Transport Assessment

Grundon Waste Management Depot

116150/CW/151104
Revision 1

Report Prepared For: Grundon Waste Management

Grontmij
Part of Sweco

Issue	Date	Reason for Issue	Prepared		Checked		Approved	
0	12/10/2015	Draft	Alex Thomas		Craig Wells		Mark Fitch	
1	03/11/2015	Final	Alex Thomas		Craig Wells		Mark Fitch	

Transport Assessment
116150/CW/151104
Revision 1

Grontmij
1 Northumberland Avenue
Trafalgar Square
London
WC2N 5BW

+44 (0)20 3002 1210
enquiries.uk@grontmij.co.uk
www.grontmij.co.uk

value beyond engineering

Contents

1. Introduction 5
1.1 Introduction 5
1.2 Background 5
1.3 Structure of this Transport Assessment 6
2. Policy 7
2.1 Introduction 7
2.2 National Planning Policy Framework (NPPF) 7
2.3 Cherwell Local Plan 1996, Retained policies 8
2.4 Non-Statutory Cherwell Local Plan 2011 9
2.5 Cherwell District Local Plan 2014 10
2.6 Illustrative Cherwell Local Plan Feb 2015 10
2.7 Oxfordshire Local Transport Plan 2011-2030 11
2.8 Banbury Area Transport Strategy, May 2014 12
2.9 Banbury Movement Study, Oxfordshire County Council, 2013 12
2.10 The Oxfordshire County Council Movement Framework 12
3. Existing Conditions 14
3.1 Site Location 14
3.2 Local Highway Network 14
3.3 Existing Site Operation 15
3.4 Existing Site Accesses 15
3.5 Existing Road Ownership 15
3.6 Existing On-Street Car Parking Restrictions 16
3.7 Existing Site Uses ..... Error! Bookmark not defined.
3.8 Existing Traffic Flows 16
3.9 Collision Analysis 17
3.10 Public Transport 21
3.11 Existing Cycle Network 22
3.12 Pedestrian Routes 22
3.13 Future Public Transport Enhancements 23
4. Development Proposals 24
4.1 Proposed Development 24
4.2 Site Access 24

4.3 Parking 24
4.4 Servicing and Deliveries 25
5. Trip Generation 26
5.1 Introduction 26
5.2 Proposed Trip Generation 26
5.3 Mode Split 27
5.4 Committed Developments 27
5.5 Servicing and Delivery Trip Generation 28
6. Impact of Development 29
6.1 Assessment Scenarios 29
6.2 Junction Impact 29
6.3 Junction/Link Flow Impact 30
7. Mitigation 31
7.1 Potential Transport Enhancements 31
7.2 Travel Plan 31
8. Summary and Conclusions 32

Appendices

Appendix A Traffic Flows
Appendix B OCC Collision Plot
Appendix C Indicative Movement Parameter Plan
Appendix D Junction Modelling Outputs

1. Introduction

1.1 Introduction

Grontmij UK have been appointed by Grundon Waste Management Ltd to provide highways and transportation advice in relation to the proposed planning application for the redevelopment of the Grundon Waste Management Depot in Banbury, Oxfordshire. The Grundon Waste Management Depot is located approximately 300m to the south-east of Banbury Rail Station, located off Higham Way.

The site is currently occupied by a waste management depot and the site of a former concrete plant, owned by Grundon and Cemex respectively. The footprint of the structures associated with the existing waste management depot totals 19,885ft². A total of 87 car parking spaces are currently available on site. A total of 51 of these car parking spaces are currently available for the depot's employees and 36 car parking spaces are available for operational vehicles.

The application seeks detailed planning consent for a residential led development comprising of up to 228 units (apartments). A proportion of these flats are expected to be affordable in nature. Up to 228 parking spaces are proposed for the development, with cycle parking provided at the site at the relevant local standard. All matters are reserved accept for access, which is considered in this document alongside all transport matters.

Cherwell District Council (CDC) are the local planning authority and Oxfordshire County Council (OCC) are the local highways authority.

1.2 Background

The existing waste management depot needs significant investment to upgrade facilities at the site. Given the recent residential development of the adjacent former Cattle Market site, it is considered that rather than upgrade the existing depot, investment would be better directed towards funding, upgrading and constructing a bespoke Waste Management Depot within a dedicated industrial estate at the Thorpe Mead site to the east of the current site. In 2011, conditional planning permission (LPA Ref: 06/00954) was granted for this proposed relocation of the existing waste management depot.

The relocation of the Depot there enables the redevelopment of the depot site as part of the wider Banbury Regeneration Area and will also generate the necessary funding to secure the new facilities at Thorpe Mead.

Prior to submission of this Transport Assessment (TA) a Transport Scoping Report was submitted to CDC and OCC. This report has been prepared with reference to the comments received and subsequent discussions that have been held since submission of the scoping report.

1.3 Structure of this Transport Assessment

Following this introductory chapter, this report has been structured as follows:

- Chapter 2 identifies relevant transport policy at local, regional and national level;
- Chapter 3 outlines the existing transport conditions in the immediate vicinity of the development site;
- Chapter 4 outlines the development proposals;
- Chapter 5 outlines the development trip generation;
- Chapter 6 summarises the results of the traffic impact analysis;
- Chapter 7 considers mitigation measures associated with the proposed scheme; and
- Chapter 8 provides a summary of the report and draws conclusions.

2. Policy

2.1 Introduction

This chapter provides an examination of the current national, regional and local transportation policy relating to the proposed development at Higham Way, Banbury.

The key documents are:

- National Planning Policy Framework (NPPF) – 2012.
- Adopted Cherwell Local Plan (1996) (Only policies included in Schedule of Saved Policies)
- Non-Statutory Cherwell Local Plan 2011 (December 2004)
- Banbury Regeneration Area East – Supplementary Planning Guidance

2.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) document sets out national planning policies for England. It supersedes and replaces almost all previous national planning policy statements (PPS) and planning policy guidance notes (PPG), including PPG13 Transport. National Policy in relation to Transport is set out within the NPPF Chapter 4, Paragraphs 29 to 41.

Paragraph 32 of the NPPF notes that all developments that generate significant amounts of movement should be accompanied by a Transport Statement or Transport Assessment and that plans 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*
>
> *Improvements can be undertaken within the transport network that are cost effective and limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe'*
>
> *Similarly, Paragraph 34 notes 'Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised'.*

Paragraph 35 discusses the design of development noting that, where practical, developments should:

> *'Accommodate the efficient delivery of goods and supplies;*

Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;

Create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians, avoiding street clutter;

Incorporate facilities for charging plug-in and other ultra-low emission vehicles; and

Consider the needs of people with disabilities by all modes of transport.'

Paragraph 39 of the NPPF discusses what should be taken into account by local authorities when setting their parking standards. Therefore, with the replacement of PPG13, there are now no national parking standards and as such, it is considered that local council parking policy should be used to source the most up to date and appropriate standards for development.

2.3 Cherwell Local Plan 1996, Retained policies

The adopted Cherwell Local Plan 1996 remains the statutory development plan for the district up to when the policies within the Non Statutory Cherwell Local Plan 2011 form part of the Local Development Framework. The Chapter 5 of the Cherwell Local Plan 1996 focuses on Transport Policies. Although, a number of policies are no longer adopted, some are still saved and valid. The following transport policies have been retained, which are relevant to this application:

TR1

'Before proposals for development are permitted the council will require to be satisfied that new highways, highway- improvement works, traffic-management measures, additional public transport facilities or other transport measures that would be required as a consequence of allowing the development to proceed will be provided.'

TR7

'Development that would regularly attract large commercial vehicles or large numbers of cars onto unsuitable minor roads will not normally be permitted.'

TR16

'New development or redevelopment on land served by station approach and Merton Street that would generate a significant increase in traffic flows will be resisted unless (i) the council is satisfied that a satisfactory alternative means of access is or will be provided or (ii) the development is required to meet the operational needs of Banbury Railway Station. The council will seek the improvement of access to the station for public transport, cyclists and pedestrians in such proposals.'

2.4 Non-Statutory Cherwell Local Plan 2011

The policies and proposals in the Non-Statutory Cherwell Local Plan 2011 are still relevant considerations in deciding planning applications, up to a point when the policies within the Non Statutory Cherwell Local Plan 2011 form part of the Local Development Framework. Therefore, the following transport policies are relevant to this application:

'TR1 All traffic generating development must contribute to achieving the objectives of the local transport plan.

TR2 Major generators of travel demand should be located in existing centres which are highly accessible by means other than the private car.

TR3 A transport assessment and travel plan must accompany development proposals likely to generate significant levels of traffic.

TR4 Before proposals for development are permitted the council will need to be satisfied that all appropriate mitigation measures required to support that development are identified within an implementation programme. Such measures will include highway improvements, traffic management measures, improved public transport and/or facilities, and measures to improve pedestrian and cycle accessibility.

TR5 Before proposals for development are permitted the council will need to be satisfied that:

(i) conflict between vehicles and pedestrians, cyclists and people with sensory and mobility impairments is minimised by securing segregated provision, controlled crossings or other measures as appropriate, and;

(ii) the development does not compromise the safe movement and free flow of traffic or the safe use of roads by others.

Proposals that do not comply with relevant standards of road safety will not be permitted.

TR6 The council will seek to facilitate the provision and operation of an effective public transport system as a genuine alternative to the use of private vehicles, so far as it is possible to do so through its land use planning powers. This will include, where appropriate, giving priority to public transport over general traffic and making provision for interchange facilities and encouraging integration between different modes of transport.

TR8 Development that would prejudice pedestrian and cycle circulation or route provision will not be permitted.

TR9 All new development shall provide cycle parking to Oxfordshire county council standards.

TR11 Development likely to attract vehicular traffic will be required to:

(i) accommodate within the site the necessary highway safety requirements relating to access, turning and servicing.

(ii) include appropriate measures to minimise the visual impact of vehicles and parking areas.

(iii) comply with maximum standards for car parking.

(iv) provide parking for people with disabilities in accordance with the council's standards.

(v) provide cycle parking in accordance with the council's standards.

development proposals which do not have regard to these criteria will not be permitted.

TR19 Roads to serve new residential areas shall be designed and constructed to give priority to pedestrians, cyclists and bus operators, and to ensure a maximum design speed of 20 mph on principal estate roads and 15 mph on all other roads, mews courts and housing squares.

6.59 Substantial areas of land adjoining the Railway Station are classed as brownfield and previously developed and offer potential for redevelopment of mixed uses at high densities.

TR25 Development that would prejudice the provision of a cycle and pedestrian network for the town particularly between residential areas, schools and employment areas will not be permitted.'

2.5 Cherwell District Local Plan 2014

The Local Plan is the document which sets the long term strategic 'spatial vision' for a local authority area. It contains the strategic spatial framework and policies to help deliver that vision for site specific locations within Cherwell District.

One of the key strategic objectives is to Maximise the opportunity to shift dependence from the car to sustainable modes of transport (a.25) and to reduce the need to travel and provide good access to public and other sustainable modes of transport.

2.6 Illustrative Cherwell Local Plan Feb 2015

The site has recently been suggested by the Inspector for allocation for housing development as part of the new Cherwell Local Plan 2006-2031. The specific draft policy is Banbury 19, Land at Higham Way which states that '*In principle the site offers a suitable location for development, and would contribute to the creation of sustainable and mixed communities'.*

Other key transport considerations include that access will be via Higham Way, the site should integrate well with Banbury and help make connections with the adjoining town centre and Railway Station and that the layout should maximise the potential for walkable neighbourhoods and enables a high degree of integration and connectivity between new and existing communities. New footpaths and cycleways should be provided that link to existing networks.

2.7 Oxfordshire Local Transport Plan 2011-2030

The Oxfordshire Local Transport Plan 2011 focuses on attracting and supporting economic investment and growth, delivering transport infrastructure, tackling congestion and improving quality of life. More recently, a revised 2015 Oxfordshire Local Transport Plan (LTP4) is being developed to supersede the 2011 Plan. However, at this stage, the 2011 plan remains the current local transport plan policy document.

The Local Transport Plan 2011 is split into two definitive parts. Part 1 focuses on policy, and sets out the local transport plan aims for Oxfordshire, being:

- *'to support the local economy and the growth and competitiveness of the county;*
- *to make it easier to get around the county and improve access to jobs and services for all by offering real choice;*
- *to reduce the impact of transport on the environment and help tackle climate change; and*
- *to promote healthy, safe and sustainable travel.'*

In addition, policies relating to development include Policy SD1, which states that Oxfordshire County Council will seek to ensure that:

> *'i. the location and layout of new developments minimise the need for travel and can be served by high quality public transport, cycling and walking facilities;*
>
> *ii. developers promote sustainable travel for all journeys associated with new development, especially those to work and education, and;*
>
> *iii. the traffic from new development can be accommodated safely and efficiently on the transport network.'*

In addition, Section 8.5 makes reference to the additional guidance for new developments including the Residential Roads Design Guide and the Guidance on Transport Assessments and Travel Plans.

The policy document which contains car parking standards for new residential developments within Oxfordshire is entitled 'Transport for New Developments, Parking Standards for New Developments, December 2011'. The parking standards for Cherwell urban areas are contained within Appendix B of the guidance. Table 2.1 sets out the car parking provision as described in the document.

Table 2.1 - Car parking standards in new residential developments in Cherwell Urban Area

Bedrooms per dwelling	Max. Allocated Spaces	Max. spaces when two allocated space per dwelling is provided		Max. spaces when one allocated space per dwelling is provided		Max. unallocated spaces when no allocated spaces
		Allocated Spaces	Un-allocated Spaces	Allocated Spaces	Un-allocated Spaces	
1	1	N/A	N/A	1	0.4	1.2
2	2	2	0.3	1	0.6	1.4
2/3	2	2	0.3	1	0.7	1.5
3	2	2	0.3	1	0.8	1.7
3/4	2	2	0.4	1	1	1.9
4+	2	2	0.5	1	1.3	2.2

Part 2 of the Local Transport Plan 2011 focuses on the implementation plan and local area strategies for specific towns within Oxfordshire, including the Banbury Area Strategy.

2.8 Banbury Area Transport Strategy, May 2014

The Banbury Area Transport Strategy forms Chapter 15 of the Oxfordshire Local Transport Plan (LTP3). It identifies that 2,500 extra homes are planned in Banbury up to 2031. The strategy sets out the required transport improvements to tackle the challenges identified in the Banbury Movement Study, 2013. It also identifies a series of improvements to increase the overall capacity of the local transport network to accommodate the anticipated cumulative impact of the growth.

2.9 Banbury Movement Study, Oxfordshire County Council, 2013

Banbury Movement Study provided an assessment of the current (2013) and predicted future traffic and travel demands in Banbury. Furthermore, it recommended a series of transport schemes which could be implemented to benefit traffic movement in Banbury.

2.10 The Oxfordshire County Council Movement Framework

Used to supplement the County Council's 'Cycling Strategy' (2001), the Oxfordshire County Council Movement Framework outlines the minimum requirements for cycling infrastructure within Oxfordshire. Minimum cycle parking standards are outlined in Table 2.2.

Table 2.2 – OCC Minimum residential cycle parking standards

Space type	Standard
Resident	1 bed – 1 space 2+ beds – 2 spaces
Visitor	1 stand per 2 units where more than 4 units

3. Existing Conditions

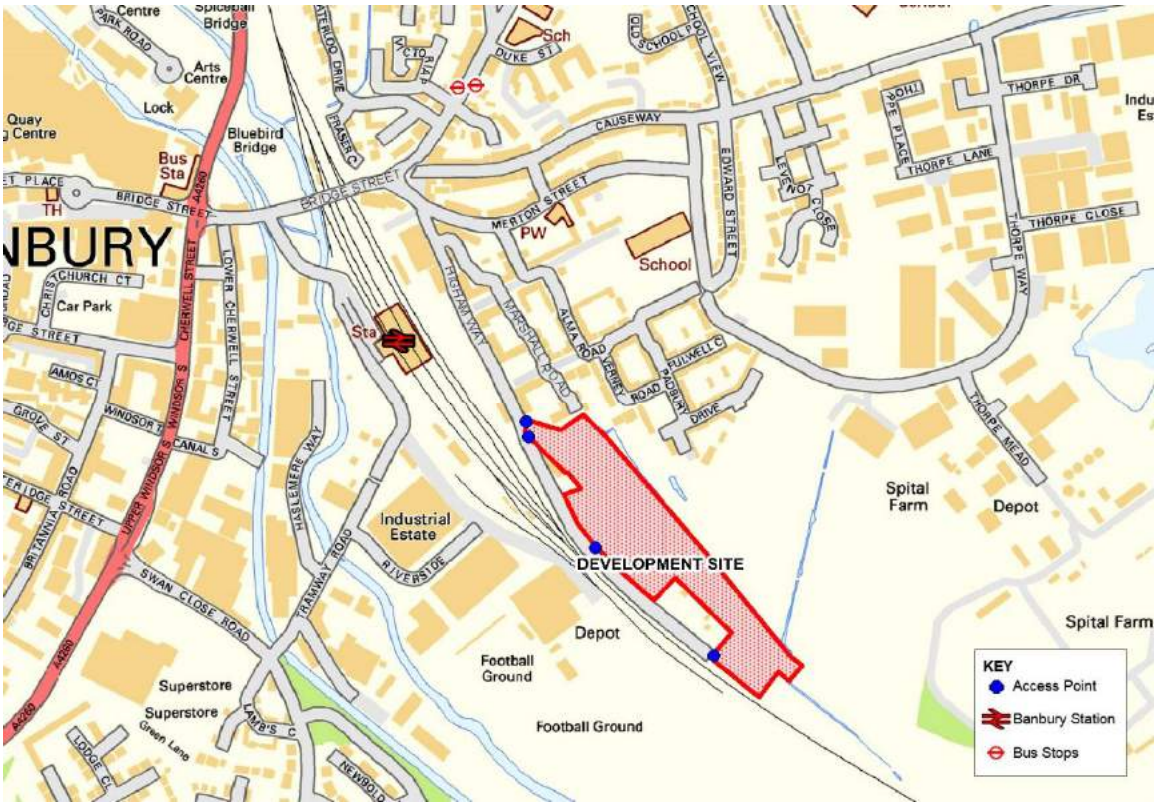
3.1 Site Location

The existing Grundon Waste Management Depot site is located approximately 300m to the south-east of Banbury Rail Station, located off Higham Way.

The site is bounded by Higham Way to the west which forms the only road access to the site. Higham Way becomes a cul-de-sac at the southern boundary of the site. The remaining boundaries are shaped by the Chiltern Main Line to the south-west, housing developments to the north and north-east, and playing fields and allotments to the east and south.

Figure 3.1 displays the existing site location on the local highway network.

Figure 3.1 – Site location



3.2 Local Highway Network

Higham Way is frequently used by the HGV traffic associated with the existing waste management depot. There is some on-street parking available towards the northern section of Higham Way. Where on-street parking is unavailable, double yellow lines have been implemented. Limited visitor parking is provided in the recently built residential developments north of the site, also accessed off Higham Way.

Higham Way leads into Merton Street to the north. Merton Street is a reasonably narrow road with residential parking along its northern extent. Merton Street extends from Bridge

Street in the west to Thorpe Way in the east. The western section of Merton Street between Junction Road and Bridge Street is two-way. The section between Junction Road and Thorpe Way is one way eastbound.

Bridge Street is one of the two road bridges passing over the railway line in Banbury. It is a two-way single carriageway road, merging with Middleton Road in the east and provides access to the town centre in the west.

There are two sections of road in the area named Thorpe Way. The Thorpe Way / Edward Street loop leads from and connects to the southern side of Causeway through a residential area. This loop is a two-way single carriageway road, apart from the section of Thorpe Way between Merton Street and Causeway which is one way northbound. The other section of road named Thorpe Way extends in a southern loop from Overthorpe Road in the east to connect with Alma Road in the west. Alma Road passes through a residential area comprising of new build apartments.

Overthorpe Road / Causeway are two way single carriageway roads which merge with each other extending from Warkworth in the east to Bridge Street in the west. However, a road barrier has been erected at the Overthorpe Road / Thorpe Way junction, which prevents through traffic movement along the road.

3.3 Existing Site Operation

The site is currently occupied by a waste management depot and the site of a former concrete plant, owned by Grundon and Cemex respectively. The footprint of the structures associated with the existing waste management depot totals 19,885ft². A total of 87 car parking spaces are currently available on site. A total of 51 of these car parking spaces are used for the depot's employees and 36 car parking spaces are available for operational vehicles.

It should be noted that there is a National Grid owned property, bordering the railway line which is entirely surrounded by the development site on its remaining boundaries. There are currently no plans pertaining to the redevelopment of this land but access to this site will be maintained.

3.4 Existing Site Accesses

Higham Way runs along the western edge of the site, between the site and the railway line, and all access to the existing sites is from this road. There is currently one access to the Cemex site and one to the Grundon Waste site at the very northern end of the proposed site boundary. A second access to the Grundon Waste site is located further south and at the very southern end is an access into the Transco National Grid site. These access points are shown on the site location plan at Figure 3.1.

3.5 Existing Road Ownership

The section of Higham Way south of Marshall Road to the cements works used to form part of the development area but its ownership was transferred to OCC in January 2013 and has

been upgraded to adoptable standards. Since this transfer of ownership, OCC have improved the quality of the road.

To the south of the now adopted section of Highway Way there is an existing right of access to the two National Grid sites adjacent to and south of the proposed development site. This right of access will be retained as part of the development works although it will take a different form.

3.6 Existing On-Street Car Parking Restrictions

Despite an absence of Controlled Parking Zones within Banbury, parking on the highway network local to the site is heavily restricted, owing to the site's proximity to Banbury Rail Station and the town centre itself. Double yellow lines are present on many of the surrounding streets including Merton Street, Bridge Street and Higham Way. Limited on-street parking is available on Merton Street yet is primarily used by local residents. Within the adjacent Kings Oak scheme parking is predominantly reserved for residents only, although a number of visitor spaces are available.

The nearest car park to the site is located at Banbury Rail Station, which is accessible from Higham Way. Despite its proximity to the site, the cost of parking in this location would be prohibitive to any not using the station itself.

3.7 Existing Traffic Flows

Fully classified turning count surveys were undertaken on Thursday 2nd July 2015 at the following locations:

- Higham Way/Merton Street (priority junction)
- Bridge Street/Merton Street (signalised junction)
- Middleton Road/Bridge Street/Waterloo Drive (signalised junction)
- Bridge Street/Banbury Station access (priority junction)
- Bridge Street / Cherwell Street (signalised junction)

In addition Automatic Traffic Count (ATC) surveys were undertaken at:

- Middleton Road (east of McKeevor Place)
- Bridge Street (west of Merton Street)

These surveys have been used to establish the existing traffic flows on the local highway network and this is summarised on the flow diagrams at Appendix A of this report.

The extent of the study network has been previously agreed with OCC, who have also advised which peak hours should be used in order that the assessments within this report align with the area wide modelling being undertaken by the local highway authority.

The peak hours being used are therefore:

- AM Peak – 0800-0900
- PM Peak – 1700-1800

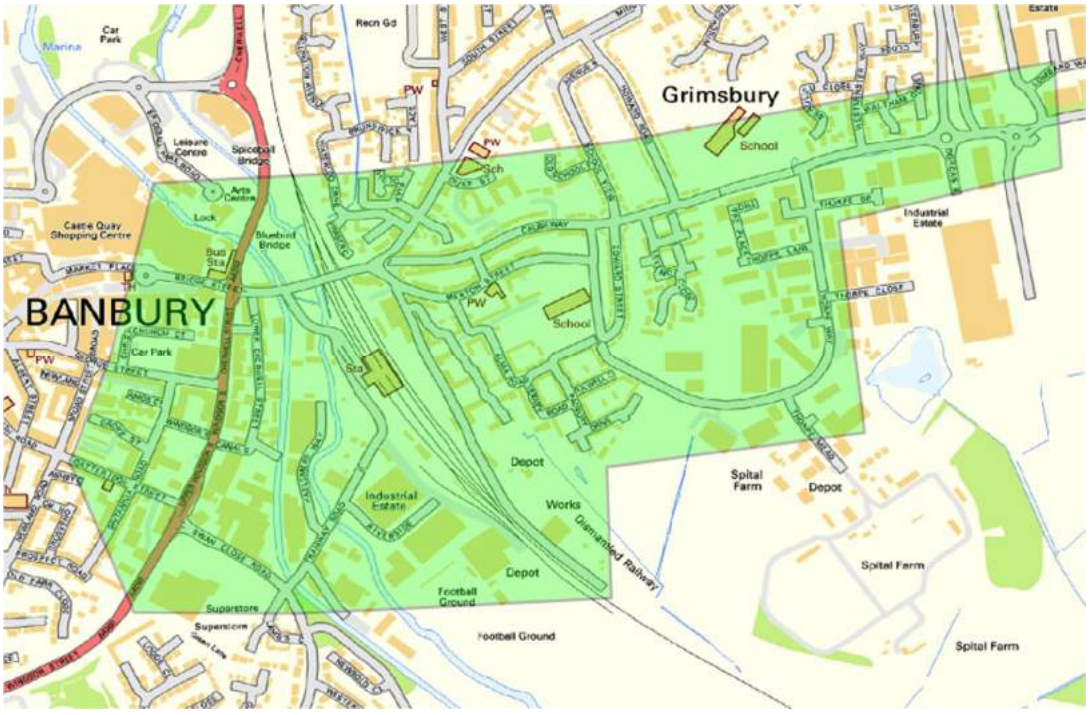
3.8 Collision Analysis

3.8.1 Collision Data

Recent three year records of road traffic collision statistics were obtained from OCC to determine the safety of local roads surrounding the site. The records supplied provided an overview of all recorded collisions from 01/07/2012 to 30/06/2015, and are described in further detail below. A plan of the collisions locations broken down by severity has also been provided by OCC and is included at Appendix B. It should be noted that no particular patterns in collision type/ cause are evident.

The study area illustrated in Figure 3.2 is loosely defined by the Causeway and Bridge Street to the north, the Castle Quay Shopping Centre and Broad Street to the west, Banbury United's Football Ground to the south, and Thorpe Way to the east. With the site located on Higham Way, off Bridge Street, the main focus of investigation is on junctions and links in its immediate vicinity, as well along the main routes to the town centre. Despite this focus, collisions within the entirety of the study area have been included.

Figure 3.2 – Collision analysis study area

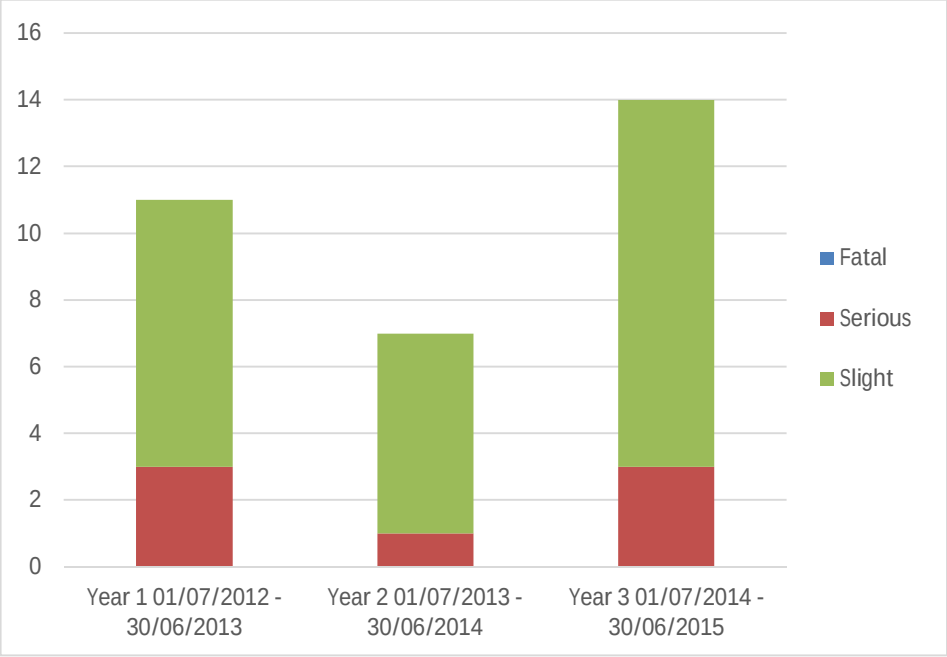


Collision data for the study area was obtained for the most recent 36 months available, with data incorporating the period between 01/07/2012 and 30/06/2015. During this period there were 32 recorded collisions, of which 25 were assigned a severity classification of slight, and seven assigned as serious. The 32 collisions resulted in 37 casualties, 30 of which were classified with a severity of slight, and the remaining seven as serious. It should be noted that during the 36 month period, no fatalities were recorded. The breakdown of collisions by year and severity is summarised in Table 3.1.

Table 3.1 – Collision severity by year

	Fatal	Serious	Slight	TOTAL	%KSI
Year 1 01/07/2012 - 30/06/2013	0	3	8	11	27.27%
Year 2 01/07/2013 - 30/06/2014	0	1	6	7	14.29%
Year 3 01/07/2014 - 30/06/2015	0	3	11	14	21.43%
Total	0	7	25	32	21.88%
Annual Average	0.00	2.33	8.33	10.67	21.00%

Figure 3.3 – Graph to show collision severity by year



The data in Table 3.1, shown graphically in Figure 3.3 shows that the number of collisions resulting in serious injury is low, with three in Year 1 and eight slight injuries. Year 2 saw a decrease in the overall number of collisions with seven collisions overall, of which one was serious. The following year saw an increase in collisions, comprising three serious and 11 slight injuries. The fluctuation in the overall collision totals does not indicate any trend in collisions over the past 36 months within the study area.

During the three year period, a total of 10 collisions involved pedestrians, four involved pedal cyclists and a further five involved powered two wheelers. Eight of the incidents occurred in non-dry conditions and 12 in darkness. A breakdown of the main factors in collisions is provided below in Table 3.2.

Table 3.2 – Main collision factors

	No.	%age
KSI	7	21.88%
Pedestrians	10	31.25%
Pedal Cyclist	4	12.50%
Powered two wheeler	5	15.63%
Bus/ Coach	2	6.25%
Goods vehicle	0	0.00%
Right Turn	10	31.25%
Left Turn	5	15.63%
U-Turn	1	3.13%
Non-dry	8	25.00%
Dark	12	37.50%
Total no. of collisions	32	

The distribution of collisions within the study area during the three year study period is summarised below in Table 3.3. The table has been arranged so as to easily identify collisions which took place along the links which are in the vicinity of the site and which form the prominent routes to the town centre and employment areas.

Table 3.3 – Collisions by location within the study area

Location	No. of Collisions	Of which KSI	% of total collisions in study area
Bridge Street/ Middleton Road			
Bridge Street JW Cherwell Street	4	0	12.50%
Bridge Street JW Lower Cherwell Street	2	0	6.25%
JW Rail Station access	1	1	3.13%
Non-junction collisions	2	1	6.26%
Total	9	2	28.13%
Merton Street and surrounding area			

Location	No. of Collisions	Of which KSI	% of total collisions in study area
JW Junction Road	1	0	3.13%
Alma Road	1	0	3.13%
Total	2	0	6.26%
Causeway			
JW Edward Street	1	0	3.13%
Non-junction collisions	1	0	3.13%
Total	2	0	6.26%
Cherwell Street/Upper Windsor Street			
JW George Street	1	1	3.13%
Non-junction collisions	6	2	18.75%
Total	7	3	21.88%
George Street			
JW Britannia Road	5	2	15.63%
Non-junction collisions	2	0	6.25%
Total	7	2	21.88%
Swan Close Road			
JW Bankside	1	0	3.13%
Non-junction collisions	2	0	6.25%
Total	3	0	9.38%
Other			
Non-junction collisions	2	0	6.25%
TOTAL WITHIN STUDY AREA	32	7	100.00%

As shown in Table 3.3, over 25% of all collisions occur on Bridge Street, as would be expected as Bridge Street is the main route to the town centre from the site so is the most heavily used. Five of the nine incidents involve pedestrians, however all of these occur at different locations along the length of Bridge Street and all for various reasons. The accidents are unrelated with no trend.

Four of the incidents on Bridge Street occurred at the junction with Cherwell Street, none of which resulted in serious injury and with only one involving a pedestrian. The remaining three incidents all involved cars.

With regards to incidents within the vicinity of the site, those on Merton Street and the surrounding area account for only 6% of all incidents seen. Neither of the two incidents resulted in serious injury, with both involving cars and powered two wheelers only.

3.9 Public Transport

3.9.1 National Rail

Banbury station, at just over 600m walk from the site, is within easy walking distance. It is located on the Chiltern Main Line which offers regular services to London Marylebone (55 minutes), Birmingham (45 minutes) and Oxford. Services to destinations including Manchester, Newcastle, Reading, Southampton and Edinburgh are also provided through the operator Cross-Country.

Table 3.4 – National Rail services from Banbury Station

Selected Destinations	Calling at	Peak freq.
London Marylebone	Bicester North - London Marylebone	3 per hour
Birmingham (All Stations)	Leamington Spa - Warwick - Birmingham Moor Street/ Snow Hill OR Leamington Spa - Coventry - Birmingham International - Birmingham New Street	4 per hour
Oxford	Oxford only	2 per hour
Stratford-upon-Avon	Leamington Spa - Warwick - Stratford-upon-Avon	1 per hour
Reading	Oxford - Reading	2 per hour
Manchester	Leamington Spa - Birmingham - Wolverhampton - Stafford - Stoke - Stockport - Manchester	1 per hour

3.9.2 Public Bus

The site benefits from the provision of a number of bus stops located within walking distance on Middleton Road. The bus stops serving routes B7, 499, 500 and 508 are within 650 metres of the site.

Table 3.5 – Local bus services

Number	Route	Peak freq. (buses p/hr)
B7	Banbury – Grimsbury – Edmunds Road	2
200	Banbury – Woodford Halse – Daventry	1
499	Banbury – Brackley – Banbury	1
500	Banbury – Middleton Cheney – Brackley	2

Figure 3.1 displays the location of the existing public transport links closest to the site.

3.10 Existing Cycle Network

Existing routes predominantly run north-south following the path of the River Cherwell, Oxford Canal and Spiceball Park. From the town centre, a spur of National Cycle Route (NCR) 5 is present, linking the rail station to NCR 5 proper which lies to the south of the town, yet further routes are not present. Regional Route 40 lies to the east of the town yet is isolated from the NCR 5 spur. There are proposals from Sustrans to connect these two routes to provide a continuous east-west route from the town centre to the large industrial estates in the east, and would also provide excellent cycle access to and from the proposed development. A further extension of an existing north-south route would also provide an uninterrupted cycle route from Bridge Street to the large industrial estates to the north of the town. The site is well placed to benefit from such a development. Figure 3.4 shows a map of the town's cycle routes.

It should be noted that Cherwell District Council has released publications encouraging cycling for leisure and has highlighted a number of further cycle routes. These primarily use the footpaths adjacent to the Oxford Canal and Spiceball Park, and ultimately connect with rural settlements outside of the town.

3.11 Pedestrian Routes

As with the cycle routes, off-road pedestrian routes from the site are largely dictated by the location of the railway, river and canal, with considerable east-west severance again evident. In the town centre in particular, many sections of the pedestrian routes are shared with advertised cycle routes. Overall, the pedestrian network is largely fragmented and disparate, most notably in the Grimsbury area of town. The site itself is isolated from the network at present. However the new footbridge at Banbury Rail Station greatly reduces the walking distance to access the station from the east. The bridge not available as a pedestrian thoroughfare, as automatic ticket barriers are in place, but the route to and from the town centre via Bridge Street is of a similar length anyway.

Figure 3.5 displays the main public rights of way in the town in relation to the location of the site.

A number of leisure routes within the town have been published by Cherwell District Council, which predominately incorporate the Oxford Canal which lies parallel to the railway line.

Unofficial walking routes within the town and the greater Cherwell Valley area itself have been recommended and mapped on social media sites such as mapmywalk.com and mapometer.com.

3.12 Future Public Transport Enhancements

There are a number of proposed enhancements to transport infrastructure within Banbury and the wider Cherwell region. Prominent enhancements are listed below:

- Electrification of the Chiltern Mainline which is expected to lead to an increase in demand for rail due to decreased journey times to Birmingham and London Marylebone.
- Proposals are in place for the reimplementation of the east-west rail link between Oxford, Bedford and Cambridge, which would greatly improve accessibility to the town, via nearby Bicester.
- Improvements to, or relocation of the existing bus station to allow for the expansion of the Castle Quay retail centre.
- Development of the town's bus network, including local and inter-urban services as proposed in policy BAN3 of the Oxfordshire Local Transport Plan (2011).
- Improvements to the Bridge Street/ Cherwell Street junction to the west of the site in order to enhance connectivity to the rail station and accommodate trips associated with future development in the local area.

4. Development Proposals

4.1 Proposed Development

The development proposals are for a residential led development comprising of up to 228 units (apartments). Up to 228 parking spaces are proposed for the development, with cycle parking provided at the relevant local standard.

The proposed layout seeks to address the site's prominent location adjacent to the railway line and respond to the open green space beyond in order to create striking and locally distinctive buildings in this highly visible location.

4.2 Site Access

The vehicular access to the site is to remain from Higham Way via Merton Street, at the northern edge of the site. It is proposed to construct a new access road from Higham Way, along the western boundary of the site. This also allows for a buffer between the development and the Chiltern Main Line.

The existing access to the Transco National Grid site will be retained in its current location, along the existing southern section of Higham Way, as shown on the indicative movement parameter plan included at Appendix C.

On-site roads are to be constructed to primarily meet the needs of pedestrians and cyclists, with the speed of vehicle traffic greatly reduced.

The proposed construction of a road along the site's western boundary will improve pedestrian access to the site, by allowing pedestrian and cycle access from Marshall Road and Verney Road. Higham Way is also expected to be upgraded for pedestrian and cycle use.

As well as adopting the principles from 'Home Zones', a segregated north-south green link will encourage further pedestrian and cycle movements to and from the site. Further pedestrian and cycle links to the east are also proposed.

4.3 Parking

A total of 228 car parking spaces will be provided, which is a ratio of one space per unit. Spaces will be located within parking courtyards and partially within an undercroft arrangement at the ground floor of the proposed blocks. This significantly reduces the amount of visible hard standing across the site, creating a pleasant amenity space that is not dominated by vehicular parking.

Cycle parking for both residents and visitors will be provided in accordance with the Oxfordshire County Council Cycling Strategy (2001), seeking one cycle parking space per one bedroom unit, and two cycle parking spaces for units with two bedrooms or more. Additional cycle parking will be provided for visitors to meet one stand per two units.

4.4 Servicing and Deliveries

Servicing vehicle and refuse vehicle access is proposed from Higham Way via the proposed vehicle access. A large refuse vehicle is expected to be the largest to access the site and swept path analysis of this vehicle has therefore been undertaken to demonstrate that it will be able to route through the development and turn around in order to exit.

Cherwell District Council currently provides a weekly waste collection alternating between waste only and recycling only. It is expected that the proposed development will be incorporated into the existing service.

5. Trip Generation

5.1 Introduction

This chapter provides details of the estimated trip generation associated with the proposed development. It also considered the likely mode share and servicing/delivery trip generation of this residential scheme.

5.2 Proposed Trip Generation

The TRICS database has been interrogated in order to identify likely all-person trip rate for the scheme (using surveys of comparable sites). In order to identify comparable sites, only sites which meet the following criteria have been selected.

- Sites located within England
- Sites in town centre or edge of town centre locations
- Sites with more than 50 residential units
- Surveys undertaken on weekdays
- Surveys undertaken since 2007
- Sites located within 1km of a railway station

Table 5.1 summarises details of the site selection that is produced by this search.

Table 5.1 – TRICS site selection

Survey ref	Town/city	Location	No. of units	Date of survey
EX-03-C-02	Southend-on-Sea	Edge of Town Centre	94	22/10/2013
GM-03-C-02	Manchester	Town Centre	154	13/10/2011
SC-03-C-01	Camberley	Edge of Town Centre	140	21/07/2008
WM-03-C-03	Solihull	Edge of Town Centre	60	21/19/2007

Table 5.2 summarises the all-person trip rates from this site selection and the resultant trip generation based on a total of 228 residential units at the proposed site.

Table 5.2 – All-Person trip rates and generation (based on 228 units)

	Trip Rates				Trip Generation			
	AM Peak (8-9)		PM Peak (5-6)		AM Peak (8-9)		PM Peak (5-6)	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
All-Person	0.078	0.451	0.455	0.181	18	103	104	41

Table 5.2 above shows that the proposed development is likely to generate 121 person trips during the AM peak and 145 person trips during the PM peak.

5.3 Mode Split

Census 2011 data has been used to establish the baseline mode share for resident's method of travel to work. Data has been extracted for the Output Area closest to the site (E00169011) and is summarised below in Table 5.3. This modal split has been applied to the all-person trip generation to identify the trip generation by mode which is also displayed in Table 5.3.

Table 5.3 – All-Person trip rates and generation (based on 228 units)

Mode of Travel	Mode Share (%)	Trip Generation			
		AM Peak (8-9)		PM Peak (5-6)	
		IN	OUT	IN	OUT
Train	12.7%	2	13	13	5
Bus	2.3%	0	2	2	1
Taxi	1.2%	0	1	1	0
Motorcycle	0.6%	0	1	1	0
Driving a car	51.4%	9	53	53	21
Passenger in a car	1.7%	0	2	2	1
Bicycle	3.5%	1	4	4	1
Walking	26.6%	5	27	28	11

Table 5.3 above shows that the proposed development is likely to generate 62 two-way car driver trips during the AM peak and 74 two-way car driver trips during the PM peak.

5.4 Committed Developments

As agreed with CDC and OCC the committed developments included within the Transport Assessment for the Castle Quay site (App. Ref. 13/01601/OUT) have been considered within this assessment. The sites are listed below and the only exclusion is the Banbury Station Multi Storey Car Park which was completed and fully operation by the time the recent traffic surveys were undertaken.

Traffic flows for all the below sites have been extracted from the TA for the Castle Quay site.

- 05/01337/OUT Bankside / College Fields
- 10/01575/OUT Southam Road. SAPA Site
- 11/01868/F Relocated Prodrive Factory to Hella Site

- 11/01870/F Banbury Gateway Retail Park
- 11/01878/OUT Central M40 Site
- 12/00080/OUT Bloxham Road
- 12/01789/OUT Warwick Road North. Hanwell Fields
- 13/00158/OUT West of Southam Road and
- 13/00159/OUT East of Southam Road. Hardwick Farm
- 13/00656/OUT West of Warwick Road
- 13/00444/OUT Bretch Hill

5.5 Servicing and Delivery Trip Generation

The four sites identified from the TRICS database and displayed in Table 5.1 were again referenced to identify the likely trip generation of delivery and servicing vehicles. Table 5.4 below summarises the OGV trip rates from this site selection and the resultant trip generation based on a total of 228 residential units at the proposed site.

Table 5.4 - Servicing and delivery trip generation based on 228 units (OGVs)

Time Period	Trip Rate		Trip Generation	
	IN	OUT	IN	OUT
07:00-08:00	0	0	0	0
08:00-09:00	0	0	0	0
09:00-10:00	0	0	0	0
10:00-11:00	0	0	0	0
11:00-12:00	0.002	0	0.456	0
12:00-13:00	0	0.002	0	0.456
13:00-14:00	0	0	0	0
14:00-15:00	0	0	0	0
15:00-16:00	0	0	0	0
16:00-17:00	0.002	0.002	0.456	0.456
17:00-18:00	0	0	0	0
18:00-19:00	0	0	0	0
Total	0.004	0.004	0.912	0.912

It is clear that servicing for the proposed development will have a minimal impact on the local highway network, with no more than two additional trips generated per day.

6. Impact of Development

6.1 Assessment Scenarios

As agreed with OCC during pre-application discussions, the following scenarios have been assessed within this TA:

- Existing (from 2015 traffic surveys)
- Baseline (Existing + Committed Development)
- Total Future (Baseline + Proposed Development)

The addition of committed development traffic flows was discussed with OCC and as stated in the previous chapter, it was agreed that traffic flows from the committed development sites identified within the Castle Quay TA should be used. These flows have been added to the existing surveyed flows to establish the 'Baseline' scenario and flow diagrams for the local road network are provided in Appendix A. It should be noted that flows for the Banbury Station Multi Storey Car Park have been removed from the total committed developments given in the Castle Quay TA as this development was completed prior to the undertaking of traffic surveys in July 2015.

The development related vehicle traffic detailed in Table 5.3 has been distributed through the local road network according to existing turning proportions identified from the 2015 traffic surveys. These flow are then added to the Baseline flows to create the 'Total Future' scenario. Flow diagrams are again provided at Appendix A of this report.

6.2 Junction Impact

It has been agreed with OCC that a model of the priority junction at Higham Way/ Merton Street should be prepared alongside proportional traffic impact analysis of local key junctions.

The Higham Way / Merton Street is a give-way junction, and therefore it has been assessed using industry standard 'Junctions 9' software. Table 6.1 summarises the key results of the modelling undertaken for this junction and a full output is included at Appendix D.

Table 6.1 – Summary of Junction 9 modelling results – Higham Way/Merton Street

Time Period	AM Peak (8-9)		PM Peak (5-6)	
	Queue (PCUs)	RFC	Queue (PCUs)	RFC
Higham Way (left/right)	0.3	0.24	0.3	0.23
Merton Street (right)	0.3	0.23	0.5	0.30

The results above clearly demonstrate that in the Total Future scenario, the junction will operate well within capacity and with minimal queuing.

6.3 Junction/Link Flow Impact

An assessment of the percentage increase in traffic on a number of links and junctions in the vicinity of the site has been undertaken to identify the impact of the development. Table 6.2 summarises this assessment.

Table 6.2 – Junction/link flow impact assessment

Junction/ Link	Existing Flow	Baseline Flow	%Impact	Total Future Flow	% Impact
AM Peak (8-9)					
Bridge St (west of Merton St)	1,065	1,195	12.2%	1,243	4.0%
Bridge St (east of McKeevor Pl)	768	849	10.5%	862	1.5%
Jct – Bridge St/ Merton St	1,156	1,286	11.2%	1,347	4.8%
Jct – Bridge St/ Concord Av/ Cherwell St	2,507	2,828	12.8%	2,875	1.6%
PM Peak (5-6)					
Bridge St (west of Merton St)	1,107	1,244	12.4%	1,300	4.6%
Bridge St (east of McKeevor Pl)	676	877	29.7%	888	1.3%
Jct – Bridge St/ Merton St	1,216	1,353	11.3%	1,423	5.2%
Jct – Bridge St/ Concord Av/ Cherwell St	2,702	3,039	12.5%	3,093	1.8%

The above assessment shows that increases in traffic flows on the surrounding highway network will be minimal as a result of the proposed development. Generally, increases in flow will be at or below 5% in both the AM and PM peaks.

7. Mitigation

7.1 Potential Transport Enhancements

It is expected in local policy that this development makes a contribution towards improvements to the Bridge Street / Cherwell Street signalised junction (as outlined in the Banbury Movement Study). However the impact that this development will have on this junction is minimal so any contribution must reflect that impact.

It is noted that changes to signal controls and staging at the Bridge Street/Concord Avenue, and Bridge Street/Merton Street junctions have been secured as part of the Banbury multi-storey car park proposals by Chiltern Railways.

7.2 Travel Plan

A site-specific travel plan will be produced for the residential development. In accordance with national and local policy the travel plan will set out a comprehensive package of measures and initiatives that will be introduced into the development to enable and encourage residents to travel to and from the site by modes other than by private car.

The measures in the travel plan will focus on the following themes for the development:

- Travel information and marketing;
- Walking;
- Cycling;
- Public transport; and
- Reducing the need to travel.

The travel plan will demonstrate that the development site has good accessibility by public transport, particularly by train being located very close to Banbury Station, and has good walking and cycling links.

8. Summary and Conclusions

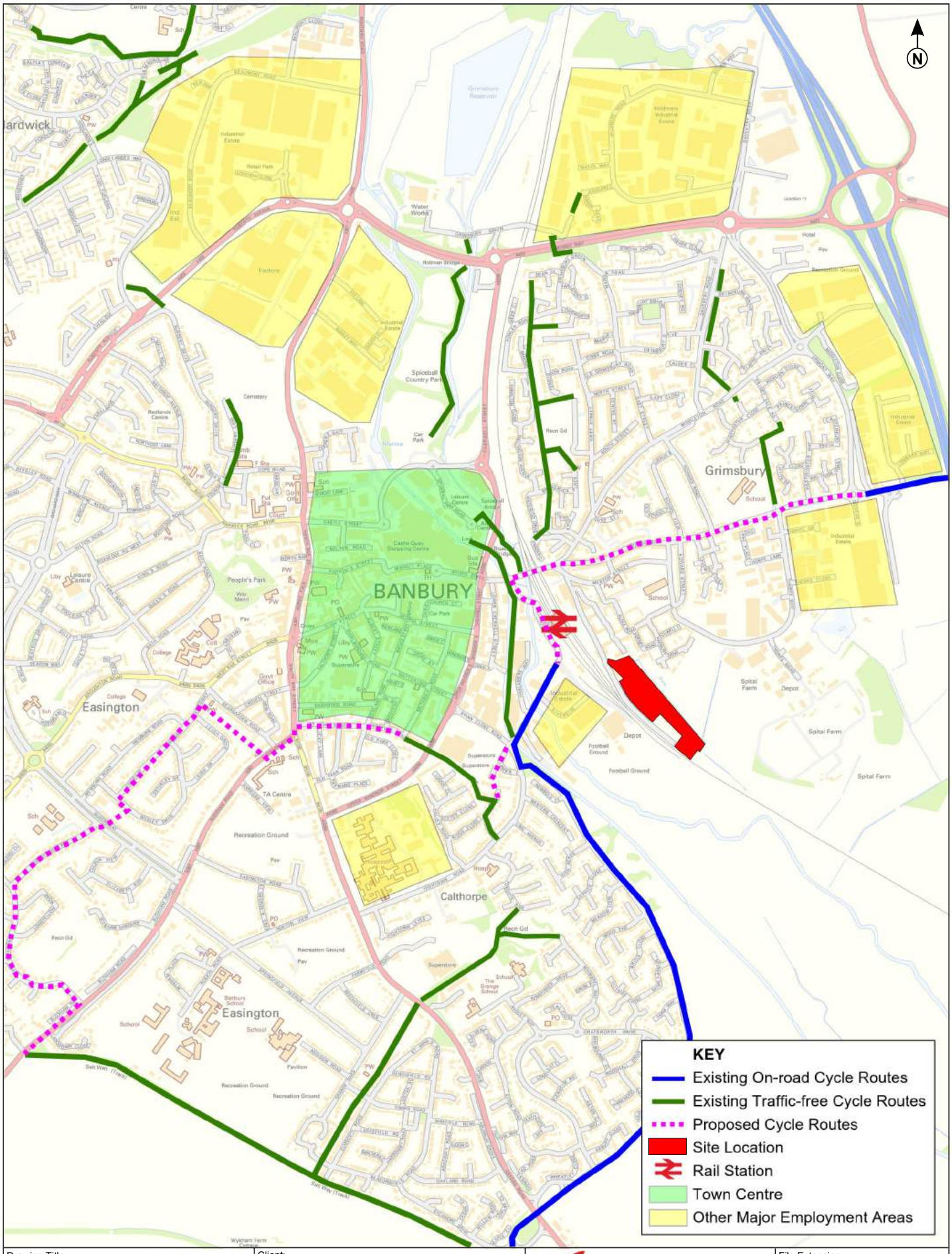
This Transport Assessment has been prepared by Grontmij on behalf of Grundon Waste Management Ltd and assesses the likely impact of the proposed development on the local highways and transportation networks. The proposal is for the redevelopment of the existing Grundon Waste Management Site on Higham Way to provide up to 228 residential units. This would be facilitated by the relocation of the existing waste management site to a purposed built facility at Thorpe Mead which has already received planned permission.

The development site is located close to Banbury Station at the southern end of Higham Way, benefiting from access to the rail services from station and the bus services accessible on Middleton Rd/Bridge Street to the north of the site.

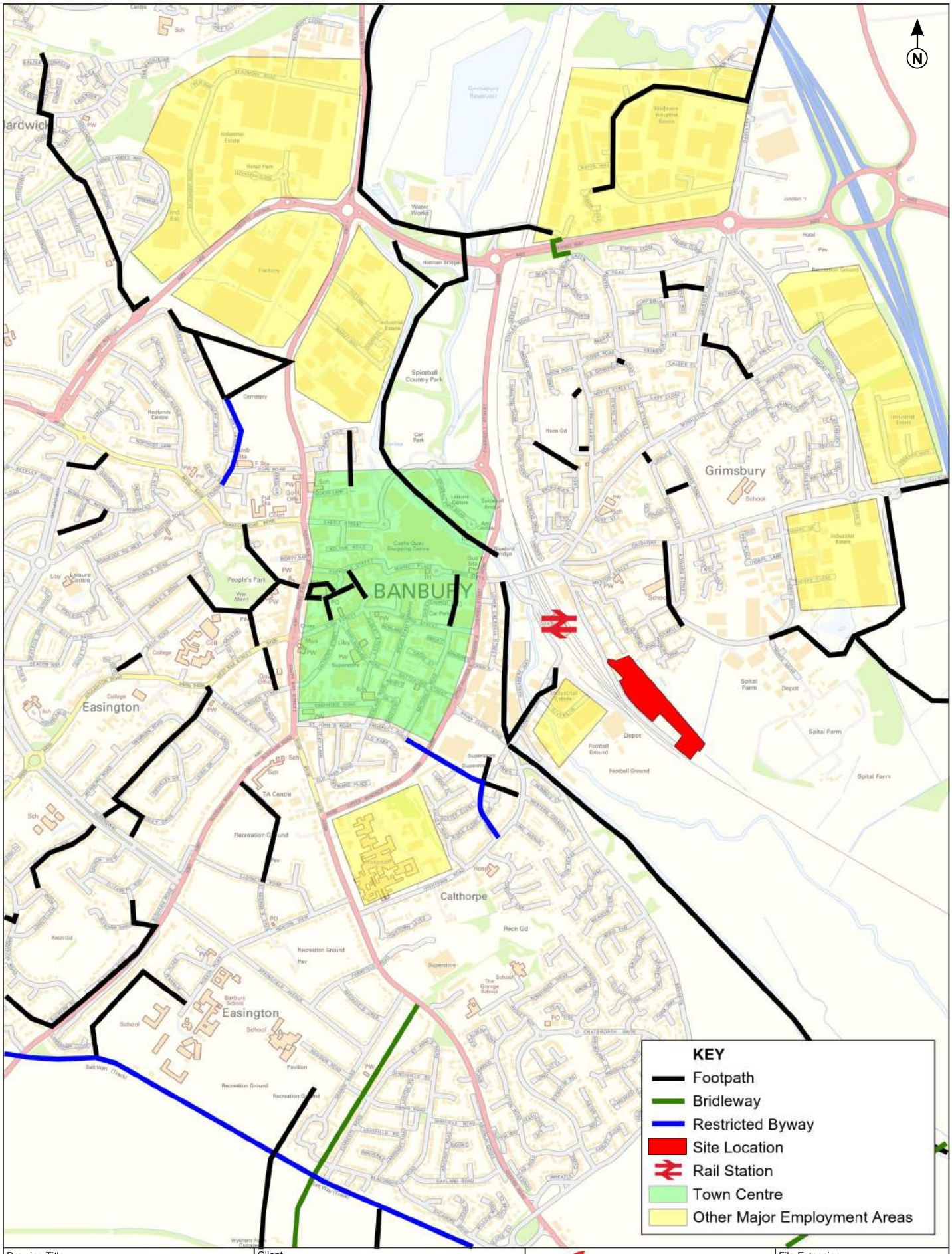
Up to a total of 228 parking spaces will be provided for the development at a ratio of one space per unit, in accordance with local policy. Cycle parking will also be provided in accordance with local standards.

An assessment of the operation of the Higham Way/Merton Street junction has been undertaken and shows that the junction will operate well within capacity even with the addition of all committed development traffic and traffic associated with the proposed development. The proportional traffic impact analysis at the nearest signal junctions has also been undertaken and this has demonstrated that the impact of the development will be minimal.

The development proposals complement local planning policy and will promote a layout that connects into existing transport networks as well as creating links with other adjacent transport networks. In particular the location in relation to Banbury Station make the site an ideal location for residential travel by non-car means.



Drawing Title: EXISTING & PROPOSED CYCLE ROUTES	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij			File Extension: F:\U2012\proj\116150 Grundon Waste Depot_\Project\Design \Drawings\Inkscape
	Job Title: GRUNDON WASTE MANAGEMENT DEPOT	Designed by: AT	Scale: N.T.S.		
		Drawn by: AT	1st Issued: OCT '15		Drg No: FIGURE 3.4
		Ckd/Appd by: MF	Job No: 116150		

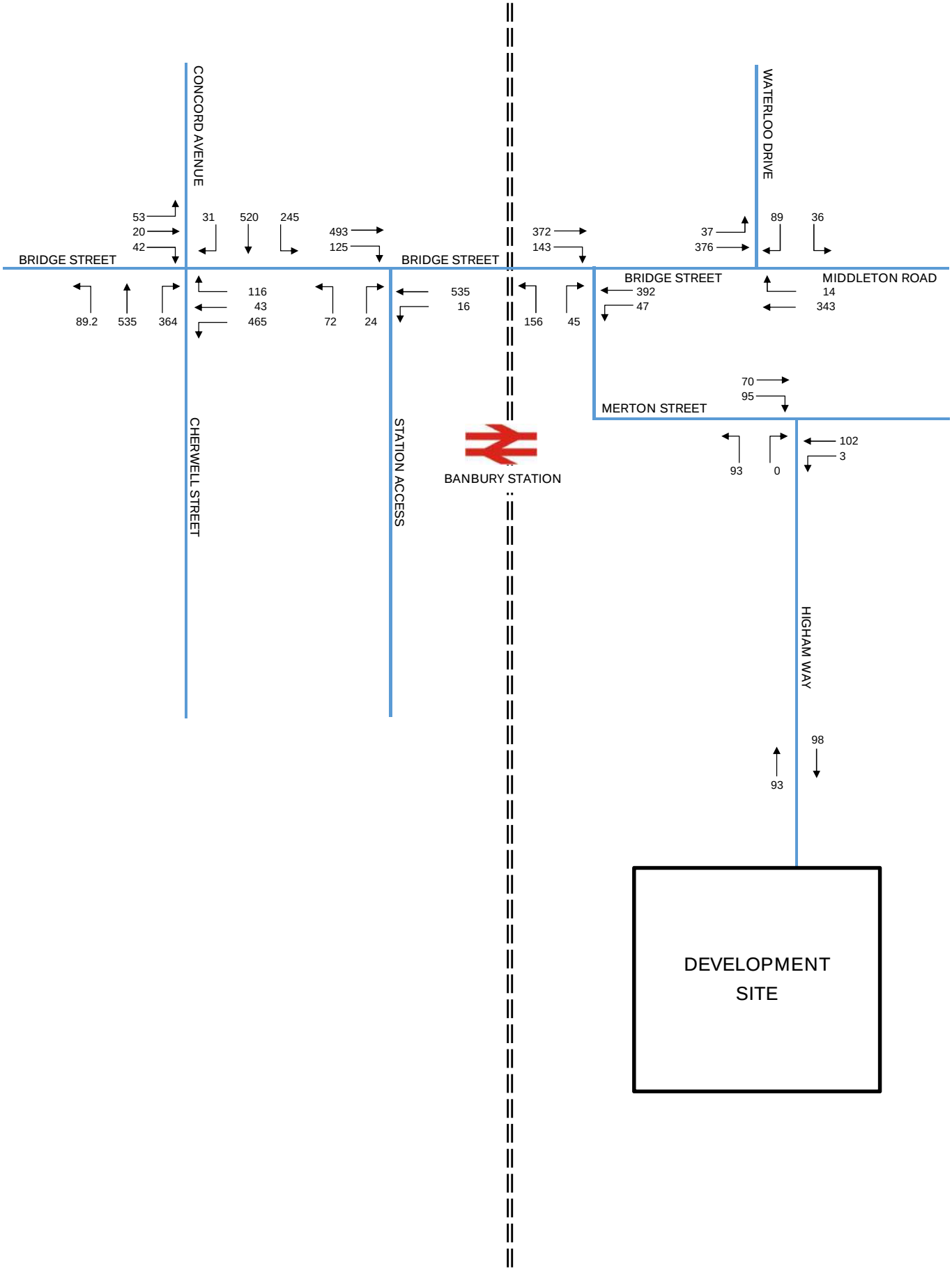


Drawing Title: EXISTING PUBLIC RIGHTS OF WAY	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij			File Extension: F:\U2012\proj\116150 Grundon Waste Depot_\Project\Design \Drawings\Inkscape
	Job Title: GRUNDON WASTE MANAGEMENT DEPOT	Designed by	AT	Scale	N.T.S.
		Drawn by	AT	1st Issued	OCT '15
		Ckd/Appd by	MF	Job No	116150
					Drg No: FIGURE 3.5

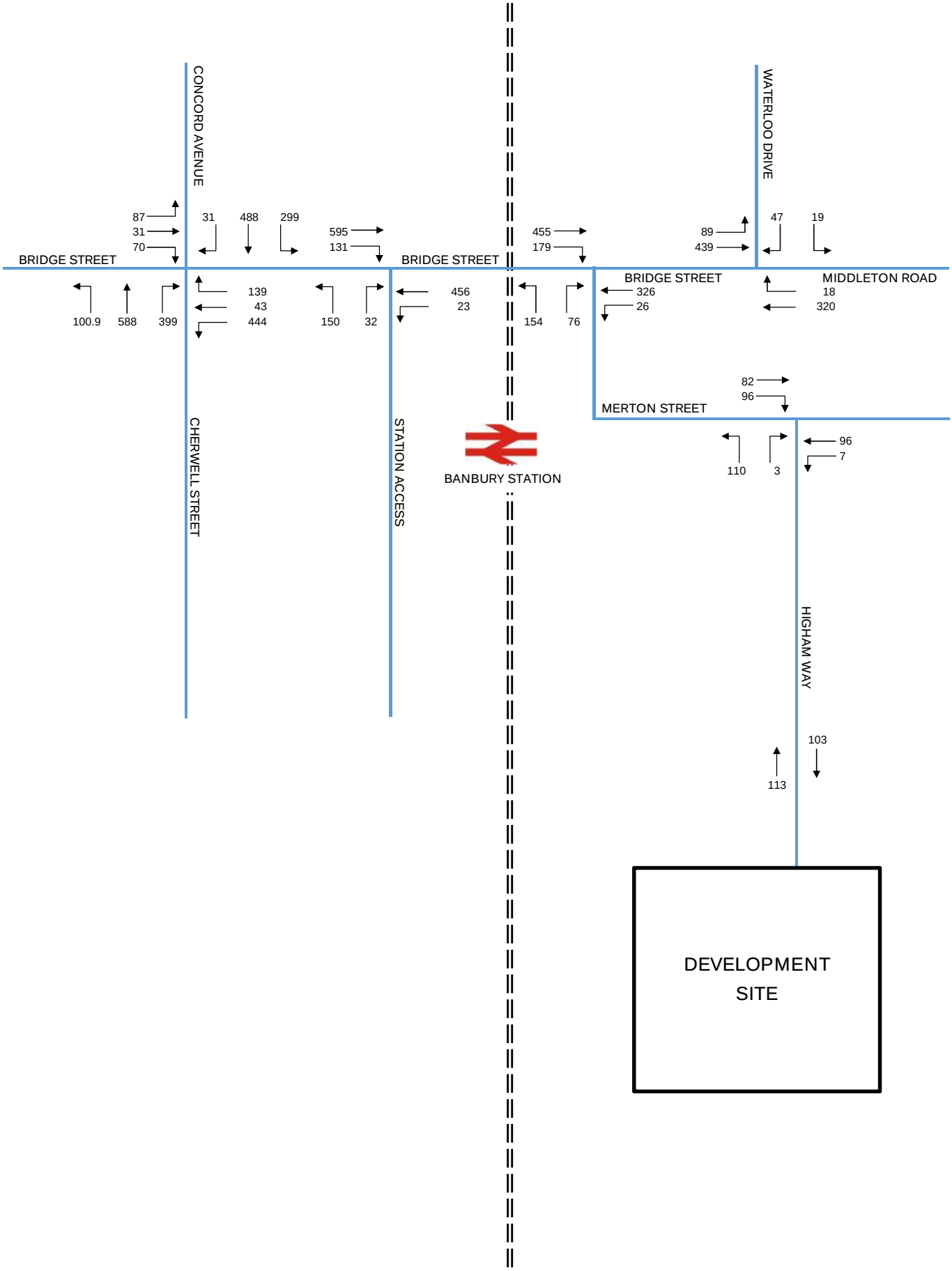
Appendices

Appendix A - Traffic Flows

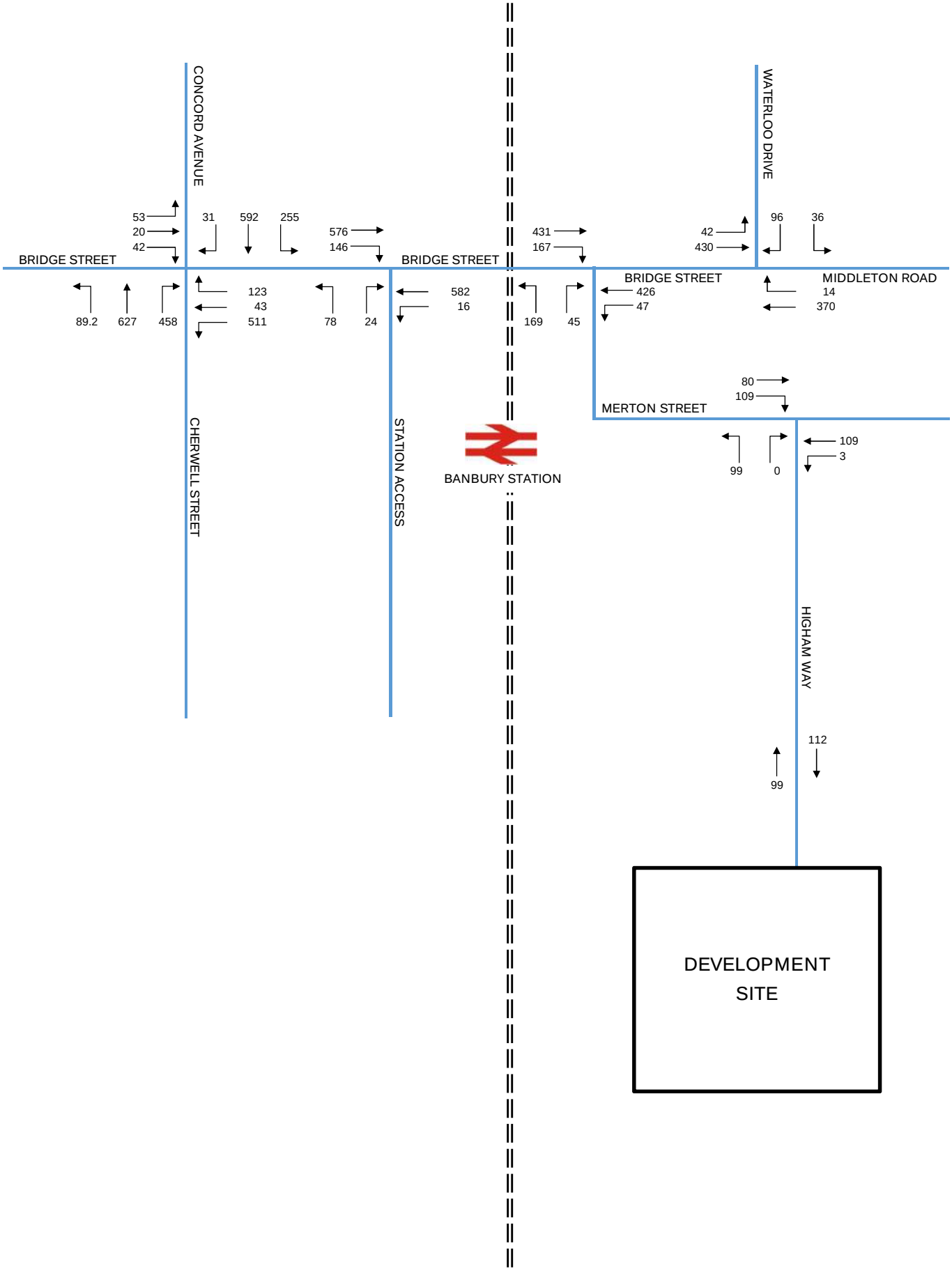
116150/CW/151104 Issue 1



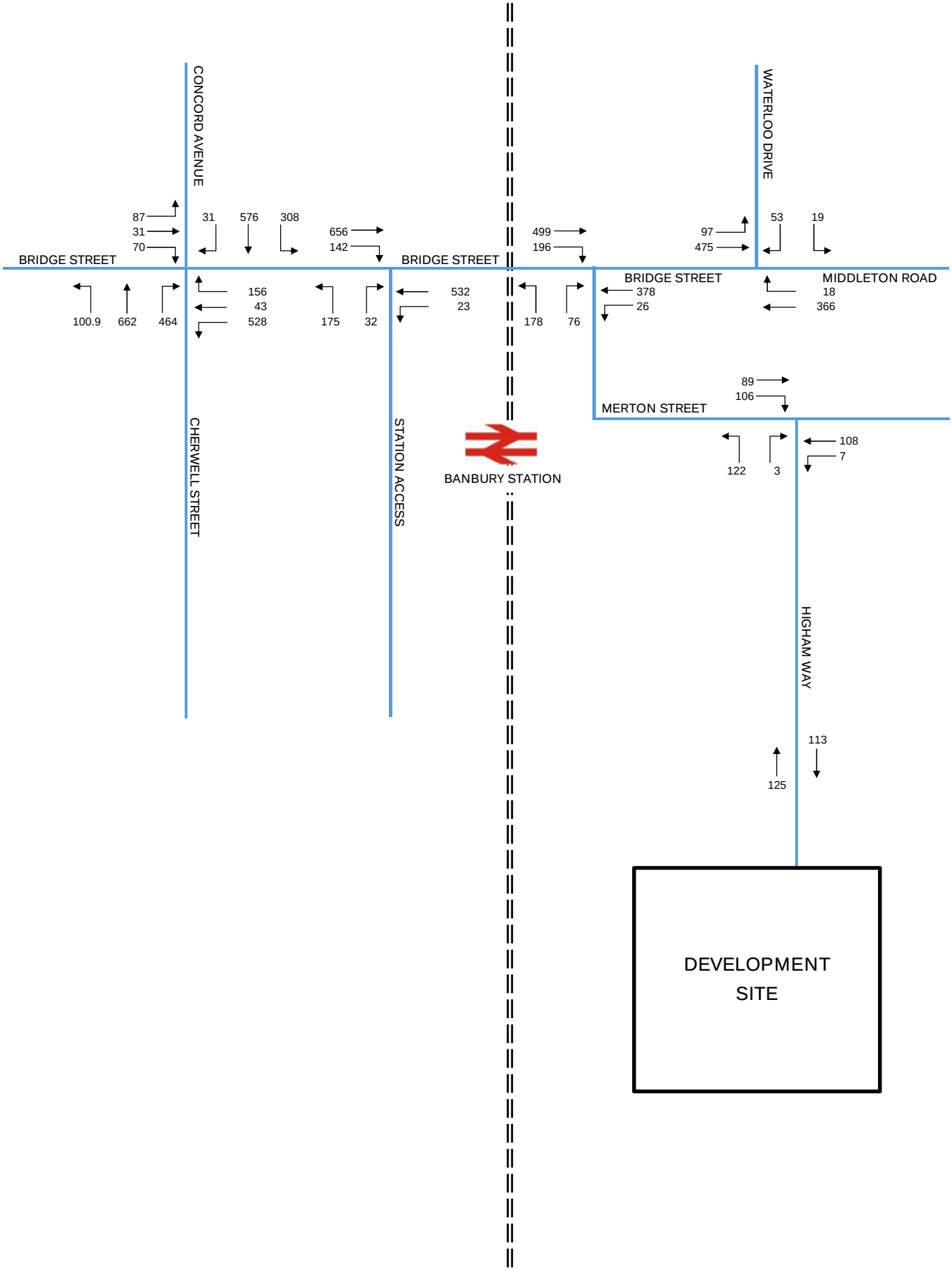
Drawing Title: EXISTING (2015) TRAFFIC FLOWS (PCUs) - AM PEAK (0800-0900)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-01
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	



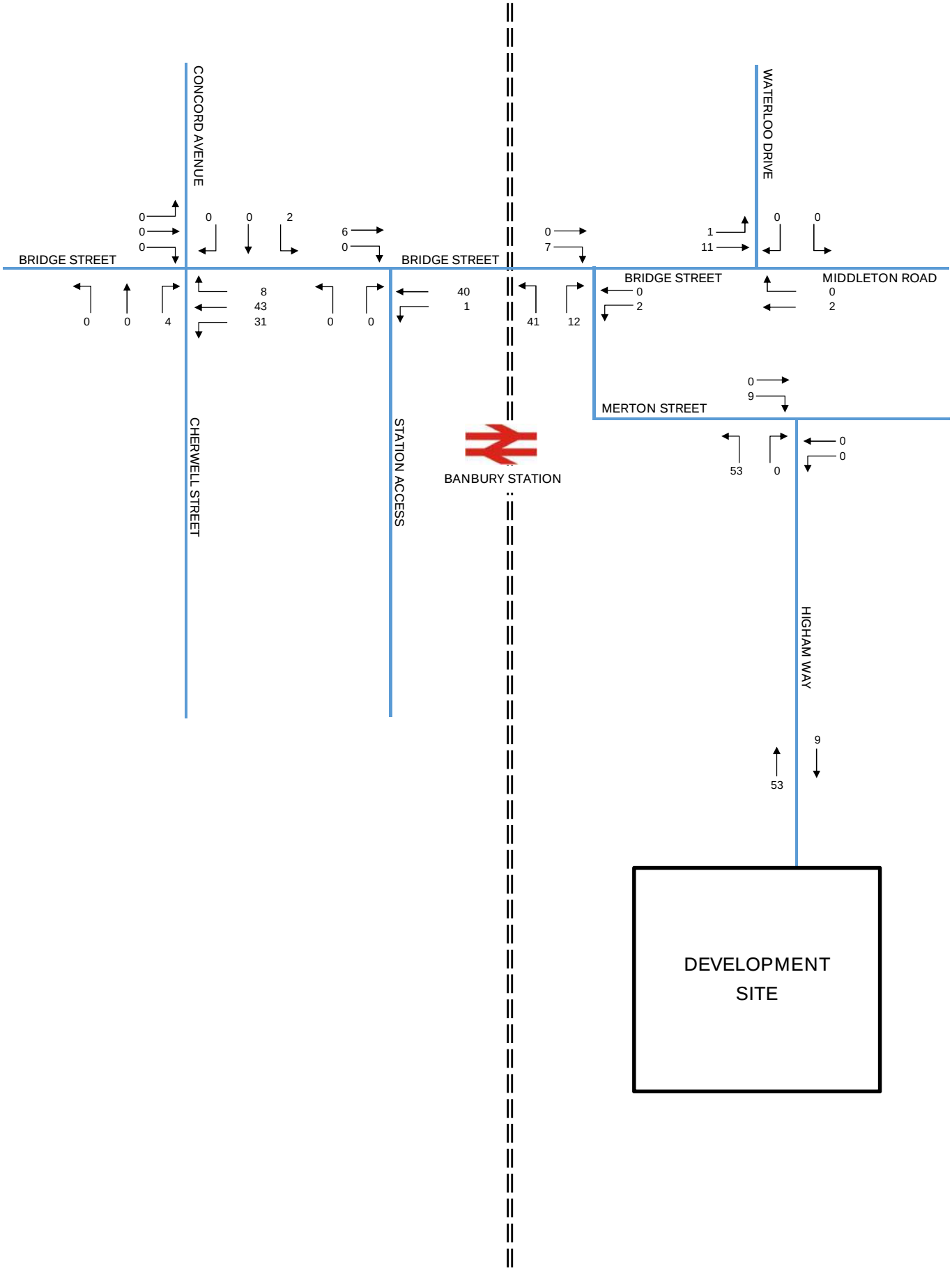
Drawing Title: EXISTING (2015) TRAFFIC FLOWS (PCUs) - PM PEAK (1700-1800)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-02
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	



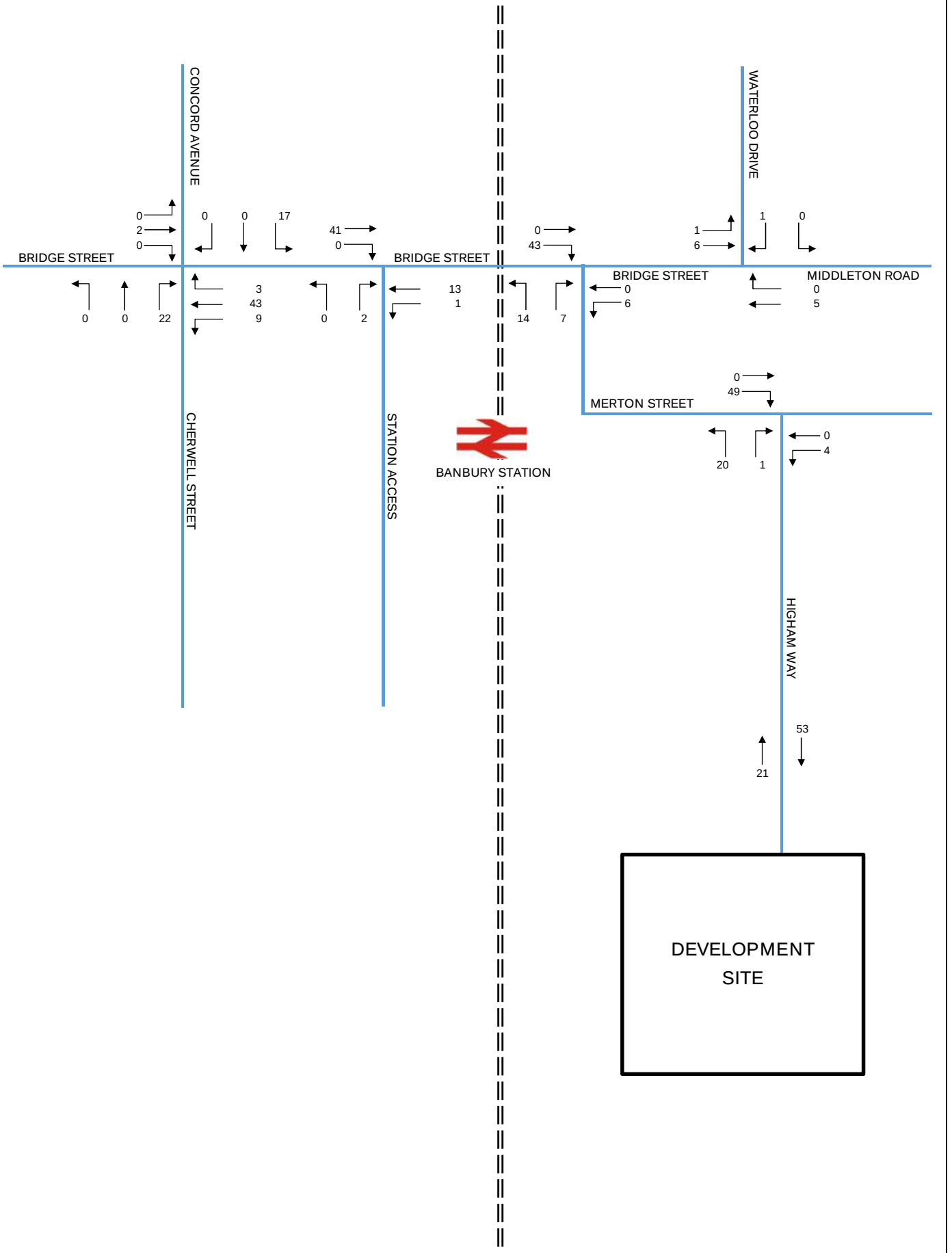
Drawing Title: BASELINE (EXISTING + COMMITTED) TRAFFIC FLOWS (PCUs) - AM PEAK (0800-0900)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-03
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	



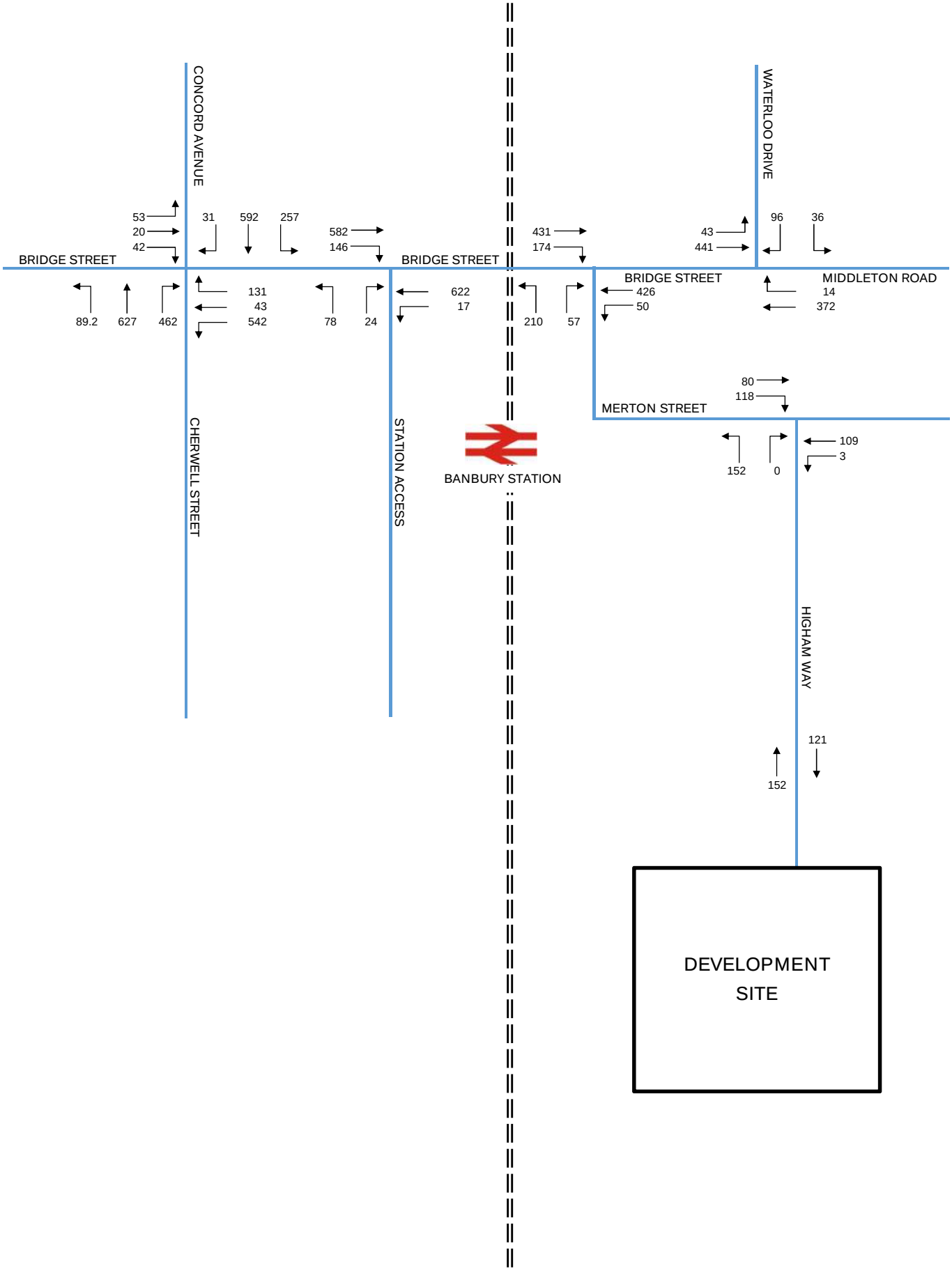
Drawing Title: BASELINE (EXISTING + COMMITTED) TRAFFIC FLOWS (PCUs) - PM PEAK (1700-1800)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-04
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	



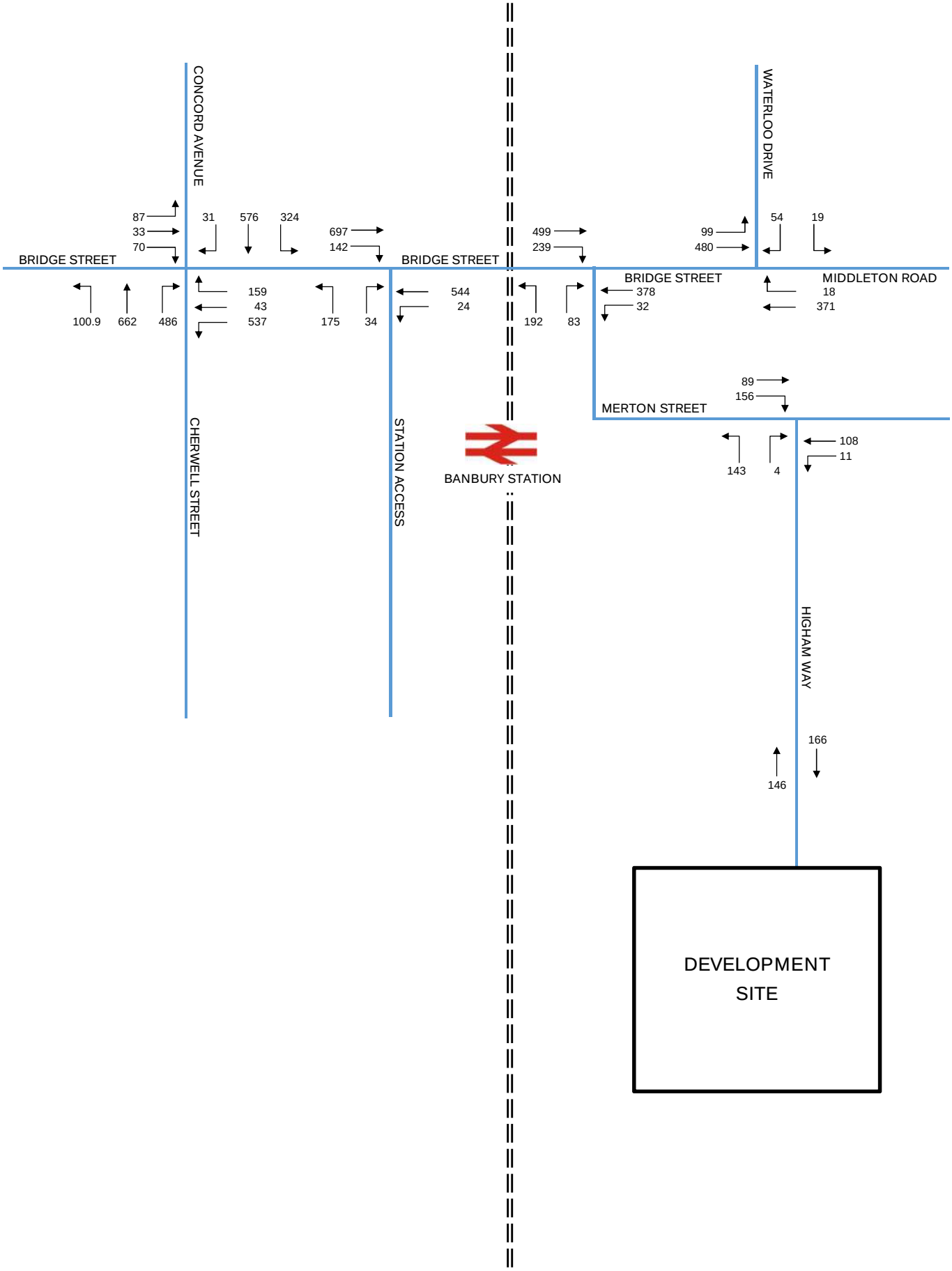
Drawing Title: DEVELOPMENT TRAFFIC FLOWS (CARS) - AM PEAK (0800-0900)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-05
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	



Drawing Title: DEVELOPMENT TRAFFIC FLOWS (CARS) - PM PEAK (1700-1800)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-06
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	



Drawing Title: TOTAL FUTURE (BASELINE + PROPOSED DEVELOPMENT) TRAFFIC FLOWS (PCUs) - AM PEAK (0800-0900)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-07
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	



Drawing Title: TOTAL FUTURE (BASELINE + PROPOSED DEVELOPMENT) TRAFFIC FLOWS (PCUs) - PM PEAK (1700-1800)	Client: GRUNDON WASTE MANAGEMENT LTD	Grontmij		File Extension: 151009_116150_Traffic Flows.xls
	Job Title: GRUNDON WASTE DEPOT	Designed by: SC	Scale: N.T.S.	Figure No. App A-08
		Drawn by: SC	1st Issued: Oct '15	
		Ckd/appd: CW	Job number: 116150	

Appendices

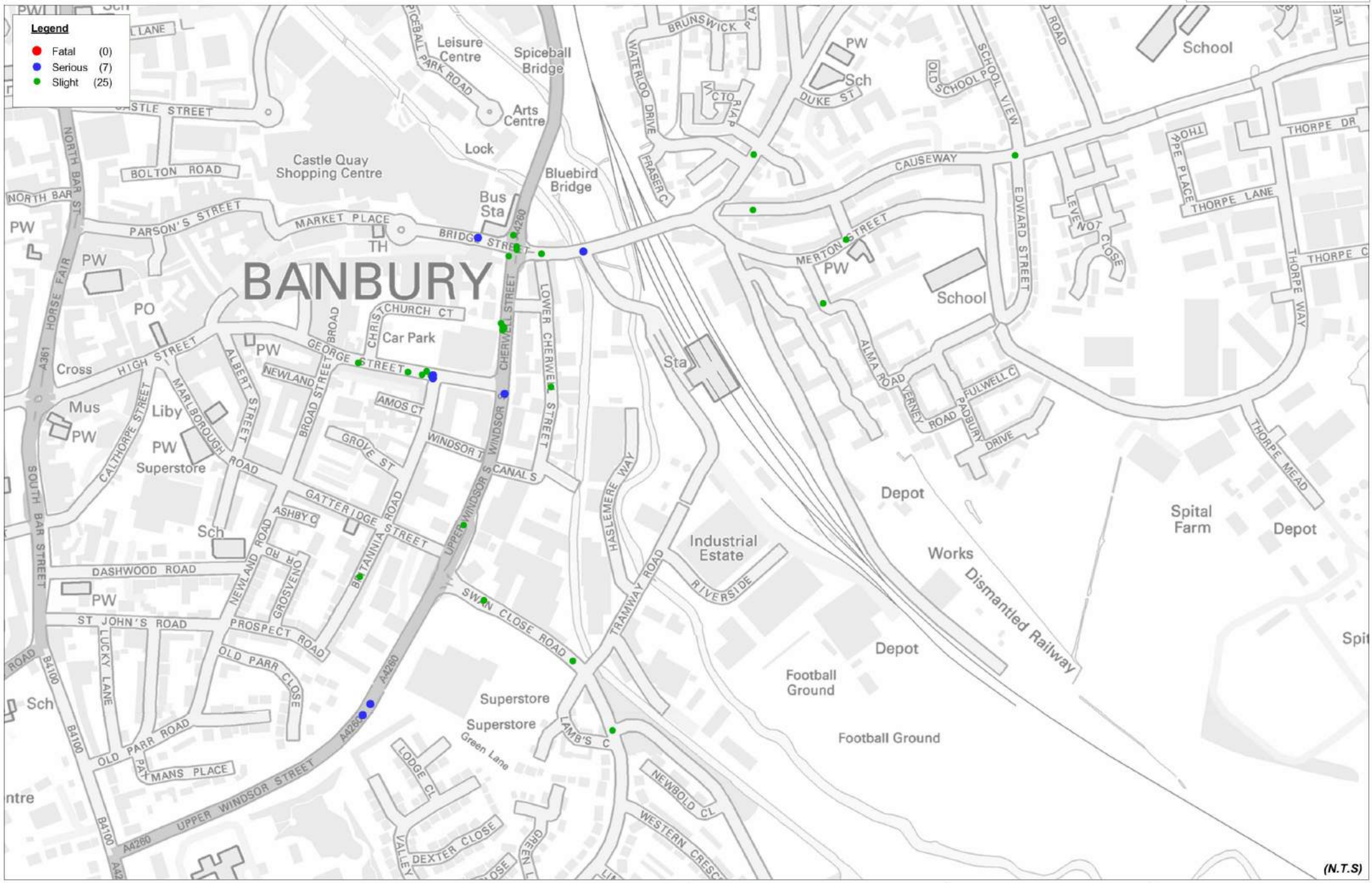
Appendix B - OCC Collision Plot

116150/CW/151104 Issue 1

ACCIDENT REQUEST - BANBURY TOWN CENTRE AREA

OXFORDSHIRE COUNTY COUNCIL - HIGHWAYS & TRANSPORT

Accidents between following dates:
01/07/2012 and 30/06/2015



OXFORDSHIRE COUNTY COUNCIL

Date drawn: 31/07/2015
Drawn by: CJM

Map centre:
easting. 446160, northing. 240350

Appendices

Appendix C - Indicative Movement Parameter Plan

116150/CW/151104 Issue 1

jsa
jsa architects
tavistock house waltham road
woodlands park maidenhead
berkshire sl6 3nh
tel 01628 828241-4
fax 01628 828120
mail@jsaarchitects.com
www.jsaarchitects.com

KingsOak Housing Development

Marshall Road

Barteak Housing Development

Site Access

Chiltern Rail

National Grid (Transco)

Building Areas
Primary Route
Secondary Route
Pedestrian Route
Focal Point
Primary Pedestrian Access
Primary Vehicular Access

0 10 20 40 60m
1:1000

PRELIMINARY for discussion purposes only

K:\Projects\Residential Developers\Grundon\GMSB - Grundon Depot, Market Street, Banbury\2-0 FEASIBILITY\01-scheme\Drawings\PK-103- Proposed Outline Plan.dwg

Subject to:
Planning and Highways
Any easements, covenants and contractual agreements restricting, limiting or preventing potential development of the site to be brought to the immediate attention of jsa architects.

- Grundon
  Grundon Depot, Higham Way, Banbury
- Proposed Site Diagram
  Indicative Movement Parameter Plan

Project	GMSB
Dwg No/rev.	PL-110
Scale	1:1000@A2
Date	2015
Checked by	

Appendices

Appendix D - Junction Modelling Outputs

116150/CW/151104 Issue 1

Junctions 9

PICADY 9 - Priority Intersection Module

Filename: Higham Way JW Merton Road.j9
Path: F:\U2012\proj\116150 Grundon Waste Depot_\Project\Design\Technical\Modelling\PICADY
Report generation date: 09/10/2015 14:01:29

»2015, AM
»2015, PM

Summary of junction performance

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)
	2015									
Stream B-AC	0.3	6.69	0.24	A	4.26	0.3	6.74	0.23	A	4.67
Stream C-AB	0.3	7.88	0.23	A		0.5	8.61	0.30	A	
Stream C-A										
Stream A-B										
Stream A-C										

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages.

File summary

File Description

Title	Higham Way JW Merton Road
Location	Higham Way JW Merton Road, Banbury
Site number	A
Date	28/07/2015
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	116150
Enumerator	GRONTMIJ"p503161
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

Scenario name	Time Period name	Description	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
2015	AM	AM Peak Period	ONE HOUR	07:45	09:15	15
2015	PM	PM Peak Period	ONE HOUR	16:45	18:15	15

2015, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - Higham Way JW Merton Road	Higham Way JW Merton Road	T-Junction	Two-way	4.26	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Merton Street East		Major
B	Higham Way		Minor
C	Merton Street West		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C - Merton Street West	7.65			41.0	✓	1.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B - Higham Way	One lane	4.58	42	21

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	580.818	0.098	0.248	0.156	0.355
1	B-C	737.946	0.105	0.265	-	-
1	C-B	597.707	0.215	0.215	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Description	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D1	2015	AM	AM Peak Period	ONE HOUR	07:45	09:15	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Merton Street East		✓	112.00	100.000
B - Higham Way		✓	152.00	100.000
C - Merton Street West		✓	198.00	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
From		A - Merton Street East	B - Higham Way	C - Merton Street West
	A - Merton Street East	0.000	3.000	109.000
	B - Higham Way	0.000	0.000	152.000
	C - Merton Street West	80.000	118.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
		A - Merton Street East	B - Higham Way	C - Merton Street West
From	A - Merton Street East	0	0	0
	B - Higham Way	0	0	0
	C - Merton Street West	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.24	6.69	0.3	A
C-AB	0.23	7.88	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

Main results: (07:45-08:00)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	114.43	715.93	0.160	113.68	0.2	5.970	A
C-AB	90.25	588.81	0.153	89.52	0.2	7.200	A
C-A	58.81			58.81			
A-B	2.26			2.26			
A-C	82.06			82.06			

Main results: (08:00-08:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	136.64	711.66	0.192	136.46	0.2	6.257	A
C-AB	108.52	589.31	0.184	108.33	0.2	7.483	A
C-A	69.48			69.48			
A-B	2.70			2.70			
A-C	97.99			97.99			

Main results: (08:15-08:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	167.36	705.75	0.237	167.07	0.3	6.680	A
C-AB	134.48	591.23	0.227	134.19	0.3	7.873	A
C-A	83.52			83.52			
A-B	3.30			3.30			
A-C	120.01			120.01			

Main results: (08:30-08:45)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	167.36	705.75	0.237	167.35	0.3	6.685	A
C-AB	134.48	591.23	0.227	134.47	0.3	7.882	A
C-A	83.52			83.52			
A-B	3.30			3.30			
A-C	120.01			120.01			

Main results: (08:45-09:00)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	136.64	711.66	0.192	136.92	0.2	6.268	A
C-AB	108.52	589.31	0.184	108.80	0.2	7.496	A
C-A	69.48			69.48			
A-B	2.70			2.70			
A-C	97.99			97.99			

Main results: (09:00-09:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	114.43	715.93	0.160	114.63	0.2	5.988	A
C-AB	90.25	588.81	0.153	90.44	0.2	7.228	A
C-A	58.81			58.81			
A-B	2.26			2.26			
A-C	82.06			82.06			

2015, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1 - Higham Way JW Merton Road	Higham Way JW Merton Road	T-Junction	Two-way	4.67	A

Junction Network Options

[same as above]

Arms

Arms

[same as above]

Major Arm Geometry

[same as above]

Minor Arm Geometry

[same as above]

Slope / Intercept / Capacity

[same as above]

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Description	Traffic profile type	Model start time (HH:mm)	Model finish time (HH:mm)	Time segment length (min)
D2	2015	PM	PM Peak Period	ONE HOUR	16:45	18:15	15

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Merton Street East		✓	119.00	100.000
B - Higham Way		✓	147.00	100.000
C - Merton Street West		✓	245.00	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
From		A - Merton Street East	B - Higham Way	C - Merton Street West
	A - Merton Street East	0.000	11.000	108.000
	B - Higham Way	4.000	0.000	143.000
	C - Merton Street West	89.000	156.000	0.000

Vehicle Mix

Heavy Vehicle proportion

		To		
From		A - Merton Street East	B - Higham Way	C - Merton Street West
	A - Merton Street East	0	0	0
	B - Higham Way	0	0	0
	C - Merton Street West	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.23	6.74	0.3	A
C-AB	0.30	8.61	0.5	A
C-A				
A-B				
A-C				

Main Results for each time segment

Main results: (16:45-17:00)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110.67	707.62	0.156	109.93	0.2	6.015	A
C-AB	120.21	592.05	0.203	119.18	0.3	7.598	A
C-A	64.24			64.24			
A-B	8.28			8.28			
A-C	81.31			81.31			

Main results: (17:00-17:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	132.15	702.69	0.188	131.97	0.2	6.306	A
C-AB	145.01	594.23	0.244	144.72	0.3	8.005	A
C-A	75.24			75.24			
A-B	9.89			9.89			
A-C	97.09			97.09			

Main results: (17:15-17:30)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	161.85	695.85	0.233	161.57	0.3	6.735	A
C-AB	180.67	599.09	0.302	180.20	0.4	8.588	A
C-A	89.08			89.08			
A-B	12.11			12.11			
A-C	118.91			118.91			

Main results: (17:30-17:45)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	161.85	695.84	0.233	161.84	0.3	6.740	A
C-AB	180.67	599.09	0.302	180.66	0.5	8.607	A
C-A	89.08			89.08			
A-B	12.11			12.11			
A-C	118.91			118.91			

Main results: (17:45-18:00)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	132.15	702.67	0.188	132.42	0.2	6.317	A
C-AB	145.01	594.23	0.244	145.46	0.3	8.032	A
C-A	75.24			75.24			
A-B	9.89			9.89			
A-C	97.09			97.09			

Main results: (18:00-18:15)

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	110.67	707.59	0.156	110.86	0.2	6.034	A
C-AB	120.21	592.05	0.203	120.50	0.3	7.642	A
C-A	64.24			64.24			
A-B	8.28			8.28			
A-C	81.31			81.31			