C9362-TAR01_C **December 2009**

TRANSPORT ASSESSMENT

WATER BOTTLING PLANT, CLIMBING SPORTS CENTRE & FUTURE SCIENCE PARK

EXPRESS PARK, BUXTON

Jubb Consulting Engineers Limited
Alexander House
Excelsior Road
Western Avenue
Cardiff
CF14 3AT

Tel: 029 2052 4444
Fax: 029 2052 4445
E-Mail: cardiff@jubb.uk.com
WWW: www.jubb.uk.com

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1.0 INTRODUCTION

1.1 Jubb Consulting Engineers Limited (JCEL) have been commissioned as Transport Consultant to advise on the transportation and highway issues associated with a mixed use employment scheme on the former Cowdale Quarry on the outskirts of Buxton. A Site Location Plan is illustrated in **Figure 1** below. JCEL are experienced practitioners in this field and have undertaken a wide variety of assessments on behalf of both public and private sector clients.

Figure 1 Site Location

1.2 The application site, is a former quarry with a site area of 17.8ha. The site has not been in active quarry related use since the 1950's. The concept of this scheme is to renovate this former quarry site to provide much needed employment land.

1.3 The proposed application is for a water bottling plant, but as the applicant has long term aspirations to create a modern vibrant science park on the remainder of the site, the impact of the additional uses are included in the Transport Assessment. The principal elements of the scheme as depicted in **Appendix A** are seen as:

Present Application:

- Water Bottling Plant of 14,100m^2 GFA
- Climbing visitor centre (340m^2)
  - To serve existing climbing undertaken in the quarry

Future Potential:

- Science Park
  - Up to 27,600m^2 Gross Floor Area (GFA) B1/B2 consisting of 14 buildings of 2-3 storeys in height and between 680-5,200m^2 GFA
- Small scale site sports centre to include:
  - Multi Use Games Area (MUGA) and Indoor Sports Hall suitable for 5-a-side Football (equivalent to three 5-a-side pitches GFA 1,750)

1.4 For this size of development a Transport Assessment (TA) is required in line with the Department for Transport (DfT) 'Guidance on Transport Assessment' to:

- Encourage environmental sustainability
- Manage the existing network
- Mitigate residual impacts

1.5 At this time (November 2009) a planning application is to be submitted for initial elements of this scheme. A masterplan for the entire site has been proposed, which this TA document supports and justifies the existence of suitable highway capacity within the study area, and identifies the scale of any associated highway improvements.

1.6 Jubb is acutely aware of the critical role of Highway Authorities in evaluating this scheme and has promptly sought advice from Derbyshire County Council (DCC) on transport, access and highway grounds. Initial discussions with the Council proposed the following limits for testing:

- A6 Express Park, Buxton – Development Access
- A6 / B5059 Morrisons Roundabout
- A6 / A53 Fairfield Roundabout
- A53 Bridge St / Spring Gardens Roundabout
- A515 / B5059 High St / London Rd / Dale Rd Signals

1.7 This report:

- considers the proposal in light of national, regional and local policies;
- describes the application site and development proposal;
- examines the site location and adjacent local highway network;
- reviews the existing non-car infrastructure;
- conducts an accident analysis;
- identifies the assessment area and existing traffic;
- predicts traffic growth;
- quantifies the development traffic;
- examines the operational impact of the development traffic upon the local highway network;
- describes the proposed measures to promote sustainable travel; and
- summarises the proposed Travel Plan.

1.8 The report concludes that the development will have some impact on the local highway network. The development will provide local employment opportunities that will help to rebalance the net commute out of the area, and through local provision enable opportunities for sustainable travel and commensurate reductions in transport related $C0_2$ emissions.

2.0 TRANSPORT PLANNING POLICY

2.1 The policy framework surrounding the proposed development forms an integral part of this Transport Assessment. Within the context of national, regional and local policy, the following planning and transport policies have been reviewed:

- Planning Policy Guidance 13: Transport (DfT, 2001)
- Delivering a Sustainable Transport System (DfT, 2008)
- Guidance on Transport Assessment (DfT, 2007)
- East Midlands Plan 2006-2026
- Derbyshire Local Transport Plan 2006-2011
- High Peak Borough Council Local Development Framework 2004-2021
- High Peak Borough Council Local Plan, Saved Policies

2.2 Current transport policies at the national, regional and local level are built around the central themes of long-term sustainable development, sustained investment in transport and improved accessibility at all levels. It promotes continued economic growth through the provision of an efficient and reliable transport system, a reduction in traffic congestion, improvements in highway safety, and enhancements in accessibility of sustainable modes of travel.

2.3 The key objective of the transport strategy for the development proposal is to deliver a sustainable and safe transport regime.

Policy Planning Guidance Note (PPG)13 Transport

2.4 A revised Planning Policy Guidance Note (PPG) 13 was published in March 2001. It details the Government policy and guidance on how to integrate planning and transport by promoting sustainable transport and reducing the need to travel, especially by car.

2.5 The Guidance states that development proposals must be located and designed in ways which reduce both the need to travel and the reliance on the private car. It realises that all land uses generate travel demand, but the importance is to ensure developments comprising jobs, shopping, leisure and services offer a realistic choice of access by public transport, walking and cycling.

2.6 The document recommends that proposals should, where possible:

- Promote sustainable transport choices by offering a realistic choice of access by public transport, walking and cycling;
- Reflect parking policies alongside other planning and transport measures to reduce the reliance on the car for work and other journeys;
- Improve walking and cycling facilities creating a more attractive environment for pedestrians and cyclists;
- Improve the attractiveness of urban areas and allow for the efficient use of land.

2.7 The development proposal ensures the aims of PPG13 are fully integrated within the overall scheme.

Delivering a Sustainable Travel System

2.8 ***"Towards a Sustainable Transport System – Supporting Economic growth in a Low Carbon World"*** was compiled and published by DfT in October 2007.

2.9 The document:

- Demonstrates the commitment of the central Government's to a transport policy which delivers economic growth and lower carbon emissions;
- Sets out the Government's policies and strategies to improve the transport contribution in economy growth and to secure its own part in the overall level of reduction in carbon emissions; and
- Proposes a new approach to long term strategy

2.10 Since its publication a new document "Delivering a Sustainable Transport System" has been published for consultation. It identified five refined goals and 17 subsequent challenges to tackle. These are identified in terms of a hierarchy of network. The five goals are:

- To support national economic competitiveness and growth, by delivering reliable and efficient transport networks;
- To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change;

- To contribute to better safety, security and health and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health;
- To promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society;
- To improve quality of life for transport users and non-transport users, and to promote a healthy natural environment.

Guidance on Transport Assessment (TA)

2.11 ***"Guidance on Transport Assessment"***, published by the DfT in May 2007, presents a detailed approach for stakeholders on :

- When a TA is necessary;
- What level of assessment is required; and
- The best practice for compiling such a report.

2.12 The guidance establishes the methods to certify that any proposals conform to up to date national policies and follow the vision of central Government on future transportation network.

2.13 The document emphasises that when preparing a TA the following considerations should be taken into account:

(i) Encouraging sustainable access

- Reducing the need to travel, especially by car;
- Improving sustainable transport choices – making it easier and safer for people to access jobs, shopping, leisure facilities and services etc by public transport, walking and cycling;
- The accessibility of the location;
- Other measures which may assist in influencing travel behaviour, i.e. achieving reductions in car usage by measures such as car sharing.

(ii) Managing the existing network

- Making the best possible use of existing transport infrastructure;
- Managing access to the highway network.

(iii) Mitigating residual impacts

- Through improvements to the local public transport network, and walking and cycling facilities;
- Through minor physical improvements to existing roads;
- Through provision of new or expanded roads.

2.14 The content and philosophy underpinning the Transport Assessment are discussed, adjusted and agreed with the Local Planning Authority and Highway's Agency (if appropriate) to ensure a full understanding of development traffic implications on the local and strategic highway network.

East Midlands Plan 2006 - 2026

2.15 The East Midland Plan (EMP) document published by the Government Office in March 2009 provides a broad development strategy for the East Midlands up to 2026. The Core Strategy within the document establishes the context for the delivery of sustainable development in the region. The Spatial Strategy therein outlines the regional priorities for both the urban and rural communities and includes specific policies in respect of the Regions 5 sub-areas of which the Peak Sub-Area is one. The document also includes policies and proposals in respect to the Regional Transport Strategy.

2.16 Policy 8 of the EMP sets out specific Spatial Strategy Priorities for the Peak sub-area. These are to:

- Help secure the conservation and enhancement of the National Park
- Address the social and economic needs of the Park's communities for example by the provision of appropriate business premises and affordable housing
- Protect and enhance the natural and cultural heritage of the sub-area

2.17 Policy 43 of the EMP sets out the Regional Transport objectives in respect to the development of infrastructure and services with a view to supporting sustainability, promoting accessibility and overcoming peripherality in the rural areas. Policy 44 specifically identifies transport objectives for the Peak sub-area that seek to:

- Overcome the problems of rural isolation
- Improve transport linkages to the North West Region and the rest of the East Midlands

2.18 Policies are also included in relation to traffic growth reduction (45), behavioural change in respect of reducing the need to travel including the use of Travel Plans (46) and parking levies/congestion charges (47).

2.19 The EMP sees policies and programmes being developed by Authorities consistent with the aims and objectives of the EMP.

Local Transport Plan 2006 – 2011

2.20 The Local Transport Plan (LTP) above is set within the framework of the longer term Derbyshire Local Transport Strategy (DLTS) which covers the period through to 2021. The DLTS sets out the wider transport agenda for the County dealing with overall principles and objectives with the LTP translating such into a policies implementation and capital investment programme with appropriate objectives and targets for the period 2006 to 2011.

2.21 The LTP has five key strategies which reflect the shared priorities of Central and Local Government, national and local transport objectives and priorities as well as quality of life issues. These are:

- Efficient maintenance and management
- Improving accessibility and healthy travel choices
- Safer roads and communities
- Reduced congestion and a strong economy
- Better air quality and environment

2.22 The development proposals will be shown to be consistent with strategies and objectives of the LTP.

High Peak Borough Council Local Development Framework

2.23 The Council is currently preparing a Local Development Framework (LDF) for the District as a replacement for the Structure Plan and Local Plan approach previously adopted by Local Authorities with the objective of streamlining the local planning process. The first step requires the establishment of a Core Strategy setting out policies and targets within the context of the EMP. This is currently being undertaken as a joint exercise with Derbyshire Dales District Council because of the similar issues and challenges facing the two Authorities.

2.24 A public consultation exercise has just recently been undertaken and it is anticipated that a draft Core Strategy will be published in March 2010. An important element will be the plans for the future growth of towns and villages across the area.

2.25 In the interim period until the adoption of full LDF development proposals "should be considered in the context of adopted Regional Plans and saved Local Plan policies".

High Peak Borough Council Local Plan (2005)

2.26 In March 2008 the Secretary of State issued a direction saving certain policies within the Council's Local Plan which was originally adopted in March 2005. This saved document will continue to be used for the time being alongside Regional Plan policies etc in the determination of Planning Applications.

2.27 In respect to the transport and access issues, Policy 78 of the Saved Plan includes specific policies relating to new development proposals which should seek:

- To reduce the need to travel
- Widen transport choice for people and goods
- Integrate transport and land use

2.28 Furthermore Policy 81 requires that it must be shown that the capacity and design of the transport network serving the site can reasonably accommodate the anticipated increase in travel without materially harming safety or local amenity.

2.29 Policy 82 requires that the proposed access and egress arrangements by all users should be safe and appropriate to recognised design standards. Conditions may also be applied in respect to parking numbers and servicing arrangements.

3.0 DEVELOPMENT PROPOSAL

3.1 The application site is a former quarry located alongside the A6, 1 mile east of Buxton.

3.2 The envisaged development will see the provision of a new water bottling plant that will extract water from an authorised borehole located in the quarry. The bottling plant needs to be within a suitable distance of the extraction point, and its siting within a former quarry is seen as suitable for a land use of this nature.

3.3 In addition the site is planned to be used for a science park that will provide valuable employment land within the town that currently experiences a net out commute. Providing for local employment opportunities enhances the ability to encourage sustainable travel, and reduces the travel distance of local residents, reducing carbon emissions and the associated negative impacts of car use.

3.4 The mix of the envisaged development is described as follows:

Use	GFA (m^2)
Science Park	27600
Visitor Centre	340
Sports Centre	1750
Water Bottling Plant	14100

Table 3.1 Development Schedule

Parking Provision

3.5 Maximum Parking Standards for various categories of land uses are set out in the High Peak Local Plan Adopted March 2005. (**Appendix B**). Taking into account the location of the application site, the following relevant parking standards are summarised below to gauge the necessary parking provision. It is noted that based on the Trip Rates (see section 9) the peak parking accumulation on site for the Science Park is 890 spaces. In addition, secured and sheltered cycle stands will also be provided onsite at the locations where good natural surveillance is present.

Land Use		Maximum Level of Provision
B1 Offices Only	Up to 2500m^2	1 space per 25 sq.m^2
	Over 2500m^2	1 space per 30 sq.m^2
B1 (Other Business) & B2 (General Industry)	Up to 2500m^2	1 space per 40 sq.m^2
	Over 2500m^2	1 space per 55 sq.m^2
B8 Storage and Distribution	Up to 250m^2	1 space per 25 sq.m^2
	Over 250m^2 & up to 2500m^2	1 space per 60 sq.m^2
	Over 2500m^2	1 space per 120 sq.m^2
D2 Assembly & Leisure: Other Indoor Leisure		1 space per 22 sq.m^2
Sports Fields		12 spaces per pitch

Table 3.2 – Parking Standards

Building	GFA (m^2)	B1 - Offices	B1/B2
A	1020	41	26
B	680	28	18
C	1020	41	26
D	680	28	18
E	5800	194	106
F	5800	194	106
G	5800	194	106
H	1020	41	26
I	1020	41	26
J	1020	41	26
K	1020	41	26
L	1020	41	26
M	1020	41	26
N	680	28	18
Science Park Combined	**27600**	**994**	**580**
Climbing Visitor Centre	340	To be determined	
Sports Centre (12 per pitch)	1750	36	
Water Bottling Plant (B8)	14100	118	
	Total	**1148**	**734**

Table 3.3 Maximum Parking Allowance

4.0 AUDIT OF NON-CAR TRANSPORT ACCESSIBILITY

4.1 This section examines the level of accessibility, by means other than car travel, to the application site.

Walking and Cycling

4.2 There are no footpaths adjoining the A6 at this location. There are at present no formal cycle routes adjacent to the application site as shown within **Figure 2** below. The A6 could be used by cyclists, but is only recommended for experienced riders.

Figure 2: Existing Cycle Routes

4.3 To enhance the site's accessibility to cyclists it is proposed to upgrade the existing bridleway to the south of the quarry, thereby providing a connection via Dukes Drive to the National Cycle Network shown in Figure 2 above. This will also extend the existing local network and connections to the hospital and Staden Lane Industrial Estate.

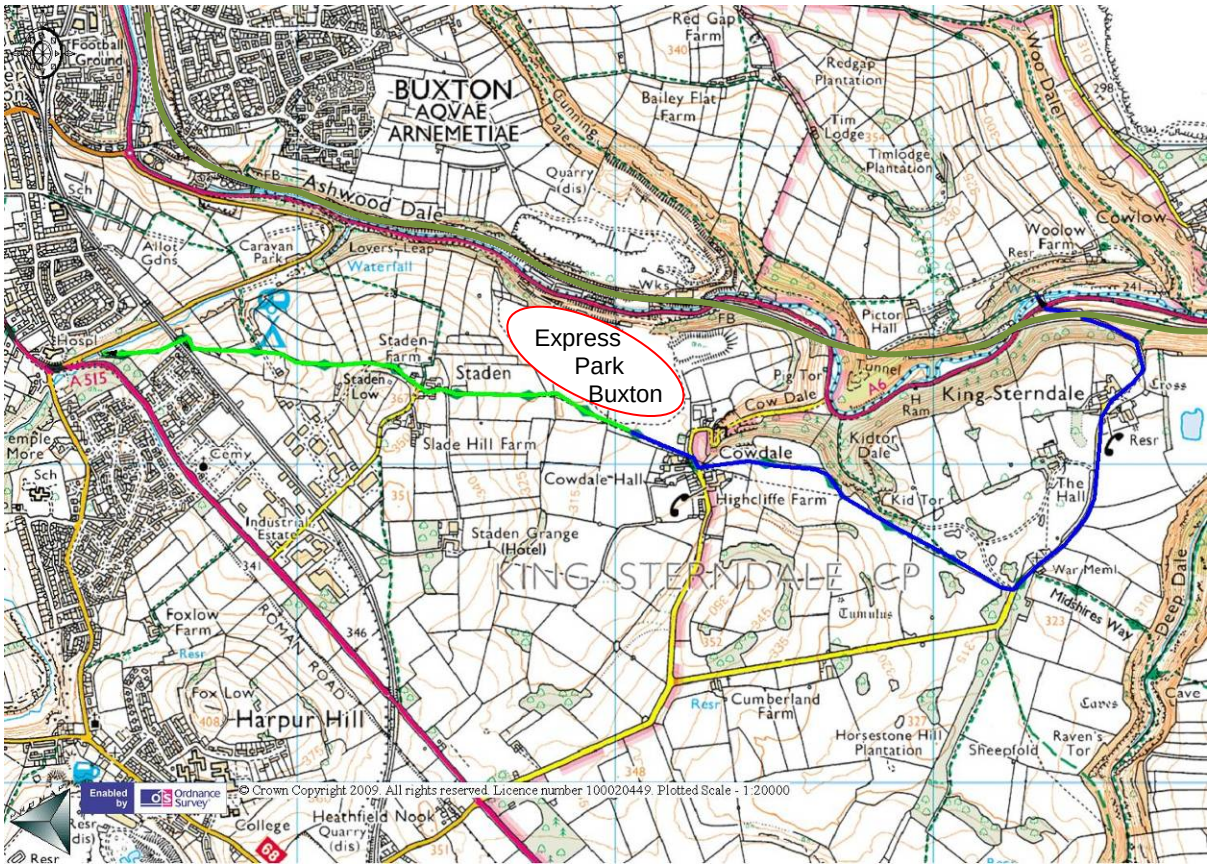


Figure 3: Proposed Future Cycle Routes

4.4 To the east the route can extend on through Cowdale and link to the Monsal Trail, which is being promoted by the Peak District National Park Authority. The proposed £3.785m project would link with existing cycle tracks using the alignment of the disused railway and the Monsal, High Peak and Tissington Trails. Onward connections to existing stations at Matlock and Buxton would provide for longer distance leisure cycling.

4.5 The section from Buxton to Bakewell would use the 400m-long tunnels along the rail route, axed in the late 1960s. The former rail line passes to the immediate north of Express Park, Buxton and will hence provide future opportunities for local commuter access by cycle to the site from both Buxton and points east towards Bakewell. At present the Department for Transport has pledged £1m towards the cost of the scheme. This is in addition to the backing previously announced by Cycling England of £1.25m.

Public Transport

Travel by Bus

4.6 The two nearest bus stops to the site are to 1.5 kilometres west at Morrisons (Dale Rd/Bakewell Rd) or 800 metres east at Pig Tor.

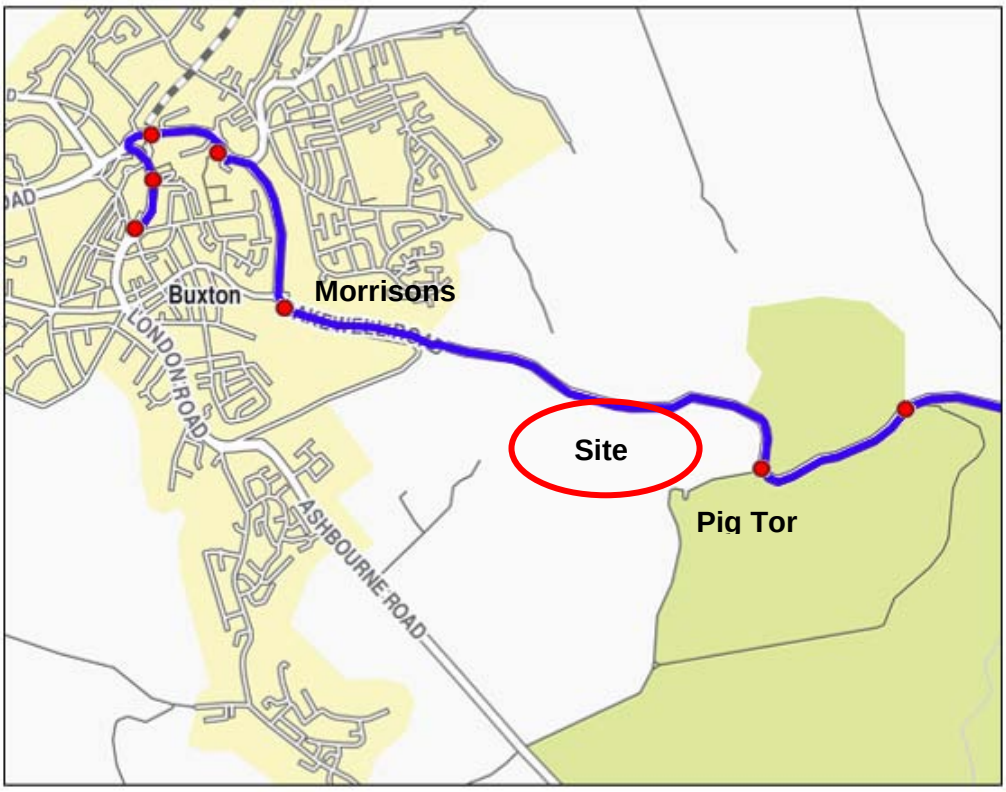


Figure 3 Nearby Bus Stops/Existing Route

4.7 Along this section of the A6 there are 5 services operating as detailed in **Table 4.1**. Detailed service Information is included as **Appendix C**.

No. / Operator	Route	Direction	Frequency Mon – Sat *(First- Last)*	Frequency Sunday *(First- Last)*
65 TM Travel	Buxton - Tideswell - Sheffield Centre Meadowhall	Out	07:00 – 16:00 5 per day	11:00-18:15 3 per day
		Return	09:25 – 17:30 5 per day	09:30 – 16:50 3 per day
66 TM Travel	Buxton – Tideswell – Chesterfield	Out	11:00 – 14:00 2 per day	16:30 1 per day
		Return	10:30 – 14:30 2 per day	14:55 1 per day
68	Buxton - Tideswell - Castleton	Out	14:50 1 per day	-
		Return	09:00 1 per day	10:25 1 per day
170 Hulleys of Baslow	Buxton - Bakewell - Baslow - Chesterfield	Out	-	19:00 1 per day
		Return	-	09:15 – 17:50 2 per day
218 Hulleys of Baslow	Buxton - Bakewell, Baslow, Sheffield	Out	09:00 – 18:05 4 per day	11:00 – 17:00 3 per day
		Return	07:30 – 16:40 4 per day	09:30 – 15:30 3 per day
605 TM Travel	Buxton - Bakewell - Matlock - Chesterfield	Out	07:30 1 per day	-
		Return	16:55 1 per day	-

Table 4.1 Bus Timetable

4.8 In addition to the above, a wide variety of services operate within and around Buxton. Opportunities for linkages to these services could enhance the level of potential bus patronage to this site.

Travel by Rail

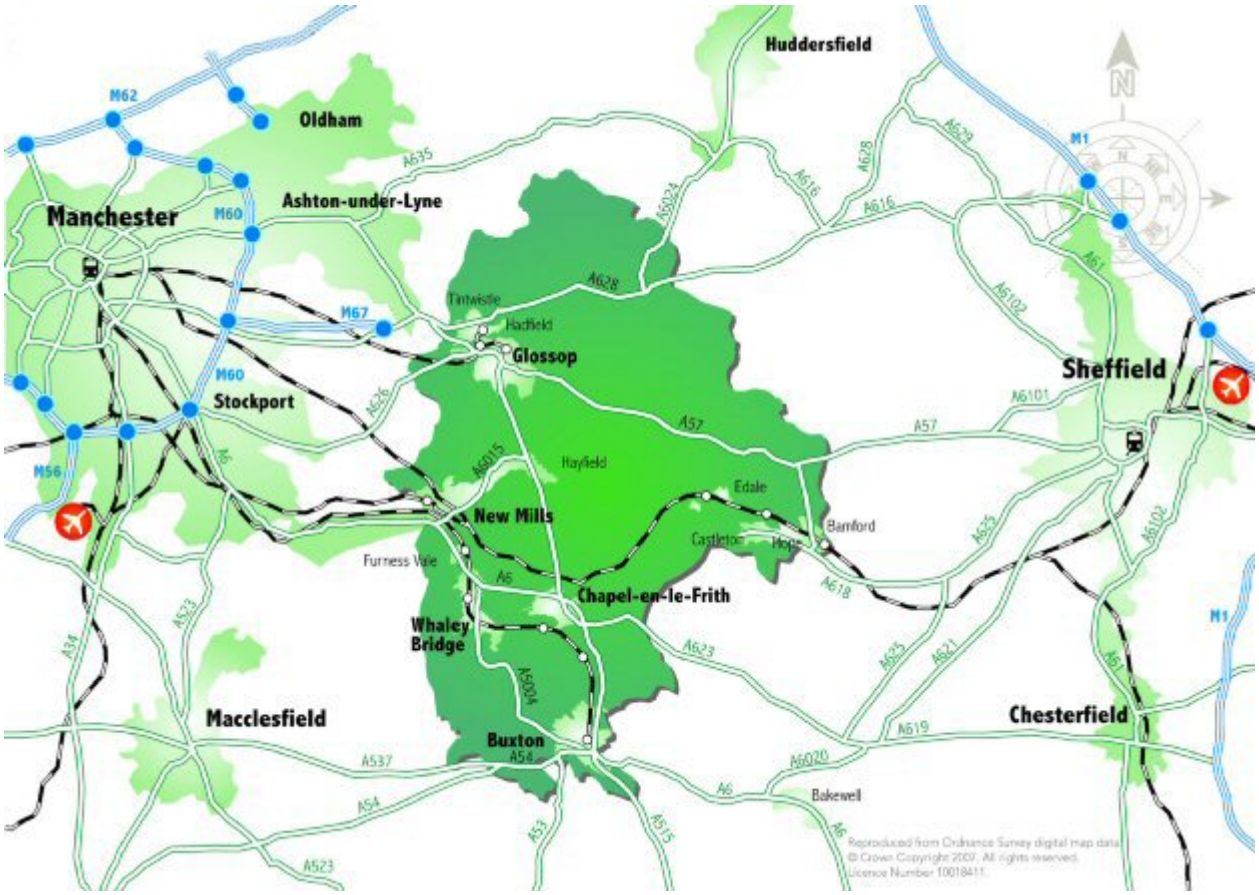
4.9 Buxton Train Station is located 3 kilometres west of the development. The station is a branch line with direct services to Manchester, Preston and Blackpool, with available interchanges from principally Stockport or Manchester for onward connection to the rest of UK. Services operate roughly from 6am to midnight with a daytime frequency of four trains per hour (two arrivals/two departures), reducing to hourly (1 arrival/1 departure) in the evening.

5.0 LOCAL HIGHWAY NETWORK

5.1 This chapter describes the existing road conditions focussing on the junction flagged for study by DCC.

5.2 Buxton itself is surrounded by the Peak District National Park. It is a hub of the regional road network with roads radiating from the town including:

- A6 that runs through the eastern edges of the town east towards Derby and Chesterfield (A619) and north to Greater Manchester;
- A515 south to Ashbourne and on to the West Midlands conurbation;
- A53 south west to Leek and Stoke-On-Trent, which also becomes the A537 west to Macclesfield



A6, Bakewell Road

5.3 The proposed development would be accessed directly from the A6, 1 mile east of Buxton. Within the vicinity of the development site, the road is 7.0 metres wide and subject to a speed limit of 50 mph.

Plate 1 A6 Looking West

Plate 2 A6 Looking East

5.4 Based upon the projected traffic volumes it is proposed that the junction will incorporate a right-turning lane with a ghost island on the A6. The design of this access junction will be engineered to accomplish the standards specified in the Design Manual for Road and Bridges (DMRB).

A 515 – Example Ghost Island as to be provided at development site

A6 Morrisons Roundabout

5.5 This roundabout on the eastern fringe of Buxton provides access to the Morrisons supermarket and via Dale Road the southern residential areas of the town.

A6 Fairfield Roundabout

5.6 This small three arm roundabout forms the northern gateway entry to the central area of Buxton. It is 600metres north of Morrisons and the road between the two junctions is of a good standard with no minor junctions making it the effective eastern distributor within the town.

A53 Bridge St / Spring Gardens A53 / A6 Fairfield Road

A53 Spring Gardens Roundabout

5.7 As depicted above the roundabout is 70 metres west of the Fairfield junction. It provides the northern arm of what is in effect the town's inner ring road for traffic to/from the north to the south/west. It is urban in character with 30mph speed limits, footpaths and street lighting all present.

A515 High St/London Rd Signals

5.8 This five armed signalised junction is the southern end of the town centre. It incorporates pedestrian crossings on all arms within an all red phase. A layout plan, complete with phasing and staging for this junction was supplied by DCC and has been used in modelling future impacts in the area.

5.9 It is urban in character with 30mph speed limits, footpaths and street lighting all present.

View north from London St towards High St

6.0 ROAD SAFETY

6.1 As part of the Transport Assessment (TA) an analysis has been undertaken of the personal injury road traffic accidents (PIA) that have been recorded on the highway network both in the immediate vicinity of the site and the wider area of Buxton itself.

6.2 The details of these accidents have been obtained from the Derbyshire Police Authority covering the period 1st January 2004 to 31st August 2009. Maps showing their locations together with detailed information on each are included in **Appendix D**.

6.3 In total 161 PIA's were recorded within the area of which :

- 2 were fatal
- 21 were classified as serious
- 138 were classified as slight

6.4 A detailed examination is undertaken below of the accidents that have occurred on those sections of road and key junctions where it is considered that the traffic generated by the development proposal might have an impact. The network has been sectionalised as follows:

- A6 from the proposed new access to the development to east of the Cowdale village T-junction
- A6 from the new access westwards to the Morrison's roundabout
- A6 Morrison's roundabout and immediate approaches
- A6 Bakewell Road between Morrison's roundabout and the A 53 junction at Fairfield roundabout
- A 53 Fairfield Roundabout to and including the Bridge Street/Spring Gardens roundabout
- B 5059 Dale Road
- Signalised junction of the A515 and the B5059 Dale Road and approaches

A6 East of Development access

6.5 In the study period there were 14 recorded PIA's (7 serious and 7 slight) on this section of road with one involving a pedestrian. 13 of these accidents involved vehicles losing control (pedestrian accident excepted). A wet road was recorded as a possible factor in 5 accidents. 4 accidents occurred at night (the road is not lit). 8 of the accidents occurred in the period 01/01/2004 to 04/2005. The left hand bend near the Cowdale Village T-junction was a historic accident cluster site with 7 accidents occurring here during 2004 alone. Subsequent road safety improvements undertaken by the County Council has dramatically improved the safety record here with only 3 recorded accidents in the subsequent period 01/05/05 to 31/08/2009. The road is subject to a 50mph speed limit.

A6 between Development access and the Morrison's roundabout

6.6 In the study period there were 4 recorded PIA's (2 serious and 2 slight) on this section of road. A wet road surface was recorded as a possible factor in 3 accidents with all the accidents occurring during the day. One accident involved a parked car. There were no accident clusters. This section of road is subject to 30mph and 50mph speed limits and has lighting on part.

A6 Morrison's roundabout and immediate approaches

6.7 In the study period there were 5 PIA's all slight in this area two involving pedestrians. A wet road surface was recorded as a possible factor in one with all the accidents occurring during the day. One accident involved a pedal cyclist. There were no obvious common factors. The roads in the area have street lighting and are subject to a 30mph speed limit.

A6 Bakewell Road between Morrison's roundabout and the A53 Fairfield Road junction roundabout

6.8 In the study period there were 2 PIA's both slight on this section of road. A wet road surface was recorded as a possible factor in one with both accidents occurring during the day. There was no common factor. The road has street lighting and is subject to a 30 mph speed limit.

A53 Fairfield roundabout to and including the Bridge Street/Spring Gardens roundabout

6.9 In the study period there were 7 PIA's (1 fatal, 1 serious and 5 slight) on this section of road. A wet road surface was recorded as a possible factor in 2 accidents with one occurring at night. 4 of the accidents, including the fatality, involved pedestrians. These occurred on the various approaches to the roundabouts and with the fatality involving a PSV. Only one accident involved a turning movement at a roundabout. All the roads in this area have street lighting and are subject to 30mph speed limit.

B5059 Dale Road

6.10 In the study period there were 2 PIA's, both slight in this road. Both occurred during the day and involved turning movements into side roads. The road has street lighting and is subject to a 30mph speed limit.

Junction of A515 / B5059 and approaches

6.11 In the study period there were 5 PIA's (1 serious and 4 slight) in this area. A wet road surface was recorded as a possible factor in 2 with one accident occurring at night. In one accident a parked vehicle was a contributory factor. 2 accidents were of a shunt type. No accidents involved turning manoeuvres within the signalised junction were recorded. All the roads in this area have street lighting and are subject to a 30 mph speed limit.

6.12 As there are no identified accident cluster sites within the highway network area studied nor predominant causation on any sections of road other than drivers losing control of their vehicles on the section of the A6 between Morrison's Roundabout and the Cowdale Village T-junction (which has now partly been addressed by the road safety improvements undertaken by the County Council) it is not considered that the development proposals will have a detrimental impact on road safety in the area. In fact the provision of traffic islands and associated road markings and signing on the approaches to the proposed new access into the development should encourage lower traffic speeds on this section of road.

7.0 BASELINE TRAFFIC CONDITION

7.1 In order to establish a baseline condition for the proposed study network and fully understand the problems, restraints as well as the opportunities of the current transport system, historical traffic information (Automatic Traffic Count) data for the A6 has been sourced from Derbyshire County Council.

7.2 The site, immediately west of the proposed development is continually monitored 365 days per year. The hourly profile shows the peak demand on the network to be between 16:00-17:00. There is no traditional AM peak as traffic continually builds through the day. Weekend traffic levels are greater, reflective of the high volume of leisure and visitor trips to the town.

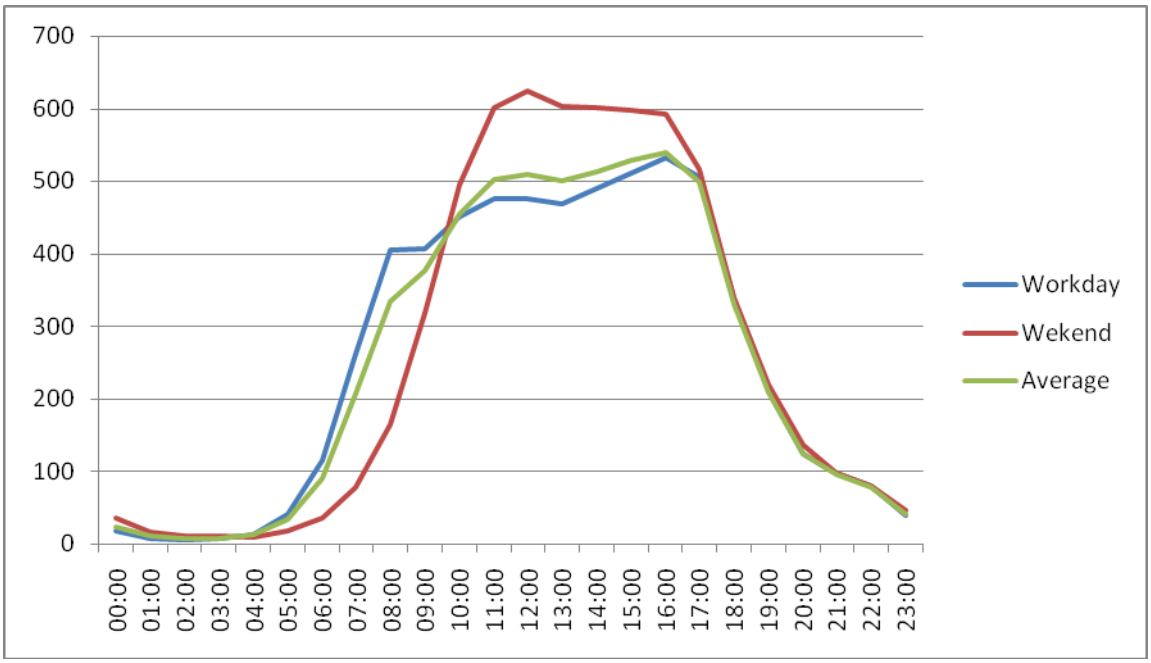


Chart 7.1 - Average Hourly Traffic Flows (Jan-Oct 2009)

7.3 Based on the ATC data the average daily flows are for a typical weekday, are 6,000 per day, and 6,300 at the weekend.

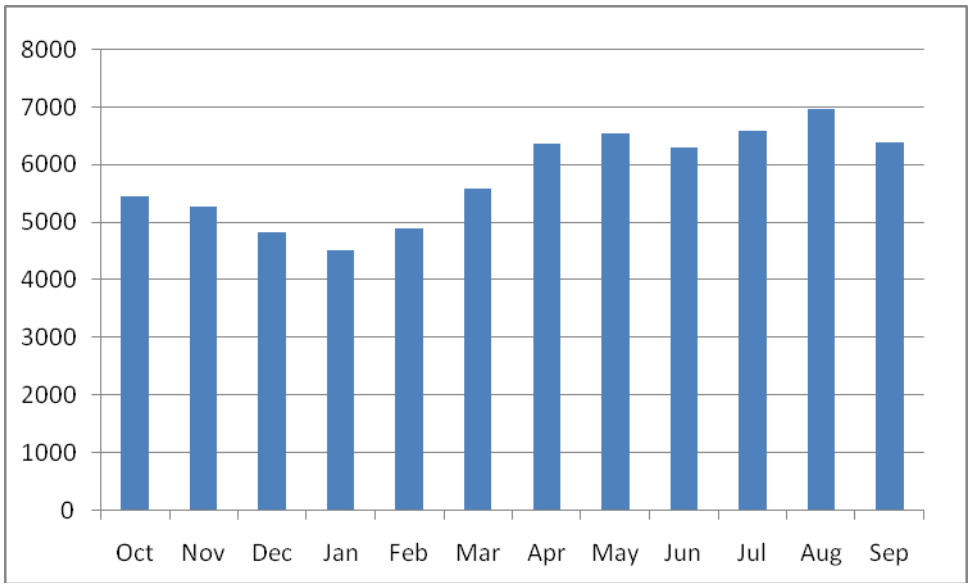


Chart 7.2 - Average Monthly Traffic Flows (Oct 2008 - Sept 2009)

7.4 The monthly profile further illustrates the seasonally affected traffic attracted to the town. Overall traffic flows are 20% higher than the AADT in the peak month of August, and 20% lower in January.

7.5 To compliment the above data, peak hour video traffic surveys were also conducted on 13th October 2009 between 07:00-10:00 and 16:00-19:00 at:

- A6 Morrisons Roundabout
  - A6 Bakewell Rd (S and N) / Morrisions (E) / B5059 Dale Road (W)
- A6 Fairfield Roundabout
  - A6 Bakewell Rd (S) / A6 Fairfield Rd (E) / A53 Spring Gardens (W)
- A53 Spring Gardens Roundabout
  - A53 Spring Gardens(E) / Sylvan Park Car Park (S) / Spring Gardens (W) / A53 Bridge St (N)
- A515 High St/London Rd Signals
  - A515 High St (N) / B5059 Dale Road (E) / London Rd (S) / Green Lane (SW) / B5059 West Road (W)

7.6 The geographic scope of the obtained traffic information is indicated in **Figure 5** below:

Figure 5 Study Area

7.7 In order to accurately reflect the peak demand of the adjacent highway network and deliver a robust assessment, the collected traffic data is calibrated for :

- AM - every accumulated hour between 07:30 – 09:30 with a 30-minute increment;
- PM - every accumulated hour between 16:00 – 18:00 with a 30-minute increment.

7.8 The related entry flows at each individual junction are tabulated as follows:

Junction	AM Peak			PM Peak		
	0730-0830	0800 - 0900	0830-0930	1600-1700	1630-1730	1700-1800
A6 Morrisons Roundabout	1256	1496	1554	1796	1914	1891
A6 Fairfield Roundabout	1870	2145	2248	2448	2476	2375
A53 Bridge St / Spring Gardens	1020	1260	1395	1560	1543	1471
A515 High Street/London Rd	1106	1412	1517	1503	1609	1613
Total	5252	6313	6714	7307	7542	7350

Table 7.2 Observed Traffic Inflow at the Flagged Junctions

7.9 DfT Guidance on Transport Assessment stated that the chosen analysis period should not only reflect the condition of the adjacent transport system but also take into account the travel patterns of development-generated trips.

7.10 Section details the trips generated by the development. The peak half hour of trip generation is between 08:30-09:00 and 17:00-17:30.

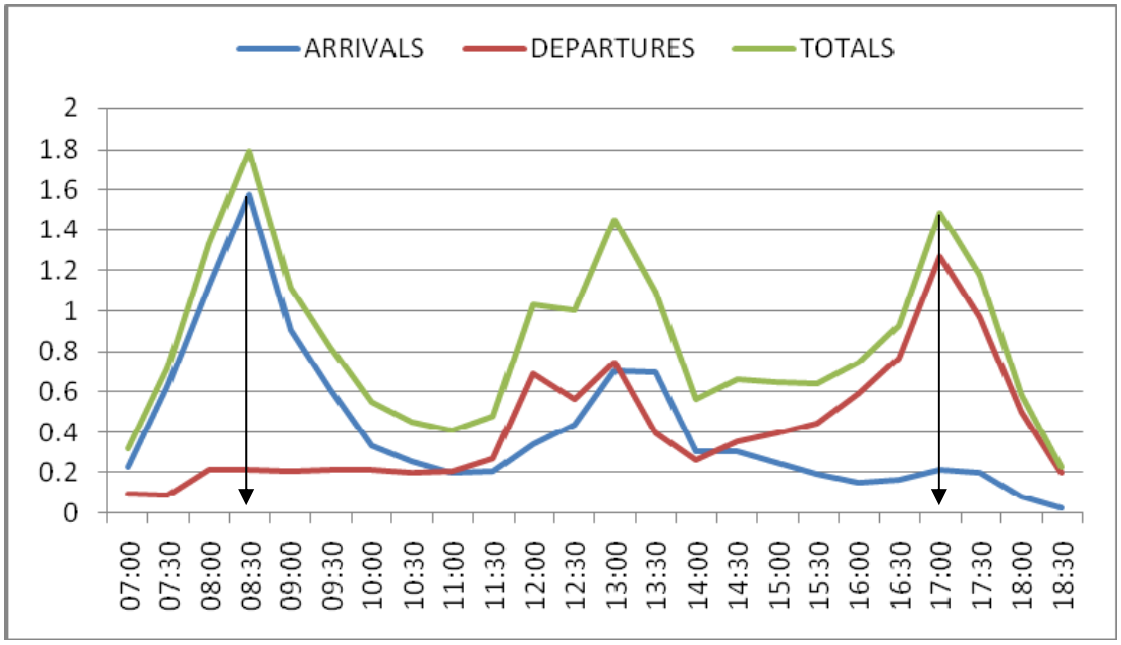


Chart 7.3 – Daily Traffic Generation Flow Profile

7.11 Taking into consideration the cumulative hours, in combination with the base network traffic the highest volumes of trips will be on the network during the cumulative peaks of 08:30-09:30 and 16:30-17:30. These are consequently confirmed as the testing periods. These baseline traffic flows are shown within **Appendix F**.

8.0 FUTURE YEAR TRAFFIC CONDITIONS

8.1 It is anticipated that the proposed development will be occupied in 2014. A design year of 2019 (completion year plus 5), is proposed to ensure a robust reflection of the future highway conditions.

8.2 In view of this, growth adjustments are applied to base year traffic flow to reflect the rising traffic demand resulting from greater wealth, increased working population, increased employment potential, and increased car ownership amongst other factors.

8.3 The relevant local growth factors have been derived using TEMPRO Dataset 5.3 for the High Peak Local Authority area to lift up the 2009 base flow for an Opening Year 2014 and Design Year 2019.

8.4 This programme, the Trip End Model Presentation Program, is designed by the Department for Transport for fast and efficient access to the national trip end model projections of growth in travel demands.

8.5 The adopted growth rates are summarised in **Table 8.1** below:

Period	Growth Rate	
	AM	PM
Year 2009 to 2019	1.1618	1.1683

Table 8.1 Growth Factors

Committed Development

8.6 Discussions with Derbyshire County Council indicated that there are no significant committed developments in the surrounding area that may affect traffic flows on the tested junctions. The impact of the development traffic will be assessed solely on the observed traffic levels that has been factored up to the opening and design year level.

8.7 The resultant future year traffic diagrams are included within **Appendix F**.

9.0 DEVELOPMENT GENERATED TRIPS

9.1 The specified methodological approach in terms of the quantification of the development traffic impact; and the scope of the required traffic modelling is common to similar work of this nature undertaken by Jubb.

9.2 The corresponding assessment on trip generation, distribution, modal split and trip assignment to the network are considered in the following section.

Person Trip Generation

Science Park

9.3 In line with DfT Guidelines, the TRICS database has been employed as the initial tool to estimate the likely people movement generation for the various elements of this particular application.

9.4 The database was reviewed and multi-modal studies were included for sites with similar characteristics to the proposed development in terms of location and scale of development. This assures a robust assessment and provides a reasonable indication as to the level of person trips that will be generated by the application site.

9.5 The obtained average person trip rates for the envisaged elements are summarised below with the full TRICS reports included within **Appendix E**.

9.6 Thus the resultant person trip rates by mode are:

Mode		08:30-09:30	16:30-17:30	Daily Trip Rates:
Solo Car Drivers	Arr	1.932	0.293	7.37
	Dep	0.341	1.476	7.368
	Total	2.273	1.769	14.738
Car Sharers	Arr	0.212	0.042	1.357
	Dep	0.066	0.212	1.263
	Total	0.278	0.254	2.62
PT Users	Arr	0.101	0.005	7.37
	Dep	0	0.104	7.368
	Total	0.101	0.109	14.738
Cyclists	Arr	0.065	0.01	0.203
	Dep	0	0.048	0.19
	Total	0.065	0.058	0.393
Pedestrians	Arr	0.176	0.034	1.033
	Dep	0.011	0.192	1.027
	Total	0.187	0.226	2.06
People (Total)	Arr	2.487	0.383	10.204
	Dep	0.419	2.033	10.058
	Total	2.906	2.416	20.262

Table 9.1: Person Trips by Modes – Business Parks

9.7 As a result of the analysis of surveys within the TRICS database the following modal split is recorded.

Mode	08:30-09:30	16:30-17:30	Daily Trip Rates:
Solo Car Drivers	78.3%	73.2%	72.7%
Car Sharers	9.6%	10.5%	12.9%
PT Users	3.5%	4.5%	2.3%
Cyclists	2.2%	2.4%	1.9%
Pedestrians	6.4%	9.4%	10.2%
Total	100%	100%	100%

Table 9.2: Business Park Modal Split (TRICS data)

9.8 For robustness the assessment of existing trip patterns within the Buxton area has been undertaken. This can corroborate the anticipated modal share that could be achieved in this location, appropriately adjusted to affect the specific accessibility issues affecting the site.

9.9 The 2001 Census Data – Method of Travel to Work for Resident Population (UV39) and Daytime Population (UV37) of Cote Heath Ward were reviewed. This is the ward within which the site lies. The derived travel patterns are indicated in **Table 9.3** below.

	Cote Heath Ward		High Peak Local Authority	
Method Of Travel	**Resident UV39**	**Workplace UV37**	**Resident UV39**	**Workplace UV37**
Train	0.5%	0.5%	4.9%	0.8%
Bus, minibus or coach	5.5%	2.5%	3.5%	3.8%
Taxi or minicab	0.8%	0.6%	0.6%	0.7%
Driving a car or van	67.8%	75.9%	66.6%	63.2%
Passenger in a car or van	8.7%	7.6%	7.0%	7.9%
Motorcycle, scooter or moped	1.1%	0.8%	0.9%	0.8%
Bicycle	1.7%	1.5%	1.4%	1.9%
On foot	13.5%	10.3%	14.6%	20.4%
Other	0.4%	0.3%	0.5%	0.4%

Table 9.3: 2001 Census Data – Method of Travel to Work

9.10 The data indicates a comparable pattern between those that travel to work in Cote Heath (Workplace Population), and those that travel from Cote Heath (residents). In the order of 70% of workers commute by solo car journey. The values also indicate a higher level of sustainable travel than predicted amongst business park users.

9.11 As discussed in the audit of sustainable access, the site does not have direct pedestrian connections, dedicated cycle routes or high public transport accessibility. In light of this it is proposed to operate a shuttle for workers and visitors to the Science Park and the town centre. Here public transport services (bus and train) can be accessed, and those within a suitable walking distance could also avail of the Park Shuttle. In this manner the TRICS modal split data is to be adopted, with those coming on foot assumed to use the shuttle.

9.12 For the Science Park the person trips generated would be as follows:

Mode	AM 08:30-09:30		PM 16:30-17:30	
	IN	Out	IN	OUT
Solo Car Drivers	533	94	81	407
Car Sharers	59	18	12	59
PT Users	28	0	1	29
Cyclists	18	0	3	13
Pedestrians[1]	49	3	9	53

Table 9.4: Predicted Person Trips

[1] Pedestrians will be assumed to travel to the site by the shuttle bus, but walk within the town itself.

Water Bottling Plant

9.13 Taking into account the operation of the similar Water Bottling Plants, TRICS does not supply suitable data, and data from an existing local operator has been used. The plant operates on a 12 hour shift pattern between 6am and 6pm, 365 days a year. Only 15 staff are employed directly with the bottling facility. Separately the office also has approximately 15 staff that work standard office working hours.

9.14 The last component is deliveries and goods movements. These will vary during the year but on a typical day between 50 and 120 HGV movements would be expected (two way total). This accommodates for an expanded facility which presently generates approximately a total of 80 movements at its peak. These occur throughout the day but predominantly outside of the tested peaks, with 70% of the daily movements between 6am-3pm (ie 35-80 HGV movements).

HGV Movements	Weekday	Saturday	Sunday
Winter	25 per day	18	12
Summer	60	40	30

Table 9.5: Predicted HGV Movements

Sports & Leisure Facilities

Climbing Centre

9.15 Currently within the quarry climbing occurs without any support or ancillary services. The terrain offers a great climbing environment, and through the provision of a new centre, these opportunities can be enhanced and offered to a wider selection of the community and tourists. The centre will provide changing, storage and toilets offering climbers a degree of comfort and amenities that they currently do not have.

9.16 The centre will be open at times of the day suited to demand and climbing conditions, and would attract most visitors at weekends and summer evenings. These would be periods outside of peak hours, and in such numbers that it is not felt to generate any traffic issues.

Sports Centre

9.17 As a supporting element of infrastructure, the provision of an on site Sports Centre is primarily targeted at broadening the appeal of the Science Park and providing a venue for those on site to partake in sporting and social activities.

9.18 The Centre will be low key, but made available to wider members of the public at suitable times. The detailed mix is to be determined, but based upon its size and layout the highest trip generation is the equivalent of three 5-a-side pitches.

9.19 The table below indicates that with three pitches only 14 two way trips would be generated in the PM Peak. Being inconsequential, and primarily aimed at serving the demands generated by the Science Park, there is anticipated to be little or no external traffic demand generated during the PM peak hour and hence the Sports Centre has not been included within the modelled peaks.

Mode		08:30-09:30	16:30-17:30	Daily Trip Rates:
Vehicles	Arrival	3.5	9.2	88.6
	Departure	0.8	4.5	85.4
	Total	4.3	13.7	174.0

Table 9.6: Predicted Sports Centre Vehicular Trips

Person Trips Distribution

9.20 The derived journeys, made by various means of travel, to and from each identified origin/destination, are distributed based on the following parameters.

9.21 In order to establish a robust distribution model based upon local information 2001 census data has been employed. Due to the scale of development, rather than rely on data for the single ward (Cote Heath) where the site is located, data has been aggregated from the seven wards identified as forming Buxton. These are:

- Barms
- Burbage
- Buxton Central
- Corbar
- Cote Heath
- Stone Bench
- Temple

9.22 Analysis of the Distance Travelled to Work (UV35) provides the potential distribution of trips. The number does not include the residents with no fixed place of work, and who work offshore or outside the UK.

2001 Census: Distance Travelled to Work - Workplace Population (UV80)	Barms	Burbage	Buxton Central	Corbar	Cote Heath	Stone Bench	Temple	All Buxton	High Peak
Less than 2km	93	163	1925	794	405	383	271	**4034**	11336
2km to less than 5km	17	342	263	165	213	102	20	**1122**	5164
5km to less than 10km	11	161	461	136	104	72	48	**993**	4342
10km to less than 20km	3	131	285	94	179	45	43	**780**	3217
20km to less than 30km	7	36	196	45	80	31	28	**423**	1089
30km to less than 40km	4	23	89	31	29	5	20	**201**	426
40km to less than 60km	0	17	33	14	17	7	6	**94**	328
60km and over	0	9	23	15	6	4	3	**60**	279
Total	135	882	3275	1294	1033	649	439	**7707**	26181

The number does not include the residents with no fixed place of work, and who work offshore or outside the UK.

Table 9.7 – Distance Travelled to Work – Workplace Population

9.23 To determine where those destinations are outside of the District use has been made of the Peak Sub Region Strategic Housing Market Assessment – December 2008 that assessed commuting flows. The derived destinations/origins profile for both in and out commuting from High Peak is summarised as below in **Table 9.8**. The remainder commute elsewhere not identified within these locations.

Distance	Origin/Destination	In Commuters	Out Commuters	Direction
5km to less than 10km	Derbyshire Dales	21.0%	5%	A515 S
10km to less than 20km	Macclesfield	10.0%	9%	A53 SW
	Staffs Moorland	3.0%	0%	A53 SW
20km to less than 30km	Chesterfield	2.0%	1%	A6 E
	NE Derbys	2.0%	1%	A6 E
30km to less than 40km	Tameside	23.0%	18%	A6 N
	Stockport	18.0%	21%	A6 N
	Manchester	0.0%	21%	A6 N
40km to less than 60km	Sheffield	3.0%	4%	A6 E
	Derby	0.0%	1%	A6 E
	Amber Valley (Ripley)	0.0%	1%	A6 E
	Trafford	0.0%	4%	A6 N
	Salford	0.0%	3%	A6 N

Table 9.8 – Destination/Origin of Commuting Outside of High Peak District

9.24 In combining the two datasets trips in the distance bands have been apportioned in accordance with the working population for those areas within Buxton, whilst those travelling from further afield have been pro-rated in accordance with the identified commuting patterns detailed above. This provides the following people distribution for the proposed development. To assign the development movements to the local network, possible travel routes to the listed destinations/origins have been identified and summarised in **Table 9.9** below:

Distance	All Buxton	Origin/ Destination	Direction	Proportion
Less than 5km (Buxton Wards)	60.13%	Barms	A6 N	5.8%
		Burbage	A53 SW	5.7%
		Buxton Central	Dale Rd	10.9%
		Corbar	A53N	10.7%
			A53 SW	1.2%
		Cote Heath	Dale Rd	4.5%
			A515 S	4.5%
		Stone Bench	A6 N	11.4%
		Temple	Green Lane	2.7%
			A53 SW	2.7%
5km to less than 10km	12.91%	Derbyshire Dales	A6 E	6.45%
			A515 S	6.45%
10km to less than 20km	10.27%	Macclesfield	A53 SW	7.90%
		Staffs Moorland	A53 SW	2.37%
20km to less than 30km	7.84%	Chesterfield	A6 E	3.92%
		NE Derbyshire	A6 E	3.92%
30km to less than 40km	5.02%	Tameside	A6 N	2.81%
		Stockport	A6 N	2.20%
40km to less than 60km	1.94%	Sheffield	A6 E	1.94%
60km and over	1.89%	Various	A6 E	0.94%
		Various	A6 N	0.94%
Total	100.00%			100.0%

Table 9.9 – People Trip Distribution by Distance/Direction

Direction	Proportion
A515 S	11.0%
Dale Rd	15.4%
Green Lane	2.7%
A53 SW (via West St)	19.8%
A53N	10.7%
A6 N	23.1%
A6 E	17.2%
Total	100.0%

Table 9.10 – Summary People Trip Distribution by Direction

9.25 Considering the location of the site there will be limited opportunities for using existing scheduled public transport, or walking directly to the site. Accordingly a shuttle bus will be a keystone of the development running between the town centre and the site. This will allow those that walk or use public transport to connect and reach work by sustainable means of travel. Thus whilst the above represents all trips an adjustment is necessary to allow for those who will travel by means other than car. Based on the projected modal split the following distribution of mode by distance is envisaged.

	Distance Band	Car	Car Passenger	Pedestrian	Cycle	Public Transport	Total
AM Peak	Less than 5km	42.22%	5.76%	3.48%	2.24%	6.44%	60.13%
	5km to less than 10km	11.67%	1.24%	0%	0%	0%	12.91%
	10km to less than 20km	9.29%	0.98%	0%	0%	0%	10.27%
	20km to less than 30km	7.09%	0.75%	0%	0%	0%	7.84%
	30km to less than 40km	4.54%	0.48%	0%	0%	0%	5.02%
	40km to less than 60km	1.76%	0.19%	0%	0%	0%	1.94%
	60km and over	1.71%	0.18%	0%	0%	0%	1.89%
	Total	**78.3%**	**9.6%**	**3.48%**	**2.24%**	**6.44%**	**100.0%**
PM Peak	Less than 5km	37.55%	6.32%	4.51%	2.40%	9.35%	60.13%
	5km to less than 10km	11.55%	1.36%	0%	0%	0%	12.91%
	10km to less than 20km	9.19%	1.08%	0%	0%	0%	10.27%
	20km to less than 30km	7.01%	0.82%	0%	0%	0%	7.84%
	30km to less than 40km	4.49%	0.53%	0%	0%	0%	5.02%
	40km to less than 60km	1.74%	0.20%	0%	0%	0%	1.94%
	60km and over	1.69%	0.20%	0%	0%	0%	1.89%
	Total	**73.2%**	**10.5%**	**4.51%**	**2.40%**	**9.35%**	**100.0%**

Table 9.11 – Modal Share by Distance

9.26 The resultant distribution is shown in **Table 9.12** with a detailed assignment of all motorised trips. The predicted future traffic flows are also shown in **Appendix F**.

Distance	All Buxton	Origin/ Destination	Direction	AM Peak	PM Peak
Less than 5km (Buxton Wards)	60.13%	Barms	A6 N	5.16%	4.90%
		Burbage	A53 SW	5.09%	4.83%
		Buxton Central	Dale Rd	9.76%	9.28%
		Corbar	A53N	9.62%	9.15%
			A53 SW	1.07%	1.02%
		Cote Heath	Dale Rd	4.08%	3.88%
			A515 S	4.08%	3.88%
		Stone Bench	A6 N	10.24%	9.73%
		Temple	Green Lane	2.42%	2.30%
			A53 SW	2.42%	2.30%
5km to less than 10km	12.91%	Derbyshire Dales	A6 E	7.46%	7.89%
			A515 S	7.46%	7.89%
10km to less than 20km	10.27%	Macclesfield	A53 SW	9.13%	9.66%
		Staffs Moorland	A53 SW	2.74%	2.90%
20km to less than 30km	7.84%	Chesterfield	A6 E	4.53%	4.79%
		NE Derbyshire	A6 E	4.53%	4.79%
30km to less than 40km	5.02%	Tameside	A6 N	3.25%	3.44%
		Stockport	A6 N	2.54%	2.69%
40km to less than 60km	1.94%	Sheffield	A6 E	2.25%	2.38%
60km and over	1.89%	Various	A6 E	1.09%	1.15%
		Various	A6 N	1.09%	1.15%
Total	100.00%			100%	100%

Table 9.12 – Vehicular Trip Distribution by Distance/Direction

Direction	AM Peak	PM Peak
A515 S	11.5%	11.8%
Dale Rd	13.8%	13.2%
Green Lane	2.4%	2.3%
A53 SW (via West St)	20.4%	20.7%
A53N	9.6%	9.1%
A6 N	22.3%	21.9%
A6 E	19.8%	21.0%
Total	100.0%	100%

Table 9.13 – Summary Vehicular Trip Distribution by Direction

9.27 The distribution methodology has focussed on the current origin of commuters into Buxton. However there is a noted imbalance between in and out commuting as people travel further and in greater numbers from Buxton, than travel to work in Buxton.

2001 Census: Distance Travelled to Work (UV35)	Barms	Burbage	Buxton Central	Corbar	Cote Heath	Stone Bench	Temple	All Buxton	High Peak
Less than 2km	419	226	817	611	701	911	353	**4038**	11217
2km to less than 5km	97	192	130	161	388	224	57	**1249**	5106
5km to less than 10km	123	152	176	133	236	227	88	**1135**	5686
10km to less than 20km	75	125	149	139	194	136	85	**903**	8565
20km to less than 30km	67	66	154	107	117	85	93	**689**	3912
30km to less than 40km	34	35	94	102	61	42	73	**441**	1214
40km to less than 60km	13	20	33	36	22	25	22	**171**	807
60km and over	13	13	38	41	24	19	18	**166**	889
Total	841	829	1591	1330	1743	1669	789	**8792**	37396

The number does not include the residents with no fixed place of work, and who work offshore or outside the UK.

Table 9.14 – Distance Travelled to Work – Residents

Distance Band	Distance Travelled to Work (UV35)	Distance Travelled to Work - Workplace Population (UV80)
Less than 2km	45.9%	52.3%
2km to less than 5km	14.2%	14.6%
5km to less than 10km	12.9%	12.9%
10km to less than 20km	10.3%	10.1%
20km to less than 30km	7.8%	5.5%
30km to less than 40km	5.0%	2.6%
40km to less than 60km	1.9%	1.2%
60km and over	1.9%	0.8%
Total	100.0%	100.0%

Table 9.15 – Buxton In and Out Commuting Distances

9.28 The provision of a significant employment location that can offer a diverse range of opportunities will make a notable contribution towards re-addressing this imbalance and provide for greater local opportunities. Those that currently commute out of Buxton to further afield will be able to stay local, and hence have a greater opportunity to also adopt sustainable travel habits. The methodology adopted is seen as a robust assessment, but it is flagged that in reality less longer distance commuting out of Buxton and the hinterland will occur in the future.

10.0 JUNCTION CAPACITY STUDY

10.1 Guidance on Transport Assessment indicates that junction assessment should be conducted where material changes in traffic volumes are experienced. Thus, for the sake of robustness, the percentage increase on the net traffic for a base year of 2009 as result of the proposed regeneration scheme, is subsequently tabulated below:

AM Peak: 08:30 - 09:30	East of Site	West of Site
A6 Eastbound	118%	5.1%
A6 Westbound	15.9%	22.0%
Pm Peak: 16:30 - 17:30	**East of Site**	**West of Site**
A6 Eastbound	14.2%	21.8%
A6 Westbound	70.0%	3.2%

Table 10.1 A6 – Percentage Change in Movement

AM Peak: 08:30 - 09:30	A	B	C	D
A. A6 (South)	0.0%	25.6%	8.7%	0.0%
B. Dale Rd	79.1%	0.0%	0.0%	0.0%
C. A6 Bakewell Rd (North)	38.6%	0.0%	0.0%	0.0%
D. Morrisons	0.0%	0.0%	0.0%	0.0%
PM Peak: 16:30 - 17:30	**A**	**B**	**C**	**D**
A. A6 (South)	0.0%	69.6%	27.9%	0.0%
B. Dale Rd	25.8%	0.0%	0.0%	0.0%
C. A6 Bakewell Rd (North)	8.5%	0.0%	0.0%	0.0%
D. Morrisons	0.0%	0.0%	0.0%	0.0%

Table 10.2 A6 Morrisons Roundabout – Percentage Change in Movement

AM Peak: 08:30 - 09:30	A	B	C
A. A6 Bakewell Rd (S)	0.0%	4.3%	4.1%
B. A53 Spring Gardens (W)	22.1%	0.0%	0.0%
C. A6 Fairfield Rd (E)	17.1%	0.0%	0.0%
PM Peak: 16:30 - 17:30	A	B	C
A. A6 Bakewell Rd (S)	0.0%	18.5%	14.7%
B. A53 Spring Gardens (W)	3.1%	0.0%	0.0%
C. A6 Fairfield Rd (E)	3.2%	0.0%	0.0%

Table 10.3 A6 Fairfield Roundabout – Percentage Change in Movement

AM Peak: 08:30 - 09:30	A	B	C	D
A. A53, Spring Gardens (E)	0.0%	0.0%	0.0%	1.2%
B. Car Park (S)	0.0%	0.0%	0.0%	0.0%
C. Spring Gardens (W)	0.0%	0.0%	0.0%	0.0%
D. A53 Bridge St (N)	8.2%	0.0%	0.0%	0.0%
PM Peak: 16:30 - 17:30	**A**	**B**	**C**	**D**
A. A53, Spring Gardens (E)	0.0%	0.0%	0.0%	6.3%
B. Car Park (S)	0.0%	0.0%	0.0%	0.0%
C. Spring Gardens (W)	0.0%	0.0%	0.0%	0.0%
D. A53 Bridge St (N)	1.2%	0.0%	0.0%	0.0%

Table 10.4 A53 Spring Gardens – Percentage Change in Movement

AM Peak: 08:30 - 09:30	A	B	C	D	E
A. A515, High St (N)	0.0%	0.0%	0.0%	0.0%	0.0%
B. B5059 Dale Rd (E)	0.0%	0.0%	15.9%	4.0%	11.7%
C. A515 London St (S)	0.0%	41.9%	0.0%	0.0%	0.0%
D. Green Lane (SW)	0.0%	13.2%	0.0%	0.0%	0.0%
E. B5059 West St (W)	0.0%	42.9%	0.0%	0.0%	0.0%
PM Peak: 16:30 - 17:30	**A**	**B**	**C**	**D**	**E**
A. A515, High St (N)	0.0%	0.0%	0.0%	0.0%	0.0%
B. B5059 Dale Rd (E)	0.0%	0.0%	43.6%	16.8%	36.1%
C. A515 London St (S)	0.0%	11.4%	0.0%	0.0%	0.0%
D. Green Lane (SW)	0.0%	3.2%	0.0%	0.0%	0.0%
E. B5059 West St (W)	0.0%	10.2%	0.0%	0.0%	0.0%

Table 10.5 High St/London Rd – Percentage Change in Movement

10.2 According to the IHT Guidance on Traffic Impact Assessment, junction capacity tests are required where:

- the development traffic exceeds 5% of the existing traffic on any turning movements on a congested network
- for a free flow condition, a 10% threshold will be introduced.

10.3 In view of this, junction capacity tests would therefore be conducted via ARCADY, PICADY and LINSIG models at the following locations:

- A6 Express Park, Buxton - Development Access
- A6 / B5059 Morrisons Roundabout
- A6 / A53 Fairfield Roundabout
- A53 Bridge St / Spring Gardens Roundabout
- A515 / B5059 High St / London Rd / Dale Rd Signals

For the specified AM and PM testing periods at:

- Base Year 2009
- Design Year 2019 with and without development

10.4 In order to accurately set up the LINSIG model for A515 High St/London Rd junction, junction layout and signal timing plans were obtained from DCC.

10.5 It should be noted that the recommended theoretical capacity of a junction equates to:

- a Ratio of Flow over Capacity (RFC) of 0.85 for T-junction and Roundabout; and
- a positive Practical Reserve Capacity value for Signalised Junction.

If the above thresholds are exceeded, the junction will be considered as operating over capacity and would experience delays, queuing and resultant congestion.

Junction 1 – A6 Development Access

10.6 The junction has been designed in accordance with the Design for Manual and Bridges (DMRB) and in discussion with Derbyshire County Council's Highway Team. The junction provides for a right turning bay of a length commensurate with the maximum queue lengths the site will generate. Equally the internal layout and width provides for safe stacking and turning at the mouth of the junction existing the site. Visibility splays will be created with a 'y' distance of 145m, measured from 4.5m back from the junction. Designs for the junction, and Swept Path Analyses are included within **Appendix G**.

10.7 The outturn PICADY results (also Appendix G) indicate that a priority junction can satisfactorily accommodate the generated traffic flows from the site without detrimental impact upon the A6. As there is currently no junction, no without development scenario is presented. The junction will not impact upon the A6 traffic flows as they will retain a clear road past the site. Any queuing traffic can be safely accommodated within the right turn ghost lane, or be within the site.

AM Peak: 08:30 - 09:30	RFC	Queue
Arm B – Site Access Left Turn	0.138	0.16
Arm B – Site Access Right Turn	0.080	0.09
Arm C – A6 Right Turn Lane	0.787	3.47
Pm Peak: 16:30 - 17:30	**RFC**	**Queue**
Arm B – Site Access Left Turn	0.714	2.41
Arm B – Site Access Right Turn	0.314	0.45
Arm C – A6 Right Turn Lane	0.116	0.13

Table 10.6 A6 Development Access, 2019, With Development

Junction 2 – A6 Morrisons

10.8 Below the baseline tests indicate that the roundabout junction is shown as operating satisfactorily within its theoretical capacity for the present year and a design year of 2019.

10.9 With future development one arm approaches capacity in the PM peak – the A6 approach to the Morrisons roundabout. This is a single lane approach and the future predicted queues are in the order of 6 vehicles.

10.10 The potential for selected localised improvements may facilitate the addition of a second lane at the approach to this junction from the A6 and alleviate this issue. This can be a topic for discussion based upon the future development of the scheme and aspirations of the local highway authority.

	AM Peak		PM Peak	
	Max RFC	Max Queue	Max RFC	Max Queue
Arm	**Base Year 2009**			
A. A6 (South)	0.382	0.6	0.465	0.9
B. Dale Rd	0.299	0.4	0.396	0.6
C. A6 Bakewell Rd (North)	0.501	1.0	0.574	1.3
D. Morrisons	0.187	0.2	0.424	0.7
Arm	**Without Development 2019**			
A. A6 (South)	0.439	0.8	0.51	1.0
B. Dale Rd	0.342	0.5	0.439	0.8
C. A6 Bakewell Rd (North)	0.546	1.2	0.628	1.7
D. Morrisons	0.182	0.2	0.422	0.7
Arm	**With Development 2019**			
A. A6 (South)	0.510	1.0	0.876	6.4
B. Dale Rd	0.560	1.3	0.52	1.1
C. A6 Bakewell Rd (North)	0.784	3.4	0.665	2.0
D. Morrisons	0.305	0.4	0.314	0.6

Table 10.7 A6 Morrisons, Modelling Results Summary

10.11 Detailed ARCADY Reports are included within **Appendix H**.

Junction 3 – A6 Fairfield Rd Roundabout

10.12 Below the baseline tests indicate that the roundabout junction is shown as operating within its theoretical capacity for the present year and a design year of 2019. The addition of development traffic sees an increase in queue length of 2 vehicles on the most heavily affected arm. No improvements or alterations at this location are felt warranted.

	AM Peak		PM Peak	
	Max RFC	Max Queue	Max RFC	Max Queue
Arm	**Base Year 2009**			
A. A6 Bakewell Rd (S)	0.522	1.1	0.558	1.3
B. A53 Spring Gardens (W)	0.406	0.7	0.552	1.2
C. A6 Fairfield Rd (E)	0.636	1.7	0.584	1.4
Arm	**Without Development 2019**			
A. A6 Bakewell Rd (S)	0.639	1.7	0.680	2.1
B. A53 Spring Gardens (W)	0.480	0.9	0.677	2.1
C. A6 Fairfield Rd (E)	0.747	2.9	0.693	2.2
Arm	**With Development 2019**			
A. A6 Bakewell Rd (S)	0.666	2.0	0.805	4.0
B. A53 Spring Gardens (W)	0.532	1.1	0.726	2.6
C. A6 Fairfield Rd (E)	0.842	5.1	0.707	2.4

Table 10.8 A6 Fairfield Rd Roundabout, Modelling Results Summary

10.13 Detailed ARCADY Reports are included within **Appendix I**.

Junction 4 – A53, Spring Gardens Roundabout

10.14 Below the baseline tests indicate that the roundabout junction is shown as operating satisfactorily within its theoretical capacity for the present year and a design year of 2019. The junction is remote from the dominant movements arising from the development and minimal changes occur at this junction which has sufficient capacity to accommodate future growth.

	AM Peak		PM Peak	
	Max RFC	Max Queue	Max RFC	Max Queue
Arm	**Base Year 2009**			
A. A53, Spring Gardens (E)	0.476	0.9	0.425	0.7
B. Car Park (S)	0.044	0.0	0.150	0.2
C. Spring Gardens (W)	0.289	0.4	0.529	1.1
D. A53 Bridge St (N)	0.387	0.7	0.474	0.9
Arm	**Without Development 2019**			
A. A53, Spring Gardens (E)	0.555	1.2	0.497	1.0
B. Car Park (S)	0.057	0.1	0.200	0.2
C. Spring Gardens (W)	0.375	0.6	0.692	2.2
D. A53 Bridge St (N)	0.464	0.9	0.565	1.3
Arm	**With Development 2019**			
A. A53, Spring Gardens (E)	0.561	1.3	0.528	1.1
B. Car Park (S)	0.058	0.1	0.213	0.3
C. Spring Gardens (W)	0.380	0.6	0.729	2.5
D. A53 Bridge St (N)	0.504	1.0	0.572	1.3

Table 10.9 A53 Spring Gardens Modelling Results Summary

10.15 Detailed ARCADY Reports are included within **Appendix J**.

Junction 5 – A515, High St / London Rd

10.16 Below the baseline tests indicate that the roundabout junction is shown that at present it is operating under stress with a 7-10% Practical Reserve Capacity. Based on predicted background growth, this deteriorates in the future to -8% with a degree of saturation in excess of 90% on multiple arms.

10.17 The junction has a number of alternate routes that can be taken to avoid these queues and rat running is likely to result as pressure increases on this signalised arrangement. The junction itself offers limited scope for expansion as there are residential properties abutting the five roads that form the junction.

		AM Peak		PM Peak	
Arm		Degree of Saturation	Max Queue	Degree of Saturation	Max Queue
		Base Year 2009			
A. A515, High St (N)		48.8	6.5	63.6	9.2
B. B5059 Dale Rd (E)		80.6	8.8	81.7	10.2
C. A515 London St (S)	Lane 1	81.9	12.4	81.1	12.2
	Lane 2	38.5	2.2	44.7	2.1
D. Green Lane (SW)		84.1	6.9	76.3	4.4
E. B5059 West St (W)		55.0	5.0	53.3	5.4
Practical Reserve Capacity (PRC)		7.0%		10.2%	
Arm		Without Development 2019			
A. A515, High St (N)		56.8	7.9	74.3	11.6
B. B5059 Dale Rd (E)		93.6	13.3	95.5	16.1
C. A515 London St (S)	Lane 1	95.0	19.0	94.8	18.8
	Lane 2	51.3	3.2	67.3	2.9
D. Green Lane (SW)		97.3	11.3	89.4	6.6
E. B5059 West St (W)		63.9	6.1	62.4	6.6
Practical Reserve Capacity (PRC)		-8.1%		-6.1%	

Table 10.10 A515 High St / London Rd Modelling Results Summary

10.18 In light of the above capacity issues it has been assumed that changes will be needed to the junction form to ensure future problems are averted. A number of options could be considered to improve the junction operation including:

- Changes to the staging of movements
- Changes to which movement are permitted
- Adding additional lanes to the junction

10.19 With the junction constraints that exist alterations to the permitted movements is seen as the most logical option. Within signal design additional stages detract from the junction's efficiency and in consideration of the existing geometry, it is proposed that Green Lane is an exit only arm. Traffic that would otherwise emerge at this point on the network has a number of alternate routes to either London Road or West Road, but for robustness all movements currently undertaken from this arm have been assigned to West Road.

10.20 Testing under this future scenario shows a much improved scenario and junction capacity is restored to a positive value. Testing for the consequence of the development shows the future operation of these signals to be considered satisfactory.

		AM Peak		PM Peak	
		Degree of Saturation	Max Queue	Degree of Saturation	Max Queue
Arm		**Without Development 2019**			
A. A515, High St (N)		46.9	6.9	59.6	9.7
B. B5059 Dale Rd (E)		60.2	7.9	74.3	10.4
C. A515 London St (S)	Lane 1	76.2	12.6	73.7	12.1
	Lane 2	37.7	2.7	41.5	2.1
D. Green Lane (SW)		No Exit			
E. B5059 West St (W)		78.4	11.6	73.5	10.2
Practical Reserve Capacity (PRC)		14.8%		21.2%	
Arm		**With Development 2019**			
A. A515, High St (N)		53.1	7.5	71.8	11.3
B. B5059 Dale Rd (E)		63.0	8.3	87.3	16.5
C. A515 London St (S)	Lane 1	86.7	14.8	89.5	15.6
	Lane 2	70.7	5.3	67.0	3.7
D. Green Lane (SW)		No Exit			
E. B5059 West St (W)		88.1	16.6	71.4	9.8
Practical Reserve Capacity (PRC)		2.1%		0.6%	

Table 10.11 A515 High St / London Rd Revised Junction Modelling Results Summary

10.21 Detailed LINSIG Reports are included within **Appendix K**.

11.0 FUTURE SUSTAINABLE ACCESS

11.1 The proposed development will promote measures that maximise the accessibility of the site to sustainable modes. The primary aim is to remove barriers and facilitate access for alternative means of travel.

11.2 The TA has acknowledged that the location outside the defined settlement boundary of Buxton, will limit direct opportunities for sustainable travel. To counter this deficit the scheme promoters intend to operate a Shuttle service between the town and the site to cater for walking and public transport trips that cannot be made directly due to the site's limitations. This is similar to schemes operating at other business parks throughout the country.

11.3 The applicant will work with and support the development of local cycle network enhancements to open up the site to alternate forms of travel and support sustainable tourism initiatives in the locality.

11.4 To deliver a sustainable development, the proposed scheme will be sensitively designed to provide a high quality layout and environment maximising transport sustainability and integration.

11.5 With the intention of reducing the need of travel and discouraging unnecessary car usage, a development travel plan has also been developed as part of the scheme. This will:

- Raise people's awareness of sustainable travel;
- Reduce resident's dependency on car usage;
- Encourage modal shift towards walking, cycling and public transport.

A summary of this adopted document is detailed in the following section.

11.6 It is anticipated that the implementation of the adopted Travel Plan, will achieve a positive modal shift and relieving potential negative impacts upon the capacity of the existing highway system.

12.0 DEVELOPMENT TRAVEL PLAN

12.1 Travel Plans are seen by the Government as a strategic management tool in achieving traffic reduction and accelerating the development of more sustainable travel trends within both the strategic and local highway networks. Furthermore they are being increasingly used as part of a tool kit to secure reductions in carbon emissions and contribute to the UK's target of an 80% reduction in CO^2 by 2050.

12.2 The document is tailored to meet the criteria and requirements outlined within wider Best Practice Guidance and has been directed towards:

- Reducing car dependency and usage;
- Travel demand, sustainability and reduced travel need;
- Promoting and facilitating walking and cycling;
- Promoting and facilitating an increased use of public transport;
- Information, awareness raising and marketing;
- Partnership working.

12.3 The specific Travel Plan will have two overarching aims, supported by five objectives.

AIMS:

- Encourage the consideration of suitable methods of transport prioritising walking, cycling and public transport for any journey associated with the development; and
- Reduce the reliance on the private motor vehicle and contribute to national targets for CO2 reduction.

The objectives are to:

- Reduce the need to travel by car, thus reducing pollution and congestion in the area, and minimising the need for parking;
- Facilitate good access to key destinations such as retail, leisure health and education;

- Cooperate with neighbouring communities, Local Authority, and other relevant organisations in achieving the greatest modal shift away from solo car journeys.
- Seek to provide opportunities for on-site facilities to discourage the use of the car for day to day tasks – for example collections and deliveries by local services and retailers;
- Promote a healthier lifestyle for employees, visitors and the wider community.

12.4 In order to achieve the above objectives, a comprehensive package of measures and initiatives have been recommended and summarised below:

- Appointment of a Development Travel Co-ordinator;
- Display a Travel Information Board that can be accessed by all the future occupants;
- Provide a Travel Plan Welcome Pack for new employees;
- Launch a 'Park' website which will publish the latest travel information and news on the implementation of the Travel Plan.
- Offer 10% discount on seasonal bus tickets;
- Run a Park Shuttle Bus with local collection and drop off points within the town connecting with bus and train services.
- Promote Derbyshire Car Share Scheme;
- Support cyclists with facilities, route assistance and training if necessary.

12.5 Time-bounded goals and measurable targets were set out for the short, medium and long term implementation of the Travel Plan. The document indicates that:

- During the first year of opening, the following initiatives should be conducted onsite:
  - Appointment of a Development Travel Co-ordinator
  - Prepare a Travel Plan Welcome Pack
  - Manage a Webpage/Travel Information Board
  - Provision of cycle stands
  - Arrange for the first Travel Survey

- Following the first travel survey, it is anticipated to achieve a positive modal shift of 1-2% in car reduction per annum on the observed site modal share.

- After a five-year implementation, an improved travel patterns over the proposed baseline condition is perceived as follows. These will be reviewed and adjusted where appropriate following the first travel survey onsite

Mode of Travel	Existing (Peak Hour)	The Fifth Year of Opening
Pedestrian	8%	12%
Public Transport	4%	6%
Shuttle Bus Users	12%	16%
Bicycle	2%	4%
Solo Car Driver	76%	65%
Car Sharers	10%	15%
Total	100%	100%

Table 12.1 Five-Year Targets – Science Park

12.6 In order to gauge the effectiveness of the adopted travel plan and promptly respond to the changing travel demand at the site, a review and monitoring process will be introduced complying the principles below:

- the first travel survey will take place when a 'critical mass' of 50% occupancy has been reached;
- thereafter at an interval of bi-annually for a maximum of 3 further surveys;
- If targets are not met, monitoring will be carried out on an annual basis until such time as agreed targets are reached, or 7 years after the first survey date.

13.0 CONCLUSION

13.1 The report has evaluated the transport consequences of a planned mixed use development to the east of Buxton. The proposed development aims to create a modern vibrant Science Park, with sports facilities and a new water bottling plant. The scheme includes for:

- Science Park
  - o Approximately 27,600m^2 GFA B1/B2 consisting of 14 buildings between 680-5,200m^2
- Water bottling facility of 14,100m^2 GFA
- Small scale site sports centre to include:
  - o Multi Use Games Area (MUGA) and Indoor Sports Hall suitable for 5-a-side Football (equivalent to three 5-a-side pitches GFA 1,750)
- Climbing visitor centre (340m^2)
  - o To serve existing climbing undertaken in the quarry

13.2 Consultation with the Local Highway Authority established a suitable scope of study which has been followed. Five junctions were subsequently tested against the traffic generated by the proposed scheme:

- A6 Express Park, Buxton - Development Access
- A6 / B5059 Morrisons Roundabout
- A6 / A53 Fairfield Roundabout
- A53 Bridge St / Spring Gardens Roundabout
- A515 / B5059 High St / London Rd / Dale Rd Signals

13.1 This test results indicated that the network could accommodate the future traffic demand with little or no adjustment. Existing future capacity issues at the A515 / B5059 junction were identified, and a proposed solution to this issue put forward for consideration. Overall noting that this proposal is a large scheme for the town, the report concludes that the development will have some impact on the local highway network which can be mitigated against. The development will provide positive benefits with local employment opportunities that will help to rebalance the net commute out of the area, and enable opportunities for sustainable travel and commensurate reductions in transport related $C0_2$ emissions.