
LAND AT ODD DOWN, BATH
TECHNICAL NOTE 2
EASTERN ACCESS ASSESSMENT

Introduction

- 1.1 This Technical Note has been prepared as an Addendum to the earlier submission made by the Hignett Family Trust (Reference: CD10/LD1b) and to address the questions arising from the Council in CD10/E8 as to the acceptability and achievability of upgrading the South Stoke Lane / Midford Road junction.
- 1.2 The Core Strategy Placemaking Principles for the Odd Down allocation specify the requirement for an access from Combe Hay Lane, but acknowledge the possibility of a junction on South Stoke Lane. The Hignett Family Trust has commissioned this Technical Note to assess whether the junction at South Stoke Lane / Midford Road is feasible either an alternative or an additional access to that proposed from Combe Hay Lane.
- 1.3 This report is intended to provide a more detailed examination of the development and access proposals than the Preliminary Capacity Assessment of Access Junctions (Reference: CD10/LD1a) previously submitted. The previous assessment was predicated upon a number of assumptions, whereas the analysis in this Report is instead based upon actual traffic counts and a standard methodology. It therefore represents a robust examination of junction capacity and the impact of the proposed development.
- 1.4 In the covering note supporting the Statement of Common Ground, Savills made reference to further technical evidence which would be available following the completion of the SoGC. This Technical Note provides the evidence which was referred to in that note

Local Plan Allocation

- 1.5 Bath and North East Somerset Council (B&NES) have issued for public consultation a Schedule of Proposed Changes to the Submitted Core Strategy which proposes that land adjacent to Odd Down be removed from the Green Belt to provide for the development of 300 dwellings. No specific area for these proposed residential dwellings has been specified, although it is suggested that vehicular access should be from the west via Combe Hay Lane.
- 1.6 This Technical Note assesses the ability of the proposed allocation or part of it to be accessed from the east via Southstoke Lane/ Midford Road.

Traffic Surveys

- 1.7 Manual Classified Count surveys (MCC) were undertaken at the crossroads junction of Midford Road and Southstoke Lane.
- 1.8 The peak period turn count surveys were undertaken by professional survey company, 360TSL, on Wednesday 22 January 2014. These identified the peak hours as follows:
 - AM peak . 08:00 to 09:00
 - PM peak . 17:00 to 18:00

Assessment Scenarios

- 1.9 For the purposes of this Report, the development is assumed to comprise 350 residential units and 300 employees. There are currently approximately 100 employees on the site at the Manor Farm Buildings and hence the increase in employment levels will be 200 employees.
- 1.10 These figures have been consciously selected to ensure that the assessment of junction capacity incorporates a degree of flexibility. In reality however the scale of vehicle movements is likely to be significantly less.

Trip Generation

- 1.11 The TRICS 2013(a) database has been used to extract person trip rates for the proposed residential aspect of the scheme and to extract vehicle trip rates for the employment uses
- 1.12 The houses privately owned and Business Park categories were used for a robust assessment. Sites in Greater London and Ireland (north and south) have been excluded and the size of development restricted to between 90 and 491 residential units and 45 to 1000 employees. Only sites located in edge of town or suburban locations have been used with the assessment limited to weekday movements only.
- 1.13 In addition, the resident population within 1 mile radius of the survey sites has been limited to no more than 25,000 while the resident population within 5 mile radius of the survey sites has been limited to no more than 125,000 for the residential aspect and 250,000 for the employment use. This provides sufficient sites for each aspect to generate a robust average trip rate.
- 1.14 The resultant person trip rates and person trip generation are shown in **Table 1**.

Proposed Residential	Morning Peak Hour		Evening Peak Hour		Daily	
	Arrivals	Depts	Arrivals	Depts	Arrivals	Depts
Trip Rate (per unit)	0.256	0.851	0.639	0.394	4.137	4.464
350 Units	90	298	224	138	1448	1562

Table 1: Person Trips Generated by the Proposed Residential Development

- 1.15 Table 1 demonstrates that 350 residential units would generate approximately 388 two-way person trips during the morning peak hour, 362 two-way person trips during the evening peak hour with a two-way person trip generation of 3010 over the course of a 12-hour day.
- 1.16 In order to convert the person trips associated with the residential aspect of the scheme into actual vehicle trips, 2011 Census Method of Travel to Work data for the Odd Down ward was used to generate modal split information.
- 1.17 For a robust assessment of the modal split, non-travellers such as persons who work from home and persons not in employment are removed from the Census calculations. This results in 58% of travellers from the Odd Down Census ward driving a car or van to work. This value has been applied to the person trips identified in **Table 1** in order to generate the vehicle trips outlined in **Table 2**.

Proposed Residential	Morning Peak Hour		Evening Peak Hour		Daily	
	Arrivals	Deps	Arrivals	Deps	Arrivals	Deps
Trip Rate (per unit)	0.149	0.496	0.373	0.230	2.412	2.603
350 Units	52	174	130	80	844	911

Table 2: Vehicle Trips Generated by the Proposed Residential Development

1.18 Due to the likelihood of varying origin locations for the employment use, it was considered more appropriate to directly extract vehicle trips from TRICS for the employment use. These are outlined in **Table 3** below.

Proposed Employment	Morning Peak Hour		Evening Peak Hour		Daily	
	Arrivals	Deps	Arrivals	Deps	Arrivals	Deps
Trip Rate (per unit)	0.149	0.496	0.373	0.230	2.412	2.603
300 Employees	141	29	24	113	544	545

Table 3: Vehicle Trips Generated by the Proposed Employment Development

1.19 The vehicle trips identified in Tables 2 and 3 are subsequently assigned to the 2019 Base network to generate a 2019 Base plus development scenario. The method of assignment is detailed below.

Trip Distribution and Assignment

- 1.20 Information to estimate the trip distribution has been obtained by using the 2001 Travel to Work Census data from the website www.nomisweb.co.uk (supplied by the Office of National Statistics).
- 1.21 For the residential use, the Odd Down Census ward was set as the place of residence with destinations set at ward level within B&NES and at local authority level further afield. Conversely, for the employment use, Odd Down was set as the destination with origins set at ward level within B&NES and at local authority level further afield.

Traffic Growth

- 1.22 The traffic impacts of the development will be assessed based on the year of application and a date five years thereafter. The assessment years will therefore be 2014 and 2019. The traffic flows associated with the 2014 and 2019 base scenarios are illustrated in **Figures 1 and 2** respectively.
- 1.23 Growth factors need to be applied to the 2014 surveys so that the likely base traffic flows in the 2019 assessment year can be calculated. The TEMPRO trip end model referenced to National Road Traffic Forecast central growth values has been used to calculate the growth factors. For 2014 to 2019 the growth factors are 1.073 and 1.073 for the AM and PM Peak respectively.

Calculated Development Traffic Flows

- 1.24 The predicted development traffic flows have been applied to the network for the 2019 design year using the trip distributions identified previously.
- 1.25 The resultant trip assignment have been added to the 2019 TEMPRO growthed base flows to provide traffic flow data as shown in **Figure 3**.

Junction Assessments

- 1.26 A proposed signal controlled junction has been assessed in LINSIG using the 2019 with development traffic flows for 350 Residential and 300 Employees.
- 1.27 The LINSIG model has been assessed for a new signal junction with no right turn filter arrow and with a right turn filter on the west to south movement.
- 1.28 The results of these assessments are summarised in **Tables 4 and 5** respectively with the signalised layout illustrated in **Figure 4**.

Scenario	Approach	Degree of Saturation (DoS)	Maximum Queue (veh)	Ave. Delay (mins/veh)
2019 AM Base + Scenario 2 (350 Units + 300 Employees)	North	32.5%	3.2	0.88
	East	74.0%	20.3	0.41
	South	83.1%	10.0	1.22
	West	85.3%	10.0	1.39
2019 PM Base + Scenario 2 (350 Units + 300 Employees)	North	15.9%	2.1	0.63
	East	56.6%	12.3	0.49
	South	67.8%	9.5	0.78
	West	66.9%	16.5	0.50

Table 4: LINSIG Results (with No Filter Arrow)

- 1.29 The results of the signal junction assessment with no filter arrow shows that the junction operates within its theoretical operational capacity in both the AM and PM peak hours.
- 1.30 However, congestion on the south and west arms in the AM peak causes delays which exceed one minute per vehicle, with a maximum queue in excess of 100m on the eastern arm.
- 1.31 In order to test the effect of introducing a right turn filter arrow, a further LINSIG assessment was undertaken. The results of the model, which includes a right turn filter, are presented in **Table 5** below.

Scenario	Approach	Degree of Saturation (DoS)	Maximum Queue (veh)	Ave. Delay (mins/veh)
2019 AM Base + Scenario 2 (350 Units + 300 Employees)	North	28.2%	2.7	0.86
	East	78.1%	22.2	0.49
	South	77.3%	8.7	1.10
	West	66.2%	9.2	1.05
2019 PM Base + Scenario 2 (350 Units + 300 Employees)	North	18.4%	2.2	0.71
	East	55.6%	12.1	0.45
	South	61.5%	7.6	0.83
	West	61.5%	15.0	0.62

Table 5: LINSIG Results (with Filter Arrow)

- 1.32 Comparing the results shown in **Tables 5 and 6**, it is apparent that the introduction of a right turn filter arrow on the west to south movement produces a reduction in the degree of saturation, reduced average delay and a slight reduction in queues on the south and west arms. This is at the expense of a slight increase in queues delays and the degree of saturation on the eastern arm.

- 1.33 However, delays still exceed one minute per vehicle and queues extend for over 100m on the east arm in the AM peak. Despite these issues, both LINSIG models operate well within capacity.
- 1.34 In order to address some of the capacity and other traffic issues identified in the LINSIG assessments outlined above and to test the viability of alternative junction layouts, two additional assessments were undertaken in ARCADY with two new roundabout junction configurations. The two assessed roundabout junctions are in the form of a mini-roundabout and a standard (30.8m) diameter roundabout junction.
- 1.35 As such, a mini-roundabout junction was assessed in ARCADY in 2019 with 350 Residential and 300 Employees at the Southstoke Lane/Midford Road junction.
- 1.36 The results of these assessments are summarised in **Tables 6 & 7** for the mini and standard roundabouts respectively.

Scenario	Approach	Ratio of Flow to Capacity (RFC)	Maximum Queue (veh)	Ave. Delay (mins/veh)
2019 AM Base + Scenario 2 (350 Units + 300 Employees)	North	0.11	0.13	0.11
	East	0.92	8.97	0.63
	South	0.71	2.36	0.71
	West	0.62	1.64	0.62
2019 PM Base + Scenario 2 (350 Units + 300 Employees)	North	0.11	0.12	0.09
	East	0.57	1.33	0.14
	South	0.58	1.39	0.24
	West	0.69	2.26	0.17

Table 6: ARCADY Results for a Mini-Roundabout

- 1.37 The results of these assessments show that, as a mini-roundabout, the junction operates near to its theoretical operational capacity in 2019 in the AM peak. Delays are less than 45 seconds per vehicle and queues are around 50m at their longest. The PM peak does not experience any notable capacity, delay or queue issues.
- 1.38 For completeness, a standard roundabout junction was also assessed in ARCADY in 2019 with 350 Residential and 300 Employees at the Southstoke Lane/Midford Road junction.
- 1.39 The roundabout junction configuration used for this assessment is based on an indicative layout, with Southstoke Lane realigned further to the west to achieve suitable deflection on the west and south arms as shown in **Figure 5**. The results of these assessments are summarised in **Table 7** below.

Scenario	Approach	Ratio of Flow to Capacity (RFC)	Maximum Queue (veh)	Ave. Delay (mins/veh)
2019 AM Base + Scenario 2 (350 Units + 300 Employees)	North	0.12	0.14	0.09
	East	0.82	4.40	0.30
	South	0.78	3.21	0.61
	West	0.57	1.39	0.12
2019 PM Base + Scenario 2 (350 Units + 300 Employees)	North	0.12	0.14	0.09
	East	0.51	1.05	0.11
	South	0.61	1.56	0.27
	West	0.65	1.83	0.13

Table 7: ARCADY Results for a Standard Roundabout

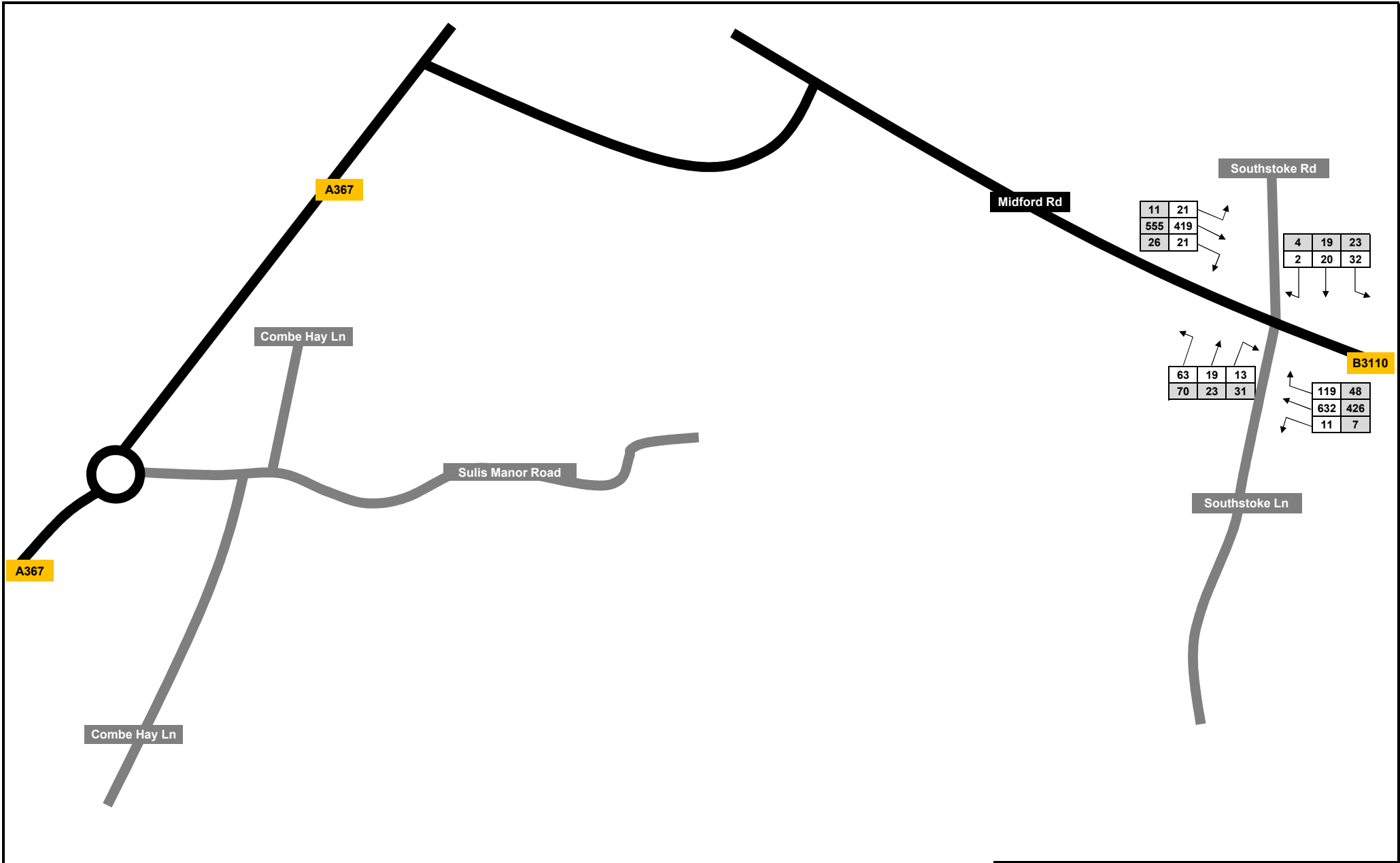
- 1.40 The results of this assessment show that a standard roundabout junction operates well within its theoretical operational capacity in 2019 in both the AM and PM peak hours with the addition of 350 residential units and 300 employees to the Land at Odd Down site.

Summary of Assessments

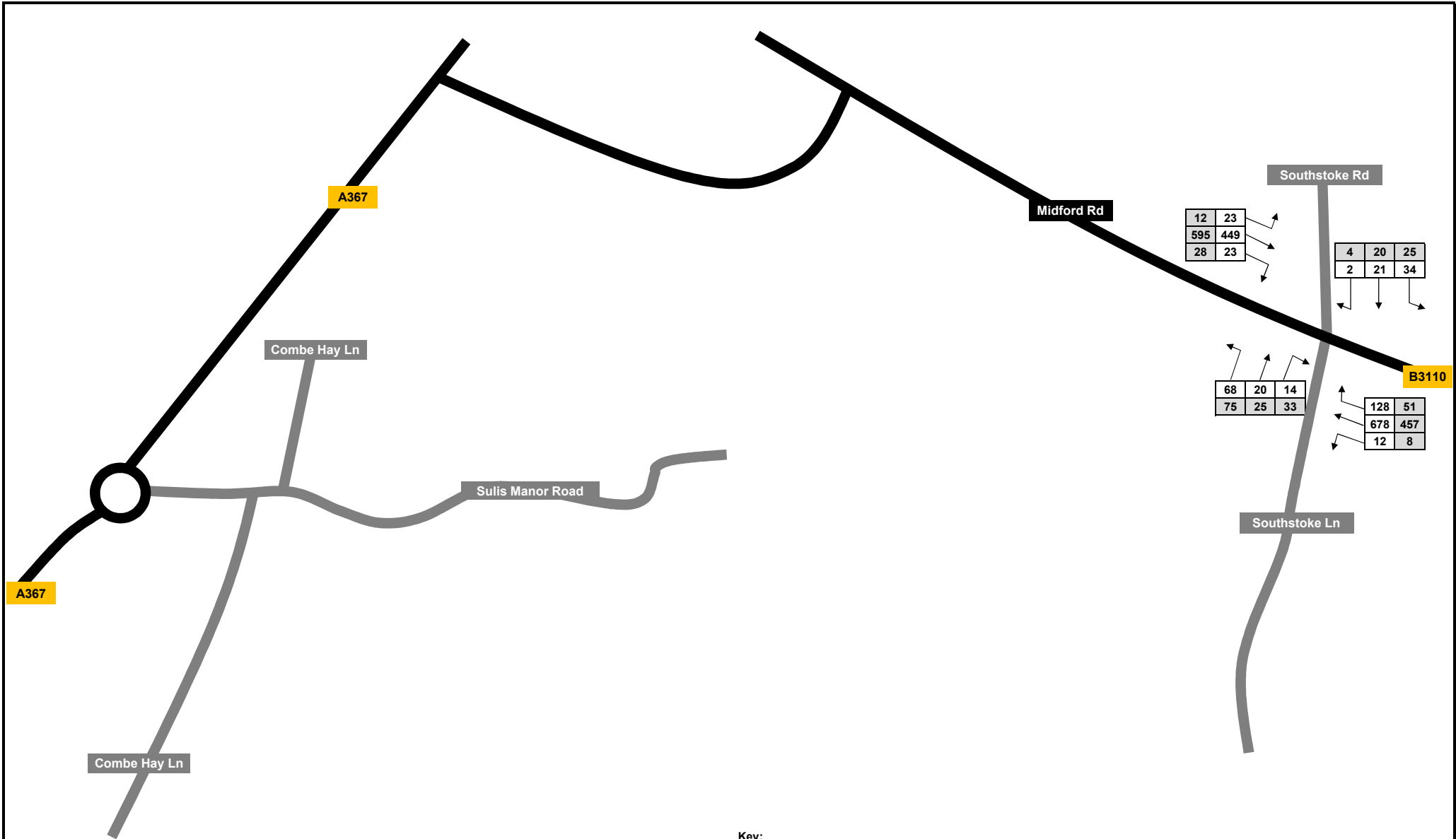
- 1.41 The capacity assessments of the revised Southstoke Lane/Midford Road junction can be summarised as follows:
- Two variations in signal phasing were tested: one with a filter arrow and one without a filter arrow.
 - The signalised layout operates within its maximum operational capacity in both the AM and PM with the addition of the traffic associated with a development comprising 350 Residential and 300 Employees in both layout options (i.e. filter arrow / no filter).
 - Maximum DOS values of 85.3% were observed in the AM peak which reduced to 78.1% with the addition of a filter arrow. However, queues of around 100m and delays of over 1 minute per vehicle are observed with a signalised set-up.
 - The subsequent testing of the two roundabout designs indicates that the mini-roundabout junction is nearing capacity on the eastern arm in the AM peak with no capacity issues in the PM peak.
 - The standard roundabout generates significant benefits over the other junctions assessed within this report, with low queues and delays and the junction operating within its theoretical capacity.
- 1.42 The proposed development may come forward with two separate access points from the east and the west. It is possible therefore that the number of vehicle movements at the Midford Road / South Stoke Lane junction could be substantially less.
- 1.43 Nevertheless, the report demonstrates that the upgrading of the South Stoke Lane / Midford Road junction is feasible and achievable whether it represents the sole access to the site or only a part of the access strategy.

FMW Consultancy

10 March 2014




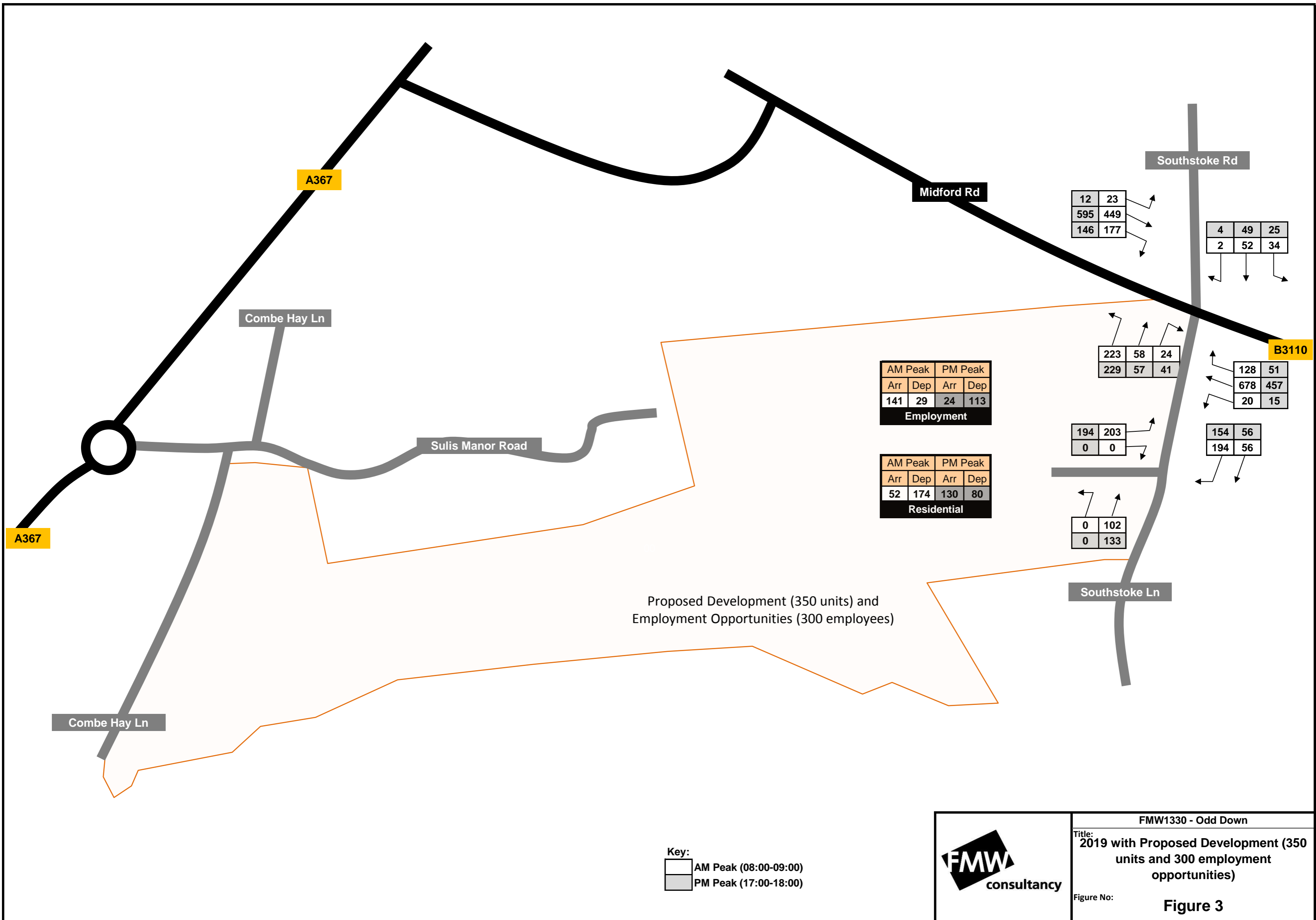
FMW1330 - Odd Down
 Title: 2014 Surveyed Traffic Flows
 Figure No: Figure 1



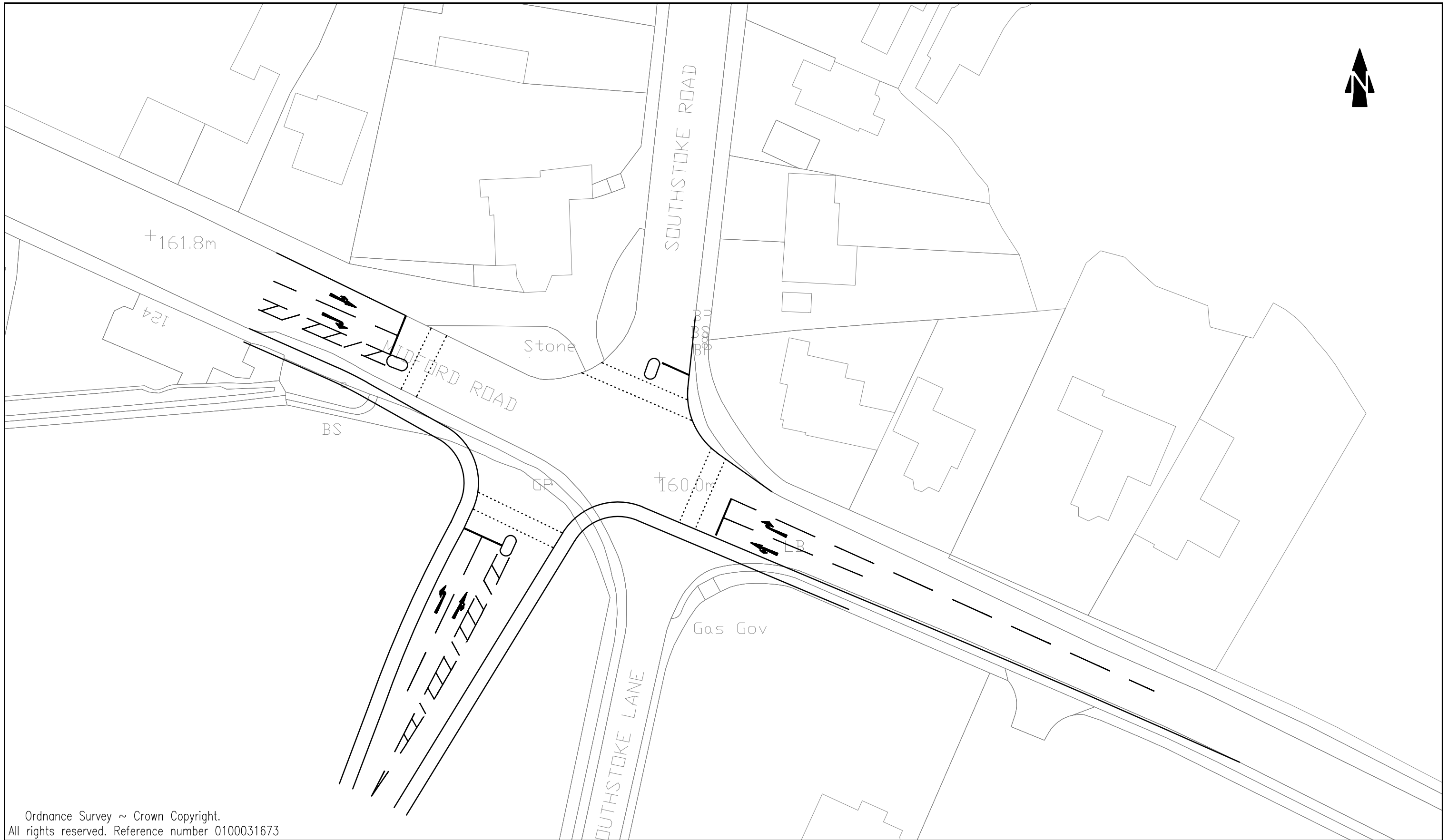
Key:

- 5 AM Peak (08:00-09:00)
- 9 PM Peak (17:00-18:00)
- 1.07 2014 > 2019 Growth Factor
- 1.07 2014 > 2019 Growth Factor

	<p>FMW1330 - Odd Down</p>
	<p>Title:</p> <p>2019 Base Traffic Flows</p>
	<p>Figure No:</p> <p>Figure 2</p>



	FMW1330 - Odd Down
	Title: 2019 with Proposed Development (350 units and 300 employment opportunities)
	Figure No: Figure 3



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REV	DATE	BY	DESCRIPTION	CHK	APD

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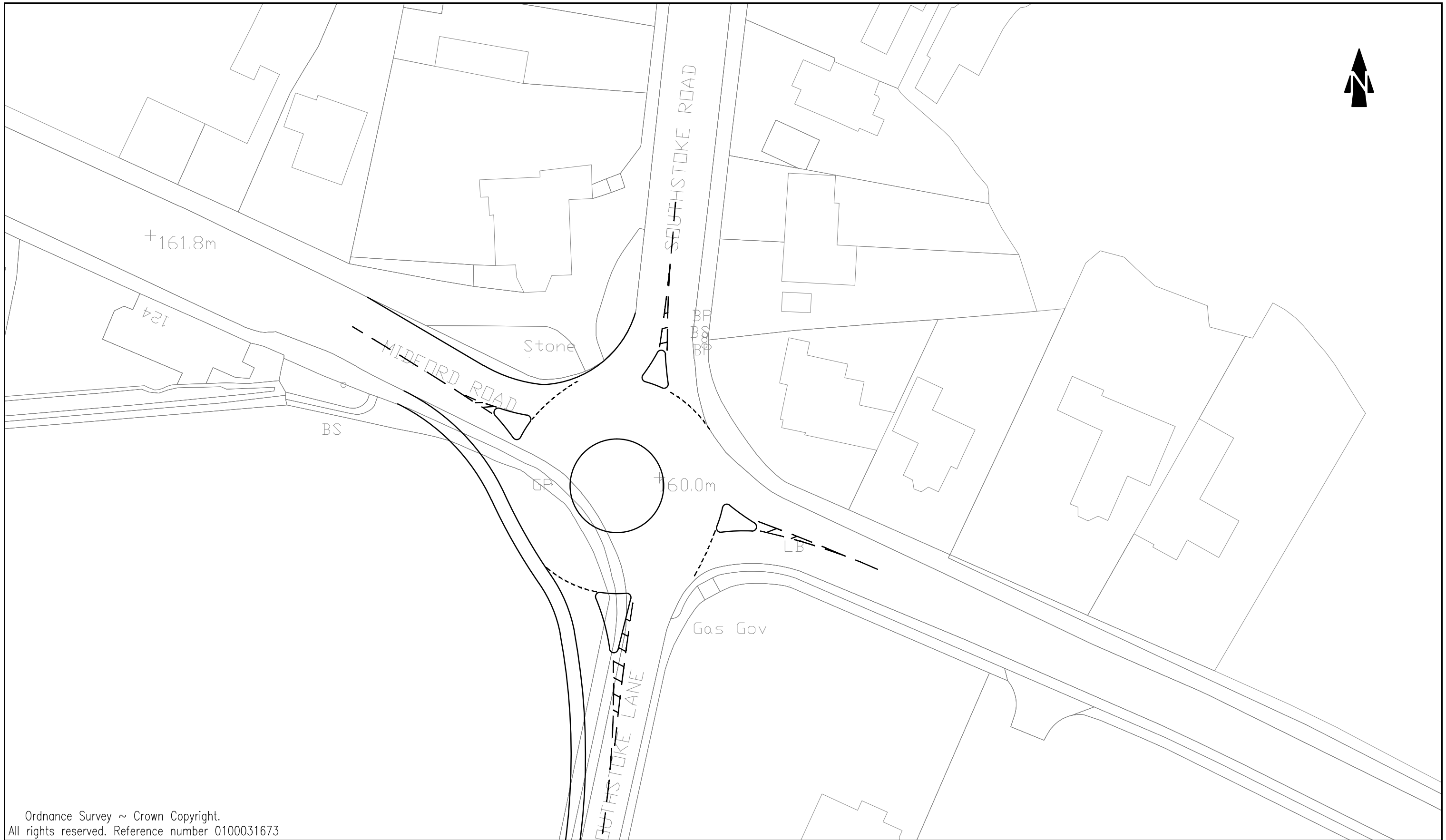

FMW consultancy
 Trym Lodge, 1 Henbury Road, Westbury-on-Trym, Bristol BS9 3HQ
 Tel: +44 (0)117 959 6464 Fax: +44 (0)117 959 6465
 enquiries@fmwconsultancy.co.uk

CLIENT:

PROJECT: **Odd Down, Bath**

TITLE: **Southstoke Lane / Midford Road
PFA'S SIGNAL CONTROLLED JUNCTION**

SCALE @ A3: 1:500	CHECKED: MRJ	APPROVED: RJW
CAD FILE: SK02	DESIGN-DRAWN: NH	DATE: 07/02/2014
PROJECT No: FMW1330	DRAWING No: Figure 4	REV: -
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FMW consultancy

Trym Lodge, 1 Henbury Road, Westbury-on-Trym, Bristol BS9 3HQ
 Tel: +44 (0)117 959 6464 Fax: +44 (0)117 959 6465
 enquiries@fmwconsultancy.co.uk

CLIENT:

PROJECT: **Odd Down, Bath**

TITLE: **Southstoke Lane / Midford Road
 Proposed Roundabout Junction**

SCALE @ A3: 1:500	CHECKED: MRJ	APPROVED: RJW
CAD FILE: SK01	DESIGN-DRAWN: NH	DATE: 07/02/2014
PROJECT No: FMW1330	DRAWING No: Figure 5	REV: -
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