

Transport Assessment

**Land South of Beech
Grove, Mengham,
Hayling Island**

**Prepared for
Tolcarne Drive
Developments Ltd**

by

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ACRONYMS AND ABBREVIATIONS

CIHT	Chartered Institution for Highways and Transportation (formerly IHT)
DfT	Department for Transport
GTA	Guidance on Transport Assessment
HBC	Havant Borough Council
HCC	Hampshire County Council
IHT	Institution for Highways and Transportation (now CIHT)
MfS	Manual for Streets
SMA	Stuart Michael Associates
TA	Transport Assessment
TRICS	Trip Rate Information Computer System

1.0 INTRODUCTION

- 1.1 This Transport Assessment has been prepared by Stuart Michael Associates, consulting engineers, on behalf of Tolcarne Drive Developments (the Applicant). This Transport Assessment accompanies an outline planning application for 131 residential dwellings on land south of Beech Grove, Mengham, Hayling Island. Hayling Island is situated on the south coast in the Havant district of Hampshire. The site is currently grazing land owned by the Applicant.

Background

- 1.2 The site is located on land south of Beech Grove and is bounded to the west by Mengham Junior School, to the north by existing residential development on Hawthorne Grove and Beech Grove, to the east by fields, and to the south by existing residential development on Goldring Close and My Lords Lane (**Figure 1.1** refers).
- 1.3 The site is well-located for access to local facilities, with a full range of everyday amenities (schools, convenience stores, post office, barbers, banks and public library) within reasonable walking distance of the centre of the site.
- 1.4 The southern part of the site (land north of Goldring Close) has been allocated as a reserved housing site by Havant Borough Council (HBC) in the Havant Borough Local Plan. The northern part of the site is not currently allocated.
- 1.5 The Applicant proposes to construct 131 dwellings on the site which would contribute to the Council's identified need for 727 new homes required on Hayling Island in the period 2006 – 2026.
- 1.6 This Transport Assessment (TA) has been undertaken as part of an outline planning application which seeks to establish the principle for development on the site and the density, heights, site layout and access arrangements of the proposed development. Work undertaken for the TA has identified that all three key junctions assessed currently operate within capacity and will continue to do so following completion of the proposed development.

Development Proposals

- 1.7 The proposed development comprises the construction of 131 residential units on land south of Beech Grove and north of Goldring Close, Mengham. The development is likely to include affordable housing provision, public open space and play areas. Housing mix will be as follows:
- 14 x 1 bed flat
 - 48 x 2 bed house
 - 49 x 3 bed house

- 20 x 4 bed house

- 1.8 In accordance with HBC, 30% (39 dwellings) will be allocated affordable housing. The site layout will be designed in accordance with guidance provided in Manual for Streets (MfS1, 2007) and Manual for Streets 2 (MfS2, 2010) and will therefore facilitate ease of movement by pedestrians and cyclists by ensuring that the layout retains a significant degree of permeability. This will assist the development in integrating with the surrounding area.
- 1.9 Vehicle access will be taken from Beech Grove. A pedestrian and cycle only access will be provided from St Margarets Road to the west of the site. This will also form an emergency access into the site. The link will be facilitated through the demolition of number 23 St Margarets Road.
- 1.10 Development proposals are further described in Section 4 of this TA.

Assessment Methodology

- 1.11 Research undertaken in connection with this assessment has included:
- Site visits to assess local infrastructure and facilities;
 - Assessment of existing public transport provision, timetable information, bus routes and rail services;
 - Assessment of current infrastructure provision for pedestrians and cyclists;
 - Consideration of appropriate measures to encourage modal shift away from the private car towards walking, cycling and use of public transport;
 - Assessment of existing and future traffic levels on the local highway network and consideration of the traffic likely to be generated from any committed development relevant to the application site;
 - Assessment of the operation and capacity of junctions on the local and wider primary highway network;
 - Review of national and local government policy guidance; and
 - Assessment of the road safety implication of the proposed development.
- 1.12 This TA has had regard to the advice contained within the Department for Transport's (DfT) "Guidance on Transport Assessment" (GTA, March 2007). The GTA states that residential developments of 80+ units should provide a TA and Travel Plan. A Residential Travel Plan has been proposed as part of the proposed mitigation measures against the potential traffic impact of the completed development (Section 6 refers).

Consultation

- 1.13 The Applicants have delivered a public exhibition to all interested parties in the local area. The event was held on 28th June 2012 and was very well-attended. Residents and local councillors were provided with the opportunity to voice their opinion on the proposed development and raise any concerns. SMA attended the exhibition to disseminate information regarding the potential traffic impact of the development and explain the proposals. Feedback obtained at the exhibition has been taken into consideration when compiling the TA and the proposed mitigation measures.

Report Outline

- 1.14 Section 2 provides an overview of the relevant national and local policies.
- 1.15 Section 3 describes the existing conditions around the site including accessibility, traffic flows, road safety and provision for walking, cycling and public transport.
- 1.16 Section 4 describes the proposed development, the proposed access arrangements and the proposed links to walking, cycling, public transport and road networks. Parking, cycle parking and access for refuse vehicles is also examined.
- 1.17 Section 5 considers the potential trip generation of the proposed development and provides a traffic impact assessment.
- 1.18 Section 6 explains the measures proposed to mitigate any traffic impact of the development.
- 1.19 Section 7 describes the potential highways contributions which will result from the construction of the development.
- 1.20 Section 8 provides a summary of the TA and the conclusions to be drawn from the assessment.

2.0 POLICY

- 2.1 The promotion of more sustainable transport choices is embedded in national and local planning and transport policy. New developments are encouraged to give priority to pedestrians, cyclists and public transport users and promote more sustainable travel behaviour. The Travel Plan is an important accompanying document detailing the objectives, targets and proposed measures which may be implemented in order to achieve this. This section of the TA summarises the most relevant policies to the planning application.

National Policy

- 2.2 The **National Planning Policy Framework (NPPF)** was published in March 2012 replacing all previous Planning Policy Guidance Notes. At the heart of the NPPF is a presumption in favour of sustainable development
- 2.3 With regard to promoting sustainable transport, it is recognised that all developments that generate significant amounts of movement should be supported by a Transport Statement or Assessment and decisions should take account of whether:
- “the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;
 - Safe and suitable access to the site can be achieved for all people; and
 - Improvements can be undertaken within the transport network that cost effectively limits the significant impacts of the development. Development should only be refused on transport grounds where the residual cumulative impacts of development are severe.”
- 2.4 Developments expected to generate significant movement should be located such that the need to travel is reduced and the use of sustainable transport modes is maximised (NPPF, paragraph 34). The location of these developments should allow for the efficient delivery of goods and supplies; prioritise pedestrian and cycle movements; have access to high quality public transport facilities; utilise safe and secure layouts which result in minimal street clutter and conflicts between traffic and non-motorised road users; incorporate facilities for low emission vehicles where practical; and show consideration for the needs of disabled users of all modes of transport (NPPF, paragraph 35).
- 2.5 The NPPF states that a Travel Plan is “a key tool” in achieving the considerations described above; all developments which generate significant amounts of movement should produce a Travel Plan (NPPF, paragraph 36).

Local Planning Policy

Hampshire County Council (HCC)

- 2.6 The **Third Hampshire Local Transport Plan (LTP3)** provides the long term transport strategy for the County for 2011-2031 and was formally approved in February 2011.
- 2.7 There are 14 policy objectives presented in the LTP3 under 5 broad themes: 'supporting the economy through resilient highways'; 'management of traffic'; 'the role of public transport'; 'quality of life and place'; and 'transport and growth areas'. Reference is made to Travel Plans under the theme 'management of traffic' as they can be used as a tool to encourage lift sharing and use of park and ride, both of which can reduce the number of cars on the road, and consequently reduce the number of parking spaces generally required.
- 2.8 Chapter 7 of the LTP3 is entitled South Hampshire Joint Strategy and is a collaboration between the three local transport authorities HCC, Portsmouth City Council and Southampton City Council. The Strategy recognises transport an "enable of activity" (page 65) providing opportunities for work, education and leisure. The Strategy aims to create "a resilient, cost effective, fully-integrated sub-regional transport network, enabling economic growths whilst protecting and enhancing health, quality of life, equality of opportunity, safety and security" (page 65).
- 2.9 Challenges for the region include securing funding to deliver transport improvements, delivering transport infrastructure in a timely manner to support housing and regeneration, managing the existing transport network to maintain and improve journey reliability and travel times, and successfully mitigating the adverse impacts of transport activity on local communities and the environment.
- 2.10 Amongst other aims, the Strategy seeks to:
- Optimise the capacity of the highway network and improve journey time reliability for modes (Policy C);
 - Achieve and sustain a high quality, resilient and well maintained highway network (Policy D);
 - Promote active travel modes and develop supporting infrastructure (Policy H); and
 - Encourage private investment in bus travel and where practical better infrastructure and services (Policy I).

Havant Borough Council (HBC)

- 2.11 The HBC **Local Development Framework (LDF)** is the collection of development plans which affect Havant, of which the **Havant Borough Core Strategy** is the central document. It was adopted by HBC in March 2011 and sets out the vision for planning in

the Borough to 2026. It contains Core Strategy Policies and Development Management Policies to which developers should conform, some of which are mention herewith.

- 2.12 Themes covered in the Core Strategy include regeneration (**Policy CS6**), housing (**Policy CS9**), the concentration and distribution of development (**Policy CS17**), transport and access (**Policy CS20**) and developer requirements (**Policy CS21**).

- 2.13 Development Management **Policy DM11** 'Planning for more Sustainable Travel' seeks to "increase integration of sustainable travel modes and availability of non-motorised modes" by ensuring that:

*"new developments are located and designed to encourage lower vehicle speeds and safe, permeable, inclusive layouts that integrate with existing pedestrian, cycle and public transport routes. This will facilitate and encourage short distance trips by cycle and walking, including to public transport interchanges"*¹

- 2.14 **Policy DM12** 'Mitigating the Impacts of Travel' requires:

*"the submission of a transport assessment and travel plan alongside any planning application in proposals for major development or where a proposal is likely to have significant transport implications"*²

- 2.15 Further, HBC seeks to ensure, where relevant, that a bond is provided to be used in the event that the Travel Plan fails to achieve its targets and thereby falling short of the stated ambition to reduce vehicular car travel associated with development traffic. HBC accepts the submission of framework travel plans in relation to outline planning applications (ref: DM12 (5)).

- 2.16 **Policy DM13** states that proposals for residential development should adhere to the standards laid down in the **Residential Car Parking and Cycle Provision Supplementary Planning Document**. The standards provided in this SPD, adopted by HBC in March 2010, vary according to the accessibility of an area, or zone, and whether or not the spaces are to be allocated. The zones are identified as 'Standard', 'Havant town centre' and 'Waterlooville town centre'. Given the location of the application site on Hayling Island, the 'standard' parking standards have been summarised herewith.

¹ Havant BC Adopted Core Strategy, DM11 (5) (March 2011)

² Havant BC Adopted Core Strategy, DM12 (2) (March 2011)

Table 2.1: 'Standard' zone vehicular residential parking standards

Size of Dwelling	No. of Spaces per Dwelling
Allocated Vehicle Parking (Standard zone)	
1 bed unit	1
2 bed unit	2
3 bed unit	2
4+ bed unit	3
Unallocated parking (Standard zone)	
1 bed unit	0.9
2 bed unit	1.3
3 bed unit	1.9
4+ bed unit	2.4

Source: HBC 'Residential Parking & Cycle Provision SPD' March 2010
Tables 4 and 5

2.17 **Table 2.2** provides the standards for the cycle storage / parking provision for 'Standard' zones.

Table 2.2: 'Standard' zone cycle parking / storage standards

Size of Dwelling	Long Stay	Short Stay
1 bed unit	1 space per unit	1 loop/hoop per unit
2 bed unit	2 spaces per unit	1 loop/hoop per unit
3 bed unit	2 spaces per unit	1 loop/hoop per unit
4+ bed unit	2 spaces per unit	1 loop/hoop per unit

Source: HBC 'Residential Parking & Cycle Provision SPD' March 2010
Table 7

3.0 EXISTING CONDITIONS

Existing Site Accessibility

- 3.1 The Accessibility Plan at **Figure 3.1** illustrates the locations of many of the key facilities in the vicinity of the application site, including the closest bus stops, healthcare facilities, schools, recreation areas and community facilities, such as the local library and closest post office.
- 3.2 Figure 3.1 illustrates that many of the facilities located on Elm Grove are within a short distance (up to 1km radius) of the application site. These facilities include the Cooperative convenience store (with customer car and cycle parking); Hayling Island Health Centre; Hayling Island Library; Post Office; Mengham Infant and Junior Schools (Mengham Junior School is located adjacent to the site); and Hayling College. Other everyday facilities are represented including barbers, banks and several pharmacies.
- 3.3 The convenience of the site's location to local shops and facilities offers several opportunities for travel on foot, by bicycle and by public transport.

Pedestrian Accessibility

- 3.4 The concept of the 'walkable neighbourhood' is promoted by Manual for Streets (MfS). A walkable neighbourhood is typically characterised by having a range of facilities within 10 minutes walk, or approximately 800m³. The accompanying Residential Travel Plan has illustrated walking routes from the centre of the proposed development to key facilities, showing that many are accessible within this MfS timeframe.
- 3.5 Existing pedestrian movement in proximity to the site is facilitated by the flat local topography, and continuous street-lit footways linking the site with the surrounding area including local amenities.
- 3.6 A public right of way exists across the recreation ground at the western end of Hawthorne Grove. This gives access to the local shops and amenities on Elm Grove. From the centre of the application site, this route is approximately 630m / 7½ minutes' walk.
- 3.7 A public footpath exists at the western boundary of the application site, linking Beech Grove to the north of the site, with Mengham Lane to the south (approximately 425m / 5 minutes' walk).
- 3.8 The main shopping area within Mengham is largely located on Elm Grove, which benefits from pedestrian crossings and street lit continuous footways, thereby facilitating ease of movement on foot. Low vehicular speeds contribute to the overall attractiveness of travelling on foot.

³ MfS1 (2007) Paragraph 4.4.1
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Cyclist Accessibility

- 3.9 Cycling is generally considered to be an effective mode of travel over distances of up to 5km. This is supported by the recorded average cycling distance of 4.02km (2.5 miles)⁴. **Figure 3.3** shows existing cycle routes and facilities in the vicinity of the site.
- 3.10 Cycle parking exists at several locations on Elm Grove including the Cooperative store which is located on the corner of Tournurbury Lane and Elm Grove.
- 3.11 Havant Borough Council promote cycling on Hayling Island on their Cycle Map and Guide (2011 Edition) which provides an illustration of suitable and recommended cycle routes on the island, as well as in Havant. The Sustrans cycle route NCN2 runs north-south on the west of the island, by way of the Hayling Billy Trail. This route is shown together with other recommended cycle routes on Figure 3.3.
- 3.12 The selection of cycle facilities available in the vicinity of the site, together with the flat topography, ample street lighting and generally wide roads show that the application site offers considerable scope for a variety of local trips to be made by cycling.

Public Transport User Accessibility

Bus

- 3.13 The existing public bus services in proximity to the application site are shown on **Figure 3.4**.
- 3.14 Stagecoach bus services 30 and 31, known collectively as 'The Bridge' service, operate north-south in proximity to the site along Elm Grove. The services connect Hayling Island, from the sea front, with Havant on the mainland at a typical frequency of 15 minutes Monday-Saturday and a combined frequency of 60 minutes on Sunday. **Table 3.1** provides details of the services.
- 3.15 The Bridge services terminate at Havant bus station which is located approximately 4 minutes walk from Havant railway station.

Table 3.1: Summary of The Bridge bus services (Stagecoach)

Route No.	Route	Day	Times of Operation*	Typical Frequency
30	Havant - West Town - Beachlands - Eastoke - Mengham - Havant	Mon - Fri	06:11 - 22:50	Half Hourly
		Sat	06:43 - 22:50	Hourly
		Sun	09:05 - 17:05	Every 2 hours
31	Havant - Mengham - Eastoke - Beachlands - West Town - Havant	Mon - Fri	06:09 - 21:42	2 - 3 buses per hour
		Sat	06:50 - 21:42	2 - 3 buses per hour
		Sun	09:57 - 17:57	Every 2 hours

* Route 30: times shown are from Mengham, Elm Grove (North-bound); Route 31: times shown are from Mengham, Elm Grove (South-bound)

- 3.16 In addition to The Bridge bus services, bus service 638 operates once daily in each direction Monday to Friday between the Hayling Island Lifeboat Public House on the sea front and Mengham Middle School, operating via Mengham Infant School. The service is provided by bus operator Emsworth & District.

Rail

- 3.17 The most convenient railway station for the application site is Havant railway station, situated on the Portsmouth Direct Line which operates between London Waterloo and Portsmouth Harbour. The station is located approximately 8.6km from the site on North Street, Havant and is accessible via the A3023. The Bridge bus services (Stagecoach) terminate on Elm Lane at Havant Bus Station, approximately 0.4km from the station. **Table 3.2** below presents a summary of the rail services from Havant to key destinations.

Table 3.2: Summary of rail services from Havant

Key Destination	Train Operating Company	Number of services (AM Peak*, Weekday)	Approximate Journey Duration
Portsmouth	SWT / Southern	5	20 minutes
Littlehampton	Southern	2	38 minutes
Southampton	Southern	2	40 minutes
Brighton	Southern / FGW	2	1 hour 2 minutes
London Waterloo	SWT	3	1 hour 23 minutes
London Victoria	Southern	4	1 hour 50 minutes

*08:00-09:00

FGW = First Great Western SWT = South West Trains

- 3.18 Bicycle storage and car parking is available at the railway station.

The Local Road Network

- 3.19 Vehicular access to the proposed development will be taken from Beech Grove, a quiet residential road benefitting from street lighting and continuous footways. Traffic speed is limited to 30mph and there are no parking restrictions currently in place. The road is approximately 7m wide.
- 3.20 Surrounding roads share similar characteristics with Beech Grove. Beech Grove connects with Hawthorne Grove which in turn provides pedestrian access to the recreation ground to the north west of the site. Pedestrians may access the shops and local facilities from this ground.

- 3.21 Traffic speeds are generally restricted to 30mph, with most streets benefitting from street lighting and continuous footways. Signage promotes a “20 is plenty” driver attitude on Elm Grove which also benefits from regular pedestrian crossing opportunities.
- 3.22 Elm Grove links Mengham with South Hayling to the south and with the A3023 to the north. The A3023 connects with the A27 north of Hayling Island, giving access to Southampton, the M27 and A3(M) to the west and Chichester to the east.

Access to Local Facilities

- 3.23 Figure 3.1 illustrates that many of the facilities located on Elm Grove are within a short distance (up to 1km radius) of the application site. These facilities include the Cooperative convenience store (with customer car and cycle parking); Hayling Island Health Centre; Hayling Island Library; Post Office; Mengham Infant and Junior Schools (Mengham Junior School is located adjacent to the site); and Hayling College. Other everyday facilities are represented including barbers, banks and several pharmacies.

Road Safety

- 3.24 Personal Injury Accident (PIA) data has been obtained from Hampshire Constabulary for the latest five year period (01/06/07-31/05/12). Examination of the data reveals that during this period a total of thirteen accidents were reported to the police. Twelve of these were recorded as slight accidents and the thirteenth as serious.
- 3.25 **Figure 3.5** identifies where each incident took place. Of the thirteen accidents, five occurred on Tournerville Lane and seven on Elm Grove and Church Road. No accidents were reported at the junction between Beech Grove and Tournerville Lane; and two were reported at, or close to, the staggered junction between Church Road, Tournerville Lane, Elm Grove and St Mary's Road.
- 3.26 All of the accidents reported to the police were caused by driver error, rather than hazardous road conditions. The causes of the accidents included driver loss of control, driver reaction failure/delay and rear shunting.

Existing Traffic Conditions

- 3.27 The following junctions have been surveyed (**Appendix 1** refers):
- Priority T-junction between Beech Grove and Tournerville Lane
 - Staggered junction between Tournerville Lane, Elm Grove, St Mary's Road and Church Road
 - Roundabout between Church Road, Manor Road and Havant Road
- 3.28 In addition, the traffic conditions at Hayling Bridge have also been surveyed.

3.29 **Figure 3.6** summarises and illustrates the existing AM and PM peak hour traffic flows at the above junctions.

3.30 The junction capacity software programmes ARCADY and PICADY have been used to assess the existing capacity of the junctions stated above. The software has been used to obtain the ratios of flow to capacity (RFCs) through each junction during the AM and PM peak periods. The industry standard threshold RFC of 0.85 has been used as a benchmark to judge the operation of the junctions. An RFC of less than 0.85 indicates that the junction is operating within its capacity.

Priority T-junction between Beech Grove and Tournerbury Lane

3.31 The capacity of the junction has been assessed during the AM peak (08:00-09:00) and PM peak (17:30-18:30) (**Table 3.4** and **3.5**).

Table 3.4: Beech Grove and Tournerbury Lane - Existing Junction Capacity (AM)

	RFC
B-AC	0.014
C-AB	0.011

Table 3.5: Beech Grove and Tournerbury Lane - Existing Junction Capacity (PM)

	RFC
B-AC	0.01
C-AB	0.012

3.32 Tables 3.4 and 3.5 show that the priority T-junction between Beech Grove and Tournerbury Lane operates well within its capacity at current traffic levels. All RFCs are significantly less than 0.85.

Staggered junction between Tournerbury Lane, Elm Grove, St Mary's Road and Church Road

3.33 The results of the analysis at this junction are presented in **Tables 3.6** and **3.7** below.

Table 3.6: Staggered Junction – Existing Capacity AM

	RFC
B-ACD	0.501
AB-D	0.225
D-ABC	0.291
CD-B	0.129

Table 3.7: Staggered Junction – Existing Capacity PM

	RFC
B-ACD	0.429
AB-D	0.122
D-ABC	0.178
CD-B	0.215

- 3.34 The results presented in Table 3.6 and 3.7 indicate that the staggered junction currently operates within capacity.

Roundabout at Church Road, Manor Road and Havant Road

- 3.35 The results of the analysis at this junction are presented in **Tables 3.8 and 3.9** below.

Table 3.8: Roundabout – Existing Capacity AM

	RFC
Havant Road	0.352
Church Road	0.655
Manor Road	0.512

Table 3.9: Roundabout – Existing Capacity PM

	RFC
Havant Road	0.491
Church Road	0.382
Manor Road	0.270

- 3.36 The results presented in Table 3.8 and 3.9 indicate that the staggered junction currently operates within capacity.

Hayling Bridge

- 3.37 SMA procured an automatic traffic count (ATC) from HCC undertaken at Hayling Bridge between 18 June 2012 and 24 June 2012. The data confirms that the average weekday AM peak hour (08:00-09:00) flow is circa 2,040 two-way movements of which 63% of the flow is northbound towards Havant.

- 3.38 In the evening peak hour (17:00-18:00) the average weekday flow is circa 2,120 two-way movements of which 66% of the flow is southbound onto the Island.

- 3.39 The 24 hour 5 day average two-way flow across Hayling Bridge equates to 26,385 movements.

Committed Development

- 3.40 No committed development has been identified in the area that would be considered to significantly affect the proposed development. It is anticipated that the effects of any committed development in the area would be covered by applying usual growth.

4.0 DEVELOPMENT PROPOSALS

4.1 The Applicant proposes to construct 131 residential dwellings 30% of which (39 dwellings) shall be allocated affordable housing. The development is to be located on land south of Beech Grove and north of Goldring Close, Mengham, Hayling Island. The lower part of the site has been allocated in the Havant Borough Local Plan.

4.2 The affordable housing element of the development will comprise 39 dwellings, consisting of:

- 10 x 1 bed flat;
- 15 x 2 bed house;
- 12 x 3 bed house; and
- 2 x 4 bed house.

4.3 The privately owned element of the development will comprise 92 dwellings, the mix of which is proposed as follows:

- 4 x 2 bed flat;
- 33 x 2 bed house;
- 37 x 3 bed house; and
- 18 x 4 bed house.

Access Arrangements

4.4 A 5.5m wide vehicular access to the proposed development will be taken from Beech Grove at the north of the site. Beech Grove will continue into the site and a new junction will be constructed with Hawthorn Grove. Traffic on Hawthorn Grove will give way to traffic using Beech Grove. A proposed access plan is provided at **Appendix 2**.

4.5 Visibility is to be unobstructed by hedging and vegetation.

4.6 Pedestrian movement in and out of the development is to be assisted via a 2 metre wide footway to be provided on the western side of the access road. This footway will connect with the existing footway on Hawthorne Grove and contribute to the permeability of the development and its connection with the wider area.

4.7 Cyclists will also be able to access the development via the proposed vehicular access at Beech Grove.

4.8 Further pedestrian and cycle access will be facilitated via the proposed emergency access from St Margarets Road at the south western corner of the site.

Site Layout

- 4.9 A site layout is provided at **Appendix 3**. It is proposed that the development will be designed and built to a 20mph design speed. Low vehicular speeds will help encourage movements on foot and bicycle.
- 4.10 Pedestrian and cycle links will connect the development with the surrounding residential area and local community. A permeable layout, with convenient routes to opportunities to travel by public transport, will be important to encourage travel by modes other than the private car.

5.0 TRAFFIC IMPACT ASSESSMENT

Vehicle Trip Generation

- 5.1 The vehicle trip generation of the proposed development has been calculated using the TRICS database (TRICS 2012(a)v6.9.2). The TRICS analysis has included sites which have been judged to best reflect the location and characteristics of the proposed development. For example, the level of public transport provision close to the sites has been used as an indicator in selecting the most appropriate sites. In addition, all sites included in the analysis did not have a Travel Plan in place at the time of the survey.
- 5.2 The full TRICS output with selection criteria is included at **Appendix 4**. The vehicle trip rates obtained from TRICS are presented in **Table 5.1** along with the corresponding vehicle trip generation.

Table 5.1: Vehicle Trip Rates and Trip Generation – 131 dwellings

		Trip Rate	Vehicle Trips
AM	Arrivals	0.161	21
	Departures	0.447	59
	Two-way	0.608	80
PM	Arrivals	0.437	57
	Departures	0.270	35
	Two-way	0.707	92
Daily	Arrivals	2.940	385
	Departures	3.001	393
	Two-way	5.941	778

- 5.3 Table 5.1 indicates that the proposed development could generate a total of 778 two-daily vehicle trips. The AM (08:00-09:00) peak period could generate 80 two-way trips whilst 93 two-way trips could be generated in the PM (17:00-18:00) peak period.

Trip Distribution and Assignment

- 5.4 Based on 2001 origin and destination (residence and workplace) census data, it has been assumed that the majority of the traffic arising from the development will commute north from the site to the mainland at Havant and beyond. For this reason, circa 91% of the development traffic has been assigned to making a right turn from Tournurbury Lane onto Church Road. Trips within Hayling East ward and to Hayling West ward comprise the remaining 9% of distributed trips; it is assumed that these trips will travel left onto Elm Grove from Tournurbury Lane.
- 5.5 These assumptions equate to 54 right turn departures at Tournurbury Lane during the AM peak and 32 during the PM peak. These flows have been assigned to travel north (from Church Road to Havant Road) through the roundabout at Manor Road, Church Road and Havant Road.

- 5.6 The development traffic flows on the local highway network for the AM and PM peaks are illustrated on **Figure 5.1**

Traffic Growth

- 5.7 Analysis in Section 3 has shown the existing operational capacity of the assessed junctions. To assess the impact of the proposed development in the anticipated year of completion, NTM and TEMPRO have been used to calculate potential growth on the local network to 2017.
- 5.8 The growth factors stated below have been applied to traffic flows travelling northbound or southbound on Church Road / Elm Grove and on all arms and directions at the roundabout. No growth has been added to the existing flows at the priority T-junction between Beech Grove and Tournerbury Lane.

- Adjusted AM peak growth factor = 1.0501
- Adjusted PM peak growth factor = 1.0512

- 5.9 **Figure 5.2** illustrates the resultant traffic forecasted growth to year 2017 for the AM and PM peaks.

- 5.10 The capacity of each of the junctions has been reassessed to take into account the above growth factors and the effects of traffic flows arising from the proposed development. The results describe the potential future year situation, following completion of the proposed development.

- 5.11 **Figure 5.3** illustrates the resultant traffic forecasted growth to year 2017 plus development traffic for the AM and PM peaks

Future Year (2017) Situation

- 5.12 **Tables 5.2 to 5.7** show the operational capacity of each junction in 2017. The analysis has taken account of growth where appropriate, plus the potential effect of the proposed development.

Priority T-junction between Beech Grove and Tournerbury Lane

- 5.13 No growth has been applied to existing traffic flows at the priority T-junction between Beech Grove and Tournerbury Lane to the north of the site. Tables 5.2 and 5.3 therefore present the effect of the proposed development traffic on the existing situation.

Table 5.2: Existing Situation + Proposed Development Traffic (AM) – 2017

	RFC
B-AC	0.108
C-AB	0.048

Table 5.3: Existing Situation + Proposed Development Traffic (PM) – 2017

	RFC
B-AC	0.065
C-AB	0.113

- 5.14 It is anticipated that all development traffic will move through the priority T-junction between Beech Grove and Tournerbury Lane. The analysis has shown that during both the AM and PM peak periods, the junction will operate well-within capacity.

Staggered junction between Tournerbury Lane, Elm Grove, St Mary's Road and Church Road

Table 5.4: Existing Situation + Growth + Proposed Development Traffic (AM) – 2017

	RFC
B-ACD	0.82
AB-D	0.231
D-ABC	0.299
CD-B	0.136

Table 5.5: Existing Situation + Growth + Proposed Development Traffic (PM) – 2017

	RFC
B-ACD	0.614
AB-D	0.125
D-ABC	0.183
CD-B	0.239

- 5.15 Growth has been applied to the existing traffic flows on Church Road / Elm Grove at the staggered junction. Taking this into account along with the potential traffic movements from the proposed development, the analysis has shown that the staggered junction will still operate to an acceptable level, with the highest RFC of 0.820 indicated during the AM period on the Tournerbury Lane arm of the junction (movements B-ACD).

Signalising the Staggered Junction

- 5.16 Residents present at the public exhibition held on the 28th June 2012 voiced concerns regarding placing additional traffic at the staggered junction. In response to this, SMA has investigated the potential to (i) construct a roundabout at the junction (ii) construct an arrangement of two mini-roundabouts at the junction or (iii) signalise the junction.
- 5.17 The roundabout and signal options were tested using DfT software. The results demonstrated that both options improved the operation benefit for drivers exiting Tournerbury Lane, but this had an adverse impact on the free flow of traffic using Elm

Grove. Given the scale of development proposed, SMA considers there is little merit in promoting an alternative junction solution.

Roundabout at Church Road, Manor Road and Havant Road

- 5.18 Growth has been applied to the existing traffic flows at each arm of the roundabout. The analysis presented in **Tables 5.6** and **5.7** therefore shows the operational capacity of the junction in 2017 taking account of growth and traffic from the proposed development.

Table 5.6: Existing Situation + Growth + Proposed Development Traffic (AM) – 2017

	RFC
Havant Road	0.376
Church Road	0.738
Manor Road	0.589

Table 5.7: Existing Situation + Growth + Proposed Development Traffic (PM) – 2017

	RFC
Havant Road	0.539
Church Road	0.433
Manor Road	0.294

- 5.19 The results show that the roundabout will continue to operate within capacity following completion of the development and taking account of background traffic growth. Church Road is likely to be the busiest arm with an RFC of 0.738 during the AM peak.

Hayling Bridge

- 5.20 Section 3 (paragraph 3.36) related that the average AM peak hour weekday traffic flows over Hayling Bridge currently equate to 2,040 two-way flows, of which 63% (1,285) are northbound. Northbound AM peak flows from the proposed development across Hayling Bridge amount to an additional 54 trips, an increase of circa 4%.
- 5.21 The existing average PM peak hour weekday traffic flows amount to 2,120 two-way flows, of which 66% (1,346) are southbound. Southbound PM peak flows from the proposed development across Hayling Bridge equate to a further 32 trips, an increase of 2%.

6.0 MITIGATION / DEMAND MANAGEMENT

- 6.1 Government policy has been to seek alternatives to building new roads to reduce the impact of roads users on each other and the environment⁵. Accordingly, the Applicant will seek to achieve a modal shift away from the use of the private car through the implementation of a Residential Travel Plan.

Residential Travel Plan

- 6.2 A Travel Plan will be provided in accordance with the GTA and guidance provided by HCC which states that Travel Plans should aim to⁶:

- minimise the impact of additional demand arising from the proposed development;
- increase accessibility and ensure opportunities are provided for people to travel to and from the site in a variety of ways; and
- reduce dependence on the use of the private car.

- 6.3 A Residential Travel Plan has been prepared by SMA and is submitted in support of the outline planning application. The Travel Plan will aim to achieve a 6 percentage point reduction in the number of single occupancy vehicle trips made to/from the development over the lifetime of the Travel Plan. Initially, the Travel Plan will be implemented for 5 years from the date of first occupation. If the Travel Plan does not achieve the targeted reduction in single occupancy vehicle trips, the Travel Plan may be extended.

- 6.4 The proposed measures will raise awareness of the alternative travel modes accessible from the site and will seek to promote participation in walking, cycling, public transport use and car sharing.

- 6.5 Proposed Travel Plan measures include the provision of a residents travel information pack to each household of the development, to be delivered to the first occupiers. Each pack will contain a cycle voucher intended to contribute towards the cost of a bicycle and/or cycling accessories. In addition, each household could receive vouchers for use on the local 'The Bridge' bus services which provide an essential public transport link between Hayling Island and Havant.

- 6.6 The Travel Plan will be orchestrated and managed by a Travel Plan Coordinator (TPC) who will be appointed by the Applicant. It shall be monitored in accordance with iTRACE. A baseline travel survey will be carried out once a previously agreed occupancy level is reached to establish the modal split of the development. The exercise will be repeated 12 months, 36 months and 60 months after the baseline travel

⁵ DfT 'GTA' 2007, paragraph 4.85

⁶ HCC Environment Department 'A Guide to Development Related Travel Plans' (2009) paragraph 1.1

survey to track the progress towards achieving the targeted vehicle trip reduction and expected corresponding increase in sustainable modes.

- 6.7 This TA has shown that on completion the proposed development could generate 555 two-way single occupancy vehicle trips on a daily basis. Total person trips (single occupancy vehicle user⁷, car sharer⁸, public transport user, cyclist or pedestrian) are forecast at 1,206.
- 6.8 Single occupancy vehicle driver trips could therefore comprise 46% of the total daily trips⁹. In accordance with HCC's Travel Plan monitoring strategy from iTRACE, the Travel Plan has targeted a 6 percentage point decrease in the proportion of vehicle driver trips. This equates to achieving a modal share of 40%, or 482 trips¹⁰. This equates to a 13% reduction¹¹, similar to that shown as achievable by the government lead Smarter Choices research programmes.
- 6.9 The effect of the Travel Plan has not been modelled in the preceding chapter. However, should the Travel Plan achieve the 6 percentage point reduction described above, it is anticipated that this would have a significant impact on the traffic generation of the proposed development and its impact on the surrounding local road network.

⁷ A single occupancy vehicle trip comprises one driver alone.

⁸ For the purposes of the baseline analysis contained in the Travel Plan, a car sharer is a driver or a passenger in a vehicle carrying one driver and one passenger

⁹ $555 / 1206 = 46\%$ modal share

¹⁰ $0.40 \times 1206 = 482$ targeted modal share trip count

¹¹ $555 - 482 = 73$ trips; $73 / 555 = 13\%$ reduction

7.0 HIGHWAY CONTRIBUTION

- 7.1 HCC has published a document entitled 'Transport Contribution Policy' (September 2007) which sets out the approach used for calculating the transport contributions in Hampshire.
- 7.2 The cost of a one bedroom dwelling in a residential development equates to £1,980 per unit. The cost for two/three bed units is £3,745 per dwelling and for four plus bed units the cost equates to £5,457 per unit.
- 7.3 The proposed development consists of 10 one bed units, 101 mix of two and three bed units and 20 four bed units. To provide access into the development a 3 bed dwelling will be demolished. Based upon the above costs, the total highway contribution would equate to £503,440.00 (**Table 7.1** refers).

Table 7.1: Proposed Highway Contribution

Unit Contribution	Proposed / Existing	Total
1 bed @ £1,980	10	£ 19,800.00
2 / 3 bed @ £3,745	101	£ 378,245.00
4+ bed @ £5,457	20	£ 109,140.00
Sub Total	131	£ 507,185.00
Deductions	1 existing to be demolished	£ 3,745.00
Net Total		£ 503,440.00

- 7.4 The highways contribution sought by the County Council should be further discounted in view of the costs for the measures set out in the Travel Plan submitted as part of the planning application.

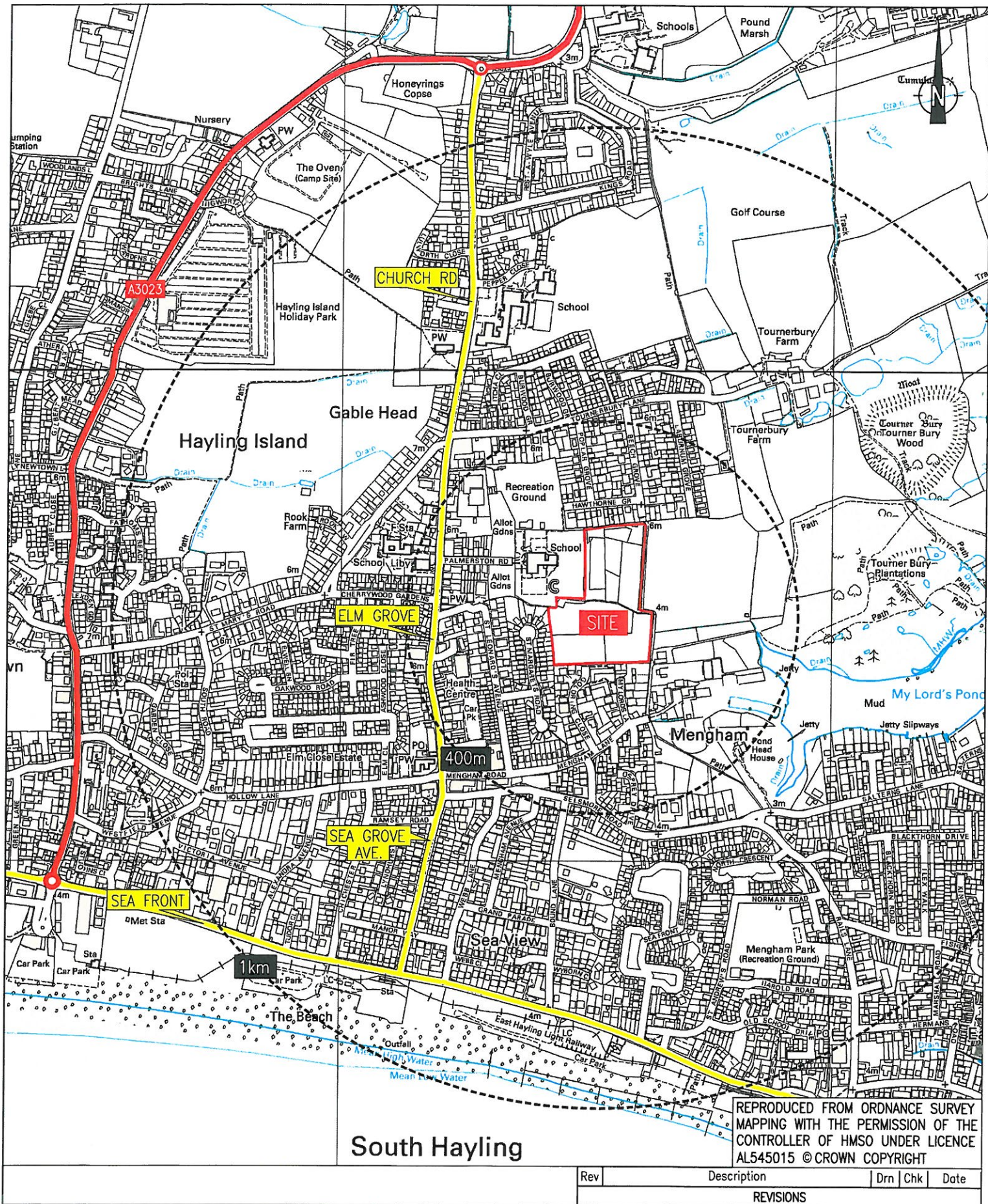
8.0 SUMMARY AND CONCLUSIONS

- 8.1 The Applicant is seeking outline planning permission for the construction of 131 residential units on land south of Beech Grove, Mengham, Hayling Island. The development will consist of a mix of private and affordable (30%) housing consisting of 1 and 2 bed flats, 2 bed houses, 3 bed houses and 4 bed houses.
- 8.2 Vehicular access will be taken from Beech Grove which will be extended into the site. Traffic on Beech Grove will have priority over traffic on Hawthorne Grove. An emergency only access will be constructed from St Margarets Road. This access will also be used by pedestrians and cyclists.
- 8.3 The application site is very well-located for convenient access to local shops and amenities, including local school, a public library and the local doctors' surgery. Many of these facilities are located on Elm Grove in central Mengham, much of which is accessible within 10 minutes' walk.
- 8.4 The existing operational capacity of each of the three key junctions identified as being most affected by the development has been tested. Analysis has shown that with current traffic flows, each of the three junctions operate well-within capacity, indicating RFCs of well below 0.85.
- 8.5 Each junction has been re-tested to take account of growth where appropriate, plus the effect of the forecast trip generation which could arise from the proposed development. Each junction has been shown to operate within capacity under these forecast circumstances.
- 8.6 The Applicant will seek to achieve a modal shift away from the private car by implementing a Residential Travel Plan at the development. This will entail the delivery of a package of measures designed to raise awareness of modes other than the private car. The measures include the provision of cycle vouchers valid towards the cost of bicycles and cycle accessories, as well as the delivery of travel information packs to each household on first occupation and the offer of personal travel planning sessions.
- 8.7 The traffic impact assessment in Section 5 has not taken into account the effect of the potential modal shift anticipated to arise from the proposed Travel Plan. Should the Travel Plan be successful in its aims and targets, the number of traffic movements associated with the development will reduce.
- 8.8 It is therefore considered that in Highway terms, there are no over-riding reasons why a development comprising up to 131 dwellings could not be satisfactorily accommodated on the existing highway network.

- 8.9 It is suggested that further discussion with the local Highway Authority would be appropriate in respect of planning conditions and financial contributions to transportation measures within the vicinity of the site, in line with the scale of development proposed.

- 8.9 It is suggested that further discussion with the local Highway Authority would be appropriate in respect of planning conditions and financial contributions to transportation measures within the vicinity of the site, in line with the scale of development proposed.

FIGURES



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F: 01635 861 215 W: www.stuartmichael.co.uk

JOB TITLE
**LAND SOUTH OF BEECH GROVE
HAYLING ISLAND**

DRAWING TITLE
SITE LOCATION PLAN

DATE **JUNE 2012** DRAWN **CT** CHECKED **DW** ISSUE CHECKBOX

DRAWING No. **FIGURE 1.1** REV. **.** SCALE **1:10,000** © **A4**



KEY

- NATIONAL CYCLE ROUTE 2 (SUSTRANS)
- HBC SUGGESTED LINK ROUTE – SIGNPOSTED
- HBC SUGGESTED LINK ROUTE – NOT SIGNPOSTED
- OFFROAD SECTION
- OTHER HBC OFF-ROAD CYCLE TRACK
- CYCLE SHOP
- CYCLE PARKING

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LAND SOUTH OF BEECH GROVE
HAYLING ISLAND

EXISTING CYCLE PROVISIONS

JOB TITLE

DRAWING TITLE

Rev	Description	Drm	Chk	Date
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REVISIONS			
Preliminary	Approval	Tender	Const.

DRAWING STATUS			
DATE	DRAWN	CHECKED	ISSUE CHECKBOX

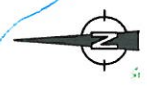
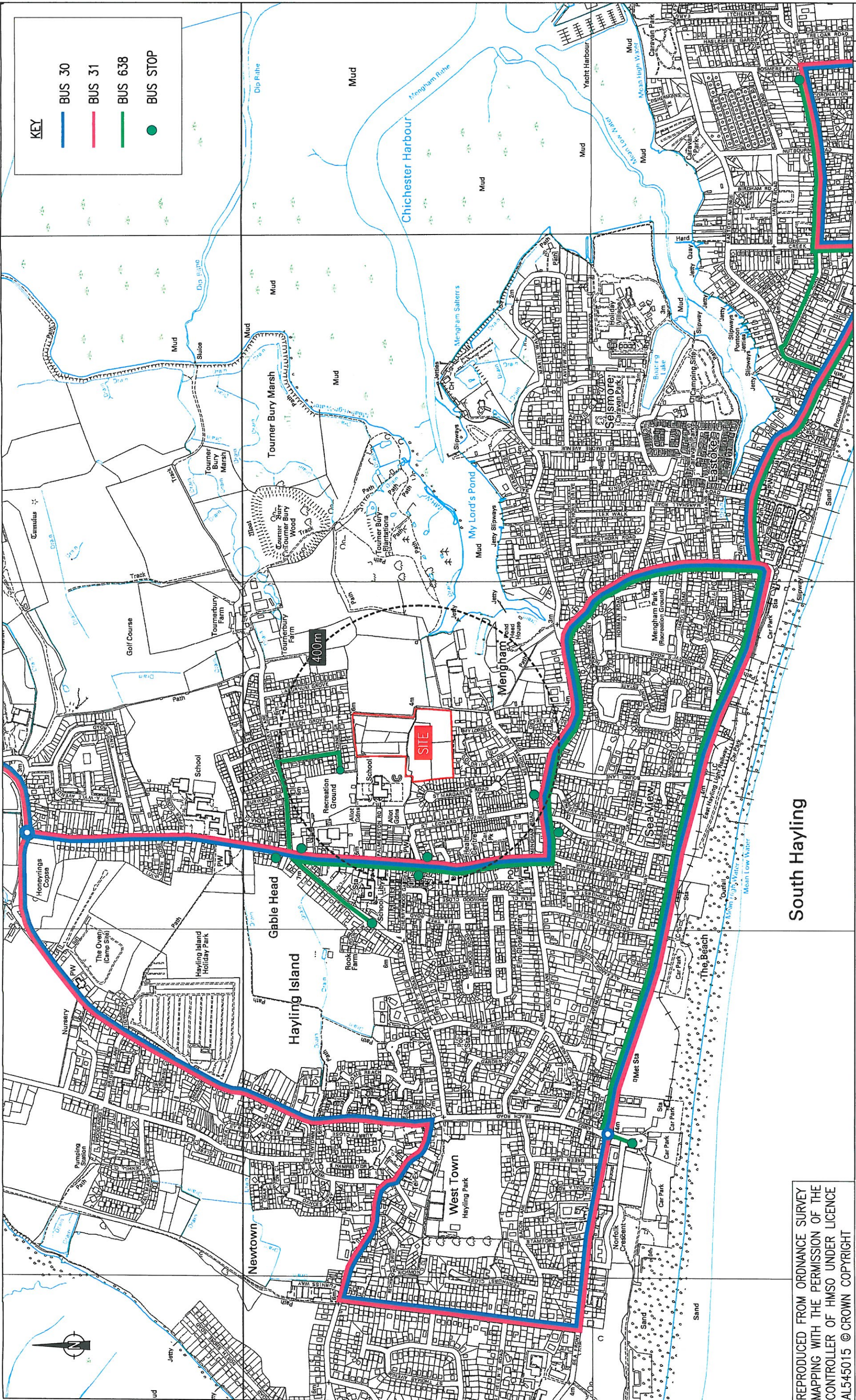
JUNE 2012 DW

FIGURE 3.3

SCALE

1:12,500 @ A3

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KEY

- BUS 30
- BUS 31
- BUS 638
- BUS STOP

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South Hayling

LAND SOUTH OF BEECH GROVE
HAYLING ISLAND

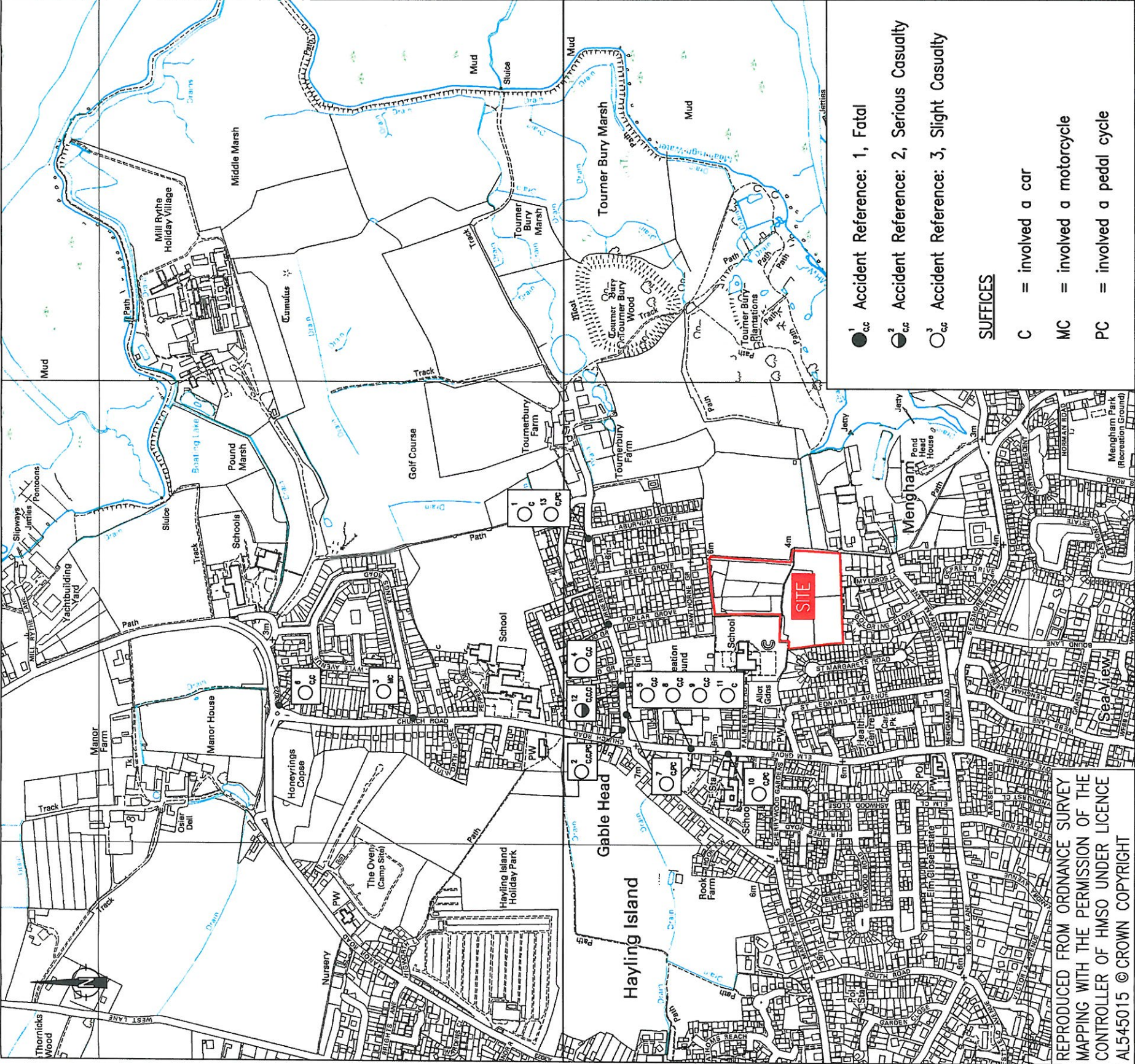
EXISTING BUS SERVICES

JOB TITLE		DRAWING TITLE	
LAND SOUTH OF BEECH GROVE HAYLING ISLAND		EXISTING BUS SERVICES	
DATE		DRAWING No.	
JUNE 2012		FIGURE 3.4	
DRAWN		SCALE	
CT		1:10,000 @ A3	
CHECKED		DW	
ISSUE CHECKBOX		© This drawing is the copyright of Stuart Michael Associates Limited. It may not be reproduced or amended without the written approval of Stuart Michael Associates	

REVISIONS		DRAWING STATUS	
Rev	Description	Approval	Tender
1	Initial		
2	Revised		
3	Final		
4	Issue		
5	Issue		
6	Issue		
7	Issue		
8	Issue		
9	Issue		
10	Issue		
11	Issue		
12	Issue		
13	Issue		
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95	Issue		
96	Issue		
97	Issue		
98	Issue		
99	Issue		
100	Issue		

TABLE OF ACCIDENT DATA FOR 5 YEAR PERIOD TO 31ST MAY 2012

1. SLIGHT ACCIDENT 19.06.07 @ 21:52. CAR TRAVELLING EAST ON TOURNEBURY LANE LOSES CONTROL AND HITS LAMPPOST.
2. SLIGHT ACCIDENT 19.12.07 @ 07:30. A CAR TRAVELLING NORTH ON CHURCH ROAD TURNS RIGHT ONTO TOURNEBURY LANE AS A PEDAL CYCLIST CROSSES TOURNEBURY LANE FROM THE SOUTH KERB AND STARTS TO CYCLE EAST ALONG THE ROAD. THE CAR HITS THE REAR OF THE PEDAL CYCLE. THE DRIVER OF THE CAR FAILS TO REACT AND THE PEDAL CYCLE AND CYCLIST ARE DRAGGED ALONG UNDER THE CAR FOR APPROX. 20m. THE CAR MOUNTS THE NEARSIDE KERB AND HITS A SECOND CAR WHICH IS PARKED IN A DRIVEWAY.
3. SLIGHT ACCIDENT 24.10.09 @ 11:00. A MOTORCYCLE TRAVELLING WEST ALONG KINGS ROAD TOWARDS JUNCTION WITH CHURCH ROAD BRAKES HEAVILY WHILST TURNING LEFT WHICH CAUSES THE VEHICLE TO SKID AND THE RIDER TO FALL.
4. SLIGHT ACCIDENT 05.11.09 @ 13:25. A CAR TRAVELLING EAST ALONG TOURNEBURY LANE CUTS ACROSS THE PATH OF AN ONCOMING CAR INTO POPLAR GROVE CAUSING COLLISION.
5. SLIGHT ACCIDENT 07.11.09 @ 12:40. CAR TRAVELLING NORTH FROM SEA FRONT IS REAR SHUNTED BY FOLLOWING CAR.
6. SLIGHT ACCIDENT 10.03.10 @ 07:20. CAR TRAVELLING WEST ALONG A3023 HAVANT ROAD SLOWED ON APPROACH TO ROUNDABOUT AND WAS REAR SHUNTED BY THE CAR TRAVELLING BEHIND.
7. SLIGHT ACCIDENT 27.06.10 @ 10:29. A CAR TURNING LEFT OUT OF THE CAR PARK ONTO TOURNEBURY LANE FAILS TO SEE A PEDAL CYCLE TRAVELLING WEST ALONG TOURNEBURY LANE AND COLLIDES WITH THE PEDAL CYCLE..
8. SLIGHT ACCIDENT 19.09.10 @ 14:00. A STATIC CAR AT THE ZEBRA CROSSING FACING SOUTH TOWARDS SEA FRONT IS REAR SHUNTED BY THE CAR FOLLOWING.
9. SLIGHT ACCIDENT 22.11.10 @ 15:43. CAR TRAVELLING SOUTH SLOWS IN ORDER TO TURN RIGHT INTO THE PH CAR PARK AND IS REAR SHUNTED BY THE CAR FOLLOWING.
10. SLIGHT ACCIDENT 23.11.10 @ 16:50. PEDAL CYCLE TRAVELLING NORTH ALONG ELM GROVE ON THE WESTSIDE PAVEMENT IS STRUCK BY A CAR TURNING RIGHT INTO THE FIRE STATION.
11. SLIGHT ACCIDENT 21.07.11 @ 23:40. THE DRIVER OF A CAR TRAVELLING NORTH FROM SEA FRONT LOSES CONTROL CAUSING THE VEHICLE TO LEAVE THE CARRIAGEWAY AND STRIKE THE RAILINGS NEAR THE ZEBRA CROSSING AND THEN OVERTURN.
12. SERIOUS ACCIDENT 14.03.12 @ 14:25. A CAR TRAVELLING WEST ON TOURNEBURY LANE COLLIDES WITH THE REAR OF A CAR PARKED WHICH IS THEN SHUNTED INTO TO THE REAR OF ANOTHER PARKED CAR.
13. SLIGHT ACCIDENT 23.05.12 @ 10:00. A PEDAL CYCLE PASSES A PARKED CAR FACING WEST ALONG LABURNUM GROVE WHEN THE CAR PULLS OUT AND COLLIDES WITH THE BICYCLE CAUSING THE RIDER TO FALL.



- ¹ cc Accident Reference: 1, Fatal
- ² cc Accident Reference: 2, Serious Casualty
- ³ cc Accident Reference: 3, Slight Casualty
- SUFFICES**
- C = involved a car
- MC = involved a motorcycle
- PC = involved a pedal cycle

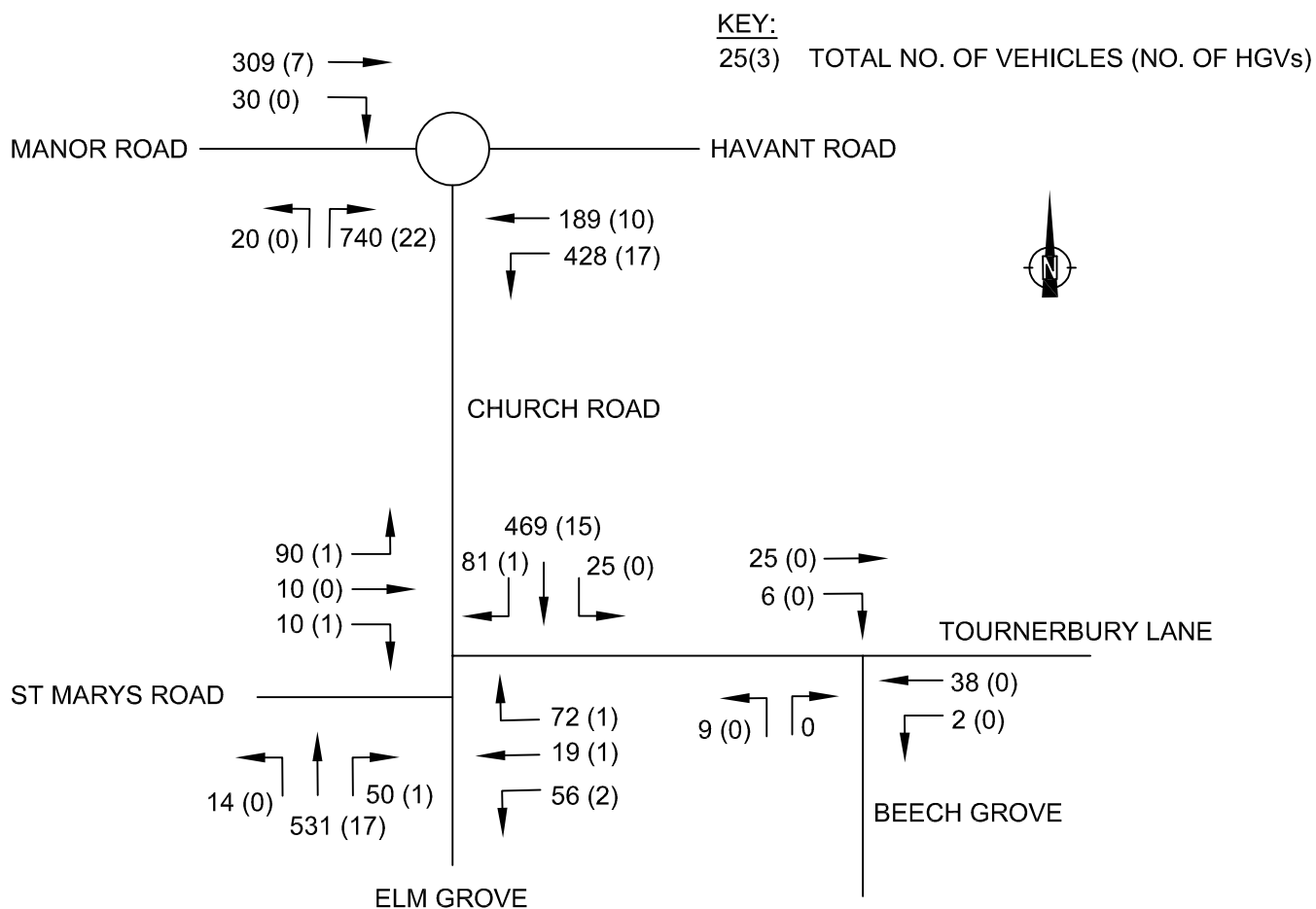
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REVISIONS				
Preliminary	Approval	Tender	Const.	
DRAWING STATUS				
DATE	AUGUST 2012	DRAWN	CT	CHECKED
DRAWING No.	FIGURE 3.5	REV	SCALE	1:10,000 @ A3

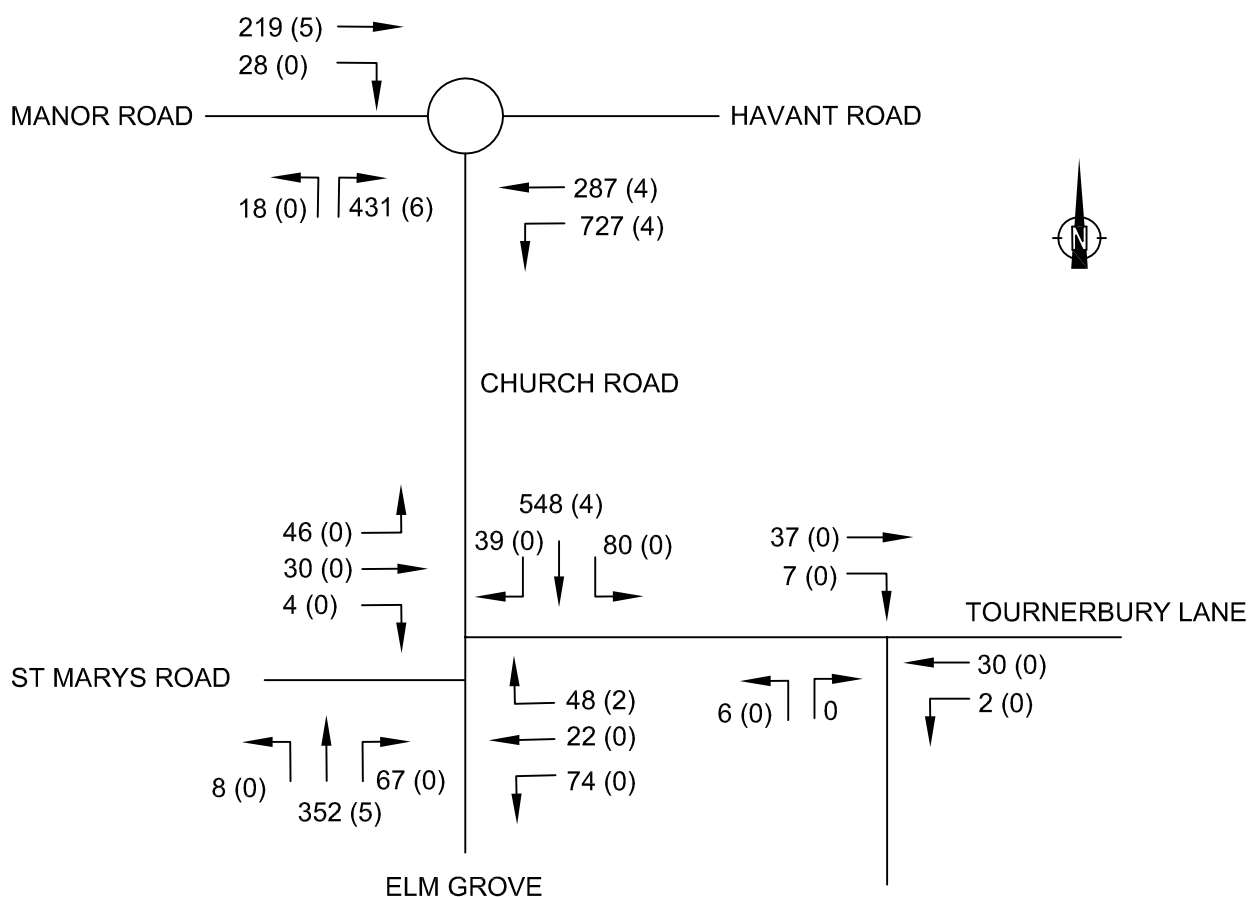
JOB TITLE
LAND SOUTH OF BEECH GROVE
HAYLING ISLAND

DRAWING TITLE
PIA DATA PLOT

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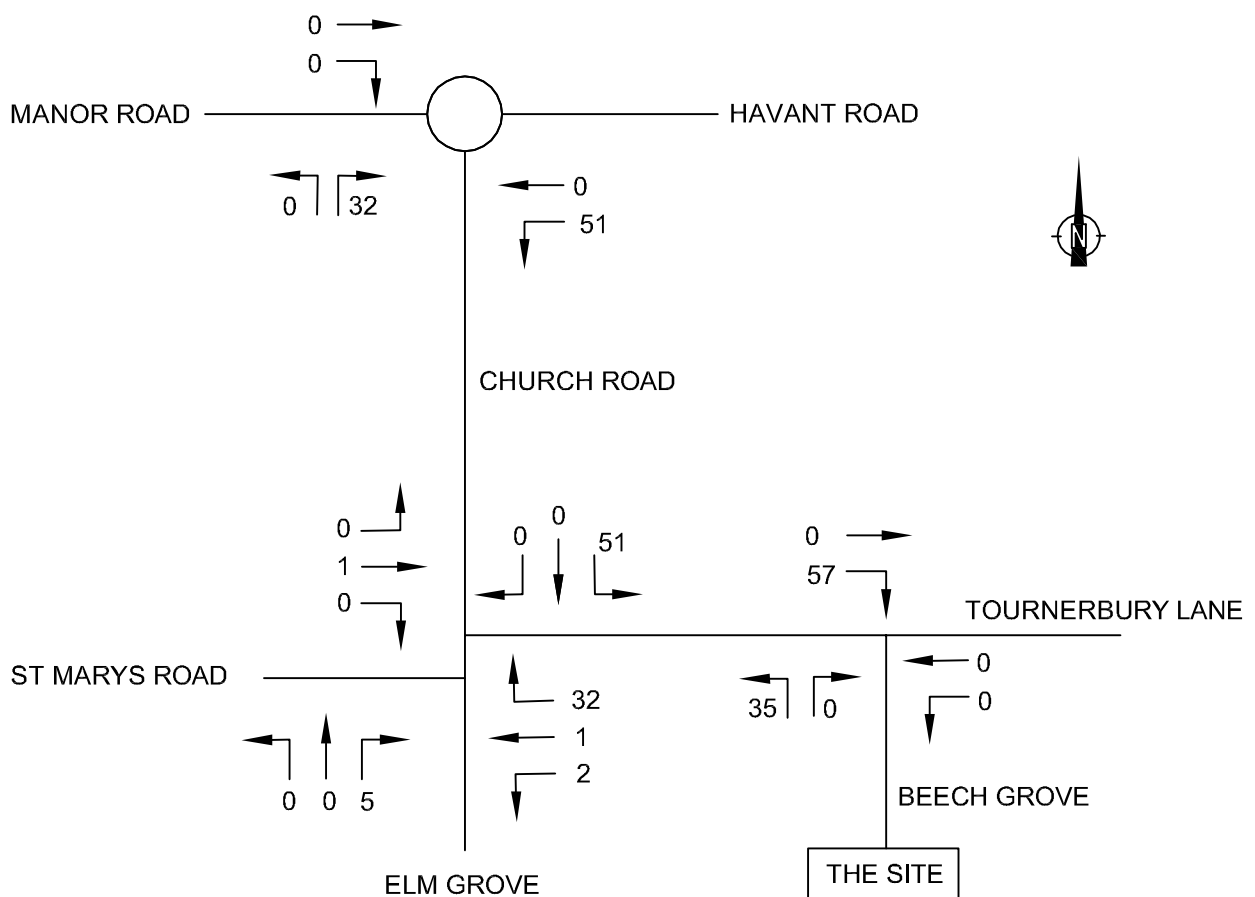
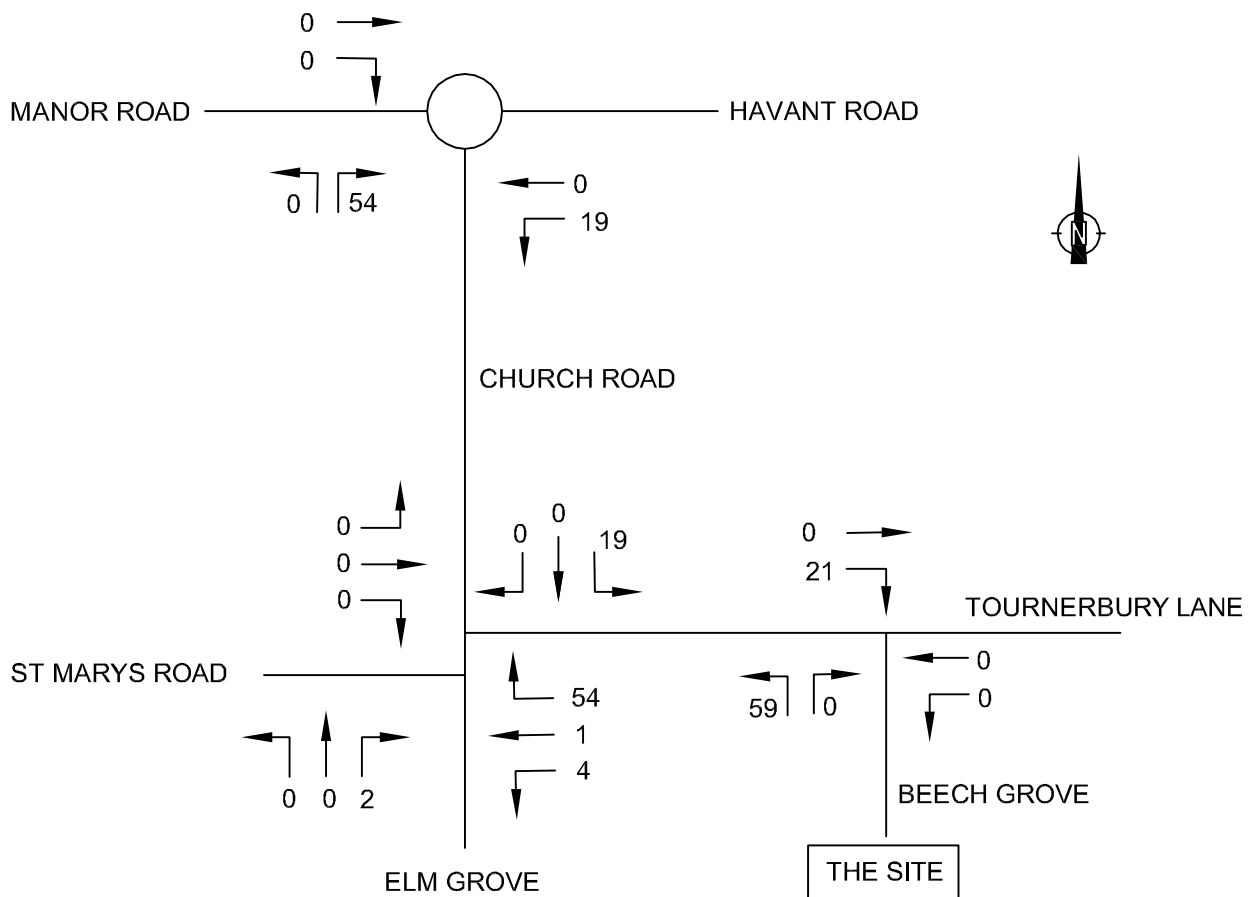


AM PEAK PERIOD (0800 TO 0900 HOURS)

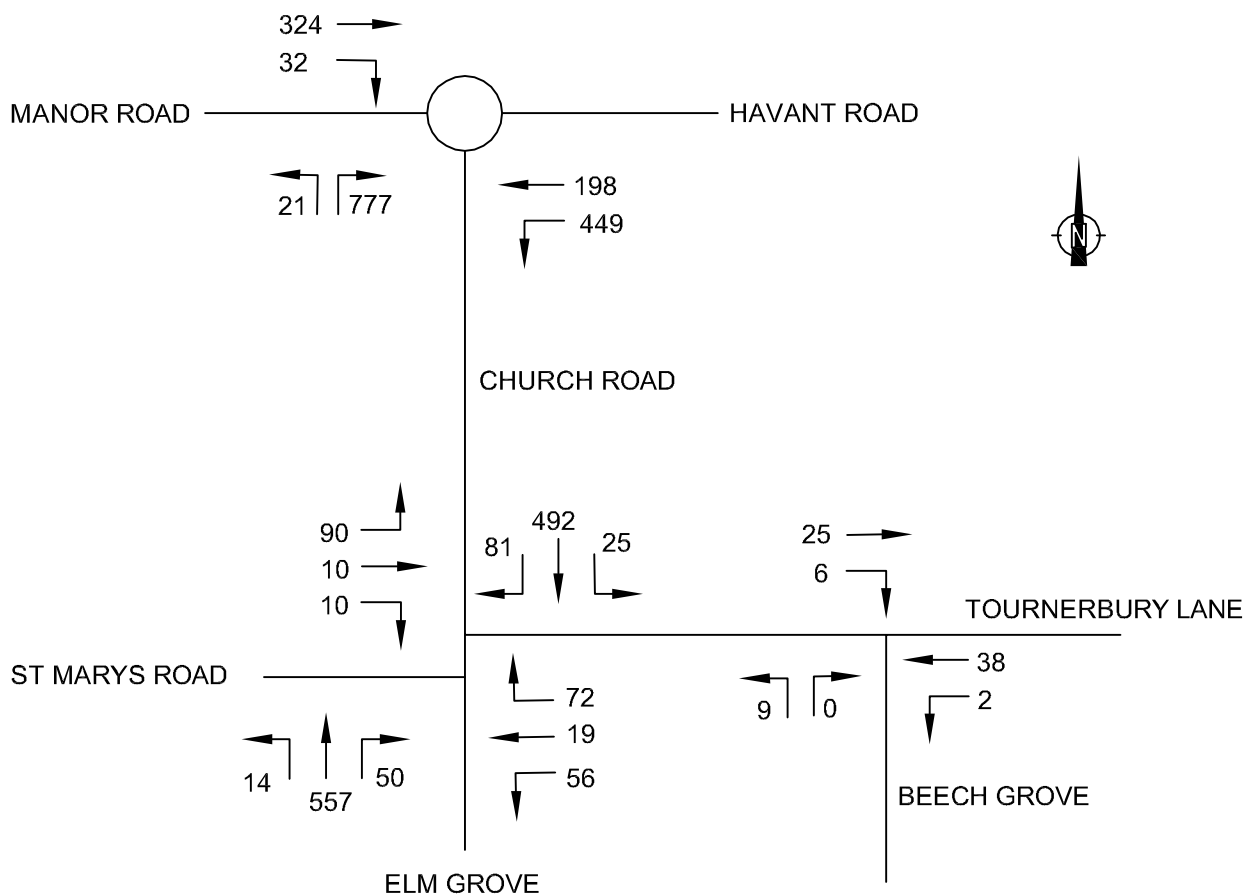


PM PEAK PERIOD (1630 TO 1730 HOURS)

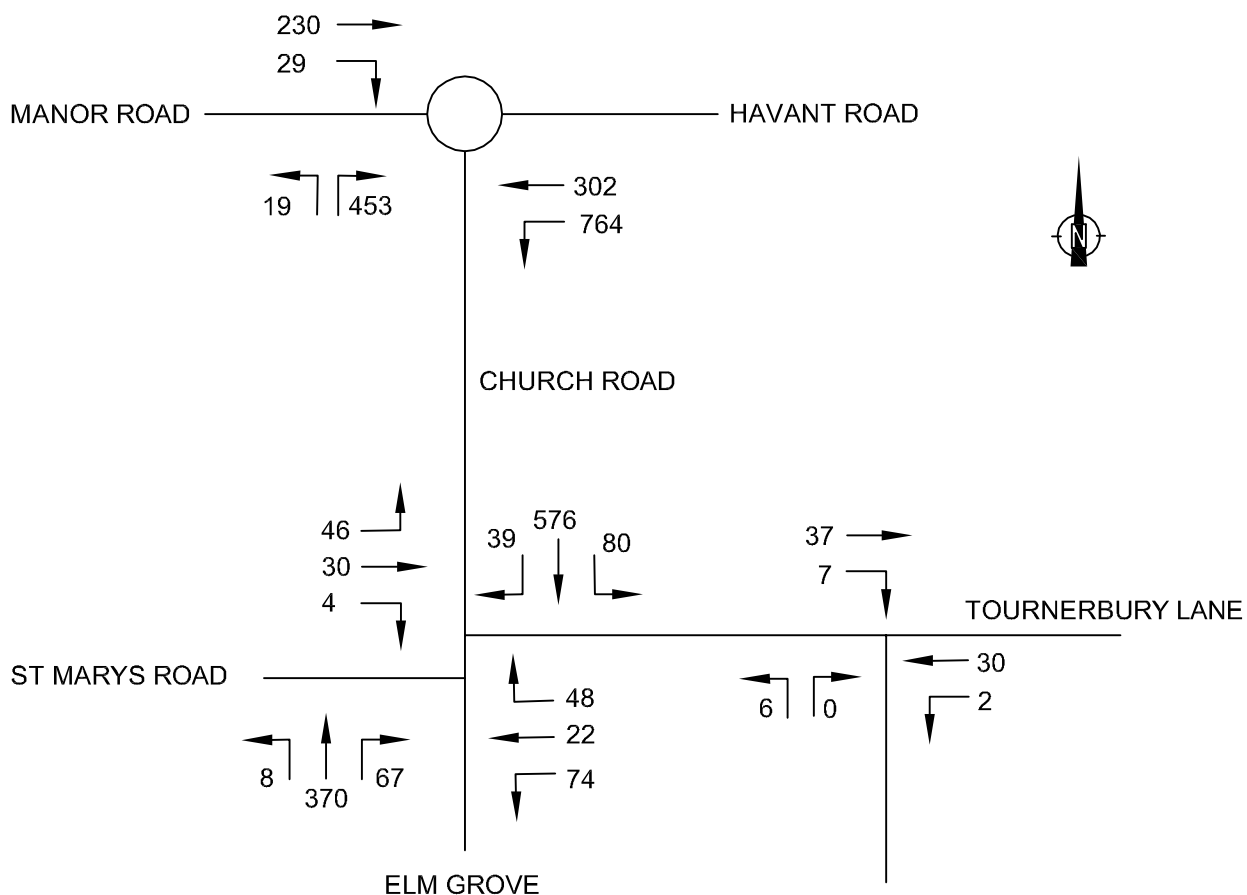
EXISTING TRAFFIC FLOWS
YEAR 2012
FIGURE 3.6



DEVELOPMENT TRAFFIC
FIGURE 5.1

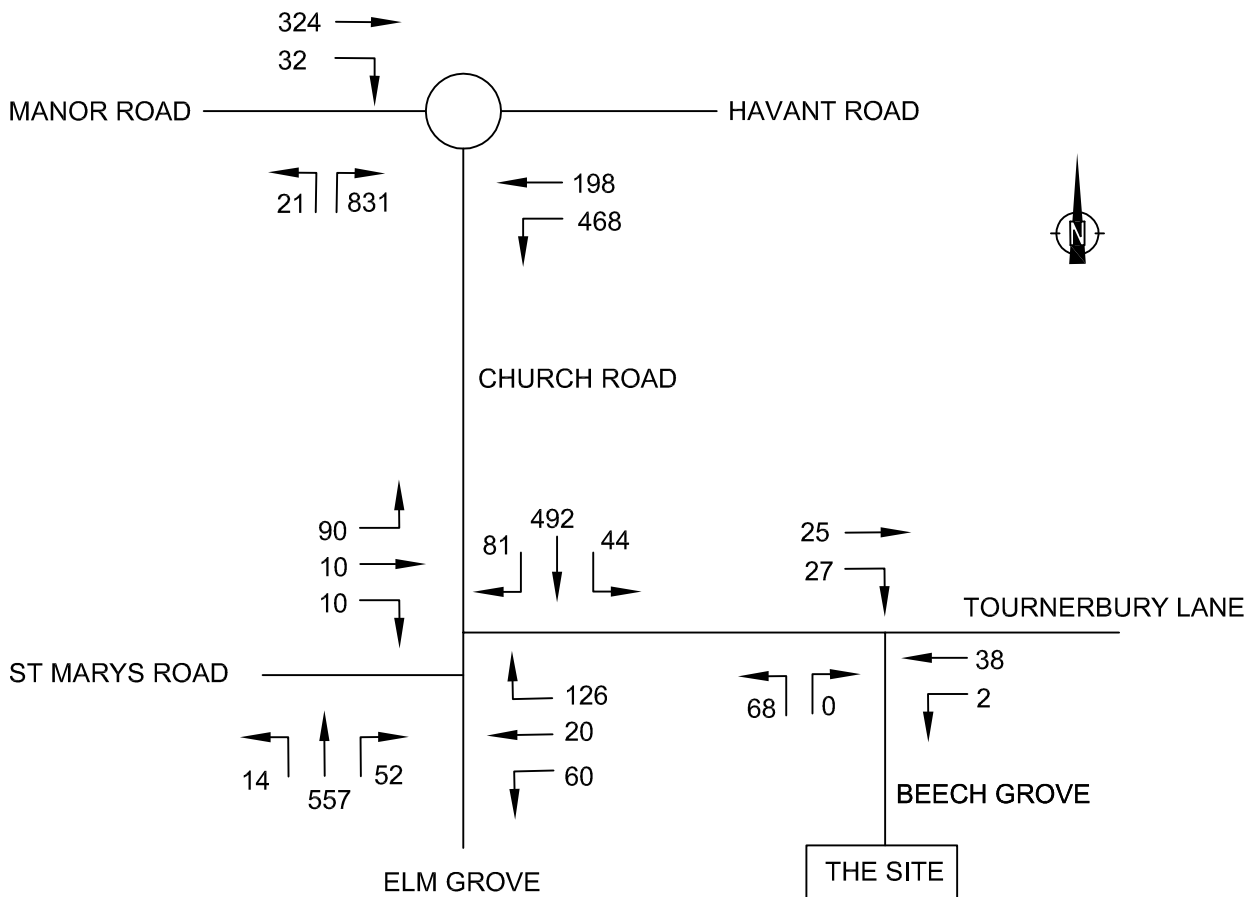


AM PEAK PERIOD (0800 TO 0900 HOURS)

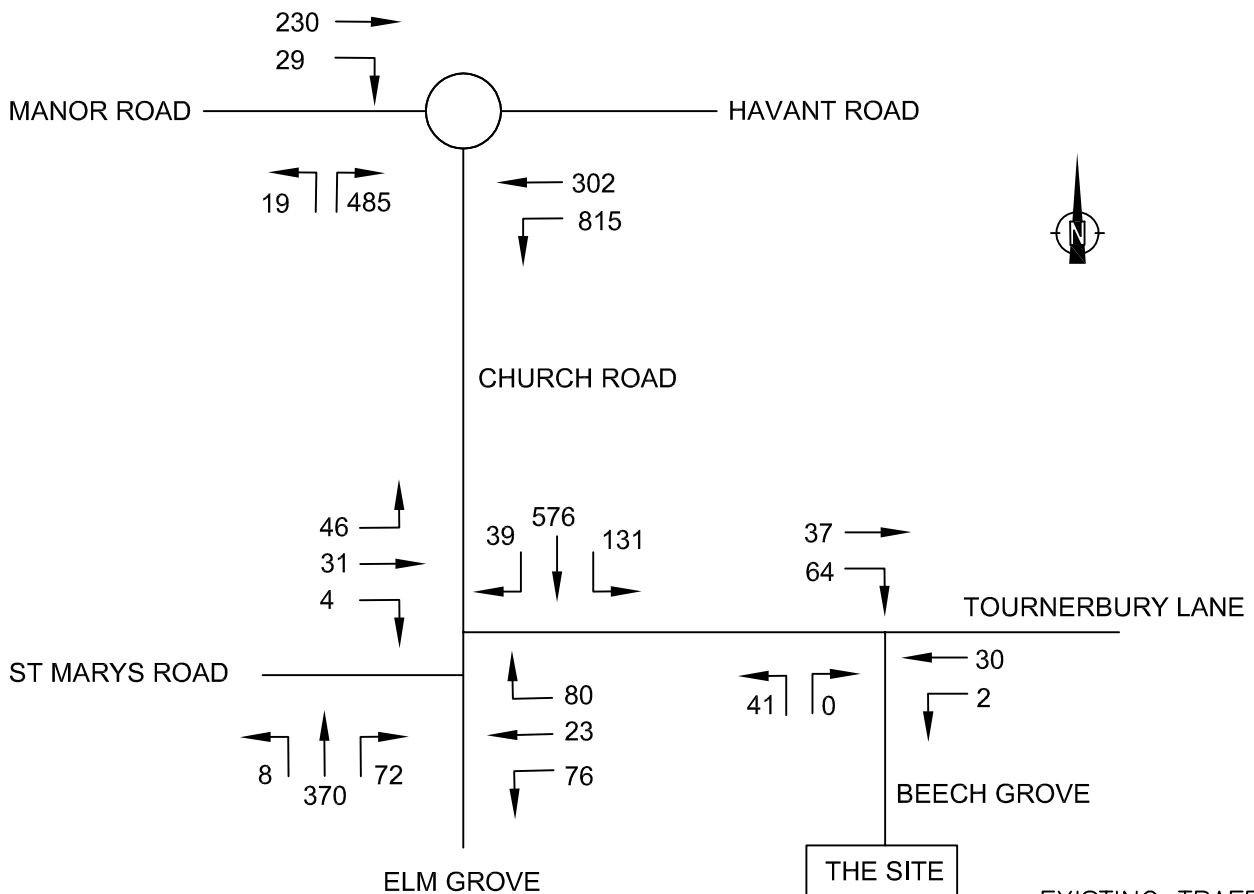


PM PEAK PERIOD (1630 TO 1730 HOURS)

EXISTING TRAFFIC FLOWS
GROWTHED TO YEAR 2017
FIGURE 5.2



AM PEAK PERIOD (0800 TO 0900 HOURS)



PM PEAK PERIOD (1630 TO 1730 HOURS)

EXISTING TRAFFIC FLOWS
GROWTHED TO YEAR 2017
+ DEVELOPMENT TRAFFIC
FIGURE 5.3

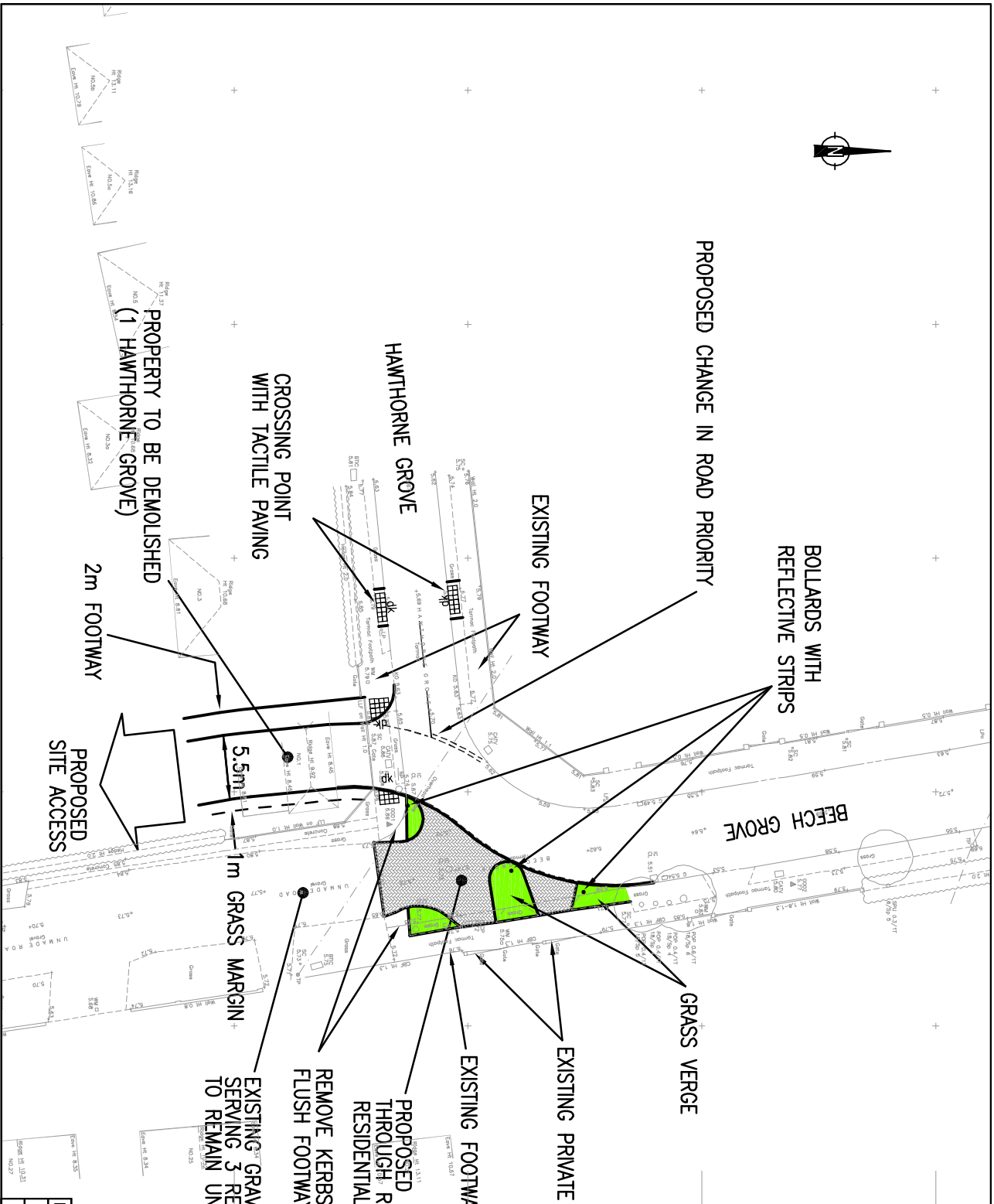
APPENDICES

APPENDIX 1



APPENDIX 2

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Rev	Description	Dwn	Chk	Date
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REVISIONS

DATE	DRAWN	CHECKED	ISSUE CHECKBOX
SEPT '12	JGP	DLW	

DRAWING No.	REV.	SCALE	
3726.001	A	1:500	© A4

TOLCARNE DRIVE
DEVELOPMENTS LTD

JOB TITLE
LAND SOUTH OF BEECH GROVE,
MENGHAM, HAYLING ISLAND
DRAWING TITLE
PROPOSED ACCESS ARRANGEMENTS

APPENDIX 3

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED
MULTI-MODAL VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	BD BEDFORDSHIRE	1 days
05	EAST MIDLANDS	
	LN LINCOLNSHIRE	1 days
06	WEST MIDLANDS	
	WO WORCESTERSHIRE	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NY NORTH YORKSHIRE	1 days

Filtering Stage 2 selection:

Parameter:	Number of dwellings
Actual Range:	115 to 186 (units:)
Range Selected by User:	100 to 195 (units:)

Public Transport Provision:

Selection by:	Include all surveys
---------------	---------------------

Date Range:	01/01/04 to 14/10/11
-------------	----------------------

Selected survey days:

Monday	1 days
Thursday	1 days
Friday	2 days

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

Selected Locations:

Suburban Area (PPS6 Out of Centre)	4
------------------------------------	---

Selected Location Sub Categories:

Residential Zone	4
------------------	---

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

MULTI-MODAL VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	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	4	143	0.088	4	143	0.267	4	143	0.355
08:00 - 09:00	4	143	0.161	4	143	0.447	4	143	0.608
09:00 - 10:00	4	143	0.195	4	143	0.253	4	143	0.448
10:00 - 11:00	4	143	0.181	4	143	0.184	4	143	0.365
11:00 - 12:00	4	143	0.186	4	143	0.189	4	143	0.375
12:00 - 13:00	4	143	0.240	4	143	0.235	4	143	0.475
13:00 - 14:00	4	143	0.235	4	143	0.207	4	143	0.442
14:00 - 15:00	4	143	0.237	4	143	0.240	4	143	0.477
15:00 - 16:00	4	143	0.296	4	143	0.209	4	143	0.505
16:00 - 17:00	4	143	0.377	4	143	0.218	4	143	0.595
17:00 - 18:00	4	143	0.437	4	143	0.270	4	143	0.707
18:00 - 19:00	4	143	0.307	4	143	0.282	4	143	0.589
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:			2.940			3.001			5.941

Parameter summary

Trip rate parameter range selected: 115 - 186 (units:)
 Survey date range: 01/01/04 - 14/10/11
 Number of weekdays (Monday-Friday): 4
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 0

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

MULTI-MODAL CYCLISTS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	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	4	143	0.011	4	143	0.012	4	143	0.023
08:00 - 09:00	4	143	0.012	4	143	0.035	4	143	0.047
09:00 - 10:00	4	143	0.005	4	143	0.004	4	143	0.009
10:00 - 11:00	4	143	0.002	4	143	0.011	4	143	0.013
11:00 - 12:00	4	143	0.007	4	143	0.002	4	143	0.009
12:00 - 13:00	4	143	0.005	4	143	0.005	4	143	0.010
13:00 - 14:00	4	143	0.011	4	143	0.005	4	143	0.016
14:00 - 15:00	4	143	0.005	4	143	0.009	4	143	0.014
15:00 - 16:00	4	143	0.016	4	143	0.005	4	143	0.021
16:00 - 17:00	4	143	0.014	4	143	0.005	4	143	0.019
17:00 - 18:00	4	143	0.011	4	143	0.014	4	143	0.025
18:00 - 19:00	4	143	0.005	4	143	0.004	4	143	0.009
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:			0.104			0.111			0.215

Parameter summary

Trip rate parameter range selected: 115 - 186 (units:)
 Survey date range: 01/01/04 - 14/10/11
 Number of weekdays (Monday-Friday): 4
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 0

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

MULTI-MODAL VEHICLE OCCUPANTS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	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	4	143	0.105	4	143	0.300	4	143	0.405
08:00 - 09:00	4	143	0.219	4	143	0.588	4	143	0.807
09:00 - 10:00	4	143	0.225	4	143	0.295	4	143	0.520
10:00 - 11:00	4	143	0.223	4	143	0.239	4	143	0.462
11:00 - 12:00	4	143	0.233	4	143	0.226	4	143	0.459
12:00 - 13:00	4	143	0.293	4	143	0.295	4	143	0.588
13:00 - 14:00	4	143	0.300	4	143	0.246	4	143	0.546
14:00 - 15:00	4	143	0.282	4	143	0.298	4	143	0.580
15:00 - 16:00	4	143	0.402	4	143	0.274	4	143	0.676
16:00 - 17:00	4	143	0.512	4	143	0.314	4	143	0.826
17:00 - 18:00	4	143	0.588	4	143	0.353	4	143	0.941
18:00 - 19:00	4	143	0.411	4	143	0.418	4	143	0.829
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:			3.793			3.846			7.639

Parameter summary

Trip rate parameter range selected: 115 - 186 (units:)
 Survey date range: 01/01/04 - 14/10/11
 Number of weekdays (Monday-Friday): 4
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 0

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

MULTI-MODAL PEDESTRIANS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	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	4	143	0.021	4	143	0.021	4	143	0.042
08:00 - 09:00	4	143	0.039	4	143	0.193	4	143	0.232
09:00 - 10:00	4	143	0.042	4	143	0.061	4	143	0.103
10:00 - 11:00	4	143	0.061	4	143	0.035	4	143	0.096
11:00 - 12:00	4	143	0.030	4	143	0.033	4	143	0.063
12:00 - 13:00	4	143	0.039	4	143	0.042	4	143	0.081
13:00 - 14:00	4	143	0.023	4	143	0.032	4	143	0.055
14:00 - 15:00	4	143	0.040	4	143	0.023	4	143	0.063
15:00 - 16:00	4	143	0.161	4	143	0.070	4	143	0.231
16:00 - 17:00	4	143	0.082	4	143	0.056	4	143	0.138
17:00 - 18:00	4	143	0.061	4	143	0.030	4	143	0.091
18:00 - 19:00	4	143	0.039	4	143	0.037	4	143	0.076
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:			0.638						1.271

Parameter summary

Trip rate parameter range selected: 115 - 186 (units:)
 Survey date range: 01/01/04 - 14/10/11
 Number of weekdays (Monday-Friday): 4
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 0

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
MULTI-MODAL PUBLIC TRANSPORT USERS

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	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	4	143	0.000	4	143	0.000	4	143	0.000
08:00 - 09:00	4	143	0.000	4	143	0.007	4	143	0.007
09:00 - 10:00	4	143	0.000	4	143	0.007	4	143	0.007
10:00 - 11:00	4	143	0.004	4	143	0.002	4	143	0.006
11:00 - 12:00	4	143	0.004	4	143	0.000	4	143	0.004
12:00 - 13:00	4	143	0.004	4	143	0.009	4	143	0.013
13:00 - 14:00	4	143	0.004	4	143	0.005	4	143	0.009
14:00 - 15:00	4	143	0.000	4	143	0.004	4	143	0.004
15:00 - 16:00	4	143	0.014	4	143	0.000	4	143	0.014
16:00 - 17:00	4	143	0.005	4	143	0.000	4	143	0.005
17:00 - 18:00	4	143	0.004	4	143	0.000	4	143	0.004
18:00 - 19:00	4	143	0.005	4	143	0.000	4	143	0.005
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:			0.044			0.034			0.078

Parameter summary

Trip rate parameter range selected: 115 - 186 (units:)
 Survey date range: 01/01/04 - 14/10/11
 Number of weekdays (Monday-Friday): 4
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 0

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

MULTI-MODAL TOTAL PEOPLE

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	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	4	143	0.137	4	143	0.333	4	143	0.470
08:00 - 09:00	4	143	0.270	4	143	0.823	4	143	1.093
09:00 - 10:00	4	143	0.272	4	143	0.367	4	143	0.639
10:00 - 11:00	4	143	0.289	4	143	0.286	4	143	0.575
11:00 - 12:00	4	143	0.274	4	143	0.261	4	143	0.535
12:00 - 13:00	4	143	0.340	4	143	0.351	4	143	0.691
13:00 - 14:00	4	143	0.337	4	143	0.288	4	143	0.625
14:00 - 15:00	4	143	0.328	4	143	0.333	4	143	0.661
15:00 - 16:00	4	143	0.593	4	143	0.349	4	143	0.942
16:00 - 17:00	4	143	0.614	4	143	0.375	4	143	0.989
17:00 - 18:00	4	143	0.663	4	143	0.396	4	143	1.059
18:00 - 19:00	4	143	0.460	4	143	0.458	4	143	0.918
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:			4.577				4.620		
							9.197		

Parameter summary

Trip rate parameter range selected: 115 - 186 (units:)
 Survey date range: 01/01/04 - 14/10/11
 Number of weekdays (Monday-Friday): 4
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 0