

Appendix 15.1 – Tables and Traffic Data

Table 4.1 - Model Inventory

03/06/2020 11:25

Model Sensitivity Analysis

Run	Name	Met Data	Surface roughness (m)	M-O (m)	Scenario	objective
1	Strathallan 2014	Strathallan 2014	0.5	30	baseline 2026	to determine worst case dispersion conditions for five years of historic met. data from nearest ground station
2	Strathallan 2015	Strathallan 2015	0.5	30	baseline 2026	
3	Strathallan 2016	Strathallan 2016	0.5	30	baseline 2026	
4	Strathallan 2017	Strathallan 2017	0.5	30	baseline 2026	
5	Strathallan 2018	Strathallan 2018	0.5	30	baseline 2026	
6	Gogar 2017	Edinburgh Gogarbank 2017	0.5	30	baseline 2026	to determine significance of met data from other sites for worst-case Strathallan year
7	Bishop 2017	Glasgow Bishopton 2017	0.5	30	baseline 2026	
8	rough 0.3m	Strathallan 2017	0.3	30	baseline 2026	to determine worst case surface roughness length for short and long-term pollutants
9	rough 0.5m	Strathallan 2017	0.5	30	baseline 2026	
10	rough 1.0m	Strathallan 2017	1.0	30	baseline 2026	
11	M-O 10m	Strathallan 2017	0.5	10	baseline 2026	to determine significance of M-O length
12	M-O 30m	Strathallan 2017	0.5	30	baseline 2026	
13	Scenario 1	Strathallan 2017	0.5	10	baseline 2026	to predict worst case in study area for both Scenarios
14	Scenario 2	Strathallan 2017	0.5	10	scheme 2026	

Table 5.1

03/06/2020 11:06

No.	Receptor name	X(m)	Y(m)	Z(m)	Scenario 1	Scenario 2	change	%EAL	Significance	EAL
1	R01	276966	695650	1.5	10.4	10.4	0%	26%	Negligible	40
2	R02	276975	695606	1.5	9.8	9.9	0%	25%	Negligible	40
3	R03	277991	695151	1.5	13.0	13.5	1%	34%	Negligible	40
4	R04	278029	695200	1.5	12.0	12.3	1%	31%	Negligible	40
5	R05	278080	695150	1.5	12.0	12.4	1%	31%	Negligible	40
6	R06	278095	695103	1.5	12.1	12.5	1%	31%	Negligible	40
7	R07	278166	694982	1.5	11.4	11.6	1%	29%	Negligible	40
8	R08	278185	694917	4.0	11.2	11.5	1%	29%	Negligible	40
9	R09	278204	694856	1.5	11.1	11.3	1%	28%	Negligible	40
10	R10	278128	694764	1.5	11.9	12.3	1%	31%	Negligible	40
11	R11	277986	694824	1.5	14.6	15.3	2%	38%	Negligible	40
12	R12	278058	694697	1.5	13.7	14.3	2%	36%	Negligible	40
13	R13	278121	694631	1.5	12.0	12.4	1%	31%	Negligible	40
14	R14	278158	694576	1.5	12.0	12.4	1%	31%	Negligible	40
15	R15	278240	694521	4.0	11.3	11.6	1%	29%	Negligible	40
16	R16	278309	694481	4.0	10.9	11.1	1%	28%	Negligible	40
17	R17	278397	694399	1.5	10.7	10.9	1%	27%	Negligible	40
18	R18	278456	694346	4.0	10.5	10.7	1%	27%	Negligible	40
19	R19	277320	695364	4.0	11.7	12.1	1%	30%	Negligible	40
20	R20	277287	694415	4.0	9.8	9.9	0%	25%	Negligible	40
Max					14.6	15.3	2%	38%		
Min					9.8	9.9	0%	25%		

units = NO2 annual mean ug/m3

Table 5.2

No.	Receptor name	X(m)	Y(m)	Z(m)
1	R01	276966	695650	1.5
2	R02	276975	695606	1.5
3	R03	277991	695151	1.5
4	R04	278029	695200	1.5
5	R05	278080	695150	1.5
6	R06	278095	695103	1.5
7	R07	278166	694982	1.5
8	R08	278185	694917	4.0
9	R09	278204	694856	1.5
10	R10	278128	694764	1.5
11	R11	277986	694824	1.5
12	R12	278058	694697	1.5
13	R13	278121	694631	1.5
14	R14	278158	694576	1.5
15	R15	278240	694521	4.0
16	R16	278309	694481	4.0
17	R17	278397	694399	1.5
18	R18	278456	694346	4.0
19	R19	277320	695364	4.0
20	R20	277287	694415	4.0
Max				
Min				

Scenario 1	Scenario 2	change	%EAL	Significance	EAL	Background	adjustment factor
11.4	11.4	0%	63%	Negligible	18	11.1	1.000
11.3	11.3	0%	63%	Negligible	18	11.1	1.000
11.6	11.7	0%	65%	Negligible	18	11.1	1.000
11.5	11.5	0%	64%	Negligible	18	11.1	1.000
11.5	11.5	0%	64%	Negligible	18	11.1	1.000
11.5	11.5	0%	64%	Negligible	18	11.1	1.000
11.4	11.4	0%	64%	Negligible	18	11.1	1.000
11.4	11.4	0%	64%	Negligible	18	11.1	1.000
11.4	11.4	0%	63%	Negligible	18	11.1	1.000
11.5	11.6	0%	64%	Negligible	18	11.1	1.000
12.0	12.1	1%	67%	Negligible	18	11.1	1.000
11.8	12.0	1%	66%	Negligible	18	11.1	1.000
11.6	11.7	0%	65%	Negligible	18	11.1	1.000
11.6	11.7	0%	65%	Negligible	18	11.1	1.000
11.5	11.5	0%	64%	Negligible	18	11.1	1.000
11.4	11.5	0%	64%	Negligible	18	11.1	1.000
11.4	11.4	0%	63%	Negligible	18	11.1	1.000
11.4	11.4	0%	63%	Negligible	18	11.1	1.000
11.5	11.5	0%	64%	Negligible	18	11.1	1.000
11.2	11.2	0%	62%	Negligible	18	11.1	1.000
12.0	12.1	0%	67%				
11.2	11.2	0%	62%				

units = PM10 annual mean ug/m3

Table 5.3

No.	Receptor name	X(m)	Y(m)	Z(m)
1	R01	276966	695650	1.5
2	R02	276975	695606	1.5
3	R03	277991	695151	1.5
4	R04	278029	695200	1.5
5	R05	278080	695150	1.5
6	R06	278095	695103	1.5
7	R07	278166	694982	1.5
8	R08	278185	694917	4.0
9	R09	278204	694856	1.5
10	R10	278128	694764	1.5
11	R11	277986	694824	1.5
12	R12	278058	694697	1.5
13	R13	278121	694631	1.5
14	R14	278158	694576	1.5
15	R15	278240	694521	4.0
16	R16	278309	694481	4.0
17	R17	278397	694399	1.5
18	R18	278456	694346	4.0
19	R19	277320	695364	4.0
20	R20	277287	694415	4.0
Max				
Min				

Scenario 1	Scenario 2	change	%EAL	Significance	EAL	Background	adjustment factor
6.1	6.1	0%	61%	Negligible	10	5.9	1.000
6.0	6.0	0%	60%	Negligible	10	5.9	1.000
6.2	6.3	0%	63%	Negligible	10	5.9	1.000
6.1	6.2	0%	62%	Negligible	10	5.9	1.000
6.1	6.2	0%	62%	Negligible	10	5.9	1.000
6.1	6.2	0%	62%	Negligible	10	5.9	1.000
6.1	6.1	0%	61%	Negligible	10	5.9	1.000
6.1	6.1	0%	61%	Negligible	10	5.9	1.000
6.1	6.1	0%	61%	Negligible	10	5.9	1.000
6.1	6.2	0%	62%	Negligible	10	5.9	1.000
6.4	6.5	1%	65%	Negligible	10	5.9	1.000
6.3	6.4	1%	64%	Negligible	10	5.9	1.000
6.2	6.2	0%	62%	Negligible	10	5.9	1.000
6.2	6.2	0%	62%	Negligible	10	5.9	1.000
6.1	6.2	0%	62%	Negligible	10	5.9	1.000
6.1	6.1	0%	61%	Negligible	10	5.9	1.000
6.1	6.1	0%	61%	Negligible	10	5.9	1.000
6.1	6.1	0%	61%	Negligible	10	5.9	1.000
6.1	6.2	0%	62%	Negligible	10	5.9	1.000
6.0	6.0	0%	60%	Negligible	10	5.9	1.000
6.4	6.5	0%	65%				
6.0	6.0	0%	60%				

units = PM2.5 annual mean ug/m3

APPENDIX 15.2 DUST CONTROL MEASURES DURING CONSTRUCTION

Scope

1. These procedures shall apply to the demolition, site clearance, groundworks and construction operations undertaken by the applicant and their appointed subcontractors at the proposed development at Craigforth, Stirling during the construction of any proposed development.
2. Potentially dusty operations include: demolition of buildings changes to the landform, the removal and storage of topsoil and subsoils; the movement of vehicles on unpaved surfaces, road building, laying of services and other groundworks; the erection of buildings; the storage of building materials and waste products.
3. These measures include a formal consultation procedure with Stirling Council to ensure that they are made aware of any potentially dusty activities.

Aims

4. The aim of these procedures is to prevent or minimise the release of dust particles from construction and demolition operations to atmosphere. Dust means all particles < 75um in diameter. Potential adverse effects from the release of dust particles include loss of amenity due to deposition and soiling of surfaces; damage to crops and other vegetation and human respiratory ill-health due to inhalation. Most airborne particles from construction and demolition are above the diameter at which adverse effects on human health are likely to occur. These procedures are intended to protect the amenity of sensitive receptors around the proposed development, with particular emphasis on adjacent residential areas.

Responsibility

5. The main contractor shall be responsible for ensuring that there are adequate resources for the effective implementation of these procedures.
6. The main contractor shall appoint a named senior manager who shall be responsible for ensuring that these procedures are implemented on a day to day basis during the construction project.
7. All employees and appointed sub-contractors engaged in the construction project shall be made aware of the potential environmental effects of dust and their respective roles in ensuring compliance with environmental standards.

Preamble

8. Design and engineering control to minimise impacts from each phase of any demolition, landform and construction operations include: the timing and phasing of operations; the location dusty activities away from sensitive receptors where practicable; the selection and use of appropriate plant and methods of working; and the use of dust suppression water sprays. Adequate process supervision is also required to ensure that

members of staff are adequately trained and aware of their environmental responsibilities and that the appropriate dust control measures are implemented.

Operating Procedures for Dust Suppression

9. Prior to the commencement of any new phase of ground works or construction the proposed method of working and dust suppression techniques shall be formally reviewed by the main contractor. Where practicable, dusty activities shall be kept as far as possible from sensitive receptors. The outcome of all such reviews shall be recorded.
10. The main contractor shall provide a telephone 'hotline' to enable direct contact between members of the public and the site agent, to enable rapid response to dust complaints.
11. The main contractor shall formally advise the local EHO from Stirling Council of the proposed methods of working or any changes proposed. The main contractor shall take account of feedback as appropriate. The outcome of all consultations and feedback shall be recorded.
12. All mobile plant introduced onto the site shall comply with the Stage 1 emission limits for off road vehicles as specified by EC Directive 97/68/EC. All mobile plant shall be maintained to prevent or minimise the release of dark smoke from vehicle exhausts. Details of vehicle maintenance shall be recorded.
13. The main contractor shall ensure that risk of dust annoyance from the operations is assessed throughout the working day, taking account of wind speed, direction, and surface moisture levels. The main contractor shall ensure that the level of dust suppression implemented on site is adequate for the prevailing conditions. The assessment shall be recorded as part of documented site management procedures.
14. Internal un-surfaced temporary roadways shall be sprayed with water at regular intervals as conditions require. The frequency of road spraying shall be recorded as part of documented site management procedures.
15. Surfaced roads and the public road during all ground works shall be kept clean and swept at regular intervals using a road sweeper as conditions require. The frequency of road sweeping shall be recorded as part of documented site management procedures.
16. All vehicles operating within the site on unsurfaced roads shall not exceed 15mph to minimise the re-suspension of dust.
17. Where dust from the operations are likely to cause significant adverse impacts at sensitive receptors, then the operation(s) shall be suspended until the dust emissions have been abated. The time and duration of suspension of working and the reason shall be recorded.
18. This dust management plan shall be reviewed monthly during the construction project and the outcome of the review shall be recorded as part of the documented site management procedures.
19. No fires or burning of wastes shall be permitted on site during construction

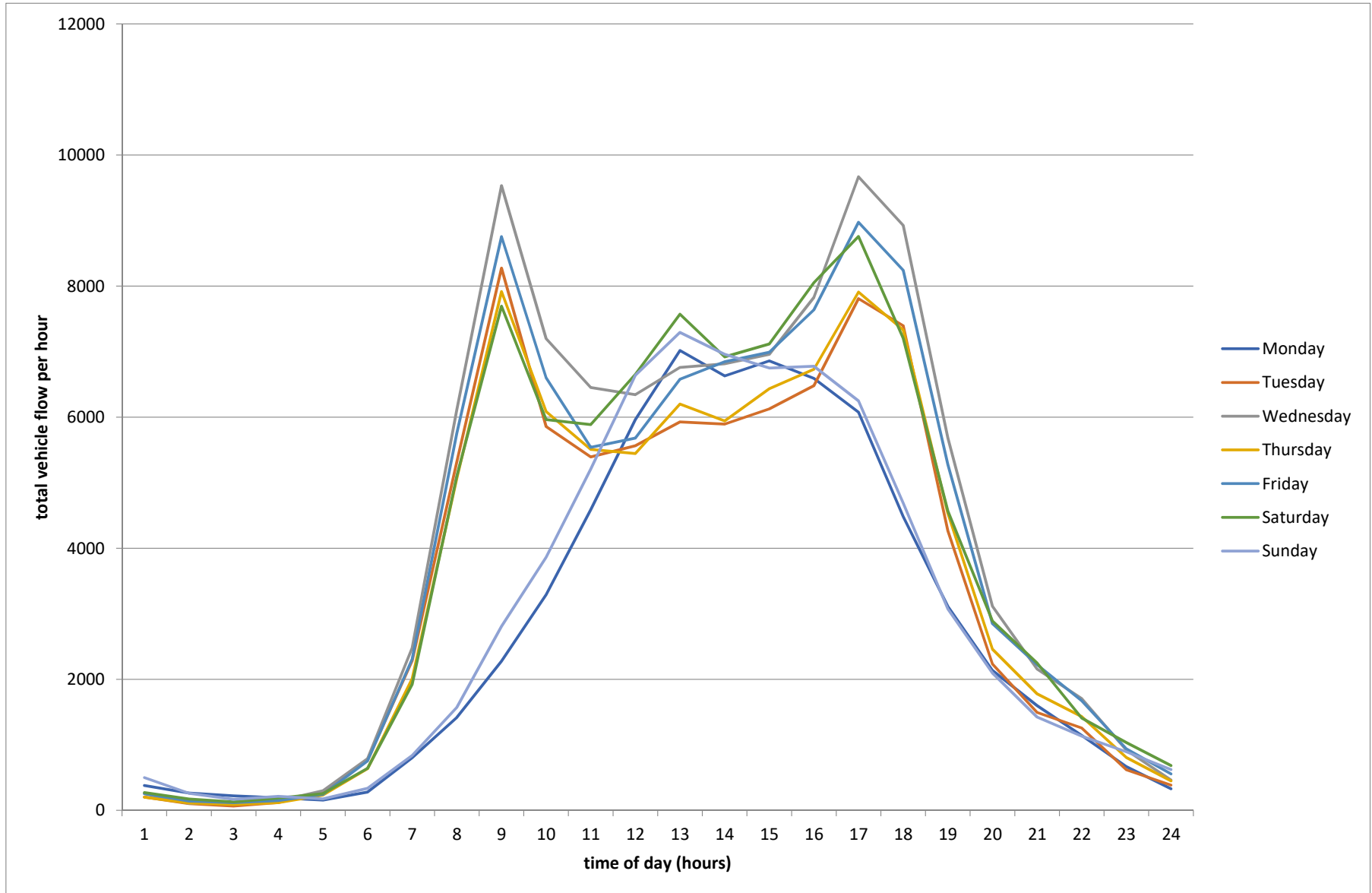
Appendix 15.3 – Model Inputs

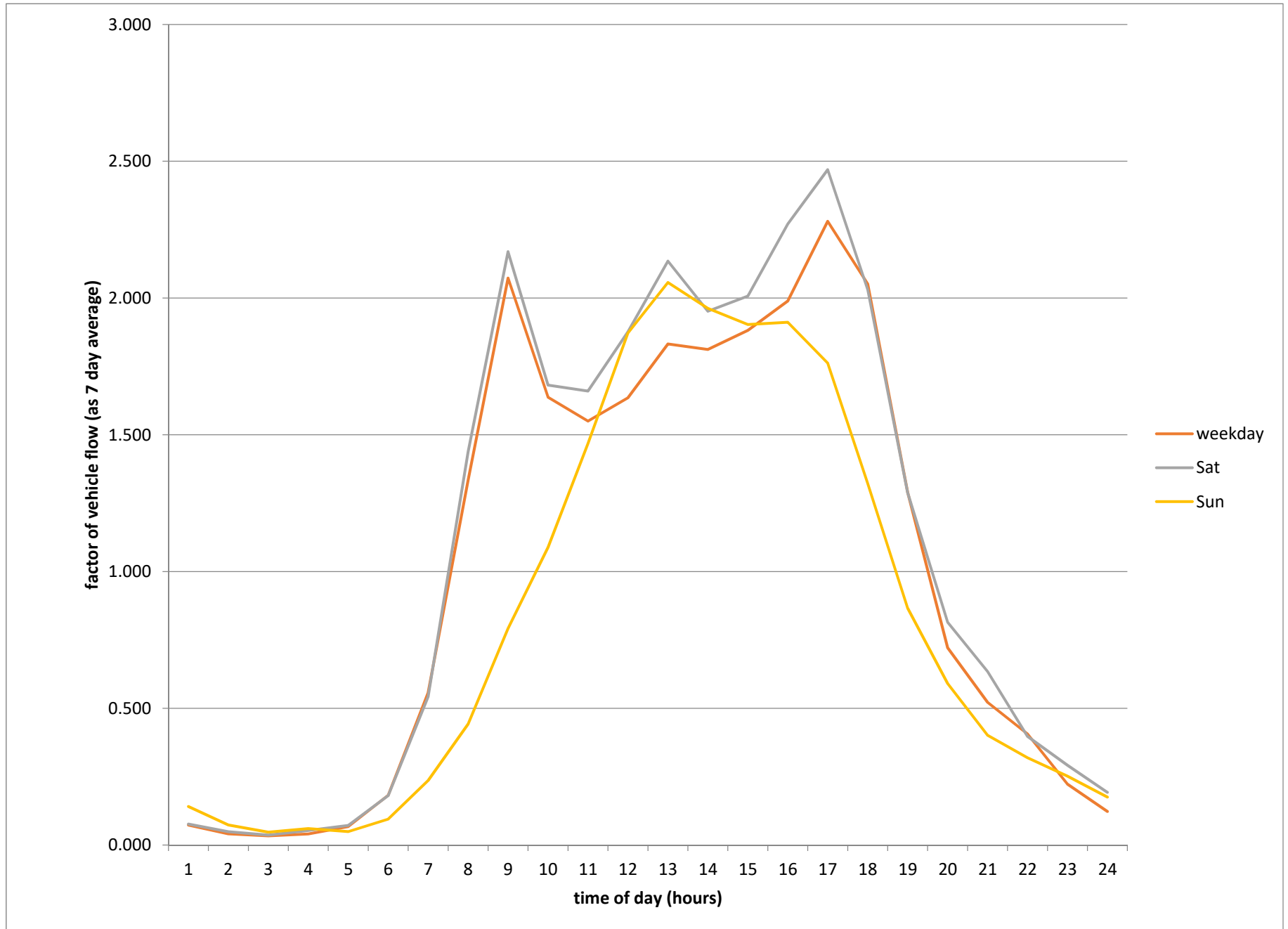
No	Description	24 hour	1 hour	LDV	HDV	speed
1	A84 west of Garden Centre	11342	473	457	16	69
2	A84 east of Garden Centre	13391	558	541	17	69
3	A84 over M9	18216	759	744	15	66
4	M9 Northbound On-Slip	4387	183	180	3	62
5	M9 Northbound Off-Slip	7471	311	299	12	82
6	M9 Southbound Off-Slip	4465	186	182	4	70
7	M9 Southbound On-Slip	7847	327	315	12	84
8	A84 North of park and ride	16898	704	600	105	59
9	A84 south of park and ride	15807	659	647	11	75
10	M9 south of A84	38962	1623	1480	144	112
11	M9 between on and off ramps	38962	1623	1480	144	112
12	M9 North of A84	38962	1623	1480	144	112

bold flows are assumed to be scottish motorway emission factors

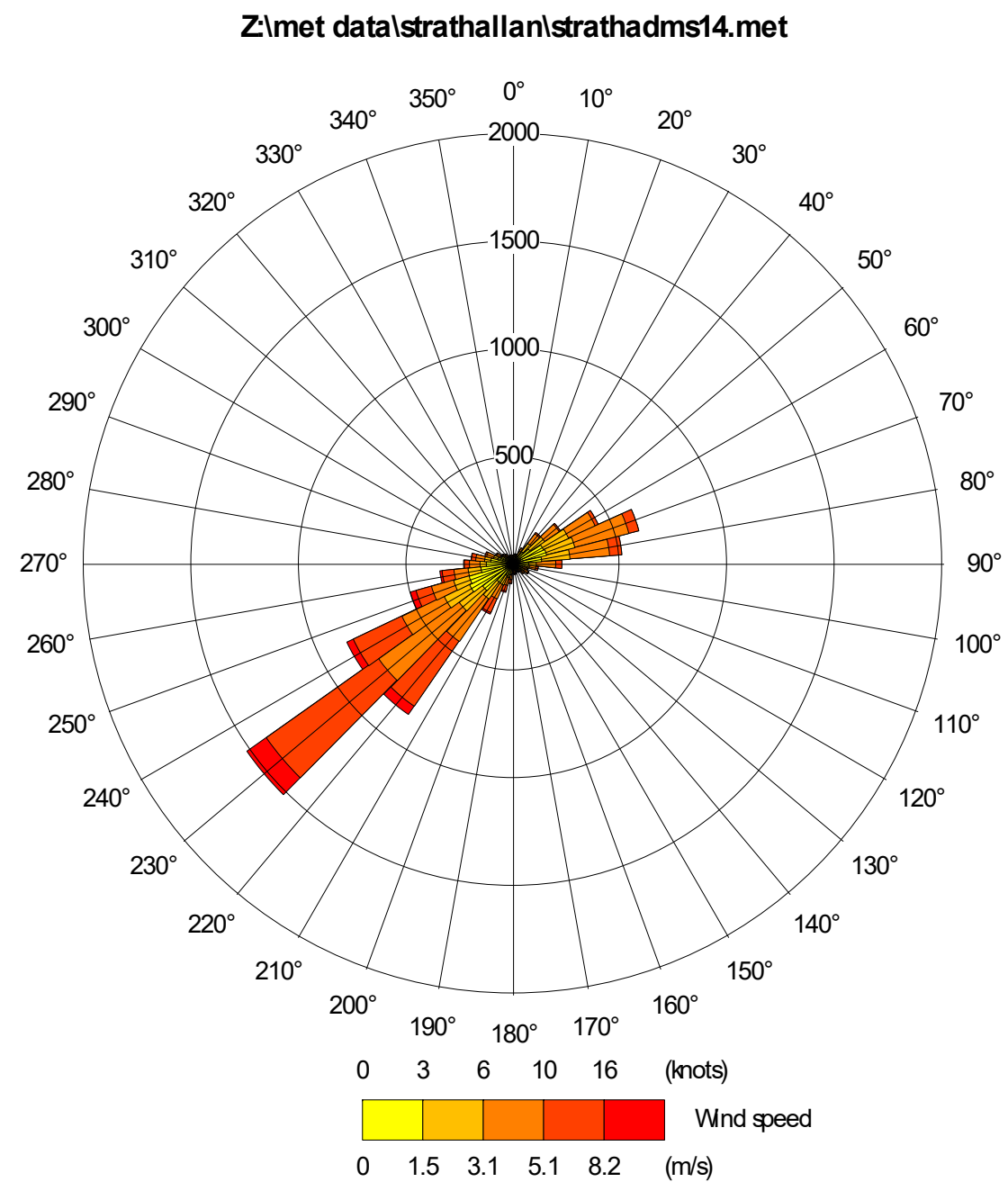
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1	A84 west of Garden Centre	11807	492	475	17	69
2	A84 east of Garden Centre	15052	627	608	19	69
3	A84 over M9	22766	949	930	19	66
4	M9 Northbound On-Slip	4449	185	182	3	62
5	M9 Northbound Off-Slip	9382	391	375	15	82
6	M9 Southbound Off-Slip	4638	193	189	4	70
7	M9 Southbound On-Slip	9640	402	386	15	84
8	A84 North of park and ride	19567	815	694	121	59
9	A84 south of park and ride	18476	770	756	13	75
10	M9 south of A84	40755	1698	1548	150	112
11	M9 between on and off ramps	38962	1623	1480	144	112
12	M9 North of A84	39024	1626	1482	144	112

bold flows are assumed to be scottish motorway emission factors





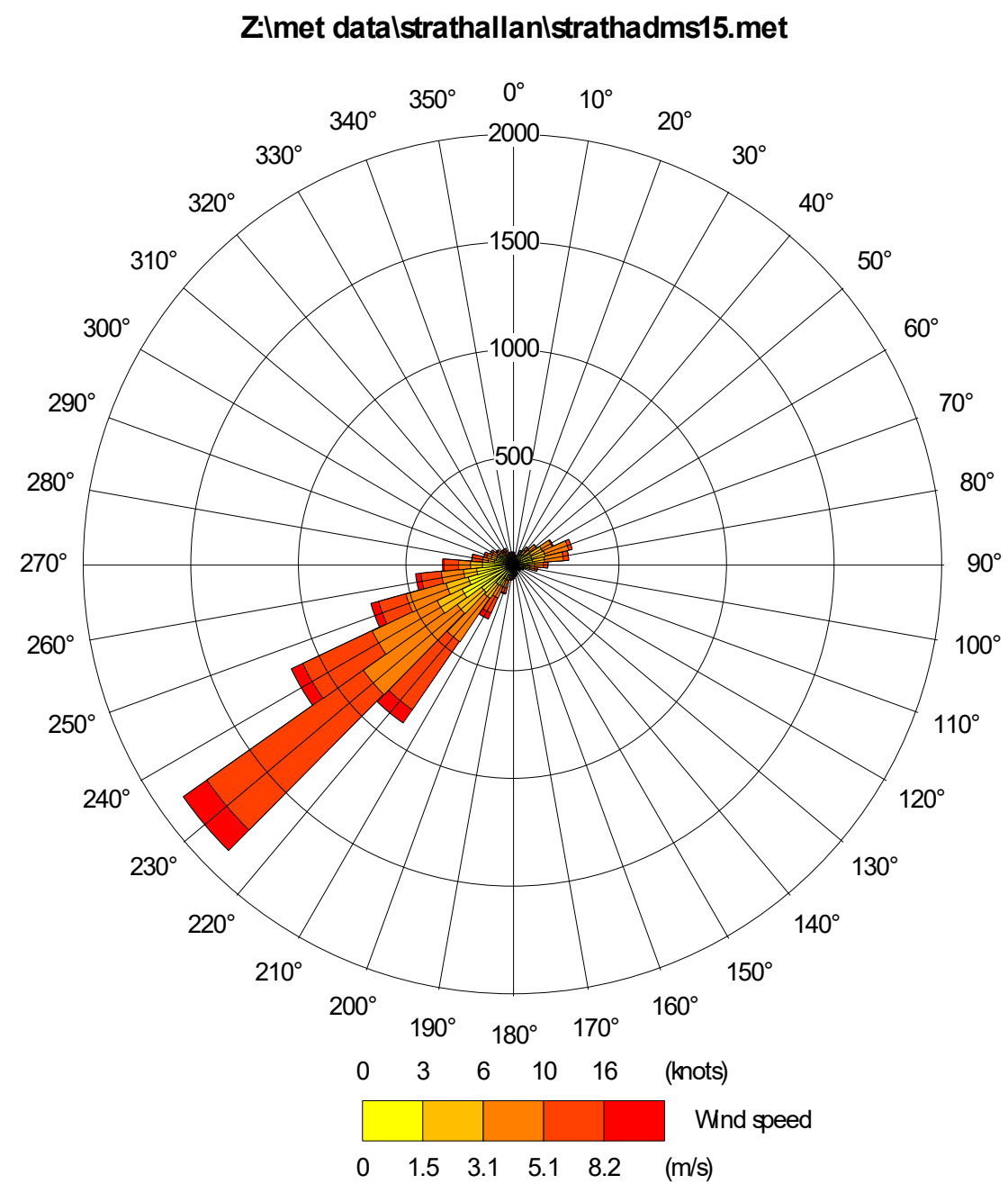
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2	0.041	0.049	0.073
3	0.034	0.036	0.047
4	0.041	0.053	0.060
5	0.068	0.072	0.049
6	0.182	0.181	0.095
7	0.557	0.542	0.236
8	1.334	1.438	0.443
9	2.073	2.169	0.792
10	1.637	1.682	1.089
11	1.550	1.660	1.468
12	1.635	1.876	1.872
13	1.832	2.135	2.057
14	1.812	1.951	1.962
15	1.882	2.007	1.903
16	1.989	2.271	1.911
17	2.280	2.469	1.762
18	2.051	2.031	1.322
19	1.290	1.288	0.867
20	0.721	0.815	0.591
21	0.522	0.635	0.402
22	0.407	0.397	0.319
23	0.223	0.292	0.252
24	0.123	0.193	0.175



Appendix 3

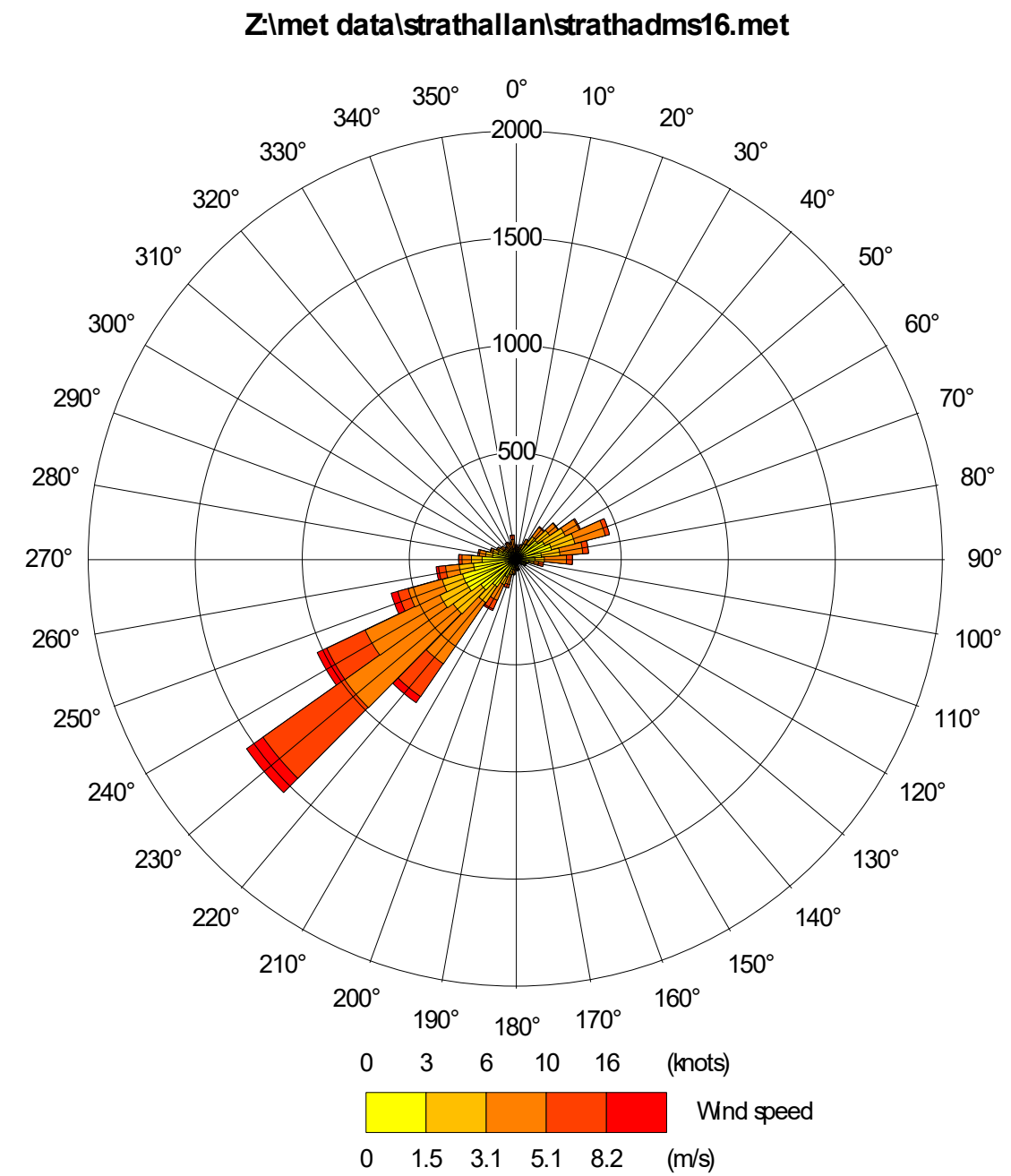


Met. Data



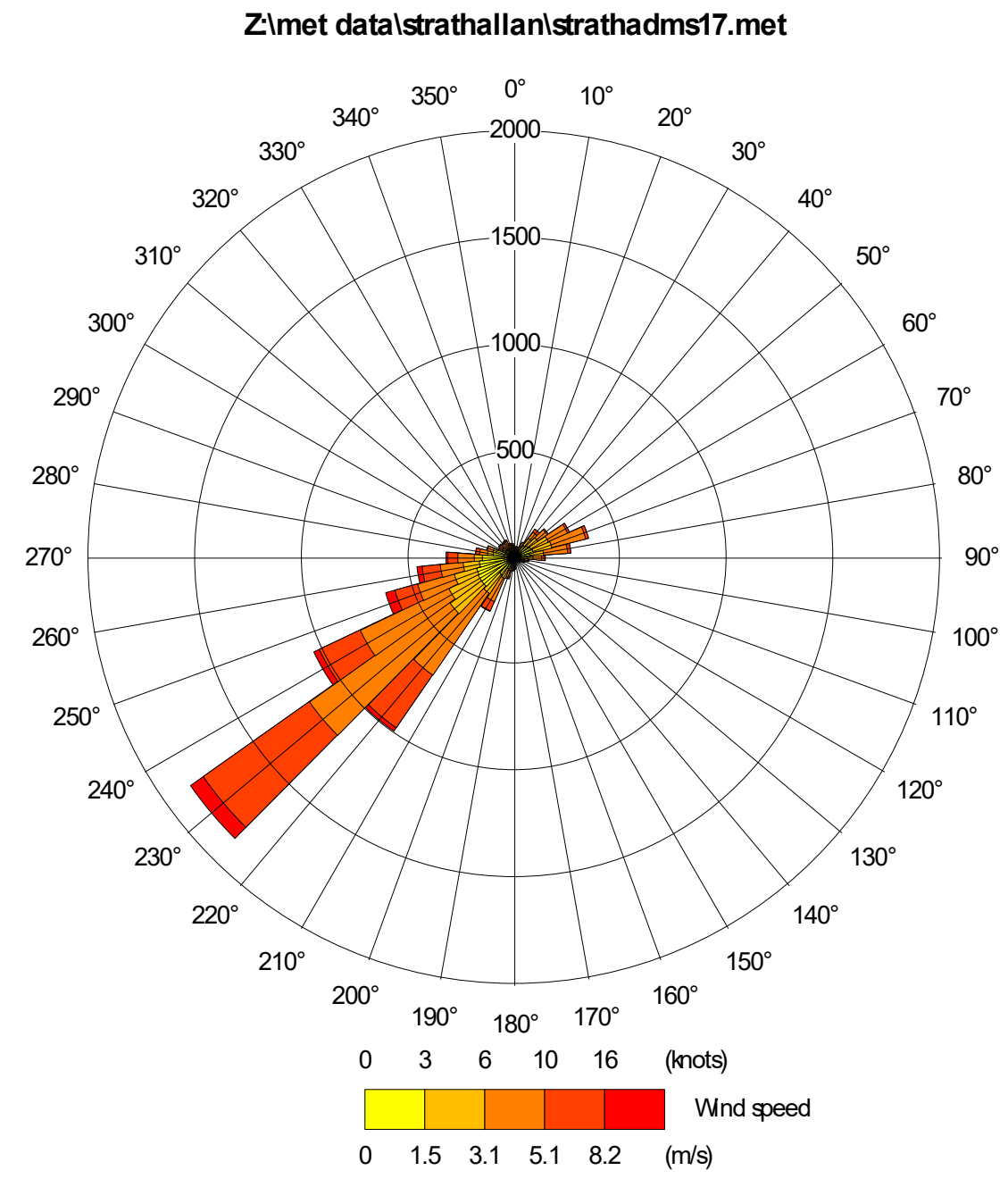
Appendix 3

Met. Data



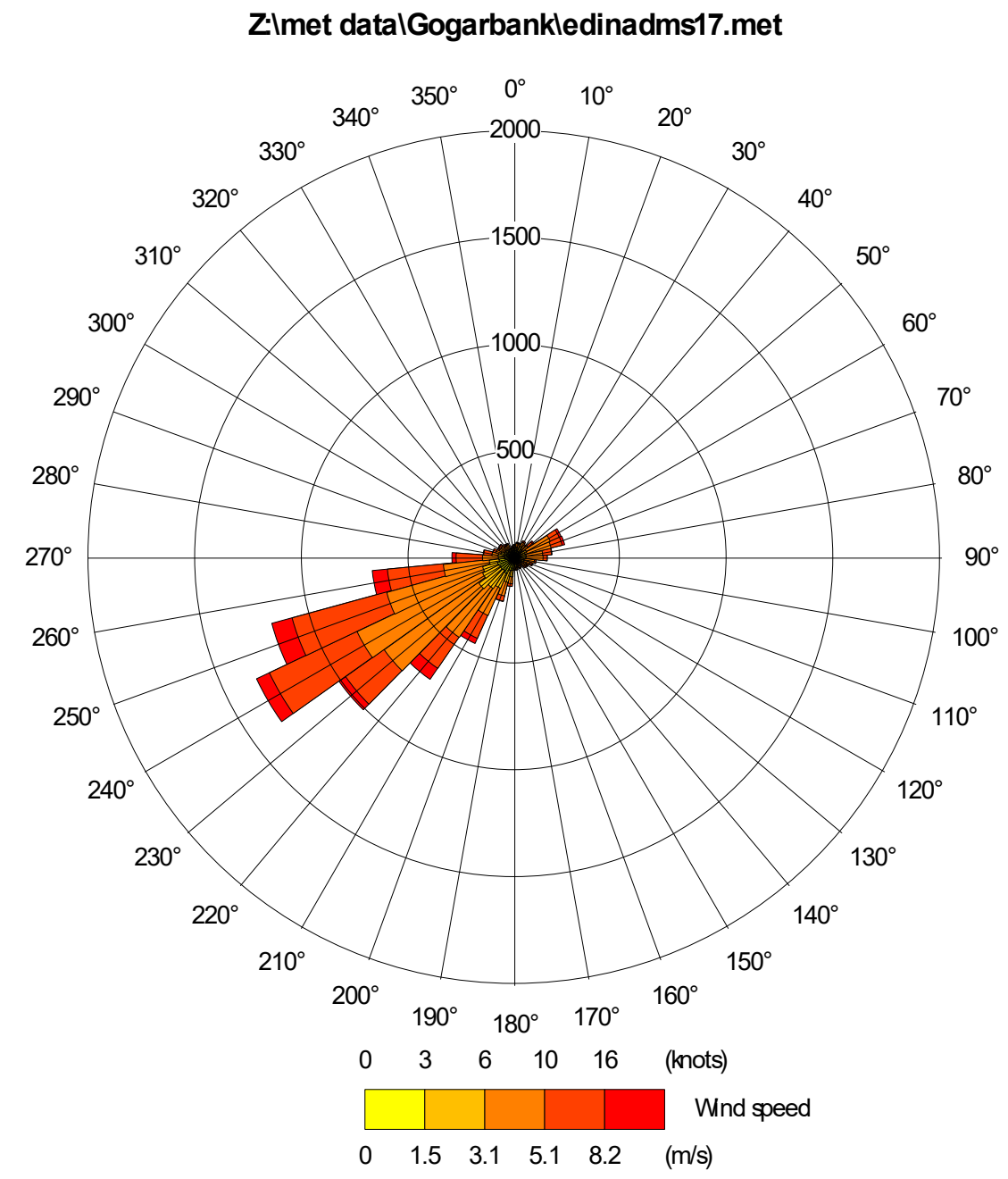
Appendix 3

Met. Data



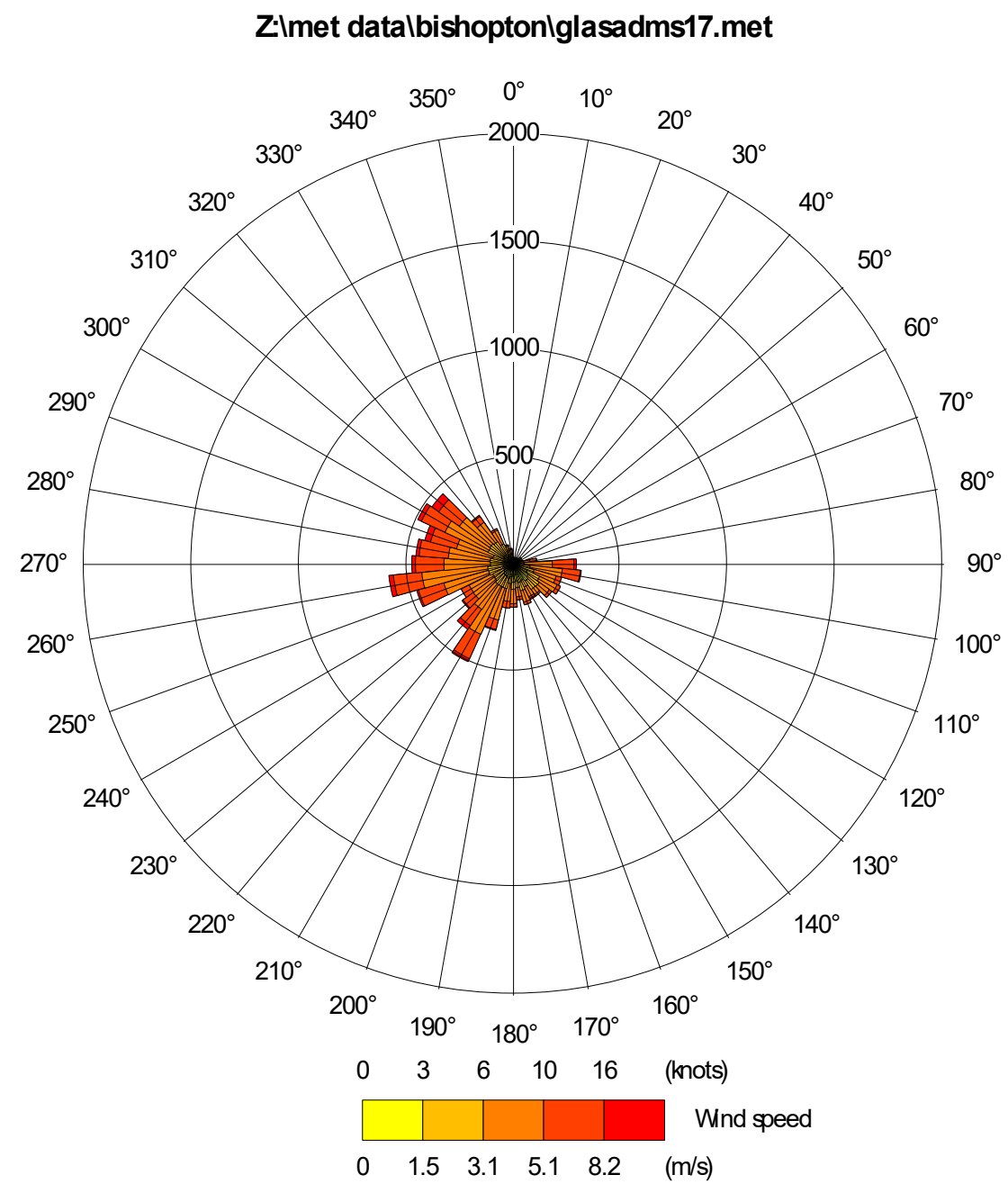
Appendix 3

Met. Data



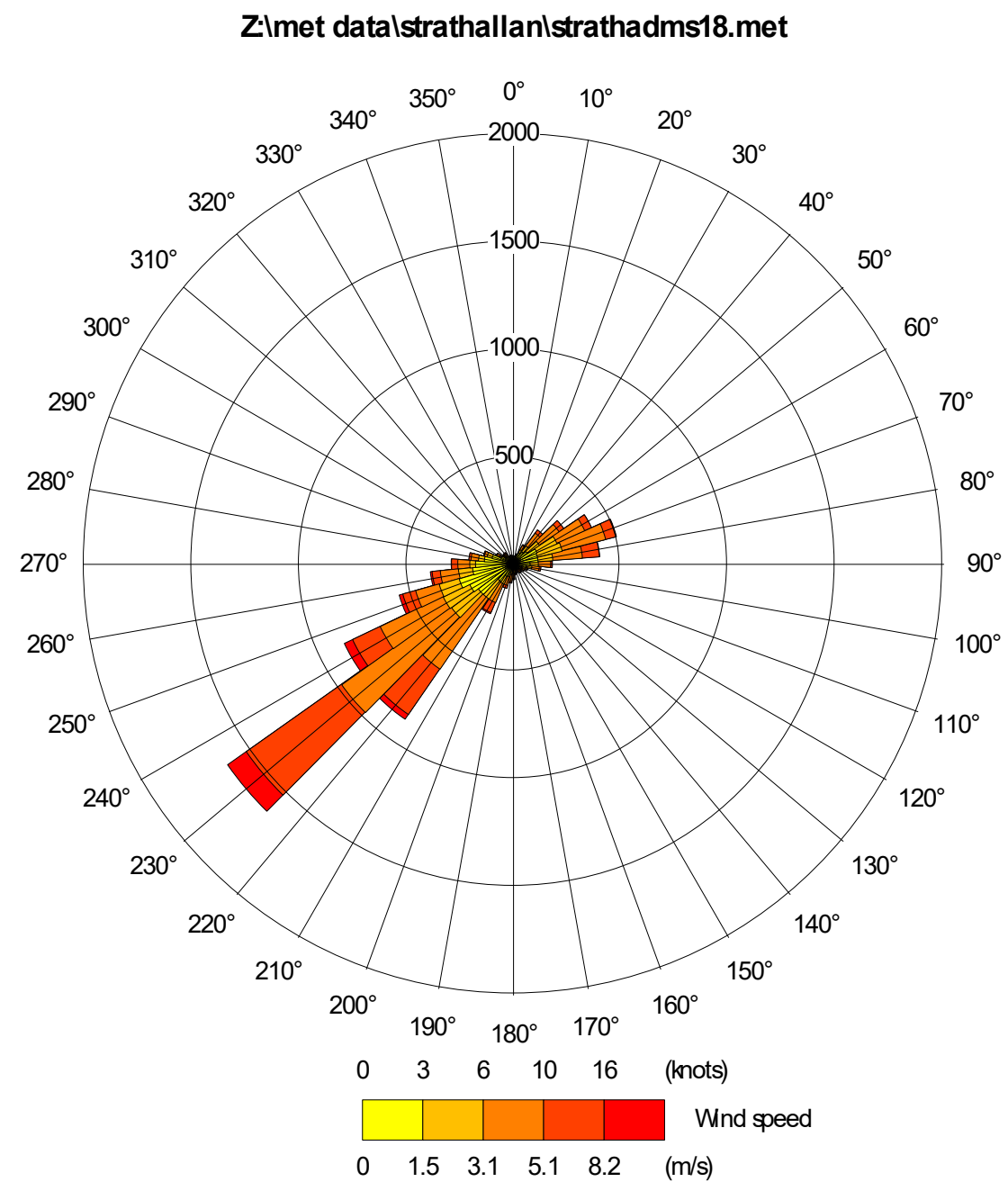
Appendix 3

Met. Data



Appendix 3

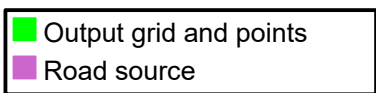
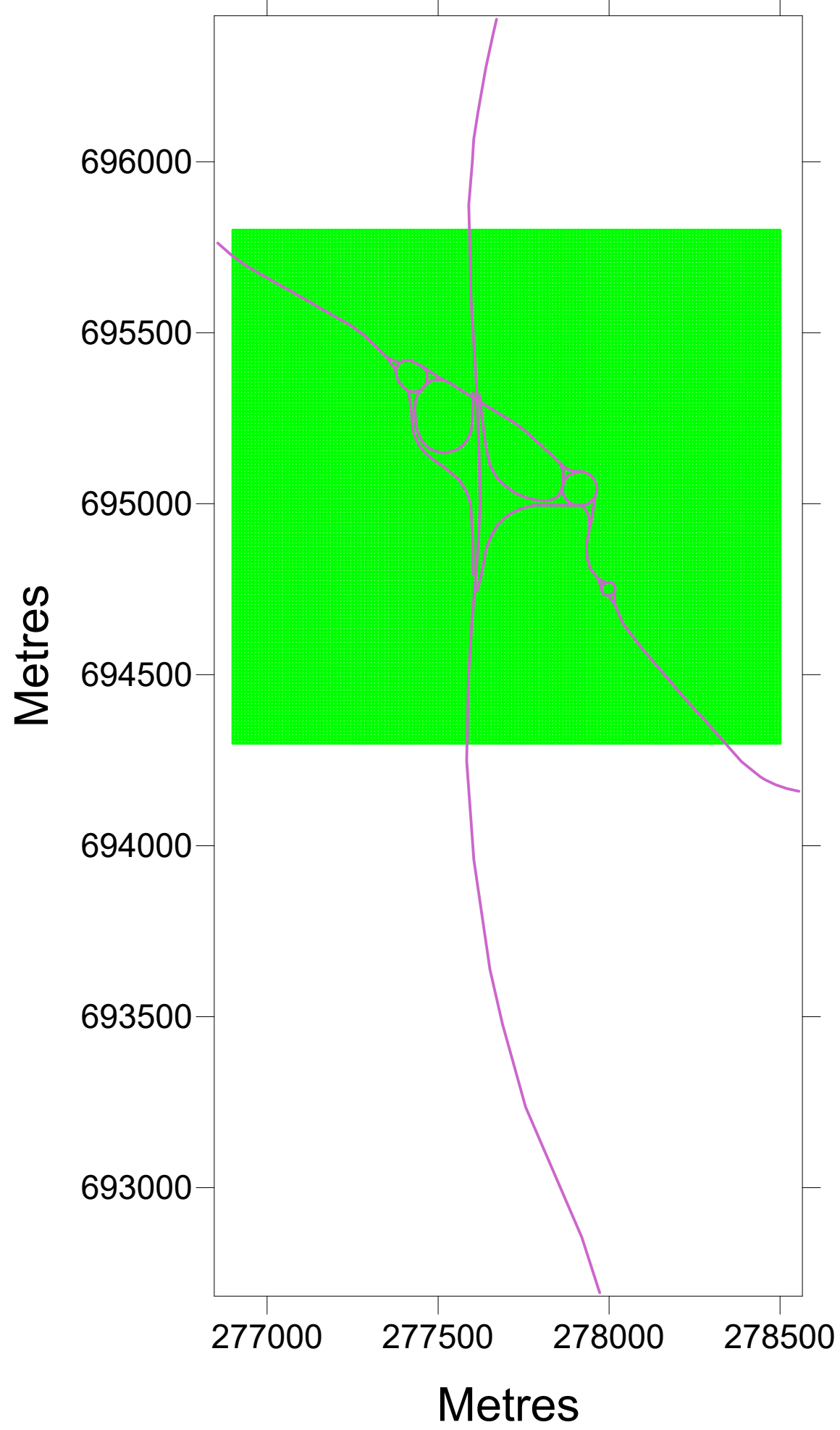
Met. Data



Appendix 3

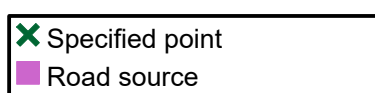
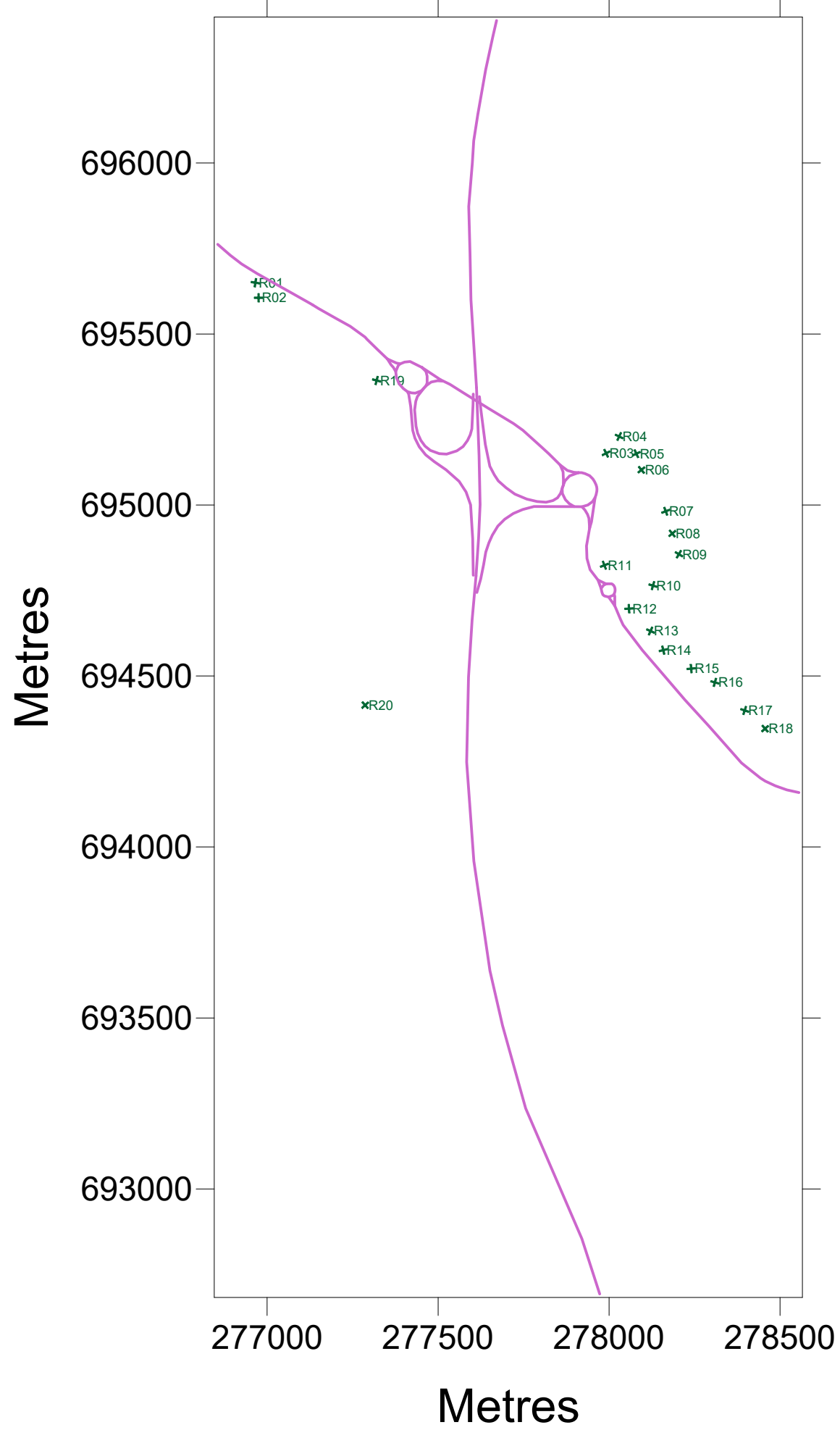
Visualisation of ADMS-Roads input

P:\files\AS 0703 Craigforth\air quality\model runs rev01\Scenario 1.upl



Visualisation of ADMS-Roads input

P:\files\AS 0703 Craigforth\air quality\model runs rev01\Scenario 1.upl



Appendix 4 – Model Outputs

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	2.30	0.23	0.23	0.13
R02	276975	695606	1.5	1.40	0.12	0.12	0.07
R03	277991	695151	1.5	3.49	0.23	0.23	0.14
R04	278029	695200	1.5	2.54	0.17	0.17	0.10
R05	278080	695150	1.5	2.51	0.16	0.16	0.10
R06	278095	695103	1.5	2.56	0.17	0.17	0.10
R07	278166	694982	1.5	1.90	0.13	0.13	0.08
R08	278185	694917	1.5	1.80	0.12	0.12	0.08
R09	278204	694856	1.5	1.70	0.12	0.12	0.07
R10	278128	694764	1.5	2.41	0.18	0.18	0.11
R11	277986	694824	1.5	5.33	0.45	0.45	0.27
R12	278058	694697	1.5	4.22	0.37	0.37	0.22
R13	278121	694631	1.5	2.72	0.24	0.24	0.14
R14	278158	694576	1.5	2.79	0.26	0.26	0.15
R15	278240	694521	1.5	2.02	0.18	0.18	0.11
R16	278309	694481	1.5	1.63	0.14	0.14	0.08
R17	278397	694399	1.5	1.47	0.13	0.13	0.08
R18	278456	694346	1.5	1.36	0.12	0.12	0.07
R19	277320	695364	1.5	4.41	0.31	0.31	0.19
R20	277287	694415	1.5	1.26	0.07	0.07	0.04

Max	5.33	0.45	0.45	0.27
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model sensitivity analysis
 met data variability
 Strathallan 2014
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.60	0.16	0.16	0.09
R02	276975	695606	1.5	0.93	0.08	0.08	0.05
R03	277991	695151	1.5	3.99	0.27	0.27	0.16
R04	278029	695200	1.5	2.91	0.19	0.19	0.12
R05	278080	695150	1.5	2.92	0.19	0.19	0.12
R06	278095	695103	1.5	3.01	0.20	0.20	0.12
R07	278166	694982	1.5	2.24	0.15	0.15	0.09
R08	278185	694917	1.5	2.13	0.15	0.15	0.09
R09	278204	694856	1.5	2.03	0.14	0.14	0.09
R10	278128	694764	1.5	2.88	0.21	0.21	0.13
R11	277986	694824	1.5	6.03	0.52	0.52	0.30
R12	278058	694697	1.5	4.99	0.44	0.44	0.26
R13	278121	694631	1.5	3.19	0.28	0.28	0.17
R14	278158	694576	1.5	3.25	0.30	0.30	0.18
R15	278240	694521	1.5	2.37	0.21	0.21	0.12
R16	278309	694481	1.5	1.92	0.17	0.17	0.10
R17	278397	694399	1.5	1.73	0.15	0.15	0.09
R18	278456	694346	1.5	1.60	0.14	0.14	0.08
R19	277320	695364	1.5	2.72	0.20	0.20	0.12
R20	277287	694415	1.5	0.77	0.04	0.04	0.03

Max	6.03	0.52	0.52	0.30
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model sensitivity analysis
 met data variability
 Strathallan 2015
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	2.20	0.22	0.22	0.13
R02	276975	695606	1.5	1.31	0.12	0.12	0.07
R03	277991	695151	1.5	3.98	0.26	0.27	0.16
R04	278029	695200	1.5	2.91	0.19	0.19	0.12
R05	278080	695150	1.5	2.91	0.19	0.19	0.12
R06	278095	695103	1.5	3.02	0.20	0.20	0.12
R07	278166	694982	1.5	2.26	0.15	0.15	0.09
R08	278185	694917	1.5	2.13	0.15	0.15	0.09
R09	278204	694856	1.5	2.03	0.14	0.14	0.09
R10	278128	694764	1.5	2.88	0.21	0.21	0.13
R11	277986	694824	1.5	6.04	0.51	0.51	0.30
R12	278058	694697	1.5	4.96	0.43	0.43	0.26
R13	278121	694631	1.5	3.16	0.28	0.28	0.17
R14	278158	694576	1.5	3.22	0.30	0.30	0.17
R15	278240	694521	1.5	2.35	0.21	0.21	0.12
R16	278309	694481	1.5	1.90	0.16	0.16	0.10
R17	278397	694399	1.5	1.72	0.15	0.15	0.09
R18	278456	694346	1.5	1.59	0.14	0.14	0.08
R19	277320	695364	1.5	3.96	0.28	0.28	0.17
R20	277287	694415	1.5	1.12	0.06	0.06	0.04

Max	6.04	0.51	0.51	0.30
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model sensitivity analysis
 met data variability
 Strathallan 2016
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.63	0.17	0.17	0.10
R02	276975	695606	1.5	0.94	0.09	0.09	0.05
R03	277991	695151	1.5	4.11	0.27	0.27	0.17
R04	278029	695200	1.5	3.01	0.20	0.20	0.12
R05	278080	695150	1.5	3.00	0.19	0.19	0.12
R06	278095	695103	1.5	3.07	0.20	0.20	0.12
R07	278166	694982	1.5	2.25	0.15	0.15	0.09
R08	278185	694917	1.5	2.14	0.15	0.15	0.09
R09	278204	694856	1.5	2.03	0.14	0.14	0.09
R10	278128	694764	1.5	2.86	0.21	0.21	0.13
R11	277986	694824	1.5	6.09	0.52	0.52	0.31
R12	278058	694697	1.5	4.94	0.43	0.43	0.25
R13	278121	694631	1.5	3.19	0.28	0.28	0.17
R14	278158	694576	1.5	3.25	0.30	0.30	0.17
R15	278240	694521	1.5	2.36	0.21	0.21	0.12
R16	278309	694481	1.5	1.92	0.16	0.16	0.10
R17	278397	694399	1.5	1.73	0.15	0.15	0.09
R18	278456	694346	1.5	1.60	0.14	0.14	0.08
R19	277320	695364	1.5	2.81	0.20	0.20	0.12
R20	277287	694415	1.5	0.83	0.05	0.05	0.03

Max	6.09	0.52	0.52	0.31
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model sensitivity analysis
 met data variability
 Strathallan 2017
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.98	0.20	0.20	0.11
R02	276975	695606	1.5	1.17	0.10	0.10	0.06
R03	277991	695151	1.5	4.01	0.27	0.27	0.16
R04	278029	695200	1.5	2.93	0.19	0.19	0.12
R05	278080	695150	1.5	2.93	0.19	0.19	0.12
R06	278095	695103	1.5	3.03	0.20	0.20	0.12
R07	278166	694982	1.5	2.28	0.15	0.15	0.09
R08	278185	694917	1.5	2.14	0.15	0.15	0.09
R09	278204	694856	1.5	2.01	0.14	0.14	0.09
R10	278128	694764	1.5	2.84	0.21	0.21	0.13
R11	277986	694824	1.5	5.90	0.50	0.50	0.30
R12	278058	694697	1.5	4.80	0.42	0.42	0.25
R13	278121	694631	1.5	3.08	0.27	0.27	0.16
R14	278158	694576	1.5	3.15	0.29	0.29	0.17
R15	278240	694521	1.5	2.31	0.21	0.21	0.12
R16	278309	694481	1.5	1.88	0.16	0.16	0.10
R17	278397	694399	1.5	1.70	0.15	0.15	0.09
R18	278456	694346	1.5	1.58	0.14	0.14	0.08
R19	277320	695364	1.5	3.64	0.26	0.26	0.16
R20	277287	694415	1.5	1.04	0.06	0.06	0.04

Max	5.90	0.50	0.50	0.30
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model sensitivity analysis
 met data variability
 Strathallan 2018
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.70	0.17	0.17	0.10
R02	276975	695606	1.5	0.99	0.09	0.09	0.05
R03	277991	695151	1.5	3.30	0.22	0.22	0.14
R04	278029	695200	1.5	2.38	0.16	0.16	0.10
R05	278080	695150	1.5	2.23	0.15	0.15	0.09
R06	278095	695103	1.5	2.32	0.15	0.15	0.09
R07	278166	694982	1.5	2.00	0.14	0.14	0.08
R08	278185	694917	1.5	1.93	0.13	0.13	0.08
R09	278204	694856	1.5	1.84	0.13	0.13	0.08
R10	278128	694764	1.5	2.74	0.20	0.20	0.12
R11	277986	694824	1.5	6.67	0.55	0.56	0.33
R12	278058	694697	1.5	5.69	0.49	0.49	0.29
R13	278121	694631	1.5	3.38	0.30	0.30	0.18
R14	278158	694576	1.5	3.33	0.31	0.31	0.18
R15	278240	694521	1.5	2.37	0.21	0.21	0.12
R16	278309	694481	1.5	1.88	0.16	0.16	0.10
R17	278397	694399	1.5	1.64	0.14	0.14	0.08
R18	278456	694346	1.5	1.50	0.13	0.13	0.08
R19	277320	695364	1.5	2.51	0.18	0.18	0.11
R20	277287	694415	1.5	0.75	0.04	0.04	0.03

Max	6.67	0.55	0.56	0.33
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model sensitivity analysis
 met data variability
 Bishopton 2017
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.24	0.13	0.13	0.07
R02	276975	695606	1.5	0.72	0.07	0.07	0.04
R03	277991	695151	1.5	3.49	0.23	0.23	0.14
R04	278029	695200	1.5	2.53	0.17	0.17	0.10
R05	278080	695150	1.5	2.52	0.16	0.16	0.10
R06	278095	695103	1.5	2.60	0.17	0.17	0.10
R07	278166	694982	1.5	1.91	0.13	0.13	0.08
R08	278185	694917	1.5	1.79	0.12	0.12	0.08
R09	278204	694856	1.5	1.72	0.12	0.12	0.07
R10	278128	694764	1.5	2.49	0.18	0.18	0.11
R11	277986	694824	1.5	5.38	0.46	0.46	0.27
R12	278058	694697	1.5	4.26	0.38	0.38	0.22
R13	278121	694631	1.5	2.75	0.25	0.25	0.14
R14	278158	694576	1.5	2.82	0.26	0.26	0.15
R15	278240	694521	1.5	2.04	0.18	0.18	0.11
R16	278309	694481	1.5	1.64	0.14	0.14	0.08
R17	278397	694399	1.5	1.47	0.13	0.13	0.08
R18	278456	694346	1.5	1.36	0.12	0.12	0.07
R19	277320	695364	1.5	2.05	0.15	0.15	0.09
R20	277287	694415	1.5	0.62	0.03	0.03	0.02

Max	5.38	0.46	0.46	0.27
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model sensitivity analysis
 met data variability
 Gogarbank 2017
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)
R01	276966	695650	1.5
R02	276975	695606	1.5
R03	277991	695151	1.5
R04	278029	695200	1.5
R05	278080	695150	1.5
R06	278095	695103	1.5
R07	278166	694982	1.5
R08	278185	694917	1.5
R09	278204	694856	1.5
R10	278128	694764	1.5
R11	277986	694824	1.5
R12	278058	694697	1.5
R13	278121	694631	1.5
R14	278158	694576	1.5
R15	278240	694521	1.5
R16	278309	694481	1.5
R17	278397	694399	1.5
R18	278456	694346	1.5
R19	277320	695364	1.5
R20	277287	694415	1.5

Max

Strathallan	Gogarbank	Bishopton
1.63	1.24	1.70
0.94	0.72	0.99
4.11	3.49	3.30
3.01	2.53	2.38
3.00	2.52	2.23
3.07	2.60	2.32
2.25	1.91	2.00
2.14	1.79	1.93
2.03	1.72	1.84
2.86	2.49	2.74
6.09	5.38	6.67
4.94	4.26	5.69
3.19	2.75	3.38
3.25	2.82	3.33
2.36	2.04	2.37
1.92	1.64	1.88
1.73	1.47	1.64
1.60	1.36	1.50
2.81	2.05	2.51
0.83	0.62	0.75

6.09	5.38	6.67
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annual mean NOx for three met data sets

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.35	0.14	0.14	0.08
R02	276975	695606	1.5	0.79	0.07	0.07	0.04
R03	277991	695151	1.5	3.98	0.26	0.27	0.16
R04	278029	695200	1.5	2.88	0.19	0.19	0.12
R05	278080	695150	1.5	2.88	0.19	0.19	0.12
R06	278095	695103	1.5	2.98	0.19	0.19	0.12
R07	278166	694982	1.5	2.15	0.15	0.15	0.09
R08	278185	694917	1.5	2.02	0.14	0.14	0.09
R09	278204	694856	1.5	1.95	0.14	0.14	0.08
R10	278128	694764	1.5	2.82	0.21	0.21	0.13
R11	277986	694824	1.5	5.94	0.51	0.51	0.30
R12	278058	694697	1.5	4.70	0.42	0.42	0.24
R13	278121	694631	1.5	3.08	0.28	0.28	0.16
R14	278158	694576	1.5	3.16	0.29	0.29	0.17
R15	278240	694521	1.5	2.29	0.20	0.21	0.12
R16	278309	694481	1.5	1.85	0.16	0.16	0.09
R17	278397	694399	1.5	1.65	0.14	0.14	0.09
R18	278456	694346	1.5	1.53	0.13	0.13	0.08
R19	277320	695364	1.5	2.29	0.16	0.16	0.10
R20	277287	694415	1.5	0.68	0.04	0.04	0.02

Max	5.94	0.51	0.51	0.30
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model sensitivity analysis
 surface roughness
 Strathallan 2017
 surface roughness 0.3m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.63	0.17	0.17	0.10
R02	276975	695606	1.5	0.94	0.09	0.09	0.05
R03	277991	695151	1.5	4.11	0.27	0.27	0.17
R04	278029	695200	1.5	3.01	0.20	0.20	0.12
R05	278080	695150	1.5	3.00	0.19	0.19	0.12
R06	278095	695103	1.5	3.07	0.20	0.20	0.12
R07	278166	694982	1.5	2.25	0.15	0.15	0.09
R08	278185	694917	1.5	2.14	0.15	0.15	0.09
R09	278204	694856	1.5	2.03	0.14	0.14	0.09
R10	278128	694764	1.5	2.86	0.21	0.21	0.13
R11	277986	694824	1.5	6.09	0.52	0.52	0.31
R12	278058	694697	1.5	4.94	0.43	0.43	0.25
R13	278121	694631	1.5	3.19	0.28	0.28	0.17
R14	278158	694576	1.5	3.25	0.30	0.30	0.17
R15	278240	694521	1.5	2.36	0.21	0.21	0.12
R16	278309	694481	1.5	1.92	0.16	0.16	0.10
R17	278397	694399	1.5	1.73	0.15	0.15	0.09
R18	278456	694346	1.5	1.60	0.14	0.14	0.08
R19	277320	695364	1.5	2.81	0.20	0.20	0.12
R20	277287	694415	1.5	0.83	0.05	0.05	0.03

Max	6.09	0.52	0.52	0.31
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model sensitivity analysis
 surface roughness
 Strathallan 2017
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.03	0.10	0.10	0.06
R02	276975	695606	1.5	0.60	0.05	0.05	0.03
R03	277991	695151	1.5	2.80	0.19	0.19	0.11
R04	278029	695200	1.5	2.04	0.13	0.13	0.08
R05	278080	695150	1.5	2.00	0.13	0.13	0.08
R06	278095	695103	1.5	2.06	0.13	0.13	0.08
R07	278166	694982	1.5	1.55	0.10	0.10	0.06
R08	278185	694917	1.5	1.44	0.10	0.10	0.06
R09	278204	694856	1.5	1.37	0.10	0.10	0.06
R10	278128	694764	1.5	2.00	0.15	0.15	0.09
R11	277986	694824	1.5	4.44	0.37	0.37	0.22
R12	278058	694697	1.5	3.51	0.31	0.31	0.18
R13	278121	694631	1.5	2.22	0.20	0.20	0.12
R14	278158	694576	1.5	2.27	0.21	0.21	0.12
R15	278240	694521	1.5	1.64	0.15	0.15	0.09
R16	278309	694481	1.5	1.32	0.11	0.11	0.07
R17	278397	694399	1.5	1.18	0.10	0.10	0.06
R18	278456	694346	1.5	1.09	0.09	0.09	0.06
R19	277320	695364	1.5	1.68	0.12	0.12	0.07
R20	277287	694415	1.5	0.52	0.03	0.03	0.02

Max	4.44	0.37	0.37	0.22
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model sensitivity analysis
 surface roughness
 Strathallan 2017
 surface roughness 1.0m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	1.63	0.17	0.17	0.10
R02	276975	695606	1.5	0.94	0.09	0.09	0.05
R03	277991	695151	1.5	4.11	0.27	0.27	0.17
R04	278029	695200	1.5	3.01	0.20	0.20	0.12
R05	278080	695150	1.5	3.00	0.19	0.19	0.12
R06	278095	695103	1.5	3.07	0.20	0.20	0.12
R07	278166	694982	1.5	2.25	0.15	0.15	0.09
R08	278185	694917	1.5	2.14	0.15	0.15	0.09
R09	278204	694856	1.5	2.03	0.14	0.14	0.09
R10	278128	694764	1.5	2.86	0.21	0.21	0.13
R11	277986	694824	1.5	6.09	0.52	0.52	0.31
R12	278058	694697	1.5	4.94	0.43	0.43	0.25
R13	278121	694631	1.5	3.19	0.28	0.28	0.17
R14	278158	694576	1.5	3.25	0.30	0.30	0.17
R15	278240	694521	1.5	2.36	0.21	0.21	0.12
R16	278309	694481	1.5	1.92	0.16	0.16	0.10
R17	278397	694399	1.5	1.73	0.15	0.15	0.09
R18	278456	694346	1.5	1.60	0.14	0.14	0.08
R19	277320	695364	1.5	2.81	0.20	0.20	0.12
R20	277287	694415	1.5	0.83	0.05	0.05	0.03

Max	6.09	0.52	0.52	0.31
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model sensitivity analysis
 surface roughness
 Strathallan 2017
 surface roughness 0.5m
 M-O 30m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)	Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr
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R01	276966	695650	1.5	2.82	0.28	0.28	0.16
R02	276975	695606	1.5	1.82	0.16	0.16	0.10
R03	277991	695151	1.5	7.59	0.50	0.50	0.31
R04	278029	695200	1.5	5.73	0.37	0.37	0.23
R05	278080	695150	1.5	5.73	0.37	0.37	0.23
R06	278095	695103	1.5	5.94	0.38	0.38	0.24
R07	278166	694982	1.5	4.62	0.31	0.31	0.19
R08	278185	694917	1.5	4.36	0.29	0.29	0.18
R09	278204	694856	1.5	4.13	0.28	0.28	0.17
R10	278128	694764	1.5	5.68	0.41	0.41	0.25
R11	277986	694824	1.5	10.56	0.87	0.87	0.51
R12	278058	694697	1.5	8.92	0.75	0.75	0.44
R13	278121	694631	1.5	5.85	0.50	0.50	0.29
R14	278158	694576	1.5	5.80	0.51	0.51	0.30
R15	278240	694521	1.5	4.45	0.38	0.38	0.23
R16	278309	694481	1.5	3.71	0.31	0.31	0.18
R17	278397	694399	1.5	3.36	0.28	0.28	0.17
R18	278456	694346	1.5	3.13	0.26	0.26	0.16
R19	277320	695364	1.5	5.21	0.37	0.37	0.23
R20	277287	694415	1.5	1.79	0.10	0.10	0.06

Max	10.56	0.87	0.87	0.51
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model sensitivity analysis
 surface roughness
 Strathallan 2017
 surface roughness 0.5m
 M-O 10m
 Scenario 1

Receptor name	X(m)	Y(m)	Z(m)
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Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr	NO2 from Nox:NO2 v7.1.2019
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R01	276966	695650	1.5
R02	276975	695606	1.5
R03	277991	695151	1.5
R04	278029	695200	1.5
R05	278080	695150	1.5
R06	278095	695103	1.5
R07	278166	694982	1.5
R08	278185	694917	1.5
R09	278204	694856	1.5
R10	278128	694764	1.5
R11	277986	694824	1.5
R12	278058	694697	1.5
R13	278121	694631	1.5
R14	278158	694576	1.5
R15	278240	694521	1.5
R16	278309	694481	1.5
R17	278397	694399	1.5
R18	278456	694346	1.5
R19	277320	695364	1.5
R20	277287	694415	1.5

2.82	0.28	0.28	0.16	10.37
1.82	0.16	0.16	0.10	9.81
7.59	0.50	0.50	0.31	12.97
5.73	0.37	0.37	0.23	11.96
5.73	0.37	0.37	0.23	11.96
5.94	0.38	0.38	0.24	12.07
4.62	0.31	0.31	0.19	11.36
4.36	0.29	0.29	0.18	11.21
4.13	0.28	0.28	0.17	11.09
5.68	0.41	0.41	0.25	11.93
10.56	0.87	0.87	0.51	14.57
8.92	0.75	0.75	0.44	13.69
5.85	0.50	0.50	0.29	12.03
5.80	0.51	0.51	0.30	12.00
4.45	0.38	0.38	0.23	11.26
3.71	0.31	0.31	0.18	10.86
3.36	0.28	0.28	0.17	10.66
3.13	0.26	0.26	0.16	10.54
5.21	0.37	0.37	0.23	11.68
1.79	0.10	0.10	0.06	9.79

Max

10.56	0.87	0.87	0.51	14.57
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Model Results - worst-case

surface roughness

Strathallan 2017

surface roughness 0.5m

M-O 10m

Scenario 1

Baseline

Receptor name	X(m)	Y(m)	Z(m)
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Conc ug/m3 NOx <All sources> - 1hr	Conc ug/m3 PM10 <All sources> - 24hrs	Conc ug/m3 PM10 <All sources> - 1hr	Conc ug/m3 PM2.5 <All sources> - 1hr	NO2 from Nox:NO2 v7.1.2019
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R01	276966	695650	1.5
R02	276975	695606	1.5
R03	277991	695151	1.5
R04	278029	695200	1.5
R05	278080	695150	1.5
R06	278095	695103	1.5
R07	278166	694982	1.5
R08	278185	694917	1.5
R09	278204	694856	1.5
R10	278128	694764	1.5
R11	277986	694824	1.5
R12	278058	694697	1.5
R13	278121	694631	1.5
R14	278158	694576	1.5
R15	278240	694521	1.5
R16	278309	694481	1.5
R17	278397	694399	1.5
R18	278456	694346	1.5
R19	277320	695364	1.5
R20	277287	694415	1.5

2.93	0.29	0.29	0.17	10.43
1.90	0.17	0.17	0.10	9.86
8.64	0.58	0.58	0.36	13.54
6.42	0.43	0.43	0.26	12.34
6.46	0.42	0.42	0.26	12.36
6.69	0.44	0.44	0.27	12.49
5.15	0.35	0.35	0.21	11.64
4.84	0.33	0.33	0.20	11.48
4.58	0.32	0.32	0.19	11.34
6.36	0.47	0.47	0.28	12.31
11.91	0.98	0.99	0.58	15.29
10.10	0.85	0.85	0.50	14.32
6.57	0.57	0.57	0.34	12.42
6.53	0.59	0.59	0.34	12.39
4.98	0.43	0.43	0.26	11.55
4.14	0.35	0.35	0.21	11.09
3.75	0.32	0.32	0.19	10.88
3.49	0.30	0.30	0.18	10.74
6.00	0.43	0.44	0.26	12.11
1.90	0.11	0.11	0.07	9.86

Max

11.91	0.98	0.99	0.58	15.29
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Model Results - worst-case

surface roughness

Strathallan 2017

surface roughness 0.5m

M-O 10m

Scenario 2

scheme

Local Authority: Stirling			Year: 2020			Traffic Mix: All non-urban UK traffic			
Receptor ID	Easting,m	Northing, m	Road increment NO _x µg m ⁻³	Background µg m ⁻³		Fraction emitted as NO ₂ (fNO2)	Total NO ₂ µg m ⁻³	Road NO ₂ µg m ⁻³	Notes
				NO _x	NO ₂				
R01	276965.69	695649.94	2.82179	12.7	8.8	0.292244287	10.37	1.57	
R02	276975	695605.94	1.82034	12.7	8.8	0.292244287	9.81	1.01	
R03	277991.41	695151.25	7.59036	12.7	8.8	0.292244287	12.97	4.17	
R04	278029.47	695200.31	5.72849	12.7	8.8	0.292244287	11.96	3.16	
R05	278079.81	695150	5.73408	12.7	8.8	0.292244287	11.96	3.16	
R06	278094.62	695102.62	5.93552	12.7	8.8	0.292244287	12.07	3.27	
R07	278165.66	694981.62	4.62243	12.7	8.8	0.292244287	11.36	2.56	
R08	278184.69	694916.5	4.35797	12.7	8.8	0.292244287	11.21	2.41	
R09	278204.16	694856	4.13155	12.7	8.8	0.292244287	11.09	2.29	
R10	278128.44	694764.25	5.67742	12.7	8.8	0.292244287	11.93	3.13	
R11	277986.34	694823.88	10.5599	12.7	8.8	0.292244287	14.57	5.77	
R12	278058.22	694697	8.9178	12.7	8.8	0.292244287	13.69	4.89	
R13	278121.25	694631.44	5.85411	12.7	8.8	0.292244287	12.03	3.23	
R14	278158.47	694575.56	5.80443	12.7	8.8	0.292244287	12	3.2	
R15	278240.12	694521.44	4.45066	12.7	8.8	0.292244287	11.26	2.46	
R16	278309.47	694481.25	3.71421	12.7	8.8	0.292244287	10.86	2.06	
R17	278396.62	694399.19	3.35728	12.7	8.8	0.292244287	10.66	1.86	
R18	278456.25	694345.94	3.13001	12.7	8.8	0.292244287	10.54	1.74	
R19	277320.25	695364.12	5.20944	12.7	8.8	0.292244287	11.68	2.88	
R20	277286.69	694414.69	1.78799	12.7	8.8	0.292244287	9.79	0.99	

Local Authority: Stirling			Year: 2020			Traffic Mix: All non-urban UK traffic			
Receptor ID	Easting,m	Northing, m	Road increment NO _x µg m ⁻³	Background µg m ⁻³		Fraction emitted as NO ₂ (fNO2)	Total NO ₂ µg m ⁻³	Road NO ₂ µg m ⁻³	Notes
				NO _x	NO ₂				
R01	276965.69	695649.94	2.93474	12.7	8.8	0.292244287	10.43	1.63	
R02	276975	695605.94	1.9008	12.7	8.8	0.292244287	9.86	1.06	
R03	277991.41	695151.25	8.63915	12.7	8.8	0.292244287	13.54	4.74	
R04	278029.47	695200.31	6.41916	12.7	8.8	0.292244287	12.34	3.54	
R05	278079.81	695150	6.45707	12.7	8.8	0.292244287	12.36	3.56	
R06	278094.62	695102.62	6.69378	12.7	8.8	0.292244287	12.49	3.69	
R07	278165.66	694981.62	5.14859	12.7	8.8	0.292244287	11.64	2.84	
R08	278184.69	694916.5	4.84145	12.7	8.8	0.292244287	11.48	2.68	
R09	278204.16	694856	4.58475	12.7	8.8	0.292244287	11.34	2.54	
R10	278128.44	694764.25	6.36296	12.7	8.8	0.292244287	12.31	3.51	
R11	277986.34	694823.88	11.9091	12.7	8.8	0.292244287	15.29	6.49	
R12	278058.22	694697	10.0999	12.7	8.8	0.292244287	14.32	5.52	
R13	278121.25	694631.44	6.5711	12.7	8.8	0.292244287	12.42	3.62	
R14	278158.47	694575.56	6.52549	12.7	8.8	0.292244287	12.39	3.59	
R15	278240.12	694521.44	4.9832	12.7	8.8	0.292244287	11.55	2.75	
R16	278309.47	694481.25	4.14454	12.7	8.8	0.292244287	11.09	2.29	
R17	278396.62	694399.19	3.74734	12.7	8.8	0.292244287	10.88	2.08	
R18	278456.25	694345.94	3.4934	12.7	8.8	0.292244287	10.74	1.94	
R19	277320.25	695364.12	5.99615	12.7	8.8	0.292244287	12.11	3.31	
R20	277286.69	694414.69	1.90211	12.7	8.8	0.292244287	9.86	1.06	