, Hg, Ni) and benzo(a)pyrene recorded > SGV for residential without plant uptake. US95 > SGV for benzo(a)pyrene only. Maximum recorded concentrations of As, Pb, Ni and Hg very highly elevated in occasional samples.** **Numerous concentrations of As, Pb, sulphate and pH > WRAS material selection threshold values.** **Asbestos not detected, but potentially present.** **Leachability: Metals are not highly leachable based on the analytical results.**
			Existing site users	Soil and dust ingestion/inhalation, dermal contact.	Medium	Unlikely	Low	Hardstanding over majority of site prevents accidental exposure. Potential for exposure in areas of soft landscape (<5%). Any such exposure therefore likely to be of short/intermittent exposure.
			Adjacent site users	Dust ingestion/inhalation	Mild	Unlikely	Very Low	Residential properties located along eastern and northern site boundary. Minimal ground disturbance in existing condition. Hardstanding over majority of site prevents soil dust generation.
			Docks	Migration via permeable strata	Mild	Low-likelihood	Low	Majority of site covered in hardstanding limiting rainwater infiltration and leaching of contaminants. Docks are approx 90m south of the site. Groundwater table approx 6-7m bgl. Groundwater gradient relatively flat across site. Hydraulic continuity with Docks likely.
			Groundwater (Glacial Till and Calp Limestone)	Migration via permeable strata	Medium	Low-likelihood	**Moderate /Low**	Majority of site covered in hardstanding limiting rainwater infiltration and leaching of contaminants. Groundwater table approx 6-7m bgl. Site lies within a drinking water protected area (DWPA) for groundwater.
			Below ground structures and services	Direct contact/permeation of water supply pipework	Medium	Low-likelihood	**Moderate /Low**	**Elevated sulphate concentrations. ACEC classification AC-5. Numerous concentrations of As, Pb, sulphate and pH > WRAS material selection threshold values.** Potential for direct contact. No record of derogation to water supply and/ or evidence of structural distress to current foundations attributable to ground conditions.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
	Copper and zinc	Landscaped area	Plants/vegetation	Root uptake	Mild	Low-likelihood	Low	**Elevated copper (30%) > DIV. Less than 10% zinc > DIV. US95 for Cu > DIV.** Majority of site covered in hardstanding. Potential for uptake in any areas of landscaping (<5%). Limited vegetation present.
	Methane, carbon dioxide	On site						**Limited monitoring programmes. Made ground and natural ground generating ground gases. Maximum recorded concentrations of methane (5.6%v/v) and carbon dioxide (10.6%v/v). Consistently low flow rates (<0.2l/hr). Characteristic Situation 2 determined [CIRIA 665]**.
			Existing site users	Gas/vapour migration and accumulation	Severe	Low-likelihood	**Moderate**	Potential for build up to hazardous concentrations in existing buildings onsite, no gas protection in existing buildings/structures. No record of incident in past.
			Adjacent site users	Gas/vapour migration and accumulation	Severe	Unlikely	**Moderate /Low**	Residential properties located on northern and eastern boundary of site. Hardstanding will encourage off-site migration. No known evidence/records/complaints of odours by offsite residents. Gas migration within Made Ground likely to be limited by retaining structures on north, west and south of site.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Hydrocarbon contaminated soil	TPH, PAHs	South of site						**Strong hydrocarbon odours recorded in soil at water table level within building maintenance yard. Elevated TPH concentrations (up to 635mg/kg) recorded. Laboratory classification suggests highly degraded diesel.**
			Existing site users	Soil and dust ingestion/inhalation, dermal contact.	Medium	Unlikely	Low	Hardstanding over majority of site prevents accidental exposure. Potential for exposure in areas of soft landscape (<5%). Any such exposure therefore likely to be of short/intermittent exposure.
			Adjacent site users	Dust ingestion/inhalation	Mild	Unlikely	Very Low	Residential properties located along eastern and northern site boundary. Minimal ground disturbance in existing condition. Hardstanding over majority of site prevents soil dust generation.
			Docks	Migration via permeable strata	Mild	Low-likelihood	Low	Majority of site covered in hardstanding limiting rainwater infiltration and leaching of contaminants. Docks are approx 90m south of the site. Groundwater table approx 6-7m bgl. Groundwater gradient relatively flat across site. Hydraulic continuity with Docks likely.
			Groundwater (Glacial Till and Calp Limestone)	Migration via permeable strata	Medium	Low-likelihood	**Moderate /Low**	Majority of site covered in hardstanding limiting rainwater infiltration and leaching of contaminants. Groundwater table approx 6-7m bgl. Site lies within a drinking water protected area (DWPA) for groundwater.
			Below ground services	Direct contact/permeation of water supply pipework	Medium	Low-likelihood	**Moderate /Low**	Potential for direct contact. No record of derogation to water supply attributable to ground conditions.
		Landscaped area	Plants/vegetation	Root uptake	Mild	Low-likelihood	Low	Majority of site covered in hardstanding. Potential for uptake in any areas of landscaping (<5%). Limited vegetation present.
	Methane, carbon dioxide	On site						**Limited monitoring programme. Maximum concentrations of methane (100%v/v) and carbon dioxide (9.3%v/v). Methane concentration likely to be associated with VOCs. Consistently low flow rates (<0.2l/hr).**
			Existing site users	Gas/vapour migration and accumulation	Severe	Low-likelihood	**Moderate**	Potential for build up to hazardous concentrations in existing buildings onsite, however consistently low flow rates recorded over monitoring period. No record of incident in past.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Conseque nce	Probability	Risk	
			Adjacent site users	Gas/vapour migration and accumulation	Severe	Unlikely	**Moderate /Low**	Residential properties located on northern and eastern boundary of site. No known evidence/records/complaints of odours by offsite residents.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Hydrocarbon contaminated groundwater	TPH, PAHs	Southern and eastern portion of site						**Very high hydrocarbon odours and a slight sheen recorded in groundwater. Consistently elevated concentrations of TPH (up to 48mg/l) and PAH (up to 25ug/l) in groundwater within southern and eastern portion of site. TPH concentrations are predominantly heavy ended (C_{12}-C_{35}). BTEX compounds locally elevated in groundwater (WS11).**
			Docks	Migration via permeable strata	Medium	Low-likelihood	**Moderate /Low**	Docks are approx 90m south of the site. Groundwater table is approx 2m bgl in area of hydrocarbon contamination. Groundwater gradient relatively flat across site. Hydraulic continuity with Docks likely. No record of incident in past.
			Groundwater (Glacial Till and Calp Limestone)	Migration via permeable strata	Medium	Likely	**Moderate**	Groundwater gradient relatively flat. Site lies within a drinking water protected area (DWPA) for groundwater.
	Methane, carbon dioxide	On site						**Limited monitoring programme. Maximum concentrations of methane (100%v/v) and carbon dioxide (9.3%v/v). Methane concentration likely to be associated with VOCs. Consistently low flow rates (<0.2l/hr).**
			Existing site users	Gas/vapour migration and accumulation	Severe	Low-likelihood	**Moderate**	Potential for build up to hazardous concentrations in existing buildings onsite, however consistently low flow rates recorded over monitoring period. No record of incident in past.
			Adjacent site users	Gas/vapour migration and accumulation	Severe	Unlikely	**Moderate /Low**	Residential properties located on northern and eastern boundary of site. No known evidence/records/complaints of odours by offsite residents.

Table 2 Enabling works/construction phase

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Made ground	Heavy metals, benzo(a)pyrene, sulphate, pH.	Site wide						**Clay bound gravels containing glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery.** **Arsenic (50% samples) recorded above residential without plant uptake. Lead (30% samples) recorded above commercial/industrial SGV. The US95 values for arsenic and lead > SGV. Occasional concentrations of other metals (Cd, Hg, Ni) and benzo(a)pyrene recorded > SGV for residential without plant uptake. US95 > SGV for benzo(a)pyrene only. Maximum recorded concentrations of As, Pb, Ni and Hg very highly elevated in occasional samples.** **Numerous concentrations of As, Pb, sulphate and pH > WRAS material selection threshold values.** **Asbestos not detected, but potentially present.** **Leachability: Metals are not highly leachable based on the analytical results.**
			Enabling/ construction workforce	Soil and dust ingestion/inhalation, dermal contact.	Medium	Low-likelihood	**Moderate /Low**	Hardstanding over majority of site prevents accidental exposure. Potential for exposure during excavation/earthworks. Period of exposure relatively limited. Possibility for maximum concentrations to produce acute effects. Standard health and safety precautions likely.
			Adjacent site users	Dust ingestion/inhalation	Medium	Low-likelihood	**Moderate /Low**	Residential properties located along eastern and northern site boundary Potential for dust generation during excavation/earthworks. Scale of earthworks likely to generate large volumes of dust. Standard good construction practice to restrict dust generation likely.
			Docks	Surface runoff and groundwater transport	Mild	Likely	**Moderate /Low**	Potential for enhanced mobilisation of contaminants during earthworks and leaching of contaminants in stockpiles/areas of exposure. Docks are approx 90m south of the site down-hydraulic gradient.
			Groundwater (Glacial Till)	Migration via permeable strata	Medium	Likely	**Moderate**	Potential for enhanced mobilisation of contaminants during earthworks. Groundwater table approx 6-7m bgl. Site lies within a drinking water protected area (DWPA) for groundwater.
	Methane, carbon dioxide	On site						**Limited monitoring programmes. Made ground and natural ground generating ground gases. Maximum recorded concentrations of methane (5.6%v/v) and carbon dioxide (10.6%v/v). Consistently low flow rates (<0.2l/hr). Characteristic Situation 2 determined [CIRIA 665].**

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
			Enabling/ construction workforce	Gas/vapour migration and accumulation	Severe	Low-likelihood	**Moderate**	Potential for exposure during excavation/earthworks in any confined spaces. Standard health and safety precautions likely.
			Adjacent site users	Gas/vapour migration and accumulation	Severe	Unlikely	**Moderate /Low**	Residential properties located along eastern and northern site boundary.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Hydrocarbon contaminated soil	TPH, PAHs	South of site						**Strong hydrocarbon odours recorded in soil at water table level within building maintenance yard. Elevated TPH concentrations (up to 635mg/kg) recorded. Laboratory classification suggests highly degraded diesel.**
			Enabling/ construction workforce	Soil and dust ingestion/inhalation, dermal contact.	Mild	Low-likelihood	Low	Hardstanding over majority of site prevents accidental exposure. Potential for exposure during excavation/earthworks. Period of exposure relatively limited. Unlikely for maximum concentrations to produce acute effects. Standard health and safety precautions likely.
			Adjacent site users	Dust ingestion/inhalation	Mild	Low-likelihood	Low	Residential properties located along eastern and northern site boundary Potential for dust generation during excavation/earthworks. Scale of earthworks likely to generate large volumes of dust. Standard good construction practice to restrict dust generation likely.
			Docks	Surface runoff and groundwater transport	Medium	Low-likelihood	**Moderate /Low**	Potential for enhanced mobilisation of contaminants during earthworks and leaching of contaminants in stockpiles. Docks are approx 90m south of the site.
			Groundwater (Glacial Till)	Migration via permeable strata	Medium	Likely	**Moderate**	Potential for enhanced mobilisation of contaminants during earthworks. Groundwater table is relatively deep across majority of site (approx 6-7m bgl). Site lies within a drinking water protected area (DWPA) for groundwater.
	Methane, carbon dioxide	On site						**Limited monitoring programme. Maximum concentrations of methane (100%v/v) and carbon dioxide (9.3%v/v). Methane concentration likely to be associated with VOCs. Consistently low flow rates (<0.2l/hr).**
			Enabling/ construction workforce	Gas/vapour migration and accumulation	Severe	Low-likelihood	**Moderate**	Potential for exposure during excavation/earthworks in any confined spaces. Standard health and safety precautions likely.
			Adjacent site users	Gas/vapour migration and accumulation	Severe	Unlikely	**Moderate /Low**	Residential properties located on northern and eastern boundary of site. No known evidence/records/complaints of odours by offsite residents.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Hydrocarbon contaminated groundwater	TPH, PAHs	Southern and eastern portion of site						**Very high hydrocarbon odours and a slight sheen recorded in groundwater. Consistently elevated concentrations of TPH (up to 48mg/l) and PAH (up to 25ug/l) in groundwater within southern and eastern portion of site. TPH concentrations are predominantly heavy ended (C_{12}-C_{35}). BTEX compounds locally elevated in groundwater (WS11).**
			Enabling/ construction workforce	Soil and dust ingestion/inhalation, dermal contact.	Medium	Low-likelihood	**Moderate /Low**	Hardstanding over majority of site prevents accidental exposure. Potential for exposure during excavation/earthworks. Period of exposure relatively limited. Possibility for maximum concentrations to produce acute effects. Standard health and safety precautions likely.
			Groundwater (Glacial Till and Calp Limestone)	Migration via permeable strata	Medium	Likely	**Moderate**	Potential for enhanced mobilisation of contaminants during dewatering. Site lies within a drinking water protected area (DWPA) for groundwater.
			Docks	Migration via permeable strata	Medium	Low-likelihood	**Moderate /Low**	Potential for enhanced mobilisation of contaminants during construction dewatering. Docks are approx 90m south of the site. Groundwater table is relatively shallow in area of hydrocarbon contamination (approx 2m bgl). Groundwater gradient appears to be relatively flat and is expected to be in hydraulic continuity with Docks. Dewatering onsite likely reduce migration of groundwater off-site.
	Methane, carbon dioxide	On site						**Limited monitoring programme. Maximum concentrations of methane (100%v/v) and carbon dioxide (9.3%v/v). Methane concentration likely to be associated with VOCs. Consistently low flow rates (<0.2l/hr).**
			Enabling/ construction workforce	Gas/vapour migration and accumulation	Severe	Low-likelihood	**Moderate**	Potential for exposure during excavation/earthworks in any confined spaces. Standard health and safety precautions likely.
			Adjacent site users	Gas/vapour migration and accumulation	Medium	Low-likelihood	**Moderate /Low**	Residential properties located on northern and eastern boundary of site. No known evidence/records/complaints of odours by offsite residents.

Table 3 Proposed development

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Made ground	Heavy metals, benzo(a)pyrene, sulphate, pH.	Railway arches along Sheriff Street Lower [made ground removed from all other parts of site)						**Clay bound gravels containing glass, brick, sea shells, ceramics, timber, rubber, concrete, ash and pottery.** **Arsenic (50% samples) recorded above residential without plant uptake. Lead (30% samples) recorded above commercial/industrial SGV. The US95 values for arsenic and lead > SGV. Occasional concentrations of other metals (Cd, Hg, Ni) and benzo(a)pyrene recorded > SGV for residential without plant uptake. US95 > SGV for benzo(a)pyrene only. Maximum recorded concentrations of As, Pb, Ni and Hg very highly elevated in occasional samples.** **Numerous concentrations of As, Pb, sulphate and pH > WRAS material selection threshold values.** **Asbestos not detected, but potentially present.** Leachability: **Metals are not highly leachable based on the analytical results.**
			Future site users	Soil and dust ingestion/inhalation, dermal contact.	Mild	Unlikely	Very Low	Potential source relatively localised. Hardstanding prevents accidental exposure.
			Adjacent site users	Dust ingestion/inhalation	Mild	Unlikely	Very Low	Potential source relatively localised. Hardstanding prevents soil dust generation.
			Docks	Migration via permeable strata	Mild	Unlikely	Very Low	Majority of made ground removed in proposed development. Hardstanding limits rainwater infiltration and leaching of contaminants. Docks are approx 90m south of the site. Groundwater table approx 2m bgl. Groundwater gradient relatively flat across site. Hydraulic continuity with Docks likely.
			Groundwater (Glacial Till and Calp Limestone)	Migration via permeable strata	Mild	Low-likelihood	Low	Majority of made ground removed in proposed development. Hardstanding limits rainwater infiltration and leaching of contaminants. Groundwater table approx 2m bgl. Site lies within a drinking water protected area (DWPA) for groundwater.
			Below ground structures and services	Direct contact/permeation of water supply pipework	Mild	Low-likelihood	Low	**Elevated sulphate concentrations. ACEC classification AC-5. Numerous concentrations of As, Pb, sulphate and pH > WRAS material selection threshold values.** Potential for direct contact beneath arches. No record of derogation to water supply and/ or evidence of structural distress to current foundations

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C665)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
								attributable to ground conditions.
	Methane, carbon dioxide	Railway arches						**Limited monitoring programmes. Made ground and natural ground generating ground gases. Maximum recorded concentrations of methane (5.6%v/v) and carbon dioxide (10.6%v/v). Consistently low flow rates (<0.2l/hr). Characteristic Situation 2 determined [CIRIA 665].**
			Existing site users	Gas/vapour migration and accumulation	Medium	Low-likelihood	**Moderate /Low**	Majority of Made Ground removed in proposed development. Potential for build up to hazardous concentrations in arches, however consistently low flow rates recorded over monitoring period.
			Adjacent site users	Gas/vapour migration and accumulation	Mild	Unlikely	Very Low	Majority of Made Ground removed in proposed development. Residential properties located on northern and eastern boundary of site. No known evidence/records/complaints of odours by offsite residents.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C552)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Hydrocarbon contaminated soil	TPH, PAHs	Railway arches along Sheriff Street Lower [hydrocarbon impacted soil removed from all other parts of site)						**Strong hydrocarbon odours recorded in soil at water table level within building maintenance yard. Elevated TPH concentrations (up to 635mg/kg) recorded. Laboratory classification suggests highly degraded diesel.**
			Future site users	Soil and dust ingestion/inhalation, dermal contact.	Mild	Unlikely	Very Low	Majority of hydrocarbon impacted soil removed in proposed development. Potential source relatively localised. Hardstanding prevents accidental exposure.
			Adjacent site users	Dust ingestion/inhalation	Mild	Unlikely	Very Low	Majority of hydrocarbon impacted soil removed in proposed development. Potential source relatively localised. Hardstanding prevents soil dust generation.
			Docks	Migration via permeable strata	Mild	Unlikely	Very Low	Majority of hydrocarbon impacted soil removed in proposed development. Hardstanding limits rainwater infiltration and leaching of contaminants. Docks are approx 90m south of the site. Groundwater table approx 2m bgl. Groundwater gradient relatively flat across site. Hydraulic continuity with Docks likely.
			Groundwater (Glacial Till)	Migration via permeable strata	Mild	Low-likelihood	Low	Majority of hydrocarbon impacted soil removed in proposed development. Hardstanding limits rainwater infiltration and leaching of contaminants. Groundwater table approx 2m bgl. Site lies within a drinking water protected area (DWPA) for groundwater.
			Below ground services	Direct contact/permeation of water supply pipework	Mild	Low-likelihood	Low	Majority of hydrocarbon impacted soil removed in proposed development Potential for direct contact beneath arches. No record of derogation to water supply and/ or evidence of structural distress to current foundations attributable to ground conditions.

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C552)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Conseque nce	Probability	Risk	
	Methane, carbon dioxide	On site						**Limited monitoring programme. Maximum concentrations of methane (100%v/v) and carbon dioxide (9.3%v/v). Methane concentration likely to be associated with VOCs. Consistently low flow rates (<0.2l/hr).**
			Existing site users	Gas/vapour migration and accumulation	Medium	Low-likelihood	**Moderate /Low**	Majority of hydrocarbon impacted soil removed in proposed development. Proposed development consists of a two storey basement carpark across majority of site which is considered to provide adequate ventilation. Potential for build up to hazardous concentrations in beneath arches, however consistently low flow rates recorded over monitoring period.
			Adjacent site users	Gas/vapour migration and accumulation	Mild	Unlikely	Very Low	Majority of impacted soil removed in proposed development. Residential properties located on northern and eastern boundary of site. No known evidence/records/complaints of odours by offsite residents. .

Source			Receptor	Pathway	**Risk assessment** (following CIRIA C552)			**Description of source [bold text].** Comment on hazard realisation [normal text]
Origin	Contaminants of concern	Zone affected			Consequence	Probability	Risk	
Hydrocarbon contaminated groundwater	TPH, PAHs	Southern and eastern portion of site						**Very high hydrocarbon odours and a slight sheen recorded in groundwater. Consistently elevated concentrations of TPH (up to 48mg/l) and PAH (up to 25ug/l) in groundwater within southern and eastern portion of site. TPH concentrations are predominantly heavy ended (C_{12}-C_{35}). BTEX compounds locally elevated in groundwater (WS11).**
			Docks	Migration via permeable strata	Mild	Low-likelihood	Low	Majority of residual soil source removed in proposed development. Docks are close to the site (approx. 90m S). Groundwater table is approx 2m bgl. Groundwater gradient relatively flat and is expected to be in hydraulic continuity with Docks.
			Groundwater (Glacial Till and Calp Limestone))	Migration via permeable strata	Medium	Low-likelihood	**Moderate /Low**	Majority of residual soil source removed in proposed development. Groundwater flow relatively flat across site. Site lies within a drinking water protected area (DWPA) for groundwater.
	Methane, carbon dioxide	Railway arches						**Limited monitoring programme. Maximum concentrations of methane (100%v/v) and carbon dioxide (9.3%v/v). Methane concentration likely to be associated with VOCs. Consistently low flow rates (<0.2l/hr).**
			Existing site users	Gas/vapour migration and accumulation	Medium	Low-likelihood	**Moderate /Low**	Majority of residual soil source removed in proposed development. Proposed development consists of a two storey basement carpark across majority of site which is considered to provide adequate ventilation. Potential for build up to hazardous concentrations in arches, however consistently low flow rates recorded over monitoring period. No record of incident in past.
			Adjacent site users	Gas/vapour migration and accumulation	Medium	Unlikely	Low	Majority of residual soil source removed in proposed development. Residential properties located on northern and eastern boundary of site. No known evidence/records/complaints of odours by offsite residents.

Appendix B: Laboratory Analytical Results

Table 1- Soil Results

Sample Identity	Units	WS1			WS2			WS3		WS4		WS5			WS6		WS7			WS8	WS9	
Depth		1.00	3.00	5.00	1.00	3.00	5.00	0.50	4.00	0.50	2.00	0.50	2.00	5.00	1.00	4.00	1.00	3.00	5.00	2.00	0.50	1.00
Strata		MG	MG	MG	MG	MG	MG	MG	SS	MG	MG	MG	MG	SS	MG	MG	MG	MG	GC	MG	MG	MG
Metals																						
Arsenic	mg/kg	33.0	26.0	124.0	18.0	71.0	150.0	18.0	9.0	7	15	20	31	9	35	13	11	19	3	26.0	16.0	13.0
Cadmium	mg/kg	2.0	1.0	41.0	1.0	1.0	35.0	1.0	1.0	1	1	<1	1	<1	<1	<1	2	1	1	1.0	1.0	1.0
Chromium	mg/kg	32	44	41	32	23	44	22	25	34	18	20	37	16	33	12	17	21	22	15	20	18
Chromium VI	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	mg/kg	95	134	222	136	238	292	113	13	47	134	96	1179	10	66	22	31	89	19	544	55	77
Lead	mg/kg	650	364	1402	408	972	1425	821	183	168	289	829	2263	99	606	125	109	739	24	1118	236	243
Mercury	mg/kg	<0.3	<0.3	308.0	<0.3	9.0	320.0	3.0	<0.3	<1	<1	<1	<1	<1	<1	<1	<1	16	<1	<0.3	<0.3	1.0
Nickel	mg/kg	41	61	131	37	64	173	33	18	48	30	38	48	9	66	11	45	47	35	40	25	18
Selenium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5
Zinc	mg/kg	334	164	841	259	312	1124	256	79	207	124	120	296	42	142	59	96	122	70	419	116	115
Water Soluble Boron	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Other Inorganics																						
Natural Moisture Content	%	24.6	25.2	48.3	18.5	30.9	55.6	14.3	21.0	7.8	20.5	15.1	23.1	19.7	33.5	21.0	10.9	22.5	13.8	25.2	20.3	20.5
Acid Soluble Sulphide	mg/kg	<5	<5	<5	<5	<5	<5	9	16	<5	17	10	35	541	8	47	<5	<5	11	<5	<5	<5
Total Sulphur	%	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	6.6	0.3	<0.2	0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2
Total Sulphate**	mg/kg	2200	980	8800	280	1200	5300	1000	1400	240	530	1900	4500	2000	370	1600	2300	11000	360	3000	3000	6100
Chloride	mg/kg	12	15	15	20	13	14	14	21	12	14	17	17	42	8	28	<5	13	14	119	38	40
Asbestos Screening	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected
pH	pH Units	8.30	8.35	7.61	8.35	8.24	7.72	8.10	7.99	8.71	8.69	8.51	8.32	8.41	8.66	8.04	8.13	7.71	8.65	8.32	8.04	8.16
Organics																						
Total Organic Carbon	%	7.6	8.3	-	5.4	11.2	-	-	1.7	-	3.6	-	5.3	-	7.5	1.6	-	-	-	8.3	-	-
Total Phenols	mg/kg	-	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	See Attached	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NDP	See Attached	See Attached
Free Cyanide	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thiocyanate	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Cyanide	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2.5	<2.5	<2.5
Hydrocarbons																						
Aliphatics																						
EC C5-C6	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C6-C8	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C8-C10	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C10-C12	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C12-C16	mg/kg	-	<0.1	-	-	<0.1	-	-	<0.1	15	-	-	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
EC>C16-C21	mg/kg	-	<0.1	-	-	<0.1	-	-	<0.1	62	-	-	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
EC>C21-C35	mg/kg	-	<0.1	-	-	<0.1	-	-	<0.1	311	-	-	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
Total Aliphatics	mg/kg	-	<0.1	-	-	<0.1	-	-	<0.1	389	-	-	-	-	-	<0.1	-	<0.1	-	<0.1	-	-
Aromatics																						
EC C6-C7	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C7-C8	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C8-C10	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C10-C12	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
EC>C12-C16	mg/kg	-	2.12	-	-	3.625	-	-	8.236	<0.1	-	-	-	-	-	1.4	-	<0.1	-	0.987	-	-
EC>C16-C21	mg/kg	-	1.95	-	-	3.617	-	-	9.423	<0.1	-	-	-	-	-	0.8	-	<0.1	-	1.215	-	-
EC>C21-C35	mg/kg	-	0.58	-	-	1.204	-	-	2.411	<0.1	-	-	-	-	-	0.12	-	<0.1	-	0.908	-	-
Total Aromatics	mg/kg	-	4.65	-	-	8.446	-	-	20.07	<0.1	-	-	-	-	-	2	-	<0.1	-	3.11	-	-
Mineral Oil by GC	mg/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
Petrol Range Organics C5-C9	mg/kg	<0.01	-	-	<0.01	-	-	-	<0.01	-	-	-	<0.01	-	-	<0.01	-	-	-	<0.01	-	-
Petrol Range Organics C10-12	mg/kg	<0.01	-	-	<0.01	-	-	-	<0.01	-	-	-	<0.01	-	-	<0.01	-	-	-	<0.01	-	-
PRO	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
Diesel Range Organics	mg/kg	271	-	-	60	-	-	-	111	-	-	-	<1	-	-	49	-	-	-	108	-	-
DRO Interpretation		Possible PAHs	-	-	Possible PAHs	-	-	-	Possible PAHs	-	-	-	NIP	-	-	NIP	-	-	-	Possible natural occurring products	-	-
TPH	mg/kg	-	4.65	-	-	8.446	-	-	20.07	389	-	-	-	-	-	2	-	<01	-	3.11	-	-
MTBE	mg/kg	-	<0.01	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	-	<0.01	-	<0.01	-	<0.01	-	-
Benzene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	-	<0.01	-	-	<0.01	-	<0.01	-	<0.01	-	-
Toluene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	-	<0.01	-	-	<0.01	-	<0.01	-	<0.01	-	-
Ethylbenzene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	-	<0.01	-	-	<0.01	-	<0.01	-	<0.01	-	-
Xylene	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	-	<0.01	<0.01	-	-	<0.01	-	-	<0.01	-	<0.01	-	<0.01	-	-
BTEX	mg/kg	<0.04	<0.04	-	<0.04	<0.04	-	-	<0.04	<0.04	-	-	<0.04	-	-	<0.04	-	<0.04	-	<0.04	-	-
PAHs																						
Naphthalene	ug/kg	510	59	139	389	230	50	225	68	56	36	46	51	77	55	55	<1	<1	<1	37	210	496
Acenaphthylene	ug/kg	566	63	59	209	168	29	170	316	49	13	44	13	21	24	13	<1	<1	<1	70	106	228
Acenaphthene	ug/kg	545	45	48	818	54	36	156	51	37	16	29	31	45	35	35	<1	<1	<1	34	1230	2203
Fluorene	ug/kg	827	34	29	784	65	19	147	110	36	7	40	18	122	24	77	<1	<1	<1	49	662	1621
Phenanthrene	ug/kg	8748	596	1047	9251	1006	457	2073	2835	339	221	660	326	554	327	363	<1	<1	<1	352	7987	20568
Anthracene	ug/kg	1899	98	124	905	268	57	338	840	116	68	175	93	248	90	131	<1	<1	<1	86	1073	2390
Fluoranthene	ug/kg	15473	669	508	6391	1087	300	2560	410	564	234	1136	410	553	281	454	<1	<1	<1	179	9923	20578
Pyrene	ug/kg	12491	614	455	5351	974	259	2259	3672	568	247	801	364	411	251	318	<1	<1	<1	190	9612	18200
Benzo(a)anthracene	ug/kg	7249	440	461	2467	726	224	1236	2380	499	315	257	182	154	503	298	<1	<1	<1	191	4413	8172
Chrysene	ug/kg	4508	497	542	3051	842	292	1408	2222	460	285	569	399	375	340	186	<1	<1	<1	229	5104	8739
Benzo(b)+Benzo(k) fluoranthene	ug/kg	7205	743	1074	4160	1513	583	2281	3591	822	315	751	796	339	535	218	<1	<1	<1	498	7529	12560
Benzo(a)pyrene	ug/kg	3134	385	543	2268	765	297	1158	2097	614	151	428	406	213	277	124	<1	<1	<1	311	4355	7209
Indeno(123cd)pyrene	ug/kg	3955	271	551	1342	534	284	1036	1235	764	155	278	434	122	272	77	<1	<1	<1	297	2670	4377
Dibenzo(ah)anthracene	ug/kg	3280	242	525	1239	483	246	836	1081	273	81	160	220	91	186	40	<1	<1	<1	360	2137	3874
Benzo(ghi)perylene	ug/kg	5999	337	708	1705	722	378	1238	1334	729	139	279	429	127	247	79	<1	<1	<1	548	3446	5605
Coronene	ug/kg	1036	-	-	477	-	-	-	342	-	-	-	196	-	-	40	-	-	-	198	-	-
Total 6 PAHs	mg/kg	31.7	-	-	15.1	-	-	-	8.2	-	-	-	2.5	-	-	<1.6	-	-	-	<1.6	-	-
Total 10 Dutch PAHs	ug/kg	60176	-	-	38725	-	-	-	17462	-	-	-	4579	-	-	1985	-	-	-	2889	-	-
Total 16 EPA PAHs	ug/kg	76389	5094	6812	40329	9436	3513	17124	22242	5926	2283	5653	4172	3452	3447	2468	<1	<1	<1	3431	60459	116821
Total 17 PAHs	ug/kg	77419	-	-	40825	-	-	-	22576	-	-	-	4368	-	-	2508	-	-	-	3629	-	-
PCBs																						
PCB Congener 28	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
PCB Congener 52	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
PCB Congener 101	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
PCB Congener 118	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
PCB Congener 153	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
PCB Congener 138	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
PCB Congener 180	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-
PCB Total of 7 Congeners	ug/kg	<1	-	-	<1	-	-	-	<1	-	-	-	<1	-	-	<1	-	-	-	<1	-	-

Sample Identity	WS11			WS12		BH1	BH3			BH4				BH 5	BH6		BH7			Residential without plant uptake[1]	Commercial/ Industrial[1]	DIV[2]	Murphy WAC[3]	KTK WAC[4]
Depth	0.50	2.00	3.00	0.50	1.00	2.00	2.0	0.50	1.00	1.00	5.0-5.3	6.0-6.3	7.20	2.00	1.00	2.00	0.50	3.00	6.50					
Strata	SS	SS	GC	MG	MG	MG	MG	MG	MG	MG	MG	MG	GC	MG	MG	MG	MG	GR	GC					
Metals																								
Arsenic	-	7	3	27.0	27.0	11.0	8.0	30.0	-	26.0	18	22	17.0	15.0	15.0	27.0	27	-	8	20	500			
Cadmium	-	<1	2	1.0	1.0	<0.5	<0.5	<0.5	-	1.0	1.0	1.0	1.0	<0.5	1.0	1.0	<1	-	1	30	1400			
Chromium	-	11	32	22	19	10	16	16	-	28	14	17	16	30	15	20	23	-	17	200	5000			
Chromium VI	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1					
Copper	-	14	26	306	610	28	7	91	-	237	270	250	42	145	42	99	29	-	18			190		
Lead	-	77	25	481	937	362	30	466	-	392	430	480	222	602	439	1187	183	-	22	450	750			
Mercury	-	<1	<1	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	1.5	2.1	<0.3	<0.3	<0.3	5.0	<1	-	<1	15	480			
Nickel	-	9	51	60	38	14	16	46	-	40	29	40	26	29	18	35	16	-	28	75	5000			
Selenium	-	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<3	<3	<0.5	<0.5	<0.5	<0.5	<1	-	<1	260	8000			
Zinc	-	45	105	233	228	62	59	98	-	153	260	240	95	103	91	139	118	-	72			720		
Water Soluble Boron	-	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	8	<1	<1	<1	<1	-	<1					
Other Inorganics																								
Natural Moisture Content	8.2	23.8	10.7	21.7	14.0	33.3	23.5	24.3	24.4	9.5	-	-	40.9	23.2	15.0	27.2	3.9	17.8	7.8					
Acid Soluble Sulphide	-	189	12	<5	8	93	<5	6	-	7	-	-	35	<5	17	<5	24	-	16					
Total Sulphur	-	0.2		<0.2	0.2	0.5	<0.2	<0.2	-	<0.2	-	-	0.3	0.3	<0.2	<0.2	<0.2	-	0.3					
Total Sulphate**	-	790	210	1600	2300	1500	560	1800	-	2000	-	-	1500	5800	500	1700	1000	-	620					
Chloride	-	22	11	41	36	76	21	15	-	33	-	-	36	33	15	11	23	-	850					
Asbestos Screening	-	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	-	No Fibres Detected	-	-	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	No Fibres Detected	-	No Fibres Detected					
pH	-	8.67	8.70	8.21	8.01	8.63	8.93	8.98	-	8.49	-	-	7.84	8.13	8.45	8.38	9.21	-	8.67					
Organics																								
Total Organic Carbon	-	2.2	-	-	-	-	1.5	-	1.1	7.6	-	-	-	3.1	-	-	-	-	0.5					
Total Phenols	-	<0.01	-	See Attached	See Attached	See Attached	See Attached	See Attached	-	See Attached	-	-	See Attached	<0.01	See Attached	See Attached	<0.01	-	<0.01	219000	219000			
Free Cyanide	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5					
Thiocyanate	-	<1	2	<1	<1	<1	<1	<1	-	<1	-	-	<1	<1	<1	<1	<1	-	<1					
Total Cyanide	-	<1	<1	<2.5	<2.5	<1	<1	<1	-	<2.5	-	-	<2.5	See Attached	<2.5	<2.5	<1	-	<1	181	13800			
Hydrocarbons																								
Aliphatics																								
EC C5-C6	<0.01	1	0.3	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	10.5	476			
EC>C6-C8	<0.01	6	3	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	26.8	>SAT			
EC>C8-C10	<0.01	4	3	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	73.1	157000			
EC>C10-C12	<0.01	7	8	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	43	157000			
EC>C12-C16	<0.1	194	<0.1	-	<0.1	-	<0.1	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	6790	157000			
EC>C16-C21	<0.1	301	<0.1	-	<0.1	-	<0.1	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-					
EC>C21-C35	<0.1	88	<0.1	-	<0.1	-	<0.1	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-					
Total Aliphatics	<0.1	601	14	-	<0.1	-	<0.1	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-					
Aromatics																								
EC C6-C7	<0.01	0.02	<0.01	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-					
EC>C7-C8	<0.01	0.10	<0.01	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	7.3	536			
EC>C8-C10	<0.01	6.38	4	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	71	62800			
EC>C10-C12	<0.01	11	12	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-	418	62800			
EC>C12-C16	286	9.4	<0.1	-	1.88	-	<0.1	-	-	-	-	-	-	2.6	-	-	-	<0.1	-	1920	47000			
EC>C16-C21	73	5.6	<0.1	-	1.808	-	<0.1	-	-	-	-	-	-	4.0	-	-	-	<0.1	-	2040	47000			
EC>C21-C35	37	0.9	<0.1	-	0.334	-	<0.1	-	-	-	-	-	-	1.0	-	-	-	<0.1	-					
Total Aromatics	396	33	17	-	4.022	-	<0.1	-	-	-	-	-	-	7.6	-	-	-	<0.1	-					
Mineral Oil by GC	-	217	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
Petrol Range Organics C5-C9	-	3.451	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01					
Petrol Range Organics C10-12	-	6.764	-	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	<0.01					
PRO	<0.01	36	31	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-					
Diesel Range Organics	-	1086	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					1000
DRO Interpretation	-	Possible highly degraded diesel	-	-	-	-	-	-	NIP	-	-	-	-	-	-	-	-	-	NIP					
TPH	396	635	31	-	4.022	-	<01	-	-	-	-	-	-	7.6	-	-	-	<01	-				500	
MTBE	<0.01	0.14	<0.01	-	<0.01	-	<0.01	-	-	-	-	-	-	<0.01	-	-	-	<0.01	-					
Benzene	<0.01	0.02	<0.01	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	<0.01	-	-	-	<0.01	<0.01	0.038	1.65			
Toluene	<0.01	0.10	<0.01	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	<0.01	-	-	-	<0.01	<0.01	3	150			
Ethylbenzene	<0.01	0.04	0.02	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	<0.01	-	-	-	<0.01	<0.01	16	48000			
Xylene	<0.01	0.17	0.05	-	<0.01	-	<0.01	-	<0.01	-	-	-	-	<0.01	-	-	-	<0.01	<0.01	7.9	341			
BTEX	<0.04	0.33	<0.09	-	<0.04	-	<0.04	-	<0.04	-	-	-	-	<0.04	-	-	-	<0.04	<0.04					6
PAHs																								
Naphthalene	-	351	-	56	47	75	<1	77	7	72	-	-	39	74	108	5377	2	-	<1	7000	290000	-		
Acenaphthylene	-	206	-	80	26	19	<1	65	3	101	-	-	9	44	201	2351	4	-	<1	-	-	-		
Acenaphthene	-	337	-	68	83	66	<1	38	19	54	-	-	27	30	79	994	16	-	<1	-	-	-		
Fluorene	-	721	-	62	41	105	<1	45	2	66	-	-	25	21	118	3380	1	-	<1	-	-	-		
Phenanthrene	-	2456	-	20	503	559	<1	618	52	1062	-	-	340	490	1969	27765	5	-	<1	-	-	-		
Anthracene	-	650	-	149	141	179	<1	251	12	260	-	-	33	190	699	10691	2	-	<1	-	-	-		
Fluoranthene	-	2634	-	505	566	393	<1	760	32	1407	-	-	113	879	3233	34308	78	-	<1	-	-	-		
Pyrene	-	2395	-	360	520	298	<1	764	27	1379	-	-	92	941	2372	28495	153	-	<1	-	-	-		
Benzo(a)anthracene	-	2016	-	457	537	179	<1	247	32	860	-	-	117	1257	3324	21106	80	-	<1	-	-	-		
Chrysene	-	1520	-	604	555	147	<1	624	36	932	-	-	171	826	1387	16330	61	-	<1	-	-	-		
Benzo(b)+Benzo(k) fluoranthene	-	1538	-	1007	537	181	<1	937	36	1808	-	-	193	1417	1963	28064	85	-	<1	-	-	-		
Benzo(a)pyrene	-	828	-	544	385	135	<1	460	7	1039	-	-	78	816	1366	16122	47	-	<1	1400	31000			
Indeno(123cd)pyrene	-	539	-	387	179	61	<1	381	14	896	-	-	71	501	781	10079	58	-	<1					
Dibenzo(ah)anthracene	-	363	-	317	116	51	<1	398	6	678	-	-	86	348	455	10344	21	-	<1					
Benzo(ghi)perylene	-	535	-	537	218	95	<1	701	22	1117	-	-	137	678	857	10027	62	-	<1					
Coronene	-	205	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	<1					
Total 6 PAHs	-	6.1	-	-	-	-	-	-	<1.6	-	-	-	-	-	-	-	-	-	<1.6					
Total 10 Dutch PAHs	-	13067	-	-	-	-	-	-	250	-	-	-	-	-	-	-	-	-	<1					40000
Total 16 EPA PAHs	-	17089	-	5154	4454	2543	<1	6366	307	11731	-	-	1530	8512	18912	225434	675	-	<1					
Total 17 PAHs	-	17294	-	-	-	-	-	-	315	-	-	-	-	-	-	-	-	-	<1				100,000	
PCBs																								
PCB Congener 28	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
PCB Congener 52	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
PCB Congener 101	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
PCB Congener 118	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
PCB Congener 153	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
PCB Congener 138	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
PCB Congener 180	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1					
PCB Total of 7 Congeners	-	<1	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	<1				1000	

MG - Made Ground
SS -Sandy Silt (with sea shells)
GR - Gravel
BC -Gravelly Clay

NIP - No Identification Possible

1 - Soil Guideline Values - DEFRA & Environment Agency (2002). "The Contaminated Land Exposure Assessment Model (CLEA): Technical Basis and Algorithms". CLR10 and R&D Publication SGV1, 3, 5, 7,9 &10
2 - Dutch Guidelines - Circular on Target Values and Intervention Values for Soil Remediation, Ministry of Housing, Spatial Planning and the Environment (2000)
3- Murphy Environmental Inert Waste Acceptance Criteria
4- KTK Landfill Hazardous Waste Acceptance Criteria

Table 1 - Soil Results

Borehole Location	**WS6**	**WS11**	**BH5**
Sample Depth	4m	3m	2m
Strata	MG	GC	MG
VOCs			
Dichlorodifluoromethane	<2	<2	<2
Chloromethane	<3	<3	<3
Vinyl Chloride	<3	<3	<3
Bromomethane	<5	<5	<5
Chloroethane	<2.5	<2.5	<2.5
Trichlorofluoromethane	<1.5	<1.5	<1.5
1,1-Dichloroethene	<2	<2	<2
Carbon Disulphide	<1	<1	<1
Dichloromethane	<4	<4	<4
Tert-butyl methyl ether	<3	<3	<3
Trans-1,2-Dichoroethene	<2	<2	<2
1,1-Dichloroethane	<2	<2	<2
Cis-1,2-Dichloroethene	<2	<2	<2
2,2-Dichloropropane	<3	<3	<3
Bromochloromethane	<6	<6	<6
Chloroform	<2	<2	<2
1,1,1-Trichloroethane	<1.5	<1.5	<1.5
1,1-Dichloropropene	<2	<2	<2
Carbontetrachloride	<1	<1	<1
1,2-Dichloroethane	<5	<5	<5
Benzene	<2	<2	<2
Trichloroethene	<2	<2	<2
1,2-Dichloropropane	<3	<3	<3
Dibromomethane	<8	<8	<8
Bromodichloromethane	<3	<3	<3
Cis-1,3-Dichloropropene	<3.5	<3.5	<3.5
Toluene	<1	<1	<1
Trans-1,3-Dichloropropene	<4	<4	<4
1,1,2-Trichloroethane	<4.5	<4.5	<4.5
1,3-Dichloropropane	<5	<5	<5
Tetrachloroethene	<1	<1	<1
Dibromochloromethane	<4	<4	<4
1,2-Dibromoethane	<5	<5	<5
Chlorobenzene	<1	<1	<1
1,1,1,2-tetrachloroethane	<2	<2	<2
Ethylbenzene	<1	<1	<1
p/m-Xylene	<2	**18**	<2
o-Xylene	<1	<1	<1
Styrene	<1	<1	<1
Bromoform	<7	<7	<7
Isopropylbenzene	<1	**5**	<1
1,1,2,2-Tetrachloroethane	<8	<8	<8
1,2,3-Trichloropropane	<8	<8	<8
Bromobenzene	<2	<2	<2
Propylbenzene	<1	**10**	<1
2-Chlorotoluene	<1	<1	<1
1,3,5-Trimethylbenzene	<1	**11**	<1
4-Chlorotoluene	<1	<1	<1
Tert-Butylbenzene	<1	<1	<1
1,2,4-Trimethylbenzene	<1	**71**	<1
Sec-Butylbenzene	<1	**3**	<1
4-Isopropyltoluene	<1	<1	<1
1,3-Dichlorobenzene	<1	<1	<1
1,4-Dichlorobenzene	<3	<3	<3
n-Butylbenzene	<2	<2	<2
1,2-Dichlorobenzene	<2	<2	<2
1,2-Dibromo-3-Chloropropar	<13	<13	<13
1,2,4-Trichlorobenzene	<3	<3	<3
Hexachlorobutadiene	<2	<2	<2
Naphthalene	<4	<4	<4
1,2,3-Trichlorobenzene	<2.5	<2.5	<2.5

Borehole Location	**WS6**	**WS11**
Sample Depth	4m	3m
Strata	MG	GC
SVOCs		
Phenol	<100	<100
2-Chlorophenol	<100	<100
2-Methylphenol	<100	<100
4-Methylphenol	<100	<100
2-Nitrophenol	<100	<100
4-Nitrophenol	<100	<100
2,4-Dichlorophenol	<100	<100
2,4-Dimethylphenol	<100	<100
4-Chloro-3-methylphenol	<100	<100
2,4,6-Trichlorophenol	<100	<100
2,4,5-Trichlorophenol	<100	<100
Pentachlorophenol	<100	<100
1,3-Dichlorobenzene	<100	<100
1,4-Dichlorobenzene	<100	<100
1,2-Dichlorobenzene	<100	<100
1,2,4-Trichlorobenzene	<100	<100
Nitrobenzene	<100	<100
Azobenzene	<100	<100
Hexachlorobenzene	<100	<100
Naphthalene	<100	<100
Acenaphthylene	<100	<100
Acenaphthene	<100	<100
Fluorene	<100	<100
Phenanthrene	<100	<100
Anthracene	<100	<100
Fluoranthrene	**163**	**185**
Pyrene	**130**	**153**
Benzo(a)anthracene	<100	<100
Chrysene	<100	<100
Benzo(b)fluoranthrene	<100	<100
Benzo(k)fluoranthrene	<100	<100
Benzo(a)pyrene	<100	<100
Indeno(1,2,3-cd)pyrene	<100	<100
Dibenzo(a,h)anthracene	<100	<100
Benzo(ghi)perylene	<100	<100
2-Chloronaphthalene	<100	<100
2-Methylnaphthalene	<100	<100
Carbazole	<100	<100
Isophorone	<100	<100
Dibenzofuran	<100	<100
Dimethyl phthalate	<100	<100
Diethyl phthalate	<100	<100
Di-n-butylphthalate	<100	<100
Di-n-octylphthalate	<100	<100
Bis(2-ethylhexyl)phthalate	<100	**1663**
Butylbenzylphthalate	<100	<100
4-Chloroaniline	<100	<100
2-Nitroanaline	<100	<100
3-Nitroaniline	<100	<100
4-Nitroaniline	<100	<100
2,4-Dinitrotoluene	<100	<100
2,6-Dinitrotoluene	<100	<100
Bis(2-chloroethyl)ether	<100	<100
4-Bromophenylphenylether	<100	<100
4-Chlorophenylphenylether	<100	<100
Hexachloroethane	<100	<100
Hexachlorobutadiene	<100	<100
Hexchlorocyclopentadiene	<100	<100
Bis(2-chloroethoxy)methane	<100	<100
N-nitrosodi-n-propylamine	<100	<100

All results given in ug/kg

MG - Made Ground
SS -Sandy Silt (with sea shells)
GR - Gravel
BC -Gravelly Clay

Table 2 - Leachate Results

Sample Location		WS1			WS2			WS3	WS4	WS5	WS6		WS8	WS11	BH3		BH4			BH 5	BH7	Irish Interim Guideline Value
Depth		1.00	3.00	5.00	1.00	3.00	5.00	4.00	2.00	2.00	1.00	4.00	2.00	2.00	1.00	2.0	1.00	5.0-5.3	6.0-6.3	2.00	6.50	
Strata		MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	SS	MG	MG	MG	MG	MG	MG	GC	
Metals																						
Dissolved Mercury Low CEN 10:1 Leachate	mg/l	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	0.0002	<0.00005	<0.00005	0.001
Total Dissolved Solids in CEN 10:1 Leachate	mg/l	104	114	-	98	98	-	458	94	646	106	120	140	306	122	126	126	-	-	590	204	1000
Total Phenols in CEN 10:1 Leachate	mg/l	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	-	-	<0.01	<0.01	0.0005
Dissolved Antimony Low CEN 10:1 Leach	mg/l	0.007	0.005	0.003	0.004	0.004	0.004	0.006	0.007	0.002	0.004	0.011	0.009	0.013	0.007	0.004	0.003	0.13	<0.0075	0.001	0.004	
Dissolved Arsenic Low CEN 10:1 Leach	mg/l	0.009	0.008	<0.001	0.01	0.012	<0.001	0.002	0.014	<0.01	0.004	0.004	0.014	0.001	0.243	0.151	0.002	0.073	0.029	<0.001	<0.001	0.01
Dissolved Barium Low CEN 10:1 Leach	mg/l	0.249	0.236	0.25	0.205	0.214	0.247	0.322	0.18	0.253	0.181	0.3	0.231	0.271	0.714	0.886	0.233	0.32	0.30	0.242	0.315	0.1
Dissolved Boron Low CEN 10:1 Leach	mg/l	-	0.082	0.132	-	0.075	0.132	-	0.021	-	0.045	0.171	-	-	-	0.027	0.067	<0.2	<0.2	0.065	-	1
Dissolved Cadmium Low CEN 10:1 Leach	mg/l	<0.0004	<0.0004	0.0012	<0.0004	<0.0004	0.0007	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0022	<0.0022	<0.0004	<0.0004	0.005
Dissolved Chromium Low CEN 10:1 Leach	mg/l	0.002	0.003	0.003	0.002	0.004	0.002	0.002	0.008	0.004	<0.001	<0.001	0.002	<0.001	0.374	0.215	0.004	<0.01	<0.01	<0.001	<0.001	0.03
Dissolved Copper Low CEN 10:1 Leach	mg/l	0.036	0.053	0.032	0.022	0.028	0.028	0.057	0.034	0.041	0.112	0.05	0.05	0.038	0.237	0.04	0.026	0.027	0.057	0.038	0.034	0.03
Dissolved Lead Low CEN 10:1 Leach	mg/l	<0.001	<0.001	0.007	<0.001	<0.001	0.001	<0.001	0.004	0.003	0.006	0.006	<0.001	0.003	0.005	0.003	<0.001	0.017	0.004	0.001	0.001	0.01
Dissolved Molybdenum Low CEN 10:1 Leach	mg/l	0.012	0.023	0.037	0.033	0.018	0.029	0.039	0.003	0.032	0.006	0.064	0.026	0.048	0.006	0.004	0.013	0.45	0.24	0.017	0.011	
Dissolved Nickel Low CEN 10:1 Leach	mg/l	<0.001	<0.001	0.008	<0.001	<0.001	0.003	0.004	0.017	0.012	0.008	0.011	<0.001	0.013	0.375	0.339	<0.001	0.039	0.087	0.006	0.014	0.02
Dissolved Selenium Low CEN 10:1 Leach	mg/l	0.004	0.002	<0.001	0.004	0.002	0.001	0.003	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	0.067	0.053	0.002	0.05	0.05	<0.001	0.019	
Dissolved Zinc Low CEN 10:1 Leach	mg/l	0.015	0.017	0.133	0.004	0.011	0.096	0.085	0.017	0.044	0.028	0.039	0.009	0.073	0.083	0.049	0.007	<0.05	<0.05	0.048	0.019	0.1
Other inorganics																						
Chloride in CEN 10:1 Leachate	mg/l	3.7	2.4	-	2.3	2.2	-	4.4	1.2	2	1.4	2.2	3.3	3.5	8.3	2	3.2	-	-	3.7	82.3	30
Fluoride in CEN 10:1 Leachate	mg/l	2	0.7	-	1.2	0.9	-	0.7	0.6	0.2	0.8	0.3	0.9	0.3	0.5	0.2	0.5	-	-	0.3	0.4	1
Sulphate in CEN 10:1 Leachate	mg/l	5.4	10.8	-	5	11	-	230.2	4.2	427.8	5.3	40.9	18.4	72.1	13	24.1	42.5	-	-	466.8	33.5	200
COD Filtered in CEN 10:1 Leachate	mg/l	-	<1.5	-	-	<1.5	-	-	<1.5	-	<1.5	2.3	-	-	-	5.1	<1.5	-	-	<1.5	-	
Organics																						
Dissolved Organic Carbon in CEN 10:1 Leachate	mg/l	3.1	<2.0	-	2	2.1	-	3	<2.0	<2.0	<2.0	7.4	3.5	8	<2.0	2.7	<2.0	-	-	<2.0	<2.0	

MG - Made Ground

SS -Sandy Silt (with sea shells)

GR - Gravel

BC -Gravelly Clay

Table 3 - Groundwater Results		Location																										
	Borehole	BH1			BH2		BH3			BH4				BH5			BH6		BH7			WS7			WS11			Irish Interim Guideline Value
	Sampling date	04-Sep-08	10-Sep-08	17-Sep-08	10-Sep-08	17-Sep-08	29-Aug-08	04-Sep-08	10-Sep-08	29-Aug-08	04-Sep-08	04-Sep-08	10-Sep-08	29-Aug-08	10-Sep-08	17-Sep-08	10-Sep-08	17-Sep-08	29-Aug-08	04-Sep-08	10-Sep-08	29-Aug-08	04-Sep-08	10-Sep-08	29-Aug-08	04-Sep-08	10-Sep-08	
Determinand	*Comments*				HC odour & slight sheen		High HC odour. Slight sheen on 3rd round				Sample contaminated in metals analysis	Re-analysed					Slight HC odour & slight sheen					Slight HC odour			Very high HC odour & slight sheen			
Metals																												
Dissolved Antimony Low Level	ug/l	1	<1	2	<1	3	3	1	<1	5	<1	-	<1	3	3	4	<1	<1	<1	<1	1	11	21	20	<1	3	2	
Dissolved Arsenic Low Level	ug/l	1	<1	2	2	3	3	<1	<1	5	2	-	<1	10	9	10	2	3	5	8	8	3	8	1	2	6	4	10
Dissolved Berylium Low Level	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Dissolved Boron Low Level	ug/l	150	217	194	457	381	606	17	6	161	35	-	41	1020	1028	862	308	114	1250	1010	1141	551	618	457	196	132	231	1000
Dissolved Cadmium Low Level	ug/l	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	0.5	<0.4	<0.4	0.5	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	1.6	1.3	1.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	5
Dissolved Chromium Low Level	ug/l	<1	1	<1	<1	1	4	3	<1	2	126	6	1	13	1	1	<1	<1	7	2	3	7	1	<1	9	<1	<1	30
Dissolved Copper Low Level	ug/l	2	3	1	3	2	3	7	4	5	15	-	5	4	5	5	<1	2	8	8	4	5	9	5	4	9	1	30
Dissolved Lead Low Level	ug/l	1	16	<1	<1	<1	<1	19	1	2	34	-	1	2	4	<1	<1	3	<1	4	1	2	35	2	6	62	2	10
Dissolved Nickel Low Level	ug/l	6	6	4	7	4	5	7	2	4	68	-	2	17	17	19	7	10	14	13	13	10	10	8	8	15	12	20
Dissolved Selenium Low Level	ug/l	12	8	11	3	10	16	<1	3	8	2	-	<1	<1	<1	2	<1	<1	31	28	27	1	10	<1	<1	<1	2	
Dissolved Zinc Low Level	ug/l	21	151	<1	32	<1	32	45	22	34	104	-	18	57	55	32	27	27	35	25	17	34	36	23	76	72	15	100
Dissolved Mercury Low Level	ug/l	-	<0.05	<0.05	<0.05	<0.05	0.08	-	<0.05	0.05	-	-	0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	-	0.06	<0.05	-	<0.05	<0.05	-	<0.05	1
Other Inorganics																												
Total Hardness	mg/l	472	520	508	799	701	573	162	90	610	391	-	281	1610	1564	1552	776	455	1986	1806	1906	1182	1337	982	450	548	748	200
BOD Unfiltered	mg/l	<2	<2	<2	<2	<2	43	9	<2	4	2	-	<2	<2	93	<2	<2	<2	2	<2	<2	18	<2	<2	4	4	<2	
COD Unfiltered	mg/l	204	366	<15	178	42	73	144	593	<15	129	-	229	897	280	<15	402	327	72	350	660	2242	696	574	912	339	35	
Chloride	mg/l	841	800	672	1792	1214	1790	62	38	925	624	-	493	29	35	29	20	15	6475	7208	7750	15	2011	16	14	17	17	30
Sulphate	mg/l	393	342	313	308	261	268	39	19	302	183	-	128	952	1021	976	91	89	841	1003	992	777	826	770	72	73	101	200
Sulphide	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Free Cyanide	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01
Ammoniacal Nitrogen as N	mg/l	0.2	<0.2	<0.2	36.0	39.4	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	8.9	9.6	8.9	17.4	0.8	2.0	5.3	1.5	6.8	4.9	2.0	3.4	4.0	20.6	0.15
pH	pH Units	7.59	7.71	7.68	7.29	7.86	7.76	7.89	7.92	10.05	7.57	-	7.80	7.07	7.02	7.58	7.14	7.42	7.37	7.95	7.54	7.33	7.58	7.57	7.14	7.61	7.51	>6.5 and <9.5
Organics																												
Total Organic Carbon	mg/l	<2	<2	3	9	10	6	<2	12	6	<2	-	3	7	7	7	7	14	4	<2	3	7	<2	7	10	<2	7	
Total Phenols	mg/l	0.02	<0.01	0.18	<0.01	0.13		0.03	<0.01		0.03	-	<0.01		<0.01	0.09	<0.01	0.03		<0.01	<0.01		0.02	<0.01		0.03	<0.01	500
Hydrocarbons																												
PRO	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	7.902	10.656	2.193	
TPH	mg/l	<0.01	<0.01	<0.01	41.193	6.553	48.32	<0.01	24.03	0.175	<0.01	-	<0.01	0.5782	<0.01	0.261	0.336	<0.01	0.112	<0.01	<0.01	1.015	<0.01	0.268	26.891	15.1488	15.686	0.01
MTBE	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	0.017	0.03
Benzene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.031	<0.01	0.001
Toluene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	<0.01	0.01
Ethylbenzene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.211	0.013	0.015	0.01
Xylene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.527	0.035	0.023	0.01
Aliphatics																												
EC C5-C6	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.138	1.004	0.034	
EC>C6-C8	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.453	1.927	0.454	
EC>C8-C10	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.9488	1.6496	0.3156	
EC>C10-C12	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.2728	1.4032	0.3444	
EC>C12-C16	mg/l	<0.01	<0.01	<0.01	0.226	<0.01	<0.01	<0.01	0.111	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.734	0.1031	1.152	
EC>C16-C21	mg/l	<0.01	<0.01	<0.01	1.088	<0.01	<0.01	<0.01	0.761	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.444	0.0667	0.443	
EC>C21-C35	mg/l	<0.01	<0.01	<0.01	15.312	<0.01	<0.01	<0.01	8.376	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Total Aliphatics	mg/l	<0.01	<0.01	<0.01	16.626	<0.01	<0.01	<0.01	9.248	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5.9906	6.1536	2.743	
Aromatics																												
EC C6-C7	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.031	<0.01	
EC>C7-C8	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	<0.01	
EC>C8-C10	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.1612	2.5224	0.5114	
EC>C10-C12	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.9092	2.1048	0.5166	
EC>C12-C16	mg/l	<0.01	<0.01	<0.01	18.08	6.553	48.32	<0.01	12.045	0.13	<0.01	-	<0.01	0.4452	<0.01	0.261	0.301	<0.01	0.099	<0.01	<0.01	0.66	<0.01	0.183	14.858	4.337	10.672	
EC>C16-C21	mg/l	<0.01	<0.01	<0.01	6.049	<0.01	<0.01	<0.01	2.434	0.035	<0.01	-	<0.01	0.101	<0.01	<0.01	0.035	<0.01	0.013	<0.01	<0.01	0.269	<0.01	0.061	1.848	<0.01	1.131	
EC>C21-C35	mg/l	<0.01	<0.01	<0.01	0.438	<0.01	<0.01	<0.01	0.303	0.01	<0.01	-	<0.01	0.032	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.086	<0.01	0.024	0.105	<0.01	0.112	
Total Aromatics	mg/l	<0.01	<0.01	<0.01	24.567	6.553	48.32	<0.01	14.782	0.175	<0.01	-	<0.01	0.5782	<0.01	0.261	0.336	<0.01	0.112	<0.01	<0.01	1.015	<0.01	0.268	20.9004	8.9952	12.943	
PAHs																												
Naphthalene	ng/l	<10	<10	<10	117	13	531	<10	70	28	<10	-	<10	20	<10	<10	13	382	31	<10	<10	37	<10	<10	617	<10	<10	1000
Acenaphthylene	ng/l	<10	<10	<10	4631	5201	33067	<10	3775	23	<10	-	<10	11	<10	<10	13	1147	<10	<10	<10	18	<10	<10	2350	<10	18	
Acenaphthene	ng/l	<10	<10	<10	1836	1222	6966	<10	1099	22	<10	-	<10	29	<10	<10	38	1693	11	<10	<10	32	<10	<10	2996	<10	45	
Fluorene	ng/l	<10	<10	<10	2027	31	1611	<10	1552	16	<10	-	<10	40	<10	<10	47	1781	25	<10	<10	79	<10	<10	1730	<10	45	
Phenanthrene	ng/l	<10	<10	<10	3303	67	2803	<10	2106	34	<10	-	<10	159	<10	<10	88	3062	40	<10	<10	187	<10	<10	3956	<10	61	
Anthracene	ng/l	<10	<10	<10	1901	19	2221	<10	1396	13	<10	-	<10	43	<10	<10	29	596	<10	<10	<10	86	<10	<10	480	<10	25	10000000
Fluoranthene	ng/l	<10	<10	<10	2407	<10	578	<10	1135	11	<10	-	<10	83	<10	<10	45	1318	<10	<10	<10	141	<10	<10	1792	<10	37	1000
Pyrene	ng/l	<10	<10	<10	1975	<10	1094	<10	982	11	<10	-	<10	75	<10	<10	41	1075	<10	<10	<10	117	<10	<10	1554	<10	30	
Benzo(a)anthracene	ng/l	<10	<10	<10	1867	<10	<10	<10	647	<10	<10	-	<10	27	<10	<10	13	430	<10	<10	<10	85	<10	<10	635	<10	<10	
Chrysene	ng/l	<10	<10	<10	1908	<10	<10	<10	632	<10	<10	-	<10	26	<10	<10	10	311	<10	<10	<10	83	<10	<10	545	<10	<10	
Benzo(b)+Benzo(k) fluoranthene	ng/l	<10	<10	<10	2070	<10	<10	<10	903	17	<10	-	<10	36	<10	<10	10	321	<10	<10	<10	60	<10	<10	551	<10	<10	50*
Benzo(a)pyrene	ng/l	<10	<10	<10	714	<10	<10	<10	453	<10	<10	-	<10	15	<10	<10	<10	148	<10	<10	<10	53	<10	<10	206	<10	<10	10
Indeno(123cd)pyrene	ng/l	<10	<10	<10	204	<10	<10	<10	252	<10	<10	-	<10	12	<10	<10	<10	69	<10	<10	<10	41	<10	<10	117	<10	<10	50
Dibenzo(ah)anthracene	ng/l	<10	<10	<10	190	<10	<10	<10	86	<10	<10	-	<10	18	<10	<10	<10	30	<10	<10	<10	29	<10	<10	77	<10	<10	
Benzo(ghi)perylene	ng/l	<10	<10	<10	248	<10	<10	<10	217	<10	<10	-	<10	14	<10	<10	<10	82	<10	<10	<10	57	<10	<10	128	<10	<10	50
Total Aqueous 16 EPA PAHs	ng/l	<10	<10	<10	25399	6576	48871	<10	15304	208	<10	-	<10	608	<10	<10	347	12445	149	<10	<10	1105	<10	<10	17734	<10	275	100
PCBs																												
PCB Congener 28	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PCB Congener 52	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PCB Congener 101	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PCB Congener 118	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PCB Congener 153	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PCB Congener 138	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PCB Congener 180	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PCB Total of 7 Congeners	ng/l	-	-	-	-	-	-	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000

Notes

* IGV for benzo(k)fluroanthene taken as most conservative

Table 4: GROUND GAS ASSESSMENT	Job name:Connolly Station	Job number:023956	

NOTES:

Assessment based on guidance published in CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings.'

Information from Table 8.5 of CIRIA C665

Characteristic Situation 1 conditions
Gas screening value (CH4 or CO2) < 0.07 l/h
Typically methane < 1 % by volume
Typically carbon dioxide < 5% by volume
Characteristic Situation 2 conditions
Gas screening value (CH4 or CO2) < 0.7 l/h
Borehole air flow rate < 70 l/h
Characteristic Situation 3 conditions
Gas screening value (CH4 or CO2) < 3.5 l/h

Key for shading	
(light green)	CO_2 > 5% in air
(light orange)	CH4 > 1 % in air
(yellow)	GSV > or = 0.07 l/h
(red)	GSV> or = 0.7 l/h

Approach:
Maximum concentration and flow values are used in the assessment below (minimum values for oxygen).
Where no detectable flow is recorded the instrument limit of detection is used
Where concentrations are recorded below LoD, the instrument LoD is used in the assessment (0.5%)

SITE MONITORING DATA

Investigation & Year of installation	Exploratory Hole	Response zone stratum	Date Monitored/ Sampled	Gas measurements: Flow Rate (l/hr)	Atmos Pres (mb)	Min O2 (%) air	Max CO2 (% air)	Max CH4 (% air)	CO_2 analysis: CO2 as fraction	Gas screening value CO_2 (l/hr)	CH_4 analysis: CH_4 as fraction	Gas screening value CH_4 (l/hr)	Characteristic Situation
Glovers 2008	WS6	MG	29-Aug-08	0.2	1017	17.2	2.9	0.1	0.029	0.006	0.001	0.000	1
			04-Sep-08	0.2	990	13.1	5	0.1	0.050	0.010	0.001	0.000	1
			10-Sep-08	0	1000	14.5	3.5	0.1	0.035	0.004	0.001	0.000	1
			17-Sep-08	0	1019	8.5	6.4	0.1	0.064	0.006	0.001	0.000	2
Glovers 2008	WS9	MG	29-Aug-08	0	1016	18.6	1.9	0.1	0.019	0.002	0.001	0.000	1
			04-Sep-08	0.2	991	18.6	1.9	0.1	0.019	0.004	0.001	0.000	1
			10-Sep-08	0.1	999	19.9	0.7	0.1	0.007	0.001	0.001	0.000	1
			17-Sep-08	0.1	1019	20	0.7	0.2	0.007	0.001	0.002	0.000	1
Glovers 2008	WS10	MG	29-Aug-08	0	1017	20.3	0.1	0.1	0.001	0.000	0.001	0.000	1
			04-Sep-08	0.1	992	20.1	0.1	0.1	0.001	0.000	0.001	0.000	1
			10-Sep-08	0	999	20.1	0.1	0.1	0.001	0.000	0.001	0.000	1
			17-Sep-08	0	1019	19.2	0.2	5.6	0.002	0.000	0.056	0.006	2
Glovers 2008	WS12	MG	04-Sep-08	0.1	992	19.6	1.5	0.4	0.015	0.002	0.004	0.000	1
			10-Sep-08	0.1	998	19.1	1.5	0.1	0.015	0.002	0.001	0.000	1
			17-Sep-08	0.1	1019	19.3	1.3	0.1	0.013	0.001	0.001	0.000	1
Glovers 2008	WS3	MG/SLT	29-Aug-08	0.2	1017	9.1	7.7	0.1	0.077	0.015	0.001	0.000	2
			04-Sep-08	0.2	990	7.6	9.4	0.1	0.094	0.019	0.001	0.000	2
			10-Sep-08	0.1	999	7.8	10.6	0.1	0.106	0.011	0.001	0.000	2
			17-Sep-08	0.2	1019	7.5	10.2	0.1	0.102	0.020	0.001	0.000	2
Glovers 2008	WS7	MG/BC	29-Aug-08	0.1	1016	15.7	3	0.1	0.030	0.003	0.001	0.000	1
			04-Sep-08	0	990	16.1	2.6	0.1	0.026	0.003	0.001	0.000	1
			10-Sep-08	0	1001	20.2	0.2	0.1	0.002	0.000	0.001	0.000	1
			17-Sep-08	0	1019	16.2	2.5	0.1	0.025	0.003	0.001	0.000	1
Glovers 2008	WS11	SLT/BC	29-Aug-08	0.2	1017	15	3.8	0.2	0.038	0.008	0.002	0.000	1
			04-Sep-08	0.1	991	0	9.3	100	0.093	0.009	1.000	0.100	2
			10-Sep-08	0.2	1001	10	5.7	1.2	0.057	0.011	0.012	0.002	2
			17-Sep-08	0.1	1019	0.1	8.7	69.7	0.087	0.009	0.697	0.070	2
				(Max)			(Max)	(Max)					
WORSE CASE CALCULATION ALL DATA				**0.2**			**10.60**	**100.00**	**0.106**	**0.021**	**1.000**	**0.200**	**2**

LABORATORY DATA

Investigation & Year of installation	Exploratory Hole	Response zone stratum	Date Monitored & Sampleed	FIELD RESULTS: Flow Rate (l/hr)	Atmos Pres (mb)	Min O2 (%) air	Max CO2 (% air)	Max CH4 (% air)	LAB RESULTS: O2 (%) air	CO2 (% air)	CH4 (% air)	DIFFERENCE (FIELD% - LAB%): O2 (%) air	CO2 (% air)	CH4 (% air)
Glovers 2008	WS3		10/09/2008	0.1	999	7.8	10.6	<0.1	9	8	<0.05	-1.2	2.6	0
Glovers 2008	WS10		10/09/2008	0	999	20.1	<0.1	<0.1	21	0.4	0.1	-0.9	-0.3	0
Glovers 2008	WS11		10/09/2008	0.2	1001	10	5.7	1.2	11	4.2	0.1	-1	1.5	1.1
									AVERAGE DIFFERENCE			**-1.03**	**1.27**	**0.37**

Appendix C: Waste Management

	Sample Location																				Landfill acceptance criteria	
	WS1			WS2			WS3	WS4	WS5	WS6		WS8	WS11	BH3		BH4			BH 5	BH7	Murphy (Inert WAC)	KTK (Non-Haz WAC)
Depth Strata	1.00 MG	3.00 MG	5.00 MG	1.00 MG	3.00 MG	5.00 MG	4.00 SS	2.00 MG	2.00 MG	1.00 MG	4.00 MG	2.00 MG	2.00 SS	1.00 MG	2.0 MG	1.00 MG	5.0-5.3 MG	6.0-6.3 GC	2.00 MG	6.50 GC		
Leachate																						
Arsenic (as As)	0.09	0.08	<0.01	0.10	0.12	<0.01	0.02	0.14	<0.01	0.04	0.04	0.14	0.01	2.43	1.51	0.02	0.73	0.29	<0.01	<0.01	0.5	2
Barium (as Ba)	2.49	2.36	2.50	2.05	2.14	2.47	3.22	1.80	2.53	1.81	3.00	2.31	2.71	7.14	8.86	2.33	3.2	3	2.42	3.15	20	100
Boron	-	0.82	1.32	-	0.75	1.32	-	0.21	-	0.45	1.71	-	-	-	0.27	0.67	<2	<2	0.65	-		
Cadmium (as Cd)	<0.004	<0.004	0.012	<0.004	<0.004	0.007	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.022	<0.022	<0.004	<0.004	0.04	1
Total Chromium (as Cr)	0.02	0.03	0.03	0.02	0.04	0.02	0.02	0.08	0.04	<0.01	<0.01	0.02	<0.01	3.74	2.15	0.04	<0.1	<0.1	<0.01	<0.01	0.5	10
Copper (as Cu)	0.36	0.53	0.32	0.22	0.28	0.28	0.57	0.34	0.41	1.12	0.50	0.50	0.38	2.37	0.40	0.26	0.27	0.57	0.38	0.34	2	50
Mercury (as Hg)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.002	<0.0005	<0.0005	0.01	0.2
Molybdenum (as Mo)	0.12	0.23	0.37	0.33	0.18	0.29	0.39	0.03	0.32	0.06	0.64	0.26	0.48	0.06	0.04	0.13	4.5	2.4	0.17	0.11	0.5	10
Nickel (as Ni)	<0.01	<0.01	0.08	<0.01	<0.01	0.03	0.04	0.17	0.12	0.08	0.11	<0.01	0.13	3.75	3.39	<0.01	0.39	0.87	0.06	0.14	0.4	10
Lead (as Pb)	<0.01	<0.01	0.07	<0.01	<0.01	0.01	<0.01	0.04	0.03	0.06	0.06	<0.01	0.03	0.05	0.03	<0.01	0.17	0.04	0.01	0.01	0.5	10
Antimony (as Cb)	0.07	0.05	0.03	0.04	0.04	0.04	0.06	0.07	0.02	0.04	0.11	0.09	0.13	0.07	0.04	0.03	1.3	<0.075	0.01	0.04	0.06	
Selenium (as Se)	0.04	0.02	<0.01	0.04	0.02	0.01	0.03	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.67	0.53	0.02	0.5	0.5	<0.01	0.19	0.1	0.5
Zinc (as Zn)	0.15	0.17	1.33	0.04	0.11	0.96	0.85	0.17	0.44	0.28	0.39	0.09	0.73	0.83	0.49	0.07	<0.5	<0.5	0.48	0.19	4	50
Chloride	37	24	-	23	22	-	44	12	20	14	22	33	35	83	20	32	-	-	37	823	800	15000
Fluoride	20	7	-	12	9	-	7	6	2	8	3	9	3	5	2	5	-	-	3	4	10	150
Sulphate	54	108	-	50	110	-	2302	42	4278	53	409	184	721	130	241	425	-	-	4668	335	1000	20000
Phenol index	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	See Attached	See Attached	<0.1	-	-	<0.1	<0.1	1	
Dissolved Organic Carbon (DOC)	31	<20	-	20	21	-	30	<20	<20	<20	74	35	80	<20	27	<20	-	-	<20	<20	500	800
Total Dissolved Solids (TDS)	1040	1140	-	980	980	-	4580	940	6460	1060	1200	1400	3060	1220	1260	1260	-	-	5900	2040	4000	60000
Solid																						
Total Organic Carbon (TOC)	7.6	8.3	-	5.4	11.2	-	1.7	3.6	5.3	7.5	1.6	8.3	2.2	1.1	1.5	7.6	-	-	3.1	0.5	30,000	
BTEX	<0.04	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.33	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	6	
PCB (7 congeners)	<0.001	-	-	<0.001	-	-	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	-	-	-	<0.001	1	
Mineral Oil (C10-C40)	<1	-	-	<1	-	-	<1	-	<1	-	<1	<1	217	-	<1	-	-	-	-	<1	500	
Total 17 PAH	77.419	-	6.812	40.825	-	3.513	22.576	-	4.368	-	2.508	3.629	17.294	0.315	-	-	-	-	-	<0.001	100	
Total PAH Dutch 10	60	-	-	38.7	-	-	17.5	-	4.6	-	2	2.9	13	0.25	-	-	-	-	-	-		40
DRO	271			60			111		<1		49	108	1086	<1						<1		1000

all results in mg/kg

MG - Made Ground
SS -Sandy Silt (with sea shells)
GR - Gravel
BC - Gravelley Clay

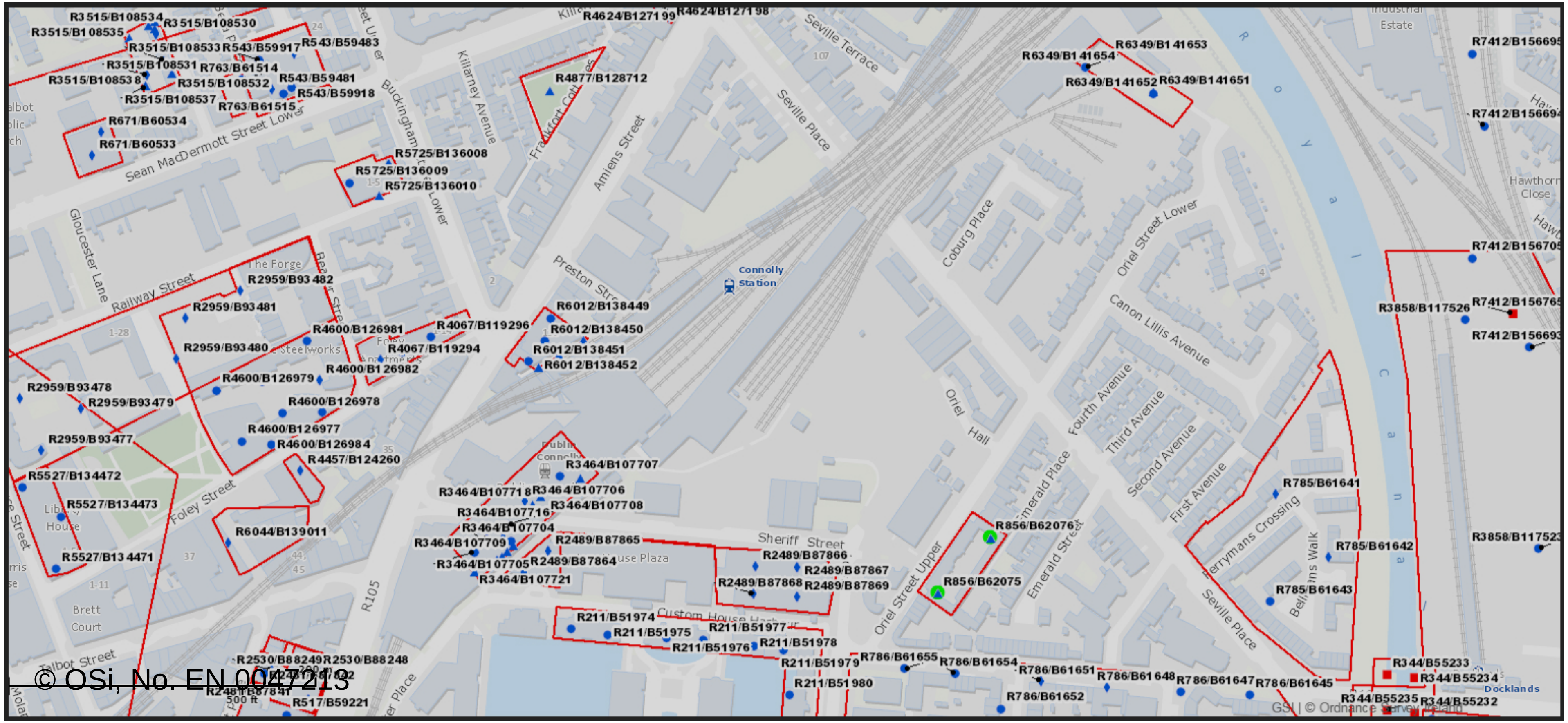
Sarah Bear
Buro Happold Limited
Camden Mill
Lower Bristol Road
Bath
BA2 3DQ
UK

Telephone: +44 (0)1225 320600
Facsimile: +44 (0)870 787 4148

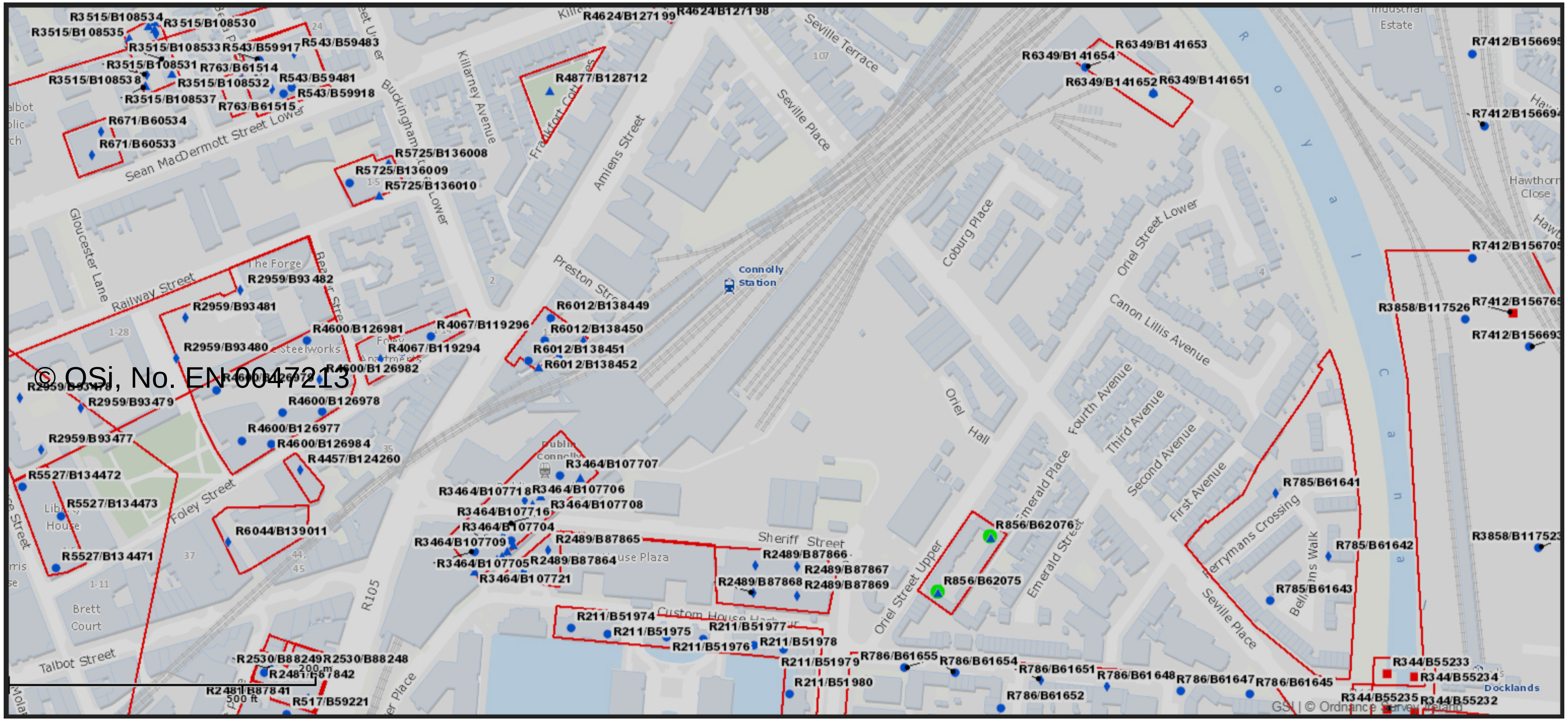
Email: sarah.bear@burohappold.com

O'CONNOR | SUTTON | CRONIN
Multidisciplinary Consulting Engineers

Appendix B
Nearby Site Investigations Log



Overview Map for GSI Report 856: Apartments
Oriel Street Lower, Dublin 1.
Points Observed: 2



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R3858/B117523
R7412/B156695
R7412/B156694
R7412/B156705
R7412/B156765
R7412/B156693
Connolly Station
Sean MacDermott Street Lower
Gloucester Lane
Railway Street
Buckingham Street Lower
Killarney Avenue
Frankfort Cottages
Amiens Street
Seville Terrace
Seville Place
Preston Street
Foley Street
Talbot Street
Sheriff Street
Oriel Street Upper
Oriel Street Lower
Oriel Hall
Coburg Place
Canon Lillis Avenue
Emerald Place
Emerald Street
Fourth Avenue
Third Avenue
Second Avenue
First Avenue
Ferrymans Crossing
Royal Canal
The Forge
Steelworks
Custom House Plaza
Brett Court
Liberty House
Hawthorn Close
Industrial Estate
Docklands
R105
200 m
500 ft
GSI | © Ordnance Survey Ireland

GSI REPORT 856

Apartments

Oriel Street Lower, Dublin 1.

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
62075	1	4.5		1.9	316944	234856	Cable Percussion (Shell and Auger)
62076	2	5		1.9	316978	234892	Cable Percussion (Shell and Auger)

GSI REPORT 856

Apartments

LAYERS FOR BOREHOLE 62075 (Company Name: 1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6207501	0	1				Fill - Made Ground	Fill - Made Ground
6207502	1	2	Soft	Black	Very Silty	Clay	Clay
6207503	2	4.5			Fine to Coarse Sandy	Gravel	Gravel

GSI REPORT 856

Apartments

LAYERS FOR BOREHOLE 62076 (Company Name: 2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
6207601	0	1				Fill - Made Ground	Fill - Made Ground
6207602	1	2.2	Soft	Black	Very Silty	Clay	Clay
6207603	2.2	5			Fine to Coarse	Gravel	Gravel

GSI REPORT 856

Apartments

TESTS FOR LAYER 6207501 IN BOREHOLE 62075 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	.5	LABSOIL	Sulphate Content - SO(3) %	0.07	%Soil
7	.5	LABSOIL	pH value	7.6	
7	.5	LABSOIL	pH value	7.6	

GSI REPORT 856

Apartments

TESTS FOR LAYER 6207502 IN BOREHOLE 62075 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1	FIELD	Standard Penetration Test	3	NBLOW
9		LABSOIL	pH value	7.5	
9		LABSOIL	pH value	7.5	

GSI REPORT 856

Apartments

TESTS FOR LAYER 6207503 IN BOREHOLE 62075 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	2	FIELD	Standard Penetration Test	34	NBLOW
3	3	FIELD	Standard Penetration Test	30	NBLOW
4	4	FIELD	Standard Penetration Test	33	NBLOW
5	4.5	FIELD	Standard Penetration Test	31	NBLOW
8		LABWATER	Sulphate content	12.2	ppw

GSI REPORT 856

Apartments

TESTS FOR LAYER 6207602 IN BOREHOLE 62076 (Company Name: 2)

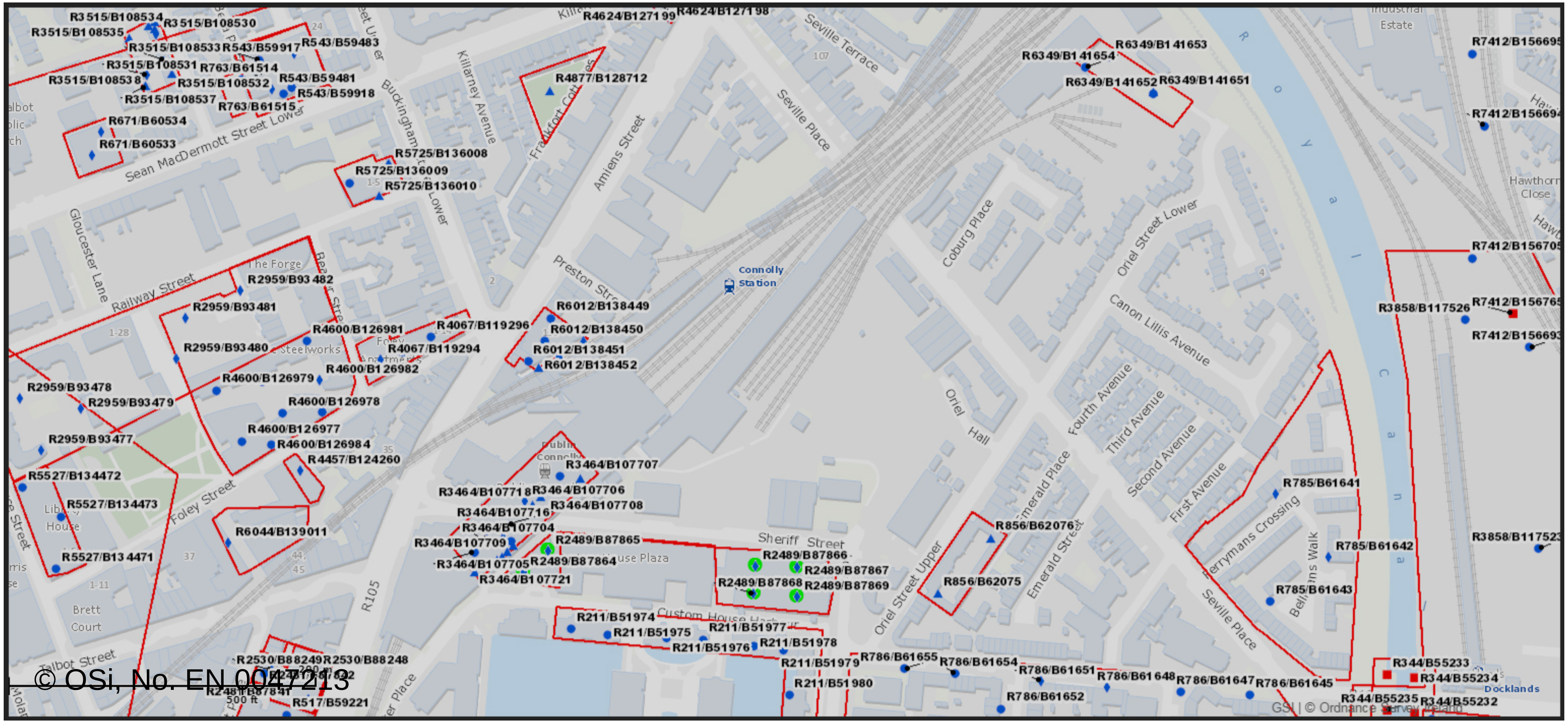
TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1	FIELD	Standard Penetration Test	5	NBLOW

GSI REPORT 856

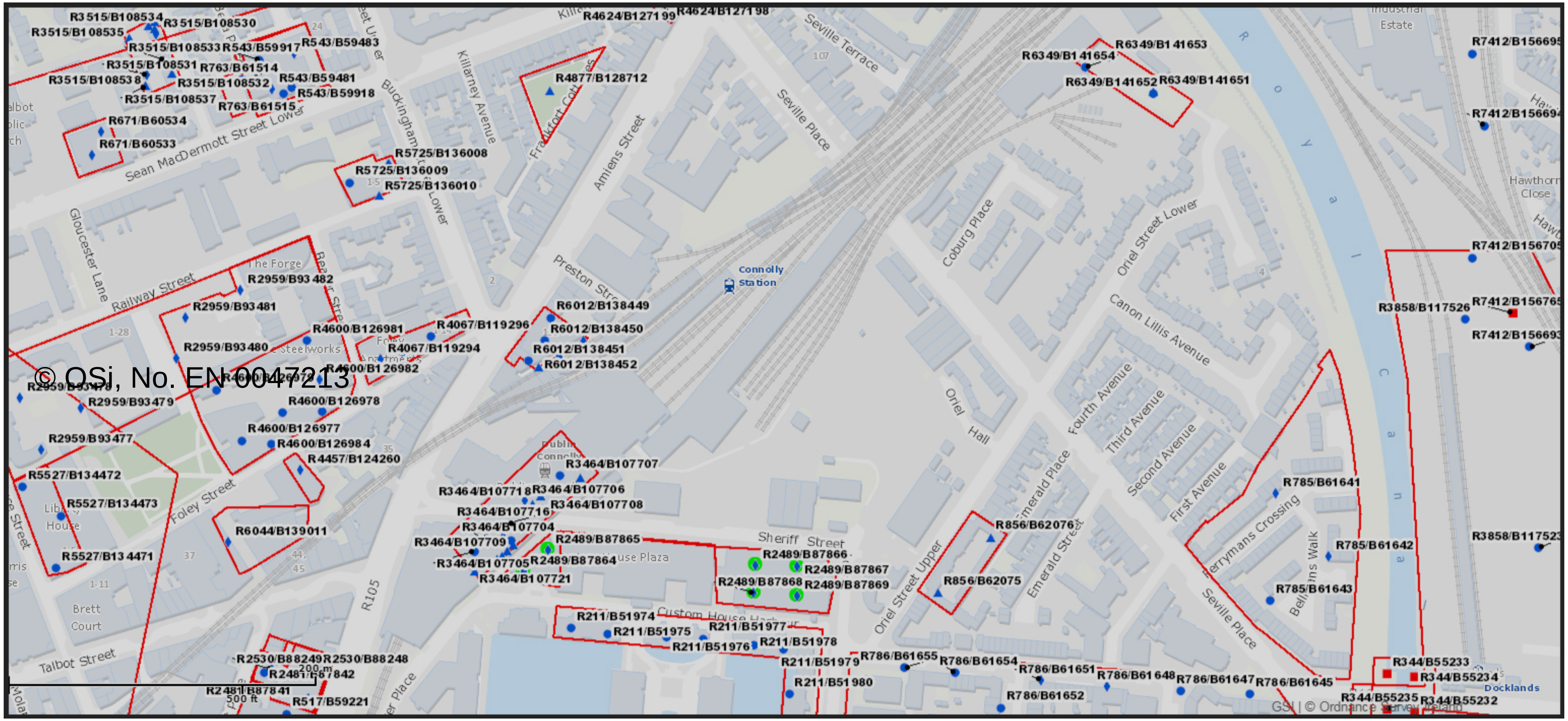
Apartments

TESTS FOR LAYER 6207603 IN BOREHOLE 62076 (Company Name: 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	3	FIELD	Standard Penetration Test	25	NBLOW
4	4	FIELD	Standard Penetration Test	37	NBLOW
5	5	FIELD	Standard Penetration Test	36	NBLOW



Overview Map for GSI Report 2489: New Hotel Development
Custom House Plaza, Sherriff Street, Dublin 1
Points Observed: 6



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R3515/B108537
R763/B61515
R671/B60534
R671/B60533
Sean MacDermott Street Lower
R5725/B136008
R5725/B136009
R5725/B136010
R4624/B127199
R4624/B127198
R4877/B128712
Killarney Avenue
Buckingham Street Lower
Frankfort Cottages
Amiens Street
Seville Terrace
Seville Place
Gloucester Lane
Railway Street
The Forge
R2959/B93482
R2959/B93481
R2959/B93480
R4600/B126981
R4067/B119296
R4067/B119294
R4600/B126982
Steelworks
R2959/B93478
R2959/B93479
R4600/B126978
R4600/B126977
R4600/B126984
R4457/B124260
R2959/B93477
R5527/B134472
R5527/B134473
Liberty House
R5527/B134471
R6044/B139011
Foley Street
Brett Court
Talbot Street
R2530/B88249
R2530/B88248
R2481/B87842
R2481/B87841
200 m
500 ft
R517/B59221
Preston Street
R6012/B138449
R6012/B138450
R6012/B138451
R6012/B138452
Connolly Station
R3464/B107707
R3464/B107718
R3464/B107706
R3464/B107716
R3464/B107708
R3464/B107704
R3464/B107709
R3464/B107705
R3464/B107721
R2489/B87865
R2489/B87864
R105
Sheriff Street
R2489/B87866
R2489/B87867
R2489/B87868
R2489/B87869
R211/B51974
R211/B51975
R211/B51976
R211/B51977
R211/B51978
R211/B51979
R211/B51980
Oriel Street Upper
R856/B62076
R856/B62075
Emerald Street
Emerald Place
Oriel Hall
Coburg Place
Oriel Street Lower
Canon Lillis Avenue
Fourth Avenue
Third Avenue
Second Avenue
First Avenue
Ferrymans Crossing
Seville Place
R786/B61655
R786/B61654
R786/B61651
R786/B61652
R786/B61648
R786/B61647
R786/B61645
R785/B61641
R785/B61642
R785/B61643
R6349/B141654
R6349/B141653
R6349/B141652
R6349/B141651
Royal Canal
R3858/B117526
R3858/B117523
R7412/B156695
R7412/B156694
R7412/B156705
R7412/B156765
R7412/B156693
Industrial Estate
Hawthorn Close
R344/B55233
R344/B55234
R344/B55235
R344/B55232
Docklands
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GSI REPORT 2489

New Hotel Development

Custom House Plaza, Sherriff Street, Dublin 1

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
87864	Borehole No. 1	9.5		3.29	316674	234870	Cable Percussion (Shell and Auger)
87865	Borehole No. 2	10		3.29	316690	234884	Cable Percussion (Shell and Auger)
87866	Borehole No. 3	9.4		3.29	316825	234874	Cable Percussion (Shell and Auger)
87867	Borehole No. 4	10		3.29	316852	234873	Cable Percussion (Shell and Auger)
87868	Borehole No. 5	8.5		3.29	316824	234856	Cable Percussion (Shell and Auger)
87869	Borehole No. 6	8		3.29	316852	234854	Cable Percussion (Shell and Auger)

GSI REPORT 2489

New Hotel Development

LAYERS FOR BOREHOLE 87864 (Company Name: Borehole No. 1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
8786401	0	.3				Fill - Made Ground	Fill - Made Ground
8786402	.3	2.2		Red Brown	Sandy Clayey	Gravel And Cobbles	Gravel And Cobbles
8786403	2.2	3.3		Grey	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786404	3.3	6.6		Grey	Fine to Coarse Sandy	Gravel	Gravel
8786405	6.6	9.5	Very Stiff to Hard	Grey Black	Very Gravelly Silty	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders

GSI REPORT 2489

New Hotel Development

LAYERS FOR BOREHOLE 87865 (Company Name: Borehole No. 2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
8786501	0	.3				Fill - Made Ground	Fill - Made Ground
8786502	.3	1.8		Red Brown	Sandy Clayey	Fill - Made Ground	Fill - Made Ground
8786503	1.8	2.4	Soft	Grey Black	Silty Gravelly	Clay	Clay
8786504	2.4	4		Grey	Fine to Coarse Sandy	Clay	Clay
8786505	4	7.7		Brown	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786506	7.7	10	Very Stiff to Hard	Grey Black	Very Gravelly Silty	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders

GSI REPORT 2489

New Hotel Development

LAYERS FOR BOREHOLE 87866 (Company Name: Borehole No. 3)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
8786601	0	.3				Fill - Made Ground	Fill - Made Ground
8786602	.3	2.4		Red Brown	Fine to Coarse Sandy	Fill - Made Ground	Fill - Made Ground
8786603	2.4	2.9	Soft	Grey Black	Silty Gravelly	Clay	Clay
8786604	2.9	4.4		Grey	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786605	4.4	6.2		Brown	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786606	6.2	7.7		Grey Black	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786607	7.7	9.4	Very Stiff to Hard	Grey Black	Very Gravelly Silty	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders

GSI REPORT 2489

New Hotel Development

LAYERS FOR BOREHOLE 87867 (Company Name: Borehole No. 4)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
8786701	0	.3				Fill - Made Ground	Fill - Made Ground
8786702	.3	2.4		Black Brown	Fine to Coarse Sandy	Fill - Made Ground	Fill - Made Ground
8786703	2.4	3.1	Soft	Grey Brown	Silty Gravelly	Clay	Clay
8786704	3.1	4.6		Grey	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786705	4.6	8.2	Very Stiff to Hard	Grey Black	Very Gravelly Silty	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders
8786706	8.2	10		Grey	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders

GSI REPORT 2489

New Hotel Development

LAYERS FOR BOREHOLE 87868 (Company Name: Borehole No. 5)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
8786801	0	.3				Fill - Made Ground	Fill - Made Ground
8786802	.3	2.2		Black Brown	Fine to Coarse Sandy	Fill - Made Ground	Fill - Made Ground
8786803	2.2	2.4	Soft	Grey Brown	Silty	Clay	Clay
8786804	2.4	4.7		Grey	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786805	4.7	8.5	Very Stiff to Hard	Grey Black	Very Gravelly Silty	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders

GSI REPORT 2489

New Hotel Development

LAYERS FOR BOREHOLE 87869 (Company Name: Borehole No. 6)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
8786901	0	.4				Fill - Made Ground	Fill - Made Ground
8786902	.4	2.4		Black	Fine to Coarse Sandy	Fill - Made Ground	Fill - Made Ground
8786903	2.4	5.1		Grey	Fine to Coarse Sandy	Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
8786904	5.1	8	Very Stiff to Hard	Grey Black	Very Gravelly Silty	Clay, Cobbles And Boulders	Clay, Cobbles And Boulders

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786402 IN BOREHOLE 87864 (Company Name: Borehole No. 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.5	FIELD	Standard Penetration Test	28	NBLOW
7	1.5	LABSOIL	Sulphate Content - SO(3) %	0.12	%Soil
8	1.5	LABSOIL	pH value	8	
8	1.5	LABSOIL	pH value	8	
9	7	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	31.2	%pass
10	7	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	20.2	%pass

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786403 IN BOREHOLE 87864 (Company Name: Borehole No. 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	34	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786404 IN BOREHOLE 87864 (Company Name: Borehole No. 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.5	FIELD	Standard Penetration Test	34	NBLOW
4	6	FIELD	Standard Penetration Test	35	NBLOW
13	4	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	15	%pass
14	4	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	4.4	%pass
15	4	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	2.6	%pass
16	4	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2.5	%pass

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786405 IN BOREHOLE 87864 (Company Name: Borehole No. 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	7.5	FIELD	Standard Penetration Test	43	NBLOW
6	9	FIELD	Standard Penetration Test	55	NBLOW
11	7	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	14	%pass
12	7	LABSOIL	Particle Size Distribution - Silt (0.06mm)	12.2	%pass

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786502 IN BOREHOLE 87865 (Company Name: Borehole No. 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.5	FIELD	Standard Penetration Test	25	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786503 IN BOREHOLE 87865 (Company Name: Borehole No. 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
8	2	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	25.7	%pass
9	2	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	5.1	%pass
10	2	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	2.3	%pass
11	2	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2.1	%pass

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786504 IN BOREHOLE 87865 (Company Name: Borehole No. 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	39	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786505 IN BOREHOLE 87865 (Company Name: Borehole No. 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.5	FIELD	Standard Penetration Test	39	NBLOW
4	6	FIELD	Standard Penetration Test	29	NBLOW
5	7.5	FIELD	Standard Penetration Test	52	NBLOW
12	7	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	26.4	%pass
13	7	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	12.6	%pass
14	7	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	5	%pass
15	7	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2.5	%pass

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786506 IN BOREHOLE 87865 (Company Name: Borehole No. 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	9	FIELD	Standard Penetration Test	54	NBLOW
7	10	FIELD	Standard Penetration Test	0	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786602 IN BOREHOLE 87866 (Company Name: Borehole No. 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.5	FIELD	Standard Penetration Test	27	NBLOW
8	2	LABSOIL	Sulphate Content - SO(3) %	0.08	%Soil
9	2	LABSOIL	pH value	8	
9	2	LABSOIL	pH value	8	

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786604 IN BOREHOLE 87866 (Company Name: Borehole No. 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	35	NBLOW
10	3.3	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	37.4	%pass
11	3.3	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	10.2	%pass
12	3.3	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	5.5	%pass
13	3.3	LABSOIL	Particle Size Distribution - Silt (0.06mm)	3.2	%pass

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786605 IN BOREHOLE 87866 (Company Name: Borehole No. 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.5	FIELD	Standard Penetration Test	39	NBLOW
4	6	FIELD	Standard Penetration Test	34	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786606 IN BOREHOLE 87866 (Company Name: Borehole No. 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	7.5	FIELD	Standard Penetration Test	41	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786607 IN BOREHOLE 87866 (Company Name: Borehole No. 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	9	FIELD	Standard Penetration Test	25	NBLOW
7	9.4	FIELD	Standard Penetration Test	0	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786702 IN BOREHOLE 87867 (Company Name: Borehole No. 4)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.5	FIELD	Standard Penetration Test	11	NBLOW
7	1.5	LABSOIL	Sulphate Content - SO(3) %	0.14	%Soil
8	1.5	LABSOIL	pH value	8	
8	1.5	LABSOIL	pH value	8	

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786703 IN BOREHOLE 87867 (Company Name: Borehole No. 4)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	31	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786704 IN BOREHOLE 87867 (Company Name: Borehole No. 4)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.5	FIELD	Standard Penetration Test	30	NBLOW
9	4	LABWATER	Sulphate content	30	ppw
10	4	LABWATER	pH value	7.5	
10	4	LABWATER	pH value	7.5	

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786705 IN BOREHOLE 87867 (Company Name: Borehole No. 4)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
4	6	FIELD	Standard Penetration Test	48	NBLOW
5	7.5	FIELD	Standard Penetration Test	13	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786706 IN BOREHOLE 87867 (Company Name: Borehole No. 4)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	10	FIELD	Standard Penetration Test	0	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786802 IN BOREHOLE 87868 (Company Name: Borehole No. 5)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.5	FIELD	Standard Penetration Test	17	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786804 IN BOREHOLE 87868 (Company Name: Borehole No. 5)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	16	NBLOW
3	4.5	FIELD	Standard Penetration Test	26	NBLOW
7	3	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	11.7	%pass
8	3	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	4.8	%pass
9	3	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	2.6	%pass
10	3	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2	%pass

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786805 IN BOREHOLE 87868 (Company Name: Borehole No. 5)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
4	6	FIELD	Standard Penetration Test	46	NBLOW
5	7.5	FIELD	Standard Penetration Test	47	NBLOW
6	8.5	FIELD	Standard Penetration Test	0	NBLOW
11	6	LABSOIL	Liquid Limit	25	%
12	6	LABSOIL	Plastic Limit	14	%
13	6	LABSOIL	Plasticity Index	11	%
14	6	LABSOIL	Moisture Content	9.17	%

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786902 IN BOREHOLE 87869 (Company Name: Borehole No. 6)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.5	FIELD	Standard Penetration Test	16	NBLOW

GSI REPORT 2489

New Hotel Development

TESTS FOR LAYER 8786903 IN BOREHOLE 87869 (Company Name: Borehole No. 6)

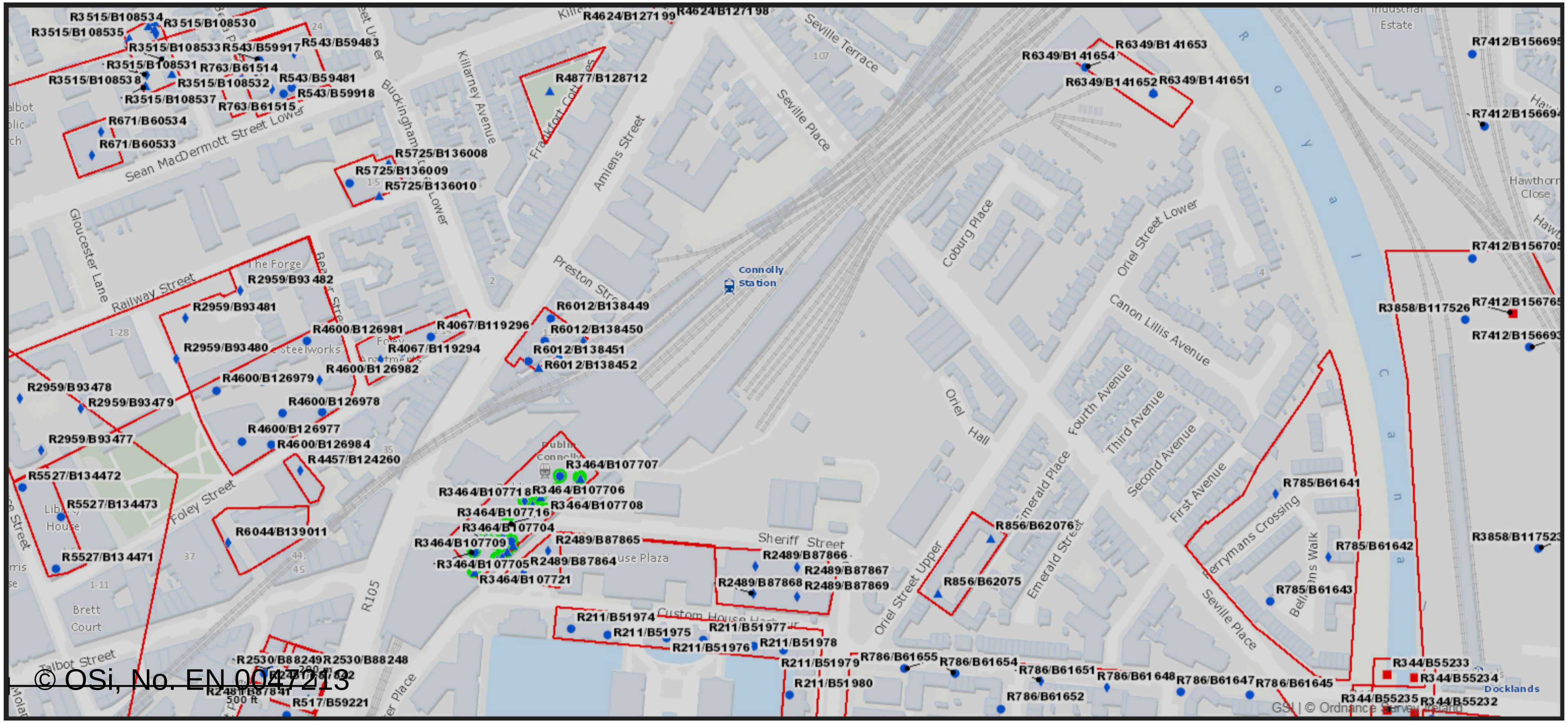
TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	26	NBLOW
3	4.5	FIELD	Standard Penetration Test	37	NBLOW

GSI REPORT 2489

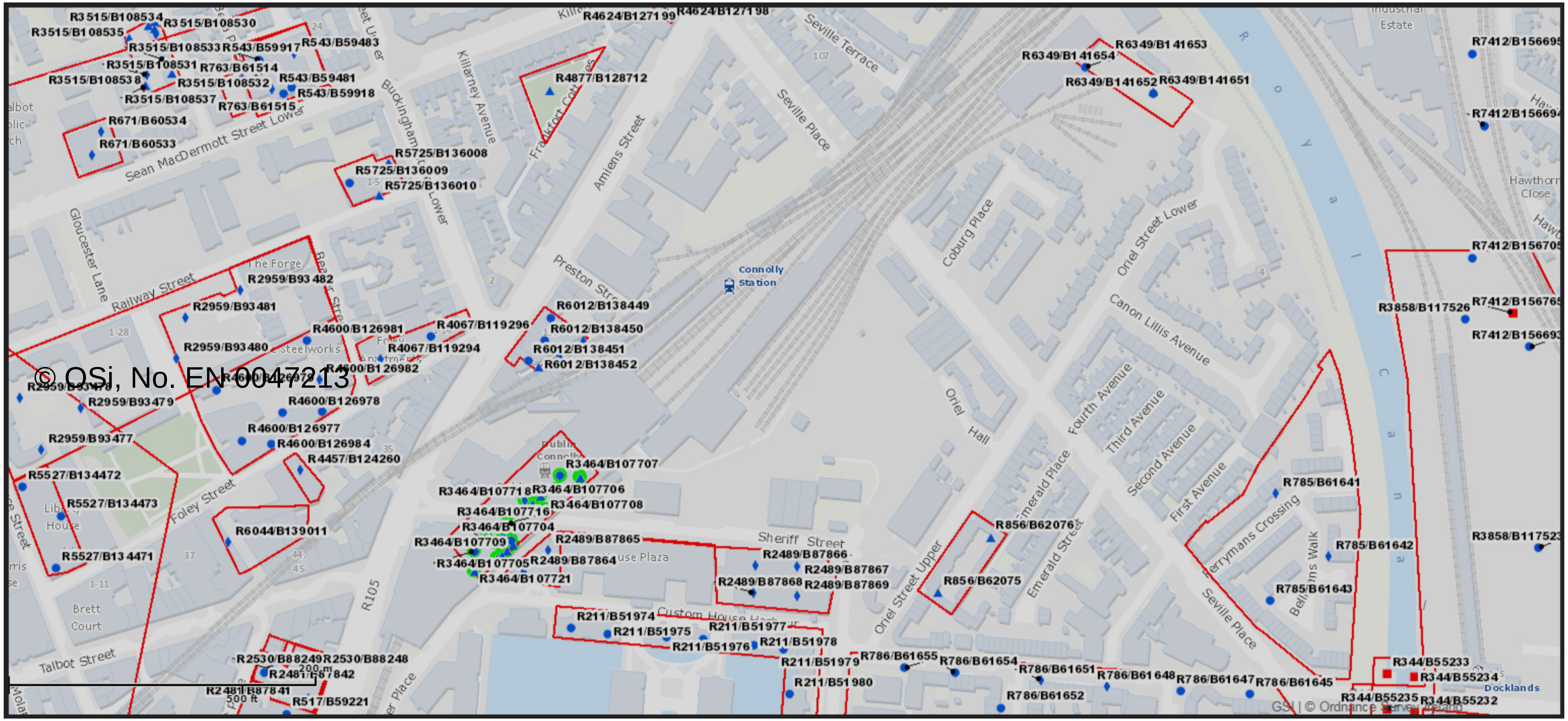
New Hotel Development

TESTS FOR LAYER 8786904 IN BOREHOLE 87869 (Company Name: Borehole No. 6)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
4	6	FIELD	Standard Penetration Test	42	NBLOW
5	7.5	FIELD	Standard Penetration Test	18	NBLOW



Overview Map for GSI Report 3464: Commercial Development
Connolly Station, Amiens Street, Dublin 1
Points Observed: 18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R3515/B108530
R3515/B108535
R3515/B108533
R543/B59917
R543/B59483
R3515/B108531
R763/B61514
R3515/B108538
R3515/B108532
R543/B59481
R3515/B108537
R543/B59918
R763/B61515
R671/B60534
R671/B60533
Sean MacDermott Street Lower
Gloucester Lane
Railway Street
The Forge
R2959/B93482
R2959/B93481
R2959/B93480
R2959/B93479
R2959/B93477
R5725/B136008
R5725/B136009
R5725/B136010
Buckingham Street Lower
Killarney Avenue
R4624/B127199
R4624/B127198
R4877/B128712
Frankfort Cottages
Amiens Street
Seville Terrace
Seville Place
R4600/B126981
R4600/B126982
R4600/B126978
R4600/B126977
R4600/B126984
R4067/B119296
R4067/B119294
Steelworks
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R5527/B134473
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R2481/B87841
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500 ft
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Preston Street
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Connolly Station
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R3464/B107708
R3464/B107704
R3464/B107709
R3464/B107705
R3464/B107721
R2489/B87865
R2489/B87864
Sheriff Street
R2489/B87866
R2489/B87867
R2489/B87868
R2489/B87869
R211/B51974
R211/B51975
R211/B51977
R211/B51976
R211/B51978
R211/B51979
R211/B51980
Coburg Place
Oriel Hall
Oriel Street Lower
Oriel Street Upper
Canon Lillis Avenue
Fourth Avenue
Third Avenue
Second Avenue
First Avenue
Emerald Place
Emerald Street
R856/B62076
R856/B62075
R786/B61655
R786/B61654
R786/B61651
R786/B61648
R786/B61647
R786/B61645
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R6349/B141654
R6349/B141653
R6349/B141652
R6349/B141651
R785/B61641
R785/B61642
R785/B61643
Ferrymans Crossing
Seville Place
Royal Canal
Industrial Estate
Hawthorn Close
R7412/B156695
R7412/B156694
R7412/B156705
R7412/B156765
R7412/B156693
R3858/B117526
R3858/B117523
R344/B55233
R344/B55234
R344/B55235
R344/B55232
Docklands
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GSI REPORT 3464

Commercial Development

Connolly Station, Amiens Street, Dublin 1

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
107704	1	11.3		1.54	316650	234891	Cable Percussion (Shell and Auger)
107705	2	12.5		1.52	316642	234883	Cable Percussion (Shell and Auger)
107706	3	10		1.64	316675	234916	Cable Percussion (Shell and Auger)
107707	4	12.5		1.9	316698	234932	Cable Percussion (Shell and Auger)
107708	5	12.4		1.51	316688	234910	Cable Percussion (Shell and Auger)
107709	6	12.5		1.55	316666	234890	Cable Percussion (Shell and Auger)
107710	RC1	2.7		1.55	316667	234887	Rotary Core Drilling
107711	RC2	2.7		1.55	316663	234883	Rotary Core Drilling
107712	RC3	3.1		1.57	316660	234880	Rotary Core Drilling
107713	RC4	5		1.57	316657	234878	Rotary Core Drilling
107714	TP1	1		1.55	316661	234893	Trial (or Observation) Pit
107715	TP2	1.4		1.55	316657	234888	Trial (or Observation) Pit
107716	TP5	1		1.55	316664	234901	Trial (or Observation) Pit
107717	TP7	1		1.7	316685	234919	Trial (or Observation) Pit
107718	TP8	1.7		1.7	316680	234914	Trial (or Observation) Pit
107719	TP9	1.7		1.8	316696	234923	Trial (or Observation) Pit
107720	TP10	1.2		1.7	316711	234931	Trial (or Observation) Pit
107721	TP11	1.6		1.39	316642	234870	Trial (or Observation) Pit

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107704 (Company Name: 1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10770401	0	1.6				Fill - Made Ground	Fill - Made Ground
10770402	1.6	3	Compact		Fine to Coarse	Gravel	Gravel
10770403	3	6	Compact	Brown	Sandy	Sand And Gravel	Sand And Gravel
10770404	6	7.1	Compact	Brown	Medium to Coarse	Sand	Sand
10770405	7.1	9	Compact		Fine to Coarse	Sand	Sand
10770406	9	11.3	Compact		Fine to Coarse Sandy	Gravel	Gravel

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107705 (Company Name: 2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10770501	0	1.6				Fill - Made Ground	Fill - Made Ground
10770502	1.6	2.9	Compact		Fine to Coarse	Gravel	Gravel
10770503	2.9	6.1	Compact	Brown Grey	Fine to Coarse Sandy	Gravel	Gravel
10770504	6.1	9.8	Compact	Brown Grey	Gravelly	Sand	Sand
10770505	9.8	12.5	Compact		Coarse Sandy	Gravel	Gravel

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107706 (Company Name: 3)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10770601	0	1.6				Fill - Made Ground	Fill - Made Ground
10770602	1.6	3.5	Compact		Fine to Coarse Sandy	Gravel	Gravel
10770603	3.5	6.6	Compact		Fine to Coarse Sandy	Gravel	Gravel
10770604	6.6	6.8		Grey	Silty	Sand	Sand
10770605	6.8	10	Compact		Fine to Coarse Sandy	Gravel	Gravel

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107707 (Company Name: 4)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10770701	0	1.6				Fill - Made Ground	Fill - Made Ground
10770702	1.6	12.5	Compact		Fine to Coarse Sandy	Gravel	Gravel

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107708 (Company Name: 5)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10770801	0	1.75				Fill - Made Ground	Fill - Made Ground
10770802	1.75	6.3	Compact		Fine to Coarse Sandy	Gravel	Gravel
10770803	6.3	7.8	Compact		Medium Gravelly	Sand	Sand
10770804	7.8	12.4	Compact		Fine to Coarse Sandy	Gravel	Gravel

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107709 (Company Name: 6)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10770901	0	1.7				Fill - Made Ground	Fill - Made Ground
10770902	1.7	12.5	Compact		Fine to Coarse Sandy	Gravel	Gravel

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107710 (Company Name: RC1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771001	0	.9				Fill - Made Ground	Fill - Made Ground
10771002	.9	1			Fine to Medium	Gravel	Gravel
10771003	1	2.2				Fill - Made Ground	Fill - Made Ground
10771004	2.2	2.7				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107711 (Company Name: RC2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771101	0	.09				Fill - Made Ground	Fill - Made Ground
10771102	.09	1.1			Sandy	Gravel	Gravel
10771103	1.1	1.3				Fill - Made Ground	Fill - Made Ground
10771104	1.3	2.7				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107712 (Company Name: RC3)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771201	0	.1				Fill - Made Ground	Fill - Made Ground
10771202	.1	1.22			Sandy	Gravel	Gravel
10771203	1.22	1.66				Fill - Made Ground	Fill - Made Ground
10771204	1.66	2.4				Fill - Made Ground	Fill - Made Ground
10771205	2.4	3.1				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107713 (Company Name: RC4)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771301	0	.09				Fill - Made Ground	Fill - Made Ground
10771302	.09	3			Sandy	Gravel	Gravel
10771303	3	5				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107714 (Company Name: TP1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771401	0	1				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107715 (Company Name: TP2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771501	0	1.4				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107716 (Company Name: TP5)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771601	0	1				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107717 (Company Name: TP7)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771701	0	.09				Fill - Made Ground	Fill - Made Ground
10771702	.09	1				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107718 (Company Name: TP8)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771801	0	.11				Fill - Made Ground	Fill - Made Ground
10771802	.11	1.5				Fill - Made Ground	Fill - Made Ground
10771803	1.5	1.7				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107719 (Company Name: TP9)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10771901	0	.2				Fill - Made Ground	Fill - Made Ground
10771902	.2	1.6				Fill - Made Ground	Fill - Made Ground
10771903	1.6	1.7			Sandy	Gravel	Gravel

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107720 (Company Name: TP10)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10772001	0	.14				Fill - Made Ground	Fill - Made Ground
10772002	.14	1.2				Fill - Made Ground	Fill - Made Ground

GSI REPORT 3464

Commercial Development

LAYERS FOR BOREHOLE 107721 (Company Name: TP11)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
10772101	0	.09				Fill - Made Ground	Fill - Made Ground
10772102	.09	1.4				Fill - Made Ground	Fill - Made Ground
10772103	1.4	1.6				Gravel	Gravel

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770401 IN BOREHOLE 107704 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.5	FIELD	Standard Penetration Test	38	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770403 IN BOREHOLE 107704 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	34	NBLOW
3	4.5	FIELD	Standard Penetration Test	34	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770404 IN BOREHOLE 107704 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
4	6	FIELD	Standard Penetration Test	30	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770405 IN BOREHOLE 107704 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	8	FIELD	Standard Penetration Test	28	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770406 IN BOREHOLE 107704 (Company Name: 1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
7	9.5	FIELD	Standard Penetration Test	67	NBLOW
8	11	FIELD	Standard Penetration Test	43	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770502 IN BOREHOLE 107705 (Company Name: 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
10	2.8	LABSOIL	Particle Size Distribution - Silt (0.06mm)	4.1	%pass
11	2.8	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	7.1	%pass
12	2.8	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	15.6	%pass
13	2.8	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	26.1	%pass

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770503 IN BOREHOLE 107705 (Company Name: 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	35	NBLOW
3	4.5	FIELD	Standard Penetration Test	41	NBLOW
14	6.1	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2.5	%pass
15	6.1	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	3.6	%pass
16	6.1	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	12.6	%pass
17	6.1	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	26.4	%pass

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770504 IN BOREHOLE 107705 (Company Name: 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	7	FIELD	Standard Penetration Test	21	NBLOW
6	8	FIELD	Standard Penetration Test	19	NBLOW
7	9	FIELD	Standard Penetration Test	34	NBLOW
18	9.8	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2.7	%pass
19	9.8	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	4.2	%pass
20	9.8	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	11.5	%pass
21	9.8	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	23.8	%pass

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770505 IN BOREHOLE 107705 (Company Name: 2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
8	10.5	FIELD	Standard Penetration Test	57	NBLOW
9	12	FIELD	Standard Penetration Test	67	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770602 IN BOREHOLE 107706 (Company Name: 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.6	FIELD	Standard Penetration Test	50	NBLOW
2	3	FIELD	Standard Penetration Test	37	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770603 IN BOREHOLE 107706 (Company Name: 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.5	FIELD	Standard Penetration Test	29	NBLOW
4	6	FIELD	Standard Penetration Test	21	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770605 IN BOREHOLE 107706 (Company Name: 3)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	7.5	FIELD	Standard Penetration Test	32	NBLOW
6	9	FIELD	Standard Penetration Test	37	NBLOW
7	10	FIELD	Standard Penetration Test	45	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770702 IN BOREHOLE 107707 (Company Name: 4)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	34	NBLOW
3	4.5	FIELD	Standard Penetration Test	21	NBLOW
4	6	FIELD	Standard Penetration Test	27	NBLOW
5	7.5	FIELD	Standard Penetration Test	38	NBLOW
6	9	FIELD	Standard Penetration Test	56	NBLOW
7	10.5	FIELD	Standard Penetration Test	71	NBLOW
8	1.8	LABSOIL	Particle Size Distribution - Silt (0.06mm)	3.2	%pass
9	1.8	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	5.00	%pass
10	1.8	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	10.2	%pass
11	1.8	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	37.4	%pass
12	5	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2.0	%pass
13	5	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	2.2	%pass
14	5	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	4.8	%pass
15	5	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	11.7	%pass
16	9	LABSOIL	Particle Size Distribution - Silt (0.06mm)	2.5	%pass
17	9	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	2.5	%pass
18	9	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	4.4	%pass

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770802 IN BOREHOLE 107708 (Company Name: 5)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	36	NBLOW
3	4.5	FIELD	Standard Penetration Test	41	NBLOW
4	6	FIELD	Standard Penetration Test	26	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770803 IN BOREHOLE 107708 (Company Name: 5)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	7.5	FIELD	Standard Penetration Test	21	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770804 IN BOREHOLE 107708 (Company Name: 5)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	9	FIELD	Standard Penetration Test	37	NBLOW
7	10.5	FIELD	Standard Penetration Test	46	NBLOW
8	12	FIELD	Standard Penetration Test	58	NBLOW

GSI REPORT 3464

Commercial Development

TESTS FOR LAYER 10770902 IN BOREHOLE 107709 (Company Name: 6)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3	FIELD	Standard Penetration Test	29	NBLOW
3	4.5	FIELD	Standard Penetration Test	37	NBLOW
4	6	FIELD	Standard Penetration Test	19	NBLOW
5	7.5	FIELD	Standard Penetration Test	28	NBLOW
6	9	FIELD	Standard Penetration Test	41	NBLOW
7	10.5	FIELD	Standard Penetration Test	53	NBLOW
8	12	FIELD	Standard Penetration Test	38	NBLOW

Overview Map for GSI Report 6012: Proposed Residential/Commercial Development
Amiens Street, Dublin 1
Points Observed: 7

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GSI REPORT 6012

Proposed Residential/Commercial Development

Amiens Street, Dublin 1

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
138449	BH1	13.5		3	316692	235035	Cable Percussion (Shell and Auger)
138450	BH2	14		3	316688	235020	Cable Percussion (Shell and Auger)
138451	BH3	14		3	316677	235007	Cable Percussion (Shell and Auger)
138452	TP1	.7		3	316684	235003	Trial (or Observation) Pit
138453	TP2	1.9		3	316697	235011	Trial (or Observation) Pit
138454	TP3	3.4		3	316713	235021	Trial (or Observation) Pit
138455	TP4	2.9		3			Trial (or Observation) Pit

GSI REPORT 6012

Proposed Residential/Commercial Development

LAYERS FOR BOREHOLE 138449 (Company Name: BH1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13844901	0	1				Fill - Made Ground	Fill - Made Ground
13844902	1	2	Firm	Brown	Sandy Gravelly	Clay	Clay
13844903	2	4.5	Medium Dense		Coarse	Gravel	Gravel
13844904	4.5	9.5	Loose	Black	Silty	Sand	Sand
13844905	9.5	13.5	Dense		Coarse	Gravel	Gravel

GSI REPORT 6012

Proposed Residential/Commercial Development

LAYERS FOR BOREHOLE 138450 (Company Name: BH2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13845001	0	1.2				Fill - Made Ground	Fill - Made Ground
13845002	1.2	3.5	Medium Dense		Coarse	Gravel	Gravel
13845003	3.5	4.5	Loose		Fine to Coarse Sandy	Gravel	Gravel
13845004	4.5	9	Loose	Brown	Silty	Sand	Sand
13845005	9	14			Coarse	Gravel	Gravel
13845006	14	14.1				Boulders	Boulders

GSI REPORT 6012

Proposed Residential/Commercial Development

LAYERS FOR BOREHOLE 138451 (Company Name: BH3)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13845101	0	.2				Fill - Made Ground	Fill - Made Ground
13845102	.2	2				Fill - Made Ground	Fill - Made Ground
13845103	2	3	Firm	Brown	Sandy	Clay And Silt	Clay And Silt
13845104	3	5.5	Medium Dense		Fine to Coarse Sandy	Gravel	Gravel
13845105	5.5	7.5	Loose	Brown	Fine to Medium	Gravel	Gravel
13845106	7.5	8.5	Loose	Black	Fine to Medium	Sand	Sand
13845107	8.5	13.8		Grey	Fine to Coarse Sandy	Gravel	Gravel
13845108	13.8	14				Boulders	Boulders

GSI REPORT 6012

Proposed Residential/Commercial Development

LAYERS FOR BOREHOLE 138452 (Company Name: TP1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13845201	0	.6				Fill - Made Ground	Fill - Made Ground
13845202	.6	.7				Fill - Made Ground	Fill - Made Ground

GSI REPORT 6012

Proposed Residential/Commercial Development

LAYERS FOR BOREHOLE 138453 (Company Name: TP2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13845301	0	.2				Fill - Made Ground	Fill - Made Ground
13845302	.2	.9				Fill - Made Ground	Fill - Made Ground
13845303	.9	1.55				Fill - Made Ground	Fill - Made Ground
13845304	1.55	1.9	Medium Dense	Light Brown	Silty Sandy	Gravel	Gravel

GSI REPORT 6012

Proposed Residential/Commercial Development

LAYERS FOR BOREHOLE 138454 (Company Name: TP3)

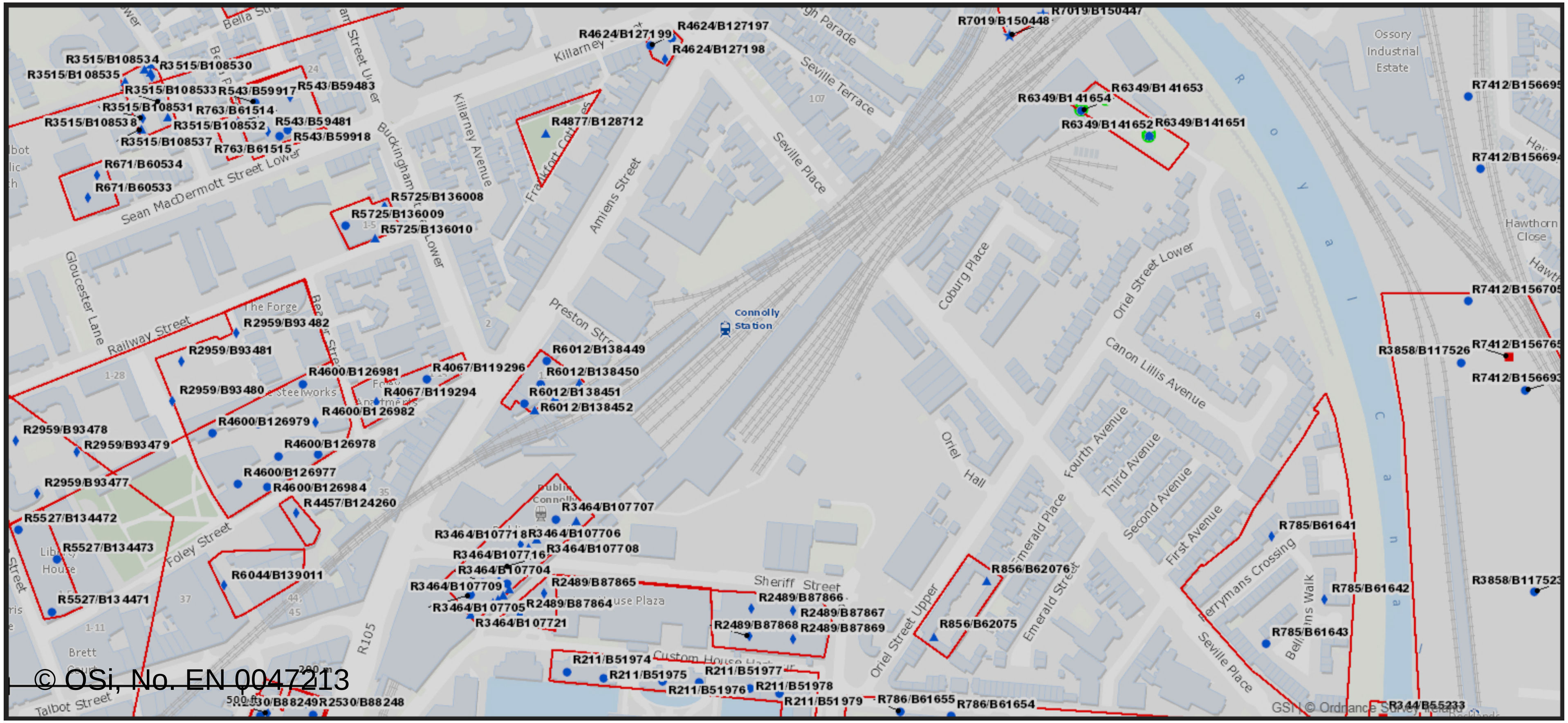
LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13845401	0	2				Fill - Made Ground	Fill - Made Ground
13845402	2	3.2				Fill - Made Ground	Fill - Made Ground
13845403	3.2	3.4		Light Brown	Slightly Silty	Gravel	Gravel

GSI REPORT 6012

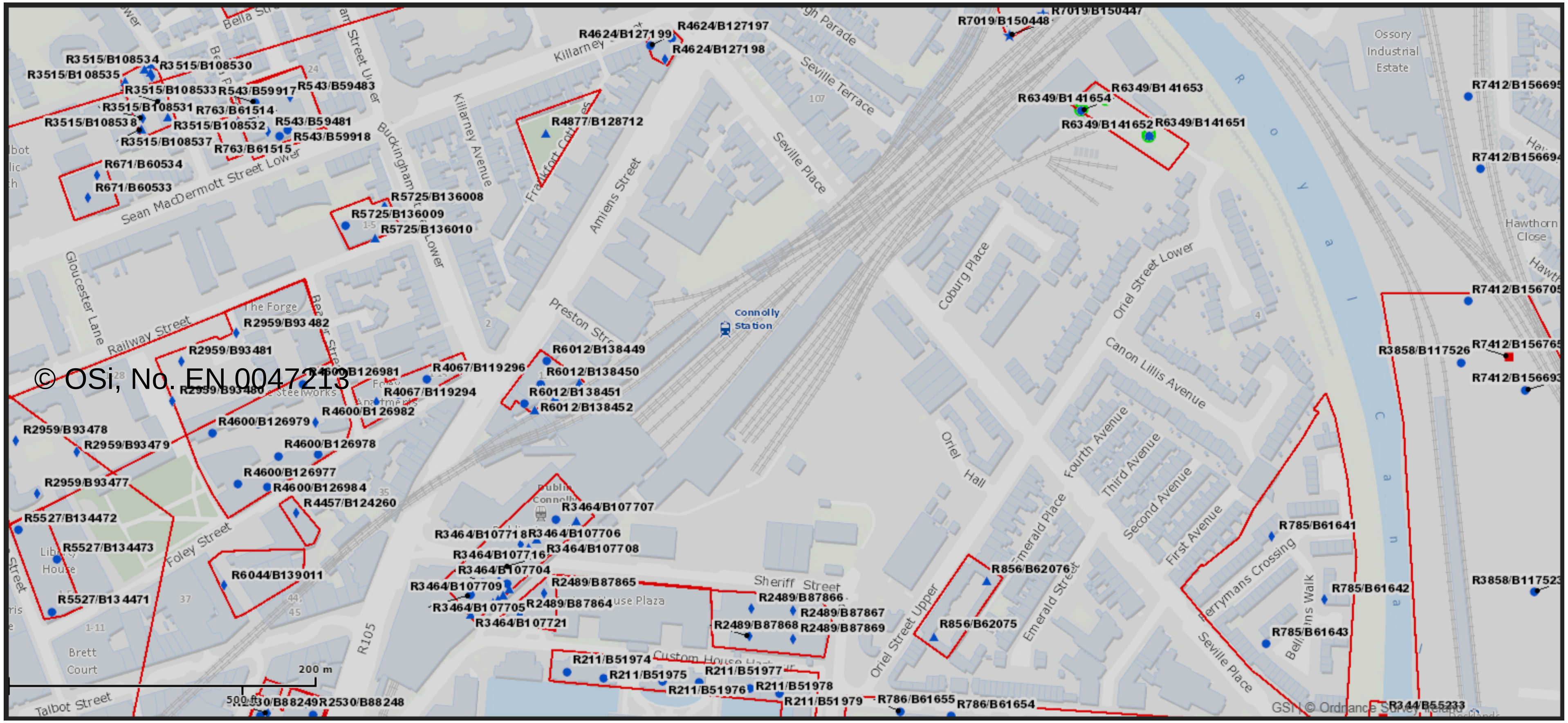
Proposed Residential/Commercial Development

LAYERS FOR BOREHOLE 138455 (Company Name: TP4)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13845501	0	.4				Fill - Made Ground	Fill - Made Ground
13845502	.4	1.6				Fill - Made Ground	Fill - Made Ground
13845503	1.6	2.5				Fill - Made Ground	Fill - Made Ground
13845504	2.5	2.9	Firm to Soft	Light Brown	Gravelly	Silt	Silt



Overview Map for GSI Report 6349: Connolly Station Development
Connolly Station, Dublin 1, Co. Dublin
Points Observed: 4



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R3515/B108532
R3515/B108537
R543/B59917
R543/B59483
R543/B59481
R543/B59918
R763/B61514
R763/B61515
R671/B60534
R671/B60533
R5725/B136008
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R5725/B136010
R4877/B128712
R4624/B127199
R4624/B127197
R4624/B127198
R7019/B150448
R7019/B150447
R6349/B141654
R6349/B141653
R6349/B141652
R6349/B141651
R7412/B156695
R7412/B156694
R7412/B156705
R7412/B156765
R7412/B156693
R3858/B117526
R3858/B117523
R2959/B93482
R2959/B93481
R2959/B93480
R2959/B93478
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R4600/B126981
R4600/B126979
R4600/B126982
R4600/B126978
R4600/B126977
R4600/B126984
R4067/B119296
R4067/B119294
R6012/B138449
R6012/B138450
R6012/B138451
R6012/B138452
R4457/B124260
R5527/B134472
R5527/B134473
R5527/B134471
R6044/B139011
R3464/B107707
R3464/B107718
R3464/B107706
R3464/B107708
R3464/B107716
R3464/B107704
R3464/B107709
R3464/B107705
R3464/B107721
R2489/B87865
R2489/B87864
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R2489/B87867
R2489/B87868
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R211/B51974
R211/B51975
R211/B51977
R211/B51976
R211/B51978
R211/B51979
R2530/B88249
R2530/B88248
R786/B61655
R786/B61654
R856/B62076
R856/B62075
R785/B61641
R785/B61642
R785/B61643
R344/B55233
Royal Canal
Ossory Industrial Estate
Hawthorn Close
Connolly Station
Seville Place
Seville Terrace
Killarney Avenue
Killarney
Amiens Street
Frankfort Cottages
Buckingham Street Lower
Sean MacDermott Street Lower
Gloucester Lane
Railway Street
The Forge
Foley Street
Preston Street
Coburg Place
Oriel Street Lower
Oriel Street Upper
Oriel Hall
Canon Lillis Avenue
Fourth Avenue
Third Avenue
Second Avenue
First Avenue
Ferrymans Crossing
Emerald Place
Emerald Street
Sheriff Street
Custom House Harbour
Talbot Street
Brett Court
Liberty House
R105
200 m
500 ft
GSI | © Ordnance Survey Ireland

GSI REPORT 6349

Connolly Station Development

Connolly Station, Dublin 1, Co. Dublin

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
141651	BH1	4		6	317084	235182	Cable Percussion (Shell and Auger)
141652	BH1A	11.5		6	317084	235181	Cable Percussion (Shell and Auger)
141653	BH2	10.5		6	317056	235205	Cable Percussion (Shell and Auger)
141654	BH3	11.5		6	317040	235198	Cable Percussion (Shell and Auger)

GSI REPORT 6349

Connolly Station Development

LAYERS FOR BOREHOLE 141651 (Company Name: BH1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
14165101	0	.8				Fill - Made Ground	Fill - Made Ground
14165102	.8	2.2				Fill - Made Ground	Fill - Made Ground
14165103	2.2	3.9				Fill - Made Ground	Fill - Made Ground
14165104	3.9	4				Boulders	Boulders

GSI REPORT 6349

Connolly Station Development

LAYERS FOR BOREHOLE 141652 (Company Name: BH1A)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
14165201	0	.9				Fill - Made Ground	Fill - Made Ground
14165202	.9	2.1				Fill - Made Ground	Fill - Made Ground
14165203	2.1	5.2				Fill - Made Ground	Fill - Made Ground
14165204	5.2	6.1				Fill - Made Ground	Fill - Made Ground
14165205	6.1	6.5		Brown	Clayey	Fill - Made Ground	Fill - Made Ground
14165206	6.5	8.1	Medium Dense		Sandy	Gravel	Gravel
14165207	8.1	11.5			Medium to Coarse	Gravel	Gravel

GSI REPORT 6349

Connolly Station Development

LAYERS FOR BOREHOLE 141653 (Company Name: BH2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
14165301	0	.5				Fill - Made Ground	Fill - Made Ground
14165302	.5	1.1				Fill - Made Ground	Fill - Made Ground
14165303	1.1	3				Fill - Made Ground	Fill - Made Ground
14165304	3	5.5				Fill - Made Ground	Fill - Made Ground
14165305	5.5	6.2				Fill - Made Ground	Fill - Made Ground
14165306	6.2	10.5	Dense		Fine to Coarse Sandy	Gravel	Gravel

GSI REPORT 6349

Connolly Station Development

LAYERS FOR BOREHOLE 141654 (Company Name: BH3)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
14165401	0	.1				Fill - Made Ground	Fill - Made Ground
14165402	.1	4				Fill - Made Ground	Fill - Made Ground
14165403	4	5.5				Fill - Made Ground	Fill - Made Ground
14165404	5.5	6.5				Fill - Made Ground	Fill - Made Ground
14165405	6.5	7				Fill - Made Ground	Fill - Made Ground
14165406	7	7.6				Fill - Made Ground	Fill - Made Ground
14165407	7.6	11.5	Dense		Medium to Coarse	Gravel	Gravel

OCSC
O'CONNOR | SUTTON | CRONIN
Multidisciplinary
Consulting Engineers

Appendix C
HazWasteOnline (HWOL) assessment

Waste Classification Report

62D3T-N4LXB-UGXXG

Job name

B909 GQRA review 16.11.2018

Description/Comments

Samples taken by Glovers Ltd on behalf of Buro Happold in 2008 Site Investigations. Methodology used not known, i.e. whether the samples are spot, or interval samples.

Project

B909 Connolly Station Environmental

Site

Connolly Station Car Park

Related Documents

#	Name	Description
None		

Waste Stream Template

EJEL Rilta

Classified by

Name:
Iain Williams
Date:
16 Nov 2018 14:43 GMT
Telephone:
+353 1 868 2000

Company:
OCSC
9 Prussia Street
Dublin 7

Report

Created by: Iain Williams
Created date: 16 Nov 2018 14:43 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1[1m]	1.00	Non Hazardous		3
2	WS1[3m]	3.00	Non Hazardous		5
3	WS1[5m]	5.00	Non Hazardous		8
4	WS2[1m]	1.00	Non Hazardous		10
5	WS2[3m]	3.00	Non Hazardous		12
6	WS2[5m]	5.00	Non Hazardous		15
7	WS3[0.5m]	0.50	Non Hazardous		17
8	WS3[4m]	4.00	Non Hazardous		19
9	WS4[0.5m]	0.50	Non Hazardous		22
10	WS4[2m]	2.00	Non Hazardous		25
11	WS5[0.5m]	0.50	Non Hazardous		27

Classification of sample: WS1[1m]

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

Sample details

Sample Name:		LoW Code:	
WS1[1m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
1.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
24.6% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 24.6% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		33 mg/kg	1.32	34.968 mg/kg	0.0035 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	2 mg/kg	1.285	2.063 mg/kg	0.000161 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		95 mg/kg	1.252	95.44 mg/kg	0.00954 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		32 mg/kg	1.462	37.536 mg/kg	0.00375 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	650 mg/kg		521.669 mg/kg	0.0522 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		41 mg/kg	1.579	51.974 mg/kg	0.0052 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		334 mg/kg	3.22	863.113 mg/kg	0.0863 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.51 mg/kg		0.409 mg/kg	0.0000409 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.566 mg/kg		0.454 mg/kg	0.0000454 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.545 mg/kg		0.437 mg/kg	0.0000437 %	✓	
15	fluorene		201-695-5	86-73-7		0.827 mg/kg		0.664 mg/kg	0.0000664 %	✓	
16	phenanthrene		201-581-5	85-01-8		8.748 mg/kg		7.021 mg/kg	0.000702 %	✓	
17	anthracene		204-371-1	120-12-7		1.899 mg/kg		1.524 mg/kg	0.000152 %	✓	
18	fluoranthene		205-912-4	206-44-0		15.473 mg/kg		12.418 mg/kg	0.00124 %	✓	
19	pyrene		204-927-3	129-00-0		12.491 mg/kg		10.025 mg/kg	0.001 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		7.249 mg/kg		5.818 mg/kg	0.000582 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		4.508 mg/kg		3.618 mg/kg	0.000362 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		3.134 mg/kg		2.515 mg/kg	0.000252 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		3.955 mg/kg		3.174 mg/kg	0.000317 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		3.28 mg/kg		2.632 mg/kg	0.000263 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		5.999 mg/kg		4.815 mg/kg	0.000481 %	✓	
26	coronene		205-881-7	191-07-1		1.036 mg/kg		0.831 mg/kg	0.0000831 %	✓	
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		7.205 mg/kg		5.783 mg/kg	0.000578 %	✓	
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		7.205 mg/kg		5.783 mg/kg	0.000578 %	✓	
29	benzene	601-020-00-8	200-753-7	71-43-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
30	toluene	601-021-00-3	203-625-9	108-88-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
31	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
33	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		**<LOD**
34	pH			PH		8.3 pH		8.3 pH	8.3 pH		
35	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5 mg/kg	1.884	<4.71 mg/kg	<0.000471 %		**<LOD**
								Total:	0.168 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS1[3m]

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

Sample details

Sample Name:		LoW Code:	
WS1[3m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
3.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
25.2% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 25.2% Dry Weight Moisture Correction applied (MC)

#	Determinand / CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide } 033-003-00-0	215-481-4	1327-53-3		26	mg/kg	1.32	27.419	mg/kg	0.00274 %	✓	
2	cadmium { cadmium sulfide } 048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.027	mg/kg	0.0000799 %	✓	
3	copper { copper(II) oxide } 029-016-00-6	215-269-1	1317-38-0		134	mg/kg	1.252	133.976	mg/kg	0.0134 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }	215-160-9	1308-38-9		44	mg/kg	1.462	51.365	mg/kg	0.00514 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	364	mg/kg		290.735	mg/kg	0.0291 %	✓	
7	mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide } 028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		61	mg/kg	1.579	76.956	mg/kg	0.0077 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide } 030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide } 005-008-00-8	215-125-8	1303-86-2		164	mg/kg	3.22	421.773	mg/kg	0.0422 %	✓	
12	naphthalene 601-052-00-2	202-049-5	91-20-3		0.059	mg/kg		0.0471	mg/kg	0.00000471 %	✓	
13	acenaphthylene	205-917-1	208-96-8		0.063	mg/kg		0.0503	mg/kg	0.00000503 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		0.045 mg/kg		0.0359 mg/kg	0.00000359 %	✓	
15	•	fluorene		201-695-5	86-73-7		0.034 mg/kg		0.0272 mg/kg	0.00000272 %	✓	
16	•	phenanthrene		201-581-5	85-01-8		0.596 mg/kg		0.476 mg/kg	0.0000476 %	✓	
17	•	anthracene		204-371-1	120-12-7		0.098 mg/kg		0.0783 mg/kg	0.00000783 %	✓	
18	•	fluoranthene		205-912-4	206-44-0		0.669 mg/kg		0.534 mg/kg	0.0000534 %	✓	
19	•	pyrene		204-927-3	129-00-0		0.614 mg/kg		0.49 mg/kg	0.000049 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.44 mg/kg		0.351 mg/kg	0.0000351 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.497 mg/kg		0.397 mg/kg	0.0000397 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.385 mg/kg		0.308 mg/kg	0.0000308 %	✓	
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		0.271 mg/kg		0.216 mg/kg	0.0000216 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.242 mg/kg		0.193 mg/kg	0.0000193 %	✓	
25	•	benzo[ghi]perylene		205-883-8	191-24-2		0.337 mg/kg		0.269 mg/kg	0.0000269 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.743 mg/kg		0.593 mg/kg	0.0000593 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.743 mg/kg		0.593 mg/kg	0.0000593 %	✓	
28		benzene	601-020-00-8	200-753-7	71-43-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
29		toluene	601-021-00-3	203-625-9	108-88-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
30		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
31	•	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
32	•	pH			PH		8.35 pH		8.35 pH	8.35 pH		
33	(speciated)	cyanides { • salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5 mg/kg	1.884	<4.71 mg/kg	<0.000471 %		**<LOD**
34	•	TPH (C6 to C40) petroleum group			TPH		4.65 mg/kg		3.714 mg/kg	0.000371 %	✓	
35		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
									Total:	0.102 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
(speciated icon)	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration very low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00037%)

Classification of sample: WS1[5m]

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

Sample details

Sample Name:
WS1[5m]
Sample Depth:
5.00 m
Moisture content:
48.3%
(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: 48.3% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		124 mg/kg	1.32	110.398 mg/kg	0.011 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	41 mg/kg	1.285	35.533 mg/kg	0.00276 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		222 mg/kg	1.252	187.387 mg/kg	0.0187 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		41 mg/kg	1.462	40.407 mg/kg	0.00404 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	1402 mg/kg		945.381 mg/kg	0.0945 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		308 mg/kg	1.353	281.102 mg/kg	0.0281 %	✓	
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		131 mg/kg	1.579	139.524 mg/kg	0.014 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		841 mg/kg	3.22	1825.973 mg/kg	0.183 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.139 mg/kg		0.0937 mg/kg	0.00000937 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.059 mg/kg		0.0398 mg/kg	0.00000398 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.048	mg/kg		0.0324	mg/kg	0.00000324 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.029	mg/kg		0.0196	mg/kg	0.00000196 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		1.047	mg/kg		0.706	mg/kg	0.0000706 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.124	mg/kg		0.0836	mg/kg	0.00000836 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		0.508	mg/kg		0.343	mg/kg	0.0000343 %	✓	
19	●	pyrene		204-927-3	129-00-0		0.455	mg/kg		0.307	mg/kg	0.0000307 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.461	mg/kg		0.311	mg/kg	0.0000311 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.542	mg/kg		0.365	mg/kg	0.0000365 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.543	mg/kg		0.366	mg/kg	0.0000366 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.551	mg/kg		0.372	mg/kg	0.0000372 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.525	mg/kg		0.354	mg/kg	0.0000354 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		0.708	mg/kg		0.477	mg/kg	0.0000477 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.074	mg/kg		0.724	mg/kg	0.0000724 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.074	mg/kg		0.724	mg/kg	0.0000724 %	✓	
28	●	pH			PH		7.61	pH		7.61	pH	7.61 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
											Total:	0.357 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS2[1m]

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

Sample details

Sample Name:
WS2[1m]
Sample Depth:
1.00 m
Moisture content:
18.5%
(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: 18.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		18	mg/kg	1.32	20.056	mg/kg	0.00201 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.085	mg/kg	0.0000844 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		136	mg/kg	1.252	143.664	mg/kg	0.0144 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		32	mg/kg	1.462	39.468	mg/kg	0.00395 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	408	mg/kg		344.304	mg/kg	0.0344 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		37	mg/kg	1.579	49.318	mg/kg	0.00493 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		259	mg/kg	3.22	703.754	mg/kg	0.0704 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.389	mg/kg		0.328	mg/kg	0.0000328 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.209	mg/kg		0.176	mg/kg	0.0000176 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.818	mg/kg		0.69	mg/kg	0.000069 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.784	mg/kg		0.662	mg/kg	0.0000662 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		9.251	mg/kg		7.807	mg/kg	0.000781 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.905	mg/kg		0.764	mg/kg	0.0000764 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		6.391	mg/kg		5.393	mg/kg	0.000539 %	✓	
19	●	pyrene		204-927-3	129-00-0		5.351	mg/kg		4.516	mg/kg	0.000452 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		2.467	mg/kg		2.082	mg/kg	0.000208 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		3.051	mg/kg		2.575	mg/kg	0.000257 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		2.268	mg/kg		1.914	mg/kg	0.000191 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		1.342	mg/kg		1.132	mg/kg	0.000113 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		1.239	mg/kg		1.046	mg/kg	0.000105 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		1.705	mg/kg		1.439	mg/kg	0.000144 %	✓	
26	●	coronene		205-881-7	191-07-1		0.477	mg/kg		0.403	mg/kg	0.0000403 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		4.16	mg/kg		3.511	mg/kg	0.000351 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		4.16	mg/kg		3.511	mg/kg	0.000351 %	✓	
29		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
30		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
31		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
32	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
34	●	pH			PH		8.35	pH		8.35	pH	8.35 pH		
35		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
											Total:	0.135 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS2[3m]

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

Sample details

Sample Name:	LoW Code:	
WS2[3m]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
3.00 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:		
30.9% (dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 30.9% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		71	mg/kg	1.32	71.614	mg/kg	0.00716 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	0.982	mg/kg	0.0000764 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		238	mg/kg	1.252	227.596	mg/kg	0.0228 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		23	mg/kg	1.462	25.681	mg/kg	0.00257 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	972	mg/kg		742.552	mg/kg	0.0743 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		9	mg/kg	1.353	9.306	mg/kg	0.000931 %	✓	
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		64	mg/kg	1.579	77.225	mg/kg	0.00772 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		312	mg/kg	3.22	767.458	mg/kg	0.0767 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.23	mg/kg		0.176	mg/kg	0.0000176 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.168	mg/kg		0.128	mg/kg	0.0000128 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		0.054	mg/kg		0.0413	mg/kg	0.00000413 %	✓	
15	•	fluorene		201-695-5	86-73-7		0.065	mg/kg		0.0497	mg/kg	0.00000497 %	✓	
16	•	phenanthrene		201-581-5	85-01-8		1.006	mg/kg		0.769	mg/kg	0.0000769 %	✓	
17	•	anthracene		204-371-1	120-12-7		0.268	mg/kg		0.205	mg/kg	0.0000205 %	✓	
18	•	fluoranthene		205-912-4	206-44-0		1.087	mg/kg		0.83	mg/kg	0.000083 %	✓	
19	•	pyrene		204-927-3	129-00-0		0.974	mg/kg		0.744	mg/kg	0.0000744 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.726	mg/kg		0.555	mg/kg	0.0000555 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.842	mg/kg		0.643	mg/kg	0.0000643 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.765	mg/kg		0.584	mg/kg	0.0000584 %	✓	
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		0.534	mg/kg		0.408	mg/kg	0.0000408 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.483	mg/kg		0.369	mg/kg	0.0000369 %	✓	
25	•	benzo[ghi]perylene		205-883-8	191-24-2		0.722	mg/kg		0.552	mg/kg	0.0000552 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.513	mg/kg		1.156	mg/kg	0.000116 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.513	mg/kg		1.156	mg/kg	0.000116 %	✓	
28		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
29		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
30		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
31	•	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
32	•	pH			PH		8.24	pH		8.24	pH	8.24 pH		
33		cyanides { • salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
34	•	TPH (C6 to C40) petroleum group			TPH		8.45	mg/kg		6.455	mg/kg	0.000646 %	✓	
35		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
											Total:	0.194 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration very low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00064%)

Classification of sample: WS2[5m]

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

Sample details

Sample Name:		LoW Code:	
WS2[5m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
5.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
55.6% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 55.6% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		150 mg/kg	1.32	127.281 mg/kg	0.0127 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	35 mg/kg	1.285	28.91 mg/kg	0.00225 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		292 mg/kg	1.252	234.909 mg/kg	0.0235 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		44 mg/kg	1.462	41.329 mg/kg	0.00413 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	1425 mg/kg		915.81 mg/kg	0.0916 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		320 mg/kg	1.353	278.352 mg/kg	0.0278 %	✓	
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		173 mg/kg	1.579	175.613 mg/kg	0.0176 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		1124 mg/kg	3.22	2325.927 mg/kg	0.233 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.05 mg/kg		0.0321 mg/kg	0.00000321 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.029 mg/kg		0.0186 mg/kg	0.00000186 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.036	mg/kg		0.0231	mg/kg	0.00000231 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.019	mg/kg		0.0122	mg/kg	0.00000122 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		0.457	mg/kg		0.294	mg/kg	0.0000294 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.057	mg/kg		0.0366	mg/kg	0.00000366 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		0.3	mg/kg		0.193	mg/kg	0.0000193 %	✓	
19	●	pyrene		204-927-3	129-00-0		0.259	mg/kg		0.166	mg/kg	0.0000166 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.224	mg/kg		0.144	mg/kg	0.0000144 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.292	mg/kg		0.188	mg/kg	0.0000188 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.297	mg/kg		0.191	mg/kg	0.0000191 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.284	mg/kg		0.183	mg/kg	0.0000183 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.246	mg/kg		0.158	mg/kg	0.0000158 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		0.378	mg/kg		0.243	mg/kg	0.0000243 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.583	mg/kg		0.375	mg/kg	0.0000375 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.583	mg/kg		0.375	mg/kg	0.0000375 %	✓	
28	●	pH			PH		7.72	pH		7.72	pH	7.72 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
											Total:	0.413 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3[0.5m]

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

Sample details

Sample Name:	LoW Code:	
WS3[0.5m]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
0.50 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:		
14.3% (dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 14.3% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				18	mg/kg	1.32	20.793	mg/kg	0.00208 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium sulfide }			1	1	mg/kg	1.285	1.124	mg/kg	0.0000875 %	✓	
		048-010-00-4	215-147-8	1306-23-6									
3		copper { copper(II) oxide }				113	mg/kg	1.252	123.754	mg/kg	0.0124 %	✓	
		029-016-00-6	215-269-1	1317-38-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				22	mg/kg	1.462	28.131	mg/kg	0.00281 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	821	mg/kg		718.285	mg/kg	0.0718 %	✓	
		082-001-00-6											
7		mercury { mercury dichloride }				3	mg/kg	1.353	3.552	mg/kg	0.000355 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel dihydroxide }				33	mg/kg	1.579	45.602	mg/kg	0.00456 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
		034-002-00-8											
10		zinc { zinc oxide }				<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
		030-013-00-7	215-222-5	1314-13-2									
11		boron { diboron trioxide; boric oxide }				256	mg/kg	3.22	721.163	mg/kg	0.0721 %	✓	
		005-008-00-8	215-125-8	1303-86-2									
12		naphthalene				0.225	mg/kg		0.197	mg/kg	0.0000197 %	✓	
		601-052-00-2	202-049-5	91-20-3									
13		acenaphthylene				0.17	mg/kg		0.149	mg/kg	0.0000149 %	✓	
			205-917-1	208-96-8									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.156	mg/kg		0.136	mg/kg	0.0000136 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.147	mg/kg		0.129	mg/kg	0.0000129 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		2.073	mg/kg		1.814	mg/kg	0.000181 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.338	mg/kg		0.296	mg/kg	0.0000296 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		2.56	mg/kg		2.24	mg/kg	0.000224 %	✓	
19	●	pyrene		204-927-3	129-00-0		2.259	mg/kg		1.976	mg/kg	0.000198 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.236	mg/kg		1.081	mg/kg	0.000108 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		1.408	mg/kg		1.232	mg/kg	0.000123 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.158	mg/kg		1.013	mg/kg	0.000101 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		1.036	mg/kg		0.906	mg/kg	0.0000906 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.836	mg/kg		0.731	mg/kg	0.0000731 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		1.238	mg/kg		1.083	mg/kg	0.000108 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.281	mg/kg		1.996	mg/kg	0.0002 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		2.281	mg/kg		1.996	mg/kg	0.0002 %	✓	
28	●	pH			PH		8.1	pH		8.1	pH	8.1 pH		
29	(speciated)	cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
											Total:	0.169 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
(speciated icon)	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3[4m]

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

Sample details

Sample Name:
WS3[4m]
Sample Depth:
4.00 m
Moisture content:
21%
(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: 21% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				9	mg/kg	1.32	9.821	mg/kg	0.000982 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium sulfide }			1	1	mg/kg	1.285	1.062	mg/kg	0.0000826 %	✓	
		048-010-00-4	215-147-8	1306-23-6									
3		copper { copper(II) oxide }				13	mg/kg	1.252	13.449	mg/kg	0.00134 %	✓	
		029-016-00-6	215-269-1	1317-38-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				25	mg/kg	1.462	30.197	mg/kg	0.00302 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	183	mg/kg		151.24	mg/kg	0.0151 %	✓	
		082-001-00-6											
7		mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel dihydroxide }				18	mg/kg	1.579	23.497	mg/kg	0.00235 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
		034-002-00-8											
10		zinc { zinc oxide }				<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
		030-013-00-7	215-222-5	1314-13-2									
11		boron { diboron trioxide; boric oxide }				79	mg/kg	3.22	210.223	mg/kg	0.021 %	✓	
		005-008-00-8	215-125-8	1303-86-2									
12		naphthalene				0.068	mg/kg		0.0562	mg/kg	0.00000562 %	✓	
		601-052-00-2	202-049-5	91-20-3									
13		acenaphthylene				0.316	mg/kg		0.261	mg/kg	0.0000261 %	✓	
			205-917-1	208-96-8									

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.051 mg/kg		0.0421 mg/kg	0.00000421 %	✓	
15	fluorene		201-695-5	86-73-7		0.11 mg/kg		0.0909 mg/kg	0.00000909 %	✓	
16	phenanthrene		201-581-5	85-01-8		2.835 mg/kg		2.343 mg/kg	0.000234 %	✓	
17	anthracene		204-371-1	120-12-7		0.84 mg/kg		0.694 mg/kg	0.0000694 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.41 mg/kg		0.339 mg/kg	0.0000339 %	✓	
19	pyrene		204-927-3	129-00-0		3.672 mg/kg		3.035 mg/kg	0.000303 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		2.38 mg/kg		1.967 mg/kg	0.000197 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		2.222 mg/kg		1.836 mg/kg	0.000184 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		2.097 mg/kg		1.733 mg/kg	0.000173 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		1.235 mg/kg		1.021 mg/kg	0.000102 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		1.081 mg/kg		0.893 mg/kg	0.0000893 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		1.334 mg/kg		1.102 mg/kg	0.00011 %	✓	
26	coronene		205-881-7	191-07-1		0.342 mg/kg		0.283 mg/kg	0.0000283 %	✓	
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		3.591 mg/kg		2.968 mg/kg	0.000297 %	✓	
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		3.591 mg/kg		2.968 mg/kg	0.000297 %	✓	
29	benzene	601-020-00-8	200-753-7	71-43-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	toluene	601-021-00-3	203-625-9	108-88-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
33	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
34	pH			PH		7.99 pH		7.99 pH	7.99 pH		
35	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5 mg/kg	1.884	<4.71 mg/kg	<0.000471 %		<LOD
36	TPH (C6 to C40) petroleum group			TPH		20.07 mg/kg		16.587 mg/kg	0.00166 %	✓	
37	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
								Total:	0.0485 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration very low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00166%)

Classification of sample: WS4[0.5m]

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

Sample details

Sample Name:		LoW Code:	
WS4[0.5m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
7.8% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 7.8% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7	mg/kg	1.32	8.574	mg/kg	0.000857 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.192	mg/kg	0.0000928 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		47	mg/kg	1.252	54.577	mg/kg	0.00546 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		34	mg/kg	1.462	46.097	mg/kg	0.00461 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	168	mg/kg		155.844	mg/kg	0.0156 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		48	mg/kg	1.579	70.33	mg/kg	0.00703 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		207	mg/kg	3.22	618.288	mg/kg	0.0618 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.056	mg/kg		0.0519	mg/kg	0.00000519 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.049	mg/kg		0.0455	mg/kg	0.00000455 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.037 mg/kg		0.0343 mg/kg	0.00000343 %	✓	
15	fluorene		201-695-5	86-73-7		0.036 mg/kg		0.0334 mg/kg	0.00000334 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.339 mg/kg		0.314 mg/kg	0.0000314 %	✓	
17	anthracene		204-371-1	120-12-7		0.116 mg/kg		0.108 mg/kg	0.0000108 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.564 mg/kg		0.523 mg/kg	0.0000523 %	✓	
19	pyrene		204-927-3	129-00-0		0.568 mg/kg		0.527 mg/kg	0.0000527 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.499 mg/kg		0.463 mg/kg	0.0000463 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.46 mg/kg		0.427 mg/kg	0.0000427 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.614 mg/kg		0.57 mg/kg	0.000057 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.764 mg/kg		0.709 mg/kg	0.0000709 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.273 mg/kg		0.253 mg/kg	0.0000253 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.729 mg/kg		0.676 mg/kg	0.0000676 %	✓	
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.822 mg/kg		0.763 mg/kg	0.0000763 %	✓	
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.822 mg/kg		0.763 mg/kg	0.0000763 %	✓	
28	benzene	601-020-00-8	200-753-7	71-43-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	toluene	601-021-00-3	203-625-9	108-88-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
32	pH			PH		8.71 pH		8.71 pH	8.71 pH		
33	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
34	TPH (C6 to C40) petroleum group			TPH		389 mg/kg		360.853 mg/kg	0.0361 %	✓	
35	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
36	phenol	604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
								Total:	0.133 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0361%)

Classification of sample: WS4[2m]

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

Sample details

Sample Name:		LoW Code:	
WS4[2m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
2.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
20.5% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 20.5% Dry Weight Moisture Correction applied (MC)

#		Determinand / CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0	215-481-4	1327-53-3		15	mg/kg	1.32	16.436	mg/kg	0.00164 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.067	mg/kg	0.000083 %	✓	
3		copper { copper(II) oxide } 029-016-00-6	215-269-1	1317-38-0		134	mg/kg	1.252	139.202	mg/kg	0.0139 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide }	215-160-9	1308-38-9		18	mg/kg	1.462	21.832	mg/kg	0.00218 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	289	mg/kg		239.834	mg/kg	0.024 %	✓	
7		mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		30	mg/kg	1.579	39.324	mg/kg	0.00393 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc oxide } 030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8	215-125-8	1303-86-2		124	mg/kg	3.22	331.34	mg/kg	0.0331 %	✓	
12		naphthalene 601-052-00-2	202-049-5	91-20-3		0.036	mg/kg		0.0299	mg/kg	0.00000299 %	✓	
13		acenaphthylene	205-917-1	208-96-8		0.013	mg/kg		0.0108	mg/kg	0.00000108 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.016 mg/kg		0.0133 mg/kg	0.00000133 %	✓	
15	fluorene		201-695-5	86-73-7		0.007 mg/kg		0.0058 mg/kg	0.000000581 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.221 mg/kg		0.183 mg/kg	0.0000183 %	✓	
17	anthracene		204-371-1	120-12-7		0.068 mg/kg		0.0564 mg/kg	0.00000564 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.234 mg/kg		0.194 mg/kg	0.0000194 %	✓	
19	pyrene		204-927-3	129-00-0		0.247 mg/kg		0.205 mg/kg	0.0000205 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.315 mg/kg		0.261 mg/kg	0.0000261 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.285 mg/kg		0.237 mg/kg	0.0000237 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.151 mg/kg		0.125 mg/kg	0.0000125 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.155 mg/kg		0.129 mg/kg	0.0000129 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.081 mg/kg		0.0672 mg/kg	0.00000672 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.139 mg/kg		0.115 mg/kg	0.0000115 %	✓	
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.315 mg/kg		0.261 mg/kg	0.0000261 %	✓	
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.315 mg/kg		0.261 mg/kg	0.0000261 %	✓	
28	pH			PH		8.69 pH		8.69 pH	8.69 pH		
29	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		**<LOD**
30	phenol	604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
								Total:	0.0798 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS5[0.5m]

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

Sample details

Sample Name:
WS5[0.5m]
Sample Depth:
0.50 m
Moisture content:
15.1%
(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: 15.1% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		20 mg/kg	1.32	22.942 mg/kg	0.00229 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<1 mg/kg	1.285	<1.285 mg/kg	<0.0001 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		96 mg/kg	1.252	104.405 mg/kg	0.0104 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		20 mg/kg	1.462	25.396 mg/kg	0.00254 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	829 mg/kg		720.243 mg/kg	0.072 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		38 mg/kg	1.579	52.147 mg/kg	0.00521 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		120 mg/kg	3.22	335.695 mg/kg	0.0336 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.046 mg/kg		0.04 mg/kg	0.000004 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.044 mg/kg		0.0382 mg/kg	0.00000382 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		0.029	mg/kg		0.0252	mg/kg	0.00000252 %	✓	
15	•	fluorene		201-695-5	86-73-7		0.04	mg/kg		0.0348	mg/kg	0.00000348 %	✓	
16	•	phenanthrene		201-581-5	85-01-8		0.68	mg/kg		0.591	mg/kg	0.0000591 %	✓	
17	•	anthracene		204-371-1	120-12-7		0.175	mg/kg		0.152	mg/kg	0.0000152 %	✓	
18	•	fluoranthene		205-912-4	206-44-0		1.136	mg/kg		0.987	mg/kg	0.0000987 %	✓	
19	•	pyrene		204-927-3	129-00-0		0.801	mg/kg		0.696	mg/kg	0.0000696 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.257	mg/kg		0.223	mg/kg	0.0000223 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.569	mg/kg		0.494	mg/kg	0.0000494 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.428	mg/kg		0.372	mg/kg	0.0000372 %	✓	
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		0.278	mg/kg		0.242	mg/kg	0.0000242 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.16	mg/kg		0.139	mg/kg	0.0000139 %	✓	
25	•	benzo[ghi]perylene		205-883-8	191-24-2		0.279	mg/kg		0.242	mg/kg	0.0000242 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.751	mg/kg		0.652	mg/kg	0.0000652 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.751	mg/kg		0.652	mg/kg	0.0000652 %	✓	
28	•	pH			PH		8.51	pH		8.51	pH	8.51 pH		
29		cyanides { • salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
30		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.127 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS5[2m]

⚠ **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:		LoW Code:	
WS5[2m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
2.00 m		Entry:	17 05 03 * (Soil and stones containing hazardous substances)
Moisture content:			
23.1% (dry weight correction)			

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.184%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

copper(II) oxide: (compound conc.: 0.12%)
lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.184%)

Determinands

Moisture content: 23.1% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		31 mg/kg	1.32	33.249 mg/kg	0.00332 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1 mg/kg	1.285	1.044 mg/kg	0.0000812 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		1179 mg/kg	1.252	1198.899 mg/kg	0.12 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		37 mg/kg	1.462	43.93 mg/kg	0.00439 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		**<LOD**
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	2263 mg/kg		1838.343 mg/kg	0.184 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		**<LOD**

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		48	mg/kg	1.579	61.589	mg/kg	0.00616 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		296	mg/kg	3.22	774.235	mg/kg	0.0774 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.051	mg/kg		0.0414	mg/kg	0.00000414 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.013	mg/kg		0.0106	mg/kg	0.00000106 %	✓	
14	acenaphthene		201-469-6	83-32-9		0.031	mg/kg		0.0252	mg/kg	0.00000252 %	✓	
15	fluorene		201-695-5	86-73-7		0.018	mg/kg		0.0146	mg/kg	0.00000146 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.326	mg/kg		0.265	mg/kg	0.0000265 %	✓	
17	anthracene		204-371-1	120-12-7		0.093	mg/kg		0.0755	mg/kg	0.00000755 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.41	mg/kg		0.333	mg/kg	0.0000333 %	✓	
19	pyrene		204-927-3	129-00-0		0.364	mg/kg		0.296	mg/kg	0.0000296 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.182	mg/kg		0.148	mg/kg	0.0000148 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.399	mg/kg		0.324	mg/kg	0.0000324 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.406	mg/kg		0.33	mg/kg	0.000033 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.434	mg/kg		0.353	mg/kg	0.0000353 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.22	mg/kg		0.179	mg/kg	0.0000179 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.429	mg/kg		0.348	mg/kg	0.0000348 %	✓	
26	coronene		205-881-7	191-07-1		0.196	mg/kg		0.159	mg/kg	0.0000159 %	✓	
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.796	mg/kg		0.647	mg/kg	0.0000647 %	✓	
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.796	mg/kg		0.647	mg/kg	0.0000647 %	✓	
29	benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
30	toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
34	pH			PH		8.32	pH		8.32	pH	8.32 pH		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
35		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
		006-007-00-5											
36		phenol				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		604-001-00-2	203-632-7	108-95-2									
										Total:	0.396 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS5[5m]

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

Sample details

Sample Name:
WS5[5m]
Sample Depth:
5.00 m
Moisture content:
19.7%
(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: 19.7% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9 mg/kg	1.32	9.927 mg/kg	0.000993 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<1 mg/kg	1.285	<1.285 mg/kg	<0.0001 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		10 mg/kg	1.252	10.458 mg/kg	0.00105 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		16 mg/kg	1.462	19.536 mg/kg	0.00195 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	99 mg/kg		82.707 mg/kg	0.00827 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		9 mg/kg	1.579	11.876 mg/kg	0.00119 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		42 mg/kg	3.22	112.978 mg/kg	0.0113 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.077 mg/kg		0.0643 mg/kg	0.00000643 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.021 mg/kg		0.0175 mg/kg	0.00000175 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.045	mg/kg		0.0376	mg/kg	0.00000376 %	✓	
15	fluorene		201-695-5	86-73-7		0.122	mg/kg		0.102	mg/kg	0.0000102 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.554	mg/kg		0.463	mg/kg	0.0000463 %	✓	
17	anthracene		204-371-1	120-12-7		0.248	mg/kg		0.207	mg/kg	0.0000207 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.553	mg/kg		0.462	mg/kg	0.0000462 %	✓	
19	pyrene		204-927-3	129-00-0		0.411	mg/kg		0.343	mg/kg	0.0000343 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.154	mg/kg		0.129	mg/kg	0.0000129 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.375	mg/kg		0.313	mg/kg	0.0000313 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.213	mg/kg		0.178	mg/kg	0.0000178 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.122	mg/kg		0.102	mg/kg	0.0000102 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.091	mg/kg		0.076	mg/kg	0.0000076 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.127	mg/kg		0.106	mg/kg	0.0000106 %	✓	
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.339	mg/kg		0.283	mg/kg	0.0000283 %	✓	
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.339	mg/kg		0.283	mg/kg	0.0000283 %	✓	
28	pH			PH		8.41	pH		8.41	pH	8.41 pH		
29	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
30	phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
										Total:	0.0259 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS6[1m]

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

Sample details

Sample Name:		LoW Code:	
WS6[1m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
1.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
33.5% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 33.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		35 mg/kg	1.32	34.615 mg/kg	0.00346 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<1 mg/kg	1.285	<1.285 mg/kg	<0.0001 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		66 mg/kg	1.252	61.886 mg/kg	0.00619 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		33 mg/kg	1.462	36.128 mg/kg	0.00361 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	606 mg/kg		453.933 mg/kg	0.0454 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		66 mg/kg	1.579	78.088 mg/kg	0.00781 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		142 mg/kg	3.22	342.489 mg/kg	0.0342 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.055 mg/kg		0.0412 mg/kg	0.00000412 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.024 mg/kg		0.018 mg/kg	0.0000018 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		0.035	mg/kg		0.0262	mg/kg	0.00000262 %	✓	
15	•	fluorene		201-695-5	86-73-7		0.024	mg/kg		0.018	mg/kg	0.0000018 %	✓	
16	•	phenanthrene		201-581-5	85-01-8		0.327	mg/kg		0.245	mg/kg	0.0000245 %	✓	
17	•	anthracene		204-371-1	120-12-7		0.09	mg/kg		0.0674	mg/kg	0.00000674 %	✓	
18	•	fluoranthene		205-912-4	206-44-0		0.281	mg/kg		0.21	mg/kg	0.000021 %	✓	
19	•	pyrene		204-927-3	129-00-0		0.251	mg/kg		0.188	mg/kg	0.0000188 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.503	mg/kg		0.377	mg/kg	0.0000377 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.34	mg/kg		0.255	mg/kg	0.0000255 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.277	mg/kg		0.207	mg/kg	0.0000207 %	✓	
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		0.272	mg/kg		0.204	mg/kg	0.0000204 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.186	mg/kg		0.139	mg/kg	0.0000139 %	✓	
25	•	benzo[ghi]perylene		205-883-8	191-24-2		0.247	mg/kg		0.185	mg/kg	0.0000185 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.535	mg/kg		0.401	mg/kg	0.0000401 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.535	mg/kg		0.401	mg/kg	0.0000401 %	✓	
28	•	pH			PH		8.66	pH		8.66	pH	8.66 pH		
29		cyanides { • salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
30		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
											Total:	0.102 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS6[4m]

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

Sample details

Sample Name:
WS6[4m]
Sample Depth:
4.00 m
Moisture content:
21%
(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: 21% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13 mg/kg	1.32	14.185 mg/kg	0.00142 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<1 mg/kg	1.285	<1.285 mg/kg	<0.0001 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		22 mg/kg	1.252	22.76 mg/kg	0.00228 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		12 mg/kg	1.462	14.495 mg/kg	0.00145 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	125 mg/kg		103.306 mg/kg	0.0103 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		11 mg/kg	1.579	14.359 mg/kg	0.00144 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		59 mg/kg	3.22	157.002 mg/kg	0.0157 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.055 mg/kg		0.0455 mg/kg	0.00000455 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.013 mg/kg		0.0107 mg/kg	0.00000107 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.035	mg/kg		0.0289	mg/kg	0.00000289 %	✓	
15	fluorene		201-695-5	86-73-7		0.077	mg/kg		0.0636	mg/kg	0.00000636 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.363	mg/kg		0.3	mg/kg	0.00003 %	✓	
17	anthracene		204-371-1	120-12-7		0.131	mg/kg		0.108	mg/kg	0.0000108 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.454	mg/kg		0.375	mg/kg	0.0000375 %	✓	
19	pyrene		204-927-3	129-00-0		0.318	mg/kg		0.263	mg/kg	0.0000263 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.298	mg/kg		0.246	mg/kg	0.0000246 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.186	mg/kg		0.154	mg/kg	0.0000154 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.124	mg/kg		0.102	mg/kg	0.0000102 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.077	mg/kg		0.0636	mg/kg	0.00000636 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.04	mg/kg		0.0331	mg/kg	0.00000331 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.079	mg/kg		0.0653	mg/kg	0.00000653 %	✓	
26	coronene		205-881-7	191-07-1		0.04	mg/kg		0.0331	mg/kg	0.00000331 %	✓	
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.218	mg/kg		0.18	mg/kg	0.000018 %	✓	
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.218	mg/kg		0.18	mg/kg	0.000018 %	✓	
29	benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
30	toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
34	pH			PH		8.04	pH		8.04	pH	8.04 pH		
35	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
36	TPH (C6 to C40) petroleum group			TPH		2	mg/kg		1.653	mg/kg	0.000165 %	✓	
37	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
38	phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
										Total:	0.0338 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00016%)

Classification of sample: WS7[1m]

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

Sample details

Sample Name:
WS7[1m]
Sample Depth:
1.00 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 Moisture Correction applied (MC)

#		Determinand CLP index number / EC Number / CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		11 mg/kg	1.32	13.096 mg/kg	0.00131 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	2 mg/kg	1.285	2.318 mg/kg	0.00018 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		31 mg/kg	1.252	34.991 mg/kg	0.0035 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		17 mg/kg	1.462	22.404 mg/kg	0.00224 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	109 mg/kg		98.287 mg/kg	0.00983 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		45 mg/kg	1.579	64.092 mg/kg	0.00641 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		96 mg/kg	3.22	278.727 mg/kg	0.0279 %	✓	
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
13		acenaphthylene 205-917-1 / 208-96-8		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
15	•	fluorene		201-695-5	86-73-7		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
16	•	phenanthrene		201-581-5	85-01-8		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
17	•	anthracene		204-371-1	120-12-7		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
18	•	fluoranthene		205-912-4	206-44-0		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
19	•	pyrene		204-927-3	129-00-0		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
25	•	benzo[ghi]perylene		205-883-8	191-24-2		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
28	•	pH			PH		8.13 pH		8.13 pH	8.13 pH		
29		cyanides { • salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		**<LOD**
30		phenol	604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
									Total:	0.0537 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS7[3m]

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

Sample details

Sample Name:
WS7[3m]
Sample Depth:
3.00 m
Moisture content:
22.5%
(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: 22.5% Dry Weight Moisture Correction applied (MC)

#		Determinand CLP index number | EC Number | CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 | 215-481-4 | 1327-53-3		19 mg/kg	1.32	20.479 mg/kg	0.00205 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 | 215-147-8 | 1306-23-6	1	1 mg/kg	1.285	1.049 mg/kg	0.0000816 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 | 215-269-1 | 1317-38-0		89 mg/kg	1.252	90.945 mg/kg	0.00909 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } | 215-160-9 | 1308-38-9		21 mg/kg	1.462	25.055 mg/kg	0.00251 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 | 215-607-8 | 1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	739 mg/kg		603.265 mg/kg	0.0603 %	✓	
7		mercury { mercury dichloride } 080-010-00-X | 231-299-8 | 7487-94-7		16 mg/kg	1.353	17.678 mg/kg	0.00177 %	✓	
8		nickel { nickel dihydroxide } 028-008-00-X | 235-008-5 [1] 234-348-1 [2] | 12054-48-7 [1] 11113-74-9 [2]		47 mg/kg	1.579	60.601 mg/kg	0.00606 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 | 215-222-5 | 1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 | 215-125-8 | 1303-86-2		122 mg/kg	3.22	320.674 mg/kg	0.0321 %	✓	
12		naphthalene 601-052-00-2 | 202-049-5 | 91-20-3		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
13		acenaphthylene | 205-917-1 | 208-96-8		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
15	•	fluorene		201-695-5	86-73-7		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
16	•	phenanthrene		201-581-5	85-01-8		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
17	•	anthracene		204-371-1	120-12-7		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
18	•	fluoranthene		205-912-4	206-44-0		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
19	•	pyrene		204-927-3	129-00-0		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
21		chrysene	601-048-00-0	205-923-4	218-01-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
25	•	benzo[ghi]perylene		205-883-8	191-24-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
28		benzene	601-020-00-8	200-753-7	71-43-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29		toluene	601-021-00-3	203-625-9	108-88-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	•	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
32	•	pH			PH		7.71 pH		7.71 pH	7.71 pH		
33		cyanides { • salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
34	•	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
35		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
36		phenol	604-001-00-2	203-632-7	108-95-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
									Total:	0.116 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS7[5m]

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

Sample details

Sample Name: **WS7[5m]**	LoW Code:		
Sample Depth: **5.00 m**	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)	
Moisture content: **13.8%** (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)	

Hazard properties

None identified

Determinands

Moisture content: 13.8% Dry Weight Moisture Correction applied (MC)

#		Determinand (CLP index number / EC Number / CAS Number)	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		3	mg/kg	1.32	3.481	mg/kg	0.000348 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	1	mg/kg	1.285	1.129	mg/kg	0.0000879 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		19	mg/kg	1.252	20.9	mg/kg	0.00209 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } / 215-160-9 / 1308-38-9		22	mg/kg	1.462	28.255	mg/kg	0.00283 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	24	mg/kg		21.09	mg/kg	0.00211 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		35	mg/kg	1.579	48.579	mg/kg	0.00486 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		70	mg/kg	3.22	198.059	mg/kg	0.0198 %	✓	
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
13		acenaphthylene / 205-917-1 / 208-96-8		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
15	●	fluorene		201-695-5	86-73-7		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
16	●	phenanthrene		201-581-5	85-01-8		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
17	●	anthracene		204-371-1	120-12-7		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
18	●	fluoranthene		205-912-4	206-44-0		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
19	●	pyrene		204-927-3	129-00-0		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
25	●	benzo[ghi]perylene		205-883-8	191-24-2		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
28	●	pH			PH		8.65	pH		8.65	pH	8.65 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
30		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
											Total:	0.0344 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS8[2m]

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

Sample details

Sample Name:
WS8[2m]
Sample Depth:
2.00 m
Moisture content:
25.2%
(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: 25.2% Dry Weight Moisture Correction applied (MC)

#		Determinand CLP index number / EC Number / CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		26 mg/kg	1.32	27.419 mg/kg	0.00274 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	1 mg/kg	1.285	1.027 mg/kg	0.0000799 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		544 mg/kg	1.252	543.903 mg/kg	0.0544 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		15 mg/kg	1.462	17.511 mg/kg	0.00175 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	1118 mg/kg		892.971 mg/kg	0.0893 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		40 mg/kg	1.579	50.463 mg/kg	0.00505 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		419 mg/kg	3.22	1077.579 mg/kg	0.108 %	✓	
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		0.037 mg/kg		0.0296 mg/kg	0.00000296 %	✓	
13		acenaphthylene 205-917-1 / 208-96-8		0.07 mg/kg		0.0559 mg/kg	0.00000559 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.034	mg/kg		0.0272	mg/kg	0.00000272 %	✓	
15	fluorene		201-695-5	86-73-7		0.049	mg/kg		0.0391	mg/kg	0.00000391 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.352	mg/kg		0.281	mg/kg	0.0000281 %	✓	
17	anthracene		204-371-1	120-12-7		0.086	mg/kg		0.0687	mg/kg	0.00000687 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.179	mg/kg		0.143	mg/kg	0.0000143 %	✓	
19	pyrene		204-927-3	129-00-0		0.19	mg/kg		0.152	mg/kg	0.0000152 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.191	mg/kg		0.153	mg/kg	0.0000153 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.229	mg/kg		0.183	mg/kg	0.0000183 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.311	mg/kg		0.248	mg/kg	0.0000248 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.297	mg/kg		0.237	mg/kg	0.0000237 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.36	mg/kg		0.288	mg/kg	0.0000288 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.548	mg/kg		0.438	mg/kg	0.0000438 %	✓	
26	coronene		205-881-7	191-07-1		0.198	mg/kg		0.158	mg/kg	0.0000158 %	✓	
27	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.498	mg/kg		0.398	mg/kg	0.0000398 %	✓	
28	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.498	mg/kg		0.398	mg/kg	0.0000398 %	✓	
29	benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
30	toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
34	pH			PH		8.32	pH		8.32	pH	8.32 pH		
35	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		<LOD
36	TPH (C6 to C40) petroleum group			TPH		3.11	mg/kg		2.484	mg/kg	0.000248 %	✓	
37	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
										Total:	0.262 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration very low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00024%)

Classification of sample: WS9[0.5m]

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

Sample details

Sample Name:		LoW Code:	
WS9[0.5m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
20.3% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 20.3% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	17.56	mg/kg	0.00176 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.068	mg/kg	0.0000831 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		55	mg/kg	1.252	57.23	mg/kg	0.00572 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		20	mg/kg	1.462	24.299	mg/kg	0.00243 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	236	mg/kg		196.176	mg/kg	0.0196 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		25	mg/kg	1.579	32.824	mg/kg	0.00328 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		116	mg/kg	3.22	310.479	mg/kg	0.031 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.21	mg/kg		0.175	mg/kg	0.0000175 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.106	mg/kg		0.0881	mg/kg	0.00000881 %	✓	

#		Determinand CLP index number / EC Number / CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene 201-469-6 / 83-32-9		1.23	mg/kg		1.022	mg/kg	0.000102 %	✓	
15	●	fluorene 201-695-5 / 86-73-7		0.662	mg/kg		0.55	mg/kg	0.000055 %	✓	
16	●	phenanthrene 201-581-5 / 85-01-8		7.987	mg/kg		6.639	mg/kg	0.000664 %	✓	
17	●	anthracene 204-371-1 / 120-12-7		1.073	mg/kg		0.892	mg/kg	0.0000892 %	✓	
18	●	fluoranthene 205-912-4 / 206-44-0		9.923	mg/kg		8.249	mg/kg	0.000825 %	✓	
19	●	pyrene 204-927-3 / 129-00-0		9.612	mg/kg		7.99	mg/kg	0.000799 %	✓	
20		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		4.413	mg/kg		3.668	mg/kg	0.000367 %	✓	
21		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		5.104	mg/kg		4.243	mg/kg	0.000424 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		4.355	mg/kg		3.62	mg/kg	0.000362 %	✓	
23	●	indeno[123-cd]pyrene 205-893-2 / 193-39-5		2.67	mg/kg		2.219	mg/kg	0.000222 %	✓	
24		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		2.137	mg/kg		1.776	mg/kg	0.000178 %	✓	
25	●	benzo[ghi]perylene 205-883-8 / 191-24-2		3.446	mg/kg		2.865	mg/kg	0.000286 %	✓	
26		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		7.529	mg/kg		6.259	mg/kg	0.000626 %	✓	
27		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		7.529	mg/kg		6.259	mg/kg	0.000626 %	✓	
28	●	pH PH		8.04	pH		8.04	pH	8.04 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5		<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
								Total:	0.0704 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS9[1m]

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

Sample details

Sample Name:	LoW Code:	
WS9[1m]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1.00 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:		
20.5% (dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 20.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13	mg/kg	1.32	14.244	mg/kg	0.00142 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.067	mg/kg	0.000083 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		77	mg/kg	1.252	79.989	mg/kg	0.008 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		18	mg/kg	1.462	21.832	mg/kg	0.00218 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	243	mg/kg		201.66	mg/kg	0.0202 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1	mg/kg	1.353	1.123	mg/kg	0.000112 %	✓	
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		18	mg/kg	1.579	23.594	mg/kg	0.00236 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		115	mg/kg	3.22	307.291	mg/kg	0.0307 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.496	mg/kg		0.412	mg/kg	0.0000412 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.228	mg/kg		0.189	mg/kg	0.0000189 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		2.203 mg/kg		1.828 mg/kg	0.000183 %	✓	
15	fluorene		201-695-5	86-73-7		1.621 mg/kg		1.345 mg/kg	0.000135 %	✓	
16	phenanthrene		201-581-5	85-01-8		20.568 mg/kg		17.069 mg/kg	0.00171 %	✓	
17	anthracene		204-371-1	120-12-7		2.39 mg/kg		1.983 mg/kg	0.000198 %	✓	
18	fluoranthene		205-912-4	206-44-0		20.578 mg/kg		17.077 mg/kg	0.00171 %	✓	
19	pyrene		204-927-3	129-00-0		18.2 mg/kg		15.104 mg/kg	0.00151 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		8.172 mg/kg		6.782 mg/kg	0.000678 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		8.739 mg/kg		7.252 mg/kg	0.000725 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		7.209 mg/kg		5.983 mg/kg	0.000598 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		4.377 mg/kg		3.632 mg/kg	0.000363 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		3.874 mg/kg		3.215 mg/kg	0.000321 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		5.605 mg/kg		4.651 mg/kg	0.000465 %	✓	
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		12.56 mg/kg		10.423 mg/kg	0.00104 %	✓	
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		12.56 mg/kg		10.423 mg/kg	0.00104 %	✓	
28	pH			PH		8.16 pH		8.16 pH	8.16 pH		
29	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5 mg/kg	1.884	<4.71 mg/kg	<0.000471 %		<LOD
								Total:	0.0765 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
(icon)	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS11[0.5m]

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

Sample details

Sample Name:		LoW Code:	
WS11[0.5m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
8.2% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 8.2% Dry Weight Moisture Correction applied (MC)

#		Determinand (CLP index number / EC Number / CAS Number)	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
2		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
3		xylene 601-022-00-9 / 202-422-2 [1], 203-396-5 [2], 203-576-3 [3], 215-535-7 [4] / 95-47-6 [1], 106-42-3 [2], 108-38-3 [3], 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
4	•	ethylbenzene 601-023-00-4 / 202-849-4 / 100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
5	•	TPH (C6 to C40) petroleum group TPH		396	mg/kg		365.989	mg/kg	0.0366 %	✓	
6		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
								Total:	0.0366 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0366%)

Classification of sample: WS11[2m]

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

Sample details

Sample Name:		LoW Code:	
WS11[2m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
2.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
23.8% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 23.8% Dry Weight Moisture Correction applied (MC)

#		Determinand / CLP index number / EC Number / CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		7	mg/kg	1.32	7.465	mg/kg	0.000747 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	<1	mg/kg	1.285	<1.285	mg/kg	<0.0001 %		<LOD
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		14	mg/kg	1.252	14.156	mg/kg	0.00142 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		11	mg/kg	1.462	12.986	mg/kg	0.0013 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	77	mg/kg		62.197	mg/kg	0.00622 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		9	mg/kg	1.579	11.483	mg/kg	0.00115 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		45	mg/kg	3.22	117.039	mg/kg	0.0117 %	✓	
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		0.351	mg/kg		0.284	mg/kg	0.0000284 %	✓	
13		acenaphthylene 205-917-1 / 208-96-8		0.206	mg/kg		0.166	mg/kg	0.0000166 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		acenaphthene		201-469-6	83-32-9		0.337	mg/kg		0.272	mg/kg	0.0000272 %	✓	
15		fluorene		201-695-5	86-73-7		0.721	mg/kg		0.582	mg/kg	0.0000582 %	✓	
16		phenanthrene		201-581-5	85-01-8		2.456	mg/kg		1.984	mg/kg	0.000198 %	✓	
17		anthracene		204-371-1	120-12-7		0.65	mg/kg		0.525	mg/kg	0.0000525 %	✓	
18		fluoranthene		205-912-4	206-44-0		2.634	mg/kg		2.128	mg/kg	0.000213 %	✓	
19		pyrene		204-927-3	129-00-0		2.395	mg/kg		1.935	mg/kg	0.000193 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		2.016	mg/kg		1.628	mg/kg	0.000163 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		1.52	mg/kg		1.228	mg/kg	0.000123 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.828	mg/kg		0.669	mg/kg	0.0000669 %	✓	
23		indeno[123-cd]pyrene		205-893-2	193-39-5		0.539	mg/kg		0.435	mg/kg	0.0000435 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.363	mg/kg		0.293	mg/kg	0.0000293 %	✓	
25		benzo[ghi]perylene		205-883-8	191-24-2		0.535	mg/kg		0.432	mg/kg	0.0000432 %	✓	
26		coronene		205-881-7	191-07-1		0.205	mg/kg		0.166	mg/kg	0.0000166 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.538	mg/kg		1.242	mg/kg	0.000124 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.538	mg/kg		1.242	mg/kg	0.000124 %	✓	
29		benzene	601-020-00-8	200-753-7	71-43-2		0.02	mg/kg		0.0162	mg/kg	0.00000162 %	✓	
30		toluene	601-021-00-3	203-625-9	108-88-3		0.1	mg/kg		0.0808	mg/kg	0.00000808 %	✓	
31		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		0.04	mg/kg		0.0323	mg/kg	0.00000323 %	✓	
32		ethylbenzene	601-023-00-4	202-849-4	100-41-4		0.17	mg/kg		0.137	mg/kg	0.0000137 %	✓	
33		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
34		pH			PH		8.67	pH		8.67	pH	8.67 pH		
35		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
36		TPH (C6 to C40) petroleum group			TPH		634	mg/kg		512.116	mg/kg	0.0512 %	✓	
37		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		0.14	mg/kg		0.113	mg/kg	0.0000113 %	✓	
38		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0761 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration low.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

benzene: (conc.: 1.62e-06%)
toluene: (conc.: 8.08e-06%)
ethylbenzene: (conc.: 0.00001%)
tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00001%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

xylene: (conc.: 3.23e-06%)
TPH (C6 to C40) petroleum group: (conc.: 0.0512%)

Classification of sample: WS11[3m]

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

Sample details

Sample Name:		LoW Code:	
WS11[3m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
3.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
10.7% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 10.7% Dry Weight Moisture Correction applied (MC)

#		Determinand CLP index number / EC Number / CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		3	mg/kg	1.32	3.578	mg/kg	0.000358 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	2	mg/kg	1.285	2.322	mg/kg	0.000181 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		26	mg/kg	1.252	29.4	mg/kg	0.00294 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		32	mg/kg	1.462	42.249	mg/kg	0.00422 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		**<LOD**
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	25	mg/kg		22.584	mg/kg	0.00226 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		**<LOD**
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		51	mg/kg	1.579	72.768	mg/kg	0.00728 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		**<LOD**
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		105	mg/kg	3.22	305.408	mg/kg	0.0305 %	✓	
12		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
13		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		0.02	mg/kg		0.0181	mg/kg	0.00000181 %	✓	
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		0.05	mg/kg		0.0452	mg/kg	0.00000452 %	✓	
16	●	pH			PH		8.7	pH		8.7	pH	8.7 pH		
17		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
18	●	TPH (C6 to C40) petroleum group			TPH		31	mg/kg		28.004	mg/kg	0.0028 %	✓	
19		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
											Total:	0.0513 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration very low.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 4.52e-06%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

xylene: (conc.: 1.81e-06%)
TPH (C6 to C40) petroleum group: (conc.: 0.0028%)

Classification of sample: WS12[0.5m]

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

Sample details

Sample Name:
WS12[0.5m]
Sample Depth:
0.50 m
Moisture content:
21.7%
(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: 21.7% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		27	mg/kg	1.32	29.292	mg/kg	0.00293 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.056	mg/kg	0.0000822 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		306	mg/kg	1.252	314.744	mg/kg	0.0315 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		22	mg/kg	1.462	26.421	mg/kg	0.00264 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	481	mg/kg		395.234	mg/kg	0.0395 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		60	mg/kg	1.579	77.872	mg/kg	0.00779 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		233	mg/kg	3.22	616.46	mg/kg	0.0616 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.056	mg/kg		0.046	mg/kg	0.0000046 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.08	mg/kg		0.0657	mg/kg	0.00000657 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.068	mg/kg		0.0559	mg/kg	0.00000559 %	✓	
15	fluorene		201-695-5	86-73-7		0.062	mg/kg		0.0509	mg/kg	0.00000509 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.02	mg/kg		0.0164	mg/kg	0.00000164 %	✓	
17	anthracene		204-371-1	120-12-7		0.149	mg/kg		0.122	mg/kg	0.0000122 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.505	mg/kg		0.415	mg/kg	0.0000415 %	✓	
19	pyrene		204-927-3	129-00-0		0.36	mg/kg		0.296	mg/kg	0.0000296 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.457	mg/kg		0.376	mg/kg	0.0000376 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.604	mg/kg		0.496	mg/kg	0.0000496 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.544	mg/kg		0.447	mg/kg	0.0000447 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.387	mg/kg		0.318	mg/kg	0.0000318 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.317	mg/kg		0.26	mg/kg	0.000026 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.537	mg/kg		0.441	mg/kg	0.0000441 %	✓	
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.007	mg/kg		0.827	mg/kg	0.0000827 %	✓	
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.007	mg/kg		0.827	mg/kg	0.0000827 %	✓	
28	pH			PH		8.21	pH		8.21	pH	8.21 pH		
29	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
										Total:	0.147 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS12[1m]

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

Sample details

Sample Name:
WS12[1m]
Sample Depth:
1.00 m
Moisture content:
14%
(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: 14% Dry Weight Moisture Correction applied (MC)

#		Determinand / CLP index number / EC Number / CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		27	mg/kg	1.32	31.271	mg/kg	0.00313 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	1	mg/kg	1.285	1.127	mg/kg	0.0000877 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		610	mg/kg	1.252	669.81	mg/kg	0.067 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		19	mg/kg	1.462	24.359	mg/kg	0.00244 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	937	mg/kg		821.93	mg/kg	0.0822 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		38	mg/kg	1.579	52.65	mg/kg	0.00526 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		228	mg/kg	3.22	643.976	mg/kg	0.0644 %	✓	
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		0.047	mg/kg		0.0412	mg/kg	0.00000412 %	✓	
13		acenaphthylene 205-917-1 / 208-96-8		0.026	mg/kg		0.0228	mg/kg	0.00000228 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		acenaphthene		201-469-6	83-32-9		0.083	mg/kg		0.0728	mg/kg	0.00000728 %	✓	
15		fluorene		201-695-5	86-73-7		0.041	mg/kg		0.036	mg/kg	0.0000036 %	✓	
16		phenanthrene		201-581-5	85-01-8		0.503	mg/kg		0.441	mg/kg	0.0000441 %	✓	
17		anthracene		204-371-1	120-12-7		0.141	mg/kg		0.124	mg/kg	0.0000124 %	✓	
18		fluoranthene		205-912-4	206-44-0		0.566	mg/kg		0.496	mg/kg	0.0000496 %	✓	
19		pyrene		204-927-3	129-00-0		0.52	mg/kg		0.456	mg/kg	0.0000456 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.537	mg/kg		0.471	mg/kg	0.0000471 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.555	mg/kg		0.487	mg/kg	0.0000487 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.385	mg/kg		0.338	mg/kg	0.0000338 %	✓	
23		indeno[123-cd]pyrene		205-893-2	193-39-5		0.179	mg/kg		0.157	mg/kg	0.0000157 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.116	mg/kg		0.102	mg/kg	0.0000102 %	✓	
25		benzo[ghi]perylene		205-883-8	191-24-2		0.218	mg/kg		0.191	mg/kg	0.0000191 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.537	mg/kg		0.471	mg/kg	0.0000471 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.537	mg/kg		0.471	mg/kg	0.0000471 %	✓	
28		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
29		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
30		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32		pH			PH		8.01	pH		8.01	pH	8.01 pH		
33		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		<LOD
34		TPH (C6 to C40) petroleum group			TPH		4.02	mg/kg		3.526	mg/kg	0.000353 %	✓	
35		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.226 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration very low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00035%)

Classification of sample: BH1[2m]

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

Sample details

Sample Name:	LoW Code:	
BH1[2m]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
2.00 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:		
33.3% (dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 33.3% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11	mg/kg	1.32	10.895	mg/kg	0.00109 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.5	mg/kg	1.285	<0.643	mg/kg	<0.00005 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		28	mg/kg	1.252	26.294	mg/kg	0.00263 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		10	mg/kg	1.462	10.964	mg/kg	0.0011 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	362	mg/kg		271.568	mg/kg	0.0272 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		14	mg/kg	1.579	16.589	mg/kg	0.00166 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		62	mg/kg	3.22	149.762	mg/kg	0.015 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.075	mg/kg		0.0563	mg/kg	0.00000563 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.019	mg/kg		0.0143	mg/kg	0.00000143 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.066	mg/kg		0.0495	mg/kg	0.00000495 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.105	mg/kg		0.0788	mg/kg	0.00000788 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		0.559	mg/kg		0.419	mg/kg	0.0000419 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.179	mg/kg		0.134	mg/kg	0.0000134 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		0.393	mg/kg		0.295	mg/kg	0.0000295 %	✓	
19	●	pyrene		204-927-3	129-00-0		0.298	mg/kg		0.224	mg/kg	0.0000224 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.179	mg/kg		0.134	mg/kg	0.0000134 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.147	mg/kg		0.11	mg/kg	0.000011 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.135	mg/kg		0.101	mg/kg	0.0000101 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.061	mg/kg		0.0458	mg/kg	0.00000458 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.051	mg/kg		0.0383	mg/kg	0.00000383 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		0.095	mg/kg		0.0713	mg/kg	0.00000713 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.181	mg/kg		0.136	mg/kg	0.0000136 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.181	mg/kg		0.136	mg/kg	0.0000136 %	✓	
28	●	pH			PH		8.63	pH		8.63	pH	8.63 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
											Total:	0.0494 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH3[2m]

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

Sample details

Sample Name:
BH3[2m]
Sample Depth:
2.0 m
Moisture content:
23.5%
(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: 23.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8	mg/kg	1.32	8.553	mg/kg	0.000855 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.5	mg/kg	1.285	<0.643	mg/kg	<0.00005 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		7	mg/kg	1.252	7.095	mg/kg	0.00071 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		16	mg/kg	1.462	18.935	mg/kg	0.00189 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	30	mg/kg		24.291	mg/kg	0.00243 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		16	mg/kg	1.579	20.463	mg/kg	0.00205 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		59	mg/kg	3.22	153.824	mg/kg	0.0154 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
13	acenaphthylene		205-917-1	208-96-8		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
15	●	fluorene		201-695-5	86-73-7		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
16	●	phenanthrene		201-581-5	85-01-8		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
17	●	anthracene		204-371-1	120-12-7		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
18	●	fluoranthene		205-912-4	206-44-0		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
19	●	pyrene		204-927-3	129-00-0		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
25	●	benzo[ghi]perylene		205-883-8	191-24-2		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
28		benzene	601-020-00-8	200-753-7	71-43-2		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
29		toluene	601-021-00-3	203-625-9	108-88-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
30		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
31	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
32	●	pH			PH		8.93 pH		8.93 pH	8.93 pH		
33		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		**<LOD**
34	●	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
35		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
									Total:	0.0255 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH3[0.5m]

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

Sample details

Sample Name:		LoW Code:	
BH3[0.5m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
24.3% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 24.3% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		30	mg/kg	1.32	31.866	mg/kg	0.00319 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.5	mg/kg	1.285	<0.643	mg/kg	<0.00005 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		91	mg/kg	1.252	91.643	mg/kg	0.00916 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		16	mg/kg	1.462	18.813	mg/kg	0.00188 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	466	mg/kg		374.899	mg/kg	0.0375 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		46	mg/kg	1.579	58.453	mg/kg	0.00585 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		98	mg/kg	3.22	253.86	mg/kg	0.0254 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.077	mg/kg		0.0619	mg/kg	0.00000619 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.065	mg/kg		0.0523	mg/kg	0.00000523 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.038	mg/kg		0.0306	mg/kg	0.00000306 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.045	mg/kg		0.0362	mg/kg	0.00000362 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		0.618	mg/kg		0.497	mg/kg	0.0000497 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.251	mg/kg		0.202	mg/kg	0.0000202 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		0.76	mg/kg		0.611	mg/kg	0.0000611 %	✓	
19	●	pyrene		204-927-3	129-00-0		0.764	mg/kg		0.615	mg/kg	0.0000615 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.247	mg/kg		0.199	mg/kg	0.0000199 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.624	mg/kg		0.502	mg/kg	0.0000502 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.46	mg/kg		0.37	mg/kg	0.000037 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.381	mg/kg		0.307	mg/kg	0.0000307 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.398	mg/kg		0.32	mg/kg	0.000032 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		0.701	mg/kg		0.564	mg/kg	0.0000564 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.937	mg/kg		0.754	mg/kg	0.0000754 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.937	mg/kg		0.754	mg/kg	0.0000754 %	✓	
28	●	pH			PH		8.98	pH		8.98	pH	8.98 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
											Total:	0.0841 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH3[1m]

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

Sample details

Sample Name:		LoW Code:	
BH3[1m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
1.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
24.4% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 24.4% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		naphthalene	601-052-00-2	202-049-5	91-20-3		0.007	mg/kg		0.0056	mg/kg	0.000000563 %	✓	
2	•	acenaphthylene		205-917-1	208-96-8		0.003	mg/kg		0.0024	mg/kg	0.000000241 %	✓	
3	•	acenaphthene		201-469-6	83-32-9		0.019	mg/kg		0.0153	mg/kg	0.00000153 %	✓	
4	•	fluorene		201-695-5	86-73-7		0.002	mg/kg		0.0016	mg/kg	0.000000161 %	✓	
5	•	phenanthrene		201-581-5	85-01-8		0.052	mg/kg		0.0418	mg/kg	0.00000418 %	✓	
6	•	anthracene		204-371-1	120-12-7		0.012	mg/kg		0.0096	mg/kg	0.000000965 %	✓	
7	•	fluoranthene		205-912-4	206-44-0		0.032	mg/kg		0.0257	mg/kg	0.00000257 %	✓	
8	•	pyrene		204-927-3	129-00-0		0.027	mg/kg		0.0217	mg/kg	0.00000217 %	✓	
9		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.032	mg/kg		0.0257	mg/kg	0.00000257 %	✓	
10		chrysene	601-048-00-0	205-923-4	218-01-9		0.036	mg/kg		0.0289	mg/kg	0.00000289 %	✓	
11		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.007	mg/kg		0.0056	mg/kg	0.000000563 %	✓	
12	•	indeno[123-cd]pyrene		205-893-2	193-39-5		0.014	mg/kg		0.0113	mg/kg	0.00000113 %	✓	
13		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.006	mg/kg		0.0048	mg/kg	0.000000482 %	✓	
14	•	benzo[ghi]perylene		205-883-8	191-24-2		0.022	mg/kg		0.0177	mg/kg	0.00000177 %	✓	
15	•	coronene		205-881-7	191-07-1		0.008	mg/kg		0.0064	mg/kg	0.000000643 %	✓	
16		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.036	mg/kg		0.0289	mg/kg	0.00000289 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		benzo[k]fluoranthene				0.036	mg/kg		0.0289	mg/kg	0.00000289 %	✓	
		601-036-00-5	205-916-6	207-08-9									
18		benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
19		toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
20		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
21	●	ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
22	●	polychlorobiphenyls; PCB				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
23	●	TPH (C6 to C40) petroleum group				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
				TPH									
										Total:	0.00004 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: BH4[1m]

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

Sample details

Sample Name:		LoW Code:	
BH4[1m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
1.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
9.5% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 9.5% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		26	mg/kg	1.32	31.35	mg/kg	0.00314 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.174	mg/kg	0.0000913 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		237	mg/kg	1.252	270.932	mg/kg	0.0271 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		28	mg/kg	1.462	37.373	mg/kg	0.00374 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	392	mg/kg		357.991	mg/kg	0.0358 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		40	mg/kg	1.579	57.699	mg/kg	0.00577 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		153	mg/kg	3.22	449.901	mg/kg	0.045 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.072	mg/kg		0.0658	mg/kg	0.00000658 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.101	mg/kg		0.0922	mg/kg	0.00000922 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.054	mg/kg		0.0493	mg/kg	0.00000493 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.068	mg/kg		0.0621	mg/kg	0.00000621 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		1.062	mg/kg		0.97	mg/kg	0.000097 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.26	mg/kg		0.237	mg/kg	0.0000237 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		1.407	mg/kg		1.285	mg/kg	0.000128 %	✓	
19	●	pyrene		204-927-3	129-00-0		1.379	mg/kg		1.259	mg/kg	0.000126 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.86	mg/kg		0.785	mg/kg	0.0000785 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.932	mg/kg		0.851	mg/kg	0.0000851 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.039	mg/kg		0.949	mg/kg	0.0000949 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.896	mg/kg		0.818	mg/kg	0.0000818 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.678	mg/kg		0.619	mg/kg	0.0000619 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		1.117	mg/kg		1.02	mg/kg	0.000102 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.808	mg/kg		1.651	mg/kg	0.000165 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.808	mg/kg		1.651	mg/kg	0.000165 %	✓	
28	●	pH			PH		8.49	pH		8.49	pH	8.49 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		<LOD
											Total:	0.123 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH4[5-5.3m]

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

Sample details

Sample Name:		LoW Code:	
BH4[5-5.3m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
5.0-5.3 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#	Determinand / CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide } 033-003-00-0	215-481-4	1327-53-3		18	mg/kg	1.32	23.766	mg/kg	0.00238 %	✓	
2	cadmium { cadmium sulfide } 048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.285	mg/kg	0.0001 %	✓	
3	copper { copper(II) oxide } 029-016-00-6	215-269-1	1317-38-0		270	mg/kg	1.252	337.98	mg/kg	0.0338 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }	215-160-9	1308-38-9		14	mg/kg	1.462	20.462	mg/kg	0.00205 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	430	mg/kg		430	mg/kg	0.043 %	✓	
6	mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		1.5	mg/kg	1.353	2.03	mg/kg	0.000203 %	✓	
7	nickel { nickel dihydroxide } 028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		29	mg/kg	1.579	45.805	mg/kg	0.00458 %	✓	
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		**<LOD**
9	zinc { zinc oxide } 030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		**<LOD**
10	boron { diboron trioxide; boric oxide } 005-008-00-8	215-125-8	1303-86-2		260	mg/kg	3.22	837.168	mg/kg	0.0837 %	✓	
									Total:	0.171 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH4[6-6.3m]

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

Sample details

Sample Name:	LoW Code:	
BH4[6-6.3m]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
6.0-6.3 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		22	mg/kg	1.32	29.047	mg/kg	0.0029 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	1.285	mg/kg	0.0001 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		250	mg/kg	1.252	312.944	mg/kg	0.0313 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		17	mg/kg	1.462	24.846	mg/kg	0.00248 %	✓	
5	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	480	mg/kg		480	mg/kg	0.048 %	✓	
6	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		2.1	mg/kg	1.353	2.842	mg/kg	0.000284 %	✓	
7	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		40	mg/kg	1.579	63.18	mg/kg	0.00632 %	✓	
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		**<LOD**
9	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		**<LOD**
10	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		240	mg/kg	3.22	772.771	mg/kg	0.0773 %	✓	
										Total:	0.17 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH4[7.2m]

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

Sample details

Sample Name:	**BH4[7.2m]**	LoW Code:	
Sample Depth:	**7.20 m**	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	**40.9%** (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 40.9% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17	mg/kg	1.32	15.93	mg/kg	0.00159 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1	mg/kg	1.285	0.912	mg/kg	0.000071 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		42	mg/kg	1.252	37.313	mg/kg	0.00373 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		16	mg/kg	1.462	16.597	mg/kg	0.00166 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	222	mg/kg		157.559	mg/kg	0.0158 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		26	mg/kg	1.579	29.146	mg/kg	0.00291 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		95	mg/kg	3.22	217.096	mg/kg	0.0217 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.039	mg/kg		0.0277	mg/kg	0.00000277 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.009	mg/kg		0.0063	mg/kg	0.000000639 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14	●	acenaphthene	201-469-6	83-32-9		0.027	mg/kg		0.0192	mg/kg	0.00000192 %	✓	
15	●	fluorene	201-695-5	86-73-7		0.025	mg/kg		0.0177	mg/kg	0.00000177 %	✓	
16	●	phenanthrene	201-581-5	85-01-8		0.34	mg/kg		0.241	mg/kg	0.0000241 %	✓	
17	●	anthracene	204-371-1	120-12-7		0.033	mg/kg		0.0234	mg/kg	0.00000234 %	✓	
18	●	fluoranthene	205-912-4	206-44-0		0.113	mg/kg		0.0802	mg/kg	0.00000802 %	✓	
19	●	pyrene	204-927-3	129-00-0		0.092	mg/kg		0.0653	mg/kg	0.00000653 %	✓	
20		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.117	mg/kg		0.083	mg/kg	0.0000083 %	✓	
21		chrysene 601-048-00-0	205-923-4	218-01-9		0.171	mg/kg		0.121	mg/kg	0.0000121 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.078	mg/kg		0.0554	mg/kg	0.00000554 %	✓	
23	●	indeno[123-cd]pyrene	205-893-2	193-39-5		0.071	mg/kg		0.0504	mg/kg	0.00000504 %	✓	
24		dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		0.086	mg/kg		0.061	mg/kg	0.0000061 %	✓	
25	●	benzo[ghi]perylene	205-883-8	191-24-2		0.137	mg/kg		0.0972	mg/kg	0.00000972 %	✓	
26		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.193	mg/kg		0.137	mg/kg	0.0000137 %	✓	
27		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.193	mg/kg		0.137	mg/kg	0.0000137 %	✓	
28	●	pH		PH		7.84	pH		7.84	pH	7.84 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		<LOD
										Total:	0.0483 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH5[2m]

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

Sample details

Sample Name:		LoW Code:	
BH5[2m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
2.00 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
23.2% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 23.2% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15	mg/kg	1.32	16.075	mg/kg	0.00161 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.5	mg/kg	1.285	<0.643	mg/kg	<0.00005 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		145	mg/kg	1.252	147.328	mg/kg	0.0147 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		30	mg/kg	1.462	35.59	mg/kg	0.00356 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	602	mg/kg		488.636	mg/kg	0.0489 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		29	mg/kg	1.579	37.18	mg/kg	0.00372 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		103	mg/kg	3.22	269.194	mg/kg	0.0269 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.074	mg/kg		0.0601	mg/kg	0.00000601 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.044	mg/kg		0.0357	mg/kg	0.00000357 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		0.03	mg/kg		0.0244	mg/kg	0.00000244 %	✓	
15	•	fluorene		201-695-5	86-73-7		0.021	mg/kg		0.017	mg/kg	0.0000017 %	✓	
16	•	phenanthrene		201-581-5	85-01-8		0.49	mg/kg		0.398	mg/kg	0.0000398 %	✓	
17	•	anthracene		204-371-1	120-12-7		0.19	mg/kg		0.154	mg/kg	0.0000154 %	✓	
18	•	fluoranthene		205-912-4	206-44-0		0.879	mg/kg		0.713	mg/kg	0.0000713 %	✓	
19	•	pyrene		204-927-3	129-00-0		0.941	mg/kg		0.764	mg/kg	0.0000764 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.257	mg/kg		1.02	mg/kg	0.000102 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.826	mg/kg		0.67	mg/kg	0.000067 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.816	mg/kg		0.662	mg/kg	0.0000662 %	✓	
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		0.501	mg/kg		0.407	mg/kg	0.0000407 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.348	mg/kg		0.282	mg/kg	0.0000282 %	✓	
25	•	benzo[ghi]perylene		205-883-8	191-24-2		0.678	mg/kg		0.55	mg/kg	0.000055 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.417	mg/kg		1.15	mg/kg	0.000115 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.417	mg/kg		1.15	mg/kg	0.000115 %	✓	
28		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
29		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
30		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
31	•	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
32	•	pH			PH		8.13	pH		8.13	pH	8.13 pH		
33	•	TPH (C6 to C40) petroleum group			TPH		7.6	mg/kg		6.169	mg/kg	0.000617 %	✓	
34		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
35		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
											Total:	0.101 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No free draining liquid phase present, concentration very low.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00061%)

Classification of sample: BH6[1m]

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

Sample details

Sample Name:	LoW Code:	
BH6[1m]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1.00 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:		
15% (dry weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 15% Dry Weight Moisture Correction applied (MC)

#		Determinand / CLP index number / EC Number / CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		15 mg/kg	1.32	17.222 mg/kg	0.00172 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	1 mg/kg	1.285	1.118 mg/kg	0.000087 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		42 mg/kg	1.252	45.717 mg/kg	0.00457 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		15 mg/kg	1.462	19.064 mg/kg	0.00191 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	439 mg/kg		381.739 mg/kg	0.0382 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		18 mg/kg	1.579	24.723 mg/kg	0.00247 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		91 mg/kg	3.22	254.79 mg/kg	0.0255 %	✓	
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		0.108 mg/kg		0.0939 mg/kg	0.00000939 %	✓	
13		acenaphthylene 205-917-1 / 208-96-8		0.201 mg/kg		0.175 mg/kg	0.0000175 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	acenaphthene		201-469-6	83-32-9		0.079	mg/kg		0.0687	mg/kg	0.00000687 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.118	mg/kg		0.103	mg/kg	0.0000103 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		1.969	mg/kg		1.712	mg/kg	0.000171 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.699	mg/kg		0.608	mg/kg	0.0000608 %	✓	
18	●	fluoranthene		205-912-4	206-44-0		3.233	mg/kg		2.811	mg/kg	0.000281 %	✓	
19	●	pyrene		204-927-3	129-00-0		2.372	mg/kg		2.063	mg/kg	0.000206 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		3.324	mg/kg		2.89	mg/kg	0.000289 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		1.387	mg/kg		1.206	mg/kg	0.000121 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.366	mg/kg		1.188	mg/kg	0.000119 %	✓	
23	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.781	mg/kg		0.679	mg/kg	0.0000679 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.455	mg/kg		0.396	mg/kg	0.0000396 %	✓	
25	●	benzo[ghi]perylene		205-883-8	191-24-2		0.857	mg/kg		0.745	mg/kg	0.0000745 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.963	mg/kg		1.707	mg/kg	0.000171 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.963	mg/kg		1.707	mg/kg	0.000171 %	✓	
28	●	pH			PH		8.45	pH		8.45	pH	8.45 pH		
29		cyanides { ● salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
											Total:	0.077 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH6[2m]

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

Sample details

Sample Name:
BH6[2m]
Sample Depth:
2.00 m
Moisture content:
27.2%
(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: 27.2% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		27 mg/kg	1.32	28.026 mg/kg	0.0028 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1 mg/kg	1.285	1.01 mg/kg	0.0000786 %	✓	
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		99 mg/kg	1.252	97.426 mg/kg	0.00974 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		20 mg/kg	1.462	22.98 mg/kg	0.0023 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	1187 mg/kg		933.176 mg/kg	0.0933 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		5 mg/kg	1.353	5.32 mg/kg	0.000532 %	✓	
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		35 mg/kg	1.579	43.461 mg/kg	0.00435 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		139 mg/kg	3.22	351.858 mg/kg	0.0352 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		5.377 mg/kg		4.227 mg/kg	0.000423 %	✓	
13	acenaphthylene		205-917-1	208-96-8		2.351 mg/kg		1.848 mg/kg	0.000185 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	•	acenaphthene		201-469-6	83-32-9		0.994	mg/kg		0.781	mg/kg	0.0000781 %	✓	
15	•	fluorene		201-695-5	86-73-7		3.38	mg/kg		2.657	mg/kg	0.000266 %	✓	
16	•	phenanthrene		201-581-5	85-01-8		27.765	mg/kg		21.828	mg/kg	0.00218 %	✓	
17	•	anthracene		204-371-1	120-12-7		10.691	mg/kg		8.405	mg/kg	0.00084 %	✓	
18	•	fluoranthene		205-912-4	206-44-0		34.308	mg/kg		26.972	mg/kg	0.0027 %	✓	
19	•	pyrene		204-927-3	129-00-0		28.495	mg/kg		22.402	mg/kg	0.00224 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		21.106	mg/kg		16.593	mg/kg	0.00166 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		16.33	mg/kg		12.838	mg/kg	0.00128 %	✓	
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		16.122	mg/kg		12.675	mg/kg	0.00127 %	✓	
23	•	indeno[123-cd]pyrene		205-893-2	193-39-5		10.079	mg/kg		7.924	mg/kg	0.000792 %	✓	
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		10.344	mg/kg		8.132	mg/kg	0.000813 %	✓	
25	•	benzo[ghi]perylene		205-883-8	191-24-2		10.027	mg/kg		7.883	mg/kg	0.000788 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		28.064	mg/kg		22.063	mg/kg	0.00221 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		28.064	mg/kg		22.063	mg/kg	0.00221 %	✓	
28	•	pH			PH		8.38	pH		8.38	pH	8.38 pH		
29		cyanides { • salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2.5	mg/kg	1.884	<4.71	mg/kg	<0.000471 %		**<LOD**
											Total:	0.169 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH7[0.5m]

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

Sample details

Sample Name:
BH7[0.5m]
Sample Depth:
0.5 m
Moisture content:
3.9%
(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: 3.9% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		27	mg/kg	1.32	34.311	mg/kg	0.00343 %	✓	
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<1	mg/kg	1.285	<1.285	mg/kg	<0.0001 %		<LOD
3	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		29	mg/kg	1.252	34.939	mg/kg	0.00349 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		23	mg/kg	1.462	32.354	mg/kg	0.00324 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.1	mg/kg	1.923	<0.192	mg/kg	<0.0000192 %		<LOD
6	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	183	mg/kg		176.131	mg/kg	0.0176 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		16	mg/kg	1.579	24.323	mg/kg	0.00243 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		<1	mg/kg	1.245	<1.245	mg/kg	<0.000124 %		<LOD
11	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		118	mg/kg	3.22	365.684	mg/kg	0.0366 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.002	mg/kg		0.0019	mg/kg	0.000000192 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.004	mg/kg		0.0038	mg/kg	0.000000385 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	acenaphthene		201-469-6	83-32-9		0.016	mg/kg		0.0154	mg/kg	0.00000154 %	✓	
15	fluorene		201-695-5	86-73-7		0.001	mg/kg		0.0009	mg/kg	0.000000096 %	✓	
16	phenanthrene		201-581-5	85-01-8		0.005	mg/kg		0.0048	mg/kg	0.000000481 %	✓	
17	anthracene		204-371-1	120-12-7		0.002	mg/kg		0.0019	mg/kg	0.000000192 %	✓	
18	fluoranthene		205-912-4	206-44-0		0.078	mg/kg		0.0751	mg/kg	0.00000751 %	✓	
19	pyrene		204-927-3	129-00-0		0.153	mg/kg		0.147	mg/kg	0.0000147 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.08	mg/kg		0.077	mg/kg	0.0000077 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		0.061	mg/kg		0.0587	mg/kg	0.00000587 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.047	mg/kg		0.0452	mg/kg	0.00000452 %	✓	
23	indeno[123-cd]pyrene		205-893-2	193-39-5		0.058	mg/kg		0.0558	mg/kg	0.00000558 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.021	mg/kg		0.0202	mg/kg	0.00000202 %	✓	
25	benzo[ghi]perylene		205-883-8	191-24-2		0.062	mg/kg		0.0597	mg/kg	0.00000597 %	✓	
26	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.085	mg/kg		0.0818	mg/kg	0.00000818 %	✓	
27	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.085	mg/kg		0.0818	mg/kg	0.00000818 %	✓	
28	pH			PH		9.21	pH		9.21	pH	9.21 pH		
29	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		**<LOD**
30	phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
										Total:	0.0677 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH7[3m]

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

Sample details

Sample Name:		LoW Code:	
BH7[3m]		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
3 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
17.8% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 17.8% Dry Weight Moisture Correction applied (MC)

#		Determinand CLP index number / EC Number / CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
2		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
3		xylene 601-022-00-9 / 202-422-2 [1], 203-396-5 [2], 203-576-3 [3], 215-535-7 [4] / 95-47-6 [1], 106-42-3 [2], 108-38-3 [3], 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
4	●	ethylbenzene 601-023-00-4 / 202-849-4 / 100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
5	●	TPH (C6 to C40) petroleum group TPH		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
6		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
								Total:	0.00001 %		

Key

(yellow)	User supplied data
(grey)	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: BH7[6.5m]

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

Sample details

Sample Name:
BH7[6.5m]
Sample Depth:
6.50 m
Moisture content:
7.8%
(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: 7.8% Dry Weight Moisture Correction applied (MC)

#		Determinand CLP index number / EC Number / CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		8 mg/kg	1.32	9.798 mg/kg	0.00098 %	✓	
2		cadmium { cadmium sulfide } 048-010-00-4 / 215-147-8 / 1306-23-6	1	1 mg/kg	1.285	1.192 mg/kg	0.0000928 %	✓	
3		copper { copper(II) oxide } 029-016-00-6 / 215-269-1 / 1317-38-0		18 mg/kg	1.252	20.902 mg/kg	0.00209 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		17 mg/kg	1.462	23.049 mg/kg	0.0023 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.1 mg/kg	1.923	<0.192 mg/kg	<0.0000192 %		<LOD
6		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6	1	22 mg/kg		20.408 mg/kg	0.00204 %	✓	
7		mercury { mercury dichloride } 080-010-00-X / 231-299-8 / 7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
8		nickel { nickel dihydroxide } 028-008-00-X / 235-008-5 [1] 234-348-1 [2] / 12054-48-7 [1] 11113-74-9 [2]		28 mg/kg	1.579	41.026 mg/kg	0.0041 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
10		zinc { zinc oxide } 030-013-00-7 / 215-222-5 / 1314-13-2		<1 mg/kg	1.245	<1.245 mg/kg	<0.000124 %		<LOD
11		boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		72 mg/kg	3.22	215.057 mg/kg	0.0215 %	✓	
12		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
13		acenaphthylene 205-917-1 / 208-96-8		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		acenaphthene		201-469-6	83-32-9		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
15		fluorene		201-695-5	86-73-7		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
16		phenanthrene		201-581-5	85-01-8		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
17		anthracene		204-371-1	120-12-7		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
18		fluoranthene		205-912-4	206-44-0		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
19		pyrene		204-927-3	129-00-0		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
21		chrysene	601-048-00-0	205-923-4	218-01-9		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
22		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
23		indeno[123-cd]pyrene		205-893-2	193-39-5		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
25		benzo[ghi]perylene		205-883-8	191-24-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
26		coronene		205-881-7	191-07-1		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
29		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
30		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
31		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
32		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
34		pH			PH		8.67	pH		8.67	pH	8.67 pH		
35		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
36		phenol	604-001-00-2	203-632-7	108-95-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0355 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

lead compounds with the exception of those specified elsewhere in this Annex (worst case)

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 1; Carcinogenic to humans; Lead REACH Consortium considers some lead compounds Carcinogenic category 1A
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

coronene (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/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 Jun 2014
Hazard Statements: STOT SE 2 H371

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s)/Risk Phrase(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on Hazard Statement.

cadmium {cadmium sulfide}

Worst case species based on Hazard Statements.

copper {copper(II) oxide}

Reasonable

chromium in chromium(III) compounds {chromium(III) oxide}

oxide conversion factor included

chromium in chromium(VI) compounds {chromium(VI) oxide}

most conservative

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Hexavalent Chromium not detected above Limit of detection, Chromium present as Chromium 3+

mercury {mercury dichloride}

Worst case species based on Hazard Statements.

nickel {nickel dihydroxide}

Worst case species based on Hazard Statements.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on Hazard Statements.

zinc {zinc oxide}

Concentrations of chromium VI insufficient for zinc chormate to be present.

boron {diboron trioxide; boric oxide}

Reasonable

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2018.306.3704.7580 (03 Nov 2018)
HazWasteOnline Database: 2018.306.3704.7580 (03 Nov 2018)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - 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
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
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

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Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 10.1
BAT REPORT

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

2019

Bat Assessment

Dr Tina Aughney

Bat Eco Services

Bat Eco Services, Ulex House, Drumheel, Lisduff, Virginia, Co. Cavan. A82 XW62.

Licenced Bat Specialist: Dr Tina Aughney (tina@batecoservices.com, 086 4049468)

NPWS licence C30/2017 (Licence to handle bats, expires 31st December 2019)

NPWS licence 33/2017 (Licence to photograph/film bats, expires 31st December 2019)

NPWS licence DER/BAT 2017-09 (Licence to disturb a roost, expires 29th March 2020)

Client: MH Planning

Project Name & Location: Connolly Station, Dublin 1

Report Revision History

Date of Issue	Draft Number	Issued To (process of issuing)
8th August 2019	Draft 1	Davin Aiken, MH Planning by email
21st August 2019	Draft 2	Davin Aiken, MH Planning by email
20th September 2019	Draft 3	Davin Aiken, MH Planning by email
1st October 2019	Final – V2	Davin Aiken, MH Planning by email

Purpose

This document has been prepared as a Report for MH Planning. Only the most up to-date report should be consulted. All previous drafts/reports are deemed redundant in relation to the named site.

Bat Eco Service accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

Carbon Footprint Policy

It is the policy of Bat Eco Services to provide documentation digitally in order to reduce carbon footprint. Printing of reports etc. is avoided, where possible.

Bat Record Submission Policy

It is the policy of Bat Eco Services to submit all bat records to Bat Conservation Ireland database one year post-surveying. This is to ensure that a high level bat database is available for future desktop reviews. This action will be automatically undertaken unless otherwise requested, where there is genuine justification.

Executive Summary

Project Name & Location: Mixed-use development at Connolly Station, Dublin 1

Proposed work: Mixed-use development

Bat Survey Results - Summary

Bat Species	Roosts	Foraging	Commuting
Common pipistrelle *Pipistrellus pipistrellus*		√	√
Soprano pipistrelle *Pipistrellus pygmaeus*			
Nathusius' pipistrelle *Pipistrellus nathusii*			
Leisler's bat *Nyctalus leisleri*		√	√
Brown long-eared bat *Plecotus auritus*			
Daubenton's bat *Myotis daubentonii*			
Natterer's bat *Myotis nattereri*			
Whiskered bat *Myotis mystacinus*			
Lesser horseshoe bat *Rhinolophus hipposideros*			

Bat Survey Duties Completed

Survey	Completed	Survey	Completed
Tree PBR Survey	○	Daytime Building Inspection	●
Static Detector Survey	●	Daytime Bridge Inspection	○
Dusk Bat Survey	●	Dawn Bat Survey	●
Walking Transect	●	Driving Transect	○
Trapping / Mist Netting	○	IR Camcorder filming	○
Endoscope Inspection	●	Other	○

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Contents

1. Introduction

This document provides information on a proposed mixed-use development at Connolly Station, Dublin 1 and its potential effects in relation to local bat populations.

1.1 Relevant Legislation & Bat Species Status in Ireland

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Acts (2000 and 2010). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat *Rhinolophus hipposideros* is further listed under Annex II. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

Also, under existing legislation, the destruction, alteration or evacuation of a known bat roost is a notifiable action and a derogation licence has to be obtained from the *National Parks and Wildlife Service* (NPWS) before works can commence. Any works interfering with bats and especially their roosts, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997 and Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law), issued by NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 "*Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences*" issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16^{th} of May 2007.

There are eleven recorded bat species in Ireland, nine of which are considered resident. Eight resident bat species and one of the vagrant bat species are vesper bats and all vespertilionid bats have a tragus (cartilaginous structure inside the pinna of the ear). Vesper bats are distributed throughout the island. Nathusius' pipistrelle *Pipistrellus nathusii* is a recent addition while the Brandt's bat has only been recorded once to-date (Only record confirmed by DNA testing, all other records has not been genetically confirmed). The ninth resident species is the lesser horseshoe bat *Rhinolophus hipposideros*, which belongs to the Rhinolophidea and has a complex nose leaf structure on the face, distinguishing it from the vesper bats. This species' current distribution is confined to the western seaboard counties of Mayo, Galway, Clare, Limerick, Kerry and Cork. The eleventh bat species, the greater horseshoe bat, was only recorded for the first time in February 2013 in County Wexford and is therefore considered to be a vagrant species.

Irish bat species list (please see Appendices for more information in individual bat species) is presented in Table 1. The current status of the known bat species occurring in Ireland is given in the Table 1 below.

Table 1: Status of the Irish bat fauna (Marnell *et al.*, 2009).

Species: Common Name	Irish Status	European Status	Global Status
Resident Bat Species ^			
Daubenton's bat *Myotis daubentonii*	Least Concern	Least Concern	Least Concern
Whiskered bat *Myotis mystacinus*	Least Concern	Least Concern	Least Concern
Natterer's bat *Myotis nattereri*	Least Concern	Least Concern	Least Concern
Leisler's bat *Nyctalus leisleri*	Near threatened	Least Concern	Least Concern
Nathusius' pipistrelle *Pipistrellus nathusii*	Least Concern	Least Concern	Least Concern
Common pipistrelle *Pipistrellus pipistrellus*	Least Concern	Least Concern	Least Concern
Soprano pipistrelle *Pipistrellus pygmaeus*	Least Concern	Least Concern	Least Concern
Brown long-eared bat *Plecotus auritus*	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat *Rhinolophus hipposideros*	Least Concern	Near threatened	Least Concern
Possible Vagrants ^			
Brandt's bat Myotis brandtii	Data deficient	Least Concern	Least Concern
Greater horseshoe bat *Rhinolophus ferrumequinum*	Data deficient	Near threatened	Near threatened

^ Roche *et al.,* 2014

1.2 Relevant Guidance Documents

This report will draw on guidelines already available in Europe and will use the following documents:

- National Roads Authority (2006) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes
- Collins, J. (Editor) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust, London
- McAney, K. (2006) A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- The status of EU protected habitats and species in Ireland: Conservation status in Ireland of habitats and species listed in the European Council Directive on the Conservation of

Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

Based on the information collected during the desktop studies and bat surveys, the bat ecologist assigns an ecological value to each bat species recorded based on its conservation status at different geographical scales (Table 2). For example, a site may be of national ecological value for a given species if it supports a significant proportion (e.g. 5%) of the total national population of that species.

Table 2: The six-level ecological valuation scheme used in the CIEM Guidelines (2016) Ecological Value

Ecological Value	Geographical Scale of Importance
International	International or European scale
National	The Republic of Ireland or the island of Ireland scale (depending on the bat species)
Regional	Province scale: Leinster
County	County scale: Co. Dublin
Local	Proposed development area and immediate surroundings
Negligible	None, the feature is common and widespread

Impacts on bats can arise from activities that may result in:

- Physical disturbance of bat roosts e.g. destruction or renovation of buildings
- Noise disturbance e.g. increase human presence, use of machinery etc.
- Lighting disturbance
- Loss of roosts e.g. destruction or renovation of buildings
- Modifications of commuting or foraging habitats
- Severance or fragmentation of commuting routes
- Loss of foraging habitats.

It is recognised that any development will have an impact on the receiving environment, but the significance of the impact will depend on the value of the ecological features that would be affected. Such ecological features will be those that are considered to be important and potentially affected by the proposed road improvement scheme.

The guidelines consulted recommend that the potential impacts of a proposed development on bats are assessed as early as possible in the design stage to determine any areas of conflict along each of the proposed route options.

1.3 Project Description

1.3.1 Site Location

The site is located adjacent and to the east of Connelly Station, Dublin 1. The site is bounded by Connolly Station to the west and north, Sheriff Street Lower to the south, Oriel Street Upper to the south, Oriel Hall to the south east and the Centralised Train Control Centre to the north and east. The site area is approximately 2.83 hectares. Further west of Connelly Station is Talbot Street which leads directly to O'Connell Street. To the south is the Inner Dock and George Dock, located adjacent to the city's financial district, the Irish Financial Service Centre (IFSC). The River Liffey is located approximately 450m to the south, To the east is a small area of inner-city housing bounded within the environs of the subject site by the Royal Canal and railway infrastructure servicing Connolly Station and Dublin Port. To the north and northwest is mainly inner-city residential areas with business and retail along the main thoroughfare of Amiens Street.

Recent aerial photography shows that the site is entirely composed of artificial surfaces. Lands marked for proposed development at Connolly Station, Co. Dublin consists of buildings (ranging from modern prefabricated structures, natural stone structures, brick building and concrete block structure), hard stand areas (e.g. car parks).

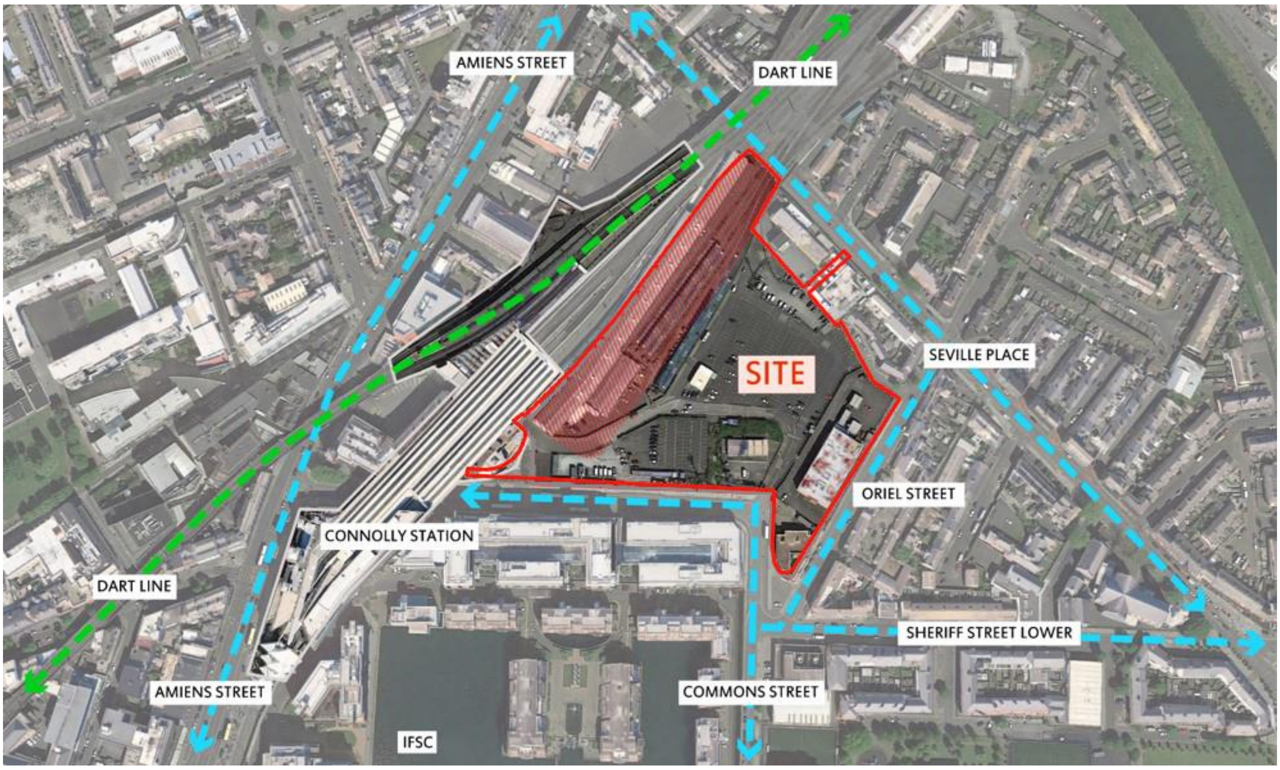

Figure 1 – Aerial view showing red line development boundary (from www.google.com).

1.3.2 Proposed Project

Oxley Holdings Ltd. intend to apply to An Bord Pleanála for permission for a Strategic Housing Development at this site (c. 2.88 hectares) to the rear of Connolly Station, Sherriff Street Lower, Dublin 1, Eircode D01 V6V6. The site abuts Connolly Rail Station and has frontage onto Sherriff Street Lower, Oriel Street Upper and Seville Place.

The development will consist of;

i. the demolition of 4 no. structures with a combined gross floor area of 3,028sq.m;

ii. the construction of 741 no. Build to Rent (BTR) residential units in 8 no. apartment blocks ranging in height from 4 storeys to 23 storeys with lower height buildings located adjacent to the northeast and east site boundaries, with a cumulative gross floor area of 68,535sq.m comprising;

a. Block B1 (maximum building height 54.917m, total gross internal floor area 11,260sq.m, Apartment Mix: Studio: 25, 1-bed: 37, 2-bed: 51);

b. Block B2 (maximum building height 54.917m, total gross internal floor area 10,831sq.m, Apartment Mix: Studio: 20, 1-bed: 35, 2-bed: 51,);

c. Block B3 (maximum building height 51.767m, total gross internal floor area 9,766sq.m, Apartment Mix: Studio: 22, 1-bed: 60, 2-bed: 27, 3-Bed: 1);

d. Block C1 (maximum building height 79,450m, total gross internal floor area 12,705sq.m, Apartment Mix: Studio: 84, 1-bed: 40, 2-bed: 41);

e. Block C2 (maximum building height 39,615 m, total gross internal floor area 4,890 sq.m, Apartment Mix: Studio: 9, 1-bed: 33, 2-bed: 3, 3-Bed: 4);

f. Block C3 (maximum building height 39,650 m, total gross internal floor area 6,775sq.m, Apartment Mix: Studio: 40, 1-bed: 18, 2-bed: 23);

g. Block D1 (maximum building height 53,392 m, total gross internal floor area 8,418 sq.m, Apartment Mix: Studio: 10, 1-bed: 25, 2-bed: 44, 3-Bed: 1);

h. Block D2 (maximum building height 30,950 m, total gross internal floor area 3,890 sq.m, Apartment Mix: Studio: 18, 1-bed: 8, 2-bed: 11);

iii. residential support amenities including 1 no. gyms, a resident’s lounge, work areas, meeting rooms, dining rooms, recreational areas with a combined GFA of 1,444 sq.m;

iv. change of use from club house to pedestrian passageway of the existing vault (137sq.m GFA) fronting Seville Place, a Protected Structure (RPS No. 130);

v. a basement of 7,253.4 sq.m with vehicular access from Oriel Street Upper incorporating residents' car parking (58 no. spaces), residents cycle parking (640 no. spaces) 7 no. plant rooms (combined 2,228sq.m), waste management facilities (393 sq.m)

vi. at surface level X no. car parking spaces, 766 no. covered cycle parking spaces for residents and visitors, concierge office (233 sq.m) and waste management facilities (126 sq.m);

vii. ‘other uses’ including 10 no. units providing retail, commercial, and community use with a combined GFA of 3,142 sq.m;

viii. A total of 18,562 sq.m of hard and soft landscaping comprising both public, communal and private open space located throughout the development;

ix. A service and emergency vehicle only access ramp from the Oriel Street Upper site entrance to serve CIE’s transport needs at Connolly Station;

x. Enabling works of a non-material nature to safeguard the existing vaults (Protected Structures - RPS No. 130) that form part of the subject site fronting Sherriff Street Lower, Oriel Street Upper, and Seville Place during the construction phase;

xi. All associated ancillary development works including drainage, 6 no. electricity substations, pedestrian access; and

xii. Works to the Masonry wall fronting Oriel Street and the Vaults fronting Seville Place (both a Protected Structure) consisting of the creation of a new vehicular and pedestrian entrance

1.3.3 Bat Survey Aims

The aims of the bat survey at the proposed project site are as follows:

- Collect robust data following good practice guidelines to allow an assessment of the potential impacts of the proposed project on local bat populations, both on and off-site;
- Facilitate the design of mitigation, enhancement and monitoring strategies for local bat populations recorded, if required;
- Provide baseline information with which the results of post-construction monitoring surveys can be compared to, where appropriate;
- Provide clear information to enable NPWS and planning authorities to reach robust decisions with definitive required outcomes;
- Assist clients in meeting their statutory obligations;
- Facilitate the conservation of local bat populations.

2. Bat Survey Methodology

2.1 Daytime Inspections

One purpose of daytime inspections is to determine the potential of bat roosts within the survey area. Due to the transient nature of bats and their seasonal life cycle, there are a number of different types of bat roosts. Where possible, one of the objectives of the surveys is to be able to identify the types of roosts present, if any. However, the determination of the type of roost present depends on the timing of the survey and the number of bat surveys completed. Consequently, the definition of roost types, in this report, will be based on the following:

Table 3: Bat Roost Types (Collins 2016).

Roost Type	Definition	Time of Survey
Day Roost	A place where individual bats or small groups of males, rest or shelter in the daytime but are rarely found by night in the summer.	Anytime of the year
Night Roost	A place where bats rest or shelter in the night but are rarely found in the day. May be used by a single bat on occasion or it could be used regularly by the whole colony.	Anytime of the year
Feeding Roost	A place where individual bats or a few bats rest or feed during the night but are rarely present by day.	Anytime of the year
Transitional Roost	A place used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.	Outside the main maternity and hibernation periods.
Swarming Site	Where large numbers of males and females gather. Appear to be important mating sites.	Late summer and autumn
Mating Site	Where mating takes place.	Late summer and autumn
Maternity Site	Where female bats give birth and raise their young to independence.	Summer months
Hibernation Site	Where bats are found, either individually or in groups in the winter months. They have a constant cool temperature and humidity.	Winter months in cold weather conditions
Satellite Roost	An alternative roost found in close proximity to the main nursery colony and is used by a few individuals throughout the breeding season.	Summer months

2.1.1 Building & Structure Inspection

Structures, buildings and other likely places that may provide a roosting space for bats are inspected during the daytime for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past.

Inspections are undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope).

Bridge structures and similar stone structures (e.g. stone arches in the Luggage Store and Warehouse) are assessed using a 4-point classification system designed for bridges by Billington & Norman (1997) as follows:

Table 4: Bridge and Stone Structure Bat Roost Classification System (Adapted from Billington & Norman, 1997).

Bridge Category	Description
0	No potential (i.e. no suitable crevices for roosting bats).
1	Low potential (i.e. crevices present that may be of use to bats).
2	High potential (i.e. crevices ideal for roosting bats but no evidence of usage during inspections).
3	Roost (evidence of bats roosting either because bats are present or other evidence is recorded during inspection (e.g. bat droppings).

2.1.2 Tree Potential Bat Roost (PBRs) Inspection

Trees that may provide a roosting space for bats are classified using the Bat Tree Habitat Key (BTHK, 2018) and the classification system used is from Collins (2016). The Potential Roost Features (PRFs) listed in this guide are used to determine the PBR value of trees.

Trees identified as PBRs are inspected during the daytime, where possible, for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past.

A series of inspections are undertaken. Phase 1 inspections aims to make a list of trees within the proposed development site that may be suitable as roosting sites for bats. Inspections are undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) during the daytime searching for PRFs, if visible. To aid this Phase 1 inspection, tree reports, if available, are consulted to supplement that data collected.

Phase 2 inspections are, generally, recommended once a complete list of trees that have been identified as PBRs, and are marked for felling in order for the proposed development to be undertaken. The Phase 2 inspection will generally involve a closer examination of individual trees using a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope) and where required (and/or possible), height surveys are completed using a ladder. If a tree is deemed to be a roost site then further surveying involving dusk and dawn surveys of the actual trees may be recommended to determine what bat species are present.

Table 5: Tree Bat Roost Category Classification System (Collins, 2016).

Tree Category	Description
1	Trees with multiple, highly suitable features (Potential Roosting Features = PRFs) capable of supporting larger roosts
2	Trees with definite bat potential but supporting features (PRFs) suitable for use by individual bats;
3	Trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features (PRFs) which may have limited potential to support bats;
4	Trees have no potential.

2.1.3 Bat Habitat & Commuting Routes Mapping

The survey site is assessed during daytime walkabout surveys, in relation to potential bat foraging habitat and potential bat commuting routes. Such habitats are classified according to Fossit, 2000 (Appendix 1, Table 1.B) while hedgerows are classified according to BATLAS 2020 classification (Bat Conservation Ireland, 2015) (Appendix 1, Table 1.A). Bat habitats and commuting routes identified are considered in relation to the wider landscape to determine landscape connectivity for local bat populations through the examination of aerial photographs.

2.2 Night-time Bat Detector Surveys

2.2.1 Dusk & Dawn Bat Surveys

Dusk and dawn surveys are comprised of dusk emergence surveys, dawn surveys and walking transects.

Dusk emergence surveys are completed from 10 minutes before sunset to at least 90 minutes post sunset here the surveyors then position themselves adjacent to the building / structure to be surveyed to determine if bats are roosting within, location of roost, number of bats, bat species etc.

Walking transects were completed post dusk emergence survey and involve walking the survey area and adjacent area to determine local foraging and commuting bats.

Dawn surveys are completed 90 minutes before sunrise to10 minutes after sunrise.

Surveys are completed during mild and dry weather conditions with air temperature 8^{o}C or greater. All bat encounters are noted during surveys.

The following equipment is used for all of the above surveys:

Surveyor 1 (Principal surveyor): Wildlife Acoustics Echo Meter Touch (Generation 1, Apple IOS) connected to iPad 2 (32 GB storage) and Petersson D200 Heterodyne Bat Detector.

Surveyor 2: (Field assistant) Wildlife Acoustics Echo Meter Touch2 Pro (Android) connected to Samsung Galaxy Tab S3 and Petersson D200 Heterodyne Bat Detector.

Walking transects involve the surveyor(s) walking the survey area, noting the time, location and bat species encountered. If the mapping facility is used on the Wildlife Acoustics Echo Meter Touch2 Pro (Android) connected to Samsung Galaxy Tab S3, this is mapped using Google Earth with a KLM file produced for mapping purposes. Validation of bat records is completed by the principal bat surveyor prior to mapping. Otherwise, Irish Grid references are recorded and an excel file of bat record locations is produced for mapping.

2.2.2 Passive Static Bat Detector Survey

A Passive Static Bat Surveys involves leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified period of time (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for analysis post surveying). The bat detector is effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter period of time. Bat detectors with ultrasonic microphones are used as the ultrasonic calls produced by bats cannot be heard by human hearing.

The microphone of the unit was position horizontally to reduce potential damage from rain. Bat Logger A+ units and Wildlife Acoustics Song Meter SM2, SM2 BAT+ SM4 Bat FS and SM3 BAT Platform Units use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro SD cards depending on the model) and downloaded for analysis. These results are depicted on a graph showing the number of bat passes per species per hour/night. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

The recordings are analysed using various software. Recordings made by SongMeter SM2 (Unit 2) is analysed using SongScope, SongMeter SM2Bat+ (Unit 4), Audio Moths, Song Meter Bat FS (Units 1-5) and SongMeter 3 recordings are analysed using BatClassifyIreland and Wildlife Acoustics Kaleidoscope Pro. Elekon BatLogger A+ units are analysed using BatExplorer. Each sequence of bat pulses are noted as a bat pass to indicate level of bat activity for each species recorded. This is either expressed as the number of bat passes per hour or per survey night.

The following static units were deployed during this static bat detector survey in 2018 and 2019:

Table 6: Static Bat Detectors deployed during Static Bat Detector Surveys.

Static Unit Code	Bat Detector Type	Recording Function	Microphone
SM2 Unit 2 **SM2 Unit 4**	Wildlife Acoustics SongMeter 2 Bat+	Passive Full Spectrum	SMX-US (connected directly to unit) SMX-U1 (connected directly to unit)
BL Unit A **BL Unit B**	Elekon BatLogger A+ bat detector	Passive Full Spectrum	FG Black microphone, 2m cable
AM Unit 1 **AM Unit 2** **AM Unit 3** **AM Unit 4**	Silicon Labs AudioMoth	Passive Full Spectrum	MEMS microphone which is surface mounted
SM3 Unit 1	Wildlife Acoustics SongMeter 3	Passive Full Spectrum	SMM-U1, 5m cable

2.3 Desktop Review

2.3.1 Bat Conservation Ireland Database

A data base search of the Bat Conservation Ireland database was undertaken for a 1km radius of the proposed development site.

2.4 Photographic Record

A photographic record is completed for the survey and is presented in Section 8.

2.5 Survey Constraints

The following assessment has been completed in relation to Survey Constraints:

Table 7: Survey Constraint Assessment Results.

Category	Discussion
Timing of surveys	2018 – August 29th (1 night) 2019 - July 23th, 25th, and 26th (3 nights)
Weather conditions	Good weather conditions 2018 survey: cloudy, light breeze, dry and 16°C 2019 survey: patchy cloud cover, light breeze, dry and 22°C
Survey effort	Three emergence dusk surveys One dawn survey Two walking transects Internal inspections of buildings / structures
Equipment	All in good working order (ultrasonic microphones are tested for sensitivity at the start of the survey season. Where sensitivity is reduced, microphones are replaced).

It is therefore deemed that the bat survey work completed is appropriate in order to complete an assessment of the potential impacts on bats from the proposed development.

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3. Bat Survey Results

3.1 Daytime Inspections

3.1.1 Building & Structure Inspection

The following buildings / structures were inspected as detailed in Table 8 on numerous dates. As part of the assessment, the structures / buildings are assessed as to whether they are suitable as a bat roost (either as Low / Medium / High suitability). Then if there is evidence of bat roosting, the type of roost is determined according to Table 3. No bat evidence was recorded within or on external surfaces of any of the structures / buildings inspected.

Table 8: Buildings / Structures inspection results.

Building Code	Building / Structure Description Inspection Description	Grid Reference	Roost Suitability	Bat Species Recorded Roost Type
Stone arches, Sherriff Street Lower	An internal inspection of large natural stone arches previous used for luggage storage.	01677334929	Medium – High Bridge Category 2 assessment due to the presence of suitable crevices within the structure.	No evidence of bats recorded.
Oriel House	Red brick building, suspended ceilings, sky light roof. Internal inspection and external wall inspection 29/8/18 & 25/8/19	01684134894	Medium	No evidence of bats recorded.
Connolly Station platform and associated buildings	Large modern prefabricated structures. Internal inspection and external wall inspection on 29/8/18	01674035002	Low	No evidence of bats recorded.
Miscellaneous modern buildings	Modern prefabricated structures, steel containers etc. Internal inspection of main building and external wall inspection of all buildings on 29/8/18 & 25/8/19	01686934940	Low	No evidence of bats recorded.
GAA Vault, Seville Place	Modern renovation of stone vault – plaster seal of original internal stone work. Internal inspection on 2/9/2019.	01685435118	Low	No evidence of bats recorded.

3.1.2 Tree Potential Bat Roost (PBRs) Inspection

There are no trees located within the proposed development area. A small area of vegetation is located within the boundary of the Signal and Electrical Department. This vegetation is primarily shrubs and therefore has no roosting potential for bats.

3.1.3 Bat Habitat & Commuting Routes

The project area is an urban setting with little natural habitat present. The principal area for bat foraging and commuting is likely to be the River Liffey located approximately 450 m from the proposed development area. However, the general survey area is lit up with extensive street lighting and lighting associated with urban areas. As a consequence, the area is not considered to be suitable for foraging. The general area is also considered to be of low value for commuting bats.

3.2 Night-time Bat Detector Surveys

3.2.1 Dusk & Dawn Bat Survey

In 2018, a dusk emergence survey was completed on the 29th August (weather conditions: cloudy, light breeze, dry and 16°C) by two surveyors. During the 2019 surveys, dusk emergence surveys were completed on the 23rd (weather conditions: cloudy, calm, dry and 16°C) and 25th August weather conditions: (patchy cloud cover, light breeze, dry and 22°C) followed by a dawn survey on the 26th August (2 surveyors) (weather conditions: patchy cloud cover, light breeze, dry and 17.5°C). See Table 7 above.

During the 2018 dusk emergence survey, Surveyor 1 was located within the compound of the IT and office buildings and completed an emergence survey of these structures. Surveyor 2 was located in front of the stone arch structures and completed an emergence count of these. No bats were recorded emerging from the buildings on-site. The first bat encounter was at 21:08 hours and this was a Leisler's bat commuting through the site. The second bat was encountered at 21:30 hours and this was a common pipistrelle. Little bat activity was recorded overall during the dusk survey. The activity record is indicative of commuting bats only, no foraging was noted.

The following Table 9 summarises the results of the bat detector surveys completed:

Table 9: Buildings / Structures survey results.

Building Code	Roost Type & Location	Bat Species (No. of bats)	Access Points	Vegetation / Lighting arrangement
Stone arches, **Sherriff Street Lower**	Emergence surveys & Dawn surveys (2018 and 2019) No bat roosts recorded	No bats recorded	No bats recorded	External street lighting No vegetation
Oriel House	Emergence surveys & Dawn surveys (2018 and 2019) No bat roosts recorded	No bats recorded	No bats recorded	External street lighting, Internal lighting Office building – in use No vegetation

Connolly Station platform and associated buildings	Emergence surveys & Dawn surveys (2018 and 2019) No bat roosts recorded	No bats recorded	No bats recorded	External street lighting Main station buildings – in use No vegetation
Miscellaneous modern buildings	Emergence surveys & Dawn surveys (2018 and 2019) No bat roosts recorded	No bats recorded	No bats recorded	External street lighting, Internal lighting Mix-use buildings Some vegetation

During the 2019 emergence dusk and dawn surveys and the walking transects (post dusk and pre-dawn), little bat activity was recorded. Two common pipistrelle encounters were recorded during the 23rd August 2019 survey. Both of these encounters were commuting individuals. This was the same for the walking transect completed on the 25th August 2019: i.e. two common pipistrelle encounters. The walking transects routes shown in Figure 2 and Figure 3 below show the areas walked.

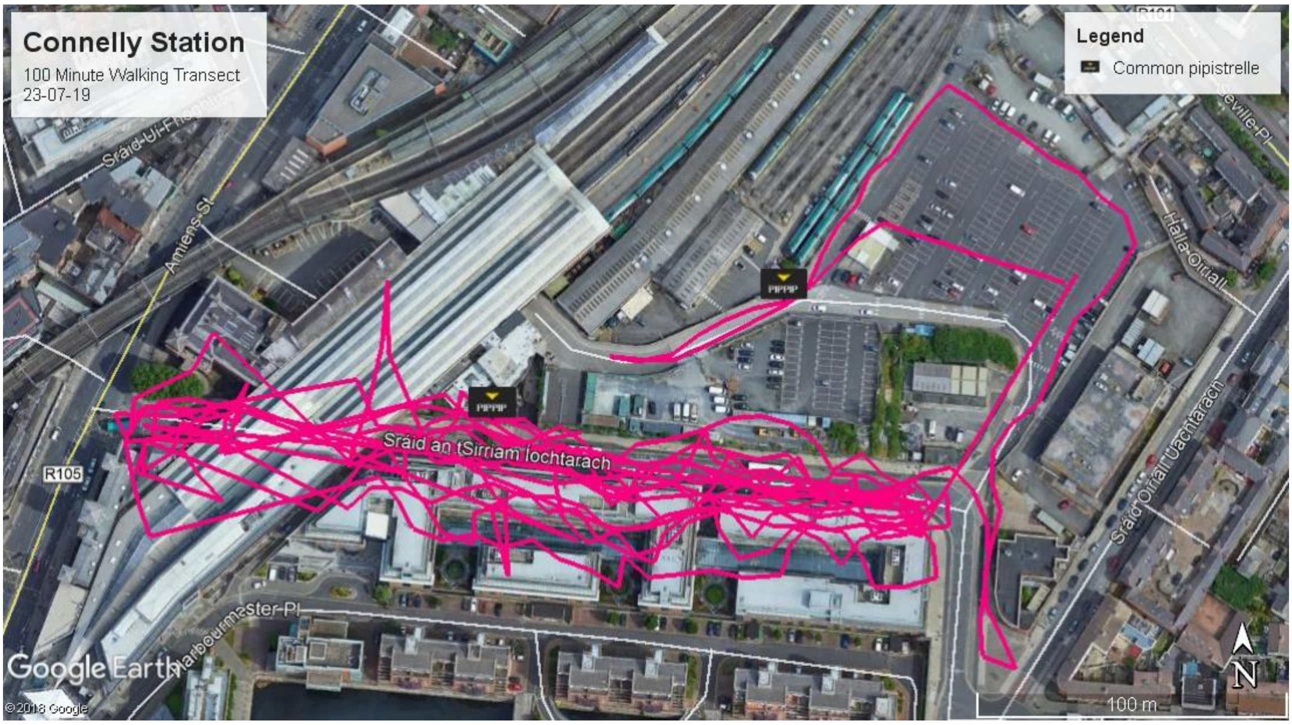

Figure 2: Walking transect completed on the 23rd August 2019 – pink lines show the areas walked.

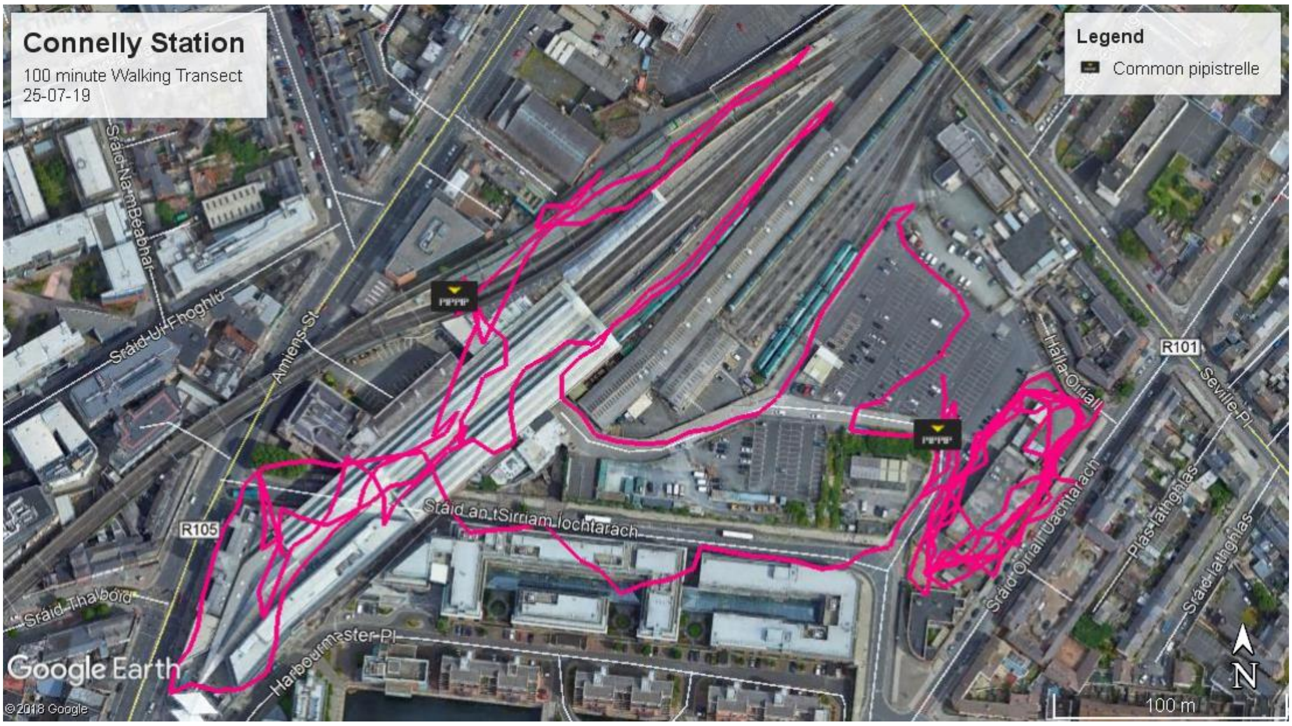

Figure 3: Walking transect completed on the 25th August 2019 – pink lines show the areas walked.

3.2.2 *Passive Static Bat Detector Survey*

Static units were deployed in both 2018 and 2019 surveys for various periods of time as shown in Table 10 and Figure 4 below. No bats were recorded on the static units located inside of buildings in either survey year. In relation to the static unit located outside between Oriel House and IT Building during the 2018 survey, two species of bat were recorded in low activity numbers: common pipistrelle (CP) (3 passes) and Leisler's bat (Leis) (9 passes). These passes were recorded during dusk and dawn and are likely to be commuting bats.

Table 10: Results of Static Bat Detectors deployed during Static Bat Detector Surveys.

Static Code	Location Description	Grid Reference	Survey Period	Bat Species Recorded
BatLogger Unit A	CME Maintenance Plant	O1674035002	29th -30th August 2018	None
BatLogger Unit B	Adjacent to Oriel House and IT Buildings	O1684134894	29th -30th August 2018	CP (3 passes) Leis (9 passes)
AM Units 1 & 2	Oriel House	O1684134894	26th to 29th July 2019	None
AM Units 3 & 4	IT Building	O1686934940	26th to 29th July 2019	None
SM3, SM2 Unit 2, SM2 Unit 4, AM Units 1-4	Rotation within the stone arch buildings	O1677334929	29th -30th August 2018 23rd to 26th July 2019	None

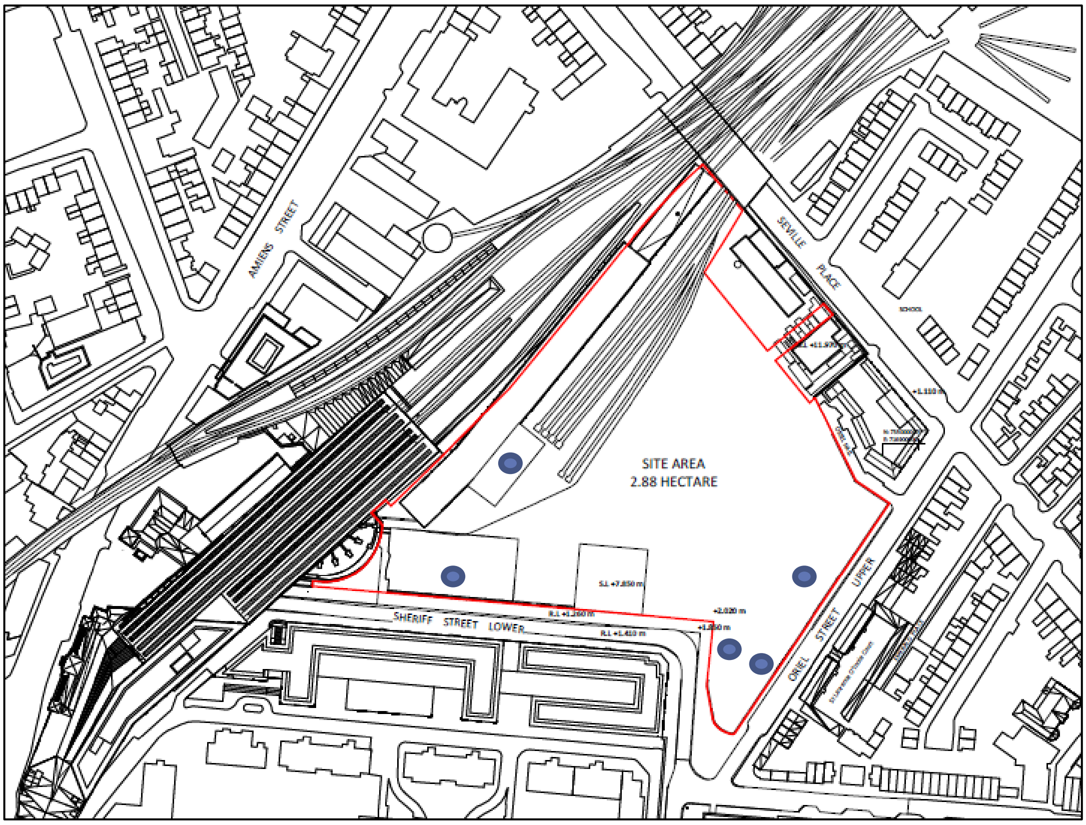

Figure 4: Map of current building layout within survey area and location of static units in 2018 and 2019 survey years.

3.3 Desktop Review

3.3.1 Bat Conservation Ireland Database

A data search of the Bat Conservation Ireland database at a 1km level of the Irish Grid reference O1670034900 was undertaken. Three roosts (Leisler's bat and two unidentified bat roosts) and four Ad Hoc records for Leisler's bat, common pipistrelle, soprano pipistrelle and Nathusius' pipistrelle were recorded within a 1km radius of the proposed development site.

4. Bat Ecological Evaluation

4.1 Bat Species Recorded

Two bat species were recorded within the proposed development site: common pipistrelle and Leisler's bat. Both of these bat species are common Irish bat species. Both were recorded in very low numbers using the proposed development site. The low level of activity reflects primarily commuting individuals with no foraging activity recorded during any of the surveys completed.

While there are extensive buildings within the proposed development site, some of which would be considered suitable to provide roosting sites for bats, their location in a highly urbanised area with little vegetation and a large degree of outdoor and street lighting deems the area to have a low potential for roosting bats. However, as bats are transient and opportunistic mammals, bats can quickly avail of any roosting spaces in a building or structure during inclement weather conditions.

Vegetation within the proposed development area was surveyed for Potential Bat Roosts (PBRs). As there is no tall tree vegetation, no PBRs were recorded.

No bats were recorded roosting in any of the structures / buildings surveyed.

4.2 Bat Foraging Habitat & Commuting Routes

There is little foraging habitat available for local bat populations within the proposed development site. This coupled with the large degree of outdoor and street lighting deems the area to have a low potential for foraging bats. Bat encounters recorded during the bat surveys completed are commuting individuals and the commuting activity recorded was low.

4.3 Zone of Influence – Bat Landscape Connectivity

The general landscape adjacent to the proposed development site is comprised of urbanisation. While the River Liffey is located approximately 450m away from the proposed development site, there is little habitat to connect to this linear habitat feature. In general, the landscape is considered to have a Low connectivity for local bat populations.

5. Impact Assessment

Two bat species were recorded in low activity numbers within the proposed development site. No bats were recorded roosting within buildings and structures examined.

The proposed development site is deemed to have some potential to provide roosting sites for bats but due to the highly urbanised setting, this potential is reduced. Therefore the proposed development site is not considered to be an important area for roosting bats.

There was a low level of bat activity for two species of bat and therefore the proposed development site is not an important area for local bat populations in relation to commuting and foraging individuals.

Landscaping will entail a ground floor street scape, a first floor (Highline) landscaped open spaces to connect each of the blocks, private open roof courtyards (4 floor), and private open rooftop gardens/terraces, as shown in Figure 5. As there is little vegetation in existence within the current area of the proposed development site, plans to increase landscaping will benefit wildlife including local bat populations.

Figure 5: Masterplan open space amenity and landscape plan

The proposed development is likely to entail the following potential impacts during the construction phase:

- Removal of existing buildings
  - Loss of roosting habitat — No impact
- Renovation of stone arches
  - Loss of roosting habitat — Minor Negative impact
- Removal of vegetation
  - Loss of foraging habitat — No impact
- Construction of proposed development
  - Loss of commuting habitat — No impact
- Landscaping (increase of vegetation)
  - Potential foraging habitat — Positive impact

The proposed development is likely to entail the following potential impacts during the operational phase:

- Lighting of proposed development
  - Loss of commuting habitat — Minor Negative impact
- Increase human activity and noise levels
  - Loss of commuting habitat — Minor Negative impact
- Increases landscaping
  - Potential increase of foraging habitat — Positive impact

Therefore it is deemed that the proposed development will have a Minor Negative Impact on local bat populations.

6. Mitigation Measures

The following mitigation measures are recommended to allow the bat activity recorded to continue post-development:

6.1.1 Lighting plan

Nocturnal mammals are impacted by lighting. Therefore, it is important that lighting installed within the proposed development site is completed with sensitivity for local bat wildlife where possible while still providing the necessary lighting for human usage.

- Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following appropriate luminaire specifications are recommended to be considered when choosing luminaires. This is taken from the most recent Bat Conservation Trust (BCT, 2018) Guidance Note 08/18 – Bats and artificial lighting in the UK.

    - All luminaires used should lack UV/IR elements to reduce impact.
    - LED luminaires should be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
    - A warm white spectrum (<2700 Kelvins is recommended to reduce the blue light component of the LED spectrum).
    - Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
    - The use of specialist bollard or low-level downward directional luminaires should be considered in bat sensitive areas to retain darkness above.
    - Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
    - Only luminaires with an upward light ratio of 0% and with good optical control should be used.
    - Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
    - Any external security lighting should be set on motion-sensors and short (1min) timers.
    - As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

In relation to urban lighting, avoid lighting over reflective surfaces and, where possible, use timers to reduce lighting during hours of the night when it is not needed.

For pedestrian lighting, use low level lighting that is as directional as possible and below three lux at ground level with an aim to having it below 1 lux at ground level.

6.1.2 Landscaping plan

The key messages in relation to planting in order to provide foraging habitat for bats is that bats are insectivores and therefore creating areas that will attract nocturnal flying insects will benefit bats. It is important to ensure that as much vegetation is planted with a mixture of flowering plans, trees and shrubs to encourage a diversity of insects, where possible, within the proposed development area. Urban spaces offer a chance to create "green oases" in a city by introducing soft landscaping. The landscaping is recommended to incorporate:

- Native hedgerow tree species
- Individual deciduous trees (in lines) that could potentially provide commuting corridors through the proposed development site
- Flower rich meadows, scrub and groups of trees
- Where possible, include water features connected to other green spaces
- Green roofs, communal wildlife friendly gardens and potentially living walls with climbing plants and creepers with a view of provide connected pockets of foraging habitat (linking in with other streetscape planting e.g. individual trees)
- Avoid the use of chemicals (weed killers, *etc*.) within the development zone.

6.1.3 Vault Inspection

Due to the transient nature of bats, it is recommended that prior to the commencement of development that a bat survey is completed to ensure ensure that no bats area present, particular for the protected structures on Sheriff Street Lower and Seville Place, and prior to pointing of stonework.

7. Residual Impacts

This report provides information on the bat usage of the proposed development site. Two bat species were infrequently recorded during these bat surveys: common pipistrelle and Leisler's bat.

A low level of bat activity of common pipistrelles and Leisler's bats was recorded. In relation to the bat evidence collected by this report, it is deemed that the bat populations recorded within the survey area are of Negligible Importance.

This proposed development site has low levels of bat usage. The proposed development site provides limited commuting habitat for bats. Therefore, it is considered that the proposed development of the site will have Minor Negative impact on local bat populations.

A number of mitigation measures have been provided and incorporated into the design of the proposed development, and strict adherence to these will reduce the overall impact level of potential impact to Negligible.

Implementation of the mitigation measures provided will maintain commuting usage of the general area of the proposed development for local bat populations. Landscaping, in particular, will likely have a positive impact on local bat populations. Following the lighting recommendations will also have a positive impact on local bat populations.

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9. Photograph Catalogue

9.1 Oriel House




9.2 Connolly Station: Train Service Depot

9.3 Stone arches along Sherriff Street Lower

9.4 Miscellaneous structures within the proposed development area.

APPENDIX 11.1
NOISE & VIBRATION MEASUREMENT LOCATIONS

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix 11.1 Noise Measurement Locations

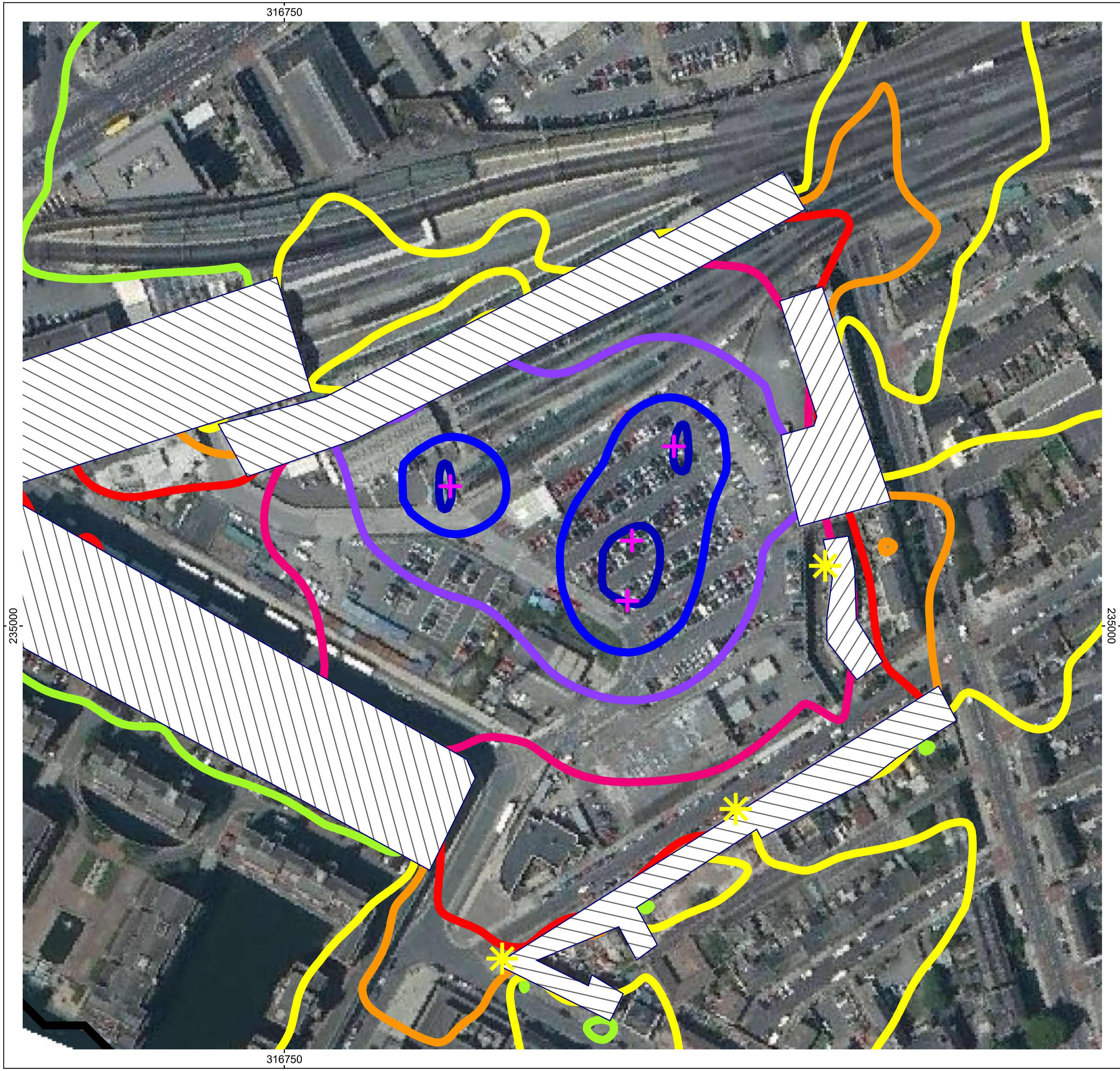
APPENDIX 11.1 NOISE MEASUREMENT LOCATIONS

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 11.2
SOUNDPLAN NOISE OUTPUT

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019



Customer:
Ballymore
Project: Connolly Station
Project-No. 2018300

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

Map
1

Connolly Station

Construction on site

Levels Ld
in dB(A)

=	35.0
=	40.0
=	45.0
=	50.0
=	55.0
=	60.0
=	65.0
=	70.0
=	75.0

Signs and symbols
Point receiver
Industrial building
Noise calculation area
Geometry bitmap
Source
Main building

N

Length scale 1:964
0 5 10 20 30 40 m

IRWIN CARR
CONSULTING

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 11.3
CALIBRATION CERTIFICATE

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Calibration Certificate

Certificate Number 2018006022
Customer:
Environmental Measurement
Unit 12
Dublin, 24, Ireland

Model Number	LxT SE	***Procedure Number***	D0001.8378		
Serial Number	0005614	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	14 Jun 2018		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.54	°C	± 0.25 °C
Description	Sound Expert LxT Class 1 Sound Level Meter Firmware Revision: 2.302	***Humidity***	49.5	%RH	± 2.0 %RH
		Static Pressure	85.68	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRMLxT1L S/N 055671 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 23.6 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis LxT Manual for SoundTrack LxT & SoundExpert Lxt, I770.01 Rev J Supporting Firmware Version 2.301, 2015-04-30

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa

Calibration Certificate

Certificate Number 2018006767
Customer:
Environmental Measurement
Unit 12
Dublin, 24, Ireland

Model Number	LxT SE	***Procedure Number***	D0001.8378		
Serial Number	0005646	***Technician***	Ron Harris		
Test Results	**Pass**	***Calibration Date***	5 Jul 2018		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	23.4	°C	± 0.25 °C
Description	Sound Expert LxT	***Humidity***	49.8	%RH	± 2.0 %RH
	Class 1 Sound Level Meter	***Static Pressure***	86.95	kPa	± 0.13 kPa
	Firmware Revision: 2.302				

Evaluation Method Tested electrically using Larson Davis PRMLxT1L S/N 055677 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 μPa assuming a microphone sensitivity of 23.6 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Correction data from Larson Davis LxT Manual for SoundTrack LxT & SoundExpert Lxt, I770.01 Rev J Supporting Firmware Version 2.301, 2015-04-30

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 μPa

Larson Davis, a division of PCB Piezotronics, Inc
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ilac-MRA A2LA ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

APPENDIX 12.1

POLLUTANT CONCENTRATIONS DUE TO TRAFFIC EMISSIONS

VOLUME III

APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix 12-1 Pollutant concentrations due to traffic emissions per assessed year

Receptor Name	MET Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	Annual mean µg m^{-3}
Without Development 2018	2013			
R1-3- N		4.0	2.0	0.2
R4-6- E		3.7	1.8	0.2
R7-9 - S		3.6	1.8	0.2
R10-12 SW		2.3	1.1	0.1
R13-15 - W		2.6	1.3	0.1
Without Development 2018	2014			
R1-3- N		4.0	2.0	0.2
R4-6- E		3.7	1.8	0.2
R7-9 - S		3.6	1.8	0.2
R10-12 SW		2.3	1.1	0.1
R13-15 - W		2.7	1.3	0.2
Without Development 2018	2015			
R1-3- N		3.7	1.8	0.2
R4-6- E		3.5	1.7	0.2
R7-9 - S		3.4	1.7	0.2
R10-12 SW		2.2	1.1	0.1
R13-15 - W		2.6	1.3	0.1
Without Development 2018	2016			

Receptor Name	MET Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	**Annual mean µg m^{-3}**	**Annual mean µg m^{-3}**
R1-3- N		4.0	2.0	0.2
R4-6- E		3.8	1.8	0.2
R7-9 - S		3.6	1.8	0.2
R10-12 SW		2.3	1.1	0.1
R13-15 - W		2.7	1.3	0.2
Without Development 2018	2017			
R1-3- N		3.1	1.5	0.2
R4-6- E		3.1	1.5	0.2
R7-9 - S		3.1	1.5	0.2
R10-12 SW		2.2	1.1	0.1
R13-15 - W		2.6	1.3	0.1
Without Development 2022	2013			
R1-3- N		3.1	1.5	0.2
R4-6- E		2.8	1.4	0.2
R7-9 - S		2.7	1.3	0.2
R10-12 SW		1.7	0.9	0.1
R13-15 - W		2.0	1.0	0.1
Without Development 2022	2014			
R1-3- N		2.8	1.4	0.2
R4-6- E		2.6	1.3	0.2
R7-9 - S		2.6	1.3	0.2
R10-12 SW		1.7	0.9	0.1
R13-15 - W		2.0	1.0	0.1

Receptor Name	MET Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	**Annual mean µg m^{-3}**	**Annual mean µg m^{-3}**
Without Development 2022	2015			
R1-3- N		2.8	1.5	0.2
R4-6- E		2.6	1.4	0.2
R7-9 - S		2.6	1.3	0.2
R10-12 SW		1.7	0.9	0.1
R13-15 - W		2.0	1.0	0.1
Without Development 2022	2016			
R1-3- N		3.0	1.5	0.2
R4-6- E		2.8	1.4	0.2
R7-9 - S		2.7	1.3	0.2
R10-12 SW		1.8	0.9	0.1
R13-15 - W		2.1	1.0	0.1
Without Development 2022	2017			
R1-3- N		2.4	1.2	0.2
R4-6- E		2.3	1.1	0.2
R7-9 - S		2.3	1.2	0.2
R10-12 SW		1.7	0.8	0.1
R13-15 - W		2.0	1.0	0.1
With Development 2022	2013			
R1-3- N		3.3	1.7	0.2
R4-6- E		3.8	1.9	0.3
R7-9 - S		4.1	2.1	0.3
R10-12 SW		2.0	1.0	0.1

Receptor Name	MET Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	**Annual mean µg m^{-3}**	**Annual mean µg m^{-3}**
R13-15 - W		2.1	1.1	0.2
With Development 2022	2014			
R1-3- N		3.2	1.7	0.2
R4-6- E		3.8	1.9	0.3
R7-9 - S		4.1	2.1	0.3
R10-12 SW		2.0	1.1	0.1
R13-15 - W		2.1	1.1	0.2
With Development 2022	2015			
R1-3- N		3.0	1.5	0.2
R4-6- E		3.6	1.8	0.3
R7-9 - S		3.9	2.0	0.3
R10-12 SW		2.0	1.0	0.1
R13-15 - W		2.1	1.1	0.2
With Development 2022	2016			
R1-3- N		3.2	1.7	0.2
R4-6- E		3.8	1.9	0.3
R7-9 - S		4.1	2.1	0.3
R10-12 SW		2.0	1.0	0.1
R13-15 - W		2.1	1.1	0.2
With Development 2022	2017			
R1-3- N		2.5	1.3	0.2
R4-6- E		3.1	1.6	0.2
R7-9 - S		3.6	1.8	0.3

Receptor Name	MET Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	**Annual mean µg m^{-3}**	**Annual mean µg m^{-3}**
R10-12 SW		1.9	1.0	0.1
R13-15 - W		2.1	1.1	0.2
Without Development 2037	2013			
R1-3- N		2.6	1.3	0.2
R4-6- E		2.4	1.2	0.2
R7-9 - S		2.3	1.2	0.2
R10-12 SW		1.5	0.7	0.1
R13-15 - W		1.7	0.8	0.2
Without Development 2037	2014			
R1-3- N		2.6	1.3	0.2
R4-6- E		2.4	1.2	0.2
R7-9 - S		2.3	1.2	0.2
R10-12 SW		1.5	0.8	0.1
R13-15 - W		1.8	0.9	0.2
Without Development 2037	2015			
R1-3- N		2.4	1.2	0.2
R4-6- E		2.3	1.1	0.2
R7-9 - S		2.2	1.1	0.2
R10-12 SW		1.5	0.7	0.1
R13-15 - W		1.7	0.9	0.2
Without Development 2037	2016			
R1-3- N		2.6	1.3	0.2
R4-6- E		2.4	1.2	0.2

Receptor Name	MET Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	Annual mean µg m^{-3}	Annual mean µg m^{-3}
R7-9 - S		2.4	1.2	0.2
R10-12 SW		1.5	0.8	0.1
R13-15 - W		1.8	0.9	0.2
Without Development 2037	2017			
R1-3- N		2.0	1.0	0.2
R4-6- E		2.0	1.0	0.2
R7-9 - S		2.0	1.0	0.2
R10-12 SW		1.4	0.7	0.1
R13-15 - W		1.7	0.9	0.2
With Development 2037	2013			
R1-3- N		2.8	1.4	0.3
R4-6- E		3.1	1.5	0.3
R7-9 - S		3.3	1.6	0.3
R10-12 SW		1.7	0.8	0.2
R13-15 - W		1.8	0.9	0.2
With Development 2037	2014			
R1-3- N		2.8	1.4	0.3
R4-6- E		3.1	1.5	0.3
R7-9 - S		3.3	1.6	0.3
R10-12 SW		1.7	0.9	0.2
R13-15 - W		1.8	0.9	0.2
With Development 2037	2015			
R1-3- N		2.6	1.3	0.2

Receptor Name	MET Year	Pollutant concentrations at receptors (excluding background concentrations)		
		NO_x	NO_2	PM_{10}
		Annual mean µg m^{-3}	**Annual mean µg m^{-3}**	**Annual mean µg m^{-3}**
R4-6- E		2.9	1.4	0.3
R7-9 - S		3.2	1.6	0.3
R10-12 SW		1.6	0.8	0.2
R13-15 - W		1.8	0.9	0.2
With Development 2037	2016			
R1-3- N		2.8	1.4	0.3
R4-6- E		3.1	1.5	0.3
R7-9 - S		3.3	1.6	0.3
R10-12 SW		1.7	0.8	0.2
R13-15 - W		1.8	0.9	0.2
With Development 2037	2017			
R1-3- N		2.7	1.3	0.3
R4-6- E		3.1	1.5	0.3
R7-9 - S		3.3	1.6	0.3
R10-12 SW		1.7	0.8	0.2
R13-15 - W		1.8	0.9	0.2

TABLE A1: POLLUTANT CONCENTRATIONS DUE TO TRAFFIC EMISSIONS – EXCLUDING BACKGROUND

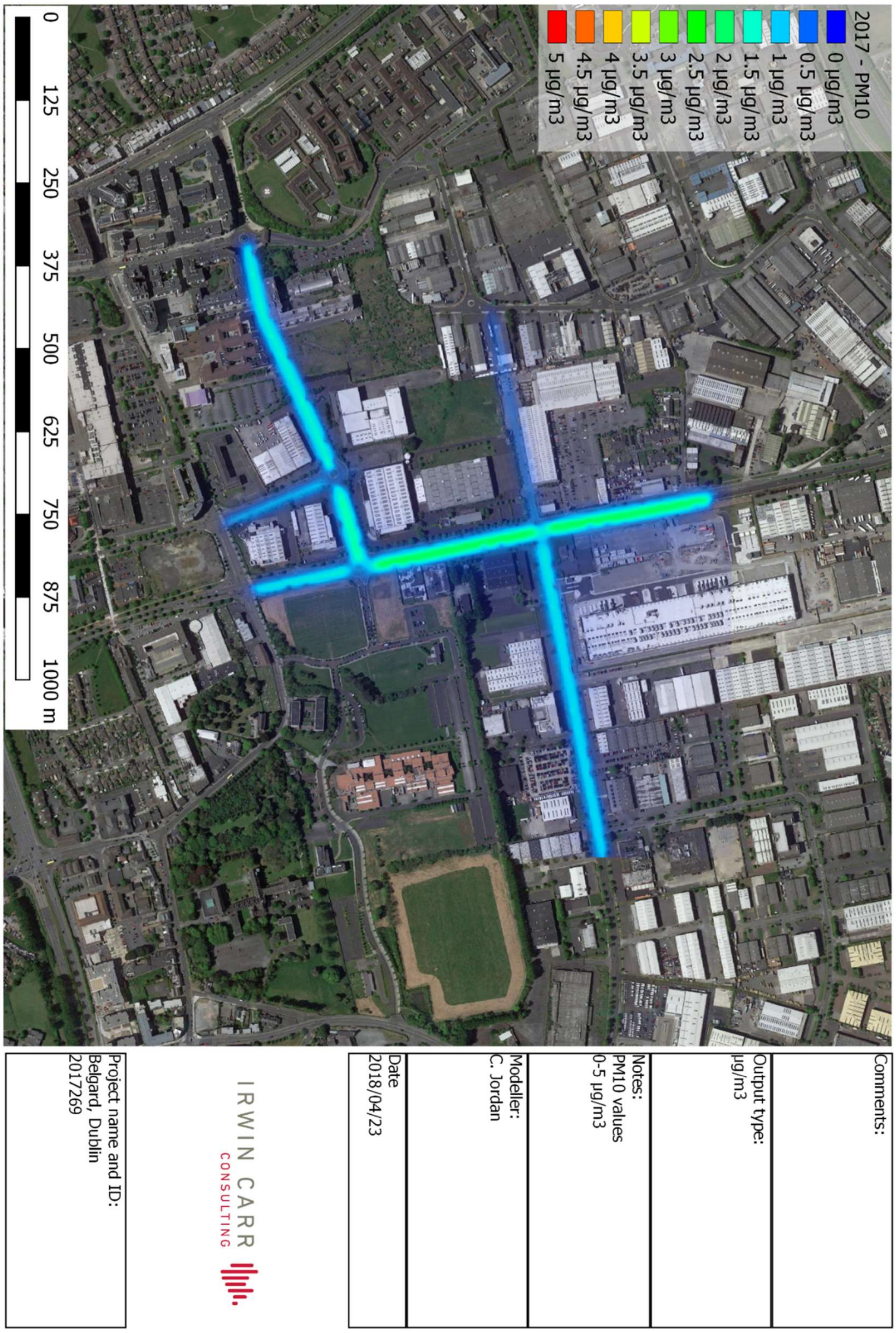
Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 12.2
GRAPHICAL REPRESENTATION OF POLLUTANT CONCENTRATIONS

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix 12-2 Graphical Representation of pollutant concentrations due to traffic emissions



Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 13.1
SMR/RMP SITE WITHIN THE SURROUNDING AREA

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix 13.1 SMR/RMP site within the surrounding area

SMR No	DU018-020
RMP Status	Yes
Location	Dublin city
I.T.M.	Various
Classification	Zone of archaeological potential
Dist. from development	100m west
Description	Zone of archaeological potential for historic city of Dublin
Reference	www.archaeology.ie

SMR No	DU018-020501
RMP Status	No
Location	Talbot St
I.T.M.	716382, 734877
Classification	Mill - unclassified
Dist. from development	295m west
Description	No information available
Reference	www.archaeology.ie

SMR No	DU018-020502
RMP Status	No
Location	North of Custom House
I.T.M.	716400, 734651
Classification	Sea wall
Dist. from development	390m southwest
Description	No information available

SMR No	**DU018-020502**
Reference	www.archaeology.ie

SMR No	**DU018-020152-**
RMP Status	No
Location	Custom House Quay
I.T.M.	716518, 734553
Classification	Glasshouse
Dist. from development	415m south
Description	There is a glasshouse marked on Rocques map 1756.
Reference	www.archaeology.ie

APPENDIX 13.2
LEGISLATION PROTECTING THE ARCHAEOLOGICAL RESOURCE

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix 13.2 Legislation protecting the archaeological resource

PROTECTION OF CULTURAL HERITAGE

The cultural heritage in Ireland is safeguarded through national and international policy designed to secure the protection of the cultural heritage resource to the fullest possible extent (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 35). This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention), ratified by Ireland in 1997.

THE ARCHAEOLOGICAL RESOURCE

The National Monuments Act 1930 to 2014 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes. A National Monument is described as ‘a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto’ (National Monuments Act 1930 Section 2). A number of mechanisms under the National Monuments Act are applied to secure the protection of archaeological monuments. These include the Register of Historic Monuments, the Record of Monuments and Places, and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

OWNERSHIP AND GUARDIANSHIP OF NATIONAL MONUMENTS

The Minister may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

REGISTER OF HISTORIC MONUMENTS

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the register is illegal without the permission of the Minister. Two months’ notice in writing is required prior to any work being undertaken on or in the vicinity of a registered monument. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

PRESERVATION ORDERS AND TEMPORARY PRESERVATION ORDERS

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

RECORD OF MONUMENTS AND PLACES

Section 12(1) of the 1994 Act requires the Minister for Arts, Heritage, Gaeltacht and the Islands (now the Minister for the Department of Culture, Heritage and the Gaeltacht) to establish and maintain a record of monuments and places where the Minister believes that such monuments exist. The record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the state. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994. All recorded monuments on the proposed development site are represented on the accompanying maps.

Section 12(3) of the 1994 Act provides that ‘where the owner or occupier (other than the Minister for Arts, Heritage, Gaeltacht and the Islands) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Arts, Heritage, Gaeltacht and the Islands to carry out work and shall not, except in case of urgent necessity and with the consent of the Minister, commence the work until two months after giving of notice’.

Under the National Monuments (Amendment) Act 2004, anyone who demolishes or in any way interferes with a recorded site is liable to a fine not exceeding €3,000 or imprisonment for up to 6 months. On summary conviction and on conviction of indictment, a fine not exceeding €10,000 or imprisonment for up to 5 years is the penalty. In addition, they are liable for costs for the repair of the damage caused.

In addition to this, under the European Communities (Environmental Impact Assessment) Regulations 1989, Environmental Impact Statements (EIS) are required for various classes and sizes of development project to assess the impact the proposed development will have on the existing environment, which includes the cultural, archaeological and built heritage resources. These document’s recommendations are typically incorporated into the conditions under which the proposed development must proceed, and thus offer an additional layer of protection for monuments which have not been listed on the RMP.

THE PLANNING AND DEVELOPMENT ACT 2000

Under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies with regard to the growth of the area over a five-year period. They cover a range of issues including archaeology and built heritage, setting out their policies and objectives with regard to the protection and enhancement of both. These policies can vary from county to county. The Planning and Development Act 2000 recognises that proper planning and sustainable development includes the protection of the archaeological heritage. Conditions relating to archaeology may be attached to individual planning permissions.

Dublin City Development Plan 2016–2022:

It is the policy of Dublin City Council:

CHC9: To protect and preserve National Monuments

1. To protect archaeological material in situ by ensuring that only minimal impact on archaeological layers is allowed, by way of the re-use of buildings, light buildings, foundation design or the omission of basements in the Zones of Archaeological Interest.

2. That where preservation in situ is not feasible, sites of archaeological interest shall be subject to ‘preservation by record’ according to best practice in advance of re-development.

3. That sites within Zones of Archaeological Interest will be subject to consultation with the City Archaeologist and archaeological assessment prior to a planning application being lodged.

4. That the National Monuments Service will be consulted in assessing proposals for development which relate to Monuments and Zones of Archaeological Interest.

5. To preserve known burial grounds and disused historic graveyards, where appropriate, to ensure that human remain are re-interred, except where otherwise agreed with the National Museum of Ireland.

6. That in evaluating proposals for development in the vicinity of the surviving sections of the city wall that due recognition be given to their national significance and their special character.

7. To have regard to the Shipwreck inventory maintained by the DAHG. Proposed developments that may have potential to impact on riverine, inter-tidal and sub-tidal environments shall be subject to an underwater archaeological assessment in advance of works.

8. To have regard to DAHG policy documents and guidelines relating to archaeology.

It is an objective of Dublin City Council:

CHCO10:

1. To implement the archaeological actions of the Dublin City Heritage Plan 2002–2006 in light of the Dublin City Heritage Plan Review 2012.

2. To prepare and implement conservation plans for National Monuments and Monuments in DCC care (City Walls, St Luke’s Church, St James’s Graveyard, St Thomas’s Abbey, St Canice’s Graveyard etc).

3. To maintain, develop and promote the Dublin City Archaeological Archive (DCAA) at Pearse Street Library and Archives.

4. To ensure the public dissemination of the findings of licensed archaeological activity in Dublin through the Dublin County Archaeology GIS.

5. To develop a long-term management plan to promote the conservation, management and interpretation of archaeological sites and monuments and to identify areas for strategic research.

6. To have regard to the city’s industrial heritage and Dublin City Industrial Heritage Record (DCIHR) in the preparation of Local Area Plans (LAPs) and the assessment of planning applications and to publish the DCIHR online. To review the DCIHR in accordance with Ministerial recommendations arising from the national Inventory of Architectural Heritage (NIAH) survey of Dublin City and in accordance with the Strategic Approach set out in Section 11.1.4 of this chapter.

7. To promote awareness of, and access to, the city’s archaeological inheritance and foster high-quality public archaeology.

8. To promote archaeological best practice in Dublin city.

9. To promote the awareness of the international significance of Viking Dublin and to support post-excavation research into the Wood Quay excavations 1962 – 1981.

10. To develop a strategy for the former Civic Museum collection and for other collections of civic interest and importance.

11. To investigate the potential for the erection of Columbarium Walls.

12. To support the implementation of the Kilmainham Mill Conservation Plan.

13. Dublin City Council will seek to work with Diageo to undertake a more comprehensive industrial heritage survey of the constituent historic buildings within the Guinness Brewery complex at St James’s Gate.

14. To implement and promote The Dublin Principles (ICOMOS, 2011) as guiding principles to assist in the documentation, protection, conservation and appreciation of industrial heritage as part of the heritage of Dublin and Ireland.

15. To continue to implement actions of the St Luke’s Conservation Plan on the basis of funds available to conserve the monument, recover the graveyard, provide visitor access, improve visual amenity and secure an appropriate new use.

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 13.3
IMPACT ASSESSMENT AND THE CULTURAL HERITAGE RESOURCE

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix 13.3 Impact assessment and the cultural heritage resource

POTENTIAL IMPACTS ON ARCHAEOLOGICAL AND HISTORICAL REMAINS

Impacts are defined as 'the degree of change in an environment resulting from a development' (Environmental Protection Agency 2017). They are described as profound, significant or slight impacts on archaeological remains. They may be negative, positive or neutral, direct, indirect or cumulative, temporary or permanent.

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological and historical resources potentially affected. Development can affect the archaeological and historical resource of a given landscape in a number of ways.

Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape.

Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation.

Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits.

Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value.

Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow.

Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluviums or peat deposits.

Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, and service trenches.

Although not widely appreciated, positive impacts can accrue from developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments, and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

PREDICTED IMPACTS

The severity of a given level of land-take or visual intrusion varies with the type of monument, site or landscape features and its existing environment. Severity of impact can be judged taking the following into account:

The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;

Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;

Assessment of the levels of noise, visual and hydrological impacts, either in general or site-specific terms, as may be provided by other specialists.

APPENDIX 13.4

MITIGATION MEASURES AND THE CULTURAL HERITAGE RESOURCE

VOLUME III

APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix 13.4 Mitigation measures and the cultural heritage resource

POTENTIAL MITIGATION STRATEGIES FOR CULTURAL HERITAGE REMAINS

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved in situ.

DEFINITION OF MITIGATION STRATEGIES

ARCHAEOLOGICAL RESOURCE

The ideal mitigation for all archaeological sites is preservation in situ. This is not always a practical solution, however. Therefore, a series of recommendations are offered to provide ameliorative measures where avoidance and preservation in situ are not possible.

Archaeological Test Trenching can be defined as ‘a limited programme of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land, inter-tidal zone or underwater. If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their worth in a local, regional, national or international context as appropriate’ (CIfA 2014a).

Full Archaeological Excavation can be defined as ‘a programme of controlled, intrusive fieldwork with defined research objectives which examines, records and interprets archaeological deposits, features and structures and, as appropriate, retrieves artefacts, ecofacts and other remains within a specified area or site on land, inter-tidal zone or underwater. The records made and objects gathered during fieldwork are studied and the results of that study published in detail appropriate to the project design’ (CIfA 2014b).

Archaeological Monitoring can be defined as ‘a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive (CIfA 2014c).

Underwater Archaeological Assessment consists of a programme of works carried out by a specialist underwater archaeologist, which can involve wade surveys, metal detection surveys and the excavation of test pits within the sea or riverbed. These assessments are able to access and assess the potential of an underwater environment to a much higher degree than terrestrial based assessments.

Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 14.A
HISTORIC MAPPING

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

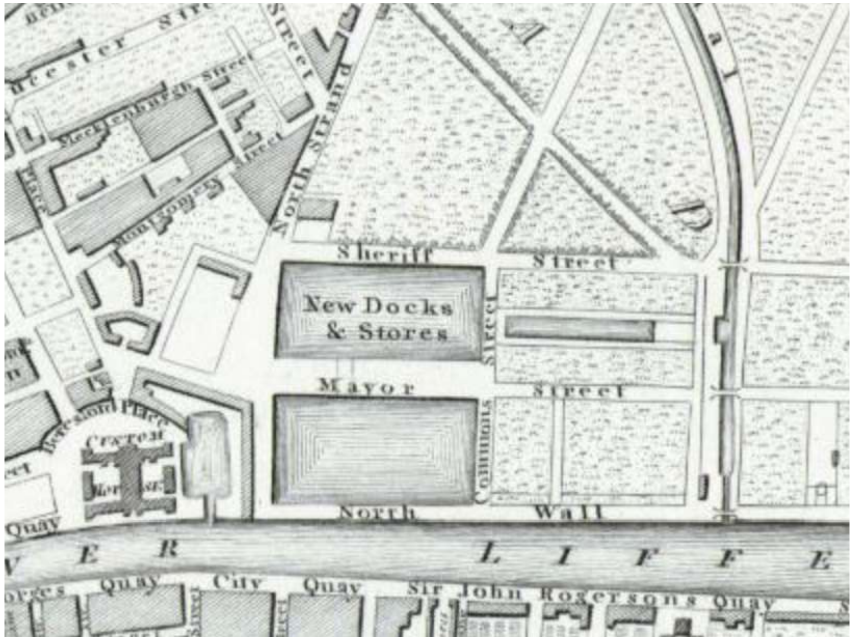
Appendix A

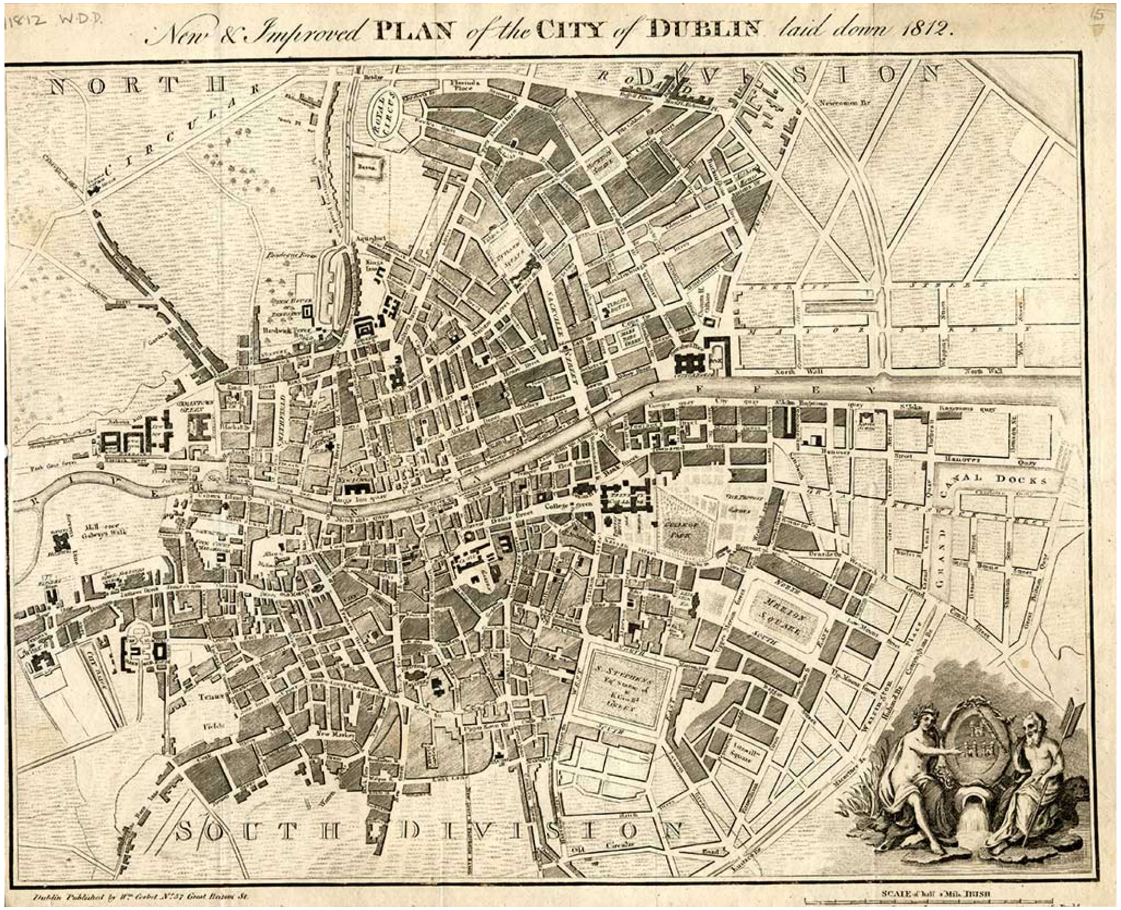
Reviews historic mapping relevant to the period of the development of the site and that reveals the development of the urban landscape over time.

Appendix A
Historic Maps 1812 - 1910

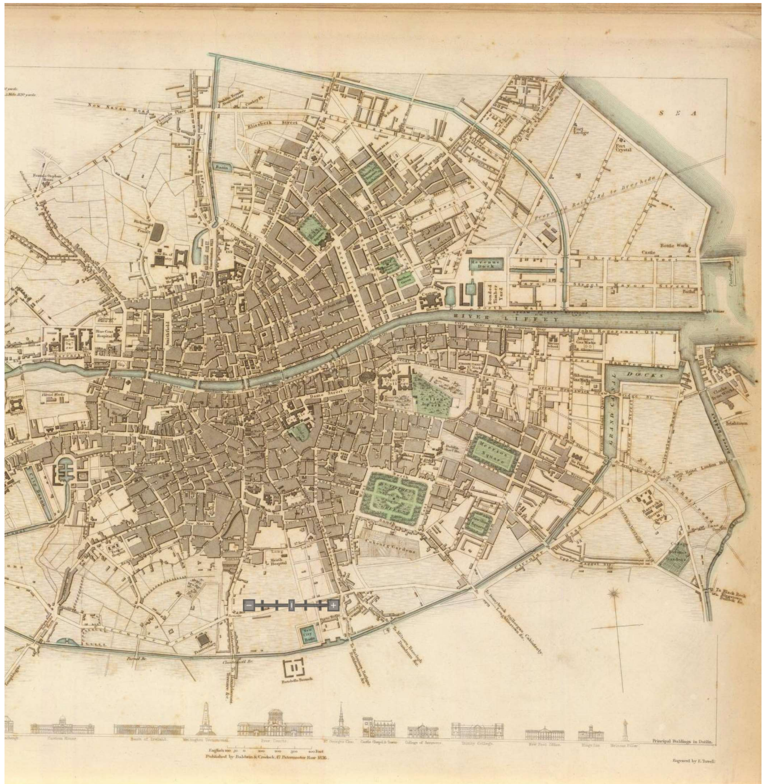
Plan of the City of Dublin 1812 Society of Diffusion of Useful Knowledge

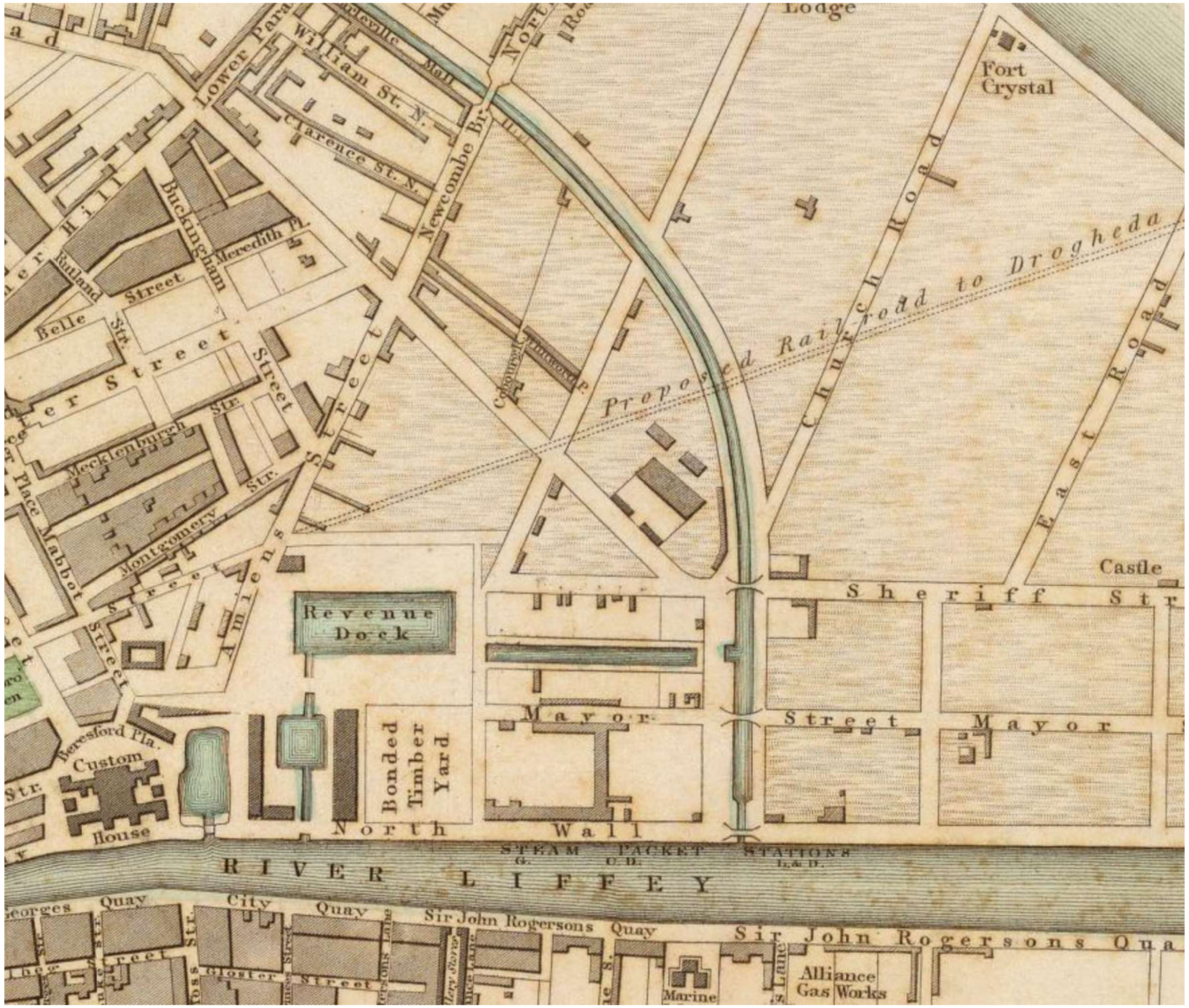
Detail from Plan of Dublin 1818



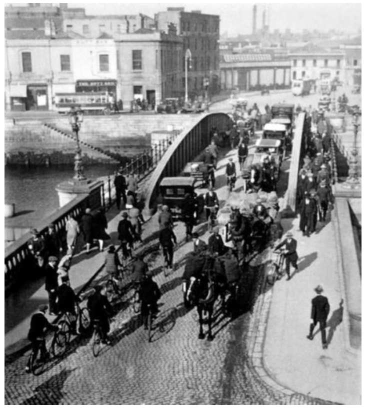


The previous maps do not show the proposed line of the railway to Drogheda but it appears on this map of Dublin dated 1836.
As entering the city from the north east
A detail is shown in the right hand side illustration the tracks terminating at the junction of Sheriff Street and Amiens Street.





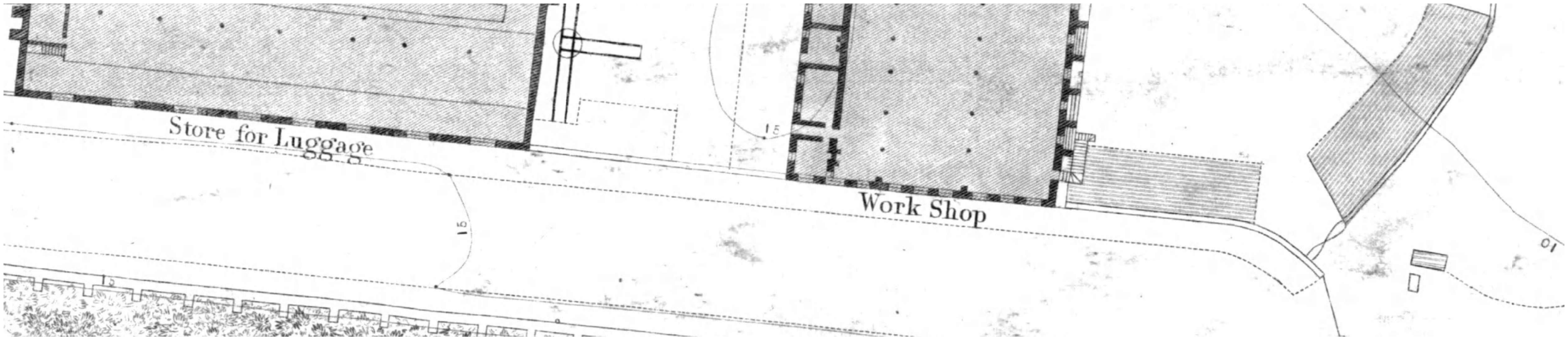
1855 Frasers map of Dublin and environs shows how little development had occurred east of the site. Buildings indicated are metal works, vinegar works vitriol works and glass works.

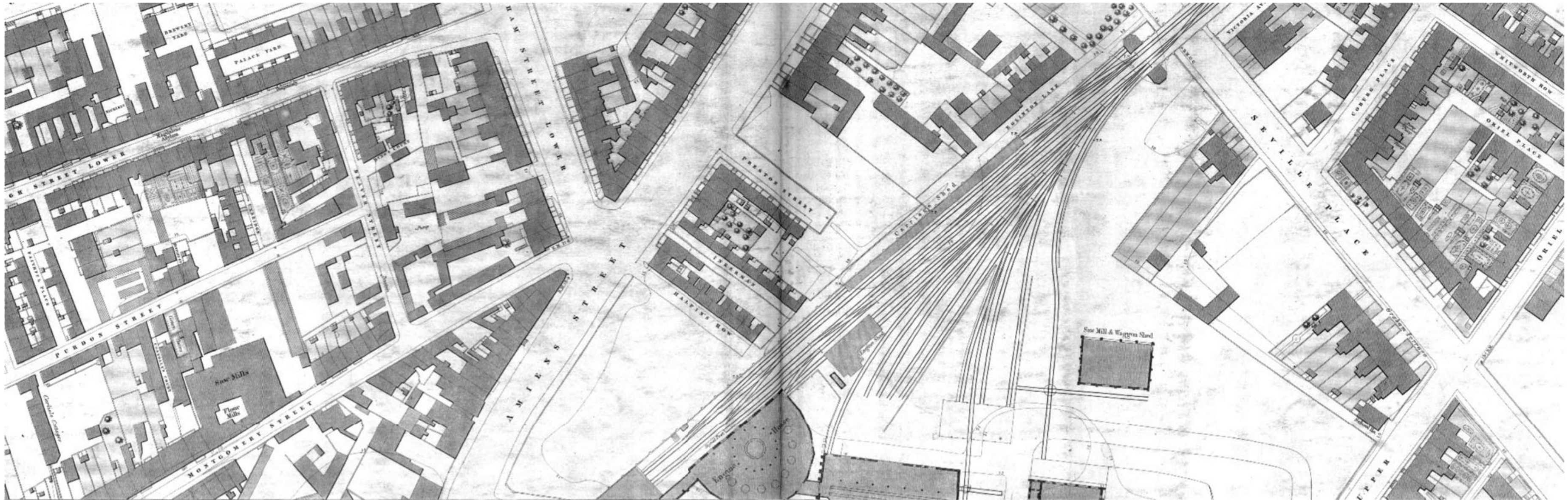


Amiens street Locomotive shed

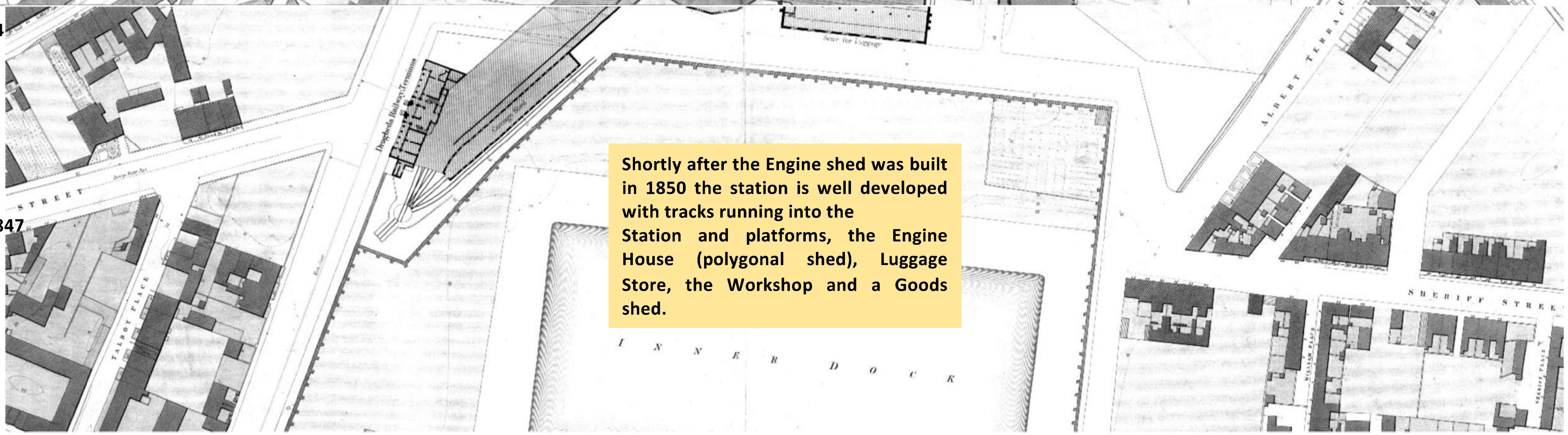
Butt Bridge

The 1864 Ordnance Survey map illustrates the interior layout of the Luggage Store and Workshop at upper level. The buildings to the east may be stabling or stores.



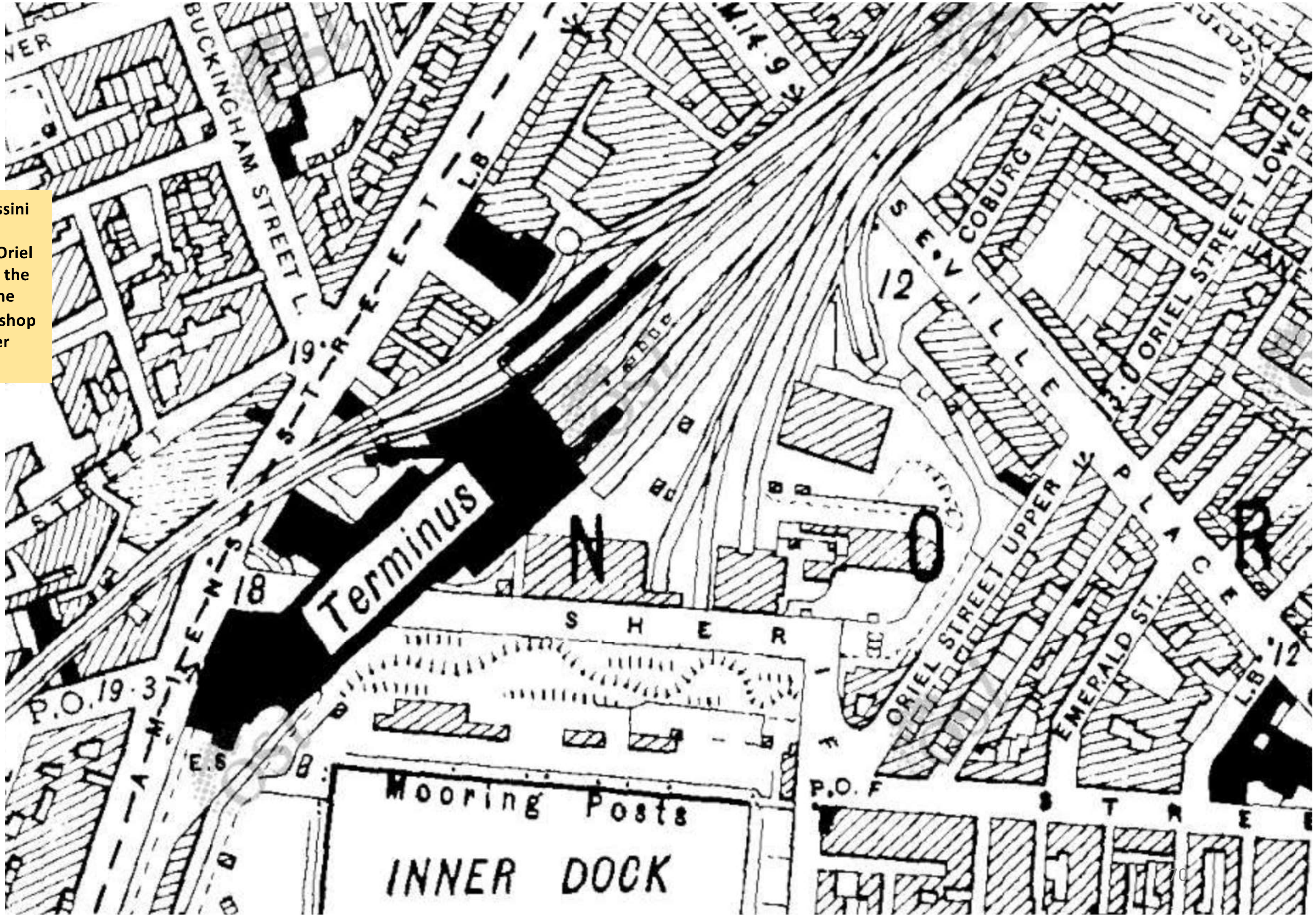


OS map modified 1864



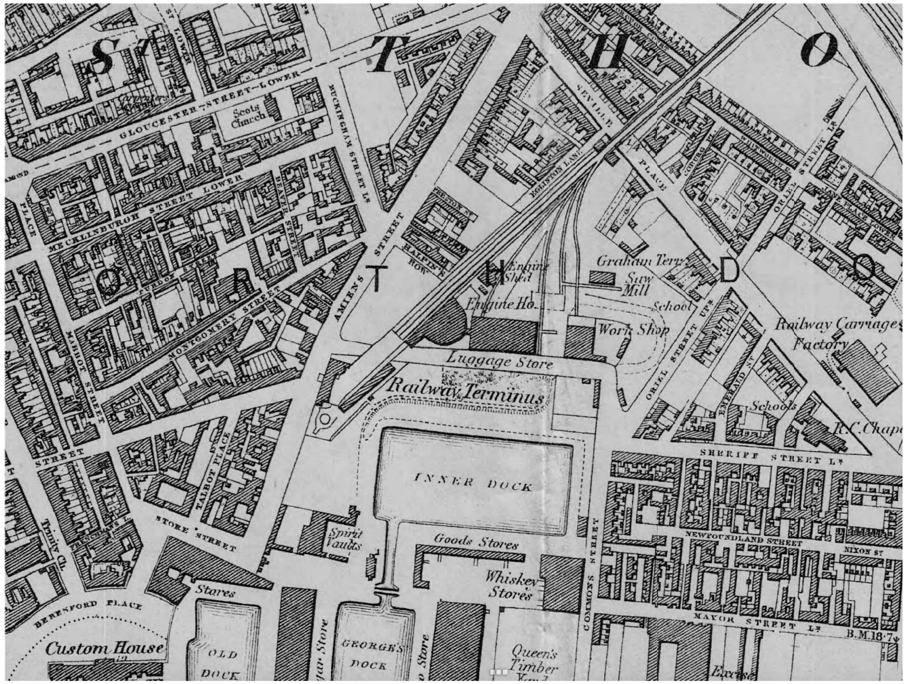
OS map modified in 1847

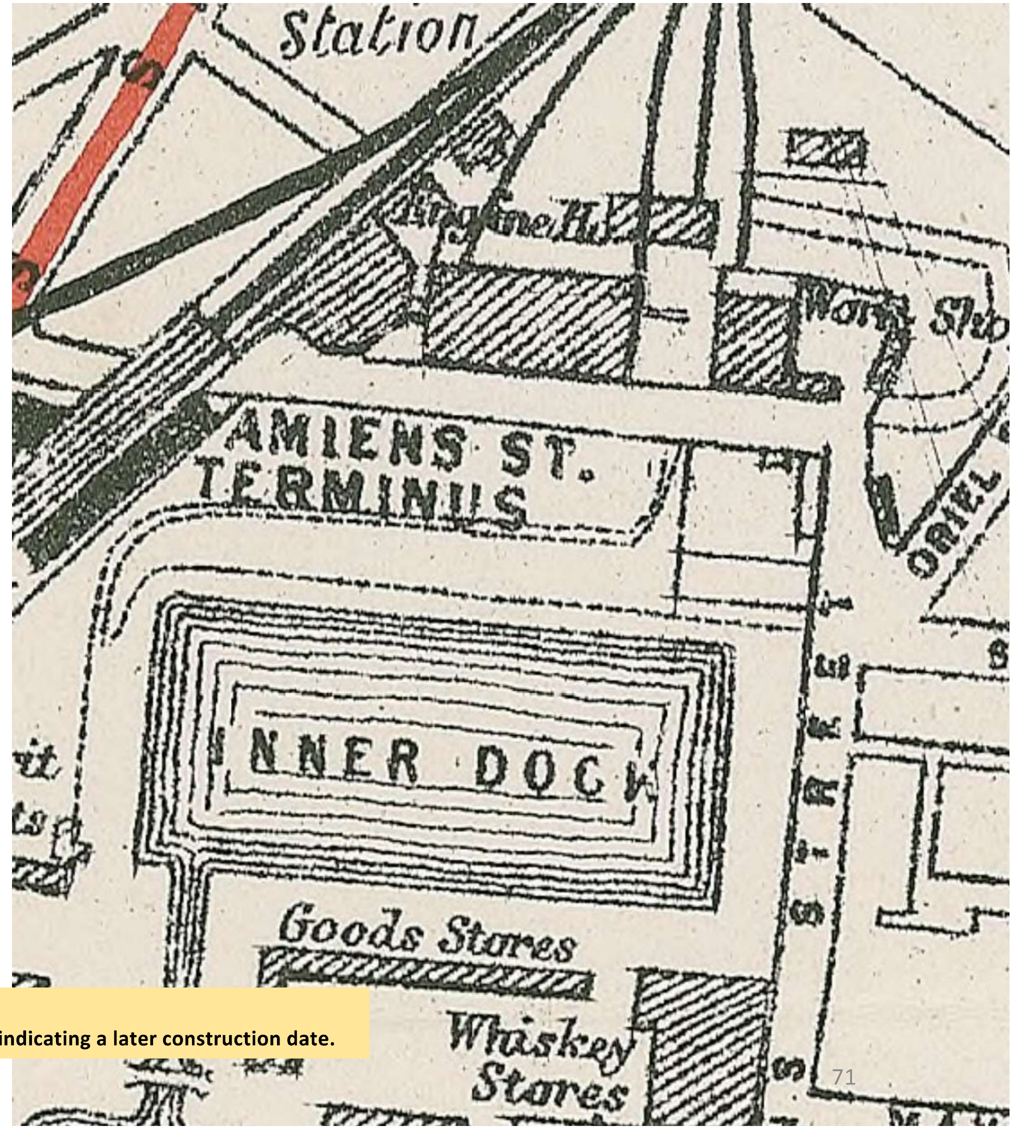
Shortly after the Engine shed was built in 1850 the station is well developed with tracks running into the Station and platforms, the Engine House (polygonal shed), Luggage Store, the Workshop and a Goods shed.



A detail from the Ordnance Survey Cassini map, renowned for its accuracy
Indicates further building on the site, Oriel House is located at the southern tip of the site but the warehouse shown along the flanking wall is not linked to the Workshop as shown in the photograph taken after the fire in the 1970s

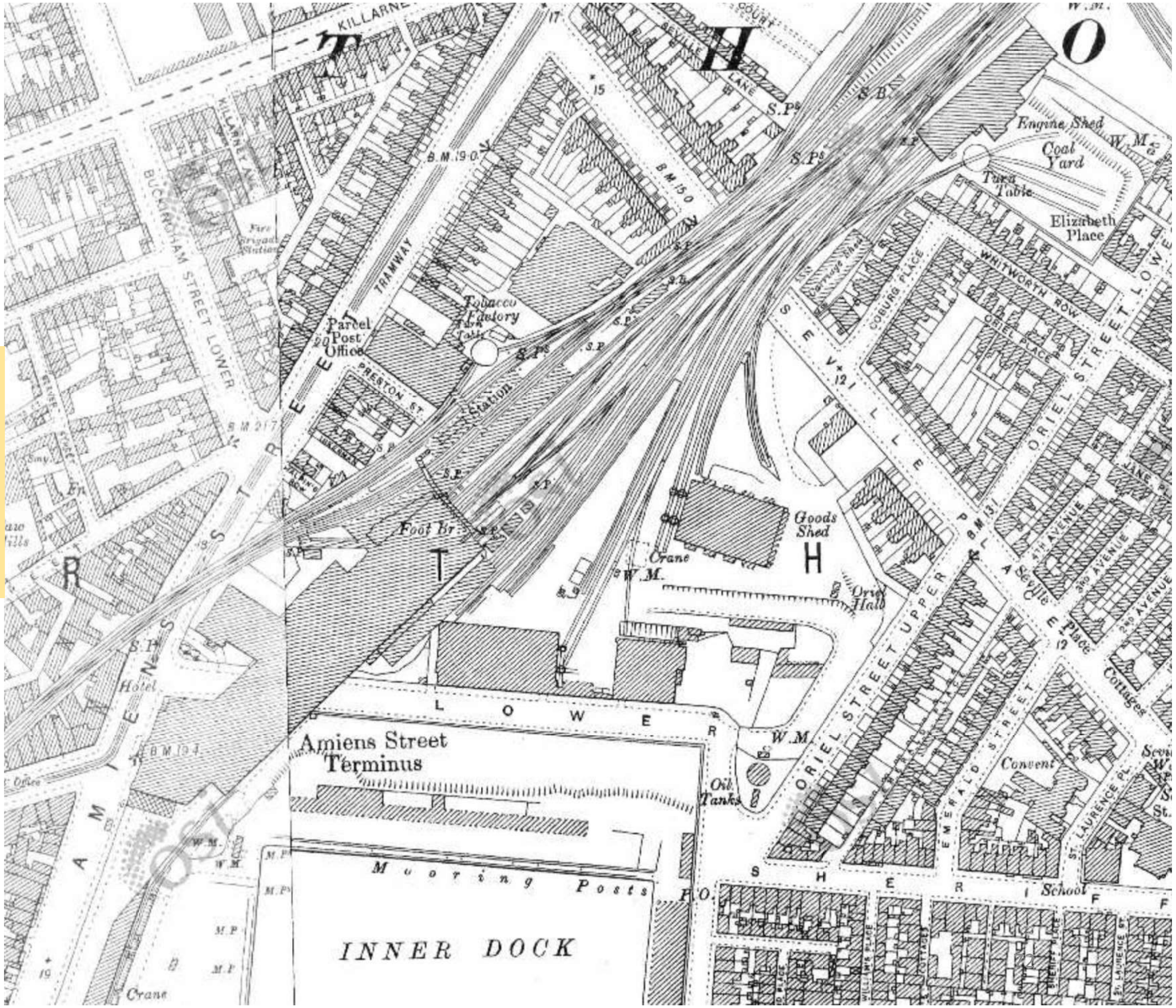
Thom's Almanac and Official Directory
Map of the city of Dublin and its environs constructed for Thom's almanac and official directory 1844-1880





MH Gill and Son 1907
New Map of the City of Dublin and its Environs does not indicate a warehouse along the flanking wall indicating a later construction date.

Ordnance Survey map 1906-9 The Loop line built in 1891 and the north bound tram lines are now show.
Narrow works buildings are indicated between the Luggage store and workshop along the flanking wall
An oil tank is positioned on future site of Oriel House with a ramped access way through the site from the entrance off Sheriff Street Lower. A building called Oriel Hall is located on the site of the present housing development off Oriel Street Upper.



Proposed Strategic Housing Development, ‘The Connolly Quarter’, Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 14.B
PHOTOGRAPHIC PLATES

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix B.

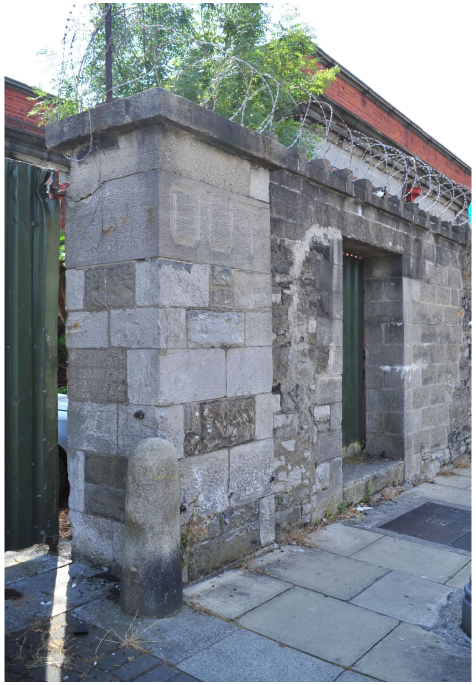
Photographs of the protected structures designated for their heritage interest and contained within the site and form part of the Strategic Housing Development application.

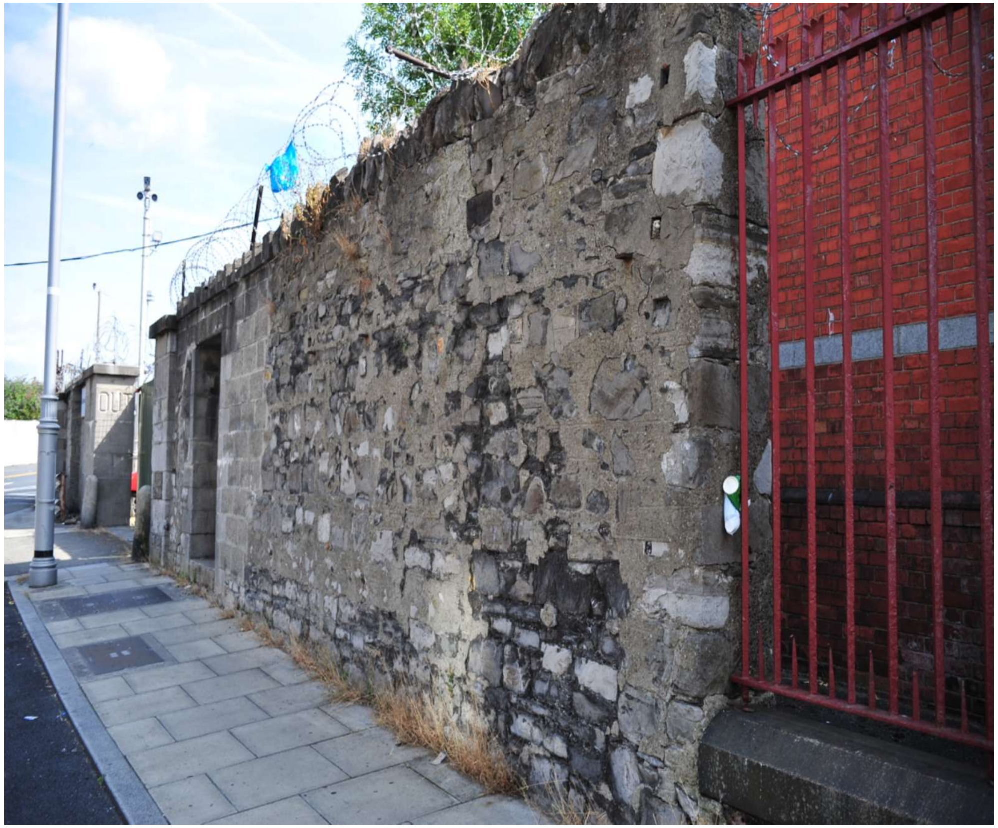
The flanking wall between the Luggage Store and the Workshop, Sheriff Street Lower

Three infilled arches located within the boundary wall between the Luggage Store and the Workshop building on Sheriff Street Lower. The opening up of these arches and the conservation of the stonework is part of the proposed works included in the Strategic Housing Development application and includes the end walls of the Luggage Store and Workshop structures as part of the new entrance to Connolly Square.

The flanking wall between the Luggage Store and the Workshop, Sheriff Street Lower

Entrance gates
Sheriff Street Lower



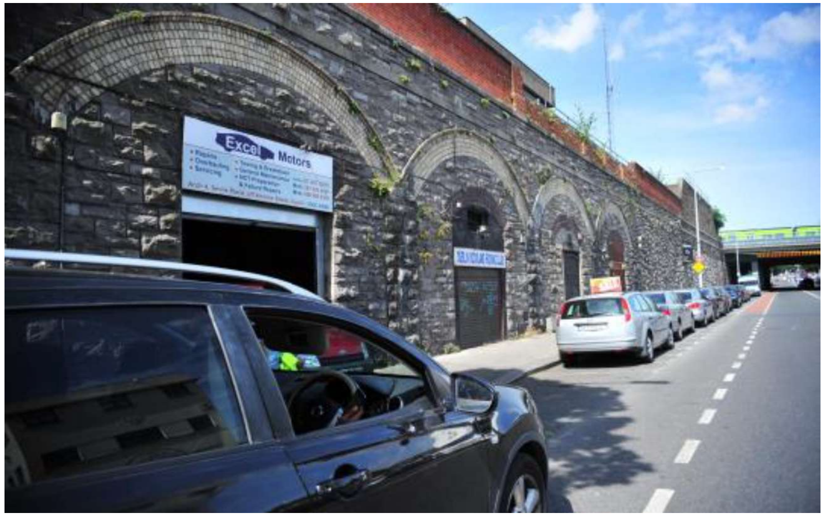


Remnants of the gate piers and boundary wall at the site entrance to be removed as part of the site enabling works for the proposed development and are included within the Strategic Housing Development application.

Oriel Street Upper boundary wall

Boundary wall at Oriel Street Upper with blocked up openings of original wall.
Original construction below granite course

Vault at Seville Place



Proposed Strategic Housing Development, 'The Connolly Quarter', Rear of Connolly Station, Sheriff Street Lower, Dublin 1.

APPENDIX 14.C
METHOD STATEMENT FOR CONSERVATION WORK

VOLUME III
APPENDICES TO ENVIRONMENTAL IMPACT ASSESSMENT REPORT

OCTOBER 2019

Appendix C.
Method Statement for the conservation of 19th century stonework at the site at Connolly Station

Appendix C

MATERIALS AND METHODS TO BE USED

For conservation works to be carried out to : End walls of Luggage Store, Workshop, Seville Place vault and Sheriff Street Lower and Oriel Street Upper boundary walls.

METHOD STATEMENT
Method statements will be provided to the specialist contractor for all proposed conservation works to the historic building fabric and who will be required to carry out the works in accordance with the documentation. The following conservation methodology is site specific and based on inspections prior to being in a position to assess the condition, extent and materials that will be exposed following the removal of the infill material from alongside the vaults. It is followed by the proposed Methodology for the conservation works to the historic masonry construction at the Connolly station site.

INSPECTION AND RECORDING
The process of evaluation for suitable cleaning method will involve research, trials in situ, testing and approval sought followed by implementation.

Following the excavation of the infill that presently obscures the end walls of the Luggage Store and Workshop. The information provided will be proportionate to the significance of these structures and to the extent of works proposed.

In relation to the 19th century walls the method used will include site inspections, drawn survey or rectified photography - marking up materials, condition, cracks length and width/lateral displacement/old-recent/external -internal/joints or mortar failures, previous repairs or insertions that have occurred to the historic fabric.
All features that will experience potential impacts, regardless of significance or the extent of that impact, will be recorded to level three inventory standard. This will include full measured, written, drawn and photographic surveys of all buildings and features of heritage interest identified within the survey area. Works intended to be carried out to the protected structures will be preceded by detailed assessment and recording of historic materials and construction methods. Copies of all documentation to be provided to the Irish Railway Record Society Archive and the Irish Architectural Archives.

The historic boundary walls will be subjected to a full measured Survey and Condition analysis. Dimensional information will include length, depth, height and relative levels. Elevations will identifying the various construction materials and the locations where changes in these materials occur. Any features such as blocked- up entrances, piers, arches etc will be identified and surveyed in detail by rectified photography. Proposals to remove sections of the wall on Oriel Street Upper to accommodate the Masterplan design will be be recorded using rectified photography. The surveys will inform the strategy for removal and making-good of the walls where this is required under the Masterplan.

Visual indicators of the existing condition of the stone from the surveys of Sheriff Street Lower, Oriel Street Upper and at Seville Place will be recorded as to type, frequency and intensity.

Sample test areas will establish the reference for the remainder of the conservation process. The architect will be required to review and observe work in progress to ensure quality control
during cleaning and record the outcome.

TESTING SOILING
Analysis and testing of materials and methods for cleaning stone will be undertaken in advance of the proposed works commencing. These tests will be observed over sufficient period of time to select gentlest method of cleaning and treatment that is found to cause damage to the historic surface will not be used. The cleaning trial will be specified, recorded, and supervised. The results will be used to determine the method of cleaning whether by water, chemical or abrasion and will be undertaken on an area representative of typical condition adjacent to the doorways of the Luggage Store and include a section of pilaster and string course along with adjacent walling. Following cleaning trials a detailed specification will be prepared to include preparation, protection of property, materials, equipment, and techniques. It will also specify methods of work for operatives and surface repairs.

PROTECTION and MONITORING
Protection and temporary works will be provided for the protected structures throughout the construction period to prevent and damage or loss of historic fabric.
Monitoring during the construction phase is necessary to ensure that any demolitions, excavations and removals on site are undertaken with care in order to ensure no damage results to Protected Structures. During this phase expert architectural and conservation advice to be incorporated within detailed specifications and safety documentation. Appropriate inspections and guidance provided during the implementation of the works by a Grade 1 conservation architect.

SKILL
Contractors and their operatives engaged to work on the protected structures will be required to display proficiency and experience in traditional building skills. If necessary a training programme will be implemented.
The involvement of a skilled mason in the planning and execution of re-laying historic paving, kerbs, setts and salvaged granite to be provided in order to conserve these diminishing resource and tradition.

QUALITY
To ensure that adequate standards are met, detailed conservation methodologies will be included in any tender documentation and specifications should take account of best practice.

STANDARDS, GUIDELINES and ADVICES
The standards and guidelines to be applied for the cleaning of the historic wall will be based on preservation, conservation, maintenance and repair, as defined by various documents that follow precepts of the Venice Charter 1964.

All works to be carried out in accordance with the *Architectural Heritage Protection: Guidelines for Planning Authorities and the Advice Series* issued by the Department of the Arts Heritage and the Gaeltacht, 2011.

HEALTH AND SAFETY
Construction work on protected structures shall comply fully with the Safety, Health and Welfare at Work (Construction) Regulations 5.1 504 of 2006. The conservation architect shall be aware of the particular challenges of retaining as much as possible of the fabric of a protected structure and providing a safe working environment during construction. Particular care should be taken in relation to propping and temporary works so as to minimise damage to and intervention in the fabric of the building. This requires a coordinated approach by the conservation architect, the Health and Safety Officer, Structural Engineer and the Contractor.

CONSERVATION OF STONEWORK

PROPOSAL REMOVAL SECTION of BOUNDARY WALLS
Generally boundary walls will be retained however in a number of strategic locations it is proposed to remove sections of the boundary walls. These openings/partial demolitions are required to achieve the Masterplan objectives including access from Oriel Street Upper and at Sheriff Street Lower will be affected. The three segmental arched openings which provided access into the site and have been closed off/blocked up in modern times, are to be reopened. Careful removal of infill will be carried out. The original arches and reveals will be retained and repaired.

As a result of opening out these blocked up arches on Sheriff Street Lower and removing sections of the boundary wall along Oriel Street Upper to permit entrances into the site a quantity of 19th century granite stones will become available. This stock of limestone will be retained retained and reused within the scheme to replace stone damaged by the water penetration at the Luggage Store and Workshop that will be the subject of a separate application to the planning authority.

Investigative opening up works to assess condition and location of concealed building fabric may be required.

VISUAL INDICATORS
Inspection of the external face of the walls along Sheriff Street Lower and Oriel Street Upper has identified

- Soiling (historic atmospheric pollution mainly),
- Flaking stones (caused by water soaking/evaporation water cycle),
- Cracking
- Bulging
- Staining
- Salt efflorescence,
- Biological growth,
- Gypsum crust (most destructive form of decay),
- Scaling (water absorption and evaporation)

The external masonry walling appears superficially to be in sound condition. However the saturation of the walls over such a long period may have led to the deterioration and loss of its core and will require remedial treatment. The structures will require immediate drying out as a preliminary to conservation of the fabric.
Significant loss of mortar can be seen on the face of the wall. Subsidence has been noted within floor structures and diagonal cracking within the vault walls. Tie bars inserted to the front elevation indicate that there has been historic movement in the wall. Pollution has damaged the face of limestones. Cleaning, removal of vegetation and repointing will be considered.
As the wall along Sheriff Street Lower has been subject of severe damp penetration from the infill and car parking above a sufficient time scale needs to be allowed for the drying out of the historic fabric prior to fully assessing stability, condition and remedial measures.

Growth of moss, lichen and algae will be removed by dry or wet scrubbing. Spraying a biocidal treatment that causes growth to die and become brittle will permit it to fall off naturally.

METHODOLOGY for CLEANING
1. Establish criteria for the cleaning of the stonework
2. Understand the nature and condition of the masonry substrate and the soiling to be removed
3. Evaluate the the advantages and disadvantages of cleaning systems available
4. Develop appropriate contract (method statements, drawings and specifications)
5. Provide quality control during the cleaning operation

WORKING DRAWINGS
Prepare drawings of plinths, string courses, quoins, arches, cornice elements and moulded stones, to show:
Fixing details numbered to correspond to numbers on stones.
Submit copies of drawings to Architect at least two weeks before required date for cutting stone before proceeding with cutting.
Hand approved set of drawings to Architect on completion.

PRINCIPLES OF CLEANING
The cleaning of the masonry will only be carried out when necessary to halt deterioration or remove heavy soiling.
A contractor of proven experience of cleaning historic stone building and fully trained in the system being specified will be employed

The soiling of the stonework is attributed to a combination of factors and to the condition and components of the masonry substrate. Residues includes sulphur dioxide deposits and skin formations resulting from the combustion of fossil fuels, ingrained grime, dirt, and soot. Carbon deposits and atmospheric pollutants, contaminants, biological growth particularly on horizontal surfaces, staining exposure ferrous materials in substrate to acids have been noted along the wall surface on Sheriff Street Lower and Oriel Street Upper.

METHOD of POINTING FOR STONEWORK

The pointing of the walls varies along differing sections depending on location, mortar mix, joints and condition. Fine pointing can be seen in the ashlar section and generally a wider flush pointing elsewhere.

FINE POINTING of ASHLAR

Lay a strip of carpet tape over the joint to be pointed slit the tape into the joint with a sharp knife, and press the edges of the tape into the cut

Point with specified mortar mix

Press the mortar home with a pointing key until the joint is full

Strike off and peel off the tape

RE-POINTING of STONEWORK

Clean out joints to a minimum of 25 mm using hand, not power tools

Do not use angle grinders for cutting back joints

Stamp or hand grout empty joints with mortar to a depth of 25 mm from the face of the masonry

Clean the prepared face using a bristle brush flush the joint out thoroughly with clean water, taking care to avoid saturation remove all dust and loose material working from the top to the base of the wall

Lightly wet the joints and point neatly in the specified mortar mix

Brush over lightly with a stiff bristle brush or dab with a piece of coarse sacking after the initial set has taken to leave a slightly textured finish

STONE REPAIR

Where stone repairs are specified, an assessment will be made on site as to the most appropriate method using the joint experience and expertise of the stone mason and architect

Stone will only be replaced or repaired where identified by the architect and any further stonework thought to require replacement and not shown on the drawings, shall be marked up with chalk to allow for further inspection. The contractor must check with the architect if the drawings / instructions are not clear.

STRUCTURAL INTERVENTIONS

The quality of the original stonework was sufficiently robust good given that the arched structures were designed to bear the weight of trains however the effects of water penetration over a long period of time will hav implications.

Structural analysis and condition surveys will be undertaken of all protected structures and features of industrial heritage interest within the site. By this means potentially negative impacts may be minimised, whil positive impacts such as the conservation of the heritage elements may be enhanced.

SALVAGE

Stone salvaged from the boundary walls will be stored on site. This reduces the handling of the historic material and thereby lessens the risk of damage or breakage. The stone will be laid on pallets and evenly supporte to prevent breakage. The supply of such historic hand-crafted material is limited, therefore care shall be taken to avoid damage.

The storage facility should provide clean, dry conditions, free of contamination. The stones will be stored clear of the ground. An inventory system will be used to record the locations from which all stones were taken.

REVIEW OF SCOPE OF REPAIR WORK UPON CLOSE INSPECTION

Provide access scaffolding and artificial lighting to all areas where stone repair is to be made to enable the conservation architect to make a close inspection.

Provide attendance and inspect the work with the conservation architect to confirm the nature and extent of the cutting out and preparation of voids as identified on drawings. Make a record of instructions given durin inspections, which may either confirm or vary the scope of work, and measure and record relevant details. Prepare and submit details of instructions for confirmation. Prepare schedules and drawings for use as basis of implementation

RE-USE OF STONE

Agree extent to which existing stone is to be retained for re-use in other than its existing location. Remove all such stone; clean, overhaul, protect and store on site until required.

IDENTIFICATION

Mark each stone, whether new, secondhand or re-used, clearly on an unexposed face to indicate the natural bed and, where known, its position in the finished work.

SPRAYING CLEARED VOIDS

Following clearance of voids of vegetation or organic material, spray diluted biocide as recommended by manufacturer.

FLUSHING OUT

Flush out cleared joints and voids with clean water by spraying with hand pumps. Spray not to be one used for weed killers, biocides, etc.

PREPARING BEDS AND BACKINGS

Remove soft mortar by brushing, vacuuming or raking with chisel .

Cut out defective stones or parts of stones until structurally sound material is reached. Leave cavities cut square and take care not to damage adjacent stones or surfaces to be retained.

Remove or cut out fully all stones, or parts of stones, to be replaced with new, prior to cutting and dressing replacement stone, to ensure that new stone exactly matches the void into which it is to be set.

Remove all unwanted remaining bedding and backing material, fixings and similar items from voids left where defective stones have been cut out and/or where stones are missing. Rake and clean out cavities to provide sound, hard surfaces for replacement stones/tiles. Remove dust throughout with a vacuum cleaner. Treat voids with specified biocide

REPAIRS TO EXISTING STONEWORK

When reconstructing stonework save as much as possible of the original fabric and retain the character of the masonry. In particular, strictly maintain the existing pattern of jointing.

Where stones are to be removed keep area of removal to minimum. Remove stones in their entirety, irrespective of size, unless instructed otherwise.

Set stones for re-use aside with care and mark them as necessary on unexposed faces to ensure their replacement on their proper beds and in their proper locations. Use manual tools only.

Notify the Architect of any signs of structural movement found within the walls when stones have been cut out..

CUTTING OUT FOR PIECING IN

Ascertain depth of the stone to be repaired. If practical remove stone to a depth of 100mm.

Cut out defective section to a square or rectangular profile. Ensure finished joints are fully filled. while lifting the stone, pack the side joints with 1:3 NHL 3.5 hydraulic lime:sand mortar mix.

Firmly pack the side joints with slate set at least 12mm behind the finished mortar face.

MASONRY ADHESIVES

For fixing small sections of stone in 'dentistry' repairs use 'Akemi' resin/epoxy-based adhesive or other approved.

METAL DOWELS, FIXINGS AND WALL TIES

Copper or stainless steel as defined in Table 1 of BS 5390.

FILL DEEP HOLES

in existing masonry with small stones set in bedding mortar

FORM OPENINGS

Use rigid templates accurately fabricated to the required size

MECHANICAL FIXINGS

Bed cramps, dowels and other fixings in 1:3 NHL 3.5 hydraulic lime:sand mortar.

JOGGLE JOINTS

Fill with 1:3 NHL 3.5 hydraulic lime: sand mortar and tamp to expel air.

RETAINED ORIGINAL MASONRY

Not to be cut or adjusted in any way to accommodate new or re-used masonry, except with prior approval of the conservation architect

REMOVAL OF WATER TRAPS

Report to Architect where water traps and steps result either from dressing back or erosion. Carefully weather stone to remove traps if and as instructed by architect.

BRUSHING BACK OF ERODED/FLAKING MORTAR POINTING

Brush back stone joints to remove loose and flaking mortar for inspection by conservation architect. Smooth and compact underlying mortar by gently tamping with smooth rounded dowel.

PINNING FRACTURED SPLIT STONES

To dressed stones with sound uneroded surface, carefully drill out stone plug with diamond coring tool. Drill across fractures or cracks into sound stone to a minimum depth of 75mm.

Carefully drill through face at approximately 300mm to horizontal, to diameter instructed, ensuring drilling has penetrated background, solid stone or stable core to minimum depth of 100mm.

Remove debris from hole by blowing out with tubing and flush out hole with clean water from a syringe.

Attach tubing to syringe and fill with resin prior to filling hole. Cut to length threaded austenitic stainless steel rod. Allow 6mm cover to face for small diameter rod, 12mm for large rod.

Fill hole with resin to correct depth to avoid overfilling: e.g. 6mm diameter hole to take 3mm diameter rod hole to be resin filled to two thirds depth.

Place protective plastic film and modelling clay plug below hole. Carefully insert dowel into resin filled hole by gently turning and pushing.

Allow resin to cure to Manufacturer's recommended timings. Following curing, point hole in matching mortar.

MORTAR FLAUNCHING TO ERODED STONES

Form mortar weathering fillets, avoiding feathered edges, to prevent recesses collecting water in crevices or whole stones, as instructed

STITCHING ACROSS MAJOR CRACKS
Where instructed and as directed specifically by the conservation architect. All be carried out with utmost care: works to
Remove stones as instructed for a distance of a minimum of 900 mm across the crack. Clean stones, mark and set aside for possible re-use.
Do not adjust adjacent sound stonework to accommodate new stone unless instructed to do so.
Using removed stone or matching stone salvaged from elsewhere, fill each pocket with pieces of stone at least 200 mm long. Set stones in specified mortar.
Ensure vertical joints are between 15 mm and 25 mm wide and that the crack line is covered by a stones placed centrally across it.
REMOVAL OF HARD POINTING
Remove a sample section of hard mortar pointing in each area scheduled for removal in agreed location. Carefully cut out hard mortar by picking with chisel to reveal original mortar joint.
Drill fine holes along centre line of especially hard mortar joint to loosen mortar, then pick out pointing with chisel.
Submit samples to architect. Obtain approval before proceeding with removal generally.
REMOVAL OF OLD MORTAR STANDING PROUD
Remove a sample section of mortar standing proud of adjacent stones in each area scheduled for removal in agreed location.
Carefully dress back the joints with fine chisels to the adjacent stone surfaces.
Bevel off the joints at the perimeters of recessed sections to weather and avoid stepped surfaces.
Submit samples to Architect. Obtain approval before proceeding with removal generally.
BASIC WORKMANSHIP
Comply with the clauses of the following that are relevant, unless otherwise specified or shown on drawings:
BS EN 1996, parts 1-3; 2005 and 2006, and PD 6697:2010.
PROTECTION
Provide all necessary protection to:
- Surrounding work.
- Voids left after defective stones have been cut out and/or where stones are missing. - Areas of ancient/eroded stonework.

SUPPORT
Ensure that structural stability of the walls and arches and of all temporary work is maintained throughout.
Scaffolding may be in contact with the walls only with the approval of the Architect. All scaffold pole ends within 100mm of the building must be fitted with plastic caps.
BONDING
Cut stones to full dimensions so that:
- Bond is maintained with both facework and with backing.
- Bond is maintained with facework and back face of stonework is flush with outer

REPLACE DAMAGE STONES
to a minimum depth of 100mm all stones damaged during cutting out, as instructed
RE-SETTING OF STONE
Scrape out mortar joints to stone
Lever stone loose using timber shims etc to protect the arrises
Clear backing and bedding mortar and reset stone using lime mortar to new line in lime mortar as specified using shims if necessary on a like for like basis.
REPLACING STONEWORK
Cut out defective stone completely or to a minimum depth of 100mm (or depth to match width / height if less) , using hand tools and diamond disc cutters to minimize the vibration and taking care to avoid damage to

LIME MORTAR REPAIRS

Using specified mortar from approved prepared samples -

Cut out the decayed areas (or previous poor mortar repairs) undercutting the edges to provide key. Wash out the cavity.

Saturate the cavity with lime rich water from the top of the coarse stuff curing bin to prevent dewatering of the repair mortar. Pre-wet the stone using industrial methylated spirits to enhance capillary attraction.

Place the repair mortar compacting in layers not exceeding 10mm in thickness in any one application and having no feather edges. Allow each layer to dry out before rewetting and placing the next

For cavities exceeding 12mm in depth and extending over 50mm square surface area, drill holes to take non- ferrous or stainless steel reinforcement and set in epoxy mortar; allowing cover for reinforcement.

Finish repair to the approved sample of profile using a wood or felt-covered oat, or with a damp sponge or coarse cloth. Follow joints or surface finishing in the original work.

Protect repairs against frost, rain and direct sunlight for 1 month after completion and keep it moist with dampened hessian for a fortnight to ensure slow drying.

SAMPLE PANELS

Allow for providing four different samples of plastic repair, each approximately 300 mm square, to be carried out successively, in agreed locations, for each type of mix/colour required.

Base mortar on preliminary mix of 1:1:2 NHL3.5 hydraulic lime:sand:crushed stone.

Allow for altering the mortar mix for each sample and for each panel to dry out completely. Obtain approval of sample areas before ordering bulk materials.

Retain and protect approved samples until Practical Completion and ensure executed work matches.

PREPARATION FOR MORTAR REPAIRS

Cut back damaged stone to firm base and minimum depth of 25mm, in ashlar preferably in regular shape parallel to original coursing.

Undercut head and sides of small areas to provide key.

Reinforce where necessary with 3mm diameter austenitic stainless steel or non-ferrous wire, resin anchored as specified by architect.

APPLYING MORTAR

Brush out or vacuum clean cavity to remove all dust and wet to reduce suction.

Press mortar firmly into cavity and around reinforcement and finish surface slightly rougher than surrounding stone with a wood float.

Apply the mix in two coats scratching the first to receive the second. Where tile reinforcements are to be used, leave them projecting 5mm to key the final coat. Roughen surface after initial set with bristle brush or scrim to remove laitance.

Do not form feather edges. Keep plastic repairs moist for three to four days after completion. Repair each stone individually.

DEPTH OF CUTTING OUT OF POINTING

Cut out and remove pointing where indicated on drawings to a minimum depth of 30mm. Where remaining mortar in the joint is found to be loose or soft, cut back to solid material up to a maximum of 100mm.

Remove all loose or powdered mortar to the beds or perpend joints of the stone.

Report to conservation architect where mortar remains loose or soft or cavities are found at or beyond 100m depth and seek further instructions.

PREPARATION OF FINE JOINTS IN DRESSED STONES

Gently work a fine hacksaw blade along joints and remove loose material to a minimum depth of 13mm

SALVAGING SETTS LOCATED FROM FOREGROUND OF ORIEL HOUSE

In front of Oriel House the forecourt to the offices is laid out with early twentieth stone century setts. As part of the urban planning and architectural designs of the Connolly Quarter Masterplan this part of the site is the location for a hotel building and it will be necessary in order to implement the designs to lift the setts and relay them as part of the landscaping of the public realm within the site. Setts will be numbered in situ using a water soluble marking to allow reinstatement of the paving on site.

Drawn survey of extent and bonding pattern will be prepared. A photographic record to be carried out prior to lifting the stone setts. Dimensions of the setts, joints and materials to be recorded. Bedding and jointing materials to be analysed.

Detail at weigh bridge, edge conditions and drainage elements recorded. A record will be maintained during the relocation of setts elsewhere on site.

An inventory system will be used to record the locations from which all stones were taken.

Setts to be stored on site awaiting relocation. Prior to storage, paving elements which have been lifted shall be cleaned of all bedding, jointing materials and any other materials adhering to them.

Re-setting as ground cover to follow the recorded pattern. Laying to be carries out with tight joints using original joint dimension.

Fine sand is the preferred conservation option. The sand should be brushed into the joints and thoroughly compacted. To be topped up in as the aggregate shakes down and stiffens.

Tar pointing Is not suitable. It lifts out over time leaving deep recessed joints.

Record any features of interest uncovered during the progress of the works.

The Architectural Conservation Officer of Dublin City Council to be consulted in the event of uncovering any items of special interest beneath the surface.

The paving materials will be stored on site. This reduces the handling of the historic paving elements and thereby lessens the risk of damage or breakage. The setts will be laid on pallets and evenly supported to prevent breakage. The supply of such historic hand-crafted material is limited, therefore care will be taken to avoid damage or loss. Salvaged setts to be stored will be sorted by stone type for reuse in homogenous surfaces of one stone type. The storage facility should provide clean, dry conditions, free of contamination. The stones will be stored clear of the ground.

Modern practice of laying setts in tar is not appropriate. This example in Sheriff Street Lower indicates tar breaking down and flaking away.

At Oriel House the original layout, bonding pattern and junction details are known and the setts may be re-laid and maintaining the same joint width and pointing detail. For reinstated sett surfaces, a flexible construction with tight joints is required. Traditional skills will be employed in the work, supported by modern techniques where traditional methods would prove inadequate