Corstorphine Connections post-12-Month Data Collection

12-Month vs Baseline Data Summary Note

City of Edinburgh Council

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Quality information

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1. Introduction

AECOM was commissioned by The City of Edinburgh Council to offer consultancy services for monitoring and evaluating the Corstorphine Connections project, both before and after its implementation. The baseline surveys were conducted in November 2021, before the project began in May 2023. An initial post-monitoring survey was completed between November and December 2023. The most recent survey took place between May and June 2024, around a year after the project's implementation.

This document compares the results from baseline and 12-month-post surveys. The following surveys were carried out for both study periods:

1. Automatic Traffic Counts (ATCs);
2. Pedestrian/Cycle surveys;
3. Pedestrian desire-line tracing;
4. School surveys;
5. Acoustic surveys; and
6. Air quality surveys.

Names and location for survey sites are shown in Table 1 and Figure 1 below.

Table 1. Survey Site Names

Site Letter	Site Name
A	Meadow Place Road
B	St John's Road
C	Station Road
D	Pinkhill
E	Balgreen Road
F	Ladywell Avenue
G	Dovecot Road
H	Broomhall Crescent
I	Saughton Road North
J	Broomhouse Drive
K	Ladywell Road
L	Featherhall Avenue
M	Manse Street
N	Manse Road
O	Corstorphine High Street
P	Kirk Loan
Q	Lampacre Road

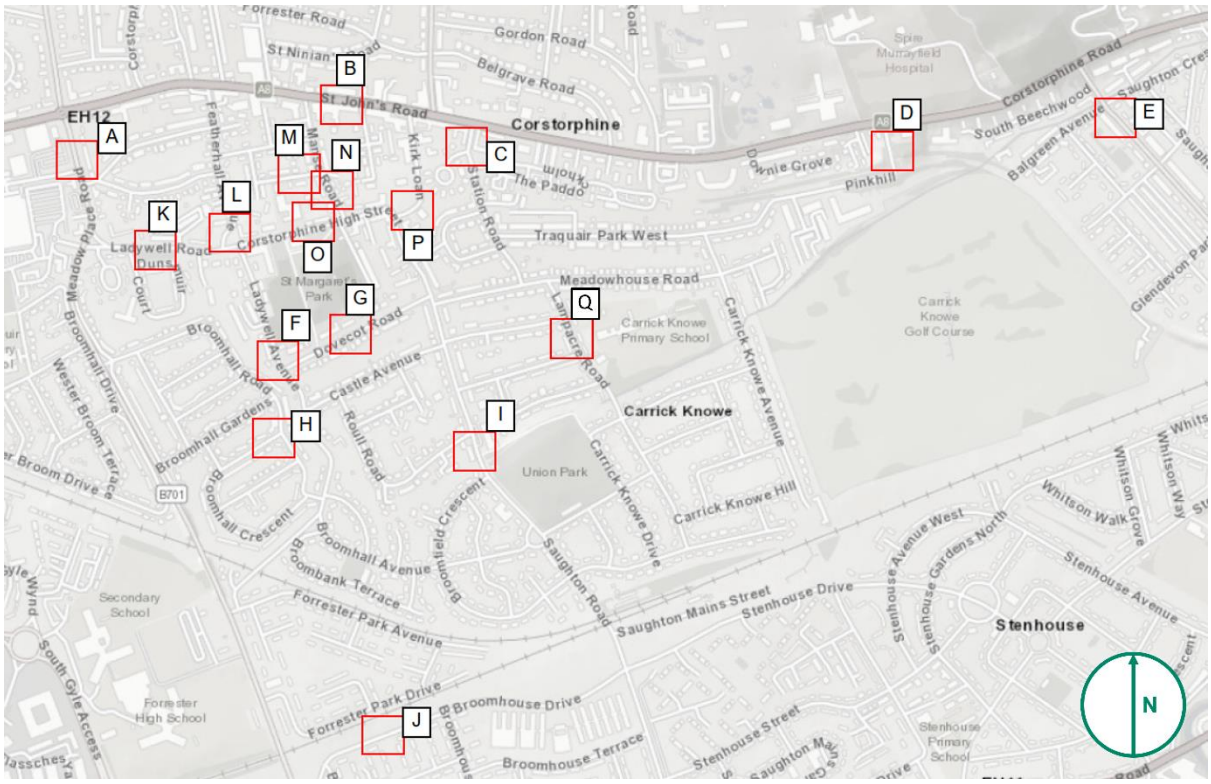


Figure 1: Corstorphine Survey Sites

2. Automatic Traffic Counts

Context

Traffic levels have continued to rise in Edinburgh (and especially West Edinburgh) since 2021, following the recovery from the pandemic, as summarized in Table 40. The Council's counter network reports a 5% overall traffic increase in the city and a 6% rise specifically in West Edinburgh between 2021 and 2023. Similarly, Department for Transport indicates that in 2023, there were 12.1% more miles driven in Edinburgh than in 2021[1].

Results

To evaluate changes in vehicle volumes and speeds, Automatic Traffic Counts were conducted at 16 sites in and around the Corstorphine area. The baseline data corresponds to the period from Monday, 8th November to Friday, 12th November 2021, before the implementation of the Corstorphine Connections scheme. A second follow-up survey was conducted 12 months after the scheme was put into place during May-June 2024, with the 12-month data below covering the period from Monday, 10th June to Friday, 14th June 2024 as this week had the most reliable data capture.

Table 2, Table 3, Table 4, and Table 5 provide a summary and comparison of the ATC results from the baseline and post-12-month surveys, presenting average weekday values. The following results are presented for each of the 16 sites, labelled A-P:

- For the full 24 hours:
  - Baseline, 6-month, and 12-month flows for both directions and the two-way flow
  - The difference between the baseline and 12-month flows for both directions and the two-way.
  - Baseline, 6-month, and 12-month speeds for both directions
  - The difference between the baseline and 12-month speeds for each direction
  - Baseline, 6-month, and 12-month 85th percentile speeds for both directions
  - The difference between the baseline and 12-month 85th percentile speeds for each direction
  - Totals relating to two-way flows for all sites, sites within the project area, sites on boundary roads around the project area, and sites on streets surrounding Corstorphine Primary School.

- During bus gate hours (08:00-10:00 & 14:45-18:30):
  - Baseline, 6-month, and 12-month flows for both directions and the two-way flow
  - The difference between the baseline and 12-month flows for both directions and the two-way.
  - Totals relating to two-way flows for all sites, sites within the project area, sites on boundary roads around the project area, and sites on streets surrounding Corstorphine Primary School.

Lime green shaded table cells identify streets on the boundary of the study area, and dark blue shaded cells identify those surrounding Corstorphine Primary School. Note that the two-way flow values may not equal the sum of the two directional flows due to rounding.

[1] DfT, https://roadtraffic.dft.gov.uk/local-authorities/29, accessed 13/08/24

Table 2: Full 24 Hours - Weekday Average Flows (vehicles)

		Baseline (Nov. '21)			6 Month (Nov. '23)			12 Month (Jul. '24)			12 Month vs Baseline			
Site	Location	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	Two-Way (%)
A	Meadow Place Road	10087	10028	20114	11432	9616	21048	11576	9458	21034	1489	-570	920	
B	St John's Road	11479	9553	21032	11356	10133	21489	11727	10323	22050	248	770	1018	
C	Station Road	1406	821	2227	1947	857	2804	2133	860	2993	727	39	766	
D	Pinkhill	689	1067	1757	691	951	1642	705	918	1624	16	-149	-133	
E	Balgreen Road	3253	3111	6364	3822	3731	7553	3136	3327	6464	-117	216	100	
F	Ladywell Avenue	1130	677	1807	826	581	1407	882	665	1546	-248	-12	-261	
G	Dovecot Road	213	256	469	271	356	628	269	354	623	56	98	154	
H	Broomhall Crescent	103	91	193	85	96	181	90	74	164	-13	-17	-29	
I	Saughton Road North	4304	4585	8889	4052	4591	8644	4643	4925	9568	339	340	679	
J	Broomhouse Drive	3658	3282	6940	6140	5211	11351	4745	4654	9399	1087	1372	2459	
K	Ladywell Road	3981	3115	7096	3615	4047	7662	3681	4119	7801	-300	1004	705	
L	Featherhall Avenue	523	520	1043	619	1082	1700	641	1144	1785	118	624	742	
M	Manse Street	62	102	165	40	111	151	33	119	152	-29	17	-13	
N	Manse Road	3026	3	3028	1534	4	1539	1627	6	1632	-1399	3	-1396	
O	Corstorphine High Street	3809	2597	6406	3604	2850	6454	3439	3019	6458	-370	422	52	
P	Kirk Loan	17	2624	2641	21	2424	2445	25	2756	2780	8	132	139	
			Total	90171			96698			96071			5900	6.5%
			Streets (in project area) Total	35721			35256			37126			1405	3.9%
			Boundary Streets Total	54450			61441			58946			4496	8.3%
			Corstorphine Pr. School Surrounding Streets Total	10642			9844			10027			-615	-5.8%

Table 3: During Bus Gate Hours - Weekday Average Flows (vehicles)

		Baseline (Nov. '21)			6 Month (Nov. '23)			12 Month (Jul. '24)			12 Month vs Baseline			
Site	Location	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	Two-Way (%)
A	Meadow Place Road	3761	3748	7509	4458	3390	7849	4479	3312	7791	717	-436	282	
B	St John's Road	4412	3604	8016	4132	3947	8079	4049	3868	7916	-363	264	-100	
C	Station Road	574	308	882	973	351	1325	1024	354	1378	450	46	496	
D	Pinkhill	281	509	790	319	488	808	330	477	808	49	-31	18	
E	Balgreen Road	1271	1288	2559	1583	1408	2991	1146	1294	2440	-125	7	-119	
F	Ladywell Avenue	557	326	883	397	295	692	423	328	751	-134	2	-132	
G	Dovecot Road	107	115	222	154	180	334	142	177	320	36	62	98	
H	Broomhall Crescent	42	37	78	34	40	74	37	31	68	-4	-6	-10	
I	Saughton Road North	1793	1844	3638	1685	1903	3588	1911	2055	3966	118	211	328	
J	Broomhouse Drive	1679	1451	3130	2493	2346	4839	2161	2035	4196	482	584	1066	
K	Ladywell Road	1579	1273	2853	1446	1895	3341	1406	1967	3374	-173	694	521	
L	Featherhall Avenue	273	256	529	304	610	913	301	668	969	28	412	440	
M	Manse Street	29	48	76	13	47	60	11	50	61	-18	2	-16	
N	Manse Road	1311	1	1312	416	2	418	353	2	356	-957	1	-956	
O	Corstorphine High Street	1510	1073	2583	1478	1265	2743	1363	1337	2699	-148	264	116	
P	Kirk Loan	6	1134	1141	12	1057	1069	10	1145	1155	3	11	15	
			Total	36199			39122			38248			2048	5.7%
			Streets (in project area) Total	14986			15364			15904			918	6.1%
			Boundary Streets Total	21214			23758			22343			1130	5.3%
			Corstorphine Pr. School Surrounding Streets Total	4500			4135			4085			-416	-9.2%

Table 4: Full 24 Hours - Weekday Average Speeds (mph)

		Baseline (Nov. '21)		6 Month (Nov. '23)		12 Month (Jul. '24)		12 Month vs Baseline	
Site	Location	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB
A	Meadow Place Road	17.4	22.1	15.4	21.0	14.5	21.0	-3.0	-1.1
B	St John's Road	15.5	17.3	15.9	17.4	17.6	19.2	2.1	1.9
C	Station Road	13.4	13.2	13.7	14.1	14.8	15.2	1.4	2.0
D	Pinkhill	17.1	17.4	16.0	16.2	17.0	17.0	-0.1	-0.4
E	Balgreen Road	25.4	25.0	23.9	22.4	25.1	23.0	-0.3	-2.0
F	Ladywell Avenue	17.7	19.1	18.1	19.1	18.1	19.5	0.4	0.4
G	Dovecot Road	19.5	19.0	14.4	14.3	15.3	15.0	-4.2	-4.0
H	Broomhall Crescent	16.6	15.7	18.0	17.9	17.7	17.5	1.1	1.8
I	Saughton Road North	22.2	23.5	20.8	21.4	21.5	22.5	-0.7	-1.0
J	Broomhouse Drive	29.7	30.0	27.6	27.7	29.8	30.2	0.1	0.2
K	Ladywell Road	24.2	23.0	22.3	20.2	23.6	21.4	-0.6	-1.6
L	Featherhall Avenue	17.1	15.0	12.9	12.4	12.4	12.1	-4.7	-2.9
M	Manse Street	11.2	11.8	9.8	7.8	9.2	7.8	-2.0	-4.0
N	Manse Road	16.8	-	16.4	-	16.6	-	-0.2	-
O	Corstorphine High Street	22.3	22.6	21.7	20.9	22.9	22.7	0.6	0.1
P	Kirk Loan	10.1	15.6	9.7	15.0	9.9	15.5	-0.2	-0.1

Table 5: Full 24 Hours - Weekday Average 85th Percentile Speeds (mph)

		Baseline (Nov. '21)		6 Month (Nov. '23)		12 Month (Jul. '24)		12 Month vs Baseline	
Site	Location	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB
A	Meadow Place Road	23.4	26.6	21.6	25.4	21.0	25.6	-2.4	-1.1
B	St John's Road	22.4	22.8	22.4	22.0	25.7	24.7	3.3	1.9
C	Station Road	16.4	16.3	17.1	17.5	18.7	18.8	2.3	2.5
D	Pinkhill	20.2	20.1	19.7	19.6	20.6	20.3	0.4	0.2
E	Balgreen Road	28.7	29.0	27.7	26.2	29.1	26.9	0.4	-2.1
F	Ladywell Avenue	21.1	22.7	21.3	22.9	21.8	23.3	0.7	0.6
G	Dovecot Road	24.4	24.6	18.1	17.9	20.1	19.8	-4.4	-4.8
H	Broomhall Crescent	20.4	19.8	22.0	22.3	22.7	23.2	2.3	3.4
I	Saughton Road North	25.9	27.1	24.5	24.8	25.3	26.2	-0.5	-1.0
J	Broomhouse Drive	33.8	34.0	31.5	31.4	34.0	33.8	0.2	-0.2
K	Ladywell Road	27.7	27.0	25.8	24.9	27.3	26.7	-0.3	-0.3
L	Featherhall Avenue	20.3	17.5	15.6	14.9	15.1	14.4	-5.3	-3.2
M	Manse Street	14.5	15.5	11.9	9.9	12.1	10.1	-2.4	-5.4
N	Manse Road	20.0	-	19.7	-	20.0	-	-0.1	-
O	Corstorphine High Street	26.1	26.6	25.6	24.7	26.9	26.9	0.8	0.3
P	Kirk Loan	13.4	18.7	12.4	17.9	13.6	18.7	0.3	0.0

3. Pedestrian / Cycle Surveys

Context

Data suggests that cycling levels in parts of Edinburgh decreased between 2021 and 2023, likely influenced by changes to work and leisure cycling patterns during the pandemic. Cycling levels have then generally increased again during 2024 (Table 41). This may be a factor in the levels of cycling reported during the Corstorphine Connections project which follow a similar overall pattern of decline followed by growth (Table 8).

When reviewing the survey results, the effects of seasonal conditions and weather at the time of the surveys should also be considered. The baseline data was collected in early/mid-November whereas the 12-month data was collected in early/mid June when the weather is generally warmer and dryer, and there are more daylight hours. Further details are provided in Table 42.

It is noted that southbound pedestrian flows on Lampacre Road in the baseline survey are significantly higher than in the opposite direction and on nearby roads. As such it is reasonable to consider that the southbound baseline flow is likely to be anomalous.

Results

Surveys of pedestrians and cyclists were conducted at 8 sites (I, K, L, M, N, O, P, and Q) with baseline data gathered in November 2021, prior to the scheme's implementation. Just over 12 months after the scheme was introduced, a second follow-up survey was carried out in June 2024.

Weekday average flows for pedestrians and cyclists were calculated by averaging data from a Tuesday and a Thursday at each site. The tables below highlight sites surrounding Corstorphine Primary School with blue shaded cells. Detailed information on the specific days each site was surveyed is provided below. Results for both pedestrians and cyclists are presented for each of the 8 sites, all of which are interior to the project area:

- For the period 07:00-19:00 and during bus gate hours (08:00-10:00 & 14:45-18:30):
  - Baseline, 6-month and 12-month flows for both directions and the two-way flow
  - The difference between the baseline and 12-month flows for both directions and the two-way.
  - Totals relating to two-way flows for all 8 sites.

NB:

- Raw data for each site was categorized by kerbside and by ‘pavement’ versus ‘on-road’, but these variables have been consolidated in the analysis.
- For Site O, data for the park entrance has not been included for consistency between surveys.
- Baseline data has been taken from surveys conducted on the 9th & 11th November, apart from Site O which used 16th & 18th November.
- For all sites, 12-month data has been taken from surveys conducted on the 6th & 11th June.

A summary and comparison of the pedestrian and cycle count results are given in Table 6, Table 7, Table 8, and Table 9.

Table 6: 07:00–19:00 – Weekday Average Pedestrian Flows

		Baseline			6-Month			12-Month			12-Month vs Baseline			
Site	Location	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	Two-way (%)
I	Saughton Road North	689	741	1430	728	773	1500	900	915	1815	211	175	386	
K	Ladywell Road	413	378	791	474	403	876	464	443	907	51	65	116	
L	Featherhall Avenue	471	470	940	365	364	729	391	392	782	-80	-78	-158	
M	Manse Street	358	358	716	320	332	652	380	386	766	22	28	50	
N	Manse Road	496	420	916	451	343	794	432	293	725	-64	-127	-191	
O	Corstorphine High Street	538	457	995	620	514	1134	614	513	1126	76	56	132	
P	Kirk Loan	234	266	500	300	334	633	299	350	649	65	85	150	
Q	Lampacre Road	215	753	968	321	334	655	309	334	642	94	-420	-326	
			Total	7,255			6,971			7,412			157	2.2%

Table 7: During Bus Gate Hours (08:00–10:00 & 14:45–18:30) – Weekday Average Pedestrian Flows

		Baseline			6-Month			12-Month			12-Month vs Baseline			
Site	Location	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	Two-way (%)
I	Saughton Road North	354	388	742	364	390	754	484	477	961	130	90	219	
K	Ladywell Road	215	197	411	275	239	514	290	269	559	76	73	148	
L	Featherhall Avenue	300	317	617	215	223	438	236	232	468	-64	-85	-149	
M	Manse Street	304	297	601	259	276	535	296	301	597	-9	5	-4	
N	Manse Road	328	273	601	280	212	492	259	155	414	-69	-118	-187	
O	Corstorphine High Street	391	338	729	410	311	720	392	332	724	1	-6	-5	
P	Kirk Loan	108	135	242	149	180	329	154	181	334	46	46	92	
Q	Lampacre Road	140	671	811	262	269	531	237	263	500	97	-409	-312	
			Total	4,753			4,310			4,555			-198	-4.2%

Table 8: 07:00–19:00 – Weekday Average Cycle Flows

		Baseline			6-Month			12-Month			12-Month vs Baseline			
Site	Location	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	Two-way (%)
I	Saughton Road North	27	35	61	17	22	38	23	29	52	-4	-6	-10	
K	Ladywell Road	18	22	40	15	13	28	29	29	58	11	8	19	
L	Featherhall Avenue	29	28	56	12	23	34	22	33	55	-7	6	-2	
M	Manse Street	8	8	16	4	5	9	6	8	14	-2	-1	-3	
N	Manse Road	32	8	40	22	4	26	26	5	31	-6	-4	-9	
O	Corstorphine High Street	28	21	48	25	17	42	29	18	47	2	-3	-2	
P	Kirk Loan	4	19	22	1	15	16	6	26	32	3	7	10	
Q	Lampacre Road	11	28	39	16	20	36	21	26	46	10	-2	8	
			Total	321			227			332			12	3.6%

Table 9: During Bus Gate Hours (08:00–10:00 & 14:45–18:30) – Weekday Average Cycle Flows

		Baseline			6-Month			12-Month			12-Month vs Baseline			
Site	Location	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	NB/EB	SB/WB	Two-Way	Two-way (%)
I	Saughton Road North	15	22	37	10	12	22	12	16	28	-3	-7	-9	
K	Ladywell Road	14	14	28	10	8	18	14	18	32	0	5	5	
L	Featherhall Avenue	19	15	34	6	10	16	12	15	27	-7	0	-7	
M	Manse Street	6	5	10	4	4	8	5	6	11	-1	2	1	
N	Manse Road	22	5	27	14	1	15	19	2	21	-4	-3	-7	
O	Corstorphine High Street	19	12	31	16	12	28	20	10	30	1	-2	-2	
P	Kirk Loan	2	11	13	1	8	8	2	14	16	0	3	3	
Q	Lampacre Road	6	22	28	12	16	28	14	21	35	8	-1	8	
			Total	206			140			198			-8	-3.9%

4. Pedestrian Desire-Line Tracing

Pedestrian desire-line tracing was performed at sites I, K, L, M, N, O, P, & Q to understand the impacts of the Corstorphine Connections project on pedestrian flows and route choices through the study area. Surveys were carried out in the period 7am-7pm on a Tuesday, Thursday and Saturday in both the baseline and 12-month surveys. Summaries of peak hours and daily totals for each site in both surveys are shown in the tables below.

Table 10: Site I (Saughton Road North) baseline pedestrian movement tracing

	Tuesday (09/11/21)	Thursday (11/11/21)	Saturday (13/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 11: Site I (Saughton Road North) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 12: Site K (Ladywell Road) baseline pedestrian movement tracing

	Tuesday (09/11/21)	Thursday (11/11/21)	Saturday (13/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 13: Site K (Ladywell Road) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 14: Site L (Featherhall Avenue) baseline pedestrian movement tracing

	Tuesday (09/11/21)	Thursday (11/11/21)	Saturday (13/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 15: Site L (Featherhall Avenue) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 16: Site M (Manse Street) baseline pedestrian movement tracing

	Tuesday (09/11/21)	Thursday (11/11/21)	Saturday (13/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 17: Site M (Manse Street) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 18: Site N (Manse Road) baseline pedestrian movement tracing

	Tuesday (09/11/21)	Thursday (11/11/21)	Saturday (13/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 19: Site N (Manse Road) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 20: Site O (Corstorphine High Street) baseline pedestrian movement tracing

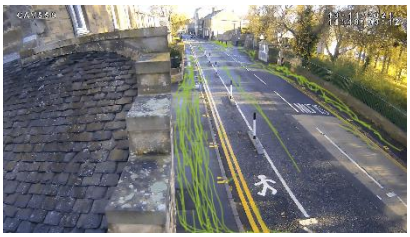
	Tuesday (16/11/21)	Thursday (18/11/21)	Saturday (13/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 21: Site O (Corstorphine High Street) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 22: Site P (Kirk Loan) baseline pedestrian movement tracing

	Tuesday (09/11/21)	Thursday (11/11/21)	Saturday (13/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 23: Site P (Kirk Loan) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 24: Site Q (Lampacre Road) baseline pedestrian movement tracing

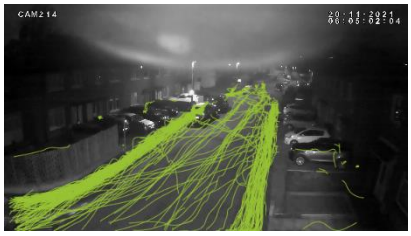
	Tuesday (09/11/21)	Thursday (11/11/21)	Saturday (20/11/21)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

Table 25: Site Q (Lampacre Road) post 12-month pedestrian movement tracing

	Tuesday (11/06/24)	Thursday (06/06/24)	Saturday (08/06/24)
AM (8am-9am)			
PM (4pm-5pm)			
All day (7am-7pm)			

5. School Hands-up Surveys

Before and after the scheme was put into place, surveys were carried out at Corstorphine Primary School to evaluate its effects on students' modes of travel to school. Following the scheme's introduction, there has been a rise in the proportion of pupils using wheeled transportation and a reduction in the proportion of students being driven.

Corstorphine Primary School

Table 26, Table 27, Table 28, and Table 29 summarize the totals for each of the specified modes of transport for March 2022 (pre-implementation), September 2023, and May 2024:

Table 26: March 2022 Hands Up Survey (Corstorphine)

	Walk	Cycle	Scooter/ Skate	Park and Stride	Driven	Bus	Taxi	Other
Total	280	9	30	107	57	16	0	1
Percentage of total	56.0%	1.8%	6.0%	21.4%	11.4%	3.2%	0.0%	0.2%

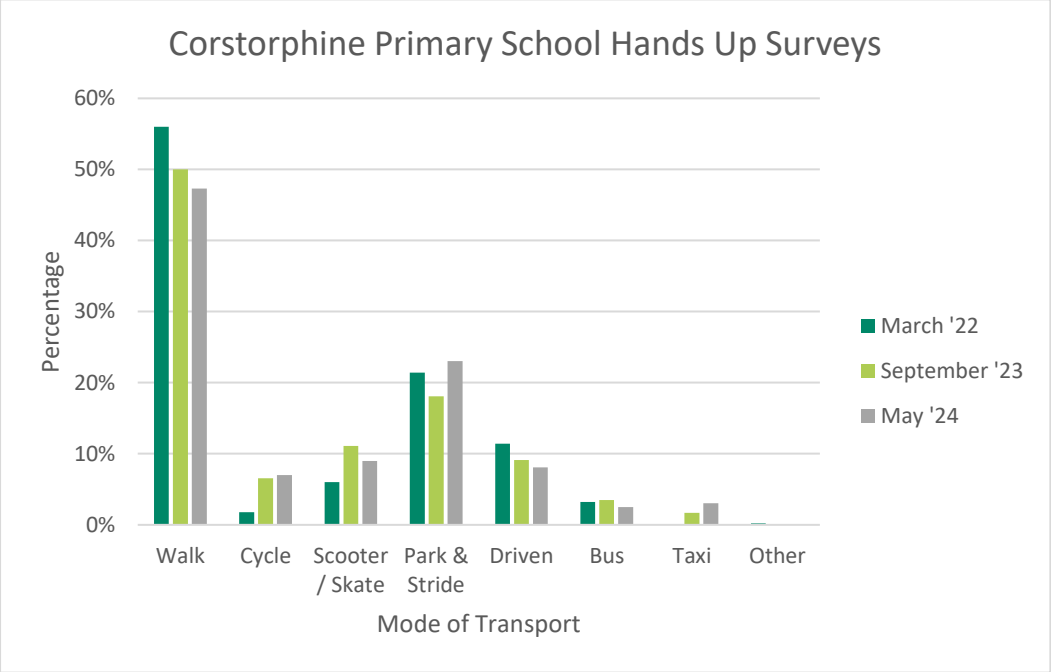
Table 27: September 2023 Hands Up Survey (Corstorphine)

	Walk	Cycle	Scooter/ Skate	Park and Stride	Driven	Bus	Taxi	Other
Total	329	43	73	119	60	23	11	0
Percentage of total	50.0%	6.5%	11.1%	18.1%	9.1%	3.5%	1.7%	0.0%

Table 28: May 2024 Hands Up Survey (Corstorphine)

	Walk	Cycle	Scooter/ Skate	Park and Stride	Driven	Bus	Taxi	Other
Total	263	39	50	128	45	14	17	0
Percentage of total	47.3%	7.0%	9.0%	23.0%	8.1%	2.5%	3.1%	0.0%

Table 29: Transport mode percentages pre- and post-implementation (Corstorphine)



Carrick Knowe Primary School

Table 30, Table 31, Table 32, and Table 33 summarize the totals for each of the specified modes of transport for March 2022 (pre-implementation), November 2023, and May 2024:

Table 30: March 2022 Hands Up Survey (Carrick Knowe)

	Walk	Cycle	Scooter/ Skate	Park and Stride	Driven	Bus	Taxi	Other
Total	146	17	22	30	40	1	3	0
Percentage of total	56.4%	6.6%	8.5%	11.6%	15.4%	0.4%	1.2%	0.0%

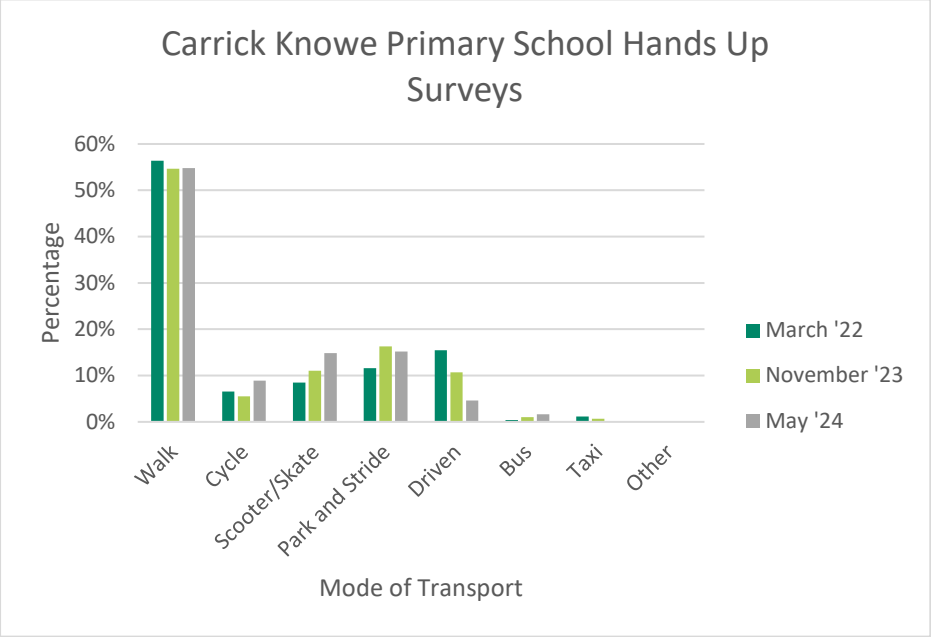
Table 31: November 2023 Hands Up Survey (Carrick Knowe)

	Walk	Cycle	Scooter/ Skate	Park and Stride	Driven	Bus	Taxi	Other
Total	158	16	32	47	31	3	2	0
Percentage of total	54.7%	5.5%	11.0%	16.3%	10.7%	1.0%	0.7%	0.0%

Table 32: May 2024 Hands Up Survey (Carrick Knowe)

	Walk	Cycle	Scooter/ Skate	Park and Stride	Driven	Bus	Taxi	Other
Total	166	27	45	46	14	5	0	0
Percentage of total	54.8%	8.9%	14.9%	15.2%	4.6%	1.7%	0.0%	0.0%

Table 33: Transport mode percentages pre- and post-implementation (Carrick Knowe)



6. Acoustic Surveys

Noise monitoring was carried out in conjunction with certain automatic traffic counts (ATCs) during all three study periods (baseline, post 6-months, and post 12-months). The measurement sites were chosen in agreement with The City of Edinburgh Council and the broader project team in 2021, corresponding to five ATC locations – B, I, L, N, and O – as depicted in Figure 2. These locations were revisited for the noise assessments in 2023 and 2024. The findings indicate that road traffic noise levels in 2024 were generally slightly lower than those observed in 2023 and 2021.

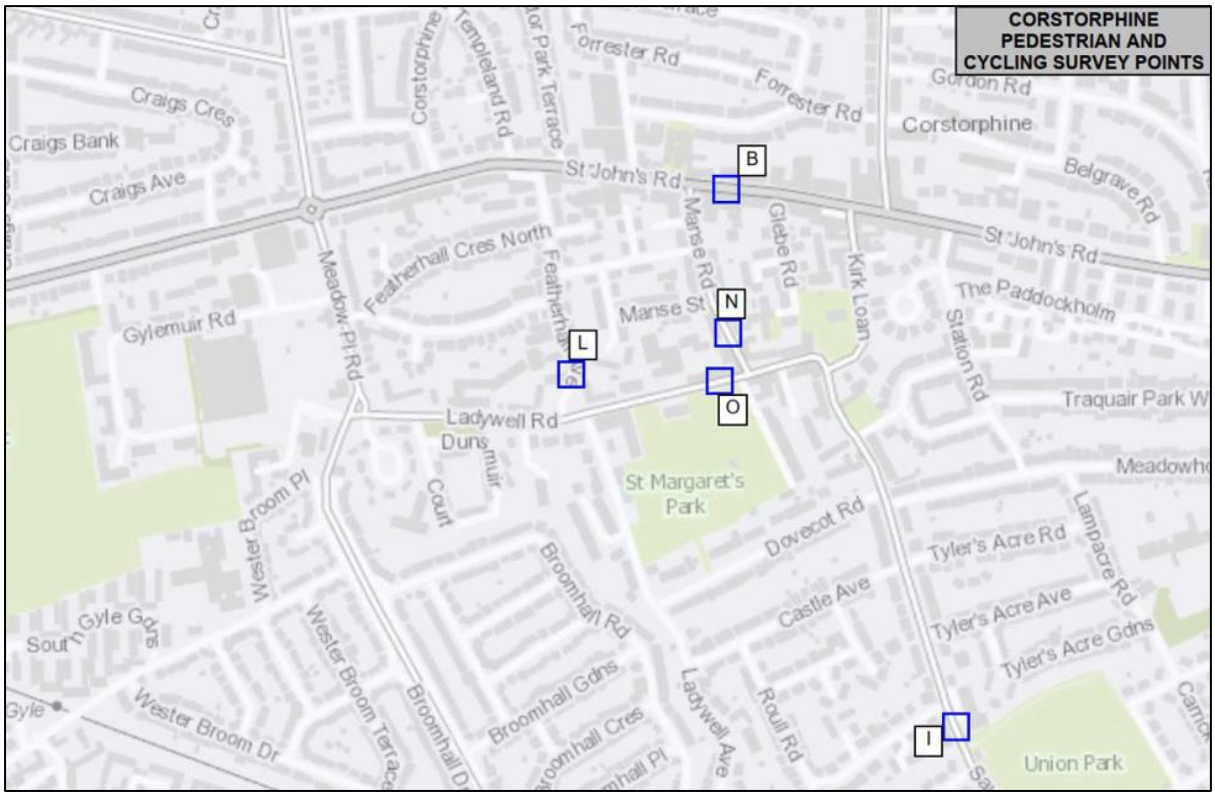


Figure 2: ATC noise survey locations

Appendix A details the shortened Calculation of Road Traffic Noise (CRTN[2]) method used to perform the measurements, which includes values $L_{Aeq,T}$, $L_{A10,T}$, $L_{A90,T}$, & L_{AFmax}.

The post 12-month surveys were conducted on Wednesday 19th June and Thursday 20th June 2024. Table 34 shows the baseline, post 6-month, post 12-month monitoring rotations.

[2] Department of Transport, Welsh Office (1988) Calculation of Road Traffic Noise (CRTN)

Table 34: Monitoring rotations

Location and period	B (AM)	B (PM)	I (AM)	I (PM)	L (AM)	L (PM)	N (AM)	N (PM)	O (AM)	O (PM)
09/11/2021		X		X	X		X		X	
11/11/2021	X		X			X		X		X
21/11/2023		X		X	X		X			
28/11/2023								X	X	
29/11/2023	X		X			X				X
19/06/2024		X		X	X		X		X	
20/06/2024	X		X			X		X		X

Baseline Survey

Results of the baseline noise monitoring are shown in Table 35. To account for variations occurring at specific days or times, monitoring at each site occurred at different times on two separate days.

The $L_{Aeq,T}$ results are provided for three-hour periods, and the $L_{A10,T}$ and $L_{A90,T}$ are provided as the arithmetic average of the three individual one-hour periods. The L_{AFmax} is the maximum level monitored during the three-hour period. The results show a range of L_{Aeq} values between 56 dB and 69 dB, L_{A10} values ranged from 58 dB to 72 dB, L_{A90} values were range between 45 dB and 62 dB, and L_{Afmax} values ranged from 79 dB to 98 dB.

Table 35: Baseline noise monitoring results

Measurement Location	Free-field/ Façade	Measurement Period	$L_{Aeq, 3hr}$ (dB)	$L_{A10, T}$ (dB)	$L_{A90, T}$ (dB)	L_{AFmax} (dB)
B- St John's Road	Façade	09/11/21 14:00 - 17:00	69	72	62	98
		11/11/21 10:00 - 13:00	69	72	62	94
I - Saughton Road North	Façade	09/11/21 15:15 - 17:13*	67	71	54	84
		11/11/21 10:00 - 13:00	65	69	49	85
L - Featherhall Avenue	Free-field	09/11/21 10:00 - 14:00	56	58	48	79
		11/11/21 14:00 - 17:00	56	59	45	86
N - Manse Road	Façade	09/11/21 10:00 - 13:00	61	65	47	92
		11/11/21 14:00 - 17:00	62	66	46	88
O - Corstorphine High Street	Façade	09/11/21 10:00 - 13:00	68	72	52	90
		11/11/21 14:00 - 17:00	67	71	50	95

* Equipment error - only 2 hours of measurements were done at this location on the first day

The main sound source at all locations was road traffic, although there were multiple contributors to the sound levels at all locations. This mainly included sounds from pedestrians passing by and sounds from children attending the nearby primary school at locations L and O, as well as bird song, dogs, and vehicles loading. A nearby substation was heard at Site I.

The sound levels at B, I and O are typical for roadside locations along a road in urban areas. The sound levels are L and N are typical for roadside locations along a road in residential areas.

12-Month Surveys

The post 12-month surveys were carried out using the same approach as the baseline surveys. For consistency, monitoring took place at various times on two different days at each site.

The results show a range of L_{Aeq} values between 53 dB and 72 dB, L_{A10} values ranged from 56 dB to 72 dB, L_{A90} values were range between 43 dB and 61 dB, and L_{Afmax} values ranged from 80 dB to 101 dB. A summary of the measured levels is presented in Table 36.

Table 36: Post 12-Month Sound Levels

Measurement Location	Free-field/ Façade	Measurement Period	$L_{Aeq, 3hr}$ (dB)	$L_{A10, T}$ (dB)	$L_{A90, T}$ (dB)	L_{AFmax} (dB)
B- St John's Road	Façade	19/06/24 14:00 - 17:00	69	72	60	92
		20/06/24 10:00 - 13:00	72	69	61	95
I - Saughton Road North	Façade	19/06/24 14:00 - 17:00	64	67	51	87
		20/06/24 10:00 - 13:00	63	67	50	83
L - Featherhall Avenue	Free-field	19/06/24 10:00 - 13:00	53	56	43	80
		20/06/24 14:00 - 17:00	56	57	45	94
N - Manse Road	Façade	19/06/24 10:00 - 13:00	63	63	45	100
		20/06/24 14:00 - 17:00	60	61	45	101
O - Corstorphine High Street	Façade	19/06/24 10:00 - 13:00	66	70	50	90
		20/06/24 14:00 - 17:00	67	71	51	91

Road traffic was the primary noise source across all locations, though other incidental sounds also influenced the overall noise levels. These additional sounds primarily included pedestrians, sirens from emergency vehicles, and children playing at the nearby primary school (at sites L and O).

At location N, traffic from Manse Road was the main source of noise when vehicles were present. However, during quieter periods between peak traffic times, when there is no direct route to St. John's Road, the dominant noise shifted to traffic from Corstorphine High Street.

Comparison

The subjective observations made during the 2024 12-month surveys were consistent with the 2021 baseline and 2023 post 6-month surveys, with the dominant sound source at all locations being road traffic, although several other extraneous sources also contributed to the sound levels in all surveys. The main exceptions to this were the audible noise from the substation at location I in 2021 and the construction work present during the 2023 surveys.

The sound climate at each monitoring location in the 2024 survey was similar to those during the 2021 and 2023 post 6-month surveys.

Table 37 shows the difference in $L_{A10,T}$ levels (the most appropriate measure of road traffic noise) between the post 12-month (2024), post 6-month (2023) and baseline (2021) surveys. Negative values show a reduction in sound levels measured between the comparative surveys.

Table 37: Comparison of $L_{A10, T}$ (dB) sound levels

Measurement Location	Free-field/ Façade	Measurement Period	12 Month vs Baseline	12 Month vs 6 Month	6 Month vs Baseline
B- St John's Road	Façade	AM	-3	-3	0
		PM	0	-1	1
I - Saughton Road North	Façade	AM	-2	-2	0
		PM	-4	-2	-2
L - Featherhall Avenue	Free-field	AM	-2	-1	-1
		PM	-2	-1	-1
N - Manse Road	Façade	AM	-2	0	-2
		PM	-5	-2	-3
O - Corstorphine High Street	Façade	AM	-2	-2	0
		PM	0	-1	1

The results show that:

- At locations B and O during afternoon periods (measured in 2024 post 12-month survey), there was no change in noise levels compared to the 2021 baseline survey.
- At all locations except for B and O during afternoon periods (measured in 2024), noise levels were slightly lower those measured in 2021.
- At location N during morning periods there was no change in noise levels (measured in 2024), compared to the 2023, post 6-month survey.
- At all locations except for N during morning periods noise levels (measured in 2024), were slightly lower those measured in 2023.
- In 2024 at all locations, noise levels are equal to or slightly lower compared to those measured in 2021 and 2023.

7. Air Quality Surveys

As part of a holistic assessment of the effects of the Corstorphine Connection project, nitrogen dioxide (NO_2) concentrations have been monitored before and after scheme implementation throughout the study area.

The pre-scheme (baseline) air quality survey results cover a monitoring period between November 2021 and May 2022, while the post-scheme monitoring period ran from June 2023 to June 2024 – this section will evaluate the entire 12-month post-scheme period and compare the results to those of the baseline monitoring period. A comparison will also be made between changes in NO_2 concentration and traffic flow changes to better understand any correlation.

UK governments are required to develop a national Air Quality Strategy that includes standards, objectives, and actions aimed at enhancing ambient air quality, as described in Part IV of the Environment Act (2021). This strategy defines Air Quality Objectives (AQOs), which are the maximum allowable concentrations of pollutants in the air. These concentrations must not be surpassed, either under any circumstances or with a limited number of exceedances within a given timeframe. The results of the post-scheme survey have also been evaluated against these criteria.

Methodology

For the post-scheme survey, NO_2 diffusion tubes were deployed (in duplicates) at 25 sites around Corstorphine from 5th June 2023 until 5th June 2024. Site information is detailed in Figure 3.

There is an existing air quality monitoring network (AQMA) within Edinburgh, managed by City of Edinburgh Council (CoEC). CoEC has six active AQMAs, the closest to the study area is at St John's Road. Site Cor_17 was co-located with the CoEC continuous monitoring station at St John's Road and two other sites (Cor_18 and Cor_19) were co-located with CoEC diffusion tubes.

The remaining diffusion tubes were installed at roadside locations around Corstorphine, matching the positions used in the pre-scheme survey. Diffusion tubes were positioned at a height of 1.8–2.8 m (representing ground floor exposure) and attached to existing street furniture. Routine checks showed no significant precision issues at all sites.

Cor_2, Cor_5, Cor_6, and Cor_12 could not be included in the comparison because the street furniture that previously held the monitoring equipment was no longer present at these sites. Consequently, these locations were excluded from the pre- and post-scheme analysis.

As baseline monitoring was only carried out for six months, the results have been annualised to account for seasonal variation. Cor_20 in the post-scheme monitoring also required annualization due to capture issues that led to a data capture rate of 41.7% at this site. Data capture of the post-scheme survey was otherwise generally good.

Diffusion tube bias was adjusted to improve the accuracy, quality and reliability of the monitoring results in line with Defra TG.22 guidance[3] using Defra's local bias adjustment sheet[4].

[3] Defra (2022), Local Air Quality Management, Technical Guidance (TG22), Available at: LAQM-TG22-August-22-v1.0.pdf (defra.gov.uk) Accessed 07/02/2024
[4] Defra (2011) Diffusion Tube Precision Accuracy Bias Spreadsheet. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/local-bias/ Accessed 07/02/2024

Table 38: Diffusion Tube Site Information

Site ID	Location
Cor 1	B701
Cor 2	Station Rd
Cor 3	Pinkhill
Cor 4	Balgreen Rd
Cor 5	Ladywell Av
Cor 6	Dovecote Rd
Cor 7	Broomhall Gardens
Cor 8	Saughton Rd N
Cor 9	Broomhouse Dr
Cor 10	Ladywell Rd
Cor 11	Featherhall Av
Cor 12	Manse Street
Cor 13	Manse Rd
Cor 14	Corstorphine High St
Cor 15	Kirk Loan
Cor 16	St John's Rd
Cor 17	St John's Rd
Cor 18	St John's Rd
Cor 19	St John's Rd
Cor 20	Corstorphine Rd
Cor 21	Balgreen Rd
Cor 22	Lampacre Rd
Cor 23	Broomhouse Rd
Cor 24	Meadowhouse Rd
Cor 25	Traquair Park W

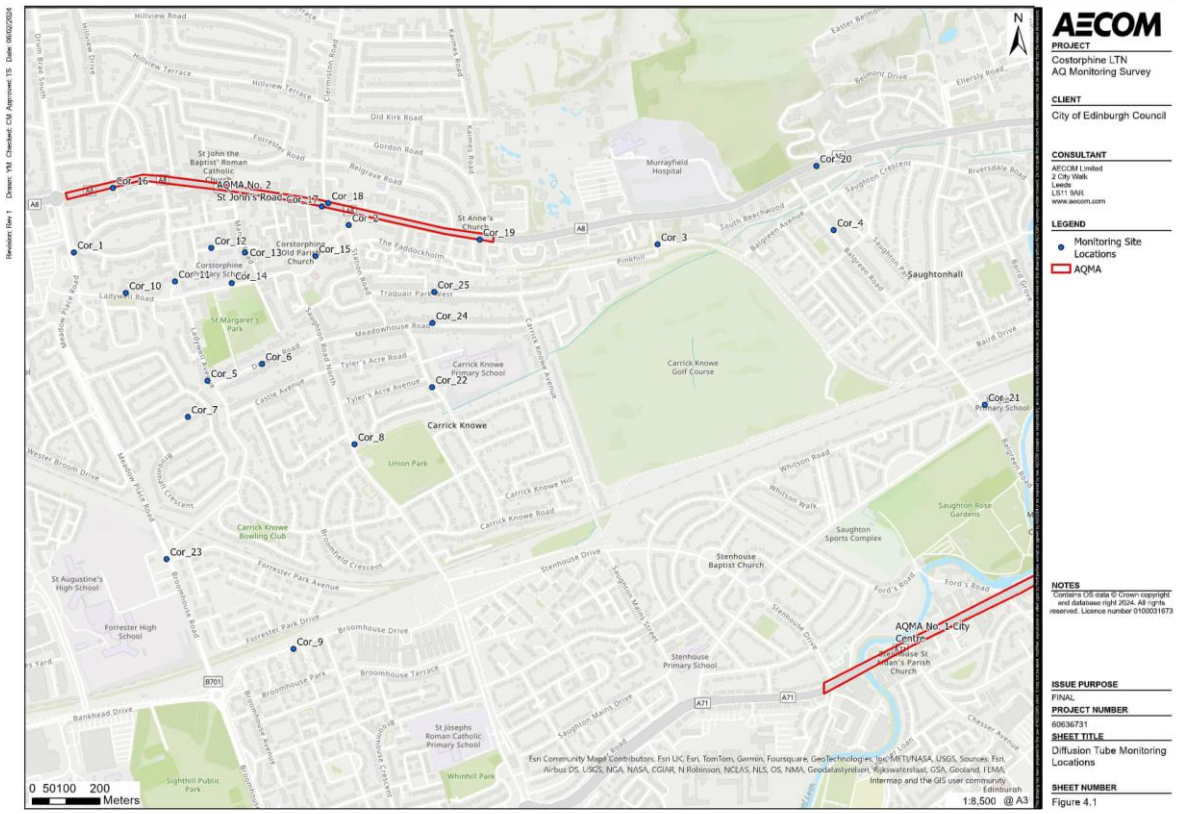


Figure 3: Location of Air Quality Monitoring Sites

Due to the high level of uncertainty around diffusion tubes monitoring results (cited as ± 25%[5]), they are regarded as an "indicative" monitoring technique. Comparison between sets of diffusion tube results that show small changes in NO_2 concentrations should therefore be interpreted with caution.

Results

Alongside assessing changes in NO_2 concentrations, the percentage change in 24-hour weekday ATC traffic flows detailed in this report were used to help identify any links between traffic flows and NO_2 concentrations. The pre- and post-scheme NO_2 concentrations, as well as the NO_2 and percentage traffic changes can be found in Table 39 and are shown in Table 2. A negative percentage change in traffic flow represents a smaller flow in the post-scheme survey compared to the pre-scheme survey.

[5] AEA Energy and Environment (2008), Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance. (1a), 53.

Table 39: Annualised and bias-adjusted NO_2 monitoring results of the pre- and post-scheme survey and change in traffic (24-hour weekday traffic flows in both directions)

Tube	Site Name	Pre-scheme (µg/m^3)	Post-scheme (µg/m^3)	Change in NO_2 concentrations (µg/m^3)	Change in traffic (%)
Cor 1	Meadow Place Road	23.5	20.4	-3.1	4.6
Cor 3	Pinkhill	13.5	11.4	-2.1	-7.6
Cor 4	Balgreen Road	14.1	13.2	-0.9	1.6
Cor 7	Broomhall Gardens	13.0	11.6	-1.4	-
Cor 8	Saughton Road North	14.2	14.5	0.3	7.6
Cor 9	Broomhouse Drive	20.6	17.4	-3.2	35.4
Cor 10	Ladywell Road	19.4	18.1	-1.3	9.9
Cor 11	Featherhall Avenue	13.9	12.9	-1.0	71.1
Cor 13	Manse Road	15.7	14.3	-1.4	-46.1
Cor 14	Corstorphine High Street	19.5	15.4	-4.1	0.8
Cor 15	Kirk Loan	14.5	13.2	-1.3	5.3
Cor 16	St John's Road	28.2	26.6	-1.6	4.8
Cor 17	St John's Road	31.2	30.6	-0.6	4.8
Cor 18	St John's Road	22.8	24.6	1.8	4.8
Cor 19	St John's Road	25.6	24.4	-1.2	4.8
Cor 20	Corstorphine Rd	21.9	19.3	-2.6	-
Cor 21	Balgreen Road	24.3	23.1	-1.2	1.6
Cor 22	Lampacre Road	12.5	11.0	-1.5	-
Cor 23	Meadow Place Road	13.3	14.0	0.7	4.6
Cor 24	Meadowhouse Road	13.5	11.6	-1.9	-
Cor 25	Traquair Park West	13.6	12.0	-1.6	-

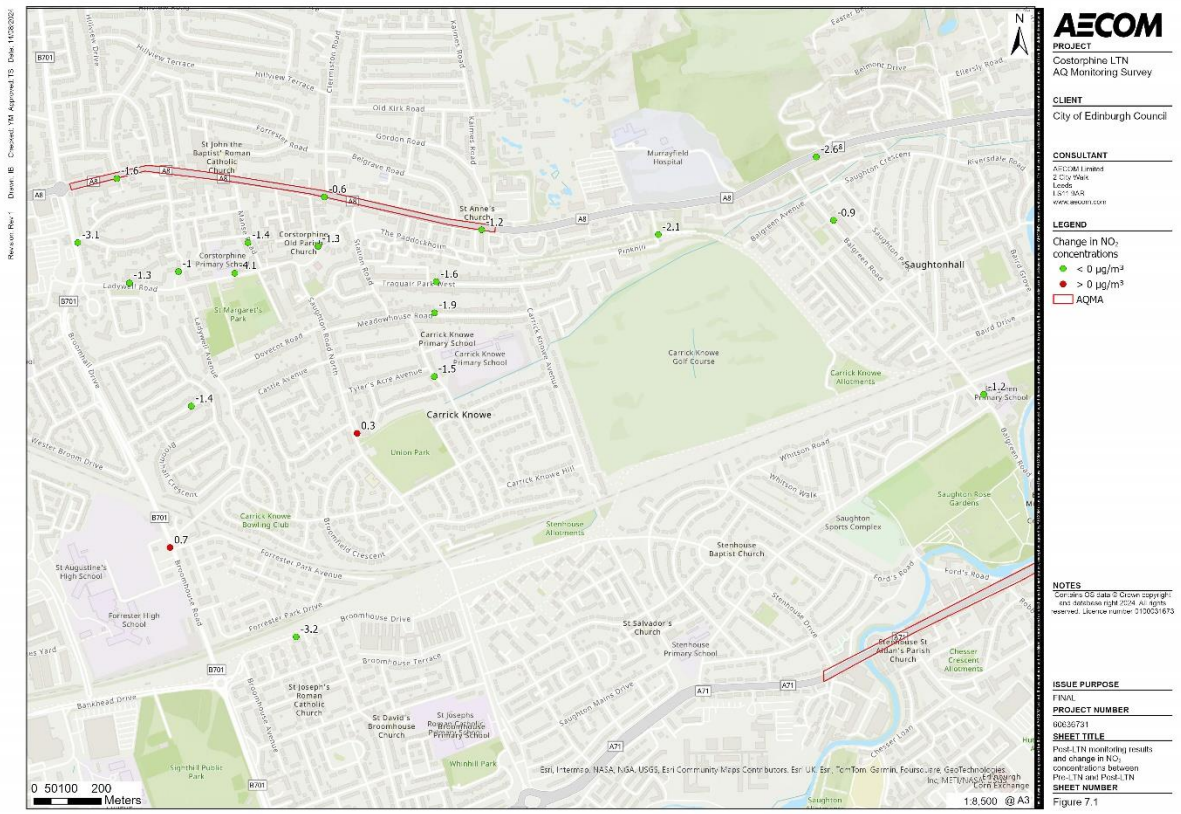


Figure 4: Post-scheme monitoring results (labels of monitoring sites) and change in Annual Mean NO_2 concentrations between pre-scheme and post-scheme surveys

The annual mean NO_2 AQO of 40 µg/m^3 was not exceeded at any of the 25 Corstorphine monitoring sites. Most sites showed a small decrease in NO_2 concentrations when comparing post-scheme to pre-scheme concentrations. Changes were small overall, ranging from -4.1 to 1.8 µg/m^3. Edinburgh-wide air quality monitoring trends[6] reflect this assessment, leading to the conclusion that fleet emission improvements are most likely responsible for this decrease, as opposed to the effects of the Corstorphine Connections project. Furthermore, there is no clear relationship between changes in annual mean NO_2 concentrations and traffic.

[6] Edinburgh City Council (2023) 2023 Air Quality Annual Progress Report (APR) for The City of Edinburgh Council. Available at: laqm-annual-progress-report-2023 (edinburgh.gov.uk) Accessed 07/02/2024

Appendix A Acoustic Terminology

A.1 Ambient or Activity Sound Levels - L_{Aeq}

The equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$, is the single number that represents the average sound energy measured over that period. The $L_{Aeq,T}$ is the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period.

A.2 Road Traffic Sound Levels – L_{A10}

With regards to road traffic the parameter L_{A10} is prescribed by the relevant guidance and legislation. $L_{A10,T}$ is the A-weighted sound level exceeded for 10% of the measurement period T. The $L_{A10,18h}$ is defined in the Calculation of Road Traffic Noise (CRTN) as the arithmetic average of the individual 1-hour $L_{A10,1h}$ levels between 06:00 - 00:00. Using the shortened CRTN measurement procedure the $L_{A10,18h}$ can be estimated from the arithmetic average of 3 individual $L_{A10,1h}$ measurements taken between 10:00 and 17:00 by the subtraction of 1 dB.

A.3 Background Sound Levels – L_{A90}

A parameter that is widely accepted as reflecting human perception of the ambient sound is the background sound level, $L_{A90,T}$. This is the sound level exceeded for 90 % of the measurement period and generally reflects the sound level in the lulls between individual sound events. Over a one-hour period, the L_{A90} will be the sound level exceeded for 54 minutes.

A.4 Maximum Sound Levels - L_{Amax}

The L_{Amax} is the maximum A-weighted sound pressure level measured over a measurement period.

A.5 Calculation of Road Traffic Noise (CRTN) Measurement Criteria

The CRTN sets out the following guidelines for the measurement procedure:

- Other traffic or extraneous sounds do not influence the measured level;
- Dry road surface;
- Average wind speed in the direction from the road to monitoring location should be less than 2 m/s;
- Maximum wind speed should never be greater than 10 m/s
- Microphone position view should not be obstructed
- Microphone should be 4-15 m from nearside edge of carriageway
- Microphone should be 1.2 m above road surface
- Microphone diaphragm should be horizontal
- Measurements should be taken in free-field conditions (minimum distance of 15 m to nearest reflecting surface). If free-field is not possible, the measurement should be taken 1 m from façade.

Appendix B Wider Traffic Context

Table 40: Number of vehicles recorded by Edinburgh City Council automatic counters

		Year 2021	2023
West Edinburgh	Vehicles	16,588,997	17,586,127
	Change		997,130
	% Change		6.0%
Whole city	Vehicles	44,407,274	46,779,595
	Change		2,372,321
	% Change		5.3%

Table 41: Number of cyclists counted at automatic counters in Edinburgh

	Average number of cyclists per day						
Location	Nov-2021	Nov-2023	Change, Nov 2021 to Nov 2023	% change	May-24	Change, Nov-2021 to May 2024	% change
Nicolson Street	581	654	73	13%	877	296	50.9%
A90 Deans Bridge	484	319	-165	-34%	522	38	7.9%
Whitehouse Loan	448	545	97	22%	512	64	14.3%
Crewe Road South	431	386	-45	-10%	441	10	2.3%
Carrington Road EB	126	114	-12	-10%	158	32	25.4%
Blacket Avenue	116	132	16	14%	No data available		

Table 42: Comparative weather data, Edinburgh Airport weather station

Date	General conditions	Wind (mph)	Temp (°C)	Daylight hours
09/11/2021	Sunny, some clouds, one short light rain shower	11–16	10–12	9 hrs 12 mins
11/11/2021	Sunny, some clouds, two short light rain showers	6–9	8–12	9 hrs 05 mins
21/11/2023	Sunny, some cloud	3–10	2–7	8 hrs 35 mins
23/11/2023	Sunny, some clouds, two short light rain showers	12–26	8–13	8 hrs 30 mins
06/06/2024	Sunny, some clouds and rain showers	8-20	9-15	-
11/06/2024	Sunny, some clouds	2-7	8-16	-

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