

OXFORDSHIRE COUNTY COUNCIL

## **Technical Note: Witney Development and Infrastructure Strategic Modelling**

Technical Summary Report

Report No. RT-A088094-01

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# 1 Introduction

## BACKGROUND

- 1.1 In October 2012 WYG were commissioned by Oxfordshire County Council to carry out a study considering the future movement demands in and around the town of Witney, West Oxfordshire.
- 1.2 The 2012 Technical Note 1 Summary of Development and Infrastructure Modelling report provided an analysis of initial modelling work undertaken using the Central Oxfordshire Transport Model (COTM) to forecast the traffic situation in Witney by 2030, assessing the comparative impacts of a number of potential major development site and supporting transport infrastructure options. Details of each of the options assessed are summarised in Table 1 below.

**Table 1 – Previous Options Assessed (2012)**

Scenario	Housing	Employment	Strategic Highway Improvements
1 – Do Nothing	No major housing	No major employment	No major infrastructure
2 – West Witney a	1000 units (West Witney)	10 Ha West Witney	Downs Road at-grade junction
3 – West Witney b	1000 units (West Witney)	10 Ha West Witney	Downs Road at –grade junction and west facing slip roads at Shores Green
4 – North Witney a	1500 units (North Witney)	15 Ha West Witney	Northern Perimeter Road and WEL2
5 – North Witney b	1500 units (North Witney)	15 Ha West Witney	Northern Perimeter Road and west facing slip roads at Shores Green
6 – East and West Witney	1000 units (West Witney) & 450 units (East Witney)	15 Ha West Witney	Downs Road at-grade junction and west facing slip roads at Shores Green
7 – East Witney	450 units (East Witney)	10 Ha East Witney	West facing slips at Shores Green
8 – West and North Witney a	1000 units (West Witney) & 1500 units (North Witney)	10 Ha West Witney	Northern Perimeter Road, Downs Road at-grade junction and west facing slip roads at Shores Green
9 – West and North Witney b	1000 units (West Witney) & 1500 units (North Witney)	10 Ha West Witney	Northern Perimeter Road, Downs Road at-grade junction and WEL2

- 1.3 This initial report concluded that development and infrastructure options which included the Shores Green west facing slip roads tended to provide the greatest overall degree of improvement to the Witney highway network, although some areas of the network were predicted to continue to be congested, particularly in the area immediately around the Staple Hall junction.
- 1.4 The report also identified that the West End Link 2 and Northern Perimeter Road options provided a degree of benefit in terms of reducing traffic levels passing through some of the more sensitive areas of the town, including reducing flows on Bridge Street, but were less effective at providing wider benefits. The level of predicted benefits were also relatively low in light of the expected costs and complications associated with the delivery of the West End Link 2 scheme.
- 1.5 As such the report recommended that the options which included the Shores Green west facing slips were of the most benefit, but that the alignment of the West End Link 2 should be protected as it could potentially form part of a wider package of works in the event of further development coming forward.
- 1.6 A number of local junctions and links were also identified as areas of future congestion and were recommended for further review, these included:
- The junction of Downs Road with Burford Road;
  - The junction of Ducklington Lane / Station Lane / Thorney Leys;
  - The junction of Bridge Street / West End / Woodgreen Hill / Newland;
  - The junction of Corn Street / Tower Hill / Welch Way / Curbridge Road and Ducklington Lane;
  - The junction of Oxford Road / Jubilee Way / Cogges Hill Road;
  - The junction of Welch Way with Woodford Way; and
  - Dry Lane

## CHANGES IN PREDICTED DEVELOPMENT

- 1.7 In light of a new 2014 SHMA (Strategic Housing Market Assessment) being published, predicting an increased overall demand for housing across Oxfordshire, an updated Local Plan for West Oxfordshire is being prepared in order to identify the most suitable locations for additional housing.
- 1.8 As such Oxfordshire County Council and West Oxford District Council have commissioned Atkins and WYG to produce an update to the previous work, specifically identifying the following:
- Reviewing the impacts of the previously identified preferred infrastructure option for Witney, (i.e. the provision of the west facing slips at Shores Green and the Downs Road at-grade roundabout junction on the A40, taking into account the increased housing levels to be planned for across West Oxfordshire (and within Witney itself). These options are referred to within this report as the 'do-something' scenarios, with the options excluding these improvements referred to as the 'do-nothing' scenarios.
  - Assessing the need for the delivery of the West End Link 2 scheme in light of potential additional development within Witney at the North Witney site. This included the assessment of two options for the West End Link, one providing single lane signal controlled junction exits from the link onto West End to the north and the A4095 to the south, and the second options assuming increased capacity junctions at either end of the link. This element of the Atkins modelling work included the northern perimeter road.
- 1.9 The remainder of this technical note provides the following:
- Section 2: summarises the main options reviewed;
  - Section 3: provides details of the overall area wide modelling results;
  - Section 4: provides a more detailed review of the forecast traffic situation within Witney;
  - Section 5: summarises the specific impacts of providing additional development at the North Witney site; and
  - Section 6: provides a series of initial conclusions and, based upon these, suggests a number of possible next steps.



## 2 Development Options

### DEVELOPMENT SCENARIOS

- 2.1 Based upon levels of predicted increase in housing delivery within the next West Oxfordshire Local Plan period, the following new scenarios were assessed by Atkins using the Central Oxfordshire Transport Model. Please note Scenarios 1 and 2 (DN and DS) do not include the northern perimeter road whilst scenarios 3a, 3b 3c, 4a 4b, 4c include the northern perimeter road:

**Table 2 – Development and Infrastructure Scenarios (2014)**

Scenario	Development (West Oxfordshire)	North Witney	Infrastructure
1 Do Nothing	11,690	1,500	Downs Road at grade junction, local improvements
1 Do Something	11,690	1,500	West facing slips at Shores Green, Downs Road at grade junction, local improvements
2 Do Nothing	9,447	1,000	Downs Road at grade junction, local improvements
2 Do Something	9,447	1,000	West facing slips at Shores Green, Downs Road at grade junction, local improvements
3a	11,690	1,500	West facing slips at Shores Green, Downs Road at grade junction, local improvements, West End Link 2, Northern perimeter road
3b	10,990	800	West facing slips at Shores Green, Downs Road at grade junction, local improvements, West End Link 2, Northern perimeter road
3c	10,390	200	West facing slips at Shores Green, Downs Road at grade junction, local improvements, West End Link 2, Northern perimeter road
4a	11,690	1,500	As Option 3a but with a higher capacity West End Link 2
4b	10,990	800	As Option 3b but with a higher capacity West End Link 2
4c	10,390	200	As Option 3c but with a higher capacity West End Link 2

## INFRASTRUCTURE ASSUMPTIONS – LOCAL IMPROVEMENTS

2.2 A number of the scenarios in Table 2 refer to a set of 'local improvements' within Witney. These schemes are common to each of the 'do-something' scenarios, with details of the relevant schemes provided below:

- Since the completion of the October 2012 report an improvement scheme has been delivered at the Ducklington Lane / Station Lane / Thorney Leys junction. This scheme serves a dual purpose, providing initial capacity benefits at an identified area of congestion and delay, whilst also acting as an enabling scheme for the future delivery of the west facing slips at Shores Green (due to the predicted increase in demand for travel through the Ducklington junction as a result of the Shores Green scheme, which enables travel between east and west Witney using the dualled section of the A40 to the south).
- Assumed future capacity improvements to the Oxford Road / Jubilee Way signal crossroads junction; and
- Assumed future reduction in the speed limit on Woodstock Road (the A4095) to 30mph to reflect proposed traffic control measures, including a new entrance gateway feature.

2.3 A full breakdown of the development and infrastructure assumptions included within each model scenario, including windfall sites, is provided within the Atkins Local Plan Modelling Technical Note dated 5<sup>th</sup> June 2014.

## 3 Modelling Results

### HEADLINE RESULTS

3.1 The Atkins Local Plan Modelling Technical Note (dated 5/6/14) provided a series of overall network statistics summarising key metrics for the modelled section of West Oxfordshire including:

- Total Travel Time;
- Total Travel Distance;
- Total Delay; and
- Average Speed

3.2 These results are repeated below for convenience, summarised and split between the main scenarios considered.

#### Scenario 1

3.3 Table 3 provides a comparison of the overall network statistics between the 'do-nothing' and 'do-something' options for development Scenario 1, i.e. a comparison of the overall operation of the highway network with and without west facing slips at Shores Green delivered alongside a district housing growth scenario of 11,690 dwellings.

**Table 3 – Scenario 1 Comparison Summary Table**

AM	2030 S1		
	Do Nothing (DN)	Do Something (DS)	DS-DN
Total Travel Time (pcu-hrs)	9,027	8,917	-110
Total Travel Distance (pcu-kms)	431,867	432,378	+511
Total Delay (pcu-hrs)	2,073	1,976	-97
Average Speed (Overall- km/h)	47.8	48.5	+1
PM	2030 S1		
	Do Nothing (DN)	Do Something (DS)	DS-DN
Total Travel Time (pcu-hrs)	10,082	9,832	-250
Total Travel Distance (pcu-kms)	447,886	448,072	+186
Total Delay (pcu-hrs)	2,812	2,601	-211
Average Speed (Overall- km/h)	44.4	45.6	+1.2

- 3.4 In the case of Scenario 1, as might be expected, the model results show the network operating better overall in scenarios which include planned mitigation at Shores Green, with decreases in overall travel time and delay and increases in average speeds across the network. The level of improvement is expected to be more pronounced in the PM peak, which is predicted to be the period with the greatest levels of congestion and delay.
- 3.5 It is also noted that overall travel distance increases slightly during both peak periods, as was the case in the previous (October 2012) assessment. This is expected to be due to more traffic taking the longer (but potentially faster) A40 route to travel east-west across Witney rather than travelling through the centre of Witney via Bridge Street and the Staple Hall junction.
- 3.6 A more detailed review of the specific predicted changes in traffic levels within Witney is provided in Section 4.

#### Scenario 2

- 3.7 Table 4 provides the same summary comparison, but based upon Scenario 2 levels of development, i.e. reduced levels of overall development across West Oxfordshire to 9,447 dwellings, including a reduced level of housing assumed at the North Witney site.

**Table 4 – Scenario 2 Comparison Summary Table**

AM	2030 S2		
	Do Nothing	Do Something	DS-DN
Total Travel Time (pcu-hrs)	8,641	8,553	-88
Total Travel Distance (pcu-kms)	423,564	425,286	+1,722
Total Delay (pcu-hrs)	1,859	1,748	-111
Average Speed (Overall- km/h)	49.0	49.7	+0.7
PM	2030 S2		
	Do Nothing	Do Something	DS-DN
Total Travel Time (pcu-hrs)	9,751	9,491	-260
Total Travel Distance (pcu-kms)	438,828	438,361	-467
Total Delay (pcu-hrs)	2,655	2,444	-211
Average Speed (Overall- km/h)	45.0	46.2	+1.2

- 3.8 In the case of Scenario 2, the results are in keeping with those identified for Scenario 1, i.e. predicted decreases in travel time and delay and increased average speeds during both peak

periods. Again the levels of overall improvement (when comparing the 'do-something' to the 'do-nothing' scenarios) are greatest during the PM peak hour period.

- 3.9 Overall the network is predicted to operate better in Scenario 2, as would be expected due to the lower overall levels of new development assumed within the scenario.

#### Scenario 3

- 3.10 Scenario 3 assumes the provision of highway infrastructure in the vicinity of the North Witney development (this is assumed to be additional to the improvements included in the 'do-something' scenarios), specifically consisting of the West Link 2 and the Northern Distributor Road.
- 3.11 Three sub-options were modelled with decreasing housing numbers (ranging between 200 and 1,500 houses) at North Witney, with a comparison of the overall network statistics for each option provided in Table 5.

**Table 5 – Network statistics comparison – development levels North Witney**

AM	2030 S3		
	Option A: 1500 Houses	Option B: 800 Houses	Option C: 200 Houses
Total Travel Time (pcu-hrs)	8,915	8,830	8,690
Total Travel Distance (pcu-kms)	433,492	432,190	427,899
Total Delay (pcu-hrs)	1,952	1,899	1,849
Average Speed (Overall- km/h)	48.6	48.9	49.2
PM	2030 S3		
	Option A: 1500 Houses	Option B: 800 Houses	Option C: 200 Houses
Total Travel Time (pcu-hrs)	9,968	9,856	9,695
Total Travel Distance (pcu-kms)	448,970	445,646	442,370
Total Delay (pcu-hrs)	2,720	2,680	2,590
Average Speed (Overall- km/h)	45.0	45.2	45.6

- 3.12 As would be expected, the impacts of the North Witney development decrease when considering reduced levels of development, with decreasing total travel time, delay and travel distance and higher travel speeds.

3.13 Table 6 provides a summary comparison between scenarios which include / exclude the West End Link 2 and Northern perimeter road. The addition of the West End Link 2 and Northern perimeter road result in a minor further reduction in travel time and delay, and increases in total travel distance and average speeds in the AM peak hour period. However the levels of overall change to the operation of the Witney network following the inclusion of the West End Link appear to be relatively limited.

3.14 Moreover in the PM peak period the operation of the highway network in Witney is predicted to be worse in the scenario which includes the lower capacity West End Link, potentially due to the additional delays at the junctions related to the link itself, compounded by proximity to the over capacity Staple Hall junction.

**Table 6 – Comparison with / without West End Link 2 and Northern perimeter road**

AM	2030		
	Option 3a (1500 Houses)	Option 1a (1500 Houses)	Option 3a – Option 1a
Total Travel Time (pcu-hrs)	8,915	8,917	-2
Total Travel Distance (pcu-kms)	433,492	432,378	+1,114
Total Delay (pcu-hrs)	1,952	1,976	-24
Average Speed (Overall- km/h)	48.6	48.5	+0.1
PM	2030		
	Option 3a (1500 Houses)	Option 1a (1500 Houses)	Option 3a – Option 1a
Total Travel Time (pcu-hrs)	9,968	9,832	+136
Total Travel Distance (pcu-kms)	448,970	448,072	+898
Total Delay (pcu-hrs)	2,720	2,601	+119
Average Speed (Overall- km/h)	45.0	45.6	-0.6

#### Scenario 4

3.15 Table 7 provides the same comparison, but for a scenario which assumes the delivery of a West End Link 2 with higher capacity junctions at either end of the link. This option is predicted to result in an overall improvement in the operation of the highway network when compared to the lower capacity West End Link option, providing the largest overall improvement to total travel time of any of the options considered (with a further reduction of 383 vehicle hours when compared to the scenarios excluding the West End Link 2). However the level of delay on the network is not predicted to reduce significantly in either peak and

remains slightly worse in the PM peak following the introduction of the West End Link 2 scheme.

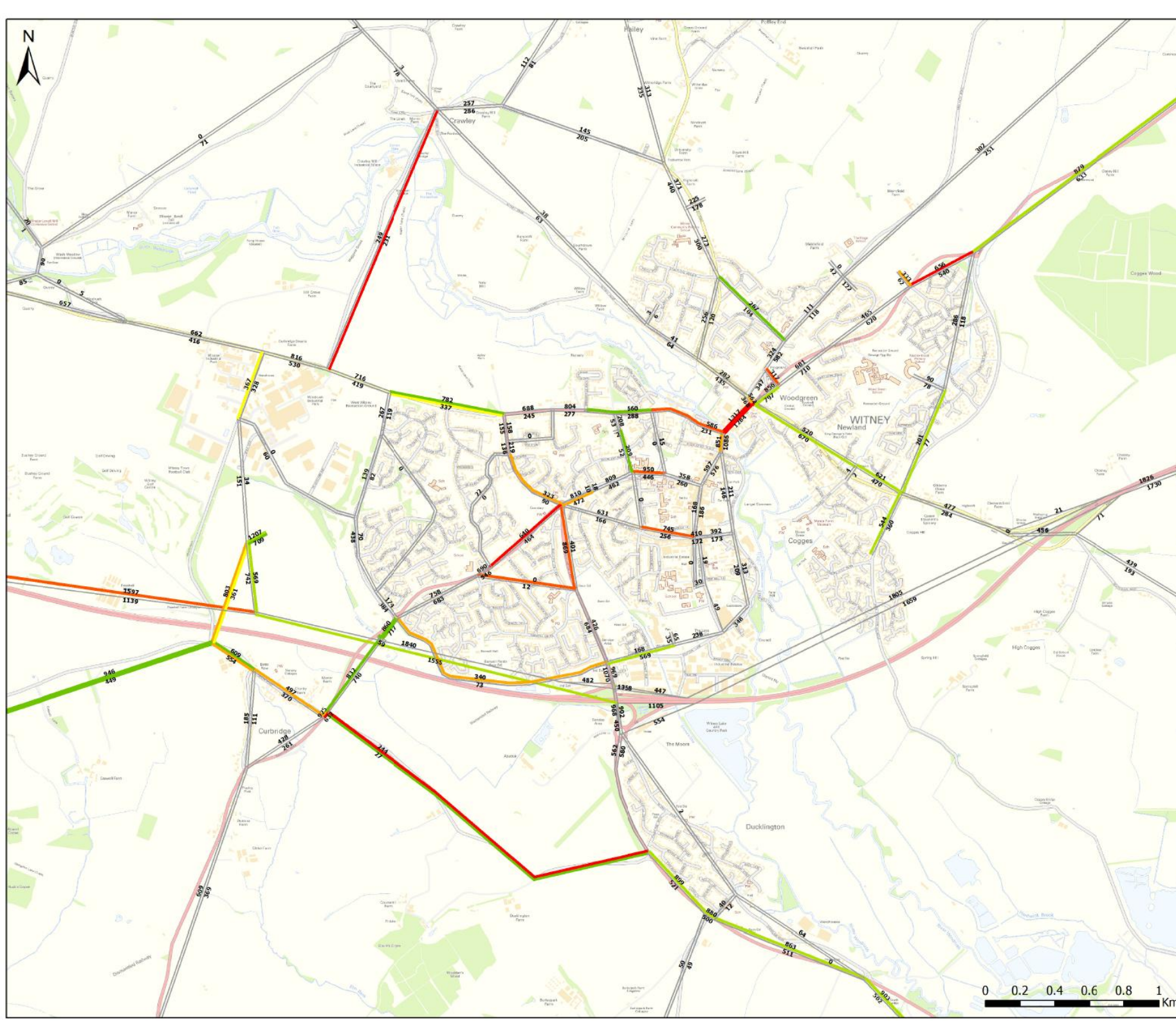
**Table 7 - Comparison with / without Higher Capacity West End Link 2 and Northern perimeter road**

AM	2030 S4		
	Option 4a (1500 Houses)	Option 1a (1500 Houses)	Option 4a – Option 1a
Total Travel Time (pcu-hrs)	8,873	8,917	-44
Total Travel Distance (pcu-kms)	432,787	432,378	+409
Total Delay (pcu-hrs)	1,928	1,976	-48
Average Speed (Overall- km/h)	48.8	48.5	+0.3
PM	2030 S4		
	Option 4a (1500 Houses)	Option 1a (1500 Houses)	Option 4a – Option 1a
Total Travel Time (pcu-hrs)	9,449	9,832	-383
Total Travel Distance (pcu-kms)	448,147	448,072	+75
Total Delay (pcu-hrs)	2,610	2,601	+9
Average Speed (Overall- km/h)	45.6	45.6	-

## 4 Witney specific impacts

- 4.1 The 2012 Technical Note 1 Summary of development and infrastructure strategic Modelling identified potential strategic highway and local infrastructure options (as identified in paragraphs 1.3 to 1.6 above) to remove traffic from the local road network in Witney and provide some relief to a number of traffic sensitive areas, although congestion continued to be predicted within the centre of Witney due to the significant demands for vehicle travel through the centre of the town and the overall levels of growth expected by 2030.
- 4.2 The update model results for the scenarios detailed in Table 2 were plotted using GIS to show the main expected flows on the Witney network and areas of specific congestion and delay based upon the new development assumptions outlined in Section 2 of this technical note. An example plan is provided on the following page (the example being for the morning peak hour Scenario 1 – ‘do-nothing’ model).
- 4.3 In each case the main roads in the model have been colour-coded according to the overall predicted volume / capacity value for each road.
- 4.4 A full set of network plans for the Witney area, providing volume / capacity summary information for each of the main scenarios assessed are appended to this technical note.





## Legend

### S1\_DN\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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4.5 The following paragraphs provide a summary of the transport impacts of the various scenarios considered at a number of the key locations within Witney. This more detailed comparison exercise has been carried out for three of the main scenarios assessed (please note the northern perimeter road is included in scenarios 3a and 4a but not in scenario 1 DN or DS):

- Scenario 1 'do-nothing' (which includes additional growth across West Oxfordshire and 1,500 houses at North Witney);
- Scenario 1 'do-something' (which includes additional growth across West Oxfordshire, 1,500 houses at North Oxford and the provision of infrastructure improvements including the west facing slips at Shores Green);
- Scenario 3a (which includes all the assumptions in the Scenario 1 'do-something' with the addition of the West End Link 2); and
- Scenario 4a (which includes all the assumptions in the Scenario 1 'do-something' with the addition of a higher capacity West End Link 2).

4.6 These four scenarios have been selected as the most directly comparable in terms of assessing the impacts of additional infrastructure, with all four scenarios including the same development assumptions for North Witney.

4.7 Table 8 provides a summary of the overall total flows on the approaches to the Staple Hall double roundabout junction. The proposed improvements in the Do Something Scenario 1 (with west facing slips) result in an overall decrease in flows in both the morning (am) and evening (pm) peak hours, particularly in the evening, with a reduction of 322 car movements.

4.8 The modeling indicates that with the provision of the West End Link 2 and northern perimeter road (in addition to the Shores Green west facing slips) there is a further reduction in flows through the junction, with 521 fewer car trips in the morning peak hour and 558 fewer total trips in the evening peak hour (representing a reduction in total flow of approximately 15%). Scenario 4, which provides the higher capacity West End Link 2 option shows a further decrease in total flows through Staple Hall during the most congested peak period (the PM peak), with a total reduction of 750 vehicle movements predicted.

**Table 8 – Comparison of flows on approaches to Staple Hall Junction/s**

Scenario	Total junction traffic (am peak)	Difference from 'Do-Nothing'	Total junction traffic (pm peak)	Difference from 'Do-Nothing'
S1 – Do Nothing	3346	N/A	3846	N/A
S1 - Do Something	3208	-138	3524	-322
S3a – Do Something plus West End Link and Northern perimeter road	2825	-521	3288	-558
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	2844	-502	3096	-750

- 4.9 Table 9 provides a summary comparison of flows predicted on the A40 between the Ducklington and Shores Green junctions. The model results show a considerable increase in the use of this section of the A40 in all of the improvement options considered.
- 4.10 The addition of the west facing slips at Shores Green result in an increase of 854 two-way vehicle trips in the morning peak hour and 1601 two-way trips in the evening peak hour. This is expected to be due to the west facing slips providing the potential for local trips within Witney to use the A40 to 'junction-hop' between the Ducklington and Shores Green junctions and therefore should give a reasonable estimation of the number of trips being removed from other local roads.
- 4.11 In each scenario which provides the West End Link 2 the use of the A40 reduces slightly, relative to the level of capacity provided at the West End Link 2 scheme, i.e. the higher capacity option has the lowest predicted level of flow on the A40. This may be due to the West End Link providing an alternative option to the A40 for east – west movements and therefore encouraging trips to remain within Witney itself.

**Table 9 – Comparison of flows on A40 (between Shores Green and Ducklington)**

Scenario	Total two way flow (am peak)	Difference from 'Do-Nothing'	Total two way flow (pm peak)	Difference from 'Do-Nothing'
----------	------------------------------	------------------------------	------------------------------	------------------------------



S1 – Do Nothing	3464	N/A	3481	N/A
S1 - Do Something	4318	+854	5082	+1601
S3a – Do Something plus West End Link and Northern perimeter road	4232	+768	4924	+1443
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	4229	+765	4852	+1371

- 4.12 The west facing slips also appear to provide a faster route to the A4095 for traffic passing Witney west-east, (with a summary of changes in flows on the A4095 provided in Table 10). In all 'do-something' scenarios the levels of two-way traffic on the A4095 are predicted to increase.

**Table 10 – Comparison of flows on A4095**

Scenario	Total two way flow (am peak)	Difference from 'Do-Nothing'	Total two way flow (pm peak)	Difference from 'Do-Nothing'
S1 – Do Nothing	1512	N/A	1470	N/A
S1 - Do Something	1619	+107	1746	+276
S3a – Do Something plus West End Link and Northern perimeter road	1689	+177	1708	+238
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	1691	+179	1719	+249

- 4.13 Table 11 provides a summary of the modelled flows on the High Street south of the junction with Witan Way. The addition of the west facing slips at Shores Green results in very little change in predicted traffic levels on this section of the High Street, whilst the addition of the West End Link 2 scheme results in a reduction in flows of 103 two way vehicle movements in the morning peak hour and an increase of 216 two way movement in the evening peak hour.

- 4.14 Scenario 4, which provides the higher capacity West End Link 2 scheme shows an increase in predicted traffic using High Street in both the AM and PM peak hours.

**Table 11 – Comparison of flows on High Street**

Scenario	Total two way flow (am peak)	Difference from 'Do-Nothing'	Total two way flow (pm peak)	Difference from 'Do-Nothing'
S1 – Do Nothing	1173	N/A	1106	N/A
S1 - Do Something	1157	-16	1121	+15
S3a – Do Something plus West End Link and Northern perimeter road	1070	-103	1322	+216
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	1188	+15	1472	+366

- 4.15 In addition to impacts immediate to Witney, changes to development and infrastructure options included within the West Oxfordshire Local Plan could also be expected to impact on the roads surrounding the town.
- 4.16 In the previous assessment work it was noted that Dry Lane was predicted to be subject to considerable levels of rat-running as the town network becomes more congested.
- 4.17 Table 12 provides a summary of the expected changes in flows on Dry Lane following the introduction of the west facing slips, with a reduction of 82 two-way trips in the AM peak hour and a reduction of 226 trips in the PM peak hour.
- 4.18 Following the addition of the West End Link 2 scheme the predicted trips on Dry Lane reduce further, resulting in a total reduction of 206 two-way trips in the AM peak hour and 360 trips in the PM peak hour.
- 4.19 The higher capacity West End Link 2 scenario shows slightly higher levels of traffic on Dry Lane (compared to the lower capacity option) in the AM peak hour, but the greatest overall level of reduction in the PM peak.

**Table 12 – Comparison of flows on Dry Lane**

Scenario	Total two way flow (am peak)	Difference from 'Do-Nothing'	Total two way flow (pm peak)	Difference from 'Do-Nothing'
S1 – Do Nothing	480	N/A	991	N/A
S1 - Do Something	398	-82	765	-226
S3a – Do Something plus West End Link and Northern perimeter road	274	-206	631	-360
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	313	-167	509	-482

- 4.20 The wider predicted changes in traffic flows on the routes through a number of villages surrounding Witney are summarised in Table 13.
- 4.21 Following the addition of the west facing slips at Shores Green in Scenario 1 'do-something' the levels of two-way traffic are predicted to slightly increase in Hailey and also increase through South Leigh in the morning peak hour. Two-way trip levels are predicted to reduce significantly through Crawley, particularly due to expected reductions in flows on Dry Lane., whilst flows through New Yatt are also expected to reduce during the evening peak hour. It is understood that none of the COTM modeling work included any scheme improvements to the A40 between Witney and Oxford.
- 4.22 Following the addition of the West End Link 2 scheme the impacts on surrounding villages are expected to be of a similar level, but with a further reduction in flows through Crawley.

**Table 13 – Comparison of flows through villages**

Scenario		Difference from 'Do Nothing' Scenario				Total
		Hailey	Crawley	New Yatt	South Leigh	
S1 Do something	AM	+23	-198	+1	+128	-365
	PM	+72	-305	-72	-14	
S3a – Do Something plus West End Link and Northern perimeter road	AM	+49	-302	-70	+134	-586
	PM	+43	-373	-30	-37	
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	AM	+52	-263	-67	+132	-576
	PM	+82	-422	-28	-62	

## SELECT LINK ANALYSIS

4.23 In order to further review the main demands for travel in and around the town a series of select link analysis were undertaken using the Witney models. These predict the routes followed by traffic using specific sections of the Witney Highway network, with the following main areas considered:

- Bridge Street;
- The West End Link Road; and
- A40 between the Shores Green and Ducklington junctions.

### Bridge Street

4.24 A Select Link Analysis carried out on Bridge Street for the morning peak hour 'do-nothing' scenario (south of the Staple Hall junction) shows 441 trips continuing east onto the A4095 and 393 heading west across Bridge Street with an origin east of the A4095.

4.25 This pattern is largely replicated for the main 'do-something' scenarios, with slightly decreasing numbers of trips on Bridge Street having an origin or destination via the A4095 east of Witney

in each case, (likely related to the similarly slightly reduced levels of overall traffic on Bridge Street).

- 4.26 A summary of the trips using Bridge Street and with an origin or destination via the A4095 to the east of Witney is provided in Table 14 (below).

**Table 14 – Bridge Street Trips with origins / destinations via A4095**

Scenario	AM	PM
<b>S1 'do-nothing'</b>		
Bridge Street (E Bound)	441	404
Bridge Street (W Bound)	393	343
<b>S1 'do-something'</b>		
Bridge Street (E Bound)	438	441
Bridge Street (W Bound)	372	349
<b>S3a</b>		
Bridge Street (E Bound)	402	401
Bridge Street (W Bound)	325	324
<b>S4a</b>		
Bridge Street (E Bound)	427	412
Bridge Street (W Bound)	300	320

- 4.27 These trips make up a relatively large proportion of the total number of movements through Bridge Street, for example in the morning peak hour 'do-nothing' scenario flows to and from the A4095 east of Witney represent nearly a third of all two-way trips, (834 of 2601 total movements).
- 4.28 Please note the data described in paragraphs 4.24 to 4.27 above is only a proportion of the total traffic on Bridge Street during the peak periods

#### West End Link

- 4.29 A Select Link Analysis on the West End Link 2 (based on the total trips predicted to use WEL2) was carried out to determine the main potential uses of the link road in the forecast scenarios.
- 4.30 Of the total trips using the West End Link 2 a high proportion are currently predicted to be associated directly with the North Witney development in both scenarios 3 and 4 which include the provision of the link, with the majority of the remainder predicted as being local to Witney.



**Table 15 - West End Link trip origins/destinations within Witney (Scenario 3a)**

	Destination			
AM	North Witney	Other Witney	Outside Witney	Total
West End Link (N Bound)	158	48	42	248
West End Link (S Bound)	145	58	86	289
PM				
West End Link (N Bound)	107	113	109	329
West End Link (S Bound)	61	60	69	190

**Table 16 – West End Link trip origins / destinations within Witney (Scenario 4a)**

	Destination			
AM	North Witney	Other Witney	Outside Witney	Total
West End Link (N Bound)	264	53	50	367
West End Link (S Bound)	51	31	47	129
PM				
West End Link (N Bound)	311	174	210	695
West End Link (S Bound)	56	42	78	176

## JOURNEY TIMES

4.31 Table 17 provides a review of the journey times for a series of routes through Witney for each of the scenarios considered.

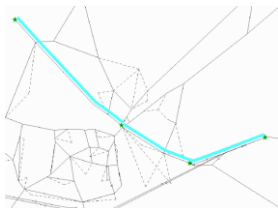

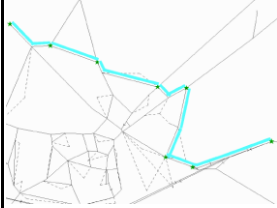
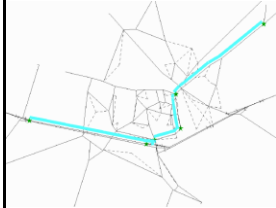
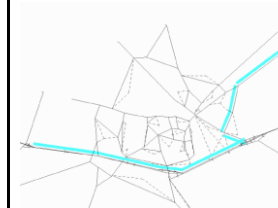
- Route 1 is a southeast – northwest route starting on the A40 to the east of Witney and travelling north through the town, via the Bridge Street / West end junction to Witney Road Crawley.
- Route 2 runs west – north east, starting on the A40 to the west of Witney, entering Witney via the Ducklington junction and routing around the town centre via Tower Hill, Burford Road and Bridge Street, before finishing to the north-east of the town on the A4095 Woodstock Road.

4.32 A number of alternate routes were also tested, including two options taking into account the new routing options offered by new infrastructure included in the forecast scenarios.

- Route 1a starts and ends at the same locations as route 1, but routes via Jubilee Way and the new Northern Perimeter Road rather than passing through the Bridge Street / West End junction.
- Route 2a assesses a slight variation on Route 2, in which traffic routes around the town centre to the east rather than the west (i.e. via Station Lane / Witan Way rather than Tower Hill / Burford Road).
- Route 2b begins on the A40 to the west of Witney and terminates on the A4095 Woodstock Road (as with Route 2 and 2a), but bypasses the town on the A40 and uses the new west facing slips at Shores Green.

4.33 Routes with a faster journey time than the Scenario 1 'do-nothing' situation are highlighted in green for each of the alternate scenarios assessed, with routes with a slower journey time highlighted in orange.

**Table 17 – Route Journey Time Comparison (seconds)**

Route		Route 1		Route 2		Route 1a		Route 2a		Route 2b	
											
Scenario	Period	EB	WB	NB	SB	EB	WB	NB	SB	NB	SB
S1 Do Nothing	AM	759	419	1017	1126	1078	961	1048	1023		
	PM	869	490	1258	1261	1144	989	1491	1407		
S1 Do Something	AM	717	403	1001	1020	1060	987	1064	923	792	701
	PM	735	446	1112	1146	1010	999	1254	1283	771	784
S3a	AM	760	398	1015	971	935	880	1057	876	789	699
	PM	940	416	1072	1090	896	908	1412	1328	743	783

- 4.34 Scenario 1 'do-something', which includes the west facing slips at Shores Green shows journey times being generally improved across the Witney network for the selected north to south and east to west routes. In particular the east to west movements between the A40 and the A4095 are significantly faster.
- 4.35 Scenario 3, which includes the addition of the West End Link 2 also results in improved journey times. East to West journey times are generally improved over the other scenarios, although north to south journeys via West End to Oxford Road are worse than the other options, (including the 'do-nothing' scenario). This may be due to additional delay caused by a new junction onto West End at the northern end of the West End Link Road 2.
- 4.36 Journey times were also used to further review the potential impacts of the proposed additional infrastructure in Scenario 1, i.e. the provision of the west facing slips at Shores Green.
- 4.37 Routes 2, 2a and 2b all run east to west between the A40 and the A4095. Table 18 provides a comparison of the journey time between these two points travelling either via the centre of Witney or via the new west facing slips at Shores Green, using the A40 to bypass the centre of the town. It can be seen in every case that the journey time via the A40 is considerably faster and would therefore suggest that the west facing slips should enable a more attractive route for anyone wanting to travel to the eastern side of Witney (or beyond) from areas to the west of the Ducklington junction.

**Table 18 – Journey time difference between route 2 and 2b (seconds)**

Scenario	Period	EB	WB
S1 Do Nothing	AM		
	PM		
SC1 OpA	AM	-209	-319
	PM	-341	-362
SC1 OpA (no North Witney)	AM	-197	-251
	PM	-330	-344
SC3A	AM	-226	-272
	PM	-329	-307

## SUMMARY IMPACTS OF WEST FACING SLIPS

- 4.38 A review of the modelling work associated with the revised levels of development proposed across West Oxfordshire, and within Witney in particular, shows that the A40 Shores Green scheme continues to be expected to provide benefit to the overall operation of the Witney Highway network.
- 4.39 In terms of overall network statistics, the provision of the west facing slips results in reduced overall travel times, reduced levels of total delay and increased average speeds.
- 4.40 The west facing slips scheme also removes a degree of traffic from the centre of Witney, more noticeable in the evening peak hour (which is the predicted within the model to be the most congested), where the number of car trips through the Staple Hall junction are predicted to reduce by approximately 322.
- 4.41 The scheme also is modelled to result in significantly increased use of the A40 between the Shores Green and Ducklington junctions, with 854 additional two-way trips in the morning peak hour and 1601 additional two-way trips in the evening peak. This increase in use of the local section of the A40 could be expected to correlate to a similar level of reduction in trips on other more local roads within Witney, including reducing traffic within Witney itself and limiting rat-running on some of the surrounding roads (including Dry Lane).

## IMPACTS OF WEST END LINK 2 AND NORTHERN PERIMETER ROAD

- 4.42 The addition of the West End Link 2 and northern perimeter road results in the best overall operation of the highway network in the Witney area, providing the greatest reduction in journey times and predicted delay and a further increase in average speeds.
- 4.43 The scheme removes a proportion of traffic from the Staple Hall Junction, approximately 15% of peak hour movements; however this reduction is not sufficient to relieve predicted levels of congestion and delay, with both Bridge Street and the Staple Hall junction predicted to continue to be congested in each forecast scenario.
- 4.44 The West End Link also results in a greater reduction in rat-running on competing routes, particularly Dry Lane and to a lesser degree through New Yatt.

- 4.45 Providing a higher capacity link, specifically by increasing the capacity at either end of the junction, results in a greater level of overall traffic reduction at the Staple Hall junction, particularly on the Bridge Street and West End approaches, equivalent to a 20% reduction in the PM peak hour. The improved West End Link 2 scheme is also predicted to slightly reduce flows on the routes through the villages surrounding Witney, although this does result in an increase in predicted flows through some of the central areas of the town, including the High Street.
- 4.46 However, as with the previous assessment, the benefits of the scheme are largely localised, with considerable use of the link by traffic related directly to the North Witney development and the majority of all use being for relatively local journeys within Witney.

## 5 Impacts of North Witney

- 5.1 One of the potential main amendments being considered to the West Oxfordshire Local Plan is understood to be the addition of the North Witney site, providing up to 1,500 new homes.
- 5.2 The North Witney site is expected to be associated with the delivery of the West End Link and the Northern perimeter road as part of a potential package of mitigating highway works.
- 5.3 This section of the technical note therefore provides an initial review comparing:
- A scenario including the delivery of 1,500 homes at North Witney alongside the West End Link Road and Northern perimeter road (as mitigating highway works);
  - A scenario including the delivery of 1,500 home at North Witney alongside a higher capacity West End Link Road and Northern perimeter road; and
  - A scenario excluding the delivery of housing at North Witney and also excluding the delivery of the West End Link and Northern perimeter road.
- 5.4 The comparison between these scenarios therefore identifies the net traffic impacts of delivering 1,500 houses at North Witney in association with the West End Link 2 and the Northern Distributor Road. In particular this comparison also assesses whether the provision of the West End Link 2 scheme is predicted to broadly mitigate the traffic effects of the North Witney development.
- 5.5 Table 19 summarises the overall change in predicted levels of traffic travelling through the Staple Hall junction. Levels of total traffic are predicted to reduce in both peak periods, with the greatest levels of reduction being on the Bridge Street and West End approaches, as some traffic re-routes via the West End Link 2.
- 5.6 As identified in the previous section of this technical note, the improved capacity West End Link 2 scheme provides the greatest level of reduction in total traffic during the busier PM peak hour period, although slightly less improvement in the AM peak.

**Table 19 – Comparison of flows on Staple Hall Junction/s 2**

Scenario	Total junction traffic (am peak)	Difference from 'S1 Do Something (no North Witney)	Total junction traffic (pm peak)	Difference from 'S1 Do Something (no North Witney)
S1 – Do Something (no North Witney)	3051	N/A	3425	N/A
S3a – Do Something plus West End Link and Northern perimeter road	2825	-226	3288	-137
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	2844	-207	3096	-329

5.7 This would therefore suggest that the provision of the West End Link 2 scheme could potentially be expected to mitigate the development traffic impacts of the North Witney development specifically at the Staple Hall junction (although this would have to be confirmed as part of any detailed Transport Assessment for the site). This would also have to be balanced against the expected new area of potential delay created by the provision of new signal controlled junction arms on West End and the A4095.

5.8 Table 20 provides a summary of predicted changes in flow on the A40 (between the Shores Green and Ducklington junctions), with a predicted overall slight decrease in two-way flows in both peak hours. This is presumed to be due to the West End Link 2 providing an alternate east-west route in addition to the A40.



**Table 20 – Comparison of flows on A40 (between Shores Green and Ducklington) 2**

Scenario	Total two way flow (am peak)	Difference from 'S1 Do Something (no North Witney)	Total two way flow (pm peak)	Difference from 'S1 Do Something (no North Witney)
S1 – Do Something (no North Witney)	4238	N/A	5040	N/A
S3a – Do Something plus West End Link and Northern perimeter road	4232	-6	4924	-116
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	4229	-9	4852	-188

5.9 Table 21 provides a summary of predicted changes in flow on the High Street, overall traffic levels are predicted to increase, particularly in the evening peak hour, with an increase of 205 trips with the lower capacity option and an increase of 355 trips with the higher capacity link.

**Table 21 – Comparison of flows on High Street 2**

Scenario	Total two way flow (am peak)	Difference from 'S1 Do Something (no North Witney)	Total two way flow (pm peak)	Difference from 'S1 Do Something (no North Witney)
S1 – Do Something (no North Witney)	1067	N/A	1117	N/A
S3a – Do Something plus West End Link and Northern perimeter road	1070	+3	1322	+205
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	1188	+121	1472	+355

5.10 For the main routes reviewed outside the centre of Witney, specifically rat-running levels on Dry Lane (Table 22) and South Leigh Road (Table 23), are both predicted to see increases in traffic levels following the addition of the North Witney development. However the higher

capacity West End Link scheme is predicted to result in a decrease in flows on Dry Lane during the busier PM peak hour.

**Table 22 - Dry Lane 2**

Scenario	Total junction traffic (am peak)	Difference from 'S1 Do Something (no North Witney)	Total junction traffic (pm peak)	Difference from 'S1 Do Something (no North Witney)
S1 – Do Something (no North Witney)	245	N/A	619	N/A
S3a – Do Something plus West End Link and Northern perimeter road	274	+29	631	+12
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	313	+68	509	-110

**Table 23 - South Leigh Road**

Scenario	Total junction traffic (am peak)	Difference from 'S1 Do Something (no North Witney)	Total junction traffic (pm peak)	Difference from 'S1 Do Something (no North Witney)
S1 – Do Something (no North Witney)	714	N/A	760	N/A
S3a – Do Something plus West End Link and Northern perimeter road	766	+52	826	+66
S4a – Do Something plus higher capacity West End Link Road and Northern perimeter road	764	+50	801	+41

## 6 Initial Conclusions

- 6.1 An initial review of the impacts of increased development numbers in Witney identified a number of main transport issues, which were largely consistent with those raised in the previous (October 2012) report. These main issues are summarised below:
- 6.2 The modelling shows that the introduction of west facing slips at Shores Green will result in a significantly increased level of traffic on the A40 south of Witney (between the Shores Green and Ducklington junctions), which could be expected to equate to a similar level of traffic relief on other local routes. This is reflected in generally lower flows on routes within Witney, including a reduction in movements through the Staple Hall junction.
- 6.3 Largely local use of the West End Link 2 route, whilst comparisons between scenarios 3 and 4 show that the attractiveness of the link is influenced by the capacity of junctions to either end, the predominant use of the link continues to be for local journeys, particularly those related to the North Witney development. Partially this may be due to the continued constraints at the Staple Hall junction preventing anyone entering Witney from Oxford Road being able to effectively access the West End Link.
- 6.4 A decrease in traffic approaching and departing Witney via the A40 east of the Shores Green junction, (with a considerable decrease in predicted flows on the east facing slips at Shores Green). This is reflected in increased predicted traffic levels on alternate longer distance east-west routes including the A4095. This is understood to be due to increasing levels of predicted congestion on the A40 between Witney and Oxford.
- 6.5 Select Link Analysis of traffic on Bridge Street shows a high proportion of the total number of movements routing towards the A4095, rather than having a local destination. Considering this in combination with the reduced levels of predicted traffic using the A40 to travel east to Oxford, it is possible that improvements to the A40 east of Witney could encourage a greater proportion of traffic travelling east to do so on the major road network and therefore relieve some of the predicted congestion within Witney.

## Appendix A – Network Plans (Scenario 1 – Do Nothing)

## Appendix B – Network Plans (Scenario 1 – Do Something)

## Appendix C – Network Plans (Scenario 2 - Do Nothing)

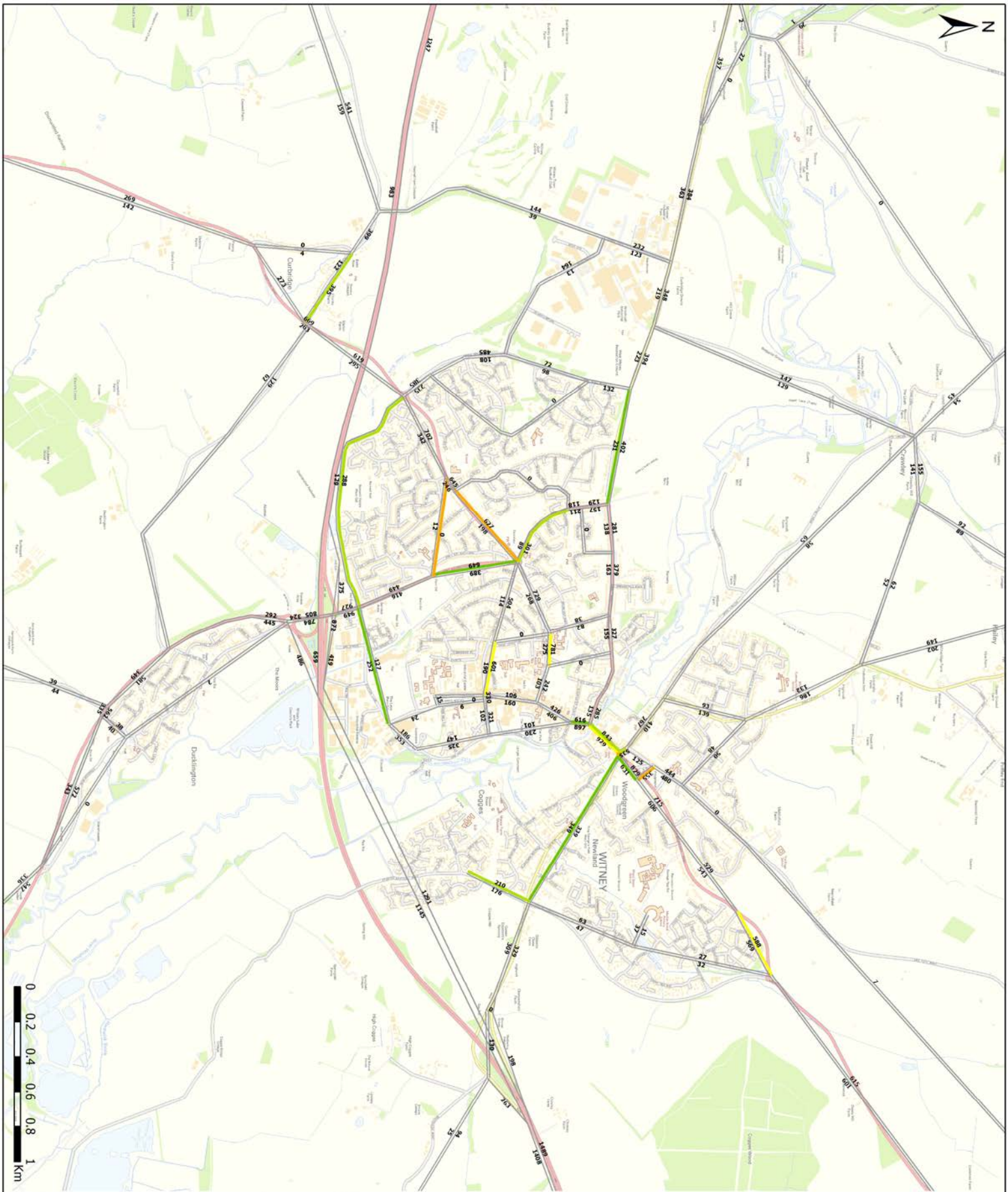
## Appendix D – Network Plans (Scenario 2 – Do Something)

## Appendix E – Network Plans (Scenario 3a – 3c)



## Appendix E – Network Plans (Scenario 5a – 5c)

## Appendix A – Network Plans (Scenario 1 – Do Nothing)



# Legend

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- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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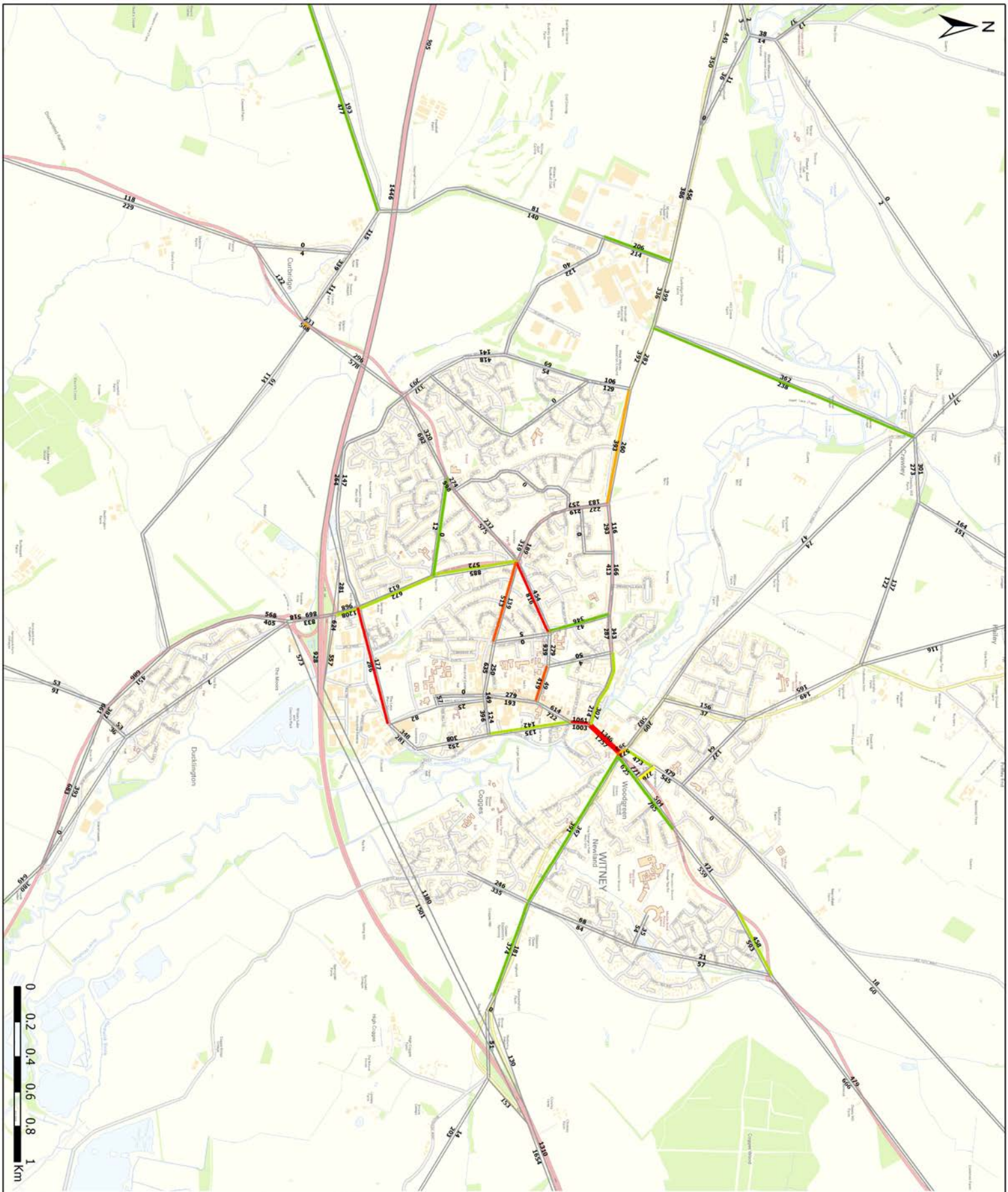
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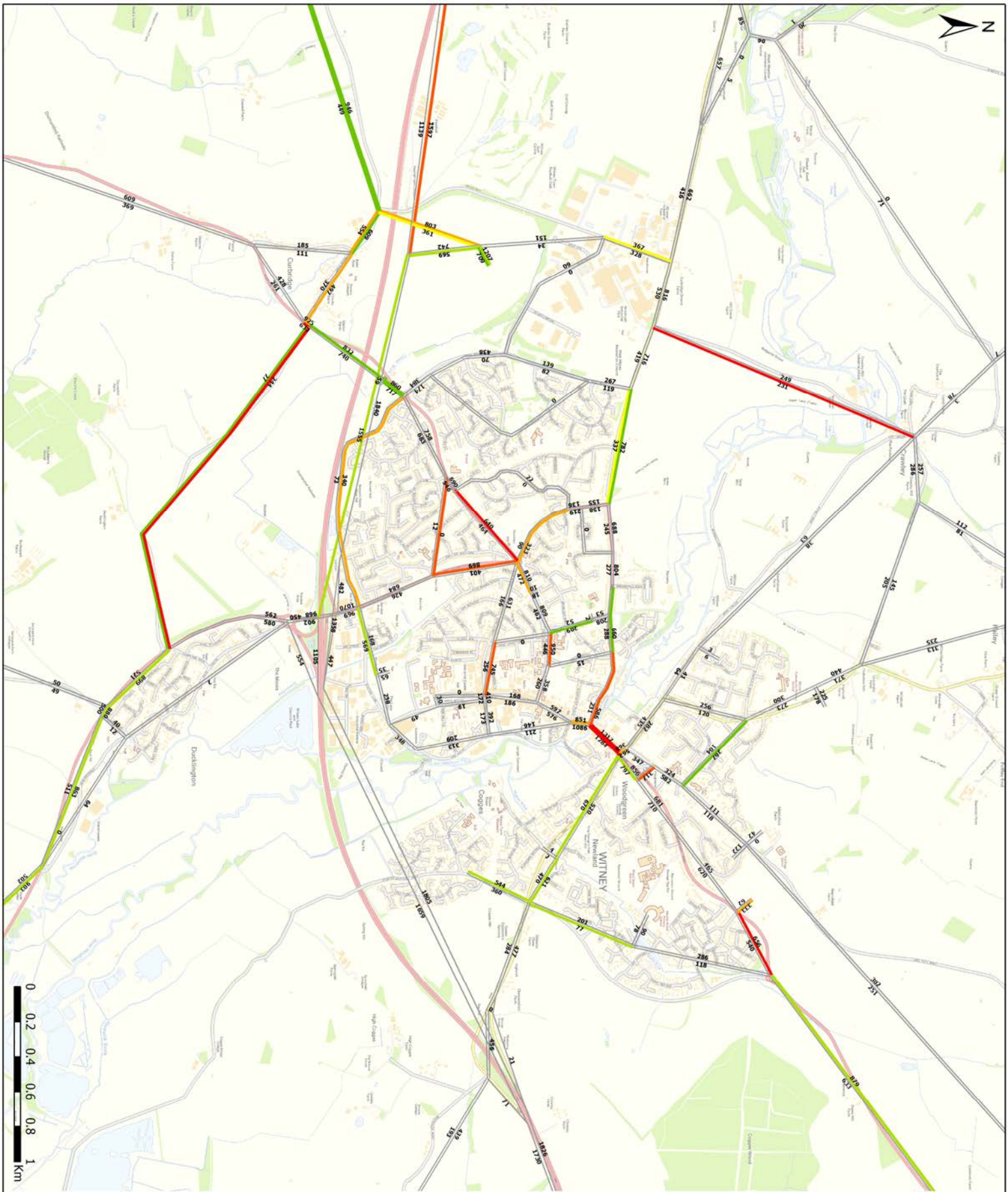
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## Appendix B – Network Plans (Scenario 1 – Do Something)





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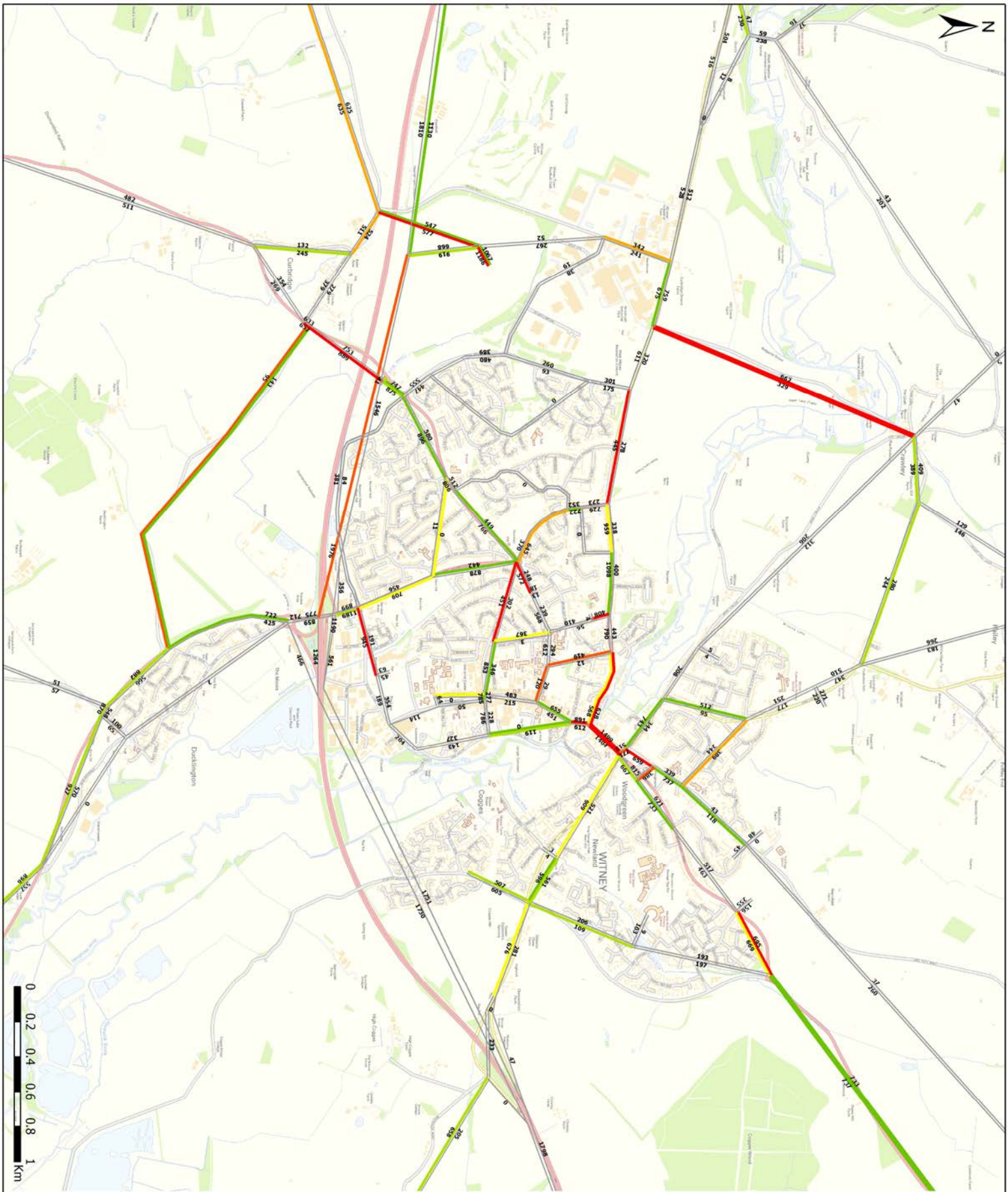
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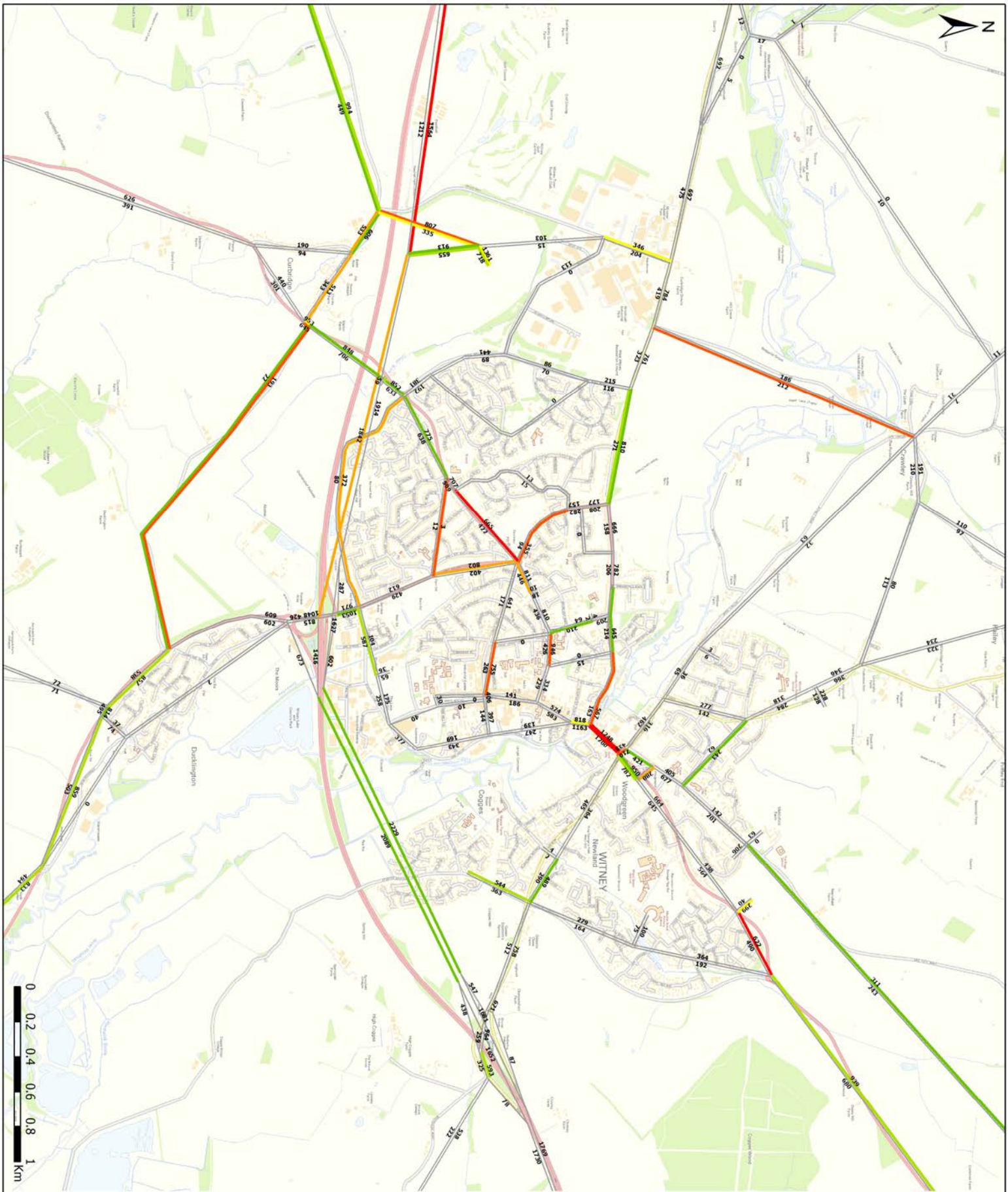
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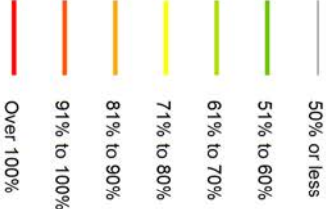
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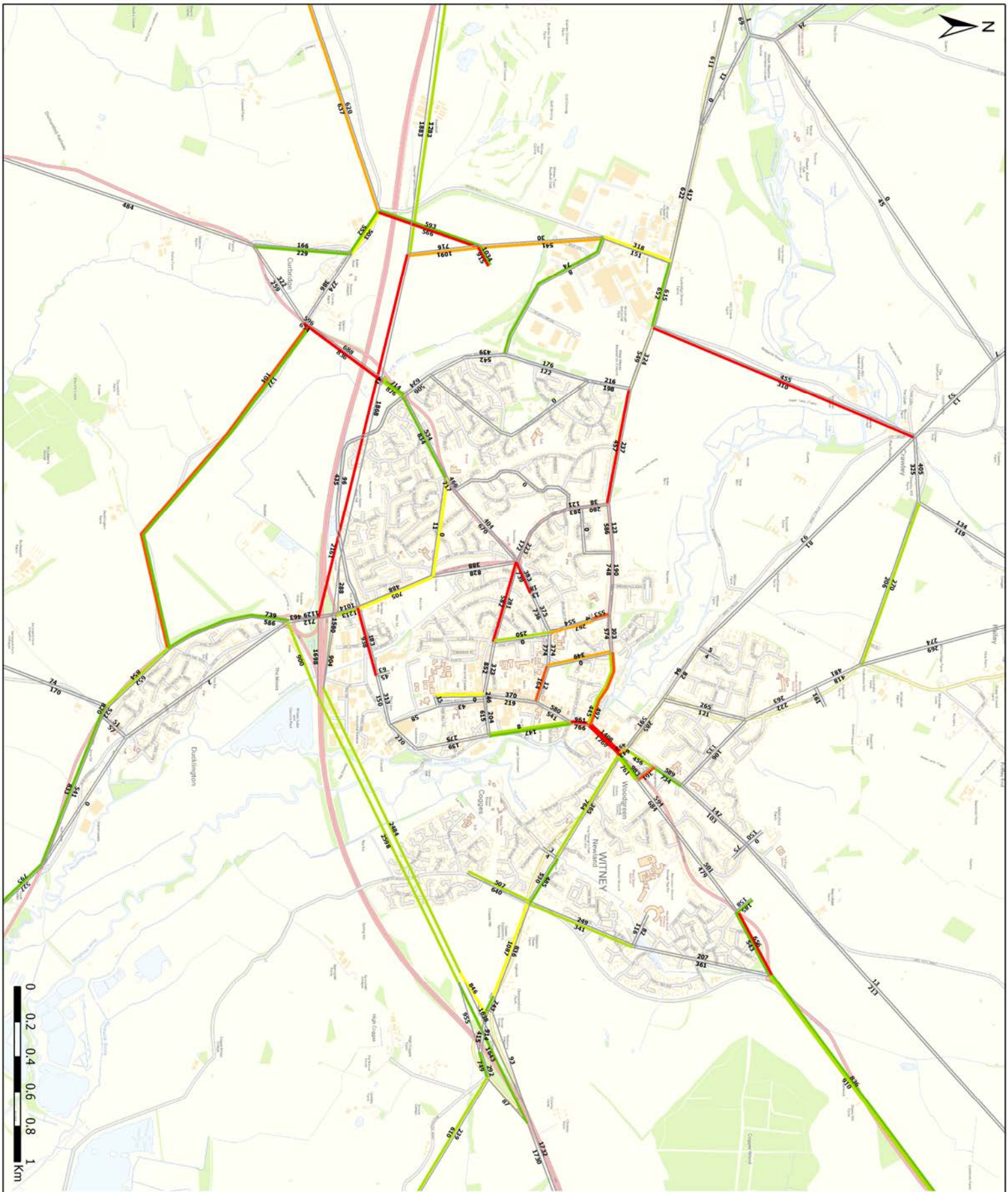
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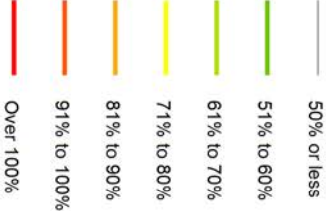
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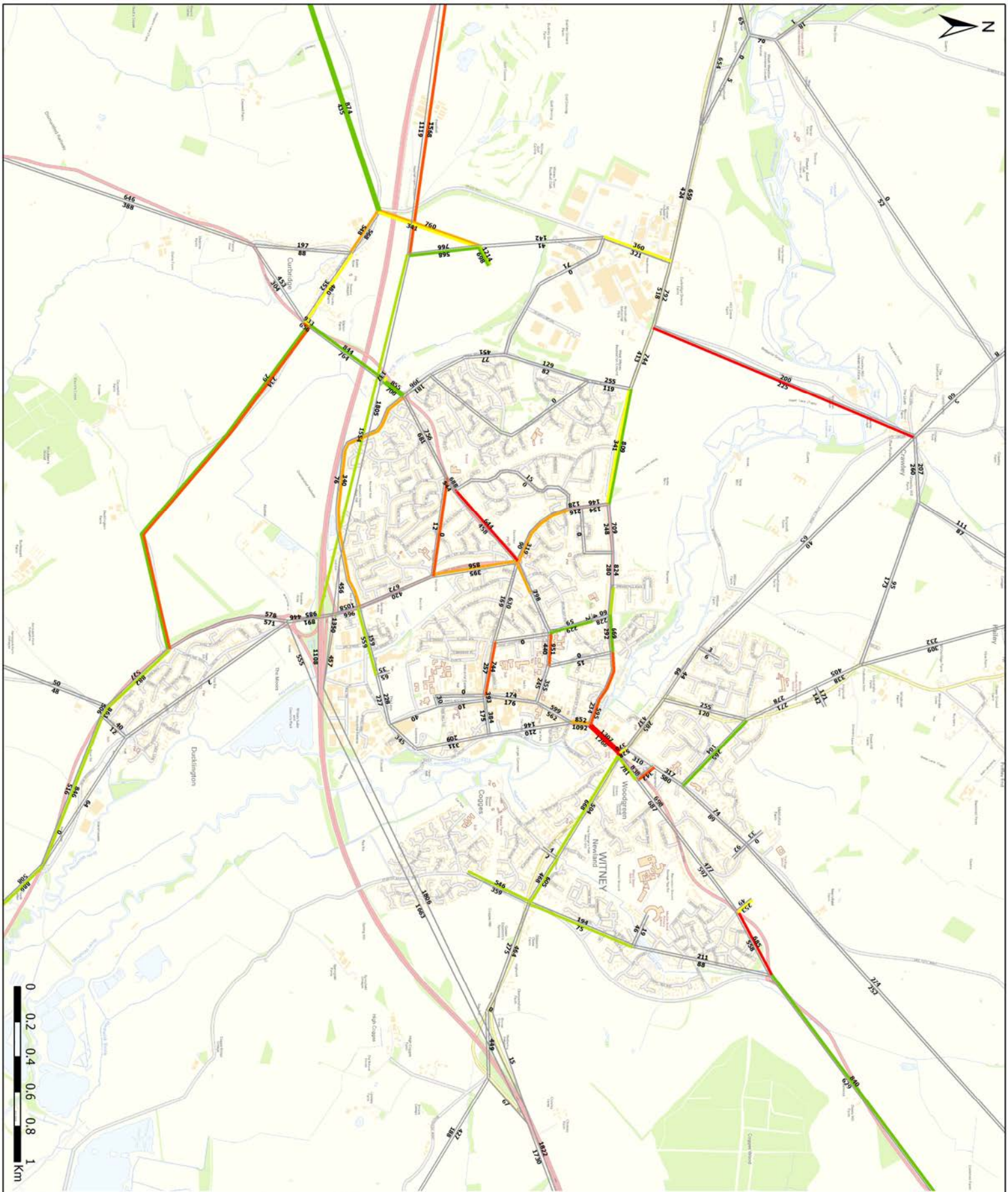
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## Appendix C – Network Plans (Scenario 2 - Do Nothing)





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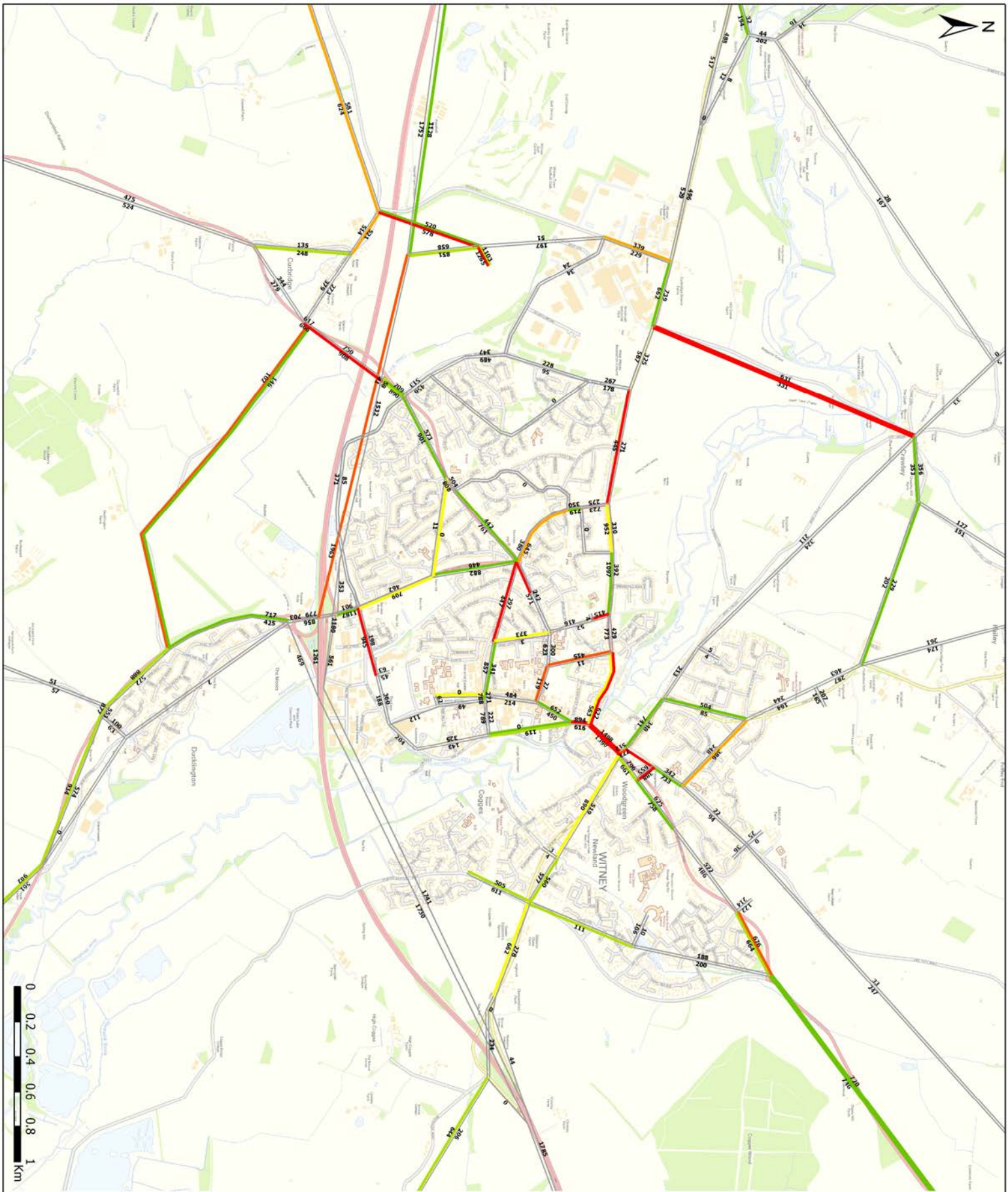
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- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

Contains Ordnance Survey data © Crown copyright and database right 2012.

REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client Title

Line 1

Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [leicester@wyg.com](mailto:leicester@wyg.com)



Project Title

Line 1

Line 2

Drawing Title

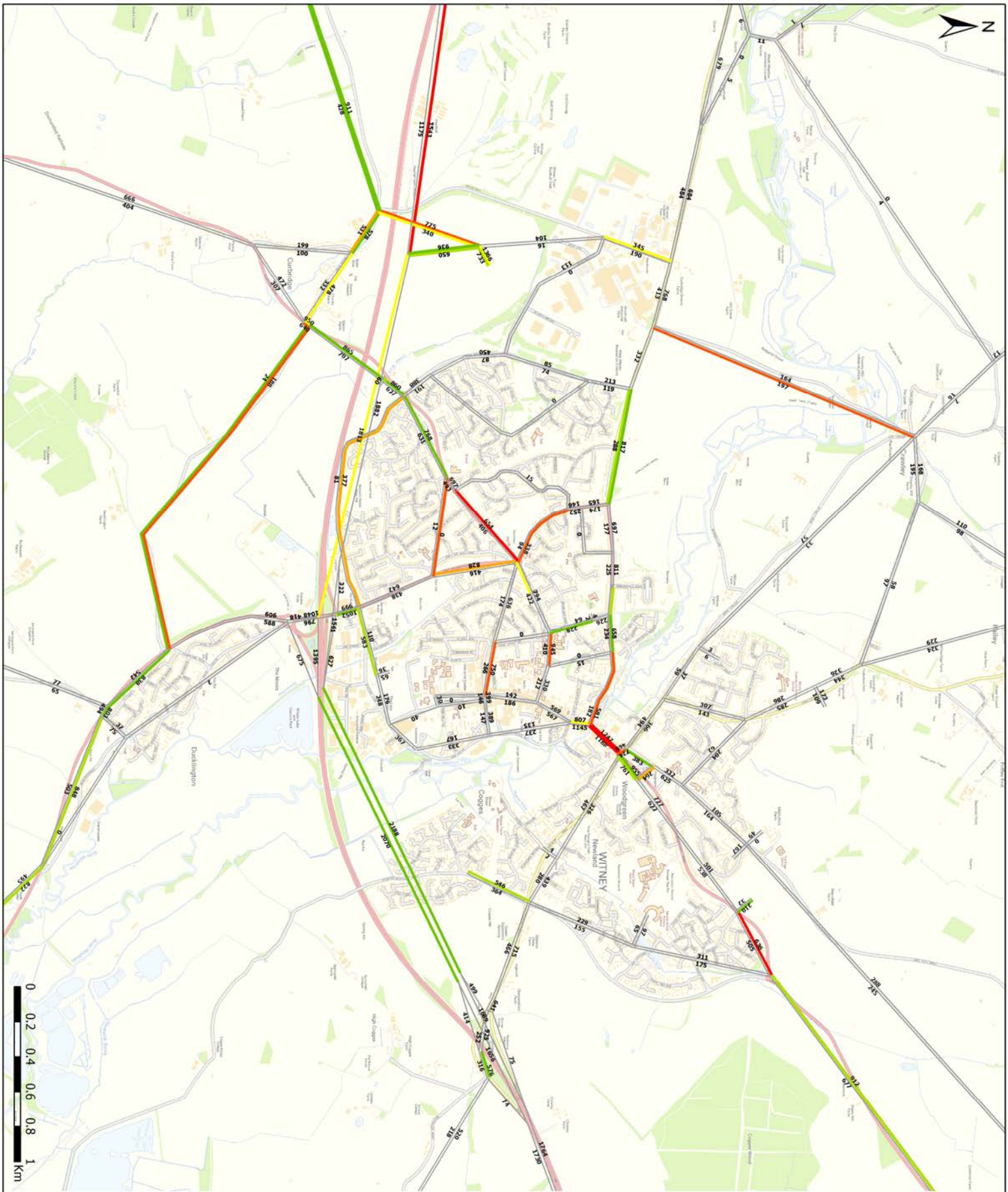
Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
Project No.	XXX	XXXXXX	XXX	XXXXXX	XXX	XXXXXX
Office Type	35	18	00X			

## Appendix D – Network Plans (Scenario 2 – Do Something)





# Legend

S2\_OPA\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

Contains Ordnance Survey data © Crown copyright and database right 2012.

KEY	DESCRIPTION	BR	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:

Client Title

Line 1

Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccaster@wyg.com](mailto:linccaster@wyg.com)



Project:

Project Title

Line 1

Line 2

Drawing Title:

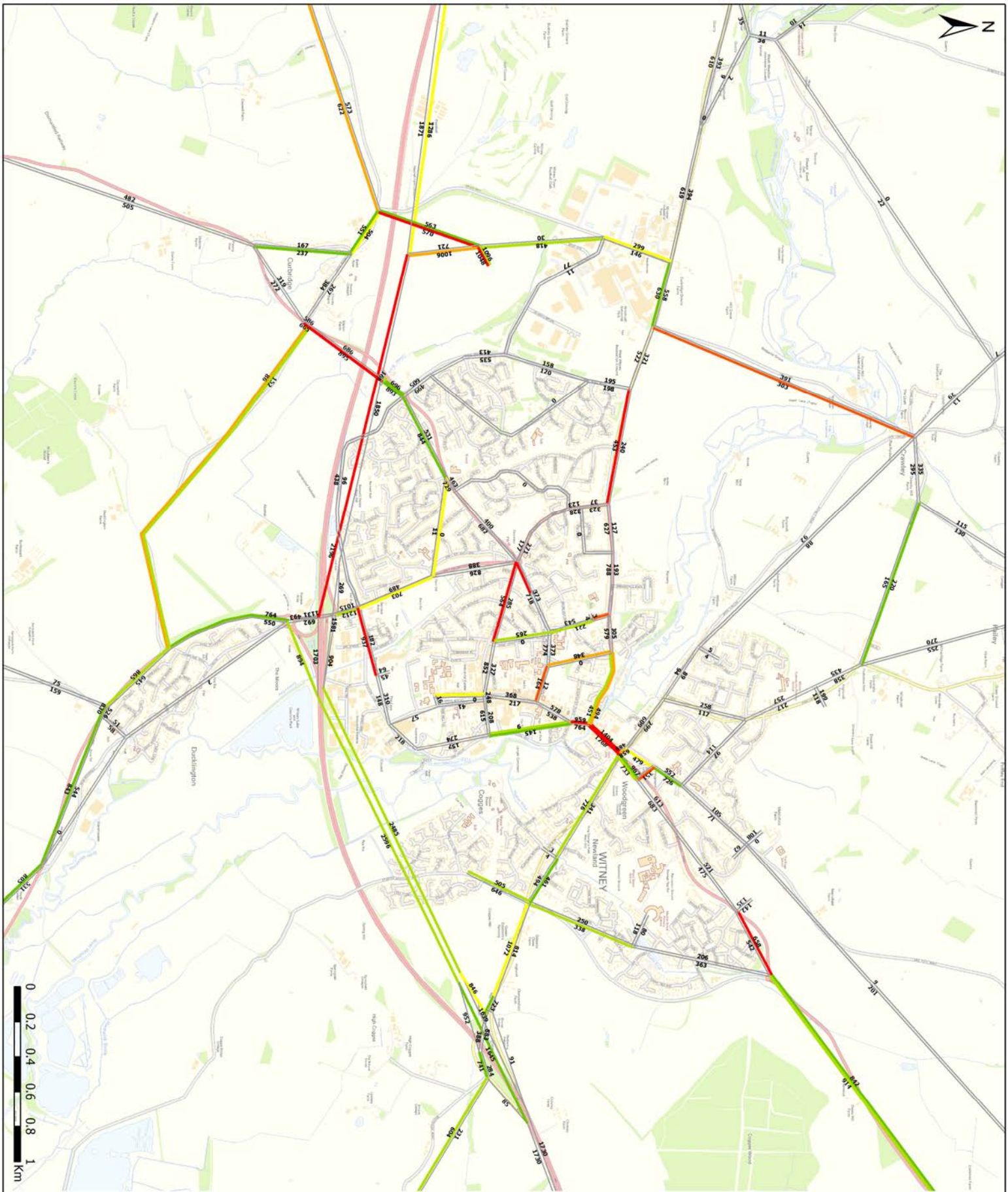
Drawing Title

Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:500	XXX	XXXXXX	XXX	XXXXXX	XXX	XXXXXX
Project No.	Office	Type	Drawing No.	Revision		
AOXXXXX	35	18	00X			





**Legend**

**S2\_Opa\_PM.FlowCapRat**

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

Contains Ordnance Survey data © Crown copyright and database right 2012.

REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:

Client Title

Line 1

Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [leicester@wyg.com](mailto:leicester@wyg.com)



Project:

Project Title

Line 1

Line 2

Drawing Title:

Drawing Title

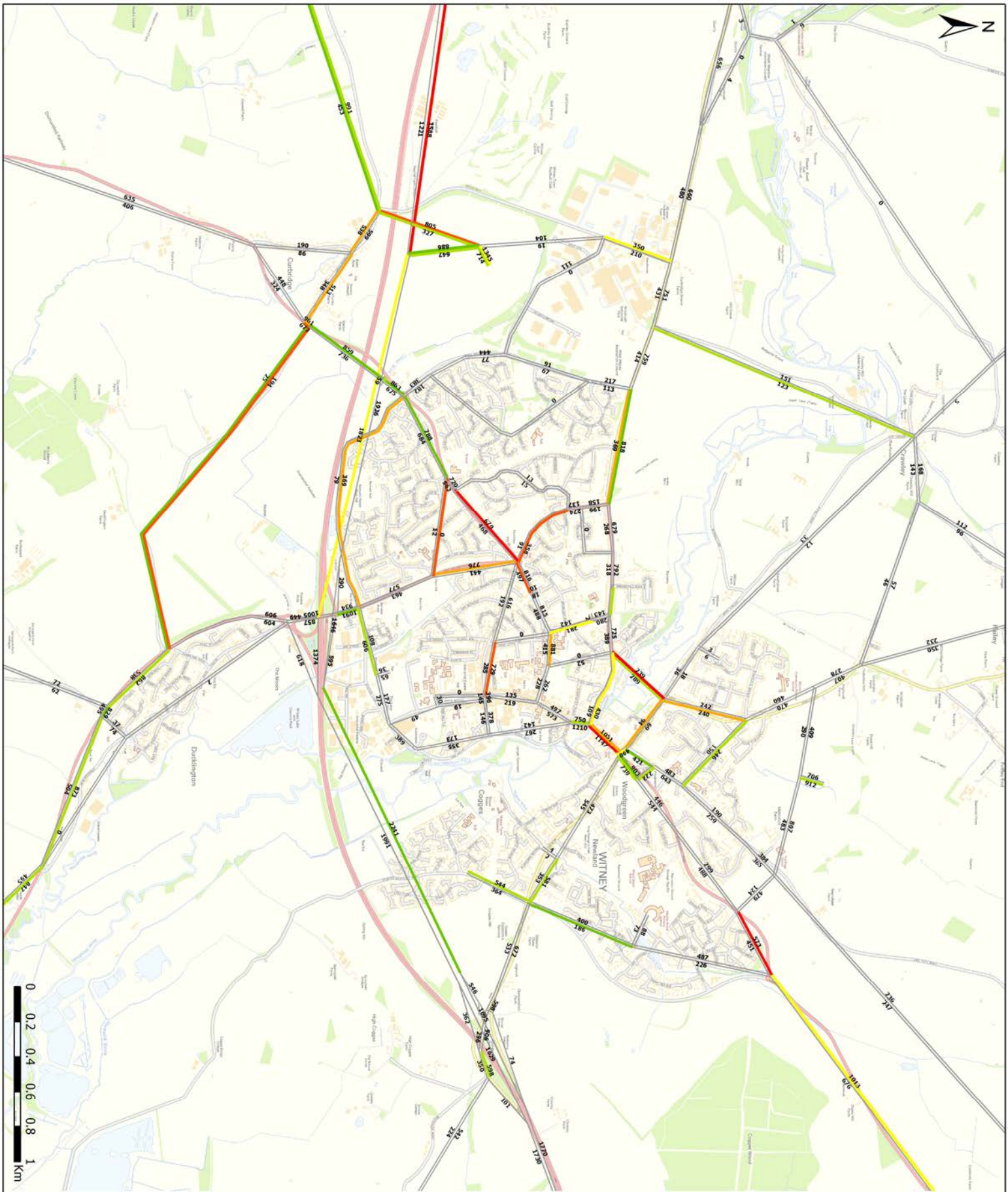
Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
Project No.	XXX	XXXXXX	XXX	XXXXXX	XXX	XXXXXX
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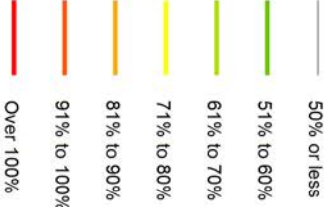
## Appendix E – Network Plans (Scenario 3a – 3c)





# Legend

S3A\_AM.FlowCapRat



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KEY	DESCRIPTION	BR	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:

Client Title

Line 1

Line 2

EXECUTIVE PARK  
S3A AM  
ANSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccaster@wyg.com](mailto:linccaster@wyg.com)



Project:

Project Title

Line 1

Line 2

Drawing Title:

Drawing Title

Line 1

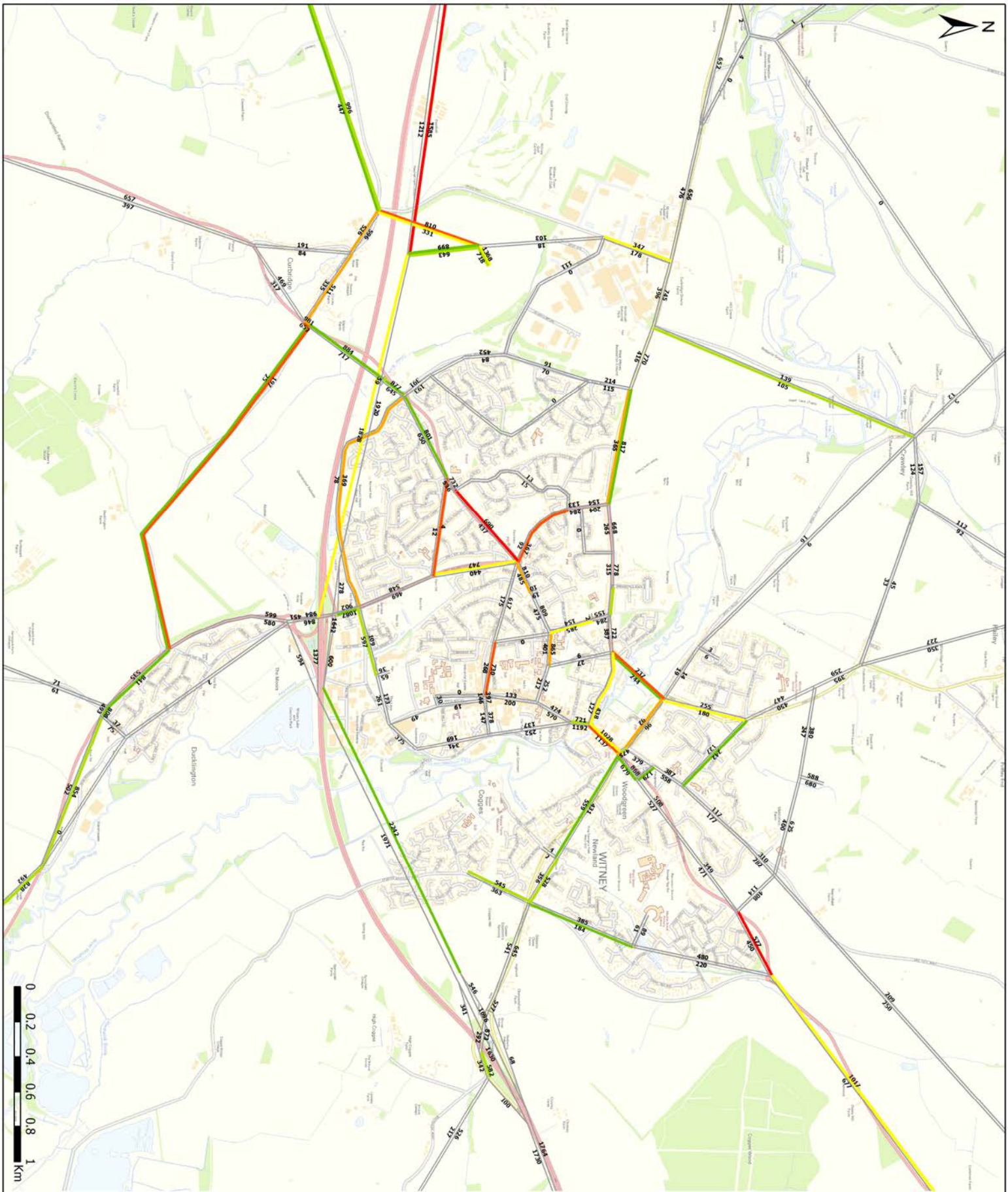
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Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	XXX	XXXXXX	XXX	XXXXXX	XXX	XXXXXX
Project No.	Office	Type	Drawing No.	Revision		
A00XXXX	35	18	00X			









# Legend

## S3B\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:

Client Title

Line 1

Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccaster@wyg.com](mailto:linccaster@wyg.com)



Project:

Project Title

Line 1

Line 2

Drawing Title:

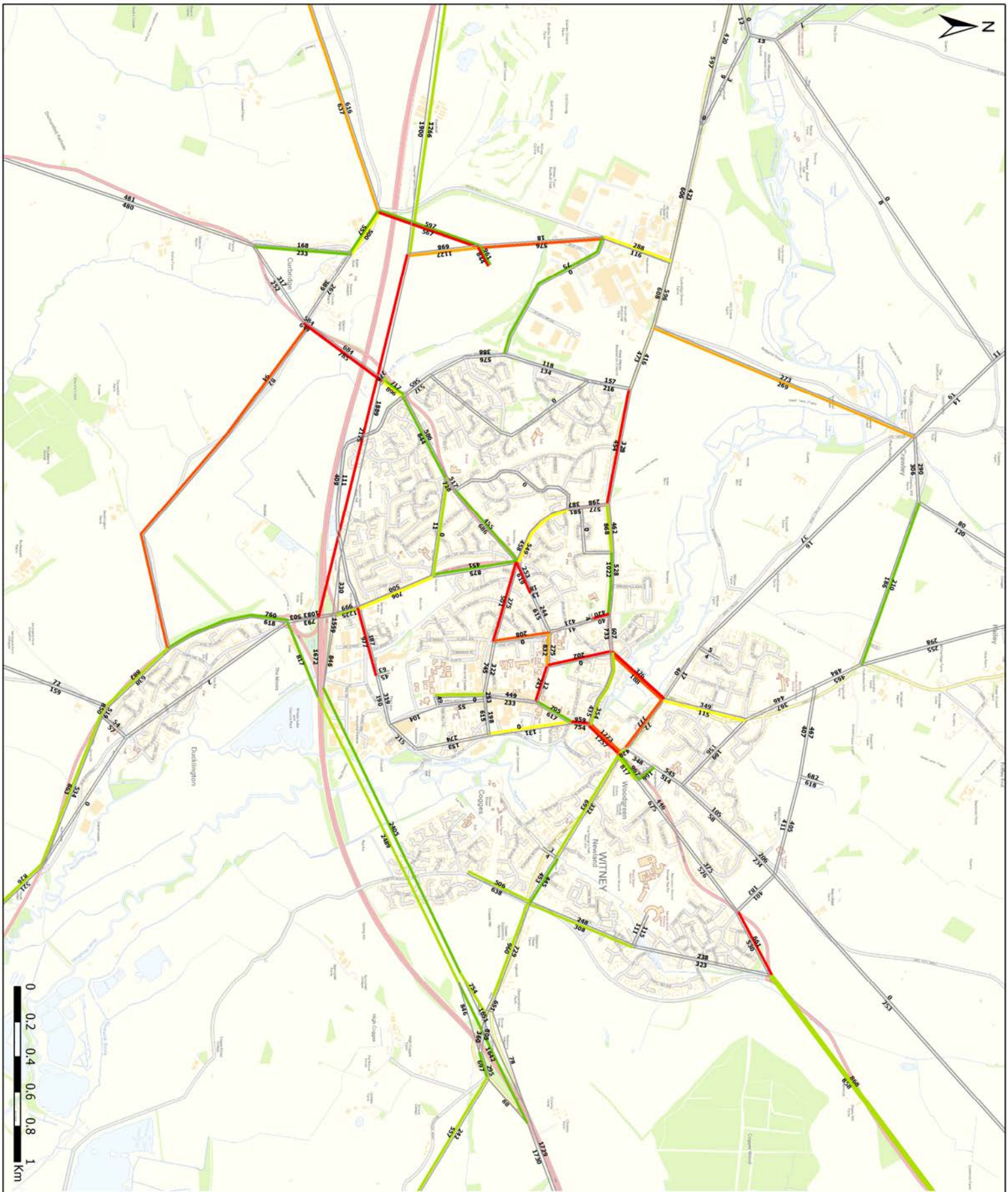
Drawing Title

Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
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Project No.	Office	Type	Drawing No.	Revision		
A00XXXX	35	18	00X			





## Legend

### WitneyLinks

#### S3B\_PM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

Contains Ordnance Survey data © Crown copyright and database right 2012.

REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:

Client Title

Line 1

Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccider@wyg.com](mailto:linccider@wyg.com)



Project:

Project Title

Line 1

Line 2

Drawing Title:

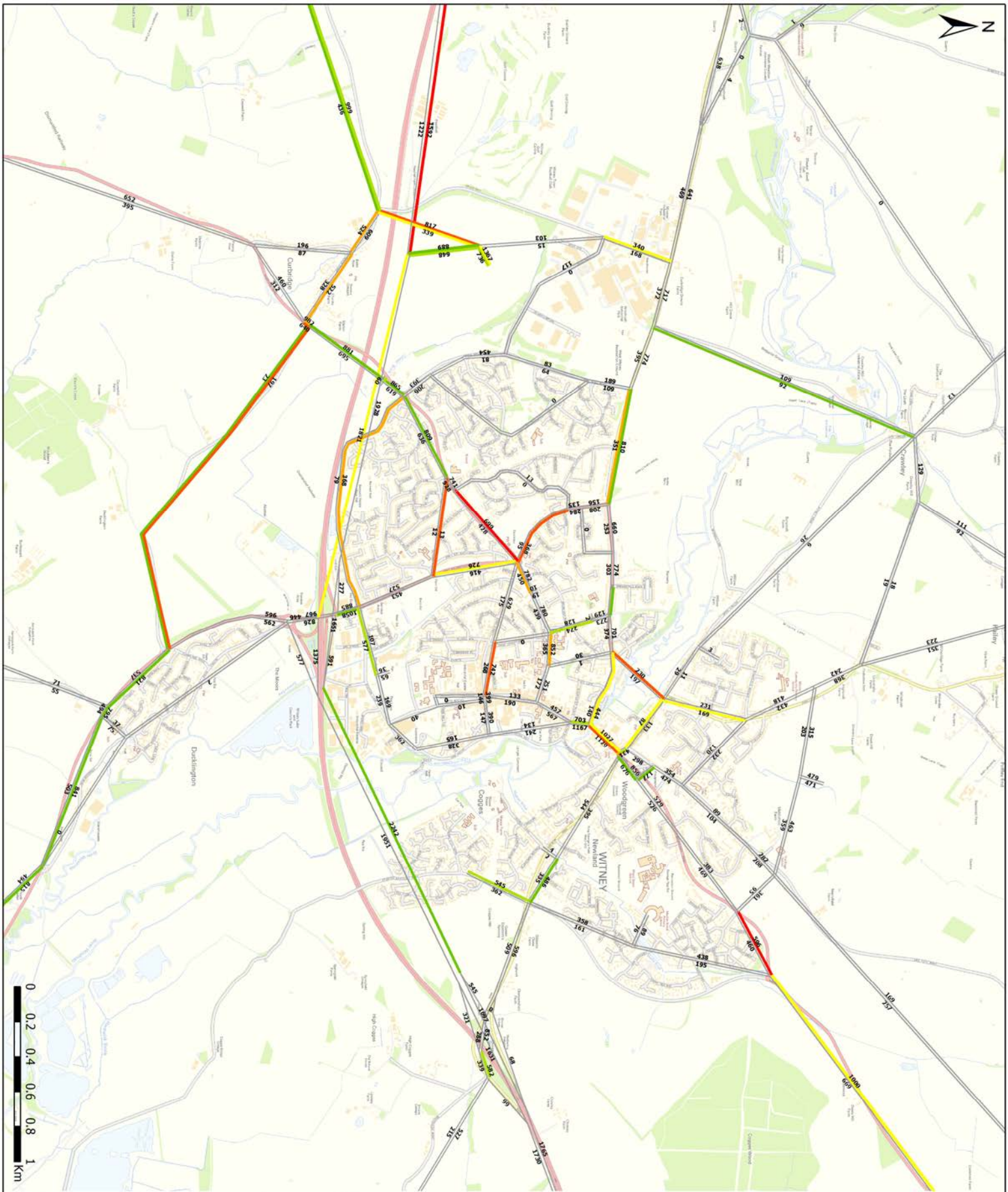
Drawing Title

Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:500	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX
Project No.	Office	Type	Drawing No.	Revision		
A00XXXX	35	18	00X			





# Legend

S3C\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client Title

Line 1

Line 2

EXECUTIVE PARK  
WITNEY  
LESTER  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [info@wyg.com](mailto:info@wyg.com)



Project Title

Line 1

Line 2

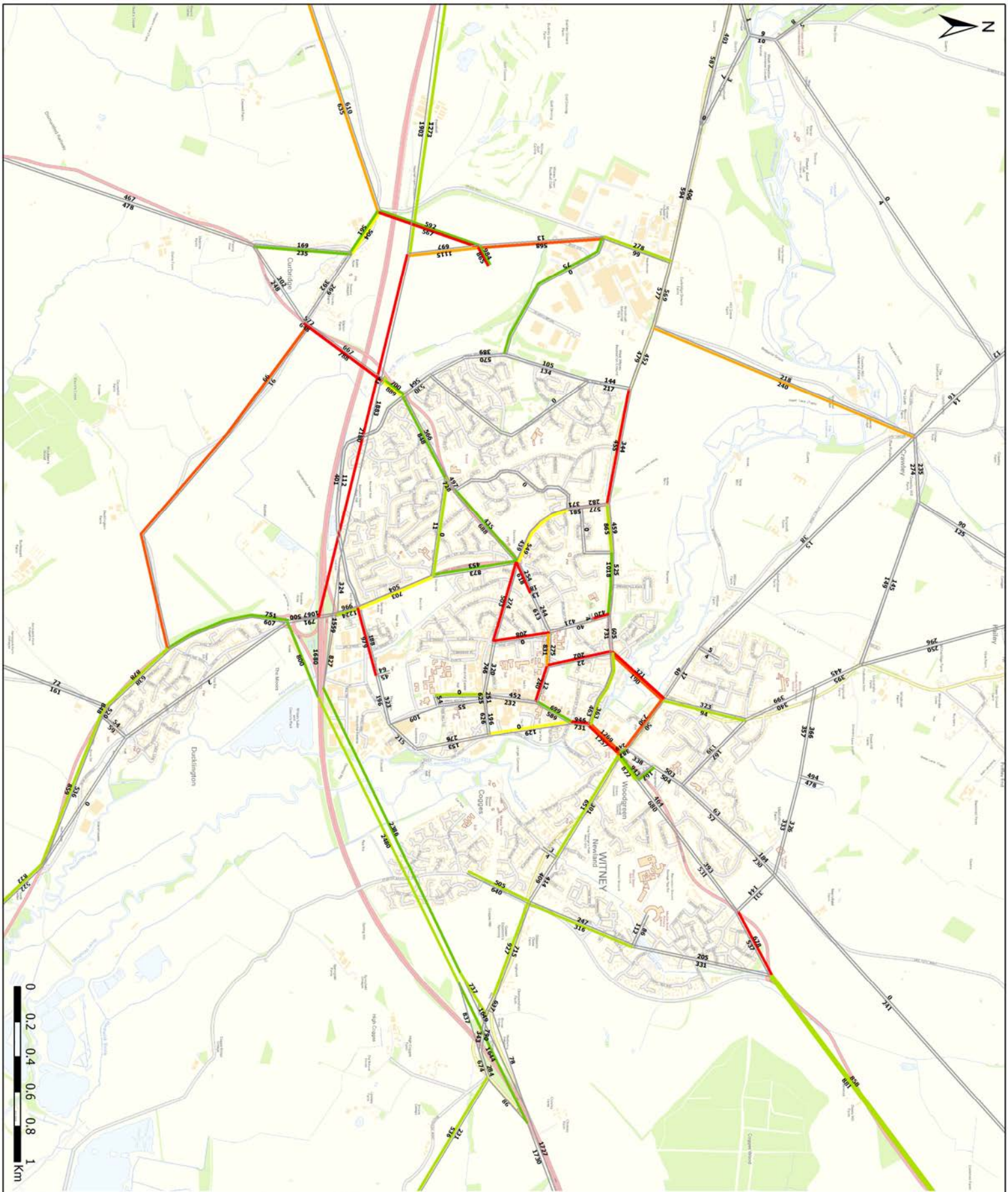
Drawing Title

Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
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Project No.	AXXXXX	35	18	00X		





# Legend

## WitneyLinks

### S3C\_PM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:  
Line 1  
Line 2

Project Title

EXECUTIVE PARK

ANSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [leicester@wyg.com](mailto:leicester@wyg.com)



Project Title

Line 1  
Line 2

Drawing Title

Line 1  
Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:1000	XXX	XXXXXX	XXX	XXXXXX	XXX	XXXXXX
Project No.	AOXXXX	35	18	00X		





## Legend

### WitneyLinks

#### S4\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:

Client Title

Line 1

Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccaster@wyg.com](mailto:linccaster@wyg.com)



Project:

Project Title

Line 1

Line 2

Drawing Title:

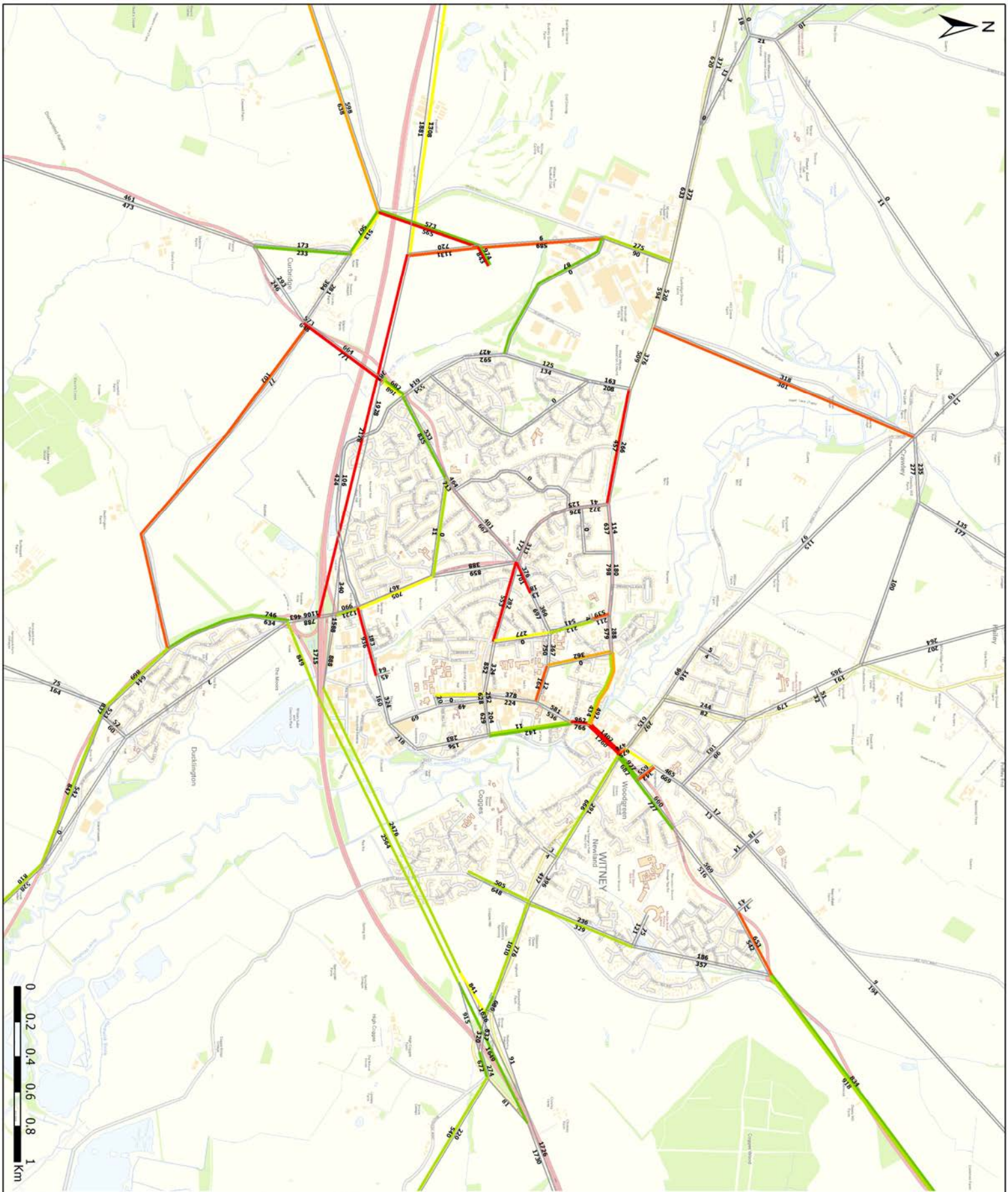
Drawing Title

Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
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Project No.	Office	Type	Drawing No.	Revision		
A00XXXX	35	18	00X			





## Legend

### WitneyLinks

#### S4\_P.M.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:  
Client Title

Line 1  
Line 2

EXECUTIVE PARK  
WITNEY  
AMSTER  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [leicester@wyg.com](mailto:leicester@wyg.com)



Project:  
Project Title

Line 1  
Line 2

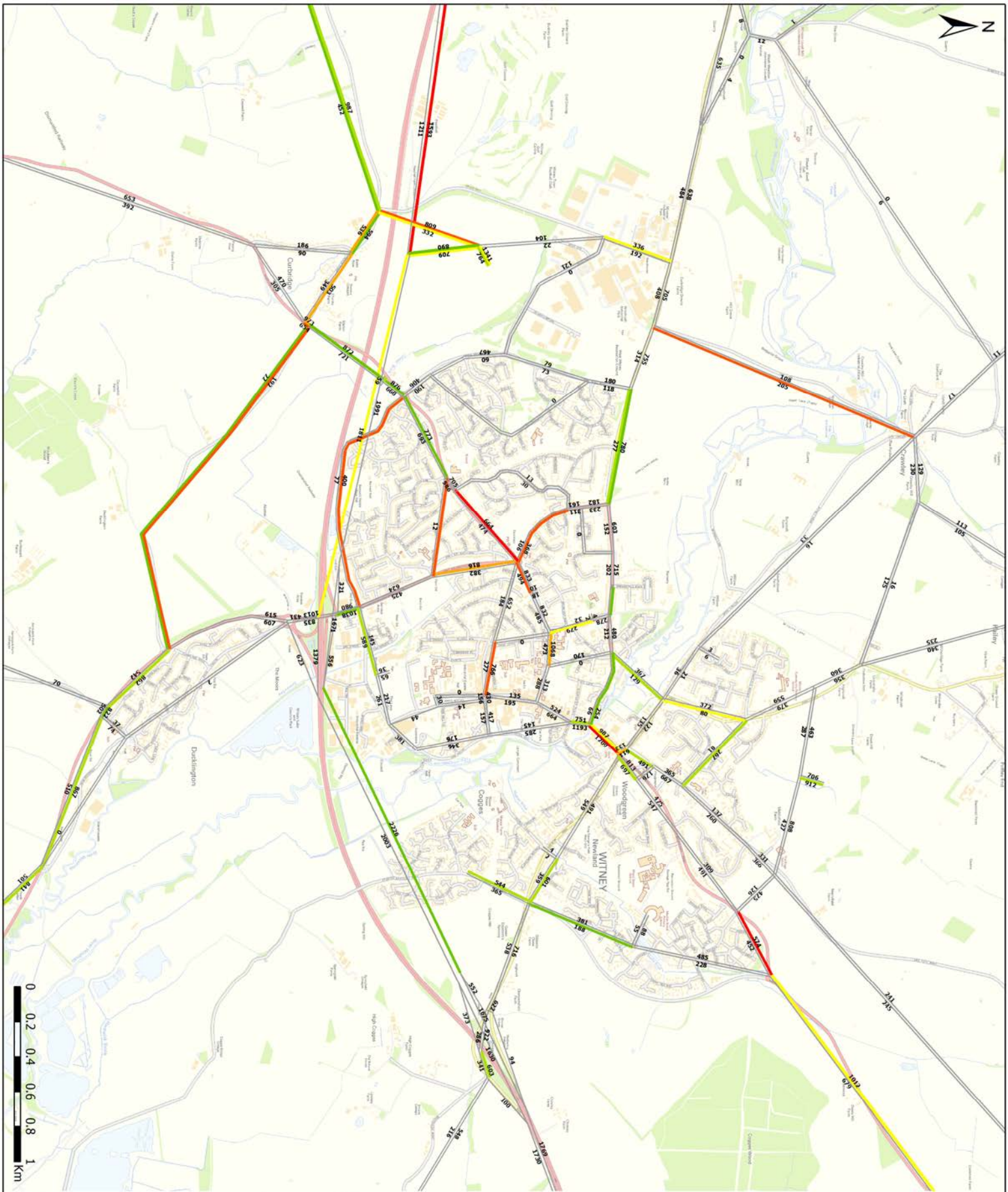
Drawing Title:  
Drawing Title

Line 1  
Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
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Project No.	Office	Type	Drawn	No.	00X	Revision
A00XXXX	35	18				



## Appendix E – Network Plans (Scenario 5a – 5c)



## Legend

### WitneyLinks

#### SSA\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:  
Client Title

Line 1  
Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccaster@wyg.com](mailto:linccaster@wyg.com)



Project:  
Project Title

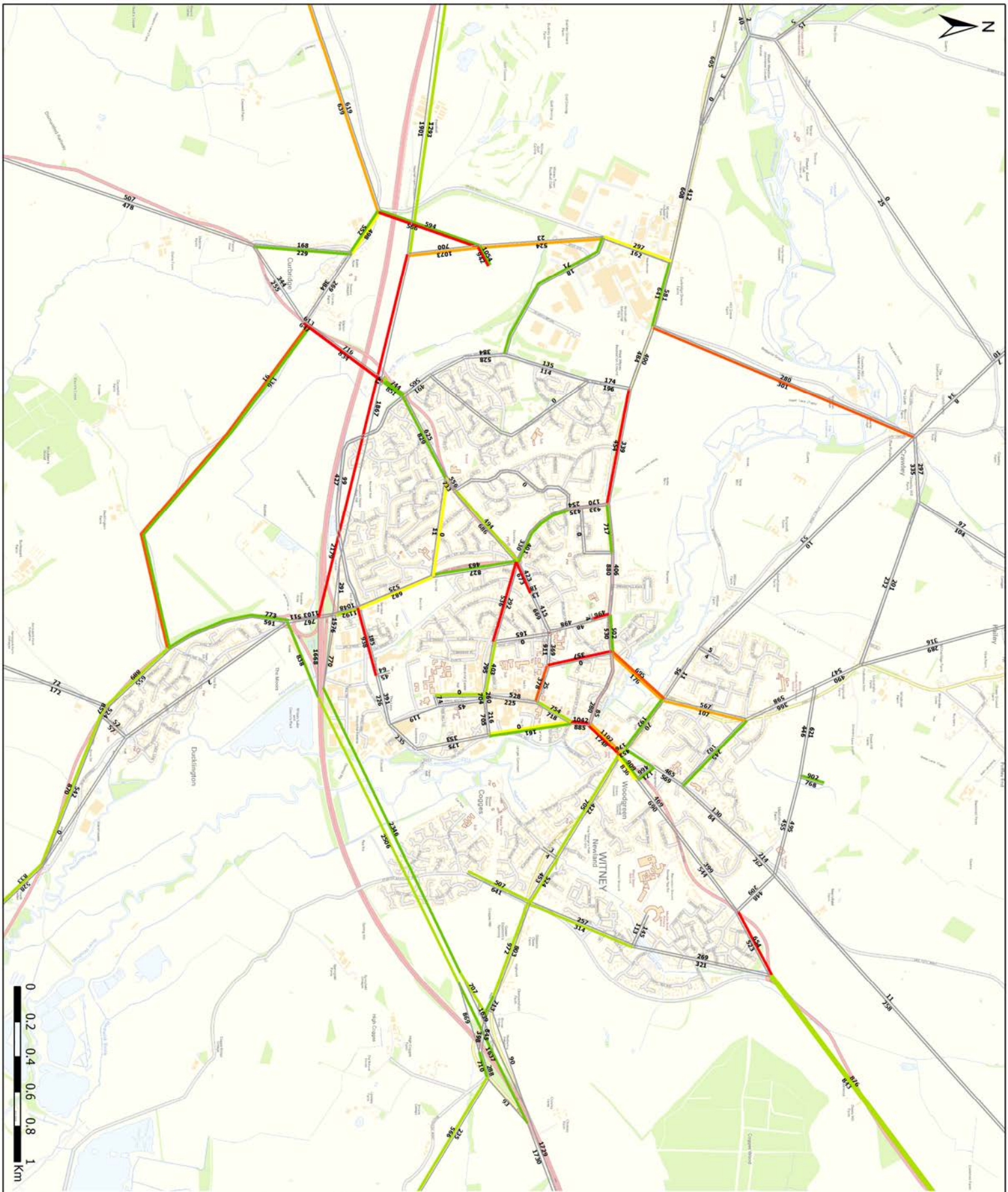
Line 1  
Line 2

Drawing Title:  
Drawing Title

Line 1  
Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
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Project No.	Office	Type	Drawing No.	Revision		
AOXXXXX	35	18	00X			

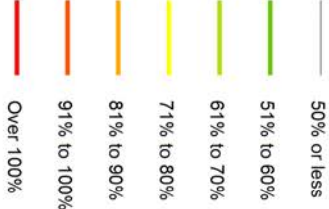




## Legend

### WitneyLinks

#### SSA\_P.M.FlowCapRat



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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client  
Line 1  
Line 2

Project  
Line 1  
Line 2

EXECUTIVE PARK  
DUSLINGTON  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [leicester@wyg.com](mailto:leicester@wyg.com)



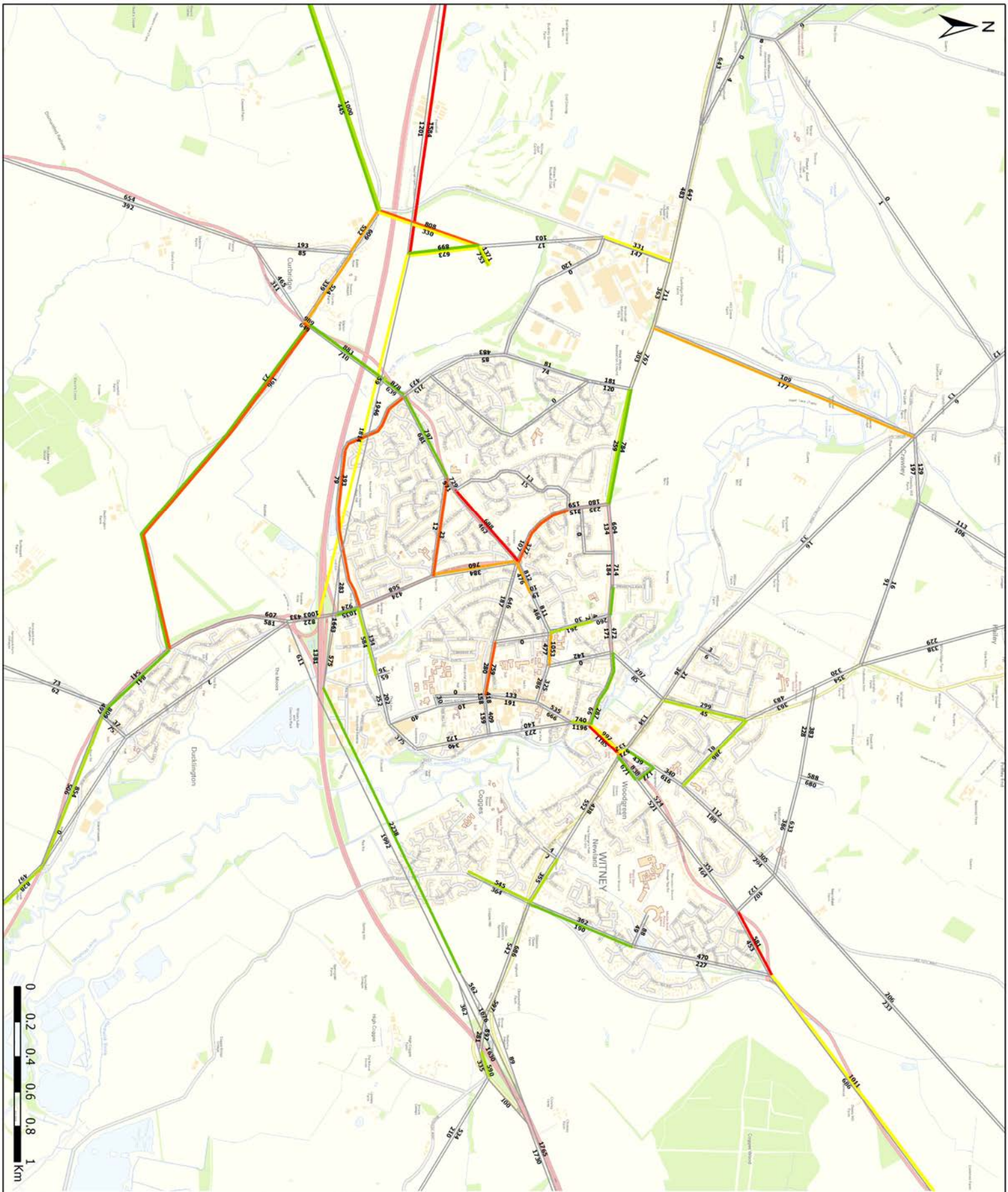
Project  
Line 1  
Line 2

Drawing Title  
Line 1  
Line 2

Scale @ A3  
Project No. A00XXXX  
Drawing No. 35 18  
Revision 00X

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:1	XXX	XXXXXX	XXX	XXXXXX	XXX	XXXXXX
Project No.	A00XXXX	35 18	00X			





## Legend

### WitneyLinks

#### S5B\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:  
Client Title

Line 1  
Line 2

EXECUTIVE PARK  
SANDHILL WAY  
ANSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccaster@wyg.com](mailto:linccaster@wyg.com)



Project:  
Project Title

Line 1  
Line 2

Drawing Title:  
Drawing Title

Line 1  
Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:500	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX
Project No.	Office	Type	Drawing No.	Revision		
A00XXXX	35	18	00X			





## Legend

### WitneyLinks

#### S5B\_PM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:  
Client Title

Line 1  
Line 2

EXECUTIVE PARK  
SANDHURST  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [linccaster@wyg.com](mailto:linccaster@wyg.com)



Project:  
Project Title

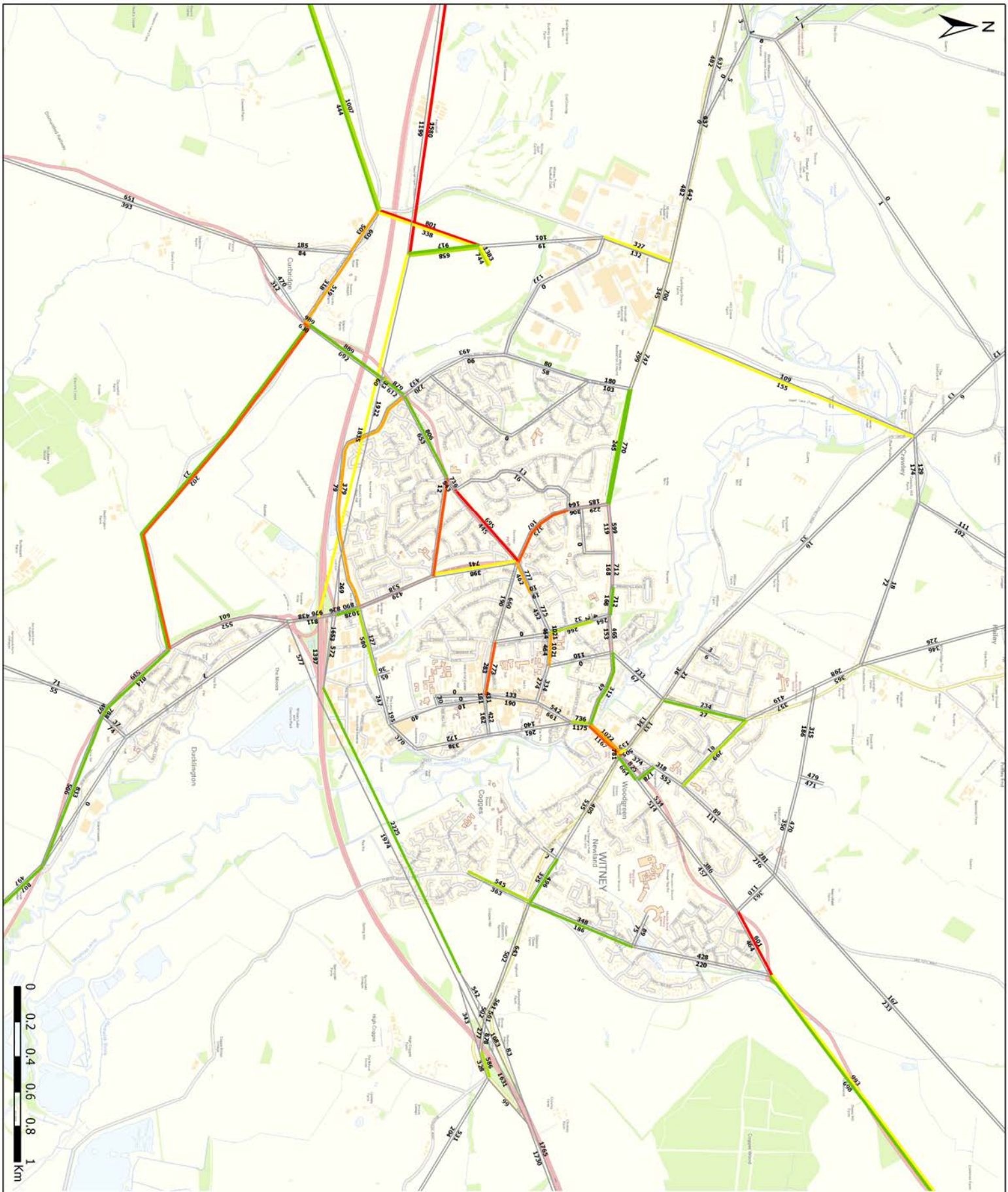
Line 1  
Line 2

Drawing Title:  
Drawing Title

Line 1  
Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:1000	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX
Project No.	Office	Type	Drawing No.	Revision		
A00XXXX	35	18	00X			





## Legend

### WitneyLinks

#### SSC\_AM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

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REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:  
Client Title

Line 1  
Line 2

EXECUTIVE PARK  
WITNEY  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [leicester@wyg.com](mailto:leicester@wyg.com)



Project:  
Project Title

Line 1  
Line 2

Drawing Title:  
Drawing Title

Line 1  
Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:1000	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX	XXX	XXXX/XX/XX
Project No.	Office	Type	Drawing No.	Revision		
AOX0000	35	18	00X			





# Legend

## WitneyLinks

### S5C\_PM.FlowCapRat

- 50% or less
- 51% to 60%
- 61% to 70%
- 71% to 80%
- 81% to 90%
- 91% to 100%
- Over 100%

Contains Ordnance Survey data © Crown copyright and database right 2012.

REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client:

Client Title

Line 1

Line 2

EXECUTIVE PARK  
WITNEY  
AMSTY  
LEICESTER  
LE7 7GR  
TEL: +44 (0)116 234 8000  
FAX: +44 (0)116 234 8001  
e-mail: [leicester@wyg.com](mailto:leicester@wyg.com)



Project:

Project Title

Line 1

Line 2

Drawing Title:

Drawing Title

Line 1

Line 2

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:500	XXX	XXXXXX	XXX	XXXXXX	XXX	XXXXXX
Project No.	Office	Type	Drawn	No.	Revision	
A00XXXX	35	18	00X			