8 Transport

8.1 Introduction, Methodology and Assessment Criteria

8.1.1 This chapter of the ES has been prepared by Fore Consulting Ltd and assesses the effects of the Development on transport and access.

8.1.2 The chapter describes the methods used to assess the baseline conditions currently existing at the Site and surroundings, the likely direct and indirect effects of the Development, the mitigation measures required to prevent, reduce, or offset the effects and the residual effects.

8.1.3 The chapter is supported by the following appendices that have also been prepared by Fore Consulting Ltd:

- Appendix 8.1: Transport Assessment (TA), May 2021.
- Appendix 8.2: Residential Travel Plan (TP), May 2021.
- Appendix 8.3: Workplace Travel Plan (TP), May 2021.

8.1.4 The scope and methodology for the Transport Assessment has been discussed and agreed with Barnsley Metropolitan Borough Council (BMBC) as the highway authority, as well as Highways England who is responsible for the operation of the nearby M1 motorway.

8.1.5 The methodology is set out in the full Transport Assessment, as provided in the technical appendices.

8.2 Competence

8.2.1 Fore Consulting Ltd is an experienced team of transport planners and consultants who advise in relation to transport and highways aspects of development proposals and planning applications, as well as major transport schemes and regeneration projects.

8.2.2 This assessment has been overseen by Paul Irwin MSc (Eng) BSc (Hons) who is a Director at Fore and is a Member of the Chartered Institution of Highways and Transportation. Paul has over 30 years transport planning experience and has been involved in the preparation of transport and highways chapters for numerous EIAs on a wide range of large development proposals. Paul has reviewed and signed off this Chapter.

8.3 Legislation, Planning Policy and Guidance

Planning Policy Context

National

8.3.1 The following national planning policy is relevant to the Development:

- National Planning Policy Framework (2019).

Local

8.3.2 The following local planning policy is relevant to the Development:

- Barnsley Local Plan (2019).

Guidance

8.3.3 The following guidance is relevant to the Development:

- Planning Practice Guidance (2014).

8.4 Significance Criteria

Consultation

8.4.1 Consultation has been undertaken with BMBC highways and transport planning officers, as well as Highways England and their consultant team in respect of the impact of the development on the Strategic Road Network, through extensive pre-application discussions.

Study Area and Scope

8.4.2 The methodology for the Transport Assessment (TA) has been informed through a number of key stages. These are as follows:

- Identification of the scope of the assessment area. This was agreed with BMBC and HE during pre-application discussions and covers Barugh Green Road, Higham Common Road, the M1 J37 and associated roundabouts and Whinby Road, along with the proposed link road.

- Determination and identification of the existing (baseline) local transport conditions, including: the local highway network, public transport network, and pedestrian and cycle networks.

- Identification of the forecast vehicle trip generation generated by the Development once completed.

- Assessment of the impact and likely significant effects of the forecast trips on the local transport network, by undertaking detailed capacity assessments of the junctions identified within the study area as agreed with BMBC.

- Assessment of the impact and likely significant effects of the remediation and construction traffic on the local transport network.

- Analysis of the personal-injury accident record within the study area for the most recently available five-year period, and a qualitative assessment of the impact of the Development on road safety.

- Identification and assessment of mitigation measures to be provided as part of the Development (including the link road).

8.4.3 For the purposes of assessing the impact of the Development on the operation of the highway network, two scenarios have been considered within this chapter of the ES to assess the environmental effects of the Proposed Development as a result of transportation. An outline of the two assessment scenarios and their derivation, is set out below:

- 2019 Base – Representing the existing transport conditions in the study area. Traffic flows have been derived from surveyed traffic count data.

- 2026 Do Minimum – Representing a future 'baseline' situation. The 2026 Do Minimum scenario establishes the future transport conditions in the study area if the Development was not brought forward. In addition to the 2019 Base scenario, predicted traffic flows associated with all known committed developments, as agreed with BMBC, have been included.

- 2026 Phase 1 – Representing the future scenario if the some, but not all, Development was to take place (specifically Phase 1a which is for 229 residential dwellings, the first part of the link road from Barugh Green Road to the northernmost internal roundabout, as well as Phase 1b which includes the full employment site). In addition to the 2026 Do Minimum scenario, predicted traffic flows associated with the Phase 1 Development have been included. It should be noted the assessment assumes 275 residential dwellings in Phase 1a, as opposed to the 229 which is now being applied for, this therefore represents an extremely robust and worst-case scenario.

- 2033 Do Minimum – Representing a future 'baseline' situation. The 2033 Do Minimum scenario establishes the future transport conditions in the study area if the Development was not brought forward. In addition to the 2019 Base scenario, predicted traffic flows associated with all known committed developments, as agreed with BMBC, have been included.

- 2033 With Development – Representing the future scenario if the full Development was to take place. In addition to the 2033 Do Minimum scenario, predicted traffic flows associated with the Development at maturity have been included. In addition, changes to the layout of the highway network, as outlined by the proposed development has also been taken into account.

Assumptions and Limitations

8.4.4 The assessment work is based on surveyed traffic flow data, which is subject to variation in the future. The assessment is also based on an estimated level of trip generation and distribution. The future scenarios and input parameters contributing to the assessment were discussed with BMBC and Highways England. This includes the base year traffic flows, the committed developments to include, trip generation and distribution assumptions, plus the input parameters to the junction capacity models. This has ensured that the assessment and modelling of the future year scenarios is as robust as possible.

8.5 Baseline Conditions

Existing Conditions

Land Use

8.5.1 The site is located on the western edge of Barnsley and consists of an undeveloped strip of land between the neighbourhoods of Barugh Green and Gawber, with A635 Barugh Green Road and the M1 motorway forming the northern and southern boundaries of the site, respectively. Currently allocated as site MU1 in the adopted Local Plan, the site is approximately 116 hectares of land which is mainly used as pasture with some arable farming.

8.5.2 The site sits on the north facing side of a wide valley, with Claycliffe Business Park at the bottom of the slope and the M1 at the top.

Highway Network

Strategic Road Network

8.5.3 The development is located a few hundred metres north of Junction 37 of the M1, which forms part of the Strategic Road Network and provides connections from the Barnsley District to key regional and national towns and cities such as Sheffield, Rotherham, Leeds, Nottingham, Derby and London.

8.5.4 Junction 37 comprises of a roundabout interchange providing connections between the M1 and the A628. The roundabout is signal-controlled and comprises four approaches with three circulating lanes. A shared-use pedestrian and cycle route is provided around the circulating carriageway, linking to uncontrolled crossing points on the slip roads.

Local Highway Network

8.5.5 The local highway network comprises a number of key links and junctions which are described in the following section.

8.5.6 A635 Barugh Green Road is a single-carriageway road is approximately 7.3m in width and runs from a junction with Redbrook Road in the east (the road name changes to A635 Wilthorpe Road beyond this point) to the Barugh Green crossroads in the west. The road is partially fronted by residential properties, with a number of side roads providing access to light industrial and distribution centres. The speed limit is 40mph along the frontage of the site, reducing to 30mph before the Barugh Green crossroads.

8.5.7 A637 Claycliffe Road leads north from a roundabout with A635 Barugh Green Road towards the settlement of Darton. It is a single-carriageway road of approximate 7.3m width, subject to a 40mph speed limit. A635 Wilthorpe Road is the eastern continuation of A635 Barugh Green Road, leading towards Barnsley town centre from a junction with Redbrook Road. It is a single-carriageway road with residential development set back from the carriageway. The speed limit is 40mph.

8.5.8 Redbrook Road is a single-carriageway road of approximate 7.3m width, running from a priority junction with A635 Barugh Green Road to the northeast of the site towards Barnsley town centre, passing by Barnsley Hospital. Almost entirely residential in character, the speed limit is 30mph throughout.

8.5.9 Higham Common Road / Higham Lane is a single-carriageway road linking Barugh Green crossroads in the north with Capitol Park and A628 Whinby Road in the south, via the settlement of Higham and a bridge over the M1. Where the road runs alongside the south-western boundary of the site, the speed limit is 30mph and a bus turning circle is present.

Surveyed Traffic Flows

8.5.10 Base traffic flows have been derived from turning count surveys, commissioned by BMBC and undertaken on Wednesday 13 March 2019. Fully classified turning count surveys were undertaken at the following locations:

- Site 1: Higham Common Road / Hermit Lane Junction.
- Site 2: A635 Cawthorpe Road / A635 Barugh Green Road / Higham Common Road / B6428 Junction.
- Site 3: A635 Barugh Green Road / Cannon Way Junction.

- Site 4: A635 / A637 Claycliffe Road / Whaley Road Roundabout.
- Site 5: Whinby Road / Higham Lane Roundabout.
- Site 6: Whinby Road / Capitol Close Roundabout.
- Site 7: Whinby Road / B6449 Roundabout.
- Site 8: M1 Junction 37.

Public Transport

Bus Services

8.5.11 The development is located to the east of the existing residential area of Higham and Barugh Green and as such is served by a number of bus services. The closest bus stops in relation to the site are on A635 Barugh Green Road, Higham Common Road and Pogmoor Road, providing access to services to Barnsley, Kexborough, Crawthorne, Mapplewell and Wakefield.

8.5.12 Details of the buses serving them are in Table 8.1 and displayed at Figure 4 in Appendix 6.1

No.	Operator	Destinations Served	Daytime Hourly Frequency		
			Mon-Fri.	Saturday	Sunday
43/44	Stagecoach	Barnsley - Worsbrough Common - Kingstone - Pogmoor	30 minutes	30 minutes	60 minutes
93 / 95 / 95a	Stagecoach	Barnsley – Gawber – Wilthorpe (95,95a) - Barugh Green – Darton – Kexborough (95,95a) – Bloomhouse Green (93,95a)	10 minutes	15 minutes	30 minutes
94 / 94A	Stagecoach	Barnsley - Gawber -Higham (94) Cawthorne (94, 94a, 94b)	60 minutes	60 minutes	120 minutes
96 / 96a	Globe Holidays	Barnsley - Gawber – (96a) - Kexborough (96, 96a) West Bretton (96, 96a) -Wakefield	60 minutes	60 minutes	-
Services per hour			10	8	3.5

Table 8.1: Bus Services

8.5.13 In combination the bus stops mentioned above offer up to 10 services per hour, providing access to destinations such as Barnsley, Kexborough, Crawthorne, Mapplewell

and Wakefield. Most of the services offer early morning services and into the night from Monday to Saturday.

Rail Services

8.5.14 Whilst the site is not directly served by rail, connections can be accessed at Dodworth station, which is approximately 1.8km southwest of the site. The station is situated on the Penistone line served by Northern Rail. At peak times, the station provides one direct service per hour to Huddersfield, Barnsley and Sheffield and intermediate local stations.

Pedestrian and Cycle Infrastructure

Pedestrian Facilities

8.5.15 The key pedestrian routes and facilities within the vicinity of the site are outlined below.

8.5.16 Good quality footways are provided along both sides of most local roads, connecting the site to Barnsley town centre and the wider area. Street lighting is present on all of the main pedestrian routes.

8.5.17 Signal-controlled pedestrian crossing facilities are provided at the Barugh Green crossroads and at locations close to Barnsley Hospital. Elsewhere, uncontrolled crossing points are typically present at junctions and other locations on the local road network where there is an adjacent footpath.

Cycling

8.5.18 The key cycle routes and facilities within the vicinity of the site are shown on Figure 4 and are outlined below.

8.5.19 National Cycle Route 62 passes to the south of Dodworth, approximately 3km to the south of the site, and connects Fleetwood on the Fylde region of Lancashire with Selby in North Yorkshire. It forms the west and central sections of the Trans Pennine Trail which is a long-distance path running from coast to coast across northern England. The section of National Cycle Route 62 within the vicinity of the site is almost entirely traffic-free between Hadfield and Doncaster.

8.5.20 The western section of the Trans Pennine Trail travels between Southport and Penistone via Liverpool and Stockport, and passes through the Peak District National park.

8.5.21 The central section of the Trans Pennine Trail covers a whole network of routes, linking the major urban centres of the region including Sheffield, Rotherham, Wakefield and Barnsley.

8.5.22 Starting from close to Barnsley Interchange, a local cycle route heads east out of Barnsley town centre, connecting to National Cycle Route 67 in Stairfoot, approximately 5.5km to the east of the site. National Cycle Route 67 runs from Long Whatton near Loughborough to join National Cycle Route 71 near Northallerton in North Yorkshire.

8.5.23 The Barnsley Cycle Hub is located in Barnsley Interchange and offers a range of cycle support services to Barnsley residents and businesses. Amongst other things, the

hub features free secure indoor cycle parking, toilet and shower facilities, and bike servicing and repairs..

8.6 Future Baseline

Highway Network

8.6.1 The approach to considering the operation of the highway network in the future assessment scenarios is set out in full in the Transport Assessment; however, it can be summarised as follows:

- Future assessment years of 2026 for Phase 1 and 2033 for the full development, have been assumed for the purposes of the Transport Assessment work, representing a reasonable timescale for construction and occupation of the development.
- Traffic growth is estimated on the basis of TEMPro growth factors to 2026 and 2033.
- Traffic associated with a series of committed and proposed developments has been taken into account in the assessment of the future baseline scenario.

Public Transport / Pedestrian and Cycle Infrastructure

8.6.2 The adjacent Countryside planning application, 140 dwellings off Barugh Green Road, will undertake minor changes to the public transport / pedestrian and cycle network, which includes the relocation of a bus stop and a new pedestrian crossing island on Barugh Green Road. Aside from this, it is understood that there are no works proposed or committed by other parties, which would have a significant impact on the operation of the public transport networks, or pedestrian or cycling provision within the study area.

8.7 Identification of Likely Effects

Operation of the Highway Network

8.7.1 Vehicular access to the development will be taken from the new link road through the site, with the exception of one parcel of residential land at Pogmoor which will take access from Farm House Lane. The Farm House Lane access will serve the small residential parcel of land only, there will be no through-road to the rest of the side. It is anticipated that the link will provide two internal roundabouts to provide access to the remaining individual development plots. Capacity assessment presented in chapter 8 of the Transport Assessment (Appendix 8.1) demonstrates that the proposed layout would satisfactorily accommodate changes in traffic flows associated with the completed development safely and efficiently.

Construction

8.7.2 For the purposes of this ES, construction of the Development is anticipated to last until the Development is fully built out by 2033. The construction build out has been separated into broad phases, as set out in Chapter 3 of the ES. The residential element of the development will involve an initial phase of 229 dwellings, anticipated to be completed by 2026, along with the first part of the Link road running from Barugh Green Road to the northernmost internal roundabout and also the primary school. Phase 2 will include the completion of the link road and then thereafter in phase 3 the remaining residential

development will be built out by 2033. The employment site will be subject to a separate construction build out, potentially beginning in advance of the completion of the link road.

Operational Development

8.7.3 The full detail of the methodology is presented in the TA and is summarised as follows. To establish forecast traffic flows in the 2026 and 2033 future years without the Development taking place, predicted traffic associated with all known committed developments have been added to 2019 Base traffic data. The resulting 2026 Do Minimum and 2033 Do Minimum traffic flows represent the future 'baseline' situations.

8.7.4 To estimate changes in traffic flows associated with the Development, vehicle trip rates were calculated using the TRICS database, as agreed with BMBC and HE. The resulting vehicle trip generation was assigned to routes on the highway network surrounding the site using a trip distribution derived from 2011 Census data and agreed with BMBC and HE.

8.7.5 The likely significant effects of the Development are determined by comparing the Do Minimum scenarios with the With Development scenarios, using the significance criteria below.

Determining Effect Significance

8.7.6 The significance of an effect is derived from a measurement of the magnitude (or scale) of the change and the sensitivity and/or importance of the receptors affected. Categories of sensitivity and magnitude are defined and assessed to determine the significance of the effect.

8.7.7 The magnitude of change and the sensitivity of the affected receptor are assessed on a scale of high, moderate, low and negligible. Where an effect is considered to be non-significant, or have no influence irrespective of other effects, this is classified as 'negligible'.

8.7.8 The significance of the potential effects of the Proposed Development as a result of transportation have been determined using criteria developed from best practice techniques.

Magnitude of Effect

8.7.9 The IEMA guidelines (Guidelines for the Environmental Assessment of Road Traffic, 1993) identify a number of environment effects that may arise from changes in vehicular travel demand and set out the broad principles of how to assess the magnitude of effect for each category. This is summarised below:

- Severance – This is the perceived division that can occur within a community when it becomes separated by a major artery. Such division may result from the crossing of a heavily trafficked road or a physical barrier created by the road itself. The measurement and prediction of severance is difficult, but relevant factors include road width, traffic flow, vehicle speed, the presence of crossing facilities and the number of pedestrian movements across the affected route. The IEMA guidelines refer to the Manual of Environmental Appraisal, which suggests that changes in traffic flow of 30%, 60% and 90% would be likely to produce 'slight', 'moderate' and 'substantial' changes in severance, respectively. It is advised that these broad indicators should be used with care and regard paid to specific local conditions, in particular, the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided;

- Driver Delay – The IEMA guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at, or close to, the capacity of the system. For the purposes of this assessment, values of driver delay have been derived from the following junction capacity assessment programs: Junctions 9 for priority junctions; and LinSig for signal-controlled junctions;

- Pedestrian Delay – The IEMA guidelines note that a change in the volume, composition and/or speed of traffic may affect the ability of a person to cross a road. Typically, an increase in the traffic level results in increased pedestrian delay, although increased pedestrian activity itself may also contribute. The guidelines do not set any thresholds for assessing pedestrian delay, recommending instead that assessors use their judgement to determine the significance of the effect;

- Pedestrian Amenity – This is broadly defined as the relevant pleasantness of a journey. It is affected by traffic flow, traffic composition, footway width and separation from the carriageway. The IEMA guidelines suggest a tentative threshold for judging the significance of a change in pedestrian amenity where the traffic flow (or the heavy good vehicles (HGV) component) is halved or doubled;

- Fear and Intimidation – The impact of fear and intimidation is dependent upon the volume of traffic, the HGV composition, the proximity of traffic to people and the lack of protection caused by factors such as narrow footway width. The IEMA guidelines state that there are no commonly agreed thresholds for estimating fear and intimidation from known traffic and physical conditions, but it does nevertheless suggest some thresholds which could be used, based on previous research. These are shown in Table 8.2 below.

Degree of Hazard	**Average hourly traffic flow over 18-hour day**	**Total 18-hout HGV flow**	**Average vehicle speed over 18-hour day (mph)**
Extreme	>1800	>3000	<20
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15
Negligible	<600	<1000	<10

Table 8.2: Fear and Intimidation Thresholds

- Accidents and Safety – The IEMA guidelines do not include a definition in relation to accidents and safety, suggesting that professional judgement will be needed to assess the implications of local circumstance or factors which may increase or decrease the risk of accidents, e.g. junction conflicts.

8.7.10 From the IEMA guidelines, it should be noted that a projected change in traffic flow of less than 10% is generally considered to create no discernible environmental impact given that daily variations in background traffic flow may fluctuate by this amount under normal operating conditions.

Receptors and Receptor Sensitivity

8.7.11 The IEMA guidelines identify groups, locations and areas which may be sensitive to changes in traffic conditions and which should be considered for assessment. These are set out below:

- People at home.
- People at workplaces.
- Sensitive groups, including: children, the elderly and disabled.
- Sensitive locations, e.g. hospitals, churches, schools and historic buildings.
- People walking.
- People cycling.
- Open spaces, recreational sites and shopping areas.
- Sites of ecological/natural conservation value.
- Sites of tourist/visitor attraction.

8.7.12 Categories of receptor sensitivity have been defined as follows:

- The need to identify particular group or locations which may be sensitive to changes in traffic conditions.
- The list of affected groups and special interests set out in the IEMA guidelines.
- The identification of links or locations where it is felt that specific environmental problems may occur. Such locations would include accident black spots, conservation areas, hospitals, links with high pedestrian flows etc.

8.7.13 These categories have been used to outline, in broad terms, the sensitivity of receptors to traffic for the types of effect assessed in this chapter, although each receptor assessed will have a different sensitivity to each specific effect.

8.7.14 Table 8.3 below provides a summary of the sensitivity of receptors, categorised either as high, moderate or low.

Category	Receptor Sensitivity	Receptor Type
High	The receptor has little ability to absorb change without fundamentally altering its present character or is of international or national importance.	Schools, colleges, playgrounds, accident black spots, retirement homes, roads used by pedestrians with no footways.

Category	Receptor Sensitivity	Receptor Type
Moderate	The receptor has moderate capacity to absorb change without significantly altering its present character or is of high importance.	Congested junctions, surgeries and clinics, hospitals, shopping areas with roadside frontage, roads used by pedestrians with narrow footways, parks and recreational areas.
Low	The receptor is tolerant of change without detriment to its character or is of low or local importance.	Places of worship, public open space, tourist/visitor attractions and residential and employment areas with adequate footway provision.

Table 8.3: Sensitivity of Receptors

8.7.15 The significance of the effect is judged on the relationship of the magnitude of the effect and the sensitivity and/or importance of the receptor. A matrix of the significance of the effects is set out in Table 8.4. The effects have the potential to be adverse, beneficial or negligible.

Sensitivity of Receptor	Magnitude of Effect			
	High	Moderate	Low	Negligible
High	Major	Major	Moderate	Negligible
Moderate	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible

Table 8.4: Criteria for Assessing Effect Significance

8.7.16 The following terms have been used to define the significance of the effects identified:

- Major effect – where the Development could be expected to have a very significant effect (either positive or negative) on the existing environment.
- Moderate effect – where the Development could be expected to have a noticeable effect (either positive or negative) on the existing environment.
- Minor effect – where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) on the existing environment.
- Negligible effect – where no discernible effect is expected as a result of the Proposed Development on the existing environment.

8.7.17 Moderate and major effects are considered to be 'significant' for the purposes of this assessment.

8.7.18 In the context of the Development, short (up to 24 months duration) to medium (up to 60 months duration) term effects are generally determined to be those associated with construction activities and the long-term effects are those associated with the completed and occupied Development.

8.7.19 Although not explicit in the matrix in Table 8.4, duration has, where required, been accounted for in the assessment, for example, whether the effects are permanent or temporary, and if temporary, over what time period.

8.8 Assessment of Effects

Construction Phase

8.8.1 A contractor has not yet been appointed to undertake the construction works and no specific detail in terms of the number of vehicles likely to be generated by the construction process is available at this stage. The site will be subject to a substantial earthworks exercise with the overall level strategy founded around achieving a net balance of cut and fill across the site. Whilst this will necessitate the movement of substantial volumes of material this will be within the site itself and will avoid the need for any export of material, all of which will be retained on site.

8.8.2 Vehicle movements generated by the construction process are therefore likely to be primarily associated with the delivery of plant and construction materials, as well as construction staff travelling to and from the Site. It is estimated that the likely traffic to and from the construction site are not likely to exceed 100 two-way trips on a daily basis.

8.8.3 Consequently, the movement of construction traffic may result in temporary adverse effects on the operation of the local road network (in terms of pedestrian and driver delay on the main access routes to and from the Site) and may also adversely affect pedestrian amenity, severance, fear and intimidation, and increase the risk of accidents and safety. In addition, HGVs accessing the Site during the construction phase vehicles could carry mud or dust on to the local road network.

8.8.4 Standard measures will be put in place to minimise traffic and associated disruption during the construction phase however the likely effects of construction traffic on the main routes to and from the Site are considered to be temporary, short term and of minor adverse significance.

Phase 1 Development

8.8.5 For the purposes of this assessment, the link road is assumed to be completed at a point between 2026 and 2033. Phase 1 of the development therefore consists of some residential development (Phase 1a – 229 residential dwellings and all the employment land (Phase 1b), without the link road in place. The Phase 1 Development will generate an estimated 430 and 438 new primary two-way trips in the AM and PM peak hours. These trips have been distributed onto the local highway network using the trip distribution as agreed with BMBC and HE. The majority of these trips will be travelling to and from the M1 Junction 37, the route of which has approved highway capacity improvement schemes that are committed and will be funded as part of Sheffield City Region Investment Fund (SCRIF).

8.8.6 The resulting impact of the Phase 1 development related trips is shown in Table 8.5.

Location	Link	2026 Do Min		2026 With Phase 1 Dev		Percentage Difference	
		Veh	HGV	Veh	HGV	Veh	HGV
Cawthorne Rd / B6428 Barugh Lane / Barugh Green Rd / Higham Common Rd	Cawthorne Road	9,640	191	9,831	239	2%	25%
	B6428 Barugh Lane	9,397	313	9,899	411	5%	32%
	Barugh Green Road	9,915	336	11,125	510	12%	52%
	Higham Common Road	7,472	214	8,951	535	20%	150%
Barugh Green Rd / Cannon Way / Site Access	Barugh Green Road west	10,728	342	11,938	516	11%	51%
	Cannon Way	2,508	145	2,508	145	0%	0%
	Barugh Green Road east	11,137	370	12,267	545	10%	47%
	Site Access	0	0	1,390	0	-	-
Barugh Green Rd / Whaley Rd / Claycliffe Rd / A635	Barugh Green Road west	12,290	353	13,420	528	9%	49%
	A637 Claycliffe Road	16,473	278	16,624	278	1%	0%
	Whaley Road	5,105	145	5,105	145	0%	0%
	A635	27,413	498	28,391	672	4%	35%

M1 Junction 37	M1 southbound off slip	8,320	237	8,466	273	2%	15%
	A628 Dodworth Road	30,485	961	30,822	1,056	1%	10%
	M1 southbound on slip	14,023	457	14,357	533	2%	17%
	M1 northbound off slip	13,630	556	13,976	634	3%	14%
	Whinby Road	29,124	1,053	30,425	1,372	4%	30%
	M1 northbound on slip	8,726	255	8,864	289	2%	13%
Whinby Rd / B6449 Roundabout	Whinby Road east	28,178	1,036	29,478	1,355	5%	31%
	B6449	10,654	145	10,858	166	2%	15%
	Whinby Road north	22,214	949	23,718	1,289	7%	36%
Whinby Rd / Capitol Close Roundabout	Capitol Close	9,831	104	11,452	444	16%	326%
	Whinby Road south	22,316	996	23,820	1,335	7%	34%
	Whinby Road west	13,487	903	13,602	903	1%	0%
Whinby Rd / Higham Lane Roundabout	Higham Lane	3,083	249	3,374	307	9%	23%
	Whinby Road east	13,750	891	13,750	891	0%	0%

	Whinby Road west	16,833	781	17,124	839	2%	7%
Higham Common Rd / Site Access	Higham Common Road north	10,433	232	12,026	555	14%	3%
	Site Access Employment	0	0	3,587	719	-	-
	Site Access Link Road	0	0	0	0	-	-
	Higham Common Road south	10,433	232	12,271	632	17%	4%
Penny Pie Park	Dodworth Road west	30,193	1,098	30,530	1,193	1%	9%
	A6133 Broadway	12,849	400	12,980	422	1%	6%
	Dodworth Road east	17,365	525	17,653	591	2%	13%
	Pogmoor Road	11,575	476	11,848	482	2%	1%

Table 8.5: 2026 Future Year Traffic Data (24hr AADT)

8.8.7 As can be seen from Table 8.5, traffic flows in the 2026 With Phase 1 Development scenario are predicted to increase from the 2026 Do Minimum scenario across the study area, as a result of the Phase 1 development. None of the links in the study area are predicted to experience an increase in traffic flows of more than 20% following the introduction of traffic from the Development

Severance

8.8.8 The IEMA guidelines suggest that changes in traffic flow of 30%, 60% and 90% would be likely to produce 'slight', 'moderate' and 'substantial' changes in severance, respectively. However, regard should be paid to local conditions, in particular, the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided.

8.8.9 Examining the daily flows in the 2026 future year with the Phase 1 Development in place, there are no roads in the study area that are predicted to exceed a change in traffic flows above the thresholds suggested by the IEMA guidelines. Therefore, the likely effect

of the Development on all links in the study area, in terms of severance, is considered to be of **negligible significance**.

Driver Delay

8.8.10 The IEMA guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at, or close to, the capacity of the system.

8.8.11 Capacity assessments for the junctions within the study area have been undertaken to compare the situation in the 2026 future year, with and without the Phase 1 Development. The results of the modelling assessments, as presented within the TA, show that for each junction in the study area, the changes in traffic flows associated with the Development will have a minimal effect on driver delay in the 2026 future year. The likely effect of the Development across the study area, in terms of driver delay, is therefore considered to be of **negligible significance**.

Pedestrian Delay

8.8.12 The IEMA guidelines note that a change in the volume, composition and/or speed of traffic may affect the ability of a person to cross a road. The guidelines do not set any thresholds for assessing pedestrian delay, recommending instead that assessors use their judgement to determine the significance of the effect.

8.8.13 In relation to the Phase 1 Development, as shown on the landscape masterplan there will be a permeable network of high quality pedestrian walking routes throughout the site, including two linkages to existing residential developments within Higham. Phase 1 will provide the north west corner of the site, including the link road to the northernmost internal roundabout, adjacent and running parallel to the link road, will be a series of paths from Barugh Green Road to the internal roundabout. This provides opportunities for alternative routes that are more pleasant than footpaths adjacent to the link road carriageway.

8.8.14 As previously identified no road within the study area will experience an increase in traffic flows of more than 20%. This is taken into account alongside the improvements to pedestrian links from Higham village through to Barugh Green Road. The likely effect of the Phase 1 Development, in terms of pedestrian delay, is therefore considered to be of **negligible significance**.

Pedestrian Amenity

8.8.15 The IEMA guidelines suggest a tentative threshold for judging the significance of a change in pedestrian amenity where the traffic flow or the HGV component is halved or doubled. Pedestrian amenity is also affected by footway width and separation from the carriageway.

8.8.16 As previously mentioned, and outlined on the illustrative landscape masterplan, the development will introduce a series of new and high quality permeable pedestrian walking routes throughout the site. The pedestrian infrastructure will also have multiple access points into the surrounding area, for example in Phase 1 there will be two pedestrian routes connecting into Higham village to the west. This will significantly enhance the connectivity of the site and the linkages with the wider area, opening up new routes that do not currently exist.

8.8.17 Examining the daily flows in the 2026 future year with the Phase 1 Development, there are only two roads in the study area that are predicted to exceed a change in traffic flows above the thresholds suggested by the IEMA guidelines. These are Capitol Close and

Higham Common Road, both of which will experience an increase in HGV traffic flows. The likely effect of the Phase 1 development in these two areas, in terms of pedestrian amenity, is therefore considered to be of **minor adverse significance**.

8.8.18 Weighing against this, there is a benefit of a network of high-quality pedestrian routes which will provide a benefit to the local area. The network of pedestrian routes also provide routes parallel to the link road but with a separation from the carriageway. As such, in the likely effect of the development in this area, in terms of pedestrian amenity, is considered to be of **minor beneficial significance**.

8.8.19 Therefore, overall on balance the likely effect of the Phase 1 Development on all links in the study area, in terms of pedestrian amenity, is considered to be of **negligible significance**.

Fear and Intimidation

8.8.20 The IEMA guidelines suggest some tentative thresholds for judging the significance of a change in fear and intimidation based on the volume of traffic, the HGV composition and the speed of vehicles.

8.8.21 It is predicted that the speed of traffic across the study area will not be materially affected by the Development and therefore vehicle speed data has not been presented.

8.8.22 As previously identified no links will see an increase in traffic flows of more than 20%. There is also a benefit of new high quality on and off road pedestrian routes through the site, to the benefit of existing local and future residents. As such, in the likely effect of the Phase 1 development in this area, in terms of fear and intimidation, is considered to be of **negligible significance**.

Accidents and Safety

8.8.23 An assessment of road traffic accident data for a five-year period has been undertaken for the purpose of this ES. The data shows that across the study area, the level of reported accidents is not uncommon for the characteristics of the road network. Furthermore, the number of accidents does not suggest a specific issue at any particular location.

8.8.24 The proposed new access road and associated junctions have been designed to appropriate standards, as well as being subject to Road Safety Audits. As such, the proposed highway design changes will not contribute to any additional accidents caused as a result of the highway layout.

8.8.25 On the basis of the above, the likely effect of the Development on all links in the study area, in terms of accidents and safety, is considered to be of **negligible significance**.

Completed Development

Highway Network

8.8.26 For the purposes of this assessment, it is assumed that the completion of the full link road will occur at a point between 2026 and 2033. The full completed Development will generate an estimated 1,017 and 1,189 new primary two-way trips in the AM and PM peak hours. These trips have been distributed onto the local highway network using the trip distribution as agreed with BMBC and HE. The majority of these trips will be travelling to and from the M1 Junction 37, the route of which has approved highway capacity

improvement schemes that are committed and will be funded as part of Sheffield City Region Investment Fund (SCRIF).

8.8.27 The proposed link road will also create an alternative route for traffic in local road network, leading to the re-assignment of some local trips. The impacts of the link road have been modelled in SATURN by AECOM using Barnsley's strategic transport model. The modelled scenarios with the introduction of the proposed link road demonstrate that a substantial volume of through trips would be removed from the existing routes in Barugh Green and Higham villages, with re-assignment to the link road. The link road will effectively draw in trips from the surrounding network due to the increase in capacity created, leading to reductions in traffic flow across a wider area.

8.8.28 The resulting combined impact of both the link road traffic re-assignment and development related trips are shown in Table 8.6.

Location	Link	2033 Do Min		2033 With Dev		Percentage Difference	
		Veh	HGV	Veh	HGV	Veh	HGV
Cawthorne Rd / B6428 Barugh Lane / Barugh Green Rd / Higham Common Rd	Cawthorne Road	10,260	242	9,209	241	-10%	0%
	B6428 Barugh Lane	10,001	417	5,794	415	-42%	0%
	Barugh Green Road	10,553	517	7,636	340	-28%	-34%
	Higham Common Road	7,953	542	4,840	363	-39%	-33%
Barugh Green Rd / Cannon Way / Site Access	Barugh Green Road west	11,418	523	9,676	346	-15%	-34%
	Cannon Way	2,669	147	2,487	146	-7%	0%
	Barugh Green Road east	11,853	552	22,331	549	88%	-1%
	Site Access	0	0	13,761	175	-	-
Barugh Green Rd / Whaley Rd	Barugh Green Road west	13,036	535	21,819	532	67%	-1%

/ Claycliffe Rd / A635	A637 Claycliffe Road	17,521	282	21,742	281	24%	0%
	Whaley Road	5,433	147	5,289	146	-3%	0%
	A635	29,142	682	30,820	678	6%	0%
M1 Junction 37	M1 southbound off slip	8,850	276	9,523	275	8%	0%
	A628 Dodworth Road	32,428	1,070	32,941	1,067	2%	0%
	M1 southbound on slip	14,917	540	16,101	539	8%	0%
	M1 northbound off slip	14,499	643	15,956	641	10%	0%
	Whinby Road	30,955	1,391	39,734	1,385	28%	0%
	M1 northbound on slip	9,282	293	10,244	292	10%	0%
Whinby Rd / B6449 Roundabout	Whinby Road east	29,948	1,373	39,098	1,367	31%	0%
	B6449	11,330	168	15,472	168	37%	0%
	Whinby Road north	23,591	1,307	31,958	1,300	35%	0%
Whinby Rd / Capitol Close Roundabout	Capitol Close	10,390	450	18,217	445	75%	-1%
	Whinby Road south	23,699	1,354	32,019	1,347	35%	0%

	Whinby Road west	14,347	915	14,604	914	2%	0%
Whinby Rd / Higham Lane Roundabout	Higham Lane	3,282	311	5,543	309	69%	0%
	Whinby Road east	14,628	903	15,495	902	6%	0%
	Whinby Road west	17,909	850	18,744	848	5%	0%
Higham Common Rd / Site Access	Higham Common Road north	11,104	235	8,740	381	-21%	62%
	Site Access Employment	0	0	3,587	719	-	-
	Site Access Link Road	0	0	13,389	175	-	-
	Higham Common Road south	11,104	235	21,292	632	92%	169%
Penny Pie Park	Dodworth Road west	32,135	1,169	32,484	1,157	1%	-1%
	A6133 Broadway	13,675	425	13,493	409	-1%	-4%
	Dodworth Road east	18,481	559	18,652	574	1%	3%
	Pogmoor Road	12,319	507	13,331	467	8%	-8%

Table 8.6: 2033 Future Year Traffic Data (24hr AADT)

8.8.29 As can be seen from Table 8.6, traffic flows in the 2033 With Development scenario are predicted to be different from the 2033 Do Minimum scenario, with some increases and some decreases across the study area. This is a result of not only development generated trips but also the impact of the introduction of the proposed link road as an alternative route choice, that will draw in trips, removing trips from key areas of the

surrounding existing local highway. As a result the impact of the development and link road can be broken down into three key areas:

- Barugh Green village – Barugh Green crossroads will see approximately 30% reduction in traffic flows resulting from the proposed development. This will therefore provide significant reduction in traffic levels and severance and amenity benefit to local residents in Barugh Green and Higham.

- Barugh Green Road east of the link road – This link will see an increase in flows of around 67% resulting from the proposed development.

- Higham Common Road to the M1 Junction 37 – This route runs to the south through Higham Lane, Capitol Close and Whinby Road. This route will see an increase in traffic flows of approximately of between 28% and 92% depending on the exact location of the link on this route.

Severance

8.8.30 The IEMA guidelines suggest that changes in traffic flow of 30%, 60% and 90% would be likely to produce 'slight', 'moderate' and 'substantial' changes in severance, respectively. However, regard should be paid to local conditions, in particular, the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided.

8.8.31 Examining the daily flows in the 2033 future year with the Development, there are some roads in the study area that are predicted to exceed a change in traffic flows above the thresholds suggested by the IEMA guidelines. As highlighted earlier there are three key areas which will be affected.

8.8.32 As previously identified the Higham Common Road to the M1 route and Barugh Green Road east will both experience an increase in traffic flows. Both of these areas will have minimal pedestrian movements. The likely effect of the Development in these two areas, in terms of severance, is therefore considered to be of **minor adverse significance**.

8.8.33 Weighing against this, there is a benefit of a substantial decrease in traffic flows through Barugh Green and Higham villages. This will improve the existing situation and reduce severance for the local community. As such, in the likely effect of the development in this area is considered to be of **minor beneficial significance**.

8.8.34 Therefore, overall on balance the likely effect of the Development on all links in the study area, in terms of severance, is considered to be of **negligible significance**.

Driver Delay

8.8.35 The IEMA guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at, or close to, the capacity of the system.

8.8.36 The proposed new link road and associated junctions will create additional capacity on the local highway network. This will remove trips from Barugh Green and Higham villages but also draw in trips from the wider area, as modelling by Barnsley's strategic

transport model. The additional trips drawn into the link road will provide benefits beyond the study area, such as Gawber and Pogmoor which will have a reduction in traffic.

8.8.37 Capacity assessments for the junctions within the study area have been undertaken to compare the situation in the 2033 future year, with and without the Development. This indicates that the local junctions in the study area will operate within capacity in the 2033 future year, regardless of whether the Development is brought forward.

8.8.38 The results of the modelling assessments, as presented within the TA, show that for each junction in the study area, the changes in traffic flows associated with the Development will have a minimal effect on driver delay in the 2033 future year. The likely effect of the Development across the study area, in terms of driver delay, is therefore considered to be of **negligible significance**.

Pedestrian Delay

8.8.39 The IEMA guidelines note that a change in the volume, composition and/or speed of traffic may affect the ability of a person to cross a road. The guidelines do not set any thresholds for assessing pedestrian delay, recommending instead that assessors use their judgement to determine the significance of the effect.

8.8.40 In relation to the Development, as shown on the landscape masterplan there will be a permeable network of high quality pedestrian walking routes throughout the site, including linkages to existing residential developments within Higham. The landscape led masterplan ensures that there are multiple crossing points across the new link road, as well as paths set back from the link road which run parallel. This provides opportunities for alternative routes that are more pleasant than footpaths adjacent to the link road carriageway.

8.8.41 As previously identified the Higham Common Road to the M1 route and Barugh Green Road east will both experience an increase in traffic flows. Both of these areas have minimal pedestrian movements. The likely effect of the Development in these two areas, in terms of pedestrian delay, is therefore considered to be of **minor adverse significance**.

8.8.42 Weighing against this, there is a benefit of a substantial decrease in traffic flows through Barugh Green and Higham villages. This will improve the existing situation and the reduction in traffic will assist in reducing pedestrian delay for the local community. Further to this, the significant additional network of high-quality pedestrian routes that is being introduced through the proposed development site will also reduce pedestrian delay in the area. As such, in the likely effect of the development in this area, in terms of pedestrian delay, is considered to be of **moderate beneficial significance**.

8.8.43 Therefore, overall on balance the likely effect of the Development on all links in the study area, in terms of pedestrian delay, is considered to be of **minor beneficial significance**.

Pedestrian Amenity

8.8.44 The IEMA guidelines suggest a tentative threshold for judging the significance of a change in pedestrian amenity where the traffic flow or the HGV component is halved or doubled. Pedestrian amenity is also affected by footway width and separation from the carriageway.

8.8.45 As previously mentioned, and outlined on the illustrative landscape masterplan, the development will introduce a series of new and high quality permeable pedestrian walking routes throughout the site. The pedestrian infrastructure will also have multiple access

points into the surrounding area, for example three pedestrian routes connecting into Higham village to the west. This will significantly enhance the connectivity of the site and the linkages with the wider area, opening up new routes that do not currently exist.

8.8.46 As previously identified the Higham Common Road to the M1 route and Barugh Green Road east will both experience an increase in traffic flows. Both of these areas have minimal pedestrian movements. The likely effect of the development in these two areas, in terms of pedestrian amenity, is therefore considered to be of **minor adverse significance**.

8.8.47 Weighing against this, there is a benefit of a substantial network of high-quality pedestrian routes which will provide a significant benefit to the local area. The network of pedestrian routes also provide routes parallel to the link road but with a separation from the carriageway. As such, in the likely effect of the development in this area, in terms of pedestrian amenity, is considered to be of **moderate beneficial significance**.

8.8.48 Therefore, overall on balance the likely effect of the Development on all links in the study area, in terms of pedestrian amenity, is considered to be of **moderate beneficial significance**.

Fear and Intimidation

8.8.49 The IEMA guidelines suggest some tentative thresholds for judging the significance of a change in fear and intimidation based on the volume of traffic, the HGV composition and the speed of vehicles.

8.8.50 It is predicted that the speed of traffic across the study area will not be materially affected by the Development and therefore vehicle speed data has not been presented.

8.8.51 As previously identified the Higham Common Road to the M1 route and Barugh Green Road east will both experience an increase in traffic flows. Both of these areas have minimal pedestrian movements. The likely effect of the Development in these two areas, in terms of fear and intimidation, is therefore considered to be of **minor adverse significance**.

8.8.52 Weighing against this, there is a benefit of a network of high quality on and off road pedestrian routes through the site and a decrease in traffic flows through Barugh Green and Higham villages, to the benefit of existing local and future residents. This will improve the existing situation and minimise the impact of the link road. As such, in the likely effect of the development in this area, in terms of fear and intimidation, is considered to be of **minor beneficial significance**.

8.8.53 Therefore, overall on balance the likely effect of the Development on all links in the study area, in terms of fear and intimidation, is considered to be of **negligible significance**.

Accidents and Safety

8.8.54 An assessment of road traffic accident data for a five-year period has been undertaken for the purpose of this ES. The data shows that across the study area, the level of reported accidents is not uncommon for the characteristics of the road network. Furthermore, the number of accidents does not suggest a specific issue at any particular location.

8.8.55 The proposed new link road and associated junctions have been designed to appropriate standards, as well as being subject to Road Safety Audits. As such, the

proposed highway design changes will not contribute to any additional accidents caused as a result of the highway layout.

8.8.56 On the basis of the above, the likely effect of the Development on all links in the study area, in terms of accidents and safety, is considered to be of **negligible significance**.

8.9 Cumulative Effects

8.9.1 The anticipated traffic generations from the committed developments referenced in the Transport Assessment, which includes the application for 140 dwellings at the adjacent site at Land off Barugh Green Road, which also forms part of the MU1 Allocation, have been included as part of all future year traffic flow scenarios identified in Tables 8.5 and 8.6. Therefore, the cumulative effects on driver delay, severance, pedestrian delay, pedestrian amenity and accidents and safety are inherently included within the impact analysis.

8.9.2 It is therefore considered that the likely cumulative effects remain as per those identified in Section 8.8 of this chapter. The identified level of significance for each effect is considered to be the same for both future years 2026 and 2033. The likely cumulative effects are summarised below:

- The likely cumulative effect in terms of severance is considered to be of negligible significance in both future years 2026 and 2033.
- The likely cumulative effect in terms of driver delay is considered to be of negligible significance in both future years 2026 and 2033.
- The likely cumulative effect in terms of pedestrian delay is considered to be of negligible significance in 2026 and minor beneficial significance in 2033.
- The likely cumulative effect in terms of pedestrian amenity is considered to be of negligible significant in 2026 and moderate beneficial significance in 2033.
- The likely cumulative effect in terms of fear and intimidation is considered to be of negligible significance in both future years 2026 and 2033.
- The likely cumulative effect in terms of accidents and safety is considered to be of negligible significance in both future years 2026 and 2033.

8.10 Mitigation and Monitoring Measures, and Residual Effects

Construction Phase

8.10.1 Potential construction phase effects will be mitigated, as far as possible, through the CEMP and CTMP which will be secured through planning conditions and would require the method of working to be approved by BMBC highways.

8.10.2 The likely residual effects of the construction phase on the operation of the highway network following mitigation is therefore considered to be of **minor adverse significance**.

Highway Network

8.10.3 Given the nature of the Development and the embedded mitigation in the form of the provision of the new link road, it will not lead to significant increases in traffic flows on

the local highway network, in fact it is predicted to lead to reductions in traffic flows passing through Higham and Barugh Green. Overall, the Development is considered to have a direct, permanent, long term effect of **negligible significance** on the operation of the highway network in Barugh Green and a **minor beneficial significance** at Barugh Green Crossroads. A Travel Plan has been prepared and accompanies the planning application. The Travel Plan will encourage and promote sustainable travel to the development once operational. As such, no additional mitigation measures in terms of the transport network are considered necessary to accommodate the Development. The likely residual effects of the Development on the operation of the highway network are of direct, permanent, long term, **negligible significance**.

Severance

8.10.4 The likely effect of the Development on all links in the study area, in terms of severance, has been identified as being of **negligible significance**. Barugh Green and Higham villages will experience a reduction on traffic flow as a result of the new link road, and this impact will be of **minor beneficial significance**. No mitigation is therefore required and the likely residual effect of the Development on severance is considered to be **negligible significance**.

Driver Delay

8.10.5 Across the study area, the likely effect of the Development in terms of driver delay has been identified as being of **negligible significance**. No mitigation is therefore required and the likely residual effect of the Development across the study area, in terms of driver delay, is considered to be of **negligible significance**.

Pedestrian Delay

8.10.6 The likely effect of the Development on all links in the study area, in terms of pedestrian delay, has been identified as being **negligible significance**. No mitigation is therefore required and the likely residual effect of the Development on pedestrian delay is considered to be of **negligible significance**.

Pedestrian Amenity

8.10.7 The likely effect of the Development on all links in the study area, in terms of pedestrian amenity, has been identified as being of **moderate beneficial significance**. No mitigation is therefore required and the likely residual effect of the Development on pedestrian amenity is considered to be of **moderate beneficial significance**.

Fear and Intimidation

8.10.8 The likely effect of the Development on all links in the study area, in terms of fear and intimidation, has been identified as being **negligible significance**. No mitigation is therefore required and the likely residual effect of the Development on fear and intimidation is considered to be of **negligible significance**.

Accidents and Safety

8.10.9 The likely effect of the Development on all links in the study area, in terms of accidents and safety, has been identified as being of **negligible significance**. No mitigation is therefore required and the likely residual effect of the Development on accidents and safety is considered to be of **negligible significance**.

8.11 Summary

8.11.1 This chapter was prepared by Fore Consulting to assess any potentially significant environmental effects that could arise from the changes change in traffic flows during the construction and operational phases of the development. The assessment has been undertaken in accordance with the IEMA guidelines. The methodology behind the preparation of the TA is also discussed.

8.11.2 The assessment of operational traffic impacts concluded that some links will experience and increase in traffic as a result of the development, whilst links in other areas will benefit from a decrease.

8.11.3 The implementation of a Construction Traffic Management Plan will ensure the impact of additional HGVs during the construction period is kept to a minimum and the implementation of a Travel Plan (Appendix 8.2 and 8.3) will encourage and promote sustainable travel to the development once operational.

8.11.4 The results of this assessment have indicated that the potential environmental effects resulting from the increase in traffic generated by the development are predicted to be minor or negligible.