6. Highways

Introduction

1. This Chapter of the Environmental Statement (ES) has been produced by Optima Highways and Transportation Ltd to assess the likely significant effects as a result of the proposed development on traffic, transport and accessibility. In particular, it considers the potential effects of transport movements generated by the scheme on the environment.

2. It describes the baseline conditions at the site and surrounding area and examines the likely significant environmental effects and mitigation measures required to offset any significant adverse effects. It also considers the potential residual effects following the proposed mitigation, as well as consideration of cumulative effects.

Legislation, Guidance and Planning Policy Context

Legislation

3. The process of Environmental Impact Assessment is governed by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (**Ref 6.1**). These regulations apply the EU directive "*on the assessment of the effects of certain public and private projects on the environment*" (usually referred to as the Environmental Impact Assessment Directive) to the planning system in England.

4. The applicable legislative framework is summarised as follows:
    - Highways Act 1980 (**Ref 6.2**); and
    - Construction (Design and Management) (CDM) Regulations 2015 (**Ref 6.3**).

5. Improvements to the off-site highway network including the access to the proposed development are likely to be delivered using an agreement between the highway authority and the Applicant under Section 278 of the Highways Act 1980 or through the payment of Section 106 contributions for the works to be carried out by the local highway authority. The CDM Regulations 2015 apply to the design of both the proposed site access arrangements and the proposed off-site highway improvements.

Guidance

6. The assessment has been carried out in accordance with advice contained in the Planning Practice Guidance, as set out below. Reference has also been made to:
    - The Institute of Environmental Management and Assessment's (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic' (**Ref 6.4**);
    - Design Manual for Roads and Bridges (**Ref 6.5**); and
    - Manual for Streets 1 and 2 (**Ref 6.6**).

Planning Policy

National Planning Policy

7. National policy is set out in the National Planning Policy Framework (NPPF) (**Ref 6.7**) and Planning Practice Guidance (**Ref 6.8**) provides guidance on the preparation of Transport Assessments and Travel Plans supporting new developments.

NPPF

8. The National Planning Policy Framework (NPPF) (February 2019) sets out the current national planning policy and outlines the important role that transport policies have to play in facilitating sustainable development. Paragraph 10 states that at the heart of the Framework is a *"presumption in favour of sustainable development"* (paragraph 11).

9. For decision-taking this means granting permission unless *"any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."*

10. Promoting sustainable transport is covered in Section 9 of NPPF (paras. 102 - 111). Paragraph 108 states that *"In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:*
    - Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;
    - Safe and suitable access to the site can be achieved for all users; and
    - Any significant impacts from the proposed development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."

11. Paragraph 109 states that *"Development should only be prevented or refused on highway grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."* Paragraph 110 expands on this and states that *"applications for development should:*
    - *give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;*
    - *address the needs of people with disabilities and reduced mobility in relation to all modes of transport;*
    - *create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;*
    - *allow for the efficient delivery of goods, and access by service and emergency vehicles; and*
    - *be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations."*

12. Paragraph 111 states that *"All developments that generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed."*

Planning Practice Guidance

13. National Planning Practice Guidance was launched on 6th March 2014 and provides an internet based source of all national planning guidance. This sets out that *"Travel Plans, Transport Assessments and Statements are all ways of assessing and mitigating the negative transport impacts of development in order to promote sustainable development. They are required for all developments which generate significant amounts of movements".*

14. The guidance explains that Travel Plans are *"long-term management strategies for integrating proposals for sustainable travel into the planning process."* and Transport Assessments are *"thorough assessments of the transport implications of development,…".* The guidance also sets out that the development of Travel Plans and Transport Assessments should be an iterative process as each may influence the other.

Local Planning Policy

15. The following local policy documents have been considered in the preparation of the TA:
    - Kirklees Local Plan (**Ref 6.9**);
    - West Yorkshire Combined Authority Transport Strategy 2040 (**Ref 6.10**); and
    - The Third West Yorkshire Local Transport Plan 'My Journey' 2011-2026 (**Ref 6.11**)

Methodology

Consultation

16. Highway officers at Kirklees Council (KC), Calderdale Council (CMBC) and Highways England (HE) have been consulted with respect to the extent of the network to be assessed and the methodology to be adopted for the assessments.

17. In September 2020 ID Planning submitted to KC a Request for an Environmental Impact Assessment (EIA) Scoping Opinion in respect of a proposed development of circa 1460 dwellings on land north of Bradley Road, Bradley, Huddersfield, HD2 2JY. This sets out that Traffic, Transport and Accessibility is to be considered within the ES and provides a brief methodology for the preparation of the Transport Assessment (TA) and Travel Plan (TP).

18. KC, CMBC and HE responded to the request for a scoping opinion and the TA takes into consideration the comments received from all three consultees.

Method of Baseline Data Collection

19. In order to determine the likely effects of the proposed development on the surrounding transport network, the following transportation and access issues have been considered further in this ES:
    - Baseline traffic levels on the local road network. Baseline traffic is the existing surveyed traffic plus consented development as agreed with KC and CMBC;
    - An analysis of development generated traffic. By undertaking a trip generation exercise the likely effect the proposed development could have on the local highway network can be assessed;
    - Distribution/assignment of trips and highway impact assessments using appropriate industry standard techniques;
    - Vehicular site access arrangements;
    - Pedestrian/cycle routes and facilities; and
    - Local Public transport provision.

20. A range of traffic surveys were undertaken on the local highway network within North Huddersfield and Brighouse and included junction turning counts, automatic traffic counters and speed surveys. These are further detailed within the Transport Assessment (TA) (**Appendix 6.1**).

21. The surveys were carried out in 15 minute intervals across the AM (07:00-10:00) and PM (15:00-18:00) periods. The count data was classified into standard vehicle types (Pedal Cycle, Motorcycle, Car, LGV, OGV1, OGV2, Bus / Coach). Queue surveys were also carried out at a number of the sites.

Assessment Methodology

22. The TA (**Appendix 6.1**) assesses the impact of 275 dwellings as the Bradley Villa Farm phase of development of the total allocation for 1958 dwellings (Allocated housing site: HS11 in the Kirklees Local Plan).

23. The following scenarios are considered:
    - 2018/2019 Survey;
    - Base Years of 2029 and 2034 including committed development and background traffic growth;
    - Interim Design Year (2029) includes Base traffic flows with the addition of the Bradley Villa Farm phase of traffic; and
    - Full Design Year (2034) includes Base traffic flows with the addition of the total allocation traffic.

24. Each development scenario has been tested for both the weekday AM and PM peak hours.

25. As well as the assessment carried out within the TA, the methodology of which has been agreed in principle with KC, CMBC and HE, consideration has also been given to the guidance contained within the 1993 Institute of Environmental Assessment (now the

Institute of Environmental Management and Assessment (IEMA)) publication 'Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic', 1993 (**Ref 6.4**).

Identification of Potential Receptors

26. The IEMA guidelines (**Ref 6.4**) identifies groups, locations and areas which may be sensitive to changes in traffic conditions and which should be considered for assessment. The guidelines also suggest that others could be added if the assessor considers it appropriate. The affected groups, locations and areas identified are:
    - People at home;
    - People at work;
    - Sensitive groups including children, the elderly and disabled;
    - Sensitive locations such as hospitals, churches, schools and historical buildings;
    - People walking;
    - People cycling;
    - Open spaces, recreational sites, shopping areas;
    - Sites of ecological/nature conservation value;
    - Sites of tourist/visitor attraction; and
    - Accident 'hot spots.'

27. The following classification of sensitivity for the type of receptor which has been assessed has been adopted for the purposes of this ES Chapter. This is detailed in **Table 6.1.**

Table 6.1: Receptor Sensitivity

Sensitivity	Receptor
High	Receptors of greatest sensitivity to traffic flow: e.g. schools, colleges, playgrounds, accident black spots, retirement homes, urban/residential roads without footways that are used by pedestrians.
Medium	Traffic flow sensitive receptors e.g. congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycleways, community centres, parks, recreation facilities.
Low	Open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

Identification of Potential Significant Effects

28. The following effects have been included in the scope of the assessment covered in this Chapter:

- Potential effects on the community associated with severance caused by an increase in traffic levels during construction and occupation of the proposed development;
- Potential effects on drivers associated with driver delay caused by additional traffic generated by the proposed development;
- Potential effects on pedestrians and cyclists associated with delays caused by changes in traffic volume or speed of traffic;
- Potential effects on pedestrian and cycle amenity caused by an increase in traffic flow, change in traffic composition and footway width/separation from traffic;
- Potential effects of pedestrians and cyclists associated with fear and intimidation caused by an increase in volume of traffic and its Heavy Goods Vehicle (HGV) composition; and
- Potential effects on highway safety caused by the increase in traffic flow as a result of the proposed development.

Impact Assessment and Significance Criteria

29. To define the scale and extent of this assessment, the IEMA guidelines identify the following rules-of-thumb by which the assessment is undertaken of the potentially significant traffic-related environmental effects:
    - **Rule 1** include highway links where the traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%); and
    - **Rule 2** include any other specifically sensitive areas where traffic flows have increased by 10% or more.

30. The IEA Guidelines state in Rule 1, at para 3.16, that: *"Traffic forecasting is not an exact science and the accuracy of projections is open to debate. It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day-to-day variation in traffic on a road is frequently at least some +/-10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact."*

31. The significance of each effect will be considered against the criteria contained within the IEMA guidelines, where possible. However, the guidelines state that *"For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources."*

32. Consideration has also been given to the tests set out in paragraph 109 of the NPPF with regards to significant / severe effects.

Significance Criteria

33. The magnitude of each potentially significant effect has also been considered against the IEMA guidelines and using the terminology set out in Chapter 2 of this ES, and an assessment made as to whether the proposed development would result in a **minor**, **moderate** or **major** effect and whether the effect would be **adverse** or **beneficial.** Where an effect is considered to be not significant or have no influence, irrespective of other effects, this is classified as negligible**.**

34. **Tables 6.2** to **6.3** set out how the magnitude of the impacts associated with the proposed development and receptor sensitivity will be assessed.

Table 6.2: Magnitude of Change Thresholds

Magnitude	Increase (or decrease) in traffic	Effect
High	Over 90%	Major adverse (or beneficial)
Medium	Over 60% and up to 90%	Moderate adverse (or beneficial)
Low	Over 30% and up to 60%	Minor adverse (or beneficial)
Negligible	Less than 30%	Negligible

Table 6.3: Matrix for determining Effect Significance

Magnitude of Impact	Sensitivity / Importance of Receptor			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

35. The criteria used to determine the significance of each of the traffic-related environmental effects is based on the advice given in the IEMA guidelines and is summarised in the paragraphs below.

Local Highway Network

36. The effect on the local highway network has been assessed based upon the change in 24 hour traffic flows.

37. The IEMA guidelines suggest that changes of traffic flow of 30%, 60% and 90% are regarded as producing minor, moderate and major impacts on the local highway network.

Severance

38. Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery and is used to describe the factors that separate

people from other people and places. For example, severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities.

39. The IEMA guidelines suggest that changes of traffic flow of 30%, 60% and 90% are regarded as producing 'minor', 'moderate' and 'major' changes in severance respectively.

40. The IEMA guidelines state that marginal changes in traffic flow are unlikely to create or remove severance, but that consideration in determining whether severance is likely to be an important issue should be given to factors such as road width, traffic flow and composition, traffic speeds, the availability of crossing facilities and the number of movements that are likely to cross the affected route. Consideration should also be given to different groups such as the elderly and young children.

41. Therefore, to assess severance, the current severance caused by traffic and related factors along the roads surrounding the proposed development has been estimated. The extent to which additional traffic will exacerbate this problem in accordance with the rules contained within the IEMA guidelines has then been assessed.

Driver Delay

42. The IEMA guidelines state that delays are only likely to be significant when the traffic on the network surrounding the proposed development is already at, or close to, the capacity of the system. The theoretical capacity of a road or a particular junction can be determined by assessing the Ratio of Flow Capacity (RFC) or equivalent. When an RFC value of 0.85 or more is experienced, queuing and congestion are likely to occur during busy periods. Although there are no quantifiable means of determining significance to driver delay, professional judgement is made as to the impact of the proposed development, taking account of the results of the traffic modelling process.

Pedestrian and Cycle Delay

43. Changes in the volume, composition or speed of traffic may affect the ability of people and cyclists to cross roads, and therefore, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend upon the general level of pedestrian and cyclist activity, visibility and general physical conditions of the crossing location.

44. Given the range of local factors and conditions which can influence pedestrian and cycling delay, the IEMA guidelines do not recommend that thresholds be used as a means to establish the significance of pedestrian and cycling delay but recommend that reasoned judgements be made instead. As with driver delay, there is no quantifiable means of determining significance to pedestrian and cycle delay, therefore professional judgement is made as to the impact of the proposed development.

Pedestrian and Cycle Amenity

45. Pedestrian and cycling amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic.

46. The IEMA guidelines note that changes in pedestrian and cyclist amenity may be considered significant where the traffic flow is halved or doubled, with the former leading to a beneficial effect and the latter an adverse effect. Professional judgement is used to assess the impact on pedestrian and cycle amenity.

Fear and Intimidation

47. The scale of fear and intimidation experienced by pedestrians is dependent on the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths, as well as factors such as the speed and size of vehicles.

48. There are no commonly agreed thresholds by which to determine the significance of the effect. The IEMA guidelines for changes in traffic flow (30%, 60% and 90% are regarded as producing ‘minor’, ‘moderate’ and ‘major’ changes respectively) have therefore been used as the basis for assessing the impact of fear and intimidation.

49. The IEMA guidelines also note that special consideration should be given to areas where there are likely to be particular problems, such as high speed sections of road, locations of turning points and accesses. Consideration should also be given to areas frequented by school children, the elderly and other vulnerable groups.

Accidents and Safety

50. Where a proposed development is expected to produce a change in the character of the traffic on the local road network, the IEMA guidelines state the implications of local circumstances or factors which may elevate or lessen risks of accidents, such as junction conflicts, would require assessment to determine the potential significance of accident risk.

51. The IEMA threshold for changes in traffic flow (30%, 60% and 90% are regarded as producing ‘minor’, ‘moderate’ and ‘major’ changes respectively) have therefore been used as the basis for assessing the impact on highway safety.

Geographical Scope

52. The scope of the TA and geographical study area has been agreed with KC, CMBC and HE and is reflected in the baseline data collection section and traffic surveys summarised within the TA.

Temporal Scope

53. The TA considers the impact of the proposed development traffic during the morning and evening peak hours (08:00-09:00-17:00-17:00) which represents the worst case combination of existing and proposed traffic.

54. A future assessment year of 2034 is considered within the modelling work.

Assumptions and Limitations

55. The potentially significant effects that will be considered as part of the ES are detailed in para. 30 of this Chapter. The scope of this assessment has been determined using IEMA guidelines which indicate that roads should be included where traffic flows are predicted to increase by more than 30% unless the road in question is located within a specifically sensitive area in which case the road should be included if traffic flows increase by 10% or more.

56. The assessment of the traffic impact has been based on traffic data collected during a series of manual classified turning count surveys, ATCs and subsequent capacity analysis. The levels of traffic generated by the proposed development and its distribution on to the highway network has been ascertained using recognised methodology and agreed in principle with the highway authorities; KC, CMBC and HE.

57. The ES considers a future baseline year of 2034, which reflects the likely year of completion of the proposed development and full occupation.

58. No specific limitations with this approach are identified.

Baseline Conditions

Extent of the Study Area

59. The extent of the full study area is set out in the TA (Appendix 6.1). Following this there has been a consideration of those junctions where development trips in either peak hour result in more than a 5% change in base flows.

60. Application of this methodology has resulted in the following key junctions requiring detailed assessment as summarised within **Table 6.4**.

Table 6.4: Junctions to Consider

Ref*	Description	Existing Layout
1	A6107 Fixby Road/A6107 Bradley Road/A641 Bradford Road	4 arm roundabout
2	A6107 Bradley Road/Dyson Wood Way	Signalised T junction
3	A6107 Bradley Road/Oak Road	Priority T junction
7	A62 Leeds Road/Old Fieldhouse Lane	Signalised T junction
8	A62 Leeds Road/Red Doles Lane	Signalised T junction
10	A641 Bradford Road/Long Hill Road	Priority T junction
11	A641 Bradford Road/ASDA Huddersfield	4 arm roundabout
12	A641 Bradford Road/York Avenue	Priority T junction
17	A6107/New Hey Road/B6114/Dewsbury Road	Signalised cross road junction
23	M62 J25	Grade-separated interchange

* the junction reference numbers are taken from the TA

61. The effect of the development on pedestrian, cycle and public transport links within the surrounding network has also been considered in this assessment.

Existing Baseline Conditions

62. Operational assessments of the junctions on the surrounding network have been undertaken using the 2018/2020 surveyed traffic flows. A Covid-19 factor has been applied to the 2020 surveyed traffic flows to ensure that these are representative of normal conditions.

63. The full results of these operational assessments are summarised in the TA (**Appendix 6.1**).

Surrounding Highway Network

64. The Site is situated on land to the north of A6107 Bradley Road some 3.8km north of Huddersfield and 2.4km south of Brighouse.

65. A6107 Bradley Road is a lit single carriageway, which runs east to west from its signalised junction with A62 Leeds Road and B6118 Colne Bridge Road for approximately 2.6km where it meets A641 Bradford Road at a four-arm roundabout known as Bradley Bar Roundabout to the southwest of the Site.

66. In the vicinity of the Site, Bradley Road is approximately 11m wide with 3.5m wide grass verges and 2.5m wide footways to both flanks. It is subject to a 40mph speed limit, with the exception of a 30mph limit in the vicinity of All Saints High School opposite the Site.

67. To the east of the Site, Bradley Road forms a signalised T junction with Dyson Wood Way, which serves Bradley Business Park.

68. The A641 runs between Bradford and Huddersfield on a north-south alignment. Along the western boundary of the Site the A641 is known as Bradford Road and forms a lit dual carriageway subject to a 40mph speed limit.

69. North of its junction with Dorchester Road, Bradford Road is subject to a 50mph speed limit as it crosses over the M62 and becomes Huddersfield Road on its approach to the Toothill Lane/Woodhouse Lane cross road junction.

70. Huddersfield Road continues toward Brighouse and on the approach to the Town Centre forms a signalised cross road junction with Gooder Lane and Birds Royd Lane, south of the River Calder.

71. Within Brighouse Town Centre, Huddersfield Road meets Bethel Street/Bradford Road and Lawson Road at a gyratory-type roundabout with give way control on the circulatory carriageway.

72. To the south of the Site, Bradford Road continues towards Huddersfield over a distance of approximately 3km via Brackenhall, Cowcliffe and Fartown.

73. Longhill Road meets Bradford Road at a priority controlled T junction some 0.5km south of Bradley Bar Roundabout. Longhill Road is a residential collector road serving the large estate within Brackenhall and connects to A62 Leeds Road via Deighton.

74. To the south of Longhill Road, Bradford Road forms a four arm roundabout, which provides access to the Asda food store and petrol filing station and a small cluster of residential properties to the west.

75. York Avenue meets Bradford Road at a priority controlled junction in Fartown Green and provides access to the residential areas to the south of Cowcliffe. Bradford Road forms a four arm signalised cross road junction with Spaines Lane and Fartown Green Road within the centre of Fartown. On the approach to Huddersfield, Bradford Road forms a further four arm signalised crossroad junction with Willow Lane East, Willow Lane and Halifax Old Road.

76. Fixby Road runs westbound from Bradley Bar Roundabout for approximately 0.8km, where it becomes Clough Lane beyond its junction with Kennedy Avenue. Clough Lane continues under the M62 and meets A643 New Hey Road and Dewsbury Road at a signalised cross road junction.

77. From the Clough Lane signals, A643 New Hay Road continues in a northerly direction towards Brighouse via Rastrick. On the approach to the Town Centre the A643 meets

Mill Royd Street at a priority controlled T junction. A643 Briggate then crosses the canal and forms a mini roundabout with Gooder Street to the west of the Town Centre.

78. The A62 runs between Manchester and Leeds over a distance of approximately 62km. Locally the A62 is known as Leeds Road and forms a signalised cross road junction with Bradley Road and the B6118 Colne Bridge Road to the east of the Site.

79. Leeds Road continues in a north easterly direction towards Cooper Bridge Roundabout (A62 Cooper Bridge Road/A644 Wakefield Road). The A644 continues towards Mirfield and Wakefield Road connects to the M62 at a grade separated junction (Junction 25) in Brighouse.

Public Transport

80. There are existing bus stops around Bradley Bar Roundabout which are used by several services linking the area to the town centres of Huddersfield, Brighouse, Bradford and Halifax.

81. The nearest railway station to the Site is at Deighton, some 2.5km to the southwest. The station provides access to Northern and Transpennine Express services providing regular connections to Huddersfield, Dewsbury, Batley, Manchester, Leeds, York and Hull.

Pedestrian and Cycle Facilities

82. Footways that are approximately 2.5m wide are provided on both flanks of Bradley Road in the vicinity of the Site. 1.6m wide footways are provided on Bradford Road segregated from the carriageway by circa 2.0m wide grass verges.

83. A pedestrian refuge island is provided opposite All Saints Catholic College within Bradley Road and dropped crossings are provided across all arms of Bradley Bar Roundabout.

84. There is a series of existing public rights of way in the vicinity of the Site and these are detailed within the TA.

85. On road cycle lanes are provided along Bradley Road between Bradley Bar Roundabout and A62 Leeds Road and there are other key cycle routes both on and off-road.

Baseline Traffic Data

86. A series of Automatic Traffic Counts have been undertaken on the local highway network in order to survey 24 hour AADT and 18 hour AAWT traffic flows.

87. A summary of the 2019 AADT flows and heavy vehicle proportions on key links in the study area are shown in **Table 6.5.**

Table 6.5: 2020 Base AADT

Ref	Highway Link	AADT Total	AADT HGV %
1	Bradley Road	19092	3.2%
2	A62 Leeds Road	17376	4.3%
3	B6118 Colne Bridge Road	15236	3.1%
4	Cooper Bridge Road	26764	5.9%
5	A62 Leeds Road (Cooper Bridge Roundabout)	20600	6.5%
6	A644 Wakefield Road	18863	7.8%
7a	M62 J25 Westbound	62076	13.2%
7b	M62 J25 Eastbound	61391	13.3%
8	A643 Huddersfield Road	18355	5.2%
9	A643 Clifton Common	8326	2.3%
10	A644 Ludenscheid Link	17764	4.9%
11	A641 Bradford Road (N)	16500	3.1%
12	A644 Halifax Road	13977	3.0%
13	A6025 Elland Road	16608	3.8%
14	A643 Halifax Road	17667	2.7%
15	A643 Bramston Street	12250	2.0%
16	A641 Huddersfield Road	18150	2.7%
17	A6107 Fixby Road	12391	4.1%
18	A641 Bradford Road (S)	21952	3.0%
19	A643 New Hey Road (Ainley Top)	11688	3.3%
20	Blackley New Road (Ainley Top)	26266	7.7%
21	Lindley Moor Road (Ainley Top)	12040	5.1%

Future Baseline Conditions (Do-minimum)

88. Operational assessments of the junctions on the surrounding network have been undertaken with the addition of planned / committed development traffic. The full results of these operational assessment are summarised in the TA.

89. The following consented developments have been treated as committed developments with the associated traffic flows included in the assessment:

- Gernhill Avenue, Fixby (Ref: 2018/62/92055/W) – 252 dwellings;
- Tithe House Lane, Bradley (Ref: 2018/49/93965/W) – 105 dwellings;
- Land between Dewsbury Road and New Hey Road in Rastrick, Calderdale (Ref: 19/00628/FUL) – 267 dwellings;
- Woodhouse Garden Suburb, Rastrick, Calderdale – 1257 dwellings;
- Thornhills Garden Suburb, Brighouse, Calderdale – 1998 dwellings;
- Clifton Business Park, Brighouse, Calderdale (Ref: 20/01354/LAA) – employment uses;
- Dyson Wood Way, Bradley (Ref: 2018/62/91432/W) – employment uses;
- Land to east of Netheroyd Hill Road, Cowcliffe – 68 dwellings;
- Land north of Ashbrow Road, Brackenhall (Ref: 2019/62/92940/W) – 161 dwellings;
- Former Cooper Bridge Waste Water Treatment Works, Leeds Road – employment; and
- Land at Slipper Lane and Leeds Road, Mirfield – 166 dwellings and employment uses.

90. Baseline conditions also include committed highway improvements as follows:

- A62/A644 (Wakefield Road) Link Road Scheme (Cooper Bridge)

91. Background traffic growth has been applied using TEMPro growth rates to the forecast year of 2034. A summary of the 2034 Base AADT flows and HGV percentages is shown in **Table 6.6**.

Table 6.6: 2034 Base AADT

Ref	Highway Link	AADT Total	AADT HGV %
1	Bradley Road	20464	3.4%
2	A62 Leeds Road	19493	4.0%
3	B6118 Colne Bridge Road	15710	3.0%
4	Cooper Bridge Road	20647	8.1%
5	A62 Leeds Road (Cooper Bridge Roundabout)	22624	6.3%
6	A644 Wakefield Road	12678	11.0%
7a	M62 J25 Westbound	70816	13.1%
7b	M62 J25 Eastbound	70146	13.2%
8	A643 Huddersfield Road	23364	4.6%
9	A643 Clifton Common	13305	1.6%
10	A644 Ludenscheid Link	20218	4.9%
11	A641 Bradford Road (N)	19418	3.0%

Ref	Highway Link	AADT Total	AADT HGV %
12	A644 Halifax Road	14251	3.3%
13	A6025 Elland Road	21227	3.3%
14	A643 Halifax Road	19157	2.7%
15	A643 Bramston Street	13392	2.1%
16	A641 Huddersfield Road	21142	2.6%
17	A6107 Fixby Road	14161	4.1%
18	A641 Bradford Road (S)	23968	3.0%
19	A643 New Hey Road (Ainley Top)	13114	3.3%
20	Blackley New Road (Ainley Top)	29470	7.7%
21	Lindley Moor Road (Ainley Top)	13510	5.1%

92. The TA has identified that none of the existing junctions will operate in excess of capacity in the baseline scenario.

Collision Data

93. Personal injury collision data was obtained for the highway network in the vicinity of the Site for the most recently available five year period prior to the end of January 2021. The study area is included in detail within the TA and includes the main corridors of Bradley Road, Bradford Road, Fixby Road and A62 Leeds Road. Collision data for Junction 25 of the M62 has also been obtained.

94. The collision data is analysed in detail in the TA, concentrating on the key junctions where capacity assessment has been undertaken, and in summary there has been a total of 149 personal injury collisions across the large study area; 128 of which have been classified as slight in severity. 19 as serious and there have been two collisions that resulted in a fatal injury.

Assessment of Impact

Construction Phase

Effects on the Local Highway Network

95. The effect of construction traffic has been considered based on the predicted increase in traffic on the surrounding network as a result of the proposed development. The traffic generated during the construction phase would be significantly less than the traffic generation of the Operational phase, particularly during peak periods.

96. The effect of the proposed development construction traffic on the surrounding network is considered low and will be temporary during the short / medium term.

97. The sensitivity of the junctions on the surrounding network to the addition of construction traffic is low and in any event is likely to be within the levels of daily fluctuation, particularly taking into account that the construction trips will avoid peak periods, wherever possible.

98. It is also recognised that construction works may result in additional conflicts between construction traffic and other users on the highway network with a need to ensure existing traffic and pedestrian / cycle facilities are maintained. In addition, there are potential effects arising from mud on the road.

Severance

99. In accordance with the IEMA guidelines, receptors are likely to experience 'minor' changes in severance when traffic flows change by 30% or more with changes in traffic flows of 60% and 90% producing 'moderate' and 'major' changes in severance.

100. There is unlikely to be any locations on the local highway network where traffic flows increase by more than 30% as a result of construction traffic. However, there may be more sensitive locations such as near schools, hospitals and local conveniences where a lesser percentage increase may have an impact and therefore it is considered that the effect of the proposed development traffic during construction on severance will be **minor adverse**.

Driver Delay

101. Delays to non-development traffic can occur on the network due to the additional traffic generated by the proposed development during construction. The IEMA guidelines note that these additional delays are only likely to be significant when traffic on the network surrounding the proposed development is already at, or close to capacity.

102. The TA has identified that there will be modest increases in congestion and delay at several junctions within the study area as a result of the completed development. It is likely construction traffic will use the same junctions and therefore the impact of the proposed development during the Construction Phase is considered to be **minor adverse**.

Pedestrian and Cycle Delay and Amenity

103. Given the variance in pedestrian and cycle numbers over a typical highway network and the differing facilities for each type of user, there is no definitive increase in traffic used to determine a level of delay experienced by pedestrians and cyclists attempting to cross the road.

104. In terms of amenity, traffic levels must double in order to cause significant adverse effect. There is unlikely to be any locations on the local highway network where traffic flows increase substantially as a result of construction traffic and therefore it is considered that the effect of the proposed development traffic during construction on pedestrian and cycle delay and amenity will be **minor adverse.**

Fear and Intimidation

105. As detailed previously, levels of fear and intimidation experienced by pedestrians are dependent on the volume of traffic, its HGV composition and factors such as speed, size and proximity of vehicles. The additional HGVs resulting from the proposed development during the construction phase will vary depending on the stage of the proposed development and the operations taking place on-site.

106. Depending on the routes that construction traffic may take, particularly HGVs, there may be an effect on more sensitive areas such as near schools and hospitals. The effect of the proposed development during the construction phase on fear and intimidation is considered to be **minor adverse.**

Accidents and Safety

107. A review of PIA data was undertaken as part of the TA. A detailed assessment has been made of the causation factors of these accidents and it is considered that the additional traffic generated by the proposed development during the construction phase will not have any significant adverse impact on highway safety and therefore the effect is **negligible.**

Operational Phase

Effects on Local Highway Network

108. The impact of the proposed development on the surrounding network has been assessed (pre-mitigation) based on the results of the junction modelling exercise for the study network.

109. **Table 6.7** compares the predicted traffic generation for the proposed development with the baseline flows to identify any potential links where increases in traffic may exceed the thresholds set out in the IEMA guidelines, therefore requiring further assessment.

Table 6.7: 2034 AADT Net Change in Traffic Volumes

Ref	Highway Link	2034 Base	2034 Design	Net Change	% Change
1	Bradley Road	20464	22055	1591	7.8
2	A62 Leeds Road	19493	20345	852	4.4
3	B6118 Colne Bridge Road	15710	16107	397	2.5

Ref	Highway Link	2034 Base	2034 Design	Net Change	% Change
4	Cooper Bridge Road	20647	20647	0	0.0
5	A62 Leeds Road (Cooper Bridge Roundabout)	22624	23565	941	4.2
6	A644 Wakefield Road	12678	13619	941	7.4
7a	M62 J25 Westbound	70816	70816	0	0.0
7b	M62 J25 Eastbound	70146	72852	2706	3.9
8	A643 Huddersfield Road	23364	23599	235	1.0
9	A643 Clifton Common	13305	13305	0	0.0
10	A644 Ludenscheid Link	20218	20218	0	0.0
11	A641 Bradford Road (N)	19418	19536	118	0.6
12	A644 Halifax Road	14251	14369	118	0.8
13	A6025 Elland Road	21227	21580	353	1.7
14	A643 Halifax Road	19157	19628	471	2.5
15	A643 Bramston Street	13392	13392	0	0.0
16	A641 Huddersfield Road	21142	24359	3217	15.2
17	A6107 Fixby Road	14161	16397	2236	15.8
18	A641 Bradford Road (S)	23968	26086	2118	8.8
19	A643 New Hey Road (Ainley Top)	13114	13702	588	4.5
20	Blackley New Road (Ainley Top)	29470	29941	471	1.6
21	Lindley Moor Road (Ainley Top)	13510	13628	118	0.9

110. The information in **Table 6.7** indicates that none of the considered links are predicted to exceed the 30% (Rule 1) IEMA negligible/neutral threshold. The majority of the links experience increases of less than 10%.

Severance

111. In accordance with the IEMA guidelines, receptors are likely to experience 'minor' changes in severance when traffic flows change by 30% or more with changes in traffic flows of 60% and 90% producing 'moderate' and 'major' changes in severance.

112. As shown in **Table 6.7** changes in excess of the 30% threshold are not expected on any link under consideration and there the effect of the proposed development on severance is **negligible**.

Driver Delay

113. Delays to non-development traffic can occur on the network due to the additional traffic generated by the proposed development. The IEMA guidelines note that these additional delays are only likely to be significant when traffic on the network surrounding the proposed development is already at, or close to capacity.

114. The addition of the proposed development traffic causes the operation of the following junctions to worsen, in excess of the operational capacity. As a result, it is therefore considered that the effect of the proposed development traffic at these locations would be **moderate adverse** (pre-mitigation):
    - Bradley Bar Roundabout.

115. At other junctions located further away from the Site the proposed development traffic impact is reduced and diluted as the traffic disperses through the network. As such it is considered that the magnitude of the effect of development traffic overall across the highway network is **minor adverse**.

Pedestrian and Cycle Delay and Amenity

116. Given the variance in pedestrian and cycle numbers over a typical highway network and the differing facilities for each type of user, there is no definitive increase in traffic used to determine a level of delay experienced by pedestrians and cyclists attempting to cross the road.

117. In terms of amenity, traffic levels must double in order to cause significant adverse effect. There is unlikely to be any locations on the local highway network where traffic flows increase substantially as a result of the proposed development traffic and therefore it is considered that the effect on pedestrian and cycle delay and amenity will be **minor adverse.**

Fear and Intimidation

118. As detailed previously, levels of fear and intimidation experienced by pedestrians are dependent on the volume of traffic, its HGV composition and factors such as speed, size and proximity of vehicles. The additional HGVs resulting from the proposed development during the operational phase will predominately relate to delivery vehicles.

The effect of the proposed development on fear and intimidation is considered to be **minor adverse.**

Accidents and Safety

119. A review of PIA data was undertaken as part of the TA. A detailed assessment has been made of the causation factors of these accidents and it is considered that the additional traffic generated by the proposed development will not have any significant adverse impact on highway safety and therefore the effect is **negligible.**

Environmental Mitigation Measures

Construction Phase

120. During the construction phase a Construction Management Plan will be introduced to address the effects identified and ensure the Construction Site is operated efficiently and safely. Wheel washing facilities will be provided to minimise mud on the highway. It is anticipated that a Construction Management Plan would be a requirement of planning.

121. A summary of the traffic and transport related environmental measures incorporated into the proposed development to control, avoid, reduce or compensate for any traffic-related environmental effects for the construction phase is provided in **Table 6.8**.

Table 6.8: Traffic related Environmental Measures during the Construction Phase

Mitigation Measure	Effect to be Addressed	Rationale
Wheel Wash and Road Sweeping	Accidents and Safety	Washing facilities will prevent vehicles leaving mud on the local road network which could impact on road safety.
Implementation of a Construction Management Plan including a Delivery Route Plan	Severance Driver Delay Pedestrian and Cycle Delay Fear and Intimidation Accidents and Safety	The Construction Traffic Management and Delivery Route Plan will define the hours during which deliveries can be made to and from the Site and also the routes that vehicles will take. This will ensure that vehicle movements are spread throughout the day avoiding peak hours on the road network reducing the effect on driver delay. Deliveries can also be timed if necessary, to avoid peak times for pedestrian movement such as school start and finish times so as to limit the effect of additional HGV movements on severance, pedestrian delay and amenity and fear and intimidation.

Operational Phase

122. A summary of the traffic and transport related environmental measures incorporated into the proposed development to control, avoid, reduce or compensate for any traffic-related environmental effects for the operational phase is provided in **Table 6.9**.

Table 6.9: Traffic related Environmental Measures during the Operational Phase

Mitigation Measure	Effect to be Addressed	Rationale
Implementation of a Travel Plan	Driver Delay Pedestrian and Cycle Delay and Amenity Fear and Intimidation	The Travel Plan that has been prepared for the proposed development sets out a package of measures aimed at promoting sustainable development. This includes measures to encourage an increase in the journeys undertaken on foot and by bicycle. Measures such as these are likely to not only boost the confidence of pedestrians and cyclists resulting in a minor beneficial effect as these road users are less likely to be intimidated by smaller increases in traffic volumes.
Public Transport Provision within the Development	Pedestrian Delay and Amenity Fear and Intimidation	The Spine Road through the proposed development has been designed to accommodate a potential new/diverted future bus service that connects Bradford Road to the west with Bradley Road to the east. It is envisaged that a minimum of four pairs of bus stops will be provided along the Spine Road. This will reduce the need for pedestrians to cross busier roads external to the development resulting in a beneficial effect.
Improvements to Bradley Bar Roundabout	Driver Delay	An improvement scheme for Bradley Bar Roundabout is proposed (for the Bradley Villa Farm phase of development) which will result in a reduction in peak hour delay at the junction.

123. The above mitigation measures will be provided at a timescale to be agreed with KC and HE.

124. The Travel Plan will also assist in mitigating the effect of the proposed development on the surrounding network by reducing the number of single occupancy car trips generated.

Residual Effects and Conclusions

Construction Phase

Severance

125. As noted in para. 38 severance can relate to quite minor traffic flows if they impede pedestrian access to essential facilities. The Construction Management Plan will be put in place to ensure that construction traffic uses appropriate routes for its type and therefore the residual effect of the proposed development during the construction phase on severance is expected to be temporary **negligible**.

Driver Delay

126. The daily traffic during the construction period is expected to be less than the proposed development generates when it is fully operational. However, the traffic during the construction phase is likely to use the most congested parts of the network.

127. The Construction Management Plan will seek to restrict peak hour traffic movements and therefore, after mitigation, the construction phase is expected to have a temporary **negligible** effect on driver delay.

Pedestrian and Cycle Delay and Amenity

128. The Construction Management Plan will seek to route construction traffic on appropriate routes for its type avoiding areas of high pedestrian / cycle activity and therefore, after mitigation, the construction phase is expected to have a temporary **negligible** effect on pedestrian and cycle delay and amenity.

Fear and Intimidation

129. Again, appropriate routes for construction traffic depending on type will ensure that this is minimised in sensitive areas and therefore, after mitigation, the construction phase is expected to have a temporary **negligible** effect on fear and intimidation.

Accidents and Safety

130. The construction phase is expected to have a temporary **negligible** effect on accidents and safety.

131. Taking into account the mitigation measures detailed in **Table 6.8** above, the overall residual impact of the traffic from the proposed development during its construction phase is considered to be temporary **negligible**.

Operational Phase

Severance

132. As already identified, none of the links on the network under consideration are expected to experience an increase in daily traffic flows of more than 30%. Therefore, the proposed development is expected to have a **negligible** effect on severance.

Driver Delay

133. The implementation of a Travel Plan at the proposed development along with improvements to the off-site highway network as described within the TA and set out in **Table 6.9** will assist in reducing driver delay. Therefore, after mitigation, the proposed development is expected to have a **negligible** effect on driver delay.

Pedestrian and Cycle Delay and Amenity

134. The Travel Plan will identify attractive pedestrian and cycle routes to local facilities and services which will reduce the need for pedestrians and cyclists to take more heavily trafficked routes.

135. The provision of a bus route through the proposed development will reduce walking distances to bus services and avoid the need to cross external roads in the vicinity of the site to access existing bus stops.

136. The Travel Plan will also reduce the effect of the proposed development in terms of additional traffic flows and therefore, after mitigation, the proposed development is expected to have a **negligible** effect on pedestrian and cycle delay and amenity.

Fear and Intimidation

137. There are no highway links on the network under consideration where the expected increase in daily traffic flows exceeds 30% and, in the operational phase, the proposed development will not give rise to significant numbers of HGVs.

138. The Travel Plan will identify attractive pedestrian routes to local facilities and services which will reduce the need for pedestrians to take more heavily trafficked routes as will the provision of a bus route through the proposed development. Therefore, after mitigation, the proposed development is expected to have a **negligible** effect on fear and intimidation.

Accidents and Safety

139. The proposed development in its operational phase is expected to have a **negligible** effect on accidents and safety.

Cumulative Effects

140. The cumulative effects of consented and planned developments (Local Plan allocations) and background traffic growth have already been considered and assessed within the detailed modelling of the highway network i.e. the baseline traffic includes the consented and planned developments as detailed within the TA.

141. **Table 6.6** also includes the daily traffic flows from the consented and planned developments and therefore the cumulative effects are also considered within the Chapter of the ES.

Climate Change

142. It is not anticipated that the traffic and transport from the proposed development will result in any discernible related impacts on climate change.

Assessment Summary

143. This chapter has been prepared by Optima Highways and Transportation Ltd to assess any potential significant environmental effects that could arise from the change in traffic flows during the construction and operational phases of the proposed development.

144. The assessment has been undertaken in accordance with the IEMA guidelines. The methodology behind the preparation of the TA is also discussed.

145. The assessment of the impact of construction traffic concluded that the traffic generated during the construction phase of the proposed development would be significantly less than the traffic generation of the development once it is occupied, particularly during peak periods. The effect of the construction traffic as a result of the proposed development on the surrounding network is considered **negligible** and will be temporary during the short/medium term.

146. Specific improvements are proposed in order to mitigate the impact of the proposed development on the wider highway network and as such would result in a **negligible** on severance, driver delay, pedestrian and cycle delay and amenity, fear and intimidation and accidents and safety.

147. **Table 6.10** overleaf contains a summary of the likely significant traffic-related effects of the proposed development that are not considered elsewhere in this ES.

Table 6.10 Summary of Significant Effects and Mitigation

Development Phase	Potential Effect of Development pre-mitigation	Significance of Effect without incorporated mitigation	Mitigation Measures	Significance of effect following mitigation (Residual)	Nature of effect
Construction	Severance	Minor adverse	Construction management plan	**Negligible**	ST, T and D
	Driver Delay	Minor adverse	Construction management plan	**Negligible**	ST, T and D
	Pedestrian and Cycle Delay and Amenity	Minor adverse	Construction management plan	**Negligible**	ST, T and D
	Fear and Intimidation	Minor adverse	Construction management plan	**Negligible**	ST, T and D
	Accidents and Safety	**Negligible**	Wheel wash and road sweeping and construction management plan	**Negligible**	ST, T and D
Operation	Severance	**Negligible**	-	**Negligible**	LT, P and D
	Driver Delay	Minor adverse	Travel Planning and off site highway works	**Negligible**	LT, P and D
	Pedestrian and Cycle Delay and Amenity	Minor adverse	Travel Planning and bus route through the proposed development	**Negligible**	LT, P and D
	Fear and Intimidation	Minor adverse	Travel Planning and bus route through the proposed development	**Negligible**	LT, P and D
	Accidents and Safety	**Negligible**	-	**Negligible**	LT, P and D

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