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Wokingham STDEP

**Potential Development Sites Transport
Review – Grazeley**

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I Introduction

I.1 Overview

- 1.1.1 This report sets out a sustainable transport strategy for a potential development site within Wokingham Borough close to the village of Grazeley.
- 1.1.2 The report has been funded through the Sustainable Transport Delivery Excellence Programme through the DfT. The fund is aimed at Local Economic Partnerships (LEPs) and provides guidance on the delivery of sustainable transport schemes within their areas.
- 1.1.3 Thames Valley Berkshire LEP have requested assistance from the STDEP fund to provide guidance and strategy for the delivery of two significant development sites within the borough of Wokingham.
- 1.1.4 Sustrans has commissioned Phil Jones Associates to deliver this support through the production of a transport review and high level strategy for the two identified potential development sites.

I.2 Wokingham

- 1.2.1 The Grazeley site lies in the borough of Wokingham, to the south west of London. Wokingham is one of six Berkshire Unitary authorities.
- 1.2.2 The borough borders Reading. The site around Grazeley will, if allocated through the Local Plan process, form a significant urban extension to the south of Reading. The site will be heavily reliant for employment on the town of Reading and its various large employment centres, as well as the wider Wokingham borough.

I.3 Objectives of Commission

- 1.3.1 This STDEP commission has been undertaken with the following objectives:
- Consider existing transport baseline including journey to work travel patterns across Wokingham Borough, focused upon travel to and from Reading;
 - Consider sustainable transport options for the potential site;
 - Review proposed transport improvements in Wokingham and Reading area;
 - High level trip generation and analysis of future travel patterns;
 - Analysis of potential mode share achievable with high quality sustainable transport options for the Grazeley site;
 - Outline Transport Strategy for the Grazeley site.



2 Policy Background

2.1 Introduction

- 2.1.1 This chapter provides a summary of the relevant policy in relation to development in Wokingham Borough, as well as an overview of the STDEP project and work to date.

2.2 Sustainable Transport Delivery Excellence Programme (STDEP)

- 2.2.1 The STDEP initiative, being led by Sustrans, is focused upon providing support and advice to LEPs on the design and delivery of transport solutions that enable increased levels of active and sustainable travel.
- 2.2.2 Thames Valley LEP have already commissioned a review considering housing density and sustainable transport as part of the first stage of STDEP. This resulted in the report 'Being Dense: it's the clever option'. This advocated the application of high density development in areas where high quality sustainable transport infrastructure is provided. The ideas within this earlier report have been considered as part of this study.

2.3 Wokingham Borough Core Strategy Development Plan Document

- 2.3.1 The Wokingham Core Strategy was adopted in January 2010 and sets out the vision for how the borough will develop up to 2026. It was developed with extensive consultation with the public and reflects the key message received from these consultations: to concentrate development in a few locations in order to preserve the character of existing areas and create high quality infrastructure rich communities.

- 2.3.2 Paragraph 2.43 specifically mentions transport and accessibility of local facilities:

'For communities to be sustainable there must be easy access to a range of facilities such as GP surgeries, shops, leisure facilities, and community and faith venues. Improved bus and train transport as well as specialist transport for those with significant disabilities, will also be required to reduce isolation and increase involvement in the community. As well as providing improved healthcare to the borough's residents, the authority will work with the PCT to ensure that adequate accessible public or community transport is available to Wokingham and other hospitals.'

- 2.3.3 There is also a focus of sustainable development. Policy CP1 looks at the ways developments can be as sustainable as possible, including methods related to transport:

'Planning permission will be granted for development proposals that:

- 1) Maintain or enhance the high quality of the environment;*
- 2) Minimise the emission of pollutants into the wider environment;*



- 3) *Limit any adverse effects on water quality (including ground water);*
- 4) *Ensure the provision of adequate drainage;*
- 5) *Minimise the consumption and use of resources and provide for recycling;*
- 6) *Incorporate facilities for recycling of water and waste to help reduce per capita water consumption;*
- 7) *Avoid areas of best and most versatile agricultural land;*
- 8) *Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;*
- 9) *Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater);*
- 10) *Provide attractive, functional, accessible, safe, secure and adaptable schemes;*
- 11) *Demonstrate how they support opportunities for reducing the need to travel, particularly by private car in line with CP6; and*
- 12) *Contribute towards the goal of reaching zero-carbon developments⁴¹ as soon as possible by:*
 - a) *Including appropriate on-site renewable energy features; and*
 - b) *Minimising energy and water consumption by measures including the use of appropriate layout and orientation, building form, design and construction, and design to take account of microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form.'*

2.3.4 Policy CP6 relates to managing travel demand in new developments. It states that:

'Planning permission will be granted for schemes that:

- a) *Provide for sustainable forms of transport to allow choice;*
- b) *Are located where there are or will be at the time of development choices in the mode of transport available and which minimise the distance people need to travel;*
- c) *Improve the existing infrastructure network, including road, rail and public transport, enhance facilities for pedestrians and cyclists, including provision for those with reduced mobility, and other users;*
- d) *Provide appropriate vehicular parking, having regard to car ownership;*



- e) *Mitigate any adverse effects upon the local and strategic transport network that arise from the development proposed;*
- f) *Enhance road safety; and*
- g) *Do not cause highway problems or lead to traffic related environmental problems.'*

2.3.5 Policy CP9 sets out criteria for the scale and location of new housing developments:

'The scale of development proposals in Wokingham borough must reflect the existing or proposed levels of facilities and services at or in the location, together with their accessibility. Development proposals (in addition to the Strategic Development Locations in policies CP18-21) within development limits will be acceptable in:

- 1) *The major development locations of Earley, Green Park, Shinfield (North of M4), Twyford, Winnersh, Wokingham and Woodley;*
- 2) *The modest development locations of Arborfield Garrison, Pinewood (Crowthorne), Finchampstead North, Ruscombe, Shinfield, Spencers Wood, Three Mile Cross and Wargrave.*
- 3) *The limited development locations of Arborfield Cross, Barkham Hill, Charvil, Finchampstead, Hurst, Riseley, Sindlesham, Sonning and Swallowfield.*
- 4) *The boundary of the Science Park proposed under policy CP16 as defined in the Managing Development Delivery DPD.*

Affordable housing on rural exception sites will be permitted adjoining the Development Limits of Modest or Limited Development Locations, if a need is demonstrated for residents, workers or other people with family connections within the Parish Council's area.'

2.4 Wokingham Local Transport Plan

2.4.1 The Local Transport Plan for Wokingham borough was adopted in 2011 and provides details of how transport and accessibility will be improved in the borough up to 2026. It lists five goals that the plan policies are intended to work towards in order to achieve the local and national policy priorities. These are:

- *'Highways Goal: "To have a resilient, safe highway network that balances capacity for all users, enhances the economic prospects of the Borough, and promotes sustainable travel."*
- *Active Travel Goal: "To work with partners to promote walking and cycling as a health enhancing physical activity for all of our residents through providing:*
 - *Connected, convenient, safe and signed pedestrian networks across the Borough to enhance existing networks;*



- *New cycleways integrated with the existing cycle network; and*
- *Improved cycle parking at stations, businesses and schools”*
- *Public Transport Goal: “To promote an integrated and inclusive public transport network that provides a convenient, acceptable, reliable and affordable alternative to car travel. “*
- *Smarter Choices and Demand Management Goal: “To enable people who live, visit and work in the Borough to make informed, safe and sustainable travel decisions from a range of transport options.”*
- *Strategic Projects Goal: “To manage the demand for travel in order to ensure that people have a high level of access to different destinations, with sufficient choice, whilst minimising the adverse effects of congestion.””*

2.4.2 The policies in the plan are categorised to show which will help achieve each goal. There is a big focus on improving infrastructure to increase accessibility and encourage sustainable travel. Policy SC/DM3 states that new developments must have accompanying travel plans to show what measures will be taken to mitigate impact on the road network and encourage people to travel by sustainable modes.

‘Policy SC/DM3: Travel Plans for New Development - We will require developers to produce comprehensive and effective Travel Plans and monitor their success against an agreed set of SMART targets.’

2.5 Wokingham Strategic Development Locations

South of M4 Strategic Development Location: SPD (October 2011)

- 2.5.1 The *South of the M4 Strategic Development Location: Supplementary Planning Document* was adopted by Wokingham Borough Council in October 2011. It sets out the requirements for the three extensions to Shinfield, Spencers Wood, and Three Mile Cross, all to the south of Junction 11 of the M4. The overall development south of the M4 is expected to deliver 2,500 dwellings.
- 2.5.2 The document notes the following transport requirements of the South of M4 Strategic Development Location (SDL):
- A contribution towards the delivery of new Park and Ride south of Junction 11 on the M4. The Park and Ride is to include a bus interchange for access via bus as well as car.
 - The SDL will include a sustainable travel connection linking Spencers Wood and Shinfield.
 - The SDL will provide for a Shinfield Eastern Relief Road between the A327 Arborfield Road and the A327 Black Boy Junction. This will include a new bridge across the M4.
- 2.5.3 The Shinfield Eastern Relief Road is expected to open during November 2016. The new M4 bridge crossing to connect with this Relief Road opened in summer 2016.



2. Policy Background

- 2.5.4 The Park & Ride facility identified is now operational as the MereOak Park and Ride facility on the A33.

Shinfield

- 2.5.5 The Shinfield development is split across various proposals including Shinfield West, Cutbush Lane, The Manor, and Shinfield Local Centre.
- 2.5.6 Shinfield West is the largest of the sites, totalling 1,350 dwellings to the southwest of the existing built-up area of Shinfield. The proposals received outline planning approval from the Secretary of State on appeal (Wokingham Borough Council reference no. O/2010/1432) in November 2012.
- 2.5.7 The appeal allowed for the construction of the Shinfield Eastern Relief Road, as detailed above.
- 2.5.8 Cutbush Lane comprises a smaller development of 126 dwellings to the north of Cutbush Lane and east of Monarch Drive. The development will have access to both Cutbush Lane and the Eastern Relief Road and will therefore provide a through-route between the two.
- 2.5.9 The Manor, located to the north of Gloucester Avenue and west of Hollow Lane, comprises the former National Dairy Institute site. The proposed development will deliver approximately 125 dwellings with access off Brooker's Hill.

Spencers Wood

- 2.5.10 Construction of the first phase of Spencers Wood, known as Croft Gardens, is currently in progress. A reserved matters application for the next phase of the development, known as North of Croft Road, is due to be submitted. The remainder of the development will comprise 363 dwellings with associated infrastructure.

Three Mile Cross

- 2.5.11 Development at Three Mile Cross was permitted as part of the hybrid planning application for Spencers Wood and Three Mile Cross (Wokingham Borough Council ref. no. O/2013/0346).
- 2.5.12 Approximately 280 new dwellings are proposed at Three Mile Cross, on land to the north and south of Church Lane. Reserved matters applications for the two sites to the north and south of Church Lane are due to be submitted.

Transport Contributions

- 2.5.13 The developments at Spencers Wood and Three Mile Cross have contributed towards the following transport improvements:
- Shinfield Eastern Relief Road
 - MereOak Park and Ride



- Bus services towards Reading town centre
- Basingstoke Way / Hyde End Road junction improvements
- Church Lane mini roundabout

Arborfield Garrison

- 2.5.14 The *Arborfield Garrison Strategic Development Location: Supplementary Planning Document* was adopted by Wokingham Borough Council in October 2011. It sets out the requirements for the re-use of Arborfield Garrison following the Ministry of Defence's vacation of the site.
- 2.5.15 Arborfield Garrison is identified in the *Wokingham Borough Core Strategy* as being capable of accommodating around 3,500 new dwellings.
- 2.5.16 The Arborfield Cross relief road will assist with the delivery of this SDL by reducing the traffic impact on Arborfield Cross. Wokingham Borough Council undertook a consultation of route options in Autumn 2013.
- 2.5.17 The Council announced in March 2014 that Option B had emerged as the preferred option for further refinement. This option provides a link between the A327 Reading Road (west of Greensward Lane) and the A327 Eversley Road just to the south of Langley Common Road Roundabout (south of Arborfield Cross).

South Wokingham

- 2.5.18 The *South Wokingham Strategic Development Location Supplementary Planning Document* was adopted by Wokingham Borough Council in October 2011. It sets out the requirements for the proposed development site to the south of Wokingham Town. The site comprises largely agricultural land either side of the Wokingham-London railway line.
- 2.5.19 The site is identified within the *Wokingham Borough Core Strategy* as being capable of accommodating around 2,500 residential dwellings with associated infrastructure.
- 2.5.20 The SDL requires the construction of a new strategic road link – the Southern Distributor Road (SDR) to connect from London Road to Finchampstead Road (A329). The first section of this route has been completed on the northern side of the railway line, connecting with London Road, as part of the Montague Park development.
- 2.5.21 The development to the south of the railway line is currently going through the pre-application masterplanning stage.

North Wokingham

- 2.5.22 The *North Wokingham Strategic Development Location Supplementary Planning Document* was adopted in October 2011. The site is an urban extension to Wokingham, adjoining the Kentwood



and Matthewsgreen neighbourhoods. The site is identified as being capable of accommodating around 1,500 dwellings with associated infrastructure.

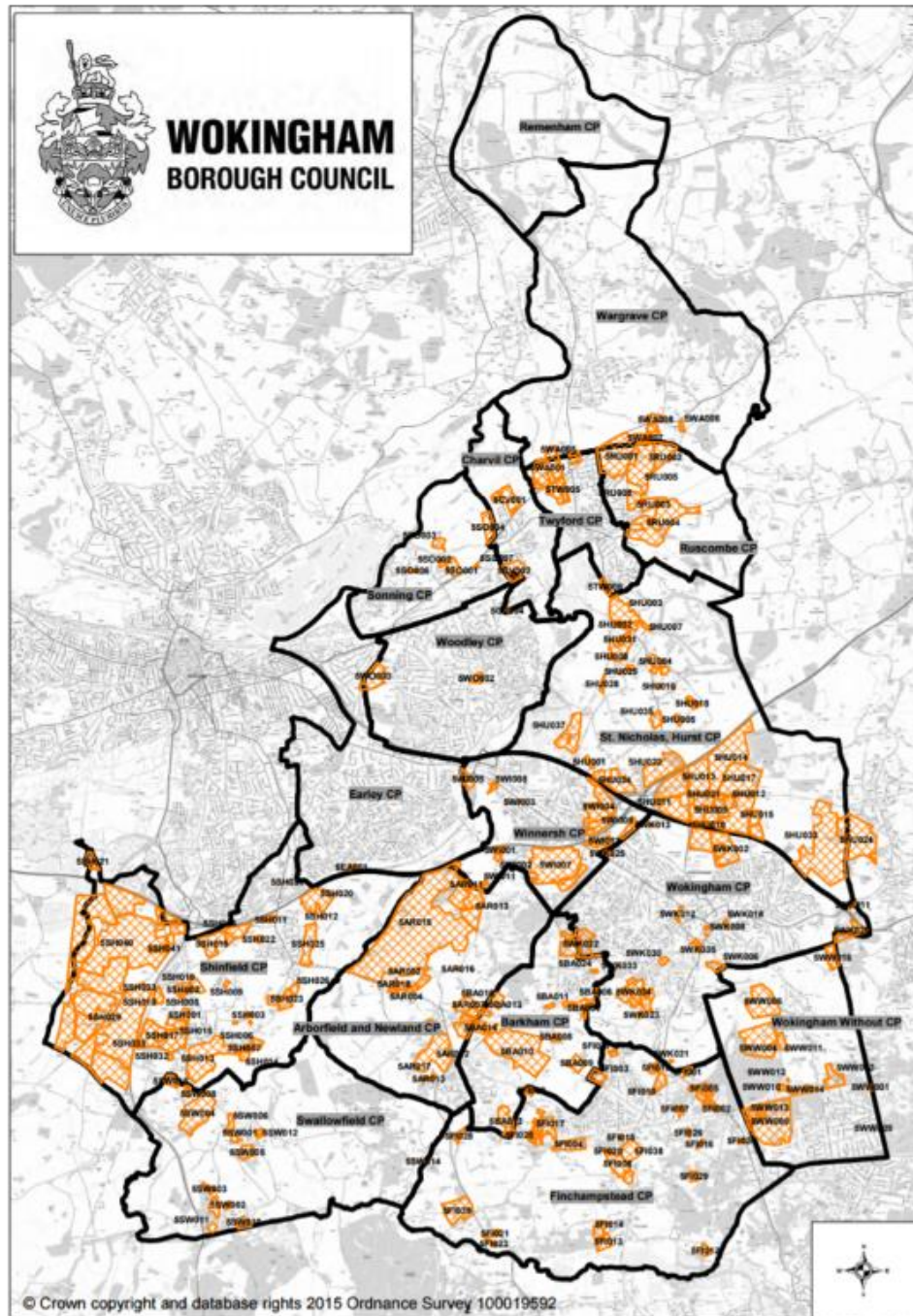
- 2.5.23 The SDL identifies the need for the construction of a new strategic link – the Northern Distributor Road – which will connect the site to Toutley Road. A further connection may be provided in the future, connecting around the east of the town to the Coppid Beech Roundabout and potential Park and Ride site.
- 2.5.24 The whole site is either completed, under construction or has outline planning permission. The Distributor Road is currently under construction, along with Kentwood East and Matthewsgreen.

2.6 Local Plan Update– Call for Sites

- 2.6.1 Wokingham Borough Council has recently commenced work on the Local Plan Update (LPU) which will shape the future of the Borough. This updated Local Plan will guide development in the Borough for the next 20 years. As part of the LPU, the Council are seeking to understand what land is available for new housing, business and leisure development, and other uses. Therefore, they undertook two ‘Call for Sites’ consultations, which were an open invitation for anybody to suggest land to be considered for development. Figure 2-1 below provides an overview of submitted sites and their locations across Wokingham Borough. However, other sites may be suggested to the Council through the LPU process and the most recent information will be published via <http://www.wokingham.gov.uk/planning-and-building-control/planning-policy/local-plan-update/>.



Figure 2-1: Local Plan Update – Call for Sites Map





3 Site Details

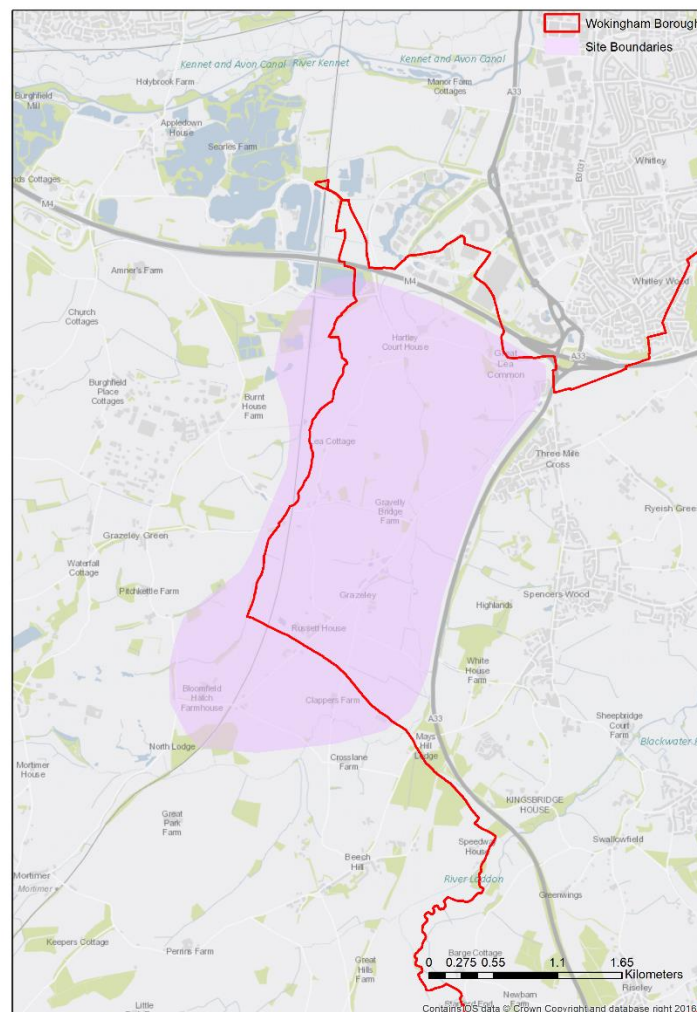
3.1 Overview

3.1.1 This chapter provides an overview of the Grazeley site in terms of its location and local context.

3.2 Site Location

3.2.1 The site at Grazeley straddles the Wokingham / West Berkshire boundary and lies within 3km of the existing southern boundary of Reading and is 8km from the town centre. Reading is one of the largest towns in the UK, with a population of over 200,000 and serves as an important employment, commercial and retail centre in the Thames Valley. Reading benefits from great transport links to London and other strategic destinations such as London Gatwick and Heathrow Airports, Birmingham, and Bristol, attracting a large number of commuters during the morning and afternoon peak hours. Grazeley itself is a small village located west of the A33 and the Fourdy Brook stream and is bordered by the Diddenham Court business park to the south.

Figure 3-1: Grazeley Site Location





- 3.2.2 To the south, the town of Basingstoke in Hampshire lies approximately 18km from the site via the A33 and is another significant employment and retail location.
- 3.2.3 The railway line that runs between Reading and Basingstoke runs through the site. The location of the site is displayed in Figure 3-1 above.

Development Proposals

- 3.2.4 Subject to confirmation through the plan preparation process and detailed technical appraisal, in principle the site is 770ha and is considered to be capable of accommodating approximately 15,000 new residential dwellings. The site offers the opportunity to be designed according to 'Garden Settlement' principles. Due to its scale, this would allow for it to be self-contained.
- 3.2.5 The Garden Settlement approach is based on a clear understanding of who is going to live on the developable land and highlights the importance of incorporating green spaces and sustainable transport infrastructure into the design in order to facilitate a closely integrated social, cultural and economic experience for future residents. A linear park is envisaged through the centre of the site, integrating an attractive landscape and ecological asset within the settlement. The draw of the water and green spaces will provide recreational opportunities throughout the community and extending in to the core of the site, promoting active and healthy lifestyles. The linear park also presents the opportunity to establish a high quality walk and cycle corridor through the site.
- 3.2.6 In addition, the delivery of high quality and accessible sustainable transport links by rail, foot and cycle will be key for ensuring delivery of a successful new community in this location.

4 Baseline Transport Conditions

4.1 Overview

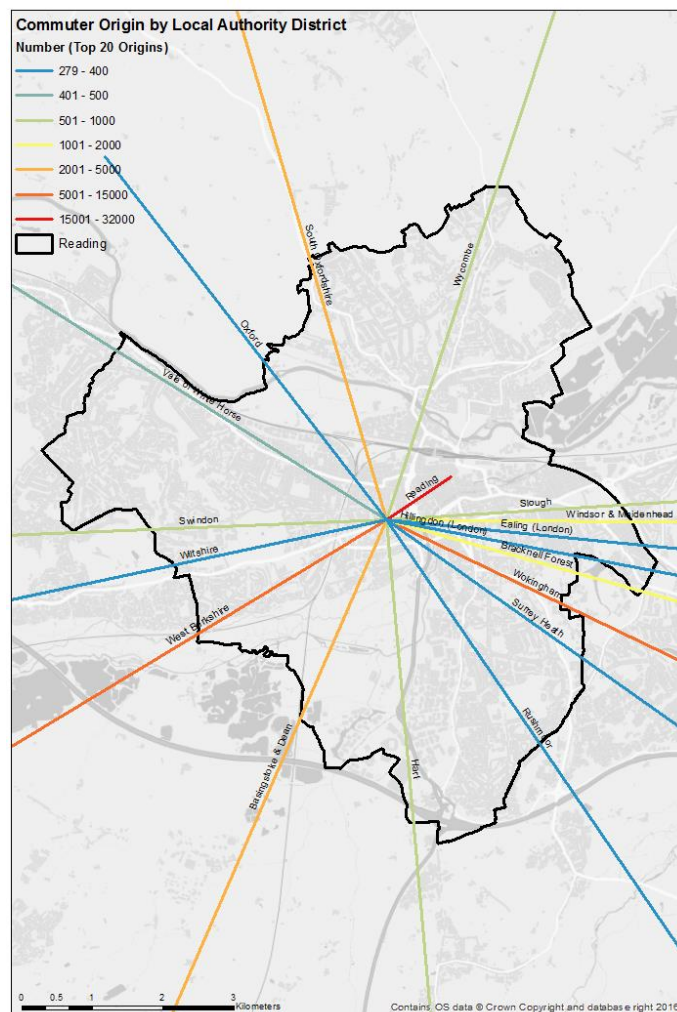
4.1.1 This chapter considers the existing transport conditions in the vicinity of the Grazeley site and identifies constraints and opportunities.

4.1.2 As shown on Figure 3-1 above, the Grazeley site is divided by the Reading to Basingstoke railway. To the north, the site is bounded by the M4 motorway, to the south by Cross Lane, to the west by Goodboy's Lane, Palmer's Lane, Rider's Lane and Burnthouse Lane. To the east, the A33 which links Reading and Basingstoke forms the site boundary.

4.2 2011 Census Journey to Work Patterns

4.2.1 Reading has a number of key employment locations. The employment origins of these areas have been identified to consider the travel patterns in the vicinity of Grazeley. _Analysis shows a high proportion of employees travelling to work in Reading from within the borough or Wokingham.

Figure 4-1: Origin of Reading Town Centre Employees





- 4.2.2 Figure 4-1 shows the origin of Reading town centre employees. Almost 34,000 employees live and work in Reading. A further 12,600 commute to Reading town centre from Wokingham Borough.
- 4.2.3 With regard to the origin of Green Park employees (Figure 4-2), over 600 people travel to Green Park from Wokingham Borough. Almost 1,100 employees work in Green Park and live within Reading Borough.
- 4.2.4 With regard to the origin of Thames Valley Park employees (Figure 4-3), over 200 employees travel to work there from within Reading and a further 190 from Wokingham Borough.

Figure 4-2: Origin of Green Park Employees

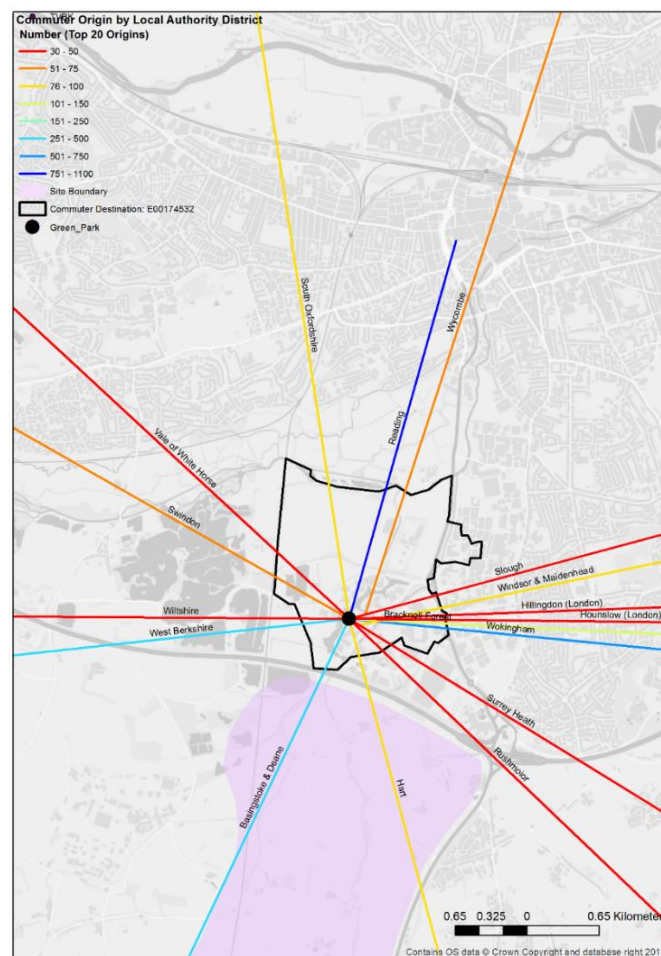
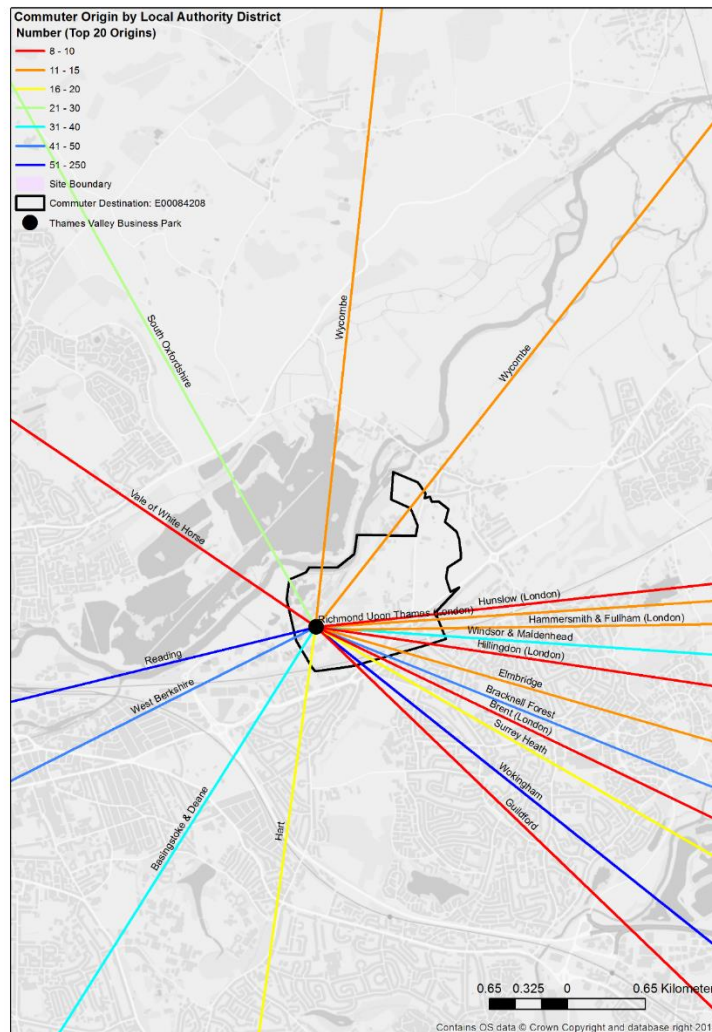




Figure 4-3: Origin of Thames Valley Park Employees



4.3 Highway Network

M4 Motorway Improvements

- 4.3.1 The M4 runs between London and South Wales and is subject to national speed limit. Junction 11 of the M4 is located at the northeast corner of the site, providing commuters with direct links to Maidenhead, Slough and then London, passing close to Heathrow Airport. To the west the M4 passes through Swindon and Bristol before entering Wales via the Severn Bridge. A two-year redevelopment scheme of the Junction 11 was completed in 2010, widening the northern section of the dual carriageway and significantly expanding and improving the vehicular capacity of the motorway junction. These improvements also included the introduction of bus priority lanes through the centre of the gyratory. These are now used by the bus routes running along the A33 and the Park & Ride services from the Mere oak site. A series of pedestrian and cycle ramps were also constructed as part of the junction upgrade enabling pedestrians and cyclists to travel across



the junction away from running traffic. However, these routes are lengthy and convoluted and do not significantly improve severance caused by the Motorway for cyclists and pedestrians.

- 4.3.2 It is understood from Highways England that the additional capacity provided by the Junction 11 upgrade is now considered to have been expended by background traffic growth and they would be resistant to significant additional traffic through the junction.
- 4.3.3 Highways England are about to commence works (March 2017) on the M4 between Junctions 3 and 12 to implement a 'smart motorway'. The scheme will use technology to improve journeys and reduce congestion by monitoring traffic flow and introducing variable speed limits. This scheme will also create additional capacity along the busy stretch of motorway through the conversion of the hard shoulder to permanent traffic lane. The works are due for completion in March 2022.

A33 Basingstoke Road

- 4.3.4 The A33 is a major road that runs between Reading and Basingstoke bordering the eastern edge of the site. In the vicinity of the site, the A33 takes the form of a two-lane dual-carriageway road that is subject to national speed limit. Access to the A33 can be gained via Mere oak Lane and Junction 11 of the M4 as well as via one or two other minor links on both the east and west side of the dual carriageway. The Mere oak Roundabout south of the M4 was replaced as part of the Junction 11 upgrade with two separate signalised junctions which now provide access to the Park and Ride facility and Mere oak Lane.

Local Highway Network

- 4.3.5 Cross Lane is a single carriageway country lane that forms the southern boundary of the site. At its eastern extent Cross Lane forms the minor arm at the priority junction with Beech Hill Road. The narrow width limits the road to one-way operation for most its stretch, yet widens on approaches to some junctions with minor and major roads. Cross Lane provides access to a few larger residential properties/farms and is served by local bus route 154 with stops located. The road also intersects National Cycle Route 23 and the rail tracks operating between Reading and Basingstoke. At its western extent Cross Lane forms the major arm of the priority junction with Goodboy's Lane.
- 4.3.6 Goodboy's Lane, Palmer's Lane, Rider's Lane and Burnthouse Lane bound the western edge of the site and largely are single carriageway country lanes subject to national speed limit. Goodboy's Lane serves a range of larger properties and industrial estates along its stretch with warning signs in vicinity of the junction with Cross Lane informing drivers that the road layout is unsuitable for heavy goods vehicles. Approximately 1.5km to the north Goodboy's Lane forms a crossroads with Goring Lane. In immediate vicinity of the crossroads the carriageway widens to accommodate two-way traffic with traffic signs informing drivers about a reduced speed limit of 50mph when entering Goring Lane. Continuing north Goodboy's Lane then becomes Palmers Lane and Riders Lane, which passes the AWE Burghfield on its eastern edge. At its northern extent Riders Lane forms the southern arm of a priority junction with Fullers Lane and continues as Burnthouse Lane to the north.



Burnthouse Lane forms a priority junction with Pingewood Road South before continuing north as Amners Farm Road and adjoining Reading Road via a priority junction to the northwest.

4.3.7 As indicated above a number of roads run through the site itself and adjoin the bordering road network via priority junctions or crossroads. There are two major east-west links passing through the site, one of which runs south to the M4 at the northern boundary of the site. Pingewood Road South and Hartley Court Road take the form of a single two-way carriageway road and provide a link between Junction 11 of the M4 and residential areas located west of the site. A second east-west link runs from Grazeley Green village at the crossroads with Goodboy's Lane, Goring Lane and Palmers Lane. Goring Lane is a two-way single carriageway road that is subject to a speed limit of 50mph and becomes Grazeley Green Road at the junction with Fullers Lane, the latter of which forms the northern side of a triangular road layout, linking Riders Lane with Goring Lane. Grazeley Green Road serves a range of larger residential properties and Berkshire Scout Enterprises before forming the minor arm at the priority junction with MereOak Lane at the eastern edge of the site

4.3.8 There are also two north-south connections, one of which departs immediately south to Junction 11 of the M4, with MereOak Lane running parallel to the A33 up to the priority junction with Grazeley Green Road. The carriageway then continues south as Bloomfield Hatch Lane, passing through the village of Grazeley and adjoining Cross Lane at its southern extent via a priority junction. Alternatively, Grazeley Road departs south at the south eastern edge of Grazeley village, forming the eastern side of a triangular road network that adjoins Cross Lane approximately 1km west to the junction with Bloomfield Hatch Lane. The second north-south link through the site passes over the M4 motorway with Kybes Lane forming the connecting link between Pingewood Road South and Hartley Court Road. South to the junction with Hartley Court Road Kybes Lane takes the form of a single carriageway country lane. At its southern extent it forms the northern arm of the priority junction with Grazeley Green Road with a continues link to Pump Lane, which continues south-east to adjoin Bloomfield Hatch Lane via a priority junction. This north-south link is also marked as National Cycle Route 23 which links Reading with Southampton via Basingstoke, Winchester and Eastleigh.

4.4 Existing Traffic Flows

4.4.1 Traffic data for the local highway network has been obtained from previous ATC counts within the site, along with DfT Traffic Counts along the A33 corridor.

4.4.2 ATC counts were undertaken in 2014 to consider a smaller site in the vicinity of Grazeley. The ATC counts considered the flow of traffic in and out of the site. Figures 4-4 and 4-5 illustrate the observed two way flows during the morning and evening peak hours. Both peak hours show a strong east-west flow of traffic through the site via Goring Lane and MereOak Lane.



Figure 4-4: AM Peak ATC 2-Way Vehicle Counts

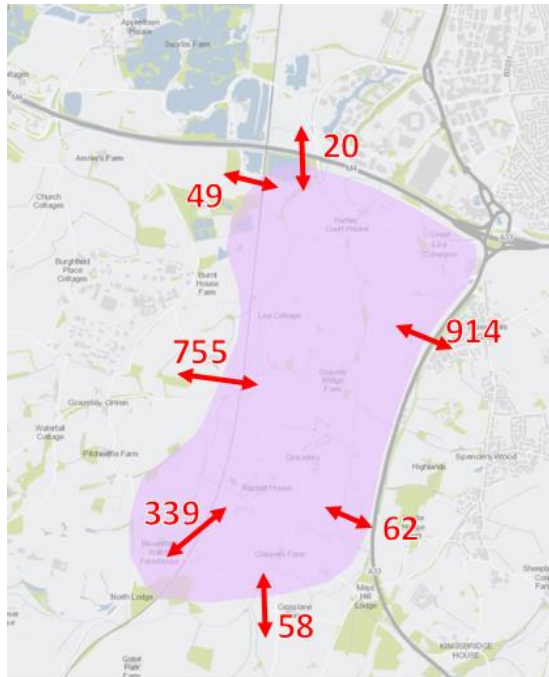
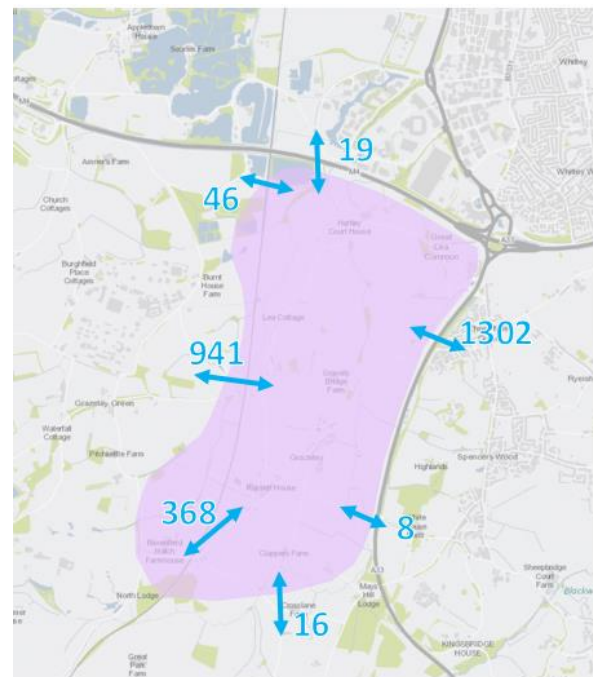


Figure 4-5: PM Peak ATC 2-Way Vehicle Counts



4.5 Bus Services

- 4.5.1 There are a number of bus stops located on the surrounding highway network that link the site with strategically important destinations such as Reading, Wokingham and Basingstoke. The nearest bus stops are located close to the north east corner of the site, on Mere oak Lane in immediate vicinity of the junction of the A33. The stops take the form of sheltered bus stops with seating and Real Time Information and are served by a wide range of bus routes, the details of which are summarised in Table 4-1 below.

Park and Ride Services

- 4.5.2 In 2015 a new park & ride facility opened to the northeast of Grazeley village, at the junction with the A33 and Mere oak Lane. The Mere oak park & ride facility provides approximately 600 car parking spaces, with services running at a maximum frequency of 20 minutes into such destinations as the RIBC, Madejski Stadium, and Reading town centre. A parking fee of 50p per car for day users applies to Mere oak P&R and is included in the bus ticket. Concessionary pass holders travel on the bus for free but need to buy a 50p per car parking ticket on the bus.



4. Baseline Transport Conditions

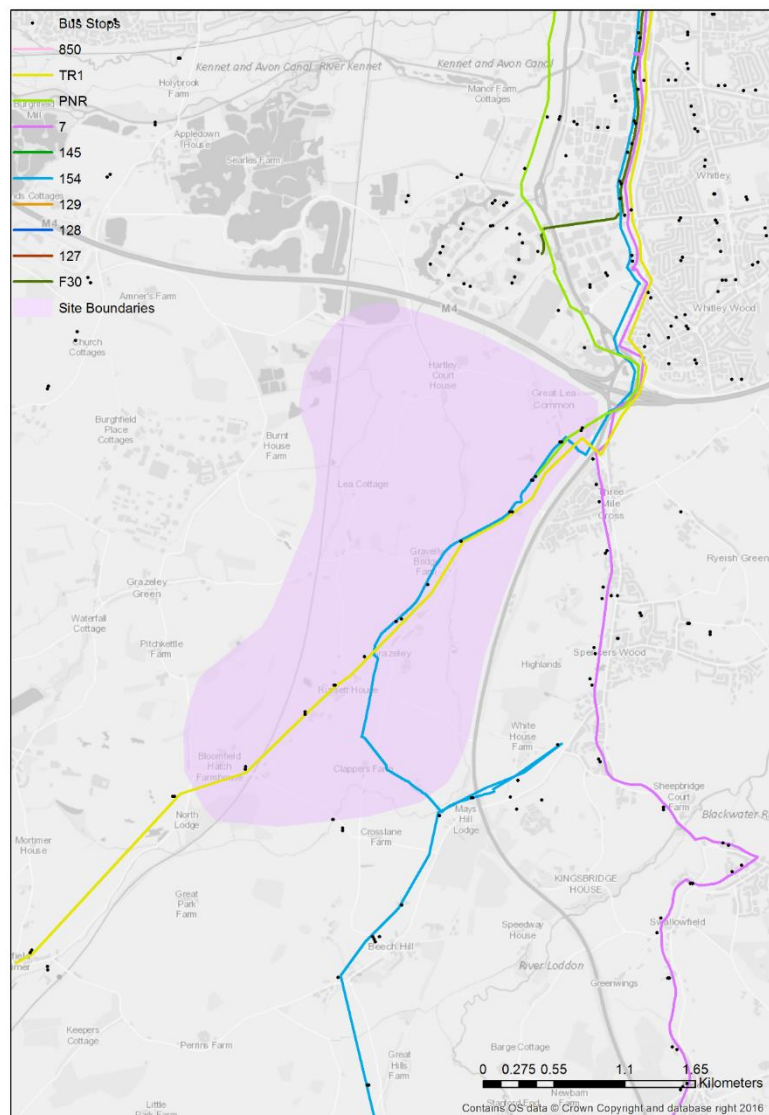
Table 4-1: Local Bus Services

Service No.	Route	Peak Hour Frequency	Operating Hours	Days of Operation
MereOak Lane				
7	Reading Town Centre – Riseley	Four services per day	19:38 – 23:22	Mon – Sat
8	Reading Town Centre – Farnborough	3-4 services in the morning and afternoon	07:29 – 09:29 15:59 – 17:21	Mon – Fri
154	Reading Town Centre – Stratfield Saye	Two services per day	09:42 & 12:32	Mon – Fri
145	Three Mile Cross – Wokingham – Winnersh	One service per day	09:45 – 13:05	Mon – Fri
TR1	Reading Town Centre – Baughurst Common	Five services per day	05:38 – 18:45	Mon – Sat
MereOak park & ride				
Greenwave Services	MereOak Park & Ride – Central Reading / Reading Station	Every 10 -15 minutes	05:50 – 18:28	Mon – Fri
Greenwave Services	MereOak Park & Ride – Central Reading / Reading Station	Every 15 – 20 minutes	07:27 – 18:36	Saturdays
Greenwave Services	Central Reading / Reading Station – MereOak Park & Ride	Every 10 -15 minutes	05:23 – 21:27	Mon – Fri
Greenwave Services	Central Reading / Reading Station – MereOak Park & Ride	Every 15 – 20 minutes	07:00 – 19:33	Saturdays

- 4.5.3 It is note that pedestrian and cycle access the facility at MereOak is poor due to there being limited crossing points on the A33. This is a particular constraint for residents of Shinfield, Three Mile Cross and other developments on the eastern side of the A33 wishing to access the Park and Ride facility.
- 4.5.4 National Express Coaches have recently relocated their Reading drop-off and pick-up point to the MereOak Park and Ride site to provide improved interchange between different long distance coach services.



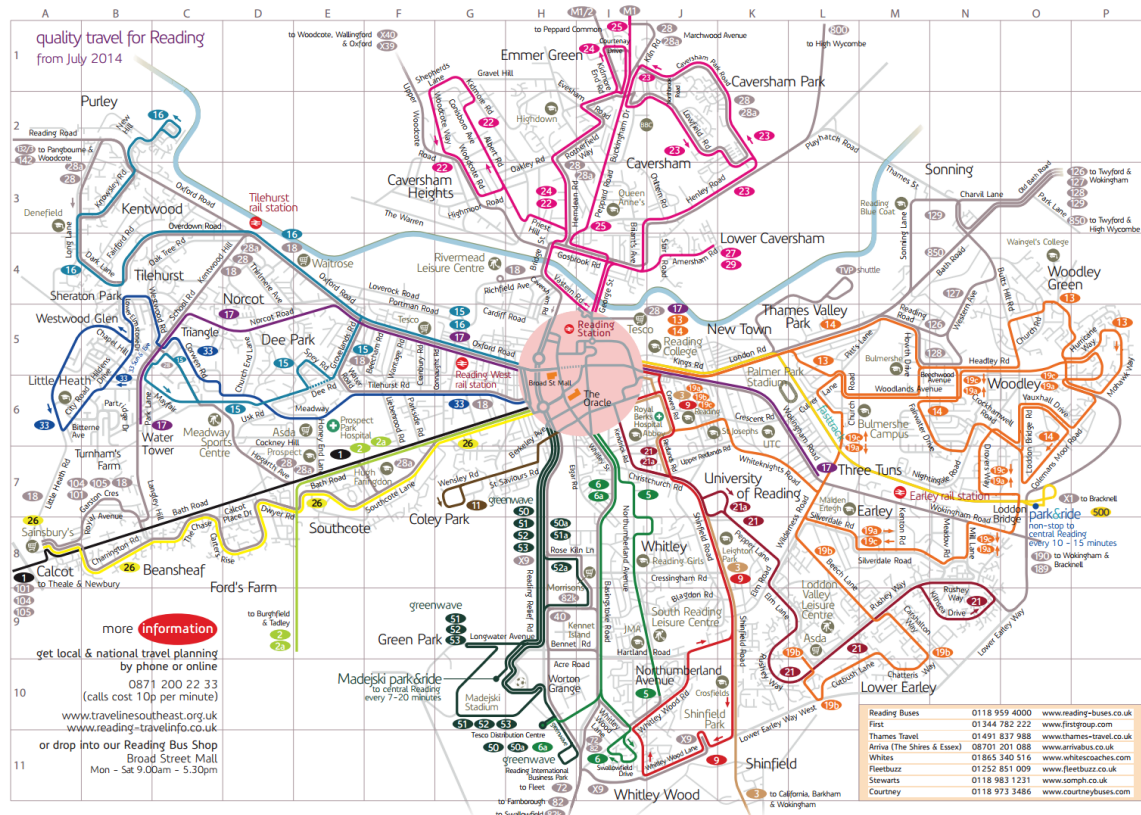
Figure 4-6: Bus Routes Serving Grazeley Site





4. Baseline Transport Conditions

Figure 4-7: Reading Bus Network Map



MRT Scheme

4.5.5 South Reading MRT is a series of bus priority measures on the A33 corridor between Mere oak Park and Ride in Grazeley and Reading town centre. Eventually, Reading Borough Council's long-term ambition is for a bus lane to run along the full length of the A33, but work will be carried out in phases, as and when future funding can be secured. The scheme aims to:

- Reduce congestion and journey times;
- Improve the attractiveness of public transport through enhanced reliability and frequency; and
- Enable sustainable economic and housing development on the main growth corridor into Reading.

4.5.6 The first phase of work to speed up buses along the A33 with a dedicated southbound bus allows buses to travel separately from running traffic to the M4 Junction 11 and the new Mere oak park-and-ride along one of town's busiest key commuter routes, serving both Reading town centre and Green Park business park. Construction of this phase is currently underway.



4.6 Rail Services

- 4.6.1 Currently, the nearest rail station to Grazeley is at Mortimer, 5km to the southwest of the village. The station is on the Reading to Basingstoke line and services to both towns run every 30 minutes, with a journey time of 12 minutes to Reading station. Secure cycle storage for nine bicycles and a station car park for 60 vehicles is provided at the station, which further encourages longer journeys to be undertaken by sustainable modes of transport.
- 4.6.2 There are proposals for a new station to the west of Reading Green Park Business Park, which would run services on the same line with a similar frequency, and cut the journey time to Reading to less than 10 minutes. Planning permission was granted for the station in 2008 as part of a wider residential development. Green Park Station is scheduled to open December 2018.
- 4.6.3 Reading Station is located within the town centre and is a vibrant and integral changeover station for most routes through the south of the country. Reading station provides direct links to London Paddington with a journey time of approximately 30 minutes. The station is operated by Great Western Railway, CrossCountry and South West Trains providing:
- Fourteen services during the morning peak hour to London Paddington
 - Four services an hour to Ealing Broadway
 - Four services an hour to Oxford
 - Four services during the morning peak hour to Basingstoke
 - Two services an hour to Bristol Temple Meads
 - One service an hour to London Gatwick
 - One service an hour to Exeter
 - One service an hour to Manchester
 - Two services an hour to Cardiff
- 4.6.4 Sheltered cycle storage for 344 bikes and a multi-storey car park for 1275 vehicles is provided at the station and further encourages longer journeys to be undertaken by sustainable modes of transport. In addition, next to the railway station is a bus interchange, served by most of Reading's urban and rural bus services.



Crossrail

- 4.6.5 From December 2019, Reading Station will be served by two trains per hour on the Elizabeth Line – Crossrail. This will enable passengers to travel through to Liverpool Street and Canary Wharf with no changes.

Western Rail Access to Heathrow (WRATH)

- 4.6.6 Network Rail are currently developing plans to improve rail access to Heathrow Airport from the west. A new direct rail link will connect Reading Station to the airport via Slough, removing the need to travel via Paddington. A new tunnel will be constructed from Langley to Iwerley connecting in to Terminal 5.
- 4.6.7 The improvements will reduce the journey time between Reading and Heathrow by approximately 35 minutes. Congestion will also be reduced at London Paddington. Services are also likely to stop at Twyford Station, providing a link for local services on the Henley line.
- 4.6.8 Work is expected to commence on the tunnel works in 2019 with services operational by 2024.

Southcote Junction to Basingstoke Electrification

- 4.6.9 The Reading to Basingstoke railway line is due to be electrified by Network Rail as a project associated with the electrification of the Great Western Mainline. The line through Grazeley forms part of the Southcote Junction to Basingstoke Electrification.
- 4.6.10 According to Network Rail's *Enhancement Delivery Plan – March 2016*, the electrification of the Southcote to Basingstoke line will enable “a significant switch to electrified services for commuting in the Thames Valley from the Berkshire and Hampshire catchments.”
- 4.6.11 The document notes that the electrification will interface with various other proposals such as the Electric Spine and the proposed Reading Green Park station. Network Rail currently predicts that the first timetabled public use of the electrified Southcote to Basingstoke line will occur during Control Period 6 (1 April 2019 – 31 March 2024).

4.7 Walking and Cycling Routes

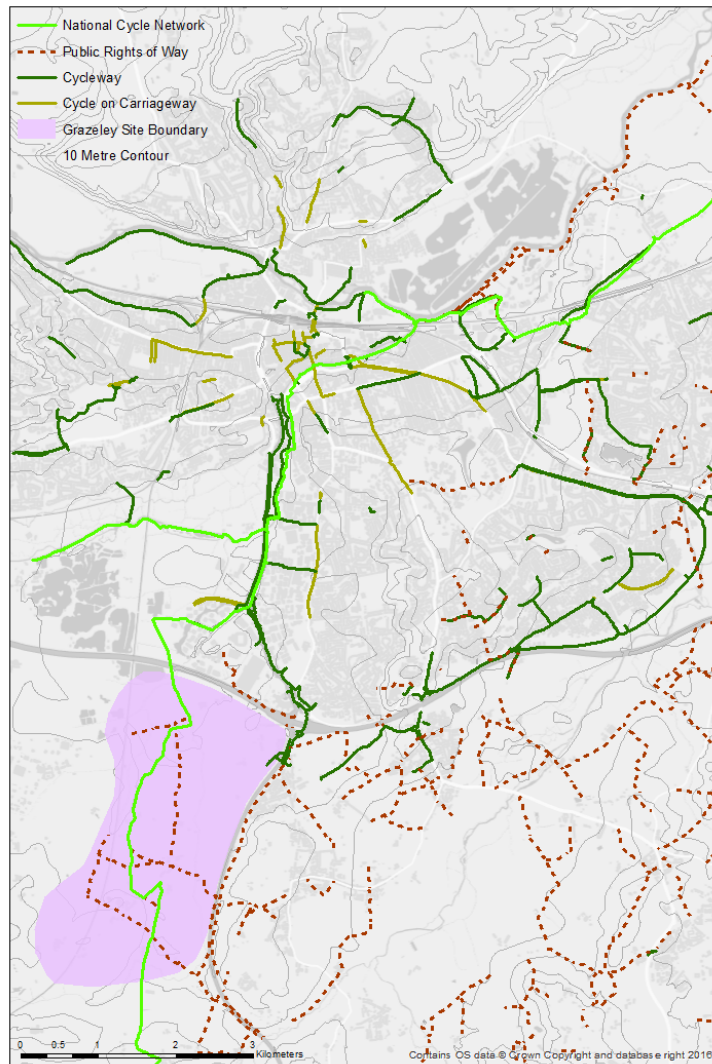
Walking

- 4.7.1 Walking is the most sustainable mode of transport and accounts for a significant proportion of all journeys. In terms of benefits, walking requires no external energy and causes no congestion or pollution. It improves personal health and encourages social interaction, helping to strengthen local communities. It is highly inclusive, being available to most people regardless of age or income.



- 4.7.2 There currently is no existing pedestrian infrastructure on the surrounding highway network with the exception of continuous footpath through Grazeley village. In addition, footpaths are provided on either side of Mere oak Lane to facilitate access to the bus stops located near the Junction 11 of the M4. Figure 4-8 shows the main cycle routes and public rights of way in the vicinity of the Grazeley site.

Figure 4-8: Cycle Routes and Public Rights of Way



Cycling

- 4.7.3 In the UK and internationally, cycling is increasingly seen as an integral element of solutions to support economic growth, tackle congestion, improve personal mobility and address health problems associated with obesity and lack of physical activity. Cycling, like walking is a great way to travel short distances as an alternative to using the car.

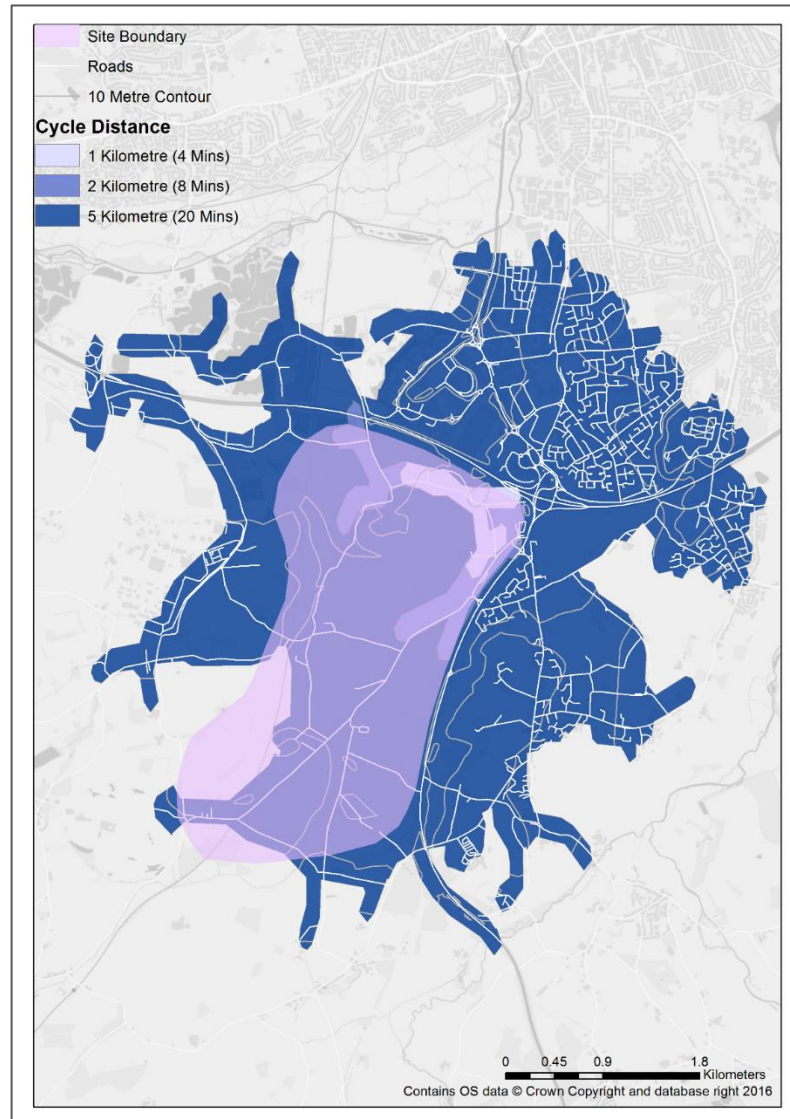


4. Baseline Transport Conditions

- 4.7.4 National Cycle Route 23 passes through the development site. NCR 23 is a long distance cycle route that runs from Reading to Southampton via Basingstoke, Winchester and Eastleigh. In addition, NCR 4 passes approximately 2.5km north to the M4 motorway on the A33 and is a long distance route between London and Fishguard via Reading, Bath, Bristol and Swansea.
- 4.7.5 National Cycle Route 422 is a new planned National Cycle Route which will connect Newbury and Windsor via Reading and Wokingham.
- 4.7.6 In the vicinity of the Grazeley site, Beech Hill Road is recommended for cycling and connects the development site via a designated cycle route to Mortimer to the south and Swallowfield to the east.
- 4.7.7 To the west of the site, there are six railway crossing points to enable pedestrians and/or cyclists to cross the Basingstoke-Reading line. These crossing points have been assessed by Sustrans for their potential to be upgraded for use as dedicated cycle/pedestrian facilities for the new development.
- 4.7.8 Of the six crossings, three are highway crossings with limited capacity to enhance for cycle use. Two are surface crossings of the railway which, upon electrification, would likely be closed. The remaining crossing, Shepherdton Lane Bridge, is a narrow rail underpass with Public Byway status. This represents the only existing crossing that has potential for enhancement for cycle and pedestrian use. The crossing is located to the west of Grazeley village, to the south of Poundgreen Farm. Full details of this assessment are provided in Appendix A.
- 4.7.9 Figure 4-9 shows 4, 8 and 20-minute cycle time isochrones from the Grazeley site. The isochrones demonstrate the severance caused by the limited M4 crossings and limited crossing of the railway line to the west. However, the current catchment shows that the town centre is accessible in just over 20-minutes cycle ride using existing routes.



Figure 4-9: Grazeley Site Cycle Isochrones



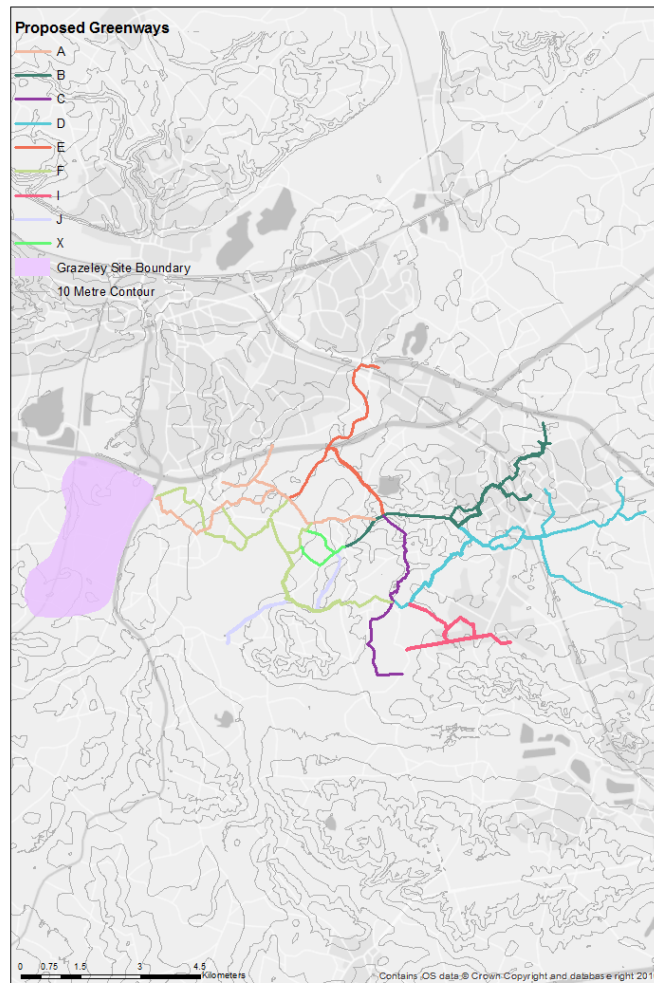
- 4.7.10 Reading operates the Readybike bicycle hire scheme across the town centre. A total of 200 bicycles are available spread over 29 docking points. The nearest docking points to the Grazeley site are located within the International Business Park and Madejski Stadium are where four docking points are located with a capacity of 60 bicycles.

Greenways

- 4.7.11 The Greenways network is a series of pedestrian and cycle paths being introduced across Wokingham to encourage sustainable travel between rural and urban areas. These routes are initially planned to link developments in Shinfield and Arborfield with Wokingham. It can be expected that any development at Grazeley would connect into this network. Figure 4-10 provides a map of currently planned Greenways routes.



Figure 4-10: Proposed Greenways Routes



4.8 Local Facilities

- 4.8.1 The existing site is mainly rural and therefore existing local facilities are currently limited. The proximity of the site to the southern edge of Reading is such that the access to education retail and employment facilities is relatively good. Any development of the scale proposed for the Grazeley site need to consider provision of a full range of local facilities including primary schools, secondary schools, GP services, retail and on-site employment opportunities.

Employment

- 4.8.2 Employment is likely to be the main generator of external trips for the Grazeley development as residents are likely to work in a number of surrounding locations including Reading, Basingstoke and London.
- 4.8.3 To the south of Reading there are large areas of employment (within both Reading District and Wokingham Borough) which extend from the M4 north towards the centre of the town and include



the new Reading International Business Park (RIBP) and the Green Park Business Park, both of which are within 1.5km of the edge of the site. Arlington Business Park is also on the edge of Reading but slightly further to the north west, in the village of Theale.

- 4.8.4 There are also two business parks close to the southern end of the site. Lambs Farm Business Park is located approximately 1km to the east between the villages of Spencers Wood and Swallowfield. Riseley Business Park is approximately 2km further south but is still easily accessible by car from the proposed site.
- 4.8.5 Thames Valley Science Park is currently being developed to the south of the M4 as part of the new Shinfield development. This will create a world class employment and technology hub in very close proximity to the Grazeley site.



5 Sustainable Transport Infrastructure

5.1 Introduction

- 5.1.1 This section sets out a series of potential interventions and infrastructure schemes that could be introduced to form a wider Transport Strategy for the Grazeley site. This has drawn upon ideas proposed at earlier planning workshops and discussed in detail with Wokingham Borough officers and Thames Valley LEP.
- 5.1.2 The delivery of high quality and accessible sustainable transport links by rail / bus / foot / cycle will be key for ensuring delivery of a successful and sustainable new community and encouraging residents to use cars less. Of particular importance will be high quality connections to the Reading area – both the town centre and the main employment areas, and connections to the rail network and links to Central London.

5.2 Site Density and Layout

- 5.2.1 To achieve a truly accessible development, it is essential that accessibility is aligned with existing and new land use patterns, ideally with a focus on Transit-Oriented Development (TOD). Higher order public transport need to be located right at the heart of neighbourhood and district centres to achieve the required modal shift to sustainable transport.
- 5.2.2 The 'Being Dense' report highlighted the relationship between housing density and successful uptake of sustainable transport, and the need to link housing density to parking levels wherever possible. The London Plan, produced by the Greater London Authority, advocates relating public transport accessibility to housing density, with areas of high Public Transport Accessibility Level (PTAL) proposed to develop higher residential densities. However, the density will clearly vary across the site and, the site being in a relatively rural location, means modal share will also vary across the site.

Dutch 'ABC Model'

The ABC location policy, applied in the Netherlands since 1988, is designed to help reduce the growth of car travel on commercial developments. Locations are graded according to their accessibility by public and private transport. Their rating then determines the level of parking provision permitted at developments within those locations.

'A' Locations – highly accessible by public transport, with relatively poor car access

'B' Locations – highly accessible by both public and private transport

'C' Locations – highly accessible by car but poorly accessed by public transport



- 5.2.3 The Dutch ABC model described above provides a framework within which the site layout and relative density can be defined according to the access to key public transport nodes. It is vital that the development is sensitive to the changes in density according to accessibility, otherwise will lack commercial viability.
- 5.2.4 The layout of a site is key to influencing mode choice. There should be focus on a range of street types catering for different movements needs and distances. Street networks should be designed to maximise connectivity and 'walkability'.

Freiburg - Reiselfeld

High frequency public transport (in this case trams) runs right through the heart of the neighbourhood and was provided from the start.

Street hierarchy prioritise pedestrian, cycle and public transport movements whilst including some parking within sympathetic street design.

Parking is limited to one space per unit. In neighbouring Vauban, parking is more restricted through car-free neighbourhoods and the provision of parking areas on the edge of the neighbourhood.



Recommendations: Develop a clear framework of density targets related to sustainable transport accessibility, using Dutch ABC style zoning as a basis for the Grazeley site layout and density.

The aim should be to internalise as many trips as possible so mixed land uses with walkable neighbourhoods and high quality services and infrastructure including schools, retail, live-work units, high speed broadband, delivery hubs and workhubs.

Parking needs to be restrained but viable. Linking parking to density and sustainable transport access provides a clear approach which can be adopted by developers.



5.3 Highway Infrastructure

- 5.3.1 The focus of this study is upon the sustainable transport aspect of the development. However, as part of any future transport masterplan, a comprehensive highway infrastructure strategy will be necessary. Therefore, some reference has been made to potential highway network improvements below.
- 5.3.2 The proximity of the site to the M4 provides both advantages and disadvantages to the development proposals. Proximity to the Strategic Road Network provides the opportunity for traffic to disperse across the network quickly, making the site highly accessible. However, the highway network in the vicinity of the site is operating close to capacity under existing conditions with limited opportunities to accommodate additional traffic. Any transport strategy will need to consider options for at least some additional highway infrastructure.
- 5.3.3 The main severing feature is the limited crossing opportunities of M4. The construction of a new highway crossing of the M4 at Shinfield sets a clear precedent for development bringing forward such significant infrastructure projects. The Shinfield crossing and associated link road received development funding of £25m. Based on the level of trips to be generated by the Grazeley site, a new crossing of the motorway would appear to be viable and would likely require a similar level of financial contribution.
- 5.3.4 The proximity of the Reading International Business Park and the Madejski Stadium to the northern side of the M4 presents a challenge in achieving any major highway crossing unless located in the northwest corner of the site.
- 5.3.5 The A33 frontage along the eastern side should be designed to suit the settlement context with an outward facing aspect of the development where possible.

Upton Northamptonshire

Upton in Northampton showcases best practice street design, through the creation of a permeable street network. The permeable network creates a high-quality place for pedestrians and cyclists as well as allowing vehicular movements.

The existing A43 has been redesigned in the vicinity of the site to create a wide boulevard style pavement, street trees, and a services road allowing new development frontage to form a local retail centre, taking advantage of passing trade.



Recommendation: Consideration of potential additional highway crossing of M4 subject to modelling of J11 capacities with full sustainable transport strategy. Alignment of any crossing is considered a challenge in the vicinity of Reading International Business Park.

Connections into the Grazeley site from the south from the A33 to encourage some transfer from car to rail where possible.

Strategic highway access will still be required and the A33 should act as the ‘front door’ of the development with quality frontage and street design.

5.4 Rail Infrastructure

- 5.4.1 The scale of the development, projected population of circa 36,000, means that the delivery of a new station is a realistic opportunity and will help to sustain the new retail, community facilities, services and industry that are planned. The proximity of the Basingstoke to Reading railway line to the site presents the opportunity to explore options for accessing services on this line for the Grazeley site residents.

A recent example of a new station being constructed for a new settlement is Cranbrook Station in Devon. Cranbrook is a planned new town to the east of Exeter, planned as part of the East Devon and Exeter Growth Point and will ultimately provide approximately 7,000 dwellings. The development has been constructed alongside the Exeter to Waterloo line and a new station was opened in December 2015. Two trains per hour are provided under current service patterns.

The station has opened at an early phase in the development – approximately 1,000 dwellings were occupied at opening. This has formed part of a wider strategy to introduce the public transport links in early phases to encourage modal shift. The station also provides a 150-space car park to encourage residents from further afield to transfer to rail to complete their journeys.





- 5.4.2 A key element of the proposals for Grazeley could be the relocation of Mortimer Station into the site. The existing station at Mortimer lies approximately 3.5km from the centre of the Grazeley site. Currently it has relatively low passenger footfall (183,146 passengers per annum 2014/15) for a station in the southeast due to it lying away from major population areas and having limited parking.
- 5.4.3 It is recommended that Mortimer Station could be relocated to within the Grazeley site, providing a direct link from within the development to the national rail network. Travel time to Reading Station is 12-minutes under current service provision. With electrification this could be further improved with additional services on this line also likely.
- 5.4.4 The provision of a direct rail link from the site to Reading provides the opportunity to connect into not only the main employment areas of Reading but into the wider rail network, connecting to enhanced services to Central London via Crossrail and GWR services.
- 5.4.5 The rail connectivity could present the opportunity for the station to develop a catchment beyond just the Grazeley site. The provision of parking facilities and a direct highway link to the station from the A33 would present the opportunity to operate a Parkway -style station where commuters from Hampshire and Basingstoke could access services to London without having to drive in to Reading itself.
- 5.4.6 The process of closing the existing Mortimer Station and reopening to the north will require lengthy negotiations with Network Rail and GWR and it is recommended that discussions commence at the earliest possible opportunity in order that a potential station can be included in Control Period 6 (2019-2024) if possible.
- 5.4.7 To the north, the opening of Green Park Station in December 2018 also provides improved connectivity.

Recommendation: A new station should form a central element of any future transport strategy for a development at Grazeley. Discussions with Network Rail should be commenced at the earliest opportunity to establish a timescale and provisional agreement for proposals.



5.5 Bus Network Improvements

The development of the scale of the Grazeley proposals will generate a significant demand for high quality bus links to surrounding retail, employment and commercial centres of Reading, Wokingham and Basingstoke.

The campaign group, Greener Journeys, commissioned a study looking at the impact of congestion on bus passengers. The study makes a series of recommendations for growing bus patronage and reducing traffic volumes in cities.

Of these recommendations, four are relevant to the planning of development:

- *Demand management*
- *Bus priority*
- *Bus stop dwell times*
- *Mobilising bus passengers*

With respect to demand management, the study notes that if bus patronage increases without demand management measures, the extra capacity freed up on the road network will be taken by latent demand and congestion will therefore not decrease. Instead, the study recommends that contentious schemes such as congestion zones or workplace parking levies are implemented.

The study highlights bus priority as being conducive to modal shift, noting that a comprehensive quality corridor initiative in a major conurbation delivered a 75% increase in bus passengers over 5 years, with 20% being new customers.

Bus Priority and Rapid Transport Network

- 5.5.1 The scale is such that there will be sufficient demand to introduce a network of new sustainable transport routes to and through the settlement. It is anticipated that these routes will be bus and/or rapid transit links in the first instance, with the ability to adapt and change as the transport technology develops. Future corridor usage could be by Autonomous or Guided vehicles, or a combination of transport options.



5. Sustainable Transport Infrastructure

- 5.5.2 The MRT scheme demonstrates the wider support for bus rapid transit infrastructure in the area in the form of bus priority or segregated/guided busways.

Eclipse BRT – Fareham

The Eclipse BRT service runs between Fareham and Gosport providing a frequent bus link, with sections of the route along dedicated busway. The service provides a 7-minute headway during peak periods. Since commencing operation in April 2012, patronage has increased 64% on new routes E1 and E2 compared with the equivalent routes which they replaced. Over the Gosport peninsula as a whole there has been a 12% general increase in bus use since operation.



- 5.5.3 It is anticipated that the use of the Mere oak Park & Ride has been high from the start as it provides links to both Green Park and the town centre with limited detour from the A33 and improved journey time compared to the main traffic.
- 5.5.4 It is recommended that routes are diverted from the A33 through the development, providing the opportunity to interchange with rail services and create a high quality corridor through the site connecting the new station, main district centre and then heading north on A33 towards Green Park, and Reading Town Centre.

Recommendation: Explore options for extending MRT into the site with segregated routes where possible, if not with considerable use of bus priority measures such as bus lanes and priority signals. Branding of the network/corridor with high quality vehicles and facilities provides the opportunity to attract new public transport users. Identification of key corridors to and through the site are essential that can be adapted for future technology such as guided buses, and/or autonomous vehicles.



5.6 Park and Ride Facilities

- 5.6.1 The MereOak Park and Ride facility lies in the north east corner of the proposed development site. It provides an alternative mode of travel for drivers travelling on the A33 to the north of the M4.
- 5.6.2 The potential for a second park and ride facility to the south of the site has been discussed with WBC. It is proposed to provide further relief to traffic on the A33 heading for employment areas in Reading. However, the potential for a successful park and ride facility at such a distance from the destinations within Reading is not assessed to be high. The propensity for drivers to transfer from their cars to a bus service is at its highest at the edge of an urban area, where congestion and delay often begins. It is not anticipated that a facility this far south of Reading (approximately 4km from the edge of Reading) would generate significant demand.
- 5.6.3 The Grazeley development would more suitably offer the opportunity to expand the MereOak Park and Ride facility, potentially offering the opportunity to extend the number and routes of bus services operated, and the option of Park and Cycle transfers.

Recommendation: Consider options for expansion of Park and Ride facility at MereOak and extend to include cycle facilities including Readybike. Improved pedestrian and cycle links to the facility to enable local residents to make better use of these services, particularly from the eastern side of the A33.

5.7 Cycle Infrastructure

- 5.7.1 The inclusion of high quality cycle infrastructure and corridors throughout the development itself as well as the creation of high quality links between the site and Reading town centre will be essential. These corridors should be designed for multiple uses and be adaptable to future technology such as small Autonomous vehicles or pods, pedestrian routes and different categories of cyclist.



Delft – Cycle Network

The City of Delft in Holland was selected as a model for transport planning in the 1970s. IN 1999, a Cycling Action Plan was devised based on a three-level hierarchy of cycle routes:

- *‘Town’ – main ‘superhighway’ routes to centres with heavy flows and a network density of 500m*
- *‘District’ – links between strategic locations across network and joining up ‘town’ routes at a density of 200-300m*
- *‘Sub-district’ – links between residential areas, often shared with pedestrians at a density of 100m*

The city has seen a 12% increase in daily cycle trips and an overall cycle mode share of 43%.



- 5.7.2 Achieving high cycle mode share will require the provision of high quality connections for commuters to the local employment centres and Reading town centre. There is a need for a hierarchy of cycle infrastructure within the site as well as connecting the site to areas outside in order to optimise cycle use for all reasonable journeys and for all user groups. Below we identify the types of route hierarchy that should be applied within the development.

Local Network

- 5.7.3 The network within the neighbourhoods of the Grazeley development site should be focused upon low speed, traffic calmed routes where all cycle users can travel safely, ideally segregated from both pedestrians and vehicles. Where necessary, shared cycle/footways can be used but with sufficient width to allow safe interaction.

Primary Streets

- 5.7.4 Primary routes within the development should allow sufficient space for cyclists with priority provided at sideroads for cyclists to cross. Cycle routes should ideally be segregated from the main traffic and pedestrian routes



Major Routes

- 5.7.5 Major routes into and out of the site for cyclists should be dedicated direct routes, ideally shorter than equivalent vehicle routes where cyclists have priority and speed is prioritised. Gradients should be low wherever possible. Links between the Grazeley site and the Reading employment sites and town centre should be of this type. In particular, a dedicated cycle crossing of the M4 should be provided, directly linking the site with Green Park and on to the town centre, avoiding the need for cyclists to travel through the lengthy cycle ramps at Junction 11.

M4 Pedestrian & Cycle Crossing

- 5.7.6 It is essential to provide a dedicated crossing of the M4 to enable strong cycle and pedestrian connections to Green Park and beyond. The existing crossing at Kybes Lane/Kirtons Farm may represent an interim solution to achieving a crossing, although should not be the only option considered.

Redhayes Bridge – Exeter

Walk/Cycle bridges can be relatively cost effective. A recent example is the Redhayes Bridge in Exeter, spanning the M5. The bridge connects the East of Exeter Growth Point development area with the main Exeter urban area via a 82m twin-arch. The bridge cost £4m and opened in 2011.



Recommendations: Design in high quality cycle network to the development from the start with a clear hierarchy and network of routes within both developments.



Ensure Readybike bicycle hire scheme is extended into the site at the earliest opportunity.

Improved crossing of M4 is essential to achieving high cycle mode share for trips to employment areas. Interim option to explore use of Kybes Lane, with longer term separate crossing to be clear aspiration.

5.8 Long Term Interventions

- 5.8.1 The development at Grazeley will have a long timeline, with development unlikely to be completed for 20 years or more. Therefore, the Masterplan proposals need to have an element of 'futureproofing' by considering longer term technology advances.

Autonomous Vehicles

- 5.8.2 A significant emerging development in transport which will need to be considered as the settlements develop is the prospect of Autonomous Vehicle (AV) technology, as referenced earlier in the report. Presently, the types of vehicles, and the extent to which AV technology will be adopted across the country is relatively unknown. The technology of the vehicles themselves is developing very rapidly, whilst the infrastructure and governance of their potential networks is somewhat behind.
- 5.8.3 It is clear that AV use is gathering momentum, however, and the design of the development will need to consider some elements of 'futureproofing'. This will be in the street design, in terms of dimensions that can be adapted to accommodate AV (or reduced to allow for less road space demand); parking and development plots may need to be adaptable should car ownership reduce significantly through AV use.
- 5.8.4 A recent white paper, jointly published by WSP|PB and Farrells¹, has set out to consider the impact on places – both urban and rural – of the introduction of autonomous vehicle technology. The report suggests that between 15% and 20% of additional developable land can be created where shared AV use is proposed compared to a normal urban layout. The land is primarily gained through the removal of parking spaces. They also suggest land is gained through more simplified travel corridors. The report highlights that cars are typically parked for 80% of the time, creating a significant waste of land. The widespread use of AV could transform suburban areas to free up a considerable amount of land currently used for parking.

Recommendations: Ensure all areas of the development, from individual plots to street sections and circulatory areas, are designed with future adaptation to technology and travel behaviour changes.

¹ <http://www.wsp-pb.com/GlobalIn/UK/WSPPB-Farrells-AV-whitepaper.pdf>



5.9 Summary of Recommendations

5.9.1 This chapter has set out a series of recommendations and factors to be considered when developing the plans for any future development around Grazeley. These recommendations are set out below:

- Develop a clear framework of density targets related to sustainable transport accessibility, using Dutch ABC style zoning as a basis for both development sites.
- Internalise as many trips as possible through mixed land uses with walkable neighbourhoods and high quality services and infrastructure including schools, retail, live-work units, high speed broadband, delivery hubs and workhubs.
- Parking needs to be restrained but viable. Linking parking to density and sustainable transport access provides a clear approach which can be adopted by developers as the site expands.
- Consideration of potential additional highway crossing of M4 subject to modelling of J11 capacities with full sustainable transport strategy. Alignment of any crossing is considered a challenge in the vicinity of Reading International Business Park.
- Connections into the Grazeley site from the south from A33 to encourage some transfer from car to rail where possible.
- Strategic highway access will still be required and the A33 should act as the 'front door' of the development with quality frontage and street design.
- A new station should form a central element of any future transport strategy for a development at Grazeley.
- Extend MRT into the site with segregated routes where possible. Branding of the network/corridor with high quality vehicles and facilities provides the opportunity to attract new public transport users. Identification of key corridors through the site that can be adapted for future technology.
- Consider options for expansion of Park and Ride facility at Mere oak and extend to include cycle facilities including Readybike. Improved pedestrian and cycle links to the facility to enable local residents to make better use of these services, particularly from the eastern side of the A33.
- Design in high quality cycle network to the development from the start with a clear hierarchy and network of routes within both developments.
- Ensure Readybike hire scheme is extended into the site at the earliest opportunity.
- Improved crossing of M4 is essential to achieving high cycle mode share for trips to employment areas. Interim options to explore Kybes Lane, with longer term separate crossing to be clear aspiration.



6 Forecast Travel Patterns

6.1 Introduction

- 6.1.1 This section considers the future travel patterns of the potential Grazeley development site. As a basis, the analysis has used the 2011 Census Journey to Work data for the wider Reading area to consider the level of achievable sustainable travel, comparing a number of areas across Reading where the access to public transport and the housing density would be similar to the proposals at Grazeley.
- 6.1.2 The proposed transport infrastructure and level of service improvements outlined in Chapter Seven have been used to forecast a future modal split for residents of the development.

6.2 Standard Trip Generation – Wokingham Strategic Model Trip Rates

- 6.2.1 A trip generation exercise has been undertaken using the trip rates as applied within the Wokingham Strategic Transport Model. The trip rates are based on a TRICS assessment undertaken on behalf of WBC. These trip rates assume no trip internalisation or linked trips as they are based on much smaller development quantum and, as such, are not representative of the likely trip levels at the Grazeley site.

Table 6-1: WBC Strategic Model Vehicle Trip Rates and Forecast Vehicle Trips

	AM Peak			Inter-Peak			PM Peak		
	Arrival	Departure	Total	Arrival	Departure	Total	Arrival	Departure	Total
	Trip Rates								
Dwelling Houses	0.13	0.4	0.53	0.17	0.16	0.33	0.33	0.2	0.54
Dwelling Flats	0.08	0.2	0.28	0.08	0.07	0.16	0.17	0.08	0.25
	Forecast Trips - Grazeley								
Dwelling Houses	1462.5	4500	5962.5	1912.5	1800	3712.5	3712.5	2250	6075
Dwelling Flats	300	750	1050	300	262.5	600	637.5	300	937.5
TOTAL	1762.5	5250	7012.5	2212.5	2062.5	4312.5	4350	2550	7012.5

**Table 6-2: WBC Strategic Model Public Transport Trip Rates and Forecast Total Trips**

	AM Peak			Inter-Peak			PM Peak		
	Arrival	Departure	Total	Arrival	Departure	Total	Arrival	Departure	Total
	Trip Rates								
Dwelling Houses	0.01	0.05	0.06	0.02	0.01	0.03	0.03	0.01	0.04
Dwelling Flats	0.01	0.1	0.1	0.01	0.01	0.01	0.03	0	0.03
	Forecast Trips - Grazeley								
Dwelling Houses	112.5	562.5	675	225	112.5	337.5	337.5	112.5	450
Dwelling Flats	37.5	375	375	37.5	37.5	37.5	112.5	0	112.5
TOTAL	150	937.5	1050	262.5	150	375	450	112.5	562.5

- 6.2.2 The use of standard TRICS trip rates in isolation results in very high levels of vehicular trips being forecast. A development of 15,000 households will generate a significant level of 'internalisation' which is discussed further below.

6.3 National Travel Survey – First Principles Approach

- 6.3.1 The National Travel Survey (NTS) 2015 has been used to forecast in more detail the number of trips by mode and purposes likely to be generated by the development. This has used a first principles approach.
- 6.3.2 To calculate the total trips per households, a number of reports from the NTS have been used. The NTS states that in the South East, an average of 946 trips per person were recorded. Based on the 2011 Census, the average population per household in Reading was 2.47. Therefore, a total of 2,343 trips per household per year can be assumed. This can then be calculated as 6.8 trips per household each weekday.
- 6.3.3 When considering the peak hour, the morning peak accounts for 11.9% of trips and the evening peak hour accounts for 7.9% (based on table NTS 0502). This can then be applied to trip purposes to derive a trip rate by purpose by peak hour as shown in Table 6.3.

**Table 6-3: Breakdown of Forecast Trips by Purpose – Grazeley Site**

Trip Purpose	Percentage		Trip Rate		Total	
	AM	PM	AM	PM	AM	PM
Commuting	22%	34%	0.18	0.18	2672	2724
Shopping	4%	12%	0.03	0.06	486	961
Leisure	3%	19%	0.02	0.10	364	1522
Personal Business	17%	24%	0.14	0.13	2065	1923
Education	50%	5%	0.40	0.03	6072	401
Other	3%	6%	0.02	0.03	364	481
Total	100%	100%	0.80	0.53	12023	8011

6.3.4 The NTS can also be used to calculate mode split by journey purpose as follows:

Table 6-4: Mode Share by Journey Purpose

Mode	Walk	Cycle	Car	Mcycle	Bus	Rail	Other
Commuting	10%	4%	70%	1%	8%	6%	2%
Shopping	25%	1%	63%	0%	9%	1%	1%
Leisure	18%	2%	70%	0%	5%	2%	4%
Personal Business	27%	1%	63%	0%	5%	1%	2%
Education	39%	1%	44%	0%	10%	2%	4%
Other	35%	0%	62%	0%	2%	0%	0%

6.3.5 When this modal share breakdown is applied to the trip rates detailed in Table 6-3, the breakdown of trips by mode and purpose can be calculated for each site.

Table 6-5: Trips by Journey Purpose – Grazeley Site

Mode	Walk		Cycle		Car		Mcycle		Bus		Rail		Other	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Commuting	265	270	98	100	1858	1894	31.3	31.9	212	216	169	173	38	39
Shopping	120	238	5	10	307	607	1.0	1.9	43	85	4	7	6	12
Leisure	66	274	6	26	254	1063	1.0	4.3	17	71	7	29	13	55
Personal Business	561	523	21	20	1306	1217	5.1	4.8	106	99	21	19	43	41
Education	2363	156	88	6	2683	177	2.5	0.2	592	39	105	7	238	16
Other	129	170	1	1	226	298	0.3	0.4	6	7	1	1	2	2



- 6.3.6 As the trip purposes and modes are broken down it begins to emerge which categories of trips are likely to be 'internalised' within these new settlements.
- 6.3.7 Both education and shopping trips can be assumed to be primarily trips made within the settlements, particularly the Grazeley development where primary and secondary schools and retail centres will be provided. A proportion of commuter trips can also be assumed to be internalised through residents working within employment areas in Grazeley.
- 6.3.8 As the Masterplan for the Grazeley site develops, a more detailed trip model can be developed which forecasts the level to which trips will be retained within the settlements. This will enable sustainable transport interventions to be targeted towards particular journey types and modes.



7 Modal Share and Accessibility

- 7.1.1 The 2011 Census and the National Travel Survey provide a comprehensive record of travel patterns in the area. Although the Census data collected only relates to commuting journeys, these account for almost 20% of all daily trips², particularly those travelling outside of a settlement during peak hours as discussed in Chapter 8.
- 7.1.2 The Journey to Work data has been analysed in detail for the wider Reading/Wokingham area to understand the local relationship between access to sustainable transport and mode share. This analysis provides a basis upon which the sustainable transport mode share can be forecast for the new settlements, and a potential target for development density around areas of high accessibility.

7.2 Mode Share Variation - Reading

- 7.2.1 The variation in sustainable transport mode share has been modelled across the Reading and Wokingham areas to understand the local patterns in sustainable travel. Figures 7.1 to 7.3 show the variation in journey to work mode share of rail, bus and cycle use by output area.
- 7.2.2 Figure 7.1 clearly demonstrates the correlation between proximity to rail stations and rail mode share, as would be expected. This is particularly the case for mainline stations such as Reading and Twyford which have regular direct services into Central London. In some areas of central Reading and Twyford, journey to work mode share is higher than 30% compared to an average across Reading of 9%.
- 7.2.3 Figure 7.2 shows the equivalent data for bus modal share. This shows a mode share of up to 30% in some parts of Reading. These areas of high bus use correlate with key bus corridors, as shown by the bus stop locations.
- 7.2.4 The plans show the direct relationship between the proximity and access to frequent public transport services and the modal share. This relationship can be used to start to forecast the likely mode share of residents of the Grazeley development based on the level of sustainable transport services provided and proximity to access to these services. This approach uses a similar, if simplified approach as PTAL calculations in Greater London.
- 7.2.5 To further consider the likely impact on modal share of access to sustainable transport services, analysis has been undertaken to measure the relationship of public transport access and frequency, and modal share. For the purposes of this high level strategy, an analysis has been undertaken of bus and rail accessibility only.

² 2015 National Travel Survey



Figure 7-1: Rail Journey to Work Mode Share by Output Area

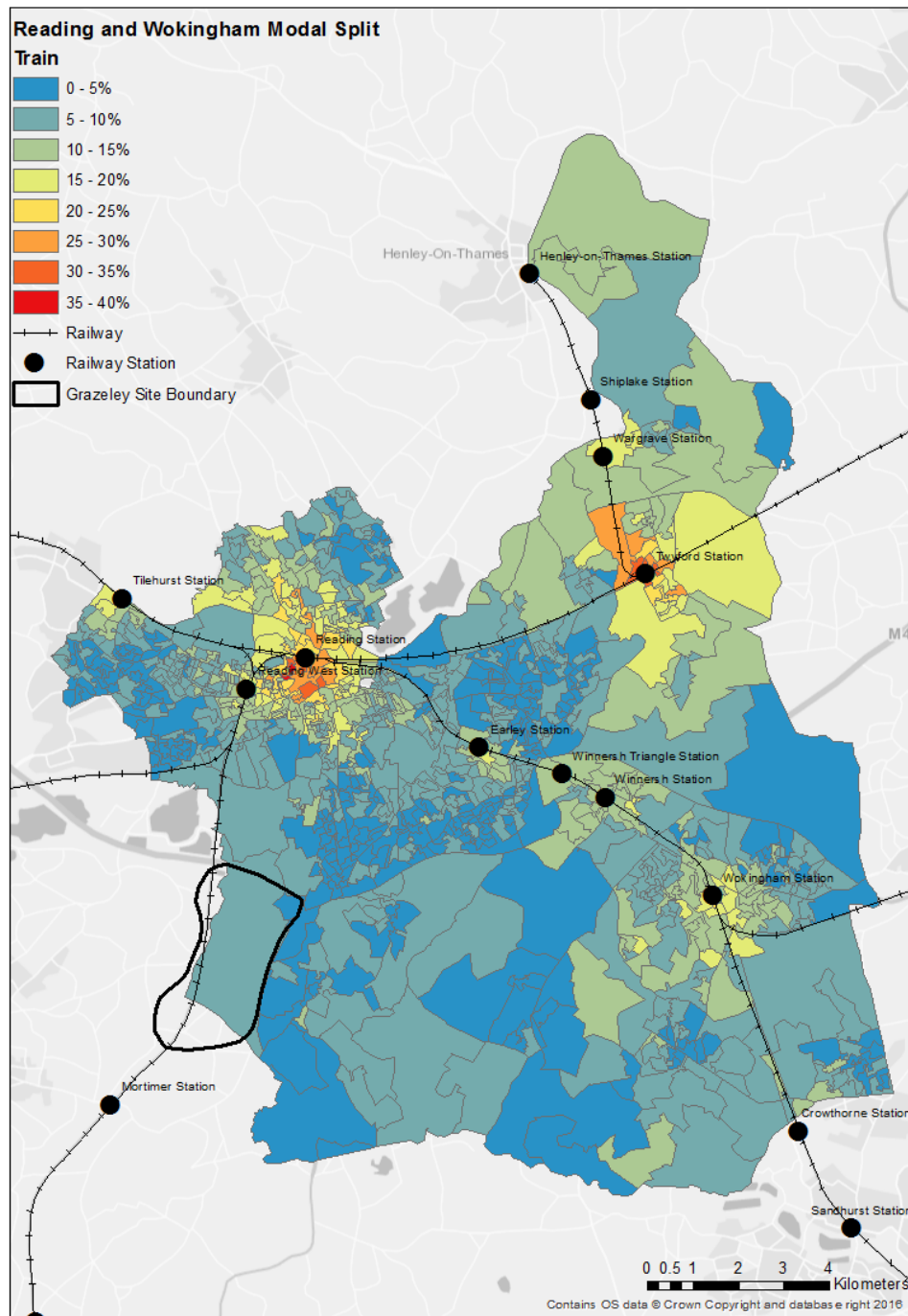




Figure 7-2: Bus Journey to Work Mode Share by Output Area

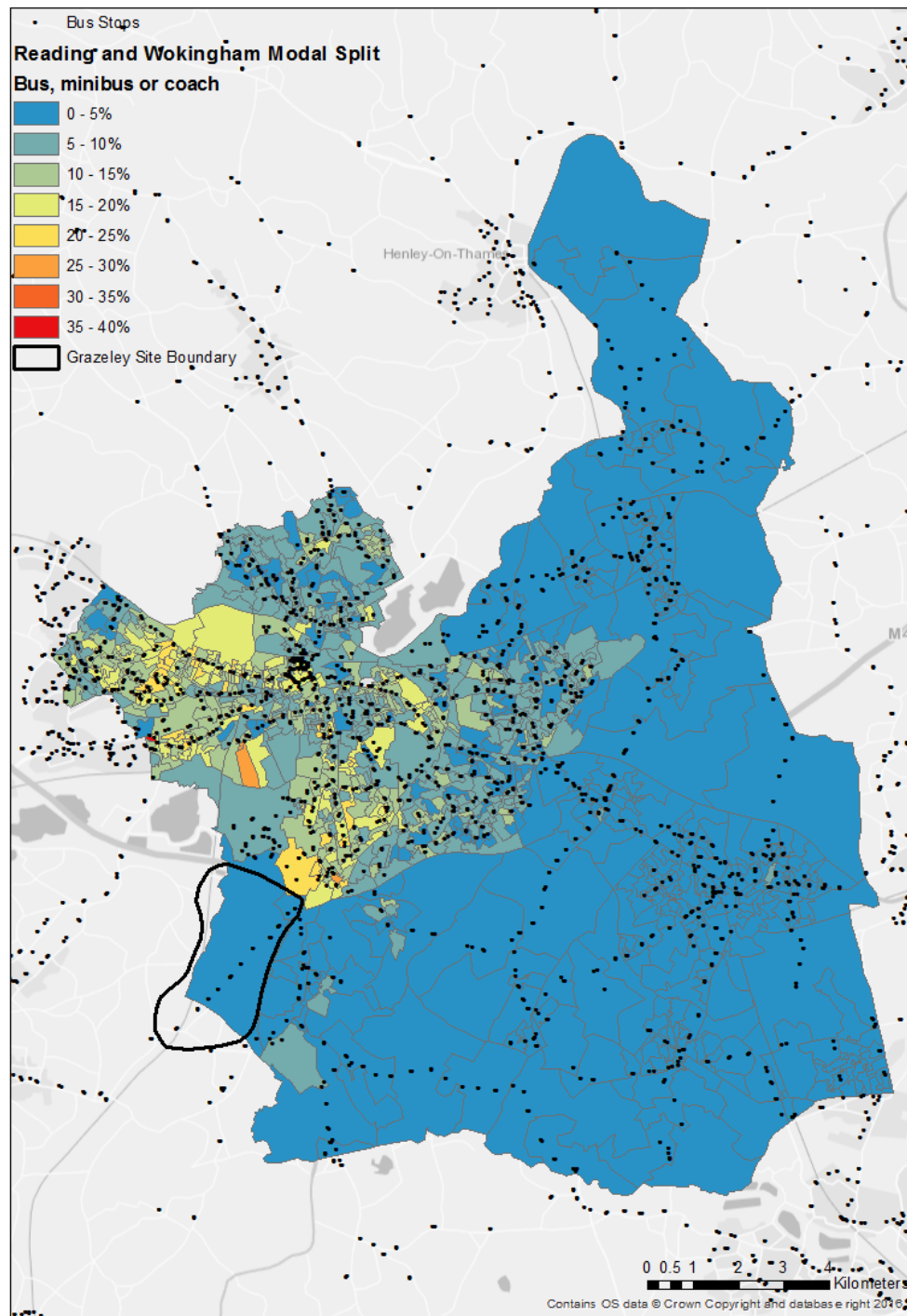
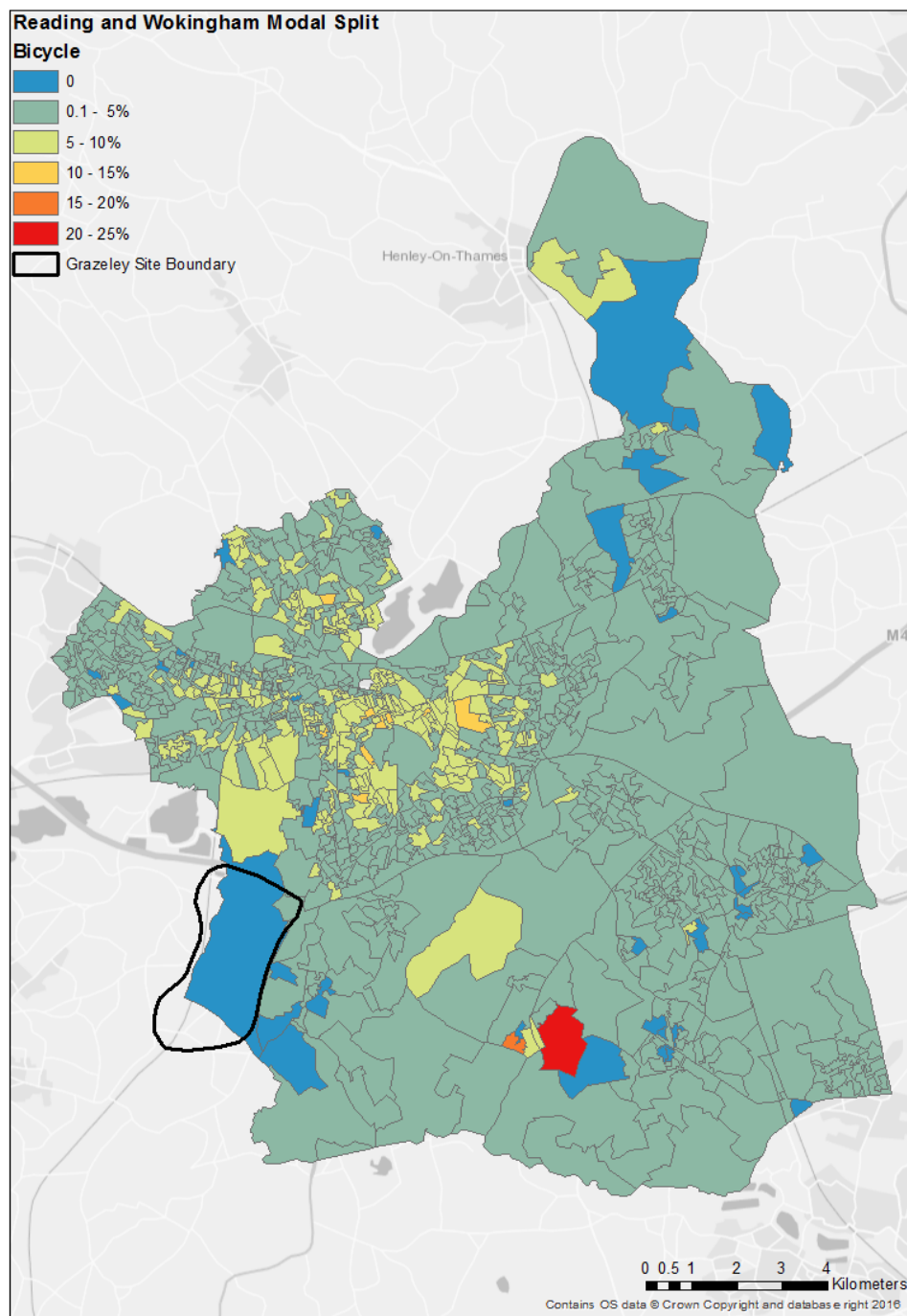




Figure 7-3: Cycle Journey to Work Mode Share by Output Area

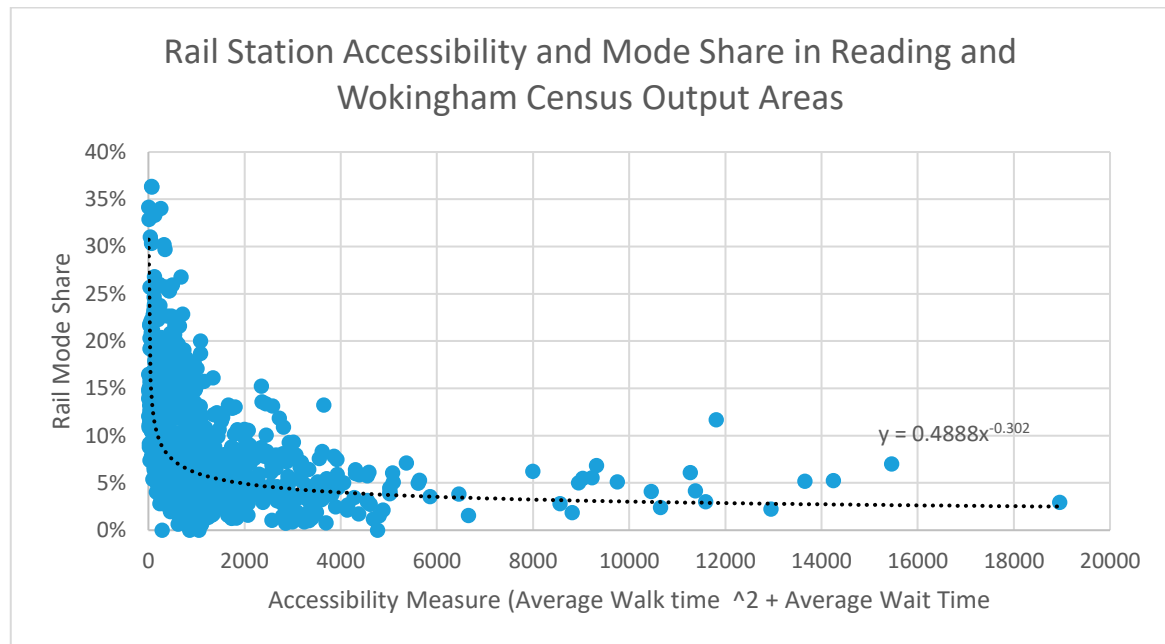


Rail Accessibility

- 7.2.6 To model the relationship between access to rail services and modal share, the rail mode share by outputs area has been modelled against a measure of accessibility encompassing walk time and service frequency as shown in Figure 7.4.



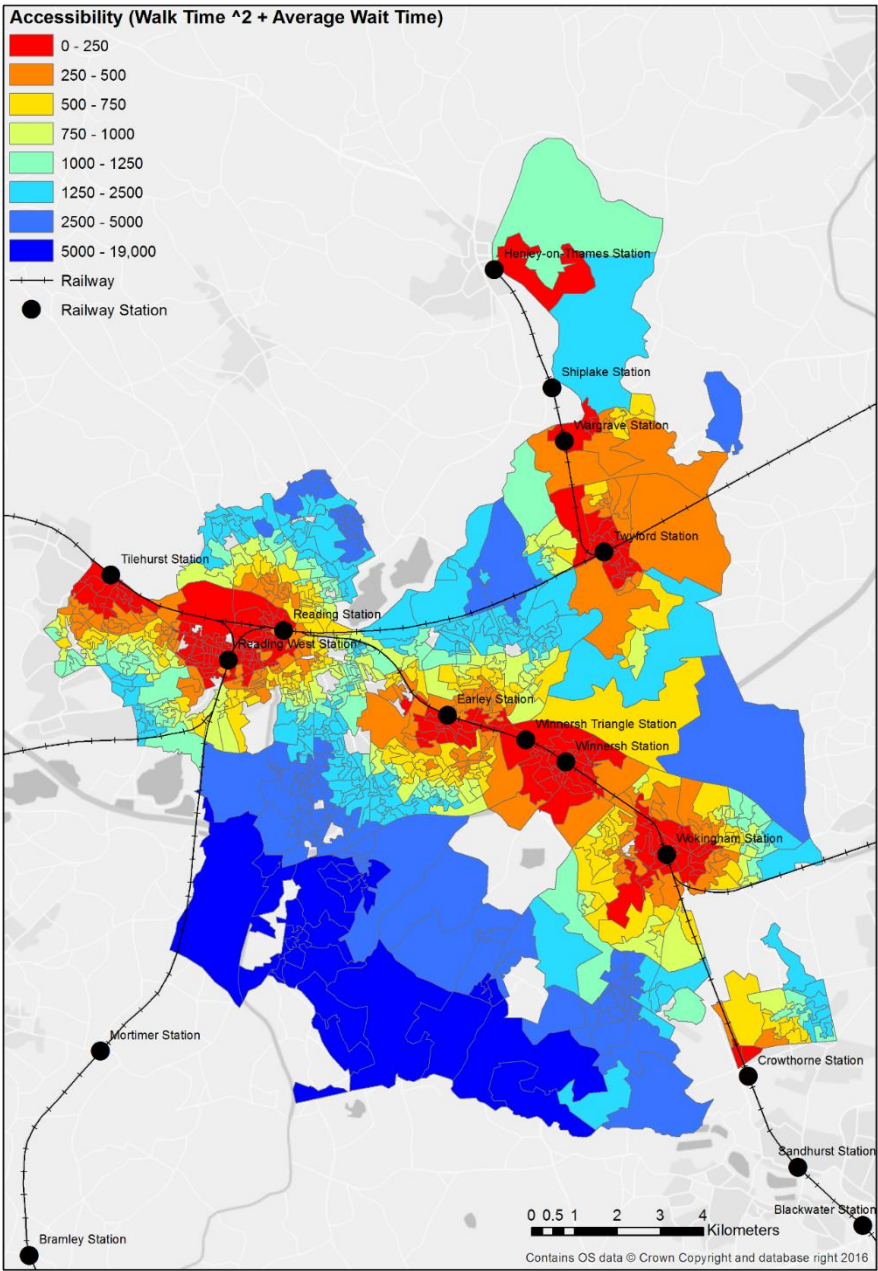
Figure 7-4: Rail Accessibility Assessment



- 7.2.7 The graph shows a direct relationship between mode share and accessibility to rail services. Areas of central Reading, within walking distance of Reading Station, have a rail modal share of up to 35%. This relationship can be used to forecast the likely rail use in the new developments based on the available services and proximity to stations.
- 7.2.8 Figure 7-5 displays this variation in accessibility across the study area. This clearly shows the relationship between proximity to stations and rail accessibility.



Figure 7-5: Rail Accessibility Map





Bus Accessibility

- 7.2.9 Again, to model the relationship between access to bus services and modal share, walk access to bus routes across Reading has been modelled against a measure of accessibility encompassing walk time and route frequency. For the purposes of this exercise, access to all bus stops from each census output area was modelled due to limited resource to undertake a more complex analysis. The overall results produced a similar pattern of modal share against accessibility. The pattern is shown more clearly in the map of accessibility by output area with a clear increase in accessibility in the central Reading area.
- 7.2.10 A more refined analysis should be undertaken to model the relative accessibility along route corridors based on a finer grain of analysis than output area. It is recommended this is undertaken at 100metre intervals.

Figure 7-6: Bus Accessibility Assessment

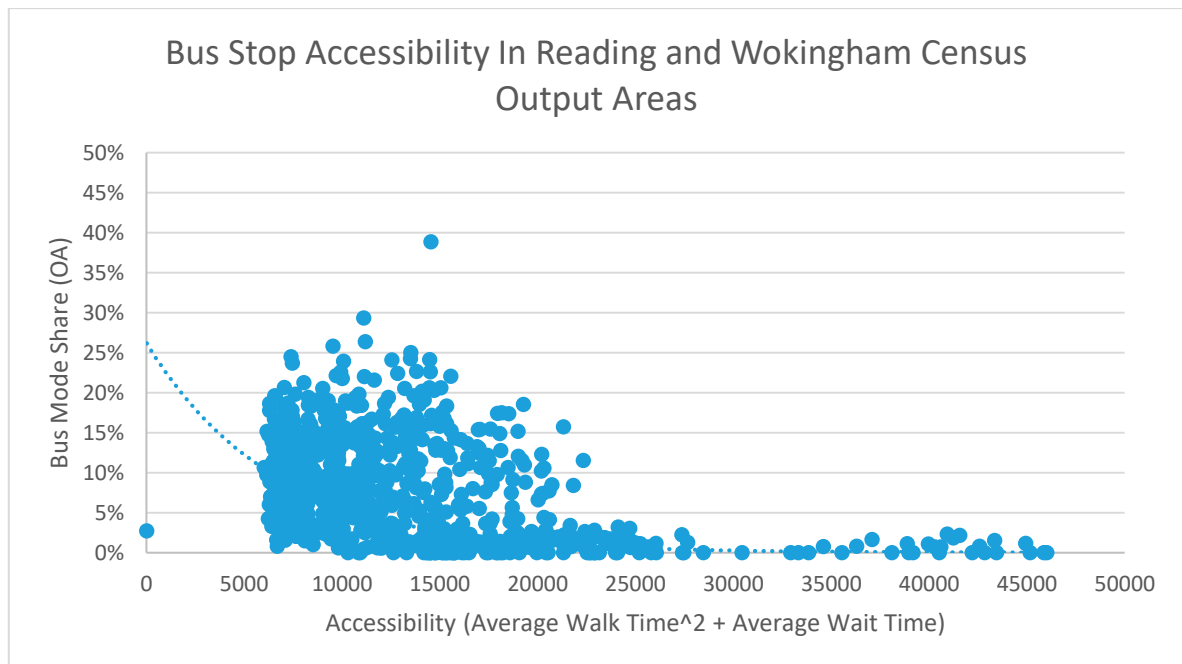
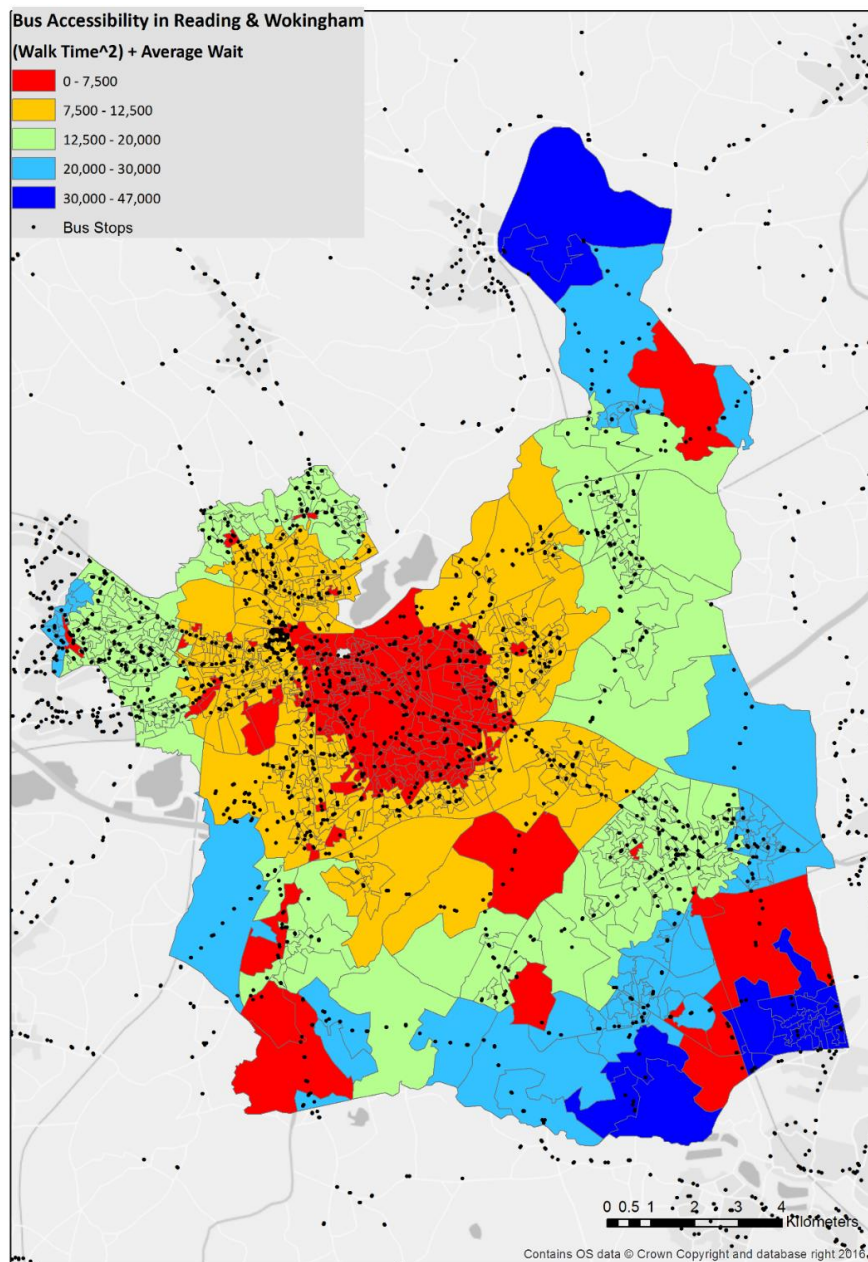




Figure 7-7: Bus Accessibility Map

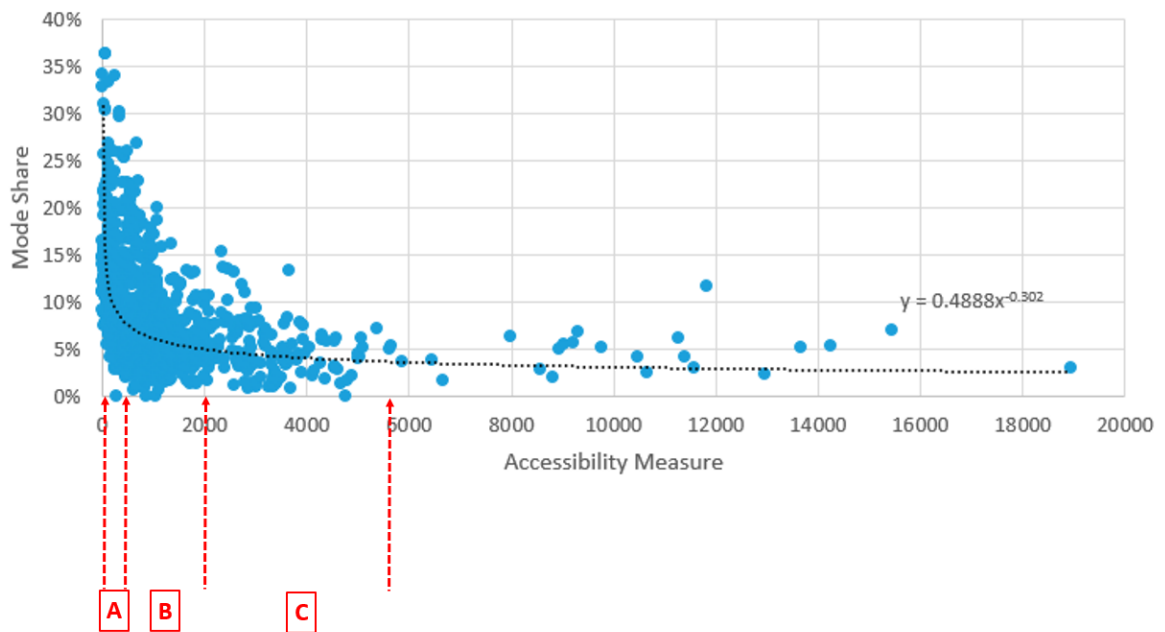


Composite Accessibility Measure

- 7.2.11 The combined rail and bus accessibility can be combined to achieve a composite measure of accessibility against mode share.
- 7.2.12 This composite measure can then be used to forecast modal share across a new development and influence the housing density.



Figure 7-8: Example Composite Accessibility Measure



- 7.2.13 Figure 7-8 above demonstrates how the 'ABC' zoning can be defined according to the composite accessibility measure based on the forecast mode share that is achievable.
- 7.2.14 The process of developing the transport strategy can be undertaken alongside this analysis to develop the optimum location for rail, bus and cycle networks to achieve the most sustainable mode share.
- 7.2.15 For the purposes of this report, the composite measure set out below is an example of how density and/or parking provision can be related to accessibility across a large site development.

Recommendation: Further assessment be commissioned to model sustainable transport accessibility – both current and future – to devise an 'ABC' style model to apply to density and/or parking provision. This would build upon the existing analysis and create a finer level of accessibility measure. Such a measure can then be applied to the proposed development site to determine the appropriate level of density and/or parking levels to recommend as the masterplan and relevant design codes emerge.



8 Recommended Next Steps

- 8.1.1 The recommendations made within this report are based on a high-level review of transport conditions and proposed interventions at the Grazeley development site.
- 8.1.2 As the Masterplans for the site emerges, the forecasting can be refined in order to test various sustainable transport scenarios. This will enable the optimum transport strategy to be developed for Grazeley.

Highway Network

- 8.1.3 Further modelling of the wider highway network is required in order to understand the future available capacity both through Junction 11 of the M4 and along the A33 corridor.
- 8.1.4 Options for achieving a new highway crossing of the M4 need to be assessed in more detail. The lack of available landing points to the north may restrict the viability of such a proposal.

Rail Proposals

- 8.1.5 The proposals to relocate Mortimer station need to be further assessed in the context of the available capacity on the Basingstoke to Reading line both pre- and post-electrification.
- 8.1.6 Parking options at a new station should be carefully considered as to the potential to achieve modal shift whilst not attracting excessive traffic into the site.

Bus Proposals

- 8.1.7 A high-quality bus network should be devised at the earliest opportunity. This will need to consider available capacity on the A33 corridor, with the potential to consider alternative north-south routes over the M4.
- 8.1.8 Bus infrastructure such as guided or segregated routing to achieve reduced journey times should be prioritised.

Cycle Network

- 8.1.9 A high quality and direct route across the motorway should be prioritised with potential alignments considered at the earliest opportunity.
- 8.1.10 A Route Assessment exercise can be undertaken to forecast the likely shift to cycle use depending on the quality of the infrastructure, the gradient and the routing.



8. Recommended Next Steps

Future Technology

- 8.1.11 Ensure the masterplan considers the future impacts of technology development such as Autonomous Vehicles, guided buses and electric vehicles to create adaptable corridors and networks.



Appendix A Review of Railway Crossings

Thames Valley Berkshire LEP

Railway crossings between the M4 at Green Park and Cross Lane at Grazeley

September 2016

About Sustrans

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Author	Simon Pratt
Checked by	

1. Pingewood Road South

Signal controlled road crossing over the railway. Long approach ramps to bridge between signal heads make this intimidating for pedestrians and cyclists. Single lane carriageway with no footways.



2. Burnthouse footpath

Unsurfaced footpath between Burnthouse Farm and Hopkiln Farm. Surface crossing of the railway would almost certainly need grade separation (e.g. a footbridge) for Network Rail approval.



3. Poundgreen Bridge

Moderately busy road passes under the railway. Road junction immediately to the west of the bridge. Two traffic lanes but no footway.



4. Shepherdton Lane bridge

Farm track with rough gravel surface passes under the railway with a substantial bridge. Public Byway status gives right of public access which must be protected as this is the only good crossing of the railway without traffic.



5. The Gables restricted byway

Unsurfaced narrow green lane with overhanging vegetation crosses the railway on the level. Grade separation would almost certainly be needed (e.g. a footbridge) for Network Rail approval.



6. Cross Lane

Road bridge over the railway with two narrow traffic lanes and no footway. Moderately busy road linking Three Mile Cross, Grazeley and Mortimer.



