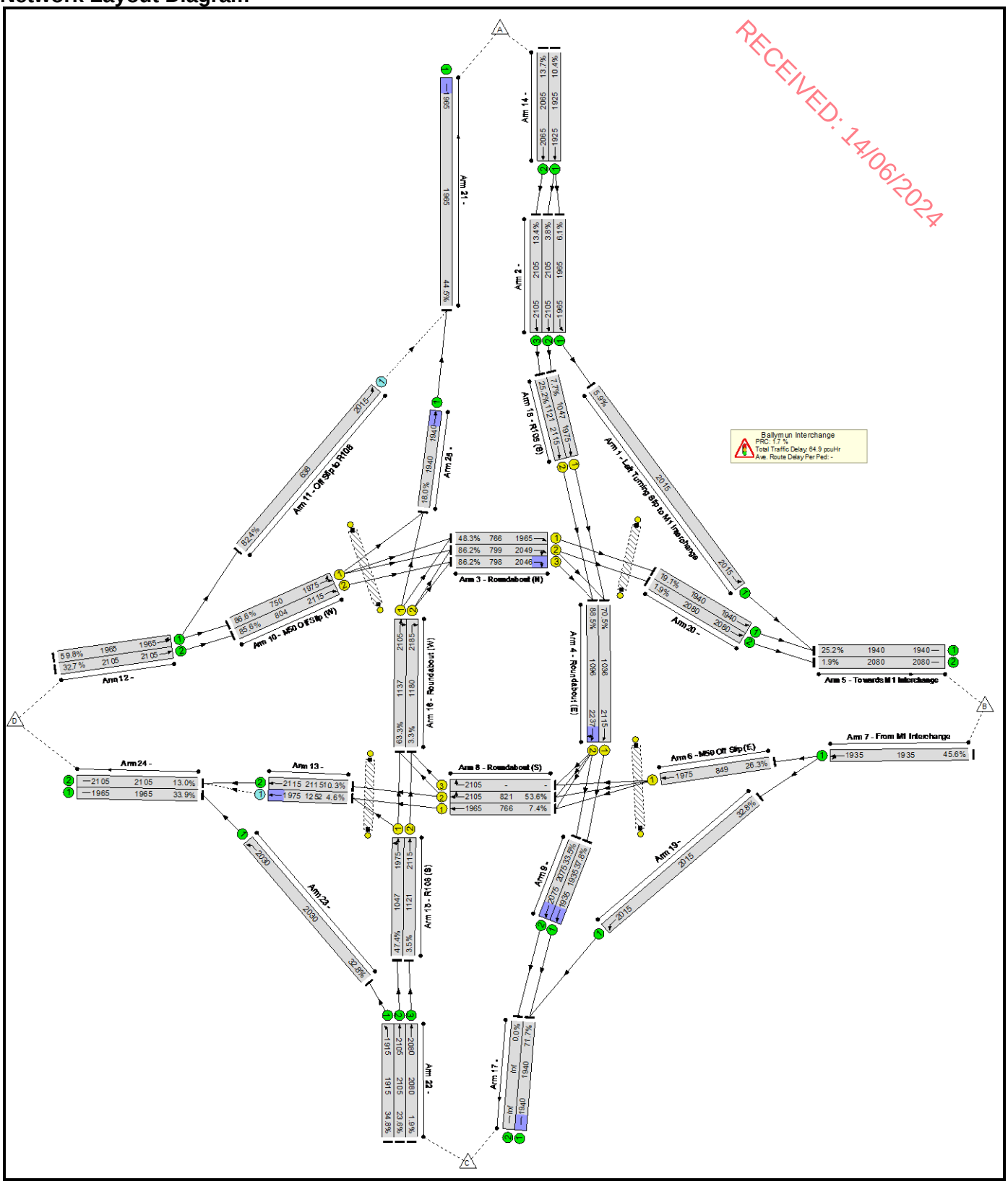
Basic Results Summary

Scenario 11: '2023 DS AM' (FG9: '2023 DS AM', Plan 1: 'Network Control Plan - AM')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Airport Roundabout	-	-	-		-	-	-	-	-	-	**88.5%**	**583**	**0**	**0**	**64.9**	-	-
Ballymun Interchange	-	-	-		-	-	-	-	-	-	**88.5%**	**583**	**0**	**0**	**64.9**	-	-
1/1	Left Turning Slip to M1 Interchange Left	U	-		-	-	-	119	2015	2015	5.9%	-	-	-	0.0	0.9	0.0
2/1	Ahead	U	-		-	-	-	119	1965	1965	6.1%	-	-	-	0.0	1.0	0.0
2/2	Ahead	U	-		-	-	-	81	2105	2105	3.8%	-	-	-	0.0	0.9	0.0
2/3	Ahead	U	-		-	-	-	282	2105	2105	13.4%	-	-	-	0.1	1.0	0.1
3/1	Roundabout (N) Ahead	U	B		1	38	-	370	1965	766	48.3%	-	-	-	4.2	41.3	10.7
3/2	Roundabout (N) Right Ahead	U	B		1	38	-	689	2049	799	86.2%	-	-	-	4.4	23.1	5.9
3/3	Roundabout (N) Right	U	B		1	38	-	688	2046	798	86.2%	-	-	-	4.2	21.7	4.9
4/1	Roundabout (E) Ahead	U	D		1	48	-	731	2115	1036	70.5%	-	-	-	5.5	26.9	21.1
4/2	Roundabout (E) Right Ahead	U	D		1	48	-	970	2237	1096	88.5%	-	-	-	9.6	35.5	30.0
5/1	Towards M1 Interchange	U	-		-	-	-	489	1940	1940	25.2%	-	-	-	0.2	1.2	0.2
5/2	Towards M1 Interchange	U	-		-	-	-	39	2080	2080	1.9%	-	-	-	0.0	0.9	0.0
6/1	M50 Off Slip (E) Ahead	U	C		1	42	-	223	1975	849	26.3%	-	-	-	1.3	21.2	4.1
7/1	From M1 Interchange Ahead Ahead2	U	-		-	-	-	883	1935	1935	45.6%	-	-	-	0.4	1.7	0.4
8/1	Roundabout (S) Ahead	U	H		1	38	-	57	1965	766	7.4%	-	-	-	0.4	22.1	1.6

Basic Results Summary

8/2	Roundabout (S) Ahead Right	U	H		1	38	-	440	2105	821	53.6%	-		-	2.6	21.3	11.5
8/3	Roundabout (S) Right	U	H		1	38	-	0	2105	-	-	-	-	-	-	-	-
9/1	Ahead	U	-		-	-	-	731	1935	1935	37.8%	-	-	-	0.5	2.3	9.7
9/2	Ahead	U	-		-	-	-	696	2075	2075	33.5%	-	-	-	0.3	1.7	6.1
10/1	M50 Off Slip (W) Ahead Left	U	F		1	37	-	650	1975	750	86.6%	-	-	-	8.2	45.5	19.7
10/2	M50 Off Slip (W) Ahead	U	F		1	37	-	688	2115	804	85.6%	-	-	-	8.3	43.3	20.2
11/1	Off Slip to R108 Ahead	O	-		-	-	-	526	2015	638	82.4%	526	0	0	2.4	16.2	7.4
12/1	Ahead Ahead2	U	-		-	-	-	1176	1965	1965	59.8%	-	-	-	0.7	2.3	0.7
12/2	Ahead	U	-		-	-	-	688	2105	2105	32.7%	-	-	-	0.2	1.3	0.2
13/1	Ahead	O	-		-	-	-	57	1975	1252	4.6%	57	0	0	0.1	4.7	0.6
13/2	Ahead	U	-		-	-	-	217	2115	2115	10.3%	-	-	-	0.1	0.9	0.1
14/1	Ahead	U	-		-	-	-	200	1925	1925	10.4%	-	-	-	0.1	1.0	0.1
14/2	Ahead	U	-		-	-	-	282	2065	2065	13.7%	-	-	-	0.1	1.0	0.1
15/1	R108 (S) Left Ahead	U	G		1	52	-	496	1975	1047	47.4%	-	-	-	2.5	18.0	9.0
15/2	R108 (S) Ahead	U	G		1	52	-	39	2115	1121	3.5%	-	-	-	0.1	12.9	0.5
16/1	Roundabout (W) Right Ahead	U	E		1	53	-	719	2105	1137	63.3%	-	-	-	2.9	14.4	9.4
16/2	Roundabout (W) Right	U	E		1	53	-	39	2185	1180	3.3%	-	-	-	0.1	8.2	0.2
17/1		U	-		-	-	-	1391	1940	1940	71.7%	-	-	-	2.2	5.6	23.5
18/1	R108 (S) Ahead	U	A		1	52	-	81	1975	1047	7.7%	-	-	-	0.3	13.4	1.1
18/2	R108 (S) Ahead	U	A		1	52	-	282	2115	1121	25.2%	-	-	-	1.2	14.9	4.4
19/1	Ahead	U	-		-	-	-	660	2015	2015	32.8%	-	-	-	0.2	1.3	0.2
20/1	Ahead	U	-		-	-	-	370	1940	1940	19.1%	-	-	-	0.1	1.1	0.1

Basic Results Summary

20/2	Ahead	U	-		-	-	-	39	2080	2080	1.9%	-	-	-	0.0	0.9	0.0
21/1		U	-		-	-	-	875	1965	1965	44.5%	-	-	-	0.4	1.7	0.6
22/1	Ahead	U	-		-	-	-	666	1915	1915	34.8%	-	-	-	0.3	1.4	0.3
22/2	Ahead	U	-		-	-	-	496	2105	2105	23.6%	-	-	-	0.2	1.1	0.2
22/3	Ahead	U	-		-	-	-	39	2080	2080	1.9%	-	-	-	0.0	0.9	0.0
23/1	Left	U	-		-	-	-	666	2030	2030	32.8%	-	-	-	0.2	1.3	0.2
24/1		U	-		-	-	-	666	1965	1965	33.9%	-	-	-	0.3	1.4	0.3
24/2		U	-		-	-	-	274	2105	2105	13.0%	-	-	-	0.1	1.0	0.1
25/1	Ahead	U	-		-	-	-	349	1940	1940	18.0%	-	-	-	0.1	1.1	0.2
Ped Link: P1	Unnamed Ped Link	-	I		1	48	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P2	Unnamed Ped Link	-	J		1	42	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P3	Unnamed Ped Link	-	K		1	48	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P4	Unnamed Ped Link	-	L		1	41	-	0	-	0	0.0%	-	-	-	-	-	-

C1 - Ballymun Interchange

PRC for Signalled Lanes (%): 1.7
PRC Over All Lanes (%): 1.7

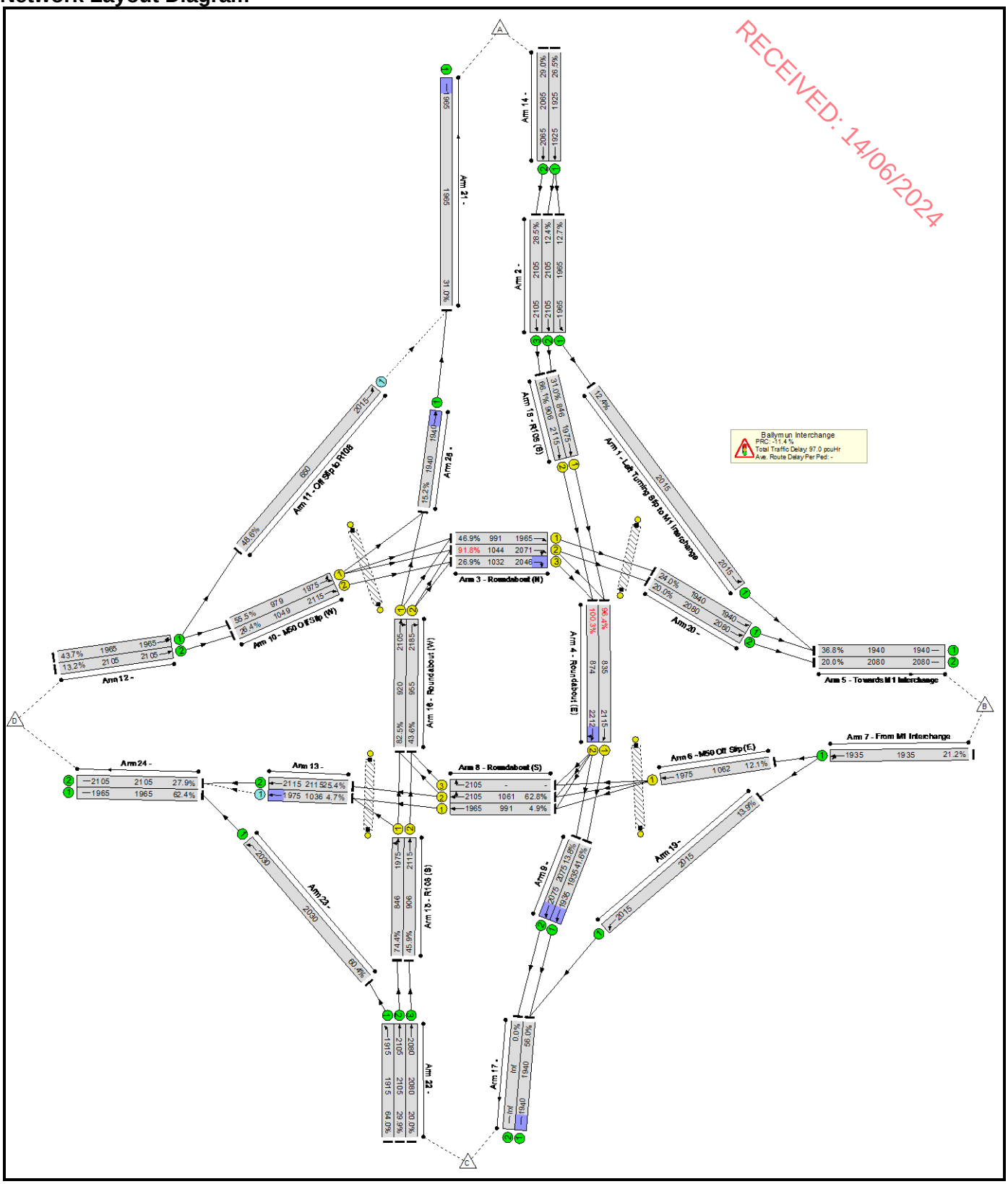
Total Delay for Signalled Lanes (pcuHr): 55.67
Total Delay Over All Lanes(pcuHr): 64.90

Cycle Time (s): 100

Basic Results Summary

Scenario 12: '2023 DS PM' (FG10: '2023 DS PM', Plan 1: 'Network Control Plan - AM')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Airport Roundabout	-	-	-		-	-	-	-	-	-	**100.3%**	**365**	**0**	**0**	**97.0**	-	-
Ballymun Interchange	-	-	-		-	-	-	-	-	-	**100.3%**	**365**	**0**	**0**	**97.0**	-	-
1/1	Left Turning Slip to M1 Interchange Left	U	-		-	-	-	249	2015	2015	12.4%	-	-	-	0.1	1.0	0.1
2/1	Ahead	U	-		-	-	-	249	1965	1965	12.7%	-	-	-	0.1	1.0	0.1
2/2	Ahead	U	-		-	-	-	262	2105	2105	12.4%	-	-	-	0.1	1.0	0.1
2/3	Ahead	U	-		-	-	-	599	2105	2105	28.5%	-	-	-	0.2	1.2	0.2
3/1	Roundabout (N) Ahead	U	B		1	59	-	465	1965	991	46.9%	-	-	-	5.1	39.8	15.8
3/2	Roundabout (N) Right Ahead	U	B		1	59	-	959	2071	1044	91.8%	-	-	-	11.7	43.8	35.7
3/3	Roundabout (N) Right	U	B		1	59	-	277	2046	1032	26.9%	-	-	-	0.5	6.1	0.8
4/1	Roundabout (E) Ahead	U	D		1	46	-	805	2115	835	96.4%	-	-	-	14.3	64.1	35.0
4/2	Roundabout (E) Right Ahead	U	D		1	46	-	876	2212	874	100.3%	-	-	-	21.2	87.0	44.4
5/1	Towards M1 Interchange	U	-		-	-	-	714	1940	1940	36.8%	-	-	-	0.3	1.5	3.0
5/2	Towards M1 Interchange	U	-		-	-	-	416	2080	2080	20.0%	-	-	-	0.1	1.1	0.1
6/1	M50 Off Slip (E) Ahead	U	C		1	63	-	129	1975	1062	12.1%	-	-	-	0.6	15.5	2.1
7/1	From M1 Interchange Ahead Ahead2	U	-		-	-	-	410	1935	1935	21.2%	-	-	-	0.1	1.2	0.1
8/1	Roundabout (S) Ahead	U	H		1	59	-	49	1965	991	4.9%	-	-	-	0.3	22.3	1.6

Basic Results Summary

8/2	Roundabout (S) Ahead Right	U	H		1	59	-	669	2105	1061	62.8%	-		-	6.7	36.3	22.0
8/3	Roundabout (S) Right	U	H		1	59	-	0	2105	-	-	-	-	-	-	-	-
9/1	Ahead	U	-		-	-	-	805	1935	1935	41.6%	-	-	-	0.6	2.9	16.5
9/2	Ahead	U	-		-	-	-	287	2075	2075	13.8%	-	-	-	0.1	1.0	0.2
10/1	M50 Off Slip (W) Ahead Left	U	F		1	58	-	543	1975	979	55.5%	-	-	-	3.8	25.0	13.0
10/2	M50 Off Slip (W) Ahead	U	F		1	58	-	277	2115	1049	26.4%	-	-	-	1.5	19.7	5.5
11/1	Off Slip to R108 Ahead	O	-		-	-	-	316	2015	650	48.6%	316	0	0	0.5	5.4	0.7
12/1	Ahead Ahead2	U	-		-	-	-	859	1965	1965	43.7%	-	-	-	0.4	1.6	0.4
12/2	Ahead	U	-		-	-	-	277	2105	2105	13.2%	-	-	-	0.1	1.0	0.1
13/1	Ahead	O	-		-	-	-	49	1975	1036	4.7%	49	0	0	0.2	15.4	0.7
13/2	Ahead	U	-		-	-	-	540	2115	2115	25.4%	-	-	-	0.2	1.1	0.2
14/1	Ahead	U	-		-	-	-	511	1925	1925	26.5%	-	-	-	0.2	1.3	0.2
14/2	Ahead	U	-		-	-	-	599	2065	2065	29.0%	-	-	-	0.2	1.2	0.2
15/1	R108 (S) Left Ahead	U	G		1	50	-	630	1975	846	74.4%	-	-	-	6.4	36.7	18.8
15/2	R108 (S) Ahead	U	G		1	50	-	416	2115	906	45.9%	-	-	-	3.2	27.9	10.1
16/1	Roundabout (W) Right Ahead	U	E		1	51	-	759	2105	920	82.5%	-	-	-	5.0	23.5	10.2
16/2	Roundabout (W) Right	U	E		1	51	-	416	2185	955	43.6%	-	-	-	1.4	12.4	2.5
17/1		U	-		-	-	-	1086	1940	1940	56.0%	-	-	-	0.9	3.1	16.4
18/1	R108 (S) Ahead	U	A		1	50	-	262	1975	846	31.0%	-	-	-	1.9	25.5	5.9
18/2	R108 (S) Ahead	U	A		1	50	-	599	2115	906	66.1%	-	-	-	5.5	32.9	16.6
19/1	Ahead	U	-		-	-	-	281	2015	2015	13.9%	-	-	-	0.1	1.0	0.1
20/1	Ahead	U	-		-	-	-	465	1940	1940	24.0%	-	-	-	0.2	1.2	0.2

Basic Results Summary

20/2	Ahead	U	-		-	-	-	416	2080	2080	20.0%	-	-	-	0.1	1.1	0.1
21/1		U	-		-	-	-	610	1965	1965	31.0%	-	-	-	0.2	1.3	0.2
22/1	Ahead	U	-		-	-	-	1226	1915	1915	64.0%	-	-	-	0.9	2.6	0.9
22/2	Ahead	U	-		-	-	-	630	2105	2105	29.9%	-	-	-	0.2	1.2	0.2
22/3	Ahead	U	-		-	-	-	416	2080	2080	20.0%	-	-	-	0.1	1.1	0.1
23/1	Left	U	-		-	-	-	1226	2030	2030	60.4%	-	-	-	0.8	2.2	0.8
24/1		U	-		-	-	-	1226	1965	1965	62.4%	-	-	-	0.8	2.4	0.8
24/2		U	-		-	-	-	589	2105	2105	27.9%	-	-	-	0.2	1.2	0.2
25/1	Ahead	U	-		-	-	-	294	1940	1940	15.2%	-	-	-	0.1	1.1	0.1
Ped Link: P1	Unnamed Ped Link	-	I		1	46	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P2	Unnamed Ped Link	-	J		1	40	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P3	Unnamed Ped Link	-	K		1	46	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P4	Unnamed Ped Link	-	L		1	39	-	0	-	0	0.0%	-	-	-	-	-	-

C1 - Ballymun Interchange

PRC for Signalled Lanes (%): -11.4
PRC Over All Lanes (%): -11.4

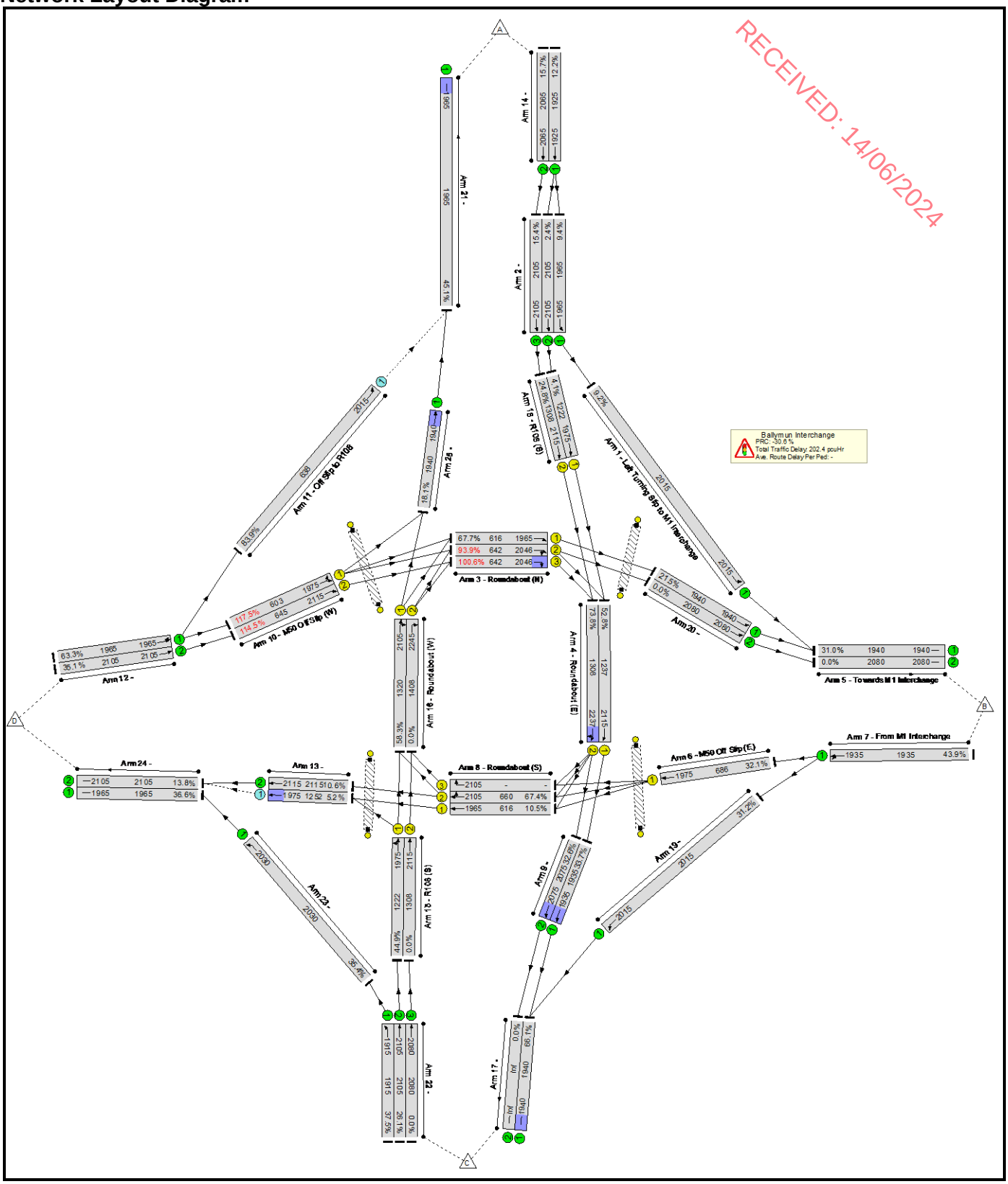
Total Delay for Signalled Lanes (pcuHr): 89.03
Total Delay Over All Lanes(pcuHr): 97.02

Cycle Time (s): 119

Basic Results Summary

Scenario 13: '2028 DS AM' (FG11: '2028 DS AM', Plan 1: 'Network Control Plan - AM')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Airport Roundabout	-	-	-		-	-	-	-	-	-	**117.5%**	**600**	**0**	**0**	**202.4**	-	-
Ballymun Interchange	-	-	-		-	-	-	-	-	-	**117.5%**	**600**	**0**	**0**	**202.4**	-	-
1/1	Left Turning Slip to M1 Interchange Left	U	-		-	-	-	185	2015	2015	9.2%	-	-	-	0.1	1.0	0.1
2/1	Ahead	U	-		-	-	-	185	1965	1965	9.4%	-	-	-	0.1	1.0	0.1
2/2	Ahead	U	-		-	-	-	50	2105	2105	2.4%	-	-	-	0.0	0.9	0.0
2/3	Ahead	U	-		-	-	-	324	2105	2105	15.4%	-	-	-	0.1	1.0	0.1
3/1	Roundabout (N) Ahead	U	B		1	36	-	417	1965	616	67.7%	-	-	-	7.2	61.9	14.7
3/2	Roundabout (N) Right Ahead	U	B		1	36	-	708	2046	642	93.9%	-	-	-	9.0	53.5	10.5
3/3	Roundabout (N) Right	U	B		1	36	-	739	2046	642	100.6%	-	-	-	17.5	97.4	20.3
4/1	Roundabout (E) Ahead	U	D		1	68	-	758	2115	1237	52.8%	-	-	-	4.7	25.9	21.5
4/2	Roundabout (E) Right Ahead	U	D		1	68	-	1063	2237	1308	73.8%	-	-	-	7.7	28.7	31.1
5/1	Towards M1 Interchange	U	-		-	-	-	602	1940	1940	31.0%	-	-	-	0.2	1.3	0.2
5/2	Towards M1 Interchange	U	-		-	-	-	0	2080	2080	0.0%	-	-	-	0.0	0.0	0.0
6/1	M50 Off Slip (E) Ahead	U	C		1	40	-	220	1975	686	32.1%	-	-	-	2.0	32.1	5.5
7/1	From M1 Interchange Ahead Ahead2	U	-		-	-	-	849	1935	1935	43.9%	-	-	-	0.4	1.7	0.4
8/1	Roundabout (S) Ahead	U	H		1	36	-	65	1965	616	10.5%	-	-	-	0.7	36.1	2.2

Basic Results Summary

8/2	Roundabout (S) Ahead Right	U	H		1	36	-	445	2105	660	67.4%	-		-	4.2	33.6	14.7
8/3	Roundabout (S) Right	U	H		1	36	-	0	2105	-	-	-	-	-	-	-	-
9/1	Ahead	U	-		-	-	-	758	1935	1935	33.7%	-	-	-	0.4	2.2	10.6
9/2	Ahead	U	-		-	-	-	773	2075	2075	32.6%	-	-	-	0.3	1.8	8.4
10/1	M50 Off Slip (W) Ahead Left	U	F		1	35	-	708	1975	603	117.5%	-	-	-	70.0	356.0	82.6
10/2	M50 Off Slip (W) Ahead	U	F		1	35	-	739	2115	645	114.5%	-	-	-	64.3	313.3	77.8
11/1	Off Slip to R108 Ahead	O	-		-	-	-	535	2015	638	83.9%	535	0	0	2.7	17.9	9.0
12/1	Ahead Ahead2	U	-		-	-	-	1243	1965	1965	63.3%	-	-	-	0.9	2.5	0.9
12/2	Ahead	U	-		-	-	-	739	2105	2105	35.1%	-	-	-	0.3	1.3	0.3
13/1	Ahead	O	-		-	-	-	65	1975	1252	5.2%	65	0	0	0.1	8.3	1.1
13/2	Ahead	U	-		-	-	-	225	2115	2115	10.6%	-	-	-	0.1	1.0	0.1
14/1	Ahead	U	-		-	-	-	235	1925	1925	12.2%	-	-	-	0.1	1.1	0.1
14/2	Ahead	U	-		-	-	-	324	2065	2065	15.7%	-	-	-	0.1	1.0	0.1
15/1	R108 (S) Left Ahead	U	G		1	72	-	549	1975	1222	44.9%	-	-	-	2.2	14.6	9.9
15/2	R108 (S) Ahead	U	G		1	72	-	0	2115	1308	0.0%	-	-	-	0.0	0.0	0.0
16/1	Roundabout (W) Right Ahead	U	E		1	73	-	769	2105	1320	58.3%	-	-	-	2.4	11.4	11.3
16/2	Roundabout (W) Right	U	E		1	73	-	0	2245	1408	0.0%	-	-	-	0.0	0.0	0.0
17/1		U	-		-	-	-	1387	1940	1940	66.1%	-	-	-	1.7	4.9	23.8
18/1	R108 (S) Ahead	U	A		1	72	-	50	1975	1222	4.1%	-	-	-	0.1	10.4	0.7
18/2	R108 (S) Ahead	U	A		1	72	-	324	2115	1308	24.8%	-	-	-	1.1	12.0	4.9
19/1	Ahead	U	-		-	-	-	629	2015	2015	31.2%	-	-	-	0.2	1.3	0.2
20/1	Ahead	U	-		-	-	-	417	1940	1940	21.5%	-	-	-	0.1	1.2	0.1

Basic Results Summary

20/2	Ahead	U	-		-	-	-	0	2080	2080	0.0%	-	-	-	0.0	0.0	0.0
21/1		U	-		-	-	-	887	1965	1965	45.1%	-	-	-	0.4	1.7	0.7
22/1	Ahead	U	-		-	-	-	719	1915	1915	37.5%	-	-	-	0.3	1.5	0.3
22/2	Ahead	U	-		-	-	-	549	2105	2105	26.1%	-	-	-	0.2	1.2	0.2
22/3	Ahead	U	-		-	-	-	0	2080	2080	0.0%	-	-	-	0.0	0.0	0.0
23/1	Left	U	-		-	-	-	719	2030	2030	35.4%	-	-	-	0.3	1.4	0.3
24/1		U	-		-	-	-	719	1965	1965	36.6%	-	-	-	0.3	1.4	0.3
24/2		U	-		-	-	-	290	2105	2105	13.8%	-	-	-	0.1	1.0	0.1
25/1	Ahead	U	-		-	-	-	352	1940	1940	18.1%	-	-	-	0.1	1.2	0.2
Ped Link: P1	Unnamed Ped Link	-	I		1	68	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P2	Unnamed Ped Link	-	J		1	62	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P3	Unnamed Ped Link	-	K		1	68	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P4	Unnamed Ped Link	-	L		1	61	-	0	-	0	0.0%	-	-	-	-	-	-

C1 - Ballymun Interchange

PRC for Signalled Lanes (%): -30.6
PRC Over All Lanes (%): -30.6

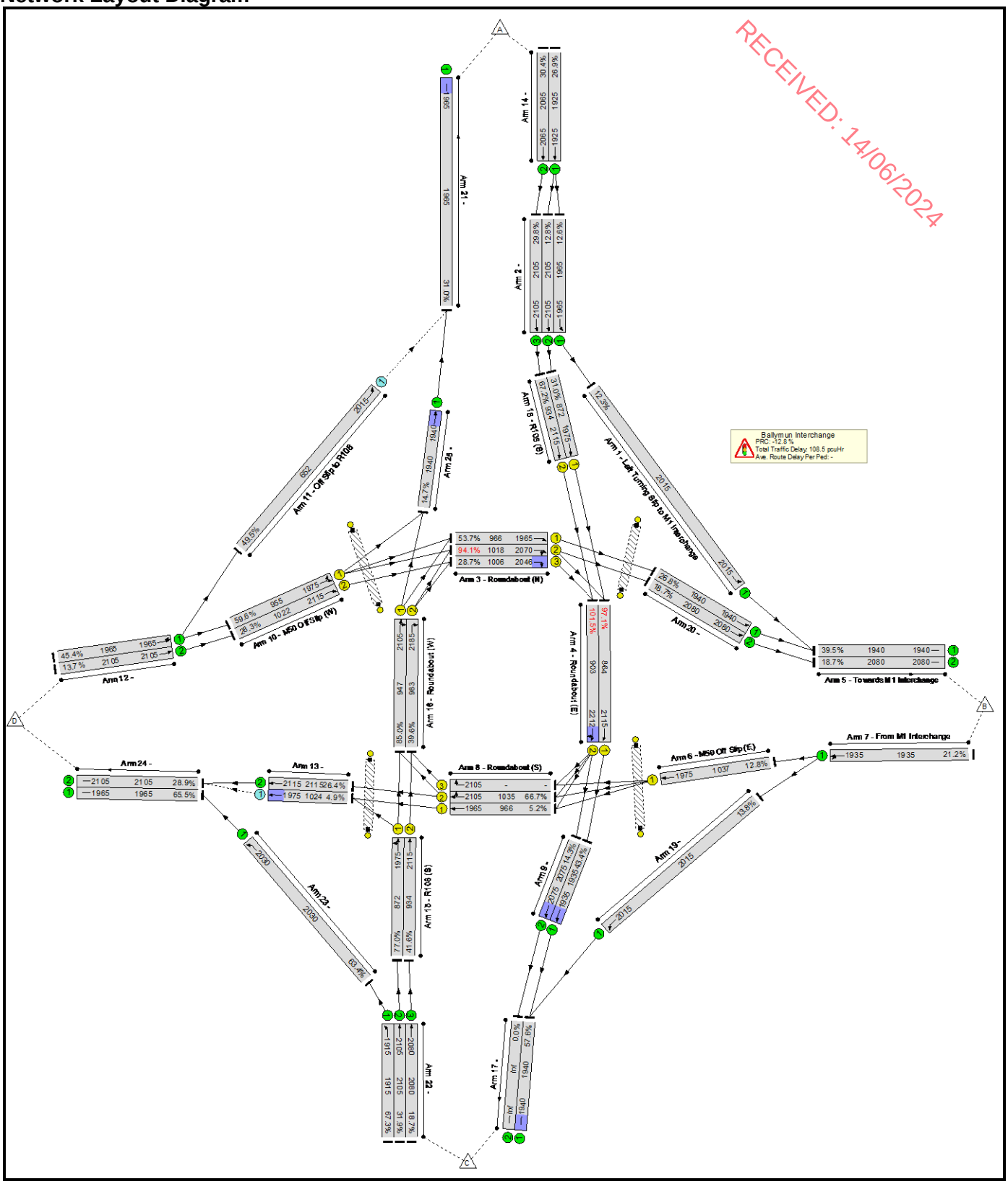
Total Delay for Signalled Lanes (pcuHr): 192.93
Total Delay Over All Lanes(pcuHr): 202.42

Cycle Time (s): 118

Basic Results Summary

Scenario 14: '2028 DS PM' (FG12: '2028 DS PM', Plan 1: 'Network Control Plan - AM')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Airport Roundabout	-	-	-		-	-	-	-	-	-	**101.5%**	**373**	**0**	**0**	**108.5**	-	-
Ballymun Interchange	-	-	-		-	-	-	-	-	-	**101.5%**	**373**	**0**	**0**	**108.5**	-	-
1/1	Left Turning Slip to M1 Interchange Left	U	-		-	-	-	248	2015	2015	12.3%	-	-	-	0.1	1.0	0.1
2/1	Ahead	U	-		-	-	-	248	1965	1965	12.6%	-	-	-	0.1	1.0	0.1
2/2	Ahead	U	-		-	-	-	270	2105	2105	12.8%	-	-	-	0.1	1.0	0.1
2/3	Ahead	U	-		-	-	-	628	2105	2105	29.8%	-	-	-	0.2	1.2	0.2
3/1	Roundabout (N) Ahead	U	B		1	58	-	519	1965	966	53.7%	-	-	-	6.2	43.2	17.9
3/2	Roundabout (N) Right Ahead	U	B		1	58	-	958	2070	1018	94.1%	-	-	-	13.1	49.3	37.7
3/3	Roundabout (N) Right	U	B		1	58	-	289	2046	1006	28.7%	-	-	-	0.5	6.4	0.9
4/1	Roundabout (E) Ahead	U	D		1	48	-	839	2115	864	97.1%	-	-	-	15.8	67.8	37.4
4/2	Roundabout (E) Right Ahead	U	D		1	48	-	917	2212	903	101.5%	-	-	-	25.8	101.3	50.0
5/1	Towards M1 Interchange	U	-		-	-	-	767	1940	1940	39.5%	-	-	-	0.3	1.6	6.8
5/2	Towards M1 Interchange	U	-		-	-	-	389	2080	2080	18.7%	-	-	-	0.1	1.1	0.1
6/1	M50 Off Slip (E) Ahead	U	C		1	62	-	133	1975	1037	12.8%	-	-	-	0.6	16.5	2.3
7/1	From M1 Interchange Ahead Ahead2	U	-		-	-	-	411	1935	1935	21.2%	-	-	-	0.1	1.2	0.1
8/1	Roundabout (S) Ahead	U	H		1	58	-	51	1965	966	5.2%	-	-	-	0.3	23.7	1.7

Basic Results Summary

8/2	Roundabout (S) Ahead Right	U	H		1	58	-	703	2105	1035	66.7%	-		-	7.5	38.9	23.2
8/3	Roundabout (S) Right	U	H		1	58	-	0	2105	-	-	-	-	-	-	-	-
9/1	Ahead	U	-		-	-	-	839	1935	1935	43.4%	-	-	-	0.7	3.0	17.9
9/2	Ahead	U	-		-	-	-	296	2075	2075	14.3%	-	-	-	0.1	1.0	0.2
10/1	M50 Off Slip (W) Ahead Left	U	F		1	57	-	569	1975	955	59.6%	-	-	-	4.3	27.1	14.5
10/2	M50 Off Slip (W) Ahead	U	F		1	57	-	289	2115	1022	28.3%	-	-	-	1.7	21.0	5.9
11/1	Off Slip to R108 Ahead	O	-		-	-	-	323	2015	652	49.5%	323	0	0	0.5	5.5	0.8
12/1	Ahead Ahead2	U	-		-	-	-	892	1965	1965	45.4%	-	-	-	0.4	1.7	0.4
12/2	Ahead	U	-		-	-	-	289	2105	2105	13.7%	-	-	-	0.1	1.0	0.1
13/1	Ahead	O	-		-	-	-	51	1975	1024	4.9%	50	0	0	0.2	16.4	0.8
13/2	Ahead	U	-		-	-	-	570	2115	2115	26.4%	-	-	-	0.2	1.2	0.2
14/1	Ahead	U	-		-	-	-	518	1925	1925	26.9%	-	-	-	0.2	1.3	0.2
14/2	Ahead	U	-		-	-	-	628	2065	2065	30.4%	-	-	-	0.2	1.3	0.2
15/1	R108 (S) Left Ahead	U	G		1	52	-	672	1975	872	77.0%	-	-	-	6.9	37.2	20.5
15/2	R108 (S) Ahead	U	G		1	52	-	389	2115	934	41.6%	-	-	-	2.8	26.2	9.2
16/1	Roundabout (W) Right Ahead	U	E		1	53	-	805	2105	947	85.0%	-	-	-	5.5	24.4	11.0
16/2	Roundabout (W) Right	U	E		1	53	-	389	2185	983	39.6%	-	-	-	1.3	11.8	2.3
17/1		U	-		-	-	-	1117	1940	1940	57.6%	-	-	-	1.0	3.3	18.1
18/1	R108 (S) Ahead	U	A		1	52	-	270	1975	872	31.0%	-	-	-	1.8	24.7	6.0
18/2	R108 (S) Ahead	U	A		1	52	-	628	2115	934	67.2%	-	-	-	5.7	32.4	17.6
19/1	Ahead	U	-		-	-	-	278	2015	2015	13.8%	-	-	-	0.1	1.0	0.1
20/1	Ahead	U	-		-	-	-	519	1940	1940	26.8%	-	-	-	0.2	1.3	0.2

Basic Results Summary

20/2	Ahead	U	-		-	-	-	389	2080	2080	18.7%	-	-	-	0.1	1.1	0.1
21/1		U	-		-	-	-	609	1965	1965	31.0%	-	-	-	0.2	1.3	0.2
22/1	Ahead	U	-		-	-	-	1288	1915	1915	67.3%	-	-	-	1.0	2.9	1.0
22/2	Ahead	U	-		-	-	-	672	2105	2105	31.9%	-	-	-	0.2	1.3	0.2
22/3	Ahead	U	-		-	-	-	389	2080	2080	18.7%	-	-	-	0.1	1.1	0.1
23/1	Left	U	-		-	-	-	1288	2030	2030	63.4%	-	-	-	0.9	2.4	0.9
24/1		U	-		-	-	-	1288	1965	1965	65.5%	-	-	-	0.9	2.7	0.9
24/2		U	-		-	-	-	621	2105	2105	28.9%	-	-	-	0.2	1.2	0.2
25/1	Ahead	U	-		-	-	-	286	1940	1940	14.7%	-	-	-	0.1	1.1	0.1
Ped Link: P1	Unnamed Ped Link	-	I		1	48	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P2	Unnamed Ped Link	-	J		1	42	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P3	Unnamed Ped Link	-	K		1	48	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P4	Unnamed Ped Link	-	L		1	41	-	0	-	0	0.0%	-	-	-	-	-	-

C1 - Ballymun Interchange

PRC for Signalled Lanes (%): -12.8
PRC Over All Lanes (%): -12.8

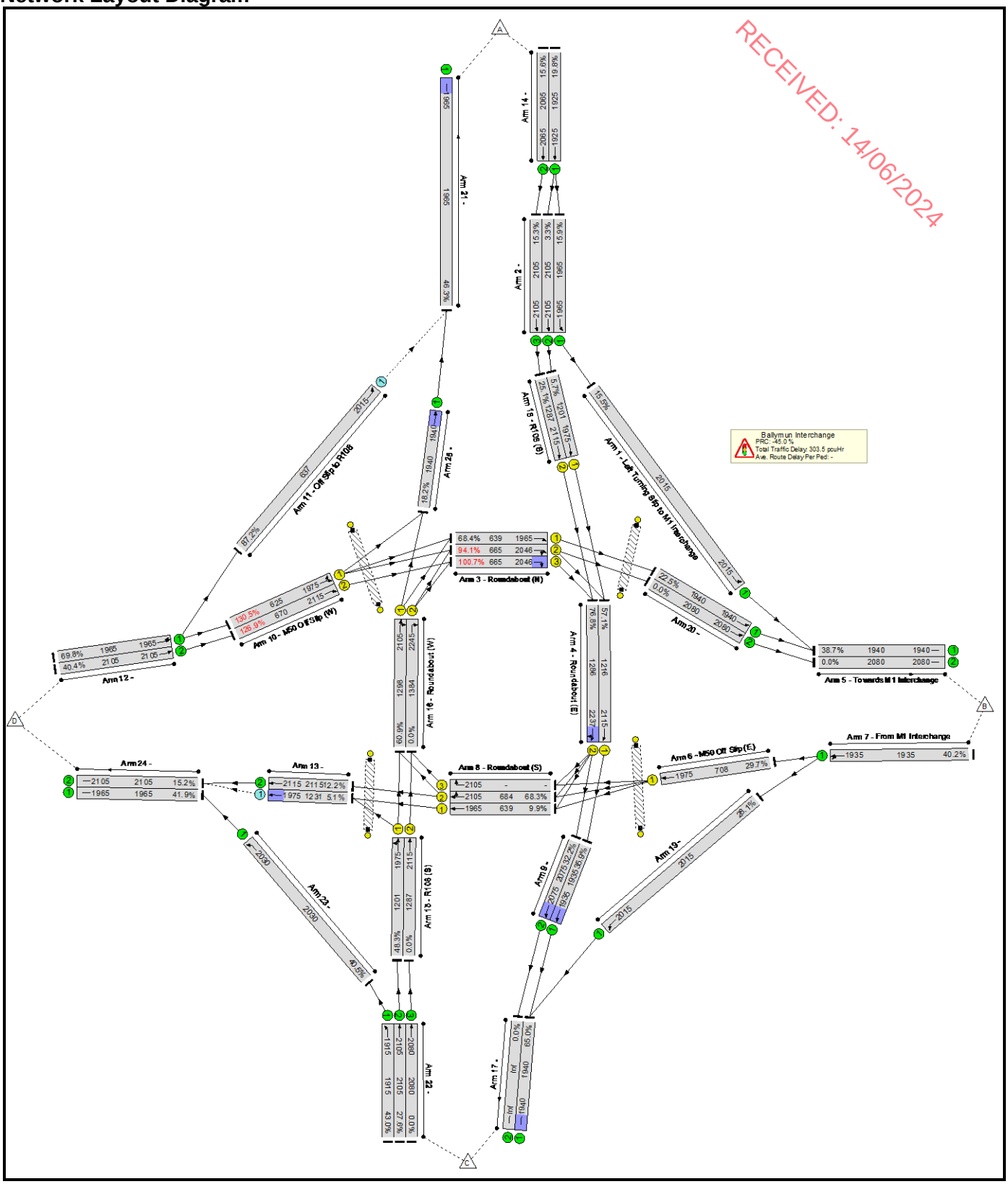
Total Delay for Signalled Lanes (pcuHr): 99.82
Total Delay Over All Lanes(pcuHr): 108.51

Cycle Time (s): 120

Basic Results Summary

Scenario 15: '2038 DS AM' (FG13: '2038 DS AM', Plan 1: 'Network Control Plan - AM')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Airport Roundabout	-	-	-		-	-	-	-	-	-	**130.5%**	**619**	**0**	**0**	**303.5**	-	-
Ballymun Interchange	-	-	-		-	-	-	-	-	-	**130.5%**	**619**	**0**	**0**	**303.5**	-	-
1/1	Left Turning Slip to M1 Interchange Left	U	-		-	-	-	313	2015	2015	15.5%	-	-	-	0.1	1.1	0.1
2/1	Ahead	U	-		-	-	-	313	1965	1965	15.9%	-	-	-	0.1	1.1	0.1
2/2	Ahead	U	-		-	-	-	69	2105	2105	3.3%	-	-	-	0.0	0.9	0.0
2/3	Ahead	U	-		-	-	-	323	2105	2105	15.3%	-	-	-	0.1	1.0	0.1
3/1	Roundabout (N) Ahead	U	B		1	38	-	437	1965	639	68.4%	-	-	-	7.6	62.3	15.6
3/2	Roundabout (N) Right Ahead	U	B		1	38	-	816	2046	665	94.1%	-	-	-	9.0	52.0	10.7
3/3	Roundabout (N) Right	U	B		1	38	-	850	2046	665	100.7%	-	-	-	18.0	97.0	21.7
4/1	Roundabout (E) Ahead	U	D		1	68	-	885	2115	1216	57.1%	-	-	-	5.4	28.1	23.2
4/2	Roundabout (E) Right Ahead	U	D		1	68	-	1173	2237	1286	76.8%	-	-	-	8.6	31.3	32.9
5/1	Towards M1 Interchange	U	-		-	-	-	750	1940	1940	38.7%	-	-	-	0.3	1.5	4.1
5/2	Towards M1 Interchange	U	-		-	-	-	0	2080	2080	0.0%	-	-	-	0.0	0.0	0.0
6/1	M50 Off Slip (E) Ahead	U	C		1	42	-	210	1975	708	29.7%	-	-	-	1.8	31.3	5.2
7/1	From M1 Interchange Ahead Ahead2	U	-		-	-	-	777	1935	1935	40.2%	-	-	-	0.3	1.6	0.3
8/1	Roundabout (S) Ahead	U	H		1	38	-	63	1965	639	9.9%	-	-	-	0.6	34.6	2.1

Basic Results Summary

8/2	Roundabout (S) Ahead Right	U	H		1	38	-	467	2105	684	68.3%	-		-	4.6	35.1	15.8
8/3	Roundabout (S) Right	U	H		1	38	-	0	2105	-	-	-	-	-	-	-	-
9/1	Ahead	U	-		-	-	-	885	1935	1935	35.9%	-	-	-	0.5	2.4	12.3
9/2	Ahead	U	-		-	-	-	853	2075	2075	32.2%	-	-	-	0.3	1.9	8.9
10/1	M50 Off Slip (W) Ahead Left	U	F		1	37	-	816	1975	625	130.5%	-	-	-	117.8	519.6	130.9
10/2	M50 Off Slip (W) Ahead	U	F		1	37	-	850	2115	670	126.9%	-	-	-	112.6	476.9	126.8
11/1	Off Slip to R108 Ahead	O	-		-	-	-	556	2015	637	87.2%	556	0	0	3.4	21.9	11.2
12/1	Ahead Ahead2	U	-		-	-	-	1372	1965	1965	69.8%	-	-	-	1.2	3.0	1.2
12/2	Ahead	U	-		-	-	-	850	2105	2105	40.4%	-	-	-	0.3	1.4	0.3
13/1	Ahead	O	-		-	-	-	63	1975	1231	5.1%	63	0	0	0.2	9.3	1.1
13/2	Ahead	U	-		-	-	-	257	2115	2115	12.2%	-	-	-	0.1	1.0	0.1
14/1	Ahead	U	-		-	-	-	382	1925	1925	19.8%	-	-	-	0.1	1.2	0.1
14/2	Ahead	U	-		-	-	-	323	2065	2065	15.6%	-	-	-	0.1	1.0	0.1
15/1	R108 (S) Left Ahead	U	G		1	72	-	580	1975	1201	48.3%	-	-	-	2.6	15.9	11.1
15/2	R108 (S) Ahead	U	G		1	72	-	0	2115	1287	0.0%	-	-	-	0.0	0.0	0.0
16/1	Roundabout (W) Right Ahead	U	E		1	73	-	790	2105	1298	60.9%	-	-	-	2.6	11.7	11.3
16/2	Roundabout (W) Right	U	E		1	73	-	0	2245	1384	0.0%	-	-	-	0.0	0.0	0.0
17/1		U	-		-	-	-	1452	1940	1940	65.0%	-	-	-	1.7	4.8	23.8
18/1	R108 (S) Ahead	U	A		1	72	-	69	1975	1201	5.7%	-	-	-	0.2	11.2	1.0
18/2	R108 (S) Ahead	U	A		1	72	-	323	2115	1287	25.1%	-	-	-	1.1	12.7	5.1
19/1	Ahead	U	-		-	-	-	567	2015	2015	28.1%	-	-	-	0.2	1.2	0.2
20/1	Ahead	U	-		-	-	-	437	1940	1940	22.5%	-	-	-	0.1	1.2	0.1

Basic Results Summary

20/2	Ahead	U	-		-	-	-	0	2080	2080	0.0%	-	-	-	0.0	0.0	0.0
21/1		U	-		-	-	-	909	1965	1965	46.3%	-	-	-	0.4	1.8	0.7
22/1	Ahead	U	-		-	-	-	823	1915	1915	43.0%	-	-	-	0.4	1.6	0.4
22/2	Ahead	U	-		-	-	-	580	2105	2105	27.6%	-	-	-	0.2	1.2	0.2
22/3	Ahead	U	-		-	-	-	0	2080	2080	0.0%	-	-	-	0.0	0.0	0.0
23/1	Left	U	-		-	-	-	823	2030	2030	40.5%	-	-	-	0.3	1.5	0.3
24/1		U	-		-	-	-	823	1965	1965	41.9%	-	-	-	0.4	1.6	0.4
24/2		U	-		-	-	-	320	2105	2105	15.2%	-	-	-	0.1	1.0	0.1
25/1	Ahead	U	-		-	-	-	353	1940	1940	18.2%	-	-	-	0.1	1.2	0.2
Ped Link: P1	Unnamed Ped Link	-	I		1	68	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P2	Unnamed Ped Link	-	J		1	62	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P3	Unnamed Ped Link	-	K		1	68	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P4	Unnamed Ped Link	-	L		1	61	-	0	-	0	0.0%	-	-	-	-	-	-

C1 - Ballymun Interchange

PRC for Signalled Lanes (%): -45.0
PRC Over All Lanes (%): -45.0

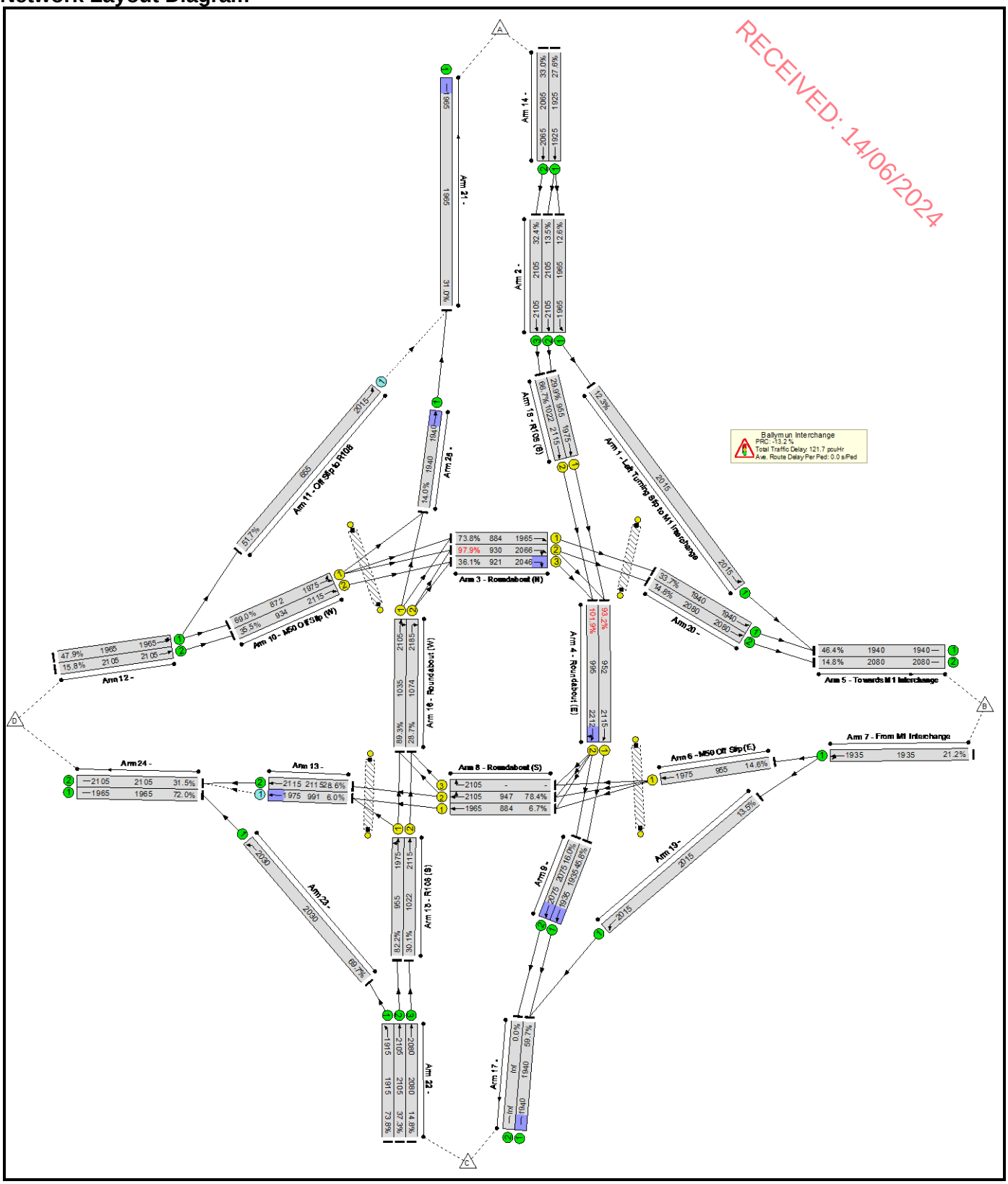
Total Delay for Signalled Lanes (pcuHr): 292.48
Total Delay Over All Lanes(pcuHr): 303.50

Cycle Time (s): 120

Basic Results Summary

Scenario 16: '2038 DS PM' (FG14: '2038 DS PM', Plan 1: 'Network Control Plan - AM')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Airport Roundabout	-	-	-		-	-	-	-	-	-	**101.9%**	**398**	**0**	**0**	**121.7**	-	-
Ballymun Interchange	-	-	-		-	-	-	-	-	-	**101.9%**	**398**	**0**	**0**	**121.7**	-	-
1/1	Left Turning Slip to M1 Interchange Left	U	-		-	-	-	247	2015	2015	12.3%	-	-	-	0.1	1.0	0.1
2/1	Ahead	U	-		-	-	-	247	1965	1965	12.6%	-	-	-	0.1	1.0	0.1
2/2	Ahead	U	-		-	-	-	285	2105	2105	13.5%	-	-	-	0.1	1.0	0.1
2/3	Ahead	U	-		-	-	-	682	2105	2105	32.4%	-	-	-	0.2	1.3	0.2
3/1	Roundabout (N) Ahead	U	B		1	53	-	653	1965	884	73.8%	-	-	-	9.7	53.5	23.2
3/2	Roundabout (N) Right Ahead	U	B		1	53	-	910	2066	930	97.9%	-	-	-	16.6	65.5	40.9
3/3	Roundabout (N) Right	U	B		1	53	-	332	2046	921	36.1%	-	-	-	0.7	7.3	1.0
4/1	Roundabout (E) Ahead	U	D		1	53	-	887	2115	952	93.2%	-	-	-	12.3	49.9	35.0
4/2	Roundabout (E) Right Ahead	U	D		1	53	-	1014	2212	995	101.9%	-	-	-	29.0	102.8	55.7
5/1	Towards M1 Interchange	U	-		-	-	-	900	1940	1940	46.4%	-	-	-	0.5	2.0	13.4
5/2	Towards M1 Interchange	U	-		-	-	-	308	2080	2080	14.8%	-	-	-	0.1	1.0	0.1
6/1	M50 Off Slip (E) Ahead	U	C		1	57	-	139	1975	955	14.6%	-	-	-	0.8	19.4	2.6
7/1	From M1 Interchange Ahead Ahead2	U	-		-	-	-	411	1935	1935	21.2%	-	-	-	0.1	1.2	0.1
8/1	Roundabout (S) Ahead	U	H		1	53	-	61	1965	884	6.7%	-	-	-	0.4	26.2	2.0

Basic Results Summary

8/2	Roundabout (S) Ahead Right	U	H		1	53	-	760	2105	947	78.4%	-		-	9.5	45.8	26.1
8/3	Roundabout (S) Right	U	H		1	53	-	0	2105	-	-	-	-	-	-	-	-
9/1	Ahead	U	-		-	-	-	887	1935	1935	45.8%	-	-	-	0.8	3.2	19.5
9/2	Ahead	U	-		-	-	-	332	2075	2075	16.0%	-	-	-	0.1	1.1	0.3
10/1	M50 Off Slip (W) Ahead Left	U	F		1	52	-	602	1975	872	69.0%	-	-	-	5.6	33.5	17.2
10/2	M50 Off Slip (W) Ahead	U	F		1	52	-	332	2115	934	35.5%	-	-	-	2.3	25.2	7.6
11/1	Off Slip to R108 Ahead	O	-		-	-	-	339	2015	655	51.7%	339	0	0	0.5	5.7	1.0
12/1	Ahead Ahead2	U	-		-	-	-	941	1965	1965	47.9%	-	-	-	0.5	1.8	0.5
12/2	Ahead	U	-		-	-	-	332	2105	2105	15.8%	-	-	-	0.1	1.0	0.1
13/1	Ahead	O	-		-	-	-	61	1975	991	6.0%	59	0	0	0.3	20.9	1.1
13/2	Ahead	U	-		-	-	-	621	2115	2115	28.6%	-	-	-	0.2	1.2	0.2
14/1	Ahead	U	-		-	-	-	532	1925	1925	27.6%	-	-	-	0.2	1.3	0.2
14/2	Ahead	U	-		-	-	-	682	2065	2065	33.0%	-	-	-	0.2	1.3	0.2
15/1	R108 (S) Left Ahead	U	G		1	57	-	785	1975	955	82.2%	-	-	-	8.1	36.9	24.5
15/2	R108 (S) Ahead	U	G		1	57	-	308	2115	1022	30.1%	-	-	-	1.8	21.3	6.4
16/1	Roundabout (W) Right Ahead	U	E		1	58	-	924	2105	1035	89.3%	-	-	-	6.6	25.8	13.3
16/2	Roundabout (W) Right	U	E		1	58	-	308	2185	1074	28.7%	-	-	-	0.9	10.2	1.7
17/1		U	-		-	-	-	1159	1940	1940	59.7%	-	-	-	1.1	3.5	19.3
18/1	R108 (S) Ahead	U	A		1	57	-	285	1975	955	29.9%	-	-	-	1.7	21.4	5.9
18/2	R108 (S) Ahead	U	A		1	57	-	682	2115	1022	66.7%	-	-	-	5.5	28.9	18.2
19/1	Ahead	U	-		-	-	-	272	2015	2015	13.5%	-	-	-	0.1	1.0	0.1
20/1	Ahead	U	-		-	-	-	653	1940	1940	33.7%	-	-	-	0.3	1.4	2.9

Basic Results Summary

20/2	Ahead	U	-		-	-	-	308	2080	2080	14.8%	-	-	-	0.1	1.0	0.1
21/1		U	-		-	-	-	610	1965	1965	31.0%	-	-	-	0.2	1.3	0.2
22/1	Ahead	U	-		-	-	-	1414	1915	1915	73.8%	-	-	-	1.4	3.6	1.4
22/2	Ahead	U	-		-	-	-	785	2105	2105	37.3%	-	-	-	0.3	1.4	0.3
22/3	Ahead	U	-		-	-	-	308	2080	2080	14.8%	-	-	-	0.1	1.0	0.1
23/1	Left	U	-		-	-	-	1414	2030	2030	69.7%	-	-	-	1.1	2.9	1.1
24/1		U	-		-	-	-	1414	1965	1965	72.0%	-	-	-	1.3	3.3	1.3
24/2		U	-		-	-	-	682	2105	2105	31.5%	-	-	-	0.2	1.2	0.2
25/1	Ahead	U	-		-	-	-	271	1940	1940	14.0%	-	-	-	0.1	1.1	0.1
Ped Link: P1	Unnamed Ped Link	-	I		1	53	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P2	Unnamed Ped Link	-	J		1	47	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P3	Unnamed Ped Link	-	K		1	53	-	0	-	0	0.0%	-	-	-	-	-	-
Ped Link: P4	Unnamed Ped Link	-	L		1	46	-	0	-	0	0.0%	-	-	-	-	-	-

C1 - Ballymun Interchange

PRC for Signalled Lanes (%): -13.2
PRC Over All Lanes (%): -13.2

Total Delay for Signalled Lanes (pcuHr): 111.28
Total Delay Over All Lanes(pcuHr): 121.70

Cycle Time (s): 120

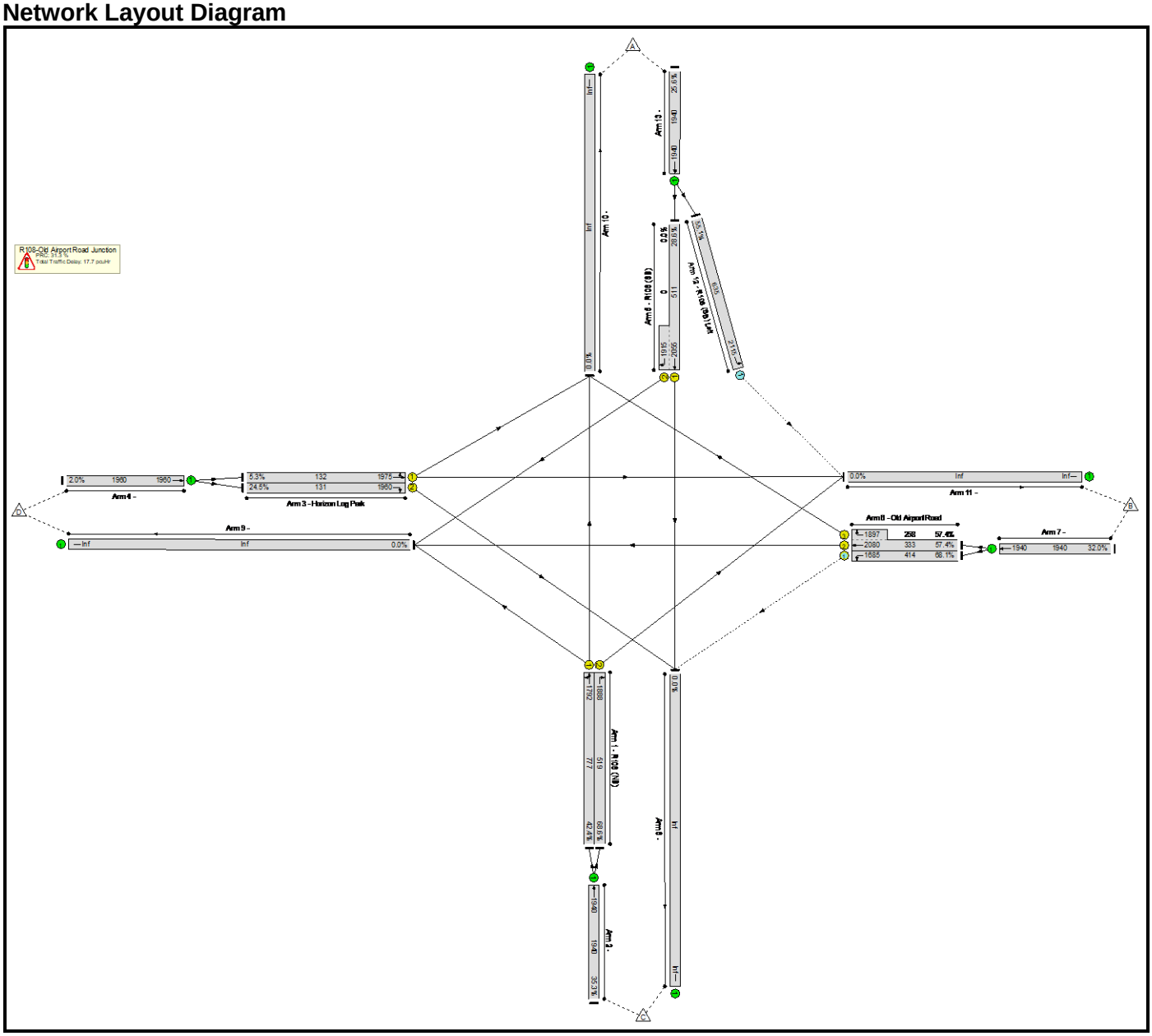
Basic Results Summary

User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	6. R108_Old Airport Rd Junction_BASE_DM_LAYOUTS.lsg3x
Author:	
Company:	
Address:	

Scenario 1: '2023 AM Peak Hour' (FG1: '2023 AM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.6%**	**226**	**406**	**0**	**17.7**	**-**	**-**
R108-Old Airport Road Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.6%**	**226**	**406**	**0**	**17.7**	**-**	**-**
1/1	R108 (NB) Left Ahead	U	F		1	51	-	329	1792	777	42.4%	-	-	-	2.5	27.6	8.0
1/2	R108 (NB) Right	U	E		1	32	-	356	1888	519	68.6%	-	-	-	4.9	49.8	11.7
2/1	Ahead	U	-		-	-	-	685	1940	1940	35.3%	-	-	-	0.3	1.4	0.3
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	7	1975	132	5.3%	-	-	-	0.1	67.2	0.2
3/2	Horizon Log Park Right	U	G		1	7	-	32	1960	131	24.5%	-	-	-	0.6	71.3	1.2
4/1	Ahead	U	-		-	-	-	39	1960	1960	2.0%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	29:10	-	146	2055:1915	511+0	28.6 : 0.0%	-	-	-	1.7	41.3	4.1
6/1	Old Airport Road Left	O	D		1	75	-	282	1685	414	68.1%	106	176	0	2.1	27.4	6.8
6/2+6/3	Old Airport Road Ahead Right	U	C		1	27	-	339	2080:1897	333+258	57.4 : 57.4%	-	-	-	4.3	45.7	6.2
7/1	Ahead	U	-		-	-	-	621	1940	1940	32.0%	-	-	-	0.2	1.4	0.2
12/1	R108 (SB) Left Left	O	-		-	-	-	350	2115	635	55.1%	120	230	0	0.6	6.6	2.8
13/1	Ahead Ahead2	U	-		-	-	-	496	1940	1940	25.6%	-	-	-	0.2	1.2	0.2

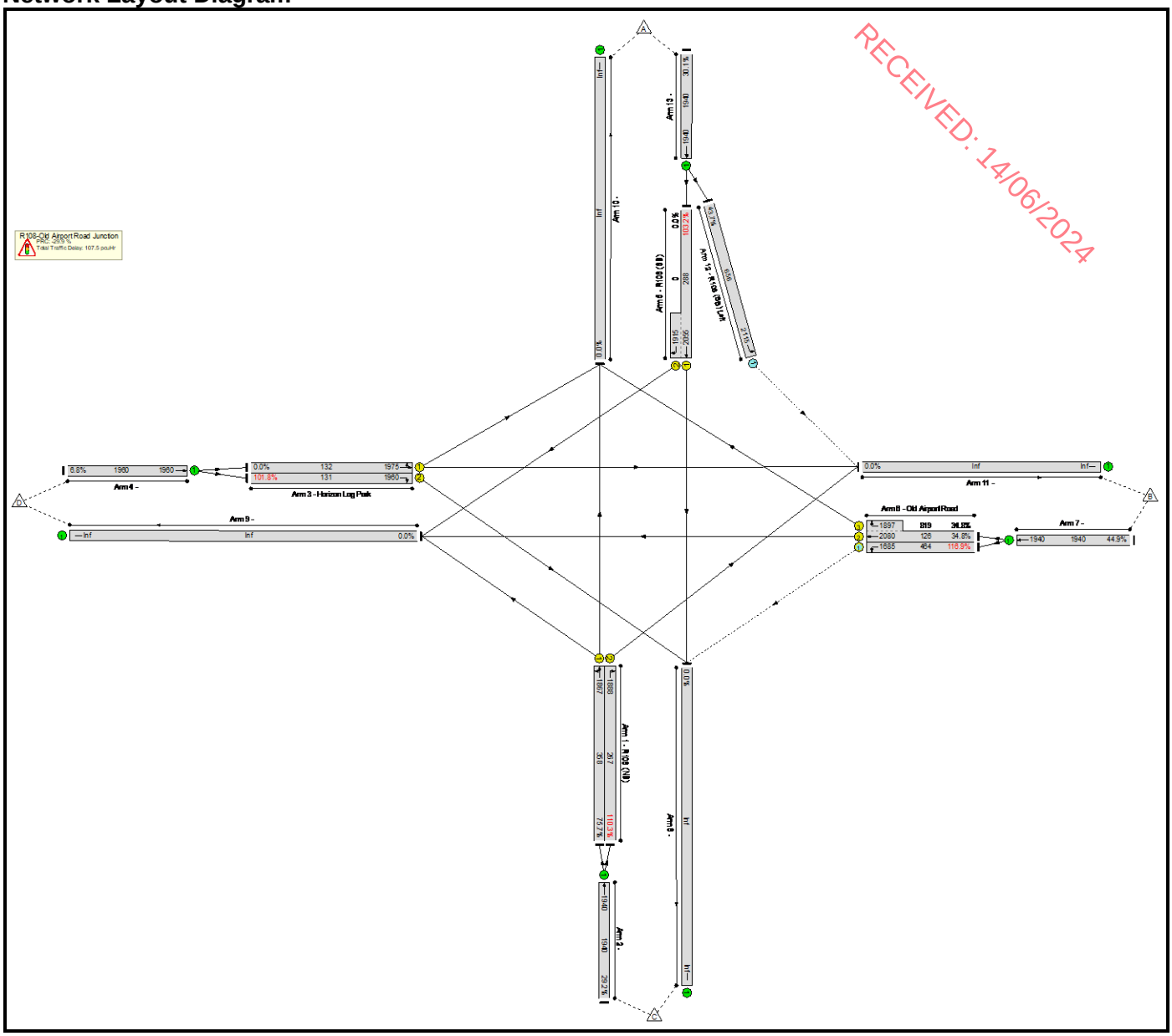
C1 PRC for Signalled Lanes (%): 31.3 Total Delay for Signalled Lanes (pcuHr): 16.34 Cycle Time (s): 120

PRC Over All Lanes (%): 31.3 Total Delay Over All Lanes(pcuHr): 17.66

Basic Results Summary

Scenario 2: '2023 PM Peak Hour' (FG2: '2023 PM Peak', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**116.9%**	**112**	**638**	**0**	**107.5**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**116.9%**	**112**	**638**	**0**	**107.5**	-	-
1/1	R108 (NB) Left Ahead	U	F		1	22	-	271	1867	358	75.7%	-	-	-	5.0	65.9	10.0
1/2	R108 (NB) Right	U	E		1	16	-	295	1888	267	110.3%	-	-	-	23.6	288.5	28.6
2/1	Ahead	U	-		-	-	-	566	1940	1940	29.2%	-	-	-	0.2	1.3	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	0	1975	132	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	7	-	133	1960	131	101.8%	-	-	-	8.6	231.9	10.9
4/1	Ahead	U	-		-	-	-	133	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	16:10	-	297	2055:1915	288+0	103.2 : 0.0%	-	-	-	16.0	193.9	21.5
6/1	Old Airport Road Left	O	D		1	91	-	542	1685	464	116.9%	52	411	0	51.0	338.9	64.2
6/2+6/3	Old Airport Road Ahead Right	U	C		1	56	-	329	2080:1897	126+819	34.8 : 34.8%	-	-	-	2.0	22.1	6.1
7/1	Ahead	U	-		-	-	-	871	1940	1940	44.9%	-	-	-	0.4	1.7	0.4
12/1	R108 (SB) Left Left	O	-		-	-	-	287	2115	656	43.7%	60	227	0	0.4	4.9	0.4
13/1	Ahead Ahead2	U	-		-	-	-	584	1940	1940	30.1%	-	-	-	0.2	1.3	0.2

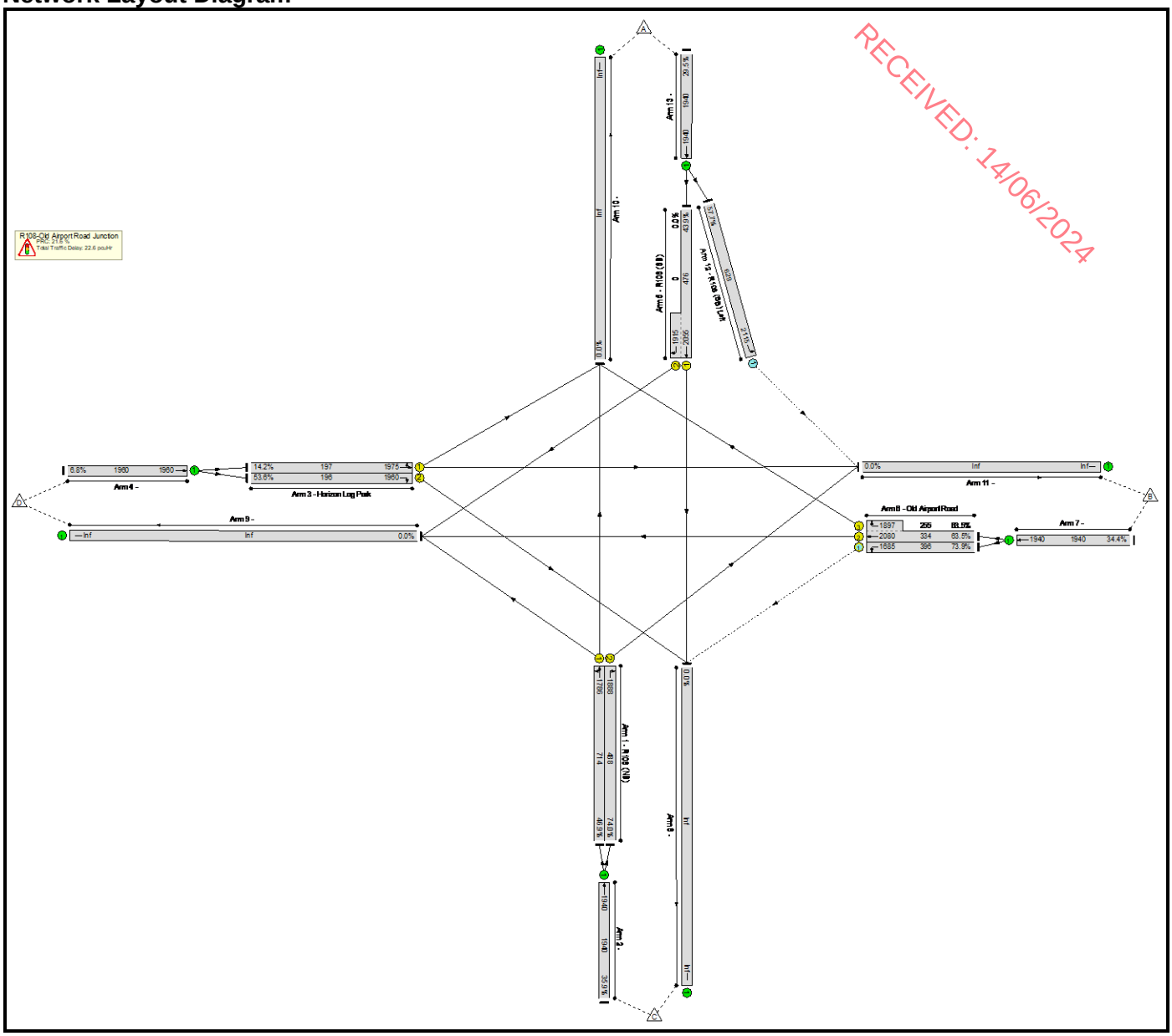
C1 PRC for Signalled Lanes (%): -29.9 Total Delay for Signalled Lanes (pcuHr): 106.20 Cycle Time (s): 120

PRC Over All Lanes (%): -29.9 Total Delay Over All Lanes(pcuHr): 107.45

Basic Results Summary

Scenario 3: '2028 DM AM' (FG3: '2028 DM AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**74.0%**	**242**	**414**	**0**	**22.6**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**74.0%**	**242**	**414**	**0**	**22.6**	-	-
1/1	R108 (NB) Left Ahead	U	F		1	47	-	335	1786	714	46.9%	-	-	-	2.9	31.3	8.6
1/2	R108 (NB) Right	U	E		1	30	-	361	1888	488	74.0%	-	-	-	5.5	54.7	12.4
2/1	Ahead	U	-		-	-	-	696	1940	1940	35.9%	-	-	-	0.3	1.4	0.3
3/1	Horizon Log Park Left Ahead	U	G		1	11	-	28	1975	197	14.2%	-	-	-	0.5	60.0	0.9
3/2	Horizon Log Park Right	U	G		1	11	-	105	1960	196	53.6%	-	-	-	2.1	70.9	3.9
4/1	Ahead	U	-		-	-	-	133	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	27:10	-	209	2055:1915	476+0	43.9 : 0.0%	-	-	-	2.7	46.0	6.3
6/1	Old Airport Road Left	O	D		1	77	-	293	1685	396	73.9%	112	181	0	2.6	31.7	7.6
6/2+6/3	Old Airport Road Ahead Right	U	C		1	27	-	374	2080:1897	334+255	63.5 : 63.5%	-	-	-	4.9	47.4	7.7
7/1	Ahead	U	-		-	-	-	667	1940	1940	34.4%	-	-	-	0.3	1.4	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	363	2115	629	57.7%	130	233	0	0.7	7.1	3.2
13/1	Ahead Ahead2	U	-		-	-	-	572	1940	1940	29.5%	-	-	-	0.2	1.3	0.2

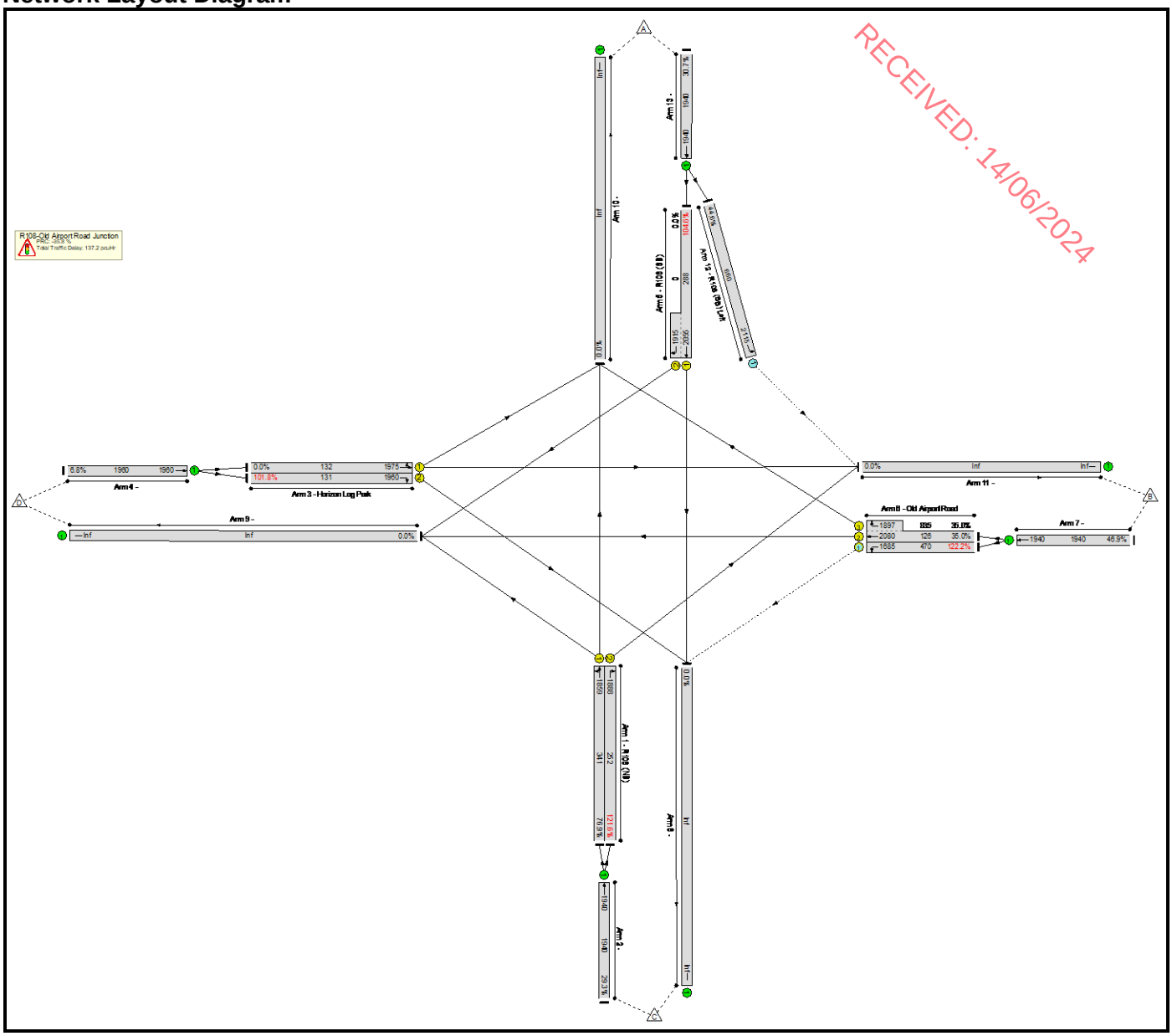
C1 PRC for Signalled Lanes (%): 21.6 Total Delay for Signalled Lanes (pcuHr): 21.11 Cycle Time (s): 120

PRC Over All Lanes (%): 21.6 Total Delay Over All Lanes(pcuHr): 22.61

Basic Results Summary

Scenario 4: '2028 DM PM' (FG4: '2028 DM PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**122.2%**	**111**	**652**	**0**	**137.2**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**122.2%**	**111**	**652**	**0**	**137.2**	-	-
1/1	R108 (NB) Left Ahead	U	F		1	21	-	262	1859	341	76.9%	-	-	-	5.0	68.5	9.9
1/2	R108 (NB) Right	U	E		1	15	-	306	1888	252	121.6%	-	-	-	37.2	437.1	41.7
2/1	Ahead	U	-		-	-	-	568	1940	1940	29.3%	-	-	-	0.2	1.3	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	0	1975	132	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	7	-	133	1960	131	101.8%	-	-	-	8.6	231.9	10.9
4/1	Ahead	U	-		-	-	-	133	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	16:10	-	301	2055:1915	288+0	104.6 : 0.0%	-	-	-	17.7	211.2	23.1
6/1	Old Airport Road Left	O	D		1	92	-	574	1685	470	122.2%	52	417	0	65.5	411.0	78.7
6/2+6/3	Old Airport Road Ahead Right	U	C		1	57	-	336	2080:1897	126+835	35.0 : 35.0%	-	-	-	2.0	21.5	6.2
7/1	Ahead	U	-		-	-	-	910	1940	1940	46.9%	-	-	-	0.4	1.7	0.4
12/1	R108 (SB) Left Left	O	-		-	-	-	294	2115	660	44.6%	59	235	0	0.4	4.9	0.4
13/1	Ahead Ahead2	U	-		-	-	-	595	1940	1940	30.7%	-	-	-	0.2	1.3	0.2

C1

PRC for Signalled Lanes (%): -35.8
PRC Over All Lanes (%): -35.8

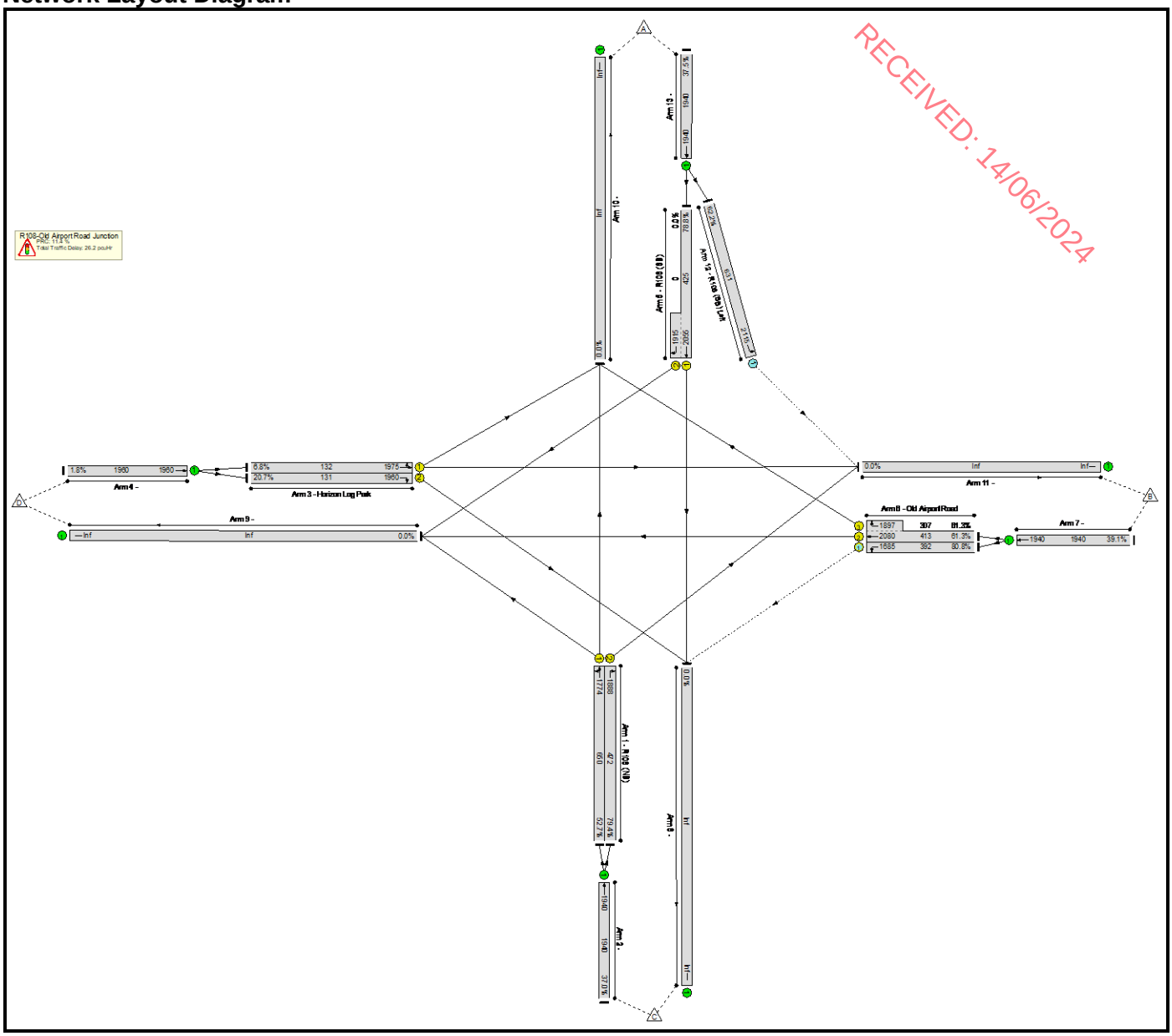
Total Delay for Signalled Lanes (pcuHr): 135.90
Total Delay Over All Lanes(pcuHr): 137.21

Cycle Time (s): 120

Basic Results Summary

Scenario 5: '2038 DM AM' (FG5: '2038 DM AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

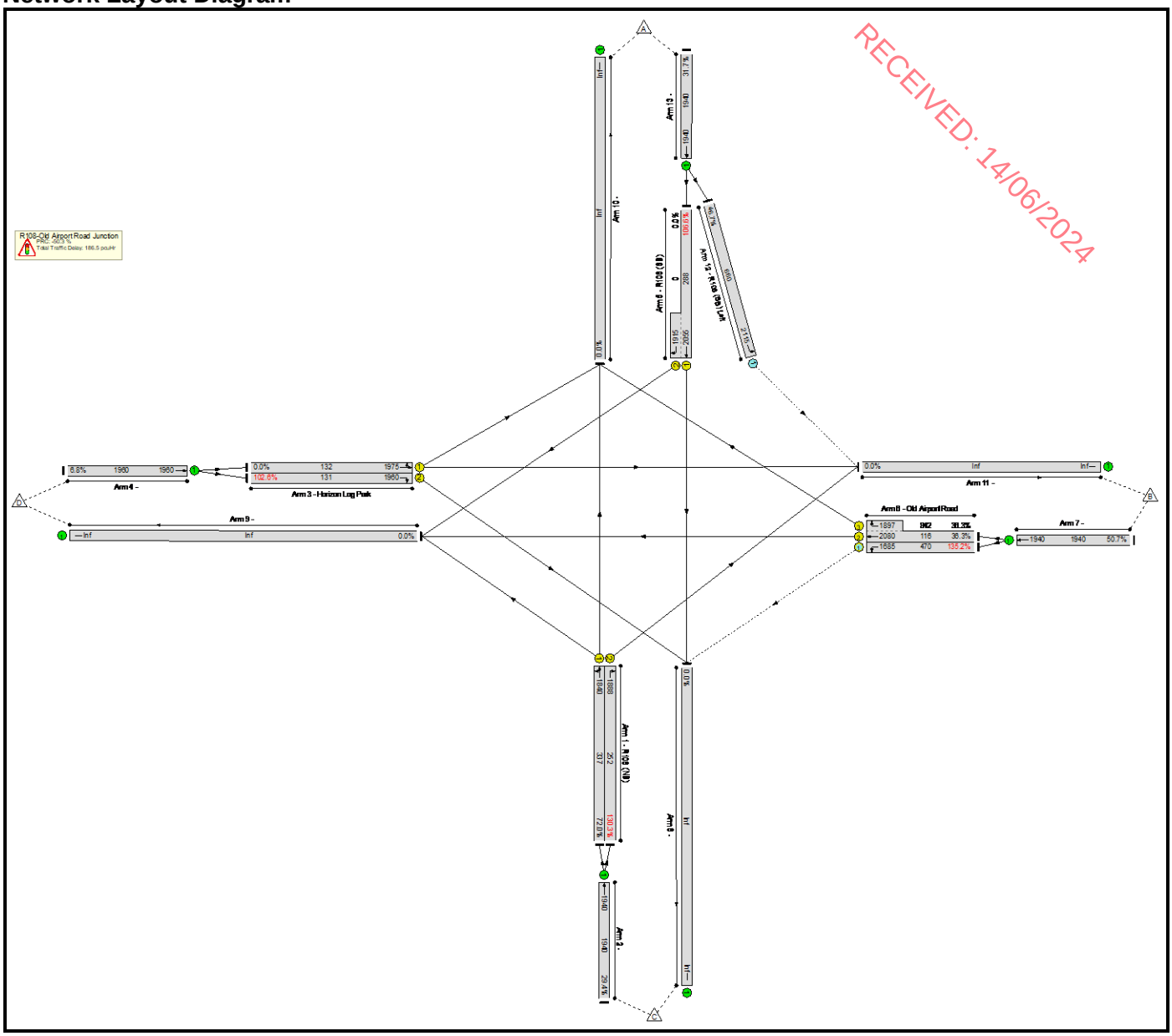
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.8%**	**225**	**484**	**0**	**26.2**	**-**	**-**
R108-Old Airport Road Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.8%**	**225**	**484**	**0**	**26.2**	**-**	**-**
1/1	R108 (NB) Left Ahead	U	F		1	43	-	343	1774	650	52.7%	-	-	-	3.4	35.7	9.5
1/2	R108 (NB) Right	U	E		1	29	-	375	1888	472	79.4%	-	-	-	6.2	60.0	13.5
2/1	Ahead	U	-		-	-	-	718	1940	1940	37.0%	-	-	-	0.3	1.5	0.3
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	9	1975	132	6.8%	-	-	-	0.2	67.4	0.3
3/2	Horizon Log Park Right	U	G		1	7	-	27	1960	131	20.7%	-	-	-	0.5	70.4	1.0
4/1	Ahead	U	-		-	-	-	36	1960	1960	1.8%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	24:10	-	335	2055:1915	425+0	78.8 : 0.0%	-	-	-	6.0	64.3	12.3
6/1	Old Airport Road Left	O	D		1	78	-	317	1685	392	80.8%	102	215	0	3.2	36.1	8.6
6/2+6/3	Old Airport Road Ahead Right	U	C		1	35	-	441	2080:1897	413+307	61.3 : 61.3%	-	-	-	4.9	39.9	8.9
7/1	Ahead	U	-		-	-	-	758	1940	1940	39.1%	-	-	-	0.3	1.5	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	392	2115	631	62.2%	122	270	0	0.9	8.2	4.1
13/1	Ahead Ahead2	U	-		-	-	-	727	1940	1940	37.5%	-	-	-	0.3	1.5	0.3

C1 PRC for Signalled Lanes (%): 11.4 Total Delay for Signalled Lanes (pcuHr): 24.40 Cycle Time (s): 120
PRC Over All Lanes (%): 11.4 Total Delay Over All Lanes(pcuHr): 26.21

Basic Results Summary

Scenario 6: '2038 DM PM' (FG6: '2038 DM PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**135.2%**	**113**	**665**	**0**	**186.5**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**135.2%**	**113**	**665**	**0**	**186.5**	-	-
1/1	R108 (NB) Left Ahead	U	F		1	21	-	243	1840	337	72.0%	-	-	-	4.4	64.7	8.8
1/2	R108 (NB) Right	U	E		1	15	-	328	1888	252	130.3%	-	-	-	49.2	539.6	53.6
2/1	Ahead	U	-		-	-	-	571	1940	1940	29.4%	-	-	-	0.2	1.3	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	0	1975	132	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	7	-	134	1960	131	102.6%	-	-	-	8.9	240.1	11.3
4/1	Ahead	U	-		-	-	-	134	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	16:10	-	307	2055:1915	288+0	106.6 : 0.0%	-	-	-	20.3	238.3	25.8
6/1	Old Airport Road Left	O	D		1	92	-	635	1685	470	135.2%	52	417	0	100.2	567.9	113.6
6/2+6/3	Old Airport Road Ahead Right	U	C		1	57	-	348	2080:1897	116+842	36.3 : 36.3%	-	-	-	2.1	21.8	6.6
7/1	Ahead	U	-		-	-	-	983	1940	1940	50.7%	-	-	-	0.5	1.9	0.5
12/1	R108 (SB) Left Left	O	-		-	-	-	308	2115	660	46.7%	60	248	0	0.4	5.1	1.8
13/1	Ahead Ahead2	U	-		-	-	-	615	1940	1940	31.7%	-	-	-	0.2	1.4	0.2

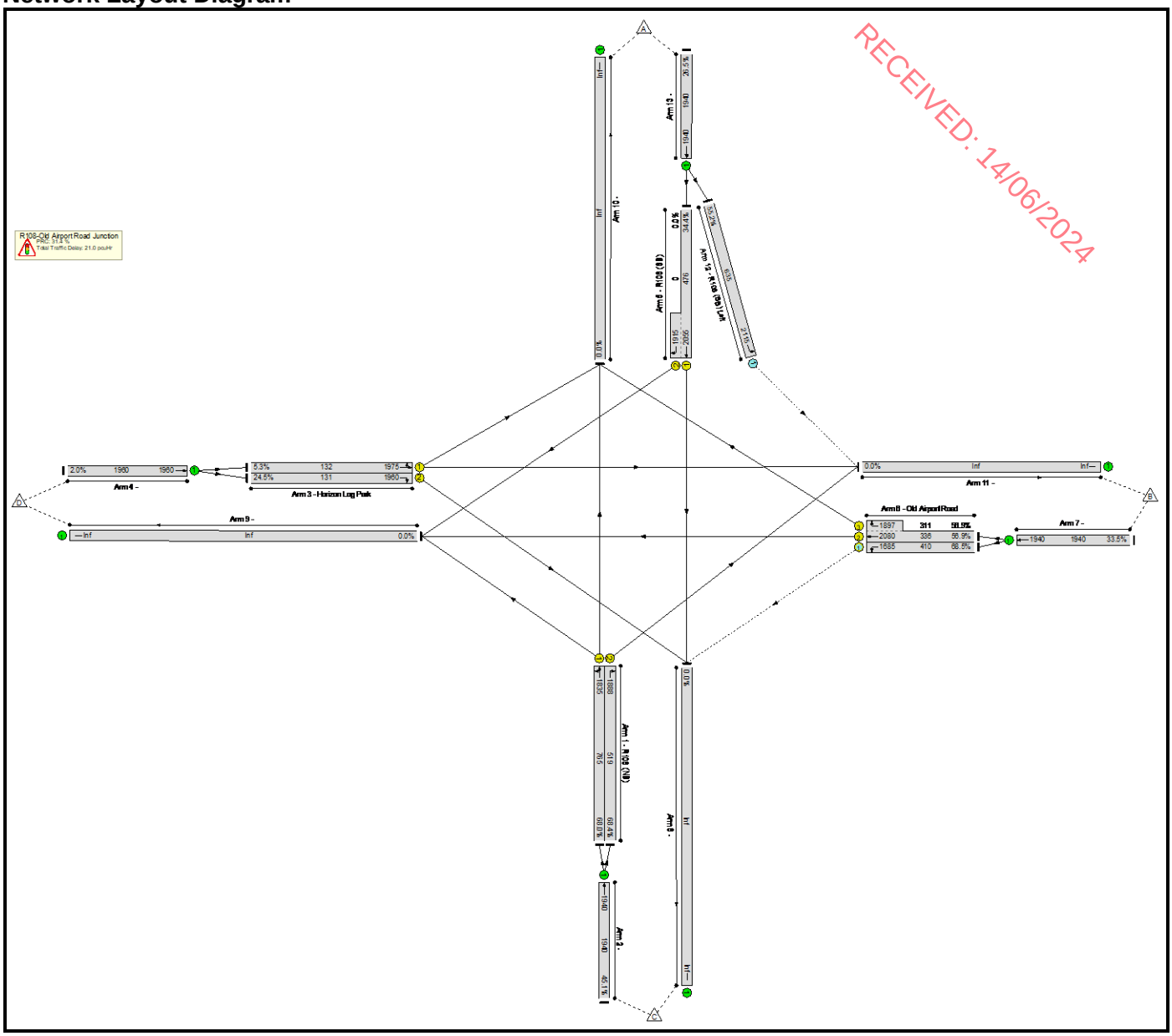
C1 PRC for Signalled Lanes (%): -50.3 Total Delay for Signalled Lanes (pcuHr): 185.06 Cycle Time (s): 120

PRC Over All Lanes (%): -50.3 Total Delay Over All Lanes(pcuHr): 186.49

Basic Results Summary

Scenario 7: '2023 AM DS' (FG7: '2023 AM DS', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.5%**	**221**	**411**	**0**	**21.0**	**-**	**-**
R108-Old Airport Road Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**68.5%**	**221**	**411**	**0**	**21.0**	**-**	**-**
1/1	R108 (NB) Left Ahead	U	F		1	49	-	520	1835	765	68.0%	-	-	-	5.2	35.8	15.1
1/2	R108 (NB) Right	U	E		1	32	-	355	1888	519	68.4%	-	-	-	4.9	49.7	11.6
2/1	Ahead	U	-		-	-	-	875	1940	1940	45.1%	-	-	-	0.4	1.7	0.4
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	7	1975	132	5.3%	-	-	-	0.1	67.2	0.2
3/2	Horizon Log Park Right	U	G		1	7	-	32	1960	131	24.5%	-	-	-	0.6	71.3	1.2
4/1	Ahead	U	-		-	-	-	39	1960	1960	2.0%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	27:10	-	164	2055:1915	476+0	34.4 : 0.0%	-	-	-	2.0	44.1	4.8
6/1	Old Airport Road Left	O	D		1	75	-	281	1685	410	68.5%	102	179	0	2.2	27.7	6.8
6/2+6/3	Old Airport Road Ahead Right	U	C		1	29	-	368	2080:1897	336+311	56.9 : 56.9%	-	-	-	4.5	43.6	6.1
7/1	Ahead	U	-		-	-	-	649	1940	1940	33.5%	-	-	-	0.3	1.4	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	351	2115	635	55.2%	120	231	0	0.6	6.6	2.9
13/1	Ahead Ahead2	U	-		-	-	-	515	1940	1940	26.5%	-	-	-	0.2	1.3	0.2

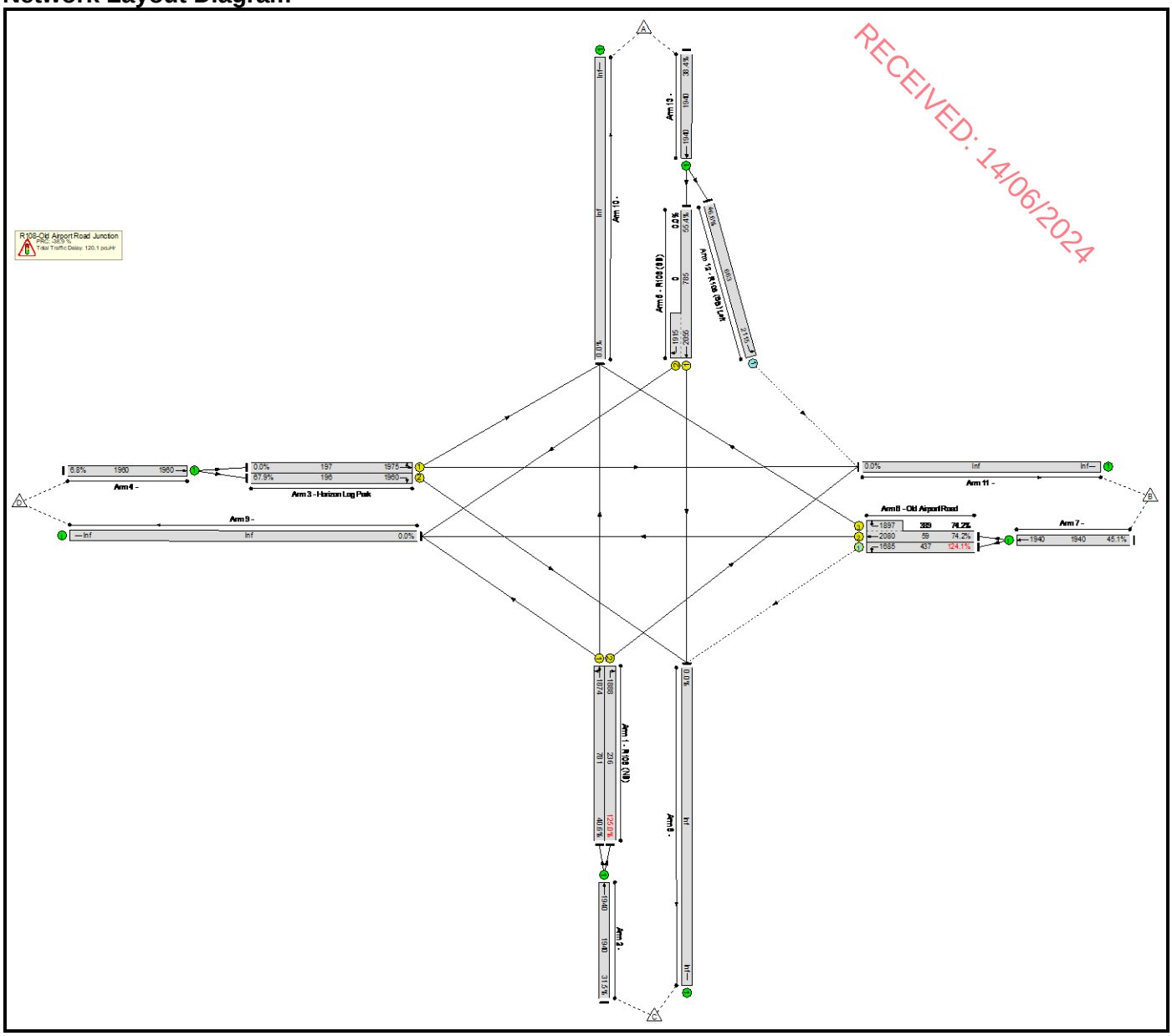
C1 PRC for Signalled Lanes (%): 31.4 Total Delay for Signalled Lanes (pcuHr): 19.46 Cycle Time (s): 120

PRC Over All Lanes (%): 31.4 Total Delay Over All Lanes(pcuHr): 20.96

Basic Results Summary

Scenario 8: '2023 PM DS' (FG8: '2023 PM DS', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

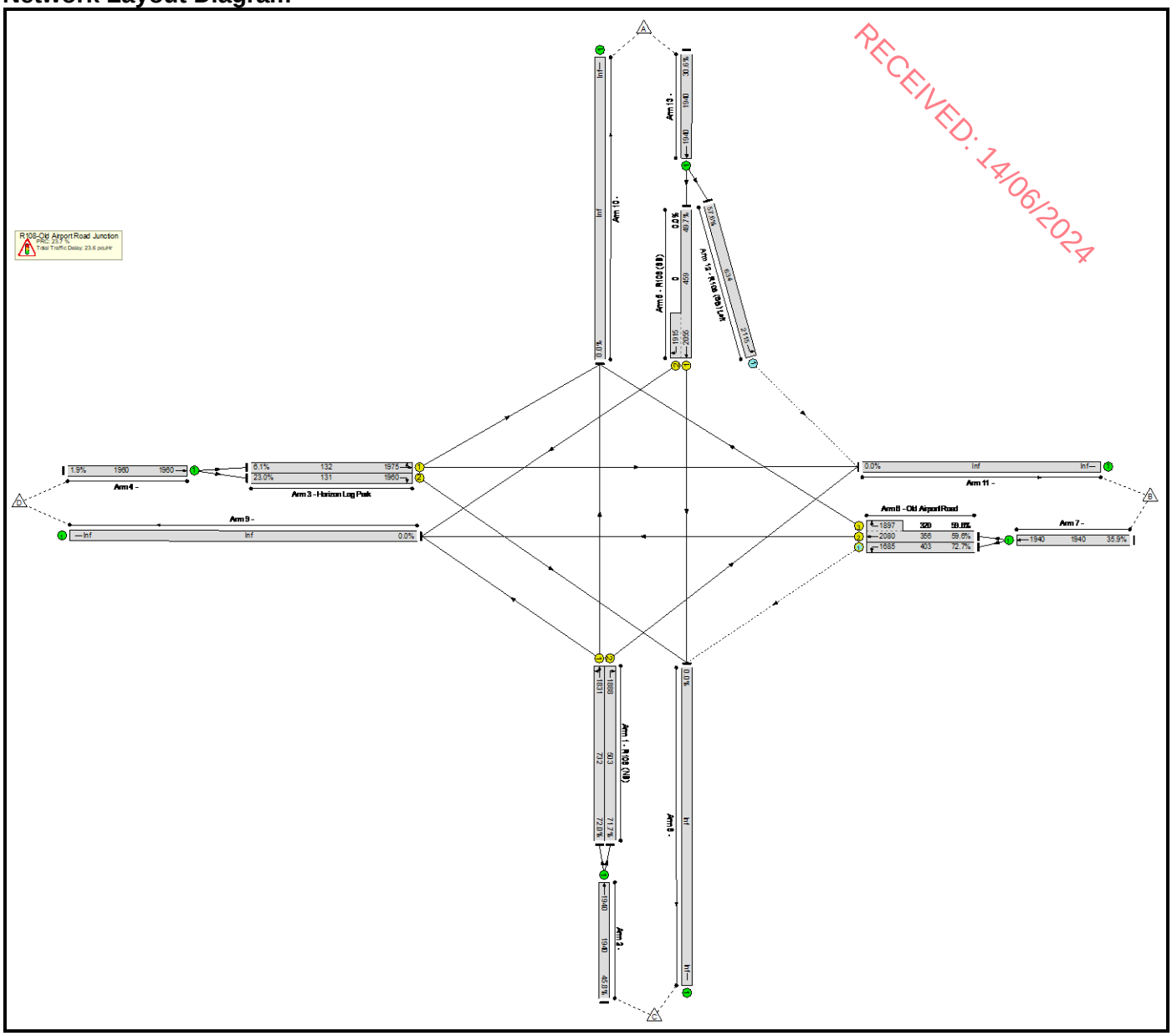
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**125.0%**	**279**	**467**	**0**	**120.1**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**125.0%**	**279**	**467**	**0**	**120.1**	-	-
1/1	R108 (NB) Left Ahead	U	F		1	49	-	317	1874	781	40.6%	-	-	-	2.5	28.5	7.7
1/2	R108 (NB) Right	U	E		1	14	-	295	1888	236	125.0%	-	-	-	38.9	475.2	43.6
2/1	Ahead	U	-		-	-	-	612	1940	1940	31.5%	-	-	-	0.2	1.4	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	11	-	0	1975	197	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	11	-	133	1960	196	67.9%	-	-	-	2.9	79.8	5.3
4/1	Ahead	U	-		-	-	-	133	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	45:10	-	435	2055:1915	785+0	55.4 : 0.0%	-	-	-	4.1	34.1	12.0
6/1	Old Airport Road Left	O	D		1	93	-	542	1685	437	124.1%	210	226	0	64.7	430.0	77.7
6/2+6/3	Old Airport Road Ahead Right	U	C		1	25	-	333	2080:1897	59+389	74.2 : 74.2%	-	-	-	5.4	58.3	10.9
7/1	Ahead	U	-		-	-	-	875	1940	1940	45.1%	-	-	-	0.4	1.7	0.4
12/1	R108 (SB) Left Left	O	-		-	-	-	309	2115	663	46.6%	68	241	0	0.4	5.1	1.7
13/1	Ahead Ahead2	U	-		-	-	-	744	1940	1940	38.4%	-	-	-	0.3	1.5	0.3

C1 PRC for Signalled Lanes (%): -38.9 Total Delay for Signalled Lanes (pcuHr): 118.66 Cycle Time (s): 120
PRC Over All Lanes (%): -38.9 Total Delay Over All Lanes(pcuHr): 120.08

Basic Results Summary

Scenario 9: '2028 AM DS' (FG9: '2028 AM DS', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

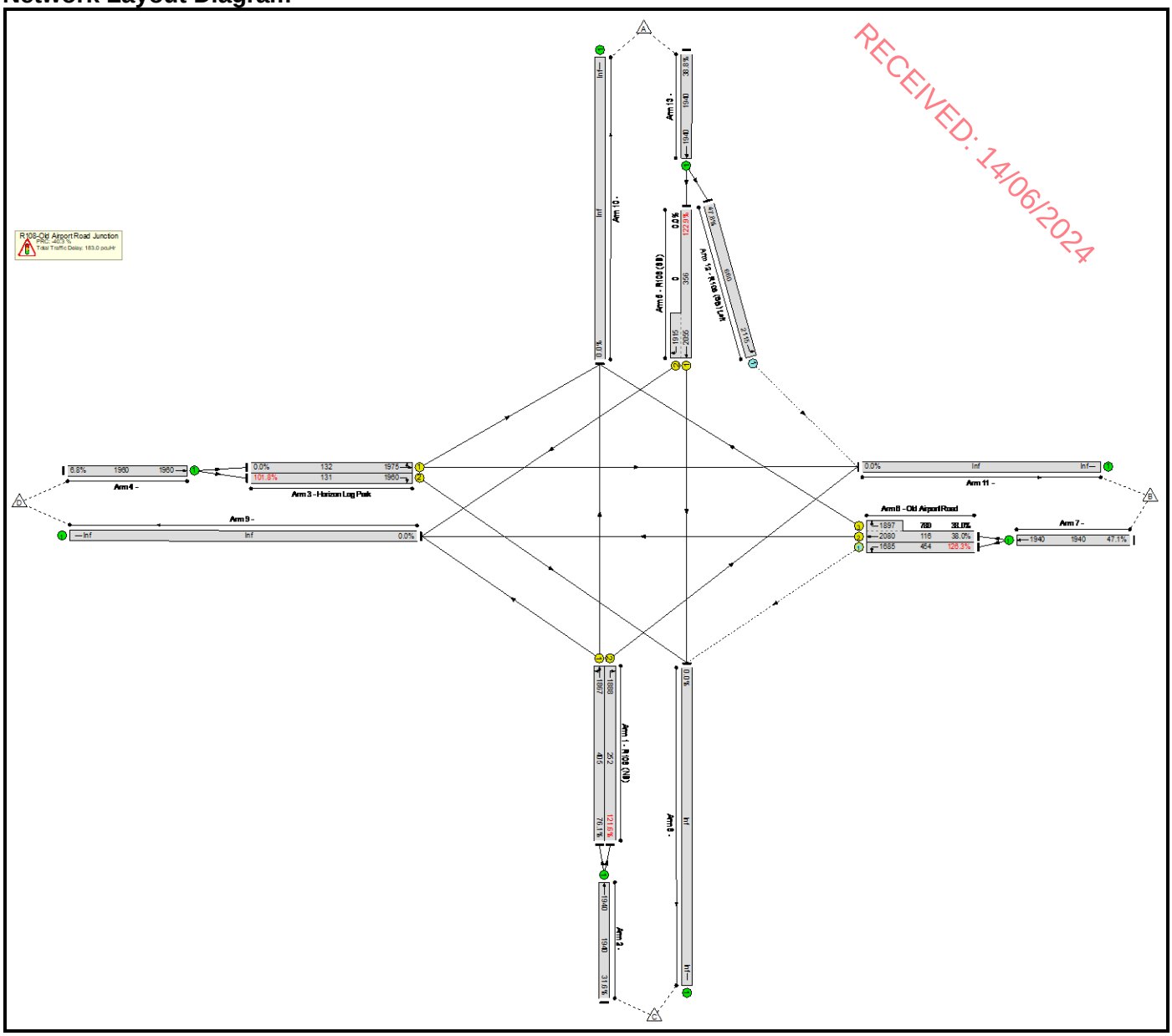
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.7%**	**224**	**434**	**0**	**23.6**	**-**	**-**
R108-Old Airport Road Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.7%**	**224**	**434**	**0**	**23.6**	**-**	**-**
1/1	R108 (NB) Left Ahead	U	F		1	47	-	527	1831	732	72.0%	-	-	-	5.7	39.0	16.1
1/2	R108 (NB) Right	U	E		1	31	-	361	1888	503	71.7%	-	-	-	5.2	52.3	12.1
2/1	Ahead	U	-		-	-	-	888	1940	1940	45.8%	-	-	-	0.4	1.7	0.4
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	8	1975	132	6.1%	-	-	-	0.1	67.3	0.3
3/2	Horizon Log Park Right	U	G		1	7	-	30	1960	131	23.0%	-	-	-	0.6	71.0	1.1
4/1	Ahead	U	-		-	-	-	38	1960	1960	1.9%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	26:10	-	228	2055:1915	459+0	49.7 : 0.0%	-	-	-	3.1	48.3	7.1
6/1	Old Airport Road Left	O	D		1	76	-	293	1685	403	72.7%	102	191	0	2.4	29.8	7.3
6/2+6/3	Old Airport Road Ahead Right	U	C		1	31	-	403	2080:1897	356+320	59.6 : 59.6%	-	-	-	4.8	42.5	7.1
7/1	Ahead	U	-		-	-	-	696	1940	1940	35.9%	-	-	-	0.3	1.4	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	365	2115	634	57.6%	122	243	0	0.7	7.1	3.2
13/1	Ahead Ahead2	U	-		-	-	-	593	1940	1940	30.6%	-	-	-	0.2	1.3	0.2

C1 PRC for Signalled Lanes (%): 23.7 Total Delay for Signalled Lanes (pcuHr): 21.94 Cycle Time (s): 120
PRC Over All Lanes (%): 23.7 Total Delay Over All Lanes(pcuHr): 23.58

Basic Results Summary

Scenario 10: '2028 PM DS' (FG10: '2028 PM DS', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**126.3%**	**122**	**647**	**0**	**183.0**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**126.3%**	**122**	**647**	**0**	**183.0**	-	-
1/1	R108 (NB) Left Ahead	U	F		1	25	-	308	1867	405	76.1%	-	-	-	5.3	62.2	11.1
1/2	R108 (NB) Right	U	E		1	15	-	306	1888	252	121.6%	-	-	-	37.1	436.4	41.7
2/1	Ahead	U	-		-	-	-	614	1940	1940	31.6%	-	-	-	0.2	1.4	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	0	1975	132	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	7	-	133	1960	131	101.8%	-	-	-	8.6	231.8	10.9
4/1	Ahead	U	-		-	-	-	133	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	20:10	-	438	2055:1915	356+0	122.9 : 0.0%	-	-	-	54.3	446.6	61.3
6/1	Old Airport Road Left	O	D		1	92	-	574	1685	454	126.3%	61	393	0	73.9	463.7	86.8
6/2+6/3	Old Airport Road Ahead Right	U	C		1	53	-	340	2080:1897	116+780	38.0 : 38.0%	-	-	-	2.3	24.4	6.8
7/1	Ahead	U	-		-	-	-	914	1940	1940	47.1%	-	-	-	0.4	1.8	0.4
12/1	R108 (SB) Left Left	O	-		-	-	-	315	2115	660	47.8%	61	254	0	0.5	5.3	1.9
13/1	Ahead Ahead2	U	-		-	-	-	753	1940	1940	38.8%	-	-	-	0.3	1.5	0.3

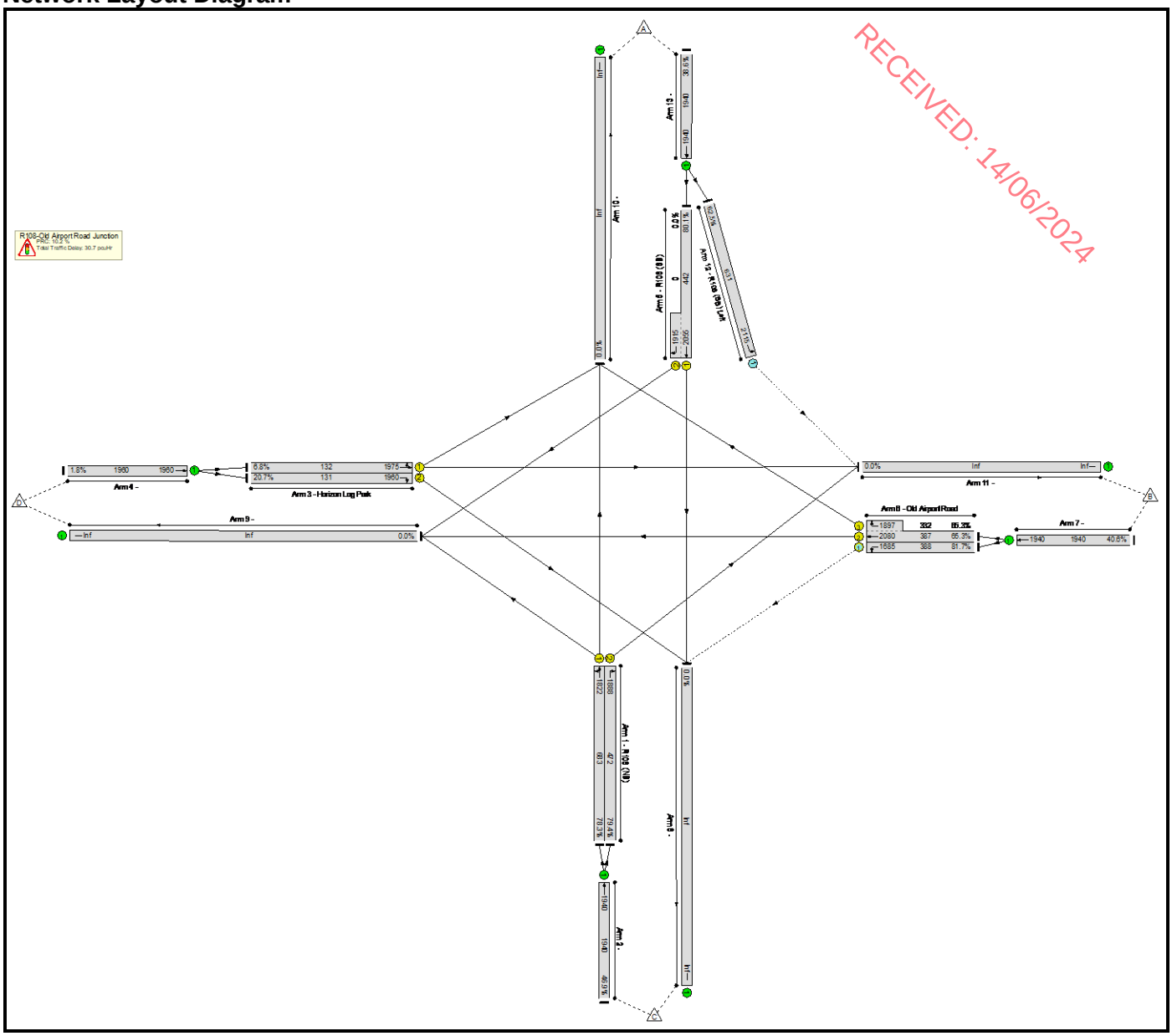
C1 PRC for Signalled Lanes (%): -40.3 Total Delay for Signalled Lanes (pcuHr): 181.55 Cycle Time (s): 120

PRC Over All Lanes (%): -40.3 Total Delay Over All Lanes(pcuHr): 183.04

Basic Results Summary

Scenario 11: '2038 AM DS' (FG11: '2038 AM DS', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**81.7%**	**228**	**483**	**0**	**30.7**	**-**	**-**
R108-Old Airport Road Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**81.7%**	**228**	**483**	**0**	**30.7**	**-**	**-**
1/1	R108 (NB) Left Ahead	U	F		1	44	-	535	1822	683	78.3%	-	-	-	6.7	45.0	17.5
1/2	R108 (NB) Right	U	E		1	29	-	375	1888	472	79.4%	-	-	-	6.2	60.0	13.5
2/1	Ahead	U	-		-	-	-	910	1940	1940	46.9%	-	-	-	0.4	1.7	0.4
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	9	1975	132	6.8%	-	-	-	0.2	67.4	0.3
3/2	Horizon Log Park Right	U	G		1	7	-	27	1960	131	20.7%	-	-	-	0.5	70.4	1.0
4/1	Ahead	U	-		-	-	-	36	1960	1960	1.8%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	25:10	-	354	2055:1915	442+0	80.1 : 0.0%	-	-	-	6.3	64.1	13.0
6/1	Old Airport Road Left	O	D		1	78	-	317	1685	388	81.7%	105	212	0	3.3	37.4	8.7
6/2+6/3	Old Airport Road Ahead Right	U	C		1	34	-	470	2080:1897	387+332	65.3 : 65.3%	-	-	-	5.4	41.7	9.5
7/1	Ahead	U	-		-	-	-	787	1940	1940	40.6%	-	-	-	0.3	1.6	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	394	2115	631	62.5%	123	271	0	0.9	8.3	4.1
13/1	Ahead Ahead2	U	-		-	-	-	748	1940	1940	38.6%	-	-	-	0.3	1.5	0.3

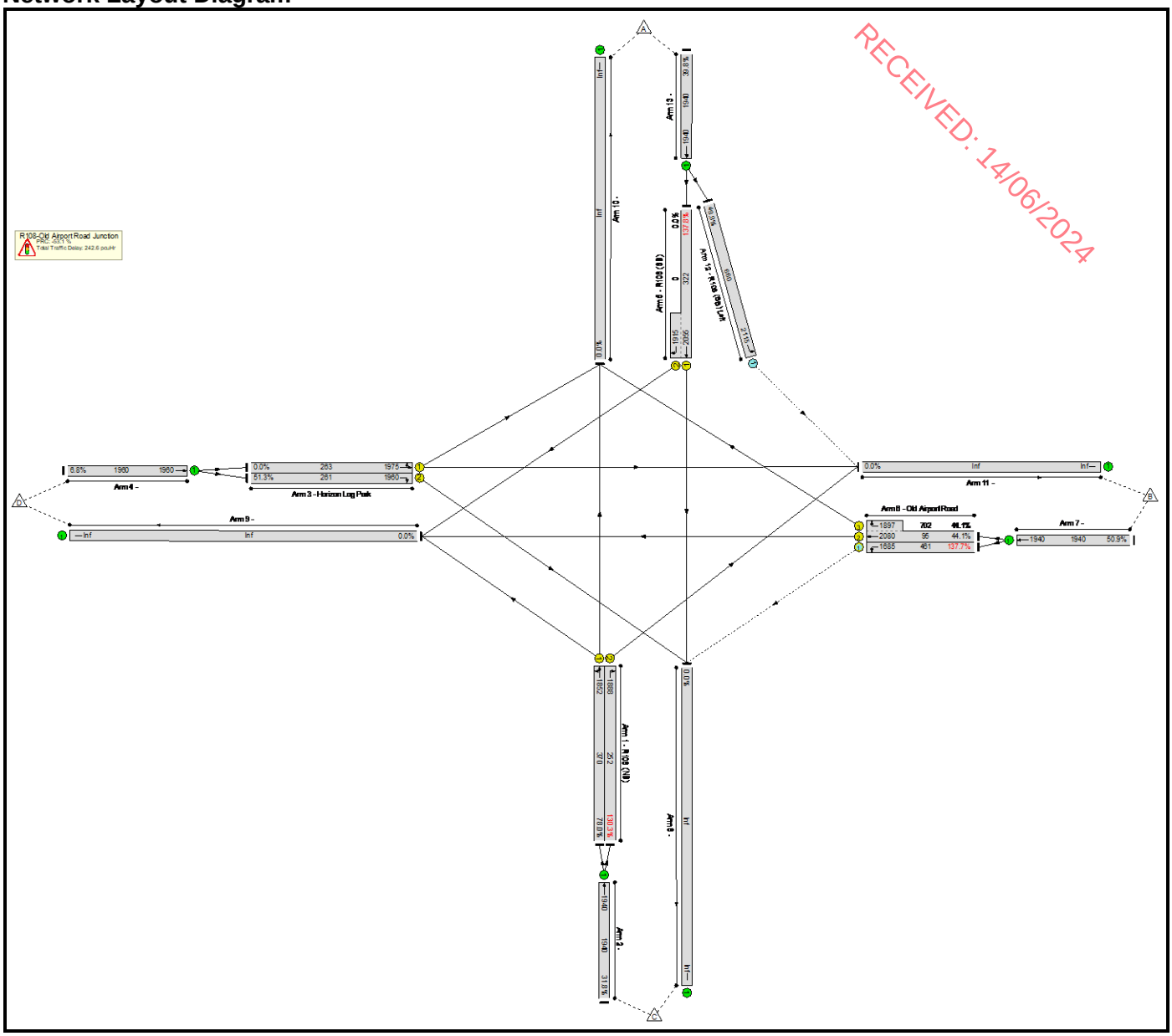
C1 PRC for Signalled Lanes (%): 10.2 Total Delay for Signalled Lanes (pcuHr): 28.68 Cycle Time (s): 120

PRC Over All Lanes (%): 10.2 Total Delay Over All Lanes(pcuHr): 30.69

Basic Results Summary

Scenario 12: '2038 PM DS' (FG12: '2038 PM DS', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**137.8%**	**188**	**603**	**0**	**242.6**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**137.8%**	**188**	**603**	**0**	**242.6**	-	-
1/1	R108 (NB) Left Ahead	U	F		1	23	-	289	1852	370	78.0%	-	-	-	5.4	66.7	10.8
1/2	R108 (NB) Right	U	E		1	15	-	328	1888	252	130.3%	-	-	-	49.1	539.1	53.6
2/1	Ahead	U	-		-	-	-	617	1940	1940	31.8%	-	-	-	0.2	1.4	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	15	-	0	1975	263	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	15	-	134	1960	261	51.3%	-	-	-	2.3	62.4	4.7
4/1	Ahead	U	-		-	-	-	134	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	18:10	-	444	2055:1915	322+0	137.8 : 0.0%	-	-	-	76.4	619.5	82.2
6/1	Old Airport Road Left	O	D		1	92	-	635	1685	461	137.7%	104	357	0	104.9	594.6	118.0
6/2+6/3	Old Airport Road Ahead Right	U	C		1	47	-	352	2080:1897	95+702	44.1 : 44.1%	-	-	-	2.9	29.6	8.0
7/1	Ahead	U	-		-	-	-	987	1940	1940	50.9%	-	-	-	0.5	1.9	0.5
12/1	R108 (SB) Left Left	O	-		-	-	-	329	2115	660	49.9%	84	245	0	0.5	5.5	2.0
13/1	Ahead Ahead2	U	-		-	-	-	773	1940	1940	39.8%	-	-	-	0.3	1.5	0.3

C1 PRC for Signalled Lanes (%): -53.1 Total Delay for Signalled Lanes (pcuHr): 240.97 Cycle Time (s): 120
PRC Over All Lanes (%): -53.1 Total Delay Over All Lanes(pcuHr): 242.59

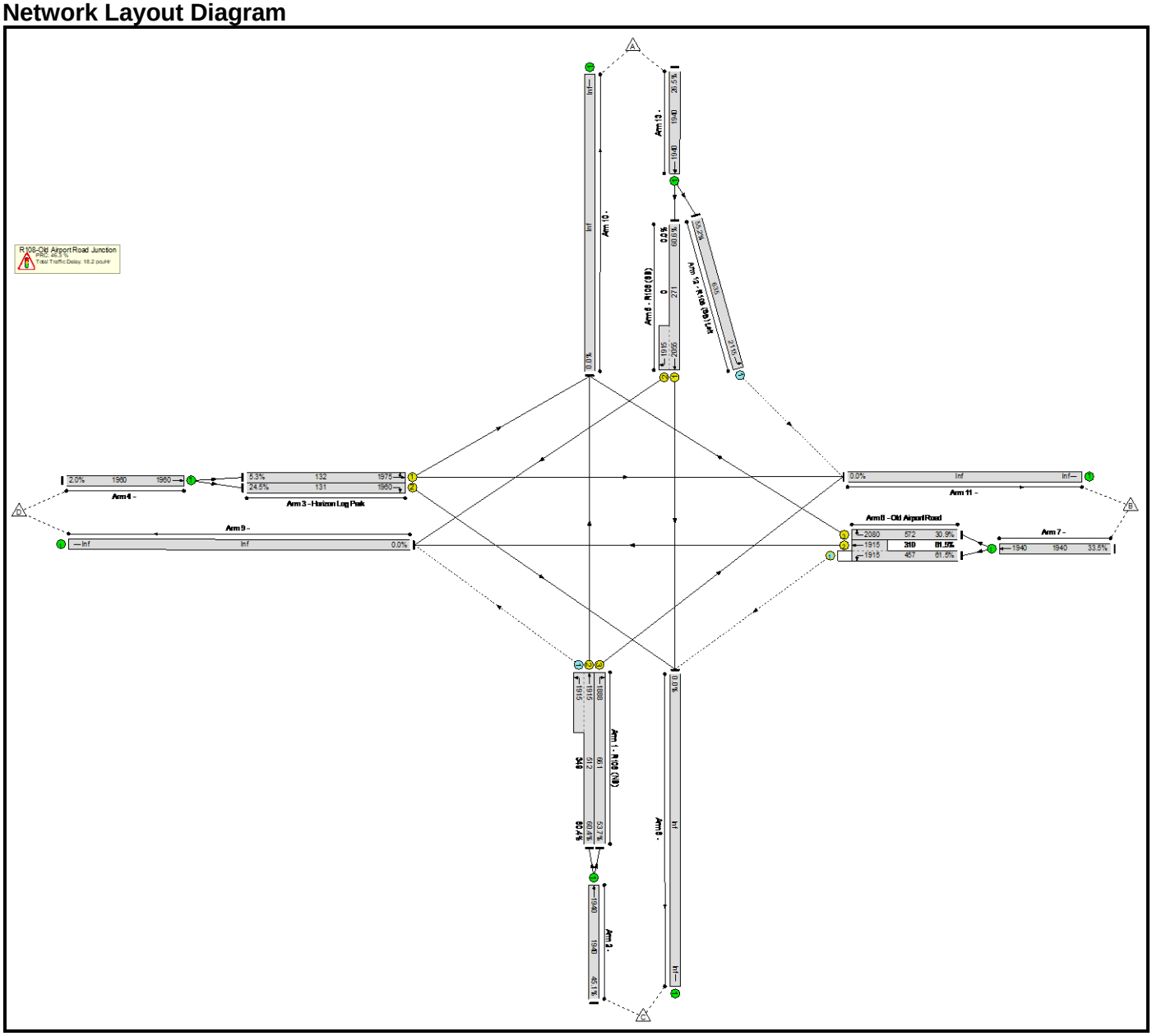
Basic Results Summary

User and Project Details

Project:	
Title:	
Location:	
Additional detail:	
File name:	6. R108_Old Airport Rd Junction_DS LAYOUT.lsg3x
Author:	
Company:	
Address:	

Scenario 1: '2023 DS AM' (FG1: '2023 DS AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**61.5%**	**306**	**537**	**0**	**18.2**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**61.5%**	**306**	**537**	**0**	**18.2**	-	-
1/2+1/1	R108 (NB) Left Ahead	U+O	F -		1	41	-	520	1915:1915	512+349	60.4 : 60.4%	86	125	0	3.4	23.2	8.7
1/3	R108 (NB) Right	U	E		1	41	-	355	1888	661	53.7%	-	-	-	3.7	37.1	10.0
2/1	Ahead	U	-		-	-	-	875	1940	1940	45.1%	-	-	-	0.4	1.7	0.4
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	7	1975	132	5.3%	-	-	-	0.1	67.2	0.2
3/2	Horizon Log Park Right	U	G		1	7	-	32	1960	131	24.5%	-	-	-	0.6	71.3	1.2
4/1	Ahead	U	-		-	-	-	39	1960	1960	2.0%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	15	-	164	2055:1915	271+0	60.6 : 0.0%	-	-	-	3.0	65.6	5.9
6/1+6/2	Old Airport Road Left Ahead	O+U	D C		1	63:32	-	472	1915:1915	457+310	61.5 : 61.5%	73	208	0	4.0	30.9	6.1
6/3	Old Airport Road Right	U	C		1	32	-	177	2080	572	30.9%	-	-	-	1.9	39.0	4.9
7/1	Ahead	U	-		-	-	-	649	1940	1940	33.5%	-	-	-	0.3	1.4	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	351	2115	635	55.2%	146	205	0	0.6	6.5	2.7
13/1	Ahead Ahead2	U	-		-	-	-	515	1940	1940	26.5%	-	-	-	0.2	1.3	0.2

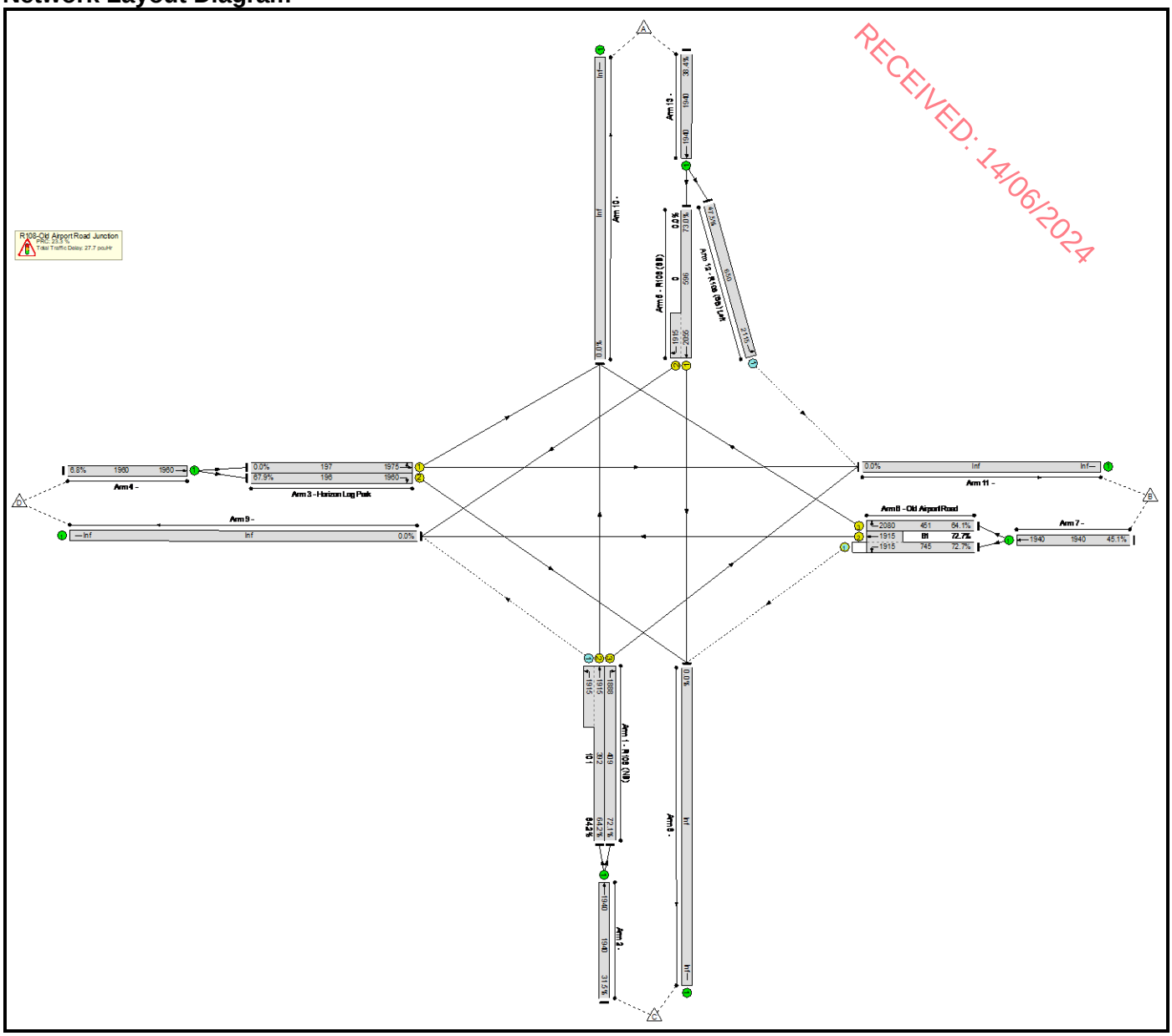
C1 PRC for Signalled Lanes (%): 46.3 Total Delay for Signalled Lanes (pcuHr): 16.73 Cycle Time (s): 120

PRC Over All Lanes (%): 46.3 Total Delay Over All Lanes(pcuHr): 18.22

Basic Results Summary

Scenario 2: '2023 DS PM' (FG2: '2023 DS PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**73.0%**	**284**	**598**	**34**	**27.7**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**73.0%**	**284**	**598**	**34**	**27.7**	-	-
1/2+1/1	R108 (NB) Left Ahead	U+O	F -		1	25	-	317	1915:1915	392+101	64.2 : 64.2%	33	32	0	3.9	43.8	8.4
1/3	R108 (NB) Right	U	E		1	25	-	295	1888	409	72.1%	-	-	-	4.8	59.1	10.4
2/1	Ahead	U	-		-	-	-	612	1940	1940	31.5%	-	-	-	0.2	1.4	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	11	-	0	1975	197	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	11	-	133	1960	196	67.9%	-	-	-	2.9	79.8	5.3
4/1	Ahead	U	-		-	-	-	133	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	34	-	435	2055:1915	596+0	73.0 : 0.0%	-	-	-	6.0	49.3	14.4
6/1+6/2	Old Airport Road Left Ahead	O+U	D C		1	79:25	-	586	1915:1915	745+61	72.7 : 72.7%	153	355	34	4.3	26.7	11.3
6/3	Old Airport Road Right	U	C		1	25	-	289	2080	451	64.1%	-	-	-	4.3	53.8	9.6
7/1	Ahead	U	-		-	-	-	875	1940	1940	45.1%	-	-	-	0.4	1.7	0.4
12/1	R108 (SB) Left Left	O	-		-	-	-	309	2115	650	47.5%	98	211	0	0.5	5.3	1.9
13/1	Ahead Ahead2	U	-		-	-	-	744	1940	1940	38.4%	-	-	-	0.3	1.5	0.3

C1

PRC for Signalled Lanes (%): 23.3
PRC Over All Lanes (%): 23.3

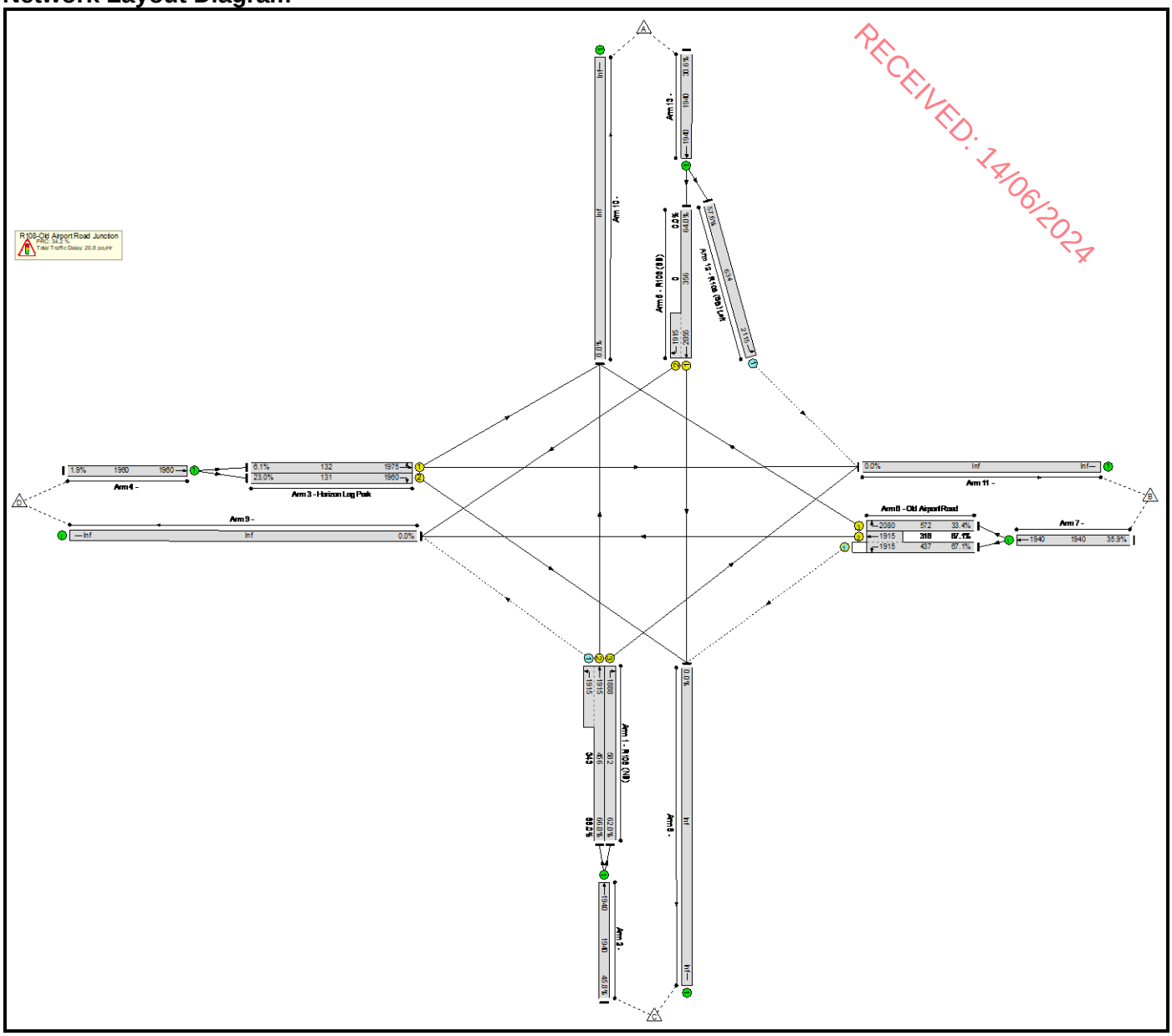
Total Delay for Signalled Lanes (pcuHr): 26.26
Total Delay Over All Lanes(pcuHr): 27.71

Cycle Time (s): 120

Basic Results Summary

Scenario 3: '2028 DS AM' (FG3: '2028 DS AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

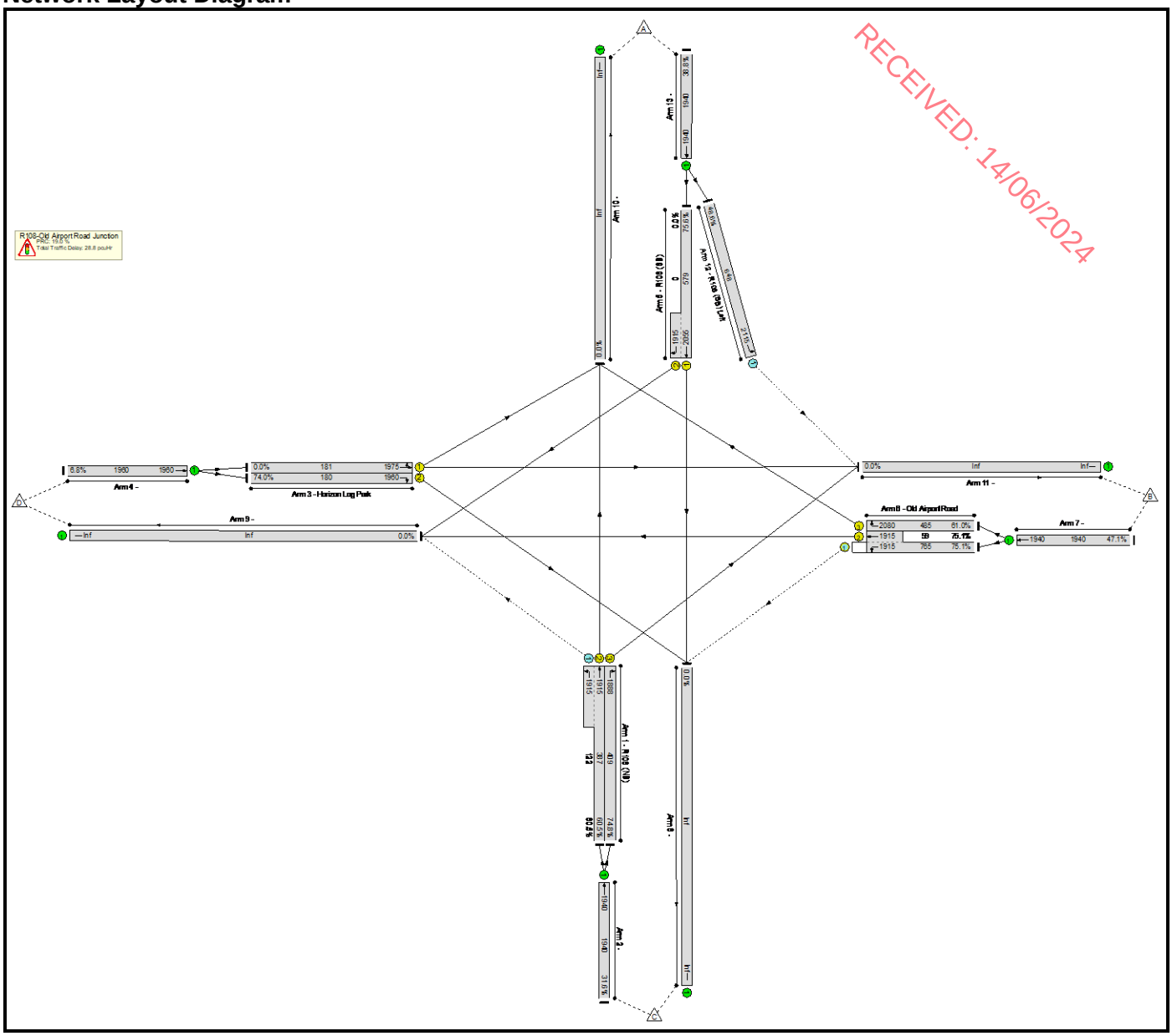
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**67.1%**	**326**	**558**	**0**	**20.8**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**67.1%**	**326**	**558**	**0**	**20.8**	-	-
1/2+1/1	R108 (NB) Left Ahead	U+O	F -		1	36	-	527	1915:1915	456+343	66.0 : 66.0%	102	124	0	3.8	26.0	9.2
1/3	R108 (NB) Right	U	E		1	36	-	361	1888	582	62.0%	-	-	-	4.4	43.6	11.0
2/1	Ahead	U	-		-	-	-	888	1940	1940	45.8%	-	-	-	0.4	1.7	0.4
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	8	1975	132	6.1%	-	-	-	0.1	67.3	0.3
3/2	Horizon Log Park Right	U	G		1	7	-	30	1960	131	23.0%	-	-	-	0.6	71.0	1.1
4/1	Ahead	U	-		-	-	-	38	1960	1960	1.9%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	20	-	228	2055:1915	356+0	64.0 : 0.0%	-	-	-	3.8	59.8	7.9
6/1+6/2	Old Airport Road Left Ahead	O+U	D C		1	68:32	-	505	1915:1915	437+316	67.1 : 67.1%	88	205	0	4.4	31.1	7.6
6/3	Old Airport Road Right	U	C		1	32	-	191	2080	572	33.4%	-	-	-	2.1	39.5	5.3
7/1	Ahead	U	-		-	-	-	696	1940	1940	35.9%	-	-	-	0.3	1.4	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	365	2115	634	57.6%	137	228	0	0.7	7.0	3.1
13/1	Ahead Ahead2	U	-		-	-	-	593	1940	1940	30.6%	-	-	-	0.2	1.3	0.2

C1 PRC for Signalled Lanes (%): 34.2 Total Delay for Signalled Lanes (pcuHr): 19.17 Cycle Time (s): 120
PRC Over All Lanes (%): 34.2 Total Delay Over All Lanes(pcuHr): 20.81

Basic Results Summary

Scenario 4: '2028 DS PM' (FG4: '2028 DS PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

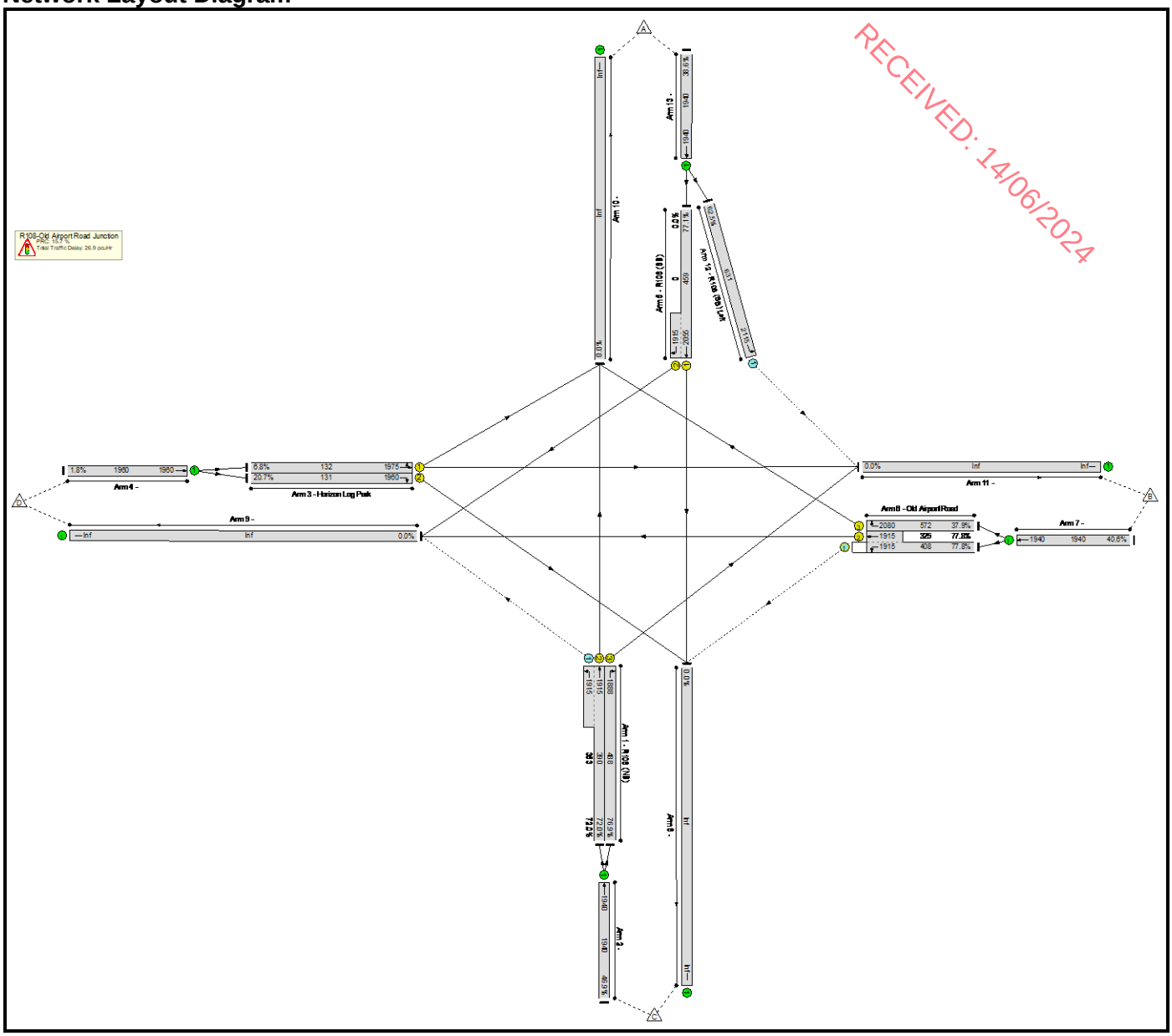
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**75.6%**	**275**	**653**	**34**	**28.8**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**75.6%**	**275**	**653**	**34**	**28.8**	-	-
1/2+1/1	R108 (NB) Left Ahead	U+O	F -		1	25	-	308	1915:1915	387+122	60.5 : 60.5%	38	36	0	3.5	40.8	7.7
1/3	R108 (NB) Right	U	E		1	25	-	306	1888	409	74.8%	-	-	-	5.2	60.9	11.0
2/1	Ahead	U	-		-	-	-	614	1940	1940	31.6%	-	-	-	0.2	1.4	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	10	-	0	1975	181	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	10	-	133	1960	180	74.0%	-	-	-	3.3	89.6	5.6
4/1	Ahead	U	-		-	-	-	133	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	33	-	438	2055:1915	579+0	75.6 : 0.0%	-	-	-	6.3	51.7	14.8
6/1+6/2	Old Airport Road Left Ahead	O+U	D C		1	79:27	-	618	1915:1915	765+59	75.1 : 75.1%	140	400	34	4.9	28.3	12.7
6/3	Old Airport Road Right	U	C		1	27	-	296	2080	485	61.0%	-	-	-	4.2	50.6	9.6
7/1	Ahead	U	-		-	-	-	914	1940	1940	47.1%	-	-	-	0.4	1.8	0.4
12/1	R108 (SB) Left Left	O	-		-	-	-	315	2115	648	48.6%	97	218	0	0.5	5.5	2.1
13/1	Ahead Ahead2	U	-		-	-	-	753	1940	1940	38.8%	-	-	-	0.3	1.5	0.3

C1 PRC for Signalled Lanes (%): 19.0 Total Delay for Signalled Lanes (pcuHr): 27.28 Cycle Time (s): 120
PRC Over All Lanes (%): 19.0 Total Delay Over All Lanes(pcuHr): 28.79

Basic Results Summary

Scenario 5: '2038 DS AM' (FG5: '2038 DS AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

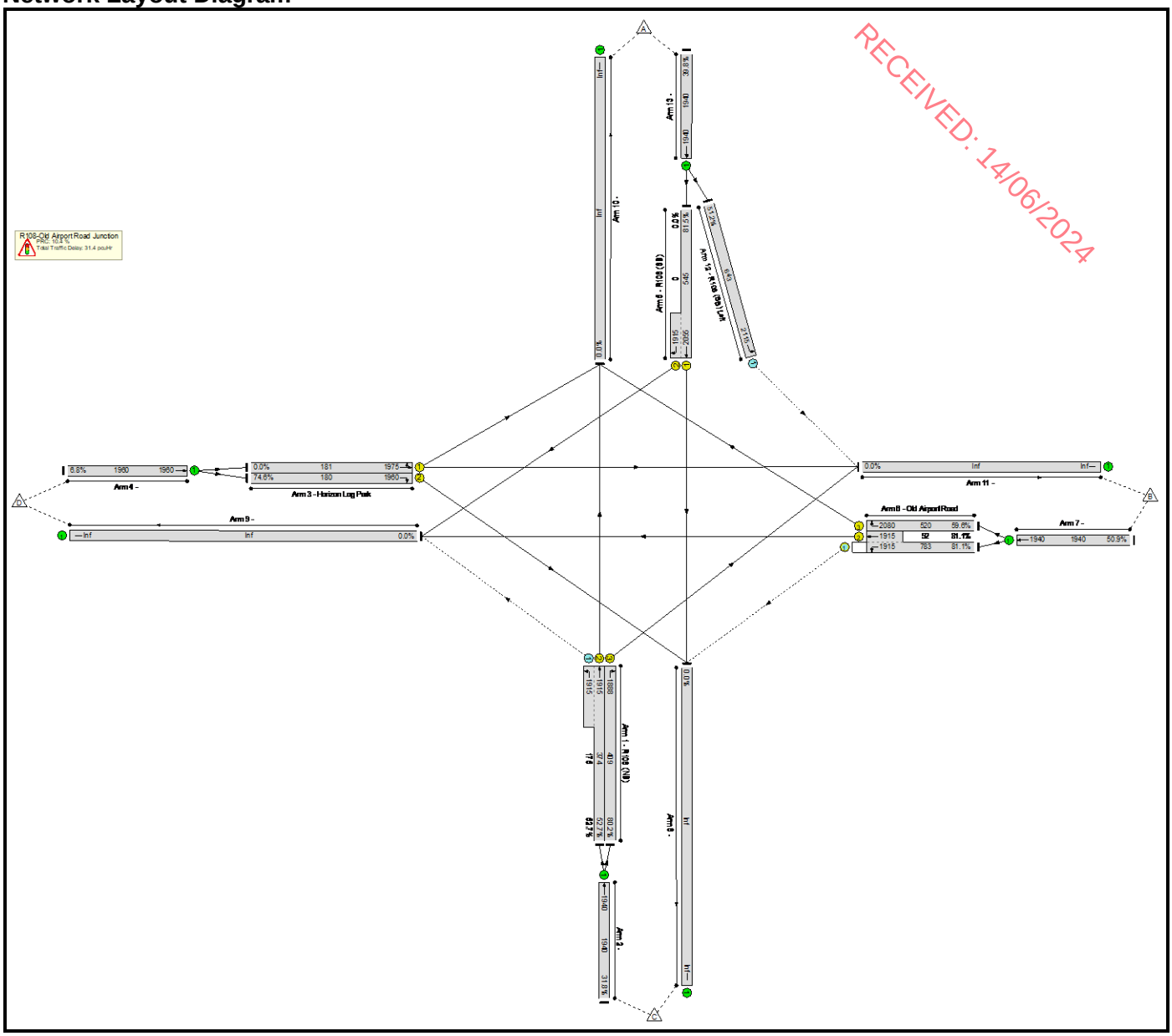
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**77.8%**	**363**	**602**	**0**	**26.9**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**77.8%**	**363**	**602**	**0**	**26.9**	-	-
1/2+1/1	R108 (NB) Left Ahead	U+O	F -		1	30	-	535	1915:1915	390+353	72.0 : 72.0%	127	127	0	4.3	28.8	9.4
1/3	R108 (NB) Right	U	E		1	30	-	375	1888	488	76.9%	-	-	-	5.9	56.7	13.2
2/1	Ahead	U	-		-	-	-	910	1940	1940	46.9%	-	-	-	0.4	1.7	0.4
3/1	Horizon Log Park Left Ahead	U	G		1	7	-	9	1975	132	6.8%	-	-	-	0.2	67.4	0.3
3/2	Horizon Log Park Right	U	G		1	7	-	27	1960	131	20.7%	-	-	-	0.5	70.4	1.0
4/1	Ahead	U	-		-	-	-	36	1960	1960	1.8%	-	-	-	0.0	0.9	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	26	-	354	2055:1915	459+0	77.1 : 0.0%	-	-	-	5.9	60.2	12.6
6/1+6/2	Old Airport Road Left Ahead	O+U	D C		1	74:32	-	570	1915:1915	408+325	77.8 : 77.8%	108	209	0	5.6	35.4	11.8
6/3	Old Airport Road Right	U	C		1	32	-	217	2080	572	37.9%	-	-	-	2.4	40.3	6.2
7/1	Ahead	U	-		-	-	-	787	1940	1940	40.6%	-	-	-	0.3	1.6	0.3
12/1	R108 (SB) Left Left	O	-		-	-	-	394	2115	631	62.5%	128	266	0	0.9	8.2	4.1
13/1	Ahead Ahead2	U	-		-	-	-	748	1940	1940	38.6%	-	-	-	0.3	1.5	0.3

C1 PRC for Signalled Lanes (%): 15.7 Total Delay for Signalled Lanes (pcuHr): 24.85 Cycle Time (s): 120
PRC Over All Lanes (%): 15.7 Total Delay Over All Lanes(pcuHr): 26.85

Basic Results Summary

Scenario 6: '2038 DS PM' (FG6: '2038 DS PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**81.5%**	**276**	**746**	**34**	**31.4**	-	-
R108-Old Airport Road Junction	-	-	-		-	-	-	-	-	-	**81.5%**	**276**	**746**	**34**	**31.4**	-	-
1/2+1/1	R108 (NB) Left Ahead	U+O	F -		1	25	-	289	1915:1915	374+175	52.7 : 52.7%	48	44	0	2.8	34.9	6.2
1/3	R108 (NB) Right	U	E		1	25	-	328	1888	409	80.2%	-	-	-	6.0	65.8	12.2
2/1	Ahead	U	-		-	-	-	617	1940	1940	31.8%	-	-	-	0.2	1.4	0.2
3/1	Horizon Log Park Left Ahead	U	G		1	10	-	0	1975	181	0.0%	-	-	-	0.0	0.0	0.0
3/2	Horizon Log Park Right	U	G		1	10	-	134	1960	180	74.6%	-	-	-	3.4	90.3	5.7
4/1	Ahead	U	-		-	-	-	134	1960	1960	6.8%	-	-	-	0.0	1.0	0.0
5/1+5/2	R108 (SB) Ahead Right	U	B A		1	31	-	444	2055:1915	545+0	81.5 : 0.0%	-	-	-	7.2	58.4	15.9
6/1+6/2	Old Airport Road Left Ahead	O+U	D C		1	79:29	-	677	1915:1915	783+52	81.1 : 81.1%	127	474	34	6.2	33.1	16.0
6/3	Old Airport Road Right	U	C		1	29	-	310	2080	520	59.6%	-	-	-	4.1	48.2	9.8
7/1	Ahead	U	-		-	-	-	987	1940	1940	50.9%	-	-	-	0.5	1.9	0.5
12/1	R108 (SB) Left Left	O	-		-	-	-	329	2115	643	51.2%	101	228	0	0.5	5.9	2.4
13/1	Ahead Ahead2	U	-		-	-	-	773	1940	1940	39.8%	-	-	-	0.3	1.5	0.3

C1 PRC for Signalled Lanes (%): 10.4 Total Delay for Signalled Lanes (pcuHr): 29.72 Cycle Time (s): 120

PRC Over All Lanes (%): 10.4 Total Delay Over All Lanes(pcuHr): 31.38

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Appendix 11: Land, Soils and Geology

Appendix 11.1: Ground Investigation Report

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Ground Investigations Ireland

DAA South Car Park

Dublin Airport Authority

Ground Investigation Report

April 2024

GROUND INVESTIGATIONS IRELAND
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DOCUMENT CONTROL SHEET

Project Title	DAA South Car Park
Engineer	Conneely Builders
Client	Dublin Airport Authority
Project No	13567-02-24
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Interim	A Molloy	S Graydon	S Kealy	Dublin	05 April 2024

Ground Investigations Ireland Ltd. present the results of the fieldworks and laboratory testing in accordance with the specification and related documents provided by or on behalf of the client The possibility of variation in the ground and/or groundwater conditions between or below exploratory locations or due to the investigation techniques employed must be taken into account when this report and the appendices inform designs or decisions where such variation may be considered relevant. Ground and/or groundwater conditions may vary due to seasonal, man-made or other activities not apparent during the fieldworks and no responsibility can be taken for such variation. The data presented and the recommendations included in this report and associated appendices are intended for the use of the client and the client's geotechnical representative only and any duty of care to others is excluded unless approved in writing.

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CONTENTS

APPENDICES

1.0 Preamble

On the instructions of Coneely Builders, a site investigation was carried out by Ground Investigations Ireland Ltd., between February and March 2024 at the site of the proposed carpark at Dublin Airport.

2.0 Overview

2.1. Background

It is proposed to construct a carpark with associated services, access roads and car parking at the proposed site. The site is currently greenfield and is located to west of the existing long-term carpark at the Dublin Airport.

2.2. Purpose and Scope

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

- Visit project site to observe existing conditions
- Carry out 20 No. Trial Pits to a maximum depth of 3.50m BGL
- Carry out 20 No. TRL/DCP Probes to determine CBR
- Carry out 17 No. Plate Bearing Tests to determine the modulus of subgrade reaction and equivalent CBR
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

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

3.2. Trial Pits

The trial pits were excavated using an 8T excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering

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

3.3. TRL Dynamic Cone Penetrometer

The TRL DCP tests were carried out at locations specified by the Consulting Engineer to determine a CBR design value for the design of external pavements. The testing was carried out below the Topsoil at the depths detailed on the test report. The test consists of dropping a 10kg weight on an anvil to drive a small diameter cone and recording the blows for a given penetration. The results of the DCP testing are included in Appendix 3 of this Report.

3.4. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 450mm diameter plate at the locations shown on the site plan in Appendix 1. The plate was loaded in increments using a hydraulic jack and an excavator to provide a reaction and the displacement was monitored in accordance with BS1377 Part 9 using independently mounted digital strain gauges. The constrained modulus and equivalent CBR are calculated in accordance with HD29/75 and are provided on the test reports in Appendix 4 of this Report.

3.5. Laboratory Testing (Pending)

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.
Environmental & Chemical testing as required by the specification, including the Rilta Suite pH and sulphate testing will be carried out by Element Materials Technology Laboratory in the UK. The Rilta suite testing includes both Solid Waste and Leachate Waste Acceptance Criteria.
Geotechnical testing consisting of moisture content, Atterberg limits and Particle Size Distribution (PSD). tests will be carried out in NMTL's Geotechnical Laboratory in Carlow
The results of the laboratory testing are included in Appendix 5 of this Report.

4.0 Ground Conditions

4.1. General

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

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

- Topsoil
- Made Ground
- Cohesive Deposits
- Granular Deposits
- Weathered Rock Deposits

TOPSOIL: Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.40m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil at the location of TP06 and TP08 to a maximum depth of 1.80m BGL. These deposits were described generally as *Brownish grey sandy gravelly Clay with low subangular cobble content and fragments of plastic, metal, timber and rubber.*

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

GRANULAR DEPOSITS: Granular deposits were encountered within or at the base of the cohesive deposits to a maximum depth of 3.20m BGL and were typically described as *grey/brown clayey sandy sub rounded to sub angular fine to coarse GRAVEL with occasional cobbles and rare boulders.* The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs.

WEATHERED BEDROCK: At the location of TP13 and TP14 weathered rock was encountered which was digable with the large excavator to a depth of up to 1.20m below the top of the stratum. The trial pits were terminated upon encountering the more competent bedrock, in which further excavation became more difficult. This material was recovered typically as angular gravel and cobbles of Limestone/Mudstone however there was some variability in the fracture spacing and the ease at which the excavator could progress. Some clay and sand were also present with the rock mass either from weathering or as infilling to fractures which were opened upon excavation.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall, nearby construction and other factors.

5.0 Recommendations & Conclusions

5.1. General

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

5.2. Foundations

An allowable bearing capacity of 50kN/m^2 is recommended for conventional strip or pad foundations on the soft to firm cohesive deposits at a depth of 0.70m BGL.

The possibility for variation in the depth of the made ground in the vicinity of these foundations should be considered and foundation inspections should be carried out. Any soft spots encountered at the proposed foundation depths should be excavated and replaced with lean mix concrete.

A ground bearing floor slab is recommended to be based on soft to firm cohesive deposits with an appropriate depth of compacted hardcore specified by the consulting engineer and in accordance with the limits and guidelines in SR21:2014 +A1:2016 and/or NRA SRW CL808 Type E granular stone fill. Where the depth of Made Ground/Soft deposits exceeds 0.9m then suspended floor slabs should be considered.

5.3. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendices of this Report. The low CBR test results indicate that a capping layer or a sufficient depth of crushed stone fill may be required. Plate bearing tests are recommended at the time of construction to verify the design assumptions for the proposed pavement make up and to verify adequate compaction has been achieved.

The use of a geogrid and separation membrane may improve the performance of the proposed pavement and enable a more economical pavement design to be achieved, a specialist supplier is recommended to advise of the required strength, depth and type of geotextile for the proposed design.

5.4. Excavations

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

Excavations in the Made Ground or soft Cohesive Deposits will require to be appropriately battered or the sides supported due to the low strength of these deposits.

Any excavations which penetrate the granular deposits will require to be appropriately battered or the sides supported and are likely to require dewatering due to the groundwater seepages noted in the exploratory hole logs in the Appendices of this Report.
The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations.

Excavations in the upper cohesive and weathered rock deposits are expected to be excavatable with conventional excavation equipment, with zones of more intact bedrock below this depth requiring rock breaking techniques. The 8T excavator was generally able to excavate to depths of 0.50m to 1.20m below the top of the weathered rock and became difficult to excavate within the confines of the trial pit on encountering the more competent rock.
Any waste material to be removed off site should be disposed of to a suitably licenced landfill.

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

APPENDIX 1 - Site Location Plan

Trial Pits/Plate Tests

Indicative Site Boundary

Client:

daa Dublin Airport

Project Code:
13567-02-24

Project Title:
Dublin Airport South Car Park

Drawing Title:
Figure 1 Site Location

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

0 20 40 60 80 m

Drawn By:	Date:
SK	05.04.2024

APPENDIX 2 – Trial Pit Records

Ground Investigations Ireland Ltd
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Site DAA South Car Park			**Trial Pit Number** TP01
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.20m x 1.20m x 2.70m	**Ground Level (mOD)** 71.78	**Client** Conneely Builders
	Location 713380.7 E 742490.1 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	TOPSOIL: Brown Clay with rootlets.		
				71.53	0.25	Firm brown gravelly CLAY with low subrounded cobble content. Gravels are angular to subangular fine to coarse.		
0.60	B1				(0.55)			
				70.98	0.80	Soft to firm grey to black sandy gravelly CLAY with low subangular to subrounded cobble content. Gravels are angular to subangular fine to coarse.		
1.10	SV 54kPa		62,62,38/Av. 54.00		(0.80)			
1.20	B2							
				70.18	1.60	Black slightly clayey sandy angular to subangular fine to coarse GRAVEL with medium angular to subangular cobble and boulder content.		▽1
			Slow ingress(1) at 1.90m.					
2.00	B3				(1.10)			
				69.08	2.70	Complete at 2.70m		

Plan

Remarks

Groundwater encountered at 1.90m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.70m BGL due to obstruction and sidewall collapse; Possible bedrock or boulder.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP01

Ground Investigations Ireland Ltd
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Site DAA South Car Park			**Trial Pit Number** TP02
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.00m x 1.20m x 3.10m	**Ground Level (mOD)** 71.73	**Client** Conneely Builders
	Location 713381.9 E 742436.6 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Brown Clay with rootlets.		
				71.43	0.30			
0.50	B1				(0.60)	Firm brown mottled grey slightly sandy gravelly CLAY with low subrounded cobble content. Gravels are angular to subangular fine to coarse.		
				70.83	0.90			
1.10	SV 28kPa		32,28,24/Av. 28.00			Soft to firm grey mottled brown sandy very gravelly CLAY with medium angular to subangular cobble content. Gravels are angular to subangular fine to coarse.		
1.20	B2		Slow ingress(1) at 1.40m.		(1.00)			▽1
				69.83	1.90			
2.20	B3				(1.20)	Soft to firm grey mottled brown sandy very gravelly CLAY with medium to high subangular to subrounded cobble content. Gravels are angular to subangular fine to coarse. (Damp).		
				68.63	3.10			
						Complete at 3.10m		

Plan

Remarks

Groundwater encountered at 1.40m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 3.10m BGL due to sidewall collapse.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP02

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Site DAA South Car Park			**Trial Pit Number** TP03
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.20m x 1.00m x 2.90m	**Ground Level (mOD)** 72.87	**Client** Conneely Builders
	Location 713438.8 E 742520.1 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	TOPSOIL: Brown slightly sandy Clay with roots and rootlets.		
				72.47	0.40	Soft to firm brown slightly sandy very gravelly CLAY. Gravels are angular to subangular fine to coarse.		
0.60	B1				(0.80)			
				71.67	1.20	Firm grey mottled brown slightly sandy gravelly CLAY with medium subangular cobble content. Gravels are angular to subangular fine to coarse.		
1.40	B2				(0.70)			▽1
			Slow ingress(1) at 1.60m.	70.97	1.90	Grey sandy clayey angular to subrounded fine to coarse GRAVEL with medium subangular cobble and boulder content. (Wet).		
					(1.00)			
2.90	B3			69.97	2.90	Complete at 2.90m		

Plan

Remarks

Groundwater encountered at 1.60m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.90m BGL due to collapsing sidewalls.
Trial pit backfilled upon completion.
Material unsuitable for shear vane test.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP06

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Site DAA South Car Park			**Trial Pit Number** TP04
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 2.90m x 1.10m x 2.40m	**Ground Level (mOD)** 71.98	**Client** Conneely Builders	**Job Number** 13567-02-24
	Location 713431.2 E 742481.2 N	**Dates** 01/03/2024	**Project Contractor** Ground Investigations Ireland	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	TOPSOIL: Brown Clay with rootlets.		
				71.73	0.25			
0.50	B1				(0.55)	Soft to firm brown slightly sandy very gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
				71.18	0.80			
1.00	B2				(1.60)	Soft to firm brown slightly sandy very gravelly CLAY with medium subangular cobble and low subangular boulder content. Gravels are angular to subangular fine to coarse.		
2.10	B3							
				69.58	2.40	Complete at 2.40m		

Plan

Remarks

No groundwater encountered.
Trial pit spalling and collapsing.
Trial pit terminated at 2.40m BGL due to sidewall collapse.
Trial pit backfilled upon completion.
Material unsuitable for shear vane test.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP04

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Site DAA South Car Park			**Trial Pit Number** TP05
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.00m x 1.10m x 2.30m	**Ground Level (mOD)** 71.16	**Client** Conneely Builders
	Location 713453.3 E 742453.9 N	**Dates** 01/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Brown Clay with rootlets.		
				70.86	0.30			
0.50	B1					Soft to firm brown sandy gravelly CLAY with low subangular to subrounded cobble content. Gravels are angular to subangular fine to coarse.		
					(1.20)			
1.10 1.20	SV 43.33kPa B2		22,70,38/Av. 43.33					
				69.66	1.50			
					(0.80)	Soft to firm brown sandy gravelly CLAY with medium subangular to subrounded cobble and boulder content. Gravels are angular to subangular fine to coarse.		
				68.86	2.30			
						Complete at 2.30m		

Plan

Remarks

No groundwater encountered.
Trial pit spalling and collapsing.
Trial pit terminated at 2.30m BGL due to sidewall collapse.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP01

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Site DAA South Car Park			**Trial Pit Number** TP06
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.40m x 1.10m x 2.90m	**Ground Level (mOD)** 71.71	**Client** Conneely Builders
	Location 713497.9 E 742512.9 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(1.20)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with fragments of plastic, metal and timber.		
0.50	B1		Slow - moderate ingress(1) at 0.70m.					▽1
1.00	SV 18.67kPa		16,20,20/Av. 18.67					
				70.51	1.20			
					(0.20)	Soft to frm brown slightly sandy gravelly CLAY with medium subangular cobble content. Gravels are angular to subrounded fine to coarse.		
				70.31	1.40			
					(0.40)	Firm to stiff brown slightly sandy gravelly CLAY with medium subangular cobble and boulder content. Gravels are angular to subrounded fine to coarse.		
				69.91	1.80			
					(1.10)	Greyish brown clayey sandy angular to subrounded fine to coarse GRAVEL with medium subangular to subrounded cobble and boulder content. (Wet).		
				68.81	2.90			
						Complete at 2.90m		

Plan

Remarks

Groundwater encountered at 0.70m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.90m BGL due to obstruction; possible bedrock or boulders.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP06

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Site DAA South Car Park			**Trial Pit Number** TP07
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.10m x 1.20m x 2.70m	**Ground Level (mOD)** 71.03	**Client** Conneely Builders
	Location 713486.1 E 742439.8 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL: Brown Clay with rootlets.		
				70.83	0.20			
					(0.30)	Firm brown mottled grey slightly sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
				70.53	0.50			
0.60	B1					Soft to firm grey very sandy very gravelly CLAY with medium subangular to subrounded cobble and low subrounded boulder content. Gravels are angular to subrounded fine to coarse.		
1.00	B2				(1.10)			
			Slow ingress(1) at 1.60m.	69.43	1.60			▽1
1.80	B3					Brownish grey clayey sandy subangular to subrounded fine to coarse GRAVEL with medium subangular to subarounded cobble and boulder content.		
					(1.10)			
				68.33	2.70			
						Complete at 2.70m		

Plan

Remarks

Groundwater encountered at 1.60m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.70m BGL due to collapsing sidwalls.
Trial pit backfilled upon completion.
Material unsuitable for shear vane test.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP07

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Site DAA South Car Park			**Trial Pit Number** TP08
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.40m x 0.90m x 2.80m	**Ground Level (mOD)** 71.66	**Client** Conneely Builders	**Job Number** 13567-02-24
	Location 713513.2 E 742465.5 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL: Brown Clay with rootlets.		
				71.46	0.20	MADE GROUND: Brown slightly gravelly Clay with low subangular to subrounded cobble content. Gravels are angular to subangular fine to coarse.		
					(0.40)			
0.55	B1			71.06	0.60	MADE GROUND: Brownish grey sandy gravelly Clay with low subangular cobble content and fragments of plastic and rubber. Gravels are angular to subangular fine to coarse.		
1.20 1.20	B2 SV 24.67kPa		Slow ingress(1) at 1.20m. 40,18,16/Av. 24.67		(1.20)			▽1
				69.86	1.80	Soft to firm brownish grey slightly sandy gravelly Clay with medium subangular to subrounded cobble and boulder content. Gravels are angular to subangular fine to coarse.		
2.00	B3				(0.50)			
				69.36	2.30	Brownish grey slightly sandy clayey angular to subangular fine to coarse GRAVEL with medium subangular to subrounded cobble and high subangular to subrounded boulder content.		
2.50	B4				(0.50)			
				68.86	2.80	Complete at 2.80m		

Plan

Remarks

Groundwater encountered at 1.20m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.80m BGL due to collapsing sidewalls.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP08

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Site DAA South Car Park			**Trial Pit Number** TP09
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.20m x 1.00m x 3.10m	**Ground Level (mOD)** 71.42	**Client** Conneely Builders
	Location 713540.8 E 742504.3 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				71.32	(0.10) 0.10	MADE GROUND: Brown slightly sandy gravelly Clay with medium subangular to subrounded cobble content and fragments of metal and red brick.		
					(0.30)	Soft brown slightly sandy slightly gravelly Clay with rootlets.		
				71.02	0.40	Soft to firm grey very sandy very gravelly CLAY with medium subangular to subrounded cobble and low subangular boulder content. Gravels are angular to subrounded fine to coarse.		
0.70	B1							
0.80	SV 33.67kPa		Slow ingress(1) at 0.80m. 58,23,20/Av. 33.67					▽1
					(1.80)			
1.80	B2							
				69.22	2.20	Grey slightly clayey sandy angular to subangular fine to coarse GRAVEL with medium to high subangular cobble and boulder content. (Wet).		
					(0.90)			
2.70	B3							
				68.32	3.10	Complete at 3.10m		

Plan

Remarks

Groundwater encountered at 0.80m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 3.10m BGL due to collapsing sidewalls.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP09

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Site DAA South Car Park			**Trial Pit Number** TP10
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.00m x 0.90m x 3.10m	**Ground Level (mOD)** 71.76	**Client** Conneely Builders	**Job Number** 13567-02-24
	Location 713372.9 E 742421.8 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Brown Clay with rootlets.		
				71.46	0.30			
0.50	B1					Soft to firm brown mottled grey slightly sandy gravelly CLAY with low to medium subangular cobble content. Gravels are angular to subangular fine to coarse.		
					(0.80)			
1.00	SV 73.33kPa		72, 78,70/Av. 73.33	70.66	1.10			
1.20	B2		Slow ingress(1) at 1.30m.			Sot to firm grey mottled brown very sandy very gravelly CLAY with medium subangular cobble content. Gravels are angular to subangular fine to coarse. (Damp.)		▽1
					(0.90)			
				69.76	2.00			
2.20	B3					Soft to firm black sandy very gravelly CLAY with medium subangular cobble content. Gravels are angular to subangular fine to coarse.		
					(0.90)			
				68.86	2.90			
					(0.20)	Black sandy very clayey angular to subangular fine to coarse GRAVEL with low angular to subangular cobble content.		
				68.66	3.10			
						Complete at 3.10m		

Plan

Remarks

Groundwater encountered at 1.30m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 3.10m BGL due to sidewall collapse.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP10

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Site DAA South Car Park			**Trial Pit Number** TP11
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.00m x 1.10m x 2.60m	**Ground Level (mOD)** 72.66	**Client** Conneely Builders
	Location 713382 E 742523.6 N	**Dates** 01/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL: Brown Clay with roots and rootlets.		
				72.46	0.20			
0.50	B1				(0.70)	Firm brown gravelly CLAY. Gravels are angular to subangular fine to coarse.		
				71.76	0.90			
1.00	SV 62.67kPa		72,82,34/Av. 62.67			Soft to firm brown to grey sandy very gravelly CLAY with medium subangular cobble content. Gravels are angular to subangular fine to coarse.		
1.00	B2							
					(1.70)			
2.00	B3							
				70.06	2.60			
						Complete at 2.60m		

Plan

Remarks

No groundwater encountered.
Trial pit spalling and collapsing.
Trial pit terminated at 2.60m BGL due to sidewall collapse.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP11

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Site DAA South Car Park			**Trial Pit Number** TP12
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 2.90m x 1.00m x 3.00m	**Ground Level (mOD)** 69.87	**Client** Conneely Builders
	Location 713586.6 E 742348.8 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35)	TOPSOIL: Brown Clay with rootlets.		
				69.52	0.35	Soft to firm brown slightly sandy very gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
0.60	B1		Slow ingress(1) at 0.70m.		(0.55)			▽1
				68.97	0.90	Firm grey to black sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
1.20	B2				(0.90)			
1.80	B3			68.07	1.80	Grey to black sandy clayey angular to subangular fine to coarse GRAVEL with low subangular to subarounded cobble content.		
					(1.40)			
				66.67	3.20	Complete at 3.20m		

Plan

Remarks

Groundwater encountered at 0.70m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 3.20m BGL due to obstruction, possible bedrock or boulders.
Trial pit backfilled upon completion.
Material unsuitable for shear vane test.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP12

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Site DAA South Car Park			**Trial Pit Number** TP13
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.00m x 0.90m x 2.60m	**Ground Level (mOD)** 70.09	**Client** Conneely Builders	**Job Number** 13567-02-24
	Location 713548.1 E 742368.9 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.35)	TOPSOIL: Brown Clay with rootlets.		
				69.74	0.35			
					(0.35)	Soft to firm brown mottled grey slightly sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
0.60	B1			69.39	0.70			
1.00	SV 31.33kPa		12,30,52/Av. 31.33		(0.70)	Soft to firm grey to black sandy gravelly CLAY with low-medium subangular cobble content. Gravels are angular to subangular fine to coarse.		
1.00	B2			68.69	1.40			
					(1.20)	Grey to black angular to subangular fine to coarse GRAVEL (possible weathered rock).		▽1
			Slow ingress(1) at 2.40m.					
2.50	B3			67.49	2.60			
						Complete at 2.60m		

Plan

Remarks

Groundwater encountered at 2.40m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.60m BGL due to obstruction, possible bedrock or boulders.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP13

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Site DAA South Car Park			**Trial Pit Number** TP14
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.20m x 0.80m x 2.40m	**Ground Level (mOD)** 70.81	**Client** Conneely Builders
	Location 713482.4 E 742366.8 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Brown Clay with rootlets.		
				70.51	0.30			
0.60	B1					Soft to firm brown mottled grey and orange slightly sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
0.90	SV 74.67kPa		86,66,72/Av. 74.67		(1.10)			
1.20	B2							
				69.41	1.40			
			Slow ingress(1) at 1.70m.		(0.50)	Firm grey mottled brown and orange slightly sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		▽1
				68.91	1.90			
2.10	B3				(0.50)	Grey to black slightly clayey slightly sandy angular to subangular fine to coarse GRAVEL (possible weathered rock).		
				68.41	2.40			
						Complete at 2.40m		

Plan

Remarks

Groundwater encountered at 1.70m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.40m BGL due to obstruction, possible bedrock or boulders.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP13

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Site DAA South Car Park			**Trial Pit Number** TP15
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 2.90m x 1.10m x 2.60m	**Ground Level (mOD)** 70.55	**Client** Conneely Builders
	Location 713530.1 E 742433.8 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	TOPSOIL: Brown Clay with rootlets.		
				70.30	0.25			
					(0.15)	Soft to firm brown slightly gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
				70.15	0.40			
0.60	B1					Soft to firm brown sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
0.80	SV 55.33kPa		58,50,58/Av. 55.33		(1.00)			
1.10	SV 48kPa		60, 38,46/Av. 48.00					
1.10	B2							
				69.15	1.40	Grey clayey sandy subangular to subrounded fine to coarse GRAVEL with medium subangular to subarounded cobble content.		
			Slow ingress(1) at 1.80m.					▽1
2.00	B3				(1.20)			
				67.95	2.60	Complete at 2.60m		

Plan

Remarks

Groundwater encountered at 1.80m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.60m BGL due to collapsing sidwalls.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP15

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Site DAA South Car Park			**Trial Pit Number** TP16
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.40m x 0.90m x 3.10m	**Ground Level (mOD)** 71.46	**Client** Conneely Builders
	Location 713546.5 E 742468.1 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	TOPSOIL: Brown Clay with rootlets.		
				71.21	0.25	Firm brown slightly sandy gravelly Clay with low subangular to subrounded cobble content. Gravels are angular to subrounded fine to coarse.		
0.50	B1				(0.55)			
				70.66	0.80	Brownish grey clayey sandy angular to subrounded fine to coarse GRAVEL with medium subangular to rounded cobble and low subrounded boulder content.		
1.00	B2							
					(1.30)			
			Slow ingress(1) at 1.70m.					▽1
				69.36	2.10	Grey to black clayey sandy angular to subangular fine to coarse GRAVEL with medium angular to subangular cobble and boulder content.		
2.20	B3							
					(1.00)			
				68.36	3.10	Complete at 3.10m		

Plan

Remarks

Groundwater encountered at 1.70m BGL with slow ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 3.10m BGL due to obstruction; possible rock or boulders.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP16

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Site DAA South Car Park			**Trial Pit Number** TP17
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.10m x 0.80m x 3.50m	**Ground Level (mOD)** 71.12	**Client** Conneely Builders
	Location 713587.6 E 742462.6 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL: Brown Clay with rootlets.		
				70.92	0.20	Soft to firm brown gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
0.60	B1							
1.00 1.00	SV 60.67kPa B2		42,76,64/Av. 60.67		(1.90)			
			Slow ingress(1) at 1.70m.					▽1
				69.02	2.10	Soft to firm brown to grey sandy gravelly CLAY with low subangular to subrounded cobble content. Gravels are angular to subangular fine to coarse.		
2.20 2.20	SV 18kPa B3		16,20/Av. 18.00		(0.30)			
				68.72	2.40	Firm grey to black sandy gravelly CLAY wih medium angular to subrounded cobble content. Gravels are angular to subangular fine to coarse.		
					(1.10)			
3.50	B4			67.62	3.50	Complete at 3.50m		

Plan

Remarks

Groundwater encountered at 1.70m BGL with slow ingress.
Trial pit sidewalls spalling and collapsing
Trial pit terminated at 3.50m BGL due to collapsing sidewalls.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP17

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Site DAA South Car Park			**Trial Pit Number** TP18
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 2.90m x 1.00m x 3.00m	**Ground Level (mOD)** 69.90	**Client** Conneely Builders
	Location 713595.3 E 742380 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24 **Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL: Brown Clay with rootlets and fragments of red brick.		
				69.60	0.30			
					(0.50)	Soft to firm brown slightly sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
0.70	B1			69.10	0.80			
1.10	SV 96kPa		120,98,70/Av. 96.00			Firm grey to black slightly sandy gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
1.20	B2				(0.90)			
				68.20	1.70			
2.00	B3					Black sandy very clayey angular to subangular fine to coarse GRAVEL with medium angular to subangular cobble content.		
					(1.30)			
			Slow ingress(1) at 2.80m.					▽1
				66.90	3.00			
						Complete at 3.00m		

Plan

Remarks

Groundwater encountered at 2.80m BGL with slow ingress.
Trial pit stable.
Trial pit terminated at 3.00m BGL due obstruction, possible bedrock or boulders.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP15

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Site DAA South Car Park			**Trial Pit Number** TP19
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.50m x 1.00m x 2.60m	**Ground Level (mOD)** 71.66	**Client** Conneely Builders
	Location 713583 E 742495.6 N	**Dates** 05/03/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				71.46	(0.20) 0.20	MADE GROUND: Brown slightly sandy gravelly Clay with low subangular to subrounded cobble content and fragments of plastic.		
0.50	B1		Fast ingress(1) at 0.50m.		(0.60)	Soft to firm brown slightly sandy gravelly Clay with low subangular to subrounded cobble content. Gravels are angular to subangular fine to coarse.		▽1
1.00	SV 20.67kPa		22,16,24/Av. 20.67	70.86	0.80	Soft to firm greyish brown slightly sandy gravelly CLAY with low subangular to subrounded cobble content. Gravels are angular to subrounded fine to coarse.		
1.30	B2				(0.80)			
				70.06	1.60	Firm greyish brown very sandy very gravelly CLAY with medium subangular cobble content. Gravels are angular to subangular fine to coarse.		
					(1.00)			
				69.06	2.60	Complete at 2.60m		

Plan

Remarks

Groundwater encountered at 0.50m BGL with fast ingress.
Trial pit spalling and collapsing.
Trial pit terminated at 2.60m BGL due to collapsing sidewalls.
Trial pit backfilled upon completion.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP19

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Site DAA South Car Park			**Trial Pit Number** TP20
Machine : 8t Excavator **Method :** Trial Pit	**Dimensions** (L x W x D) 3.00m x 1.40m x 3.20m	**Ground Level (mOD)** 70.45	**Client** Conneely Builders
	Location 713593.6 E 742432.3 N	**Dates** 29/02/2024	**Project Contractor** Ground Investigations Ireland
			Job Number 13567-02-24
			Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL: Brown Clay with rootlets.		
				70.25	0.20	Soft to firm brown gravelly CLAY with low subangular cobble content. Gravels are angular to subangular fine to coarse.		
					(0.60)			
0.60	B1		Slow ingress(1) at 0.60m.					▽1
				69.65	0.80	Loose to medium dense brown sandy very clayey GRAVEL with medium angular to subangular cobble and low subrounded boulder content. Gravels are angular to subangular fine to coarse. (wet)		
					(1.60)			
				68.05	2.40	Soft to firm dark grey to black sandy gravelly CLAY wih low subangular cobble and boulder content. Gravels are angular to subangular fine to coarse.		
2.60	B2				(0.80)			
				67.25	3.20	Complete at 3.20m		

Plan

Remarks

Groundwater encountered at 0.60m BGL with slow ingress.
Trial pit sidewalls spalling and collapsing below 0.80m BGL.
Trial pit terminated at 3.20m BGL due to collapsing sidewalls.
Trial pit backfilled upon completion.
Material unsuitable for shear vane test.

Scale (approx)	Logged By	Figure No.
1:25	AM	13567-02-24.TP20

APPENDIX 3 – TRL Probe Records

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D22 YD52

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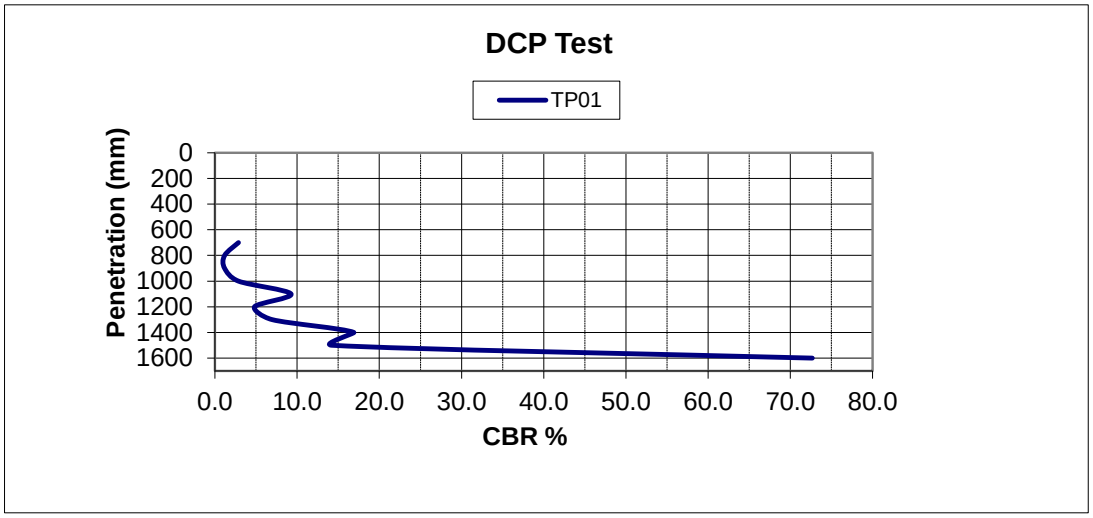
Web: www.gii.ie

Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP01
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
	-	-	0.0
700	2	50.0	2.9
800	1	100.0	1.2
900	1	100.0	1.2
1000	2	50.0	2.9
1100	5	20.0	9.3
1200	3	33.3	4.8
1300	4	25.0	7.0
1400	8	12.5	16.9
1500	7	14.3	14.2
1600	25	4.0	72.7
	-		
	-		
	-		
	-		
	-		

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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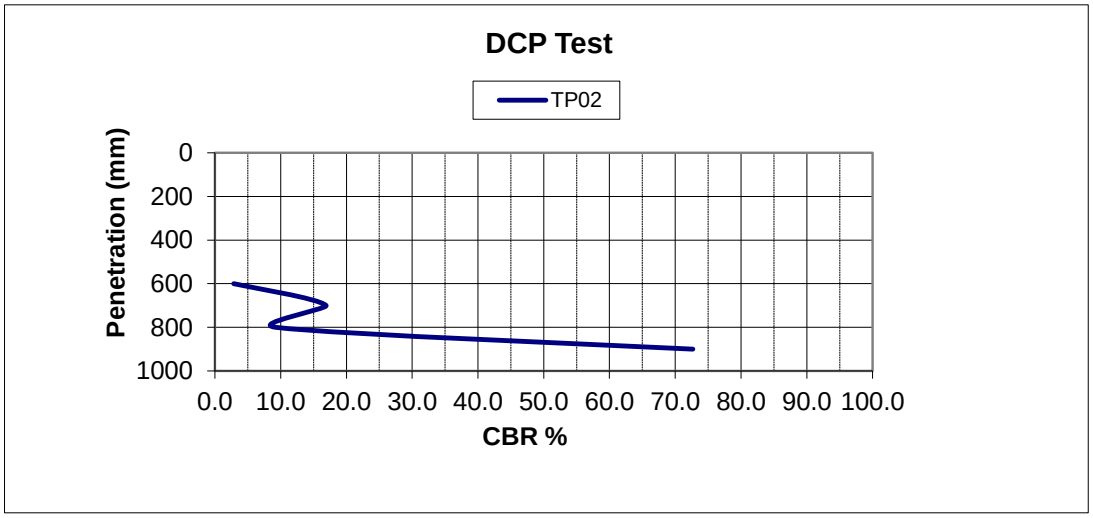
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP02
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	2	50.0	2.9
700	8	12.5	16.9
800	5	20.0	9.3
900	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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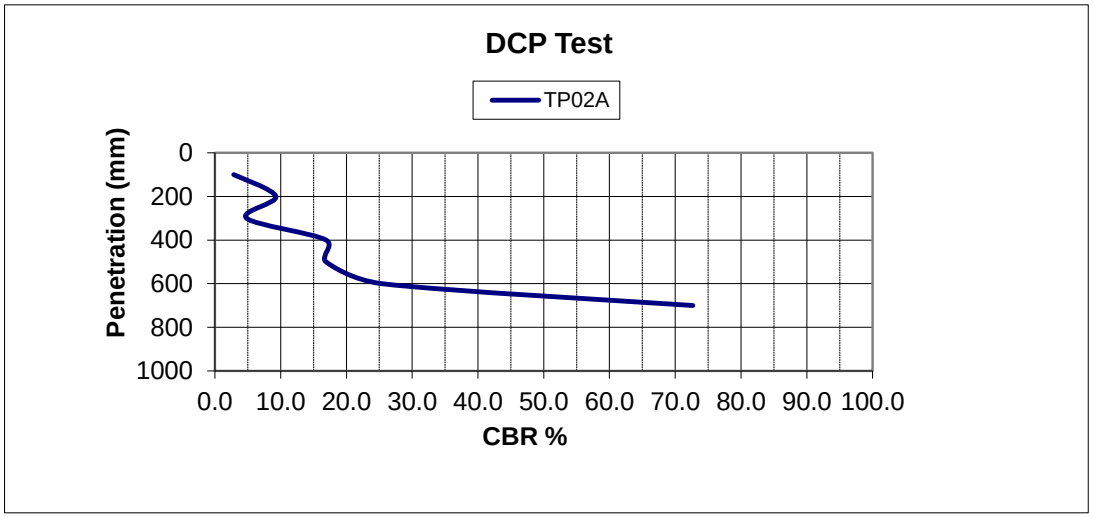
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP02A
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
100	2	50.0	2.9
200	5	20.0	9.3
300	3	33.3	4.8
400	8	12.5	16.9
500	8	12.5	16.9
600	11	9.1	25.4
700	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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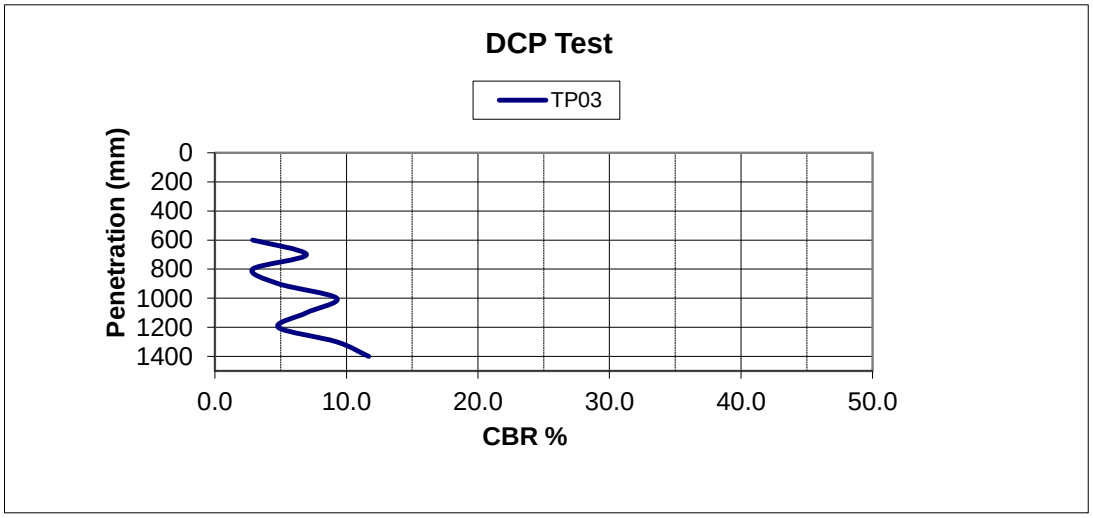
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP03
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	2	50.0	2.9
700	4	25.0	7.0
800	2	50.0	2.9
900	3	33.3	4.8
1000	5	20.0	9.3
1100	4	25.0	7.0
1200	3	33.3	4.8
1300	5	20.0	9.3
1400	6	16.7	11.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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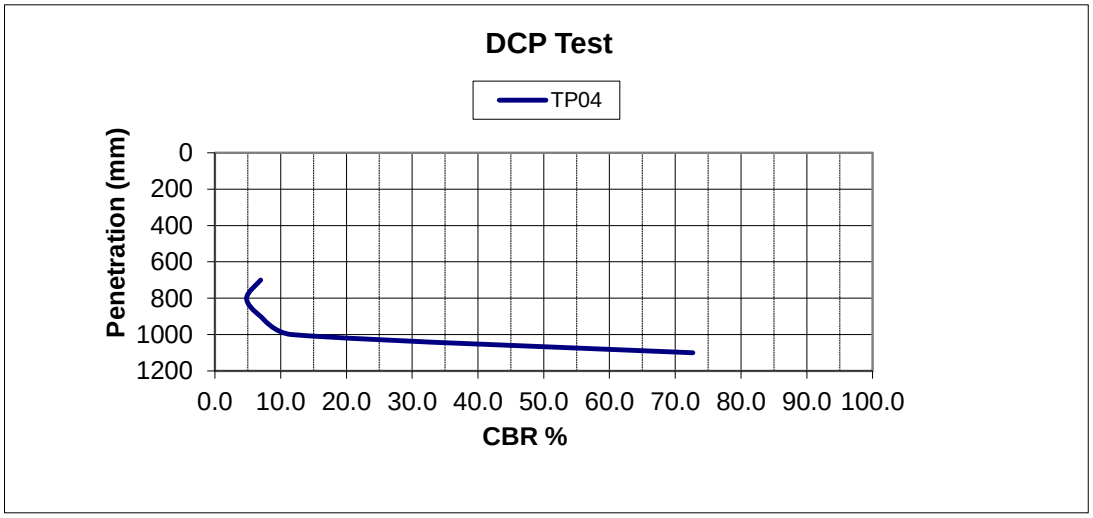
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP04
Client	Conneely Builders	**By**	A Molloy
		Date	01/03/2024
Initial Depth	0.70m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
700	4	25.0	7.0
800	3	33.3	4.8
900	4	25.0	7.0
1000	6	16.7	11.7
1100	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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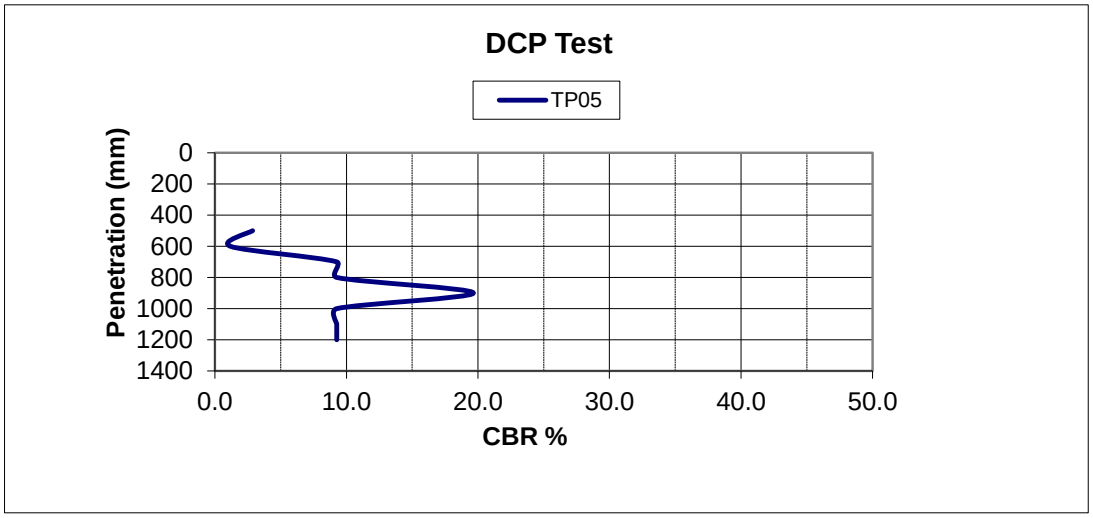
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP05
Client	Conneely Builders	**By**	A Molloy
		Date	01/03/2024
Initial Depth	0.50m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
500	2	50.0	2.9
600	1	100.0	1.2
700	5	20.0	9.3
800	5	20.0	9.3
900	9	11.1	19.7
1000	5	20.0	9.3
1100	5	20.0	9.3
1200	5	20.0	9.3
1300	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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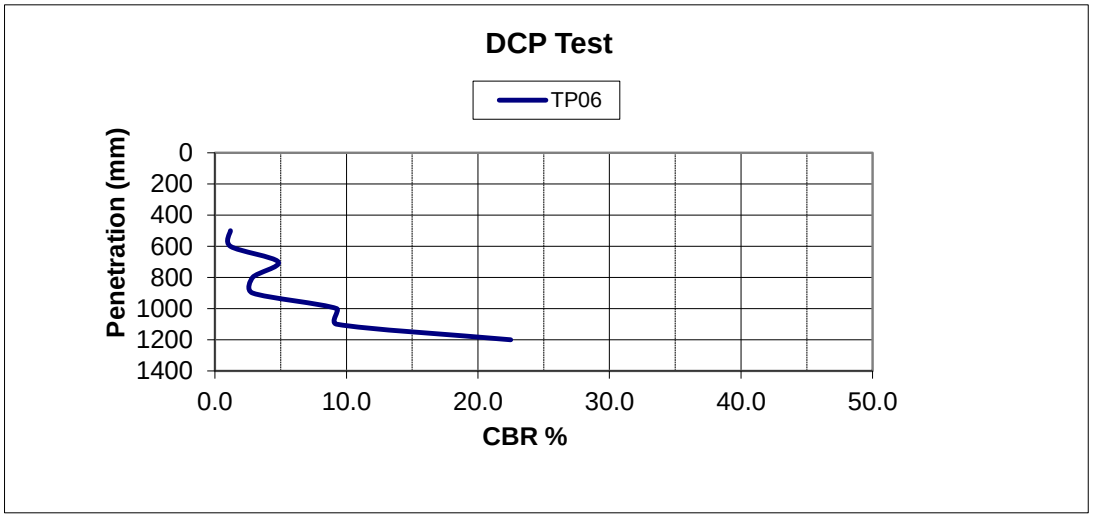
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP06
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.50m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
500	1	100.0	1.2
600	1	100.0	1.2
700	3	33.3	4.8
800	2	50.0	2.9
900	2	50.0	2.9
1000	5	20.0	9.3
1100	5	20.0	9.3
1200	10	10.0	22.5
1300	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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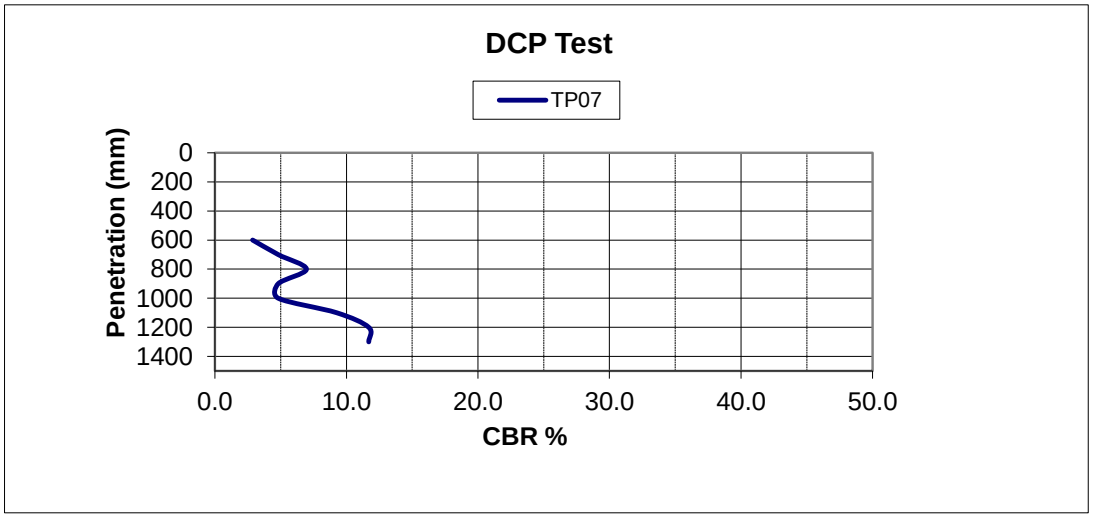
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP07
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	2	50.0	2.9
700	3	33.3	4.8
800	4	25.0	7.0
900	3	33.3	4.8
1000	3	33.3	4.8
1100	5	20.0	9.3
1200	6	16.7	11.7
1300	6	16.7	11.7
1400	5	20.0	9.3

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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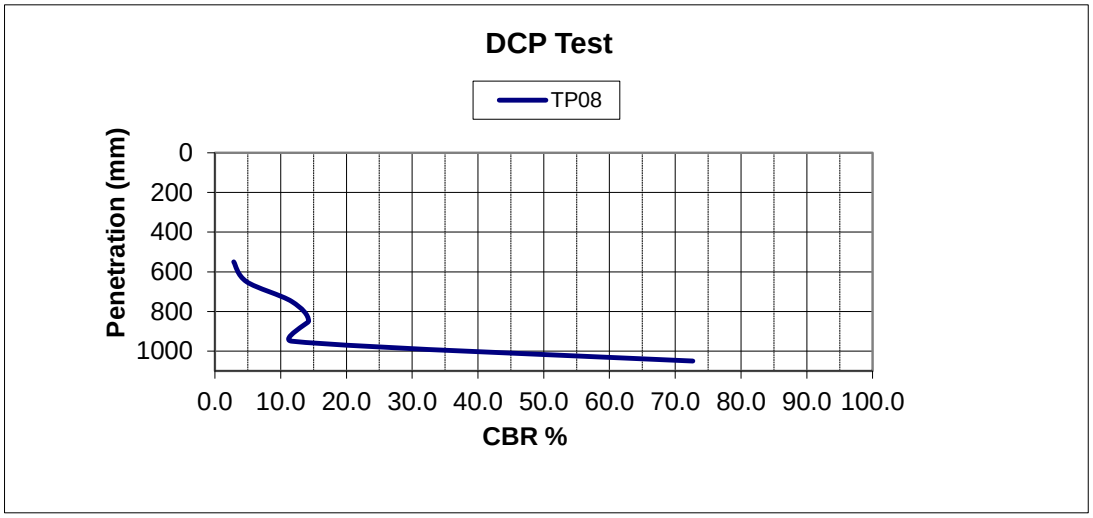
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP08
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.55m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
550	2	50.0	2.9
650	3	33.3	4.8
750	6	16.7	11.7
850	7	14.3	14.2
950	6	16.7	11.7
1050	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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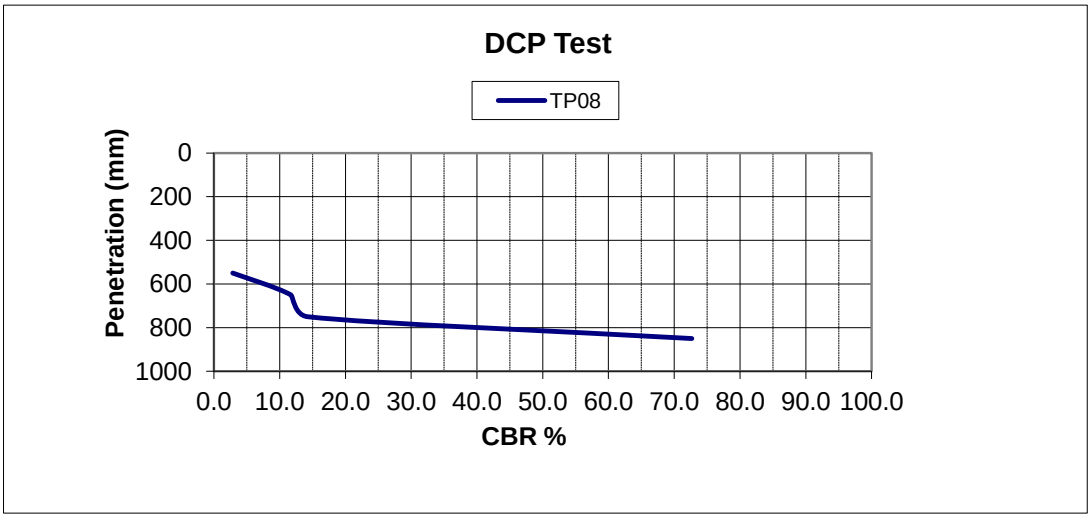
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP08
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.55m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
550	2	50.0	2.9
650	6	16.7	11.7
750	7	14.3	14.2
850	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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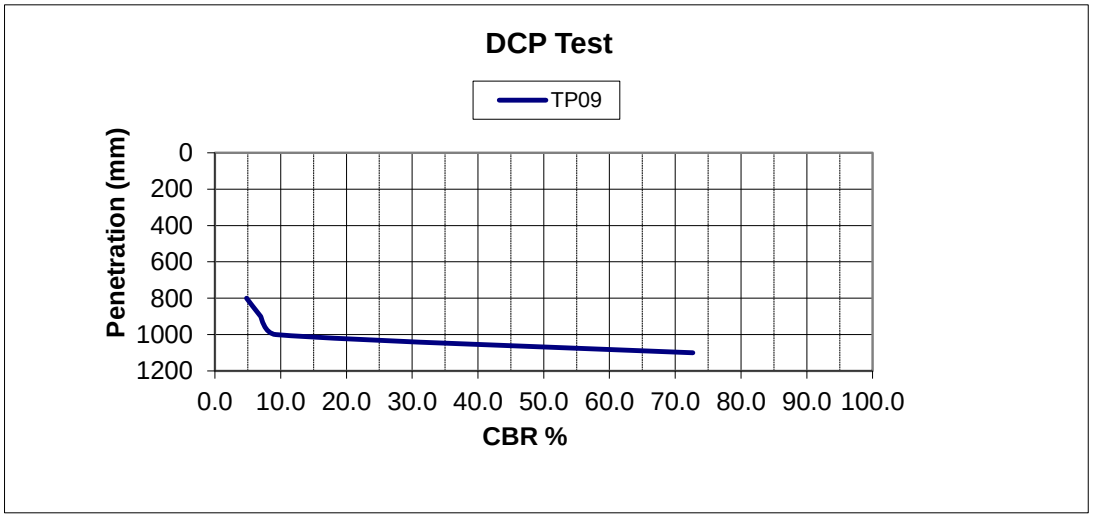
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP09
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	3	33.3	4.8
900	4	25.0	7.0
1000	5	20.0	9.3
1100	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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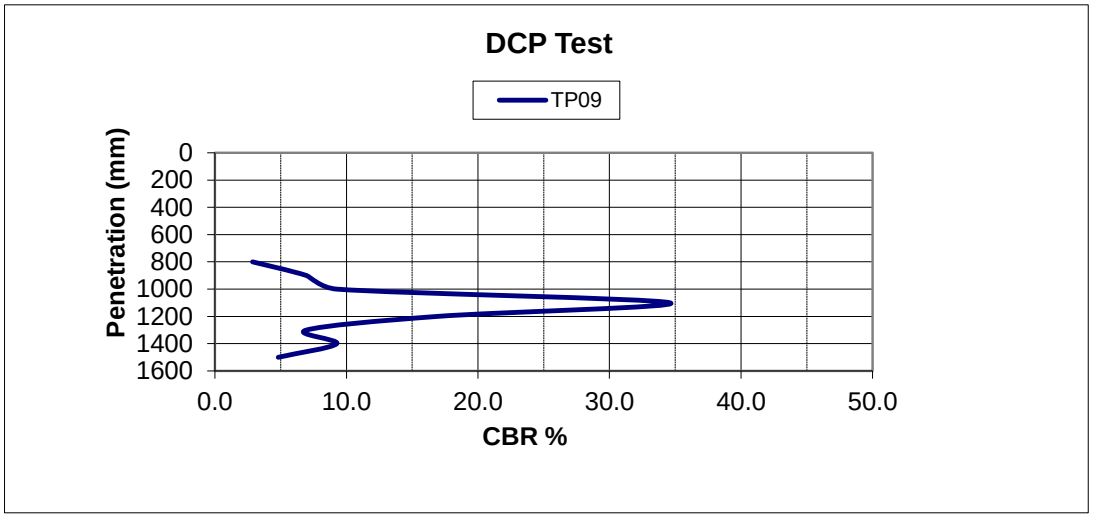
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP09
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	2	50.0	2.9
900	4	25.0	7.0
1000	5	20.0	9.3
1100	14	7.1	34.6
1200	8	12.5	16.9
1300	4	25.0	7.0
1400	5	20.0	9.3
1500	3	33.3	4.8

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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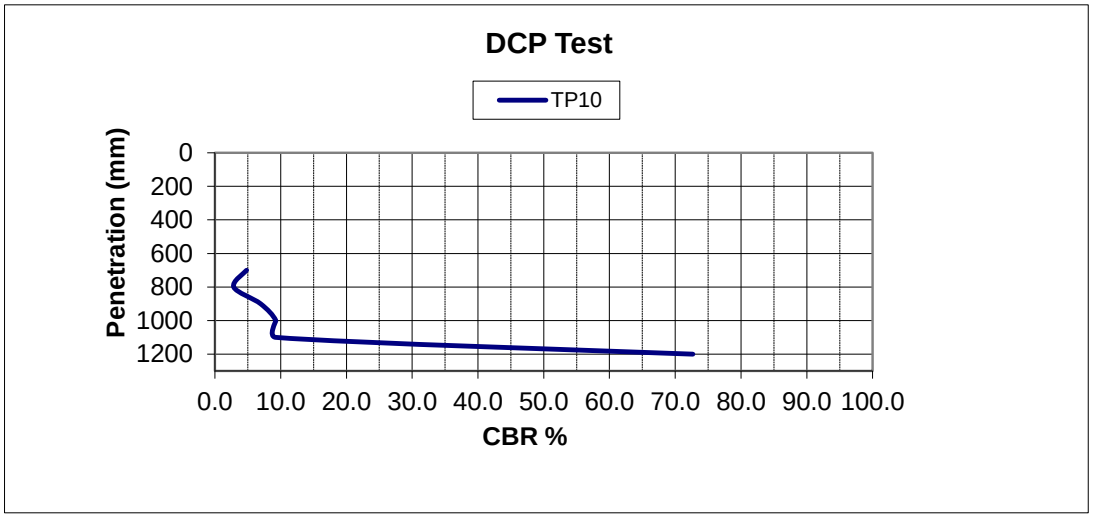
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP10
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.70m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
700	3	33.3	4.8
800	2	50.0	2.9
900	4	25.0	7.0
1000	5	20.0	9.3
1100	5	20.0	9.3
1200	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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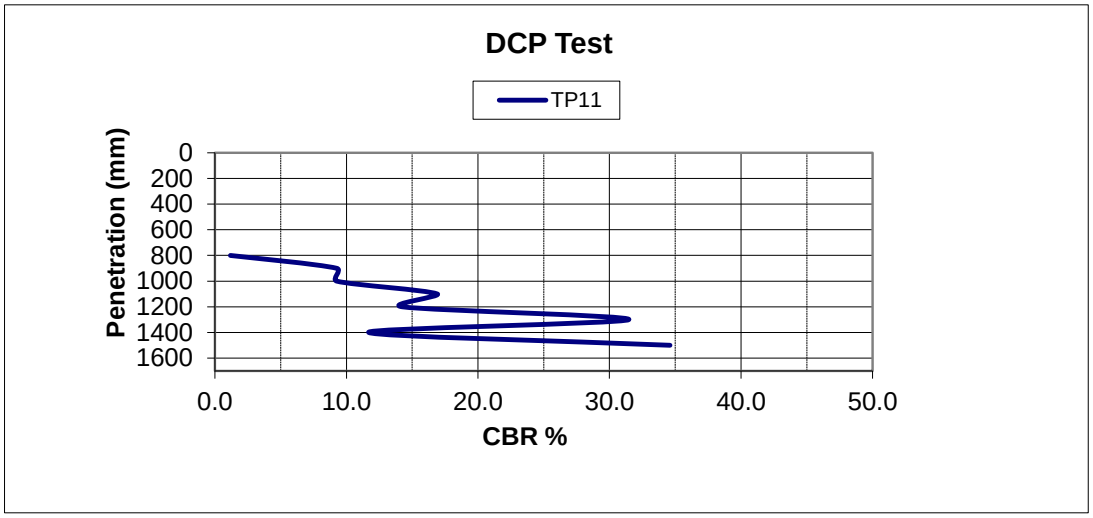
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP11
Client	Conneely Builders	**By**	A Molloy
		Date	01/03/2024
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	1	100.0	1.2
900	5	20.0	9.3
1000	5	20.0	9.3
1100	8	12.5	16.9
1200	7	14.3	14.2
1300	13	7.7	31.5
1400	6	16.7	11.7
1500	14	7.1	34.6
1600	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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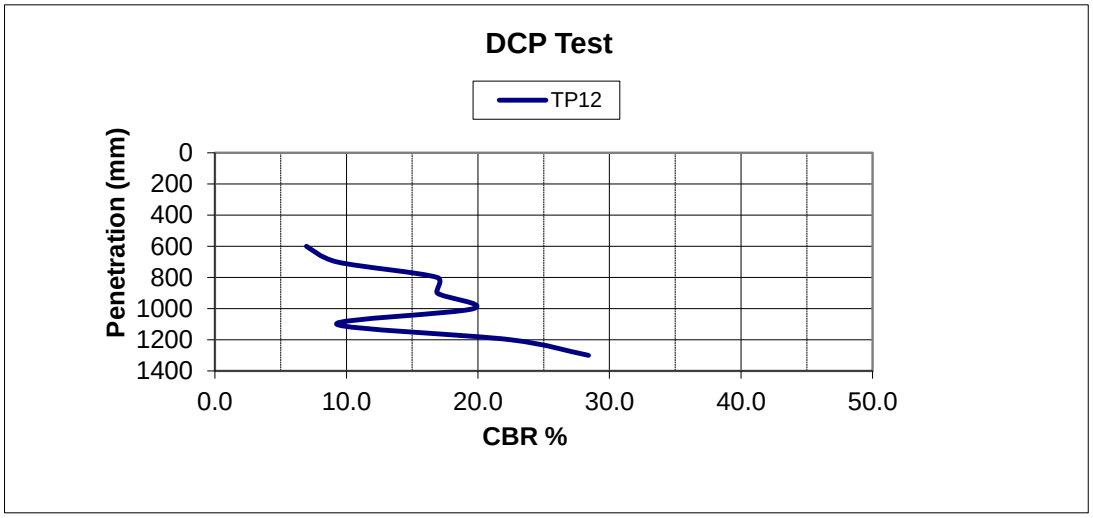
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP12
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	4	25.0	7.0
700	5	20.0	9.3
800	8	12.5	16.9
900	8	12.5	16.9
1000	9	11.1	19.7
1100	5	20.0	9.3
1200	10	10.0	22.5
1300	12	8.3	28.4
1400	6	16.7	11.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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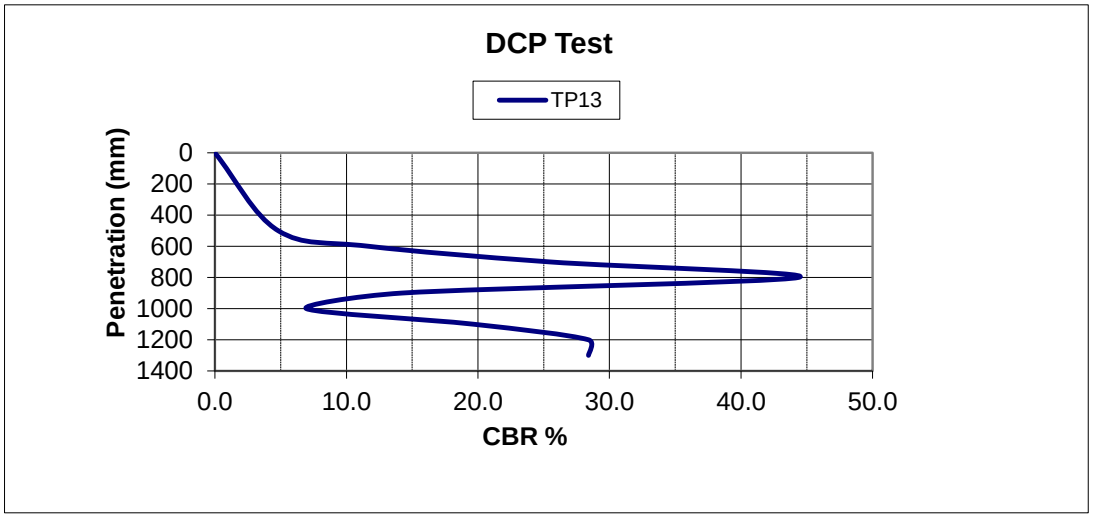
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP13
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.50m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
0	-	-	0.0
500	3	33.3	4.8
600	6	16.7	11.7
700	11	9.1	25.4
800	17	5.9	44.4
900	7	14.3	14.2
1000	4	25.0	7.0
1100	9	11.1	19.7
1200	12	8.3	28.4
1300	12	8.3	28.4

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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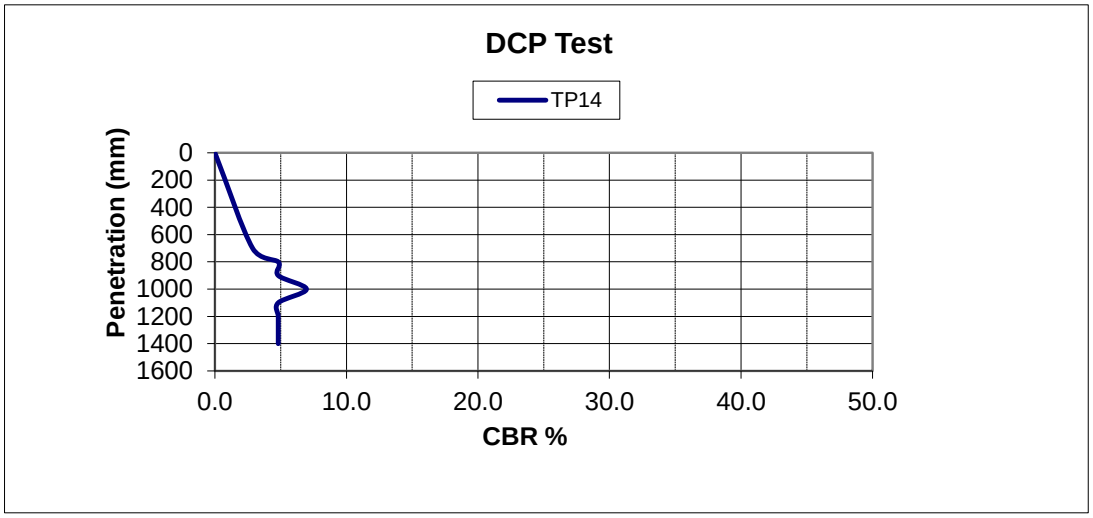
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP14
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.70m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
0	-	-	0.0
700	2	50.0	2.9
800	3	33.3	4.8
900	3	33.3	4.8
1000	4	25.0	7.0
1100	3	33.3	4.8
1200	3	33.3	4.8
1300	3	33.3	4.8
1400	3	33.3	4.8
1500	4	25.0	7.0

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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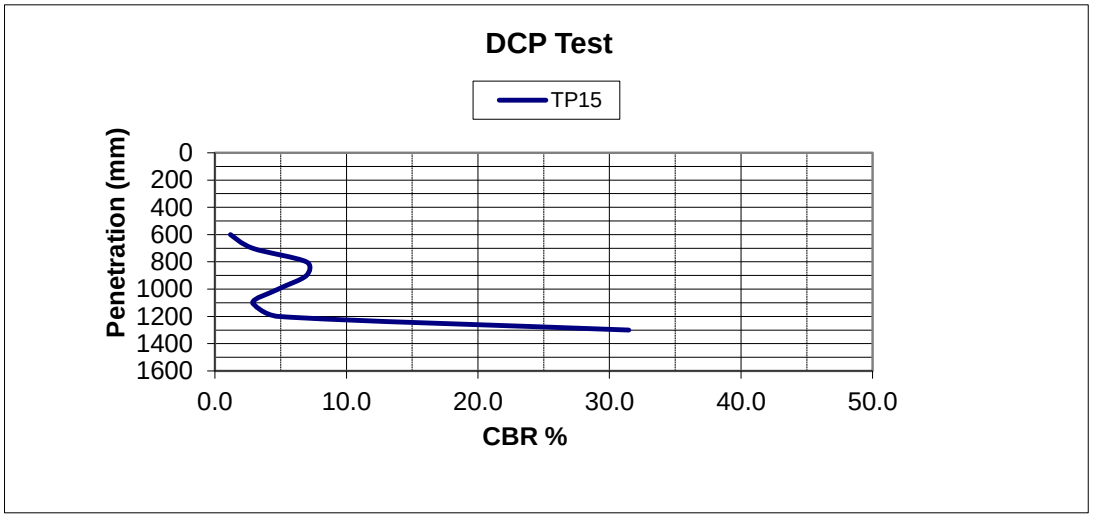
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP15
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	1	100.0	1.2
700	2	50.0	2.9
800	4	25.0	7.0
900	4	25.0	7.0
1000	3	33.3	4.8
1100	2	50.0	2.9
1200	3	33.3	4.8
1300	13	7.7	31.5
1400	11	9.1	25.4
1500	13	7.7	31.5

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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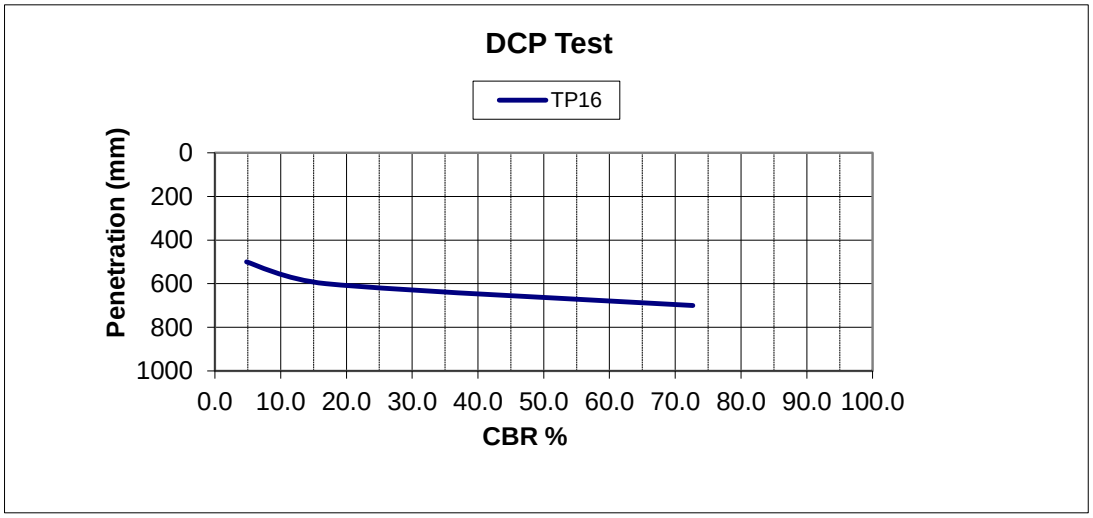
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP16
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.50m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
500	3	33.3	4.8
600	8	12.5	16.9
700	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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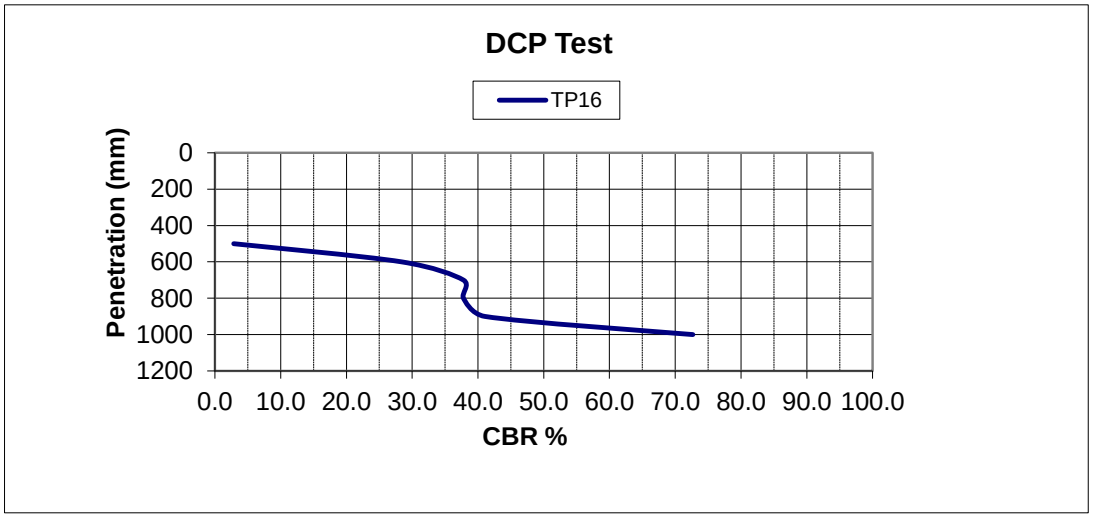
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP16
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.50m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
500	2	50.0	2.9
600	12	8.3	28.4
700	15	6.7	37.8
800	15	6.7	37.8
900	16	6.3	41.0
1000	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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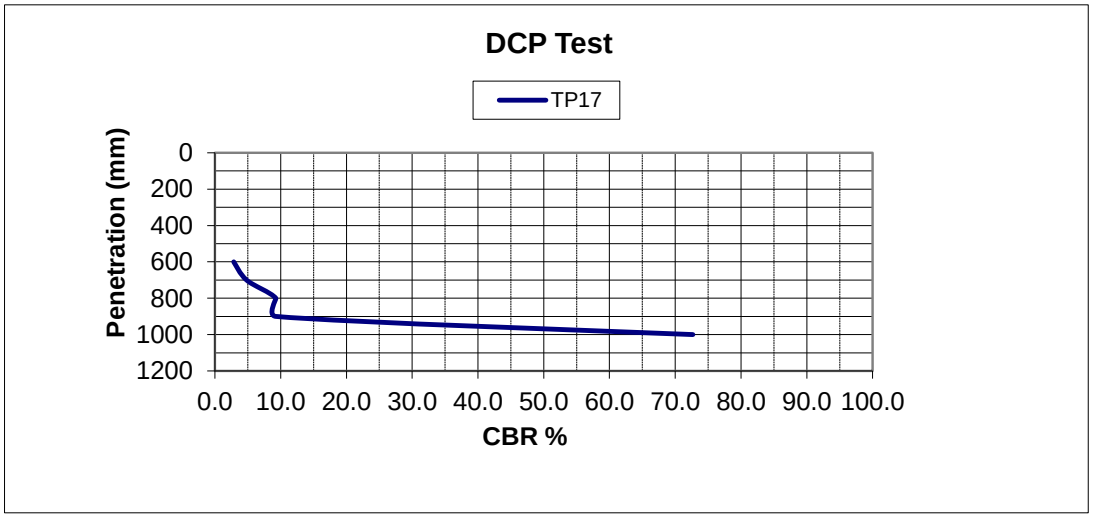
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP17
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	2	50.0	2.9
700	3	33.3	4.8
800	5	20.0	9.3
900	5	20.0	9.3
1000	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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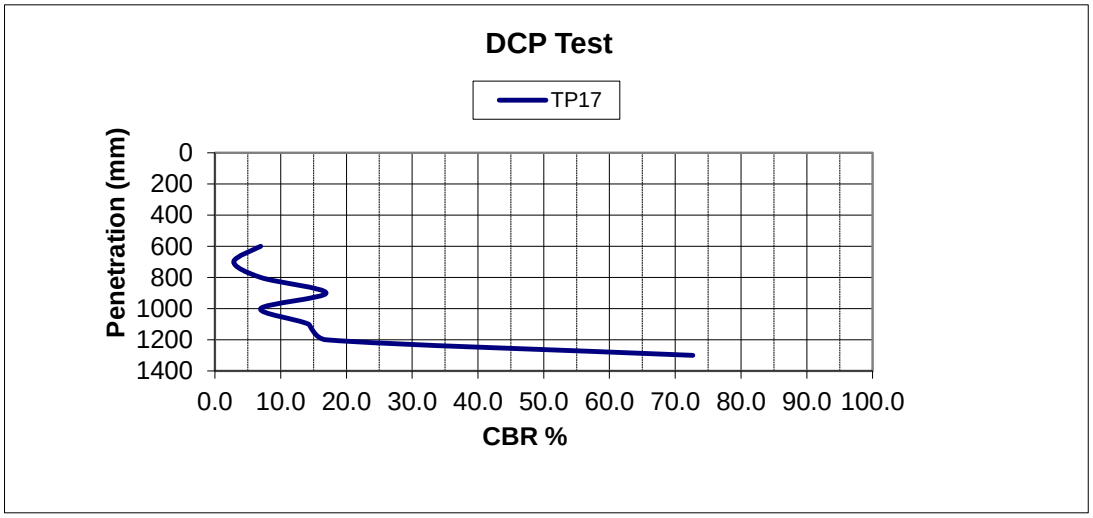
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP17
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	4	25.0	7.0
700	2	50.0	2.9
800	4	25.0	7.0
900	8	12.5	16.9
1000	4	25.0	7.0
1100	7	14.3	14.2
1200	8	12.5	16.9
1300	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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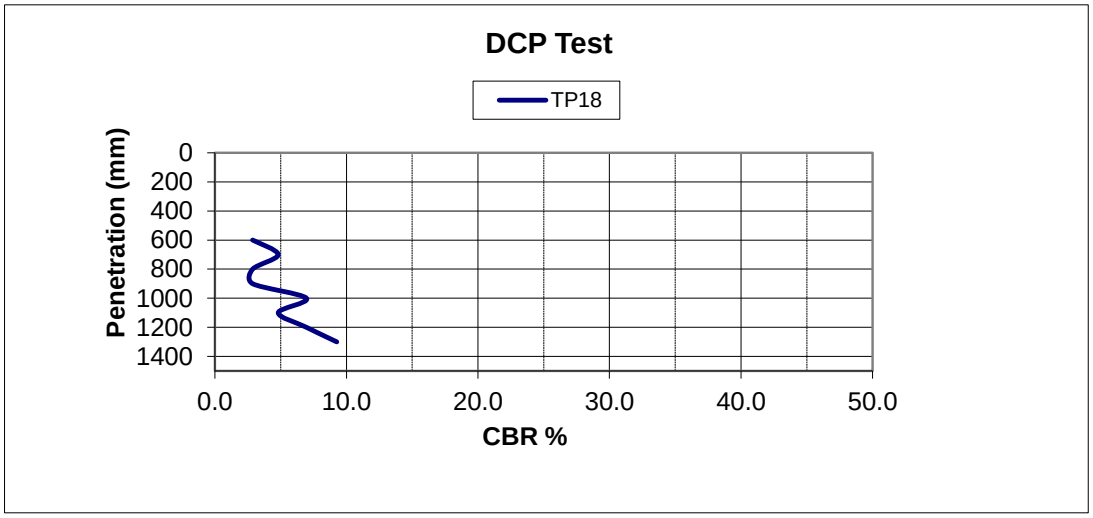
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP18
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.60m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
600	2	50.0	2.9
700	3	33.3	4.8
800	2	50.0	2.9
900	2	50.0	2.9
1000	4	25.0	7.0
1100	3	33.3	4.8
1200	4	25.0	7.0
1300	5	20.0	9.3
1400	7	14.3	14.2
1500	13	7.7	31.5

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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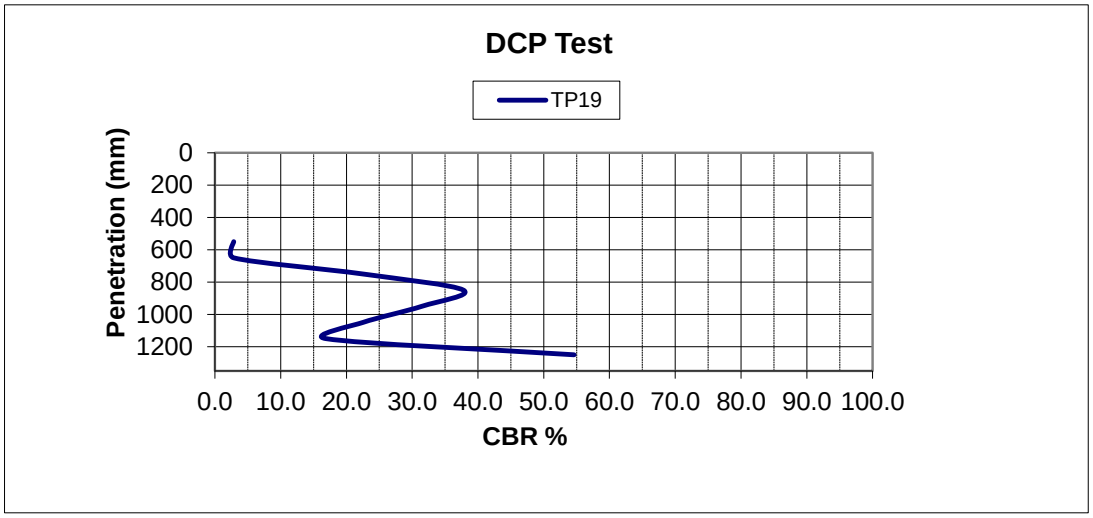
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP19
Client	Conneely Builders	**By**	A Molloy
		Date	06/03/2024
Initial Depth	0.55m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
550	2	50.0	2.9
650	2	50.0	2.9
750	10	10.0	22.5
850	15	6.7	37.8
950	13	7.7	31.5
1050	10	10.0	22.5
1150	8	12.5	16.9
1250	20	5.0	54.6
1350	10	10.0	22.5

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



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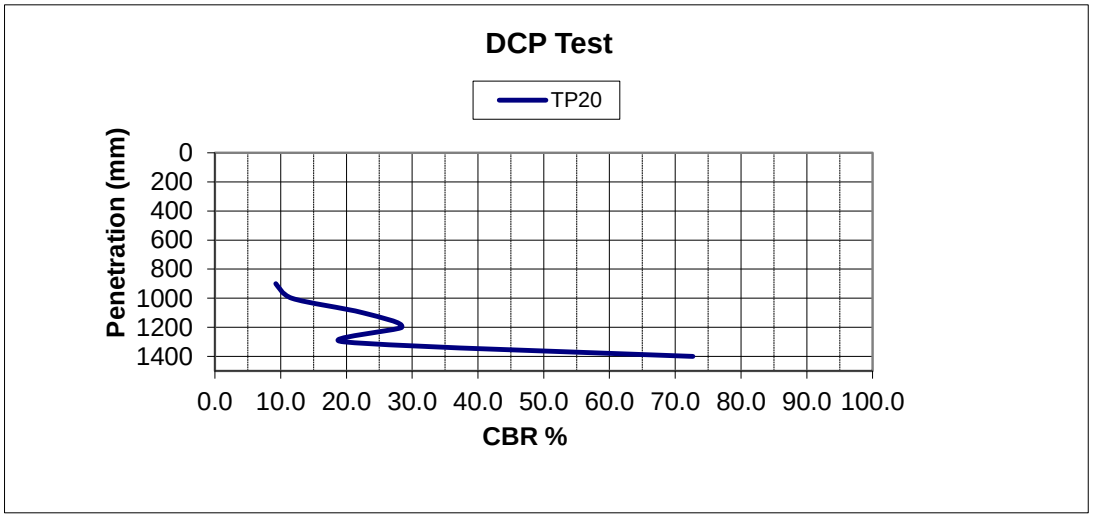
Job Name	DAA South Carpark	**Test Type**	Dynamic Cone Penetration Test
Job No.	13567-02-24	**Test Reference**	TP20
Client	Conneely Builders	**By**	A Molloy
		Date	29/02/2024
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	5	20.0	9.3
1000	6	16.7	11.7
1100	10	10.0	22.5
1200	12	8.3	28.4
1300	9	11.1	19.7
1400	25	4.0	72.7

Reference **Kleyn and Van Heerden (60° Cone)**
Formula Log10 (CBR) = 2.632 - 1.28 Log10 (mm/blow)



APPENDIX 4 – Plate Test Records

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

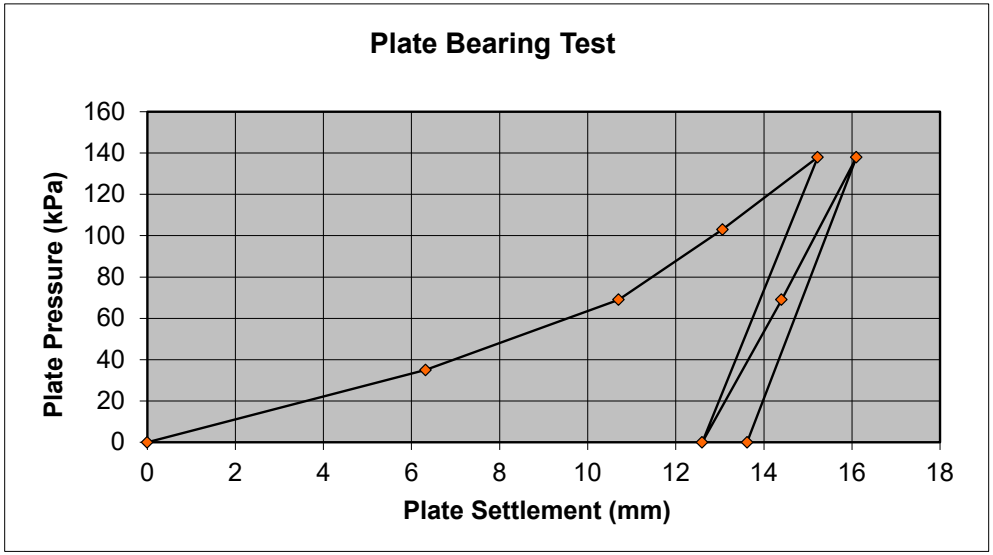
Location: TP01 (See Drawing)

Sample No: A28950/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 4 MPa/m**
k(reload) = 26 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 15.22
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.1

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
3.28	6.32	35
6.37	10.70	69
8.56	13.06	103
11.01	15.22	138
13.06	12.60	0
14.05	14.40	69
16.09	16.10	138
18.07	13.62	0

*Information supplied by customer

Authorized By : Ger Roche
Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

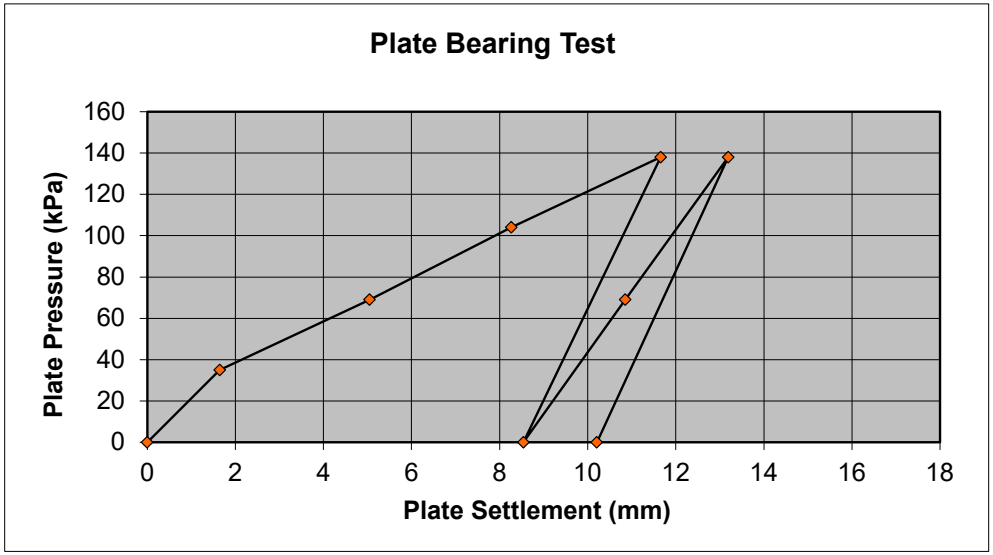
Location: TP02 (See Drawing)

Sample No: A28951/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 9 MPa/m**
k(reload) = 20 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 11.66
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.5

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
2.08	1.65	35
5.59	5.05	69
9.46	8.27	104
13.49	11.66	138
15.48	8.54	0
17.38	10.85	69
21.34	13.19	138
23.13	10.21	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Materials Testing Services

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

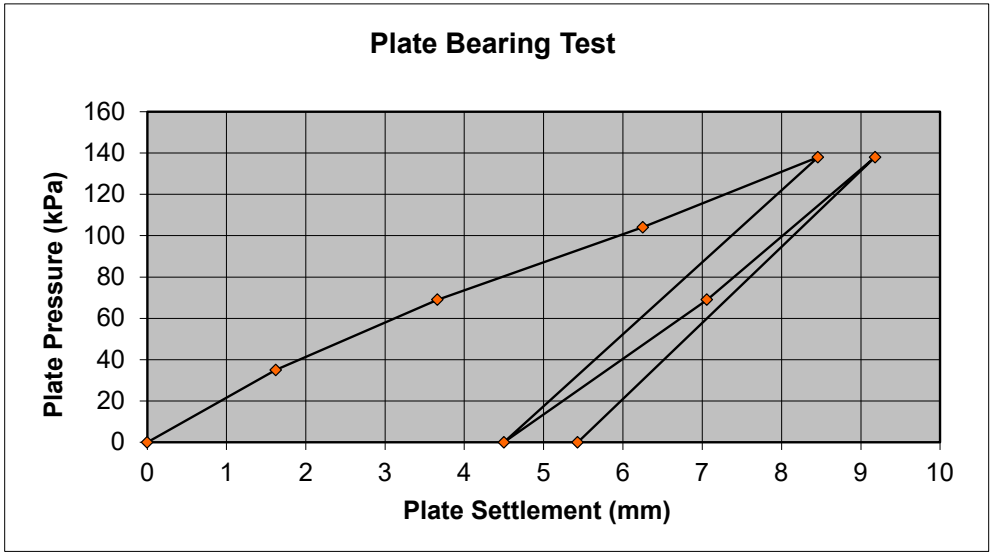
Location: TP10 (See Drawing)

Sample No: A28952/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 13 MPa/m**
k(reload) = 18 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 8.46
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.9

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
0.57	1.62	35
4.05	3.66	69
8.45	6.25	104
12.40	8.46	138
15.18	4.50	0
16.55	7.06	69
20.38	9.18	138
22.45	5.43	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

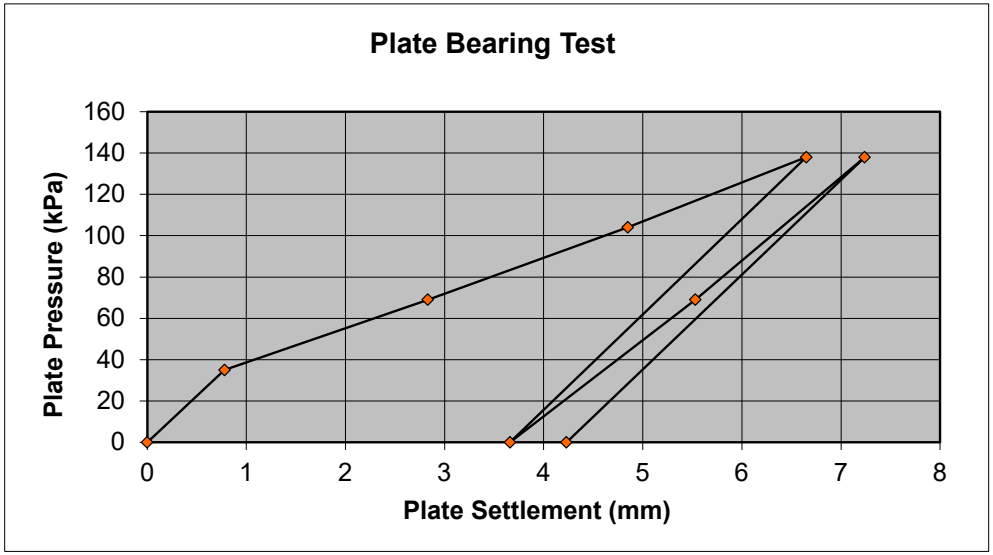
Location: TP12 (See Drawing)

Sample No: A28953/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 17 MPa/m**
k(reload) = 25 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 6.65
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 1.4

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.32	0.78	35
4.53	2.83	69
7.54	4.85	104
11.11	6.65	138
13.48	3.66	0
15.08	5.53	69
18.02	7.24	138
20.53	4.23	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Materials Testing Services

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

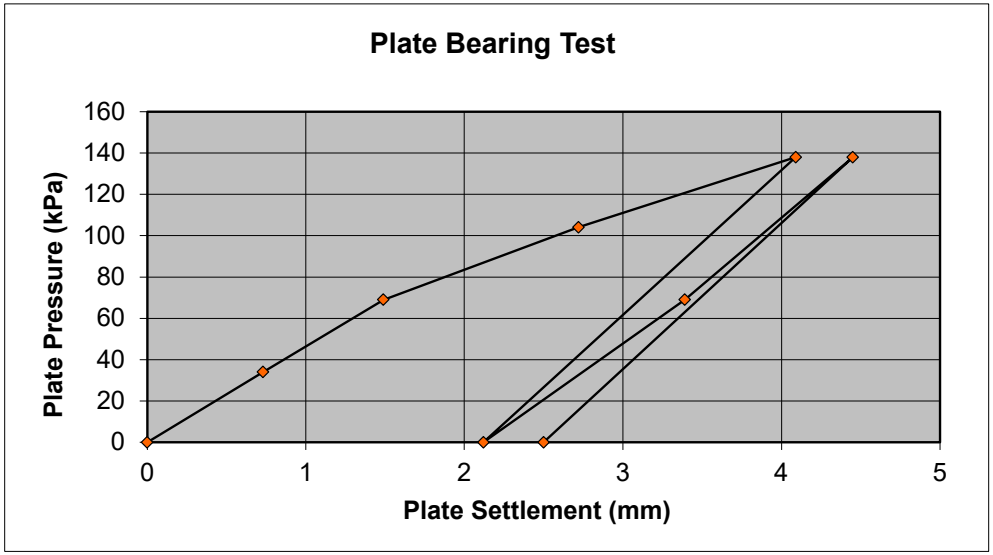
Location: TP13 (See Drawing)

Sample No: A28954/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 32 MPa/m**
k(reload) = 37 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 4.09
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 4.0

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.02	0.73	34
2.45	1.49	69
5.04	2.72	104
8.02	4.09	138
9.33	2.12	0
10.55	3.39	69
13.24	4.45	138
15.17	2.50	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

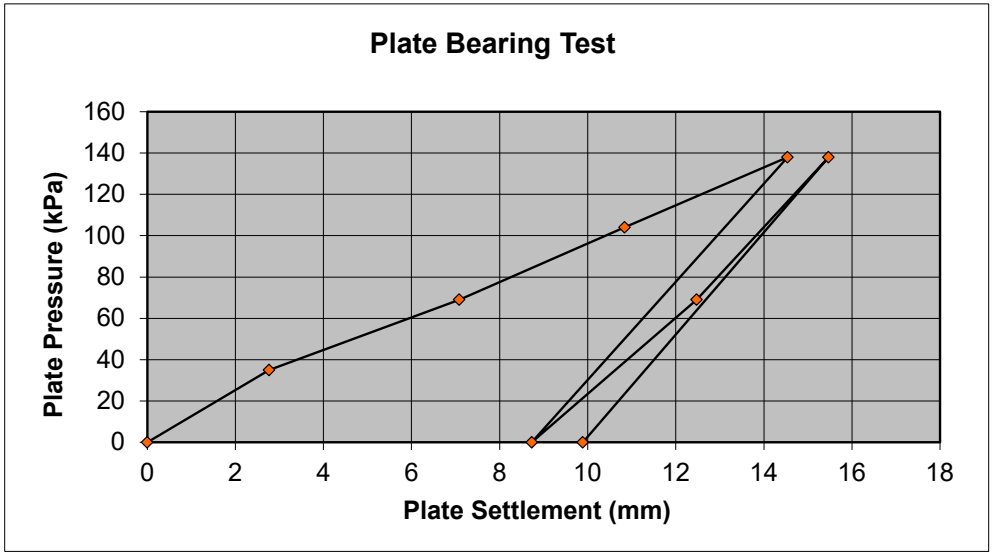
Location: TP14 (See Drawing)

Sample No: A28955/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil**



Modulus of Subgrade Reaction: **k(initial) = 7 MPa/m**
k(reload) = 13 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 14.54
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.3

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
3.01	2.77	35
7.34	7.08	69
12.41	10.84	104
19.16	14.54	138
22.19	8.73	0
23.44	12.47	69
27.26	15.47	138
29.57	9.89	0

*Information supplied by customer

Authorized By : Ger Roche
Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

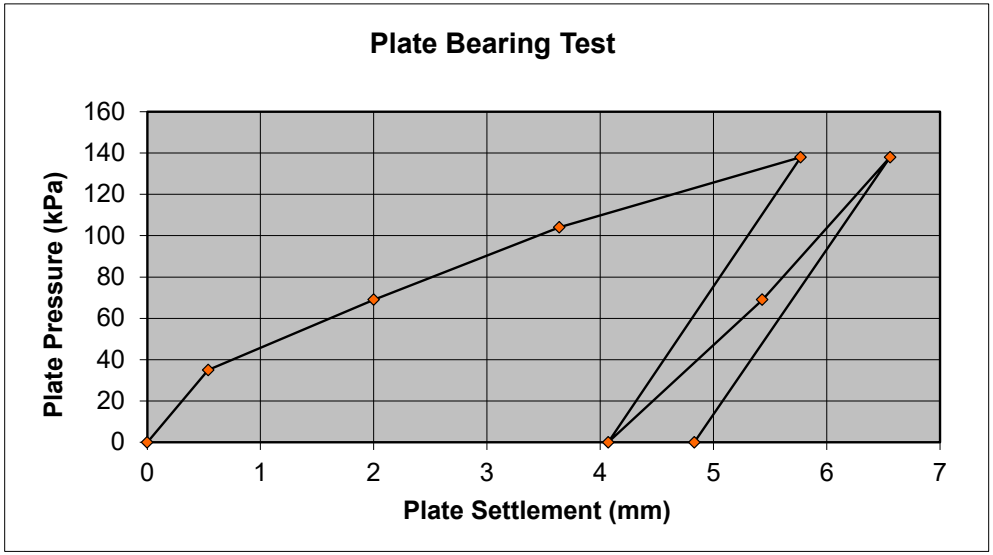
Location: TP17 (See Drawing)

Sample No: A28956/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 23 MPa/m**
k(reload) = 35 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 5.77
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 2.5

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.28	0.54	35
3.44	2.00	69
6.06	3.64	104
9.05	5.77	138
10.56	4.07	0
12.13	5.43	69
14.47	6.56	138
16.27	4.83	0

*Information supplied by customer

Authorized By : Ger Roche
Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Materials Testing Services

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

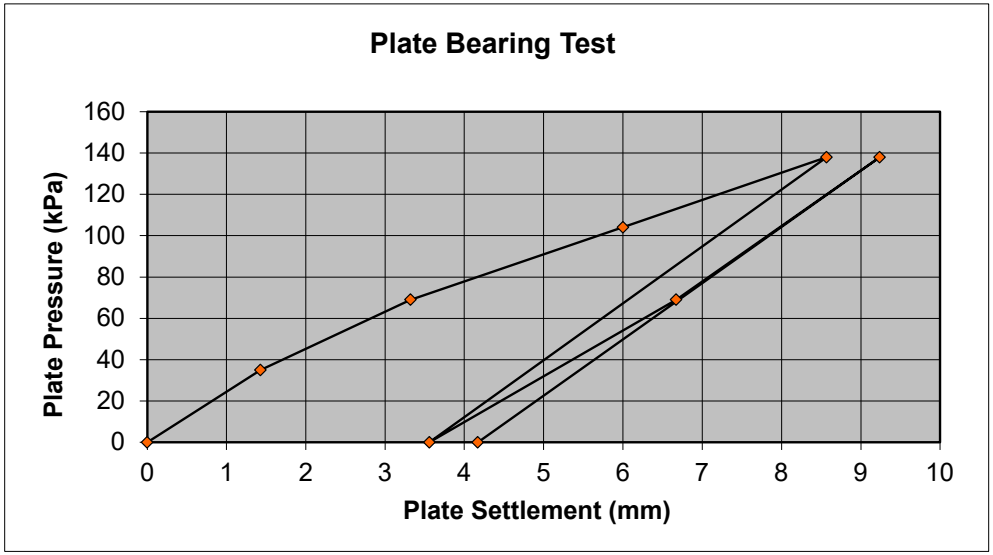
Location: TP18 (See Drawing)

Sample No: A28957/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 14 MPa/m**
k(reload) = 15 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 8.57
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 1.1

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.04	1.43	35
4.10	3.32	69
8.59	6.00	104
14.06	8.57	138
16.50	3.56	0
18.53	6.67	69
21.43	9.24	138
24.57	4.17	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

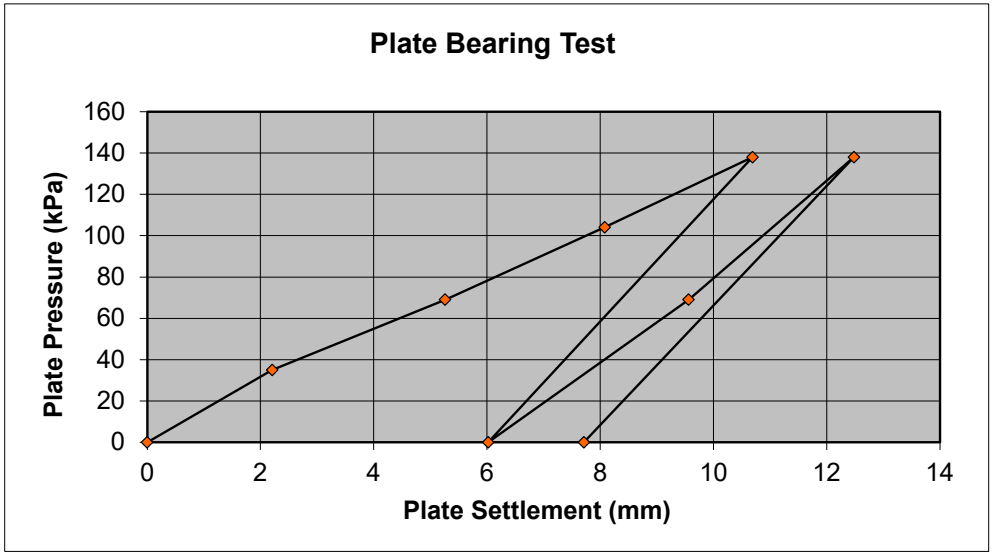
Location: TP20 (See Drawing)

Sample No: A28958/1

***Customer Ref:** File No: 13567-02-24

Tested: 04/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 9 MPa/m**
k(reload) = 13 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 10.69
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.5

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
2.03	2.21	35
5.26	5.26	69
10.05	8.08	104
14.33	10.69	138
16.44	6.02	0
19.05	9.56	69
22.56	12.48	138
25.03	7.71	0

*Information supplied by customer

Authorized By : Ger Roche
Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

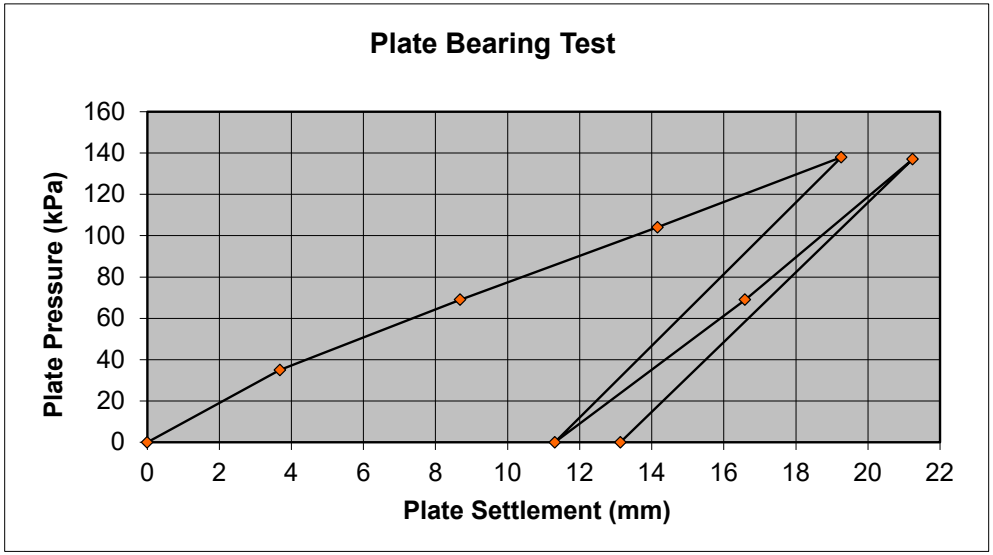
Location: TP03 (See Drawing)

Sample No: A28975/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 5 MPa/m**
k(reload) = 9 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 19.26
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.2

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
2.53	3.68	35
7.30	8.68	69
14.53	14.16	104
20.12	19.26	138
24.03	11.31	0
26.39	16.59	69
30.02	21.24	137
33.32	13.13	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

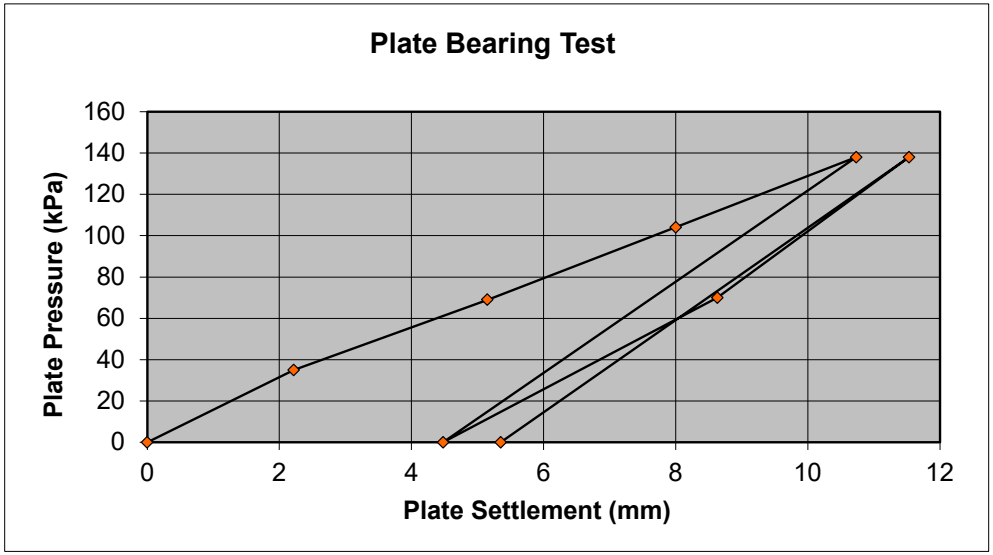
Location: TP04 (See Drawing)

Sample No: A28976/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 9 MPa/m**
k(reload) = 11 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 10.73
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.5

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.42	2.22	35
5.14	5.15	69
9.17	8.00	104
13.03	10.73	138
16.37	4.48	0
20.29	8.63	70
23.43	11.53	138
27.01	5.35	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Materials Testing Services

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

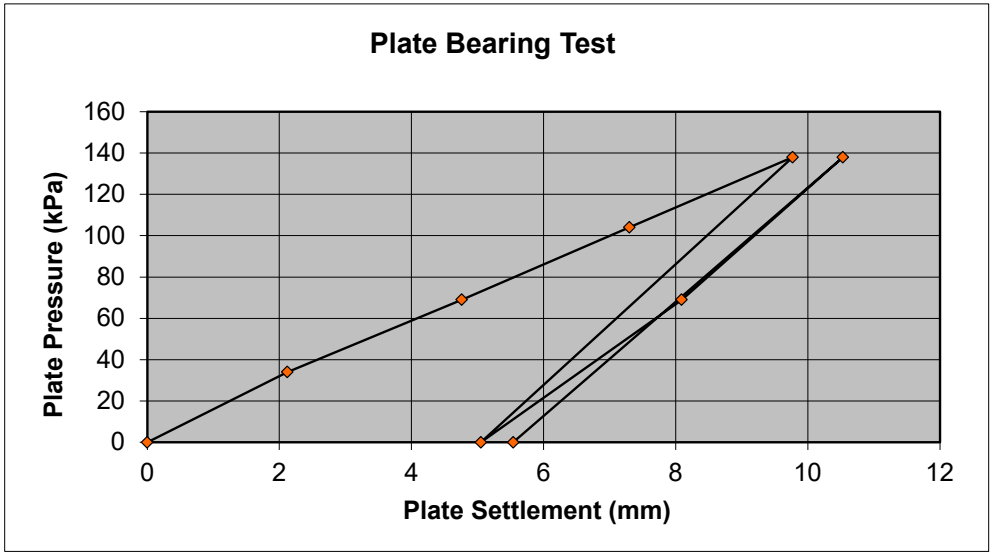
Location: TP05 (See Drawing)

Sample No: A28977/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 10 MPa/m**
k(reload) = 15 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 9.77
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.6

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.58	2.12	34
5.53	4.76	69
9.53	7.30	104
15.11	9.77	138
18.04	5.05	0
19.17	8.09	69
22.56	10.53	138
25.27	5.54	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
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Materials Testing Services

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

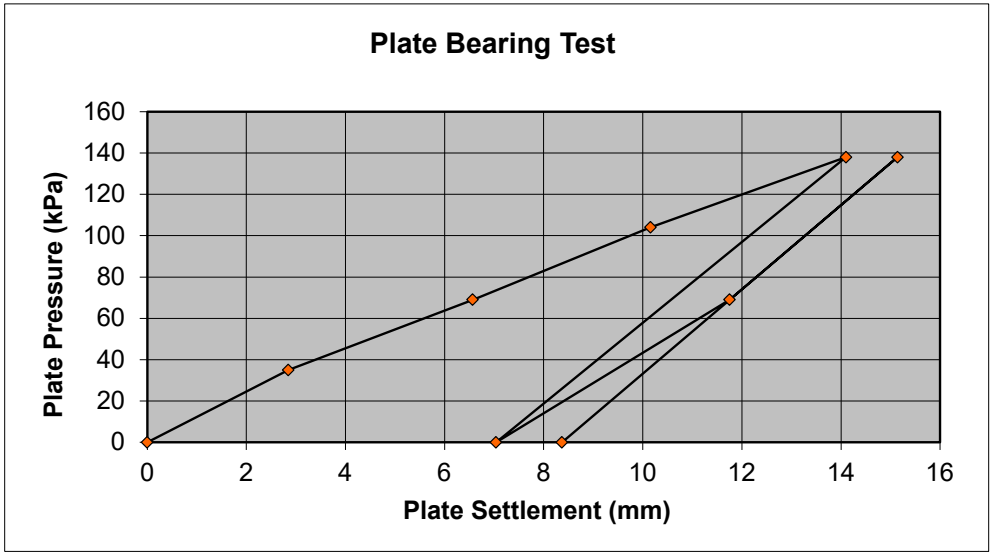
Location: TP07 (See Drawing)

Sample No: A28978/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 7 MPa/m**
k(reload) = 10 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 14.10
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.3

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
3.16	2.85	35
6.27	6.57	69
12.31	10.16	104
18.56	14.10	138
22.40	7.04	0
25.14	11.75	69
28.22	15.14	138
30.57	8.37	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

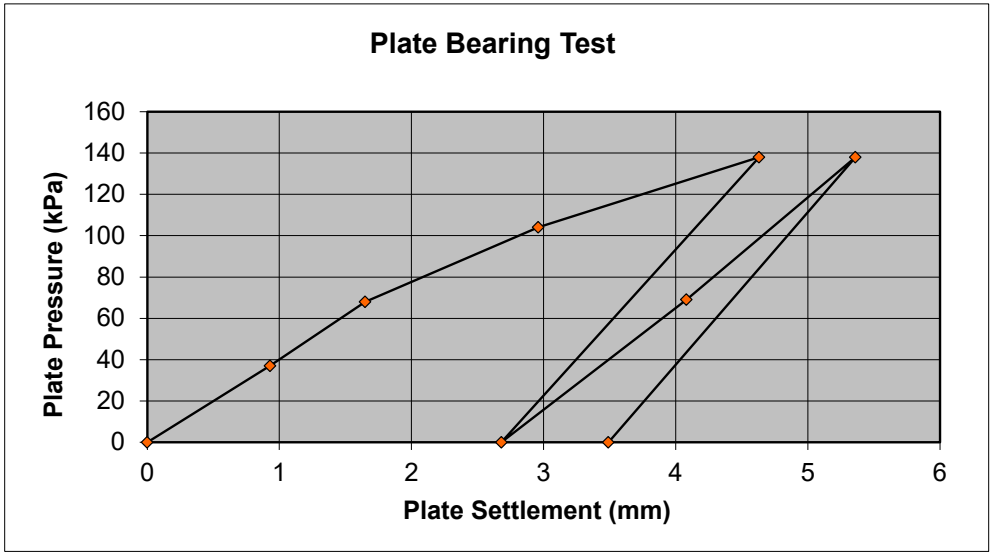
Location: TP08 (See Drawing)

Sample No: A28979/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 28 MPa/m**
k(reload) = 34 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 4.63
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 3.3

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
0.57	0.93	37
2.04	1.65	68
4.10	2.96	104
7.46	4.63	138
9.23	2.68	0
11.21	4.08	69
14.14	5.36	138
15.50	3.49	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

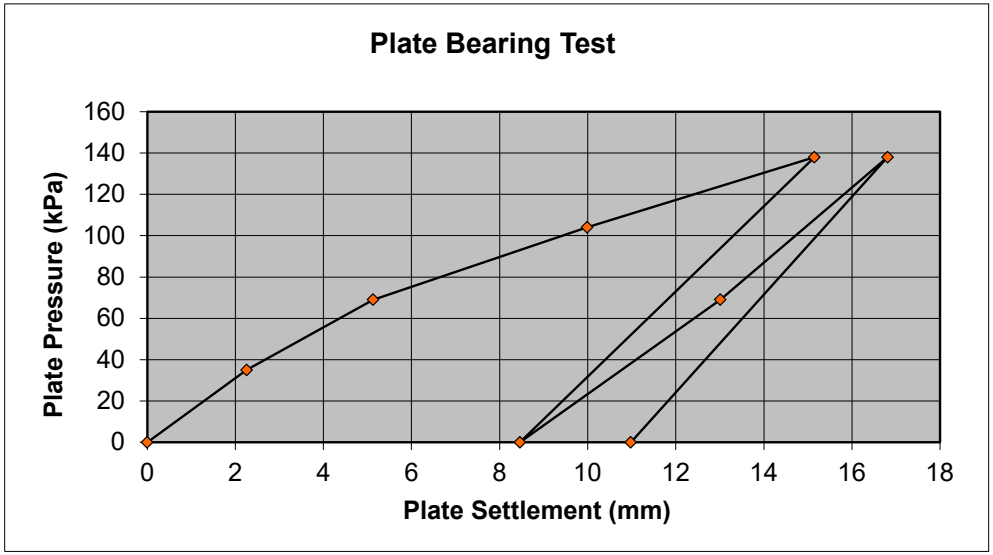
Location: TP11

Sample No: A28980/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 9 MPa/m**
k(reload) = 10 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 15.15
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.5

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.10	2.26	35
5.20	5.13	69
12.06	9.99	104
18.50	15.15	138
22.08	8.46	0
23.18	13.01	69
29.11	16.81	138
30.19	10.98	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
Tel: 059 9130044 / 9137134
Email: info@mtsltd.ie Web: www.mtsltd.ie

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

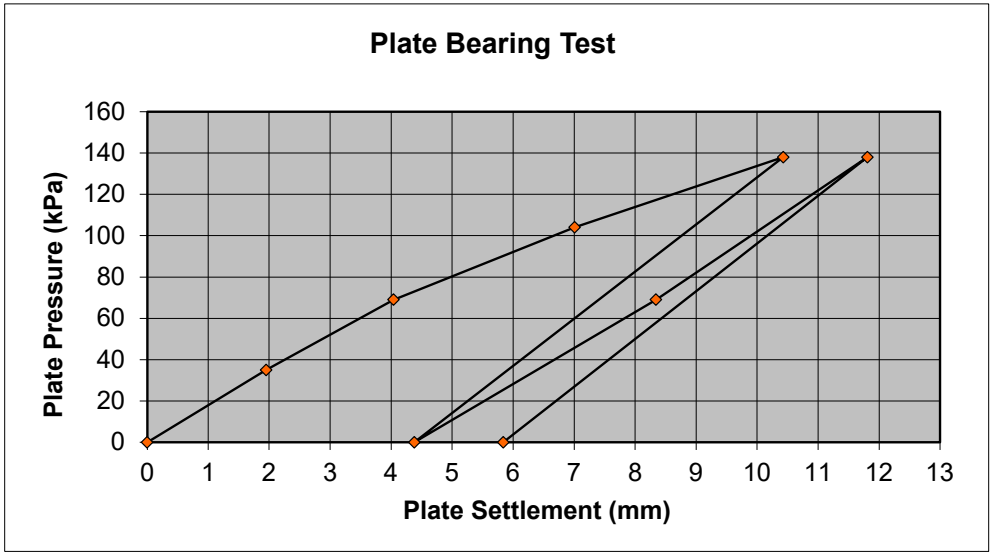
Location: TP15 (See Drawing)

Sample No: A28981/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 12 MPa/m**
k(reload) = 12 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 10.43
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 0.8

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
1.09	1.95	35
4.11	4.04	69
8.55	7.01	104
13.24	10.43	138
16.41	4.38	0
18.31	8.34	69
23.17	11.81	138
26.17	5.84	0

*Information supplied by customer

Authorized By : Ger Roche
Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

MTS Limited
19 Kernanstown Industrial Estate, Carlow.
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Email: info@mtsltd.ie Web: www.mtsltd.ie

Materials Testing Services

Plate Bearing Test Report

Tested in accordance with Documented In house Procedure CD004 / IHT001.01.1

***Customer** Ground Investigations Ireland
Catherinestown House, Hazelhatch Rd, Newcastle, Co. Dublin

***Contact:** Stephen Kealy

***Site:** Conneely Builders/DAA South Car Park

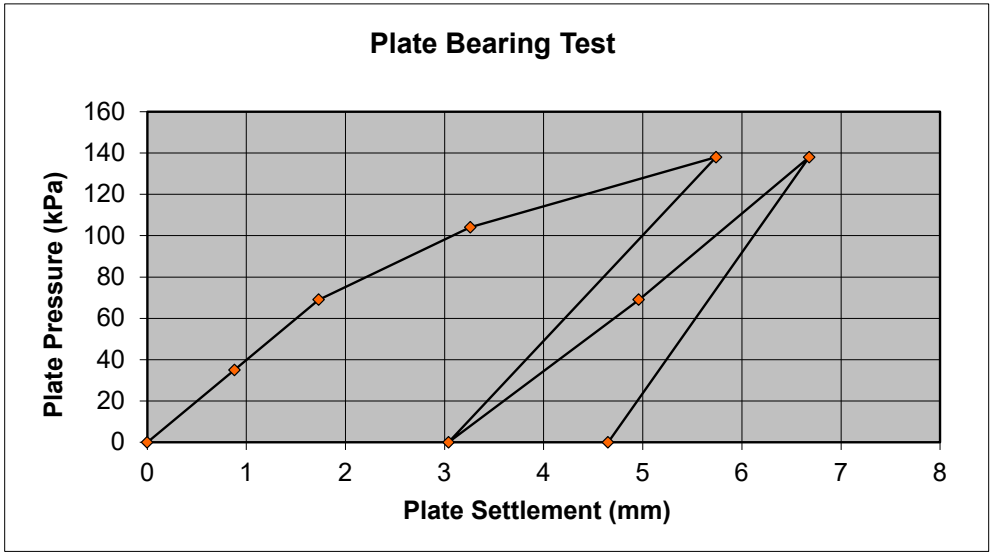
Location: TP19 (See Drawing)

Sample No: A28982/1

***Customer Ref:** File No: 13567-02-24

Tested: 05/03/2024

Material: **Fine Brown Soil + Stone**



Modulus of Subgrade Reaction: **k(initial) = 27 MPa/m**
k(reload) = 24 MPa/m

Max applied pressure kPa = 138
Max deformation (mm)= 5.74
Reaction Load = 8T Excavator
Plate Dia.(mm)= 457
Equvalent CBR % 3.1

Start Time Min	Plate Settlement, mm	Plate Pressure, kPa
0	0.00	0
0.52	0.88	35
2.58	1.73	69
5.53	3.26	104
8.29	5.74	138
10.27	3.04	0
11.40	4.96	69
14.19	6.68	138
16.25	4.65	0

*Information supplied by customer

Authorized By : Ger Roche
Co-Head of Laboratory

Issue Date: 12/03/2024

APPENDIX 5 – Laboratory Testing (Pending)

ATKINS
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Appendix 12: Water

Appendix 12.1: Screening Results

Project Ref: 100087020

Project Title: WO 03 – Remote South Staff Car Park
Site: Dublin Airport
Client: Dublin Airport Authority

Table 1: Surface Water analytical Results for Monitoring station SW-S-3

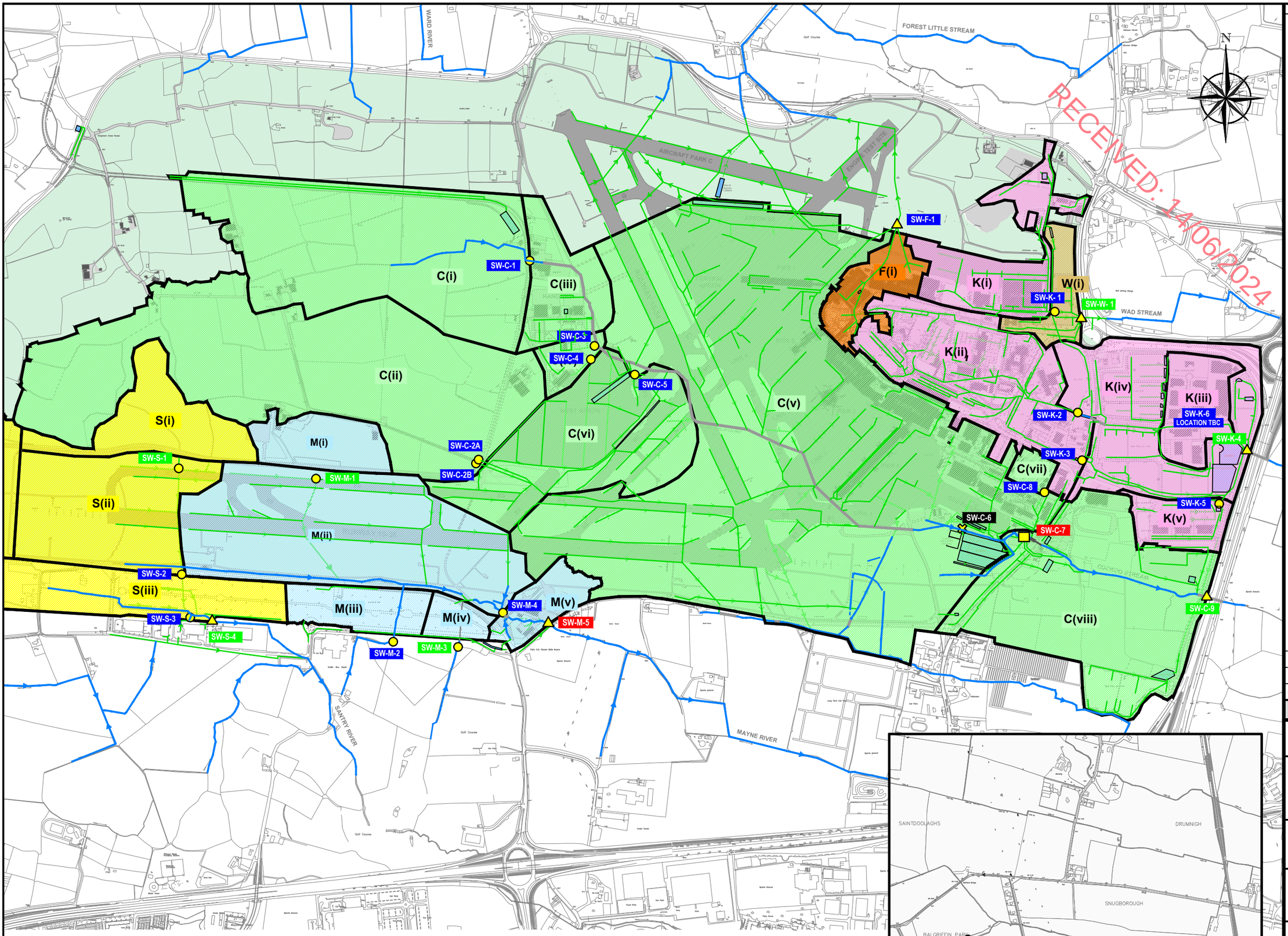
Date	Sample Location	BOD (mg/L)	COD (mg/L)	Ammonia (mg/L)	pH (pH units)	Ortho-phosphate (mg/L)	Temperature (degrees C)	Dissolved Oxygen (%)	Dissolved Oxygen2 (mg/L)	Nitrate (mg/L)	Total N (mg/L)	TPH (ug/L)	Detergents (ug/L)	Coliforms Faecal (cfu/100ml)	Coliforms Total (cfu/100ml)	Potassium (mg/L)	Toulene (ug/L)
Screening Values as defined by	**Surface Water Regulations***	**-**	**-**	**0.065**	**6.0<pH< 9.0***	**0.06**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**10**
12-Dec-19	SW-MO-SW-S-3	<2	8	0.06	7.58		8.2	138.4	12	1.95							
14-Jan-20	SW-MO-SW-S-3	<2	8	0.05	7.8	0.031	6.6	87.8	9.17	0.84	<1.0	<1					
12-Mar-20	SW-MO-SW-S-3	<2	7	**0.16**	7.85	0.027	6.5	85.2	10.29	0.79	1.4	<1					
02-Apr-20	SW-MO-SW-S-3	<2	7	**1.13**	7.98	**0.116**	11.9	87.1	9.26	2.23	3.7	<1		900	3700		
25-May-20	SW-MO-SW-S-3	<2	11	0.03	7.79	<0.014	12.1	78.4	7.2	<0.51	1.6	<1					
11-Jun-20	SW-MO-SW-S-3	<2	14	**0.08**	7.49	0.031	13.2	65.8	6.64	<0.51	0.3	<1					
14-Jul-20	SW-MO-SW-S-3	<2	6	**0.09**	7.82	<0.014	13.9	74.1	7.89	<0.51	0.4	<1					
04-Aug-20	SW-MO-SW-S-3	<2	6	0.04	7.66	<0.014	16	62.7	6.09	<0.51	0.4						
07-Sep-20	SW-MO-SW-S-3	<2	10	0.01	7.71	0.01	14.8	74.8	7.9	<0.51	0.5	<1					
07-Oct-20	SW-MO-SW-S-3	<2	11	0.05	7.91	0.03	12.3	80	8.42	0.79	1.2	<1					
04-Nov-20	SW-MO-SW-S-3	<2	10	0.05	7.87	0.04	9.7	75.4	8.46	<0.51	0.8	<1					
08-Dec-20	SW-MO-SW-S-3	18	36	0.01	8.02	0.02	6.7	70.4	8.49	<0.51	0.7	<1					
06-Jan-21	SW-MO-SW-S-3	8	15	0.05	7.64	0.05	6.3	72	8.89	1.24	0.8	<1					
03-Feb-21	SW-MO-SW-S-3	3	9	<0.01	7.59	**0.17**			8.45	1.52	1.8	<1	162			4.8	
Mar-21	SW-MO-SW-S-3	<2	6	**0.21**	7.88	**0.112**			9.16	2.18	0.9	<1	113				
06-Apr-21	SW-MO-SW-S-3	3	12	**0.07**	7.89	0.02			8.5	0.64	0.9	<1					
11-May-21	SW-MO-SW-S-3	<2	11	**0.2**	7.66	0.02			6.6	<0.51	0.7	<1					
02-Jun-21	SW-MO-SW-S-3	<2	15	**0.16**	7.62	0.03			8	<0.51	0.6	<1	60				
05-Jul-21	SW-MO-SW-S-3	<2	16	**0.12**	7.45	0.01			7.7	<0.51	0.5	<1	143				
04-Aug-21	SW-MO-SW-S-3	<2	11	**0.24**	7.51	**0.21**			4.5	<0.51	0.6	<1	<50				
01-Sep-21	SW-MO-SW-S-3	0.4	12	**0.07**	7.56	0.02			7.9	<0.51	0.5	<1	83				<1
01-Oct-21	SW-MO-SW-S-3	0.6	5	**0.08**	7.39	0.01			9.8	<0.51	0.5	<1	78				
02-Nov-21	SW-MO-SW-S-3	1	11	0.06	7.75	0.02			8.2	<0.51	0.6	<1	<50				
16-Dec-21	SW-MO-SW-S-3	<2	14	**0.08**	7.64	0.02			9.7	0.66	0.6	<1	<50				
11-Jan-22	SW-MO-SW-S-3	0.2	13	0.05	7.9	0.04			10.3	0.83	1	<1	63				
01-Feb-22	SW-MO-SW-S-3	0.8	13	**0.08**	7.8	0.03			9.1	<0.51	0.8	<1	139				
01-Mar-22	SW-MO-SW-S-3	0.7	8	0.02	7.8	0.03			10.2	0.98	0.9	<1	52				
05-Apr-22	SW-MO-SW-S-3	1.7	14	<0.01	7.87	0.01			13.4	<0.51	0.4	<1	120				
10-May-22	SW-MO-SW-S-3	1	8	**0.12**	7.56	0.05			8.9	<0.51	0.6	<1	52				
21-Jun-22	SW-MO-SW-S-3	0.8	13	**0.23**	7.58	0.02			9.3	<0.51	0.5	<1	121				
12-Jul-22	SW-MO-SW-S-3	2.7	49	**0.12**	7.49	0.03			8.2	1.3		<1	393				
02-Aug-22	SW-MO-SW-S-3	2	19	**0.09**	7.48	0.03			6.3	0.84	0.6	<1	129				
07-Sep-22	SW-MO-SW-S-3	1.1	16	<0.01	7.67	0.02			8.9	0.71	0.8	<1	140				
04-Oct-22	SW-MO-SW-S-3	1.3	6	0.06	7.56	0.01			9.9	<0.51	0.5	<1	<50				
01-Nov-22	SW-MO-SW-S-3	2.6	64	**0.53**	7.68	**0.13**			9.8	0.83	3.1	<1	86				
13-Dec-22	SW-MO-SW-S-3	3.4	31	<0.01	7.72	0.05			6.6	0.56	2.8	<1	<50				
06-Jan-23	SW-MO-SW-S-3	2	16	0.01	7.85	**0.08**			10.6	1.19	1.6	<1	<50				
07-Feb-23	SW-MO-SW-S-3	1.4	7	**0.12**	7.89	0.04			11	0.57	0.7	<1	59			15.4	
03-Mar-23	SW-MO-SW-S-3	2.5	12	**0.11**	8.07	0.04			10.6	<0.51	0.7	<1	163			21.1	
07-Apr-23	SW-MO-SW-S-3	0.6	37	0.06	7.65	**0.1**			8.2	0.69	0.8	<1	174				
05-May-23	SW-MO-SW-S-3	1.3	11	**0.09**	7.7	0.04			10.1	0.620.	1.4	<1	<50				
09-Jun-23	SW-MO-SW-S-3	0.5	26	**0.1**	7.63	0.04			8.7	<0.51	0.5	<1	123.7				
10-Jul-23	SW-MO-SW-S-3	2.1	18	0.01	7.71	0.03			10	<0.51	0.3	<1	154			12.1	
28-Aug-23	SW-MO-SW-S-3	0.6	9	**0.07**	7.74	**0.1**			9.6	<0.51	0.5	<1	86			6.5	
01-Sep-23	SW-MO-SW-S-3	1.4	<5	**0.03**	7.63	0.02			7.7	<0.51	0.6	<1	101				
06-Oct-23	SW-MO-SW-S-3	1	26	**0.14**	7.78	**0.08**			10.5	0.69	1	<1	56				

Notes:
* In the absence of CaCO3 / water hardness value, the most conservative pH limit has been used.
*Surface Water Regulations - S.I. No. 272 of 2009 as amended – S.I. No. 327 of 2012, S.I. No. 386 of 2015 and S.I. No. 77 of 2018

Relevant Surface Water Regulation Value (for MAC - EQS - Other Surface Waters) applied as generic assessment criteria.

Appendix 12.2:

Nicholas O' Dwyer Monitoring Plans Sampling Locations



SAMPLING POINT (BALGRIFFIN PARK) TO EAST OF daa LANDS

NOTES

LEGEND

- CATCHMENT BOUNDARY
- STREAMS / RIVERS
- STORM CULVERTS
- ATTENUATION AREAS (TANKS / PIPES BELOW GROUND)
- SURFACE WATER PIPELINES

SAMPLING

COMPOSITE SAMPLING	△
GRAB SAMPLING	○
CONTINUOUS MONITORING	✕
COMPOSITE SAMPLING & CONTINUOUS MONITORING	□
NO SAMPLING	SW-X-00
WEEKLY SAMPLING	SW-X-00
MONTHLY SAMPLING	SW-X-00
QUARTERLY SAMPLING	SW-X-00

DRAFT

REV	DATE	DESCRIPTION	D	C	A
3	15.11.19	BOUNDARIES / SAMPLING LOCATIONS REV.	AM	CD	SC
2	08.11.19	SAMPLING LOCATION REV.	DS	CD	SC
1	06.11.19	BOUNDARIES / SAMPLING LOCATIONS REV.	DS	CD	SC

PRELIMINARY

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W www.nodwyer.com

CLIENT: daa

PROJECT: DUBLIN AIRPORT DRAINAGE MASTERPLAN

TITLE: MONITORING PLANS SAMPLING LOCATIONS

SCALES	DRAWN	CHECKED	APPROVED
1:7500 @ A1	D_Smithers	C_Dennehy	S_Cosgrove
	DATE 15.08.19	DATE 15.08.19	DATE 15.08.19

DRAWING No. 20771-18-MP-17

REV 3

Appendix 12.3: Flood Risk Assessment

ATKINS
Member of the SNC-Lavalin Group

Remote South Staff Car Park

Flood Risk Assessment

daa plc.

April 2024

D21081-ATK-SCS-01-XXX-RP-C-XXX-0001

Notice

This document and its contents have been prepared and are intended solely as information for daa plc. and use in relation to Remote South Staff Car Park.

AtkinsRéalis assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 26 pages including the cover.

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 0.0	For Review And Comment	J.Keogh	I.O Conchubhair	V. Osborne	H. Poh	20/09/2022
Rev 1.0	Final For Planning	J.Keogh	I.O Conchubhair	V. Osborne	H. Poh	14/02/2023
Rev 2.0	For Planning	S. Nahas	G. Hanratty	G. Hanratty	E. Oday	22/04/2024

Client signoff

Client	daa plc.
Project	Remote South Staff Car Park - South
Job number	100087020 (D21081)
Client signature / date	

Contents

Tables

Figures

1. Introduction

AtkinsRéalis has been commissioned by daa plc. to prepare a Flood Risk Assessment in support of the daa plc. planning application for the development of the Remote South Staff Car Park to the West of the existing long-term blue carpark, to the South of Dublin Airport. This proposed development is a proposed extension to the existing Holiday Blue Long-Term Car Park to cater for airport staff car parking at Harristown, Dublin Airport, Swords, Co. Dublin.

1.1. Relevant Guidance

This Flood Risk Assessment (FRA) has been undertaken in accordance with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG November 2009.

The guidelines were devised to ensure that flood risk is a key consideration for developers, planning & regional authorities and the public in preparing and submitting development proposals. The principles of the guidance are as follows:

- Avoid the risk, where possible
- Substitute less vulnerable users, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible

A staged approach is recommended within the guidance document in relation to identifying and assessing flood risk. The three stages of appraisal and assessment are as follows:

- Stage 1 Flood risk identification
- Stage 2 Initial flood risk assessment
- Stage 3 Detailed flood risk assessment

1.2. Flood Risk

Flood risk can be quantified by relating the probability of the flood event occurring to the consequence of the flood. Probability, in flood event terms, is gauged by potential annual occurrence/return period and flood consequence is dependent on the nature of the flood hazard and the vulnerability of the inundated area. The source-pathway-receptor model considers the components of flood risk.

The source is the hazard with the potential to cause harm through flooding (e.g. rainfall, high sea levels). The pathway is the mechanism by which the source can affect the receptor (e.g. inadequate drainage, overtopping of

coastal defences) and finally, the receptor is anything which is affected by the flood event (e.g. people, infrastructure, property).

1.3. Causes of Flooding

The Planning System and Flood Risk Management Guidelines requires an FRA to consider all potential causes of flooding including the following:

- Coastal flooding
- Inland flooding
- Overland flow
- River flooding
- Flooding from artificial drainage systems
- Groundwater flooding

1.4. Failure of infrastructure Floodplains

A river floodplain is a low-lying area which receives excess flood water when the flow within the watercourse exceeds the capacity of the channel. A coastal flood plain is an area which, during high tide or increased sea levels, becomes inundated with sea water.

2. Planning Context

The following planning policy documents are relevant to the assessment of the proposed development:

- The national planning Guidelines published by the OPW and the Department of the Environment, Heritage and Local Government in November 2009 titled 'The Planning System and Flood Risk Management Guidelines for Planning Authorities'; and,
- Fingal County Council Development Plan 2023-2029.

2.1. The Planning System and Flood Risk Management Guidelines

2.1.1. Introduction

In November 2009, the Department of Environment, Heritage and Local Government and the Office of Public Works jointly published a Guidance Document for Planning Authorities entitled "the Planning System and Flood Risk Management".

The Guidelines are issued under Section 28 of the Planning and Development Act 2000. Planning Authorities and An Bord Pleanála are therefore required to implement these Guidelines in carrying out their functions under the Planning Acts.

The aim of the Guidelines is to ensure that a flood risk is neither created nor increased by inappropriate development.

The Guidelines require the planning system to avoid development in areas at risk of flooding, unless the development can be justified on wider sustainability grounds and the risk can be reduced or managed to an acceptable level.

The Guidelines require the adoption of a Sequential Approach (to Flood Risk Management) of Avoidance, Reduction, Justification and Mitigation and they require the incorporation of Flood Risk Assessment into the process of making decisions on planning applications and planning appeals.

Fundamental to the Guidelines is the introduction of flood risk zoning and the classifications of different types of development having regard to their vulnerability.

The management of flood risk is now a key element of any development proposal in an area of potential flood risk and should therefore be addressed as early as possible in the site master planning stage.

2.1.2. Definition of Flood Zones

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' three flood zones are designated in the consideration of flood risk to a site. The three flood zones are described in Table 2-1 below.

Table 2-1 - Flood Zone Description

Flood Zone	Description
Flood 'Zone A'	where the probability of flooding from watercourses is the highest (greater than 1% or 1 in 100 year for watercourse flooding or 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone B'	where the probability of flooding from watercourses is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 year for watercourse flooding, and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone C'	where the probability of flooding from watercourses and the sea is low or negligible (less than 0.1% or 1 in 1000 year for both watercourse and coastal flooding). Flood Zone 'C' covers all areas which are not in Zones 'A' or 'B'.

2.1.3. Definition of Vulnerability Classes

Table 2-2 below is an extract from the guidelines and defines the Vulnerability Classes identified therein.

Table 2-2 - Vulnerability Classes

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits	

Table 2-3 illustrates the types of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test.

Table 2-3 - Matrix - Development Vulnerability and Flood Zone

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Since the proposed development includes a substation, it can be classified as a Highly Vulnerable development as per the vulnerability classification in the planning guidelines.

2.2. Dublin Airport Local Area Plan 2020

In January 2020, JBA Consulting produced the Strategic Flood Risk Assessment (SFRA) and Surface Water Management Plan (SWMP) for the Dublin Airport Local Area Plan (LAP) on behalf of Fingal County Council.

The proposed objectives for flood risk management are as follows:

Objective FRM01

'Have regard to The Planning System and Flood Risk Management, Guidelines for Planning Authorities (DoEHLG/OPW 2009) and Circular PL2/2014, through the use of the sequential approach and application of the Justification Tests for Development Plans and Development Management'

Objective FRM02

'Protect existing flood risk management infrastructure and safeguard planned future infrastructure'

Objective FRM03

'Implement and comply fully with the recommendations of the Dublin Airport Local Area Plan Strategic Flood Risk Assessment and Surface Water Management Plan'

Objective FRM04

'Ensure that a Flood Risk Assessment is carried out for any development proposal, in accordance with the The Planning System and Flood Risk Management, Guidelines for Planning Authorities (DoEHLG/OPW 2009) and the recommendations of the Dublin Airport Local Area Plan Strategic Flood Risk Assessment and Surface Water Management Plan. This assessment should be appropriate to the scale and nature of risk to the potential development'

This FRA takes into account the contextual details provided by the SFRA in this LAP. Specific information available has also been extracted such as relevant flood maps and comments in the report. These are indicated throughout this FRA.

3. Site Description

3.1. General

The proposed development is a new car park to provide parking for airport staff located to the West of the existing Holiday Blue Car Park at Dublin Airport, with an independent access, along with access to the existing Holiday Blue Long-Term Car Park. The site is ca. 4.26ha in area and is located in the townland of Harristown in the Swords area and is located south of the western corner of the Runway 10-28 at Dublin Airport. The site is bound by the South Parallel Road (R108) to the north, Harristown Lane and a small woodland area containing derelict structures to the west, Horizon Business Park to the south, and the existing Holiday Blue Long-Term Car Park to the east.. The location of the proposed development is outlined in red in Figure 3-1.

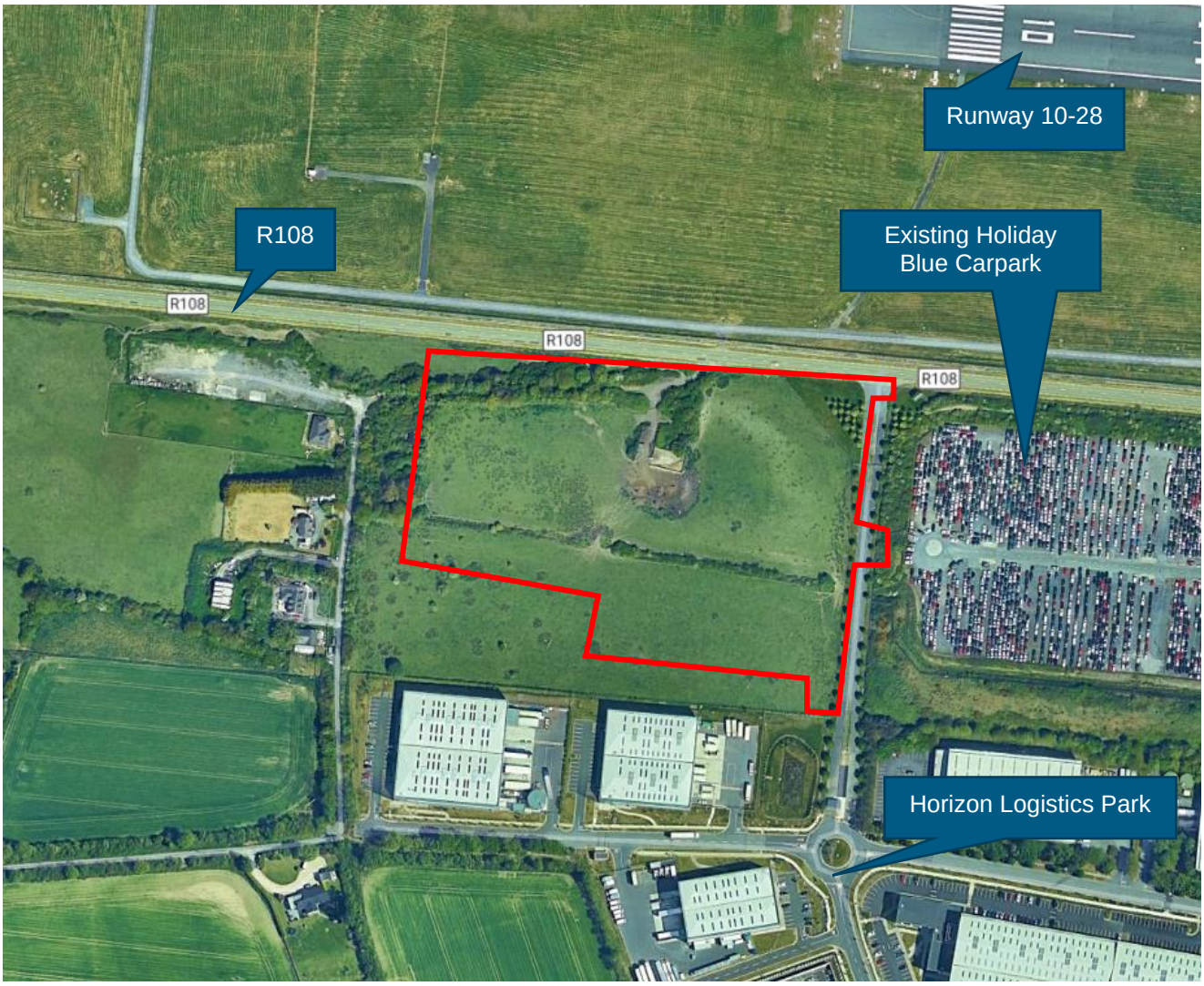

Figure 3-1 - Site Location

The proposed car park is currently a greenfield site with an area of approximately 4.26ha. The proposed development will consist of: 1) the demolition of existing cattle pen and hard standing area (total 911m^2) and the removal of 1 no. existing gated site entrance from the South Parallel Road (R108), and the construction of a westwards extension to the existing Holiday Blue Long-Term Car Park to provide an extended surface car park which will comprise 950 no. airport staff

car parking spaces, of which 48 no. will be provided for Persons with Reduced Mobility (PRM) and 96 no. will be serviced by Electric Vehicle (EV) charging points, to be accessed off the South Parallel Road (R108) via an upgraded existing former temporary construction access/egress, with an emergency access also to be provided through the existing Holiday Blue Long-Term Car Park immediately east of the proposed development site via a tie in, with security barriers, to the existing internal roundabout; 2) 30 no. bicycle spaces; 3) 1 no. new bus shelter; 4) new internal road layout, with set down areas for buses and footpaths, incorporating 2 no. existing culverts (one of which is to be extended) and 1no. new culvert over the Santry River; 5) proposed riparian corridor either side of the Santry River; 6) 1 no. single-storey substation; 7) 1 no. new single-storey welfare building; 8) 1 no. new single-storey security hut with security barriers; 9) new foul and surface water drainage system works incorporating attenuation; 10) the erection of CCTV equipment, security fencing, electrical enclosure, lighting, signage, and boundary fencing; and 11) all other associated site development works, including temporary construction compound, and all hard and soft landscaping. The proposed development layout is shown in Figure 3-2 below.

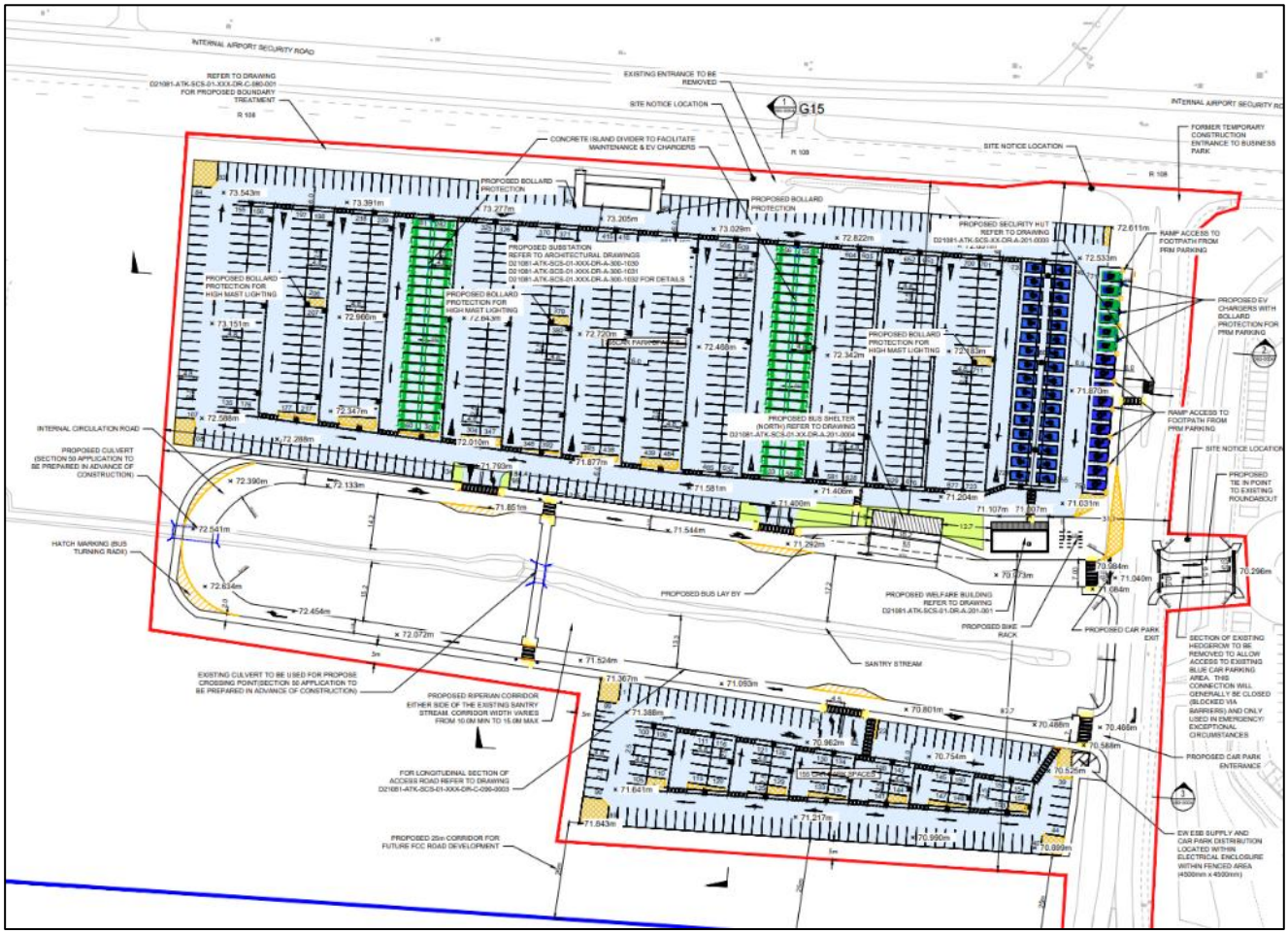

Figure 3-2 - Proposed Development Layout

The proposed development site is entirely within daa land ownership and is zoned in the Fingal County Development Plan 2023-2029 as 'GE – General Employment', with the zoning objective being to '*provide opportunities for general enterprise and employment'.* Part of the proposed development site is located in the existing, established Holiday Blue Long-Term Car Park, which benefits from a specific 'Car Park' objective in the Plan. Refer to Coakley O'Neill (2024) Planning Statement for further details.

3.2. Existing Topography

The site area comprises of generally flat terrain. The high point is located to the North of the site and falls towards the Santry River watercourse in the centre of the site.

3.3. Local Hydrology and Existing Drainage

A first order tributary of the Santry River flows from West to East through the site and is culverted under the Former Temporary Construction Entrance to the Business Park. The Santry River was diverted to the South of the existing Harristown car park (holiday blue) during the construction of the original car park. Refer to Figure 3-3 indicating location of the diverted stream in green.

Figure 3-3 - Local River Network

4. Flood Risk Identification

In accordance with the planning guidelines, a *Stage 1 Flood Risk Identification* is required to be undertaken to identify if there are any flooding or surface water management issues related to the proposed site.

4.1. Information Sources Consulted

4.1.1. Historical Flooding

Reports and maps from the OPW National Flood Mapping website (www.floodmaps.ie) have been examined to understand the historic record of flooding at the site.

It is noted that there is no indication of historical flooding on the site of the proposed development.

Figure 4-1 presents the recorded flood events in the vicinity of the site.

Figure 4-1 - Historical Flooding

4.1.2. Fluvial Flood Risk Maps – Site Location

The Office of Public Works (OPW) interactive map viewer (http://www.floodinfo.ie/map/floodmaps/) displays the predicted flood extents for both rivers and coastal areas over various return periods as defined by the Catchment Flood Risk and Management (CFRAM) studies. The viewer was consulted in relation to the proposed development. Detailed floodmaps are not available for the proposed site. However, the general OPW interactive map viewer shows that the proposed site is not at risk of fluvial flooding which can be seen in Figure 4-2.

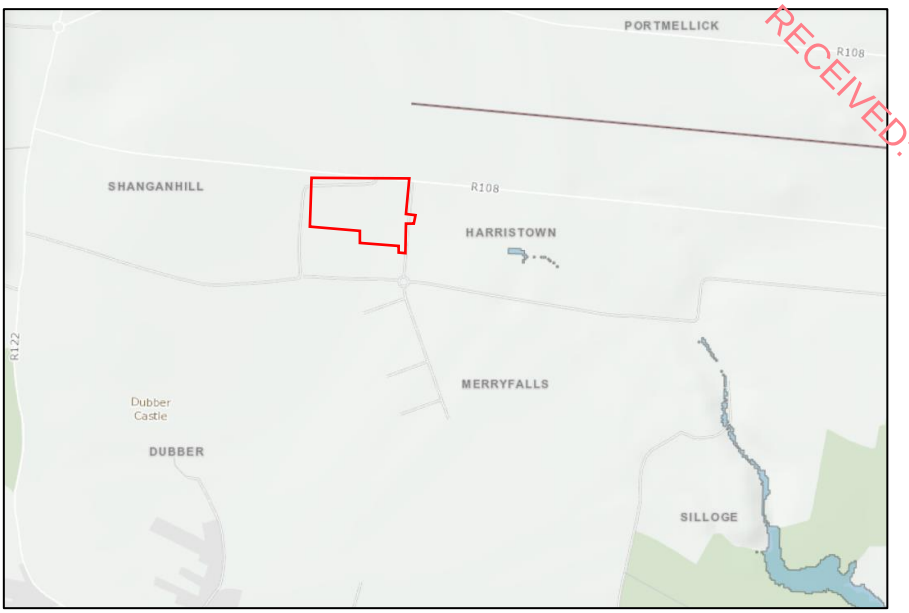

Figure 4-2 - Fluvial Flood Map

4.1.3. Fluvial Flood Risk Maps - Downstream

The flood maps downstream of the proposed development are available on floodinfo.ie. Fluvial flood maps are available for areas to the East of the proposed site but not for the location of the proposed site as outlined in Figure 4-3 below.

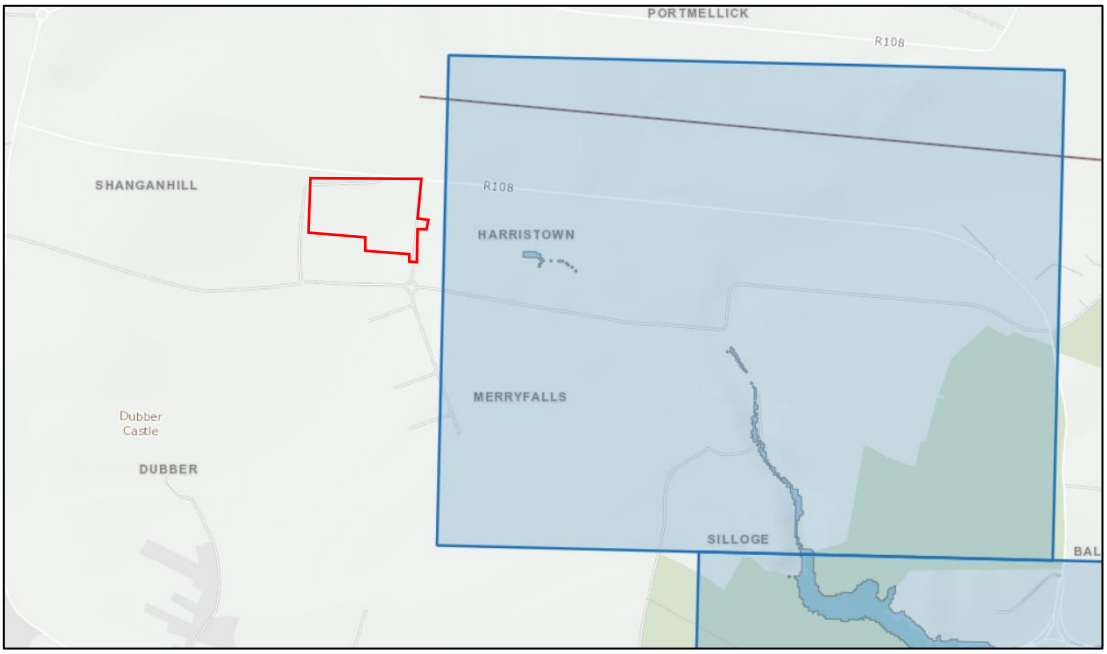

Figure 4-3 – Location of Site and its proximity to the available Fluvial Flood Maps – FEMFRAM Study

The nearest FEMFRAM mapping to the site is shown in Figure 4-4 below. It is noted that the FEMFRAM study does not extend as far West as the proposed site.

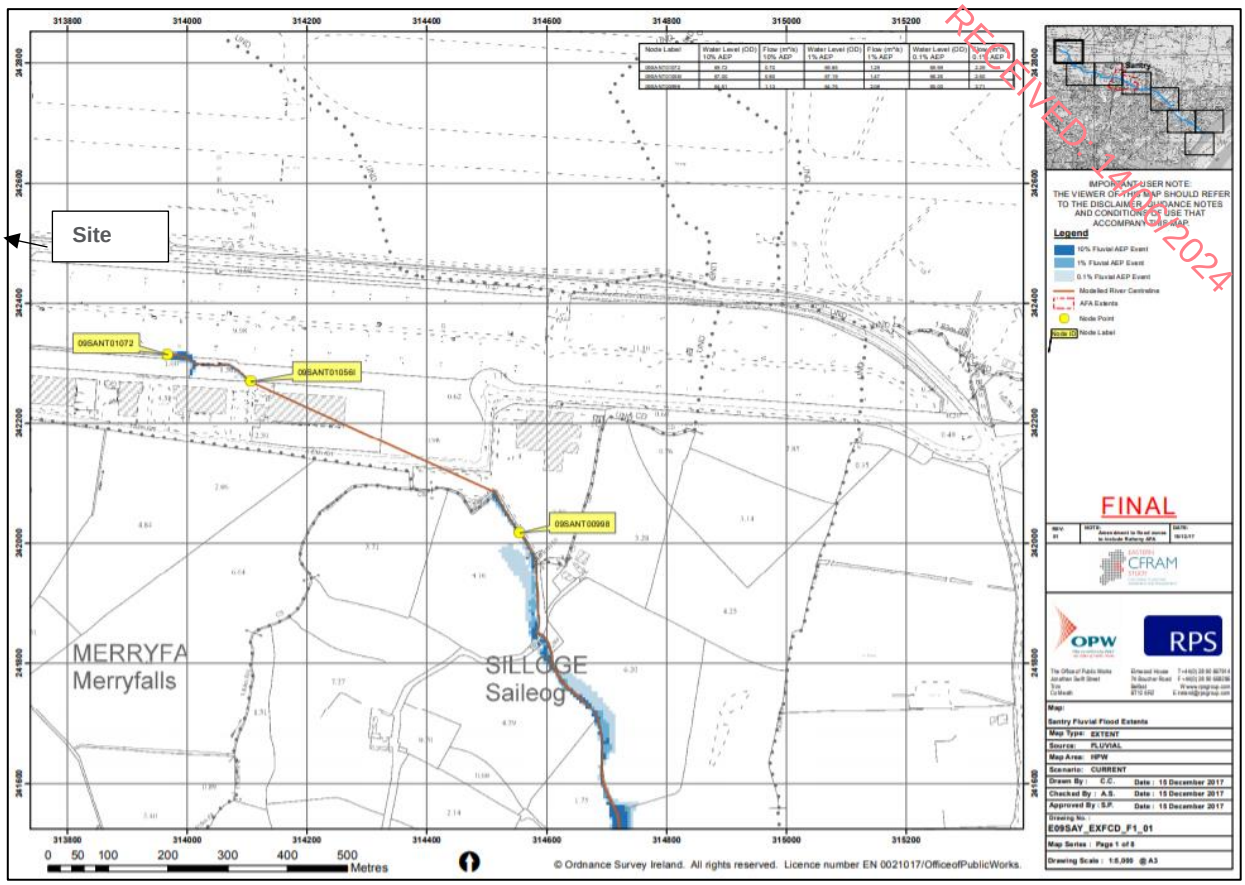

Figure 4-4 - Fluvial Flood Map – FEMFRAM Study

4.1.4. Tidal Flood Risk

The site is well elevated (circa 70mOD) and is ca. 8km inland from the nearest coastline. Therefore, the risk of tidal flooding is not considered further.

4.1.5. Pluvial Flood Risk

Pluvial flooding occurs when the capacity of the local urban drainage network is exceeded during periods of intense rainfall. At these times, water can collect at low points in the topography and cause flooding.

Drainage networks have been established and are present within close proximity to the site. Therefore, any additional runoff from proposed hardstanding areas should be controlled using Sustainable Drainage Systems (SuDS) as part of the storm network design.

The Dublin Airport Local Area Plan undertook pluvial modelling for the Dublin Airport Campus in 2020. The pluvial flood maps were produced and issued by JBA Consulting. Figure 4-5 is an extract of the map which shows the pluvial flood depths in the vicinity of the site. It is noted that the proposed site is just outside of the study area.

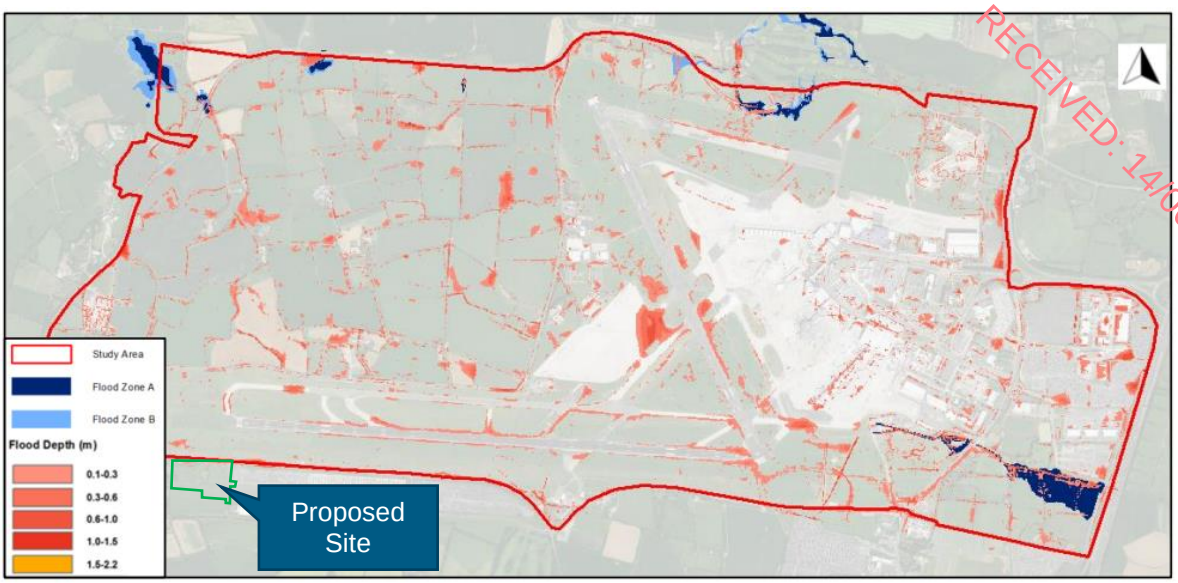

Figure 4-5 - Pluvial Flood Map - Dublin Airport LAP 2020

Figure 4-5 indicates no significant flooding within surrounding areas of the proposed development. It is considered that the existing development would not be at risk of Pluvial flooding and surface water will be catered for within the car park proposed and existing SuDS drainage systems.

4.1.6. Groundwater Flood Risk

Groundwater flooding can occur during prolonged periods of heavy rainfall, typically during late winter/early spring when the groundwater table is already high. If the groundwater level rises above ground level, it can pond at local low points and cause periods of flooding.

The groundwater vulnerability assessment is based on assembling information on the most relevant factors affecting aquifer vulnerability. These factors include soil type, geologic formation type, recharge, etc, which is then interpreted to produce a class of vulnerability.

Figure 4-6 indicates the groundwater vulnerability of the site and the surrounding areas.

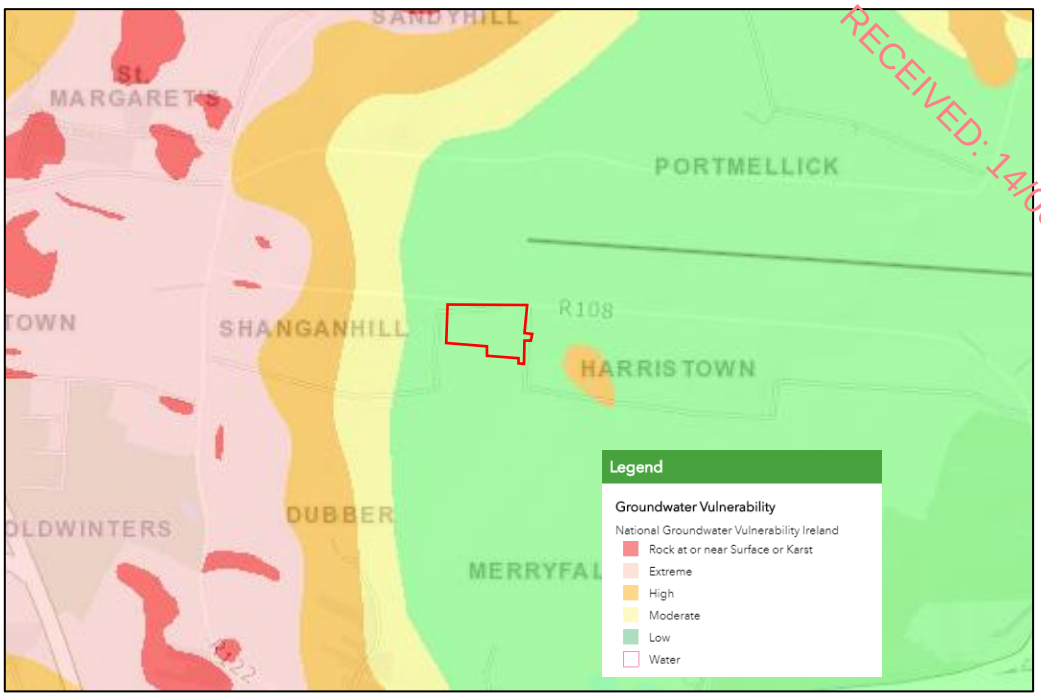

Figure 4-6 - Groundwater Vulnerability - GSI mapping (2024)

The groundwater vulnerability is indicated as Low. These maps indicate the groundwater vulnerability when the groundwater table may be high. However, this map is only indicative of groundwater vulnerability and does not reflect the risk of groundwater flooding of the site.

4.1.7. Fingal County Council Development Plan 2023-2029 Strategic Flood Risk Assessment

The floodmaps produced as part of Fingal County Development Plan (CDP) 2023-2029 Strategic Flood Risk Assessment (SFRA) were consulted in relation to the proposed site. It is noted that the proposed site is located in floodzone C, as shown in Figure 4-7.

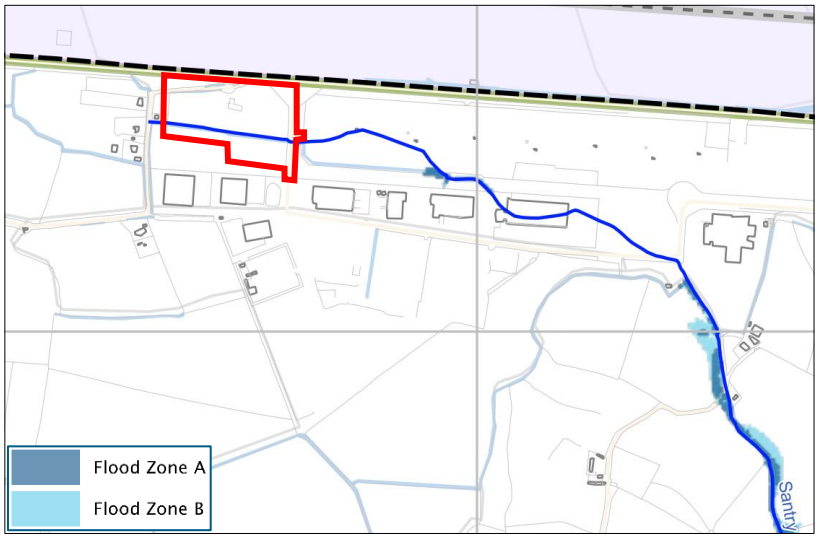

Figure 4-7 – Extract of Current Fingal CDP SFRA Floodmap

5. Initial Flood Risk Assessment

5.1. Source-Pathway-Receptor Model

Table 5-1 shows the Source-Pathway-Receptor model which summarizes the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals) and the pathways by which flood water from an event exceeding 1% AEP (Annual Exceedance Probability) would follow.

Table 5-1 below shows the Source-Pathway-Receptor model which summarizes the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals) and the pathways by which flood water from an event exceeding 1% AEP (Annual Exceedance Probability) would follow.

Table 5-1 - Possible Flooding Mechanisms

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal	No	The proposed development is well elevated and located approximately 8km inland from the sea.
Fluvial	Possible	The Santry stream flows from West to East through the centre of the site.
Pluvial (urban drainage)	Possible	Drainage networks have been established and are present within close proximity to the site.
Pluvial (overland flow)	Possible	The site area comprises of generally flat terrain.
Blockage	Possible	The Santry stream is culverted under the existing access road to the Horizon Business park and a location in the centre of the site.
Groundwater	No	There are no significant springs or groundwater discharges recorded in the immediate vicinity of the site.

The primary flood risks to the site can be attributed to fluvial and pluvial sources.

Source	Pathway	Receptor	Likelihood	Impact	Risk
Tidal	Tidal flooding from coast 8km away.	**Occupants (people)** development, **visitors** and the **buildings** and **contents** themselves and other **property** such as **vehicles** located in car park areas.	Remote	High	Very Low
Fluvial	Flooding from Sanrty Stream	**Occupants (people)** development, **visitors** and the **buildings** and **contents** themselves and other **property** such as **vehicles**	Remote	High	Low

Source	Pathway	Receptor	Likelihood	Impact	Risk
		located in car park areas.			
Surface Water - Pluvial	Flooding from external sources – overland flows	**Occupants (people)** development, **visitors** and the **buildings** and **contents** themselves and other **property** such as **vehicles** located in car park areas.	Possible	High	Moderate
Surface Water - Pluvial	Flooding from internal sources – overland flows	**Occupants (people)** development, **visitors** and the **buildings** and **contents** themselves and other **property** such as **vehicles** located in car park areas.	Possible	High	Moderate
Surface Water -Pluvial	Flooding from surcharging of the proposed development's drainage systems	**Occupants (people)** development, **visitors** and the **buildings** and **contents** themselves and other **property** such as **vehicles** located in car park areas.	Possible	High	Moderate
Human or Mechanical Error (Pluvial)	Petrol interceptor and hydrobrake	**Occupants (people)** development, **visitors** and the **buildings** and **contents** themselves and other **property** such as **vehicles** located in car park areas.	Possible	High	Moderate
Groundwater flooding	Rising GWL on the site	**Occupants (people)** development, **visitors** and the **buildings** and **contents** themselves and other **property** such as **vehicles** located in car park areas.	Remote	High	Very Low

5.2. Initial Flood Risk Assessment Results

The flood risks to the proposed development, identified from the initial flood risk assessment stage, are a moderate risk of pluvial flooding from overland flows for external and internal sources.

In addition, there is also a moderate flood risk due to a blockage or mechanical failure of the proposed drainage network (petrol interceptor and flow control).

A detailed flood risk assessment has been carried out to discuss these issues.

6. Application of Flood Risk Management Guidelines

6.1. Classification of proposed development

The proposed development is classified as a 'Highly vulnerable development' as per the vulnerability classification in the planning guidelines (see Table 2.2 above).

6.2. Sequential Approach

Figure 6-1 illustrates the sequential approach to be adopted under the 'Planning System and Flood Risk Management' Guidelines. The site of the proposed development is classified as Flood Zone C.

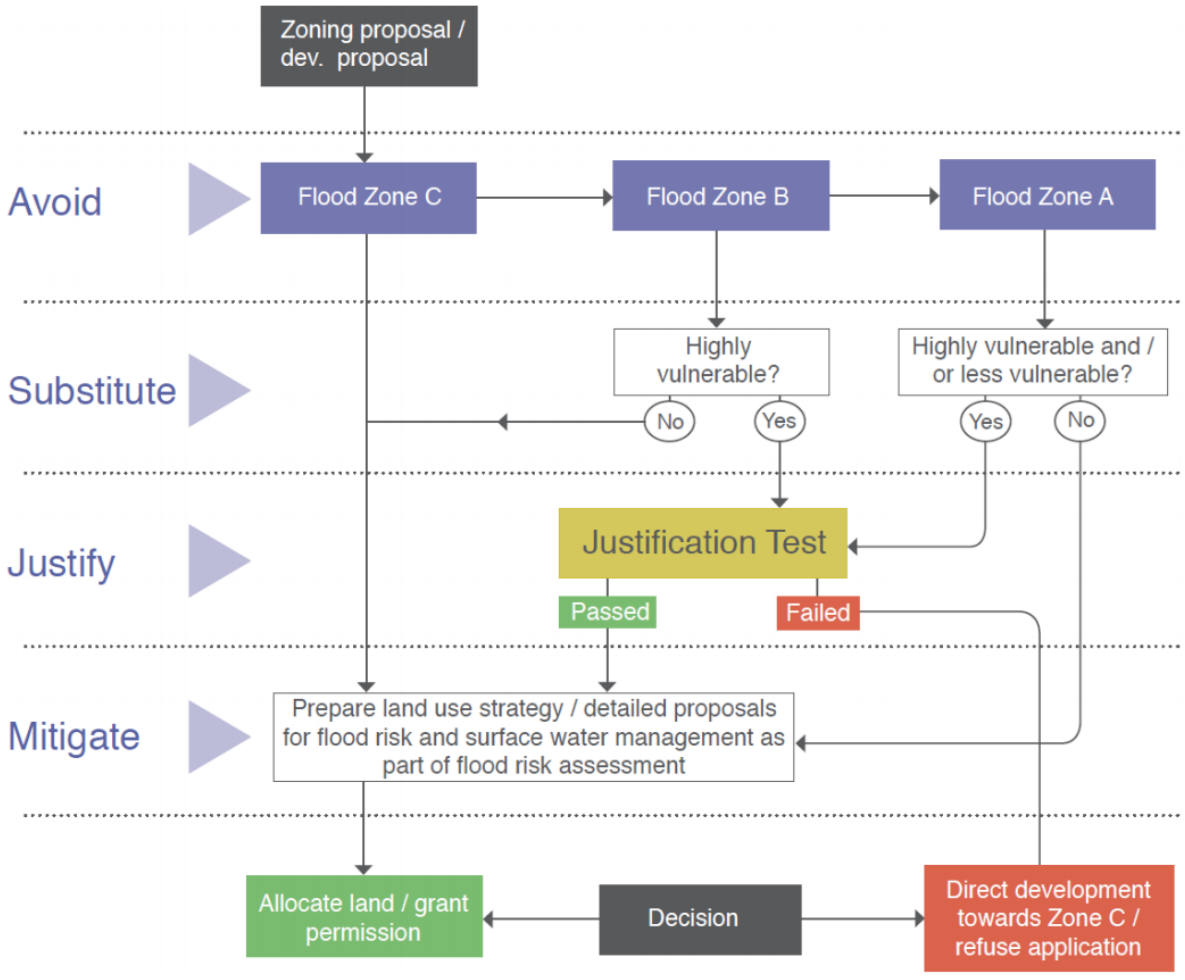

Figure 6-1 - Sequential approach mechanism in the planning process

Following the sequential approach, it is deemed that a Justification Test for the proposed development is not required and the site is suitable for development.

7. Detailed Flood Risk Assessment

7.1. Proposed Surface Water Management Measures

The following approach and parameters have been used:-

- Positive drainage system design consisting of gullies, pipes, manholes, attenuation systems and discharge control at outlets;
- SuDS systems will be provided including porous pavement, filter drains, tree pits, attenuation system and petrol interceptor;
- Attenuation to be modular system;
- Climate change factor of 20% to be applied;
- Site discharge rate is controlled to Greater Dublin Strategic Drainage Study (GDSDS) standards; and,
- Overland flow routes have been designed to direct surface flows away from buildings.

7.2. Detailed Assessment of Flood Risk

7.2.1. Pluvial Flood Exceedance - Overland flows

External Sources

Potential overland flow caused by flooding from site drainage systems in the adjacent (external to subject site) developments or from surface water that fails to enter those systems in extreme events, could follow the road gradients and enter the proposed site, as part of the existing entrance road slopes towards the proposed site.

Internal Sources

Potential overland flow caused by surface water that fails to enter the subject site's drainage system in extreme events, could follow the fall of the ground and road surfaces and enter the welfare building to cause damage or create health and safety risks. In addition, potential overland flows within the car park could impact on vehicles or pedestrians accessing vehicles.

Mitigation Measures

Proposed site levels are designed such that overland flow will not flood the welfare building or footpaths. Surface water runoff is designed to remain within the bounds of roadway reservations where possible and direct runoff to water compatible development areas and open space areas away from the building.

Overland flow routes for pluvial events will not be built on or become blocked off.

7.2.2. Pluvial Flood Exceedance – Surcharging of drainage system

Potential overland flow caused by flooding from the proposed site drainage system, where its capacity is exceeded, could follow the fall of the ground and road surfaces and enter the welfare building to cause damage or create health and safety risks. In addition, potential overland flows within the car park could impact on vehicles or pedestrians accessing vehicles.

Mitigation Measures

The site drainage system is designed to cater for the 1 in 2 year return period for underground pipes flowing full with surcharge capacity up to 1 in 30 year event. The site attenuation system is designed to cater for the critical 1 in 100 year event. Climate change is applied at 20%.

If the capacity of the site drainage is exceeded and overland flow occurs, proposed site levels are designed such that overland flow will not flood buildings or footpaths. Surface water runoff is designed to remain within the bounds of roadway reservations where possible and direct runoff to water compatible development areas and open space areas away from buildings.

7.2.3. Pluvial Flood Exceedance – Blockage or Mechanical Failure

If the petrol interceptor or flow control are not adequately cleaned and maintained, there is a risk that they could become blocked and create a throttle and cause flooding upstream in the drainage system.

Mitigation Measures

The proposed petrol interceptors and flow control will be maintained on a regular basis to reduce the risk of a blockage.

If the site drainage system becomes blocked and overland flow occurs, proposed site levels are designed such that overland flow will not flood buildings or footpaths. Surface water runoff is designed to remain within the bounds of roadway reservations where possible and direct runoff to water compatible development areas and open space areas away from buildings.

8. Conclusions and Recommendations

8.1. Compliance with Dublin Airport LAP

The below outlines the compliance with the objectives of the Dublin Airport LAP SFRA.

Objective FRM01

'Have regard to The Planning System and Flood Risk Management, Guidelines for Planning Authorities (DoEHLG/OPW 2009) and Circular PL2/2014, through the use of the sequential approach and application of the Justification Tests for Development Plans and Development Management'

Compliance Response

A FRA assessment has been carried out.

Objective FRM02

'Protect existing flood risk management infrastructure and safeguard planned future infrastructure'

Compliance Response

All proposed drainage works will be contained within the existing and proposed car park. A maximum controlled discharge rate of Qbar will ensure there is no impact downstream of the proposed development.

Objective FRM03

'Implement and comply fully with the recommendations of the Dublin Airport Local Area Plan Strategic Flood Risk Assessment and Surface Water Management Plan'

Compliance Response

As outlined in this report there is no flood risk associated with the proposed car park. A 20% allowance for climate change has been considered as part of the hydraulic performance assessment for the proposed car park which indicated no flooding on site. Refer to the *Engineering Planning Report* (D21081-ATK-SCS-01-XXX-RP-C-XXX-0002) for further information on the hydraulic assessment.

Objective FRM04

'Ensure that a Flood Risk Assessment is carried out for any development proposal, in accordance with the Planning System and Flood Risk Management, Guidelines for Planning Authorities (DoEHLG/OPW 2009) and the recommendations of the Dublin Airport Local Area Plan Strategic Flood Risk Assessment and Surface Water Management Plan. This assessment should be appropriate to the scale and nature of risk to the potential development'

Compliance Response

A Flood Risk Assessment has been carried out.

Compliance with the Objectives set out in the Dublin Airport LAP is also deemed to have been satisfied.

8.2. Conclusion

AtkinsRéalis have been commissioned by daa plc. to prepare a Flood Risk Assessment in support of the daa plc. planning application for the development of the proposed Remote South Staff Car Park to the West of the existing long-term blue carpark, to the South of Dublin Airport.

The purpose of the *Stage 1 Flood risk identification* process is to establish whether a flood risk issue currently exists or may exist in the future. If a potential flood risk issue is identified the risk will be investigated in further detail by undertaking a *Stage 2 – Initial flood risk assessment.* However, if no potential flood risk is identified then the overall assessment can conclude at this point.

In relation to the proposed development, based on the *Stage 1 - Flood risk identification* findings discussed above the proposed site is identified to be located in floodzone C.

The proposed development is classified as a 'less vulnerable development' as per the vulnerability classification in the planning guidelines. Following the sequential approach, it is deemed that a Justification Test for the proposed development is not required and the site is suitable for development.

8.3. Recommendations

The following recommendations are to be taken into consideration for the design and construction of the proposed development:

- The proposed discharge for the storm-water outfall to the existing watercourse should be set at a maximum discharge rate of QBAR or 2 l/s/ha, whichever is the greater as per the '*Greater Dublin Strategic Drainage Study Volume 2 – New Developments*' guidelines.
- Suitable Sustainable Urban Drainage systems (SuDS) are to be used within the proposed development to reduce surface water runoff from the site where feasible and designed in accordance with CIRIAs report C753 'The SuDS Manual V-6'.
- The existing maximum controlled discharge rate of Qbar is to be maintained prior to discharge to the Santry River.
- Soil Investigations are to be reviewed as part of the final SuDS design.
- The proposed SuDS should be regularly checked and maintained to ensure reduced water runoff and also reduce the risk of on-site flooding and exceedance flows. Refer to Atkins Document D21081-ATK-SCS-01-XXX-RP-C-XXX-0002 – Engineering Planning Report for further information on maintenance.

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Appendix 13: Cultural Heritage

Appendix 13.1: Archaeological Test Trenching Report

JOHN CRONIN & ASSOCIATES
ARCHAEOLOGY | CONSERVATION | HERITAGE | PLANNING

Archaeological Testing Report

Proposed car park extension, Dublin Airport, Harristown, County Dublin

Excavation Licence Number: 23E0940

Prepared by
Camilla Brännström
John Cronin & Associates
Burnside
Saint Oran's Road
Buncrana
County Donegal

On behalf of
Atkins Global

December 2023

Document Control Sheet

Project type	Test trenching
Archaeologist	Camilla Brännström
Excavation Licence	23E0940
Townland	Harristown
Town	Dublin
County	Dublin
OS Sheet	DU014
ITM	713459, 742381
Description of subject site	The subject site is located within two interconnected greenfield parcels used for pasture in the townland of Harristown, County Dublin. The proposed development lands are located to the south of Dublin Airport and to the west of the existing Blue long term airport car park.
Summary of findings	Eleven no. archaeological test trenches, measuring 1195 linear metres, were excavated within lands to the south of Dublin Airport in the townland of Harristown, County Dublin. This programme of testing was undertaken in order to assess the archaeological potential of the proposed development area ahead of an application for planning permission for the construction of a staff car park at the site. Two archaeological features, interpreted as two charcoal rich pits or troughs were identified in Trenches 7 and 10. No other archaeological features were uncovered within the test trenches.

Contents

1. Introduction

John Cronin & Associates were commissioned by **Atkins Global** to undertake a programme of licenced pre-development archaeological testing at the proposed location of a staff car park extension in the townland of Harristown, County Dublin to the south of Dublin Airport and west of the existing long-term blue car park. The programme of test trenching was carried out as part of a pre-planning application archaeological impact assessment which will be included in the EIAR for the proposed development. The overall development area comprises circa 4 hectares and is currently a greenfield site used for rough grazing. There are no recorded archaeological sites located within the subject site.

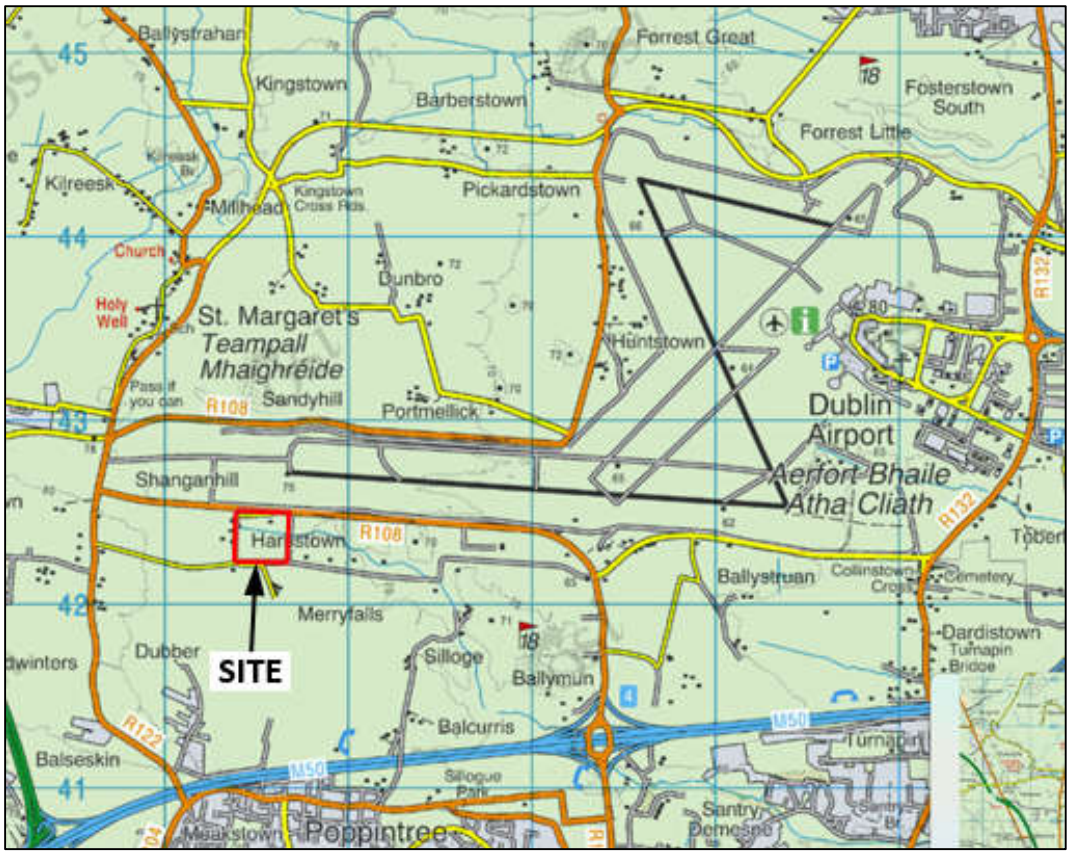

***Figure 1**: General location of subject site at Harristown, Dublin Airport*
(Source: Ordnance Survey Ireland/Government of Ireland)

The aim of the programme of archaeological test trenching was to identify the existence, location, significance and extent of any unrecorded archaeological features, deposits, and artefacts. 11 no. test trenches, totalling 1195m in length were excavated across the proposed development area.

Section 2 of this report provides archaeological context for the general area within 500m of the proposed development. **Section 3** summarises the results of the archaeological test trenching, while **Section 4** details the preliminary conclusions arising from the site investigations. In summary, two archaeological pit features were identified in Trench 7 and 10. No other archaeological features were uncovered within the excavated test trenches.

2. Context

Location

The subject site is located within the townland of Harristown, County to the south of Dublin Airport. The site consists of a c. 4ha area of farmland containing sections of two rough pasture fields located to the south of the R108 road. The proposed development will comprise the extension of an existing daa staff car park located within the adjoining property to the east. The two fields within the site are generally level and currently in use as rough grazing lands. The centre of the northern field is occupied by a modern agricultural concrete-surfaced yard with cattle pen areas. The fields are bounded by trees and bushes on the north and west sides while modern fencing form the boundaries with the car park to the east and a commercial premises to the south.

***Figure 2**: Location of subject site (red) (Source: Ordnance Survey Ireland/Government of Ireland)*

Archaeological & historical background

There are no recorded archaeological sites within the subject site. The Historic Environment Viewer records three archaeological sites within approximately 500m (study area) of the subject site boundary (**Figure 3** & **Table 1**). The wider landscape, particularly to the south and west contains a large number of recorded monuments, many of which are enclosures, field systems, ringforts, etc., indicative of likely early medieval activity.

Figure 3: *Recorded archaeological sites located within approximately 500m of the subject site (Source: Government of Ireland)*

Table 1: *List of recorded archaeological monuments within approximately 500m of the subject site*

SMR Number	***Class & Description***	***Townland***	***ITM Reference***
DU014-008----	Enclosure	Harristown	713753, 742908
DU014-040----	House - 16th/17th century	Harristown	713687, 742731
DU014-123----	Enclosure	Merryfalls	714060, 742077

Early Prehistory

Traditionally, the earliest recorded evidence for human settlement in Ireland dates to the Mesolithic period (7000–4000 BC) when groups of hunter-gatherers arrived on the island, however recent evidence in the form of a butchered bear patella found in Alice and Gwendoline Cave near Ennis in County Clare now suggests that humans were present in Ireland during the Palaeolithic period between 12,800 to 12,600 cal BC (Dowd and Carden, 2016, 161). While the Mesolithic settlers did not construct any settlements or monuments that leave any above ground traces, their presence in an area can often be identified by scatters of worked flints in ploughed fields or shell middens adjacent to the coastline. There are no recorded sites dating to the Mesolithic period within the study area. The Neolithic period (4000-2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns. As a consequence of the more settled nature of agrarian life, new site-types, such as more substantial rectangular timber houses and various types of megalithic tombs, begin to appear in the archaeological record during this period. There are no recorded sites dating to the Neolithic period within the study area.

Late Prehistory

Metalworking arrived in Ireland with the advent of the Bronze Age period (c. 2400–500 BC). This period was also associated with the construction of new monument types such as standing stones, stone rows, stone circles and fulachta fia. Fulacht fia translates as cooking places of the wild (or of deer), they are often interpreted as the remains of cooking sites and are the most numerous archaeological site type in Ireland, radiocarbon dating of excavated examples has generally produced dates in the Bronze Age (c.2400-500BC). The development of new burial practices saw the construction of funerary monuments such as cairns, barrows, boulder burials and cists. The later first millennium BC and the early centuries AD comprise the Irish Iron Age, which is the most obscure period in the Irish archaeological record. While there is general agreement that the introduction of an iron technology was a significant factor in the eventual demise of bronzeworking on a large scale, but how, why and when this came about in Ireland is far from clear. There are no recorded sites dating to the Late Prehistoric period within the study area.

Early medieval

This period began with the introduction of Christianity in Ireland and continued up to the arrival of the Anglo-Normans during the 12th-century (c. 400–1169 AD). The establishment of the Irish church was to have profound implications for political, social and economic life and is attested to in the archaeological record by the presence of church sites, associated places for burial and holy wells. The early medieval church sites were morphologically similar to ringforts but are often differentiated by the presence of features such as church buildings, graves, stone crosses and shrines. This period saw the emergence of the first phases of urbanisation around the large monasteries and the Hiberno- Norse ports. However, the dominant settlement pattern of the period continued to be rural based in sites such as ringforts, which comprise roughly circular enclosures delimited by roughly circular earthen banks formed of material thrown up from a concentric external ditch. Ringforts are one of the most numerous monuments in the Irish landscape and the early medieval terms for these sites – rath/lios/dun these still form some of the most common place-name elements in the country. Archaeological excavations indicate that many ringforts were early medieval farmsteads with internal timber buildings and were surrounded by associated field systems. There are two enclosures located within the study area (DU014-008---- and DU014-123----), which appear to correspond with early medieval ringforts.

The proposed development site is located within the townland of Harristown. Prior to the arrival of the Anglo-Normans, the subject site was part of the Gaelic kingdom of Brega, belonging to the Síl nÁedo Sláine branch of the southern Uí Néill. Brega came under the control of the kingdom of Mide following the rise of the Viking settlement in Dublin.

Late and post-medieval

The arrival and conquest of large parts of Ireland by the Anglo-Normans in the late 12th-century broadly marks the advent of the Irish late medieval period, which continued up until the beginning of the post-medieval period in *c.*1550. Within the late medieval period, towns, markets, and fairs were established and change and reform was attempted in the Irish church. By the 15th-century the native Irish chieftains and lords began to establish tower houses and smaller castles as centres of territorial control. After the Anglo-Norman conquest, the kingdom of Mide was granted to Hugh de Lacy around 1172. In 1208, King John of England granted the Lordship of Fingal to Walter de Lacy. The Civil Survey of 1654-6 records James Plunkett of Dunshaughlin as the landowner of Harristown, with 300 acres (Simington op. cit., 210).

The post-medieval period (1550+) saw the development of high and low status stone houses throughout the Irish country. During this period any given settlement cluster is likely to have consisted primarily of single-storey thatched cottages with associated farm buildings while two-storey farmhouses became more common in the 19th-century. In the latter half of the 20th-century, there was a radical change in the nature and character of Irish domestic architecture manifested by the replacement of older stone-built structures with modern bungalows of concrete blockwork construction. The recorded site of Harristown House (DU014-040---) is located within the study area. It was recorded on the Down Survey (1655-6) and described in the Civil Survey (1654-6) as 'ruins of old walls of stone' (Simington 1945, 210). The location of this house is now occupied by an airport runway to the north of the subject site and no surface remains survive.

Samuel Lewis' *Topographical Dictionary of Ireland*, published in 1837, provides historical and statistical descriptions of several of the counties, cities, boroughs, parishes, villages, and post towns throughout Ireland. An extract from the document (Lewis 1837) provides the following information about the parish of St. Margaret's which contains Harristown townland:

> *MARGARET'S (ST.), a parish, in the barony of COOLOCK, county of DUBLIN, and province of LEINSTER, ¾ miles (N.) from Dublin, on the old road to Naul, and about a mile from the mail coach road from Dublin to Ashbourne; containing 335 inhabitants, of which number, 96 are in the village. A fair is held on July 30th and 31st for the sale of horses and cattle. The principal seats are Dunbroe House, the residence of Miss Giles; Newtown, of Mrs. Stock; Newtown House, of B. Shew,Esq.; Harristown House, of P. Brennan, Esq.; Harristown, of J. Moore, Esq.; Kingstown House, of J. Shew, Esq.; and Barberstown House, of M. Brangan, Esq. In ecclesiastical arrangements it is a chapelry, in the diocese of Dublin, forming part of the benefice of Finglas and the corps of the chancellorship of St. Patrick's, Dublin: the composition for tithes is included in the amount for Finglas. The church is in ruins. Over the door of a small adjoining chapel is a Latin inscription purporting that it was built by Sir John Plunkett, formerly chief justice of the king's bench in Ireland. In the R. C. divisions the parish also forms part of the union or district of Finglas and has a neat chapel in the village, in which is also a national school. About a mile distant are the ruins of Dunsoghly castle, consisting of a tower, still roofed, and the remains of a large hall, or diningroom, and kitchens: the tower is vaulted at the bottom, and it had three stories; the floors of the two upper stories have fallen in, but the room of the principal floor is in tolerable repair: the view from the top is very extensive. The ancient family of Plunkett originally owned this property, which now belongs to Mrs. Cavenagh, who inherits it through her grandfather. Adjoining the ruins are the remains of a private chapel, over the doorway of which is a tablet of freestone, exhibiting the emblems of the crucifixion, in high relief, with the letters and date i. P. M. o. 6. s. 1573, at the bottom. Mr. B. Shew, on planting an elevated spot in his grounds, a few years since, discovered a great quantity of human bones, supposed to be some of those who fell in the various skirmishes which at different periods have taken place in this district. Near the chapel is a tepid well, or bath, dedicated to St. Bridget, said to contain lime, muriate of soda, nitrate of kali and sulphur, but the last in only a small proportion.*

The Excavations Database

The Excavation Database contains summary accounts of archaeological excavations undertaken in the Republic of Ireland and Northern Ireland from 1970 to present. A search of the townland of Harristown and neighbouring townlands showed that nine archaeological investigations took place in the study area. The nearest archaeological investigation to the proposed development was a monitoring project (15E0388) undertaken during the construction of a commercial building *c.* 87m to the south. No features of archaeological potential were discovered. See

Appendix 1 for full Excavations Database summaries of the above investigation, as well as other relevant licensed archaeological investigations undertaken within the study area.

Cartographic review

The detail on historic cartographic sources demonstrates the nature of past settlements and land use patterns in recent centuries and can also highlight the impacts of modern developments and agricultural practices. This information can aid in the identification of the location and extent of unrecorded or partially levelled features of archaeological or architectural heritage interest. The cartographic sources examined for the study areas include the first edition of the 6-inch OS map (published 1843) (**Figure 4**), the 25-inch OS maps (published 1909) (**Figure 5**) and the 2nd edition 6-inch map (published 1949) (**Figure 6**).

The 1st edition 6-inch OS map of 1843 (**Figure 4**) shows that the subject site was located within undeveloped enclosed farmland at that time. The site appears to have been part of the Harristown House landholding and the north end contains a section of an entrance route, which is partially tree-lined, extending towards the house to the north. The detail on this map appears to indicate that the main tree-lined access avenue to the house was located to the northeast of its location in an area now occupied by part of the airport runway. No demesne features such as gardens, woodlands or other landscaped features are shown in the vacant fields within the boundary of the proposed development. The detail on the 25-inch OS map and the 2nd edition 6-inch map (**Figure 5** & **6**) indicates that the layout of the proposed development site remained largely unchanged since the mid-19th century apart from removal of trees along the access route in the north end. There is no evidence of unrecorded archaeological or architectural heritage features within the proposed development site on any of the reviewed cartographic sources.

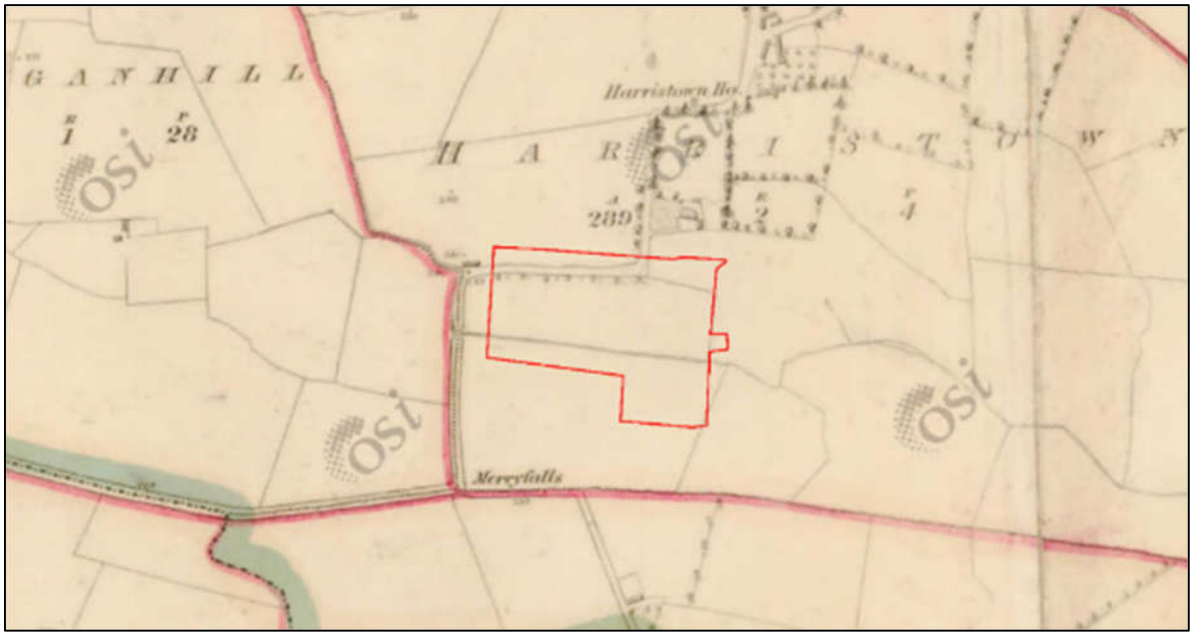

Figure 7: *Extract from the first edition 6-inch OS map showing the approximate site boundary (red) (OSI Licence No. SU 0003323)*

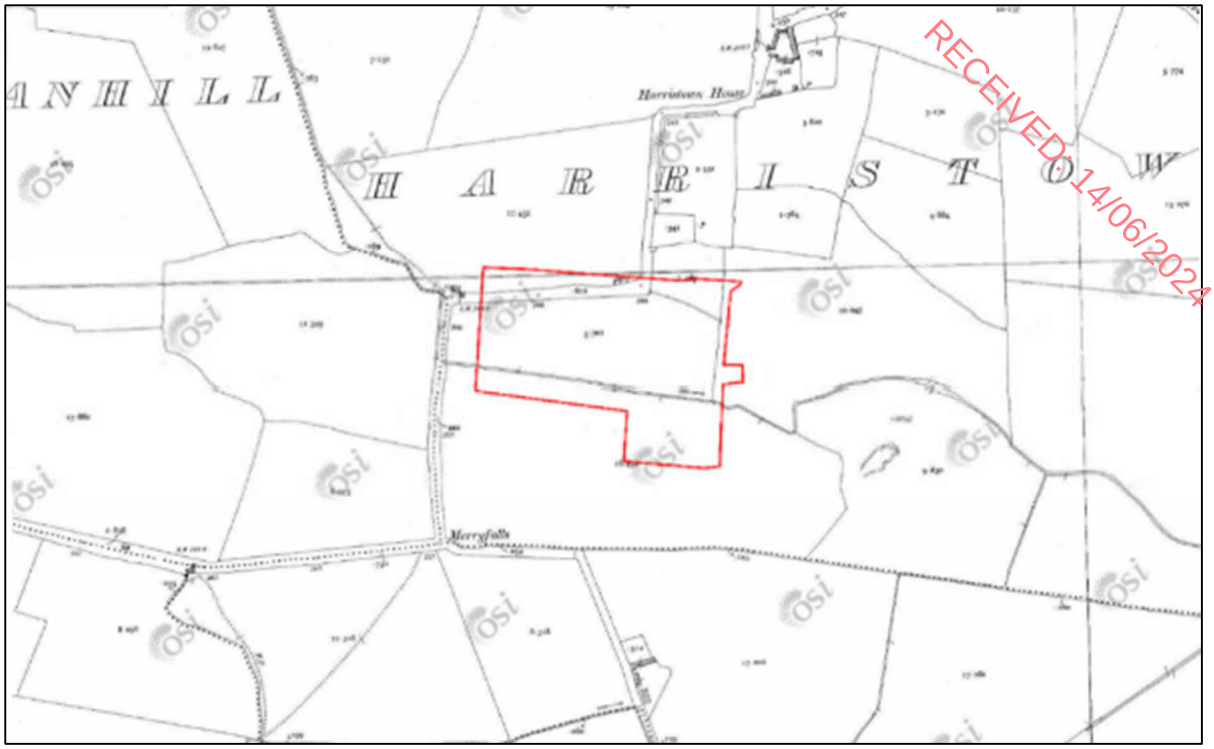

Figure 5: *Extract from the 25-inch OS map showing the approximate site boundary (red)*
(OSI Licence No. SU 0003323)

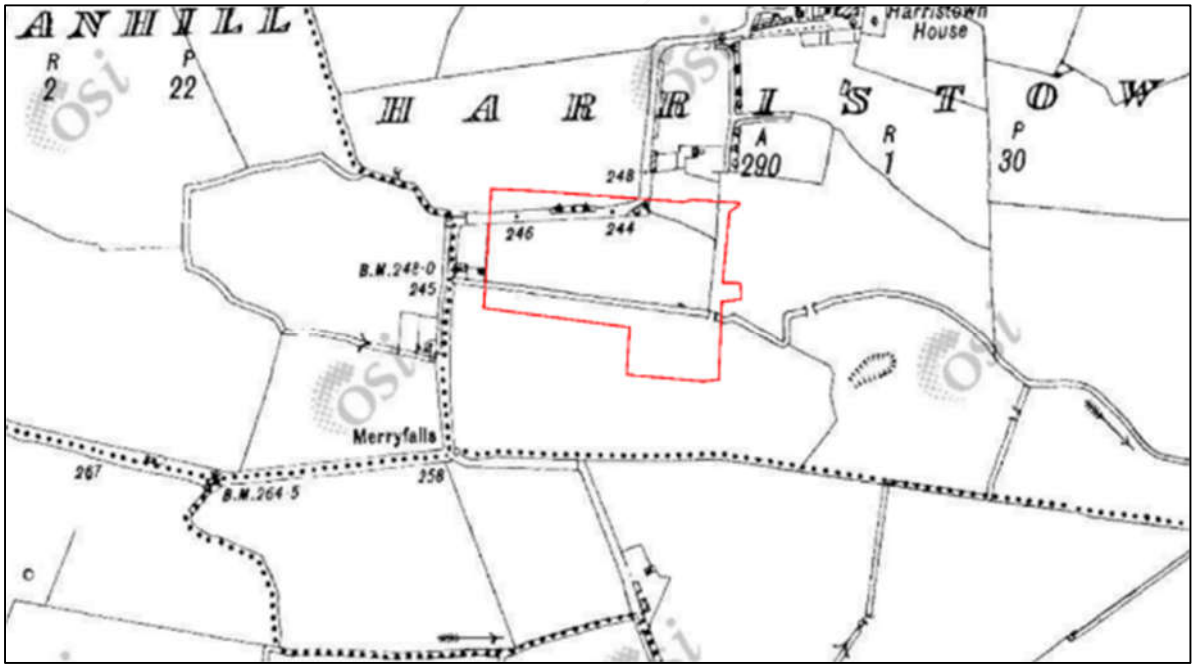

Figure 6: *Extract from Cassini map showing the approximate site boundary (red)*
(OSI Licence No. SU 0003323)

A review of Ordnance Survey of Ireland aerial/satellite imagery (1995-2018) was also carried out (**Figure 7-8**) and these images show the extent of developments related to Dublin Airport and commercial premises within the surrounding study area. A 1995 image (**Figure 7**) shows the proposed development site prior to the construction of the existing car park to the west and commercial warehouses to the south and shows the presence of a modern cattle pen within the

central area of the site. A 2018 aerial image shows the area following the construction of the car park to the east and the warehouses to the south (**Figure 8**). There is no indication of unrecorded archaeological features within the subject site on any of the reviewed images.

Figure 7: *Orthorectified 1995 aerial photo showing the approximate site boundary (red) (OSI Licence No. SU 0003323)*

Figure 8: *Orthorectified 2018 aerial photo showing the approximate site boundary (red) (OSI Licence No. SU 0003323)*

Placenames

Townlands are the smallest unit of land division in the Irish landscape and many preserve early Gaelic territorial boundaries that pre-date the Anglo-Norman conquest. The layout and nomenclature of Irish townlands was recorded and standardised by the work of the Ordnance Survey in the 19th century. The Irish translations of the townlands names often refer to natural

topographical features but name elements may also give an indication of the presence of past human activity within the townland, e.g. *dun*, *lios* or *ráth* indicate the presence of a ringfort while *temple*, *saggart*, *termon* or *kill* record an association with a church site. The subject site is located within the townland of Harristown, which was first cited in 1586 as Harreston[1], and appears to record an associated with a historic landowner.

[1] https://www.logainm.ie/ga/17340

3. Archaeological test trenching

Overview

The programme of archaeological test trenching described in this report was carried out under Excavation Licence 23E0940 over a period of three days between Tuesday 28th and Thursday 30th November 2023. A total of 11 no. linear trenches (T3 – T13) were excavated under archaeological supervision across the footprint of the area proposed for development and within the boundaries of the subject site (**Figure 9**). Two trenches (Trench 1 and 2) were omitted from the original trenching programme due to lack of access to the northeast corner of the site and the length of Trench 3 was reduced by 30m. All trenches were located within rough grazing land which is currently severely poached and waterlogged. A total of 1195 linear metres were excavated at different locations within the area proposed for development, using a tracked 360° mechanical excavator fitted with a toothless grading bucket and operating under strict supervision by the licensee. The excavated spoil from all trenches was also systematically inspected to assist with artefact retrieval.

All trenches were backfilled with the excavated material and surfaces re-instated following the completion of works.

***Figure 9**: Location of test trenches 1-13, (yellow outline). Trench 1 and 2 not excavated due to lack of access,*

Table 2: *Trench details. See* ***Figure 9*** *for trench locations*

Trench ID	***Orientation***	***Dimensions***
T1	E-W	Not excavated
T2	E-W	Not excavated
T3	E-W	50m x 1.8m
T4	E-W	80m x 1.8m
T5	E-W	80m x 1.8m
T6	E-W	110m x 1.8m
T7	ENE-WSW	230m x 1.8m
T8	ENE-WSW	125m x 1.8m
T9	ENE-WSW	128m x 1.8m
T10	E-W	100m x 1.8m
T11	E-W	100m x 1.8m
T12	E-W	96m x 1.8m
T13	E-W	96m x 1.8m

Trench descriptions

All trenches were located within agricultural land used for grazing and excavated through topsoil deposits (**Figure 9**). The natural subsoil, a light grey/yellow clay was encountered at a depth of 0.25 to 0.55m below the ground surface. Two charcoal rich features, [C.003] and [C.004] interpreted as possible pits or troughs, were identified within Trench 7 and 10. No other archaeological features or deposits were uncovered. Trench 1 and 2 could not be excavated due to lack of access, and Trench 3 was shortened by 30m (**Plate 1**). Extracts from the photographic record are presented in **Appendix 3**.

Trench ID	**T1**
Dimensions	Not excavated, land not available for testing
Orientation	E-W
ITM Co-ords	713524.78 742509.39 713574.52 742507.13
Description	**Plate 1**

Trench ID	**T2**
Dimensions	Not excavated, land not available for testing
Orientation	E-W
ITM Co-ords	713522.93 742494.60 713587.25 742490.70
Description	**Plate 1**

Trench ID	T3
Dimensions	W: 1.8m L: 50m D: 0.30 – 0.40m
Orientation	E-W
ITM Co-ords	713520.47 742476.33 713570.67 742475.01
Description	Test Trench 3 (T3) was excavated to a minimum depth of 0.3m and a maximum depth of 0.4m below the existing ground level. The topsoil consisted of mid greyish brown silty clay with moderate inclusions of small stones. It overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. The trench was shortened by 30m due to its eastern end being unavailable for testing. Nothing of archaeological significance was encountered in this trench. **Plate 2 and 3**

Trench ID	T4
Dimensions	W: 1.8m L: 80m D: 0.30 – 0.40m
Orientation	E-W
ITM Co-ords	713519.24 742459.70 713600.54 742456.21
Description	Test Trench 4 (T4) was excavated to a depth of 0.3 - 0.4m below the existing surface level. The topsoil consisted of mid greyish brown silty clay with moderate inclusions of small stones. It overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. Nothing of archaeological significance was encountered in this trench. **Plate 4 and 5**

Trench ID	T5
Dimensions	W: 1.8m L: 80m D: 0.30 – 0.40m
Orientation	E-W
ITM Co-ords	713515.54 742443.07 713597.67 742439.58
Description	Test Trench 5 (T5) was excavated to a depth of 0.3 - 0.4m below the existing surface level. was excavated to a depth of 0.3 - 0.4m below the existing surface level. The topsoil consisted of mid greyish brown silty clay with moderate inclusions of small stones. It overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. Nothing of archaeological significance was encountered in this trench. **Plate 6 - 7**

Trench ID	T6
Dimensions	W: 1.8m L: 110m D: 0.3-0.4m
Orientation	E-W
ITM Co-ords	713484.33 742430.13 713595.20 742425.00
Description	Test Trench 6 (T6) was excavated to a minimum depth of 0.3m and a maximum depth of 0.4m below the existing ground level. The topsoil consisted of mid greyish brown silty clay with moderate inclusions of small stones. It overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. Nothing of archaeological significance was encountered in this trench. **Plate 8 - 9**

Trench ID	T7
Dimensions	W: 1.8m L: 230m D:0.25-0.4m
Orientation	ENE-WSW
ITM Co-ords	713470.78 742483.77 713367.10 742485.41
Description	Test Trench 7 (T7) was excavated to a minimum depth of 0.25m and a maximum depth of 0.4m below the existing ground level. The topsoil consisted of a mid greyish brown silty clay with occasional stone inclusions. This overlay a compact grey/yellow clay subsoil with occasional stone inclusions. One possible pit or trough feature [C.003] defined by charcoal rich silty clay and heat fractured stones was uncovered in this trench at 713496.84/742399.71 (ITM). The feature extended slightly beyond the limit of excavation to the north and south but appeared to have an oval shape in plan measuring 1.90m SE-NW by 1.50m NE-SW. A number of modern cultivation furrows orientated east – west and filled with topsoil were noted within this trench. **Plate 10 - 12**

Trench ID	T8
Dimensions	W: 1.8m L: 125m D:0.3-0.5m
Orientation	ENE-WSW
ITM Co-ords	713464.62 742468.37 713365.05 742471.45
Description	Test Trench 8 (T8) was excavated to a minimum depth of 0.3m and a maximum depth of 0.5m below the existing surface level. The topsoil consisted of mid greyish brown silty clay with moderate inclusions of small stones. It overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. A number of modern cultivation furrows orientated east – west and filled with topsoil were noted within this trench. Nothing of archaeological significance was encountered in this trench. **Plate 13 - 14**

Trench ID	T9
Dimensions	W: 1.8m L: 128m D:0.3-0.4m
Orientation	ENE-WSW
ITM Co-ords	713462.57 742456.06 713364.02 742458.52
Description	Test Trench 9 (T9) was excavated to a minimum depth of 0.3m and a maximum depth of 0.4m below the existing surface level. The topsoil consisted of mid greyish brown silty clay with moderate inclusions of small stones. It overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. A number of modern cultivation furrows orientated east – west and filled with topsoil were noted within this trench. Nothing of archaeological significance was encountered in this trench. **Plate 15 - 16**

Trench ID	T10
Dimensions	W: 1.8m L: 100m D:0.4-0.5m
Orientation	E-W
ITM Co-ords	713460.73 742442.50 713364.02 742446.41

Description	Test Trench 10 (T10) was excavated to a minimum depth of 0.4m and a maximum depth of 0.5m below the existing surface level. The topsoil consisted of a mid greyish brown silty clay with occasional stone inclusions. This overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. One possible pit feature [C.004] defined by charcoal rich silty clay and occasional heat fractured stones was uncovered in this trench at 713424.72/742486.80 (ITM). The feature had a circular shape in plan and a diameter of 1.15m. **Plate 17 - 19**

Trench ID	**T11**
Dimensions	W: 1.8m L: 100m D:0.4-0.5m
Orientation	E-W
ITM Co-ords	713362.38 742421.36 713595.61 742385.84
Description	Test Trench 10 (T10) was excavated to a minimum depth of 0.4m and a maximum depth of 0.5m below the existing surface level. The topsoil consisted of a mid greyish brown silty clay with occasional stone inclusions. This overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. Nothing of archaeological significance was encountered in this trench. **Plate 20 - 21**

Trench ID	**T12**
Dimensions	W: 1.8m L: 96m D:0.4-0.5m
Orientation	E-W
ITM Co-ords	713592.74 742369.21 713469.96 742388.71
Description	Test Trench 12 (T12) was excavated to a minimum depth of 0.4m and a maximum depth of 0.5m below the existing surface level. The topsoil consisted of a mid greyish brown silty clay with occasional stone inclusions. This overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. Nothing of archaeological significance was encountered in this trench. **Plate 22 - 23**

Trench ID	**T13**
Dimensions	W: 1.8m L: 96m D:0.4-0.5m
Orientation	E-W
ITM Co-ords	713593.35 742353.19 713466.47 742372.08
Description	Test Trench 13 (T13) was excavated to a minimum depth of 0.4m and a maximum depth of 0.5m below the existing surface level. The topsoil consisted of a mid greyish brown silty clay with occasional stone inclusions. This overlay a compact light grey/yellow clay subsoil with occasional stone inclusions. Nothing of archaeological significance was encountered in this trench. **Plate 24 - 25**

4. Conclusions and recommendations

Conclusions

A programme of archaeological test trenching comprising 11 no. individual trenches, was carried out at the site of a proposed staff car park extension south of Dublin Airport in the townland of Harristown, County Dublin, over a period of three days between the 28th and 30th November 2023. There are no archaeological sites recorded within the development boundary. The testing programme identified two previously unrecorded archaeological features, interpreted as charcoal rich pits or troughs, within Trench 7 and 10. The proposed development will have a direct negative impact on both features.

Recommendations

The discovery of two archaeological features, in the form of charcoal rich pits or troughs, within the subject site during the test trenching will require a programme of archaeological mitigation. The proposed development will have a direct impact on both features. The proposed method of mitigation for these features is preservation by record (full archaeological excavation and recording). It is therefore recommended that a larger area around each feature is stripped of topsoil in order to find its full extent and any potential associated features, prior to any development work being undertaken at this site. The stripped area will include at least 10m of clearance from the outermost archaeological feature to the edge of the excavation. The supervised topsoil stripping will be undertaken using a mechanical excavator fitted with a toothless bucket which will remove the topsoil down to the uppermost archaeological layer or the surface of natural subsoil in areas where not archaeological material is present. A systematic programme of manual archaeological excavation of all revealed features of archaeological potential will then be carried out in accordance with the method statement submitted to the National Monuments Service (NMS).

Following the completion of excavations, a post-excavation phase of works, involving analysis, reporting and dissemination to the relevant authorities will be undertaken off site. The level of the post-excavation analysis and reporting will be commensurate with the level of archaeology excavated on site.

It should be noted that the above recommendations are subject to the approval of the National Monuments Service and Fingal County Council.

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Appendix 1: Excavation Database Entries

Site Name	*Licence No. & Author*	*Summary*
Harristown	01E0760 Finola O'Carroll	Pre-development testing was undertaken between 7 and 13 September prior to the construction of four pole sets for an ESB power line in Harristown. All were near recorded archaeological sites: pole settings 53 and 54 were within 100m of a ringfort (SMR 46:16) and pole settings 58 and 59 were within 150m of a second ringfort (SMR 52:1). Two 1m2 test-pits were excavated on the site of each pole set, amounting to eight test-pits in total. Excavations at pole set 53 exposed a shallow layer of friable peaty soil overlying grey sandy marl subsoil. At pole setting 54 a modern cobbled field entrance overlay 0.18–0.24m of loose sandy topsoil. Underneath this 0.08–0.2m of light grey sandy marl overlay subsoil, a brown marl with stone inclusions. Test-pits at pole set 58 exposed 0.45m of topsoil underneath a sod layer 0.08m in depth. The soil profile of test-pits at pole set 59 showed a similar soil profile, with increasing compaction towards the subsoil. The subsoil was compact grey sandy marl. Nothing of archaeological interest was recorded in any of the test-pits.
Site B, Horizon Logistics Park, Harristown	15E0388 David McIlreavy & Brenda Fuller	Monitoring of topsoil stripping at Sites B1, B2 and D1, Horizon Logistics Park, located at Harristown, Swords, was undertaken between August and September 2015. Monitoring was carried out in response to planning conditions attached to the development (Planning Ref.: 3012/14). Inspection of sites B1 and B2 prior to groundworks revealed that the area had been largely topsoil stripped in the recent past. Monitoring revealed that the remaining topsoil layer across sites B1 and B2 was less than 0.09m in depth. Removal of the remaining topsoil layer revealed nothing of archaeological significance. No evidence of topsoil removal was observed at site D1 prior to groundworks. The topsoil depth was recorded as 0.35m. Monitoring did not reveal any features of archaeological potential.
Unit D2, Horizon Logistics Park, Merryfalls	17E0133 Rob Lynch & Jane Whitaker	A programme of test trenching was undertaken within the site of a proposed warehouse/logistics unit located at Merryfalls, Co. Dublin in response to planning conditions attached to the proposed development by Fingal County Council (Planning Ref.: F16A/0439). There are no recorded monuments within the proposed development area although a ringfort was identified during geophysical survey in 2010 (DU014-123) c. 40m to south-south-west. Testing was carried out between 5 and 7 April 2017 involving the excavation of 10 trenches measuring 1,145 linear metres. No archaeological objects or deposits were identified during the course of test trenching.

Site Name	*Licence No. & Author*	*Summary*
Unit D2, Horizon Logistics Park, Merryfalls, St. Margaret's, Swords	17E0133EXT Muireann Ni Cheallachain	Archaeological excavations were undertaken at Merryfalls, St. Margaret's, Swords, Co. Dublin at the site of an extension program to Unit D2. Excavations were carried out as per planning conditions attached to the development by Fingal County Council. There are three recorded monuments within 500m of the development site. The closest of these sites is a ringfort (DU014-123) identified during geophysical survey in the Metro West Depot area. Features associated with burnt mound activity of a possible Bronze Age date were identified during archaeological testing at Site N to the south of the development. The excavations at Unit D2, Horizon logistics Park uncovered nine pits, two troughs, a possible well or bath and two field drains. A thin layer of burnt mound material overlay much of the site and also formed many of the fills within the various pits. An isolated cluster of four pits and one trough were located to the west of the site, with the remaining pits and trough found to the north-east and south-east of it, sealed by the burnt mound spread. It is possible that two of the pits located under the burnt mound might be formed naturally. The well or bath, a large pit and one of the troughs were dated very consistently to the Early Bronze Age. A possible set of wooden steps were identified at the base of the well/bath that were identified as ash. Charcoal analysis carried out on the fills of some of the pits and troughs identified very comparable assemblages and showed that two different types of local woodlands were being exploited for fuel at this site: dry woodlands and wet, riparian woodlands, the latter being commonly associated with burnt mound sites. Two post-medieval or modern drainage ditches, running east-west and north-south, cut through several pits as well as the spread. The site at Horizon D2 is an important site locally as it represents a significant addition to the evidence for prehistoric activity in the area. It is however also potentially of regional significance based on the Early Bronze Age nature of the burnt mound activity identified at the site which has indicated possible use of the site as a bathing place.
Merryfalls	17E0391 Faith Bailey	Monitoring of groundworks associated with the development of Unit D3 warehouse/logistics unit has been carried out, which is located at Merryfalls, St Margaret's, Swords, Co. Dublin. Monitoring was undertaken in response to planning conditions attached to the development by Fingal County Council (Planning Ref.: F17A/0017). Nothing of archaeological significance was identified during the course of works associated with the development.
Unit D4-7 Horizon Logistics Park, Merryfalls	17E0494 Rob Lynch	Monitoring was carried out of groundworks associated with the development of a warehouse/logistic building (Units D4-7) at Horizon Logistics Park, which is located within the townland of Merryfalls, St. Margaret's, Swords, County Dublin. The works were carried out in response to planning conditions attached to the

Site Name	*Licence No. & Author*	*Summary*
		development (Planning Ref.: F17A/0240). It follows a previous assessment carried out by Dr Karen Dempsey, May 2017. All topsoil stripping was subject to archaeological supervision. No features of archaeological potential were identified during the course of the works.
Merryfalls Unit, Dublin 9	18E0729 Merryfalls Unit, Dublin 9	A programme of testing was undertaken within the site of a proposed warehouse/logistics unit development at D9, Horizon Logistics Park, Merryfalls, St Margarets, Swords, Co. Dublin. The investigation was carried out in response to planning conditions attached to the proposed development (Planning Ref.: F18A/0457). It follows a previous desktop assessment carried out by Jacqui Anderson of IAC in July 2018. Testing trenches measuring 950 linear metres were excavated across the footprint of the proposed development area over the course of two days in December 2018. No archaeology was identified in any of the excavated test trenches and the northern extent of the site is considered to have limited archaeological potential. The southern part of the site is directly adjacent to an enclosure (DU014-123) and therefore has more archaeological potential. Although no features associated with the enclosure were identified within the current test trenches there may be an adverse impact on any previously unrecorded archaeological features or deposits that have the potential to survive beneath the current ground level, outside of the investigated area. This will be caused by ground disturbances associated with the proposed development. Archaeological monitoring will be carried out for all remaining topsoil stripping as per planning condition 13a; specifically within the southern limit of the development area in proximity to the enclosure.
Muireann Ní Cheallacháin	19E0177 Horizon Site N, Merryfalls and Silloge	Testing revealed four areas of archaeological significance, which have been designated as Archaeological Areas 1–4 (AA1–4). AA1 consists of two small possible prehistoric burnt mound spreads adjacent to a stream within a field boundary ditch, with four associated pits which may be interpreted as possible troughs. AA1 lies within the zone of notification for DU014-021 (possible medieval field system) however no remains of the possible medieval field system were identified during testing and it is presumed the ridge and furrows evident on earlier Google Earth imagery have been ploughed out. AA2: Eight trenches targeted the potential settlement/rectangular enclosing ditch identified during a previous programme of geophysical survey and test trenching. The rectangular ditch measures 1.07m wide and 0.68m deep and has steep concave sides and a concave base. It contains a light to mid brown silty clay fill with occasional stone inclusions. A large pit was identified in the interior of the enclosure and consists of a circular pit with concave sides and

Site Name	Licence No. & Author	Summary
		base. It measures 0.9m in length, 0.82m in width with a depth of 0.24m. It contains several silty-clay fills with occasional charcoal flecking. A curvilinear gully feature was recorded to the north of the rectangular enclosure. It consists of a narrow curving ditch with steep sides and a V-shaped base and contains a brown sandy silt fill. AA3: Three trenches targeted a circular anomaly identified on an aerial photograph. Segments of the three trenches were hand dug across the estimated location of the enclosure. The ditch averages 0.8m in width and 0.25m in depth across the three trenches and contains an orange brown silty clay with occasional pebbles. The circular enclosure has a diameter of 17.5m and consists of a curvilinear ditch with sloping sides and a stony concave base. No interior features were identified during testing. The small diameter and shallow nature of the enclosing ditch suggest that it is potentially a ring ditch or barrow of possibly prehistoric date. No dating evidence or indication of burial was retrieved from the test trenches AA4: Three trenches targeted the location of a previously tested 18th/19th-century vernacular house annotated as the 'Mad House' on Taylor's 1860 map. Previous test trenching of the structure revealed it to be an extensively robbed out, two-room structure of post-medieval date. Partially robbed out stone and red brick wall foundations were recorded in the two trenches, including a corner wall. The corner brick wall measures 0.4m in width and is comprised of three rows of brick. A west–east running wall is constructed of stone and red-brick and measures 0.55m in width. The north-eastern section of the building in both trenches is heavily disturbed and covered in building rubble. A fifth area (AA5) is formed by a probable ringfort in the north-west corner of the site that was identified during geophysical survey and testing in 2010 (DU014-123). This site will be preserved in situ and incorporated into green space. The remainder of the site contained multiple field drains of varying orientations and construction. These included narrow vertical-sided drains, wide concave drains, stone-lined drains and cobble-filled drains. Several possible post-medieval field boundary ditches of varying orientations were also identified across the site.

Appendix 2: Archaeological Inventory Entries

SMR Number	*Class & Description*	*Townland*	*ITM Reference*
DU014-008----	Enclosure: Situated in low-lying pasture. A roughly circular single ditched enclosure (diam. c. 35m) appears as a cropmark on an aerial photograph taken in 1971 (FSI 462/1). This may be a levelled ringfort. It is under the Dublin Airport runway.Not visible at ground level.	Harristown	713753 742908
DU014-040----	House - 16th/17th century: The Down Survey (1655-6) map shows a dwelling near where Harristown House was located. Described in the Civil survey (1654-6) as the 'ruins of old walls of stone' (Simington 1945, 210). Harristown House probably occupied the site. Now the site is part of the runway at Dublin Airport. Not visible at ground level.	Harristown	713687, 742731
DU014-123----	Enclosure: This monument was identified from geophysical survey (Licence no. 09R195) and confirmed by test excavation (Licence no. 10E0459) as part of the proposed Metro West development. It is a circular enclosure (30m diam.) characterised by a U-shaped ditch (1.1m-2.2m wide by 0.45m deep). Although undated its form, size and shape are consistent with that of a severely truncated early medieval ringfort (O'Donovan 2010, 16).	Merryfalls	714060, 742077

Appendix 3: Photographic record

Plate 1: *View of separate development in northeastern portion of site and not available for testing, facing northwest*

Plate 2*: Trench 3 facing east*

Plate 3: *Trench 3 facing west*

Plate 4*: Trench 4 facing east*

Plate 5: *Trench 4 facing west*

Plate 6: *Trench 5 facing east*

Plate 7: *Trench 5 facing west*

Plate 8: *Trench 6 facing west*

Plate 9: *Trench 6 facing east*

Plate 10: *Trench 7 facing west-northwest*

Plate 11: *Trench 7 facing east-southeast*

Plate 12: *Trench 7, feature [C.003], facing east-southeast*

Plate 13: *Trench 8 facing west-northwest*

Plate 14: *Trench 8 facing west-northwest*

Plate 15: *Trench 9 facing east-southeast*

Plate 16: *Trench 9 facing west-northwest*

Plate 17: *Trench 10 facing east*

Plate 18: *Trench 10 facing west*

Plate 19: *Close up of feature [C.004] in Trench 10 facing west*

Plate 20: *Trench 11 facing east*

Plate 21: *Trench 11 facing west*

Plate 22*: Trench 12 facing west*

***Plate 23**: Trench 12 facing east*

***Plate 24**: Trench 13 facing west*

***Plate 25**: Trench 13 facing east*

Appendix 13.2: Database of Irish Excavation Reports descriptions

Licence No. and Location	Description
01E0760 Harristown	Pre-development testing was undertaken between 7 and 13 September prior to the construction of four pole sets for an ESB power line in Harristown. All were near recorded archaeological sites: pole settings 53 and 54 were within 100m of a ringfort (SMR 46:16) and pole settings 58 and 59 were within 150m of a second ringfort (SMR 52:1). Two 1m2 test-pits were excavated on the site of each pole set, amounting to eight test-pits in total. Excavations at pole set 53 exposed a shallow layer of friable peaty soil overlying grey sandy marl subsoil. At pole setting 54 a modern cobbled field entrance overlay 0.18–0.24m of loose sandy topsoil. Underneath this 0.08–0.2m of light grey sandy marl overlay subsoil, a brown marl with stone inclusions. Test-pits at pole set 58 exposed 0.45m of topsoil underneath a sod layer 0.08m in depth. The soil profile of test-pits at pole set 59 showed a similar soil profile, with increasing compaction towards the subsoil. The subsoil was compact grey sandy marl. Nothing of archaeological interest was recorded in any of the test-pits. *Author: Finola O'Carroll*
15E0388 Site B, Horizon Logistics Park, Harristown	Monitoring of topsoil stripping at Sites B1, B2 and D1, Horizon Logistics Park, located at Harristown, Swords, was undertaken between August and September 2015. Monitoring was carried out in response to planning conditions attached to the development (Planning Ref.: 3012/14). Inspection of sites B1 and B2 prior to groundworks revealed that the area had been largely topsoil stripped in the recent past. Monitoring revealed that the remaining topsoil layer across sites B1 and B2 was less than 0.09m in depth. Removal of the remaining topsoil layer revealed nothing of archaeological significance. No evidence of topsoil removal was observed at site D1 prior to groundworks. The topsoil depth was recorded as 0.35m. Monitoring did not reveal any features of archaeological potential. *Authors: David McIlreavy & Brenda Fuller*
17E0133 Unit D2, Horizon Logistics Park, Merryfalls	A programme of test trenching was undertaken within the site of a proposed warehouse/logistics unit located at Merryfalls, Co. Dublin in response to planning conditions attached to the proposed development by Fingal County Council (Planning Ref.: F16A/0439). There are no recorded monuments within the proposed development area although a ringfort was identified during geophysical survey in 2010 (DU014-123) c. 40m to south-south-west. Testing was carried out between 5 and 7 April 2017 involving the excavation of 10 trenches measuring 1,145 linear metres. No archaeological objects or deposits were identified during the course of test trenching. *Authors: Rob Lynch & Jane Whitaker*
17E0133 ext. Unit D2, Horizon Logistics Park, Merryfalls	Archaeological excavations were undertaken at Merryfalls, St. Margaret's, Swords, Co. Dublin at the site of an extension program to Unit D2. Excavations were carried out as per planning conditions attached to the development by Fingal County Council. There are three recorded monuments within 500m of the development site. The closest of these sites is a ringfort (DU014-123) identified during geophysical survey in the Metro West Depot area. Features associated with burnt mound activity of a possible Bronze Age date were identified during archaeological testing at Site N to the south of the development. The excavations at Unit D2, Horizon logistics Park uncovered nine pits, two troughs, a possible well or bath and two field drains. A thin layer of burnt mound material overlay much of the site and also formed many of the fills within the various pits.

Licence No. and Location	Description
	An isolated cluster of four pits and one trough were located to the west of the site, with the remaining pits and trough found to the north-east and south-east of it, sealed by the burnt mound spread. It is possible that two of the pits located under the burnt mound might be formed naturally. The well or bath, a large pit and one of the troughs were dated very consistently to the Early Bronze Age. A possible set of wooden steps were identified at the base of the well/bath that were identified as ash. Charcoal analysis carried out on the fills of some of the pits and troughs identified very comparable assemblages and showed that two different types of local woodlands were being exploited for fuel at this site: dry woodlands and wet, riparian woodlands, the latter being commonly associated with burnt mound sites. Two post-medieval or modern drainage ditches, running east-west and north-south, cut through several pits as well as the spread. The site at Horizon D2 is an important site locally as it represents a significant addition to the evidence for prehistoric activity in the area. It is however also potentially of regional significance based on the Early Bronze Age nature of the burnt mound activity identified at the site which has indicated possible use of the site as a bathing place. *Author: Muireann Ni Cheallachain*
17E0391 Merryfalls	Monitoring of groundworks associated with the development of Unit D3 warehouse/logistics unit has been carried out, which is located at Merryfalls, St Margaret's, Swords, Co. Dublin. Monitoring was undertaken in response to planning conditions attached to the development by Fingal County Council (Planning Ref.: F17A/0017). Nothing of archaeological significance was identified during the course of works associated with the development. *Author: Faith Bailey*
17E0494 Unit D4-7 Horizon Logistics Park, Merryfalls	Monitoring was carried out of groundworks associated with the development of a warehouse/logistic building (Units D4-7) at Horizon Logistics Park, which is located within the townland of Merryfalls, St. Margaret's, Swords, County Dublin. The works were carried out in response to planning conditions attached to the development (Planning Ref.: F17A/0240). It follows a previous assessment carried out by Dr Karen Dempsey, May 2017. All topsoil stripping was subject to archaeological supervision. No features of archaeological potential were identified during the course of the works. *Author: Rob Lynch*
18E0729 D9, Horizon Logistics Park Merryfalls	A programme of testing was undertaken within the site of a proposed warehouse/logistics unit development at D9, Horizon Logistics Park, Merryfalls, St Margarets, Swords, Co. Dublin. The investigation was carried out in response to planning conditions attached to the proposed development (Planning Ref.: F18A/0457). It follows a previous desktop assessment carried out by Jacqui Anderson of IAC in July 2018. Testing trenches measuring 950 linear metres were excavated across the footprint of the proposed development area over the course of two days in December 2018. No archaeology was identified in any of the excavated test trenches and the northern extent of the site is considered to have limited archaeological potential. The southern part of the site is directly adjacent to an enclosure (DU014-123) and therefore has more archaeological potential. Although no features associated with the enclosure were identified within the current test trenches there may be an adverse impact on any previously unrecorded archaeological features or deposits that have the potential to survive beneath the current ground level, outside of the investigated area. This will be caused by ground disturbances associated with the proposed development.

Licence No. and Location	Description
	Archaeological monitoring will be carried out for all remaining topsoil stripping as per planning condition 13a; specifically within the southern limit of the development area in proximity to the enclosure. *Author: Muireann Ní Cheallacháin*
18E0729 ext. D9, Horizon Logistics Park Merryfalls	Archaeological monitoring of topsoil stripping was carried out at the site from 12 to 25 February 2019. This followed a course of test trenching carried out across the site in December 2018; no archaeology was found during this programme of testing. There are no recorded monuments within the boundaries of the proposed development site. However, an enclosure or heavily truncated ringfort (DU014-123) was subject to geophysical survey and archaeological testing, to the immediate east of the development area (Licence Ref.: 10E0459). A second enclosure and a second field system are located c. 475m south and 485m southwest respectively (DU014-110 and DU0140-107). No archaeological features or deposits were identified during the course of monitoring. No further archaeological mitigation is deemed to be necessary in association with the development. *Author: Muireann Ní Cheallacháin*
19E0177 Horizon Site N, Merryfalls	Testing revealed four areas of archaeological significance, which have been designated as Archaeological Areas 1–4 (AA1–4). AA1 consists of two small possible prehistoric burnt mound spreads adjacent to a stream within a field boundary ditch, with four associated pits which may be interpreted as possible troughs. AA1 lies within the zone of notification for DU014-021 (possible medieval field system) however no remains of the possible medieval field system were identified during testing and it is presumed the ridge and furrows evident on earlier Google Earth imagery have been ploughed out. AA2: Eight trenches targeted the potential settlement/rectangular enclosing ditch identified during a previous programme of geophysical survey and test trenching. The rectangular ditch measures 1.07m wide and 0.68m deep and has steep concave sides and a concave base. It contains a light to mid brown silty clay fill with occasional stone inclusions. A large pit was identified in the interior of the enclosure and consists of a circular pit with concave sides and base. It measures 0.9m in length, 0.82m in width with a depth of 0.24m. It contains several silty-clay fills with occasional charcoal flecking. A curvilinear gully feature was recorded to the north of the rectangular enclosure. It consists of a narrow curving ditch with steep sides and a V-shaped base and contains a brown sandy silt fill. AA3: Three trenches targeted a circular anomaly identified on an aerial photograph. Segments of the three trenches were hand dug across the estimated location of the enclosure. The ditch averages 0.8m in width and 0.25m in depth across the three trenches and contains an orange brown silty clay with occasional pebbles. The circular enclosure has a diameter of 17.5m and consists of a curvilinear ditch with sloping sides and a stony concave base. No interior features were identified during testing. The small diameter and shallow nature of the enclosing ditch suggest that it is potentially a ring ditch or barrow of possibly prehistoric date. No dating evidence or indication of burial was retrieved from the test trenches AA4: Three trenches targeted the location of a previously tested 18th/19th-century vernacular house annotated as the ‘Mad House’ on Taylor's 1860 map. Previous test trenching of the structure revealed it to be an extensively robbed out, two-room structure of post-medieval date. Partially robbed out stone and red brick wall foundations were recorded in the two trenches, including a corner wall. The corner brick wall measures 0.4m in width and is comprised of three

Licence No. and Location	Description
	rows of brick. A west–east running wall is constructed of stone and red-brick and measures 0.55m in width. The north-eastern section of the building in both trenches is heavily disturbed and covered in building rubble. A fifth area (AA5) is formed by a probable ringfort in the north-west corner of the site that was identified during geophysical survey and testing in 2010 (D0014-123). This site will be preserved in situ and incorporated into green space. The remainder of the site contained multiple field drains of varying orientations and construction. These included narrow vertical-sided drains, wide concave drains, stone-lined drains and cobble-filled drains. Several possible post-medieval field boundary ditches of varying orientations were also identified across the site. *Author: Muireann Ní Cheallacháin*

Appendix 13.3: Fingal County Council Planning Objectives

Appendix 13.3: Fingal County Development Plan 2023-2029 Cultural Heritage Policies and Objectives

Relevant Archaeological Policies and Objectives

Policy/Objective ref.	Policy/Objective
Policy HCAP2 Importance of Archaeological Resource:	Recognise the importance of our archaeological resource and provide appropriate objectives to ensure its appropriate retention, promotion and recording.
Policy HCAP3 Record of Monuments and Places/ Sites and Monuments Record	Safeguard archaeological sites, monuments, objects and their settings listed in the Record of Monuments and Places (RMP), Sites and Monuments Record (SMR), underwater cultural heritage including protected wrecks and any additional newly discovered archaeological remains.
Policy HCAP4 Preservation-in-situ:	Favour the preservation in-situ (or at a minimum preservation by record) of all sites and features of historical and archaeological interest.
Objective HCAO1 Preservation-in-situ:	Favour the preservation in situ or at a minimum preservation by record, of archaeological sites, monuments, features or objects in their settings. In securing such preservation the Council will have regard to the advice and recommendations of the National Monuments Service of the Department of the Housing, Local Government and Heritage.
Objective HCAO2 Protection of RMPs/SMRs	Protect all archaeological sites and monuments, underwater archaeology, and archaeological objects, which are listed in the Record of Monuments and Places, Wreck Inventory of Ireland and all sites and features of archaeological and historic interest discovered subsequent to the publication of the Record of Monuments and Places, and to seek their preservation in situ (or at a minimum, preservation by record) through the planning process
Objective HCAO3 Management of Archaeological Resource	Encourage and promote the appropriate management and maintenance of the County's archaeological heritage, including historical burial grounds and underwater cultural heritage in accordance with conservation principles and best practice guidelines.
Objective HCAO4 Industrial or Military Heritage	Secure the preservation in-situ of significant examples of industrial or military heritage
Objective HCAO5 Community Monuments Fund	Support the implementation of the Community Monuments Fund in order to ensure the monitoring and adaptation of archaeological monuments and mitigate against damage caused by climate change.
Objective HCAO6 Climate Change and the Archaeological Resource	Co-operate with other agencies in the investigation of climate change on archaeological sites and monuments and to develop suitable adaptation measures to strengthen resilience and reduce the vulnerability of archaeological heritage in line with the National Climate Change Sectoral Adaptation Plan for Built and Archaeological Heritage 2019
Policy HCAP5 Development Design	Require that proposals for linear development over one kilometre in length; proposals for development involving ground clearance of more than half a hectare; or developments in proximity to areas with a density of known archaeological monuments and history of discovery; to include an

Policy/Objective ref.	Policy/Objective
	Archaeological Impact Assessment and refer such applications to the relevant Prescribed Bodies.
Objective HCAO9 Archaeology in the Landscape	Ensure that in general development will not be permitted which would result in the removal of archaeological monuments with above ground features, protected wrecks and that this will be especially the case in relation to archaeological monuments which form significant features in the landscape
Objective HCAO10 Context of Archaeological Monuments	Ensure that development within the vicinity of a Recorded Monument or Zone of Archaeological Notification does not seriously detract from the setting of the feature and is sited and designed appropriately
Objective HCAO11 Impacts of large-scale development	Ensure that proposals for large scale developments and infrastructure projects consider the impacts on the archaeological heritage and seek to avoid them
Objective HCAO12 Coastal and Maritime Heritage	Co-operate with other agencies in the assessment of the potential for climate change to impact on coastal, riverine, inter-tidal and sub-tidal sites and their environments including shipwreck sites
Objective HCAO13 Findings of Archaeological Activity	Encourage reference to or incorporation of significant archaeological finds into development schemes, where appropriate and sensitively designed, through layout, in situ and virtual presentation of archaeological finds and by using historic place names and the Irish language where appropriate
Objective HCAO14 Archaeology in Open Space	Retain and manage appropriately archaeological monuments within open space areas in or beside developments, ensuring that such monuments are subject to an appropriate conservation management plan, are presented appropriately and are not left vulnerable, whether in the immediate or longer term, to dangers to their physical integrity or possibility of loss of amenity
Policy HCAP6 Promotion	Promote the tourism potential of Fingal's cultural heritage and improve legibility by providing guidance for appropriate interpretation in line with the Fingal Heritage Signage and Trails Guidance 2021

Relevant Architectural Heritage Policies and Objectives

Policy/Objective ref.	Policy/Objective
Policy HCAP8 Protection of Architectural Heritage	Ensure the conservation, management, protection and enhancement of the architectural heritage of Fingal through the designation of Protected Structures and Architectural Conservation Areas, the safeguarding of designed landscapes and historic gardens, and the recognition of structures and elements with no specific statutory designation that contribute positively to the vernacular, industrial, maritime or 20th century heritage of the County
Policy HCAP9 Re-use of Architectural Heritage	Champion the maintenance, repair, re-use and sensitive retro-fitting of the architectural heritage and older building stock of the County as a cornerstone of its sustainable development policy and will require that adaptative re-use and regeneration adheres to best conservation practice.
Policy HCAP10 Retention	Continue to support and encourage the sympathetic and appropriate reuse, rehabilitation and retention of protected structures and historic buildings ensuring the special interest, character and setting of the building or structure is preserved
Policy HCAP11 Conservation of Architectural Heritage	Conserve and protect buildings, structures and sites of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest by adding or retaining them on the Record of Protected Structures or by designating groups of structures as Architectural Conservation Areas.

Policy/Objective ref.	Policy/Objective
Policy HCAP12 Interventions to Protected Structures	Ensure that direct or indirect interventions to Protected Structures or adjoining development affecting them are guided by architectural conservation principles so that they are sympathetic, sensitive and appropriate to the special interest, appearance, character, and setting of the Protected Structure and are sensitively scaled and designed
Policy HCAP13 Retention of Protected Structures	Require the retention and appropriate active use of Protected Structures.
Policy HCAP14 Architectural Conservation Areas	Protect the special interest and character of all areas which have been designated as an Architectural Conservation Area (ACA). Development within or affecting an ACA must contribute positively to its character and distinctiveness and take opportunities to protect and enhance the character and appearance of the area and it's setting wherever possible. Development shall not harm buildings, spaces, original street patterns, archaeological sites, historic boundaries or features, which contribute positively to the ACA
Policy HCAP15 Character of Architectural Conservation Areas	Support and encourage the sympathetic and appropriate adaptive reuse, refurbishment, and upgrading of protected structures and buildings or structures that contribute to the character of an Architectural Conservation Area ensuring that their special interest, character and setting is retained. Prohibit development that seeks the demolition of a Protected Structure or buildings that contribute to the character of an ACA in almost all circumstances
Policy HCAP16 Conservation Best Practice	Promote best conservation practice and encourage the use of appropriately qualified and experienced conservation professionals, contractors, and craft persons.
Objective HCAO22 Record of Protected Structures	Review the Record of Protected Structures (RPS) to assess current entries and to add structures of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest as appropriate
Objective HCAO23 Expansion of Record of Protected Structures	Expand the RPS to include structures of industrial, maritime, vernacular and twentieth century heritage where they are of sufficient significance and complete the assessment of the few remaining Ministerial Recommendations from the National Inventory of Architectural Heritage (NIAH) Survey of Fingal
Objective HCAO24 Alteration and Development of Protected Structures and ACAs	Require proposals for any development, modification, alteration, extension or energy retrofitting affecting a Protected Structure and/or its setting or a building that contributes to the character of an ACA are sensitively sited and designed, are compatible with the special character, and are appropriate in terms of the proposed scale, mass, height, density, architectural treatment, layout, materials, impact on architectural or historic features
Objective HCAO25 Architectural Heritage Impact Statement	Require an Architectural Heritage Impact Statement as part of the planning documentation for development that has the potential to affect the relationship between the Protected Structure and any complex of adjoining associated buildings, designed landscape features, or designed views or vistas from or to the structure. This particularly relates to large landholdings such as country estates, institutional complexes, and industrial sites where groups of structures have a functional connection or historical relationship with the principal building
Objective HCAO26 Use of Protected Structures	Where required to support active use or facilitate suitable adaptive re-use of Protected Structures the Council may in certain circumstances consider the relaxation of site zoning restrictions to secure the preservation and conservation of the Protected Structure where the use proposed is compatible with the existing structure. This will only be permitted where the development is consistent with conservation policies and the proper planning and sustainable development of the are
Objective HCAO27 Protected Structures	Where permission is being sought for a development in which works to the Protected Structure are one element of a larger proposal, the Council will seek

Policy/Objective ref.	Policy/Objective
within Larger Developments	for the repair and refurbishment of the Protected Structure to be contained and completed within the first phase.
Objective HCAO28 Conservation Plans for Protected Structures	Demonstrate best practice in relation to the management, care and maintenance of Protected Structures by continuing the programme of commissioning Conservation Plans for the principal heritage properties in the Council's ownership (several of which are also ACAs), implement the policies and actions of these Conservation Plans where they exist, and ensure the Plans are used by all sections of the Council to inform and direct the design of interventions within the heritage properties, both to buildings and landscapes
Policy HCAP18 Designed Landscape Features, Settings and Views	Protect the setting, significant views, and built features of historic designed landscapes and promote the conservation of their essential character, both built and natural.
Policy HCAP19 Development and Historic Demesnes	Resist proposals or developments that would lead to the loss or, or cause harm to the character, principal components or setting of historic designed landscapes and demesnes of significance in the County
Objective HCAO31 Protection of Designed Landscapes	Identify the historic designed landscapes of significance in the County and determine the appropriate mechanism to ensure their future protection. Several of the most significant are already designated, as Architectural Conservation Areas.
Objective HCAO32 – Designed Landscape Appraisals	Require that proposals for development within historic designed landscapes include a Designed Landscape Appraisal (including an ecological assessment) as part of the planning documentation to fully consider the potential impacts of the proposal. The appraisal should be carried out prior to the initial design of any development, in order that this evaluation to inform the design which must be sensitive to and respect the built heritage elements and green space values of the site
Policy HCAP21 Built Heritage Asset	Protect and enhance the historic environment and built heritage assets, including elements of historic street furniture, paving and historic boundary treatments
Policy HCAP22 Retention and Reuse of Existing Building Stoc	Seek the retention, appreciation and appropriate revitalisation of the historic and vernacular building stock, and 20th century built heritage of Fingal in both the urban and rural areas of the County by deterring the replacement buildings with modern structures and by protecting (through the use of Architectural Conservation Areas and the Record of Protected Structures and in the normal course of Development Management) these buildings where they contribute to the character of an area and/or where they are rare examples of a structure type, a distinctive piece of architecture or have an innate value.
Policy HCAP23 Heritage-led Regeneration	Require that adaptative re-use of older buildings and historic centre heritage-led regeneration adheres to best conservation practice and principles. There will be a presumption against the demolition of older buildings where restoration or adaption is a feasible option
Policy HCAP24 Works to Vernacular Buildings	Works to vernacular buildings should adhere to best conservation practice and use traditional, especially vernacular, building methods and materials
Policy HCAP25 Retention of Historic Fabric	Encourage the retention of the original or historic fabric such as windows, doors, wall renders, roof coverings, shopfronts, pub fronts and other significant features of older or historic buildings, whether protected or not
Policy HCAP26 Historic Townscapes	Recognise the importance of historic townscapes or streetscapes in creating a sense of place when the urban fabric or groups of buildings are read together and how the gradual attrition of historic fabric or detailing, or the demolition and replacement of individual modest buildings can fundamentally alter the character of the place.

Policy/Objective ref.	Policy/Objective
Objective HCAO40 Public Realm Works	Require that public realm works, proposed infrastructural and public utility works do not remove historic street furniture such as limestone or granite kerbs, cobblestones, cast-iron post boxes, water pumps, milestones and historic street-lamp standards, except where an exceptional need has been clearly established.
Objective HCAO41 – Modern Street Furniture	Sensitively design, locate and rationalise modern street furniture and elements such as utility boxes, cables, bins, bike racks, poles, wires, antenna and signage. Defunct or obsolete telephone boxes/kiosks should be removed rather than replaced
Policy HCAP27 Recognition of Industrial Heritage	Recognise the value of the industrial heritage of the County and seek to protect and retain it through designation or appropriately scaled and designed development for its continued or adaptive re-use, taking direction from the ICOMOS (International Council on Monuments and Sites) and TICCIH (The International Committee for the Conservation of the Industrial Heritage) Principles for the Conservation of Industrial Heritage (The Dublin Principles)
Objective HCAO45 – Development and Industrial Heritage	Utilise the information provided within the Fingal Industrial Heritage Survey when assessing development proposals for surviving industrial heritage sites
Objective HCAO46 – Preservation of Industrial Heritage	Secure the preservation in-situ of significant examples of industrial, military and nautical heritage that form part of our post-medieval archaeological heritage, and examples of which may date from periods up to and including the 20th century
Objective HCAO47 Historic Harbours	Ensure that repairs and new insertions to the historic harbours, piers and quays are appropriate in the materials used and, in the design, and scale of any new structures or equipment
Objective HCAO48 Historic Bridge	Seek the retention and appropriate repair/maintenance of the historic road and rail bridges of the County whether Protected Structures or not

Relevant Cultural Heritage Policies and Objectives

Policy/Objective ref.	Policy/Objective
Policy HCAP32 Protection of Cultural Infrastructure	Ensure that culture infrastructure is valued and protected as an integral part of the fabric of Fingal, in line with national and regional policy.
Objective HCAO59 Cultural Assets	Ensure that regeneration contributes to the cultural assets of the community with new spaces provided at street level in larger regeneration projects that will accommodate and provide for new local cultural uses
Policy HCAP34 Irish Language	Highlight the profile of the Irish language in the urban and rural environment and support the Irish language by facilitating the provision of Irish language facilities and activities
Objective HCAO64 Townland Names	Encourage the use and promotion of historical and current townland names in the urban and rural environment in both the Irish and English languages, with a view to supporting the provision of townlands' place names markers/signage

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