Part B - Your Representations

Please note: this section will need to be completed for each representation you make on each separate policy.

4. To which part of the Local Plan or Sustainability Appraisal (SA) does this representation relate?

Local Plan or SA:	Local Plan
Paragraph Number:	
Policy Number:	DS11
Policies Map Number:	3. Cubbington

5. Do you consider the Local Plan is :

5.1 Legally Compliant?	Yes	✔	No	
5.2 Complies with the Duty to Co-operate?	Yes	✔	No	
5.3 Sound?	Yes		No	✔

6. If you answered no to question 5.3, do you consider the Local Plan and/or SA unsound because it is not: (please tick that apply):

Positively Prepared:	✔
Justified:	✔
Effective:	✔
Consistent with National Policy:	✔

For Official Use Only

Person ID: Rep ID:

7. Please give details of why you consider the Local Plan is not legally compliant or is unsound or fails to comply with the duty co-operate. Please be as precise as possible. If you wish to support the legal compliance or soundness of the Local Plan or its compliance with the duty to cooperate, please also use this box to set out your comments.

Please see below

Continue on a separate sheet if necessary

8. Please set out what modification(s) you consider necessary to make the Local Plan legally compliant or sound, having regard to the test you have identified at 7. above where this relates to soundness. (Please note that any non-compliance with the duty to co-operate is incapable of modification at examination). You will need to say why this modification will make the Local Plan legally compliant or sound. It will be helpful if you are able to put forward your suggested revised wording of any policy or text. Please be as precise as possible.

Land extending from the junction with Queen Street around to the school should be allocated to meet housing need, providing up to 150 dwellings.

Continue on a separate sheet if necessary

Please note your representation should cover succinctly all the information, evidence and supporting information necessary to support/justify the representation and the suggested modification, as there will not normally be a subsequent opportunity to make further representations based on the original representation at publication stage. **After this stage, further submissions will be only at the request of the Inspector, based on the matters and issues he/she identifies for examination.**

For Official Use Only	
Person ID:	Rep ID:

9. If your representation is seeking a modification, do you consider it necessary to participate at the oral part of the examination?

No, I do not wish to participate at the oral examination ☐

Yes, I wish to participate at the oral examination ✓

10. If you wish to participate at the oral part of the examination, please outline why you consider this to be necessary:

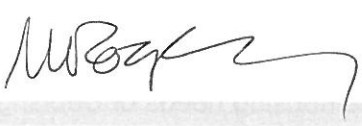
To discuss the merits of the site.

Continue on a separate sheet if necessary

Please note: This written representation carries the same weight and will be subject to the same scrutiny as oral representations. The Inspector will determine the most appropriate procedure to adopt to hear those who have indicated that they wish to participate at the oral part of the examination.

11. Declaration

I understand that all comments submitted will be considered in line with this consultation, and that my comments will be made publicly available and may be identifiable to my name/organisation.

Signed: 

Date : 25/06/2014

Copies of all the objections and supporting representations will be made available for others to see at the Council's offices at Riverside House and online via the Council's e-consultation system. Please note that all comments on the Local Plan are in the public domain and the Council cannot accept confidential objections. The information will be held on a database and used to assist with the preparation of the new Local Plan and with consideration of planning applications in accordance with the Data Protection Act 1998.

For Official Use Only	
Person ID:	Rep ID:

Q7 It has been concluded in respect of other responses made to the Plan that insufficient land has been allocated to meet the housing needs of the District. Additional allocations are therefore required to meet the objectively assessed needs of Warwick District and some of the needs arising from adjoining authorities. Failure to do so means the Plan cannot be found sound.

The Council rightly has a strategy which requires the release of sites from the Green Belt to meet housing needs, sites both adjoining the main urban areas and adjoining the larger, more sustainable, villages. These sites are stated to be required to meet the needs of individual settlements and also the needs arising from the Borough as a whole. This is a sound strategy which reflects national planning guidance and which has been fully justified through the preparation of the Local Plan.

In accordance with the NPPF the Council should release from the Green Belt those sites which are sustainably located and which would have least harm on the openness of the Green Belt and the purposes of including land within it. Thus with additional sites required this must be the correct test in finding them.

Cubbington is rightly categorised as a sustainable settlement due to its substantial range of local services and facilities and also its opportunities for travel by public transport, particularly to Leamington Spa. It is appropriate that it accommodate additional housing to meet local and wider Warwick District housing needs.

The Council has previously considered a small parcel of land at Bungalow Farm (Site 5 in the Village Housing Options Paper 2013). The small site was discounted for development due to its alleged poor access and elevation. Additional land around Site 5 does not appear to have been considered either in the Village Housing Options Report or properly in the SHLAA despite is repeated promotion. This is a clear failing on the part of the District Council. The site is suitable for development to meet the needs of both Cubbington and the wider District.

Sir Thomas White's Charity and King Henry VIII Endowed Trust together own a large swath of land between Cubbington and Lillington and have been promoting it for development for some time (see attached drawing 6009-100). The land was considered in the 2012 SHLAA which concluded it was unsuitable for development as it would 'lack cohesion' with the existing settlements. At that time a part of the site had been unintentionally excluded which would otherwise have shown that all the land between Cubbington and Lillington was available. A revised submission, showing the correct boundary, was submitted during the 2012 Preferred Options consultation but has not been acknowledged by the District Council, with the 2014 SHLAA using the same map as the 2012, and with no updated assessment. Moreover the Council has failed to acknowledge that it would be appropriate to consider allocating just part of the land to meet the housing needs of Cubbington.

We consider it appropriate for a larger site than Site 5 be allocated for development to meet some of the housing needs of Cubbington. It is considered suitable for the following reasons:

- Land adjoining Bungalow Farm is well related to the settlement of Cubbington and the services and facilities therein without reliance on the private car;
- A transport statement has previously been submitted to the Council which shows that adequate access can be provided to facilitate a residential development of 100-150 dwellings, by inserting a roundabout close to the junction with Queen Street. A copy of the report it attached herewith;

- The land was identified in the Coventry Joint Green Belt Study (2009) as being the only parcel adjoining Cubbington which was '*least constrained'* in terms of Green Belt impact (Figure 9.4, Appendix 9). The more recent Warwick District Council study (November 2013) indicates the site, when considered as a whole, fulfils a medium/high Green Belt role, but does not consider the impact of the development of part of the site. Development on part of the land adjoining Cubbington would not have a significant impact on the openness of the Green Belt, and arguably less of an impact than development elsewhere. It is also noted that no other area around Cubbington is identified as being of lesser Green Belt significance, and indeed two of the four parcels are considered to be of higher value;
- If only part of the land were to be developed there would be no coalescence with Lillington. Proper boundary treatments would form a permanent, defensible boundary, and would improve the current situation;
- The land closest to Bungalows Farm does not score highly in landscape value terms and thus could be developed without harm to the wider landscape. Indeed because of its location between Lillington and Cubbington it arguably has less impact on the wider landscape than development on the other edges of the village;
- The land proposed for development does not suffer from flooding;
- There are no known ecological constraints to development.

Overall the land extending from the junction with Queen Street around to the school should be allocated to meet housing need. The highways assessment shows up to 150 dwellings could be safely accommodated although a lower number would be more feasible from a landscape and coalescence perspective.

Attachments:
Drawing 6009-100
Banners Gate Transport Appraisal September 2010

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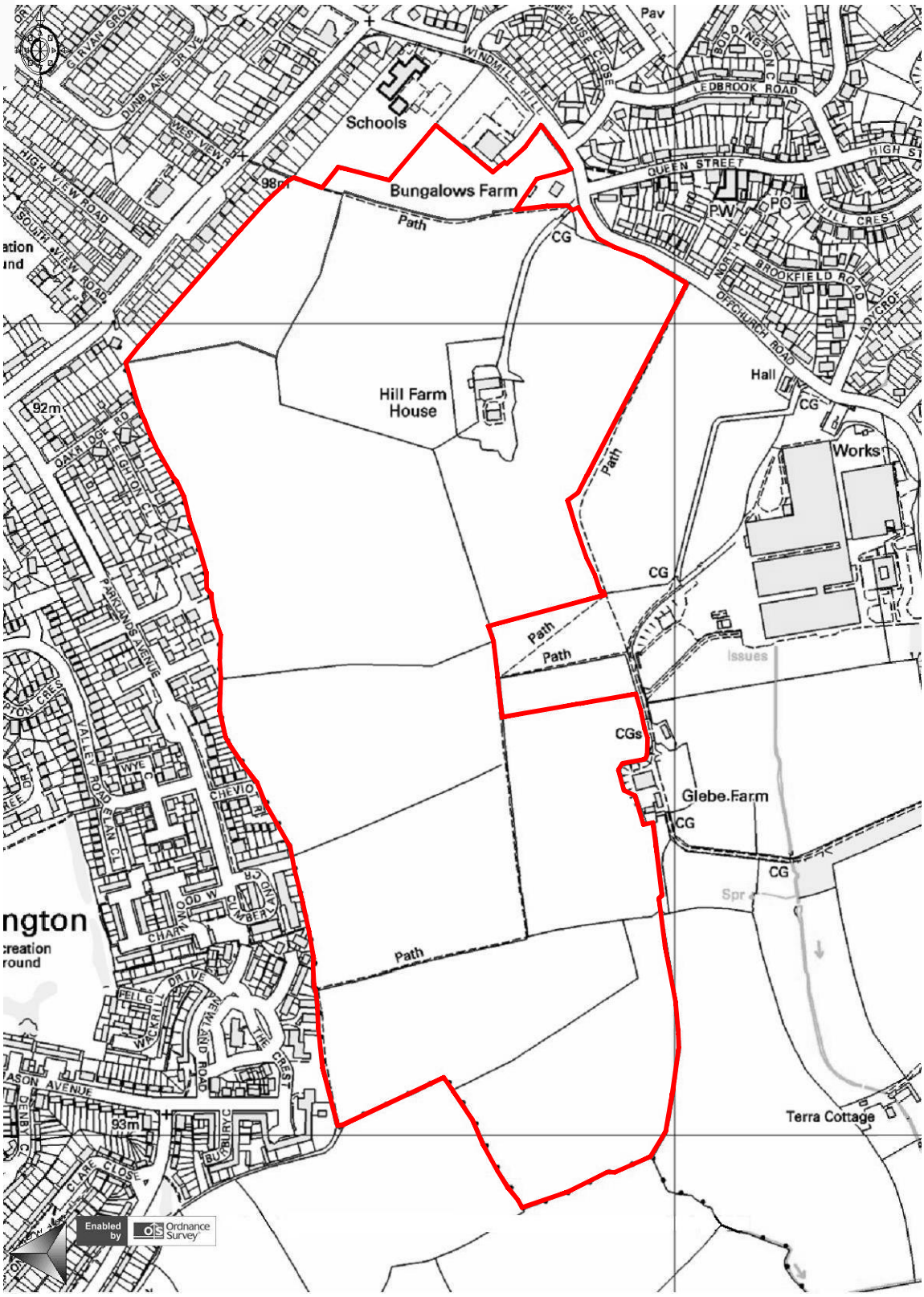

Drawing	Location Plan	Drawing No	6009–100
Project	Land at Offchurch Road Cubbington	Client	Sir Thomas White's Charity
		Scale	1:7500 @ A4
		Date	July 2012

stansgate
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Banners Gate

Highways & Transportation

Residential allocation of land at Offchurch Road, Cubbington Warwickshire

Transport Appraisal September 2010

BANNERS GATE
TRANSPORTATION

Residential allocation of land at Offchurch Road, Cubbington

Transport Appraisal

Banners Gate Transportation Ltd has prepared this report in the course of an assignment for **Sir Thomas White's Charity** the conditions of which were set out in its appointment for consulting engineering services by the Client. Banners Gate Transportation Ltd shall not be responsible for the use of the report or its contents for any purposes other than those for which it was prepared and provided.

Job P716	Revision	Prepared and checked by	Date
	Draft first issue	Nigel Vening BSc CEng MICE MCIHT	1 July 2010
	Updated and expanded	Nigel Vening BSc CEng MICE MCIHT	15 September 2010

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RESIDENTIAL DEVELOPMENT AT OFFCHURCH ROAD, CUBBINGTON
TRANSPORT APPRAISAL

CONTENTS

APPENDICES

References

Warwickshire County Council, Local Transport Plan / Warwick District Development Plan
ARCADY6 junction analysis software / TRICS database / Manual for Streets

TRANSPORT APPRAISAL

1 INTRODUCTION

1.1 Banners Gate Transportation Limited has been instructed by Stansgate Planning on behalf of the Sir Thomas White's Charity to consider relevant highway and transport planning matters connected to a potential residential allocation on land at Hill Farm House, Cubbington. The site is located within the jurisdiction of Warwick District Council and Warwickshire County Council is the Highway Authority.

1.2 Currently, the site consists of agricultural land on the north-eastern side of Leamington Spa. This report has been prepared on behalf of the land-owner whose ownership in this area is illustrated above. Consideration is being given to promoting part of the site through the forthcoming housing review within Warwick District in order to secure an allocation for residential development.

1.3 In order to promote the site within the Local Development Framework it is important to consider several disciplines to allow an informed decision to be made. This report studies the transport and sustainability credentials of the site within the policies and objectives of the Warwickshire Local Transport Plan. This study reveals there are benefits in promoting residential development at this location.

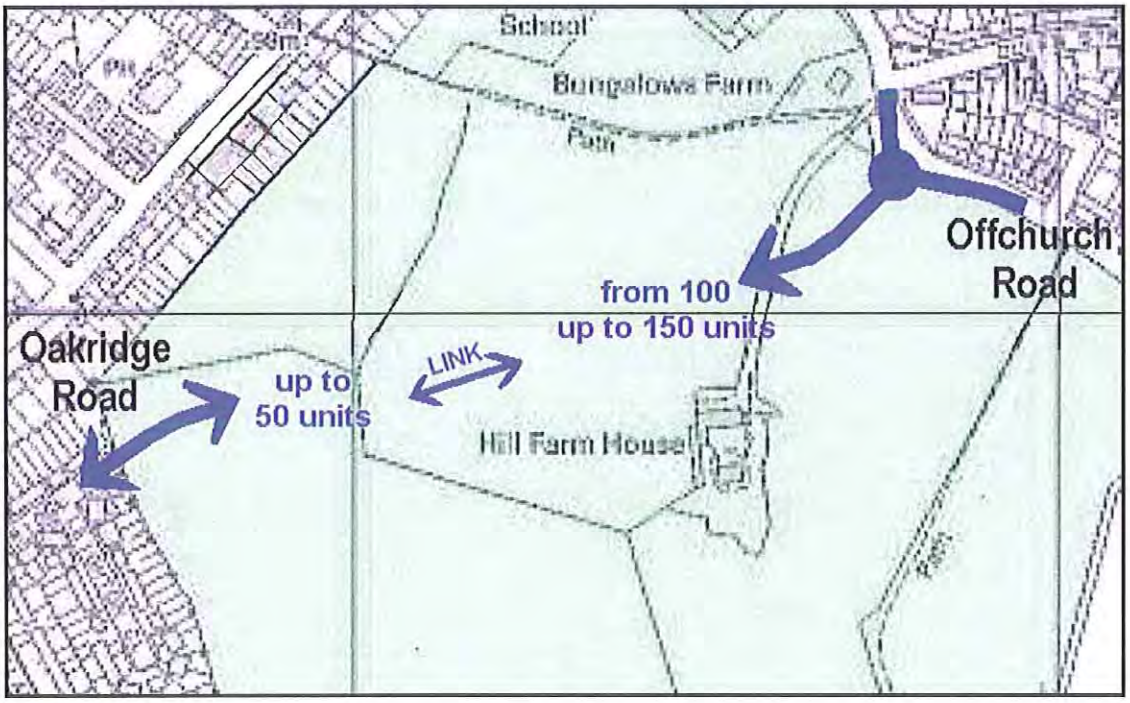
1.4 As a green field site it is acknowledged that a residential project at Offchurch Road will have an impact on the surrounding road network. This *Transport Appraisal* studies a number of topics as listed below.

- Existing conditions and constraints on the highway network
- Review of local planning policy
- The need to promote residential development in sustainable locations
- The size of the site and the scale of the residential allocation
- Traffic generation and junction improvements
- Consider the access options offered by the existing road infrastructure
- Estimate traffic generation from the allocation
- Assign the additional traffic onto the surrounding road network
- Study the operation of the mini-roundabout junction at the intersection of Rugby Road and Windmill Hill. Commission traffic counts to study queues and congestion.
- Consider the sustainability credentials of the site with an emphasis on walking and cycling. Suggest improvements as necessary
- Study bus services and local facilities and suggest improvements if necessary
- Consider highway safety and obtain personal injury accident data. Identify any safety issues and suggest mitigation measures if necessary

1.5 This *Transport Appraisal* includes a discussion of the existing road network at Section 3 with an overview of Local Plan policy at Section 4. Sections 2 and 5 consider the allocation potential and more detailed traffic analysis is included at Sections 6 and 7. A plan (drawing P716/100) illustrating the location of the site is included at Appendix A.

2 AREA OF POTENTIAL RESIDENTIAL ALLOCATION

2.1 The land holding consists of over 50 hectares. Clearly only part of this land could potentially be allocated for residential development. This report considers the suitability and capacity of the road network in the event that land was used for a development of 150-200 houses. This proposed strategy is illustrated below.



2.2 This report includes evidence to support a residential allocation, with a mix of affordable with private dwellings. The highway constraints indicate that approximately 100-150 new properties could be served from a new junction onto Offchurch Road to the northeast whilst up to a maximum of 50 units could be served from Oakridge Road.

- Primary access from Offchurch Road using a roundabout junction
- Secondary access from Oakridge Road by extending the cul-de-sac
- Pedestrian link to connect with the right of way to Rugby Road

2.3 This report discusses constraints such as the capacity of the existing mini roundabout junction of Windmill Hill (Offchurch Road) and Rugby Road and the infrastructure of Oakridge Road which has directed towards this conclusion.

3 EXISTING CONDITIONS

3.1 The site and Offchurch Road

3.1.1 The potential allocation site is located on the southern side of Offchurch Road on the south side of Cubbington. The site consists of arable land and is bounded by existing residential development to the northeast, northwest and southwest. Areas to the southeast consist of further agricultural land with some intermittent development. The potential allocation site and agricultural land to the southeast is classified as green belt. A right of way follows the route of the eastern boundary of the landholding and ultimately connects to the residential area to the south. Access to the land is obtained from within the land holding of Hill House Farm which benefits from an access direct onto Offchurch Road. The access is located on the outside of the bend in the alignment of Offchurch Road some 40 metres south of the junction of Queen Street. In addition, an opening (without a gate) from the field is available onto Offchurch Road on the southern boundary of the land-holding.

3.1.2 The photograph below illustrates a view of Offchurch Road. The route is a conventional single carriageway with street lighting and is subject to a speed limit of 30mph. There is a footway on the north side of Offchurch Road adjacent to frontage of residential property but a footway is not provided adjacent to the potential allocation site. The route of Offchurch Road combines with Welsh Road, Windmill Hill and Kenilworth Road to provide a route across the northern and eastern side of Lillington and Leamington Spa. Destinations to the south and east include Offchurch and Southam whilst the route to the northwest includes the strategic road network of the A46 as well as Kenilworth and Coventry. Part of Offchurch Road provides a bus route which links Cubbington and Leamington Spa with services every 30 minutes in each direction. Additional comment on bus services is provided in Section 3.3 below.

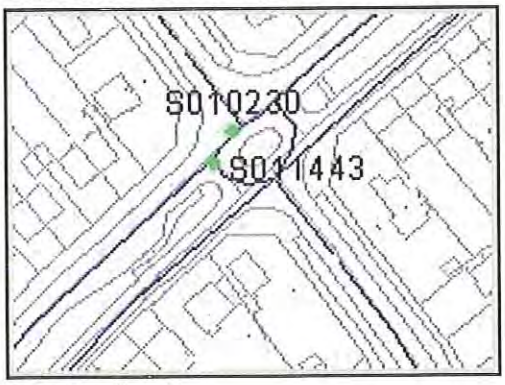
3.1.3 The settlement of Cubbington defines the northern boundary of the wider urban area of Leamington Spa. The settlement is divided into two sections. The eastern section includes a High Street with local shops and a primary school and accommodates only modest local traffic flows. The western area includes a predominantly residential area but also includes a parade of local shops on Rugby Road and Telford Infant and Junior School.

3.1.4 The single carriageway route of Rugby Road / Cubbington Road bisects the residential area. The route is subject to a speed limit of 30mph and some measures, including a central refuge for an uncontrolled pedestrian crossing, with an overrun area seek to reduce average speeds (pictured). The key area of interest extends from a mini roundabout junction of Rugby Road with Windmill Hill to the north to the cross-roads junction of Parklands Avenue with Rugby Road to the south. The mini roundabout junction operates with some congestion and queuing at peak times. The crossroads junction of Parklands Avenue and Cubbington Road includes a simple gyratory incorporating a parallel service road. The affect of this layout reduces the conflict of right turning vehicles since, for example, a right turning lane is provided for turns from the south to Parklands Avenue. The junction operates satisfactorily with minimal queuing. The safety of these junctions is considered below.

3.2 Highway safety

3.2.1 In terms of the operation and safety of the road network records are kept of *personal injury accidents*. Personal injury accidents for the route of Rugby Road including the junctions of Windmill Hill to the north east and Parklands Avenue to the south west have been obtained from Warwickshire County Council for a three year period from 1 January 2007 to the present day (June 2010).

3.2.2 The statistics reveal that a number of accidents have occurred across the network over a period of 3½ years. An extract, illustrating the Cubbington Road junction with Parklands Avenue is provided opposite. Two accidents have occurred at this junction and two accidents have occurred at the junction of Windmill Hill and Cubbington Road in this time period. Each of these incidents involved a slight injury only. Further comment on the safety of the road network is considered in a detailed assessment of the junctions in Section 7.



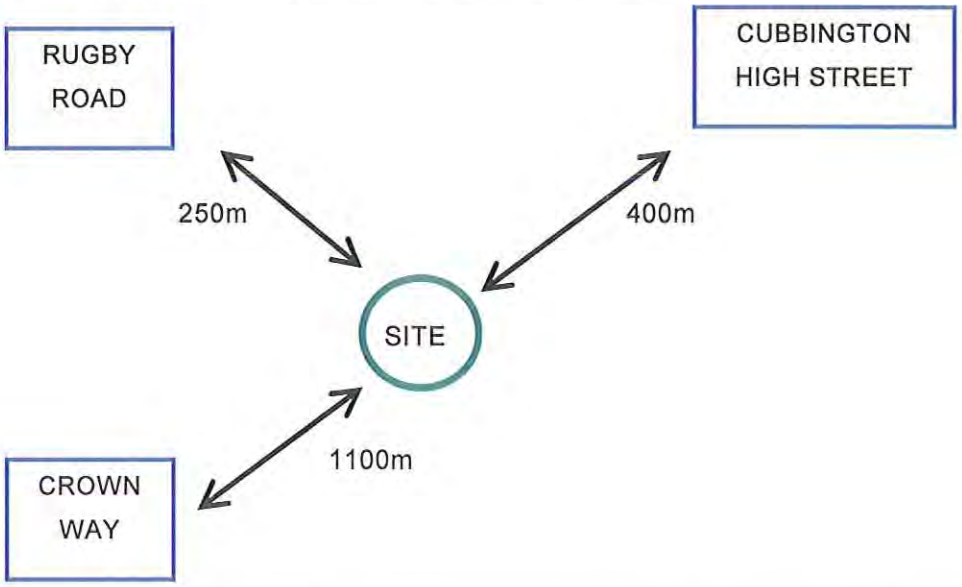
3.2.3 The potential allocation site is within walking distance of local shops and services. A convivial and direct pedestrian route is available. This aspect of transport planning is discussed below.

3.3 Reducing the need to travel using the private car

3.3.1 Local Plan Policies demand that projects make provision to avoid actively promoting the use of the private car and in many ways this is dependent on the location of the development site. In the light of the demand for new housing it is possible to consider numerous sites in the region. Many constraints would be considered and the need to travel is very important within that agenda. In essence, a site, by means of its location should make walking, cycling and the use of public transport very plausible. Many trips generated by a residential development involve the use of nearby facilities such as schools, shops, areas of employment or public transport. The site at Offchurch Road has merits in terms of sustainable transport alternatives as described below.

3.3.2 **Walking and Cycling** Walking is a realistic mode of transport for short journeys of the order of 2 kilometres (reference PPG13 paragraph 75). Generally, walking speed is estimated to be 5km/hour or fractionally over 3 miles per hour. This parameter is used in *Better Places to Live, By Design* that states that typically a 10-minute walk or 800 metres represents a good starting point to define whether or not a site has adequate access to local facilities. Guidelines published by the Institution of Highways and Transportation refer to 1000 metres as an acceptable walking distance for those without mobility impairment. Cycling is a realistic mode of transport for short journeys of the order of 5 kilometres (reference PPG13 paragraph 78).

3.3.3 The Local Plan refers to '*Shopping Centres*' and this topic is discussed in more detail in Section 4. Fundamentally, it is important to promote a residential development in a location where local services are provided and public transport is available. Three local shopping centres, namely Cubbington High Street, Rugby Road Shopping Centre and Crown Way Shopping Centre are located within walking distance of the site. The sketch below gives a guide to the proximity of the site to these services.



3.3.4 A selection of shops is provided on Rugby Road including a newsagent, convenience store and takeaways. A route approximately 400 metres long connects Offchurch Road to Rugby Road. The route is maintainable at public expense and is designated as a footpath. The footpath forms the northern boundary of the site and therefore the vast majority of the site would be located less than 400 metres from local services including public transport. The local primary school is located on Windmill Hill and is therefore approximately 300 metres from the eastern boundary of the site. Additional services, such as a post office, are located on the High Street of Cubbington. Pedestrian links are provided through the existing residential area of North Close to connect to the High Street although the quickest pedestrian route from the site would use the route of Queen Street. This route also accommodates the orbital bus route to Cubbington.

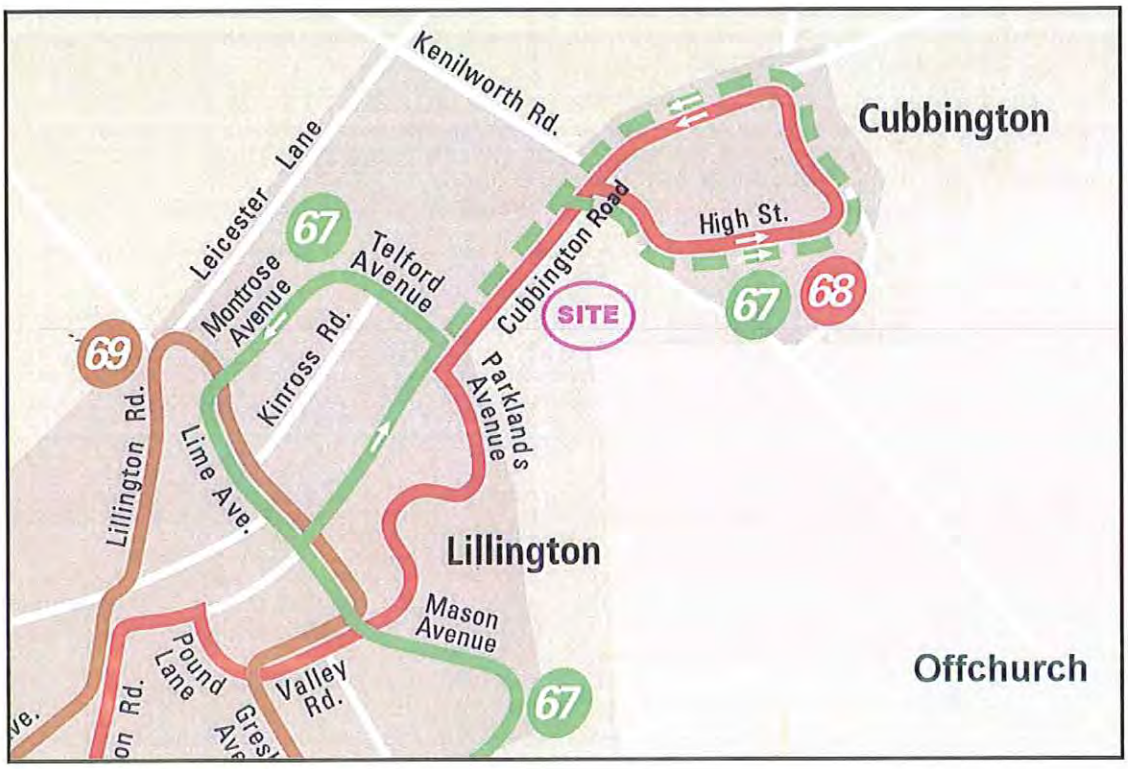
3.3.5 A 5km cycling distance includes the entire area of Leamington Spa. Employment options are located towards the south of the town at Berrington Road and Caswell Road Industrial Estate as well as Tachbrook Road and Heathcote Industrial Estate. Berrington Road is approximately 4.5km from the centre of the site. The Heathcote Industrial Estate is located 6km from the site. Importantly, the site is located 3.5km from all the employment opportunities of the town centre. Therefore, local journeys to the shops, areas of employment and schools can readily be undertaken by walking or cycling. A local facilities plan (drawing P716/101) is included at Appendix B. A succinct summary of the proximity of the site to the Local Shopping Centres is provided below.

3.3.6 This plan illustrates the proximity of the site to local services. (Distances are measured to the nearest site boundary)

Cubbington High Street	General store & post office, CostCutter, Cubbington Wines, DD Hardware, No 68 bus route	220 metres
Rugby Road Shopping Centre	Pets & Plants, The Paper Shop, Laundrette, Bargain Booze, Cubbington Fish and Chips, Our Lady and St Teresa Primary school, No 68 bus route	330 metres
Crown Way Shopping Centre	Lloyds Pharmacy, Martins Newsagent, Three cooks, Balti restaurants, Spar, Crown Fruits No 68 bus route	1070 metres

3.3.7 Importantly, regularly used facilities are located with walking distance of the allocation site.

3.3.8 **Bus travel** The Stagecoach service (68) uses the route of Offchurch Road adjacent to the site. The 68 service links the area of Cubbington with Leamington Spa and operates with services every 30 minutes in each direction. The route is illustrated below. A complete bus timetable is included at Appendix C.

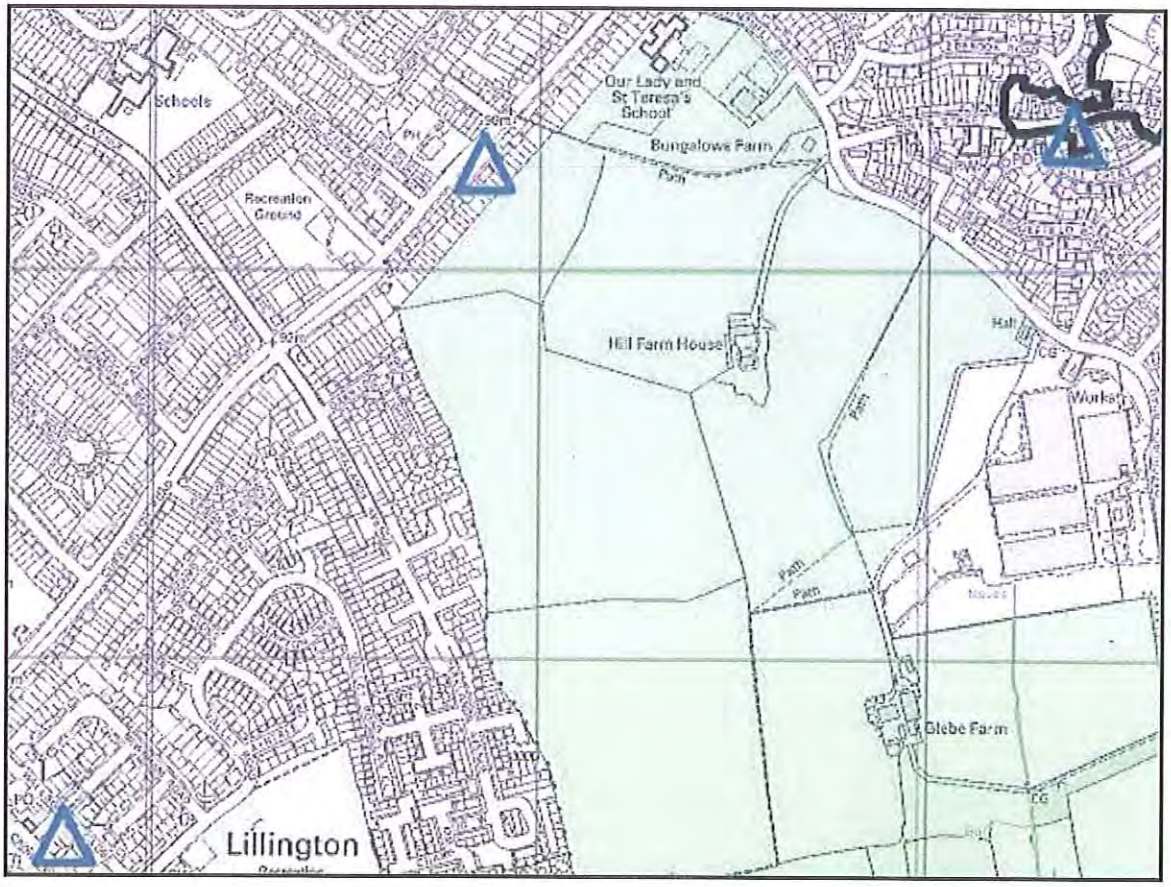


3.3.9 The plan above demonstrates how the potential allocation site is suitably located to this existing bus service. In effect, the bus route is located within a reasonable walking distance of the north-eastern, north-western and south-western boundaries of the site. Bus stops are located on Parklands Avenue (via Oakridge Road), Cubbington Road and Queen Street. Therefore, all parts of the allocation site are readily accessible to the bus service. It is considered that the frequency of bus services is sufficient to reduce the reliance on usage of the private car.

The existing right of way from Cubbington Road (Rugby Road) to the site and Offchurch Road connects directly to the northbound bus stop as illustrated in the picture opposite. The service operates with two buses per hour Monday to Sunday inclusive although early morning or late evening services are not provided on Sundays. This evidence suggests that the site is suitable for a residential allocation.

4 LOCAL PLAN POLICY

4.1 Economic growth creates the demand for new private and affordable housing but there is also the need to replace demolished stock. Therefore, over the next 10 or 15 years the region is expected to experience significant growth in housing and employment related projects. Development across the region within which Cubbington is located is managed using the policies and objectives contained in the Warwick District Local Plan. In addition it is important to study the Warwickshire Local Transport Plan 2006 to 2011 and Planning Policy Guidance 13 (Transport). An extract of the Proposals Map is illustrated below.



4.2 There are many documents that have been published by Warwick District Council on the topic of housing that can be studied. These documents are outside the scope of this transport report although it is interesting to refer to Appendix 2 of the Warwick District Local Plan which refers to the demand for housing to the year 2021. The Regional Spatial Strategy refers to the need for 8,091 dwellings within Warwick District as 25.7% of the requirement within Warwickshire. A total on 3,324 dwellings have been completed to the year 2005 leaving a residual requirement of 4,747 dwellings to be provided from 2005 to 2011. Clearly, these figures can vary over time but there is clearly a need for additional housing and that housing demand can be partly met by an allocation of land at Hill House Farm.

4.3 An allocation of land at Hill House Farm can provide housing for the future. The number of houses on the site would be determined by other policies and constraints. Numerous factors contribute to deciding whether or not a site is suitable for residential development such as environmental impact, nature or historic conservation designations, highway access and infrastructure, ground contamination and viability as well as accessibility or the precedent of previously developed land. This report does not make comment on other development constraints such as drainage implications or the environmental impact of the project. This report focuses on the access and transport matters related to the allocation.

4.4 Emphasis in this report is given to the objectives of the Local Transport Plan. Clearly it is not appropriate to repeat numerous objectives and policies within this report. Suffice to summarise the key objectives as follows:

- Reduce the impact of traffic congestion
- Improve the operation and safety of the highway infrastructure with a view to reducing the number of casualties on the road network
- Reduce the need to travel by effective choice of land-use planning. New developments should be readily accessibility to local services and public transport therefore reducing the reliance on the private car
- Create mixed, balanced and inclusive communities
- To achieve sustainable communities to minimise resource consumption and traffic flows
- Provide a comfortable and efficient public transport network
- Encourage walking and cycling and the use of public transport
- Promote new housing at sustainable and accessible locations

4.5 Clearly there is a sensitive balance between the need for growth and increased demand for housing whilst suppressing the inevitable need to travel and improving safety on the road network.

4.6 Residential development should be readily accessible to services such as convenience shopping, schools, health and education. Employment sites should be located close by and be readily accessible by public transport. If developments are located close to regularly used facilities and public transport then it is likely that the objectives listed above will be achieved not least by reducing the reliance on the use of the private car.

4.7 In many instances a green belt site may not have good sustainability credential since they are predominantly located on the edge of urban areas such that the allocation is intended to restrict urban sprawl. In this instance such principles do not apply since the site is surrounded by existing residential development on three sides. The sustainability credentials of the site are endorsed by the fact that each of the surrounding areas includes a Local Shopping Centre that has been identified within policies contained in the Local

Plan. The plan above identifies these Centres in the form of a triangle. The potential allocation site is located a short distance from these Local Shopping Centres at High Street / Queen Street, Rugby Road and Crown Way.

4.8 The importance of Local Shopping Centres is identified in Policy UAP4 which seeks to protect such sites and not permit a change of use class from generally retail including takeaways, cafes and drinking establishments.

4.9 Due consideration has been given to the policies of the Local Transport Plan and the general objective of effective land–use planning in providing new housing in sustainable locations. The site is suitably located within walking and cycling distances of three local shopping centres. Public transport, in the form of bus services, utilise Rugby Road and Offchurch Road, very close to the site. The layout would include footways and promote connectivity to the adjacent infrastructure and existing bus services.

4.10 It is considered appropriate to promote a residential allocation and this report considers the suitability of the site in the light of the objectives for sustainable transport as described above.

5 DEVELOPMENT STRATEGY

5.1 Access options to the site

5.1.1 There are a number of methods of gaining vehicular access to the site but various constraints apply.

- Access onto Offchurch Road

  Offchurch Road defines the northern boundary of the site and provides frontage of 150 metres within which an access can be constructed.

- Access onto Oakridge Road

  Oakridge Road when combined with Leighton Close forms a cul-de-sac of 50 properties. It is entirely plausible that the alignment of Oakridge Road can be continued into the adjacent field to serve residential development

- Access onto Cheviot Rise

  Cheviot Rise is a cul-de-sac of 14 properties. It is plausible that the alignment of Cheviot Rise could be continued into the adjacent field to serve residential development.

5.1.2 The Highway Authority of Warwickshire County Council expresses a preference that large residential sites should be served by two access points or at least includes an emergency access in addition to the main access. Consultations are invited from the emergency services if a cul-de-sac of more than 50 units is being promoted. This strategy promotes 'connectivity' to the road for both pedestrians and road users. Important recommendations within The Warwickshire Guide can be summarised as follows:

Warwickshire Guide (paragraph 4.4.2)

- no more than about 50 dwellings should be served by any single cul-de-sac;
- no more than about 100 dwellings should be served by a single connection to an all-purpose road which should be a link within the existing local or wider highway network capable of safely accommodating and distributing the generated traffic,
- no more than about 300 dwellings should be served by two such connections.

5.1.3 The design guide, at Section 4.4.3, goes on to state that these guidelines are flexible but other factors can have a bearing on what would be acceptable. Such factors include the congestion caused by the amount of additional traffic or the safety issues in significant additional traffic using a junction that has a poor safety record. The access options to the potential allocation site are considered in detail below

- Access onto Offchurch Road

5.1.4 The primary access to the site would utilise a new access onto Offchurch Road. It is entirely plausible to promote a priority junction to gain access to the site. However, a visitor to the site will notice that chevron signs are provided at a corner in the alignment of Offchurch Road and warning signs are provided as illustrated opposite. Therefore, it is proposed to improve the road alignment and reduce average speeds by the introduction of a roundabout. The roundabout would be designed using the guidelines contained with the Design Manual for Roads and Bridges. It is recommended that the design includes a 'midi' roundabout with an outer diameter of 26 metres. By this method average speeds would be reduced on Offchurch Road and the overall road alignment and geometry at this location would be improved. Initial proposals are illustrated on drawing P716/102 at Appendix D.

5.1.5 The quantity of traffic using this junction would be determined by the amount of development which uses this access point. Fundamentally, there is limited capacity in the nearby junction of Rugby Road and Windmill Hill Roundabout (Section 6) which reduces the development potential. It will be necessary to improve this roundabout to increase capacity and this provides the opportunity for development. The capacity analysis suggests that a range of 100-150 properties, using the connection onto Offchurch Road can be accommodated.

- Access onto Oakridge Road

5.1.6 Oakridge Road is a conventional suburban residential road with footways to both sides of the carriageway. Interestingly, the road width exceeds 6.0m metres. The Warwickshire Guide states that roads with a width of 5.5 metres can accommodate traffic flows generated by 50 dwellings or more. However, the guide also states that any cul-de-sac should not exceed 50 properties. Clearly, the existing cul-de-sac includes 50 properties but there is potential to increase this number by extending the road into the site, as long as an emergency access is provided. The Warwickshire Guide recommends that no more than 100 dwellings should be provided from a single connection. In this instance, it is possible to extend the cul-de-sac to a total of 100 units knowing an emergency access can be provided to the remainder of the site.

5.1.7 The route of Oakridge Road has sufficient width to accommodate additional traffic flows and the junction with Parklands Avenue does not exhibit characteristics that would give rise to a poor safety record. However, secondary considerations are also important. For example, the existing residents on Oakridge Road are likely to object to a significant expansion to the cul-de-sac based on intrusion and a doubling of traffic flows. In addition, development traffic would use the junction of Cubbington Road with Parklands Avenue. This junction is not ideal and it is expected that the Highway Authority would have concerns about a significant increase in traffic at this location. Therefore, a maximum of 50 units gaining access via Oakridge Road is considered appropriate and adheres to the advice within the Warwickshire Guide. Initial proposals are illustrated on drawing P716/103 at Appendix E.

- Access onto Cheviot Rise

5.1.8 Cheviot Rise is a conventional suburban residential road with footways to both sides of the carriageway. The road is 5.5m metres and access to the site is plausible. This location is 490 metres south of Oakridge Road and 810 metres south of Offchurch Road and therefore there is a poor correlation to the remainder of the site. A link to the proposed residential areas to the north is possible but there is a likely to be a third party land constraint between the public highway and the potential allocation site which suggests that delivering such a connection would be problematic. For these reasons, this access option is not considered further in this report.

5.1.9 Access roads would be constructed to adoptable standards and street lighting would be provided.

5.2 Site layout

5.2.1 It is not appropriate to prepare a site layout at this stage. A primary vehicular access would be provided onto Offchurch Road to serve a residential area with a secondary residential access onto Oakridge Road. An all-purpose vehicular route between the roads would not be provided. A route that is suitable for use by cyclists and pedestrians as well as emergency vehicles would be provided to connect the two residential areas.

- Primary access from Offchurch Road using a roundabout junction
- Secondary access from Oakridge Road by extending the cul-de-sac
- Pedestrian link to connect with the right of way to Rugby Road

- A mix of affordable dwellings with private houses
- Provision of open space

5.2.2 A proposed infrastructure discussed above offers the possibility of a through route for vehicular traffic. Clearly, such a route would be used by other traffic such as trips from Offchurch to Leamington. Such traffic would have an impact on existing residents of Oakridge Road and the operation of the junction of Parklands road with Cubbington Road. A connection through the site would reduce traffic flows on Rugby Road which would be beneficial but this is likely to be outweighed by the disadvantages.

5.2.3 Information on traffic generation of this strategy, together with consideration of the operation of the mini roundabout of Windmill Hill (Offchurch Road) and Rugby Road is considered in Sections 6 & 7.

5.3 Connectivity and encouraging walking trips

5.3.1 Section 3.3 describes the sustainability credentials of the site. Policies within the Local Transport Plan for Warwickshire seek to reduce the need to travel by promoting development of all types in locations that reduce the need for travel particularly by private car and in areas where transport alternatives such as bus and rail services are readily available.

5.3.2 The TRICS database provides a guide to the amount of walking trips, or trips using public transport and cycling. The pedestrian activity is expected to be roughly 1.0 (two-way) trip per household. A trip rate of 0.20 applies to public transport. Therefore, in the event that the site is considered for a development of 150 new properties it is expected to generate 150 walking trips (75 departures and 75 arrivals) and perhaps 15 walking departures (and 15 arrivals) to use local public transport over the course of a weekday.

5.3.3 It is clear from the evidence in this report that the site at Offchurch Road is suitable for development in that these objectives and expected walking trips are achieved. A direct and convivial route can be provided from the site to adjacent residential areas. The site is permeable and therefore convivial and direct connections to Oakridge Road, Offchurch Road and Rugby Road can be achieved. Thereafter, new residents can readily gain access to one of three local shopping centres and public transport.

5.3.4 Therefore, the evidence above with accompanying proposals indicates that the site can be described as sustainable and is suitable for a residential allocation.

6 THE ALLOCATION SITE AND TRAFFIC IMPACT

6.1 Development potential and trip generation from the existing site

6.1.1 The existing site consists of agricultural land and therefore generates only minimal traffic movements on the road network. The impact of the development therefore considers the implications of the residential allocation by adding potential traffic generation to the existing background flows.

6.2 Trip generation from residential allocation

6.2.1 The TRICS database offers a guide to trip generation from land-uses such as residential development. Trip rates can, of course, vary depending on the provision of local shops, schools and public transport. Therefore, it remains important to provide a reasonably accurate estimate of traffic generation. The development would include houses within the control of a housing association and some apartments. In this instance, it is proposed to use 'houses privately owned' which is defined as follows

Houses Privately Owned
Housing developments where at least 75% of units are privately owned. Of the total number of units, 75% must also be houses (sum of non-split terraced, detached, semi-detached, bungalows, etc), with no more than 25% of the total units being flats. Includes properties that are privately owned and then privately rented.

Housing trip rates	AM (0800 to 0900)		PM (1700 to 1800)		Two-way Daily
	Arr	Dep	Arr	Dep	
Houses Privately Owned	0.172	0.400	0.378	0.226	5.496

6.2.2 It is known that non-private housing or apartments generate less traffic per unit than 'houses privately owned' but this is ignored in this instance. This sample from the database uses sites within England only (excluding Greater London) and uses a range of sites up to a maximum of 150 units. The sample includes 33 surveys. The evidence above suggests that traffic generation would lie within the range of 5-6 two-way trips per day. The extracts from the database are included at Appendix F. Using these trip rates it is expected that the traffic generation would be divided as follows:

150 units – Offchurch Road	**26**	**60**	**57**	**35**
50 units – Oakridge Road	**9**	**20**	**19**	**12**

6.2.3 This allocation would generate roughly 110-120 trips (two-way) in the conventional weekday peak hour. In addition, residential traffic would be created at the weekend. Flows would be lower than the figures quoted above with peak movements occurring between 11am and 2pm and weekend traffic is not perceived to be a problem. The impact of additional weekday traffic is considered at Section 7.

6.3 Traffic impact of development traffic

6.3.1 Residential development on a green field site will add to congestion on the road network and guidelines suggest that a project should promote mitigation measures that would leave queues and congestion following development no worse than prevailing conditions in the event that the project did not take place. There are some instances where mitigation measures are not required simply due to the fact that adequate capacity in the local road network for that project is available. In this instance, in Cubbington there are concerns regarding the operation of the mini roundabout junction of Rugby Road with Kenilworth Road and Windmill Hill. This junction operates close to capacity at peak times and therefore a development nearby on land at Offchurch Road will exacerbate matters. Queues are apparent on the Rugby Road (south) and Windmill Hill approaches in both the morning and evening peak hours. Congestion on these arms of the junction would be made significantly worse following development. As a guide a roundabout junction should operate with a maximum RFC (Ratio of Flow to Capacity of 0.85) but currently this figure is exceeded.

6.3.2 Therefore, in the event of development it is recommended that improvements are promoted to the mini roundabout to release additional capacity. The analysis is based on traffic flows obtained during June 2010 and uses software ARCADY6 which is designed and maintained by the Transport Research Laboratory. The following comparison is included in this report.

Rugby Rd / Windmill Hill Roundabout

Based on June 2010 flows

Option 1 (do nothing)	Option 2 (do something)
Existing roundabout with existing flows	*Improved roundabout with existing flows plus traffic from 150 units*

6.3.3 The analysis does not include traffic growth and makes a comparison as listed above. Background traffic growth will exacerbate conditions but will apply equally to the "do nothing" or "do something" scenario.

7 ASSESSMENT OF THE ROAD NETWORK

7.1 Operational assessment of Windmill Hill / Rugby Road mini roundabout

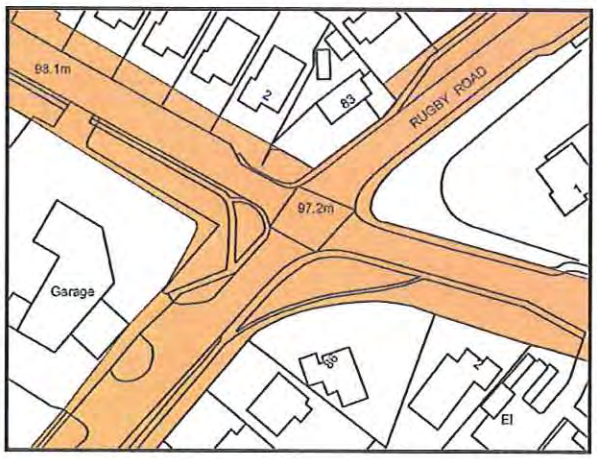
7.1.1 **'Do nothing' scenario.** The existing junction is pictured opposite. The layout has constrained approaches on each arm such that a conventional flare to the 'give way' line is not provided. However, visibility to and from vehicles on each approach is good. Congestion is observed on the approaches on Windmill Hill and also northeast-bound on Rugby Road. The northbound approach is pictured opposite.

7.1.2 Traffic surveys at the junction are included at Appendix G. An illustration of the junction (drawing P716/104) with traffic flows and analysis using the computer program ARCADY6 are included at Appendix H.

Existing layout	AM (0800 to 0900)		PM (1700 to 1800)	
2010 flows / no development	Max RFC	Max queue	Max RFC	Max queue
Kenilworth Road	0.452	0.8 vehs	0.749	2.8 vehs
Rugby Road (north east)	0.696	2.2 vehs	0.576	1.3 vehs
Windmill Hill	0.887	6.3 vehs	0.667	1.9 vehs
Rugby Road (south west)	0.882	6.0 vehs	0.947	10.2 vehs

7.1.3 The analysis demonstrates that the junction is operating close to capacity in the morning and evening peak hours. Queues tend to development on Windmill Hill and the northbound approach of Rugby Road from Leamington Spa. This analysis demonstrates that the junction provides a constraint to development in the area.

7.1.4 **'Do something' scenario** Traffic from nearby development would necessitate improvements to the Rugby Road Roundabout. The coloured area on the plan opposite denotes the land maintained at public expense as highway and denotes the area within which improvements can be legally constructed. Land is available for improvements on all arms except the approach from Rugby Road north.



7.1.5 As a reminder development traffic to Offchurch Road is quantified below.

	AM (0800 to 0900)		PM (1700 to 1800)	
	Arr	Dep	Arr	Dep
Trips at Offchurch Road	**26**	**60**	**57**	**35**

7.1.6 Some traffic would utilise the route towards Offchurch itself but it is anticipated that the majority of traffic would focus on the roundabout. Up to 45% of traffic on Windmill Hill turns left at the roundabout towards Leamington Spa. Similarly, some 30% of northbound trips on Rugby Road turn right to Windmill Hill and these flows would increase in the event of development. Interestingly, only 1-2% of flows on Windmill Hill turn to Rugby Road north and this pattern is reciprocated for the left turn from Rugby Road. In other words, traffic flows would not change in the event of development and improvements to this approach are not necessary. As it happens, widening would be very problematic due to the lack of highway land. In conclusion, widening is possible to add capacity and this can be provided on the arms affected by the development. An illustration of a possible improvement to the roundabout is illustrated as drawing P716/105 at Appendix I together with analysis of the revised roundabout using ARCADY6.

Proposed layout	AM (0800 to 0900)		PM (1700 to 1800)	
2010 flows with development	Max RFC	Max queue	Max RFC	Max queue
Kenilworth Road	0.443	0.8 vehs	0.764	3.0 vehs
Rugby Road (north east)	0.808	3.8 vehs	0.721	2.4 vehs
Windmill Hill	0.136	0.2 vehs	0.594	1.4 vehs
Rugby Road (south west)	0.789	3.5 vehs	0.869	5.7 vehs

7.1.7 The objective of the improvement would seek to have a minimal overall affect on junction delay following development. A summary of the junction delay is provided below.

Overall junction delay (minutes per vehicle)	**AM PEAK**	**PM PEAK**
Existing layout 2010	0.34	0.35
Proposed layout plus 150 unit development (based on 2010 flows)	0.20	0.28

7.1.8 The results above provide evidence that the junction improvement is justified to mitigate the impact of the development. Accident statistics reveal two slight injury incidents in three years which does not highlight safety concerns. These incidents cannot be attributed to the junction layout or poor visibility. Therefore, there are no safety concerns that would prevent use of the junction by additional traffic from the development. Following improvements, a slightly more spacious junction is likely to benefit the manoeuvring of all vehicles and the general operation of the junction thereby improving safety.

7.1.9 It is apparent that the mini roundabout junction on Rugby Road acts as capacity restraint on the local road network. Improvements to the layout can release additional capacity as described above but further development over and above 150 units on Offchurch Road is very limited.

7.2 Safety at the junction of the Parklands Avenue and Cubbington Road

7.2.1 Oakridge Road has a generous width and can accommodate perhaps traffic from an additional 50 units. Evidence suggests that this amount of housing would create an additional 20 departures in the morning peak. Appendix B of Guidance for Transport Assessment published by the Department of Transport states that a project involving the construction of less than 50 units does not require the preparation of a *Transport Assessment* or the more condensed and simpler report known as a *Transport Statement*. Clearly, these thresholds are guidelines and each individual site needs to be considered on its merits. In this instance the road has a generous width and the junction onto Parklands Avenue does not show characteristics that would give rise to a poor safety record. By contrast, the route is lightly trafficked and the junction has good visibility. Traffic has the choice of routes either north or south such that only some traffic would use the nearby junction of Cubbington Road. The layout of this junction and geometry is not ideal but the current arrangement seeks to minimise the risks to road users. A right turning lane for manoeuvres to Parklands Avenue is provided and segregated from other right turns at the junction.

7.2.2 Two accidents have occurred at this junction in 3½ years. One accident comprised a shunt accident which included three cars triggered by a car manoeuvring towards Telford Avenue to the west. The second incident included a collision between a car and a moped. The documentation states that a contributory factor was the driver failed to look properly and observe the moped.

7.2.3 By definition, for development of housing on a green filed site, the delays and congestion at this junction would get slightly worse than at present. However, observations reveal that the junction operates satisfactorily and the impact of the project would be minimal knowing traffic patterns and expected traffic distribution. Research on safety at the junction does not highlight concerns. Therefore, it is concluded that the junction operates satisfactorily and improvements are not justified.

8 CONCLUSION

8.1 Banners Gate Transportation Limited has been instructed to consider transport planning issues in support of a potential residential allocation of land at Offchurch Road, Cubbington. Key transport issues are as follows:

- The landownership provides the option of promoting residential allocation on agricultural land south of Offchurch Road, northeast of Parklands Avenue and southeast of Rugby Road. Consideration has been given to a total allocation of 200 units. Access to the site could be obtained from either Offchurch Road (150 units) or Oakridge Road (50 units).
- It is recommended that access to the site from Offchurch Road uses a new roundabout whilst the existing infrastructure of Oakridge Road, with a width in excess of 6 metres, is suitable for accommodating additional traffic. Two points of access are seen as essential to provide connectivity and flexibility in the event of an emergency. The link between the sites would be a pedestrian / cycleway connection that could be used by emergency vehicles but not general traffic.
- Evidence from the TRICS database demonstrates that a site of 200 houses would generate 80 departures and 35 arrivals in the morning peak with 76 arrivals and 47 departures in evening peak hour. Trips would be distributed across the routes of Offchurch Road, Rugby Road and Parklands Avenue.
- Traffic from up to 150 units connecting to Offchurch Road would have an impact on the nearby Rugby Road mini roundabout junction with Windmill Hill which is already congested at peak times. It is recommended that alterations are promoted to widen approaches and increase manoeuvring areas to add capacity to mitigate the impact of additional traffic.
- A smaller development of up to 50 units using Oakridge Road is not likely to have an impact due to modest flows and the availability of alternative routes via Parklands Avenue that dilutes the impact at any particular location.
- Evidence from personal injury accident statistics demonstrates that the junctions that would be affected by an increase in development traffic have a good safety record and therefore would not prejudice the development project.
- The allocation site is located within a short distance of local facilities such as shops, post office and schools as well as a regular bus service. These facilities, at three different shopping centres, are located within 1100 metres of the site and convenient, direct and convivial routes are available. The site would not create an over-reliance on the use of the private car.

8.2 The findings of this report establish that it is reasonable to conclude that the land at Offchurch Road has merits for a residential allocation within an ongoing review of housing need by Warwick District Council.

APPENDIX A

LOCATION PLAN
(DRAWING P716/100)

The Contractor is to check and verify in conjunction with the Architects details all setting out points, building and site dimensions, levels and sewer invert levels at connection points and ensure that they are fully conversant with the contents and all requirements the site investigation report before work starts.
The Contractor is to comply in all respects with current building legislation, British Standard Specifications, Building Regulations whether or not specifically stated on this drawing.

This drawing is not intended to show details of ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor. Any areas of formation for said structures which do not accord with the anticipated conditions as described in the site investigation report are to be immediately notified to the Engineer, where applicable. Any suspect field ground or ground contaminants on or within the ground should be further investigated by a suitable expert. Any contours shown indicate typical slopes for guidance only and should be investigated further by a suitable geotechnical expert.

Where existing trees are shown to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 3 metres from buildings and 3 metres from drainage and services, where applicable. A foundation is to be provided to accommodate the proposed tree planting, where applicable.

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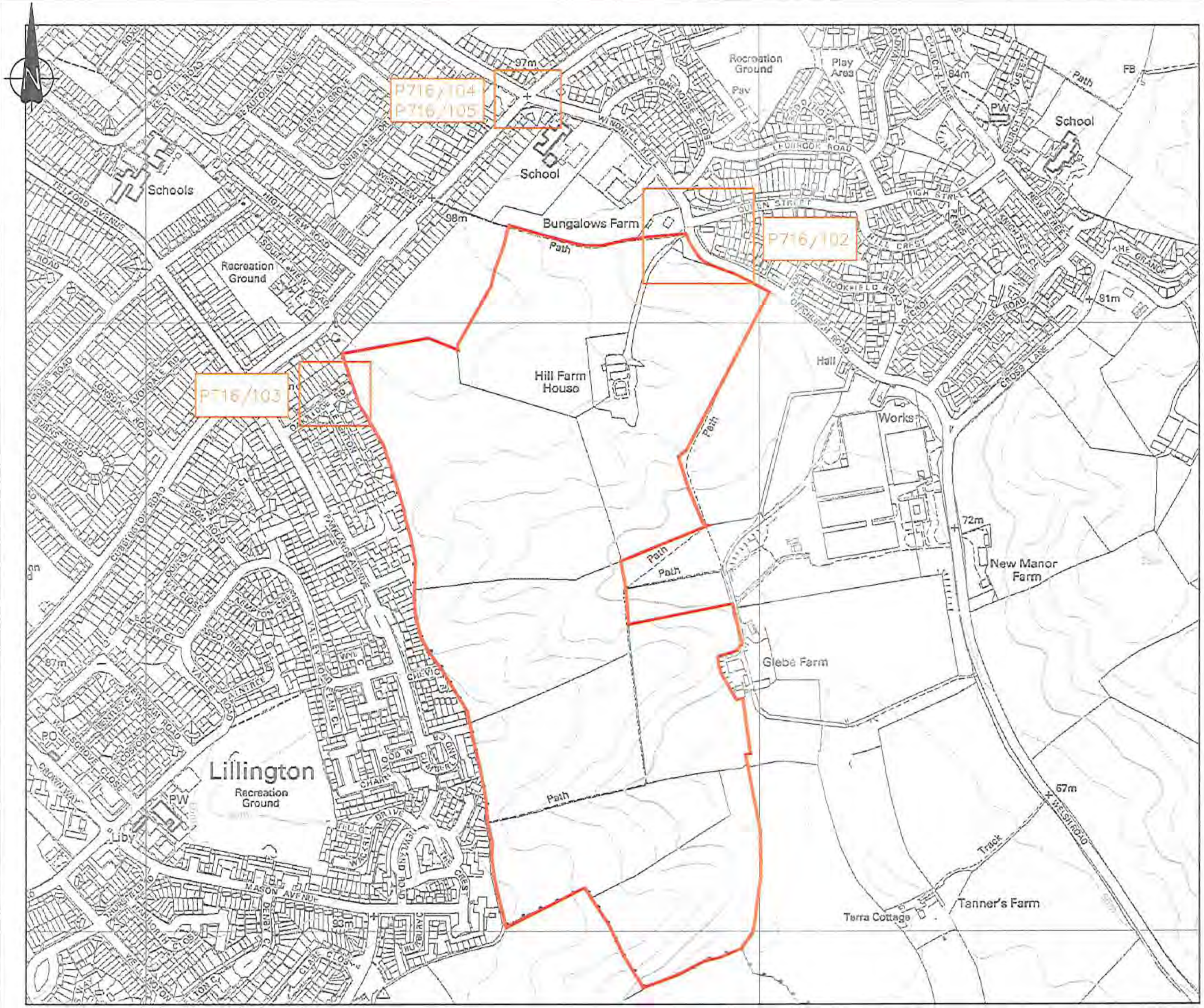


Rev.	Description	Date	By

Client

SIR THOMAS WHITE'S CHARITY

Project

LAND AT CUBBINGTON WARWICKSHIRE

Title

LOCATION OF PROPOSED & EXISTING JUNCTIONS

Banners Gate

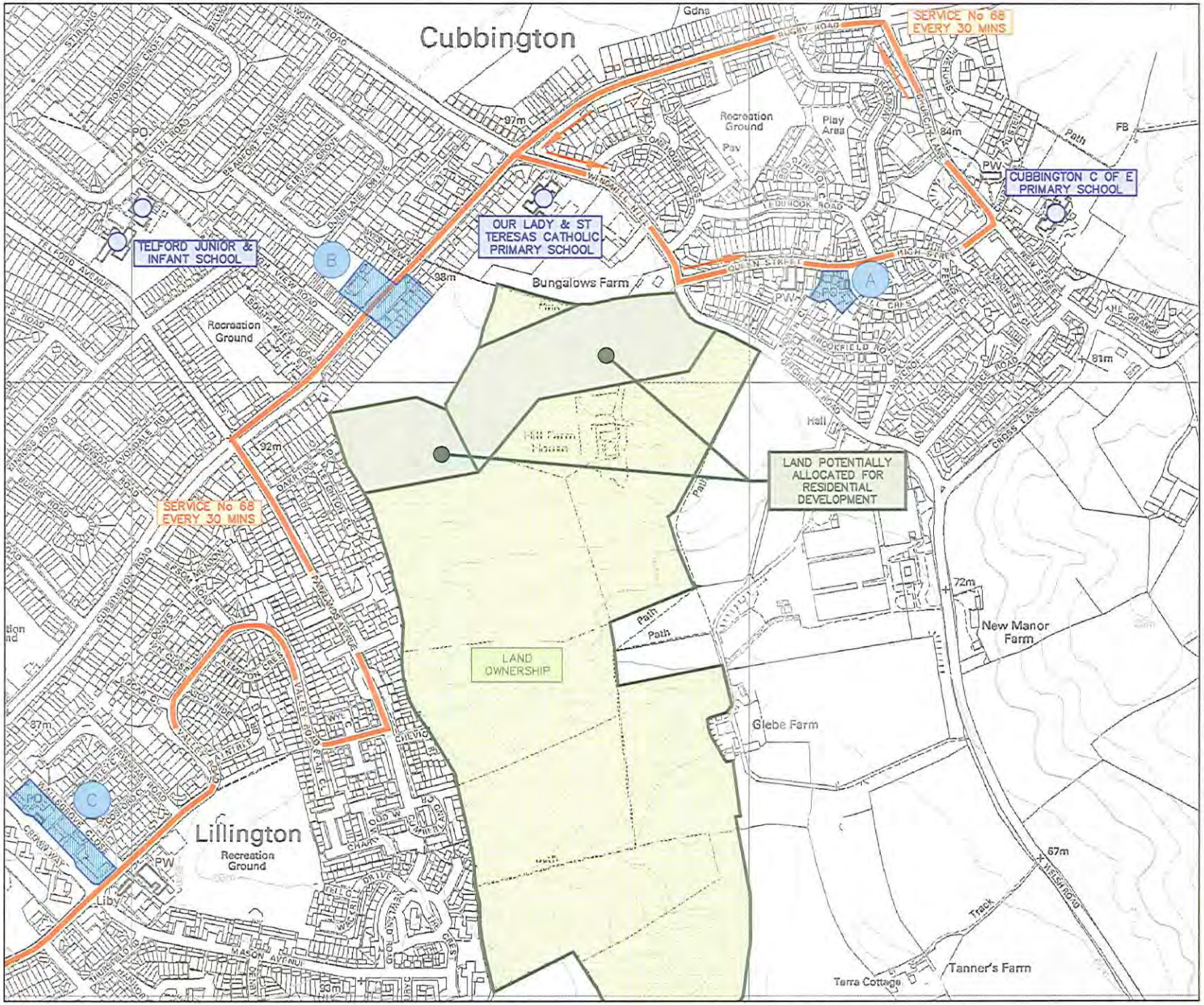
Civil, Structural & Transportation Engineers

Cavendish House, 10–11 Birmingham Street, Halesowen B63 3HN
Tel: 0121 687 1500 Fax: 0121 687 1501
E-mail: mail@bannersgate.com

Scale	NTS	Drawn	DJA
Date	Jun 10	Checked	NRV
File	P716	Drawing	P716/100

APPENDIX B

LOCAL FACILITIES PLAN
(DRAWING P716/101)



A Cubbington High Street
General Store & Post Office, Coat Cutter,
DD Hardware, Cubbington Wines
600m from site

B Rugby Road Shopping Centre
Pets & Plants, The Paper Shop,
Laundrette, Bargain Nooze Cubbington
Fish & Chips, The Rugby Tavern
700m from site

C Crown Way Shopping Centre
Lloyds Pharmacy, Martins Newsagents,
Post Office, Three Cooks, Balti
Restaurants, Spar, Crown Fruits
1200m from site

Rev.	Description	Date	By

Client
SIR THOMAS WHITE'S CHARITY

Project
LAND AT CUBBINGTON
WARWICKSHIRE

Title
LOCAL FACILITIES PLAN

Banners Gate
Civil, Structural & Transportation Engineers
Cavendish House, 10–11 Birmingham Street, Halesowen B63 3HN
Tel: 0121 657 1500 Fax: 0121 657 1501
E-mail: mail@bannersgate.com

Scale	Not to Scale	Drawn	DJA
Date	Jun 10	Checked	NRV
File	P716	Drawing	P716/101

APPENDIX C

BUS TIMETABLES

Cubbington • Stud Farm • Leamington town centre • Warwick Gates • Warwick • Hatton Park 68

MONDAYS TO FRIDAYS except Public Holidays

Cubbington church			0708	0740	0810	0840	0920	0950	then at these mins past each hour	20	50	until	1450	1520	1550	1620	1655	1725	1800
Valley Road Parklands Avenue			0714	0746	0816	0846	0926	0956		26	56		1456	1526	1556	1626	1701	1731	1806
Mason Avenue Valley Road			0716	0748	0818	0848	0928	0958		28	58		1458	1528	1558	1628	1703	1733	1808
Gresham Avenue Valley Road			0718	0750	0820	0850	0930	1000		30	00		1500	1530	1600	1630	1705	1735	1810
Lillington Road Cubbington Road			0721	0753	0823	0853	0933	1003		33	03		1503	1533	1603	1633	1708	1738	1813
Leamington Upper Parade arr			0725	0757	0829	0859	0937	1007		37	07		1507	1537	1607	1639	1714	1744	1817
Leamington Upper Parade dep		0702	0726	0802	0832	0907	0942	1012		42	12		1512	1542	1612	1642	1717	1747	1822
Leamington Parish Church		0706	0730	0806	0836	0911	0946	1016		46	16		1516	1546	1616	1646	1721	1751	1826
Leamington rail station forecourt		0709	0733	0809	0839	0916	0949	1019		49	19		1519	1551	1621	1651	1726	1756	1829
Shires Retail Park		0712	0736	0812	0842	0919	0952	1022		52	22		1522	1554	1624	1654	1729	1759	1832
Warwick Gates Co-op		0717	0741	0817	0847	0924	0957	1027		57	27		1527	1559	1629	1659	1734	1804	1837
Warwick Technology Park		0721	0745	0821	0851	0928	1001	1031		01	31		1531	1603	1633	1703	1738	1808	1841
Warwick Market Street	0658	0728	0752	0835	0905	0938	1008	1038		08	38		1538	1613	1643	1713	1748	1818	1848
Forbes Estate Shakespeare Avenue	0702	0732	0759	0842	0912	0942	1012	1042		12	42		1542	1617	1647	1717	1752	1822	1852
Hampton Road Purser Drive	0704	0734	0801	0844	0914	0944	1014	1044		14	44		1544	1619	1649	1719	1754	1824	1854
Hampton On The Hill	0707	0737	0804	0847	0917	0947	1017	1047		17	47		1547	1622	1652	1722	1757	1827	1857
Hampton Magna shops	0710	0740	0807	0850	0920	0950	1020	1050		20	50		1550	1625	1655	1725	1800	1830	1900
Warwick Parkway Station	0713	0743	0810	0853	0923	0953	1023	1053		23	53		1553	1628	1658	1728	1803	1833	1903
Hatton Park Barcheston Drive	0719	0749		0859	0929	0959	1029	1059		29	59		1559	1634	1704	1734	1809	1839	1909

route number			67	67	67	66	67
Cubbington church	1830	1855	2000	2100	2200		2300
Valley Road Parklands Avenue	1836	1901	L	L	L		L
Mason Avenue Valley Road	1838	1903	↓	↓	↓		↓
Gresham Avenue Valley Road	1840	1905					
Lillington Road Cubbington Road	1843	1908					
Leamington Upper Parade arr	1847	1912	2017	2117	2217		2317
Leamington Upper Parade dep	1847	1917	2020	2117	2220	2304	2317
Leamington Parish Church	1851	1921	2024	2122b	2224		2322b
Leamington rail station forecourt	1854	1924					
Shires Retail Park	1857	1927					
Warwick Gates Co-op	1902	1932					
Warwick Technology Park	k	1936				↓	
Warwick Market Street		1943				2325	
Forbes Estate Shakespeare Avenue						2329	
Hampton On The Hill						2332	
Hampton Magna shops						2335	
Hatton Park Barcheston Drive						2340	

k journey continues to Kineton arriving at 1929
L journey runs via Lillington and Stud Farm
b journey terminates at Leamington Old Library

SATURDAYS

route number															67	67	67	66	67
Cubbington church	0720		0820	0850	then at these mins past each hour	20	50	until	1650	1725	1800	1830	1855	2000	2100	2200		2300
Valley Road Parklands Avenue	0726		0826	0856		26	56		1656	1731	1806	1836	1901	L	L	L		L
Mason Avenue Valley Road	0728		0828	0858		28	58		1658	1733	1808	1838	1903	↓	↓	↓		↓
Gresham Avenue Valley Road	0730		0830	0900		30	00		1700	1735	1810	1840	1905					
Lillington Road Cubbington Road	0733		0833	0903		33	03		1703	1738	1813	1843	1908					
Leamington Upper Parade arr	0737		0837	0907		37	07		1707	1744	1817	1847	1912	2017	2117	2217		2317
Leamington Upper Parade dep	0737	0756	0842	0912		42	12		1712	1747	1817	1847	1917	2020	2117	2220	2304	2317
Leamington Parish Church	0741	0800	0846	0916		46	16		1716	1751	1821	1851	1921	2024	2122b	2224		2322b
Leamington rail station forecourt	0744	0803	0849	0919		49	19		1719	1756	1826	1854	1924					
Shires Retail Park	0747	0806	0852	0922		52	22		1722	1759	1829	1857	1927					
Warwick Gates Co-op		0811	0857	0927		57	27		1727	1804	1834	1902	1932					
Warwick Technology Park		0815	0901	0931		01	31		1731	1808	1838	k	1936				↓	
Warwick Market Street		0822	0908	0938		08	38		1738	1818	1845		1943				2325	
Forbes Estate Shakespeare Avenue		↓	0912	0942		12	42		1742	1822							2329	
Hampton Road Purser Drive			0914	0944		14	44		1744	1824							↓	
Hampton On The Hill			0917	0947		17	47		1747	1827							2332	
Hampton Magna shops			0920	0950		20	50		1750	1830							2335	
Warwick Parkway Station		↓	0923	0953		23	53		1753	1833							↓	
Hatton Park Barcheston Drive		0832	0929	0959		29	59		1759	1839							2340	

Hatton Park • Warwick • Warwick Gates • Leamington town centre • Stud Farm • Cubbington 68

MONDAYS TO FRIDAYS except Public Holidays

Hatton Park Barcheston Drive		0625		0725	0755		0905	0935	then at these mins past each hour	05	35	until	1505	1535	1605	1640	1710	1740	1845
Warwick Parkway Station		0631		0731	0801	0836	0911	0941		11	41		1511	1541	1611	1646	1716	1746	1851
Hampton Magna shops		0634		0734	0804	0839	0914	0944		14	44		1514	1544	1614	1649	1719	1749	1854
Hampton On The Hill		0637		0737	0807	0842	0917	0947		17	47		1517	1547	1617	1652	1722	1752	1857
Hampton Road Purser Drive		0640		0740	0810	0845	0920	0950		20	50		1520	1550	1620	1655	1725	1755	1900
Forbes Estate Shakespeare Avenue		0642		0742	0812	0847	0922	0952		22	52		1522	1552	1622	1657	1727	1757	1902
Warwick Market Street		0649		0749	0821	0856	0929	0959		29	59		1529	1559	1629	1704	1734	1804	1909
Warwick Technology Park	BT	0656	K	0756	0831	0906	0936	1006		36	06		1536	1606	1636	1711	1741	1811	1916
Warwick Gates Co-op	0638	0700	0732	0800	0835	0910	0940	1010		40	10		1540	1610	1640	1715	1745	1815	1920
Shires Retail Park	0643	0705	0737	0807	0842	0915	0945	1015		45	15		1545	1617	1647	1722	1752	1820	1925
Leamington rail station forecourt	0646	0708	0740	0812	0847	0918	0948	1018		48	18		1548	1622	1652	1727	1757	1823	1928
Leamington opp Parish Church	0649	0711	0743	0816	0851	0921	0951	1021		51	21		1551	1626	1656	1731	1801	1826	1931
Leamington Upper Parade arr	0653	0715	0747	0822	0857	0925	0955	1025		55	25		1555	1632	1702	1737	1807	1830	
Leamington Upper Parade dep	0653	0720	0750	0825	0900	0930	1000	1030		00	30		1600	1635	1705	1740	1810	1835	
Lillington Road Cubbington Road	0657	0724	0754	0829	0904	0934	1004	1034		04	34		1604	1639	1709	1744	1814	1839	
Gresham Avenue Valley Road	↓	0728	0758	↓	0908	0938	1008	1038		08	38		1608	1643	1713	1748	1818	1843	
Mason Avenue Valley Road		0730	0800		0910	0940	1010	1040		10	40		1610	1645	1715	1750	1820	1845	
Valley Road Parklands Avenue	↓	0732	0802	↓	0912	0942	1012	1042		12	42		1612	1647	1717	1752	1822	1847	
Cubbington church	0706	0738	0808	0838	0918	0948	1018	1048		18	48		1618	1653	1723	1758	1828	1853	

route number	67	67	67	67	67
Leamington opp Parish Church	1931	2031	2131	2231	2331
Leamington Upper Parade arr	1935	2035	2135	2235	2335
Leamington Upper Parade dep	1935	2035	2135	2235	2335
Lillington Road Cubbington Road	SF	SF	SF	SF	SF
Cubbington church	1955	2055	2155	2255	2355

BT journey starts from Bishops Tachbrook at 0628
K journey starts from Kineton at 0705

SATURDAYS

route number																67	67	67	67
Hatton Park Barcheston Drive			0735		0835	then at these mins past each hour	05	35	until	1535	1605	1635	1705	1735	1845				
Warwick Parkway Station			0741		0841		11	41		1541	1611	1641	1711	1741	1851				
Hampton Magna shops			0744		0844		14	44		1544	1614	1644	1714	1744	1854				
Hampton On The Hill			0747		0847		17	47		1547	1617	1647	1717	1747	1857				
Hampton Road Purser Drive			0750		0850		20	50		1550	1620	1650	1720	1750	1900				
Forbes Estate Shakespeare Avenue			0752		0852		22	52		1552	1622	1652	1722	1752	1902				
Warwick Market Street			0759	0829	0859		29	59		1559	1629	1659	1729	1759	1909				
Warwick Technology Park			0806	0836	0906		36	06		1606	1636	1706	1736	1806	1916				
Warwick Gates Co-op			0810	0840	0910		40	10		1610	1640	1710	1740	1810	1920				
Shires Retail Park		0755	0815	0845	0915		45	15		1615	1645	1715	1745	1815	1925				
Leamington rail station forecourt		0758	0818	0848	0918		48	18		1618	1648	1718	1748	1818	1928				
Leamington opp Parish Church	0701	0801	0821	0851	0921		51	21		1621	1651	1721	1751	1821	1931	1931	2031	2131	2231
Leamington Upper Parade arr	0705	0805	0825	0855	0925		55	25		1625	1655	1725	1755	1825		1935	2035	2135	2235
Leamington Upper Parade dep	0705	0805	0830	0900	0930		00	30		1630	1705	1740	1810	1835		1935	2035	2135	2235
Lillington Road Cubbington Road	0709	0809	0834	0904	0934		04	34		1634	1709	1744	1814	1839		SF	SF	SF	SF
Gresham Avenue Valley Road	↓	↓	0838	0908	0938		08	38		1638	1713	1748	1818	1843		↓	↓	↓	↓
Mason Avenue Valley Road			0840	0910	0940		10	40		1640	1715	1750	1820	1845					
Valley Road Parklands Avenue	↓	↓	0842	0912	0942		12	42		1642	1717	1752	1822	1847		↓	↓	↓	↓
Cubbington church	0718	0818	0848	0918	0948		18	48		1648	1723	1758	1828	1853		1955	2055	2155	2255

route number	67
Leamington opp Parish Church	2331
Leamington Upper Parade arr	2335
Leamington Upper Parade dep	2335
Lillington Road Cubbington Road	SF
Cubbington church	2355

SF journey runs via Stud Farm and Lillington

Cubbington • Stud Farm • Leamington town centre

68

SUNDAYS AND PUBLIC HOLIDAYS

					then at these mins past each hour			until			
Cubbington church	0850	0950	1020	1050		20	50		1720	1750	1850
Valley Road Parklands Avenue	0856	0956	1026	1056		26	56		1726	1756	1856
Mason Avenue Valley Road	0858	0958	1028	1058		28	58		1728	1758	1858
Gresham Avenue Valley Road	0900	1000	1030	1100		30	00		1730	1800	1900
Lillington Road Cubbington Road	0903	1003	1033	1103		33	03		1733	1803	1903
Leamington Upper Parade	0907	1007	1037	1107		37	07		1737	1807	1907
Leamington Old Library	0912	1012	1042	1112		42	12		1742	1812	1912

Leamington town centre • Stud Farm • Cubbington

68

SUNDAYS AND PUBLIC HOLIDAYS

			then at these mins past each hour			until		
Leamington Old Library	0925	0955		25	55		1725	1825
Leamington opp Parish Church	0926	0956		26	56		1726	1826
Leamington Upper Parade	0930	1000		30	00		1730	1830
Lillington Road Cubbington Road	0934	1004		34	04		1734	1834
Gresham Avenue Valley Road	0938	1008		38	08		1738	1838
Mason Avenue Valley Road	0940	1010		40	10		1740	1840
Valley Road Parklands Avenue	0942	1012		42	12		1742	1842
Cubbington church	0948	1018		48	18		1748	1848

sorry there is no Sunday Service to/from Leamington & Warwick/Hatton Park

what to do if things go wrong

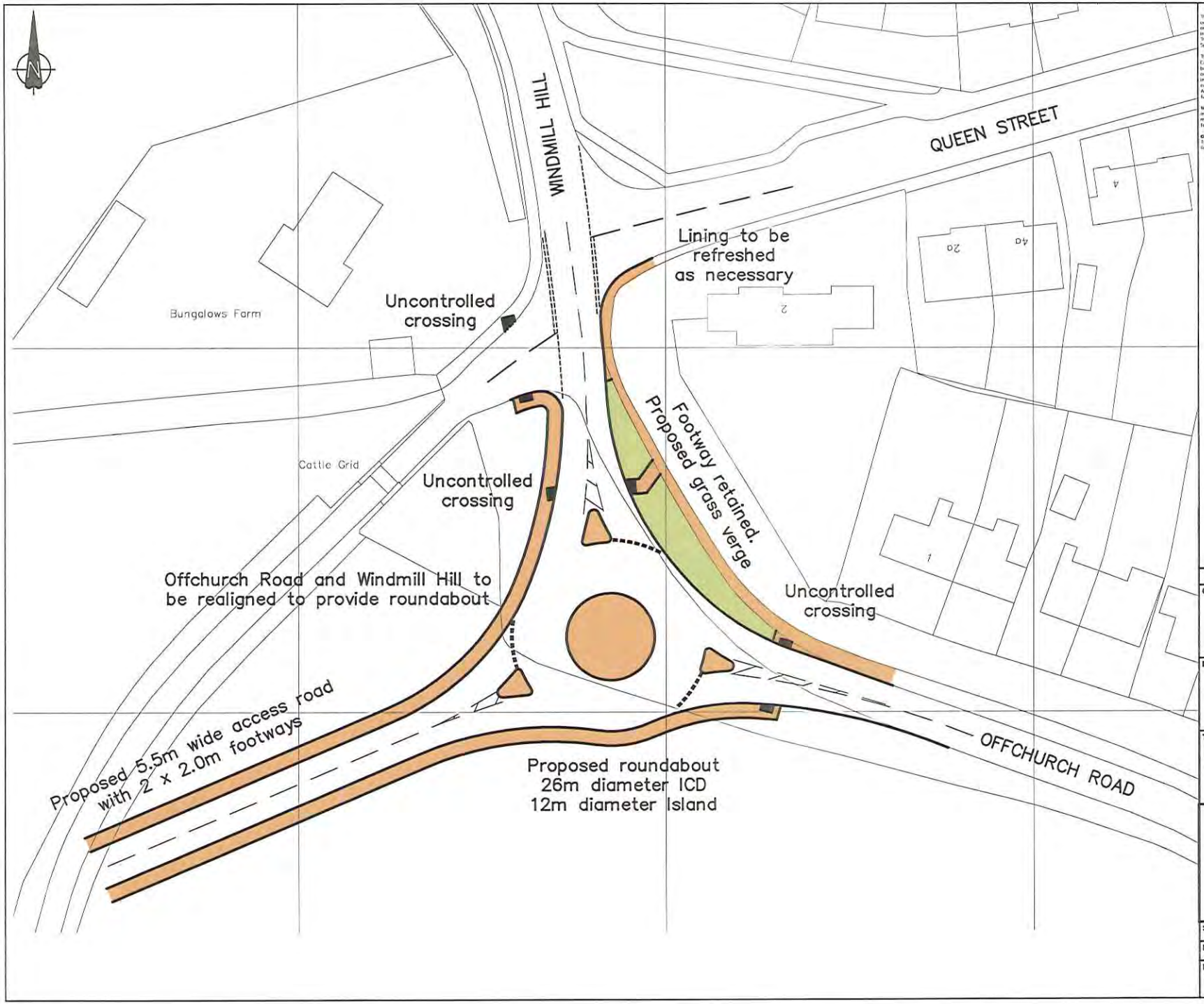
We do our best to meet your expectations, but occasionally things go wrong. If you feel we have failed you in some way please tell us about it. Contact details are on the back of this leaflet.
If you are unhappy with our response, this independent body will review complaints:
The Bus Appeals Body PO Box 2950 Stoke on Trent ST4 9EW

want to check times & fares

Sometimes we need to update our times & fares. If you haven't used this bus service for a while, just phone to check this leaflet is up to date.
We'll send you a new one if necessary.
The phone number is on the back page.

APPENDIX D

ACCESS ARRANGEMENTS
OFFCHURCH ROAD P716 / 102



The Contractor is to check and verify in conjunction with the Architects details all setting out points, building and site dimensions, levels and sewer invert levels at connection points and ensure that they are fully conversant with the contents and all requirements the site investigation report before work starts.
The Contractor is to comply in all respects with current building legislation, British Standard Specifications, Building Regulations etc., whether or not specifically stated on this drawing.

This drawing is not intended to show details of ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor any areas of formation for said structures which do not accord with the anticipated conditions as described in the site investigation report are to be immediately notified to the Engineer, where applicable. Any suspect fluid ground or ground contaminants on or within the ground should be further investigated by a suitable expert. Any earthworks shown indicate typical slopes for guidance only and should be investigated further by a suitable geotechnical expert.

Where existing trees are shown to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services, where applicable. A foundation is to be provided to accommodate the proposed tree planting, where applicable.

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Rev.	Description	Date	By

Client

SIR THOMAS WHITE'S CHARITY

Project

LAND AT CUBBINGTON WARWICKSHIRE

Title

PROPOSED ACCESS ARRANGEMENTS ROUNDABOUT

Banners Gate
Civil, Structural & Transportation Engineers
Cavendish House, 10-11 Birmingham Street, Halesowen B63 3HN
Tel: 0121 687 1500 Fax: 0121 687 1501
E-mail: mail@bannersgate.com

Scale	1:500	Drawn	DJA
Date	Jun 10	Checked	NRV
File	P716	Drawing	P716/102

APPENDIX E

ACCESS ARRANGEMENTS
OAKRIDGE ROAD P716 / 103

The Contractor is to check and verify in conjunction with the Architects details of setting out points, building and site dimensions, levels and sewer invert levels at connection points and ensure that they are fully conversant with the contents and of requirements the site investigation report before work starts.
The Contractor is to comply in all respects with current building legislation, British Standard Specifications, Building Regulations etc.,whether or not specifically stated on this drawing.

This drawing is not intended to show details of ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor any areas of formation for said structures which do not accord with the anticipated conditions as described in the site investigation report are to be immediately notified to the Engineer, where applicable. Any suspect fluid ground or ground contaminants on or within the ground should be further investigated by a suitable expert. Any earthworks shown indicate typical slopes for guidance only and should be investigated further by a suitable geotechnical expert.

Where existing trees are shown to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services, where applicable. A foundation is to be provided to accommodate the proposed tree planting, where applicable.

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Rev.	Description	Date	By

Client

SIR THOMAS WHITE'S CHARITY

Project

LAND AT CUBBINGTON WARWICKSHIRE

Title

PROPOSED ACCESS ARRANGEMENTS EXTENDED CUL-DE-SAC

Banners Gate
CIVIL, Structural & Transportation Engineers
Cavendish House, 10-11 Birmingham Street, Halesowen B63 3HN
Tel: 0121 607 1500 Fax: 0121 607 1501
E-mail: mail@bannersgate.com

Scale	1:500	Drawn	DJA
Date	Jun 10	Checked	NRV
File	P716	Drawing	P716/103

APPENDIX F

TRICS DATABASE
'HOUSES PRIVATELY OWNED '

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED

VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	BD	BEDFORDSHIRE	2 days
	HF	HERTFORDSHIRE	1 days
	SC	SURREY	1 days
03	**SOUTH WEST**		
	CW	CORNWALL	2 days
	DC	DORSET	1 days
	GS	GLOUCESTERSHIRE	1 days
	WL	WILTSHIRE	1 days
04	**EAST ANGLIA**		
	SF	SUFFOLK	2 days
05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
	LE	LEICESTERSHIRE	1 days
	LN	LINCOLNSHIRE	1 days
06	**WEST MIDLANDS**		
	SH	SHROPSHIRE	2 days
	ST	STAFFORDSHIRE	1 days
	WM	WEST MIDLANDS	3 days
	WO	WORCESTERSHIRE	3 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NY	NORTH YORKSHIRE	3 days
08	**NORTH WEST**		
	CH	CHESHIRE	2 days
	LC	LANCASHIRE	1 days
09	**NORTH**		
	CB	CUMBRIA	3 days
	TW	TYNE & WEAR	1 days

Filtering Stage 2 selection:

Parameter: Number of dwellings
Range: 10 to 150 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/02 to 26/06/09

Selected survey days:

Monday	6 days
Tuesday	11 days
Wednesday	5 days
Thursday	6 days
Friday	5 days

Selected survey types:

Manual count	33 days
Directional ATC Count	0 days

Selected Locations:

Edge of Town Centre	3
Suburban Area (PPS6 Out of Centre)	15
Edge of Town	14
Neighbourhood Centre (PPS6 Local Centre)	1

Selected Location Sub Categories:

Residential Zone	25
Out of Town	1
No Sub Category	7

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 08:00	33	64	0.073	33	64	0.286	33	64	0.359
08:00 - 09:00	33	64	0.172	**33**	**64**	**0.400**	33	64	0.572
09:00 - 10:00	33	64	0.194	33	64	0.237	33	64	0.431
10:00 - 11:00	33	64	0.166	33	64	0.200	33	64	0.366
11:00 - 12:00	33	64	0.195	33	64	0.183	33	64	0.378
12:00 - 13:00	33	64	0.221	33	64	0.187	33	64	0.408
13:00 - 14:00	33	64	0.208	33	64	0.200	33	64	0.408
14:00 - 15:00	33	64	0.205	33	64	0.198	33	64	0.403
15:00 - 16:00	33	64	0.290	33	64	0.232	33	64	0.522
16:00 - 17:00	33	64	0.338	33	64	0.213	33	64	0.551
17:00 - 18:00	**33**	**64**	**0.378**	33	64	0.226	**33**	**64**	**0.604**
18:00 - 19:00	33	64	0.281	33	64	0.213	33	64	0.494
19:00 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			2.721			2.775			5.496

Parameter summary

Trip rate parameter range selected:	10 - 150 (units:)
Survey date date range:	01/01/02 - 26/06/09
Number of weekdays (Monday-Friday):	33
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

APPENDIX G

TRAFFIC SURVEYS
RUGBY ROAD / WINDMILL HILL MINI ROUNDABOUT

MANUAL CLASSIFIED COUNTS

AXIOM Traffic Limited

JOB REF: 14130

JOB NAME: CUBBINGTON

SITE: 1

DATE: 24/06/2010

LOCATION: RUGBY ROAD / KENILWORTH ROAD

DAY: THURSDAY

TIME	MOVEMENT 1 FROM RUGBY ROAD (N) TO WINDMILL HILL			MOVEMENT 2 FROM RUGBY ROAD (N) TO RUGBY ROAD (S)			MOVEMENT 3 FROM RUGBY ROAD (N) TO KENILWORTH ROAD			MOVEMENT 4 FROM RUGBY ROAD (N) TO RUGBY ROAD (N)		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
07:30	2	0	2	23	2	25	11	1	12	0	0	0
07:45	1	0	1	38	2	40	11	0	11	0	0	0
HH/TOT	3	0	3	61	4	65	22	1	23	0	0	0
08:00	0	0	0	80	3	83	21	0	21	0	0	0
08:15	0	0	0	80	3	83	14	0	14	0	0	0
08:30	4	0	4	44	2	46	16	0	16	0	0	0
08:45	3	1	4	68	1	69	14	2	16	0	0	0
H/TOT	7	1	8	272	9	281	65	2	67	0	0	0
09:00	4	0	4	69	2	71	9	0	9	0	0	0
09:15	1	0	1	27	1	28	7	0	7	0	0	0
HH/TOT	5	0	5	96	3	99	16	0	16	0	0	0
P/TOT	15	1	16	429	16	445	103	3	106	0	0	0

TIME	MOVEMENT 1 FROM RUGBY ROAD (N) TO WINDMILL HILL			MOVEMENT 2 FROM RUGBY ROAD (N) TO RUGBY ROAD (S)			MOVEMENT 3 FROM RUGBY ROAD (N) TO KENILWORTH ROAD			MOVEMENT 4 FROM RUGBY ROAD (N) TO RUGBY ROAD (N)		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
16:30	2	0	2	40	2	42	10	0	10	0	0	0
16:45	5	0	5	22	0	22	4	0	4	0	0	0
HH/TOT	7	0	7	62	2	64	14	0	14	0	0	0
17:00	2	0	2	52	1	53	10	0	10	0	0	0
17:15	1	0	1	46	2	48	11	0	11	0	0	0
17:30	4	0	4	39	3	42	12	0	12	0	0	0
17:45	1	0	1	57	0	57	13	0	13	0	0	0
H/TOT	8	0	8	194	6	200	46	0	46	0	0	0
18:00	3	0	3	33	1	34	5	0	5	0	0	0
18:15	7	0	7	40	0	40	7	0	7	0	0	0
HH/TOT	10	0	10	73	1	74	12	0	12	0	0	0
P/TOT	25	0	25	329	9	338	72	0	72	0	0	0

MANUAL CLASSIFIED COUNTS

AXIOM Traffic Limited

JOB REF: 14130

JOB NAME: CUBBINGTON

SITE: 1 **DATE:** 24/06/2010

LOCATION: RUGBY ROAD / KENILWORTH ROAD **DAY:** THURSDAY

TIME	MOVEMENT 5 FROM KENILWORTH ROAD TO RUGBY ROAD (N)			MOVEMENT 6 FROM KENILWORTH ROAD TO WINDMILL HILL			MOVEMENT 7 FROM KENILWORTH ROAD TO RUGBY ROAD (S)			MOVEMENT 8 FROM KENILWORTH ROAD TO KENILWORTH ROAD		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
07:30	5	0	5	24	1	25	9	0	9	0	0	0
07:45	9	1	10	23	2	25	14	0	14	0	0	0
HH/TOT	14	1	15	47	3	50	23	0	23	0	0	0
08:00	16	0	16	24	1	25	18	0	18	0	0	0
08:15	15	1	16	19	1	20	29	1	30	0	0	0
08:30	20	0	20	16	0	16	21	1	22	0	0	0
08:45	9	1	10	29	2	31	15	1	16	0	0	0
H/TOT	60	2	62	88	4	92	83	3	86	0	0	0
09:00	10	1	11	30	3	33	17	0	17	0	0	0
09:15	8	1	9	18	0	18	10	0	10	0	0	0
HH/TOT	18	2	20	48	3	51	27	0	27	0	0	0
P/TOT	92	5	97	183	10	193	133	3	136	0	0	0

TIME	MOVEMENT 5 FROM KENILWORTH ROAD TO RUGBY ROAD (N)			MOVEMENT 6 FROM KENILWORTH ROAD TO WINDMILL HILL			MOVEMENT 7 FROM KENILWORTH ROAD TO RUGBY ROAD (S)			MOVEMENT 8 FROM KENILWORTH ROAD TO KENILWORTH ROAD		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
16:30	20	0	20	27	2	29	34	0	34	0	0	0
16:45	27	0	27	26	2	28	26	1	27	0	0	0
HH/TOT	47	0	47	53	4	57	60	1	61	0	0	0
17:00	14	0	14	43	0	43	38	0	38	0	0	0
17:15	13	0	13	44	2	46	28	1	29	0	0	0
17:30	16	0	16	35	3	38	40	2	42	0	0	0
17:45	14	0	14	27	1	28	37	2	39	0	0	0
H/TOT	57	0	57	149	6	155	143	5	148	0	0	0
18:00	10	0	10	44	0	44	26	1	27	0	0	0
18:15	14	0	14	26	1	27	27	0	27	0	0	0
HH/TOT	24	0	24	70	1	71	53	1	54	0	0	0
P/TOT	128	0	128	272	11	283	256	7	263	0	0	0

MANUAL CLASSIFIED COUNTS

AXIOM Traffic Limited

JOB REF: 14130

JOB NAME: CUBBINGTON

SITE: 1

DATE: 24/06/2010

LOCATION: RUGBY ROAD / KENILWORTH ROAD

DAY: THURSDAY

TIME	MOVEMENT 9 FROM RUGBY ROAD (S) TO KENILWORTH ROAD			MOVEMENT 10 FROM RUGBY ROAD (S) TO RUGBY ROAD (N)			MOVEMENT 11 FROM RUGBY ROAD (S) TO WINDMILL HILL			MOVEMENT 12 FROM RUGBY ROAD (S) TO RUGBY ROAD (S)		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
07:30	18	2	20	29	2	31	8	1	9	0	0	0
07:45	23	0	23	39	2	41	11	2	13	0	0	0
HH/TOT	41	2	43	68	4	72	19	3	22	0	0	0
08:00	42	1	43	36	4	40	25	0	25	0	0	0
08:15	31	1	32	35	2	37	16	2	18	0	0	0
08:30	34	0	34	42	0	42	36	7	43	1	0	1
08:45	18	2	20	28	0	28	35	1	36	0	0	0
H/TOT	125	4	129	141	6	147	112	10	122	1	0	1
09:00	24	0	24	33	1	34	39	1	40	0	0	0
09:15	19	1	20	20	1	21	27	2	29	0	0	0
HH/TOT	43	1	44	53	2	55	66	3	69	0	0	0
P/TOT	209	7	216	262	12	274	197	16	213	1	0	1

TIME	MOVEMENT 9 FROM RUGBY ROAD (S) TO KENILWORTH ROAD			MOVEMENT 10 FROM RUGBY ROAD (S) TO RUGBY ROAD (N)			MOVEMENT 11 FROM RUGBY ROAD (S) TO WINDMILL HILL			MOVEMENT 12 FROM RUGBY ROAD (S) TO RUGBY ROAD (S)		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
16:30	23	1	24	37	0	37	33	1	34	0	0	0
16:45	24	0	24	36	0	36	24	3	27	0	0	0
HH/TOT	47	1	48	73	0	73	57	4	61	0	0	0
17:00	23	1	24	57	4	61	31	2	33	0	0	0
17:15	27	0	27	66	1	67	46	2	48	0	0	0
17:30	26	0	26	54	1	55	28	1	29	0	0	0
17:45	21	0	21	61	0	61	28	3	31	0	0	0
H/TOT	97	1	98	238	6	244	133	8	141	0	0	0
18:00	23	0	23	39	0	39	38	0	38	0	0	0
18:15	23	2	25	45	2	47	34	1	35	0	0	0
HH/TOT	46	2	48	84	2	86	72	1	73	0	0	0
P/TOT	190	4	194	395	8	403	262	13	275	0	0	0

MANUAL CLASSIFIED COUNTS

AXIOM Traffic Limited

JOB REF: 14130

JOB NAME: CUBBINGTON

SITE: 1

DATE: 24/06/2010

LOCATION: RUGBY ROAD / KENILWORTH ROAD

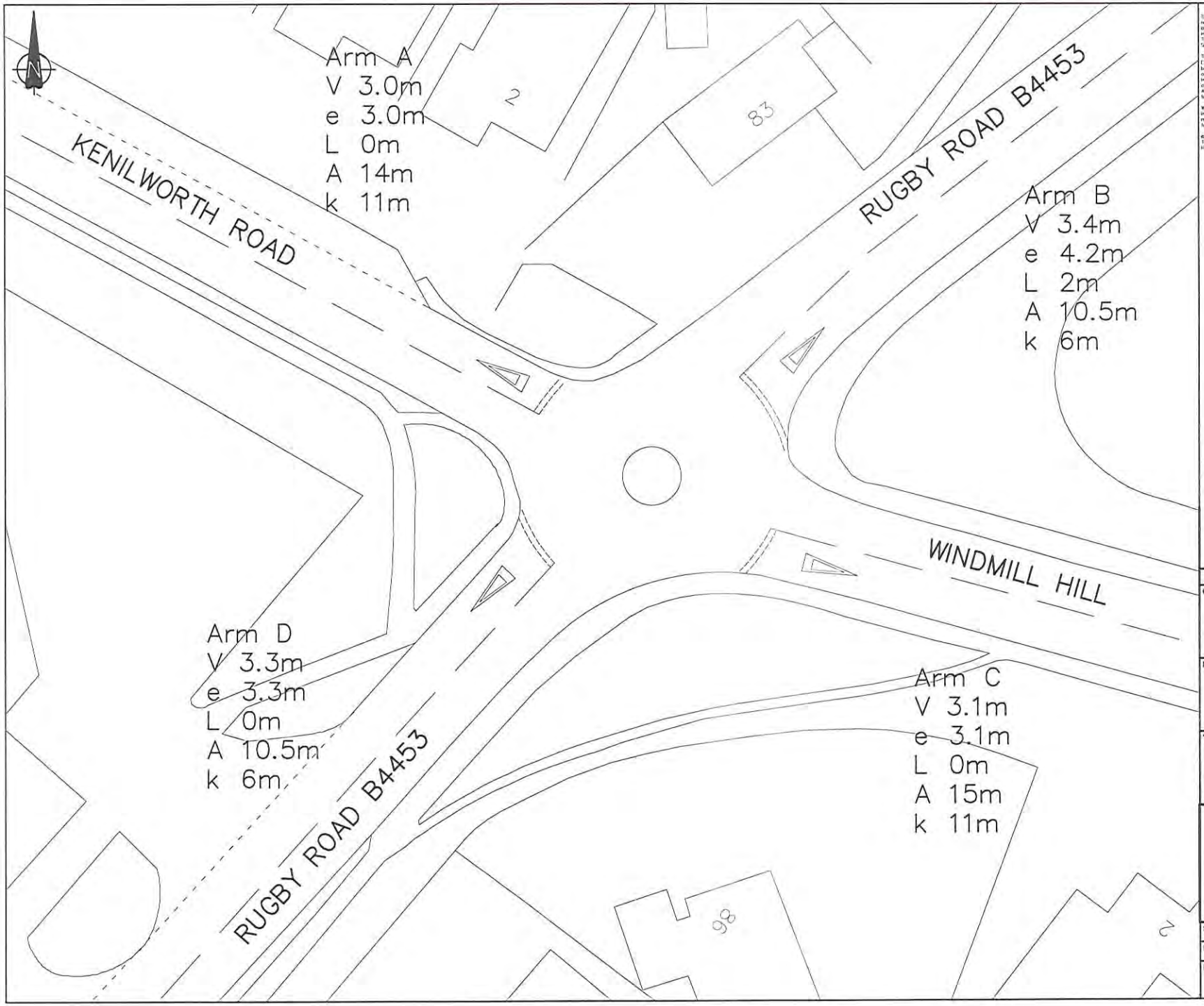
DAY: THURSDAY

TIME	MOVEMENT 13 FROM WINDMILL HILL TO RUGBY ROAD (S)			MOVEMENT 14 FROM WINDMILL HILL TO KENILWORTH ROAD			MOVEMENT 15 FROM WINDMILL HILL TO RUGBY ROAD (N)			MOVEMENT 16 FROM WINDMILL HILL TO WINDMILL HILL		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
07:30	29	1	30	21	0	21	2	0	2	0	0	0
07:45	27	0	27	36	2	38	1	2	3	0	0	0
HH/TOT	56	1	57	57	2	59	3	2	5	0	0	0
08:00	38	0	38	60	0	60	3	0	3	0	0	0
08:15	56	1	57	60	2	62	0	0	0	0	0	0
08:30	44	3	47	57	2	59	1	0	1	0	0	0
08:45	54	0	54	54	1	55	4	0	4	2	0	2
H/TOT	192	4	196	231	5	236	8	0	8	2	0	2
09:00	55	2	57	47	1	48	1	0	1	0	0	0
09:15	40	0	40	19	2	21	2	0	2	0	0	0
HH/TOT	95	2	97	66	3	69	3	0	3	0	0	0
P/TOT	343	7	350	354	10	364	14	2	16	2	0	2

TIME	MOVEMENT 13 FROM WINDMILL HILL TO RUGBY ROAD (S)			MOVEMENT 14 FROM WINDMILL HILL TO KENILWORTH ROAD			MOVEMENT 15 FROM WINDMILL HILL TO RUGBY ROAD (N)			MOVEMENT 16 FROM WINDMILL HILL TO WINDMILL HILL		
	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT	LV	HV	TOT
16:30	29	1	30	28	0	28	5	0	5	0	0	0
16:45	40	1	41	30	0	30	2	0	2	0	0	0
HH/TOT	69	2	71	58	0	58	7	0	7	0	0	0
17:00	67	1	68	50	4	54	1	0	1	0	0	0
17:15	41	0	41	41	0	41	3	0	3	0	0	0
17:30	39	1	40	33	0	33	1	0	1	0	0	0
17:45	33	1	34	37	1	38	1	0	1	0	0	0
H/TOT	180	3	183	161	5	166	6	0	6	0	0	0
18:00	29	0	29	28	0	28	0	0	0	0	0	0
18:15	46	0	46	22	0	22	5	0	5	0	0	0
HH/TOT	75	0	75	50	0	50	5	0	5	0	0	0
P/TOT	324	5	329	269	5	274	18	0	18	0	0	0

APPENDIX H

RUGBY ROAD / WINDMILL HILL MINI ROUNDABOUT
EXISTING LAYOUT DRAWING P710 / 104
TRAFFIC FLOWS,
DO NOTHING, ARCADY6 ANALYSIS



The Contractor is to check and verify in conjunction with the Architects details all setting out points, building and site dimensions, levels and sewer invert levels at connection points and ensure that they are fully conversant with the contents and of requirements the site investigation report before work starts.
The Contractor is to comply in all respects with current building legislation, British Standard Specifications, Building Regulations etc.,whether or not specifically stated on this drawing.

This drawing is not intended to show details of ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor any areas of formation for said structures which do not accord with the anticipated conditions as described in the site investigation report are to be immediately notified to the Engineer, where applicable. Any suspect fluid ground or ground contaminants on or within the ground should be further investigated by a suitable expert. Any earthworks shown indicate typical slopes for guidance only and should be investigated further by a suitable geotechnical expert.

Where existing trees are shown to be retained they should be subject to a full Arboriculture inspection for safety. All trees are to be protected so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services, where applicable. A foundation is to be provided to accommodate the proposed tree planting, where applicable.

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Rev.	Description	Date	By

Client

SIR THOMAS WHITE'S CHARITY

Project

LAND AT CUBBINGTON WARWICKSHIRE

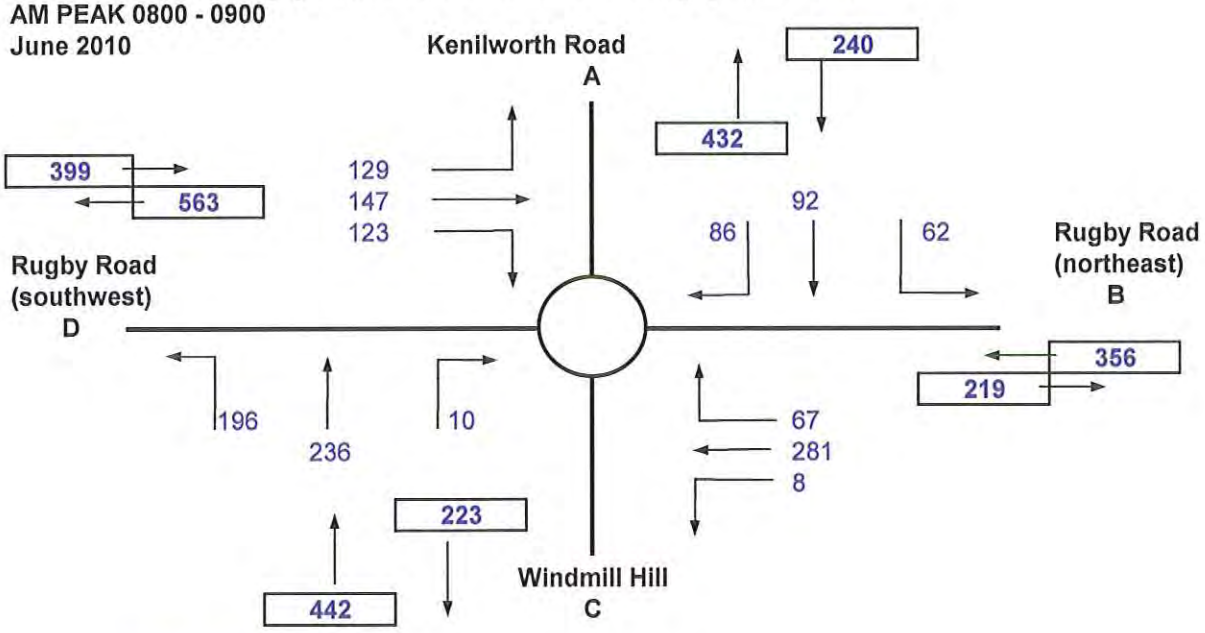
Title

RUGBY RD / WINDMILL HILL / KENILWORTH RD EX ROUNDABOUT

Banners Gate
Civil, Structural & Transportation Engineers
Cavendish House, 10-11 Birmingham Street, Halesowen B63 3HN
Tel: 0121 667 1500 Fax: 0121 667 1501
E-mail: mail@bannersgate.com

Scale	1:250	Drawn	DJA
Date	Jun 10	Checked	NRV
File	P716	Drawing	P716/104

Kenilworth Road / Rugby Road East / Windmill Rise / Rugby Road west
AM PEAK 0800 - 0900
June 2010



AM PEAK (existing)

	A	B	C	D	Total
A	0	62	92	86	240
B	67	0	8	281	356
C	236	10	0	196	442
D	129	147	123	0	399
Total	432	219	223	563	**1437**

Development traffic	Arr	Dep
AM peak	26	60

Distribution
Assume all traffic uses junction
60% travels left to Leamington Spa
40% continues straight to Coventry
No right turns from Windmill Hill are expected

Development traffic

	A	B	C	D	Total
A	0	0	10	0	
B	0	0	0	0	
C	24	0	0	36	60
D	0	0	16	0	
Total			26		86

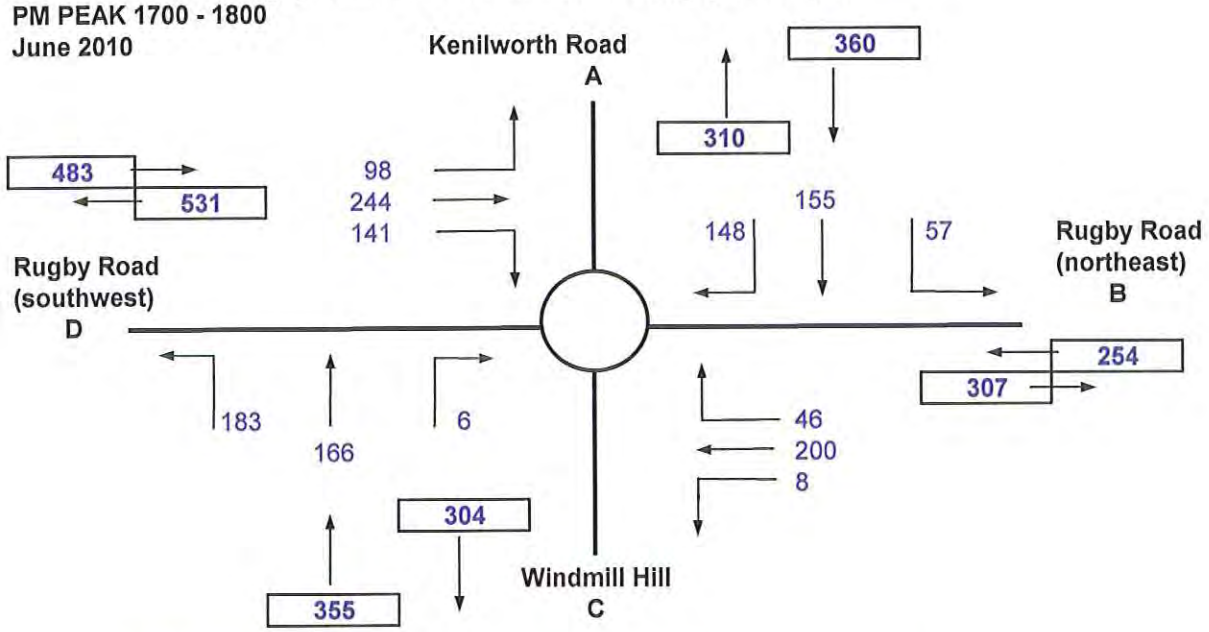
Growth factor of	1.00

Add development flows to existing traffic
and multiply by growth factor for design year

AM Design year matrix 2010

	A	B	C	D	Total
A	0	62	102	86	250
B	67	0	8	281	356
C	260	10	0	232	502
D	129	147	139	0	415
Total	456	219	249	599	**1523**

Kenilworth Road / Rugby Road East / Windmill Rise / Rugby Road west
PM PEAK 1700 - 1800
June 2010



PM PEAK (existing)

	A	B	C	D	Total
A	0	57	155	148	360
B	46	0	8	200	254
C	166	6	0	183	355
D	98	244	141	0	483
Total	310	307	304	531	**1452**

Development traffic	Arr	Dep
PM peak	57	35

Distribution
Assume all traffic uses junction
60% travels left to Leamington Spa
40% continues straight to Coventry
No right turns from Windmill Hill are expected

Development traffic

	A	B	C	D	Total
A	0	0	**23**	0	
B	0	0	0	0	
C	**14**	0	0	**21**	**35**
D	0	0	**34**	0	
Total			**57**		**92**

Growth factor of	1.00

Add development flows to existing traffic
and multiply by growth factor for design year

PM Design year matrix 2010

	A	B	C	D	Total
A	0	57	178	148	383
B	46	0	8	200	254
C	180	6	0	204	390
D	98	244	175	0	517
Total	324	307	361	552	**1544**

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 2.0 (MAR 2005)

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Run with file:- "t:\716\arcady\rugby-AM.vai" (drive-on-the-left) at 10:35:08 on Friday, 2 July 2010

FILE PROPERTIES

RUN TITLE: Rugby Road - Windmill Hill Mini Roundabout
LOCATION: Cubbington
DATE: 01/07/2010
CLIENT: Sir Thomas White's Charity
ENUMERATOR: Nigel Vening [NIGELVENING01]
JOB NUMBER: P716
STATUS: Planning
DESCRIPTION: Existing roundabout, June 2010 flows, AM peak

INPUT DATA

ARM A - Kenilworth Road
ARM B - Rugby Road -NE
ARM C - Windmill Hill
ARM D - Rugby Road -SW

MINI-ROUNDABOUT GEOMETRIC DATA

LIGHTING CONDITIONS : NORMAL

ROAD SURFACE CONDITION: NORMAL

ARM	V (m)	E (m)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.00	0.00	3.00	14.00	11.00	1.00	0.561	13.158
ARM B	3.40	4.20	2.00	3.40	10.50	6.00	0.00	0.542	12.844
ARM C	3.10	3.10	0.00	3.10	15.00	11.00	-3.00	0.666	14.850
ARM D	3.30	3.30	0.00	3.30	10.50	6.00	0.00	0.520	11.743

V = approach half-width
E = entry width
Lm = effective flare length
Vm = minimum approach half-width
A = distance between arms
K = entry corner kerb line
G = gradient over 50m

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: Existing June 2010

ARM	NUMBER OF MINUTES FROM START WHEN: FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN): BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	3.00	4.50	3.00
ARM B	15.00	45.00	75.00	4.45	6.67	4.45
ARM C	15.00	45.00	75.00	5.53	8.29	5.53
ARM D	15.00	45.00	75.00	4.99	7.48	4.99

DEMAND SET TITLE: Existing June 2010

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.000	0.258	0.383	0.358
		0.0	62.0	92.0	86.0
		(0.0)%	(5.5)%	(5.5)%	(2.5)%
	ARM B	0.188	0.000	0.022	0.789
		67.0	0.0	8.0	281.0
		(3.0)%	(0.0)%	(6.5)%	(4.0)%
	ARM C	0.534	0.023	0.000	0.443
		236.0	10.0	0.0	196.0
		(3.0)%	(12.5)%	(0.0)%	(2.5)%
	ARM D	0.323	0.368	0.308	0.000
		129.0	147.0	123.0	0.0
		(3.5)%	(4.5)%	(7.5)%	(0.0)%

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00								
ARM A	3.00	10.64	0.282		0.0	0.4	5.6	0.13
ARM B	4.45	10.32	0.431		0.0	0.7	10.5	0.17
ARM C	5.53	10.83	0.510		0.0	1.0	14.2	0.18
ARM D	4.99	9.20	0.542		0.0	1.1	15.8	0.23

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15								
ARM A	3.58	10.24	0.350		0.4	0.5	7.7	0.15
ARM B	5.31	9.91	0.536		0.7	1.1	16.0	0.21
ARM C	6.60	10.10	0.653		1.0	1.8	24.9	0.28
ARM D	5.96	8.81	0.676		1.1	2.0	27.0	0.34

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30								
ARM A	4.39	9.77	0.449		0.5	0.8	11.5	0.18
ARM B	6.51	9.38	0.694		1.1	2.1	28.9	0.33
ARM C	8.08	9.16	0.882		1.8	5.4	65.3	0.66
ARM D	7.29	8.33	0.876		2.0	5.2	62.6	0.71

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45								
ARM A	4.39	9.71	0.452		0.8	0.8	12.1	0.19
ARM B	6.51	9.35	0.696		2.1	2.2	32.6	0.35
ARM C	8.08	9.11	0.887		5.4	6.3	89.1	0.84
ARM D	7.29	8.27	0.882		5.2	6.0	84.7	0.89

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00								
ARM A	3.58	10.12	0.354		0.8	0.6	8.7	0.15
ARM B	5.31	9.84	0.540		2.2	1.2	19.4	0.23
ARM C	6.60	10.04	0.657		6.3	2.0	36.7	0.34
ARM D	5.96	8.70	0.684		6.0	2.3	41.6	0.43

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15								
ARM A	3.00	10.58	0.284		0.6	0.4	6.2	0.13
ARM B	4.45	10.28	0.433		1.2	0.8	12.2	0.17
ARM C	5.53	10.77	0.513		2.0	1.1	17.2	0.20
ARM D	4.99	9.15	0.545		2.3	1.2	19.9	0.25

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.8	*
08.45	0.8	*
09.00	0.6	*
09.15	0.4	

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	1.1	*
08.30	2.1	**
08.45	2.2	**
09.00	1.2	*
09.15	0.8	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.0	*
08.15	1.8	**
08.30	5.4	*****
08.45	6.3	******
09.00	2.0	**
09.15	1.1	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.1	*
08.15	2.0	**
08.30	5.2	*****
08.45	6.0	******
09.00	2.3	**
09.15	1.2	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	329.1	219.4	51.7	0.16	51.7	0.16
B	488.2	325.4	119.6	0.24	119.6	0.25
C	606.1	404.1	247.5	0.41	247.5	0.41
D	547.1	364.7	251.5	0.46	251.6	0.46
ALL	1970.4	1313.6	670.3	0.34	670.4	0.34

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 10:35:15 on 02/07/2010]

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 2.0 (MAR 2005)

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Run with file:- "t:\716\arcady\rugby-PM.vai" (drive-on-the-left) at 10:31:43 on Friday, 2 July 2010

FILE PROPERTIES

RUN TITLE: Rugby Road - Windmill Hill Mini Roundabout
LOCATION: Cubbington
DATE: 01/07/2010
CLIENT: Sir Thomas White's Charity
ENUMERATOR: Nigel Vening [NIGELVENING01]
JOB NUMBER: P716
STATUS: Planning
DESCRIPTION: Existing roundabout, June 2010 flows, PM peak

INPUT DATA

ARM A - Kenilworth Road
ARM B - Rugby Road -NE
ARM C - Windmill Hill
ARM D - Rugby Road -SW

MINI-ROUNDABOUT GEOMETRIC DATA

LIGHTING CONDITIONS : NORMAL

ROAD SURFACE CONDITION: NORMAL

ARM	V (m)	E (m)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.00	0.00	3.00	14.00	11.00	1.00	0.561	13.158
ARM B	3.40	4.20	2.00	3.40	10.50	6.00	0.00	0.542	12.844
ARM C	3.10	3.10	0.00	3.10	15.00	11.00	-3.00	0.666	14.850
ARM D	3.30	3.30	0.00	3.30	10.50	6.00	0.00	0.520	11.743

V = approach half-width
E = entry width
Lm = effective flare length
Vm = minimum approach half-width
A = distance between arms
K = entry corner kerb line
G = gradient over 50m

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: Existing June 2010, PM

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TO TOP OF PEAK	FLOW STOPS IS REACHED IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	4.50	6.75	4.50
ARM B	15.00	45.00	75.00	3.17	4.76	3.17
ARM C	15.00	45.00	75.00	4.44	6.66	4.44
ARM D	15.00	45.00	75.00	6.04	9.06	6.04

DEMAND SET TITLE: Existing June 2010, PM

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000	0.158	0.431	0.411
		0.0	57.0	155.0	148.0
		(0.0)	(2.0)	(4.0)	(3.0)
	ARM B	0.181	0.000	0.031	0.787
		46.0	0.0	8.0	200.0
		(3.0)	(0.0)	(2.0)	(3.0)
	ARM C	0.468	0.017	0.000	0.515
		166.0	6.0	0.0	183.0
		(2.0)	(2.0)	(0.0)	(2.0)
	ARM D	0.203	0.505	0.292	0.000
		98.0	244.0	141.0	0.0
		(2.5)	(2.5)	(5.0)	(0.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00								
ARM A	4.50	10.04	0.448		0.0	0.8	11.2	0.18
ARM B	3.17	9.48	0.335		0.0	0.5	7.1	0.16
ARM C	4.44	11.28	0.393		0.0	0.6	9.1	0.14
ARM D	6.04	9.99	0.604		0.0	1.5	20.1	0.24

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15								
ARM A	5.37	9.50	0.566		0.8	1.3	17.8	0.24
ARM B	3.79	8.87	0.427		0.5	0.7	10.5	0.20
ARM C	5.30	10.63	0.499		0.6	1.0	13.9	0.19
ARM D	7.21	9.71	0.743		1.5	2.6	35.7	0.38

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30								
ARM A	6.58	8.90	0.739		1.3	2.6	34.5	0.40
ARM B	4.64	8.14	0.570		0.7	1.3	17.8	0.28
ARM C	6.49	9.77	0.664		1.0	1.9	25.8	0.29
ARM D	8.83	9.35	0.945		2.6	8.2	92.5	0.88

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45								
ARM A	6.58	8.79	0.749		2.6	2.8	40.7	0.44
ARM B	4.64	8.06	0.576		1.3	1.3	19.6	0.29
ARM C	6.49	9.72	0.667		1.9	1.9	28.7	0.31
ARM D	8.83	9.33	0.947		8.2	10.2	139.7	1.24

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00								
ARM A	5.37	9.26	0.580		2.8	1.4	23.3	0.27
ARM B	3.79	8.73	0.434		1.3	0.8	12.4	0.21
ARM C	5.30	10.56	0.502		1.9	1.0	16.4	0.19
ARM D	7.21	9.68	0.744		10.2	3.2	66.3	0.58

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15								
ARM A	4.50	9.95	0.452		1.4	0.8	13.3	0.19
ARM B	3.17	9.40	0.338		0.8	0.5	8.1	0.16
ARM C	4.44	11.23	0.395		1.0	0.7	10.4	0.15
ARM D	6.04	9.97	0.606		3.2	1.6	26.1	0.27

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.3	*
17.30	2.6	***
17.45	2.8	***
18.00	1.4	*
18.15	0.8	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	
17.15	0.7	*
17.30	1.3	*
17.45	1.3	*
18.00	0.8	*
18.15	0.5	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.6	*
17.15	1.0	*
17.30	1.9	**
17.45	1.9	**
18.00	1.0	*
18.15	0.7	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.5	*
17.15	2.6	***
17.30	8.2	********
17.45	10.2	**********
18.00	3.2	***
18.15	1.6	**

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	493.6	329.1	140.8	0.29	140.8	0.29
B	348.3	232.2	75.5	0.22	75.5	0.22
C	486.8	324.5	104.3	0.21	104.3	0.21
D	662.3	441.5	380.5	0.57	380.6	0.57
ALL	1991.0	1327.3	701.0	0.35	701.2	0.35

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

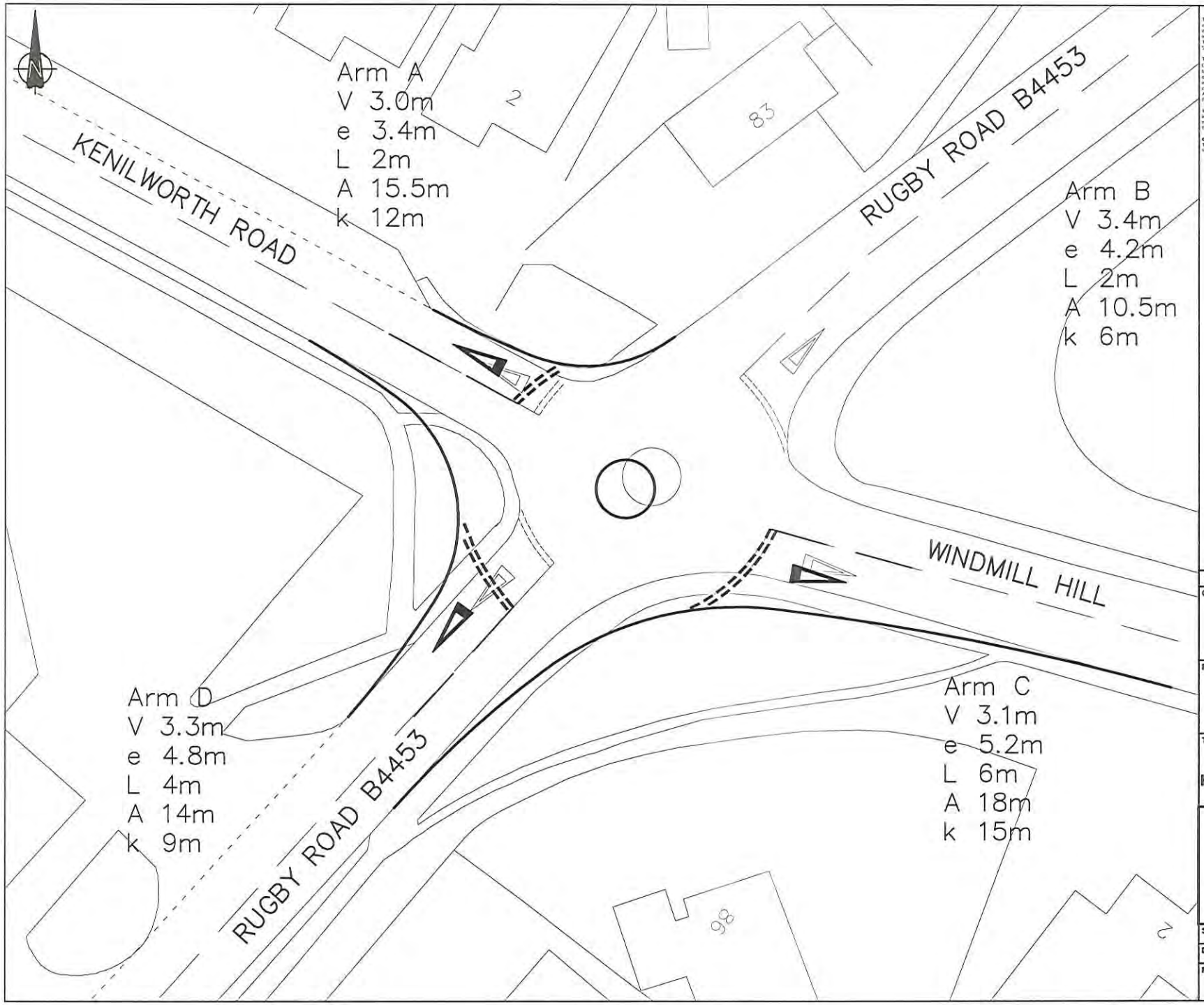
END OF JOB

========== end of file ==========

[Printed at 10:31:52 on 02/07/2010]

APPENDIX I

RUGBY ROAD / WINDMILL HILL MINI ROUNDABOUT
PROPOSED LAYOUT DRAWING P710 / 105
DO SOMETHING, ARCADY6 ANALYSIS



The Contractor is to check and verify in conjunction with the Architects details all setting out points, building and site dimensions, levels and sewer invert levels at connection points and ensure that they are fully conversant with the contents and of requirements the site investigation report before work starts.
The Contractor is to comply in all respects with current building legislation, British Standard Specifications, Building Regulations etc.,whether or not specifically stated on this drawing.

This drawing is not intended to show details of ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor any areas of formation for said structures which do not accord with the anticipated conditions as described in the site investigation report are to be immediately notified to the Engineer, where applicable. Any suspect fluid ground or ground contaminants on or within the ground should be further investigated by a suitable expert. Any earthworks shown indicate typical slopes for guidance only and should be investigated further by a suitable geotechnical expert.

Where existing trees are shown to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services, where applicable. A foundation is to be provided to accommodate the proposed tree planting, where applicable.

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Rev.	Description	Date	By

Client

SIR THOMAS WHITE'S CHARITY

Project

LAND AT CUBBINGTON WARWICKSHIRE

Title

RUGBY RD / WINDMILL HILL / KENILWORTH RD PROP ROUNDABOUT

Banners Gate
Civil, Structural & Transportation Engineers
Cavendish House, 10-11 Birmingham Street, Halesowen B63 3HN
Tel: 0121 687 1500 Fax: 0121 687 1501
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Scale	1:250	Drawn	DJA
Date	Jun 10	Checked	NRV
File	P716	Drawing	P716/105

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 2.0 (MAR 2005)

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Run with file:- "t:\716\arcady\rugby-imp-AM.vai" (drive-on-the-left) at 15:31:26 on Wednesday, 15 September 2010

FILE PROPERTIES

RUN TITLE: Rugby Road - Windmill Hill Mini Roundabout
LOCATION: Cubbington
DATE: 01/07/2010
CLIENT: Sir Thomas White's Charity
ENUMERATOR: Nigel Vening [NIGELVENING01]
JOB NUMBER: P716
STATUS: Planning
DESCRIPTION: Improved roundabout, June 2010 flows, AM peak

INPUT DATA

ARM A - Kenilworth Road
ARM B - Rugby Road -NE
ARM C - Windmill Hill
ARM D - Rugby Road -SW

MINI-ROUNDABOUT GEOMETRIC DATA

LIGHTING CONDITIONS : NORMAL

ROAD SURFACE CONDITION: NORMAL

ARM	V (m)	E (m)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.40	2.00	3.00	15.50	12.00	1.00	0.577	14.090
ARM B	3.40	4.20	2.00	3.40	10.50	6.00	0.00	0.542	11.779
ARM C	3.10	3.10	6.00	5.20	18.00	15.00	-3.00	1.687	83.262
ARM D	3.30	4.80	4.00	3.30	14.00	9.00	0.00	0.555	13.641

V = approach half-width
E = entry width
Lm = effective flare length
Vm = minimum approach half-width
A = distance between arms
K = entry corner kerb line
G = gradient over 50m

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: Improved Rbt plus development

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	3.13	4.69	3.13
ARM B	15.00	45.00	75.00	4.45	6.67	4.45
ARM C	15.00	45.00	75.00	6.28	9.41	6.28
ARM D	15.00	45.00	75.00	5.19	7.78	5.19

DEMAND SET TITLE: Improved Rbt plus development

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.000	0.248	0.408	0.344
		0.0	62.0	102.0	86.0
		(0.0)	(5.5)	(5.5)	(2.5)
	ARM B	0.188	0.000	0.022	0.789
		67.0	0.0	8.0	281.0
		(3.0)	(0.0)	(6.5)	(4.0)
	ARM C	0.518	0.020	0.000	0.462
		260.0	10.0	0.0	232.0
		(3.0)	(12.5)	(0.0)	(2.5)
	ARM D	0.311	0.354	0.335	0.000
		129.0	147.0	139.0	0.0
		(3.5)	(4.5)	(7.5)	(0.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00								
ARM A	3.13	11.34	0.276		0.0	0.4	5.4	0.12
ARM B	4.45	9.11	0.488		0.0	0.9	13.0	0.21
ARM C	6.28	71.79	0.087		0.0	0.1	1.4	0.02
ARM D	5.19	10.68	0.486		0.0	0.9	13.0	0.18

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15								
ARM A	3.73	10.91	0.342		0.4	0.5	7.5	0.14
ARM B	5.31	8.66	0.613		0.9	1.5	21.2	0.29
ARM C	7.49	69.95	0.107		0.1	0.1	1.8	0.02
ARM D	6.19	10.23	0.606		0.9	1.5	20.8	0.24

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30								
ARM A	4.57	10.36	0.441		0.5	0.8	11.1	0.17
ARM B	6.51	8.08	0.806		1.5	3.5	44.9	0.55
ARM C	9.18	67.66	0.136		0.1	0.2	2.3	0.02
ARM D	7.59	9.62	0.788		1.5	3.3	42.9	0.44

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45								
ARM A	4.57	10.32	0.443		0.8	0.8	11.7	0.17
ARM B	6.51	8.05	0.808		3.5	3.8	55.4	0.62
ARM C	9.18	67.46	0.136		0.2	0.2	2.4	0.02
ARM D	7.59	9.61	0.789		3.3	3.5	51.1	0.48

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00								
ARM A	3.73	10.85	0.344		0.8	0.5	8.3	0.14
ARM B	5.31	8.62	0.616		3.8	1.7	28.3	0.33
ARM C	7.49	69.64	0.108		0.2	0.1	1.8	0.02
ARM D	6.19	10.21	0.607		3.5	1.6	26.4	0.27

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15								
ARM A	3.13	11.30	0.277		0.5	0.4	6.0	0.12
ARM B	4.45	9.08	0.490		1.7	1.0	15.7	0.22
ARM C	6.28	71.58	0.088		0.1	0.1	1.4	0.02
ARM D	5.19	10.66	0.486		1.6	1.0	15.3	0.19

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.8	*
08.45	0.8	*
09.00	0.5	*
09.15	0.4	

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.9	*
08.15	1.5	**
08.30	3.5	****
08.45	3.8	****
09.00	1.7	**
09.15	1.0	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.1
08.15	0.1
08.30	0.2
08.45	0.2
09.00	0.1
09.15	0.1

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.9	*
08.15	1.5	*
08.30	3.3	***
08.45	3.5	***
09.00	1.6	**
09.15	1.0	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	342.8	228.5	50.0	0.15	50.0	0.15
B	488.2	325.4	178.4	0.37	178.5	0.37
C	688.3	458.9	11.2	0.02	11.2	0.02
D	569.1	379.4	169.6	0.30	169.6	0.30
ALL	2088.4	1392.2	409.1	0.20	409.2	0.20

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

[Printed at 15:31:32 on 15/09/2010]

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 2.0 (MAR 2005)

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Run with file:- "t:\716\arcady\rugby-imp-PM.vai" (drive-on-the-left) at 15:33:18 on Wednesday, 15 September 2010

FILE PROPERTIES

RUN TITLE: Rugby Road - Windmill Hill Mini Roundabout
LOCATION: Cubbington
DATE: 01/07/2010
CLIENT: Sir Thomas White's Charity
ENUMERATOR: Nigel Vening [NIGELVENING01]
JOB NUMBER: P716
STATUS: Planning
DESCRIPTION: Improved roundabout, June 2010 flows, PM peak

INPUT DATA

ARM A - Kenilworth Road
ARM B - Rugby Road -NE
ARM C - Windmill Hill
ARM D - Rugby Road -SW

MINI-ROUNDABOUT GEOMETRIC DATA

LIGHTING CONDITIONS : NORMAL

ROAD SURFACE CONDITION: NORMAL

ARM	V (m)	E (m)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.40	2.00	3.00	15.50	12.00	1.00	0.577	14.090
ARM B	3.40	4.20	2.00	3.40	10.50	6.00	0.00	0.542	11.779
ARM C	3.10	5.20	6.00	3.10	18.00	15.00	-3.00	0.756	17.819
ARM D	3.30	4.80	4.00	3.30	14.00	9.00	0.00	0.555	13.641

V = approach half-width
E = entry width
Lm = effective flare length
Vm = minimum approach half-width
A = distance between arms
K = entry corner kerb line
G = gradient over 50m

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: Improved Rbt plus development

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	4.79	7.18	4.79
ARM B	15.00	45.00	75.00	3.17	4.76	3.17
ARM C	15.00	45.00	75.00	4.88	7.31	4.88
ARM D	15.00	45.00	75.00	6.46	9.69	6.46

DEMAND SET TITLE: Improved Rbt plus development

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000 0.0 (0.0)	0.149 57.0 (2.0)	0.465 178.0 (4.0)	0.386 148.0 (3.0)
	ARM B	0.181 46.0 (3.0)	0.000 0.0 (0.0)	0.031 8.0 (2.0)	0.787 200.0 (3.0)
	ARM C	0.462 180.0 (2.0)	0.015 6.0 (2.0)	0.000 0.0 (0.0)	0.523 204.0 (2.0)
	ARM D	0.190 98.0 (2.5)	0.472 244.0 (2.5)	0.338 175.0 (5.0)	0.000 0.0 (0.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00								
ARM A	4.79	10.61	0.451		0.0	0.8	11.4	0.17
ARM B	3.17	8.05	0.394		0.0	0.6	9.0	0.20
ARM C	4.88	13.76	0.354		0.0	0.5	7.8	0.11
ARM D	6.46	11.62	0.556		0.0	1.2	17.0	0.19

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15								
ARM A	5.72	10.00	0.572		0.8	1.3	18.3	0.23
ARM B	3.79	7.37	0.514		0.6	1.0	14.4	0.27
ARM C	5.82	13.01	0.447		0.5	0.8	11.5	0.14
ARM D	7.72	11.30	0.683		1.2	2.0	28.3	0.27

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30								
ARM A	7.00	9.25	0.757		1.3	2.8	37.2	0.41
ARM B	4.64	6.52	0.713		1.0	2.2	29.5	0.49
ARM C	7.13	12.07	0.591		0.8	1.4	19.8	0.20
ARM D	9.45	10.89	0.868		2.0	5.2	64.2	0.55

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45								
ARM A	7.00	9.17	0.764		2.8	3.0	44.1	0.45
ARM B	4.64	6.44	0.721		2.2	2.4	35.1	0.54
ARM C	7.13	12.00	0.594		1.4	1.4	21.3	0.20
ARM D	9.45	10.87	0.869		5.2	5.7	82.6	0.65

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00								
ARM A	5.72	9.86	0.580		3.0	1.4	23.3	0.25
ARM B	3.79	7.25	0.523		2.4	1.1	18.6	0.30
ARM C	5.82	12.89	0.452		1.4	0.8	13.1	0.14
ARM D	7.72	11.28	0.684		5.7	2.3	39.5	0.32

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	CROSSING USE PER MIN	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15								
ARM A	4.79	10.54	0.454		1.4	0.8	13.4	0.18
ARM B	3.17	7.98	0.398		1.1	0.7	10.7	0.21
ARM C	4.88	13.67	0.356		0.8	0.6	8.7	0.11
ARM D	6.46	11.60	0.557		2.3	1.3	20.6	0.20

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.3	*
17.30	2.8	***
17.45	3.0	***
18.00	1.4	*
18.15	0.8	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.6	*
17.15	1.0	*
17.30	2.2	**
17.45	2.4	**
18.00	1.1	*
18.15	0.7	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	*
17.15	0.8	*
17.30	1.4	*
17.45	1.4	*
18.00	0.8	*
18.15	0.6	*

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.2	*
17.15	2.0	**
17.30	5.2	*****
17.45	5.7	******
18.00	2.3	**
18.15	1.3	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	525.2	350.1	147.7	0.28	147.8	0.28
B	348.3	232.2	117.4	0.34	117.4	0.34
C	534.8	356.5	82.3	0.15	82.3	0.15
D	708.9	472.6	252.4	0.36	252.4	0.36
ALL	2117.1	1411.4	599.7	0.28	599.9	0.28

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

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