

REPORT N^o 70024842 – TS1

STRATEGIC VISION FOR SOUTH EAST CALDERDALE

TRAFFIC STATEMENT

CONFIDENTIAL

OCTOBER 2016

BRIGHOUSE SUSTAINABLE URBAN EXTENSIONS

THORNHILLS LANE & WOODHOUSE

Calderdale Metropolitan Borough Council

Project no: 70024842

Date: October 2016

WSP | Parsons Brinckerhoff

Three White Rose Office Park,
Millshaw Park Lane, Leeds, LS11 0DL

Tel: +44 (0) 113 395 6453

www.wsp-pb.com

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Date	Oct 16			
Prepared by	Joe Eyles			
Signature	JAE			
Checked by	Geoff Bowman			
Signature				
Authorised by	Geoff Bowman			
Signature	GWB			
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INTRODUCTION

- 1.1.1** WSP | Parsons Brinckerhoff, working with Spawforths, on behalf of Calderdale Council have been appointed to support the evidence base for the Local Plan and to carry out a master-planning exercise for two of the Sustainable Urban Extensions within the Brighouse/Rastrick area. These sites are :-
- Thornhills Lane; LP1463; Land between Highmoor Lane and Bradford Road, Brighouse ; 140.66ha ; current allocation Green Belt. This site will be referred to as Thornhills Lane.
 - Woodhouse; LP1451; Land between Bradley Wood and Woodhouse Lane, Rastrick; 63ha; current allocation Green Belt. This site will be referred to as Woodhouse.
- 1.1.2** This Traffic Statement accompanies the Masterplan document. It sets out the background to the sites, access to sustainable modes of transport and highway infrastructure improvement which are coming forward. However, its main purpose is to set out the traffic modelling work that has been carried out to support the Strategic Vision for South East Calderdale and the Masterplan.
- 1.1.3** Calderdale Council is at an advanced stage in the preparation of its Local Plan. As part of this process there is a need to identify specific allocations for around 13,000 new dwellings and to consider longer term scenarios associated with City Region long term growth post 2030.
- 1.1.4** The balance of evidence indicates that Brighouse and Rastrick will be the key focal points for new residential development. This is due to the availability of land and their relative sustainability, with fewer potential impacts on the important environmental designations in the west of the District. Brighouse as a town is also likely to benefit from capacity improvements to the A641, A644 and potentially also a new M62 junction 24a which could all be delivered through the West Yorkshire + Transport Fund.
- 1.1.5** Consideration has been given to focusing development on a small number of Sustainable Urban Extensions which have the potential to offer a greater opportunity for sustainable development because they are of sufficient scale to provide a planned 'garden village' layout with enhanced local facilities and infrastructure, and the ability to manage and mitigate impacts in a more holistic manner.
- 1.1.6** The master plan provides a high level site layout showing how this helps to address the housing needs of the district and sets a framework for placemaking across the two sites. It also provides a commentary on access to the sites and a high level assessment of the cumulative impact of housing and employment allocations within Calderdale and the neighbouring districts.
- 1.1.7** It is demonstrated that the sites are complementary and are in sustainable locations. Nevertheless, it is recommended that additional facilities are provided as the sites are built out. They will benefit from the comprehensive highway infrastructure improvements which are being delivered alongside the Local Plan.

1.1.8

The modelling work set out in this report demonstrates that the existing network is presently operating satisfactorily but with some key junctions that have insufficient capacity which result in queuing and delays on critical parts of the network. The impact of the Thornhills Lane and Woodhouse sites will result some more onerous impacts by the end of the local Plan Period. However, it is reasonable to expect that the highways infrastructure improvements coming forward will mitigate this impact. Hence it is concluded that there is no highways reason why the two sites should not be allocated in the forthcoming Local Plan.

2 BASELINE

2.1 THE SITES

2.1.1 Thornhills Lane Site (LP1463)

- 2.1.1.1 The proposed sustainable urban extension site boundary at Thornhills Lane is outlined in figure 2-1. The site is located to the north-east of Brighouse town centre between the A641 Bradford Road and the A643 Highmoor Lane. The site is east of Clifton Beck and the Wellholme Park Woodland and extends to Common End Farm in the North. The majority of the site is used for farmland, although there are currently a small number of properties on the site; they are located near to Gospel Hall Farm on Thornhills Lane and off Thornhills Beck Lane.
- 2.1.1.2 The site area is 140.66 hectares in total and is very hilly, with steep slopes up from the town centre towards the high point at 133m in the centre of the site.

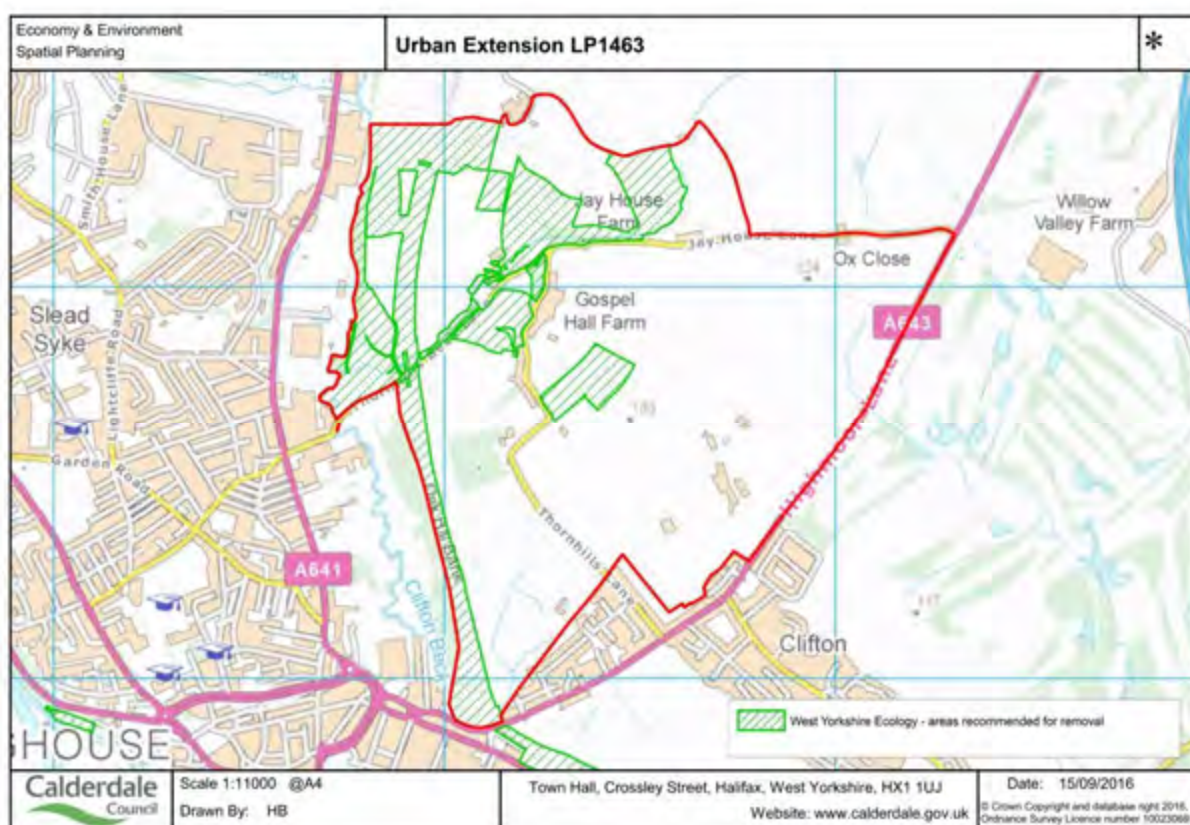


Figure 2-1: Thornhills Site Location

2.1.2 Woodhouse Site (LP1451)

- 2.1.2.1 The Woodhouse site boundary of the urban extension (LP1451) is outlined in Figure 2-2. The site is located on farmland to the south of Brighouse town centre and is bounded to the north-west by the existing Woodhouse area of Brighouse which is predominantly residential.
- 2.1.2.2 The south east boundary of the site is formed by Bradley Wood which houses an activity centre and campsite. There is also a narrow track which gives access to Firth House. The M62 lies to the south of the woods. The western edge of the site is formed by the A641 Huddersfield Road and the Brighouse to Mirfield railway line runs along the eastern edge.
- 2.1.2.3 The size of the site is 63 hectares in total, before any areas have been removed for ecology reasons. The site's topography is undulating and slopes from west to east towards the valley of the River Calder.

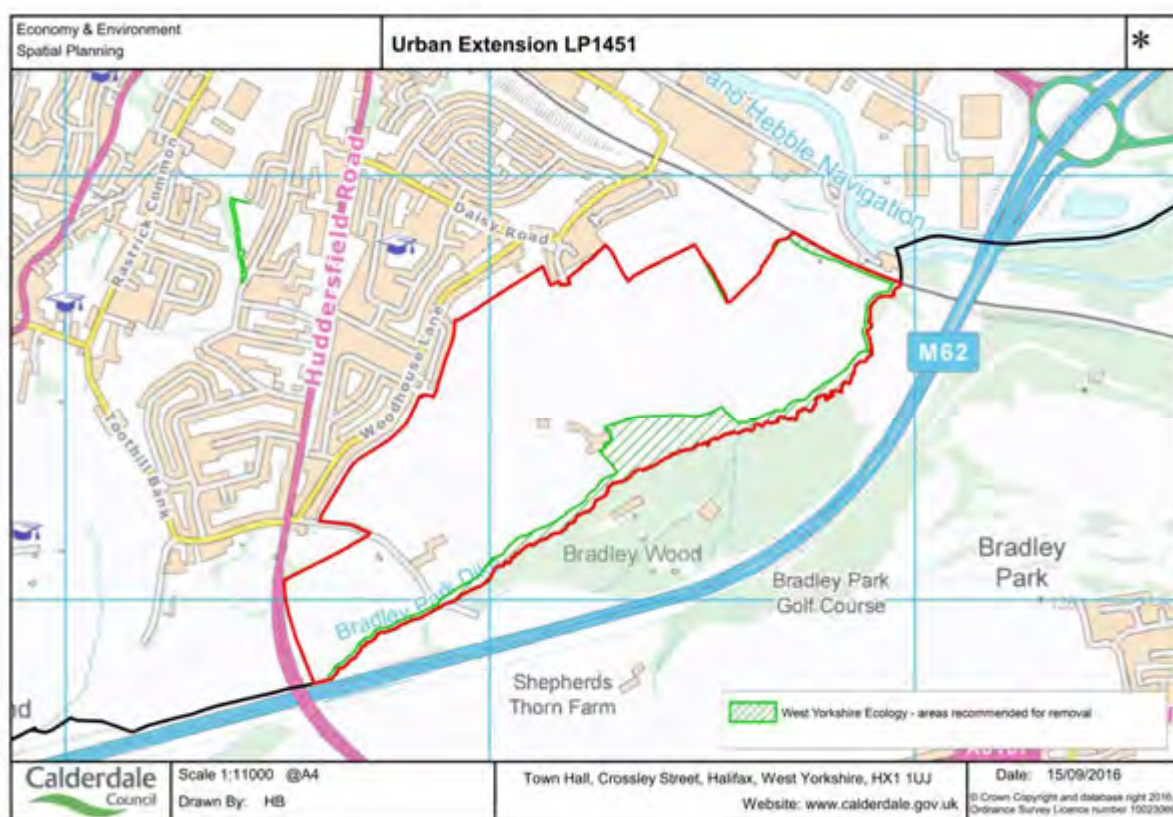


Figure 2-2: Woodhouse Site Location

2.2 THE HIGHWAY NETWORK

2.2.1 Local Highway Network

- 2.2.1.1 The Thornhills Lane site lies between the A641 and the A643 which lead out of the town centre to the north and north-east.
- 2.2.1.2 A643 Walton Lane forms the eastern boundary of the site. It runs from the edge of Brighouse town centre, up the side of the valley to its junction with A649 Halifax Road. The layout of this junction does not comply with modern day standards but operates satisfactorily at present.
- 2.2.1.3 Along its length, A643 is a wide 'A' class road. Along its upper section, it has a footway to the east side or the west side but not both. Further down, as it runs towards the town centre, it is known as Highmoor Lane and Clifton Common and has footways to both sides and is subject to a 30 mph speed limit as it enters the town. At its southern end it forms roundabout junctions with A644 and A641 in Brighouse town centre.
- 2.2.1.4 Jay House Lane forms part of the north boundary of the site and at its north-east end it forms a junction with A643. This junction has good visibility in both directions and it is operating satisfactorily at present. Jay House Lane runs across the site in a south-east direction where it is known as Thornhills Beck Lane to cross Clifton Beck at a ford and emerge on to A641.
- 2.2.1.5 A641 runs in a north-south direction to the west of the site and to the west of Clifton Beck. It forms a major part of the road network in Brighouse and beyond, linking the town with Bradford to the north and Huddersfield to the south.
- 2.2.1.6 In the vicinity of the Woodhouse site, A641 Huddersfield Road links Brighouse to Huddersfield, and bridges over the M62 motorway. The highway widens into a dual carriageway it approaches the M62 from the north and runs along the eastern boundary of the Woodhouse site.
- 2.2.1.7 There is access from the southern boundary of the Woodhouse site and Woodhouse Lane through Woodhouse along roads such as Daisy Road and Armitage Avenue which then join A641.
- 2.2.1.8 At the eastern end of the site, Woodhouse Lane meets Birds Royd Lane at a mini roundabout. Birds Royd Lane then crosses the railway line, turns sharply and runs down to join A641 to the south of the River Calder. A641 then crosses the river and enters the town centre.

2.2.2 The Operation of the Local Highway Network

- 2.2.2.1 In central Brighouse, the junctions that make up the through-route on the east side of the town are close to capacity. These include the junctions where the A641, A644 and A643 meet, with the inbound A644, inbound A643 and the junction of the A641 having the worst delays.
- 2.2.2.2 The capacity of the A644 to the south east of the town centre is restricted as a result of right turning traffic causing delays to other vehicles.
- 2.2.2.3 On the west side of the town the A644 / A6025 / A643 roundabout shows congestion on all arms and is operating beyond its capacity on the northern arm. Also, the junction of the A6025 and Brookfoot Lane shows capacity issues.

2.2.3 Strategic Highway Network

- 2.2.3.1 The M62 motorway passes near to both sustainable urban extension sites and junction 25 of the M62 is the nearest exit for both sites. The M62 extends from Liverpool in the west to Hull in the east and connects the nearby employment centres of Bradford, Leeds and Manchester with Brighouse.
- 2.2.3.2 M62 Junction 25 shows modelled link capacity issues on the circulating carriageway of the roundabout and congestion at the junction onto the roundabout from the A644 from Cooper Bridge.
- 2.2.3.3 The westbound and eastbound exits from the M62 also experience congestion. In the AM peak the westbound off slip is affected by queuing back onto the roundabout from the A644. In comparison the eastbound exit of the M62 is less affected as is the A644 approach from Brighouse.
- 2.2.3.4 Junction 25 forms a key access point for both Kirklees and Calderdale and hence it is showing issues of congestion. The known problems at Cooper Bridge also exacerbate the issues seen here.

2.3 TRAVEL BY SUSTAINABLE MODES

2.3.1 Active Modes

- 2.3.1.1 The central point of the Thornhills Lane Sustainable Urban Extension site is located approximately 1.5km from Brighouse town centre as the crow flies. Given the current footpath and highway layout, this would take approximately 24 minutes to walk. With regards to the Woodhouse site, the central point is approximately 1.5km from the town centre, measured as a geodesic distance. Using the current highway layout and footpaths on the site, this would take 21 minutes to walk.
- 2.3.1.2 The A644, which marks the northern edge of the town centre, is a major barrier to pedestrian movement. The A641 & A643 on the eastern and western sides of the town centre also constrain walkability. However, the older streets in the town centre and on the north and south sides of the town are permeable. To a lesser extent, the river, canal and railway line limit pedestrian movement to the south and west.
- 2.3.1.3 In general the gradients in and around Brighouse are steep but less challenging than other settlements in Calderdale and therefore do not act as a barrier to walking, although gradients may have an impact on walking routes throughout the Thornhills Lane site.
- 2.3.1.4 All of Brighouse is accessible from the town centre by a 15 minute cycle journey; this includes both proposed sustainable urban extension sites. A large proportion of the town, especially to the south, can be reached by cycle from the town centre within 10 minutes. The steep gradients on the north and south sides of the town may be a deterrent to cycling; this is particularly the case for the Thornhills Lane site. Highway design and the volume of traffic on the major roads around Brighouse also present a significant obstacle to cycling.
- 2.3.1.5 An improvement to cycle routes through Wellholme Park will increase the attractiveness of cycle trips for the Thornhills Lane site. Improvements to cycle facilities on Birds Royd Lane or Huddersfield Road are likely to have the same effect for residents of the Woodhouse site.

2.3.2 Bus services

- 2.3.2.1 Both the Thornhills Lane site and the Woodhouse site are within walking distance of Brighouse bus station, which is located in the north of the town centre just off the A644 Lüdenscheid link. From the station and other nearby stops, there are bus connections to Bradford, Elland, Halifax, Dewsbury and Huddersfield.
- 2.3.2.2 There are two bus corridors running alongside the Thornhills Lane site. Buses run along A641 Bradford Road at a combined frequency of 6 per hour and along the southern section of A643 Clifton Common at a combined frequency of 1 per hour.
- 2.3.2.3 Currently the existing Woodhouse estate is served by service 257 at a frequency of 1 per hour during the daytime only. The A641 Huddersfield Road, which passes the site at its south east edge, is used by services X63 & 363 which connect Brighouse with Huddersfield to the south and Bradford to the north.

2.3.3 Rail Services

- 2.3.3.1 The rail station in Brighouse is located south of the River Calder along the A641 Huddersfield Road. It is approximately 15 minutes' walk from the Woodhouse site and 25 minutes' walk from the Thornhills Lane site, although this could be shortened with improved pedestrian links through Wellholme Park. The station facilitates 1 train per hour on the Leeds to Manchester Victoria Line and 1 train per hour on the Leeds to Huddersfield. Journey times vary by time of day and route choice but Huddersfield can be reached in 12 minutes and Leeds in 34 minutes. Manchester Victoria is 64 away by train but still represents a commuting option for the residents of Brighouse.
- 2.3.3.2 Network Rail's Northern Hub improvements on the Calder Valley Line will improve line speeds to and from Brighouse. Alongside the associated junction and signalling enhancements, this will allow for more frequent services on the line and shortened journey times.
- 2.3.3.3 By 2019, the new Northern franchise will deliver new rolling stock on services calling at Brighouse and a new timetable which will increase service levels, including additional Sunday and peak services. Customers travelling from Brighouse and changing at Huddersfield or Dewsbury will benefit from improvements to the level of services offered on TransPennine express service.
- 2.3.3.4 Electrification of the nearby Trans Pennine line (in Control Period 7: 2016-2024) and the Calder Valley line (likely to be delivered by 2029) will release additional capacity on the line, enabling a higher level of service and shorter journey times to destinations such as Huddersfield, Halifax, Bradford and Leeds. These infrastructure improvements open the possibility that operators will offer services from Brighouse to stations not currently served directly.
- 2.3.3.5 A new station at Elland, proposals for which are to be studied in detail imminently, will improve local connectivity to the west of Brighouse. A new station will allow residents of the new sustainable urban extension sites to access Elland via public transport, as well as workers from Elland to access employment sites in Brighouse. New public transport infrastructure, such as the new station, is required to prevent increased congestion on routes from south-east Calderdale to Huddersfield, Leeds and other key employment centres.

2.4 **LOCAL FACILITIES**

- 2.4.1.1 The four local facilities figures in appendix A highlight the schools, healthcare and foodstores within two kilometres of the centre of both the sustainable urban extension sites.

2.4.2 Education

- 2.4.2.1 There are a number of primary, secondary and independent schools within a reasonable walking distance of the two sites. Two secondary schools are nearby to the Thornhills Lane site, Lightcliffe Academy and Brighouse High School. There are also seven primary schools within two kilometres.
- 2.4.2.2 Both Rastrick High School and All Saints Catholic College secondary schools are within two kilometres of the centre of the woodhouse site. There are several primary schools within a reasonable walking distance of the site. It is important to note that some of these facilities are located in north Huddersfield in the Kirklees district, the access to which is severed by the M62 motorway.
- 2.4.2.3 Calderdale has one further education college - the Calderdale College in Halifax. The vast majority of the borough's population lives within a 60 minute journey of the college. Brighouse is approximately 35 mins from the college by public transport. Many students resident in Calderdale travel to Kirklees to access post-16 and further education, particularly from Brighouse and surrounding areas. Greenhead College and New College in Huddersfield are popular choices among sixth form students from Calderdale.

2.4.3 Retail

- 2.4.3.1 The majority of the non-food retail units in Brighouse are found in the town centre, along with a wide variety of cafes, banks, a post office and numerous other facilities. The town centre is located 1km from the centre of the Thornhills Lane site. The centre of the Woodhouse site is slightly further from the town centre, approximately 1.5km as the crow flies. The large foodstores in the town, consisting of a Tesco and a Sainsbury's, are located to the east of the town centre.
- 2.4.3.2 Other shops near to the Thornhills Lane site are located to the West of the A641. There is a One-Stop Convenience store on Granny Hall Lane and a Premier Stores with nearby post office on Smith House Lane.
- 2.4.3.3 The Woodhouse estate, near to the proposed Woodhouse site, contains a Londis located very close to the edge of the proposed woodhouse site on the corner of Woodhouse Lane and Armitage Avenue. There is also a co-operative food in nearby Rastrick as well as an ASDA and a Nisa in north Huddersfield that are within 2km of the centre of the site.

2.4.4 Healthcare

- 2.4.4.1 There are two GP practices in the centre of Brighouse and a walk in health centre. There are also two GP surgeries in Rastrick, along with a mental health hospital. The nearest large hospital with an accident and emergency is 5 miles away in the south of Halifax.

3 PROPOSED DEVELOPMENTS

3.1 DEVELOPMENT SITES

- 3.1.1** The total area of the Thornhills Lane Site (LP1463) set aside for development is 61.71 hectares with 1926 proposed number of units, given the exclusions for SUDS, vehicular access and open space.
- 3.1.2** The total area of the Woodhouse Site (LP1451) set aside for development is 35.9685 hectares with approximately 1223 number of units, given the exclusions for ecology, vehicular access and open space.

3.2 DEVELOPMENT REQUIREMENTS

3.2.1 Facilities

- 3.2.1.1** It is recommended that a new primary school and secondary school site will be provided on the Thornhills Lane site and a primary school site be provided at Woodhouse.
- 3.2.1.2** Given the large size of the sites and the distance from Brighouse town centre, other social infrastructure such as doctors, dentists may also be necessary. This can often be seen as an opportunity for local NHS trusts and doctors surgeries. Retail units and pharmacies would be expected for the same reasons.

3.3 ACCESS

3.3.1 Thornhills Lane Site (LP1463)

- 3.3.1.1** The primary vehicular access from the west is from Bradford Road (A641) along Thornhills Beck Lane. This access is restricted because of existing buildings, the beck and the disused rail infrastructure. An alternative access off Bradford Road could be upgraded through the Calder Industrial Park, north of Brighouse Sports Club.
- 3.3.1.2** The easiest access to the site is from the wide A643 to the north east via Jay House Lane. This route could be complemented with an additional access to the southern end of Highmore Lane (A643) via either Cam Lane or Thornhills Lane. However, these options concentrate traffic onto a single road into Brighouse and onto numerous junctions which are already operating with limited capacity.
- 3.3.1.3** One further access is via a track from Woolrow Lane to the north, which passes under the disused railway track and into a small residential estate in Bailiff Bridge adjacent to Birkby Lane (A649).
- 3.3.1.4** A number of footpaths also traverse the site, of particular note is that the Bronte Way crosses the site following the alignment of Clough Lane through the site. This route is also part of the Spen Way Heritage Trail. Alongside the current paths, there is scope to improve cycling and pedestrian links across Wellholme Park, further improving access between the site and the town centre.

3.3.2 Woodhouse Site (LP1451)

- 3.3.2.1 Currently vehicular access is through the existing Woodhouse neighbourhood. This presents challenges to the development of the site and is likely to restrict the number of units which can be delivered on the site. Any access to the site, such as Firth House Lane and Shepherds Thorn Lane, are too narrow at present to accommodate significant vehicle flows. Widening these accesses and improving links south of Ryecroft Lane and Woodhouse Gardens will go some way to addressing this issue.
- 3.3.2.2 Due to the restrictions off Woodhouse Lane, it is likely that a new access road will have to be provided, possibly onto Huddersfield Road (A641) to the south of Gatehouse Lodge. Any junction close to the bridge over the M62 on the A641 would have to consider any plans to construct a new motorway junction at 24a.
- 3.3.2.3 There will also need to be improvements to junctions along A641 such as Daisy Road and Armitage Avenue and/or Birds Royd Lane to accommodate traffic from the development.
- 3.3.2.4 There are a number of footpaths and public rights of way which border and cross through the site. Access through to the Bradley Wood activity centre and campsite, as well as the footpath over the motorway, would need to be maintained.

3.4 HIGHWAYS IMPROVEMENTS

- 3.4.1.1 The masterplans for the two sites set out in this document demonstrate how over 3000 houses can be delivered in Brighouse over the next Local Plan period. The link between land use planning and the delivery of infrastructure is well understood and clearly development of this scale will require intervention of a significant scale.
- 3.4.1.2 Whilst the process of defining the details of such improvements is at an early stage, it is clear that they will need to address travel issues for pedestrians, cyclists, public transport users as well as car drivers. It is anticipated that funding for such infrastructure will come from both the private and public sector and will benefit both new and existing residents and businesses in the town.
- 3.4.1.3 The West Yorkshire Plus Transport Fund programme includes three potential transport investment projects that would, if delivered, support the delivery of the two urban extension sites.

3.4.2 A641 Bradford-Brighouse-Huddersfield

- 3.4.2.1 The first potential project is for the A641 Bradford-Brighouse-Huddersfield corridor. In June 2016, Calderdale Council successfully secured mandate approval to initiate a 'pre-feasibility' scoping and prioritisation exercise to identify the range, type and location of interventions required along the corridor in order to achieve the target outputs originally forecast when the scheme was prioritised for WY+TF delivery. This work will take account of the latest Local Plan growth assumptions in the Brighouse area, including the planned Urban Extensions and the M62 Enterprise Zone site at Clifton.
- 3.4.2.2 On conclusion of the pre-feasibility work, a further mandate will be submitted in Q4 2016/17 identifying additional funds required to undertake the feasibility work needed in order to advance the scheme to Gateway 1 (development approval) status.
- 3.4.2.3 The objectives of the scheme include the improvement of traffic flows between Bradford and Huddersfield; the reduction of congestion on A641; facilitating economic development in Brighouse Town Centre; unlocking land for development in Brighouse and at Clifton and Cooper Bridge; increasing the availability and use of sustainable transport modes in Brighouse; and the safeguarding and enhancement of the natural and built environment in Brighouse.

3.4.3 A644 improvements

- 3.4.3.1 The second scheme is the A644 improvement scheme. The scheme involves delivery of a new link road from Bradley Road to the A644. This will serve as the main access into the significant housing allocation proposed at Bradley Golf Course, before crossing the railway and the River Calder to join the A644 midway between M62 J25 and the A62/A644 junction at Cooper Bridge. This will remove a large proportion of existing traffic from the heavily congested Cooper Bridge junction, thereby reducing the scale of intervention needed there and enabling an access road into the Cooper Bridge site to be established.
- 3.4.3.2 Work to date has identified a preferred route for the Bradley Link Road based on engineering constraints. Further work is ongoing to verify this option from the perspective of other disciplines. Parallel work to masterplan the Cooper Bridge employment site will reflect the proposals for the A62/A644 junction and Bradley Link Road, once established.
- 3.4.3.3 Both this and the A641 proposal form part of a wider WY+TF Fund scheme for the A62 corridor. Following the conclusion of scenario testing work on Junction 24a, it is planned to develop a Gateway 1 submission for the A62 scheme for submission by Q3 2017/18.
- 3.4.3.4 M62 Junction 24a
- 3.4.3.5 Thirdly, a potential M62 Junction 24a comprises a separate project within the WY+TF programme intended to improve accessibility and reduce journey times for traffic wishing to access Brighouse, Huddersfield and surrounding areas.
- 3.4.3.6 Located on the A641 corridor, a new motorway junction, if delivered, could potentially assist Calderdale and Kirklees in realising their respective growth ambitions by relieving pressure on existing junctions with the motorway network.
- 3.4.3.7 Since the merits of the scheme have not yet been examined in any detail, no commitment to the delivery of M62 Junction 24a has yet been established. Clearly, delivery of a new motorway junction would affect the distribution of traffic across the local road network, and would potentially influence the scope and location of measures that are required as part of the A641 scheme.

3.5 EMPLOYMENT ALLOCATIONS

- 3.5.1 It has been demonstrated how the Thornhills Lane and Woodhouse sites can be developed separately to deliver significant levels of housing growth. However, the process of providing analysis and a masterplan for the two sites has identified several other opportunities.
- 3.5.2 For example, the Thornhills Lane site is situated between the employment site (LP1056) and the Clifton Business Park Enterprise Zone site (LP1232). This provides an opportunity to form an access from A641 through the employment site into the Thornhills Lane site.
- 3.5.3 To the south west, there is a similar opportunity to use the lower access into the Thornhills Lane site on A643 to go through to the Clifton site lower down the A643. From the southern side of the Clifton site, there is a further opportunity to link through Armitage Road area into the Woodhouse site and through to A641.
- 3.5.4 Whilst it is accepted that the costs involved to deliver such a link would be significant, there are numerous benefits which would result. These include improved connectivity; better access to the two housing sites; reduction in traffic in Brighouse town centre; improvements to the public realm in the town centre and an opportunity to regenerate the Armitage Road area.

4 TRAFFIC GENERATIONS

4.1 INTRODUCTION

- 4.1.1.1 The previous traffic modelling work on the Local Plan Transport Evidence Base undertaken by WSP | Parsons Brinckerhoff has been used to consider the impacts of the Thornhills Lane and Woodhouse sites. As part of this piece of work, a settlement-based assessment of transport impacts was undertaken, analysing all larger sites in the Calderdale district that were considered for either residential, employment, mixed use or sustainable urban extension purposes.
- 4.1.1.2 To accompany this assessment, an update of the Calderdale Strategic Transport Model (CSTM) to a 2014 base in SATURN was carried out. The CSTM now makes use of new traffic data collected in 2014 and covers the full Calderdale District, representing all key highway links and junctions with appropriate minor road network detail in the key towns. Additionally, the model now takes into account the known travel interactions with neighbouring Kirklees and Bradford districts.
- 4.1.1.3 WSP | Parsons Brinckerhoff was also commissioned by Calderdale Metropolitan Borough Council to assist in the preparation of a transport strategy for the Borough as part of the development of the Local Plan. The aim was to support the delivery of West Yorkshire plus Transport Fund schemes and the Town Centre Delivery Plan. The Transport Strategy unites a series of action plans in different delivery areas and articulates a clear vision for transport in Calderdale. It is anticipated that the implementation of the two sites will need to accord with the Transport Strategy.

4.2 TRIP RATES

- 4.2.1 The methodology to calculate trip rates for the Calderdale Local Plan is set out below.
- 4.2.2 Using information from the TRICS database, trip rates for residential development in the following categories were sourced:
- Affordable Local Authority
 - Local Authority Flats
 - Mixed affordable
 - Mixed Private
 - Mixed private/affordable
 - Private Flats
 - Private Houses
- 4.2.3 The data was filtered by the removal of sites from London, Wales, Scotland, Northern Ireland and Ireland and surveys carried out prior to 2008 were not used.
- 4.2.4 The mean trip rates from these trip rates have been used, based on an agreed split of proposed housing types from the Local Plan.

4.2.5 Table 4-1 below summarises the vehicle trip rates for the morning and evening peak period.

Table 4-1: Arrival and Departure Trip Rates

TIME PERIOD	ARR	DEP	TOT
AM	0.115	0.309	0.424
PM	0.273	0.157	0.431

- 4.2.5.1 The two-way AM peak hour trip rate is 0.424 and the two-way PM peak hour trip rate is 0.431.
- 4.2.5.2 These trip rates have been agreed with officers for the district wide traffic modelling assessment and have therefore been used here. The average trip rate is appropriate for district wide modelling for the Local Plan as it averages out variations in circumstances such as car ownership, access to public transport, house sizes etc etc across the district.
- 4.2.5.3 When these sites are subsequently brought forward by developers, individual junctions will need to be assessed as part of the planning application process and the trip rates for a particular site will need to be calculated on a site specific basis.

5 TRAFFIC MODELLING RESULTS

5.1 INTRODUCTION

- 5.1.1.1 This section provides information based on the modelling of the network within Brighouse and the surrounding area for the current and forecast scenarios. This process has utilised the SATURN model set up by WSP | Parsons Brinckerhoff to consider the traffic impacts of the Local Plan across Calderdale. The SATURN model has been used to quantify the impact of the Thornhills Lane and Woodhouse sites on the network in the vicinity of Brighouse.
- 5.1.1.2 This section provides details of the following :
- Forecast housing totals
 - Current performance at key junctions
 - Forecast performance at key junctions
- 5.1.1.3 The forecasts modelled in SATURN at this stage were the 'best-of-knowledge' totals and give an estimate of development distribution until the Local Plan is published later this year.
- 5.1.1.4 At the outset, the modelling assumed there would be a total of 6,736 dwellings for Brighouse. This figure included contributions from all possible sustainable urban extension sites within Brighouse.
- 5.1.1.5 As it was not clear which sustainable urban extensions were likely to process, only 69% of the allocations for the Sustainable Urban Extension sites in Brighouse were considered which was sufficient to meet the 6,736 target figure. When the modelling was carried out, the sustainable urban extensions modelled totalled 2,854 dwellings in Brighouse. Table 5-1 shows the build-up of the sustainable urban extensions.

Table 5-1: Modelled Dwellings in Brighouse

Site Ref	Description	Area	Modelled dwellings
LP1451	Land between, Bradley Wood and Woodhouse Lane, Rastrick, Brighouse	Brighouse	766
LP1452	Land between, Dewsbury Road, Pinfold Lane and New Hey Road, Rastrick, Brighouse	Brighouse	165
LP1453	Land Off, Lillands Lane, Rastrick, Brighouse	Brighouse	214
LP1463	Land between, Highmoor Lane and Bradford Road, Brighouse	Brighouse	1,709
Total			2,854

- 5.1.1.6 In practice, the masterplanning process has shown that the Thornhills Lane site can deliver 1926 dwellings and the Woodhouse site can deliver 1223 dwellings. This gives a total of 3149 dwellings which is 295 dwellings greater than the 2854 which have been modelled. Hence, modelling underestimates the size of the Sustainable Urban Extensions by some 10%.
- 5.1.1.7 This variation in dwelling numbers is relatively minor in the context of the Local Plan and the long timescale for delivery. It will not affect the conclusions of the strategic modelling which has been carried out. The key junctions and approaches which be affected by the Sustainable Urban Extensions as a whole will still remain the same and the location of the greatest impacts will be largely unaffected.

5.2 CURRENT AND FORECAST DELAY

5.2.1 Summary

- 5.2.1.1 The modelled performance of the network is examined in the base year to assess the operation of the network without development and in the future year to see what impact the development has on the junctions. There have been two scenarios modelled in relation to the Local Plan.
- 5.2.1.2 The base situation models the network in 2014 when traffic surveys and roadside interviews took place.
- 5.2.1.3 The future model considers the traffic situation in 2032. By this time, it has been assumed that the housing and employment proposals which are included in the Local Plan will be built out. In addition, a package of highways improvements which have been delivered by Calderdale Council since 2014 are included in the future model. The details of the improvement works are shown at Table 5-2.

Table 5-2: Implemented Highway Improvement Works

SCHEME NUMBER	SCHEME	DESCRIPTION
1	Ovenden Road / Shroggs Road	The signalised junction to be operated under MOVA
2	Queens Road / Kings Cross Road	The junction is to be changed from Cross Roads to Signalised
3	A641 / Mill Lane	The junction is to be changed from priority give way to signals
4	Rochdale Road / West Vale / Stainland Road	Signalised Right Turn Lane to be added on Rochdale Road
5	Copley Valley Link Road	New link road to be implemented from Hollas Lane / Wakefield Road junction to Mearclough Road / Canal Road and on to the Sowerby Bridge Rail Station.

- 5.2.1.4 The following diagrams show the volume to capacity (V/C) ratio of the links as traffic approaches a junction. A V/C ratio of around 85% is generally considered as the acceptable upper level of performance above which continuous queuing may start to occur during peak periods. A V/C ratio of over 100% indicates that the link is operating above capacity.
- 5.2.1.5 The following plans have been colour banded to indicate V/C ratio for each link in the network as follows:-

BANDING	COLOUR
< 85% capacity	Green
85% - 90%	Yellow
90% - 100%	Orange
>100%	Red

5.2.2 The AM Assessment

5.2.2.1 The following two plots show the operation of the overall network around Brighouse town centre in the AM peak for the Base and Forecast scenarios.

5.2.2.2 Base Year AM Overview



5.2.2.3 The base year plot shows that the town centre will generally operate satisfactorily with the vast majority of links operating below the 85% threshold although there are some issues on the A641/A643/A644 signals and A643 Owler Ings Road.

5.2.2.4 Forecast Year AM Overview



- 5.2.2.5 The base year plot shows that the town centre will generally operate satisfactorily with the vast majority of links operating below with 85% threshold although the junctions under some stress in the base year do operate increasingly above capacity in the forecast year.

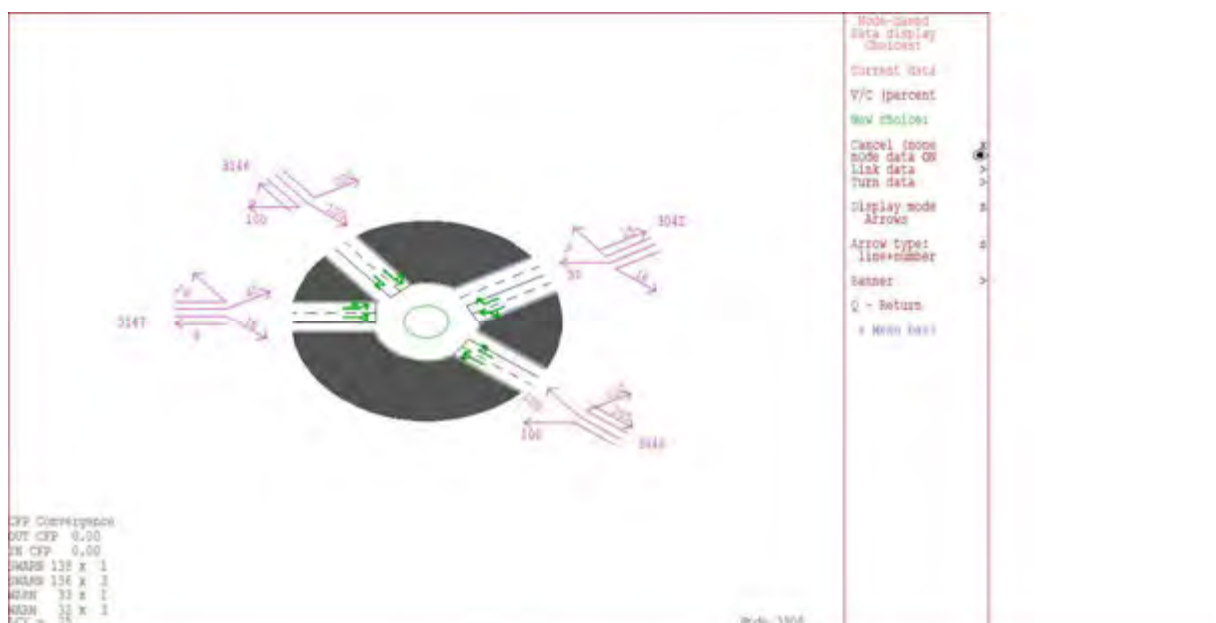
5.2.2.6 AM : A644/A6025 Lüdenscheid Link Roundabout

5.2.2.7 The following two plots provide some more detail of the operation of the A644/A6025/ Lüdenscheid Link roundabout to the west of the town centre. The main capacity issue is related to the north - south movement.

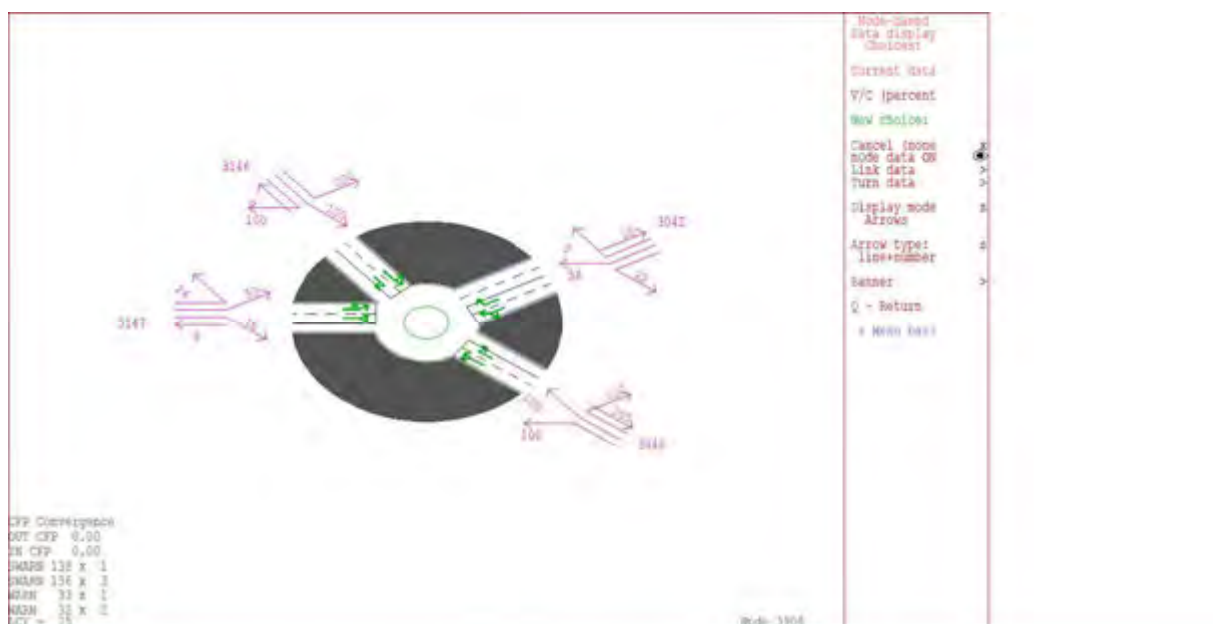
5.2.2.8 Base Year AM: A644/ A6025 Lüdenscheid Link Roundabout



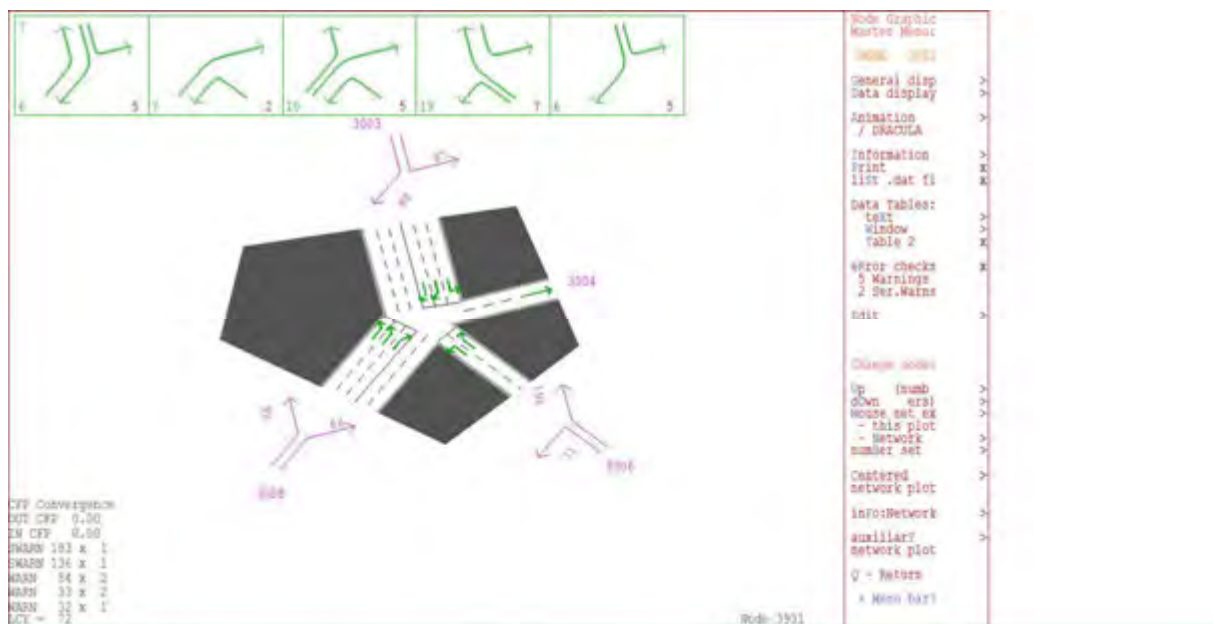
5.2.2.9 The detailed SATURN output below shows the volume to capacity (V/C) for each lane on the approach to the junction. This shows that the north-south movement is running at capacity.



5.2.2.10 Forecast Year AM: A644/ A6025/ Lüdenscheid Link Roundabout



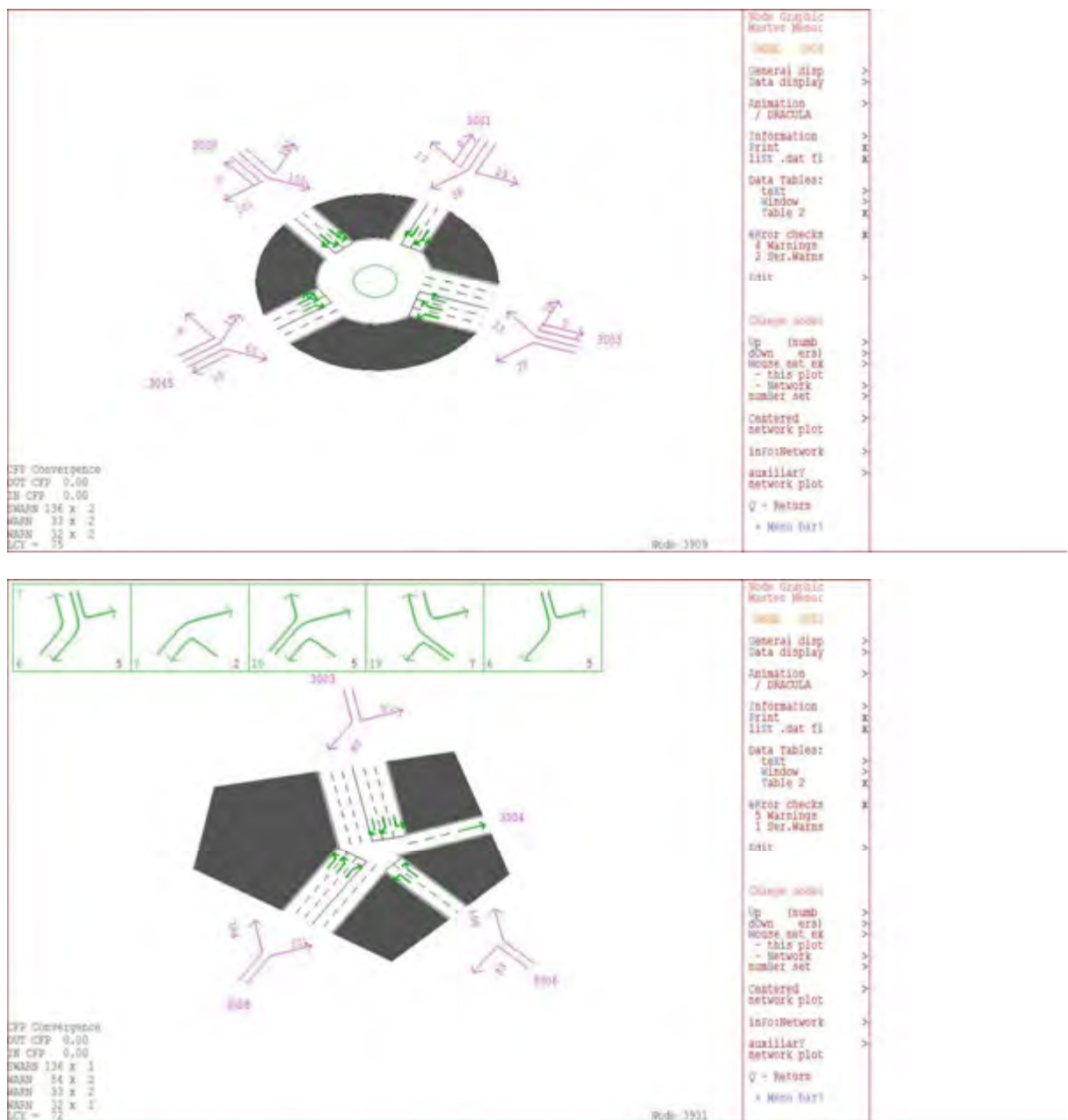
- 5.2.2.11 As the base situation is already at capacity for the north and south arms, the forecast model only shows a small increase in flows for the east and west arms which will operate within capacity.



5.2.2.15 The main over capacity movement is the southbound movement on the roundabout. The signal junction shows the northbound arm being over capacity and the eastbound arm very close to capacity.

5.2.2.16 **Forecast Year AM: A641/ Lüdenscheid Link Roundabout and A643/A644 Junction**





- 5.2.2.17 The forecast year shows a worsening of V/C ratios. However the southbound arm is the only approach which is over 85% at capacity on the roundabout.
- 5.2.2.18 The A643/A644 traffic signal junction shows that the northbound and eastbound arms will be operating over capacity.

5.2.3 The PM Assessment

5.2.3.1 The following two plots show the overall network around Brighouse town centre in the PM.

5.2.3.2 Base Year PM Overview



5.2.3.3 The overall PM base shows a similar results to the AM base regarding the junctions which are over capacity. The two main roundabouts on both sides of Ludenscheid Link and the A643/A644 junction are important for the movements through Brighouse. The eastern roundabout operates within capacity but the western roundabout exceeds capacity.

5.2.3.4 Forecast Year PM Overview

5.2.3.5 The forecast PM plot shows the links that are affected by the addition of development traffic in 2032. This has a greater impact in the PM than the AM with several links exceeding capacity.

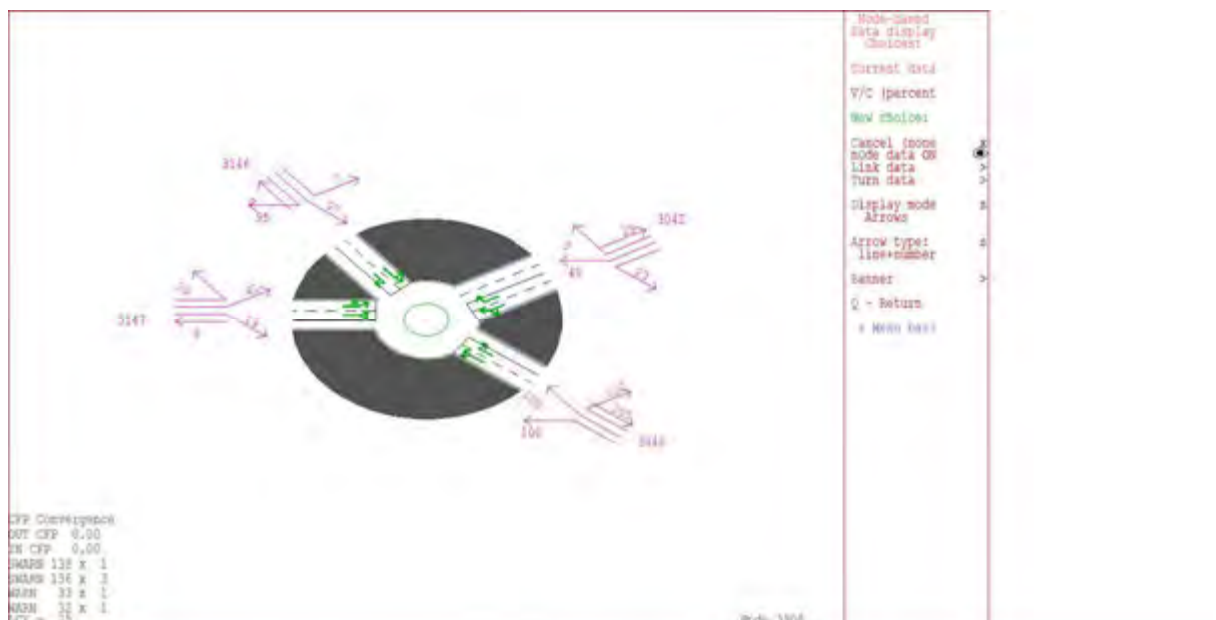
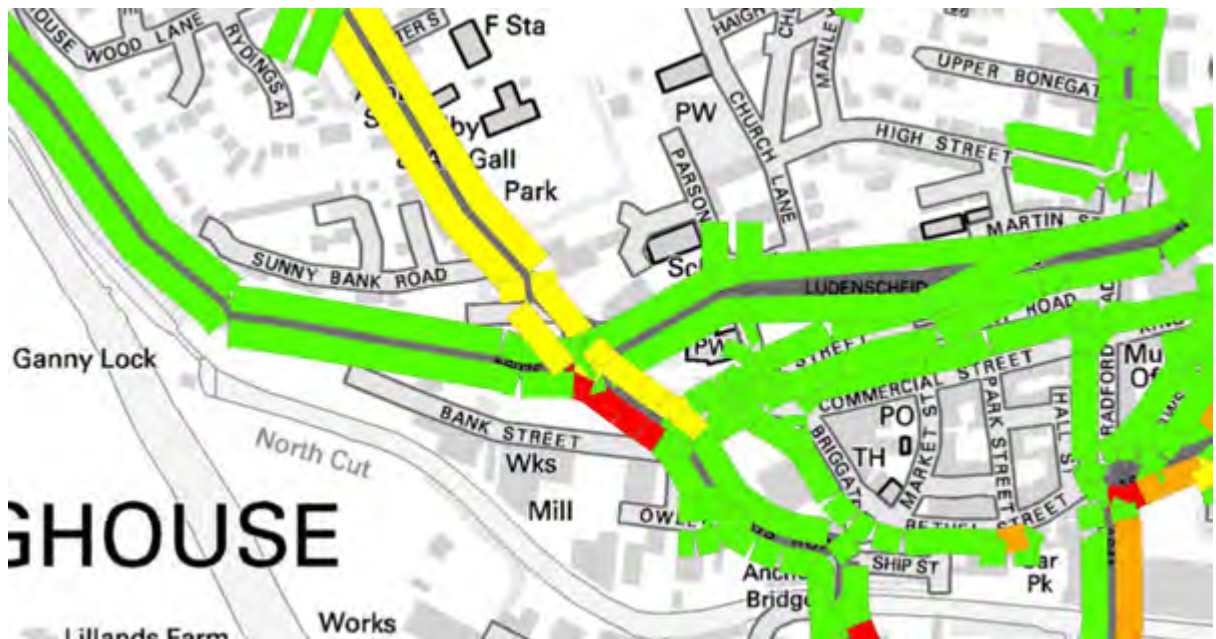


5.2.3.6 **PM A644/A6025 Lüdenscheid Link Roundabout**

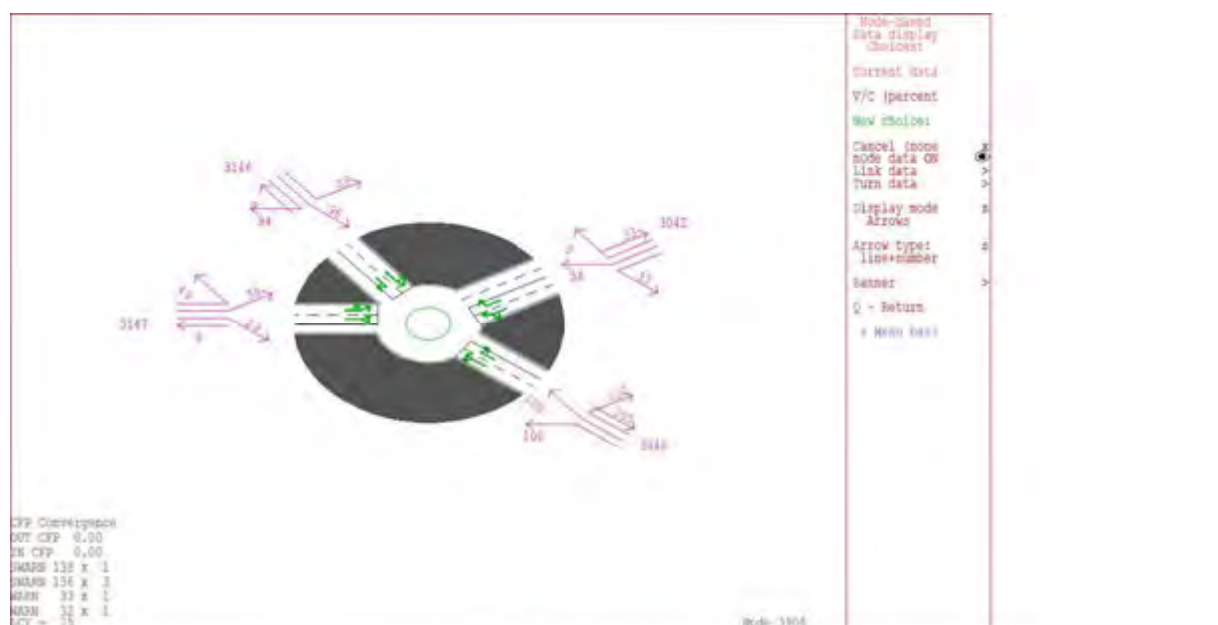
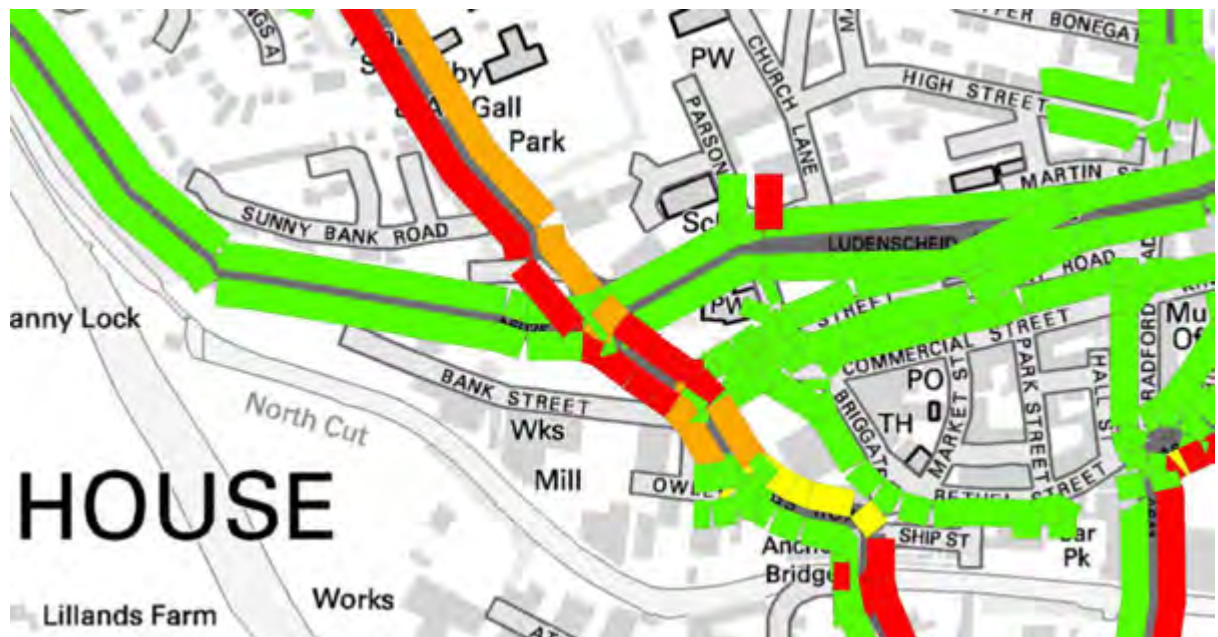
5.2.3.7 This provides some more detail on the A644 / A6025 Lüdenscheid Link Roundabout.

5.2.3.8 **Base Year PM A644/A6025 Lüdenscheid Link Roundabout**

5.2.3.9 The overcapacity movements are the north-south movements which are similar to the AM peak scenario. The east-west routes are operating well under capacity.



5.2.3.10 Forecast PM A644/A6025 Lüdenscheid Link Roundabout



- 5.2.3.11 The northbound and southbound are still over capacity movements in the forecast year but the additional impact is not much greater than base situation. Other arms worsen slightly but are not operating over the 85% threshold.

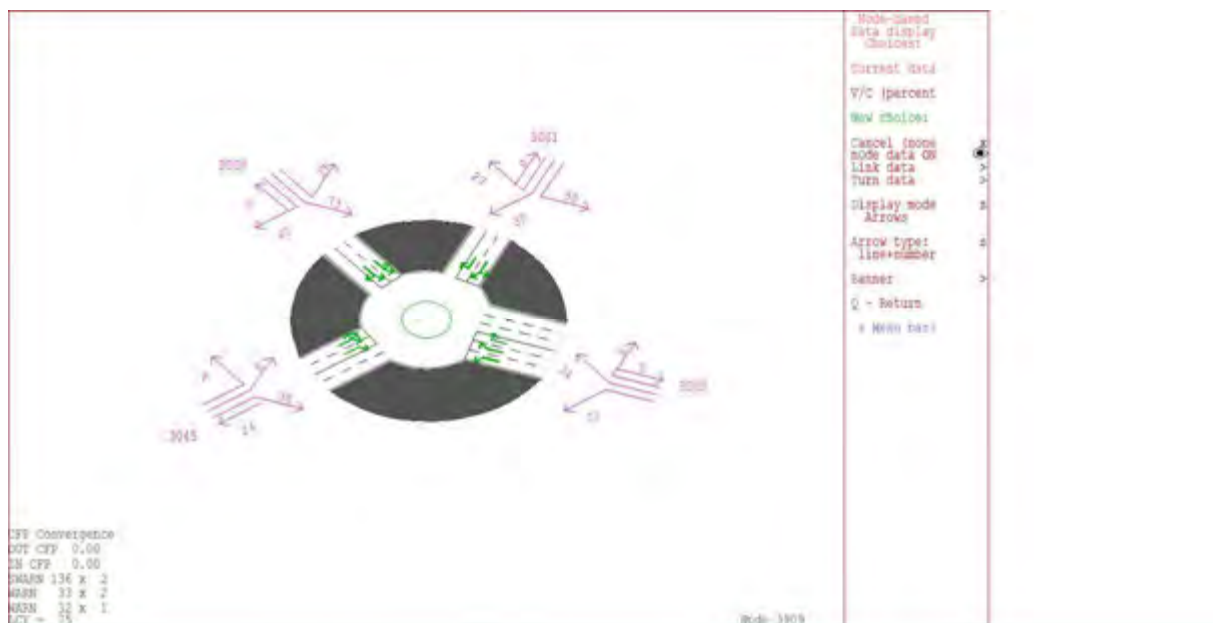
5.2.3.12 PM A641/ Lüdenscheid Link Roundabout and A643/A644 Junction

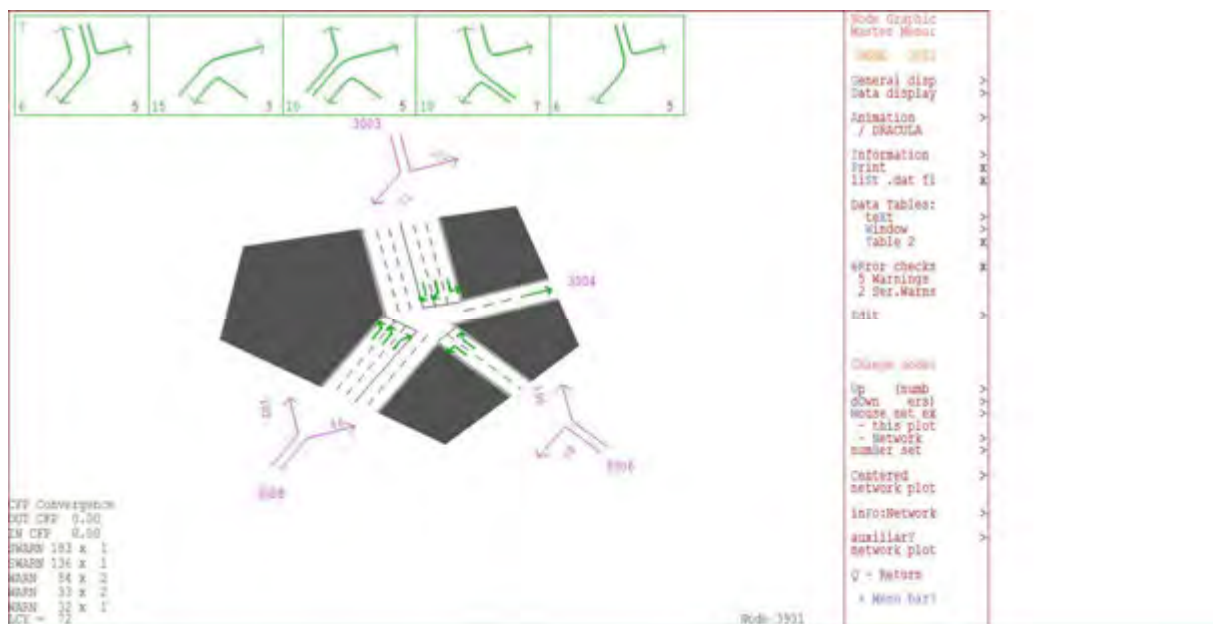
5.2.3.13 This section considers the A641/ Lüdenscheid Link Roundabout and A643/A644 Junction in more detail.

5.2.3.14 Base Year PM A641/ Lüdenscheid Link Roundabout and A643/A644 Junction



5.2.3.15

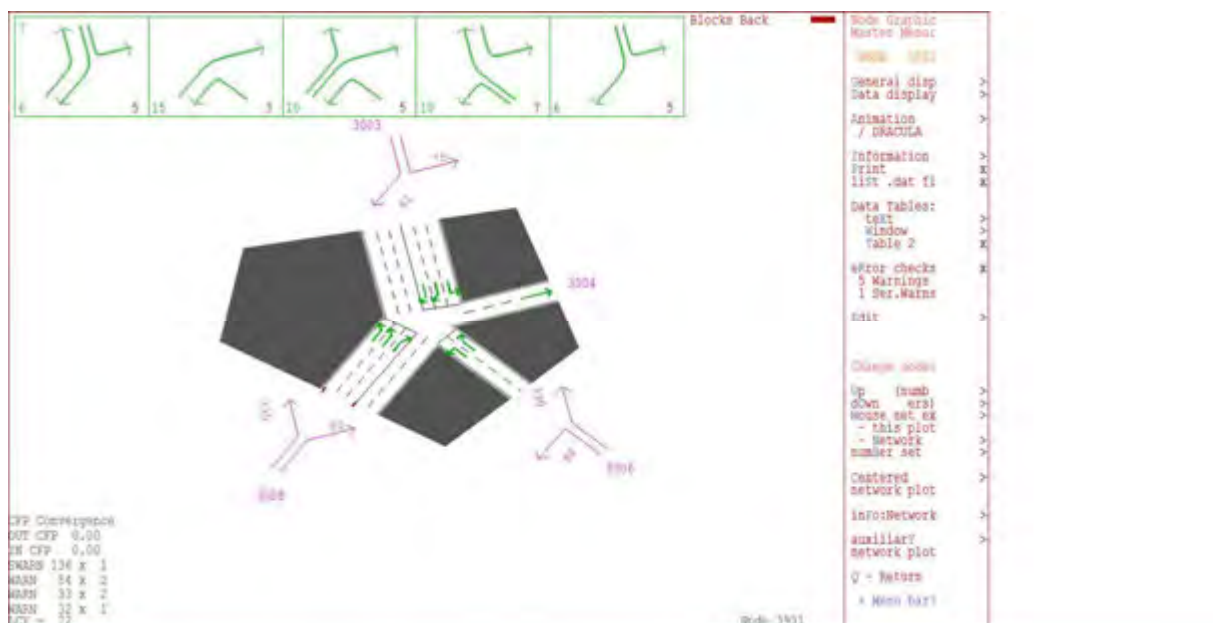
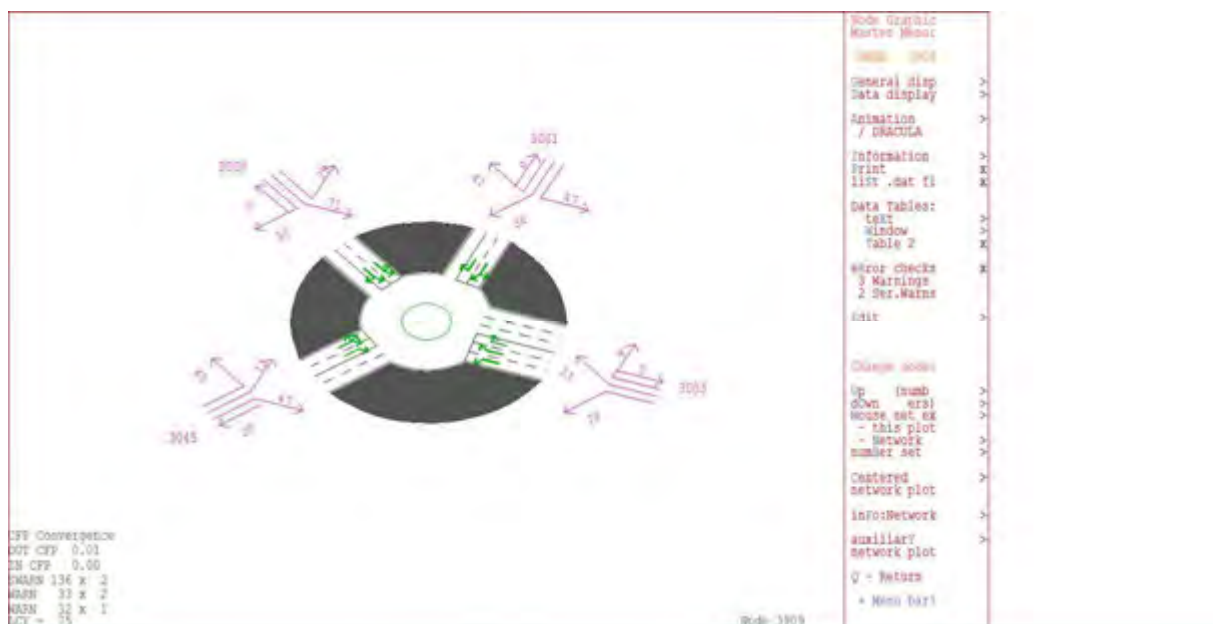




- 5.2.3.16 None of the movements on Ludenscheid link are over capacity. The signals for the A643/A644 junction are showing to be overcapacity on the western arm as it approaches the junction.

Forecast Year PM A641/ Lüdenscheid Link Roundabout and A643/A644 Junction





5.2.3.17

The southbound movement is predicted to operate at 81%. All other movements still have large amounts of spare capacity. The eastbound movement on the A643 is at capacity. This is due to additional traffic generated by the Thornhills Lane site along the A643.

5.2.4 Conclusion

- 5.2.4.1 In overall terms the analysis shows that the network operates in a reasonably satisfactory manner in the base situation. As with most towns with a historic road network such as Brighouse, there are some issues with capacity at peak times and these have been identified in the SATURN modelling. The Forecast situation takes account of some local highways improvements being implemented and the Local Plan housing allocations being built out. The resulting impacts are not particularly onerous.
- 5.2.4.2 The prospect of significant strategic highway improvements in the vicinity of the two sites has been considered as part of the masterplanning process. These include for the A641 Bradford-Brighouse-Huddersfield corridor improvements, the A644 improvement scheme and the introduction of a new motorway junction onto M62. Whilst these improvements are at the early stages of the design development, there is a reasonable prospect that they will be forthcoming during the Local Plan period. It is noticeable that the A641 corridor improvements would resolve the vast majority of capacity issues in the west of the town centre and close to the southern end of the Thornhills Lane site.
- 5.2.4.3 It is accepted that the network will need further improvements to mitigate the development of the two Sustainable Urban Extensions. Given the impact at the Forecast year is not unduly onerous, it is considered that, with the implementation of the strategic highway improvements referred to previously, the impact of the Thornhills Lane and Woodhouse sites can be readily mitigated. There is therefore no justifiable highways reason why these two sites should not be allocated.

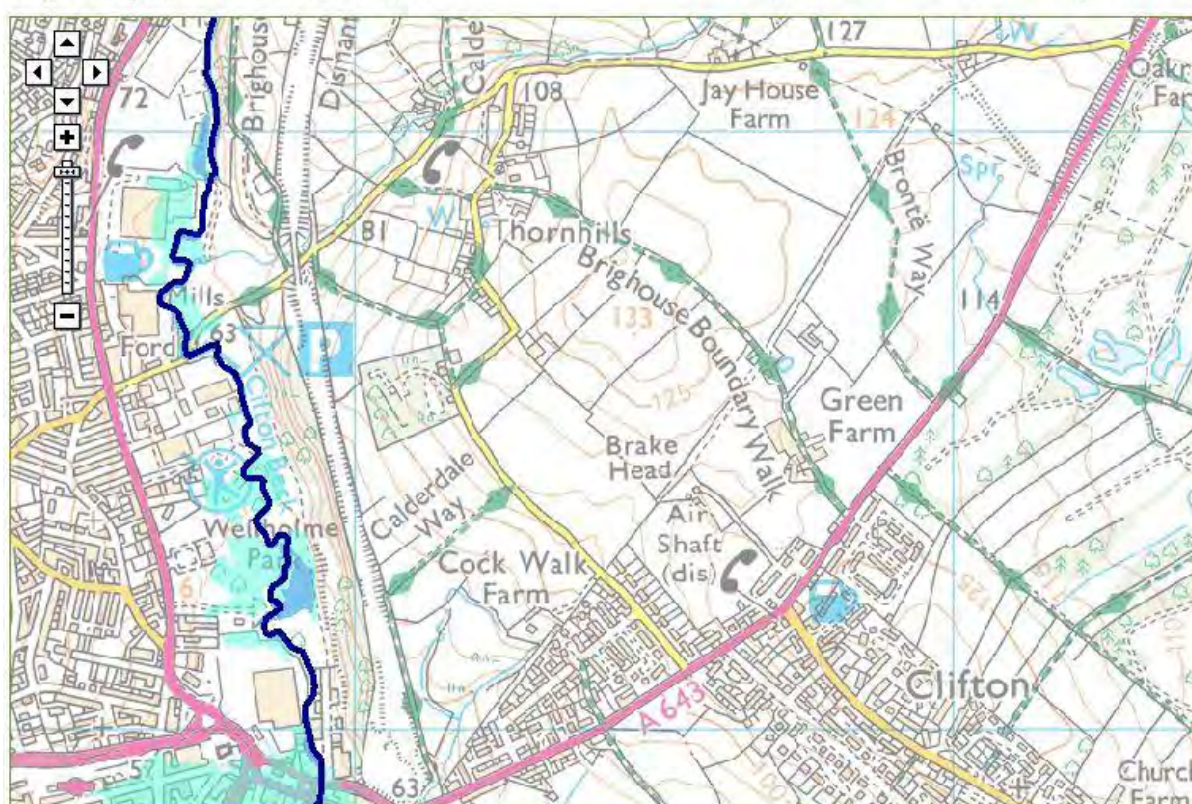
6 FLOOD RISK AND DRAINAGE

6.1 URBAN EXTENSION LP 1463 – “THORNHILLS LANE”

- 6.1.1** The site is designated on Environment Agency flood map for planning as Flood Zone 1, that is, with a low (less than 0.1%) annual probability of flooding. This is deemed within National Planning Policy Framework as suitable for all forms of development and does not therefore present a restrictive constraint. Surface water drainage is, via other smaller watercourses and drains including Clifton Beck, to the River Calder which in this location creates a flood risk to existing development within the proximity of the river. Therefore, management of surface water run-off from the development to ensure this flood risk is not worsened will be an important consideration.

Brighouse, Calderdale at scale 1:10,000

Other maps Data search Text only version



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- 6.1.2** The topography of the site is influential on potential development options, it is broadly divided into two:-
- 6.1.3** 1. The western half of the site rises steeply from Oak Hill Bank to approximately Thornhills Lane. There is a rise of approximately 50m over 600m, i.e. 1 in 12 which presents a number of constraints:
- The 1:12 gradient is significantly greater than the 1:30 typically adopted as 'flat' - 'flat' being considered not to impinge significantly on development proposals.

- b. 1:12 over that length presents access difficulties if access is directly up the hill (typically 1:20 is max gradient for roads, DDA, etc). Therefore a potentially angled alignment will be required.
- c. 1:12 will result in steps between houses, either side to side (see below 'google street view' screen shot) or back to front with retaining walls, abnormal foundations increasing development cost and making it less attractive to housebuilders.



- d. This is also not suitable for above ground type SuDS (abnormally large land-take for the volume of attenuation storage and presents a possible flood risk in 'exceedance' events. It will also present restrictions to below ground drainage – run-off will flow quickly down the slope concentrating at the bottom. There are achievable solutions but they are more costly and complex than 'normal' – adding to the other 'slope issues'.

6.1.4 These constraints need to be put into context: residential developers will tackle sites significantly in excess of 1 in 12 if the values are there. The constraints described above can be satisfactorily addressed and development is viable where land value or more philanthropic approach to development warrants the additional cost. Typically therefore the delivery model would not be through volume house builders, and development density would be reduced.

6.1.5 The steeper parts of the site would therefore likely be the last to be built-out (if at all) with more green space and potentially less permeability, providing perhaps a buffer between new settlement and existing town centre.

6.1.6 2. The eastern, top half of the site is broadly flat and therefore broadly free of the constraints described in 1 above. Development proposals would need to take cognisance of the relative elevation of this part of the site including:

- a. The form of surface water attenuation storage – attenuation at source preventing speedy run-off to lower lying drains and the River Calder will help militate against any potential increase in flood risk due to increased discharges from the development. Surface water will run-off to the Clifton Beck, via the existing

Thornhills Beck or through a throttled below-ground pipe. However, thoughtful design and careful detailing will need to be incorporated into the development to ensure there is no flood risk created by introducing above ground SuDS or other types of surface water attenuation storage elevated above lower development, overland flow routes, or high velocity surface water flows.

6.1.7 Clifton Beck cuts across Thornhills Beck Lane near to Thornhill Brigg Mills and Woodvale Office Park to the west of the site. The Beck is crossed by a ford: there is potential for flood waters to close this ford which would compromise this access. This needs careful consideration to ensure there is a suitably robust access strategy from this direction.

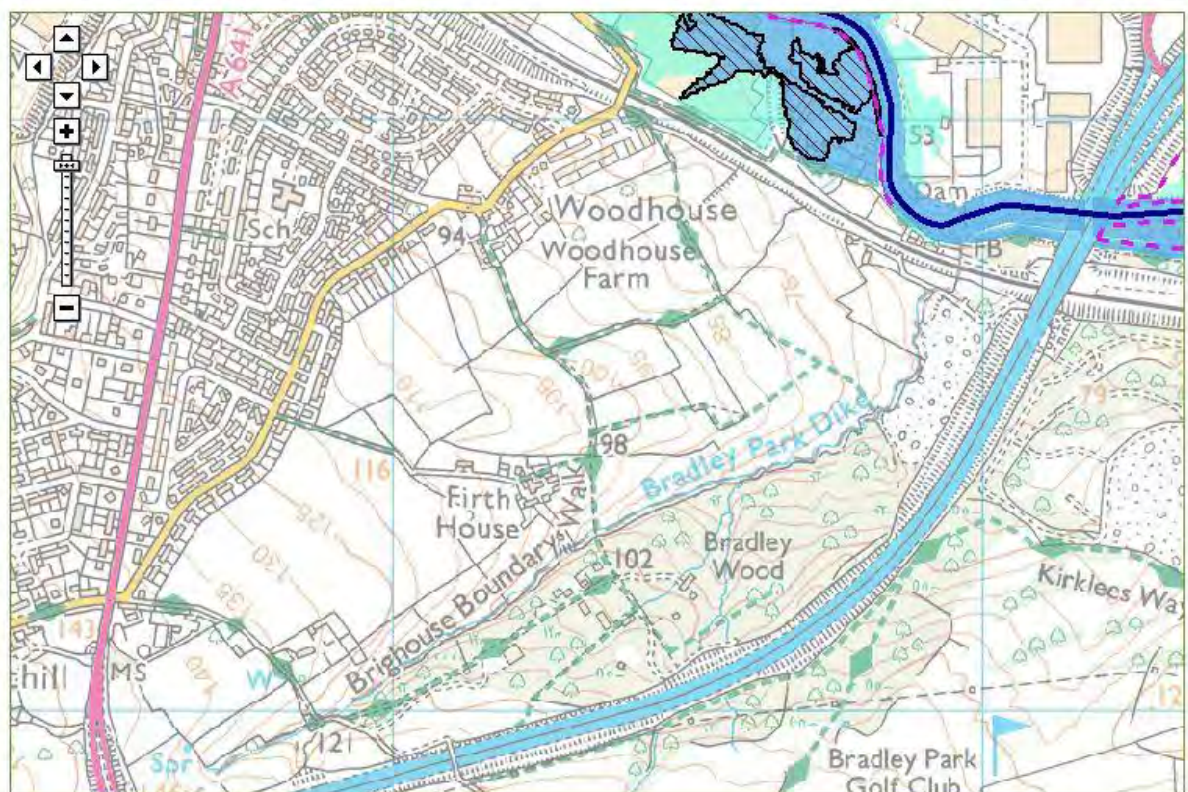
6.1.8 Provision of sustainable urban drainage systems (SuDS) would appear viable (albeit that ground investigation including testing for infiltration potential is required to confirm this). This would include a land-take of typically 5% to 10% of developed area but the constraints due to elevation and slope would be expected to push this figure towards the top of this range.

6.2 URBAN EXTENSION LP 1451 - “WOODHOUSE”

6.2.1 The site is generally designated on Environment Agency flood map for planning as flood zone 1, that is, with a low (less than 0.1%) annual probability of flooding. This is deemed within National Planning Policy Framework as suitable for all forms of development and does not therefore present a restrictive constraint.

X: 415,349;Y: 421,518 at scale 1:10,000

Other maps • Data search • Text only version •



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- 6.2.2** The only areas with a raised level of flood risk are near to Bradley Park Dike (along the southern boundary) and at the eastern end where there is a high risk of surface water flooding. These are not particularly large proportions of the site so should be readily overcome with mindful planning.
- 6.2.3** Surface water drainage is, via other smaller watercourses and drains, to the River Calder which in this location creates a flood risk to existing development within the proximity of the river. Therefore management of surface water run-off from the development to ensure this flood risk is not worsened will be an important consideration. There is a lot of flood risk associated with the Calder immediately north-east of the site (the industrial estate in and around Bird Royds Lane and River Street). Therefore, surface water discharges will be strictly limited in an attempt to militate against this flooding. Subject to a detailed analysis and geotechnical investigation to establish any possible infiltration of surface water, a land take for SuDS type attenuation features might be in the order of 10% of the developed area.
- 6.2.4** The site generally falls at approximately 1 in 24 in a north east direction, that is, towards the River Calder. Although this is slightly greater than the 1 in 30 'flat' site, it is unlikely to present any particular concerns or restrictions on development and likely to have only minimal impact on viability. It is also relatively flat in comparison to other potential development sites within this area.
- 6.2.5** The south eastern 100m or so of the site, adjacent to the Bradley Park Dike, falls quite steeply towards the dike: this would impose development constraints but is a relatively small proportion of the site and might therefore remain as greenspace or a buffer to the adjacent dike and Bradley Wood.

7

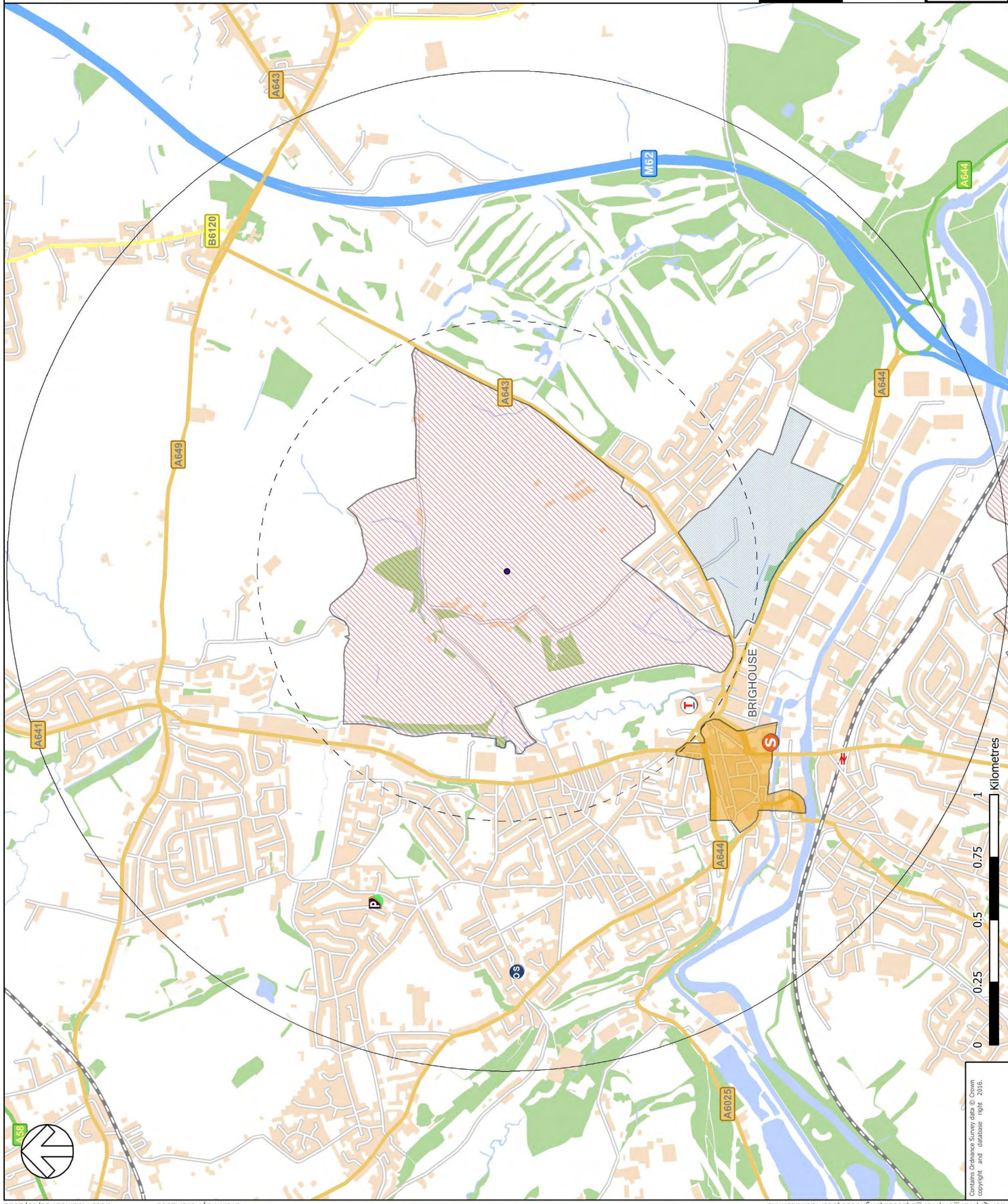
CONCLUSIONS

- 7.1.1** There is a need to identify and plan locations to provide 13,000 dwellings across Calderdale as part of their Local Plan.
- 7.1.2** As part of the site allocation process, WSP | PB have been appointed to prepare a masterplan for two site - namely the Thornhills Lane site and the Woodhouse site. The masterplan, traffic statement and associated analysis confirm the suitability of the two large sites to deliver significant levels of growth. The Thornhills Lane and Woodhouse sites offer a viable solution to provide housing in a sustainable manner in the form of Sustainable Urban Extensions.
- 7.1.3** The highway infrastructure improvements will be needed in order to provide sufficient highway a capacity for the sites. The schemes promoted by the West Yorkshire Plus Transport Fund provide a potential opportunity to deliver such mitigation measures. In particular, the proposals on the A641 corridor can facilitate economic development in Brighouse and unlock land such as sites at Thornhills Lane and Woodhouse for development.
- 7.1.4** Alongside the implementation of the sites, there is a need to maintaining various footpaths and bridleways across the sites. The plans ensure that pedestrian access to the Woodhouse site and along the Bronte Way and Spen Valley Heritage Trail at Thornhills Lane are maintained. Plans to introduce green swathes of land required as SuDS for flood alleviation will also help to maintain or provide these routes.
- 7.1.5** In overall terms, the analysis shows that the network operates in a reasonably satisfactory manner in the base situation although there are some issues with capacity at peak times The Forecast situation takes account of some local highways improvements being implemented and the Local Plan housing allocations being built out. The resulting impacts are not particularly onerous.
- 7.1.6** The prospect of significant strategic highway improvements in the vicinity of the two sites has been considered as part of the masterplanning process. It is likely that they will be forthcoming and they can fully mitigate the impact of the two sites.
- 7.1.7** It accepted that the network will need further improvements to mitigate the development of the two Sustainable Urban Extensions but there is therefore no justifiable highways reason why these two sites should not be allocated.

Appendix A

LOCAL FACILITIES MAPS





Key

- Sustainable Urban Extension
- Clifton Enterprise Zone
- Brighouse Town Centre

Foodstores

- CO-OPERATIVE FOOD
- ONE STOP CONVENIENCE
- PREMIER
- SAINSBURY'S
- TESCO

1km Isochrone
2km Isochrone

WSP | **PARSONS BRINCKERHOFF**

TITLE: LP1463 Local Facilities

FIGURE NO: Foodstores and Town Centre



