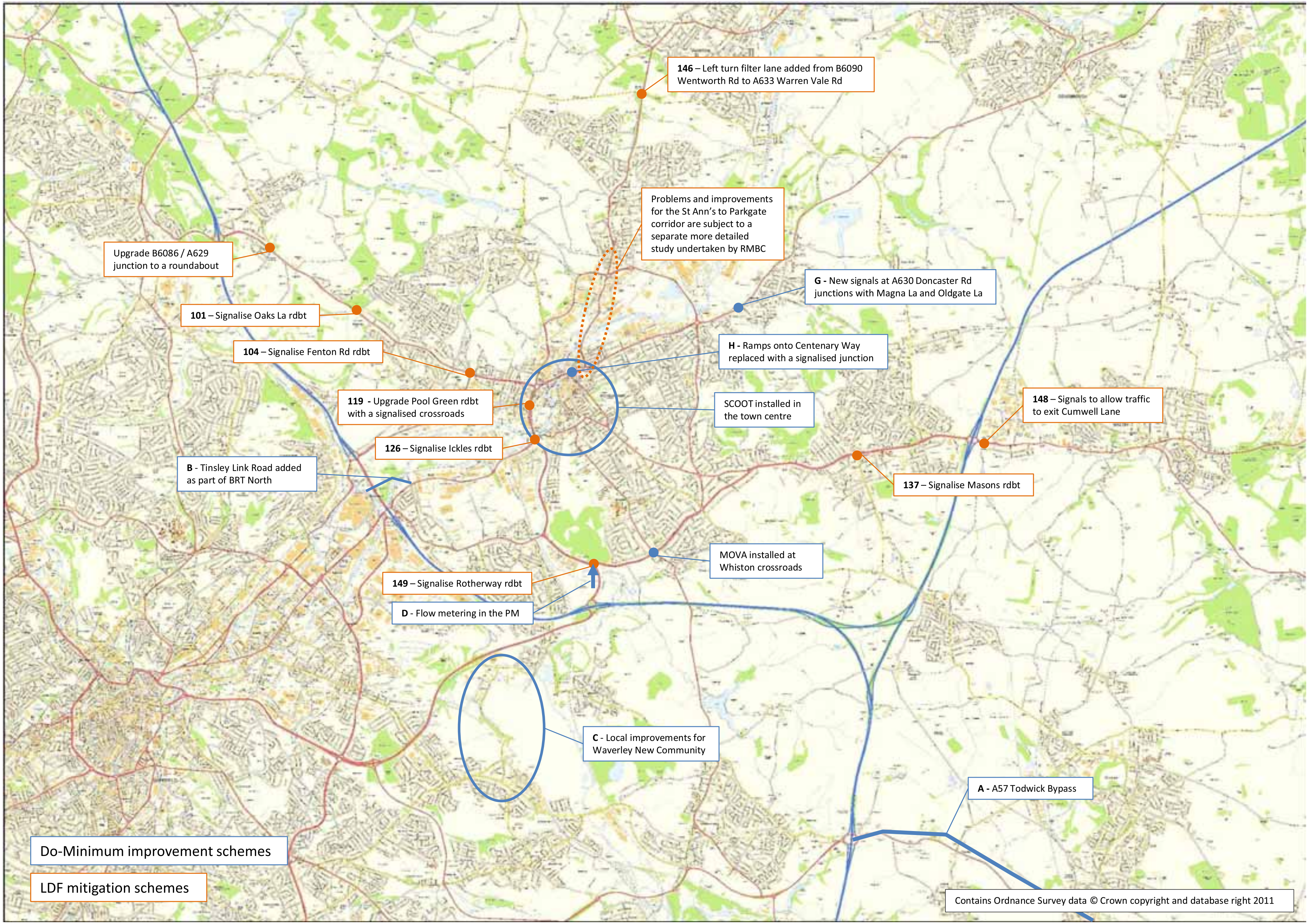
Appendix A - Map showing the location of Do-Minimum improvements schemes and proposed mitigation measures


146 – Left turn filter lane added from B6090 Wentworth Rd to A633 Warren Vale Rd
Problems and improvements for the St Ann's to Parkgate corridor are subject to a separate more detailed study undertaken by RMBC
Upgrade B6086 / A629 junction to a roundabout
G - New signals at A630 Doncaster Rd junctions with Magna La and Oldgate La
101 – Signalise Oaks La rdbt
104 – Signalise Fenton Rd rdbt
H - Ramps onto Centenary Way replaced with a signalised junction
119 - Upgrade Pool Green rdbt with a signalised crossroads
SCOOT installed in the town centre
148 – Signals to allow traffic to exit Cumwell Lane
126 – Signalise Ickles rdbt
B - Tinsley Link Road added as part of BRT North
137 – Signalise Masons rdbt
MOVA installed at Whiston crossroads
149 – Signalise Rotherway rdbt
D - Flow metering in the PM
C - Local improvements for Waverley New Community
A - A57 Todwick Bypass
Do-Minimum improvement schemes
LDF mitigation schemes
Contains Ordnance Survey data © Crown copyright and database right 2011

Appendix B

Risk Matrix for Rotherham LDF Modelling Methodology

v1.1 17-Jul-12

ID	Date logged	Status	Risk	Potential Impact(s)	Potential Mitigation	Further data required	Cost (includes cost of data collection and consultant fees) Low (<£5k) Med High (>£5k)	Timescale (includes timescales of data collection and consultant fees) Short (<1 week) Med Long (>1 month)	Recommended Mitigation
Base Model Validation									
1	12/07/2012	being addressed	Existing 2007 base model is validated to data from pre-2007 and does not necessarily reflect traffic conditions well near proposed LDF development locations	- LDF modelling could be open to criticism - LDF modelling may not provide reliable assessment of the impacts/delays and required mitigation	1. Re-validate the SATURN highway model to a 2012 base year 2. Re-validate the PT model	1. New highway counts and TrafficMaster data 2. Potential new PT counts	1. High 2. High	1. Med 2. Med	**We recommend re-validating the SATURN highway model** using: - existing counts (both pre-2007 and 2007-2011) factored to 2012 traffic levels; - new counts to plug gaps in screenlines and in areas identified as important to the assessment of the LDF, such as Rotherham town centre and near to Basingthorpe Farm (as already identified) - TrafficMaster data for journey time validation (we assume this can be provided by RMBC) We do not recommend re-validating the PT model as we understand the focus of the study is to assess the impact on the highway network and therefore it would be disproportionate to spend time/cost improving the PT model. In addition the PT costs are fixed in SRTM2 (see discussion on use of a Variable Demand Model below) and therefore do not impact on the highway model. However it is important to get the relative level of demand between modes consistent (due to mode shift in the VDM) therefore**we reccomend factoring the 2007 validated PT trip matrix to 2012 levels** using count data (if available) or factors derived from NTEM.
2	12/07/2012	live	Roadside Interview Survey (RIS) data used in building prior matrix are pre-2007. TAG recommends RIS should be less than six years old (TAG Unit 3.19 para 8.1.1).	- Matrix building could be open to criticism - The matrix may not represent current traffic patterns if they have changed significantly in the past 6 years.	Collect new RIS data and re-build the prior matrices	New RIS	High	Long	**None recommended** due to data limitations and time/cost implications of collecting new RIS and re-building the prior matrix
3	12/07/2012	live	Automatic Traffic Counts (ATCs) used to expand RIS data in matrix building are from pre-2007. TAG recommends new 2-week ATCs should be used to re-expand old RIS (TAG Unit 3.19 para 4.3.3).	- Matrix building could be open to criticism	Expand old RIS to new ATC counts	New ATCs for all RIS sites (approx 100 sites across Rotherham and Sheffield)	High	Med	**None recommended** due to data limitations and time/cost implications of collecting new ATCs and re-building the prior matrix
4	12/07/2012	live	TAG recommends starting Matrix Estimation (ME) from a prior matrix, rather than a previously validated matrix, so the impact of ME is minimised (TAG Unit 3.19 para 8.3.3)	- Matrix building could be open to criticism - ME may alter the shape of the matrix and distoprt the trip length distribution	1. Start ME from the prior matrix 2. Check the impact on the shape of the martix and trip length distribution, and apply constraints as required to control ME	None	1. Med 2. Low	1. Med 2. Short	Starting from the prior matrix would require significantly more effort to re-validate, as it would require us to put effort into re-validating traffic flows in Sheffield as well as Rotherham. In addition, to adhere to new TAG, we would have to re-design the use of existing counts to ensure they form screenlines, which would likely require collecting new counts in Sheffield as well as Rotherham. **We therefore recommend using the validated matrix from 2007 as the starting point for ME**, and argue that we are just tweaking it to re-focus the validation on the areas important for the LDF. This approach was accepted for Waverley Link Road MSBC. **We also recommend checking the impact on the shape of the martix and trip length distribution** , and apply constraints as required to control ME.
5	12/07/2012	being addressed	TAG recommends that manual classified counts (MCCs) should be factored up to ATC counts to account for day-to-day variability and to reduce the confidence interval of the count (TAG Unit 3.19 para 4.3.2, 4.4.5 and 8.3.5)	- Model calibration/validation could be open to criticism.	1. Collect new ATCs at all count site locations used in cal/val 2. Collect new ATCs at important locations and where new MCCs have been collected 3. Use existing nearby ATCs	1. New counts 2. New counts 3. None	1. High 2. Med 3. Low	1. Long 2. Short 3. Short	**We recommend:** **- collecting new ATCs at important locations** (ensuring that the model will be robust where it matters) - **collecting new ATCs where new MCCs are being collected** (demonstrating a willing to adhere to new TAG where practical), and **- using existing nearby ATCs in less critical areas** (keeping the cost and timescales proportionate to the study)
6	12/07/2012	live	TAG recommends that the use of MCCs to derive average user class splits to apply to ATCs should be avoided (TAG Unit 3.19 para 4.4.4)	- Model calibration/validation could be open to criticism.	1. Collect new MCCs at all ATC count locations used in cal/val 2. Use nearby MCCs to split ATCs into user class	1. New MCCs 2. None	1. High 1. Low	1. Med 2. Short	**We recommend using nearby MCCs to split ATCs** because it would be disproportionate to the scope of the study to collect and process a significant number new MCCs.
7	12/07/2012	live	For ME, TAG recommends using screenline or mini-screenline counts rather than individual link counts (TAG Unit 3.19 para 8.3.4)	- Many of the existing counts do not form part of a screenline so would be wasted - Model calibration/validation could be open to criticism.	1. Collect new counts to complete screenlines or mini-screenlines 2. Group existing counts into screenlines or miniscreenlines where possible 3. Use individual link counts at important locations where sufficient data to form screenlines is not available	1. New ATCs and MCCs 2. None 3.None	1. Med/High 2. Low 3. Low	1. Med 2. Short 3.Short	**We recommend grouping existing counts into screenlines or miniscreenlines where possible. We also recommend using individual link counts at important locations** where sufficient data to form screenlines is not available - we have contacted the DfT and they are open to this approach provided you can demonstrate a valid reason for doing so and that we have a high degree of confidence in the count. We do not recommend collecting new counts to complete screenlines as they would often be on minor roads where the low traffic flows do not warrant the expense of collecting the data.
Forecasting									
8	12/07/2012	live	Method to control overall level of 'unconstrained' future year demand: 1. National Trip End Model (NTEM) planning assumptions not in line with LDF 2. But NTEM growth also takes account of exogenous changes through time, such as changes to car ownership and household structure.	- Could over or underestimate the total level of future year demand	1. Adjust underlying NTEM planning data in line with LDF 2. Adjust underlying NTEM planning data to zero growth in population and jobs so that growth rates reflect just the changes in car ownership and household structure, then add development trips on top	1. Net change in population and jobs in Rotherham between 2012 and modelled future year 2. Accurate estimates of the LDF deveolopemnt trip generations	1. Low 2. Low	1. Med 2. Med	The first option would require an estimate of the net change in landuse (population and jobs) in Rotherham between 2012 and the modelled future year. The second option would require an accurate and realistic estimate of the LDF development trip generations as the overall growth in demand would not be controlled to NTEM. The first option would get the growth in demand into the right model zones and allow sufficient control over the ins and outs at each site to assess the impact on the local network and is the method we normally use for forecasting. The second option allows tighter control of the ins and outs at each site and is closer to the method normally used for a Transport Assessment. Our recommendation would be for the first option as it is less reliant on accurate estimates of trip generations at all LDF sites.
9	12/07/2012	live	Method to prepare 'constrained' demand taking account of changes in values of time, vehicle operating costs, PT fares, congestion and future year schemes.	- Just applying NTEM growth does not take account of these things and could over or underestimate total car trips, depending on the relative balance between increased congestion and values of time, reduced vehicle operating costs, and the impact of future transport schemes such as BRT North - Forecasts could be open to scrutiny	1. Use a Variable Demand Model (VDM) to constrain future year demand to changes in travel costs 2. Choice of VDM between Sheffield and Rotherham Transport Model 2 (SRTM2) and SRTM3	1. None 2.None	1. High 2. See separate sheet for comparison between SRTM2 and SRTM3	1. Med/Long 2. See separate sheet for comparison between SRTM2 and SRTM3	**We recommend using a VDM to take account of future year changes in travel costs** and adjust the demand accordingly to ensure a more robust assessment. **We recommend using SRTM2** (see separate sheet for discussion)
10	12/07/2012	live	Use of Variable Demand Model (VDM) for testing mitigation measures	- Fixed demand for the 'with mitigation' would not account for any mode or destination response as a result of the mitigation - VDM runs for the 'with mitigation' would take longer to run (days rather than hours) and may not have a material impact on the assessment (depending on the mitiagtion being tested)	1. Run VDM for each 'with mitigation' test 2. Run fixed demand (non VDM) for each 'with mitigation' test	1. None 2. None	1. High 2. Med	1. Med/Long 2. Med	We would not expect significant demand responses due to the mitigation measures (the biggest demand responses occur in preparing the future year reference demand) and the most sensitive response of route choice would be taken into account in the assignment. **We therefore recommend running fixed demand assignments for the 'with mitigation' during option testing** , with the potential to run a final mitigation package through the VDM.
11	12/07/2012	live	Need to agree on what future year(s) to model						
Representing the LDF developments									
12	12/07/2012	live	The simulation coding in the model does not extend beyond the Sheffield and Rotherham district boundaries	- The model would not be fit for purpose for assessing LDF sites at Wath, Brampton & Swinton, in particular it could not accurately model the impact on the A6195/A6023 corridor	1. Extend the simulation network	1. Network data (signal timings etc), new counts etc outside Rotherham district	1. High	1. Med	Extending the simulation network would require new network coding, new network data and counts outside Rotherham district, and require calibrating/validating. Further, the robustness of the modelling may still be criticised as the new simulation coding would still be at the edge of the detailed model area. Following discussions with you,**we recommend not extending the simulation coding** and accepting the limitations of the model to assess the impact of LDD developments in these areas.
13	12/07/2012	live	Trip distributions of LDF developments from nearby zones or a gravity model	- Using nearby zones would be quicker and easier, but relies on a reasonable distribution in the base matrices, which may not be true for zones on the periphery of the district. - Using nearby zones may not generate trips between new developments	1. Use a gravity model to distribute trips	- School places and shopping floorspace - Work places from census JtoW - Population from census	Low/Med	Short/Med	There is a significant amount of new development in the LDF and we would expect the new housing and jobs to generate trips between each other,**we therefore recommend using a gravity model to distribute the new LDF trips** .
14	12/07/2012	live	Model zones and zone connectors may not be detailed enough to accuratelty represent access to/from the LDF developments	- Development trips may not appear on the network at the correct locations, which would affect routing and also junction delays	1. Review zones prior to ME and amend as necessary	Further details (or agreed assumptions) on development access	Low	Short	We expect the majority of the new LDF developments will be built on current green/build field sites and are therefore unlikely to have a suitable model zone to separate them from existing developed areas, **we therefore recommend reviewing and adjusting the zones and zone connectors** as necessary to better represeent access to/from the LDF developments.
15	12/07/2012	live	Need to agree LDF development trip generations, trip purposes and mode share			Further details (or agreed assumptions) on development size, type and mode share			
Scope of LDF Impact Assessment - some things to consider									
16	12/07/2012	live	Are you interested in identifying impacts caused by specific developmets, or just assessing the impact on the network as a whole?	Our understanding is the former as this could be used in discussions with developers on apportionment of mitigation costs					
17	12/07/2012	live	Are mitigation measures likely to include PT and 'smarter' measures aswell as highway?	VDM would be the best tool to assess impact of PT measures TAG guidance on modelling smarter choices is not particularly useful - it is generally a case of making some assumptions and manually adjusting the demand matrices					
18	12/07/2012	live	Need to agree the types of model output and analysis we provide, both for use in identifying impacts of LDF and mitigation, and for final reporting						
19	12/07/2012	live	What is the target network performance when considering required mitigation measures: is it current levels of delay, all junctions operate within capacity, or would you be willing to accept some delays in order to deliver the LDF?						
20	12/07/2012	live	How to develop mitiagtion measures - there could be merit in working with an RMBC officer to develop and test mitigation, using the model as a tool.						
21	12/07/2012	live	To what extent do we (MVA and RMBC) need to consider the affordability and deliverability of mitigation measures						

Appendix B

Risk Matrix - SRTM2 vs SRTM3

v1.1 17-Jul-12

No	Model element	SRTM2	SRTM3	Comments
1	Model system	SATURN highway assignment PT-TRIPS PT assignment DIADEM demand model Approx 2-3 day run time for 2036 Simple set up	SATURN highway assignment Voyager PT assignment Bespoke TRAM-based demand model (with optional parking and park-and-ride models) Approx 4 day run time for 2036 More complicated set-up	- SRTM2 will be quicker and easier to use 'out of the box' - SRTM2 setup is much simpler than SRTM3 and is less prone to user input errors - SRTM2 was used for Waverley Link Road - SRTM3 was used for BRT North and South, Penistone Road, INTEGR8 (park-and-ride study) and Sheffield's City Centre Masterplan review
2	Matrix basis	Origin-Destination based	Production-Attraction and Tour based, so trips throughout the day are linked	- Tour based demand matrices are important for appraising schemes that differ by time period (such as Road User Charging), and that impact mode choice (ie if you go to work by PT you cannot come back by car), however this functionality is not relevant for assessing the impact of the LDF. - PA-tour based matrices are useful for linking both production and attraction ends of trips (ie for a commute tour you must return to the same home as you came from), however the current system is not set up to do this for new development trips
3	Main modes	Car, PT	Car, PT, Walk/Cycle	- The inclusion of walk/cycle as a main mode allows for a proper PT demand response as PT scheme demand often draws from walk/cycle rather than car, however this is unlikely to impact significantly on the assessment of the LDF
4	Time periods	3 time periods: 0800-0900, avg 1000-1600, 1700-1800	9 time periods: 0700-0800, 0800-0900, 0900-1000, avg 1000-1300, avg 1300-1600, 1600-1700, 1700-1800, 1800-1900, avg 1900-2300.	- Micro-time period choice is important for appraising schemes that differ by time period (such as RUC), and for modelling parking and park-and-ride, but is not necessary for assessing the LDF - More time periods to assign means the model takes longer to run
5	Parking capacity restraint model	Does not include a parking model	Includes optional parking restraint model in Sheffield city centre, but not Rotherham (can be turned off if not required)	- Parking restraint in Sheffield could impact the choice of mode for trips between Rotherham and Sheffield, and may supress car demand for future years, however we have found the impact to be smaller than expected - The SRTM3 parking model requires more user inputs, checking and run time
6	Park-and-Ride model	Does not include P&R model as standard, however there is a post-VDM add-on P&R module that can be used to adjust the matrices to test new P&R sites or to include them in future year reference demand forecasts	Includes optional P&R model which acts as a main mode in the VDM (can be turned off if not required)	- The SRTM2 P&R module has not been used in earnest for several years, so would require some effort to 'get out of the box' and potentially re-calibrate - The SRTM3 P&R model requires more user inputs, checking and run time
7	PT crowding	PT model is in PT-TRIPS so does not include crowding	PT model is in Voyager and includes crowding	- Crowding is important for appraising PT schemes, such as BRT, but is unlikely to have a significant impact on the LDF assessment. Without crowding there is an inherent assumption that PT operators will change their fleet in line with demand.
8	PT costs	PT costs are fixed on each loop of the VDM	PT costs change on each loop of ther VDM is response to chnages in highway congestion (for PT sub-modes using road) and crowding	- Arguably not required for assessing the LDF
9	Assignment user class	Employers Business, Commute, Other, LGV, OGV	Employers Business, Other Low Income, Other Medium Income, Other High Income, LGV, OGV	- Assignment demand was segmented by income bands in SRTM3 (required for appraising RUC and useful for BRT) but this is not necessary for assessing the LDF, indeed it may be preferable to maintain the difference between commute and other in the assignments
10	Data extracton	SATURN matrices	SQL-based databases	- SRTM3 is more flexible for extracting trip demand data, however most of the data extraction for LDF will be from the highway assignments (delays etc) rather than demand-based, in which case the two models are equal.
11	Zone system	510 zones plus 20 'dummy' zones	525 zones	- SRTM2 has 20 dummy zones (originally intended for testing proposed P&R sites) which could be used to improve the representation of LDF developments - SRTM3 does not include dummy zones so would be more difficult to change to zone system to represent the LDf developments

Appendix C

Sectored Trip Demand Matrices - Morning Peak Hour

Car Trips

2011 Base		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	9151	889	350	255	286	3356	295	444	178	617	15821
Wath, Swinton, Rawmarsh	2	1476	1243	104	29	42	568	393	365	9	182	4413
Maltby, Dinnington, Thurcroft	3	576	203	494	82	114	458	45	49	368	303	2692
Aughton, Wales	4	479	40	216	917	127	958	45	19	65	119	2985
Rotherham rural	5	458	72	139	102	212	564	38	159	112	177	2034
Sheffield	6	2277	254	300	528	242	51532	786	601	2345	2062	60928
Barnsley	7	631	347	32	25	42	812	18	567	424	819	3718
Doncaster	8	525	293	125	21	167	485	535	49	8	465	2673
Chesterfield / Nottingham	9	207	64	347	134	120	3444	261	1	0	1370	5947
Rest of Model	10	946	131	336	104	54	1782	661	596	880	1708	7197
	Total	16725	3538	2445	2198	1406	63958	3078	2850	4389	7821	108409

2028 DoMin (unconstrained)		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	9249	971	417	281	301	4506	356	522	260	750	17612
Wath, Swinton, Rawmarsh	2	1545	1310	110	38	48	791	430	421	24	230	4949
Maltby, Dinnington, Thurcroft	3	608	198	503	89	114	609	52	61	388	332	2955
Aughton, Wales	4	490	46	202	910	138	1077	51	24	74	138	3150
Rotherham rural	5	454	75	138	106	202	599	40	159	115	174	2062
Sheffield	6	4126	572	546	706	423	57301	913	737	2619	2341	70286
Barnsley	7	744	381	48	34	48	890	22	678	490	920	4255
Doncaster	8	615	327	143	28	166	542	617	60	10	529	3038
Chesterfield / Nottingham	9	364	97	400	155	140	3725	292	1	0	1545	6719
Rest of Model	10	1145	181	378	130	71	1941	746	694	965	1895	8145
	Total	19341	4158	2886	2477	1651	71981	3518	3357	4945	8855	123170

Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	98	81	67	26	15	1151	61	78	81	133	1791
Wath, Swinton, Rawmarsh	2	69	67	6	9	6	223	36	56	16	47	535
Maltby, Dinnington, Thurcroft	3	32	-5	9	7	0	151	8	12	20	30	263
Aughton, Wales	4	11	6	-14	-7	11	119	5	5	9	20	165
Rotherham rural	5	-4	3	-1	3	-11	36	1	-1	3	-2	28
Sheffield	6	1849	317	246	179	181	5768	127	137	274	279	9358
Barnsley	7	113	34	16	9	6	78	4	111	66	101	537
Doncaster	8	90	34	18	7	0	58	82	11	1	64	364
Chesterfield / Nottingham	9	157	32	53	21	21	281	31	0	0	175	771
Rest of Model	10	199	50	42	26	17	159	85	98	85	187	948
	Total	2615	619	441	279	245	8024	440	507	555	1034	14761

%Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	1%	9%	19%	10%	5%	34%	21%	17%	46%	22%	11%
Wath, Swinton, Rawmarsh	2	5%	5%	6%	30%	14%	39%	9%	15%	175%	26%	12%
Maltby, Dinnington, Thurcroft	3	6%	-3%	2%	8%	0%	33%	17%	25%	5%	10%	10%
Aughton, Wales	4	2%	14%	-6%	-1%	8%	12%	12%	29%	14%	17%	6%
Rotherham rural	5	-1%	4%	-1%	3%	-5%	6%	3%	0%	3%	-1%	1%
Sheffield	6	81%	125%	82%	34%	75%	11%	16%	23%	12%	14%	15%
Barnsley	7	18%	10%	50%	37%	13%	10%	20%	20%	15%	12%	14%
Doncaster	8	17%	11%	14%	32%	0%	12%	15%	23%	16%	14%	14%
Chesterfield / Nottingham	9	76%	51%	15%	16%	17%	8%	12%	28%	8%	13%	13%
Rest of Model	10	21%	38%	12%	25%	30%	9%	13%	16%	10%	11%	13%
	Total	16%	17%	18%	13%	17%	13%	14%	18%	13%	13%	14%

Car Origin Distribution

Origin %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	58%	6%	2%	2%	2%	21%	2%	3%	1%	4%	100%
Wath, Swinton, Rawmarsh	2	33%	28%	2%	1%	1%	13%	9%	8%	0%	4%	100%
Maltby, Dinnington, Thurcroft	3	21%	8%	18%	3%	4%	17%	2%	2%	14%	11%	100%
Aughton, Wales	4	16%	1%	7%	31%	4%	32%	2%	1%	2%	4%	100%
Rotherham rural	5	23%	4%	7%	5%	10%	28%	2%	8%	5%	9%	100%
Sheffield	6	4%	0%	0%	1%	0%	85%	1%	1%	4%	3%	100%
Barnsley	7	17%	9%	1%	1%	1%	22%	0%	15%	11%	22%	100%
Doncaster	8	20%	11%	5%	1%	6%	18%	20%	2%	0%	17%	100%
Chesterfield / Nottingham	9	3%	1%	6%	2%	2%	58%	4%	0%	0%	23%	100%
Rest of Model	10	13%	2%	5%	1%	1%	25%	9%	8%	12%	24%	100%
	Total	15%	3%	2%	2%	1%	59%	3%	3%	4%	7%	100%

Origin %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	53%	6%	2%	2%	2%	26%	2%	3%	1%	4%	100%
Wath, Swinton, Rawmarsh	2	31%	26%	2%	1%	1%	16%	9%	9%	0%	5%	100%
Maltby, Dinnington, Thurcroft	3	21%	7%	17%	3%	4%	21%	2%	2%	13%	11%	100%
Aughton, Wales	4	16%	1%	6%	29%	4%	34%	2%	1%	2%	4%	100%
Rotherham rural	5	22%	4%	7%	5%	10%	29%	2%	8%	6%	8%	100%
Sheffield	6	6%	1%	1%	1%	1%	82%	1%	1%	4%	3%	100%
Barnsley	7	17%	9%	1%	1%	1%	21%	1%	16%	12%	22%	100%
Doncaster	8	20%	11%	5%	1%	5%	18%	20%	2%	0%	17%	100%
Chesterfield / Nottingham	9	5%	1%	6%	2%	2%	55%	4%	0%	0%	23%	100%
Rest of Model	10	14%	2%	5%	2%	1%	24%	9%	9%	12%	23%	100%
	Total	16%	3%	2%	2%	1%	58%	3%	3%	4%	7%	100%

Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	-5%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Wath, Swinton, Rawmarsh	2	-2%	-2%	0%	0%	0%	3%	0%	0%	0%	1%	0%
Maltby, Dinnington, Thurcroft	3	-1%	-1%	-1%	0%	0%	4%	0%	0%	-1%	0%	0%
Aughton, Wales	4	0%	0%	-1%	-2%	0%	2%	0%	0%	0%	0%	0%
Rotherham rural	5	0%	0%	0%	0%	-1%	1%	0%	0%	0%	0%	0%
Sheffield	6	2%	0%	0%	0%	0%	-3%	0%	0%	0%	0%	0%
Barnsley	7	1%	0%	0%	0%	0%	-1%	0%	1%	0%	0%	0%
Doncaster	8	1%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%
Chesterfield / Nottingham	9	2%	0%	0%	0%	0%	-2%	0%	0%	0%	0%	0%
Rest of Model	10	1%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%
	Total	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%

Car Destination Distribution

Destination %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	55%	25%	14%	12%	20%	5%	10%	16%	4%	8%	15%
Wath, Swinton, Rawmarsh	2	9%	35%	4%	1%	3%	1%	13%	13%	0%	2%	4%
Maltby, Dinnington, Thurcr	3	3%	6%	20%	4%	8%	1%	1%	2%	8%	4%	2%
Aughton, Wales	4	3%	1%	9%	42%	9%	1%	1%	1%	1%	2%	3%
Rotherham rural	5	3%	2%	6%	5%	15%	1%	1%	6%	3%	2%	2%
Sheffield	6	14%	7%	12%	24%	17%	81%	26%	21%	53%	26%	56%
Barnsley	7	4%	10%	1%	1%	3%	1%	1%	20%	10%	10%	3%
Doncaster	8	3%	8%	5%	1%	12%	1%	17%	2%	0%	6%	2%
Chesterfield / Nottingham	9	1%	2%	14%	6%	9%	5%	8%	0%	0%	18%	5%
Rest of Model	10	6%	4%	14%	5%	4%	3%	21%	21%	20%	22%	7%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Destination %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	48%	23%	14%	11%	18%	6%	10%	16%	5%	8%	14%
Wath, Swinton, Rawmarsh	2	8%	32%	4%	2%	3%	1%	12%	13%	0%	3%	4%
Maltby, Dinnington, Thurcr	3	3%	5%	17%	4%	7%	1%	1%	2%	8%	4%	2%
Aughton, Wales	4	3%	1%	7%	37%	8%	1%	1%	1%	2%	2%	3%
Rotherham rural	5	2%	2%	5%	4%	12%	1%	1%	5%	2%	2%	2%
Sheffield	6	21%	14%	19%	29%	26%	80%	26%	22%	53%	26%	57%
Barnsley	7	4%	9%	2%	1%	3%	1%	1%	20%	10%	10%	3%
Doncaster	8	3%	8%	5%	1%	10%	1%	18%	2%	0%	6%	2%
Chesterfield / Nottingham	9	2%	2%	14%	6%	8%	5%	8%	0%	0%	17%	5%
Rest of Model	10	6%	4%	13%	5%	4%	3%	21%	21%	20%	21%	7%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	-7%	-2%	0%	0%	-2%	1%	1%	0%	1%	1%	0%
Wath, Swinton, Rawmarsh	2	-1%	-4%	0%	0%	0%	0%	-1%	0%	0%	0%	0%
Maltby, Dinnington, Thurcr	3	0%	-1%	-3%	0%	-1%	0%	0%	0%	-1%	0%	0%
Aughton, Wales	4	0%	0%	-2%	-5%	-1%	0%	0%	0%	0%	0%	0%
Rotherham rural	5	0%	0%	-1%	0%	-3%	0%	0%	-1%	0%	0%	0%
Sheffield	6	8%	7%	7%	4%	8%	-1%	0%	1%	0%	0%	1%
Barnsley	7	0%	-1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Doncaster	8	0%	0%	0%	0%	-2%	0%	0%	0%	0%	0%	0%
Chesterfield / Nottingham	9	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Rest of Model	10	0%	1%	-1%	1%	0%	0%	0%	0%	-1%	0%	0%
	Total	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Appendix C

Sectored Trip Demand Matrices - Evening Peak Hour

Car Trips

2011 Base		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	8894	1371	585	410	483	3143	734	954	381	722	17678
Wath, Swinton, Rawmarsh	2	1415	1071	198	43	90	345	352	395	93	174	4176
Maltby, Dinnington, Thurcroft	3	395	152	717	184	377	402	29	135	82	303	2777
Aughton, Wales	4	281	23	269	663	110	705	53	13	89	77	2282
Rotherham rural	5	365	146	56	172	142	156	33	141	32	108	1351
Sheffield	6	3749	566	537	1055	653	53682	1263	914	3268	2172	67859
Barnsley	7	308	525	97	56	30	913	17	439	352	573	3311
Doncaster	8	581	337	65	18	78	646	413	75	0	211	2425
Chesterfield / Nottingham	9	171	47	118	119	91	2972	562	23	0	1326	5428
Rest of Model	10	677	196	317	88	74	2345	881	268	1401	2054	8303
	Total	16836	4433	2958	2809	2128	65309	4338	3358	5701	7721	115590

2028 DoMin (unconstrained)		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	9072	1455	631	433	485	4947	856	1075	530	913	20396
Wath, Swinton, Rawmarsh	2	1474	1165	196	50	91	709	407	444	127	230	4893
Maltby, Dinnington, Thurcroft	3	475	157	717	185	352	694	47	159	123	358	3268
Aughton, Wales	4	309	31	275	664	115	848	62	17	101	96	2520
Rotherham rural	5	379	143	66	176	137	303	38	139	47	122	1549
Sheffield	6	5097	832	742	1183	737	59576	1432	1047	3561	2394	76602
Barnsley	7	381	559	108	63	33	1060	20	525	407	647	3804
Doncaster	8	676	390	76	22	82	767	494	94	0	249	2850
Chesterfield / Nottingham	9	280	71	147	130	100	3284	641	27	0	1477	6158
Rest of Model	10	839	250	354	107	84	2650	997	315	1567	2276	9439
	Total	18982	5054	3313	3014	2216	74837	4995	3842	6464	8764	131480

Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	178	84	46	23	1	1804	122	120	149	191	2719
Wath, Swinton, Rawmarsh	2	59	94	-2	7	1	364	56	48	33	56	716
Maltby, Dinnington, Thurcroft	3	79	5	0	1	-25	292	17	24	40	56	491
Aughton, Wales	4	28	8	7	1	5	143	10	5	12	19	238
Rotherham rural	5	15	-4	10	5	-5	147	4	-2	14	14	198
Sheffield	6	1348	267	205	128	84	5895	169	133	292	222	8743
Barnsley	7	73	34	11	7	3	147	4	85	55	74	494
Doncaster	8	95	54	11	4	5	120	80	18	0	38	425
Chesterfield / Nottingham	9	109	24	30	11	8	312	79	4	0	152	730
Rest of Model	10	162	54	37	19	10	304	115	47	166	222	1136
	Total	2146	621	355	205	88	9528	657	483	763	1043	15890

%Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	2%	6%	8%	5%	0%	57%	17%	13%	39%	26%	15%
Wath, Swinton, Rawmarsh	2	4%	9%	-1%	16%	1%	105%	16%	12%	36%	32%	17%
Maltby, Dinnington, Thurcroft	3	20%	3%	0%	1%	-7%	73%	59%	18%	49%	18%	18%
Aughton, Wales	4	10%	35%	3%	0%	5%	20%	19%	39%	14%	25%	10%
Rotherham rural	5	4%	-2%	18%	3%	-4%	94%	13%	-1%	44%	13%	15%
Sheffield	6	36%	47%	38%	12%	13%	11%	13%	15%	9%	10%	13%
Barnsley	7	24%	7%	11%	12%	11%	16%	22%	19%	16%	13%	15%
Doncaster	8	16%	16%	16%	23%	6%	19%	19%	24%	25%	18%	18%
Chesterfield / Nottingham	9	63%	52%	25%	10%	9%	10%	14%	19%	6%	11%	13%
Rest of Model	10	24%	28%	12%	21%	13%	13%	13%	18%	12%	11%	14%
	Total	13%	14%	12%	7%	4%	15%	15%	14%	13%	14%	14%

Car Origin Distribution

Origin %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	50%	8%	3%	2%	3%	18%	4%	5%	2%	4%	100%
Wath, Swinton, Rawmarsh	2	34%	26%	5%	1%	2%	8%	8%	9%	2%	4%	100%
Maltby, Dinnington, Thurcro	3	14%	5%	26%	7%	14%	14%	1%	5%	3%	11%	100%
Aughton, Wales	4	12%	1%	12%	29%	5%	31%	2%	1%	4%	3%	100%
Rotherham rural	5	27%	11%	4%	13%	11%	12%	2%	10%	2%	8%	100%
Sheffield	6	6%	1%	1%	2%	1%	79%	2%	1%	5%	3%	100%
Barnsley	7	9%	16%	3%	2%	1%	28%	1%	13%	11%	17%	100%
Doncaster	8	24%	14%	3%	1%	3%	27%	17%	3%	0%	9%	100%
Chesterfield / Nottingham	9	3%	1%	2%	2%	2%	55%	10%	0%	0%	24%	100%
Rest of Model	10	8%	2%	4%	1%	1%	28%	11%	3%	17%	25%	100%
	Total	15%	4%	3%	2%	2%	57%	4%	3%	5%	7%	100%

Origin %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	44%	7%	3%	2%	2%	24%	4%	5%	3%	4%	100%
Wath, Swinton, Rawmarsh	2	30%	24%	4%	1%	2%	14%	8%	9%	3%	5%	100%
Maltby, Dinnington, Thurcro	3	15%	5%	22%	6%	11%	21%	1%	5%	4%	11%	100%
Aughton, Wales	4	12%	1%	11%	26%	5%	34%	2%	1%	4%	4%	100%
Rotherham rural	5	24%	9%	4%	11%	9%	20%	2%	9%	3%	8%	100%
Sheffield	6	7%	1%	1%	2%	1%	78%	2%	1%	5%	3%	100%
Barnsley	7	10%	15%	3%	2%	1%	28%	1%	14%	11%	17%	100%
Doncaster	8	24%	14%	3%	1%	3%	27%	17%	3%	0%	9%	100%
Chesterfield / Nottingham	9	5%	1%	2%	2%	2%	53%	10%	0%	0%	24%	100%
Rest of Model	10	9%	3%	4%	1%	1%	28%	11%	3%	17%	24%	100%
	Total	14%	4%	3%	2%	2%	57%	4%	3%	5%	7%	100%

Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	-6%	-1%	0%	0%	0%	6%	0%	0%	0%	0%	0%
Wath, Swinton, Rawmarsh	2	-4%	-2%	-1%	0%	0%	6%	0%	0%	0%	1%	0%
Maltby, Dinnington, Thurcro	3	0%	-1%	-4%	-1%	-3%	7%	0%	0%	1%	0%	0%
Aughton, Wales	4	0%	0%	-1%	-3%	0%	3%	0%	0%	0%	0%	0%
Rotherham rural	5	-3%	-2%	0%	-1%	-2%	8%	0%	-1%	1%	0%	0%
Sheffield	6	1%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Barnsley	7	1%	-1%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Doncaster	8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chesterfield / Nottingham	9	1%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Rest of Model	10	1%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%
	Total	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Car Destination Distribution

Destination %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	53%	31%	20%	15%	23%	5%	17%	28%	7%	9%	15%
Wath, Swinton, Rawmars	2	8%	24%	7%	2%	4%	1%	8%	12%	2%	2%	4%
Maltby, Dinnington, Thur	3	2%	3%	24%	7%	18%	1%	1%	4%	1%	4%	2%
Aughton, Wales	4	2%	1%	9%	24%	5%	1%	1%	0%	2%	1%	2%
Rotherham rural	5	2%	3%	2%	6%	7%	0%	1%	4%	1%	1%	1%
Sheffield	6	22%	13%	18%	38%	31%	82%	29%	27%	57%	28%	59%
Barnsley	7	2%	12%	3%	2%	1%	1%	0%	13%	6%	7%	3%
Doncaster	8	3%	8%	2%	1%	4%	1%	10%	2%	0%	3%	2%
Chesterfield / Nottinghar	9	1%	1%	4%	4%	4%	5%	13%	1%	0%	17%	5%
Rest of Model	10	4%	4%	11%	3%	3%	4%	20%	8%	25%	27%	7%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Destination %		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	48%	29%	19%	14%	22%	7%	17%	28%	8%	10%	16%
Wath, Swinton, Rawmars	2	8%	23%	6%	2%	4%	1%	8%	12%	2%	3%	4%
Maltby, Dinnington, Thur	3	3%	3%	22%	6%	16%	1%	1%	4%	2%	4%	2%
Aughton, Wales	4	2%	1%	8%	22%	5%	1%	1%	0%	2%	1%	2%
Rotherham rural	5	2%	3%	2%	6%	6%	0%	1%	4%	1%	1%	1%
Sheffield	6	27%	16%	22%	39%	33%	80%	29%	27%	55%	27%	58%
Barnsley	7	2%	11%	3%	2%	2%	1%	0%	14%	6%	7%	3%
Doncaster	8	4%	8%	2%	1%	4%	1%	10%	2%	0%	3%	2%
Chesterfield / Nottinghar	9	1%	1%	4%	4%	4%	4%	13%	1%	0%	17%	5%
Rest of Model	10	4%	5%	11%	4%	4%	4%	20%	8%	24%	26%	7%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Diff		1	2	3	4	5	6	7	8	9	10	Total
Rotherham	1	-5%	-2%	-1%	0%	-1%	2%	0%	0%	2%	1%	0%
Wath, Swinton, Rawmars	2	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Maltby, Dinnington, Thur	3	0%	0%	-3%	0%	-2%	0%	0%	0%	0%	0%	0%
Aughton, Wales	4	0%	0%	-1%	-2%	0%	0%	0%	0%	0%	0%	0%
Rotherham rural	5	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%
Sheffield	6	5%	4%	4%	2%	3%	-3%	0%	0%	-2%	-1%	0%
Barnsley	7	0%	-1%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Doncaster	8	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chesterfield / Nottinghar	9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Rest of Model	10	0%	1%	0%	0%	0%	0%	0%	0%	0%	-1%	0%
	Total	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Appendix D - Network Statistics by Area

Rotherham District

	AM			IP			PM		
	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff
Distance (veh-kms)	292,424	340,645	16%	230,940	282,304	22%	301,191	346,712	15%
Time (veh-hrs)	6,897	8,629	25%	5,373	6,643	24%	7,702	9,934	29%
Total Delay (veh-hrs)	987	1,760	78%	620	955	54%	1,502	2,890	92%
Delay per veh-km (secs)	12	19	53%	10	12	26%	18	30	67%
Average Speed (kph)	42	39	-7%	43	42	-1%	39	35	-11%

Rotherham Urban Area

	AM			IP			PM		
	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff
Distance (veh-kms)	141,435	162,646	15%	112,158	133,622	19%	142,338	159,989	12%
Time (veh-hrs)	3,265	4,114	26%	2,575	3,188	24%	3,633	4,353	20%
Total Delay (veh-hrs)	412	784	90%	252	427	69%	668	1,030	54%
Delay per veh-km (secs)	10	17	65%	8	11	42%	17	23	37%
Average Speed (kph)	43	40	-9%	44	42	-4%	39	37	-6%

Wath, Swinton, Rawmarsh

	AM			IP			PM		
	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff
Distance (veh-kms)	35,403	41,352	17%	26,173	31,542	21%	36,269	42,339	17%
Time (veh-hrs)	921	1,160	26%	682	812	19%	972	1,143	18%
Total Delay (veh-hrs)	116	226	94%	64	97	52%	119	186	56%
Delay per veh-km (secs)	12	20	66%	9	11	26%	12	16	33%
Average Speed (kph)	38	36	-7%	38	39	1%	37	37	-1%

Maltby, Dinnington, Thurcroft

	AM			IP			PM		
	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff
Distance (veh-kms)	41,660	49,933	20%	34,187	41,494	21%	43,376	51,610	19%
Time (veh-hrs)	777	932	20%	624	763	22%	849	1,059	25%
Total Delay (veh-hrs)	64	87	37%	45	69	55%	103	176	70%
Delay per veh-km (secs)	5	6	15%	5	6	28%	9	12	43%
Average Speed (kph)	54	54	0%	55	54	-1%	51	49	-5%

Aughton, Wales

	AM			IP			PM		
	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff
Distance (veh-kms)	15,622	18,488	18%	10,887	15,161	39%	16,765	20,484	22%
Time (veh-hrs)	383	498	30%	252	357	42%	408	599	47%
Total Delay (veh-hrs)	45	92	104%	15	30	105%	46	146	219%
Delay per veh-km (secs)	10	18	72%	5	7	47%	10	26	161%
Average Speed (kph)	41	37	-9%	43	42	-2%	41	34	-17%

Rotherham rural

	AM			IP			PM		
	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff
Distance (veh-kms)	43,826	52,350	19%	34,388	45,308	32%	48,183	57,379	19%
Time (veh-hrs)	880	1,105	26%	660	834	26%	962	1,216	26%
Total Delay (veh-hrs)	63	165	164%	25	38	49%	76	194	154%
Delay per veh-km (secs)	5	11	121%	3	3	13%	6	12	114%
Average Speed (kph)	50	47	-5%	52	54	4%	50	47	-6%

Rotherham Town Centre

	AM			IP			PM		
	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff	2011 Base	2028 DM	%Diff
Distance (veh-kms)	14,477	15,810	9%	13,146	14,957	14%	14,260	15,165	6%
Time (veh-hrs)	671	670	0%	580	632	9%	877	1,087	24%
Total Delay (veh-hrs)	287	261	-9%	220	245	11%	489	696	42%
Delay per veh-km (secs)	71	59	-17%	60	59	-2%	124	165	34%
Average Speed (kph)	22	24	9%	23	24	4%	16	14	-14%

Appendix D - Network Statistics by Area

Rotherham District

	AM			IP			PM		
	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff
Distance (veh-kms)	340,645	339,862	0%	282,304	281,416	0%	346,712	349,283	1%
Time (veh-hrs)	8,629	8,413	-3%	6,643	6,620	0%	9,934	9,434	-5%
Total Delay (veh-hrs)	1,760	1,572	-11%	955	959	0%	2,890	2,362	-18%
Delay per veh-km (secs)	19	17	-10%	12	12	1%	30	24	-19%
Average Speed (kph)	39	40	2%	42	43	0%	35	37	6%

Rotherham Urban Area

	AM			IP			PM		
	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff
Distance (veh-kms)	162,646	162,975	0%	133,622	133,538	0%	159,989	163,343	2%
Time (veh-hrs)	4,114	4,079	-1%	3,188	3,217	1%	4,353	4,335	0%
Total Delay (veh-hrs)	784	742	-5%	427	456	7%	1,030	941	-9%
Delay per veh-km (secs)	17	16	-5%	11	12	7%	23	21	-10%
Average Speed (kph)	40	40	1%	42	42	-1%	37	38	3%

Wath, Swinton, Rawmarsh

	AM			IP			PM		
	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff
Distance (veh-kms)	41,352	40,763	-1%	31,542	30,538	-3%	42,339	41,437	-2%
Time (veh-hrs)	1,160	1,135	-2%	812	787	-3%	1,143	1,115	-2%
Total Delay (veh-hrs)	226	214	-5%	97	93	-4%	186	178	-4%
Delay per veh-km (secs)	20	19	-4%	11	11	0%	16	15	-2%
Average Speed (kph)	36	36	1%	39	39	0%	37	37	0%

Maltby, Dinnington, Thurcroft

	AM			IP			PM		
	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff
Distance (veh-kms)	49,933	49,913	0%	41,494	41,753	1%	51,610	51,154	-1%
Time (veh-hrs)	932	927	-1%	763	765	0%	1,059	1,046	-1%
Total Delay (veh-hrs)	87	86	-2%	69	70	0%	176	175	-1%
Delay per veh-km (secs)	6	6	-2%	6	6	0%	12	12	0%
Average Speed (kph)	54	54	0%	54	55	0%	49	49	0%

Aughton, Wales

	AM			IP			PM		
	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff
Distance (veh-kms)	18,488	18,502	0%	15,161	15,153	0%	20,484	20,682	1%
Time (veh-hrs)	498	500	0%	357	356	0%	599	602	0%
Total Delay (veh-hrs)	92	94	2%	30	30	-1%	146	145	0%
Delay per veh-km (secs)	18	18	2%	7	7	-1%	26	25	-1%
Average Speed (kph)	37	37	0%	42	43	0%	34	34	1%

Rotherham rural

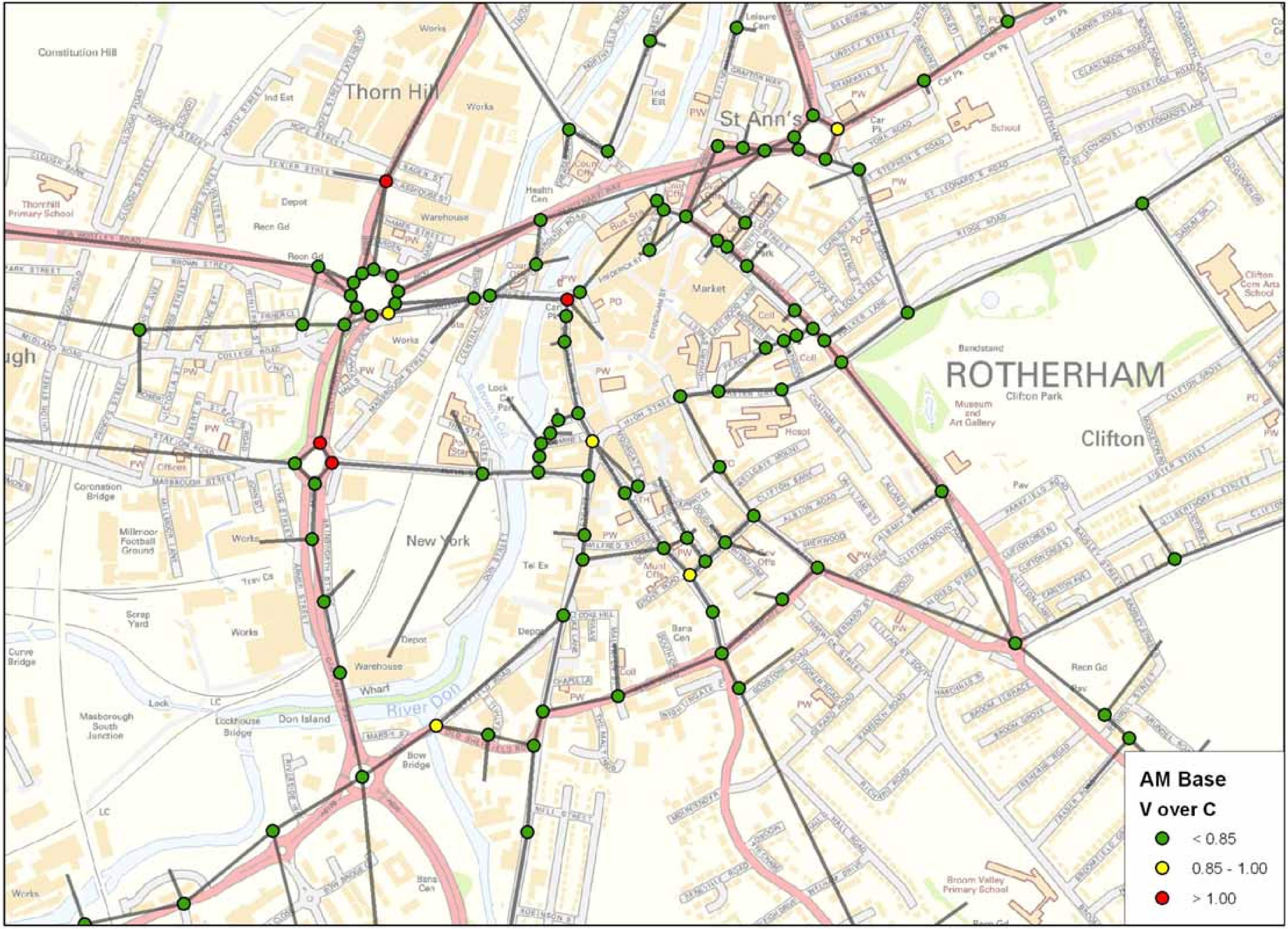
	AM			IP			PM		
	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff
Distance (veh-kms)	52,350	51,665	-1%	45,308	45,238	0%	57,379	57,272	0%
Time (veh-hrs)	1,105	1,090	-1%	834	829	-1%	1,216	1,216	0%
Total Delay (veh-hrs)	165	169	2%	38	39	4%	194	200	3%
Delay per veh-km (secs)	11	12	4%	3	3	4%	12	13	4%
Average Speed (kph)	47	47	0%	54	55	0%	47	47	0%

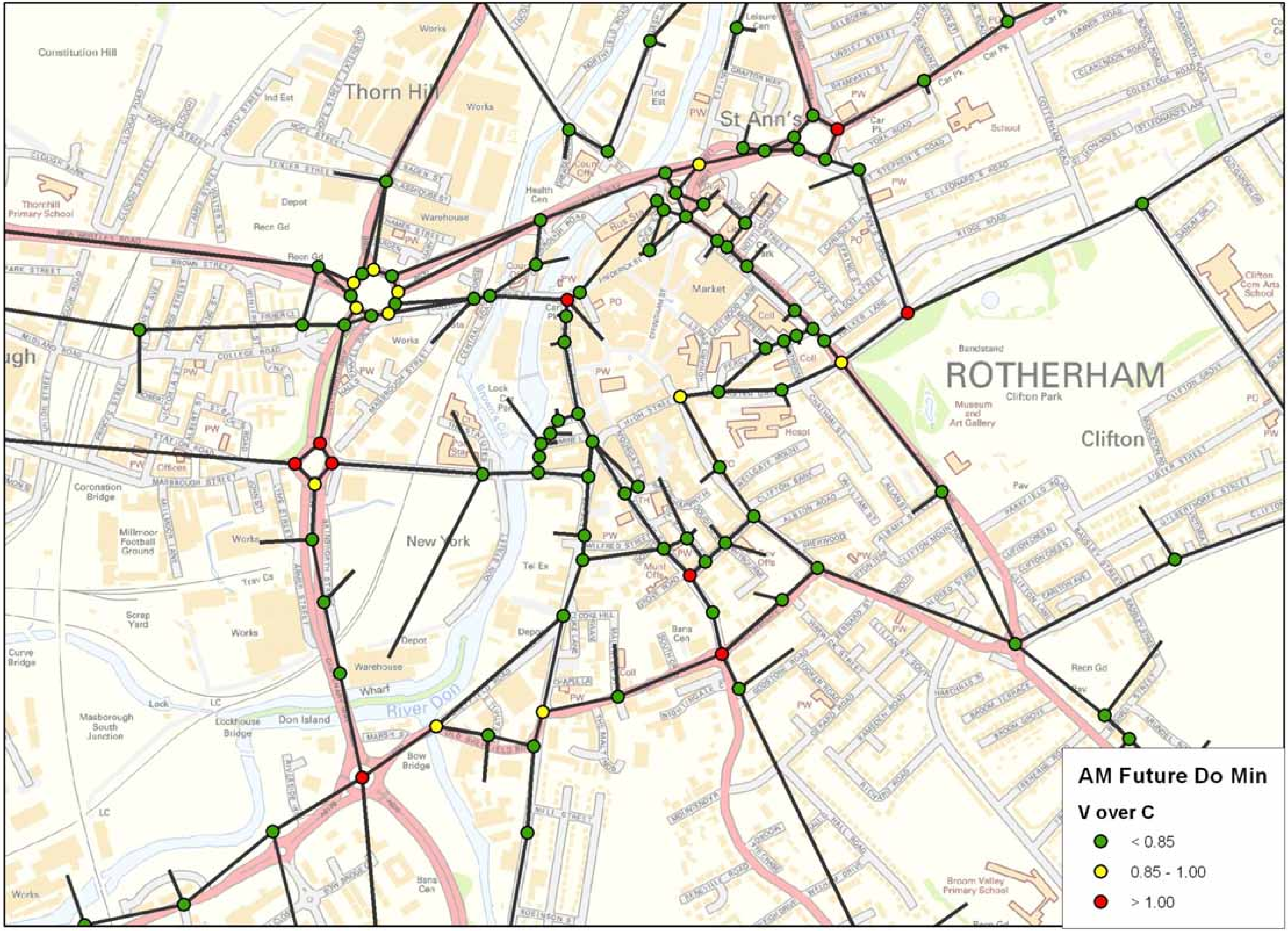
Rotherham Town Centre

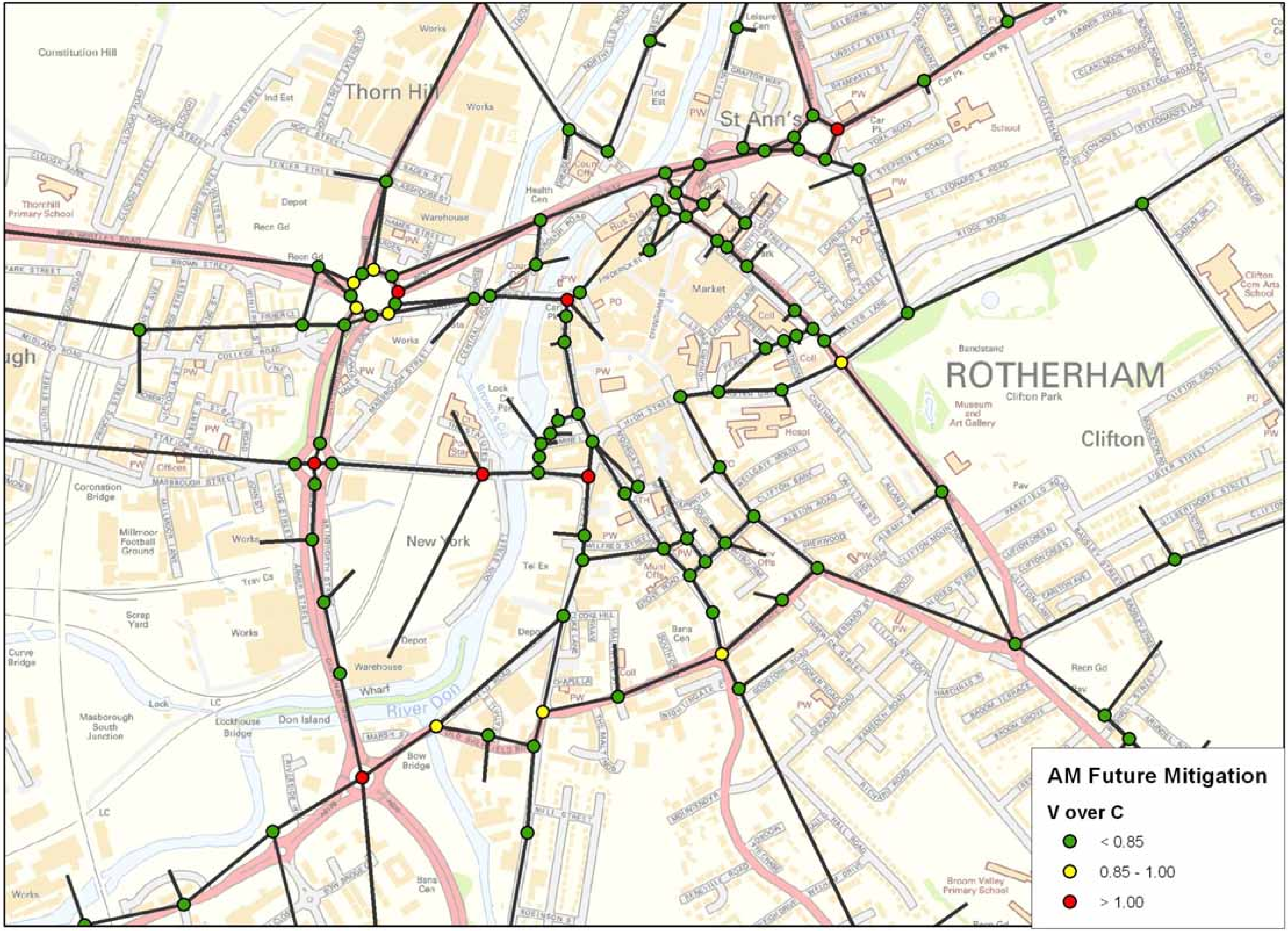
	AM			IP			PM		
	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff	2028 DM	2028 Mitigation	%Diff
Distance (veh-kms)	15,876	16,044	1%	15,177	15,196	0%	14,911	15,396	3%
Time (veh-hrs)	819	680	-17%	690	665	-4%	1,564	1,120	-28%
Total Delay (veh-hrs)	406	267	-34%	294	271	-8%	1,159	723	-38%
Delay per veh-km (secs)	92	60	-35%	70	64	-8%	280	169	-40%
Average Speed (kph)	19	24	22%	22	23	4%	10	14	44%

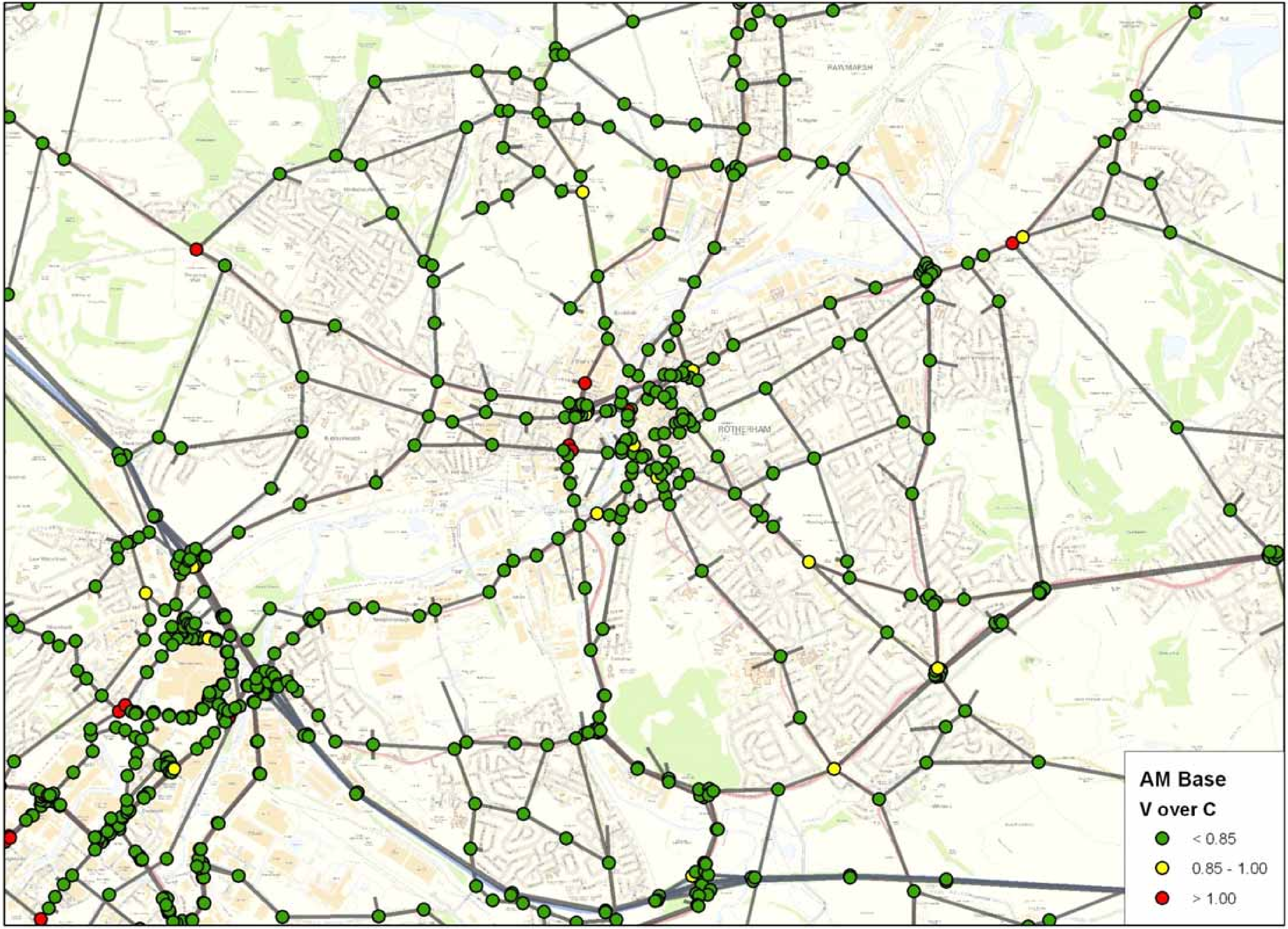
Appendix E: Junction Performance Plots

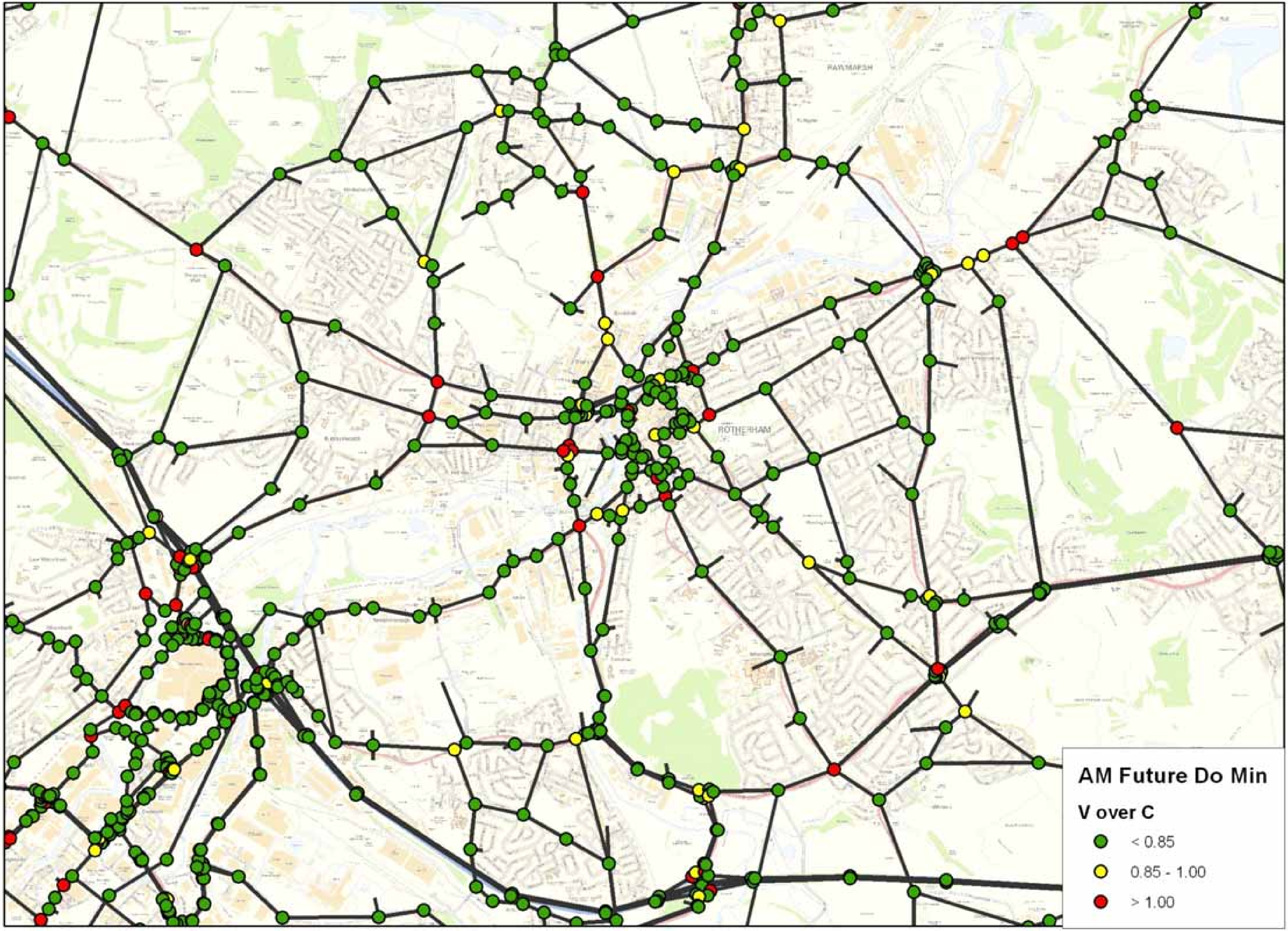
Morning Peak Plots


AM Base
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton Park
Clifton
Thorn Hill
St Ann's
New York
River Don
Constitution Hill
Museum and Art Gallery
Bandstand
Market
Bow Bridge
Don Island
Millmoor Football Ground
Coronation Bridge
Masborough South Junction
Thornhill Primary School
Broom Valley Primary School
Clifton Com Arts School

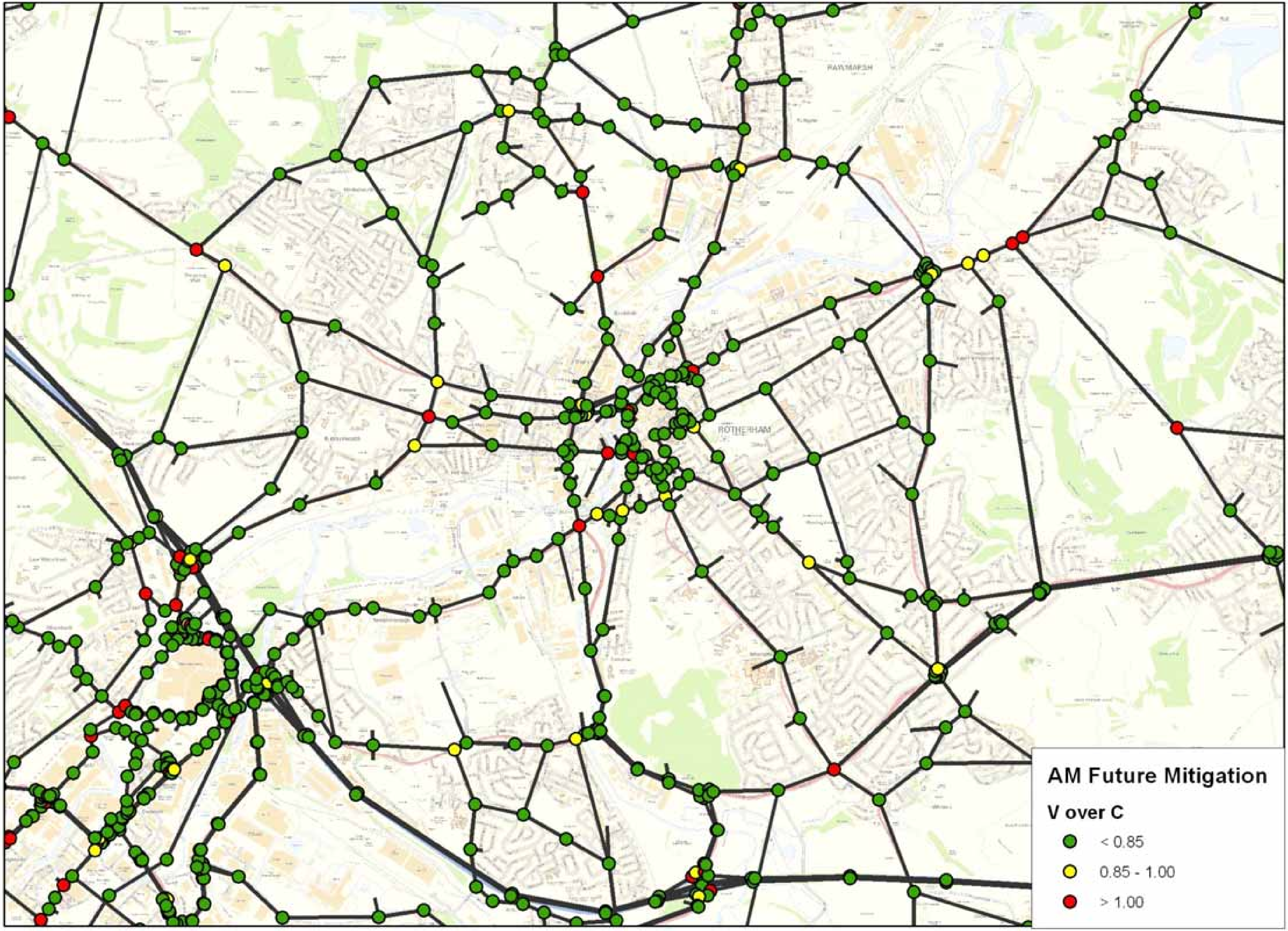

AM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton
Clifton Park
Thorn Hill
St Ann's
New York
River Don
Constitution Hill
Don Island
Museum and Art Gallery
Millmoor Football Ground
Thornhill Primary School
Broom Valley Primary School
Clifton Com Arts School
Masborough South Junction
Coronation Bridge
Bow Bridge

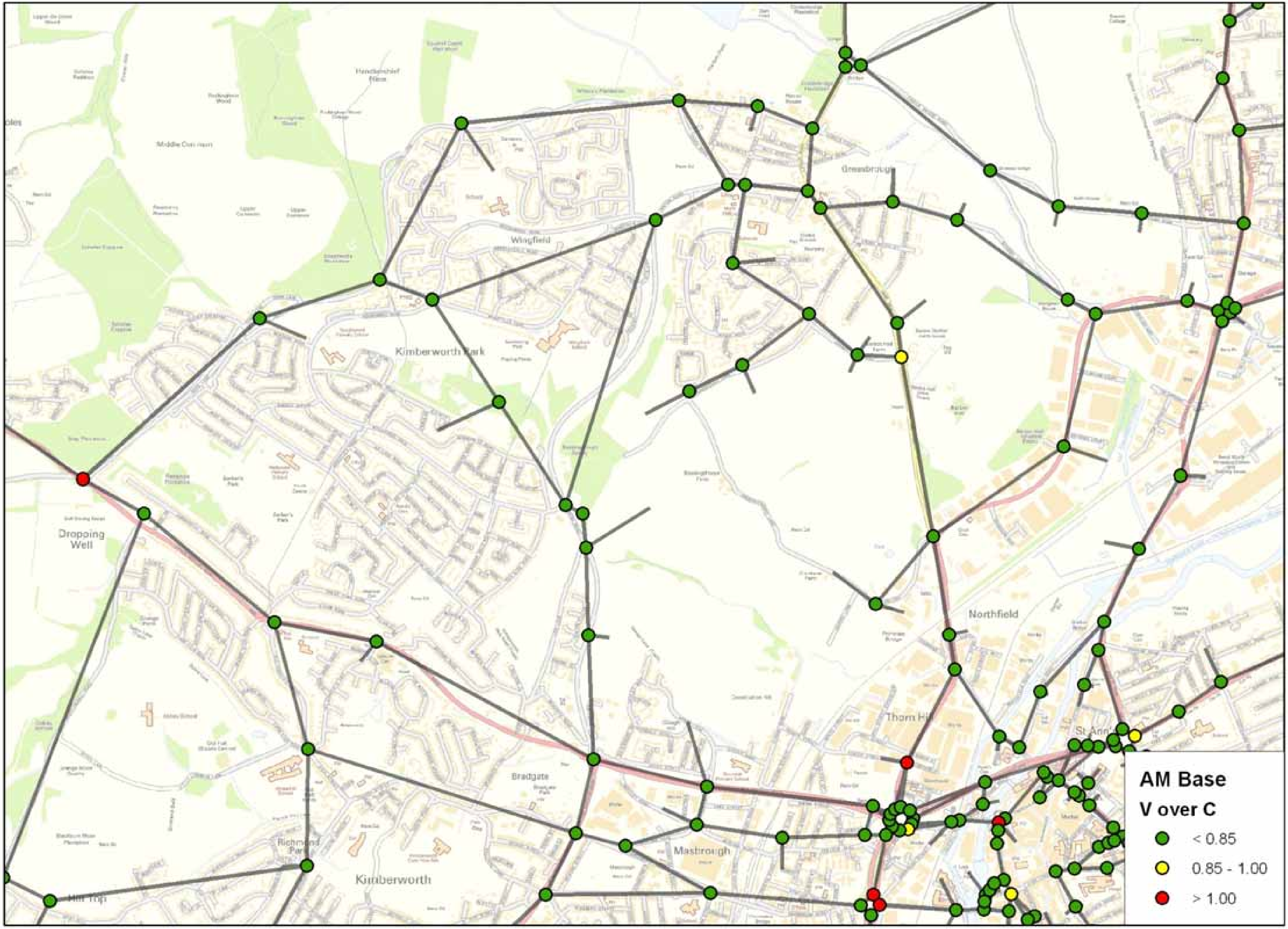

AM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton
Clifton Park
Thorn Hill
St Ann's
New York
River Don
Constitution Hill
Museum and Art Gallery
Market
Don Island
Bow Bridge
Millmoor Football Ground
Coronation Bridge
Masborough South Junction
Thornhill Primary School
Broom Valley Primary School
Clifton Com Arts School

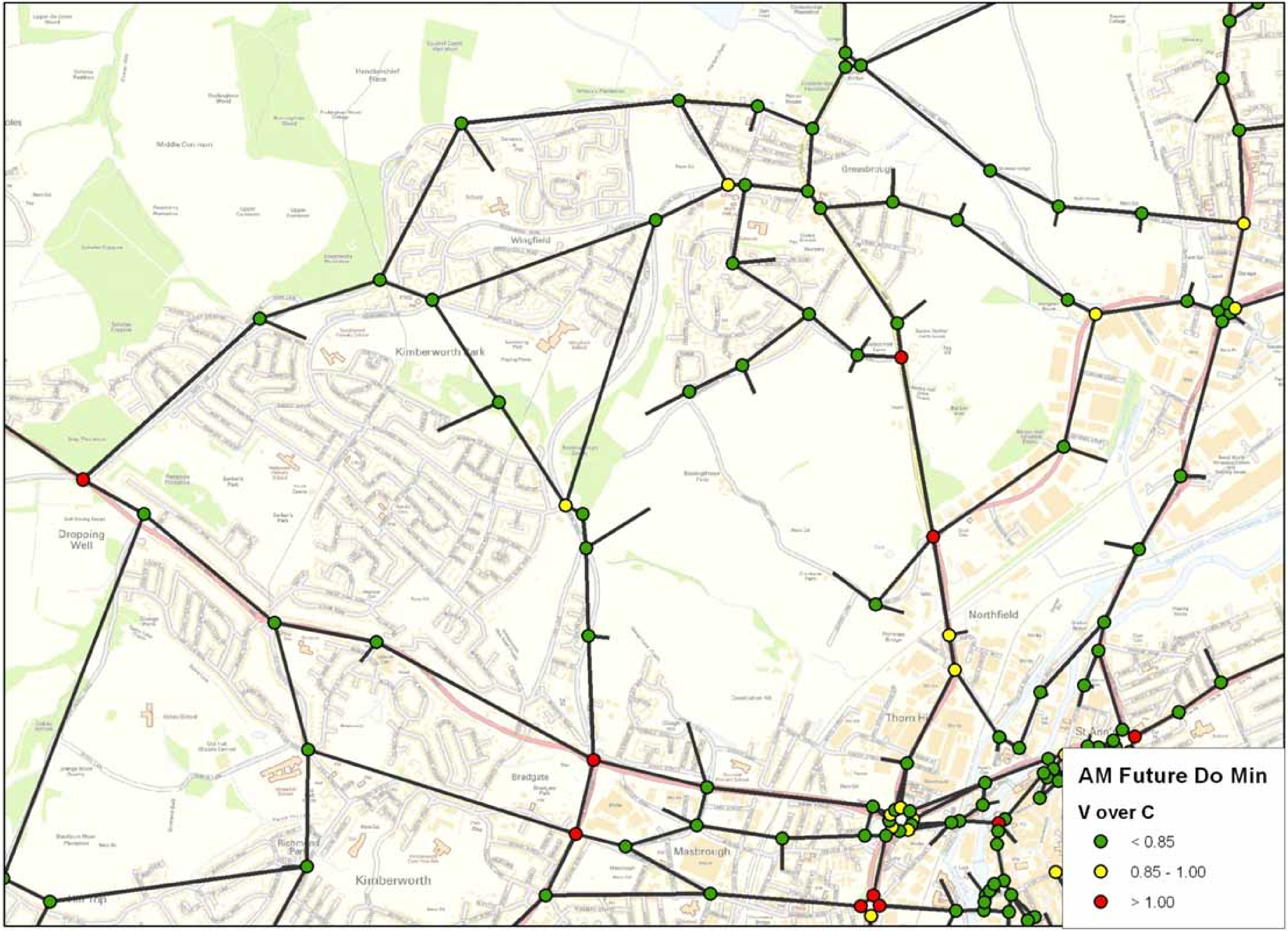

RAWMARSH
ROTHERHAM
AM Base
V over C
< 0.85
0.85 - 1.00
> 1.00



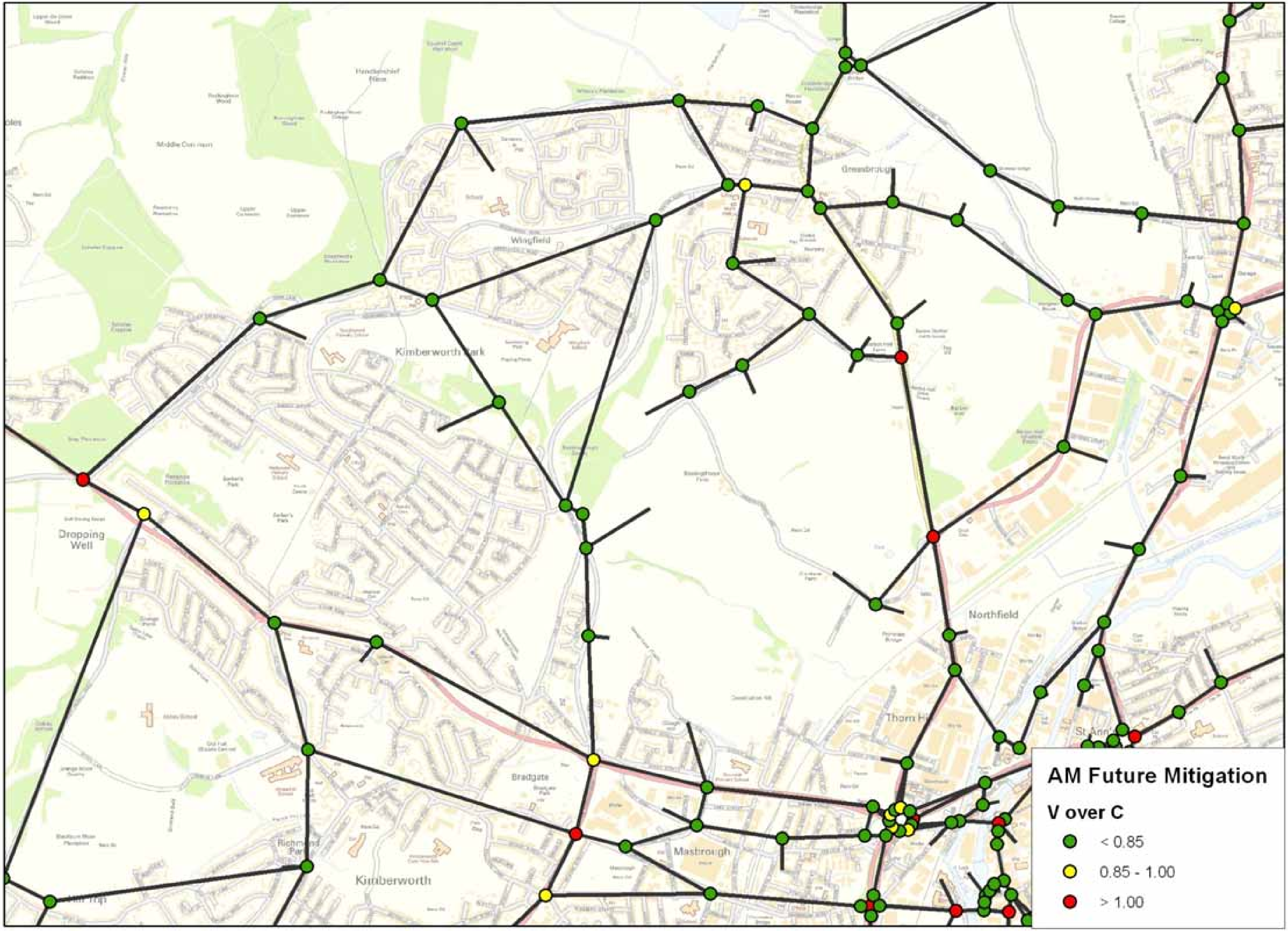
RAWMARSH
ROTHERHAM
AM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00

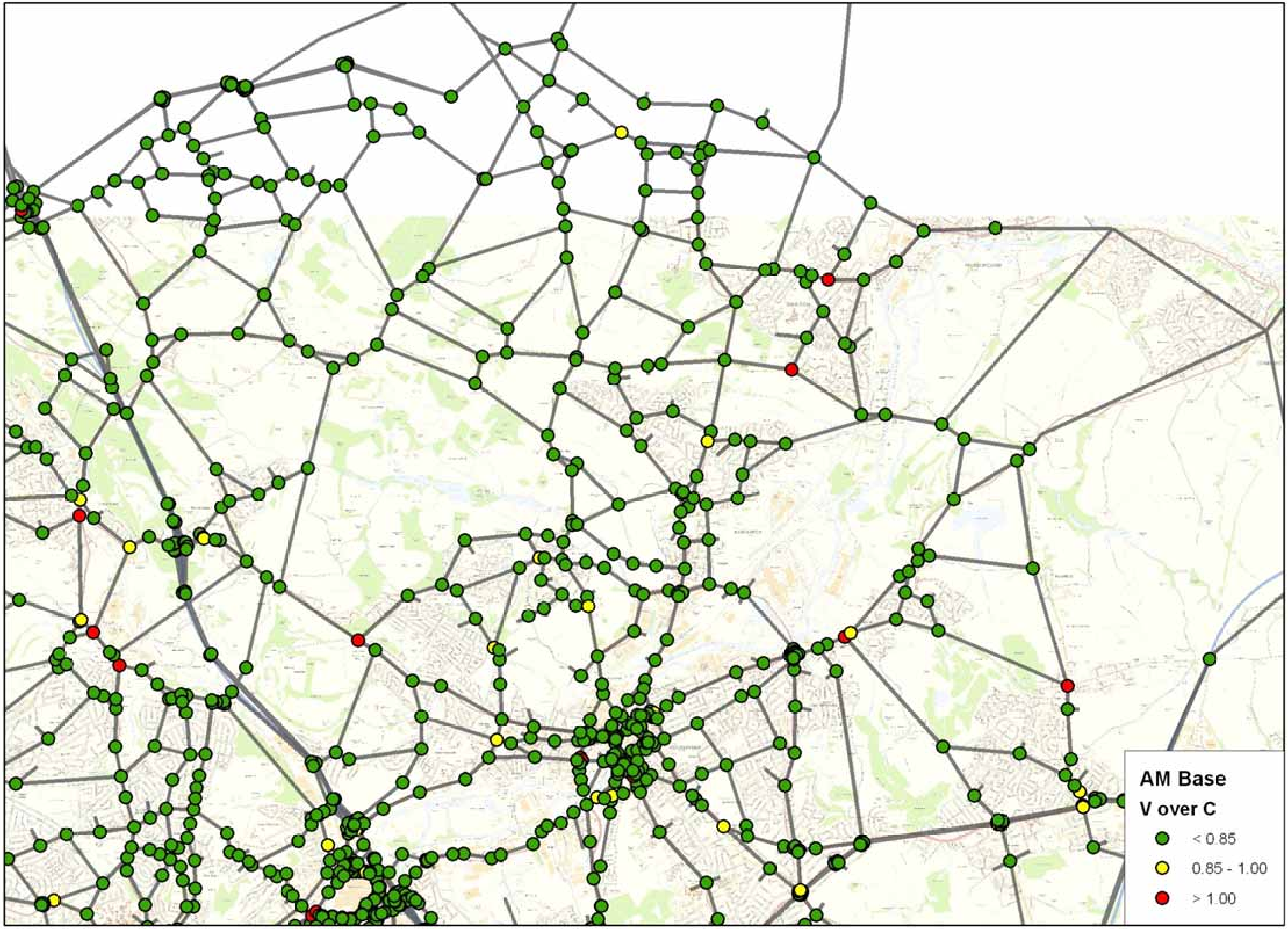

RAWMARSH
ROTHERHAM
AM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

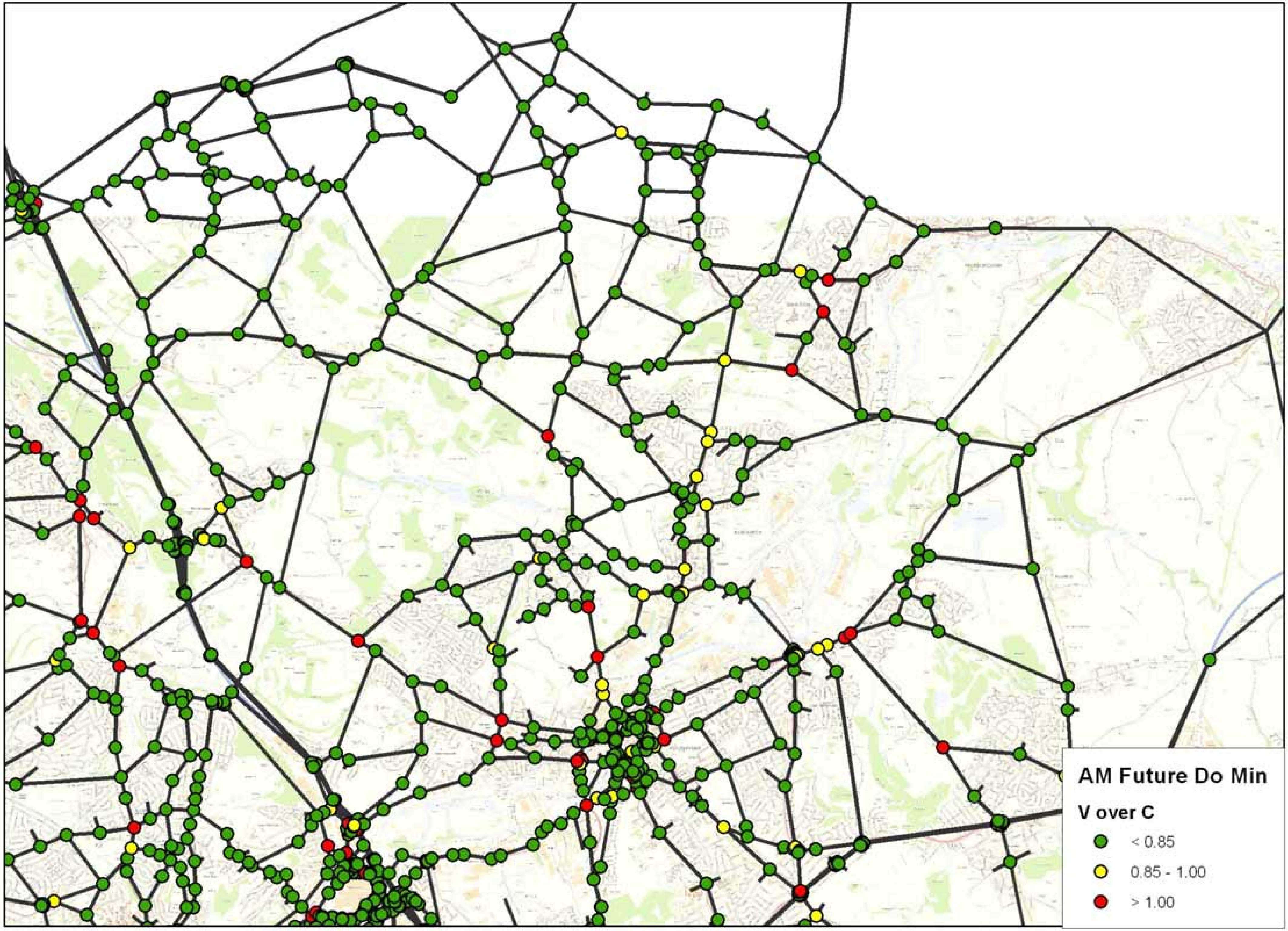

AM Base
V over C
< 0.85
0.85 - 1.00
> 1.00
Wingfield
Kimberworth Park
Greasbrough
Dropping Well
Northfield
Thorn Hill
St Ann's
Bradgate
Masbrough
Kimberworth
Richmond Park
Middle Oon mart

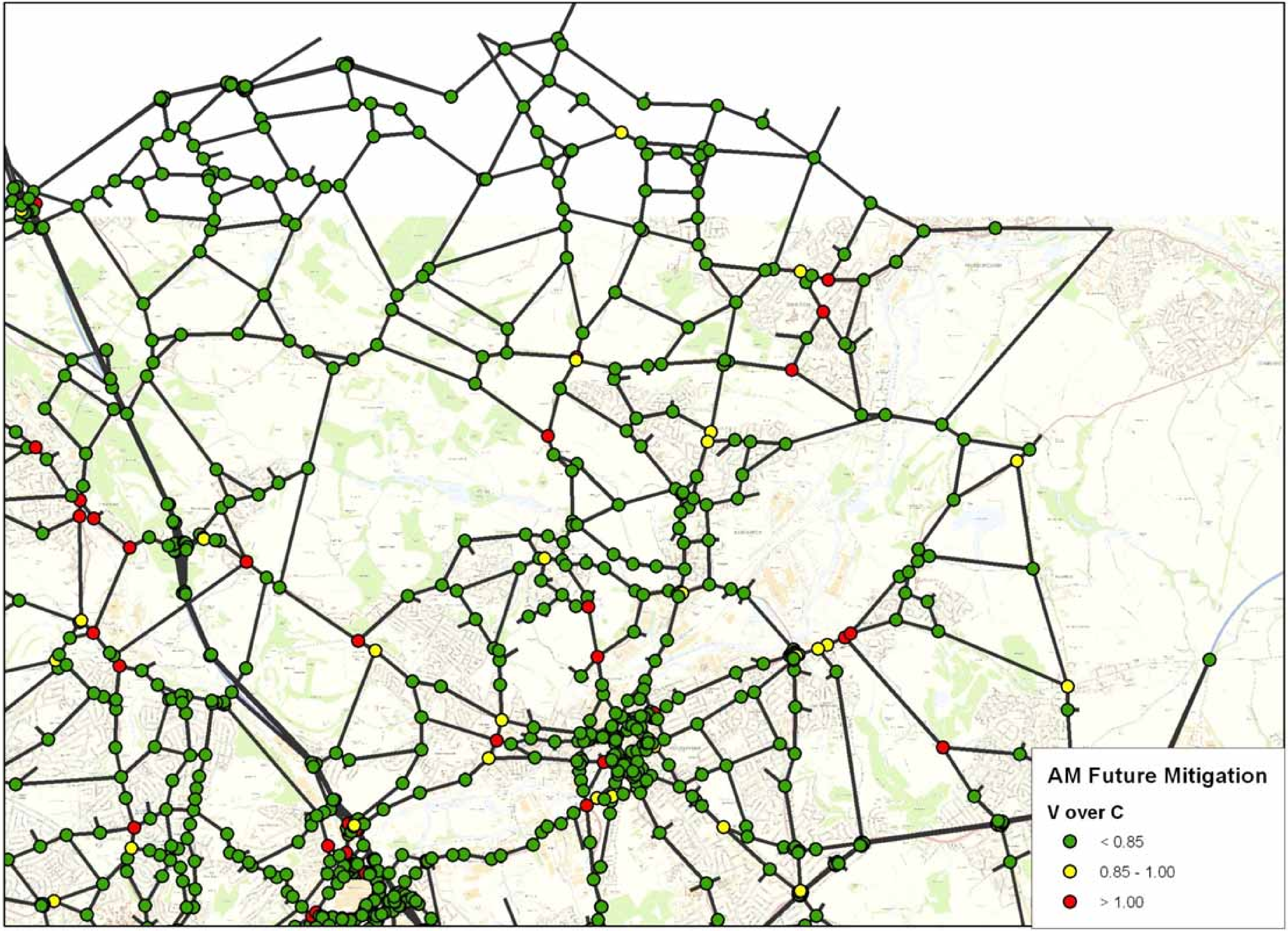


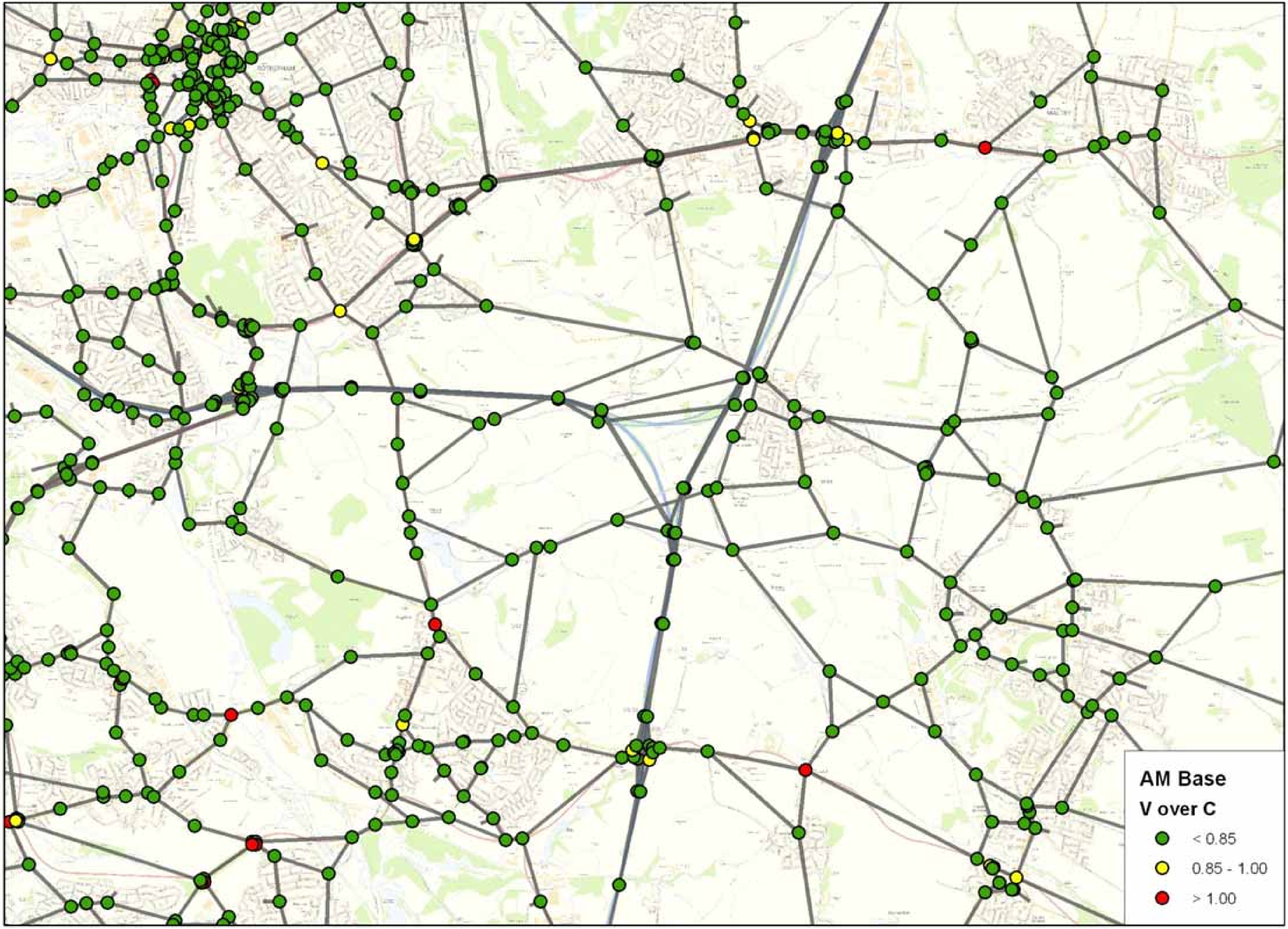
AM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00
Greasbrough
Wingfield
Kimberworth Park
Dropping Well
Northfield
Thorn Hill
Bradgate
Masbrough
Kimberworth
Richmond Park
Middle Common
Handkerchief Plane

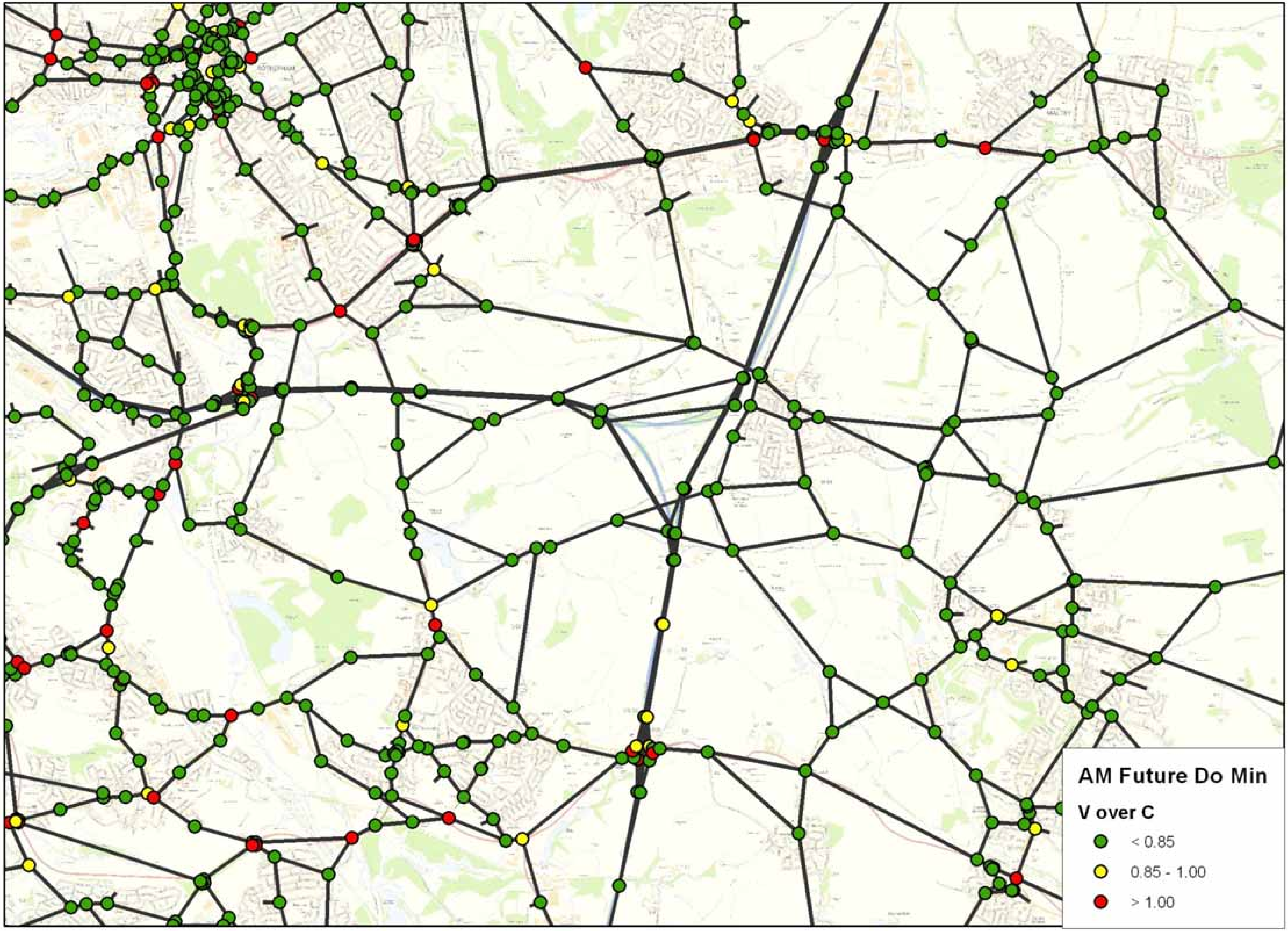

AM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00
Greasbrough
Wingfield
Kimberworth Park
Dropping Well
Northfield
Thorn Hill
Bradgate
Masbrough
Kimberworth
Richmond Park

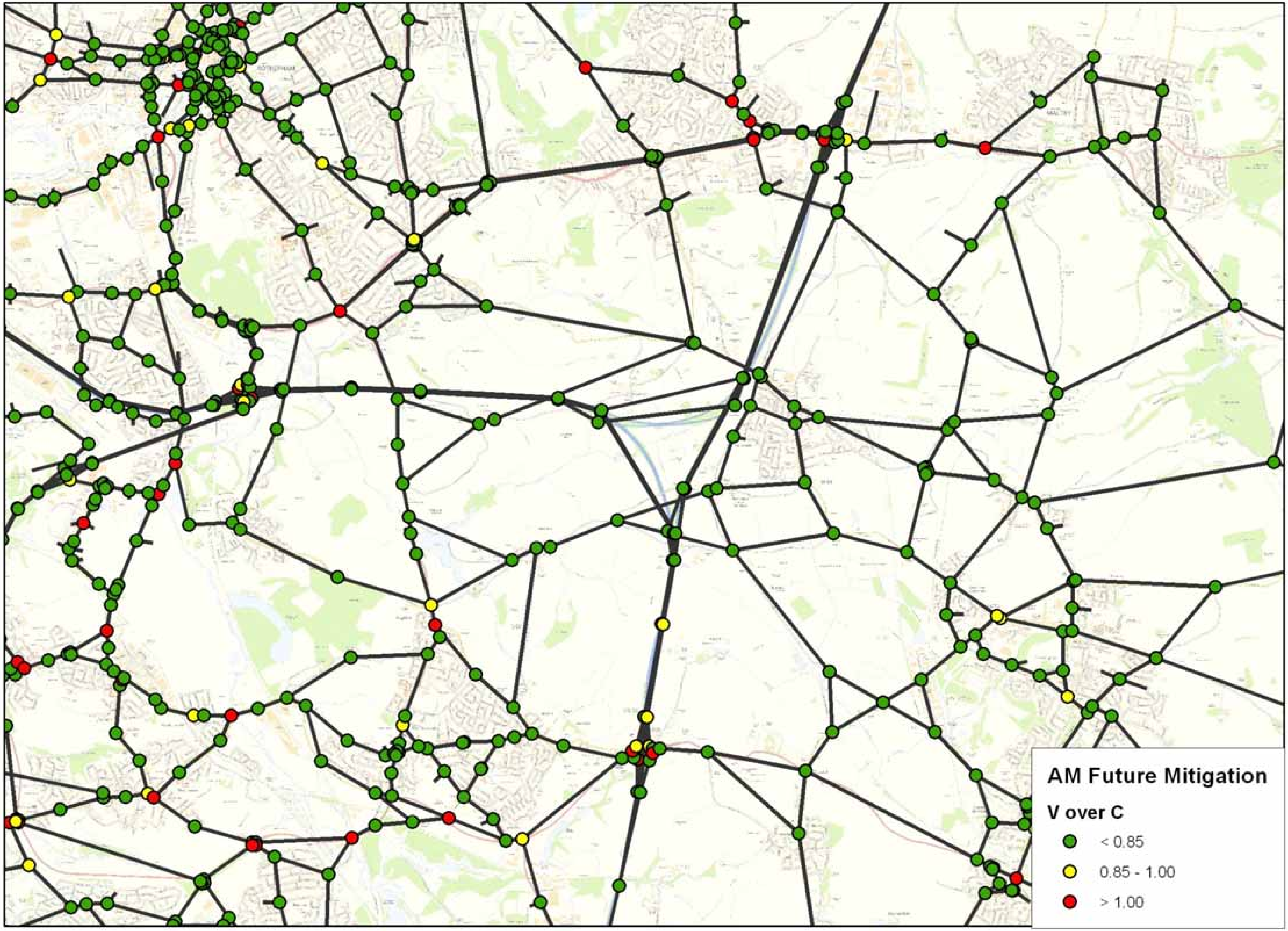

AM Base
V over C
< 0.85
0.85 - 1.00
> 1.00


AM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00

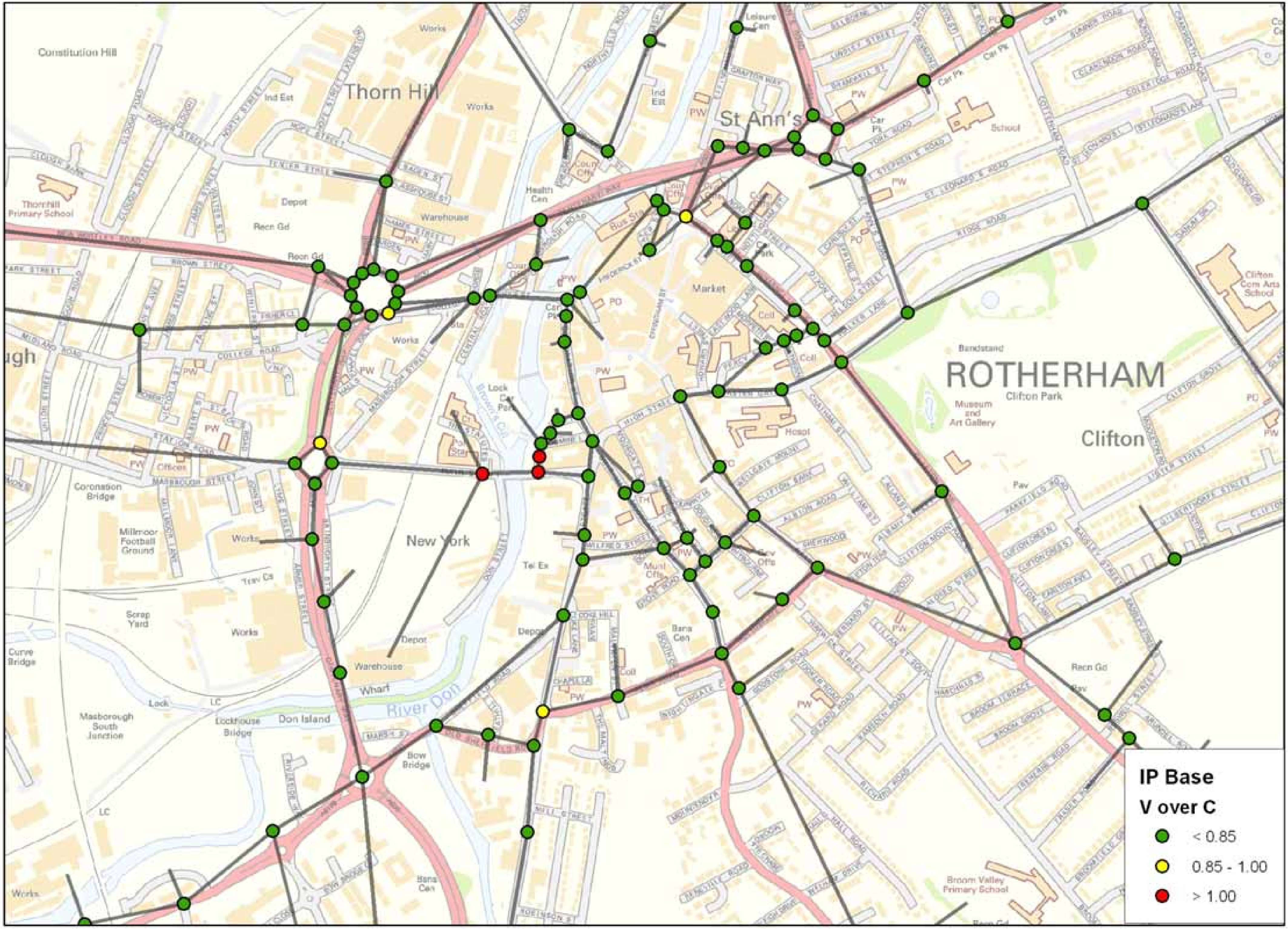

AM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

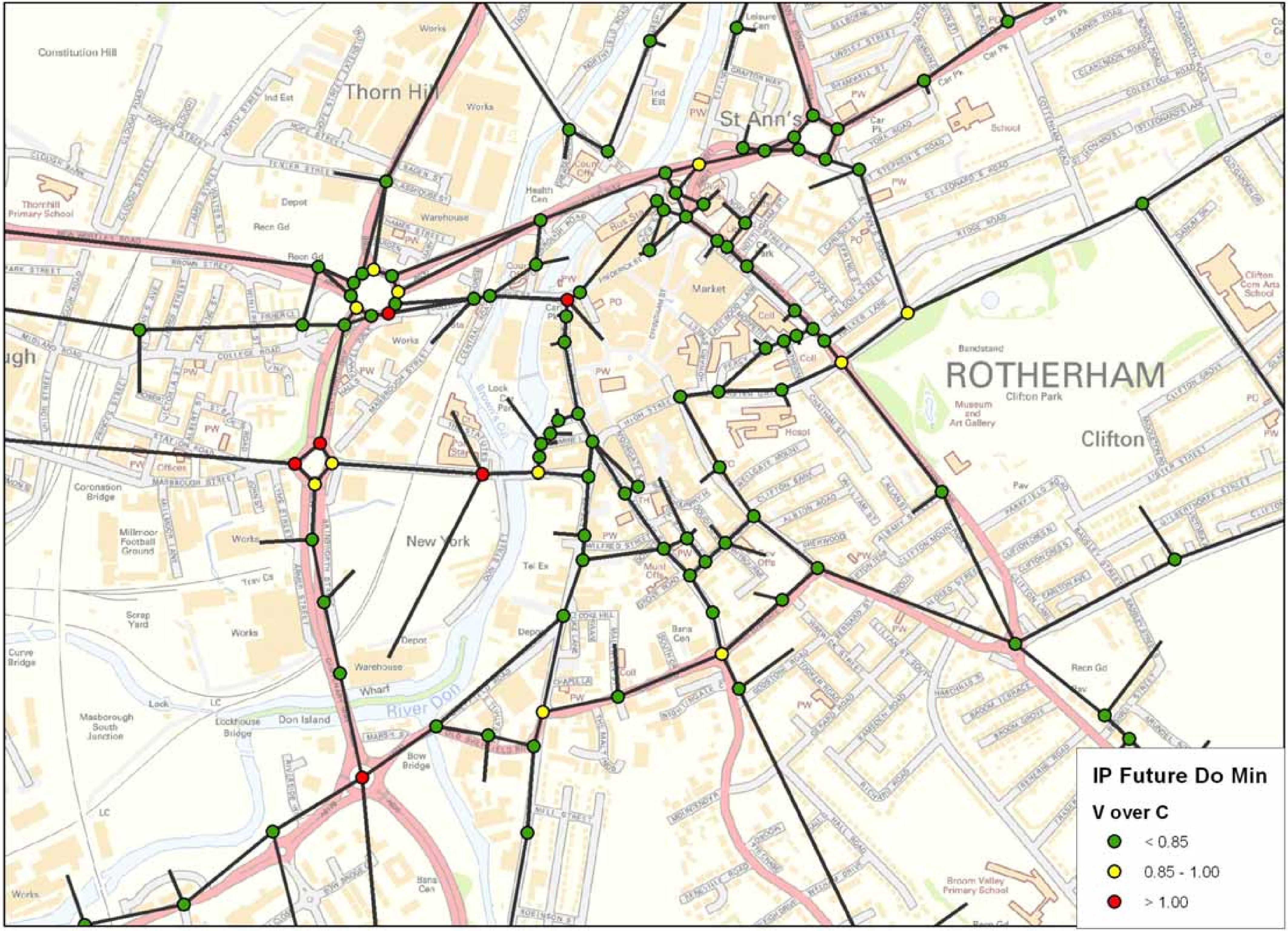

AM Base
V over C
< 0.85
0.85 - 1.00
> 1.00

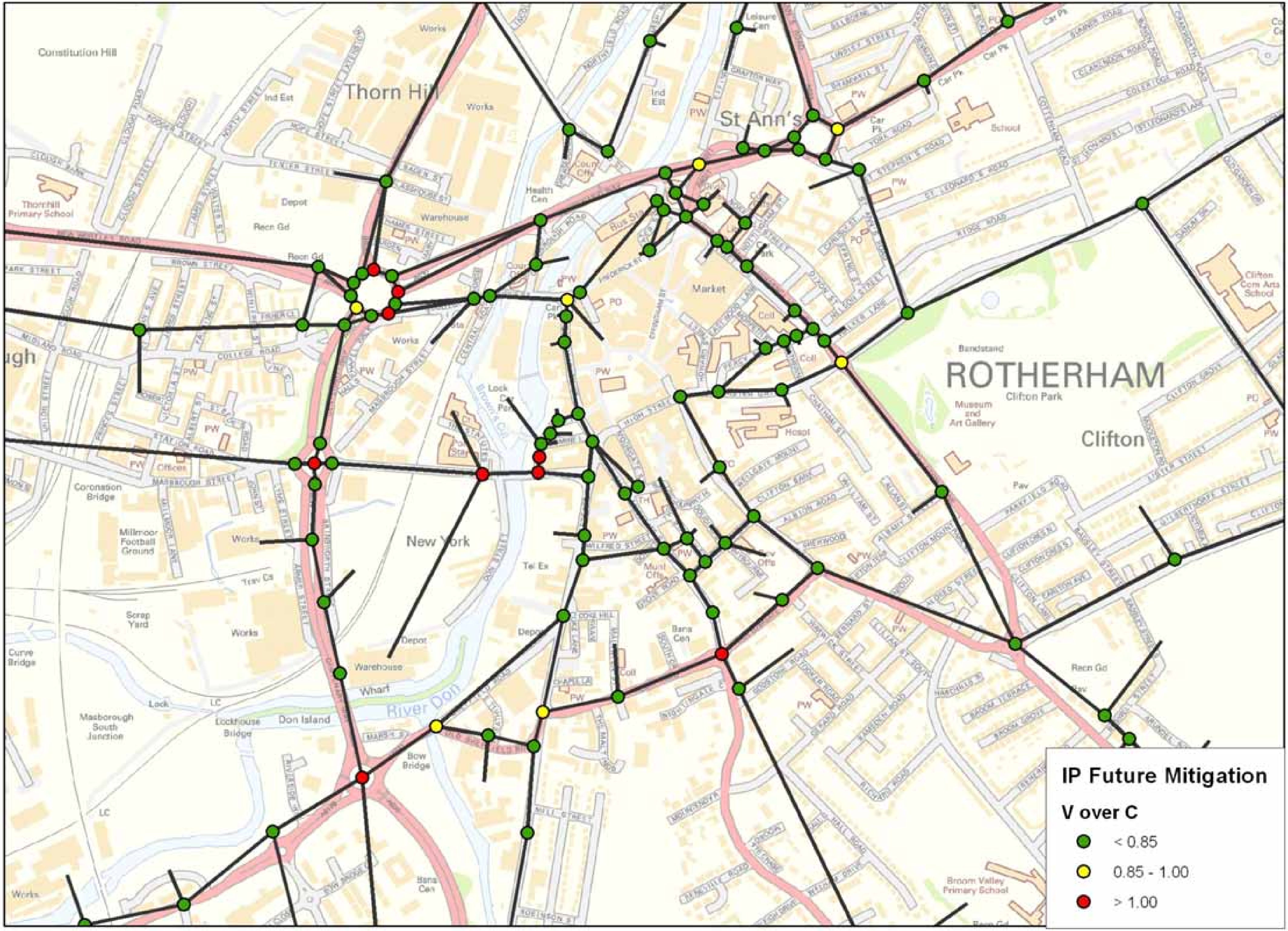

AM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00

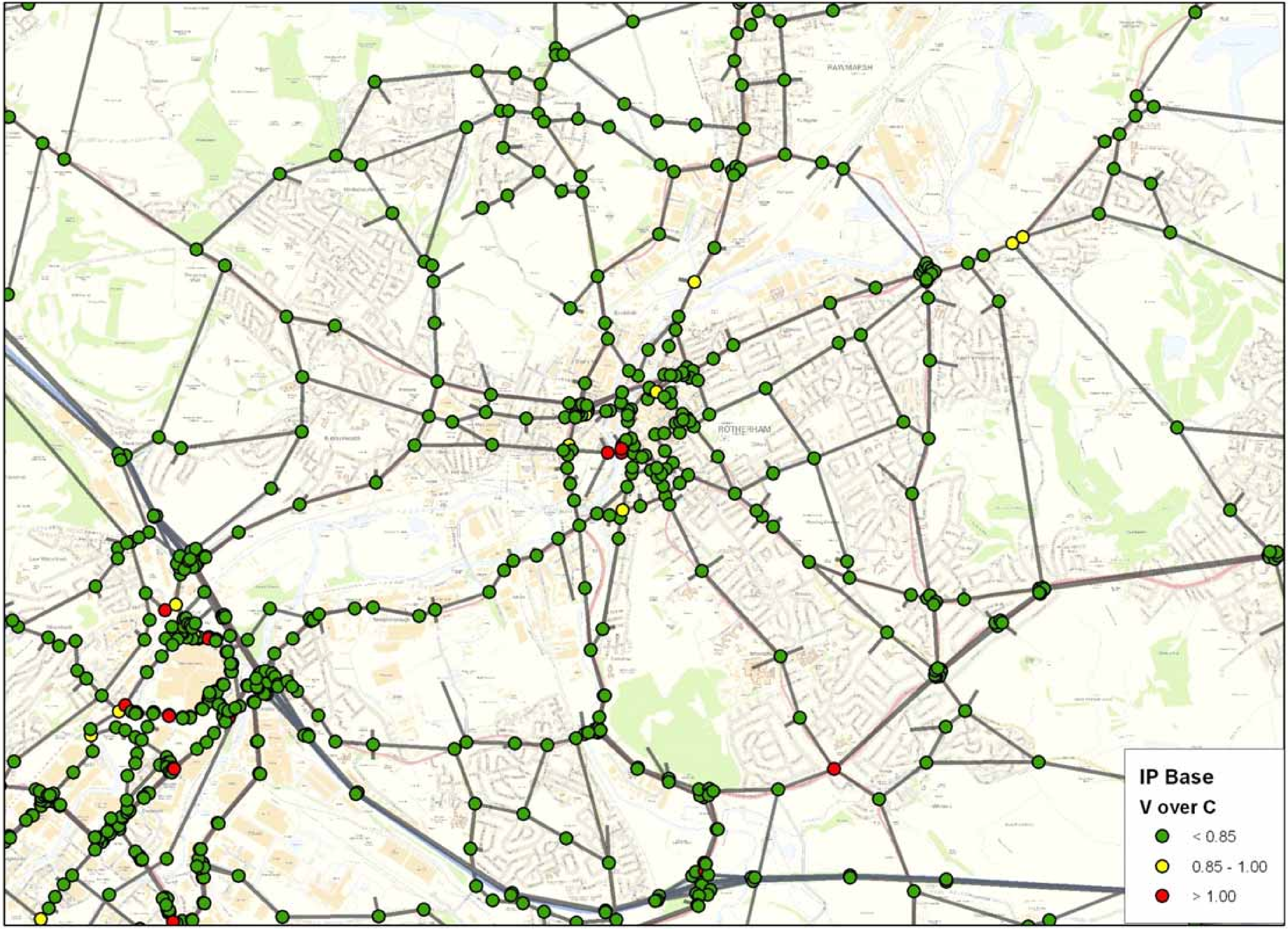

AM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

Interpeak Plots

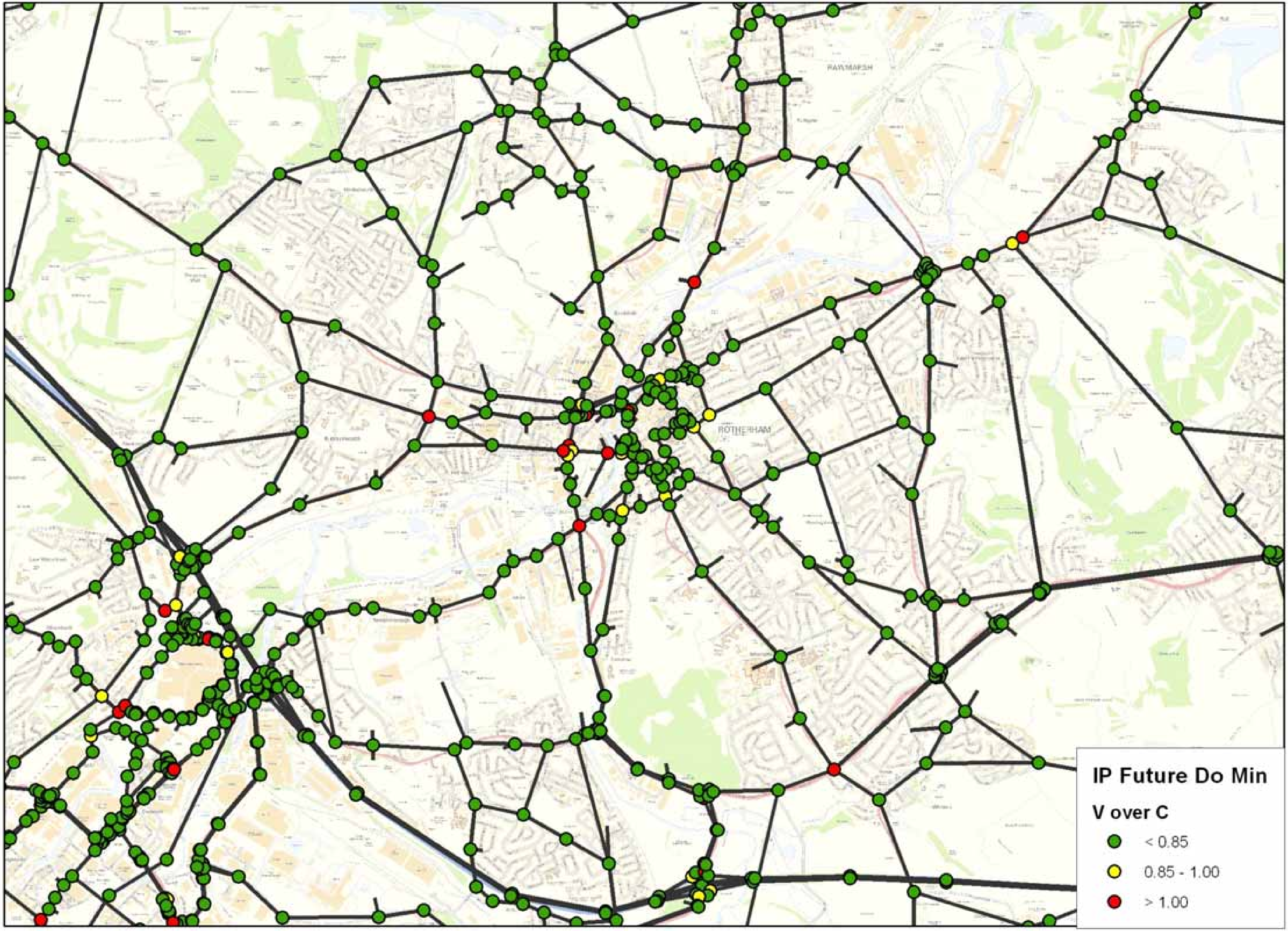

IP Base
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton
Clifton Park
Thorn Hill
St Ann's
New York
River Don
Constitution Hill
Museum and Art Gallery
Bandstand
Market
Don Island
Masborough South Junction
Millmoor Football Ground
Coronation Bridge
Bow Bridge
Lockhouse Bridge
Curve Bridge
Thornhill Primary School
Broom Valley Primary School
Clifton Com Arts School

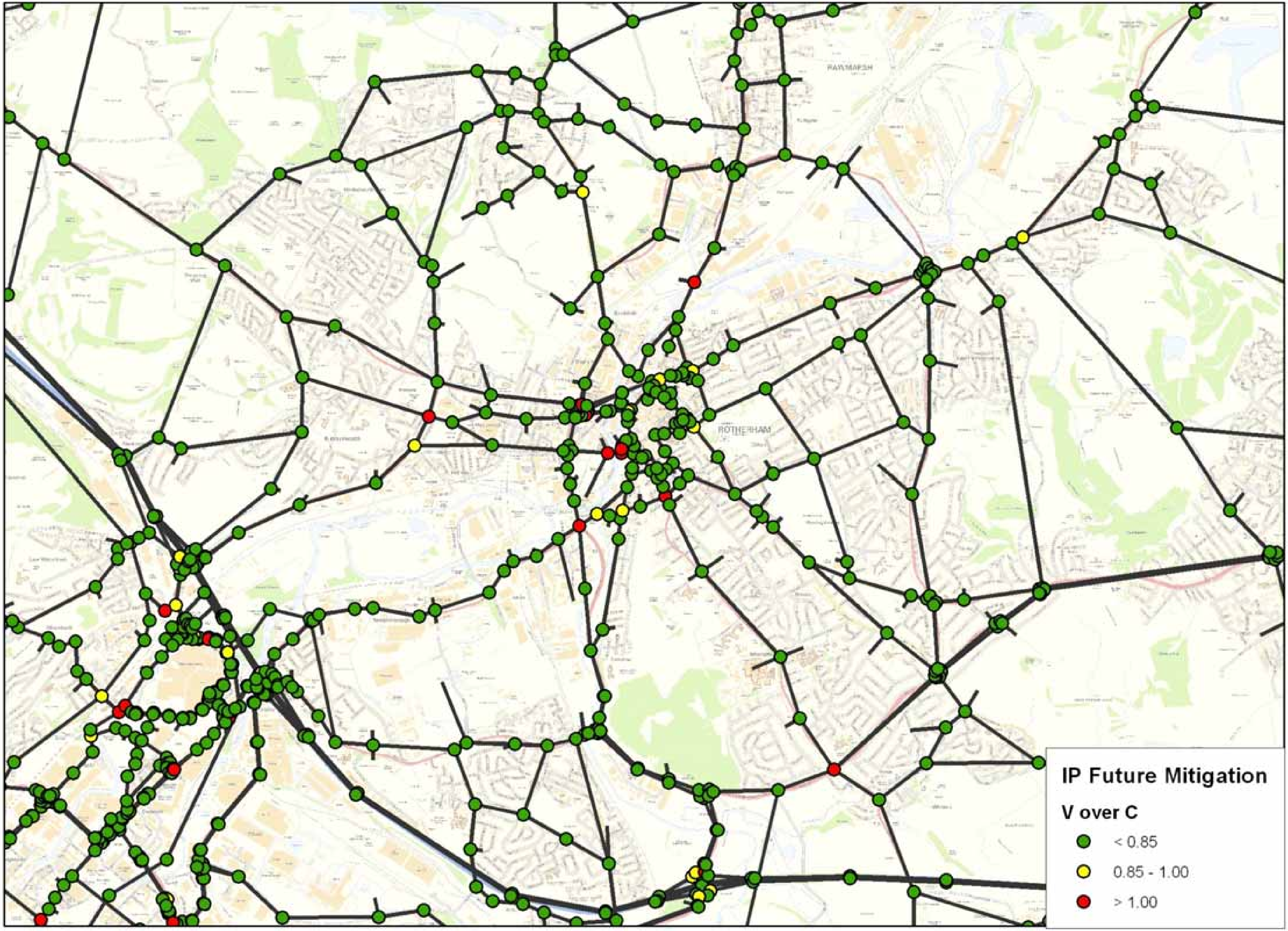

IP Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton Park
Clifton
Thorn Hill
St Ann's
New York
River Don
Constitution Hill
Museum and Art Gallery
Bandstand
Market
Millmoor Football Ground
Masborough South Junction
Don Island
Coronation Bridge
Bow Bridge
Lockhouse Bridge
Curve Bridge
Scrap Yard
Thornhill Primary School
Broom Valley Primary School
Clifton Com Arts School

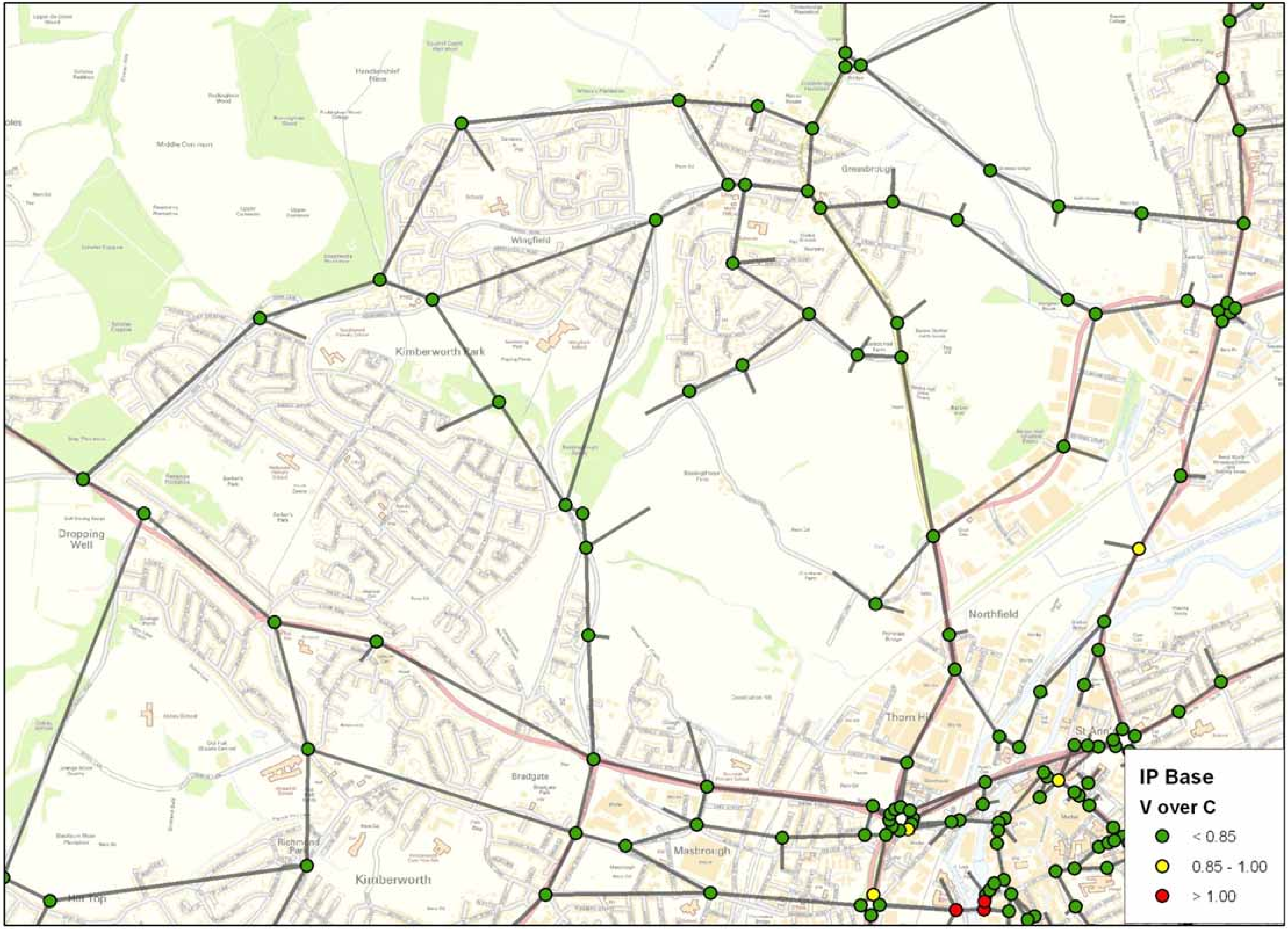

IP Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton
Clifton Park
Thorn Hill
St Ann's
New York
River Don
Constitution Hill
Museum and Art Gallery
Market
Millmoor Football Ground
Masborough South Junction
Don Island
Bow Bridge
Coronation Bridge
Broom Valley Primary School
Thornhill Primary School
Clifton Com Arts School



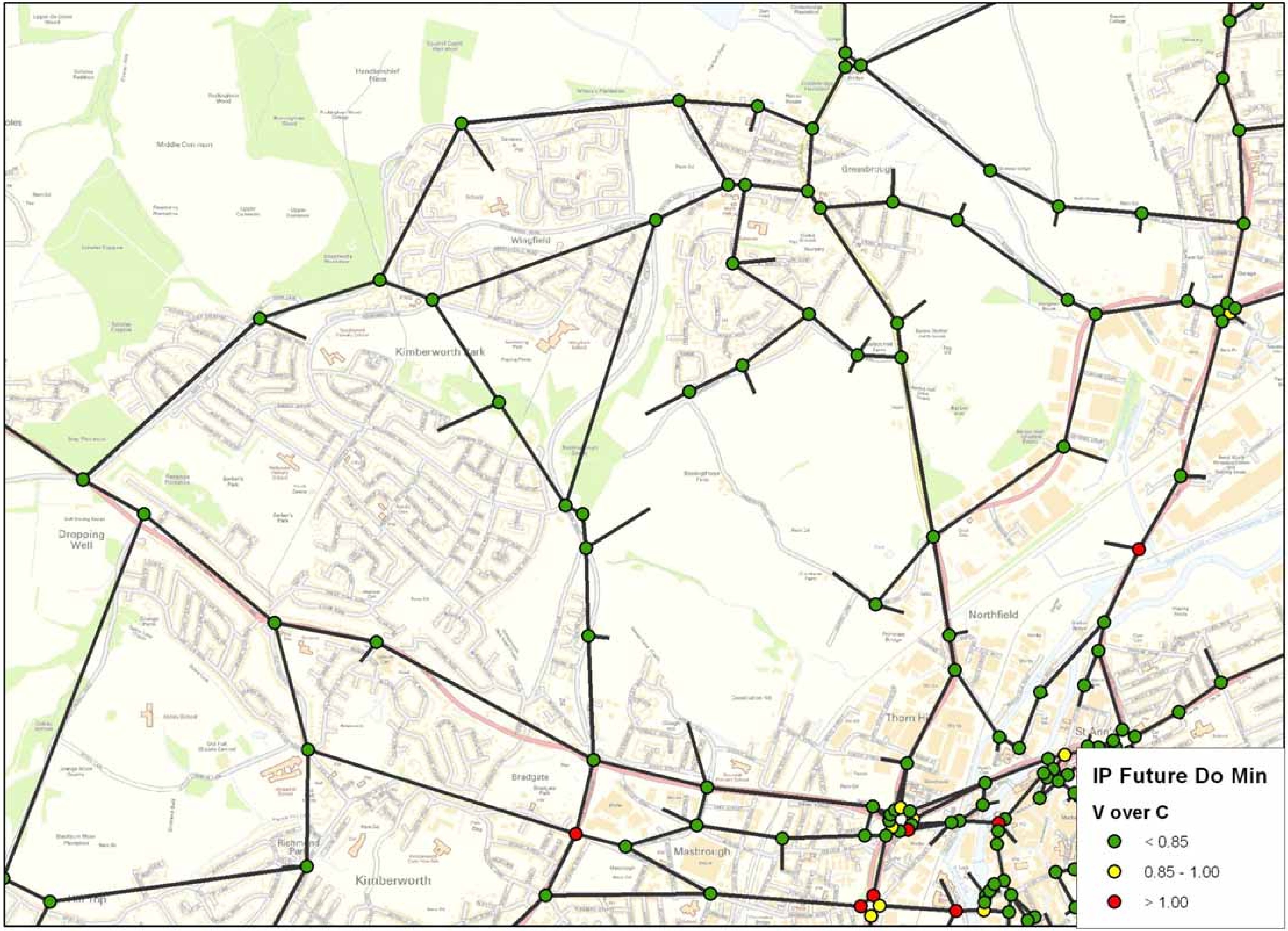
RAWMARSH
ROTHERHAM
IP Base
V over C
< 0.85
0.85 - 1.00
> 1.00

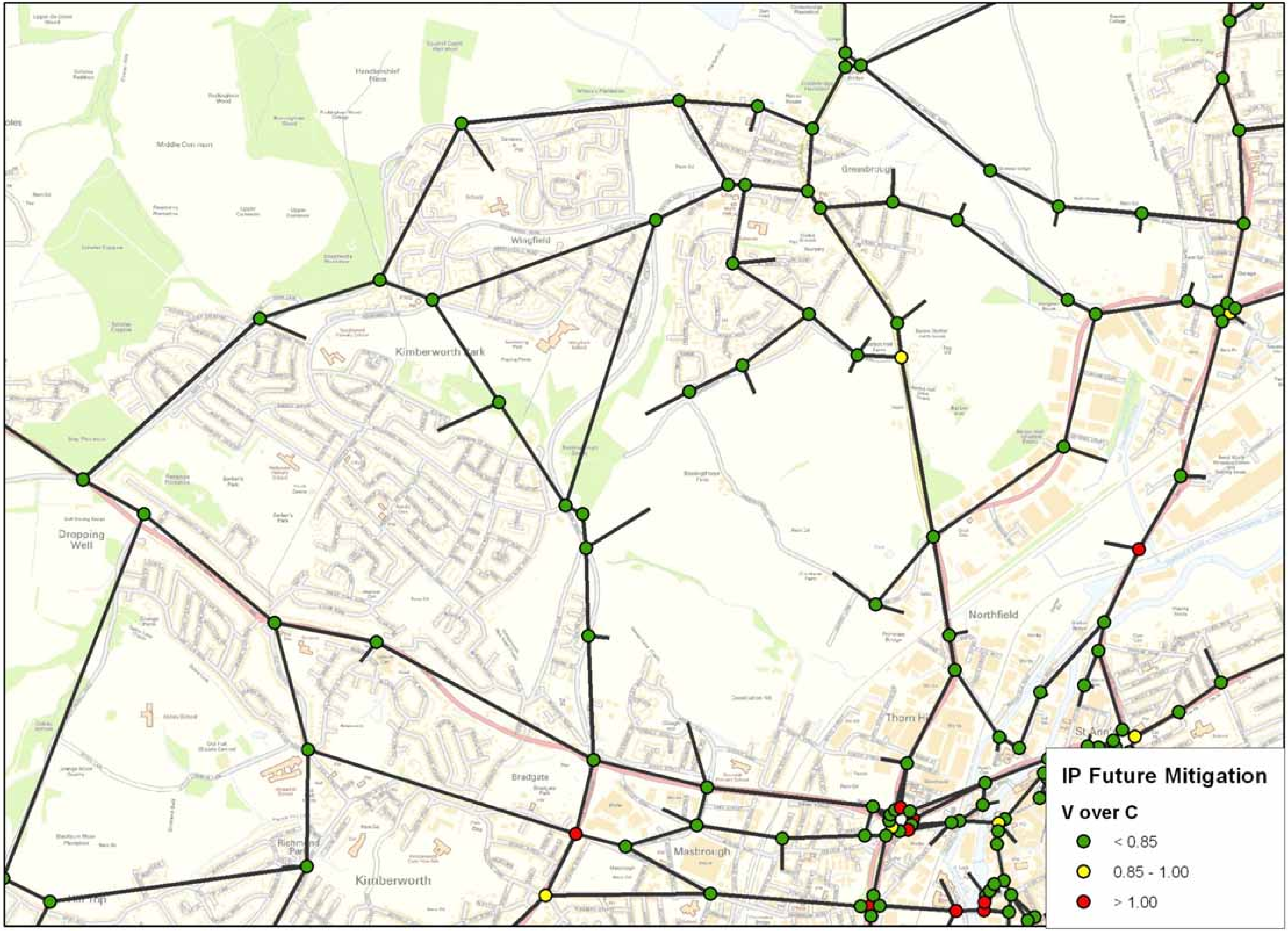

RAWMARSH
ROTHERHAM
IP Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00

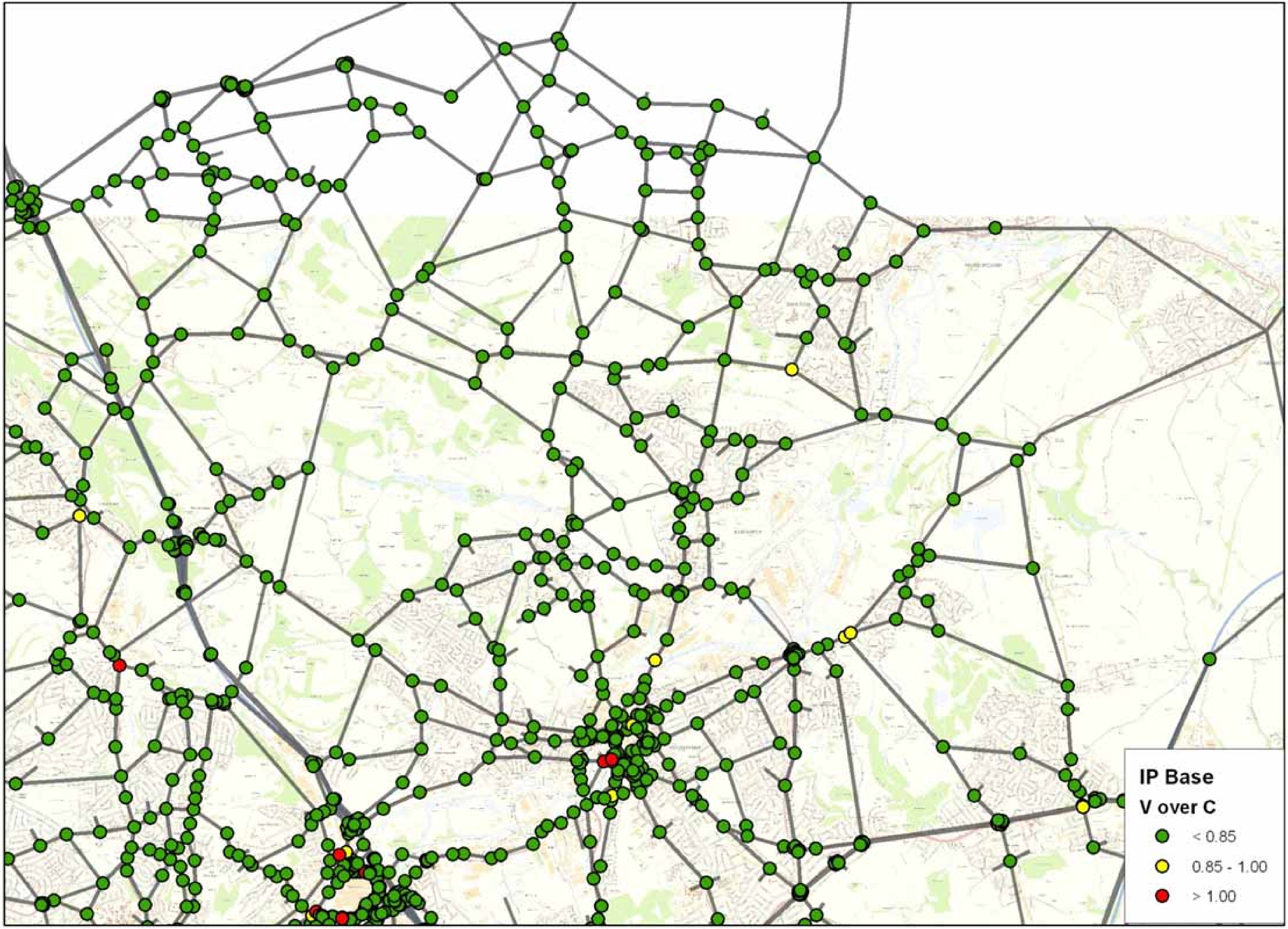

RAWMARSH
ROTHERHAM
IP Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00



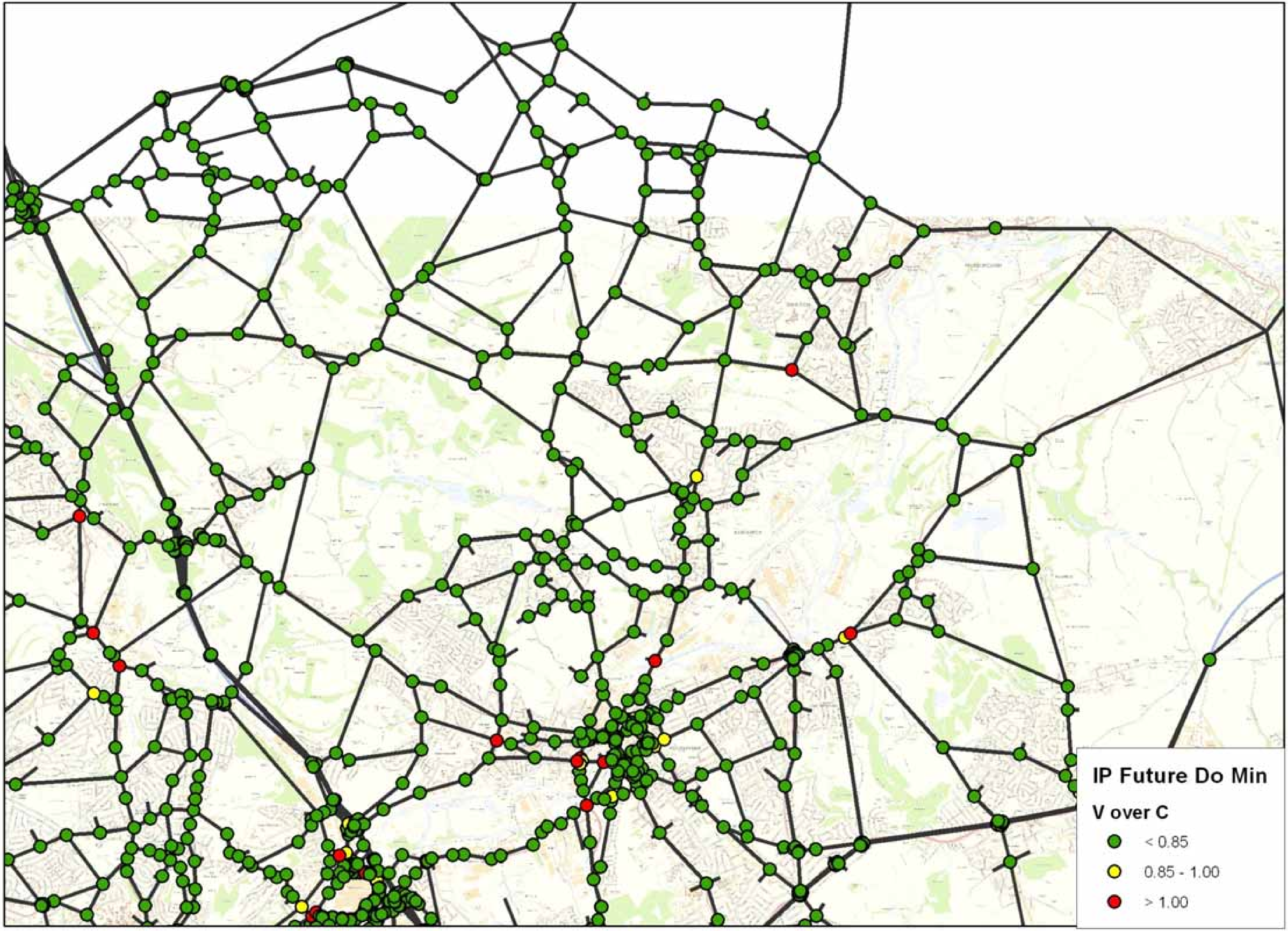
IP Base
V over C
< 0.85
0.85 - 1.00
> 1.00
Kimberworth Park
Wingfield
Greasbrough
Northfield
Dropping Well
Bradgate
Masbrough
Kimberworth
Richmond Park
Thorn Hill


IP Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00
Dropping Well
Wingfield
Kimberworth Park
Greasbrough
Northfield
Thorn Hill
Bradgate
Masbrough
Kimberworth
Richmond Park

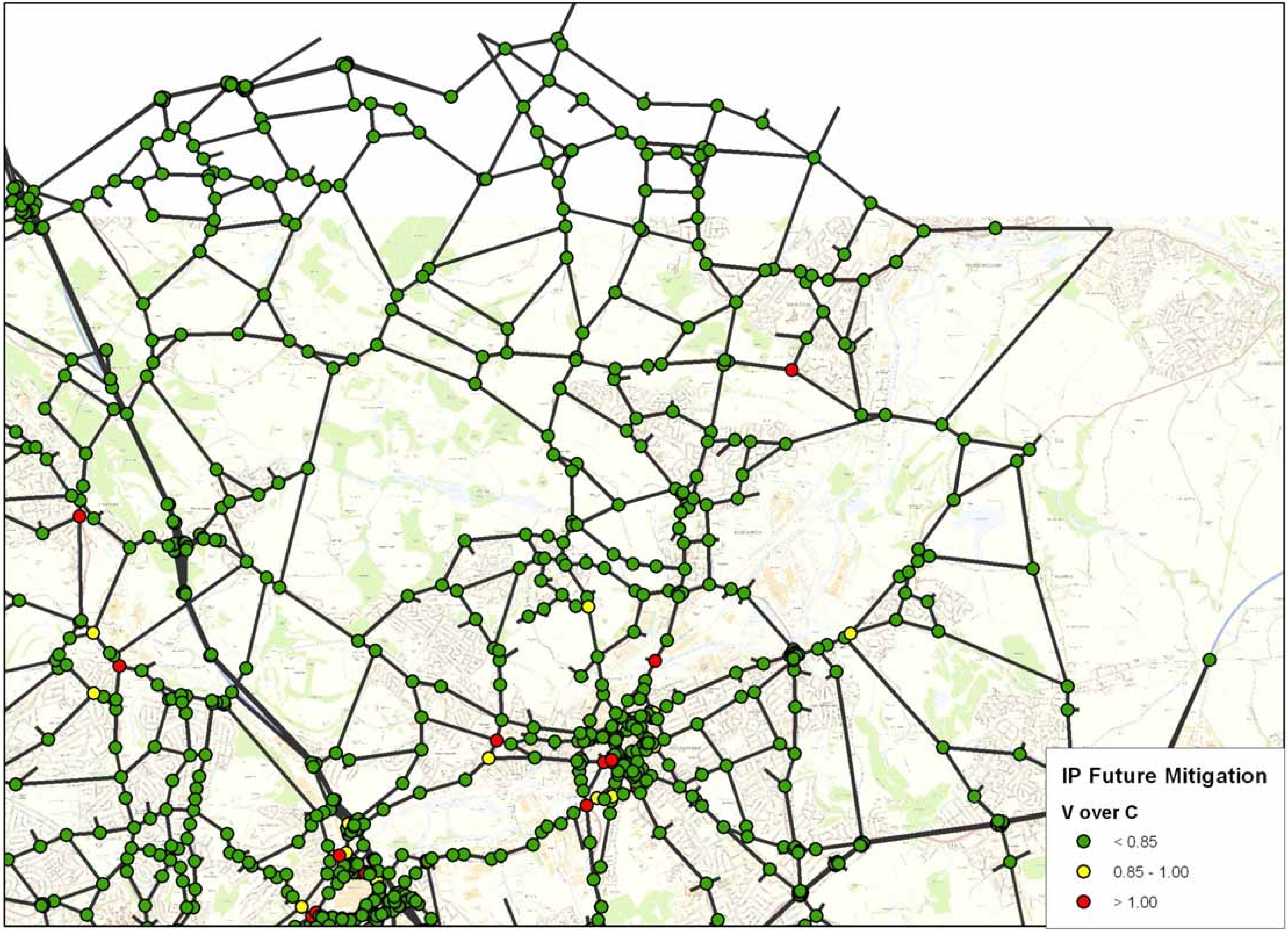

IP Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00
Wingfield
Kimberworth Park
Greasbrough
Dropping Well
Northfield
Thorn Hill
Bradgate
Masbrough
Kimberworth
Richmond Park
St Ann's

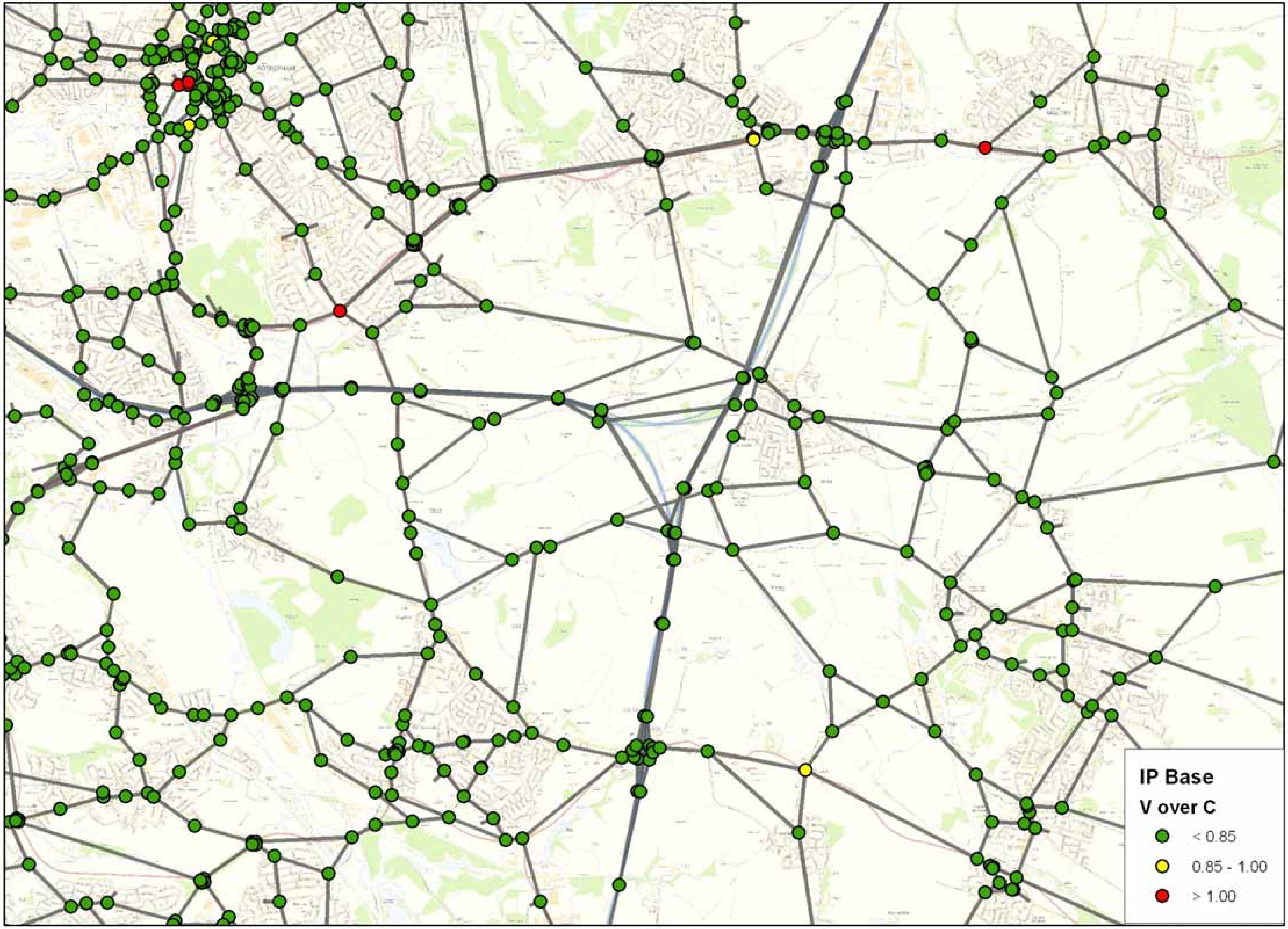


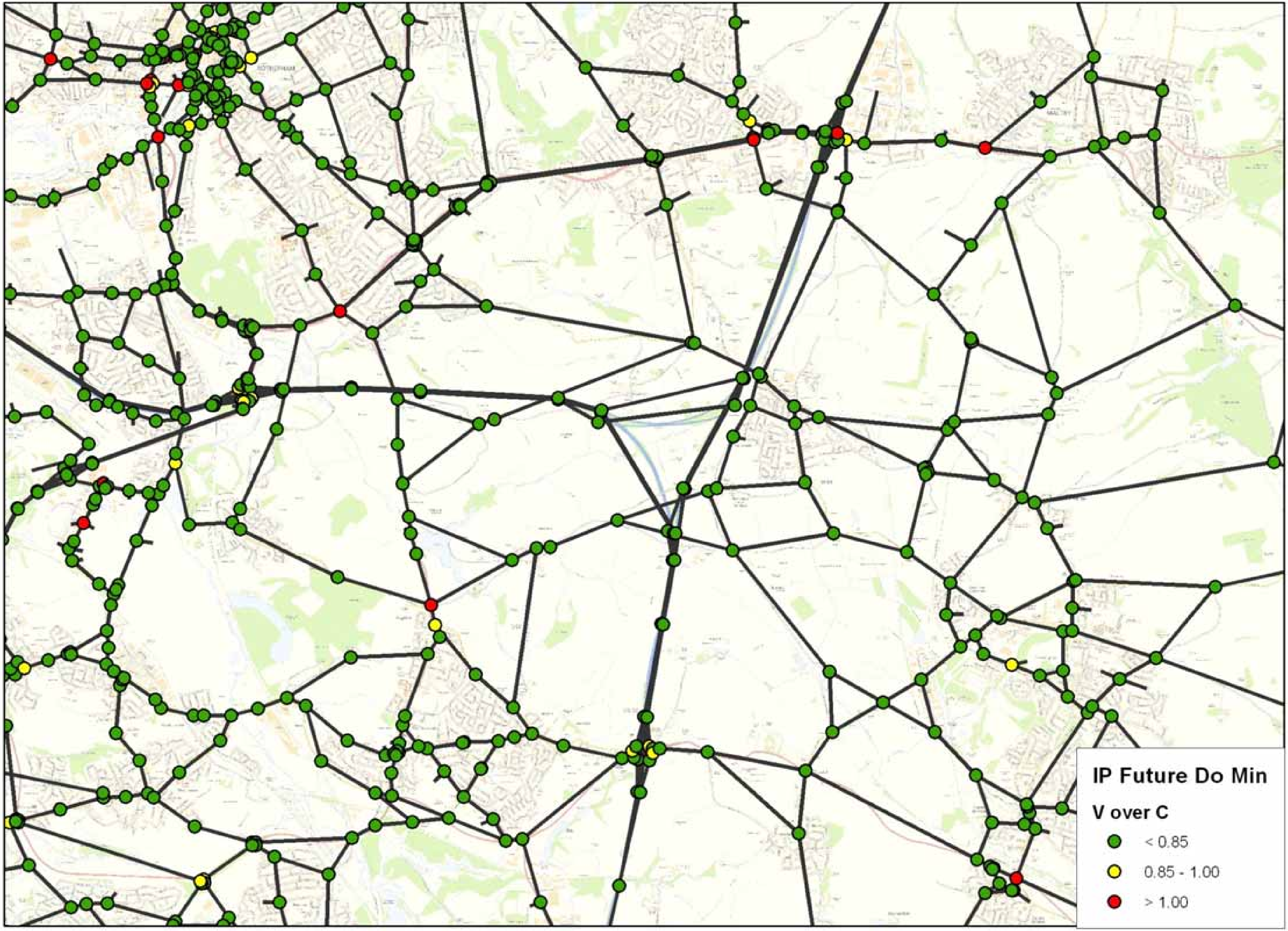
IP Base
V over C
< 0.85
0.85 - 1.00
> 1.00

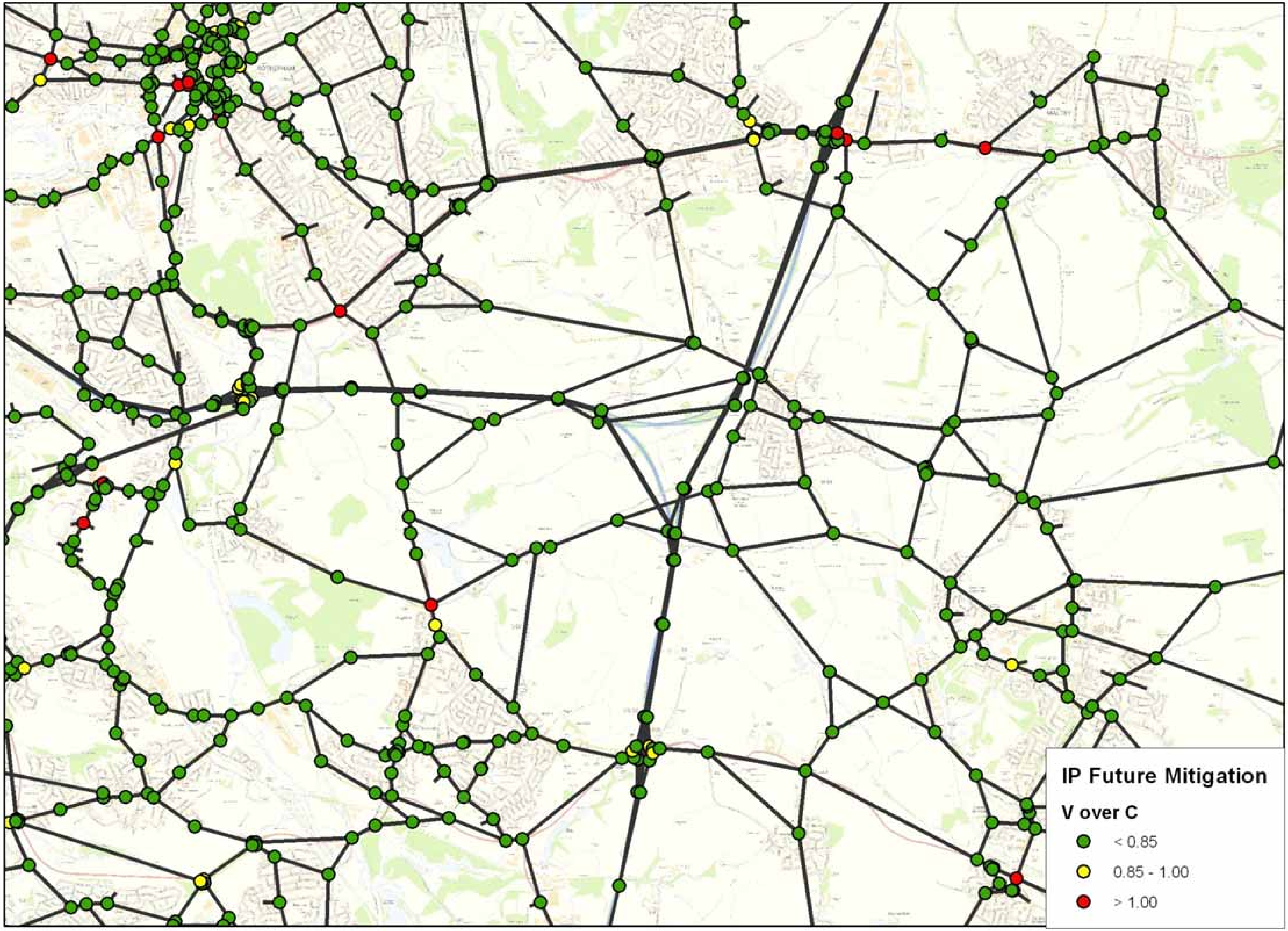


IP Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00


IP Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

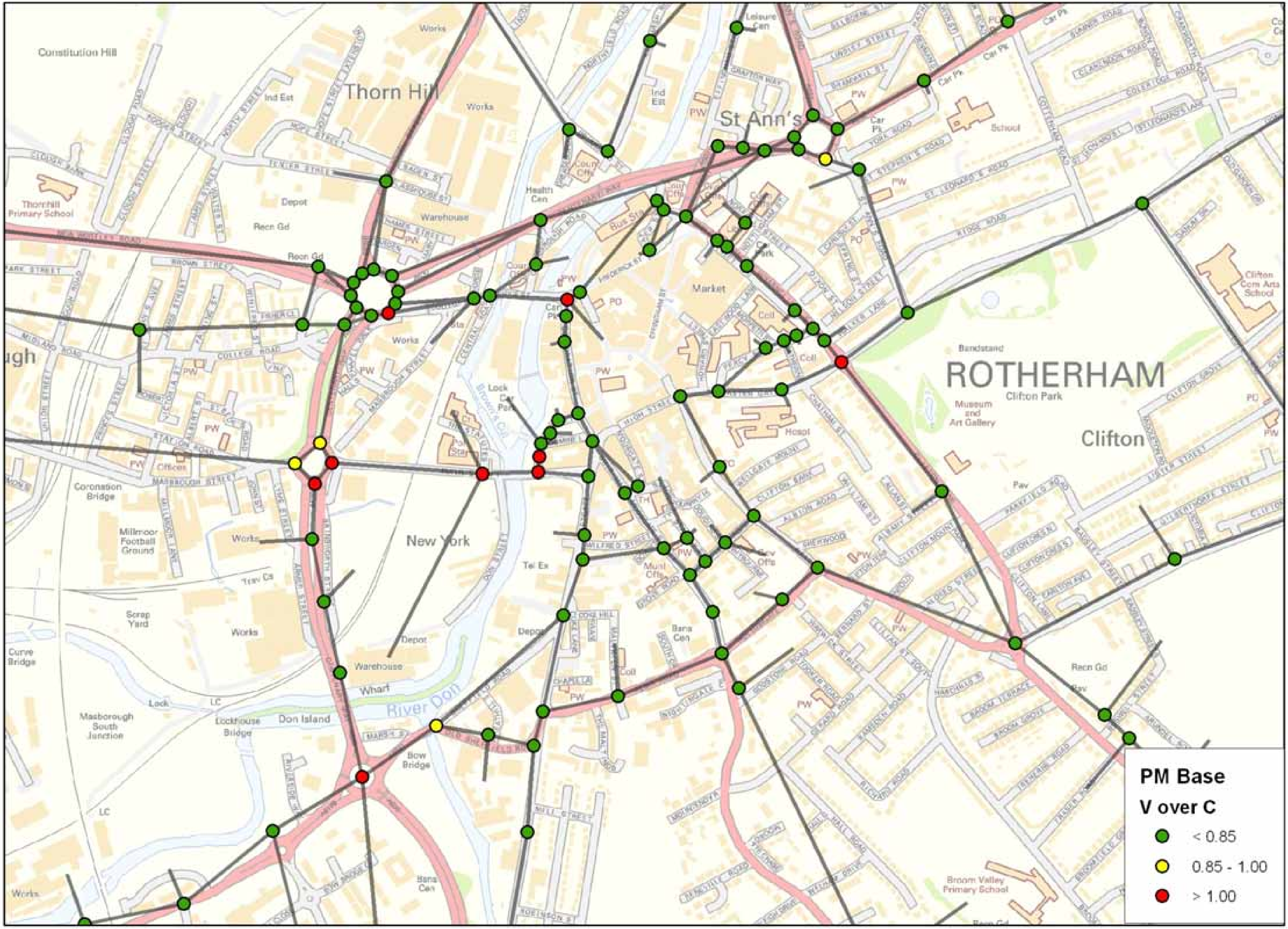

IP Base
V over C
< 0.85
0.85 - 1.00
> 1.00

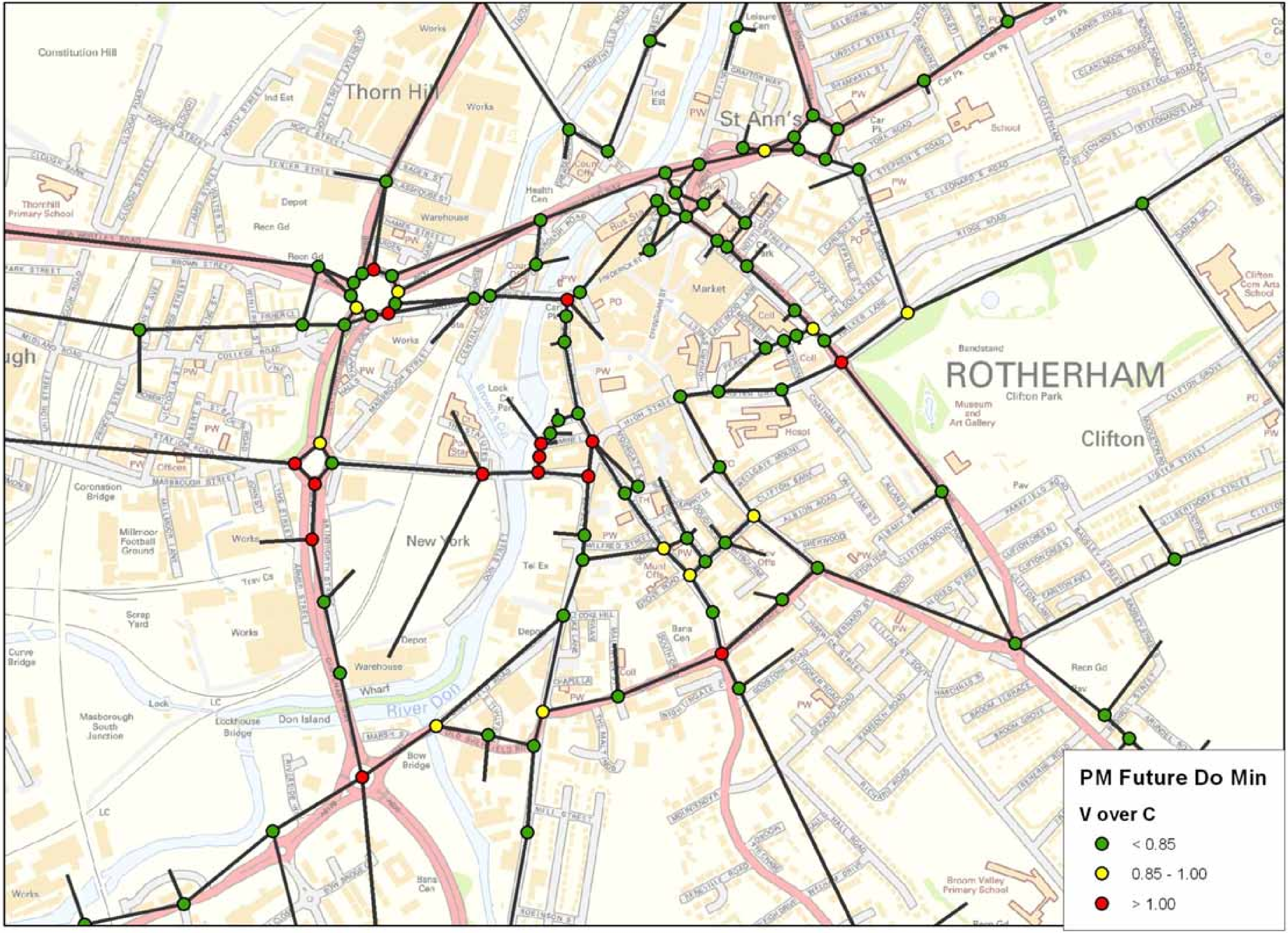

IP Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00

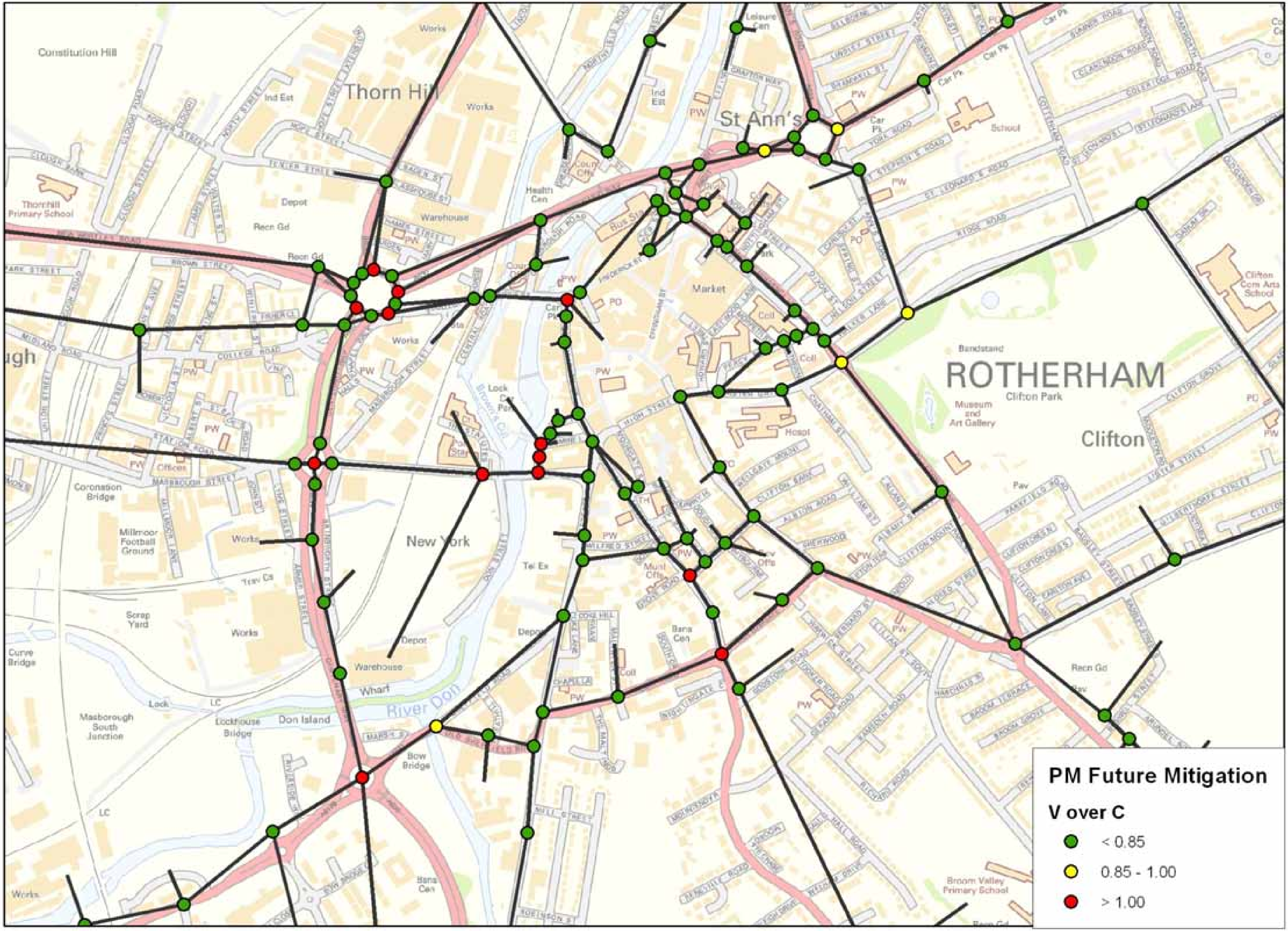


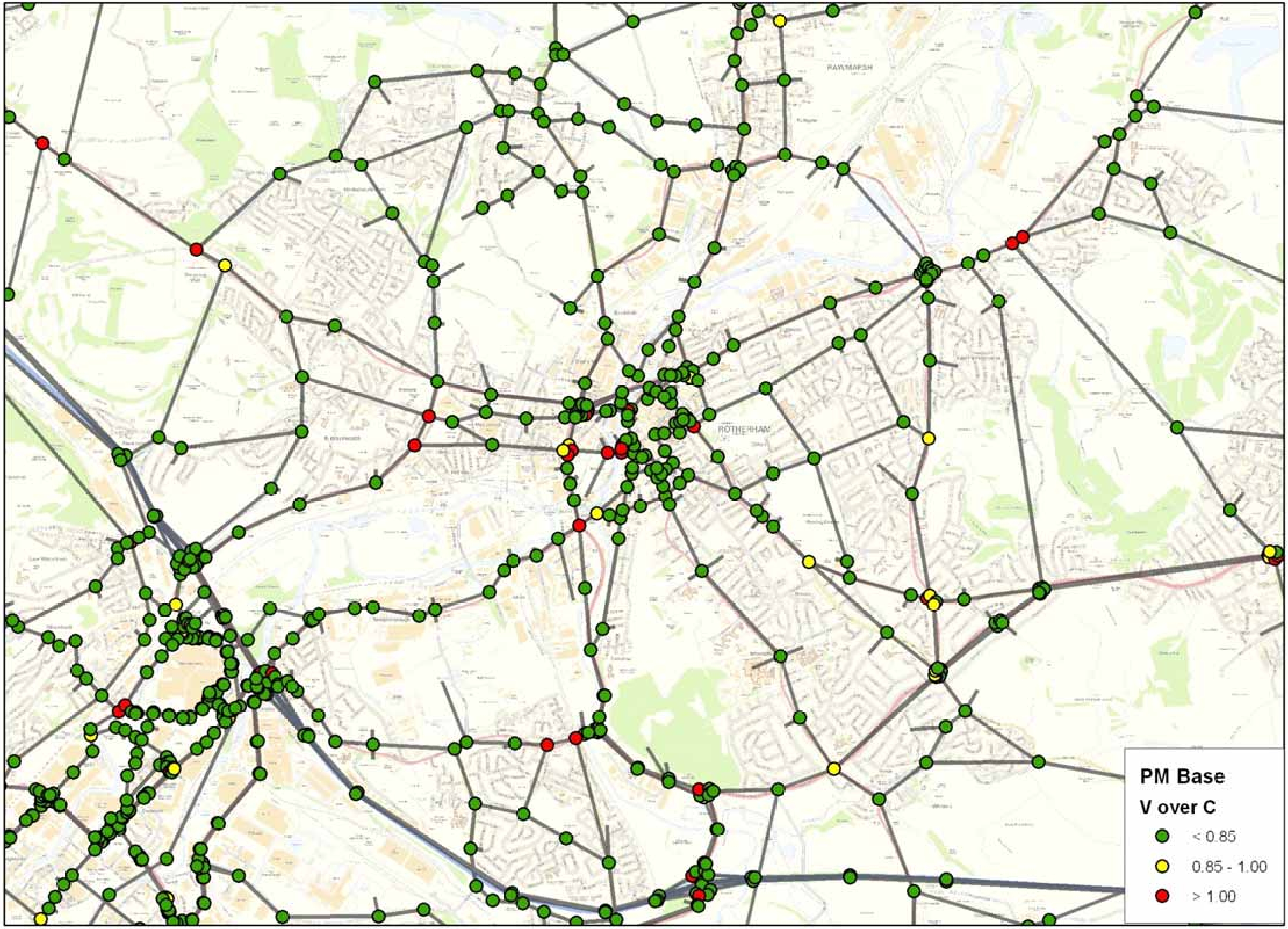
IP Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

Evening Peak Plots

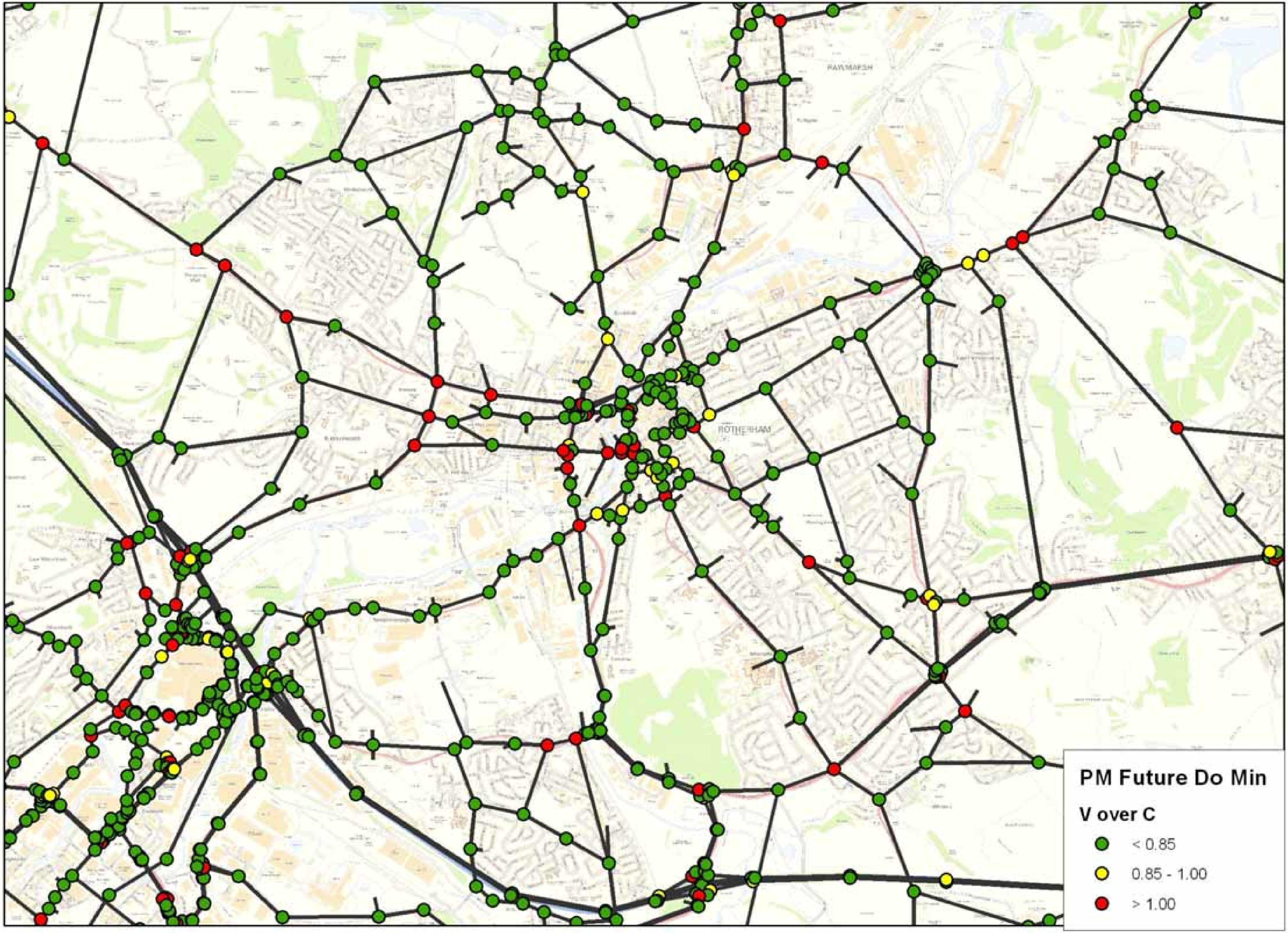

PM Base
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton
Clifton Park
Thorn Hill
St Ann's
New York
River Don
Constitution Hill
Museum and Art Gallery
Bandstand
Market
Millmoor Football Ground
Coronation Bridge
Don Island
Lockhouse Bridge
Masborough South Junction
Scrap Yard
Bow Bridge
Thornhill Primary School
Broom Valley Primary School
Clifton Com Arts School
Warehouse
Wharf
Works
Depot
Recn Gd


PM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton Park
Clifton
Thorn Hill
St Ann's
New York
Constitution Hill
River Don

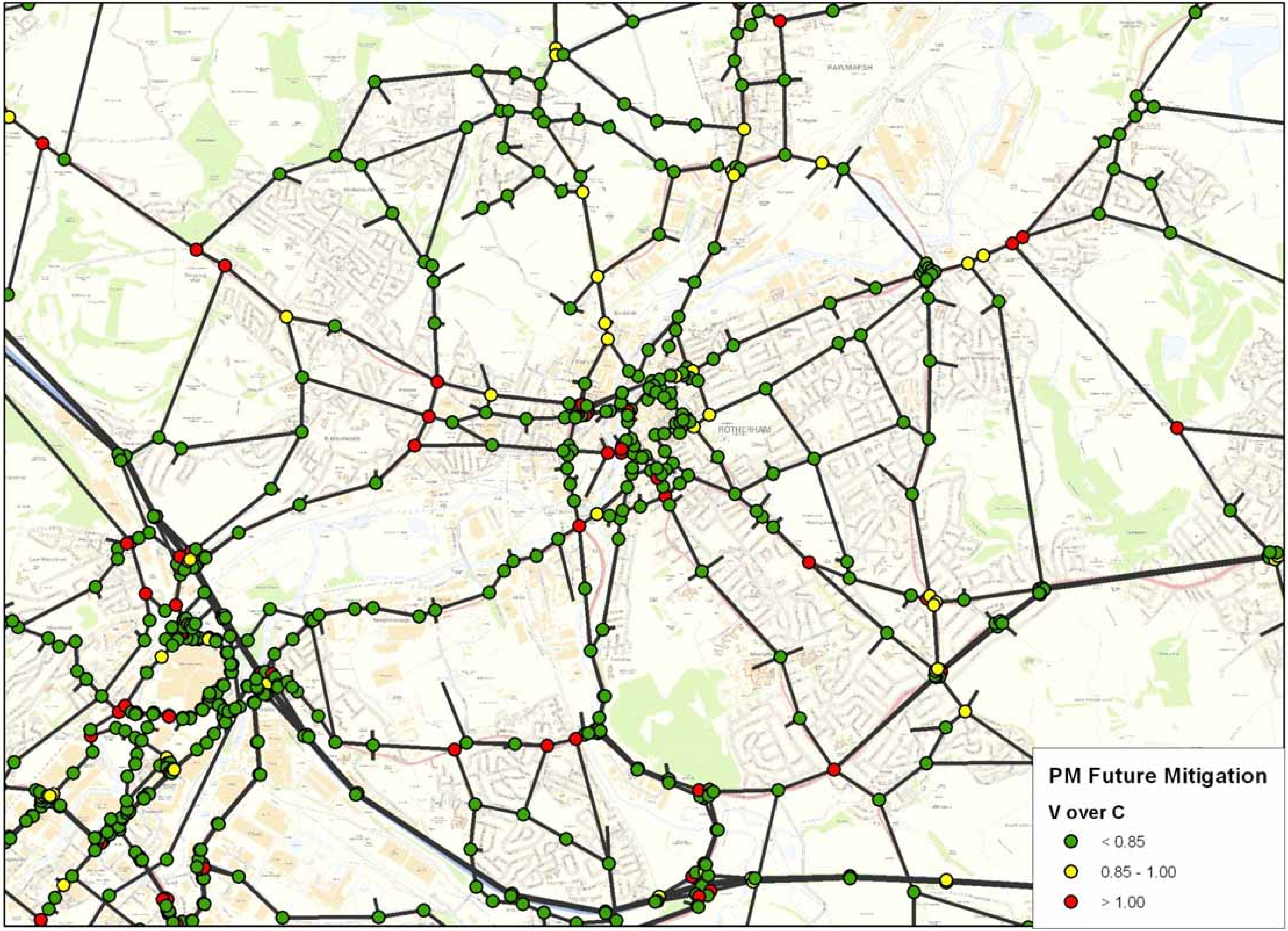

PM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00
ROTHERHAM
Clifton
Clifton Park
Thorn Hill
St Ann's
New York
River Don
Museum and Art Gallery
Market
Constitution Hill
Thornhill Primary School
Broom Valley Primary School
Millmoor Football Ground
Masborough South Junction
Don Island
Coronation Bridge
Bow Bridge



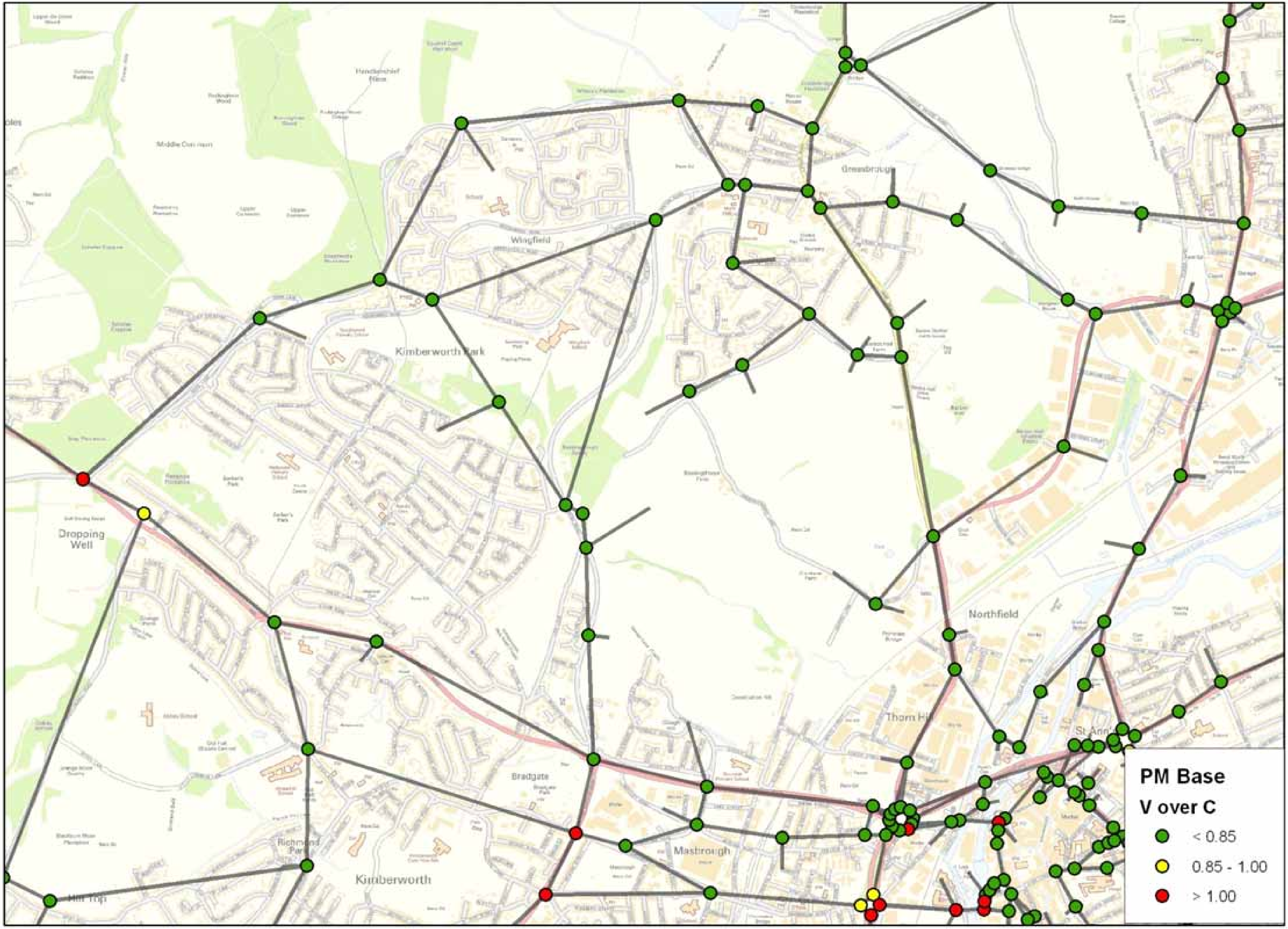
RAWMARSH
ROTHERHAM
PM Base
V over C
< 0.85
0.85 - 1.00
> 1.00



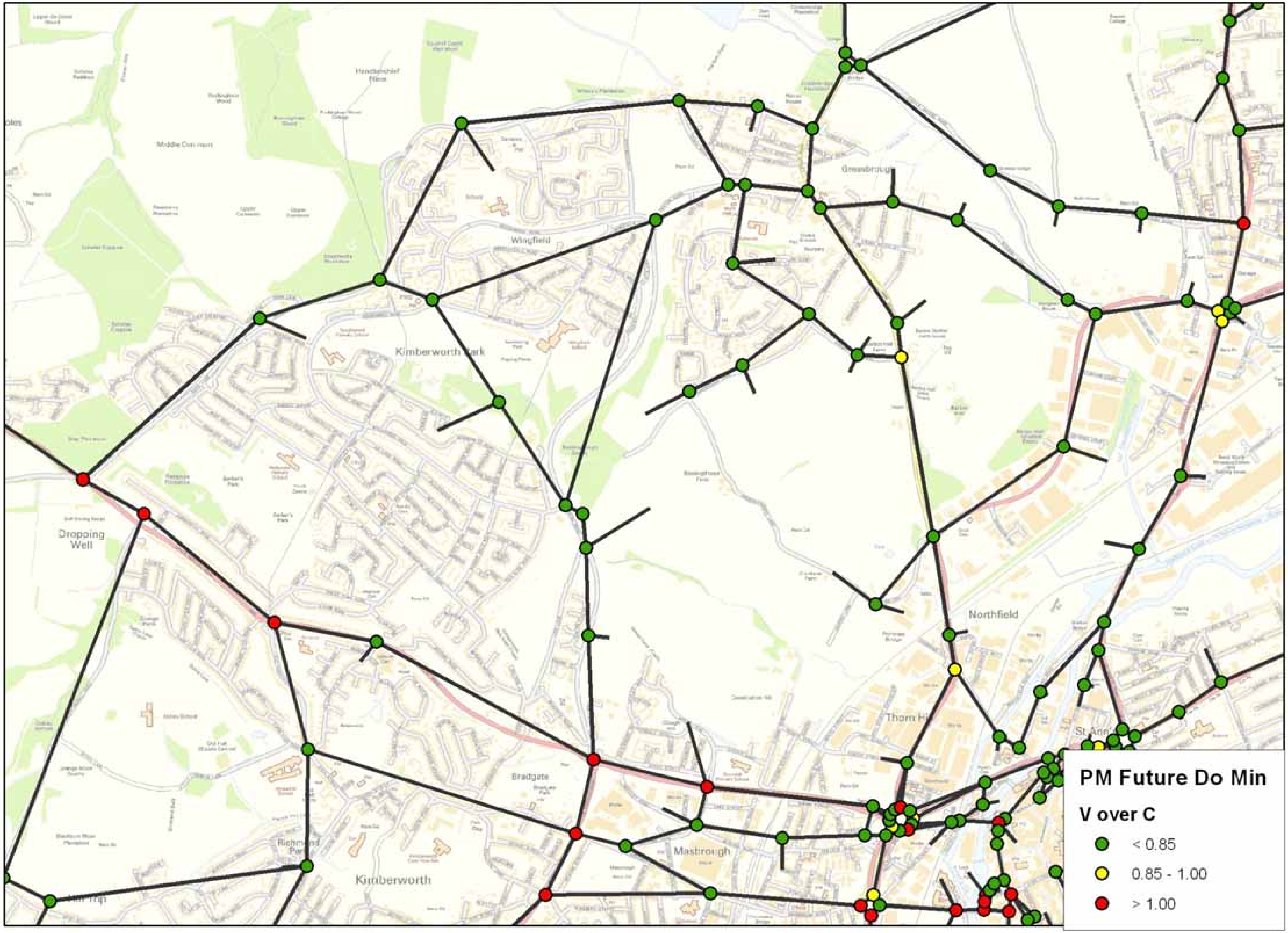
RAWMARSH
ROTHERHAM
PM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00

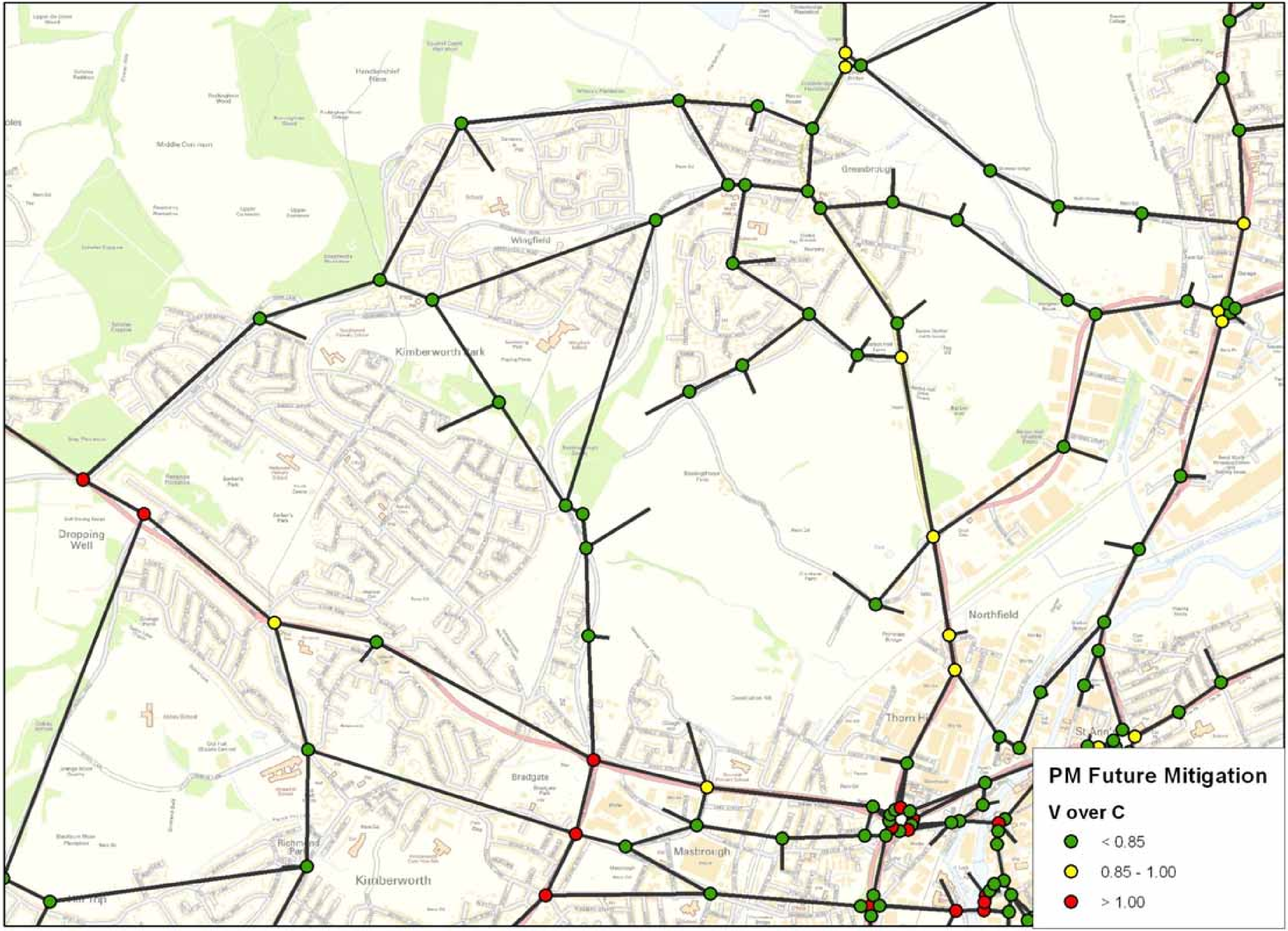


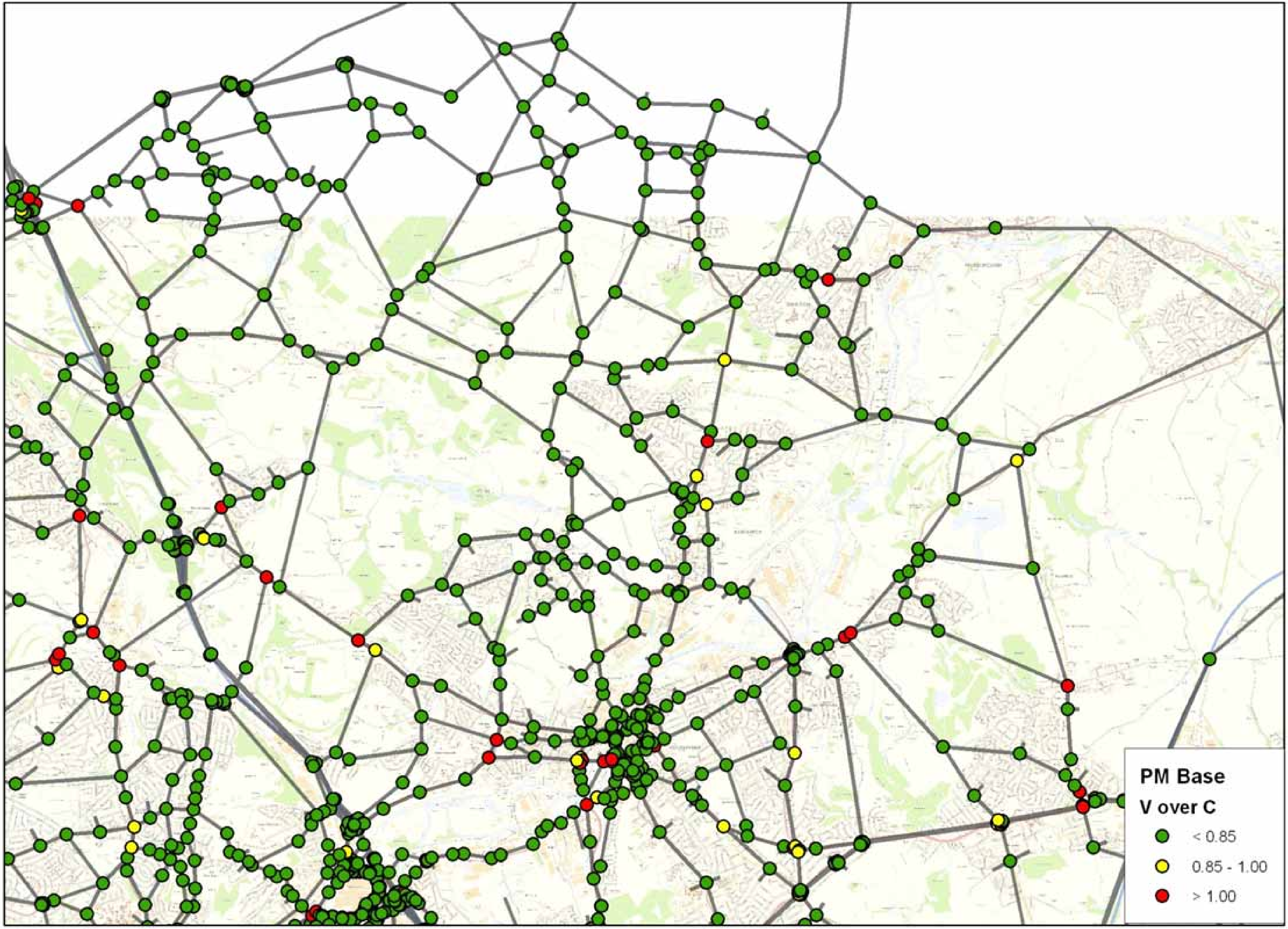
RAWMARSH
ROTHERHAM
PM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

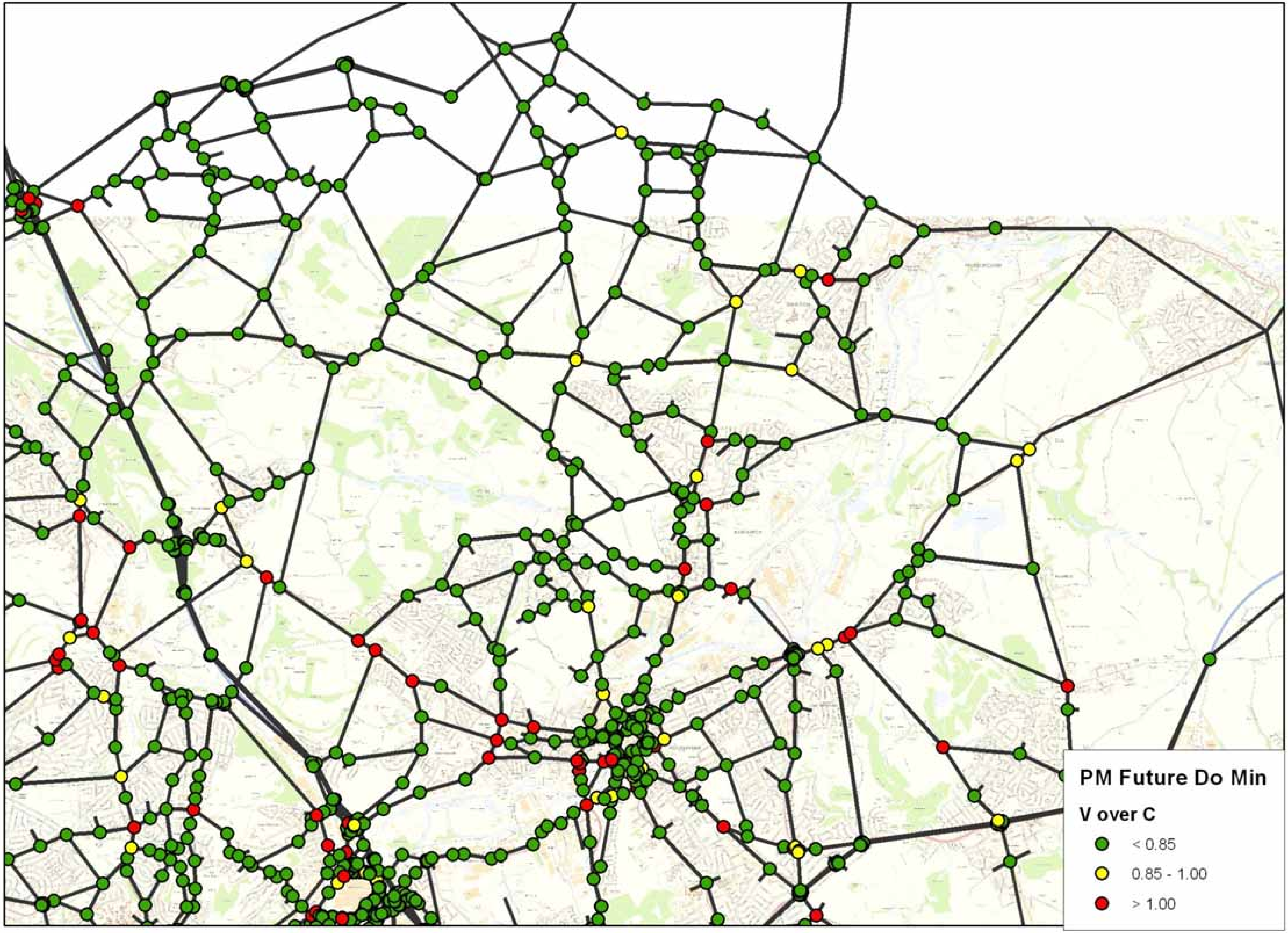


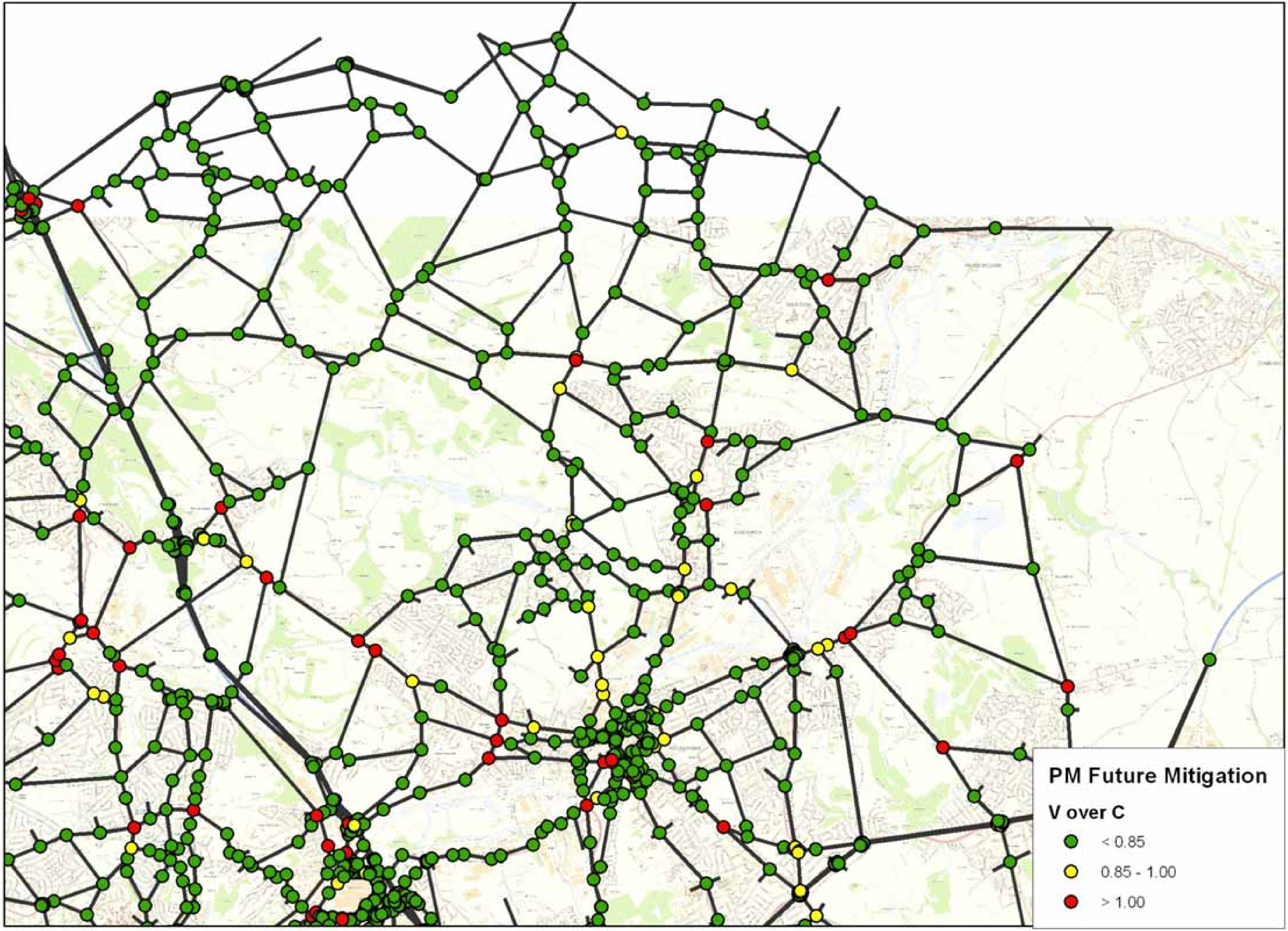
Greasbrough
Wingfield
Kimberworth Park
Dropping Well
Northfield
Thorn Hill
St Ann's
Bradgate
Masbrough
Richmond Park
Kimberworth
Hill Top
PM Base
V over C
< 0.85
0.85 - 1.00
> 1.00

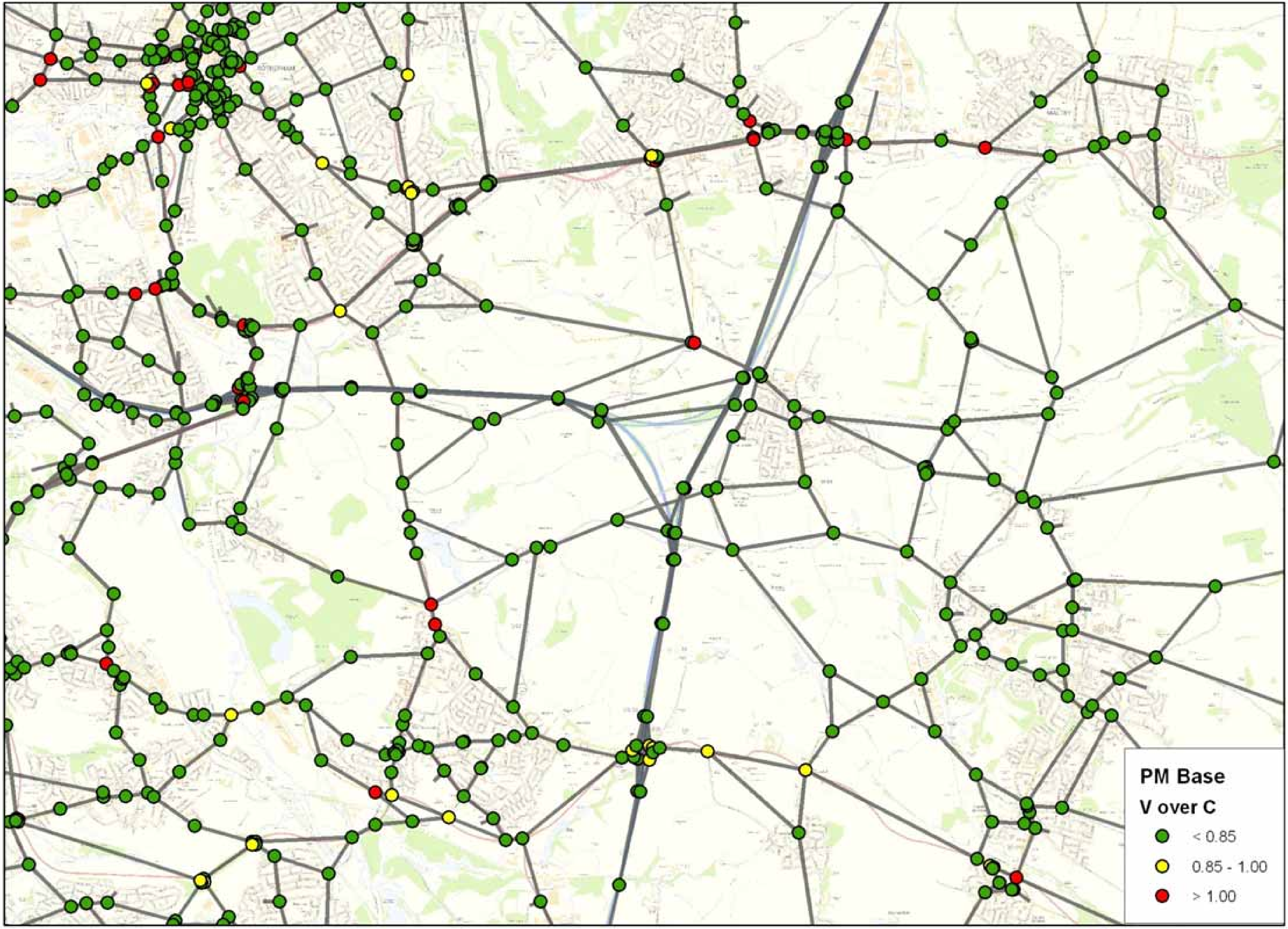

PM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00
Greasbrough
Wingfield
Kimberworth Park
Dropping Well
Northfield
Bradgate
Masbrough
Kimberworth
Richmond Park
Middle Common
Handkerchief Plain

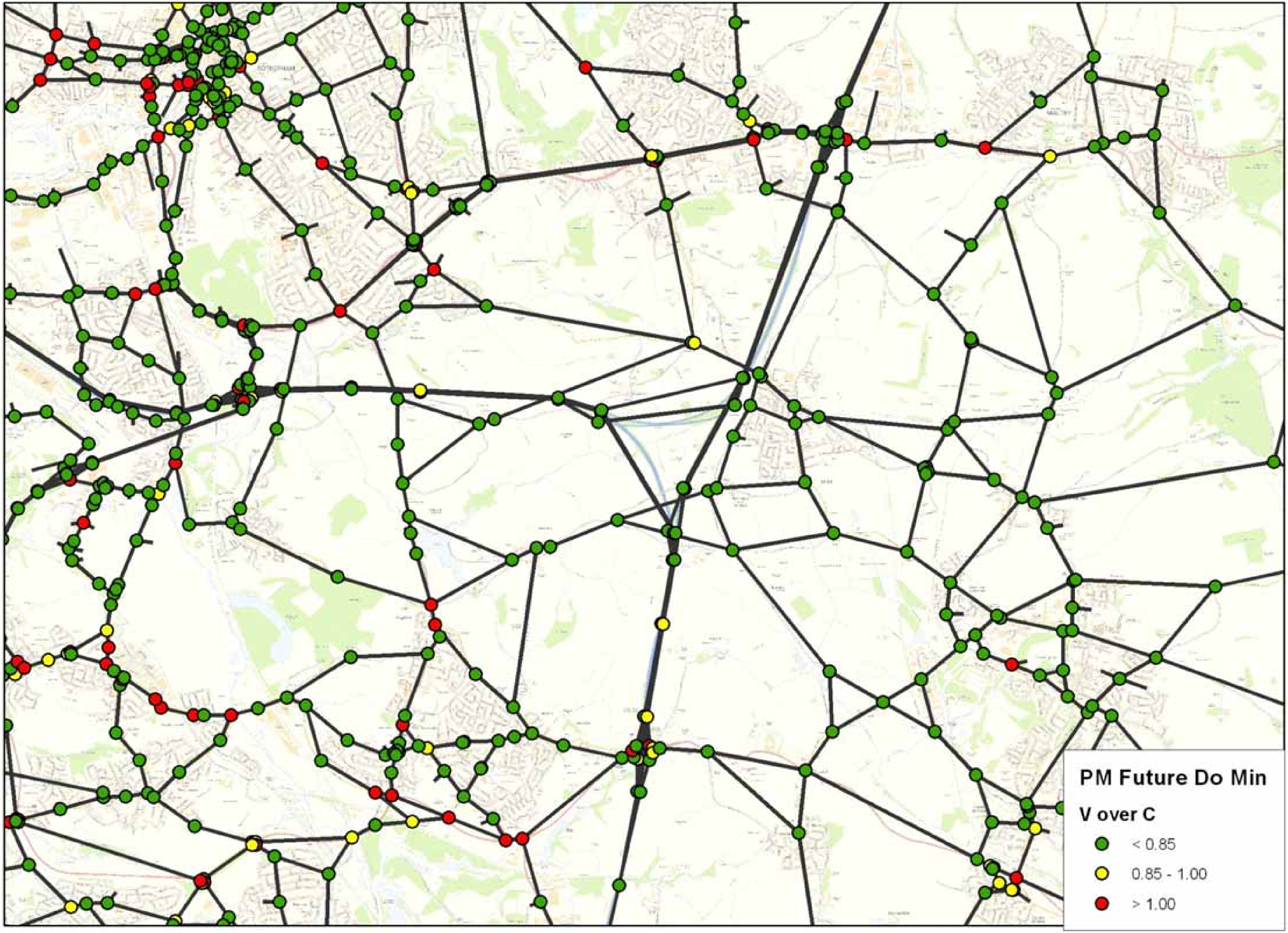

PM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00
Kimberworth Park
Wingfield
Greasbrough
Northfield
Dropping Well
Bradgate
Masbrough
Kimberworth
Richmond Park
Middle Oaks Hill
Handkerchief Piece

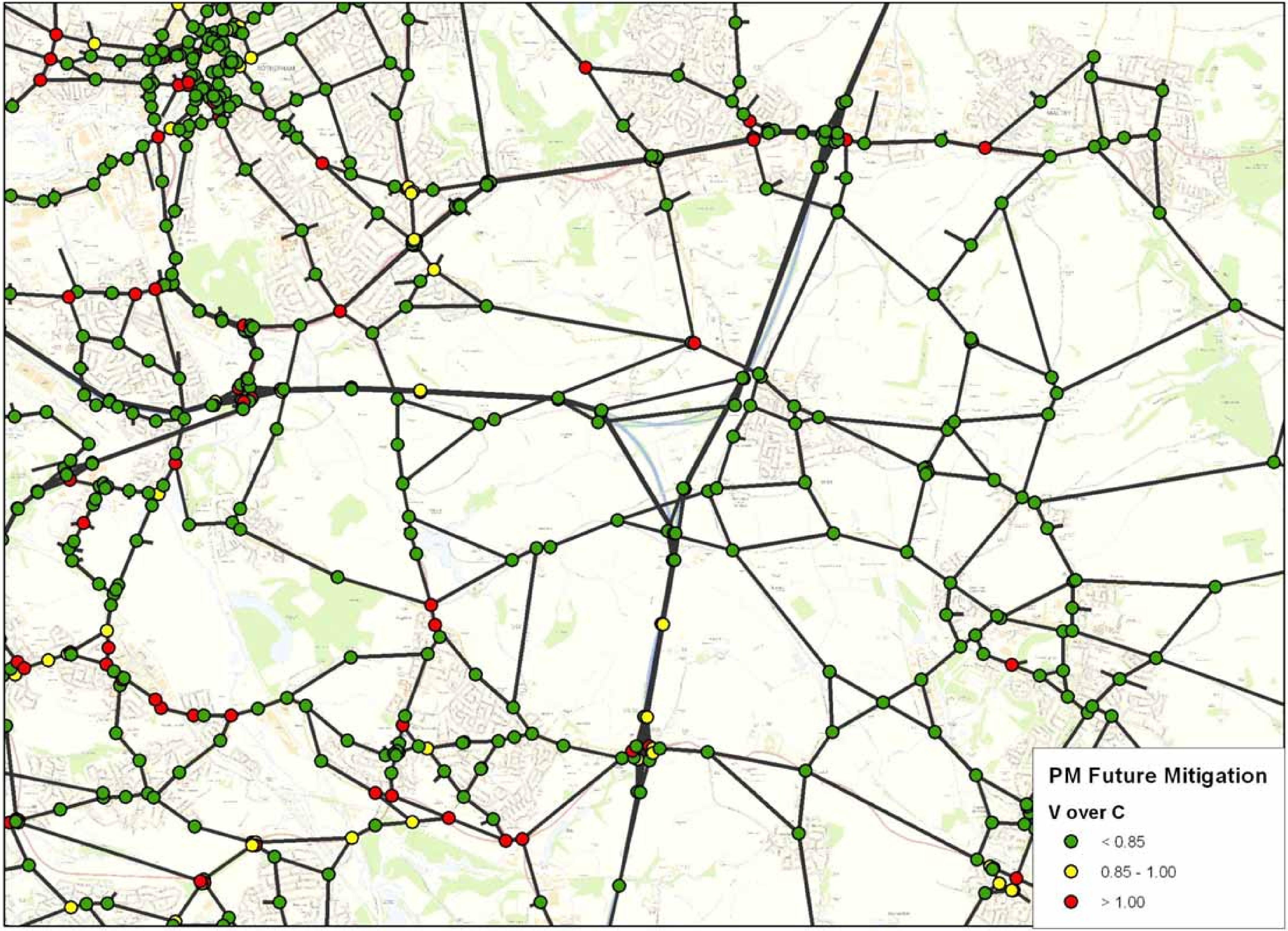

PM Base
V over C
< 0.85
0.85 - 1.00
> 1.00


PM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00


PM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

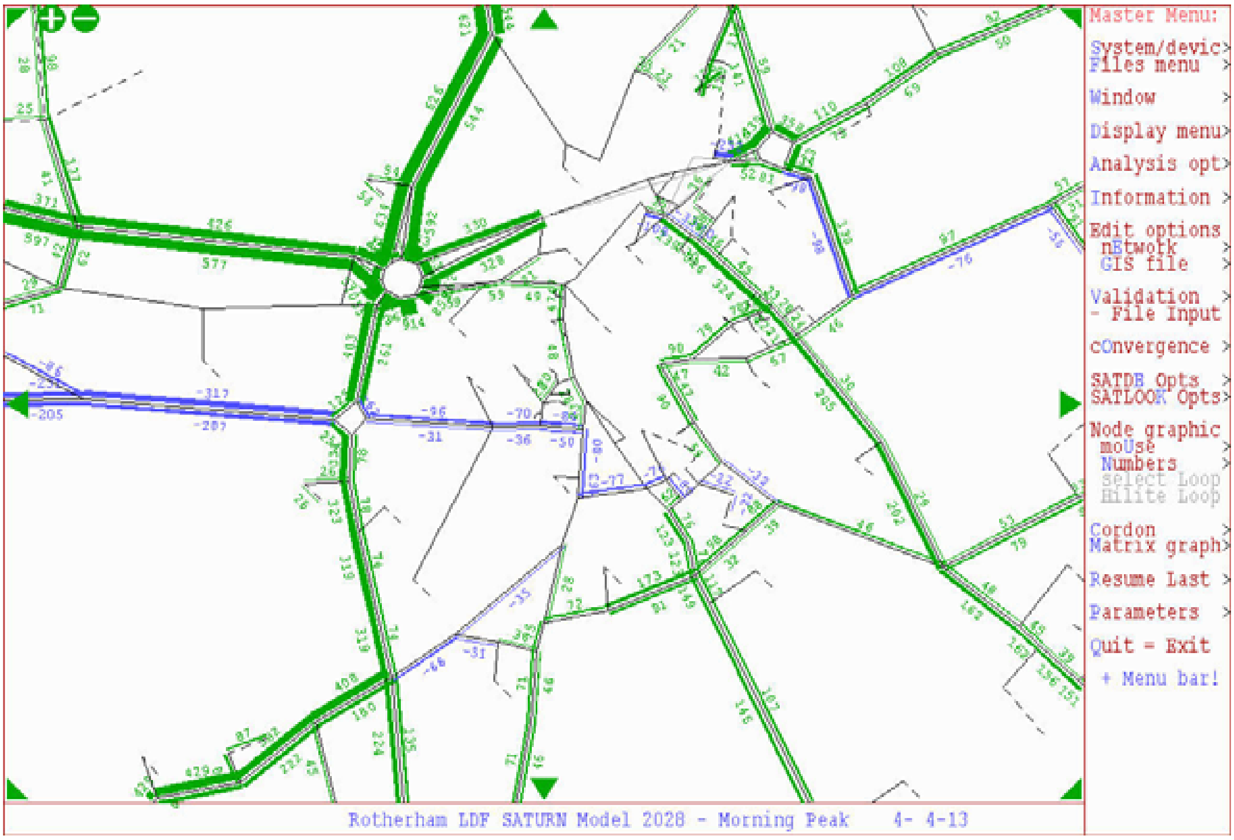

PM Base
V over C
< 0.85
0.85 - 1.00
> 1.00


PM Future Do Min
V over C
< 0.85
0.85 - 1.00
> 1.00

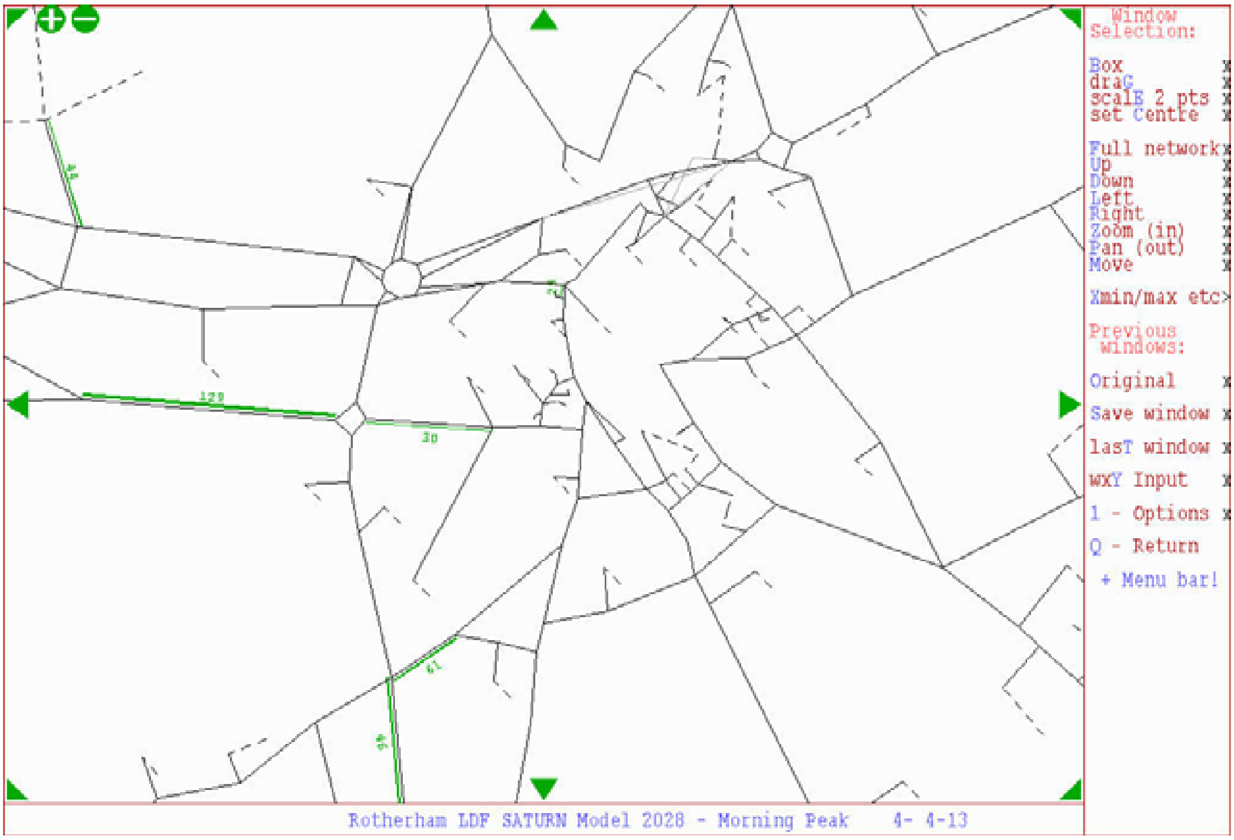

PM Future Mitigation
V over C
< 0.85
0.85 - 1.00
> 1.00

Appendix F: Base to Do Minimum Flow and Delay Difference Plots

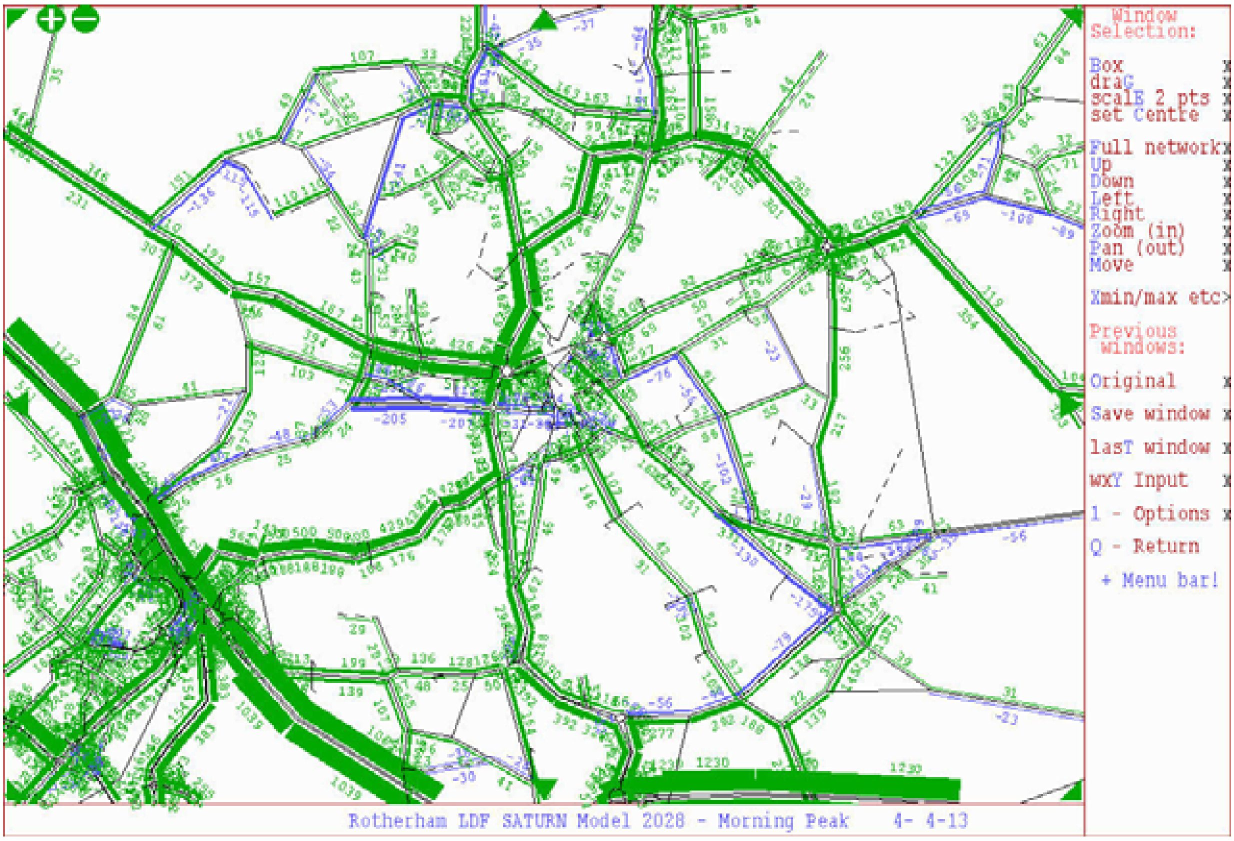
Flow Difference, Rotherham Town Centre, AM



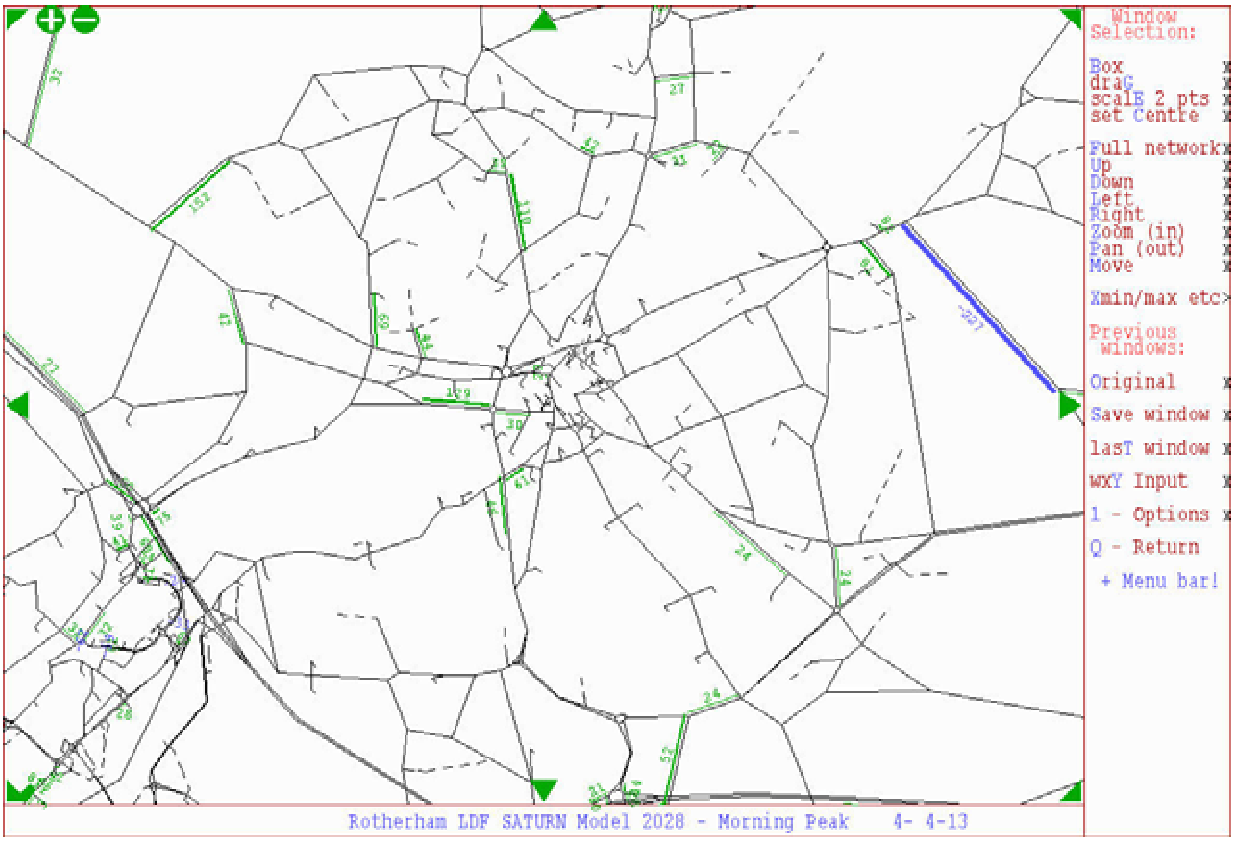
Delay Difference, Rotherham Town Centre, AM



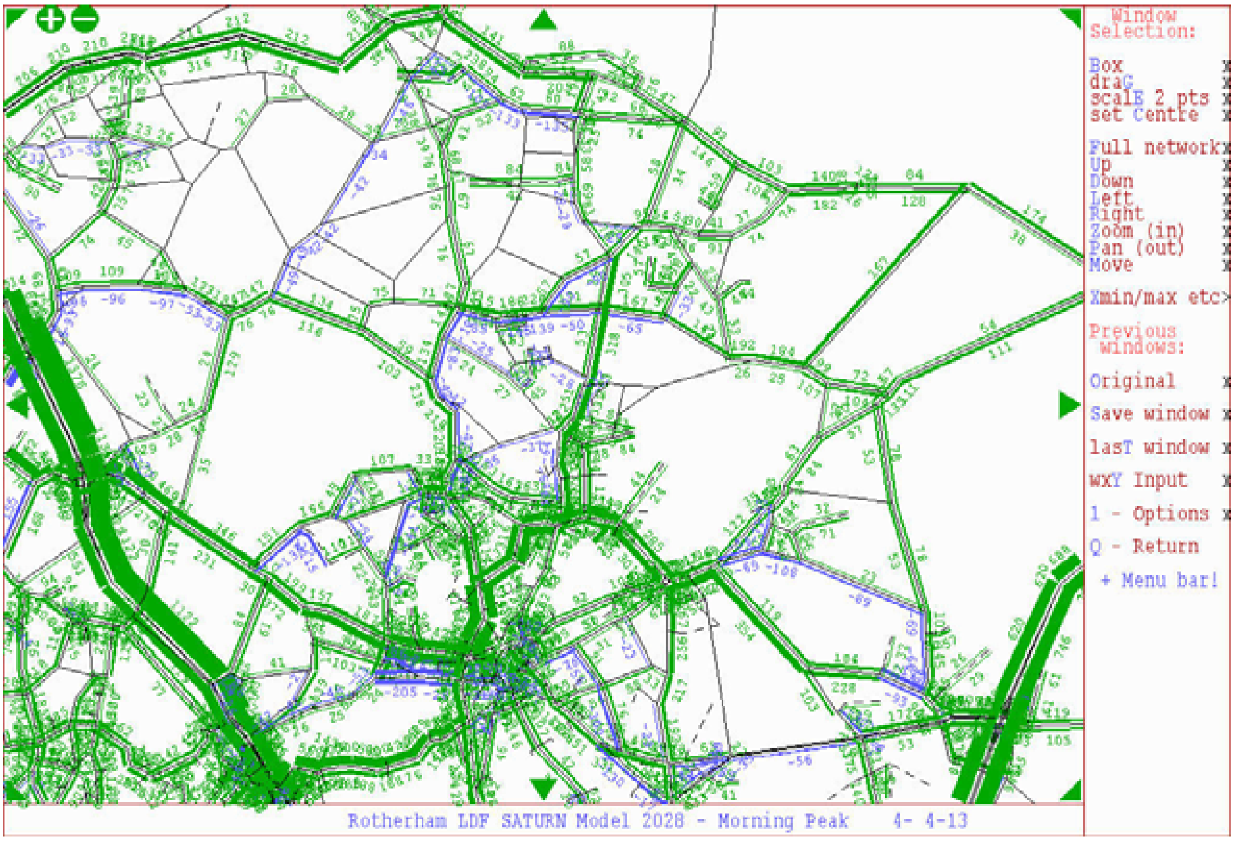
Flow Difference, Rotherham, AM



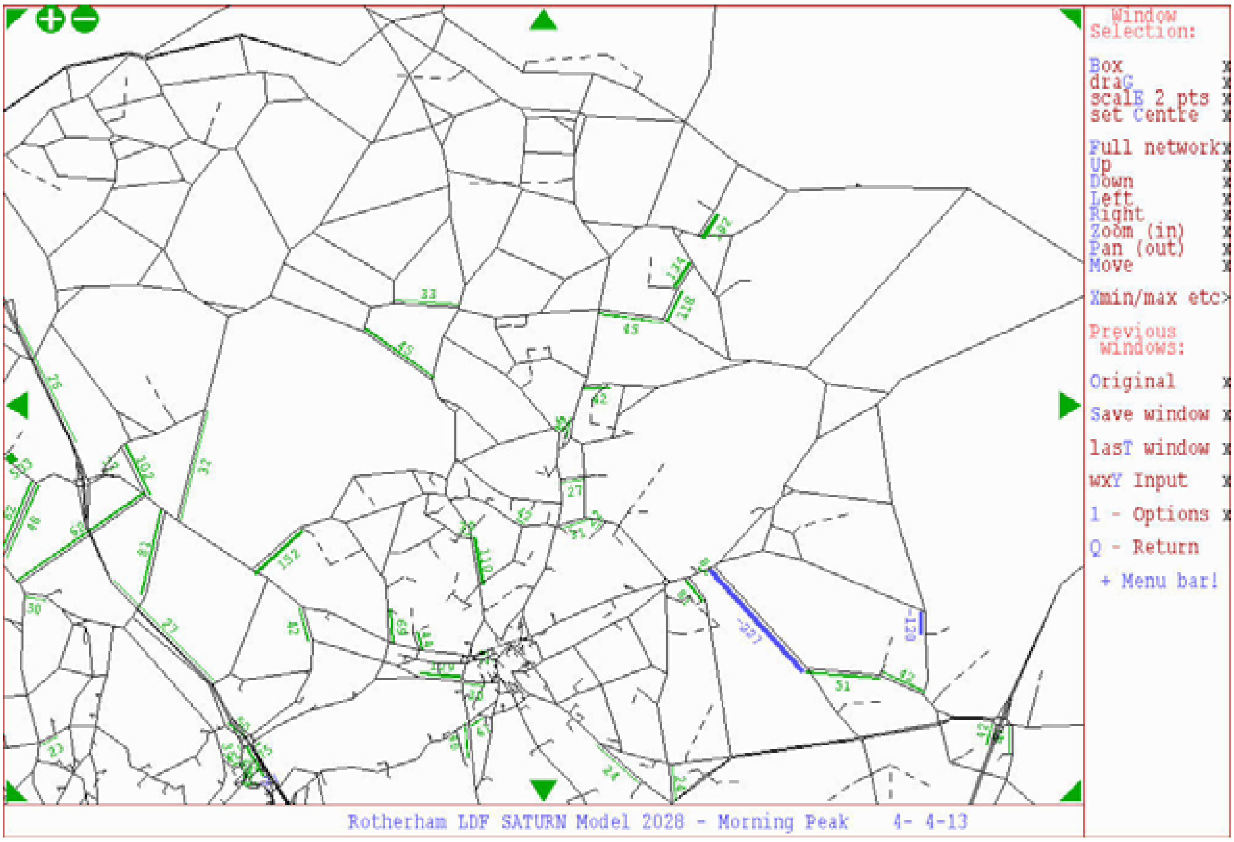
Delay Difference, Rotherham, AM



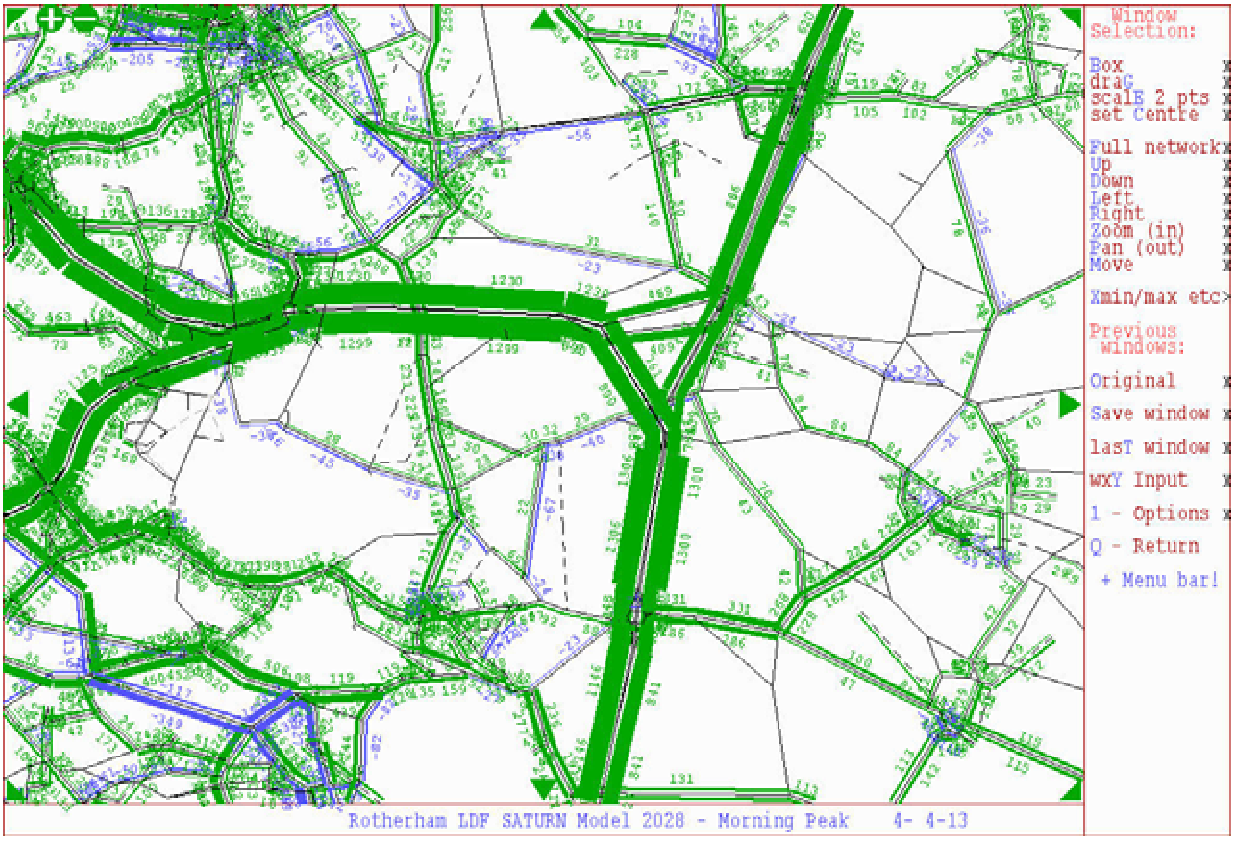
Flow Difference, North of Rotherham, AM



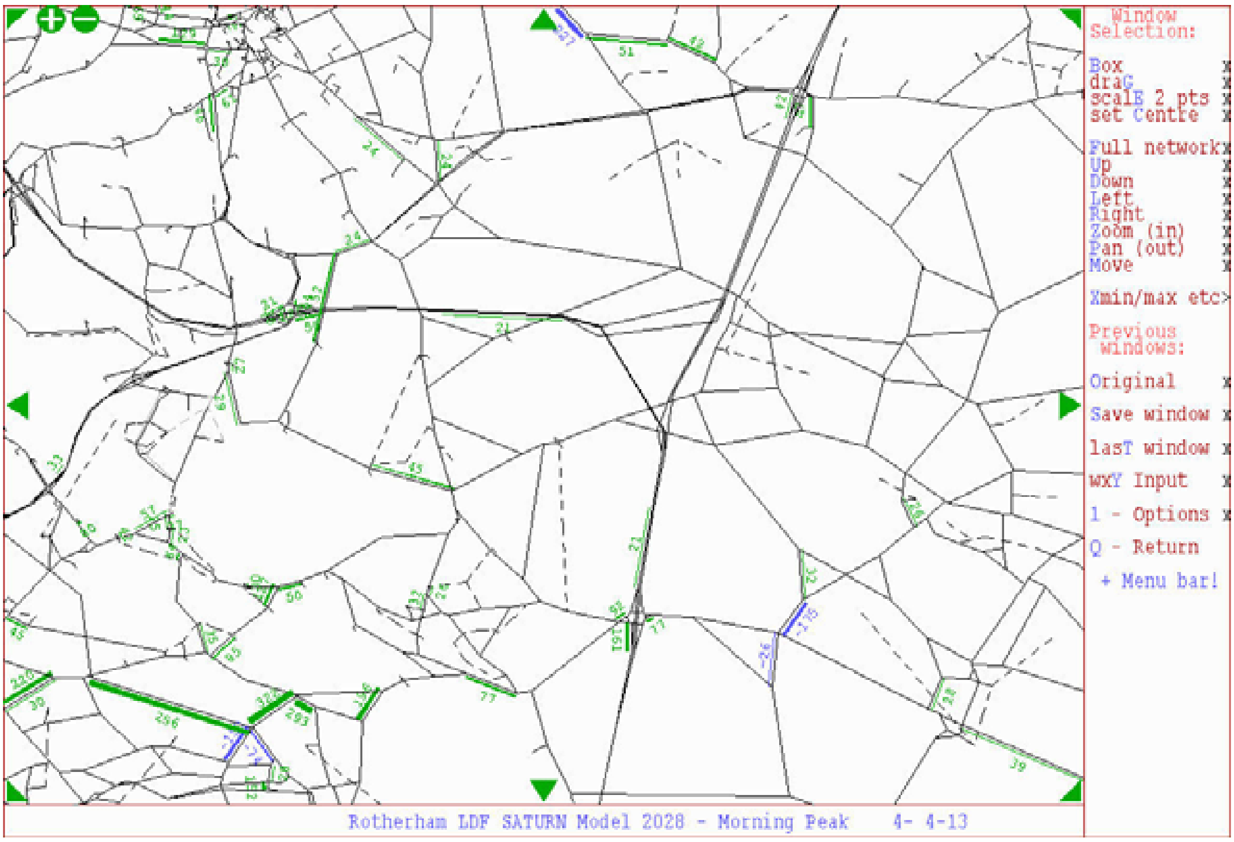
Delay Difference, North of Rotherham, AM



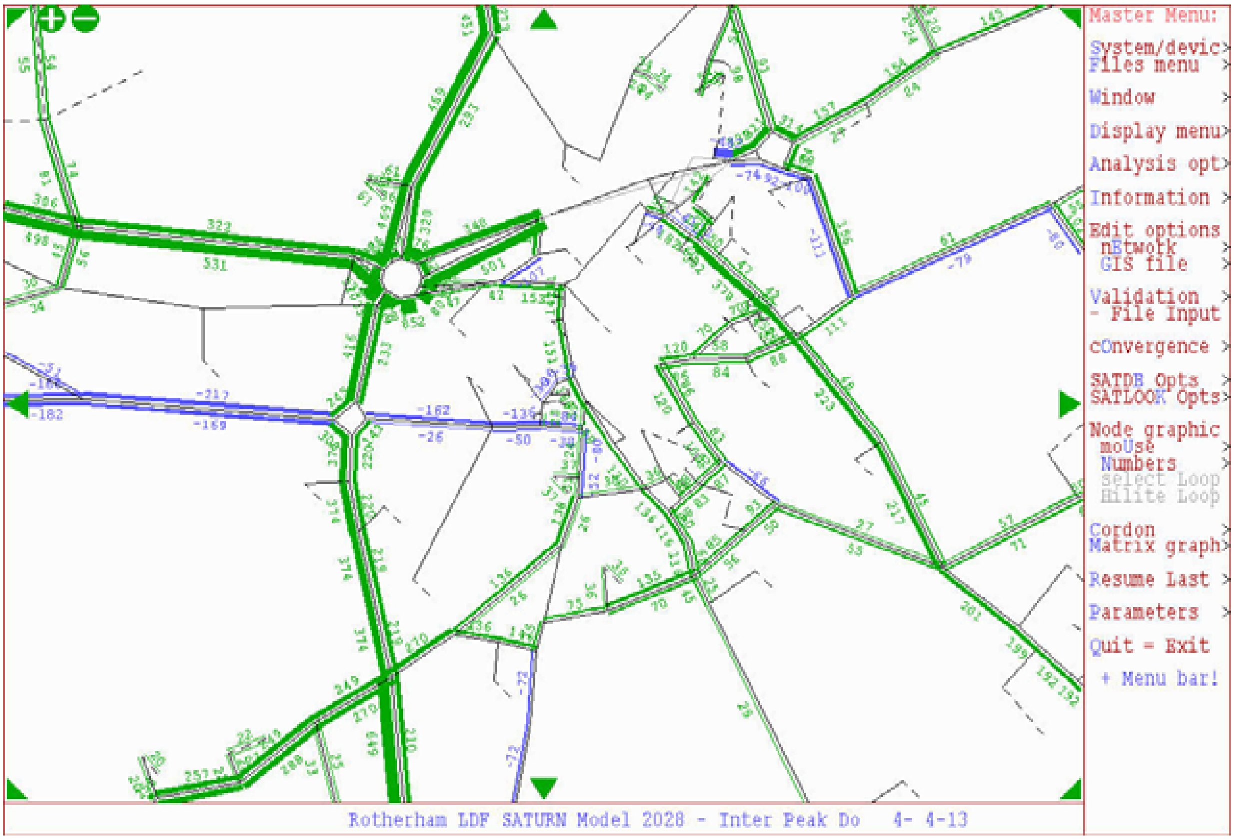
Flow Difference, South of Rotherham, AM



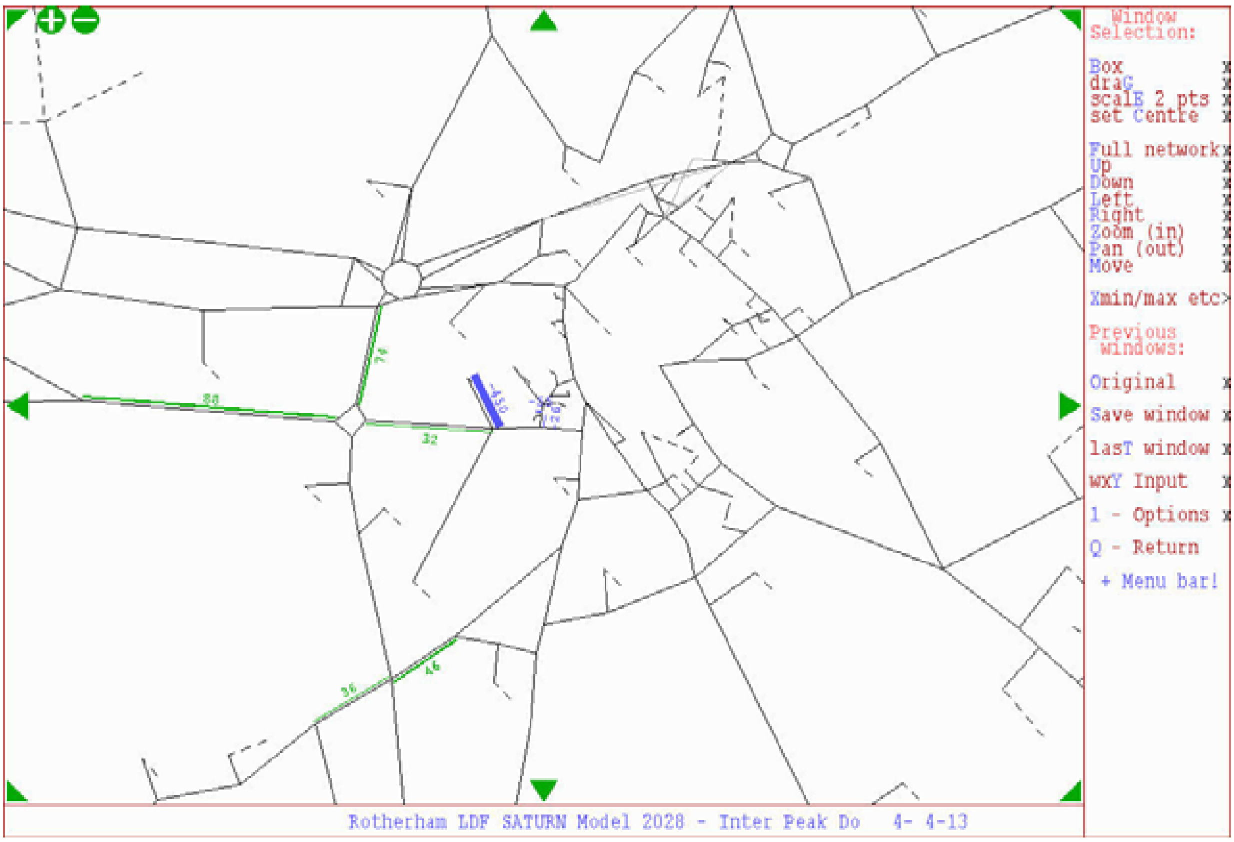
Delay Difference, South of Rotherham, AM



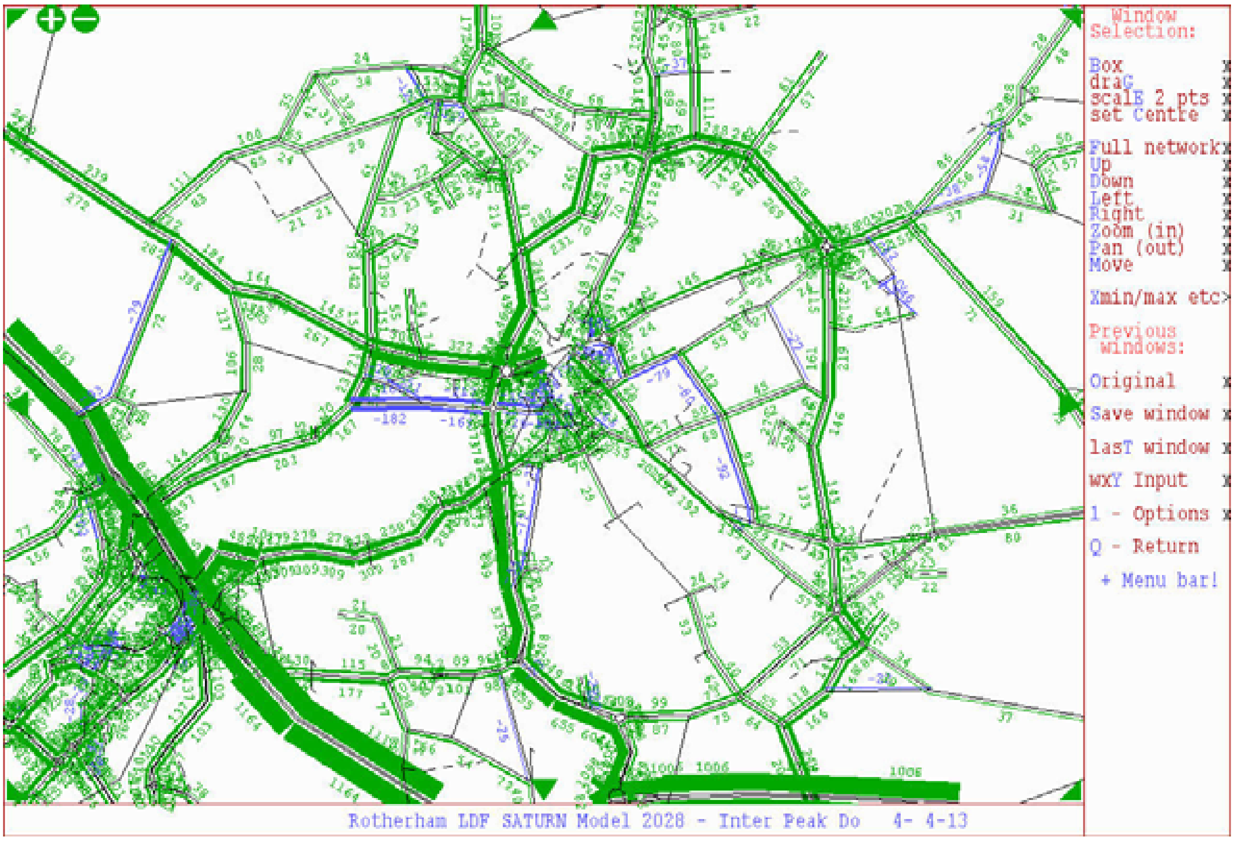
Flow Difference, Rotherham Town Centre, IP



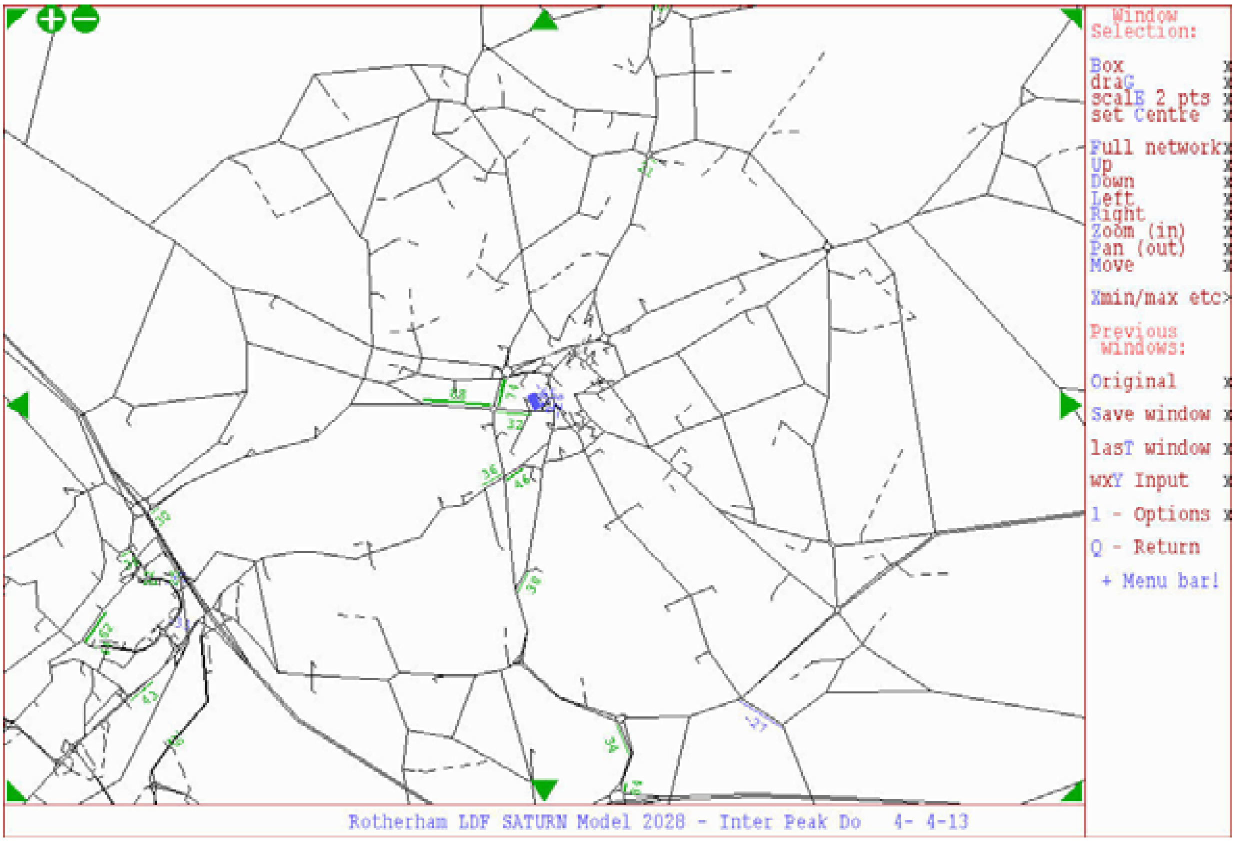
Delay Difference, Rotherham Town Centre, IP



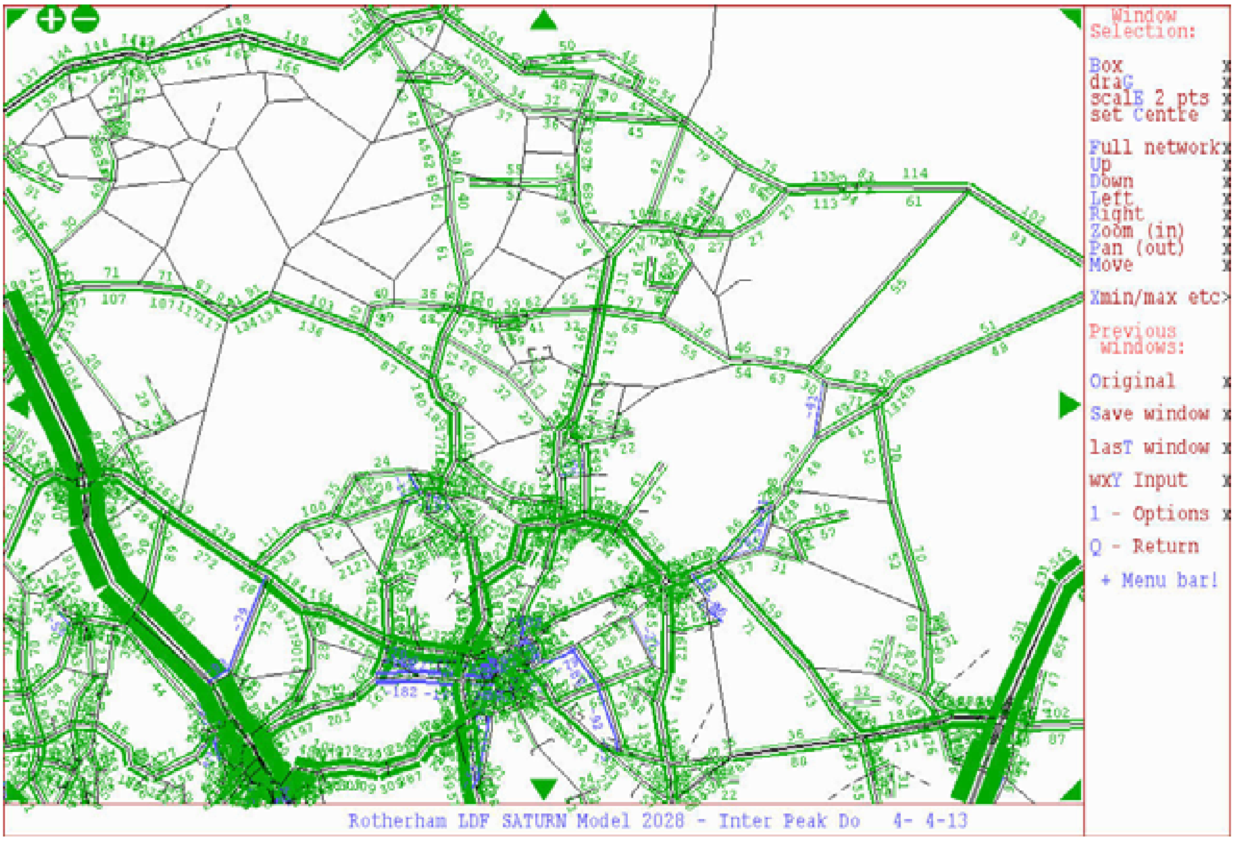
Flow Difference, Rotherham, IP



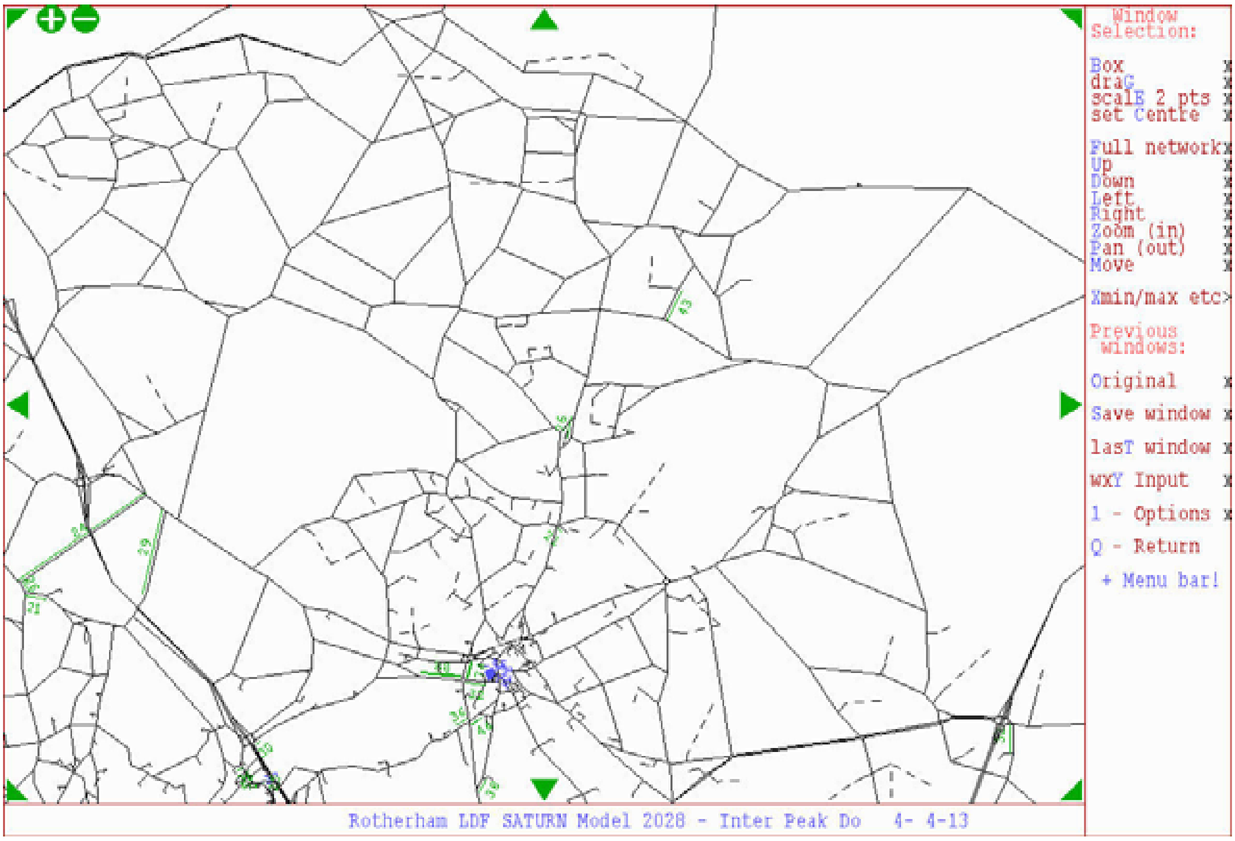
Delay Difference, Rotherham, IP



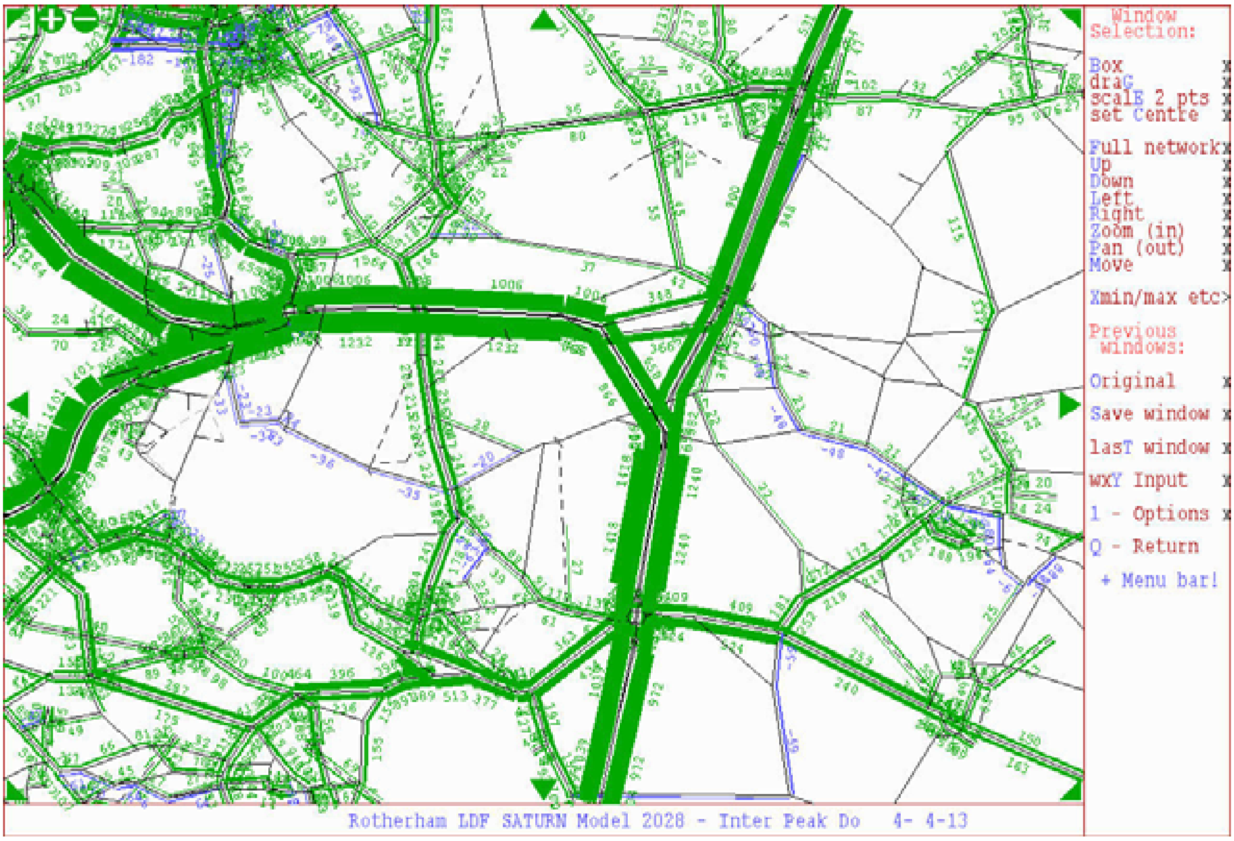
Flow Difference, North of Rotherham, IP



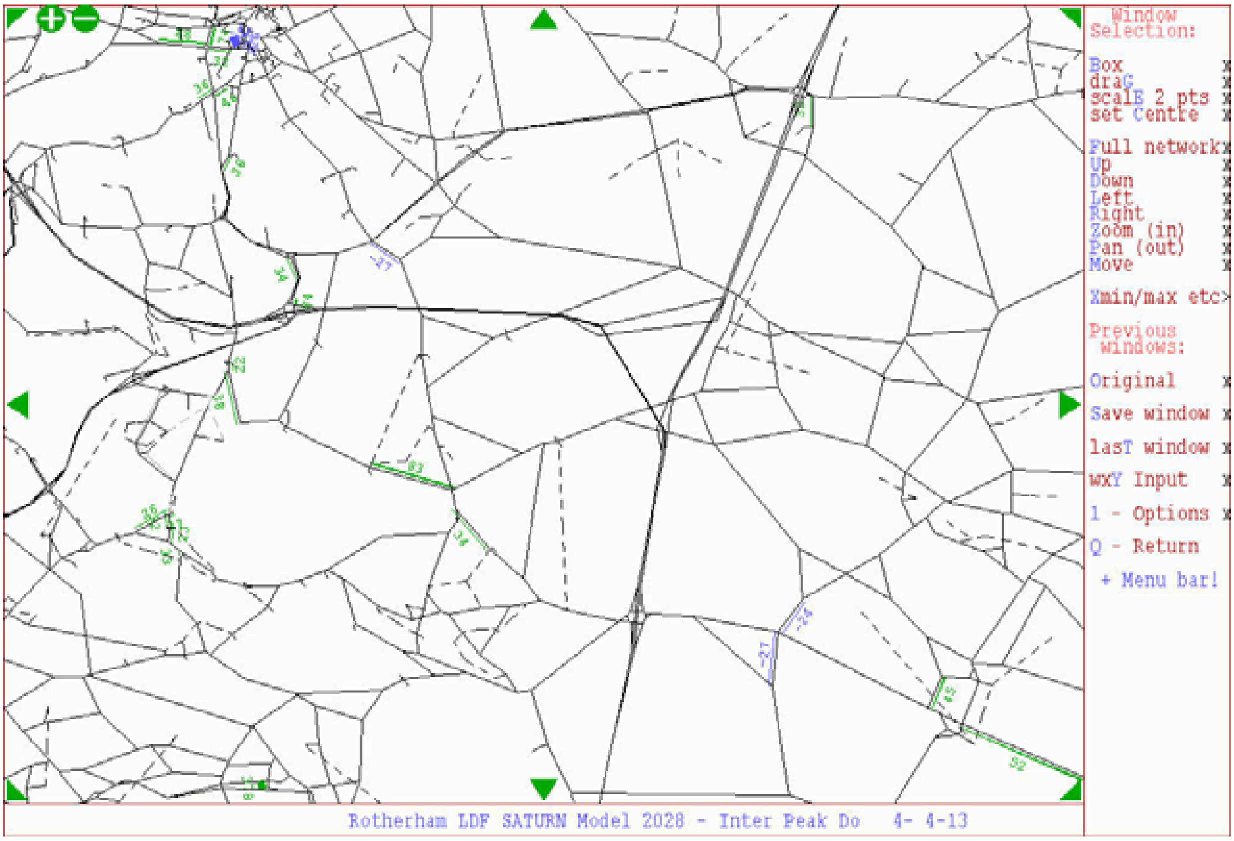
Delay Difference, North of Rotherham, IP



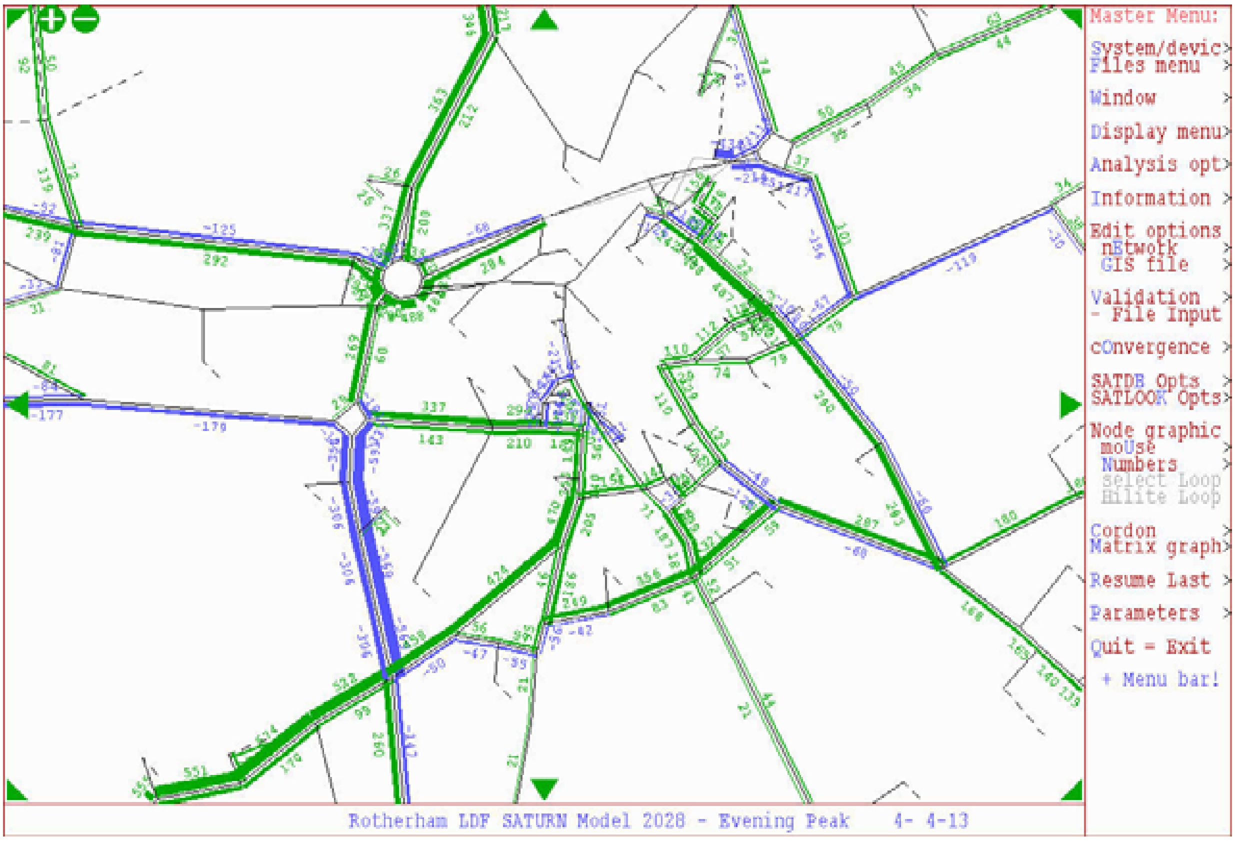
Flow Difference, South of Rotherham, IP



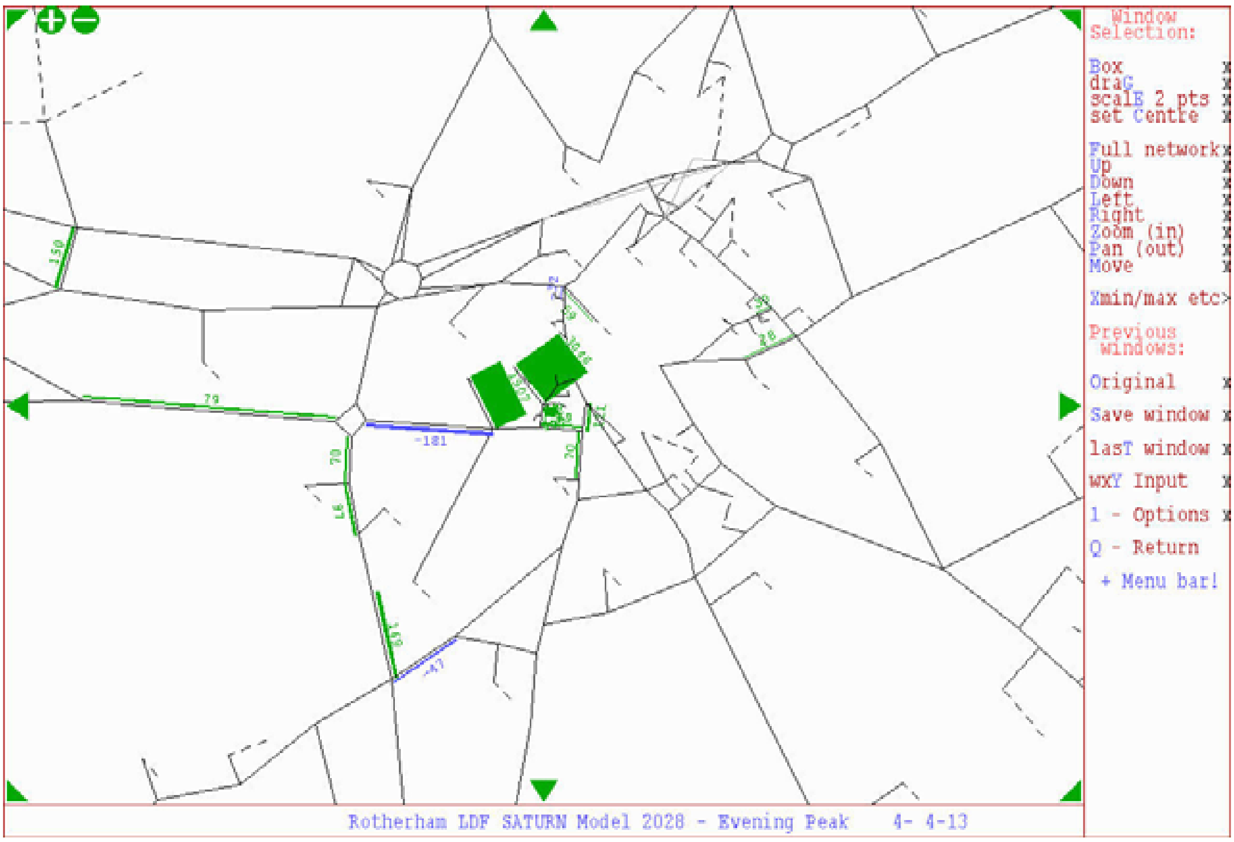
Delay Difference, South of Rotherham, IP



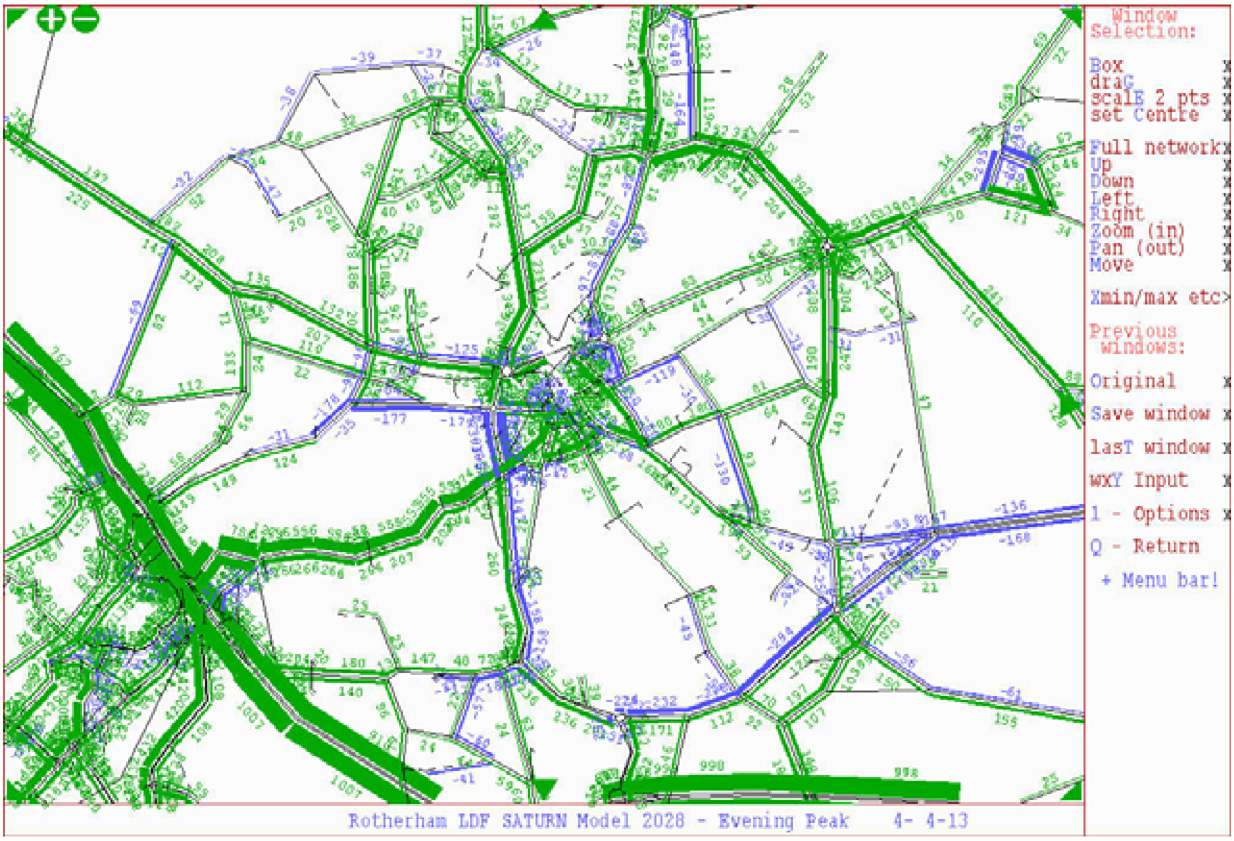
Flow Difference, Rotherham Town Centre, PM



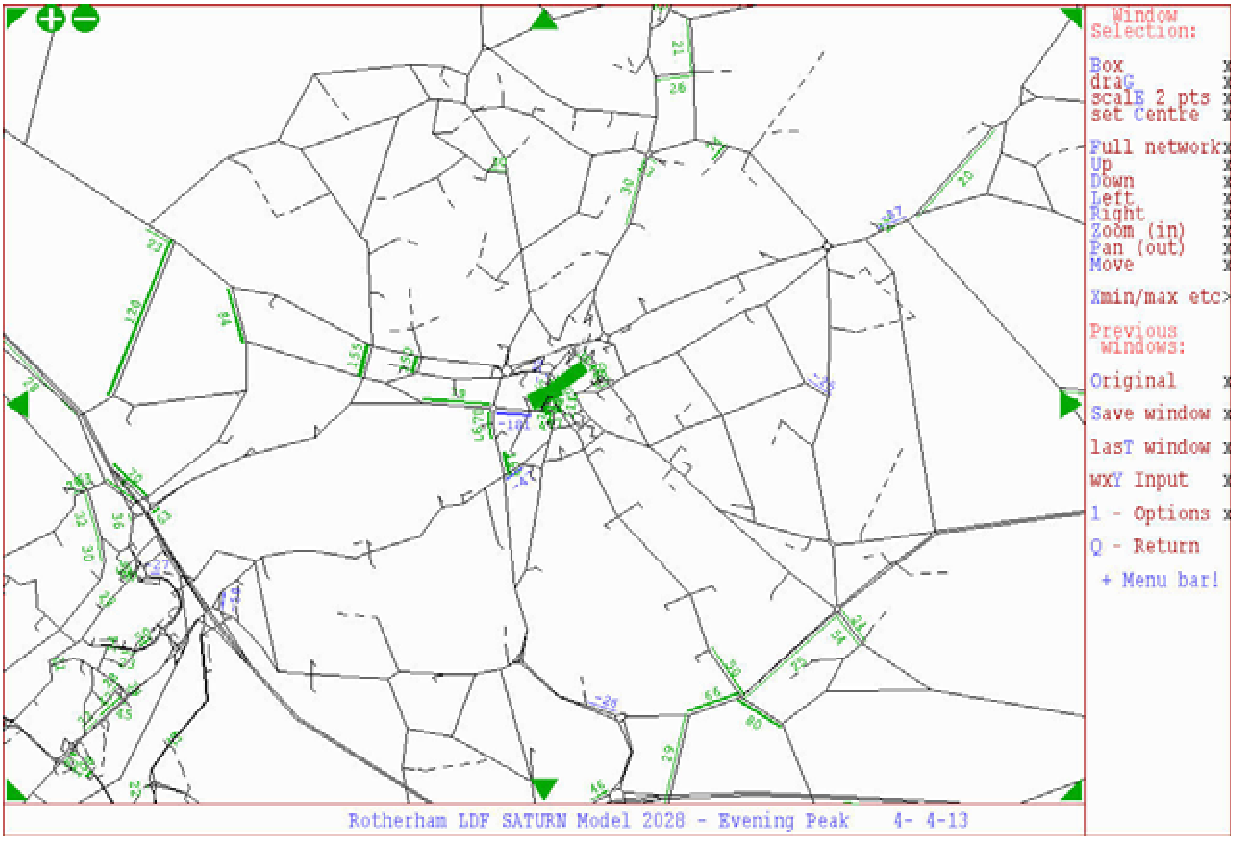
Delay Difference, Rotherham Town Centre, PM



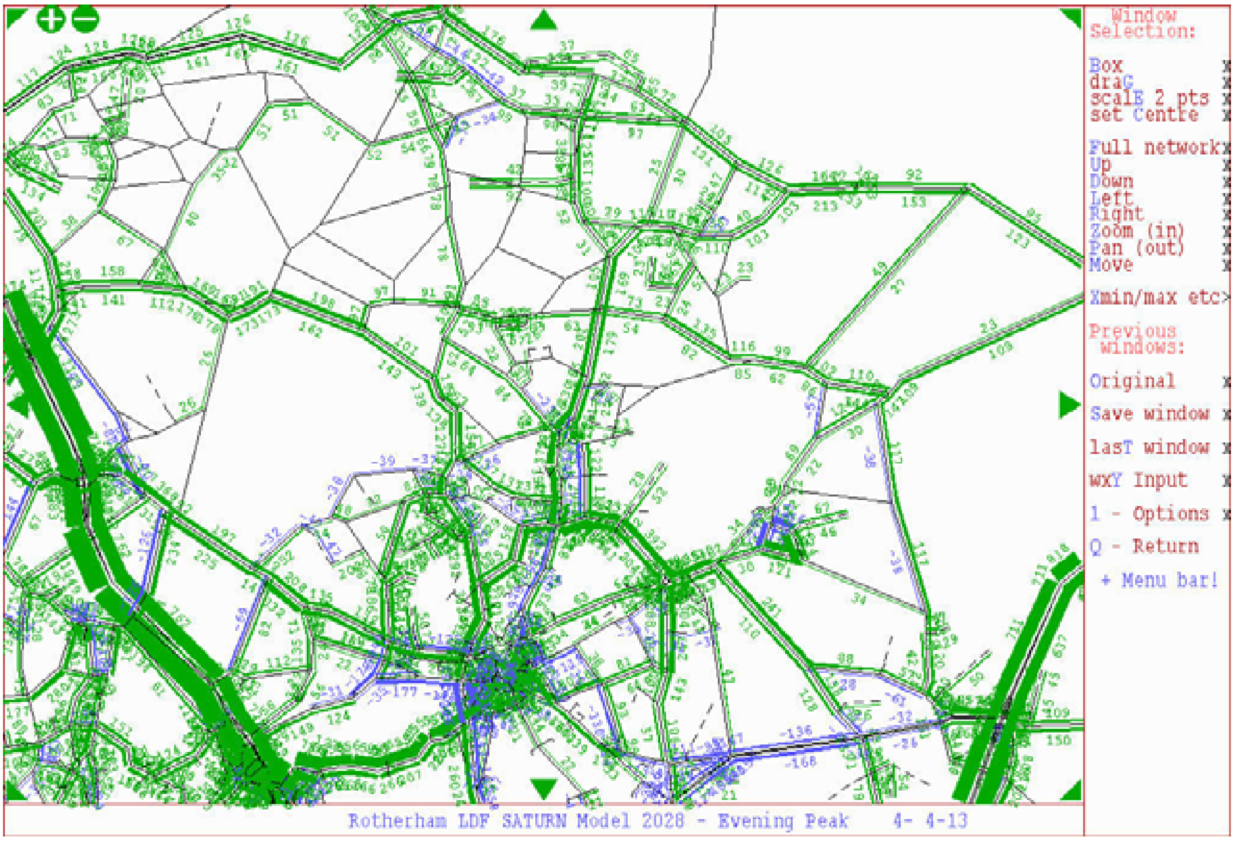
Flow Difference, Rotherham, PM



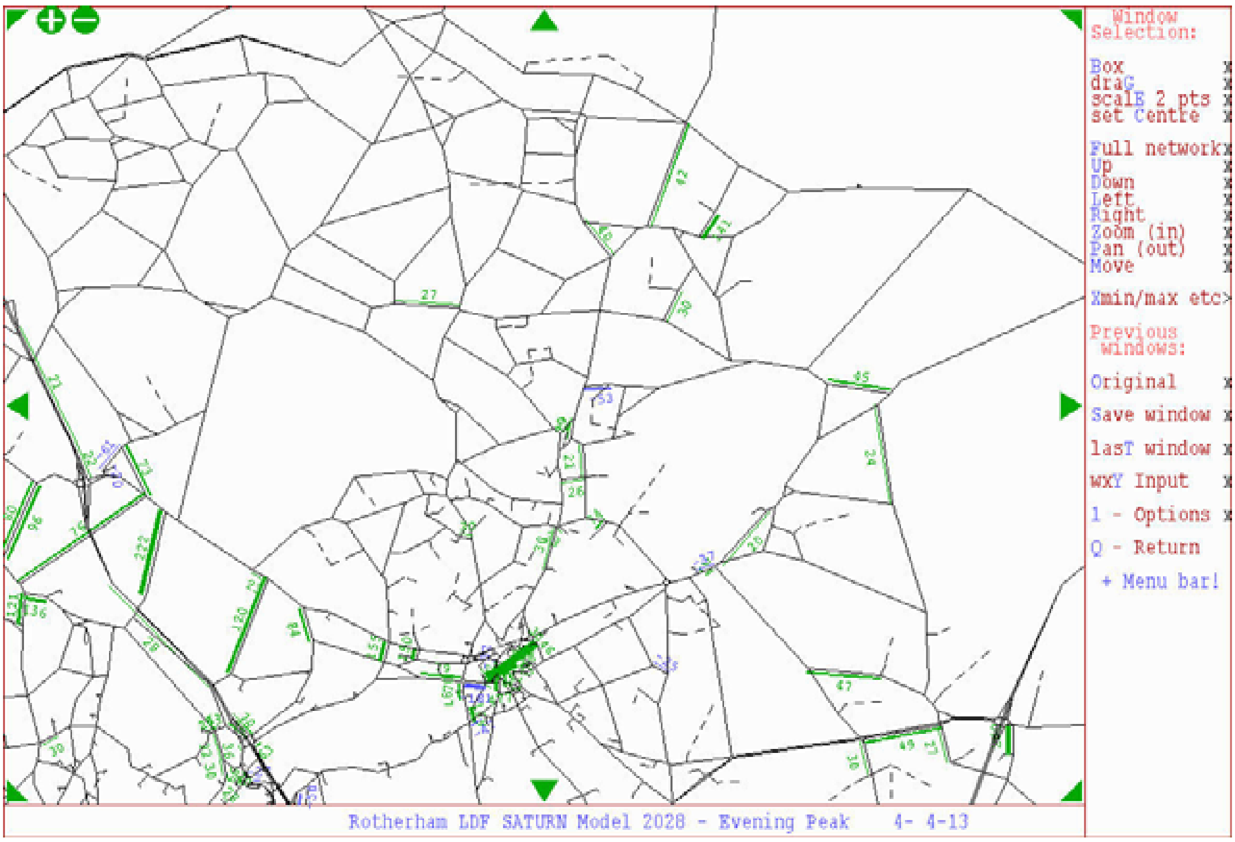
Delay Difference, Rotherham, PM



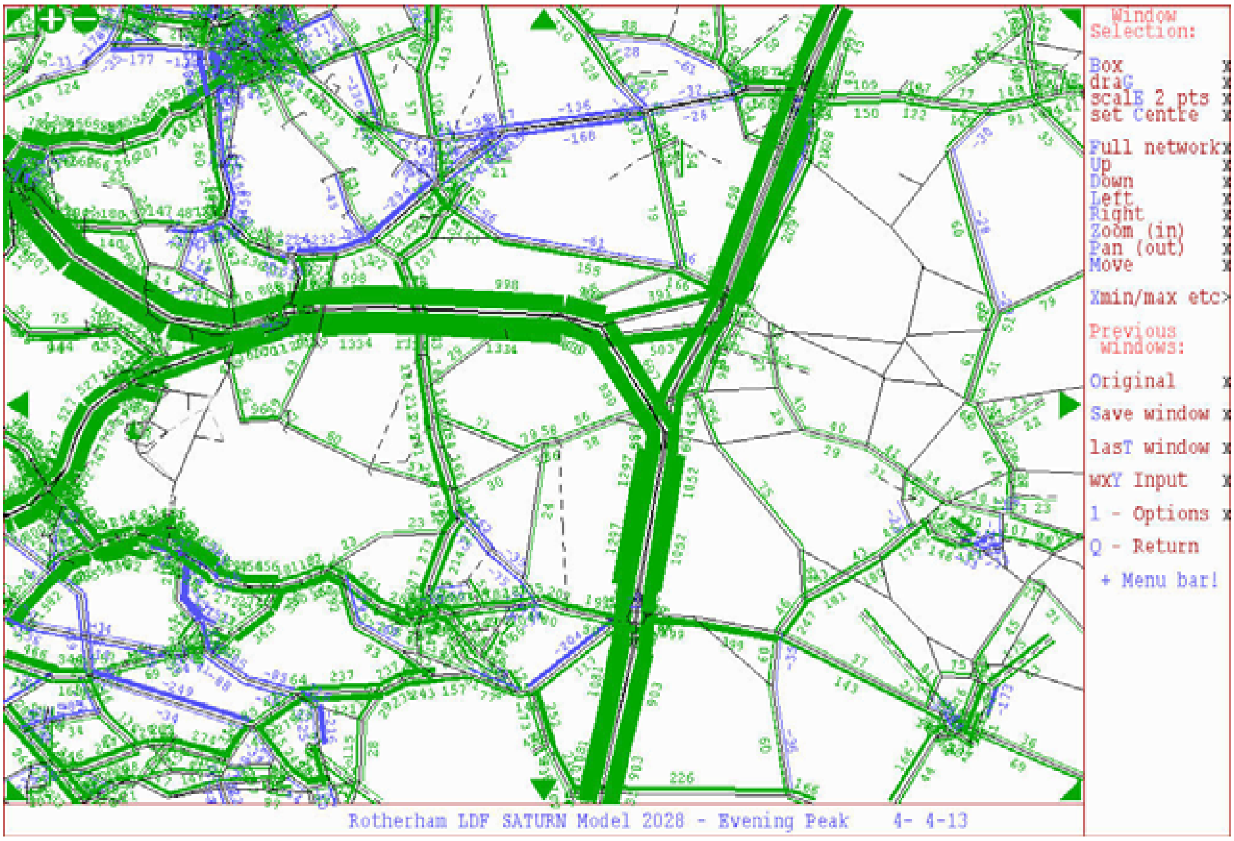
Flow Difference, North of Rotherham, PM



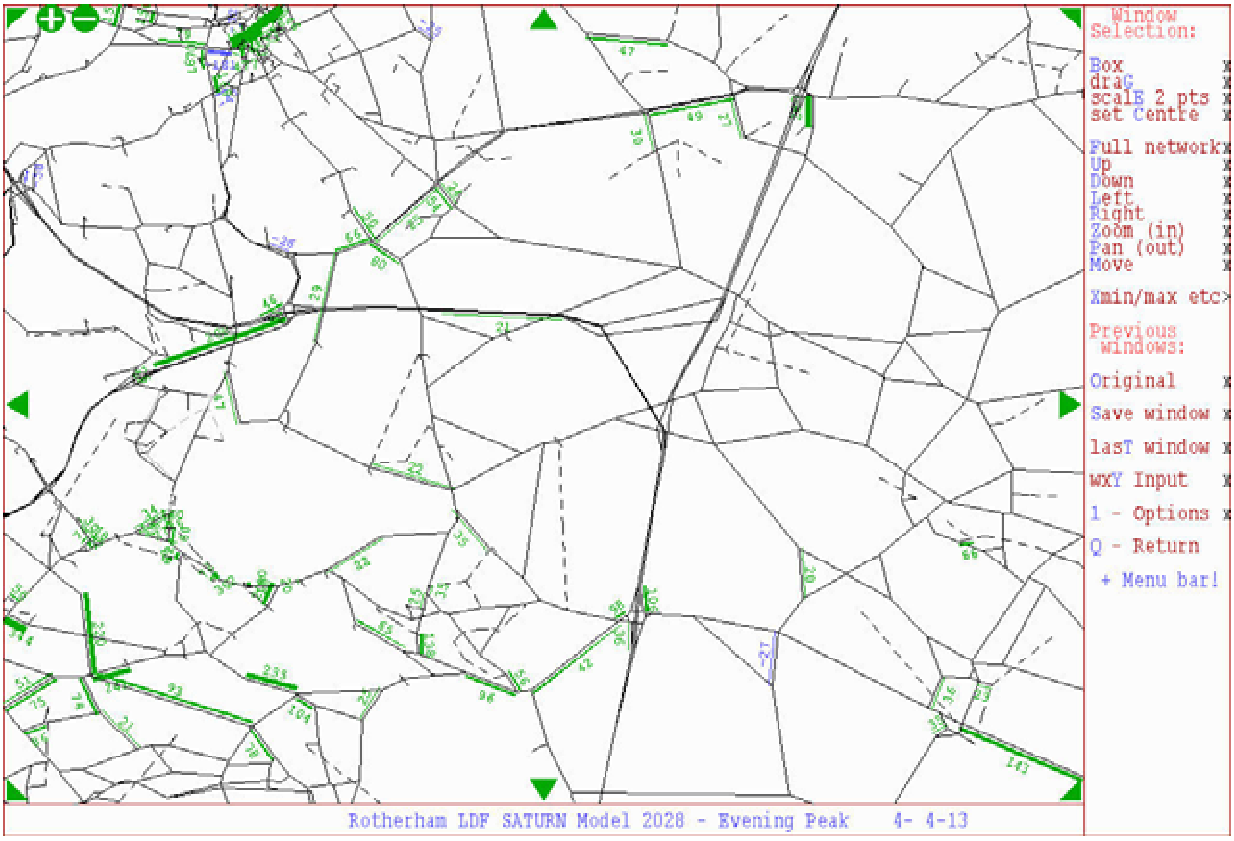
Delay Difference, North of Rotherham, PM



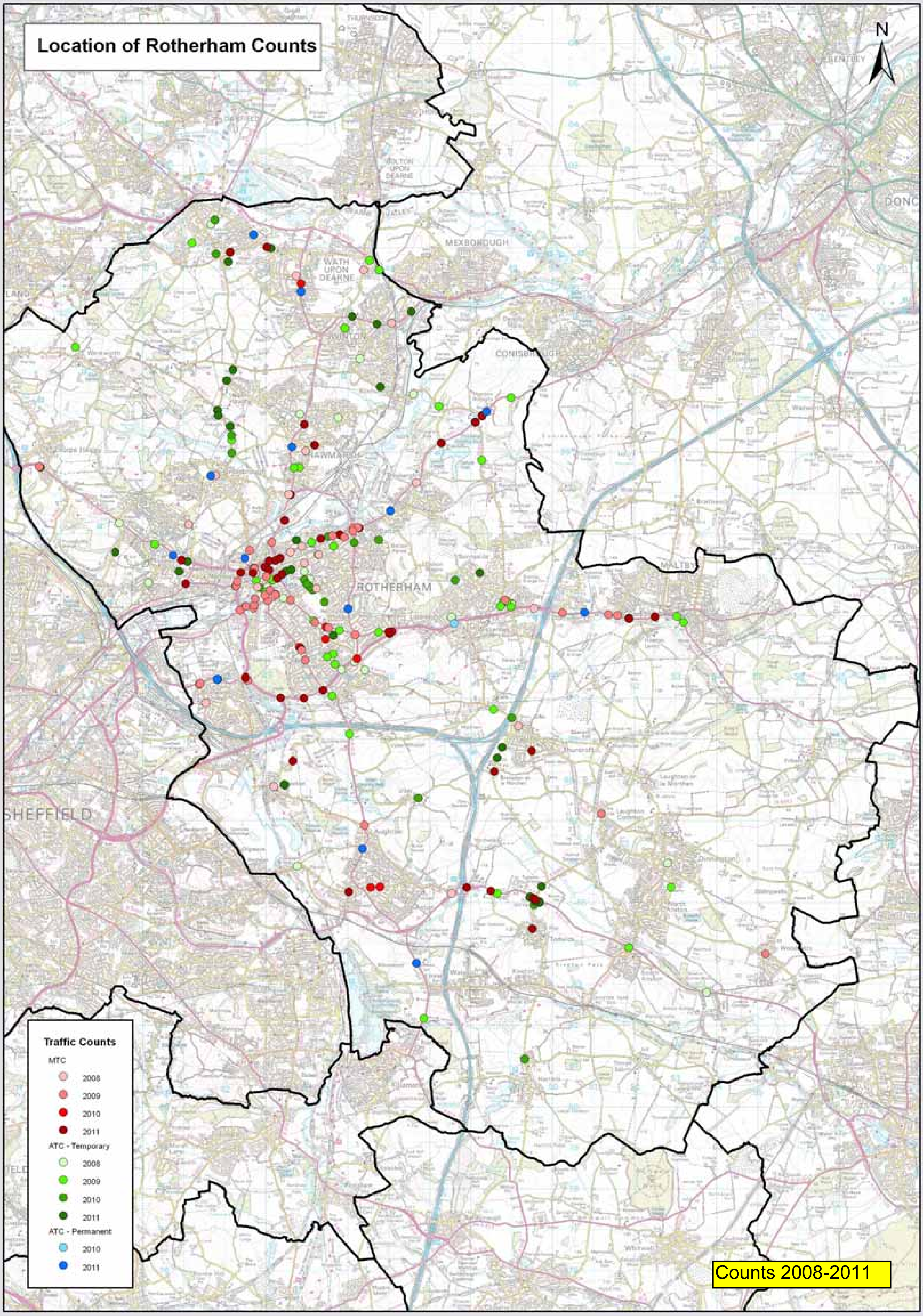
Flow Difference, South of Rotherham, PM

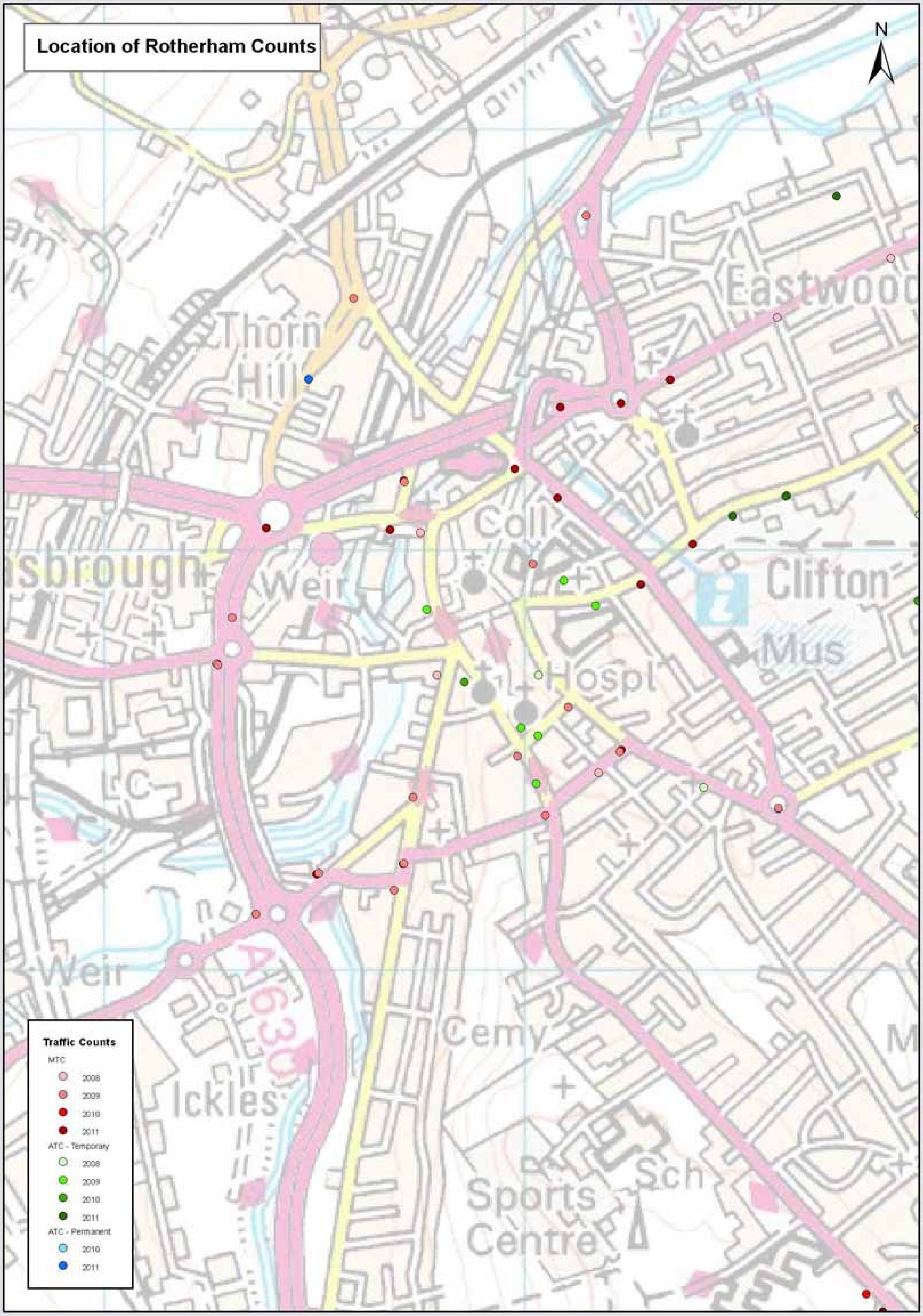


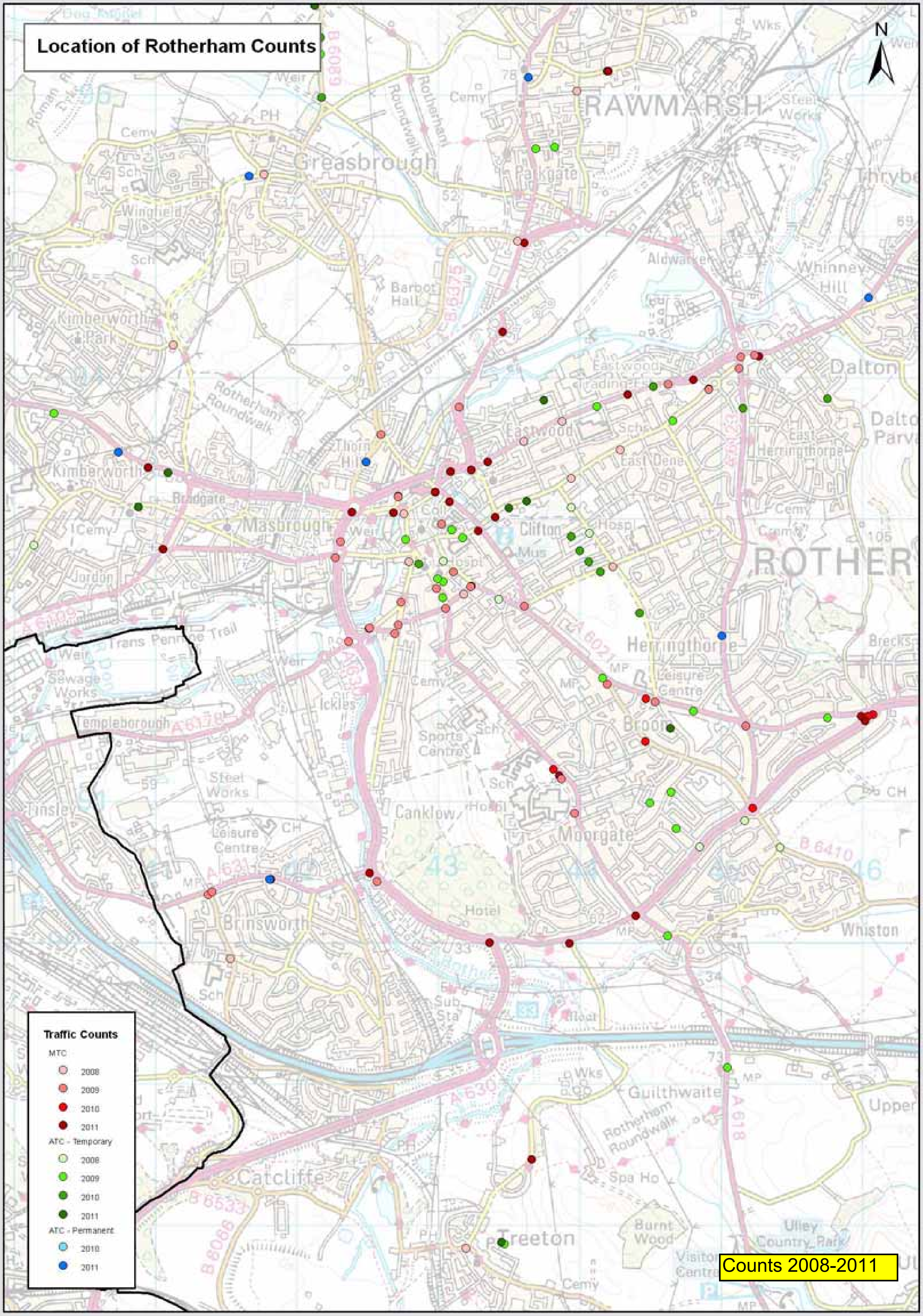
Delay Difference, South of Rotherham, PM

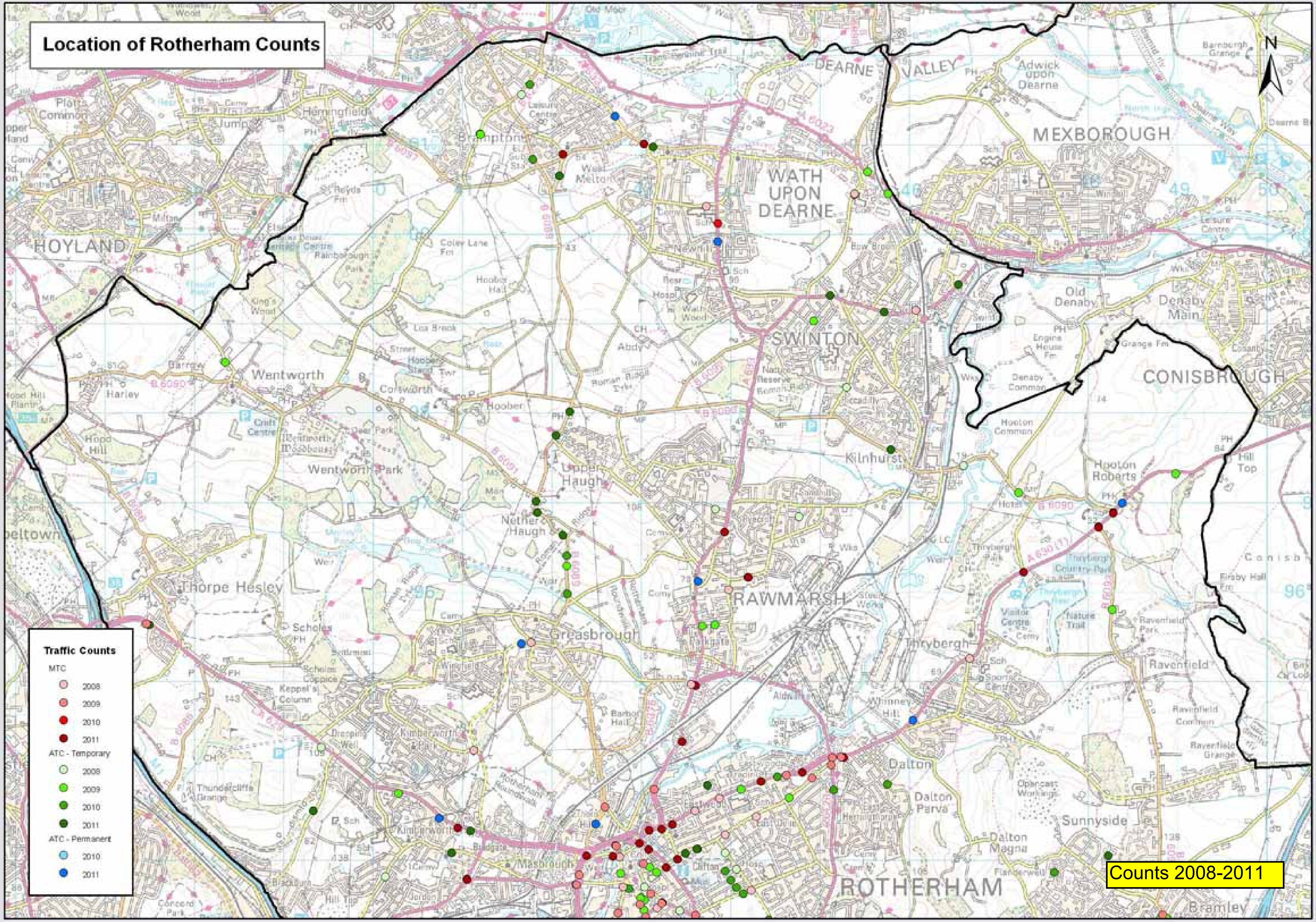


Appendix G – Location of Traffic Counts in Rotherham

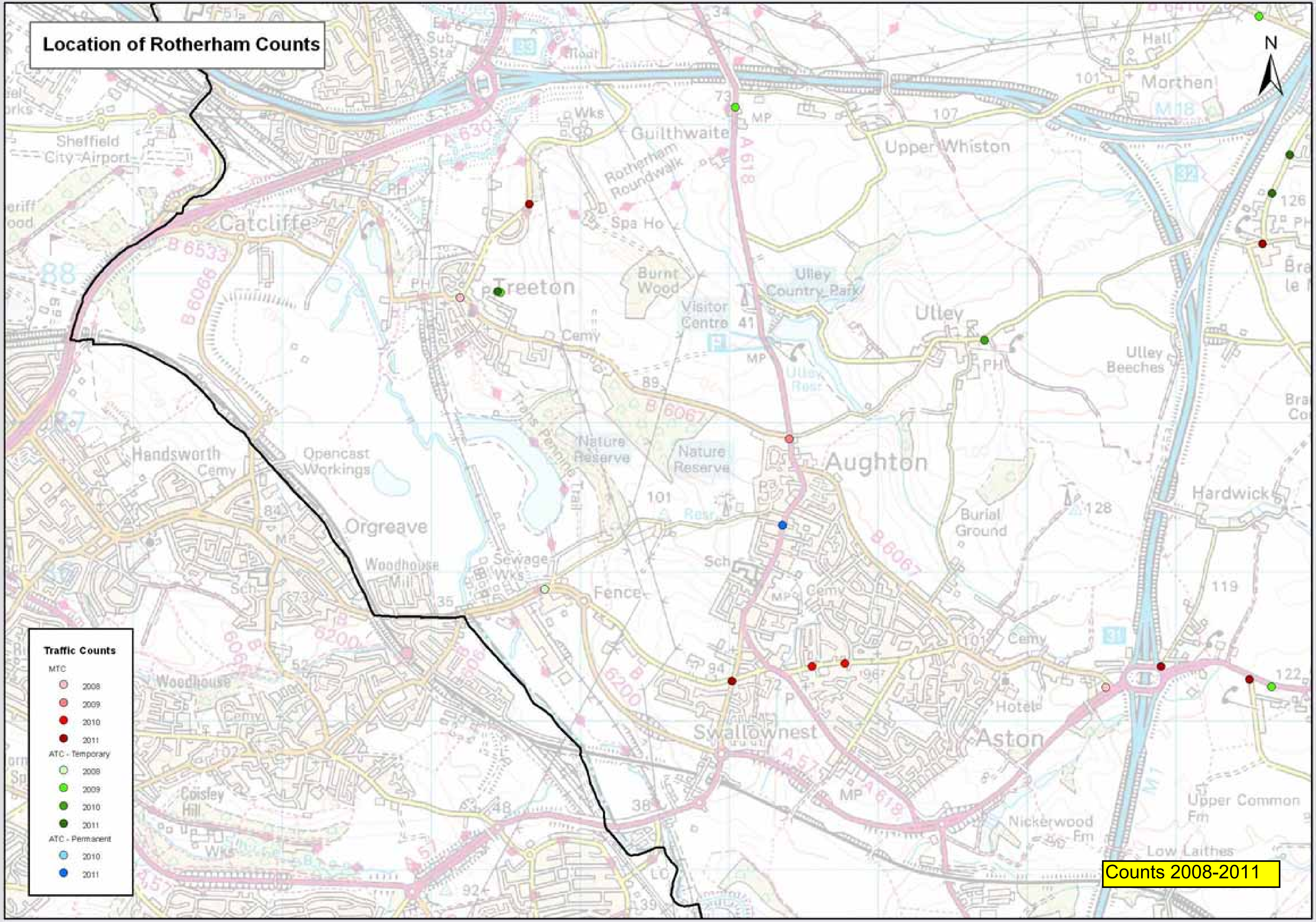

Location of Rotherham Counts
N
Traffic Counts
MTC
2008
2009
2010
2011
ATC - Temporary
2008
2009
2010
2011
ATC - Permanent
2010
2011
Counts 2008-2011
ROTHERHAM
SHEFFIELD
MEXBOROUGH
WATH UPON DEARNE
CONISBROUGH
MALTBY

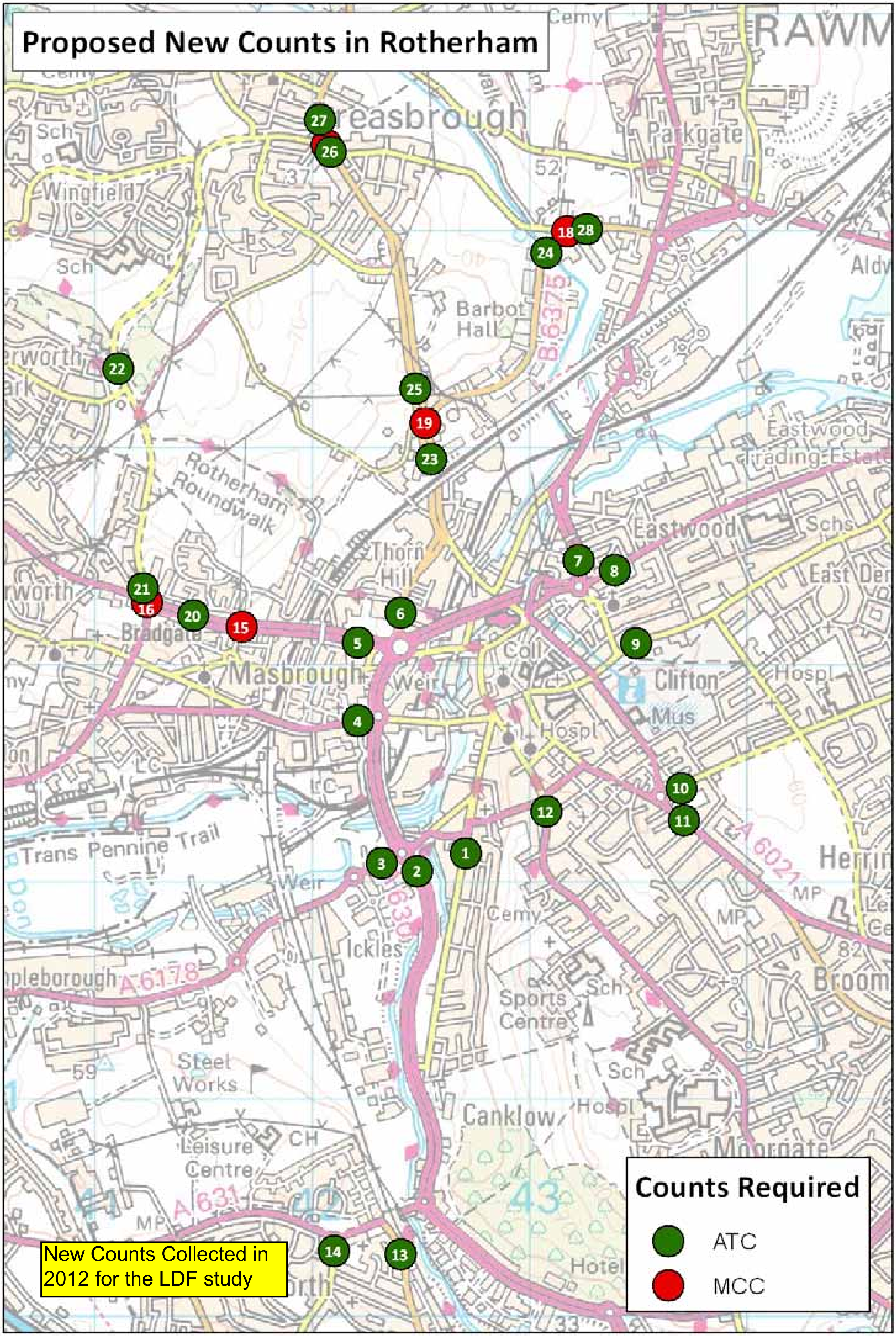

Location of Rotherham Counts
N
Thorn Hill
Eastwood
Clifton
Mus
Coll
Weir
Hospl
Weir
A630
Cemy
Ickles
Sports Centre
Sch
Traffic Counts
MTC
2008
2009
2010
2011
ATC - Temporary
2008
2009
2010
2011
ATC - Permanent
2010
2011


Location of Rotherham Counts
N
Traffic Counts
MTC
2008
2009
2010
2011
ATC - Temporary
2008
2009
2010
2011
ATC - Permanent
2010
2011
Counts 2008-2011
RAWMARSH
Greasbrough
Parkgate
Kimberworth Park
Kimberworth
Masbrough
Eastwood
East Dene
Dalton
ROTHER
Herringthorpe
Broom
Clifton
Templeborough
Tinsley
Ickles
Canklow
Moorgate
Brinsworth
Whiston
Catcliffe
Treeton
Guilthwaite
Aldwarke
Whinney Hill
Thrybe
East Herringthorpe
Barbot Hall
Wingfield
Trans Pennine Trail
Sewage Works
Steel Works
Sports Centre
Leisure Centre
Ulley Country Park
Burnt Wood
Rotherham Roundwalk
A6109
A6178
A630
A631
A6021
A618
B6089
B6410
B6533
B6066

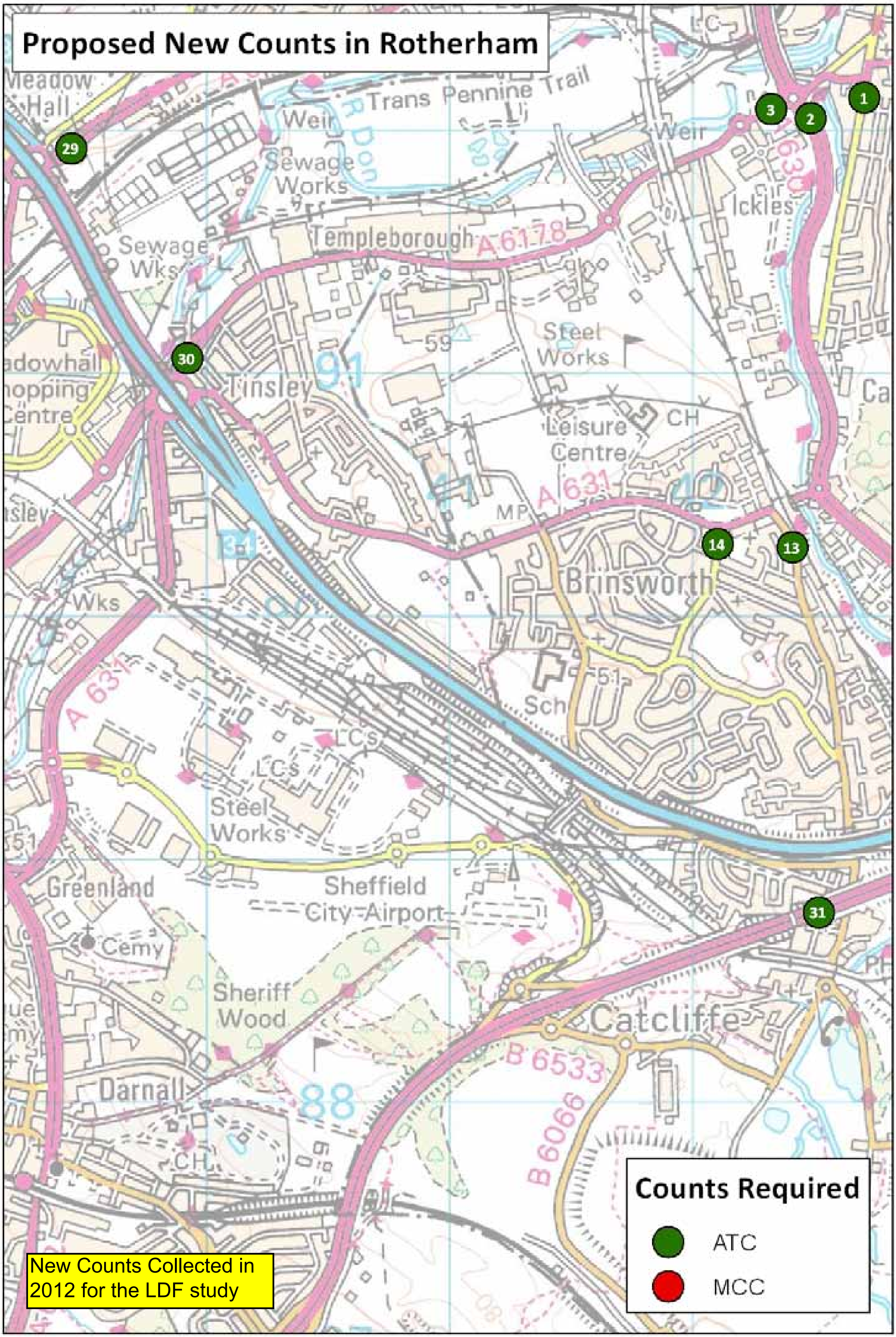

Location of Rotherham Counts
Traffic Counts
MTC
2008
2009
2010
2011
ATC - Temporary
2008
2009
2010
2011
ATC - Permanent
2010
2011
Counts 2008-2011
HOYLAND
WATH UPON DEARNE
MEXBOROUGH
SWINTON
CONISBROUGH
RAWMARSH
ROTHERHAM
Wentworth
Thorpe Hesley
Greasbrough
Kilnhurst
Dalton
Sunnyside
Bramley

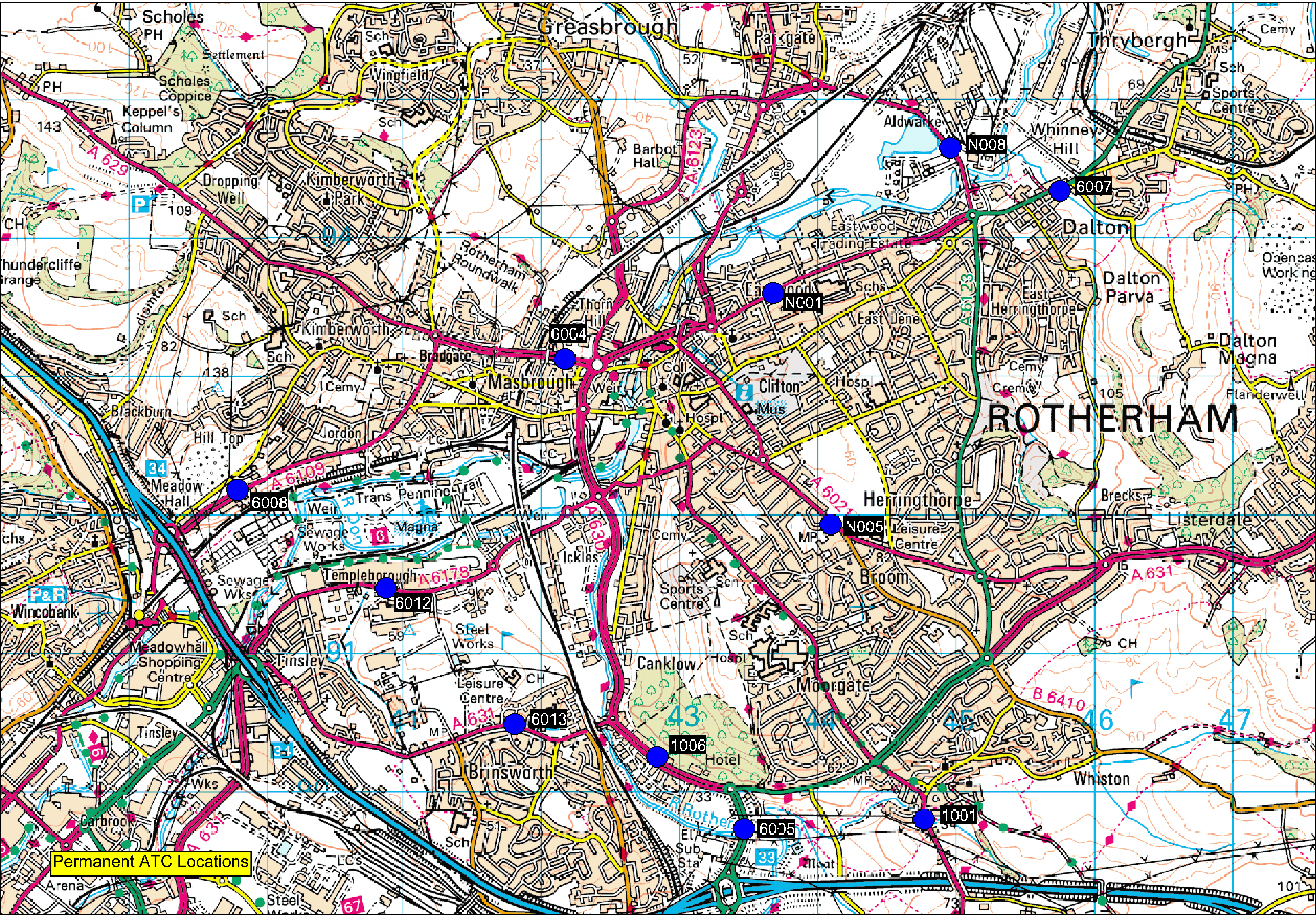
Location of Rotherham Counts




Proposed New Counts in Rotherham
Counts Required
ATC
MCC
New Counts Collected in 2012 for the LDF study
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
18
19
20
21
22
23
24
25
26
27
28
Parkgate
Barbot Hall
Rotherham Roundwalk
Thorn Hill
Eastwood
Eastwood Trading Estate
Masbrough
Bradgate
Clifton
Mus
Trans Pennine Trail
Ickles
Steel Works
Leisure Centre
Sports Centre
Canklow
Broom
Wingfield
A 6178
A 6021
A 631
B 6375
Hotel

Proposed New Counts in Rotherham





Permanent ATC Locations
N008
6007
N001
6004
6008
6012
N005
6013
1006
6005
1001
ROTHERHAM