Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Appendix 19.3: Transport Assessment

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Contents

Figures

Tables

Summary

Mott MacDonald has been commissioned by Anglian Water Services Limited (Anglian Water) to prepare a Transport Assessment (TA) to evaluate the impact of the proposed relocation of the existing Cambridge Waste Water Treatment Plant (CWWTP). This TA accompanies an Environmental Statement document, which is part of a larger DCO application by Anglian Water Services Limited.

The TA provides an overview of the baseline transport conditions in the project area, explores the impact of the Proposed Development, and provides an explanation of the committed and proposed mitigation measures.

The TA's study area encompasses the local and strategic road network, the existing public transport infrastructure, and network of public rights of way (PRoW) in the vicinity of, or within settlements. For the local and strategic road network, this includes:

- Junction 33 (The Milton Interchange) of the A14;
- Junction 34 of the A14;
- the A14, where appropriate;
- the A10, where appropriate;
- Milton Road;
- Green End Road;
- Fen Road;
- Horningsea Road;
- All roads in Waterbeach that are part of the construction route; and
- Clayhithe Road.

The existing Cambridge Waste Water Treatment Plant (WWTP), which provides waste water and sludge treatment for the residents and businesses of Cambridge, lies within the area now known as North East Cambridge (NEC) and occupies a significant part of the area designated for regeneration by the recently adopted Cambridge Local Plan and the South Cambridgeshire Local Plan.

To facilitate the regeneration of NEC, the Cambridgeshire and Peterborough Combined Authority (CPCA) with the support of local partners, applied for funding from the Housing Infrastructure Fund (HIF), which is administered by Homes England, to relocate the WWTP.

In March 2019, the Government announced that HIF funding would be granted and, as a result, Anglian Water is currently planning its relocation. Following Phase 2 Consultation, a highway access option has now been selected.

1 Introduction

1.1 Anglian Water Services Limited

1.1.1 Anglian Water Services Limited (the 'Applicant') is the largest regulated water and water recycling company in England and Wales by geographic area, supplying water and water recycling services to almost seven million people in the East of England and Hartlepool.

1.1.2 The Applicant is committed to bringing environmental and social prosperity to the region they serve, through their commitment to Love Every Drop. As a purpose-led business, The Applicant seeks to contribute to the environmental and social wellbeing of the communities within which they operate. As one of the largest energy users in the East of England, they are also committed to reaching net zero carbon emissions by 2030.

1.2 Background

1.2.1 The Applicant is proposing to build a modern, low carbon waste water treatment for Greater Cambridge on a new site area north of the A14 between Fen Ditton and Horningsea within the Cambridge drainage catchment area, to replace the plant on Cowley Road, hereafter referred to as the existing Cambridge Waste Water Treatment Plant (WWTP).

1.2.2 The relocation will enable South Cambridgeshire District Council and Cambridge City Council's long held ambition to develop a new low-carbon city district on Cambridge's last major brownfield site, known as North East Cambridge. The site is an important component of the First Proposals (preferred options) for the new Greater Cambridge Local Plan that were subject to public consultation late last year. The North East Cambridge Area Action Plan has also recently been agreed by the Councils in its Proposed Submission form and will be subject to public consultation prior to submission, once the Development Consent Order is determined. The relocation of the existing waste water treatment facility will enable this new district to come forward and deliver 8,350 homes, 15,000 new jobs and a wide range of community, cultural and open space facilities in North East Cambridge. Further details on this can be found in our Statement of Requirement (Application Document Reference 7.2) which was published in September 2019.

1.2.3 The relocation of the waste water treatment plant will also allow The Applicant to continue providing vital waste water services to customers across Cambridge and Greater Cambridge. The new plant will continue storing and treating storm flows and treating sludge to produce renewable energy. It will be designed to deal with a growing population. It offers the opportunity for a joined-up solution for treating waste water from Cambridge and Greater Cambridge, including Waterbeach. The proposal is for both waste water from the existing Waterbeach Waste Water Treatment Plant and future flows from Waterbeach New Town to be treated at the proposed Cambridge Waste Water Treatment Plant.

1.2.4 The Proposed Development will be the first waste water project to seek a Development Consent Order that is not specifically named in the National Policy Statement (NPS), 'The Applicant' sought and obtained a direction from the Secretary of State under section 35 of the Planning Act 2008 ("the 2008 Act"), which confirms that the project will be treated as a Nationally Significant Infrastructure Project ("NSIP") when the application is submitted.

1.3 The Proposed Development

1.3.1 This section provides a high-level summary of the Proposed Development. The term Proposed Development refers to the Cambridge Waste Water Treatment Plant (WWTP) Relocation project in its entirety and all works associated with the development.

1.3.2 A detailed description of the Proposed Development can be found in Chapter 2: Project Description of the Environmental Statement (Application Document Reference 5.2.2).

1.3.3 The purpose of the proposed WWTP will be to treat all waste water and wet sludge from the Cambridge catchment just as the existing Cambridge WWTP currently does, plus that from the growth indicated and being planned within the catchment in the Local Plan to 2041, with ability to expand beyond to deal with further growth.

1.3.4 As part of its statutory function, The Applicant operates the existing Cambridge WWTP. The existing Cambridge WWTP receives waste water from the Cambridge catchment either directly from the connected sewerage network or tankered to the plant from homes and businesses that are not connected. This waste water is then treated and the treated effluent discharged through an outfall to the nearby River Cam. The existing Cambridge WWTP is an integrated WWTP, as would be the Proposed Development. Integrated WWTP incorporate a sludge treatment function, in the form of a Sludge Treatment Centre (STC), which treats the sludge derived from the waste water from the catchment, and the "wet sludge" produced by other satellite plants which do not have integrated STC.

1.3.5 The Waterbeach New Town development lies to the north of Cambridge. When built out Waterbeach New Town will comprise some 11,000 new homes along with associated business, retail, community and leisure uses. Waste water from Waterbeach will ultimately be treated by the proposed Cambridge WWTP once operational. However, the rate of development at Waterbeach New Town may require a new pipeline (rising main) to be built from Waterbeach to the existing Cambridge WWTP to allow treatment of waste water in advance of the proposed WWTP becoming operational. In that case, either a later connection would be made to the proposed WWTP from a point on the pipeline route, or flows diverted from the existing Cambridge WWTP via the transfer tunnel.

1.3.6 In summary the Proposed Development will comprise of:

- an integrated waste water and sludge treatment plant;

- a shaft to intercept waste water at the existing Cambridge WWTP on Cowley Road and a tunnel/ pipeline to transfer it to the new site and terminal pumping station. Temporary intermediate shafts to launch and recover the micro-tunnel boring machine;
- a gravity pipeline transferring treated waste water from the proposed WWTP to a discharge point on the River Cam and a pipeline for storm water overflows;
- a twin pipeline transferring waste water from Waterbeach to the existing Cambridge WWTP, with the option of a connection direct in to the proposed WWTP when the existing works is decommissioned;
- ancillary on-site buildings, including a Gateway Building with incorporated Discovery Centre, substation building, workshop, vehicle parking including electrical vehicle charging points, fencing and lighting;
- environmental mitigation and enhancements including substantial biodiversity net gain, improved habitats for wildlife, extensive landscaping over 72 ha, a landscaped earth bank enclosing the proposed WWTP, climate resilient drainage system and improved recreational access and connectivity;
- renewable energy generation via anaerobic digestion which is part of the sludge treatment process that produces biogas designed to be able to feed directly into the local gas network to heat homes, or as an alternative potential future option burnt in combined heat and power engines;
- renewable energy generation via solar photovoltaic and battery energy storage system;
- other associated development such as site access, utilities, connection to the site drainage system, landscaping and off-site highway network alteration measures to reduce potential traffic impacts; and
- a new vehicle access including for Heavy Goods Vehicles (HGV's) bringing sludge onto the site for treatment.

1.4 Document purpose

1.4.1 This Transport Assessment (TA) has been prepared by Mott MacDonald on behalf of The Applicant and is part of a Development Consent Order (DCO) application for the Cambridge Waste Water Treatment Plant Relocation (CWWTPR) project. A site location and boundary plan are shown in Appendix A, Figure A.1.

1.4.2 This TA considers construction and operation of the Proposed Development and takes into account the selected permanent access option from the existing junction between the A14 off slip and junction with Horningsea Road.

1.4.3 A single access option was selected based on a wide range of criteria including environmental considerations, national, regional and local transport policies and guidance documents, and taking into account consultation with Highways England and Cambridgeshire County Council (the local highway authority). Alternative access options are discussed in the Chapter 3: Site Selection and Alternatives of the Environmental Statement (ES) and not considered further in the TA.

1.4.4 This TA should be read alongside:

- the Construction Workers Travel Plan (Application Document Reference 5.4.19.9)
- the Operational Workers Travel Plan (Application Document Reference 5.4.19.8)
- the Construction Traffic Management Plan (CTMP) (Application Document Reference 5.4.19.7)
- the Code of Construction Practice (CoCP) Part A and B (Application Document Reference 5.4.2.1, 5.4.2.2)
- the Walking, Cycling, and Horse riding Assessment and Review (WCHAR) (Application Document Reference 5.4.19.3)

1.4.5 Additional reports referred to in preparation of the TA are available at:

- Baseline - Traffic surveys (Application Document Reference 5.4.19.1)
- Re-survey - May 2022 traffic surveys (Application Document Reference 5.4.19.2)
- Recreational user counts (Application Document Reference 5.4.19.4)
- Traffic flow diagrams (Application Document Reference 5.4.19.5)
- Junction Capacity Reports (Application Document Reference 5.4.19.6)

1.5 Study area

1.5.1 The study area for the TA is shown in Appendix A, Figure A.2. This includes the existing Cambridge WWTP, the Waterbeach Water Recycling Centre (WRC), the final effluent transfer pipelines, the transfer tunnel, new access and area of land required for the landscape masterplan.

1.5.2 The study area follows the construction route and encompasses the local and strategic road network, the existing public transport infrastructure, and network of public rights of way (PRoW) in the vicinity of, or within settlements. For the local and strategic road network, this includes:

- junction 33 (The Milton Interchange) of the A14;
- junction 34 of the A14;
- the A14, where appropriate;

- the A10, where appropriate;
- Milton Road;
- Green End Road;
- Fen Road;
- Horningsea Road;
- all roads in Waterbeach that are part of the construction route; and
- Clayhithe Road.

1.5.3 The study area for Traffic and transport includes the local and Strategic Road Network, the existing public transport infrastructure, and network of PRoW in the vicinity of, or within settlements. The extent of the traffic and transport study area was agreed with CCC and National Highways via the Transport Assessment Scoping Note submitted in April 2021.

1.6 Scoping and report structure

1.6.1 The scope and assessment methodology of this TA has been discussed with transport officers from Cambridgeshire County Council (CCC).

1.6.2 The meetings held with CCC were as part of the Traffic Working Group (TWG) or specific issue related meetings with CCC and other stakeholders as required and were held on the following dates:

- 4 March 2021
- 13 April 2021
- 26 April 2021
- 26 May 2021
- 27 May 2021
- 6 October 2021
- 4 November 2021
- 27 January 2022
- 25 March 2022
- 28 April 2022
- 28 April 2022
- 23 June 2022
- 30 June 2022

1.6.3 For more detail on comments raised the ES Chapter 19 for Traffic and Transport (Application Document Reference 5.2.19), section 1.5 Consultation should be referred to.

1.6.4 The following comments and suggestions were made as a result of these discussions:

- The TA should be clear on the parameters and factors which informed the trip generation and traffic assignment.
- The distribution of trips to and from the Proposed Development should be detailed in the TA.
- Any mitigation measures should be highlighted in the TA, included those relating to Non-Motorised Users (NMUs), as well as any mitigation for traffic as required.
- For the baseline traffic conditions, the TA will need to refer to the Greater Cambridge Partnership (GCP) proposals for the greenway network.

1.6.5 This TA is structured ~~as follows:~~and content is summaries in Table 1-1~~Table 1-1~~.

- ~~Section 2 provides information on the development proposals, construction programme and access, operational access and parking, operational working hours and vehicle movements, and proposed mitigation measures.~~
- ~~Section 3 provides a summary of national, regional, local, and emerging planning and transport policy to the relevant Proposed Development. This section will also assess how the relocation of the CWWTP aligns with national and local policies, guidance, and best practice.~~
- ~~Section 4 provides an overview of the existing transport infrastructure and services and provides information on the current travel conditions within the study area. This also includes reviews Personal Injury Collision (PIC) data, obtained from CCC, for the roads local to the site for the most recent 5-year period. This section will include a review of PIC data to determine if further road safety measures will need to be considered as part of the development proposals.~~
- ~~Section 5 provides an overview of the survey methodology and summarises the traffic flows for the existing 2021 baseline~~
- ~~Section 6 provides information on other committed developments in the area.~~
- ~~Section 7 details the trip generation for the Proposed Development and rationale behind the reassignment of vehicular trips to the local road network during construction and decommissioning.~~
- ~~Section 8 details the trip generation for the Proposed Development and rationale behind the reassignment of vehicular trips to the local road network during operation.~~

- ~~Section 9 presents the result of the junction modelling assessment with and without the Proposed Development for future years.~~
- ~~Section 10 outlines the mitigation measures part of the Proposed Development.~~

~~Section 11 presents the summary and conclusion of the TA.~~

Table 1-1: TA structure and content

Section	Content	Related Appendices
2	Proposed Development o~~o~~verview- Provides information on the development proposals, construction programme and access, operational access and parking, operational working hours and vehicle movements, and proposed mitigation measures	• Appendix A • Appendix G • Appendix J
3	Policy R~~r~~eview - Provides a summary of national, regional, local, and emerging planning and transport policy to the relevant Proposed Development. This section will also assess how the relocation of the CWWTP aligns with national and local policies, guidance, and best practice	
4	Existing networks and baseline traffic conditions- Provides an overview of the existing transport infrastructure and services and provides information on the current travel conditions within the study area. This also includes reviews Personal Injury Collision (PIC) data, obtained from CCC, for the roads local to the site for the most recent 5-year period. This section will include a review of PIC data to determine if further road safety measures will need to be considered as part of the development proposals.	• Appendix A • Appendix D • Appendix F
5	Existing T~~t~~raffic F~~-f~~lows - Provides an overview of the survey methodology and summarises the traffic flows for the existing 2021 baseline	• Appendix A • Appendix E • Appendix I • Appendix L
6	Committed D~~-d~~evelopments- provides information on other committed developments in the area considered in the assessment	
7	Trip Generation, D~~d~~istribution, and A~~a~~ssignment D~~d~~uring C~~c~~onstruction Trip generation for the Proposed Development and rationale behind the reassignment of vehicular trips to the local road network during construction.	• Appendix A • Appendix K

1.1 Project elements

1.1.1 Appendix A, Figure A.1 illustrates the scheme order limits that encompasses all the project elements and the construction routes for vehicles.

1.1.2 Table 2-1~~Table 2-1~~ provides an overview of the project elements and traffic and transport receptors.

1.1.3 Appendix A, Figure A.1 illustrates the scheme order limits that encompasses all the project elements and the construction routes for vehicles.

Table 1-2: Summary project elements and traffic and transport receptors

Project element	Description	Traffic and transport receptors
Land required for the construction of the Waterbeach Pipeline	The Waterbeach transfer pipeline is proposed to run south from an area close to the existing Waterbeach WRC, under the existing Fen line railway and River Cam to the northern boundary of the proposed WWTP and on to the existing Cambridge WWTP passing under the A14, the River Cam and the existing Fen line railway. It crosses existing farm tracks and PRoW, ditches and passes under Horningsea Road. During construction it will be accessed at locations in Waterbeach, Clayhithe and the Chesterton area and near to Horningsea and Fen Ditton settlement.	Users of construction access routes Users of farm tracks and PRoW Users of Low Fen Drove Way
Land required for the construction of the Transfer tunnel	Wastewater will be transferred from the existing Cambridge WWTP using a new tunnel constructed from an interception point at the existing Cambridge WWTP to the proposed Cambridge WWTP. The waste water transfer tunnel is proposed to extend eastwards from the existing Cambridge WWTP to the proposed WWTP, crossing below the existing railway line, National Cycle Route 11, the River Cam, B1047 Horningsea Road and the A14 along its route. This will require construction activity within the existing Cambridge WWTP, land between the River Cam and Horningsea Road and the land required for the construction of the proposed WWTP. The existing Cambridge WWTP is located north east of Cambridge, bordered to the north by the A14, to the east by the railway line and to the south and west by other commercial land uses. Access to the existing Cambridge WWTP is from Cowley Road, which connects to the A1309 (Milton Road) approximately 400m to the south of junction 33 of the A14 (The Milton Interchange). Passing underneath the railway line will require The Applicant to enter into a Basic Asset Protection Agreement (BAPA) with Network Rail.	Users of construction access routes Users of farm tracks and PRoW Users of Milton Road Users of Cowley Road

Project element	Description	Traffic and transport receptors
Land required for the proposed WWTP, permanent accesses and landscape masterplan	The main development site (also referred to as "the site") is located to the north-east of Cambridge and 2km to the east of the existing WWTP. It is situated on farmland immediately north of the A14 and east of the B1047 Horningsea Road in the green belt between the villages of Horningsea to the north, Stow Cum Quy to the east and Fen Ditton to the south east. Two overhead lines of pylons cross the northern and eastern edges of the main development site and come together with a third line at the north eastern corner of the site. The site is bounded by the A14, Horningsea Rd and Low Fen Drove Way. The area is currently accessed from the Low Fen Drove Way using a single lane access track. This track is unsuitable for heavy construction traffic.	Users of construction access routes Users of Low Fen Drove Way Users of Horningsea Road
Land required for the treated effluent pipelines and outfall	Treated effluent pipelines are required from the location of the proposed WWTP to a new outfall l on the east bank of the River Cam just upstream of the A14. The treated effluent pipeline corridor extends west from the boundary of the land required for the proposed WWTP, crossing Horningsea Road in open cut and running parallel to the A14 to a section of the River Cam directly north of the A14 bridge, upstream of Baits Bite Lock. The construction corridor is in the field to the south of the driveway to Biggin Abbey. It crosses PRoW 85/6 and 85/8. The River Cam navigation is an important and well-used resource, uses by rowers, punters, boaters, and canoers.	Users of Horningsea Road Users of PRoW 85/6 and 85/8
Decommissioning of the existing WWTP	Decommissioning will take place at the existing Cambridge WWTP, starting in late 2027 and nearing completion in 2028. The activities required to decommission the existing WWTP for the purpose of permit surrender, require varying volumes of vehicle movements and staff to be present on site. The existing WWTP will be accessed via Cowley Road, via the existing WWTP access.	Users of Cowley Road

2 Proposed Development Overview

2.1.1 A detailed description of the Proposed Development can be found in Chapter 2: Project Description of the Environmental Statement (Application Document Reference 5.2.2).

2.1.2 The following section provides a summary of information pertinent to the TA.

2.2 Project elements

2.2.1 Appendix A, Figure A.1 illustrates the scheme order limits that encompasses all the project elements and the construction routes for vehicles.

2.2.2 Table 2-1~~Table 2-1~~ provides an overview of the project elements and traffic and transport receptors.

2.2.3 Appendix A, Figure A.1 illustrates the scheme order limits that encompasses all the project elements and the construction routes for vehicles.

Table 2-1: Summary project elements and traffic and transport receptors

Project element	Description	Traffic and transport receptors
Land required for the construction of the Waterbeach Pipeline	The Waterbeach transfer pipeline is proposed to run south from and area close to the existing Waterbeach WRC, under the existing Fen line railway and River Cam to the northern boundary of the proposed WWTP and on to the existing Cambridge WWTP passing under the A14, the River Cam and the existing Fen line railway. It Ccrosses existing farm tracks and PRoW, ditches and passes under Horningsea Road. During construction it will be accessed at locations in Waterbeach, Clayhithe and the Chesterton area and near to Horningsea and Fen Ditton settlement.	Users of construction access routes Users of farm tracks and PRoW Users of Low Fen Drove Way
Land required for the construction of the Transfer tunnel	Wastewater will be transferred from the existing Cambridge WWTP using a new tunnel constructed from an interception point at the existing Cambridge WWTP to the proposed Cambridge WWTP. The waste water transfer tunnel is proposed to extend eastwards from the existing Cambridge WWTP to the proposed WWTP, crossing below the existing railway line, National Cycle Route 11, the River Cam, B1047 Horningsea Road and the A14 along its route. This will require construction activity within the existing Cambridge WWTP, land between the River Cam and Horningsea Road and the land required for the construction of the proposed WWTP. The existing Cambridge WWTP is located north east of Cambridge, bordered to the north by the A14, to the east by the railway line and to the south and west by other commercial land uses. Access to the existing Cambridge WWTP is from Cowley Road, which connects to the A1309 (Milton Road) approximately 400m to the south of junction 33 of the A14 (The Milton Interchange). Passing underneath the railway line will require The Applicant to enter into a Basic Asset Protection Agreement (BAPA) with Network Rail.	Users of construction access routes Users of farm tracks and PRoW Users of Milton Road Users of Cowley Road

Project element	Description	Traffic and transport receptors
Land required for the proposed WWTP, permanent accesses and landscape masterplan	The main development site (also referred to as "the site") is located to the north-east of Cambridge and 2km to the east of the existing WWTP. It is situated on farmland immediately north of the A14 and east of the B1047 Horningsea Road in the green belt between the villages of Horningsea to the north, Stow Cum Quy to the east and Fen Ditton to the south east. Two overhead lines of pylons cross the northern and eastern edges of the main development site and come together with a third line at the north eastern corner of the site. The site is bounded by the A14, Horningsea Rd and Low Fen Drove Way. The area is currently accessed from the Low Fen Drove Way using a single lane access track. This track is unsuitable for heavy construction traffic.	Users of construction access routes Users of Low Fen Drove Way Users of Horningsea Road
Land required for the treated effluent pipelines and outfall	Treated effluent pipelines are required from the location of the proposed WWTP to a new outfall l on the east bank of the River Cam just upstream of the A14. The treated effluent pipeline corridor extends west from the boundary of the land required for the proposed WWTP, crossing Horningsea Road in open cut and running parallel to the A14 to a section of the River Cam directly north of the A14 bridge, upstream of Baits Bite Lock. The construction corridor is in the field to the south of the driveway to Biggin Abbey. It crosses PRoW 85/6 and 85/8. The River Cam navigation is an important and well-used resource, uses by rowers, punters, boaters, and canoers.	Users of Horningsea Road Users of PRoW 85/6 and 85/8
Decommissioning of the existing WWTP	Decommissioning will take place at the existing Cambridge WWTP, starting in late 2027 and nearing completion in 2028. The activities required to decommission the existing WWTP for the purpose of permit surrender, require varying volumes of vehicle movements and staff to be present on site. The existing WWTP will be accessed via Cowley Road, via the existing WWTP access.	Users of Cowley Road

2.3 Construction route

2.3.1 Construction vehicle movements will use the following roads, that are also illustrated in Appendix A, Figure A.2 (Construction Access).

- The A14 to access junction 33 (the Milton Interchange) and junction 34 (Horningsea Road);
- The A10, to access Denny End Road and Car Dyke Road junctions for Waterbeach;
- Milton Road;
- Green End Road;
- Water Street;
- Water Lane;
- Fen Road;
- Cowley Road;
- B1047 Horningsea Road;
- Clayhithe Road;
- Station Road;
- Burgess's Drove;
- Long Drove;
- Bannold Road;
- Bannold Drove;
- Denny End Road; and
- Car Dyke Road.

2.3.2 There will be various construction access points to the Proposed Development whilst it is under construction. The access routes and main construction access points are illustrated in Appendix A. Construction access points correspond to locations where construction traffic will be accessing the works corridor from. The access points will not all be used simultaneously; instead, construction traffic will access these points using a phased approach for the entirety of the construction programme. The phased approach is outlined in Section 4.1 (Construction phasing and sequence of assembly) in Chapter 2: Project Description of the Environmental Statement (Application Document Reference 5.2.2). The only junction access point that requires assessment is the proposed site access at junction 34 Horningsea Road, with analysis contained in Section 9. A full set of access points plans can be found on the Access and Traffic Regulation Order Plans (Application Document Reference 4.7).

2.3.3 A commitment was made in Phase 2 Consultation (Appendix J: Consultation 2 Stakeholder Feedback) for construction traffic to avoid travelling through the settlement of Horningsea along Clayhithe Road. This commitment sits within the CTMP, available at Application Document Reference 5.4.19.7.

2.3.4 The CTMP also ensures that construction traffic will not travel along the construction route during three peak periods:

- 08:00-09:00;
- 15:00-16:00; and
- 17:00-18:00.

2.3.5 Impacts and likely significant effects associated with the construction route have been assessed in Chapter 19 of the ES. The management of construction impacts have been identified within the CTMP, which provides a rationale for the preferred construction vehicle routing option, and the CoCP, which outlines the construction work hours.

2.3.6 The generation of construction vehicle traffic is dependent on the construction phasing programme shown in Section 4.1 (Construction phasing and sequence of assembly) in Chapter 2: Project Description of the Environmental Statement (Application Document Reference 5.2.2). as vehicle movements vary between access points and the type of construction activity being carried out.

2.3.7 A review of existing baseline traffic flow and the indicative construction peak flow has been undertaken and is summarised in Section 4 (Existing Networks and Baseline Transport Conditions ~~Existing Networks and Baseline Transport Conditions~~), for the construction of the proposed WWTP and the transfer tunnel.

2.4 Construction programme

2.4.1 This section provides an overview of the construction programme and phasing approach used for the Proposed Development. Construction and associated decommissioning works are projected to start in 2024 and end in 2028.

2.4.2 Section 4.1 (Construction phasing and sequence of assembly) in Chapter 2: Project Description of the Environmental Statement (Application Document Reference 5.2.2) provides the expected construction programme. Detail on construction traffic assignment and routing during construction is provided in Section 7 (Trip Generation, Distribution, and Assignment During Construction).

2.4.3 The construction of the Proposed Development will be organised into a number of phases and works packages. These comprise:

- construction of the Waterbeach Pipeline;
- works set up in land required for the proposed WWTP and enabling works;
- earthworks and creation of the earth bank;

- construction and assembly such as buildings, structures, process equipment, tunnels and pipework, vents, drainage;
- laying transfer pipelines and constructing the outfall;
- wet and dry commissioning of the proposed WWTP;
- decommissioning of the existing Cambridge WWTP, and Waterbeach WRC;
- laying a diversion of the Waterbeach Pipeline direct to the proposed WWTP and decommissioning the connection to the existing Cambridge WWTP; and
- landscaping works including planting and creation of recreational paths and cycle ways.

2.4.4 For the purposes of the transport assessment these packages of work are covered by the three defined projects ~~elements;~~elements: the proposed WWTP (including FE pipeline and outfall), Transfer Tunnel and Waterbeach Pipeline.

Proposed WWTP

2.4.5 Construction of the proposed WWTP is expected to begin in Year 1 (assumed to be 2024) and will last 44 months, with peak construction activity taking place in Year 3 (assumed to be 2026).

2.4.6 The access road to the proposed WWTP site will be built prior to the main WWTP works commencing. This will require:

- Up to 5 months in Year 1 (assumed to be 2024) for the construction of the temporary access which will enable the construction of the permanent access, on B1047 Horningsea Road (access point CA6); and
- Up to two months in Year 3 of construction (assumed to be 2026) for the access road finishing works, connecting to the B1047 Horningsea Road (access point CA6);

Treated effluent pipelines and outfall

2.4.7 The construction of the treated effluent pipeline is expected to take approximately nine months scheduled to commence in 2026. A section of the pipeline will be constructed across Horningsea Road, north of junction 34 of the A14 (access point CA6). The construction works across Horningsea Road is expected to last around one month.

Transfer Tunnel

2.4.8 Construction of the proposed Transfer Tunnel is expected to begin in Year 1 of construction (assumed to be 2024) and will last 24 months, with peak construction activity taking place in Year 3 of construction (assumed to be 2026).

2.4.9 Construction access for the transfer tunnel is primarily via the A14, junction 34 and B1047 Horningsea Road. Construction access to the existing WWTP at Cowley Road is also required for access to the tunnel route.

Waterbeach pipeline construction

2.4.10 Construction of the Waterbeach Pipeline will last up to 12 months in Year 1 (assumed to be 2024).

2.4.11 Temporary access to the construction compounds will be from the adopted road network along existing farm and field access tracks.

2.4.12 The associated construction activities are detailed in Table 2-2~~Table 2-2~~ for construction work related to the Waterbeach Pipeline.

Table 2-2: Large vehicle/HGV movements associated with the Waterbeach Pipeline (two way)

Construction activity	Duration
Deliveries of hardstanding, pipe sections, pipe rings, plant and machinery and compound equipment i.e., site cabins etc.	8 weeks
Deliveries of specific infrastructure requirements i.e., kiosks/pumps, removal of spoil from excavations	35-44 weeks
Removal of hardstanding, plant and machinery, compound equipment i.e., site cabins etc.	8 weeks

Source: Chapter 2 of the Environmental Statement, Table 4-6

2.4.13 The construction activities required for the Waterbeach Pipeline are sequential and will begin in the settlement of Waterbeach and the areas surrounding Clayhithe Road (access points COA19-CA10). As construction progresses, construction vehicles will also head south to build out the pipeline and access the works corridor via access points CA2-CA1. Access point locations are shown in Appendix A, Figure A.2.

2.4.14 In relation to the overall construction programme, the construction of the Waterbeach Pipeline occurs prior to the construction of the proposed WWTP, the transfer tunnel and the treated effluent pipelines and the outfall.

2.5 Construction access

2.5.1 In addition to construction of the permanent access into the land required for the proposed WWTP there are other construction access points needed. These are described in the following section and illustrated in Appendix A, Figure A.3 to Figure A.6.

Access to the proposed WWTP for construction and operation

2.5.2 The worksite and access points for the proposed WWTP is illustrated in Appendix A, Figure A.3.

2.5.3 The access to the proposed WWTP will be via an additional arm to the existing signalised junction on B1047 Horningsea Road. This adds a new section of road approximately 0.6km in length leading to the Gateway Building and Main Site Entrance. This access road will have proposed width of 7.3m, which is sufficient to accommodate HGVs.

2.5.4 The proposed permanent vehicular access will be constructed at the start of the construction phase to provide a dedicated access for construction and then operation. This is expected to take around five months. Before this permanent access is completed, a temporary construction access will be required (included within the four-month construction duration).

2.5.5 The temporary construction access will be via Horningsea Road using the existing Low Fen Drove Way to access a temporary construction compound. This temporary construction access will use the existing junction of Horningsea Road and Low Fen Drove Way. The temporary access will be designed to segregate vehicles (delivery vehicles, private cars, and HGV) from pedestrians, cyclists, and equestrians.

2.5.6 Temporary traffic management measures on Horningsea Road will be put in place during construction of the permanent access road and final effluent pipeline. This is likely to involve short term control by temporary signals on the B1047 Horningsea Road for safe construction activities. There may be a requirement for short term road closures (and associated diversion routing) on Horningsea Road for specific construction activities, although these would be kept to a minimum. Any road closures will be planned to avoid the construction working hours of the land required for the construction of the proposed WWTP. Access along the existing footway/cycleway on Horningsea Road is to be maintained through the construction phase.

2.5.7 The proposed access to the land required for the proposed WWTP is as follows:

- Vehicle movements from the east towards the proposed WWTP - to exit at junction 33 (A10), traverse Milton interchange, re-join A14 eastbound, exit Junction 34 (Fen Ditton), then follow the straight movement from exit slip road into the reconfigured 4 arm signalised junction; and
- Vehicle movements from the west towards the proposed - exit Junction 34 of the A14 (Fen Ditton), then a straight movement from exit slip road into the reconfigured 4 arm signalised junction.

2.5.8 Once the permanent vehicular access is constructed, this would mean that:

- construction traffic will not travel northwards on Horningsea Road to access Low Fen Drove Way from junction 34 of the A14; and
- construction traffic accessing the area of land required for the proposed WWTP from the A14 off-slip will proceed straight across B1047 Horningsea Road under signal control.

2.5.9 At the proposed 4 arm signalised junction on Horningsea Road forming the new access to proposed WWTP, the physical layout (kerbs, traffic islands, etc) have been designed to deter certain turning movements:

- Right turn for northbound traffic on Horningsea Road into site
- Left turn for southbound traffic on Horningsea Road into site
- Right turn for site traffic exiting the CWWTW onto Horningsea Road.

2.5.10 The principal reason for the restrictions designed into the four-arm junction on Horningsea Road is to avoid additional HGV movements to and from Horningsea and Fen Ditton and encouraging adherence to construction access routes. This is based on the very early public commitment to avoid these villages ~~[COM060 in the commitment register but the Commitment Location source not indicated]~~, and to ensure construction vehicle movements use the agreed site access routes (to / from A14 and associated slip roads, and a very short section of Horningsea Road between the two existing signalised junctions).

2.5.11 An assessment of the proposed permanent access has been carried out using predictive modelling (LinSig V3). The model outputs are available in the Section 9.5 (Permanent access: modelled years 2021, 2026, 2028, 2033 and 2038 ~~Permanent access: modelled years 2021, 2026, 2028, 2033 and 2038~~).

2.5.12 In addition to the proposed permanent access road off Horningsea Road, and associated works to the existing signalised junction to form the new access, the proposals include mitigation measures to improve access for pedestrians and cyclists in the area, described in Section 2.8~~2.8~~~~2.7~~

Access to the area of land required for the construction of the Waterbeach Pipeline

2.5.13 Access to the land for construction of Waterbeach Pipeline is required from the following sections of road:

- north of Waterbeach from Bannold Drove, Bannold Road, Burgess Drove and Long Drove.
- To the south of Waterbeach access to the land is needed from Clayhithe Road, and Hatridge's Lane.
- Access to land is needed from north of the A14 on Horningsea Road to just south of Horningsea and south from B1047 Horningsea Road to just north of Fen Ditton,
- Cowley Road and Fen Road

2.5.14 There are access points shown in Appendix A, Figure A.4 and Figure A.5 that illustrate the northern section and southern section of the pipeline respectively.

Access to land required for the construction of the treated effluent pipelines and outfall

2.5.15 In addition to construction of the permanent access into the land required for the proposed WWTP, a construction crossing will be established across ~~the~~ Horningsea

Road to link the land required for the proposed WWTP to the land required for the construction of the treated effluent pipelines and the outfall. Appendix A, Figure A.3 illustrates where the treated effluent pipeline runs from the proposed WWTP site east, across Horningsea Road and to the River Cam.

2.5.16 This crossing would be in use for up to 4 months to cover the duration of the works to construct the treated effluent pipeline and outfall and to create the new ditch habitat.

2.5.17 This crossing will operate whilst the treated effluent pipelines and the outfall are constructed. Traffic management in the form of temporary signal control and lane narrowing will be required during the laying of the treated effluent pipeline across Horningsea Road.

Access to land required for the construction of the Transfer tunnel

2.5.18 Access would be made off the B1047 Horningsea Road to land to the west to continue pipeline from the proposed WWTP and east to access shaft 4 and 5 (access point CA2 and CA3). These would be the main access points used for the delivery of materials and workforce. Appendix A, Figure A.5 illustrates the access points on the B1047 Horningsea Road and show the transfer tunnel and shafts located between the proposed WWTP and the existing WWTP.

2.5.19 Additional access points needed for small scale works would be COA2 and OA2. These are needed to help create working areas and other access points and would not be used for deliveries.

Access to the existing Cambridge WWTP for construction and decommissioning activities

2.5.20 Access to the existing Cambridge WWTP would be through the established access point on Cowley Road. This is illustrated in Appendix A, Figure A.6.

2.5.21 Vehicle movements associated will access and egress the existing Cambridge WWTP via Cowley Road using the existing WWTP access (access point COA1) for the duration of the decommissioning phase.

Decommissioning

2.5.22 Decommissioning activities will be required at the existing WWTP. In line with the delivery pattern for the existing Cambridge WWTP, 10% of all decommissioning traffic has been assumed to originate from the east and 90% from the west of the Milton Interchange (junction 33 of the A14) to access the existing WWTP via Cowley Road.

2.5.23 The decommissioning phase has been set as part of the construction phase and therefore falls under the requirements set out by the CTMP (Application Document Reference 5.4.19.7). Construction vehicles, including decommissioning vehicles, may not travel during the peak periods, identified as:

- 8:00-9:00;

- 15:00-16:00; and
- 17:00-18:00.

Access points for each structure's work site in construction

2.5.24 Following the completion of the PEIR, there have been a number of refinements to the proposed access point locations. The traffic and transport study area has therefore been revised to consider these amendments. The amendments are summarised in Table 2-3 below.

Table 2-3 Amendments to access points

Old access point number/reference	New reference	Location
14	COA1	Cowley Road access point
13	CA1	Fen Road
12	CA2 / CA3	B1047 Horningsea Road
11	n/a	Main access
10	C0A3 / CA10	Low Fen Drove Way
9	CA16	Horningsea Road layby area
8	COA9	Grange Farm Access
7	C0A20	Hatridge's Lane
6	COA14	Burgess Drove (*southern end by level crossing*)
5	CA26	Burgess Drove *(western side)*
4	COA13	Burgess Drove (*eastern side)*
3	COA14	Bannold Road
2	CA29	Long Drove
1	COA17 – COA18	Bannold Drove

2.5.25 There are additional access points to those set out in Table 2-3. These are access points for small scale works that would be of limited duration and of negligible impact to the highway network and users of the road and footway in those areas. Further detail can be found on the Access and Traffic Regulation Order Plans (Application Document Reference 4.7) for all the access point locations.

2.5.26 Swept path drawings for each access point location are available in Appendix G for the low loader and tipper (HGV) vehicle types and LGVs. The CTMP sets out a requirement for traffic marshals to be appointed by the Principal Contractor to manage the safe movements of construction vehicles into and out of the access points where appropriate. Through this measure, no two construction vehicles would access and egress the access points at the same time, therefore avoiding any potential vehicle tracking conflicts coming from restrictive road widths.

Active travel measures in construction

2.5.27 The construction worker travel plan will require the workforce to be aware of sustainable travel options prior to their first visit to the site and throughout the construction period.

2.5.28 In addition to making the workforce aware of sustainable travel options, restrictions on parking for private vehicles and contractual obligations to car share will also be imposed.

2.5.29 Full details can be found in the Construction Workers Travel Plan contained in Application Document Reference 5.4.19.9.

2.6 Operational access and parking

2.6.1 This section describes access to the proposed WWTP, operational network within the proposed WWTP, access to areas of the Proposed Development beyond the proposed WWTP, parking provision, and active travel provision.

Internal road network of the proposed WWTP

2.6.2 Access to the proposed WWTP will be via the proposed access road from Horningsea Road, which leads to the Gateway Building car park and the Main Site Entrance. Within the WWTP operational area, a perimeter road is proposed which will run along the internal boundary of the site within the raised embankments. This will provide access to other internal roads, allowing for vehicular access to different areas of the plant for operational purposes.

2.6.3 At the proposed 4 arm signalised junction on Horningsea Road forming the new access to proposed WWTP, the physical layout (kerbs / traffic islands etc) have been designed to deter certain turning movements:

- Right turn for northbound traffic on Horningsea Road into site
- Left turn for southbound traffic on Horningsea Road into site
- Right turn for operational traffic exiting the CWWTW onto Horningsea Road.

2.6.4 The principal reason for the restrictions designed into the four-arm junction on Horningsea Road is to avoid additional HGV movements to and from Horningsea and Fen Ditton and encouraging adherence to operational access routes.

2.6.5 The design of the internal road network has taken account of all operational requirements and provide suitable vehicular access including appropriate turning areas and hard standing areas for a properly functioning and safe site.

2.6.6 Roads (including turning areas) with heavy vehicle movements will be of a concrete construction. Roads where vehicle movements are deemed to be lighter and do not require containment are likely to be of a permeable material construction (block paving or similar). Car parking areas are likely to be constructed either with a heavy-duty permeable block paving or a grass reinforcement system base.

Parking in operation

2.6.7 Within the South Cambridgeshire Local Plan 2018 (South Cambridgeshire District Council, 2018), indicative parking standards for Use Class Order B1 Business and Use Class Order B2 General Industrial are set out under Policy TI/3. These standards provide a guide to developers as part of a design-led approach whereby car parking provision is tailored to reflect the specific development in terms of its location (whether there are local services available which may reduce the need to travel long distances by car), the density of development, the mix of uses proposed, together with consideration of any 'smart' measures being incorporated into the development, (such as car clubs), which may reduce the level of need for private car parking. The standards set out in Policy TI/3 determine that indicative parking provision of 76 parking spaces to serve both the Gateway Building and Workshop Building. At least 5% of the total number of car parking spaces should be reserved for people with disabilities

2.6.8 A total of 71 parking spaces are proposed to serve the Gateway and Workshop Buildings, which is below the indicative standards outlined in Policy TI/3. Of this total, 4 spaces will be set aside for people with disabilities in line with the disabled parking standards.

2.6.9 The provision of electric vehicle charging points as part of any proposed development is encouraged by South Cambridgeshire District Council as set out in set out under Policy TI/3 of the South Cambridgeshire Local Plan 2018; however, no specific electric vehicle charging standards are currently set out. The new Greater Cambridge Local Plan, currently in the First Proposals preferred options consultation stage, will set out future standards for electric vehicle charging within both South Cambridgeshire and Cambridge (Greater Cambridge Shared Planning, 2022). Policy I/EV (Parking and Electric Vehicles) states that for employment land uses, 30% of parking spaces should be provided with active charge points (minimum of 7kW), and 30% with passive provision for charge points. Therefore, the proposed WWTP site will have provision of 23 EV spaces. Passive provision for a further 30% at each location will be provided, as per the policy, and will be developed as part of the Travel Plan requirements.

Active travel measures in operation

2.6.10 Within the South Cambridgeshire Local Plan (South Cambridgeshire District Council, 2018) cycle parking standards for Use Class Order B1 Business and Use Class Order B2 General Industrial are set out under Policy TI/3. This corresponds to one secure cycle space per $30m^2$ GFA for Use Class Order B1 and one secure cycle space per $40m^2$ GFA for Use Class Order B2. Across both the Gateway Building (B1) and the Workshop Building (B2), this equates to a minimum standard of 50 cycle parking spaces.

2.6.11 It is proposed that 50 cycle parking spaces will be provided which will meet the standards set out in Policy TI/3. The usage of cycle spaces will be monitored through the Travel Plan annual review with CCC and AWS and increases to provision agreed through this process if demand exceeds the number of spaces provided.

2.6.12 In accordance Policy TI/3, cycle parking will be provided in convenient, secure location, and will be designed and located to minimise conflict between cycles, pedestrians, and vehicles. In accordance with the North East Cambridge Action Plan Policy 18, 10% of the cycle spaces will be designed to accommodate larger non-standard cycles, and charging points for electric bicycles will also be provided.

2.6.13 Encouraging remote working of staff where possible and reducing single occupancy car trips to and from the site through increased car sharing are two key objectives set out in the Operational Workers Travel Plan (Application Document Reference 5.4.19.8). As set out in the AWS Net Zero Strategy to 2030 (Anglian Water, 2021), AWS have looked at opportunities to reduce staff vehicle milage through investment in IT infrastructure to allow for more virtual meetings, and no longer expect staff to come into the office full time (Anglian Water, 2021).

Access to treated effluent tunnel and outfall

2.6.14 Permanent access to the outfall will be possible from either of the following options:

- access from the south, via the Horningsea Road and an existing track (running parallel to the A14), that serves Poplar Hall and provides track access to the Riverbank and to the field adjacent to the outfall; and
- access from the river, using barges/rafts or similar.

2.6.15 Permanent access to the treated effluent pipeline is not expected to be required however in the event access is required this will be via operational access point COA2 using the existing track that serves Poplar Hall and the route under the A14 to the outfall.

Access to transfer tunnel

2.6.16 The connection shaft for the transfer tunnel will be within the existing Cambridge WWTP site and will be a permanent surface feature to allow access for future maintenance activities.

2.6.17 The TPS within the proposed WWTP will also provide access at the terminus of the transfer tunnel.

Access points for each structure’s work site in operation

2.6.18 Following the completion of the PEIR, there have been a number of refinements to the proposed access point locations. A number of new access points have been added as the design has been developed and future operational requirements understood. These operational access points are required for ad hoc maintenance as and when required and consist of 1 or 2 transit van for to carry out the tasks required. The access points are summarised in Table 2-4 . Further detail can be found in the Access and Traffic Regulation Order Plans (Application Document Reference 4.7).

Table 2-4: Amendments to operation access points

Old access point number/reference	New reference	Location
14	COA1	Cowley Road access point
	OA1	Fen Road west side
	OA2	B1047 Horningsea Road eastern side
	COA2	B1047 Horningsea Road, west side, existing track
10	CO~~0~~A3	Low Fen Drove Way, at junction of Horningsea Road
	COA4	LFDW south side
	COA5	LFDW north side
	OA3	Track from Gayton Farm
	OA4	Clayhithe Road, by Gayton House, existing access track
	COA6	Horningsea Road (*opposite cemetery*)
	COA7	Access track east of OA3
	OA5	Layby on Clayhithe Road
	COA8	Track across from Grange Farm
8	COA9	Grange Farm Access
	OA6	Track access around Grange Farm
	COA10	Track access near COA8
	OA7	Hatridge's Lane (*near farm ~~access)~~access)*
7	~~COA20~~COA11	Hatridge's Lane
6	COA12	Burgess Drove (*southern end by level crossing*)
5	COA13	Burgess Drove *(eastern side)*
3	COA14	Bannold Road
	COA15	Bannold Drove, near railway lane
	COA16	Bannold Drove (*west side*)
1	COA17	Bannold Drove (*east side*)
	COA18	Waterbeach WRC

2.6.19 Swept path drawings for each access point location are available ~~in~~ in Appendix G.

2.6.20 For all operational access points, except the proposed WWTP permanent access road all operation all operational access points required transit van or similar sized vehicle access.

2.6.21 An OLTP would be required to set out a requirement for traffic marshals to be appointed by the Principal Contractor to manage the safe movements of operational vehicles into and out of the access points where appropriate. Through this measure, no two operational vehicles would access and egress the access points at the same time, therefore avoiding any potential vehicle tracking conflicts coming from restrictive road widths.

~~2.6.19 .~~

2.7 Operational working hours and vehicle movements

2.7.1 The proposed WWTP will be critical infrastructure and operate continuously. The operational vehicle movements will be similar to the existing Cambridge WWTP with the majority of vehicle movements will occur during the day time.

2.7.2 The maximum operational visits for staff are indicated in Table 2-5 below.

Table 2-5: Estimated operational visits associated with facility staff (two way)

Vehicle movement types	Vehicle movements per day (two way)	Frequency
Sludge technicians	4	Daily
Operations team	4	Daily
Maintenance technician	2	Mon-Friday
CHP technician	2	Mon-Friday
Cars	12	Daily
Chemical deliveries and other service vehicles	4	Daily
Office workers using the facility	60	Daily
Operational visitors to the WWTP	4	Daily
Total estimated small vehicles and van visits to the proposed WWTP	92	Daily

~~2.7.2~~2.7.3 Existing and future estimates of maximum number of HGV movements (two way) are outlined in Table 2-6. The future estimates are based on when the proposed WWTP is at full capacity. When the proposed WWTP is commissioned (i.e., year 1 of operation), it is likely that the traffic movements at that time will be similar to the existing Cambridge WWTP.

Table 2-6: Estimated future operational HGV movements (two way) at the proposed WWTP vs operational HGV movements (two way) at the existing Cambridge WWTP

Type	Average daily vehicle movements (two way)	
	Existing Cambridge WWTP	Proposed WWTP
Liquid sludge imports	57	62
Biosolids exports	10	10
Non-routine tanker movements	12	14
Septic waste movements	50	60
Total HGV movements	129	146

Source: Chapter 2:Project Description (Application Document Reference 5.2.2)

~~2.7.3~~2.7.4 Typically imports of sludge and waste water and exports (such as grit and bio solids) occur throughout the day but assuming a ten-hour period for tanker movements, the average hourly two-way flow would be 15 which is equivalent one tanker in each direction every 8 minutes.

Operational working hours

~~2.7.4~~2.7.5 The working hours for the site will be standard working hours for office-based staff, which is 09:00 to 18:00.

~~2.7.5~~2.7.6 The maintenance staff will work shift patterns that will cover a 24-hour period.

~~2.7.6~~2.7.7 HGV deliveries will typically arrive in standard working hours (09:00-18:00), however there will also be overnight deliveries that will account for around 30% of the total vehicle movements.

Occasional Operational Access Points

~~2.7.7~~2.7.8 All operational access points are only needed for ad hoc access. The type of vehicles needing access is one to two transit vans.

2.8 Mitigation measures

Principles of sustainable travel

2.8.1 The policy review summarised in Section 3~~3~~ sets out clear government objectives for delivering sustainable development, which requires the development to consider potential effects on the transport network and provide measures to not only mitigate adverse impacts but explore opportunities for sustainable transport modes.

2.8.2 Several of the long-term transport strategies for Cambridgeshire aim to promote the modal shift away from the use of private vehicles, maximising the capacity for walking, cycling, and public transport.

2.8.3 These principles are incorporated into the design of mitigation measures outlined below.

Pedestrian specific measures

2.8.4 The proposals will include a new shared-use path between Horningsea Road and the proposed site, including a new pedestrian crossing on Horningsea Road to allow pedestrians to access the proposed site from the existing shared-use path on Horningsea Road.

2.8.5 A new eastern footway on Horningsea Road will be provided to link the proposed site to Low Fen Drove Way.

2.8.6 The existing shared-use pedestrian and cycle path across the A14 road bridge will be widened to provide a better-quality route for pedestrians.

2.8.7 These measures will be delivered alongside improvements to the general permeability of the area for non-motorised users (NMUs) with additional PRoW from

Horningsea Road to Low Fen Drove Way, allowing for onward journeys to Fen Ditton via High Ditch Road and Stow cum Quy via Station Road.

Cycling specific measures

2.8.8 The proposals discussed above, including new shared-use path between Horningsea Road and the proposed site, and upgrades to the existing shared-use pedestrian and cycle path on Horningsea Road will also directly benefit cyclists travelling to and from the WWTP site.

2.8.9 These will be delivered alongside infrastructure measures outlined in the Operational Workers Travel Plan (Application Document Reference 5.4.19.8), such as 50 secure cycle parking spaces (including spaces for electric bikes and larger non-standard bikes) and associated showering and changing facilities.

Equestrian specific measures

2.8.10 As part of the proposals, A new bridleway from Low Fen Drove Way to Stow cum Quy via Station Road will be created, linking to the existing Byway Fen Ditton 14.

Public transport measures

2.8.11 The upgraded shared-use path on Horningsea Road, new pedestrian crossing, and the new footway created on the eastern side of Horningsea Road provides improved pedestrian accessibility to the local bus stops. Further, the new eastern footway between Low Fen Drove Way and the proposed site walking and cycling access point could be utilised for the provision of a new bus stop if required as part of future reviews of bus services.

Minimising journeys by private vehicles

2.8.12 Parking for the proposed WWTP will be provided in line with South Cambridgeshire parking standards set out in Policy TI/3 of the South Cambridgeshire Local Plan 2018 (South Cambridgeshire District Council, 2018). To encourage the shift to electric vehicles, 30% of the parking spaces will be provided with active charge points (minimum of 7kW), and 30% of spaces will have passive provision for future changepoint installation. This aligns with Policy I/EV (Parking and Electric Vehicles) of the future new Greater Cambridge Local Plan.

2.8.13 The improvements to NMU permeability around the site, alongside improvements to existing NMU facilities, and the creation of new NMU routes will encourage a greater modal shift to sustainable transport for those travelling to and from the WWTP site. This will be supported by infrastructure-based measures, organisational initiatives, and awareness raising measures set out in the Operational Workers Travel Plan (Application Document Reference 5.4.19.8), which also includes a Travel Plan target to reduce the mode split for single occupancy vehicle trips.

Supporting sustainable transport measures in the North Cambridge area

2.8.14 The proposed WWTP will help to support the policy objectives and measures outlined in key local transport policy in the South Cambridgeshire and Cambridge city areas.

2.8.15 The delivery of upgraded walking and cycling routes, including the new shared-use path between Horningsea Road and the WWTP, will help connect the site to the wider network such as the proposed Horningsea Greenway and Swaffhams Greenway (Greater Cambridge Partnership, 2021). The Horningsea Greenway will utilise the existing Fen Ditton to Horningsea Cycleway, providing an active travel route between Fen Ditton and Horningsea. As part of the proposed WWTP, the existing Horningsea Road cycleway will be upgraded near to the preferred site access junction to support the delivery of the Horningsea Greenway as and when it comes forward. The creation of a better cycling environment on Horningsea Road will help support the delivery of the Greenways along with the active travel policy objectives of the Cambridgeshire Long Term Transport Strategy (LTTS), the Transport Strategy for Cambridge City and South Cambridgeshire, The Cambridgeshire Local Transport Plan, and the North East Cambridge Area Action Plan (NECAAP).

2.8.16 Additionally, a number of measures will be put in place to make greener means of travel a more attractive and convenient alternative to private cars. Electric vehicle charging points are provided on site for the proposed WWTP in line with the National Planning Practice Guidance priorities. This can create the opportunity for deploying ultra-low emission vehicles for heavy goods delivery and long-term services as required in the Cambridgeshire and Peterborough Minerals and Waste Local Plan. The preparation of Construction Workers Travel Plan and Operational Workers Travel Plan also aims to reduce single occupancy vehicle travel by outlining the expected workforce locations and staff travel patterns. It can maximise the sustainable travel practices as outlined in the South Cambridgeshire Local Plan.

Primary (embedded) and tertiary mitigation (embedded)

2.8.17 Table 2-7 sets out the primary (embedded) and tertiary mitigation measures that will be adopted during the construction, operation, maintenance and decommissioning of the Proposed Development.

2.8.18 For traffic and transport, tertiary mitigation would take the form of specific measures secured by the appropriate permits and consents that delivers the mitigation. This would be required for construction work under railways, and rivers, and on highways for traffic control outside of the scheme order limits.

2.8.19 Anglian Water Services Limited ('The Applicant') has entered into a Basic Asset Protection Agreement (BAPA) with Network Rail, for locations where the construction of the Proposed Development would potentially interact with railways e.g., level crossings. Measures to prevent impacts to rail infrastructure are secured through the BAPA. The measures will include construction in line with approved method statements covering construction techniques, depths and monitoring.

Table 2-7 Primary mitigation measures

Mitigation measures	Applied to	Type	During	Justification
Pedestrian island crossing on Horningsea Road	Horningsea Road	Primary	Operation	This provides additional protection for pedestrians and cyclists crossing the road and ensures safe connection to shared footway. The traffic island prevents right-turns from the permanent site access road, which reduces potential conflicts at the A14 off-slip Road/Horningsea Road junction.
New footway section on the east side of Horningsea Road south of the junction with Low Fen Drove Way (Application Document Reference 4.11.1)	Horningsea Road	Primary	Operation	This improves the overall accessibility and connectivity of walking and cycling in the area, as well as provides more protection for pedestrians and cyclists on the east bank, where there is currently no walking and cycling path provision.
Speed control of the Horningsea Road between Fen Ditton and Horningsea	Horningsea Road	Primary	Construction and Operation	This improves overall road safety and comfort for pedestrians and cyclists making use of the shared footway.
Widening of the shared pedestrian / cycle path on the west side of Horningsea Road	Horningsea Road	Primary	Operation	This provides a more continuous connection through the cycle network on Horningsea Road.
Incorporation of a segregated pedestrian and cyclist access to the proposed WWTP	Proposed WWTP	Primary	Operation	This provides more protection for pedestrians and cyclists traveling to the proposed WWTP.
Inclusion of a temporary track adjacent to Hatridge's Lane for pedestrian access from Clayhithe Road to Clayhithe	Waterbeach Pipeline	Primary	Construction	Provides unhindered access to the users of Hatridge's Lane during construction.

Mitigation measures	Applied to	Type	During	Justification
farm (Works Plan 22 Access for Works Area 30)				
Temporary diversion of the PRoW 85/6 at the outfall works area using 85/8 and a temporary path to re-join the PRoW 85/6 upstream of the outfall works area	Outfall / Treated effluent pipeline works area	Primary	Construction	Provides temporary connectivity during construction of the outfall
Temporary junction control at selected roads within Waterbeach	Waterbeach junctions: • Bannold Road / Bannold Drove	Primary	Construction	These junctions are currently not wide enough for HGVs' turning movements and therefore require temporary control measures. More detail is available in Swept Path Analysis (Appendix G: Application Document Reference: 5.4.19.3).
Cycle parking provision for up to 50 bikes within the proposed WWTP. Provision to include for E-bikes and cargo bikes (or other over sized cycles as necessary).	Within the proposed WWTP	Primary	Operation	Provision is based on CCC's cycle parking guidance for new developments.
EV parking provision for up to 23 vehicles within the proposed ~~WWTP. With~~WWTP with passive provision for a further 23 EV spaces.	Within the proposed WWTP	Primary	Operation	Provision is based on CCC's EV parking guidance for new developments.
Permits and consents would be required for construction	Proposed Development	Tertiary	Construction	Required to gain the appropriate consents. The appointed contractor would be obligated to

Mitigation measures	Applied to	Type	During	Justification
work under railways, highways, and rivers, or those required for the stopping up or diversion of PRoW.				obtain all required permits and agreements and comply with any associated conditions.
Basic Asset Protection Agreement (BAPA)	Proposed Development - where the Proposed Development would potentially interact with railway (~~e.g.~~e.g., level crossings)	Tertiary	Construction	Required to gain the appropriate consents.

Details of proposed changes to Horningsea Road

2.8.20 The design of the access option has been subject to modelling to inform the design so that it integrates with the existing signalised junction. The proposed WWTP access road intends to facilitate the safe movement of HGVs, vehicles, cyclists, and pedestrians. In recognition of the potential impacts to the B1047 Horningsea Road, a series of embedded measures are proposed:

- design of the access so that it restricts the movement of operational vehicles to cross over the B1047 Horningsea Road between the two signalised junctions with the A14 slip roads;
- includes a segregated access for the movement of pedestrians and cyclists accessing the proposed WWTP;
- improvements to the existing shared pedestrian/cycleway by increasing with width of the route and the separation of the route from the carriageway of the B1047 Horningsea Road over the A14; and
- provision of an additional safe crossing location on the Horningsea Road for people who may wish to access the recreational features on the site or Low Fen Drove Way.

2.8.21 A residual benefit would be observed owing to the following enhancement measures are included within the design:

- pedestrian island crossing on Horningsea Road;
  - This would improve the ability for pedestrians to cross Horningsea Road safely by providing a refuge and improves connections to other walking routes in close proximity such as PRoW. This results in a residual benefit by improving the existing environment, which would decrease the effects of severance and fear and intimidation and would improve road safety.
- new footway section on the east side of Horningsea Road, south of the junction with Low Fen Drove Way;
  - The provision of a new section of footway on Horningsea Road between the main proposed WWTP and Low Fen Drove Way would improve walking and cycling connectivity and provide a safer walking and cycling environment. This results in a residual benefit by improving the existing environment, which would decrease the effects of severance and fear and intimidation and would improve road safety.
- speed control of the Horningsea Road between Fen Ditton and Horningsea;
  - Lowering traffic speeds would result in a safer and more welcoming environment for NMUs. Lower speeds would also potentially reduce the volume of accidents on the road. A residual benefit would be

observed as a result of decreasing the effects of fear and intimidation and would improve road safety.

- extension of the shared pedestrian / cycle path to the west of Horningsea Road.
  - This would provide an uninterrupted connection between the A14 off-slip and Biggins Lane to the greater walking and cycling network in proximity of the area and create a safer and more welcoming environment for NMUs. This results in a residual benefit by improving the existing environment, which would decrease the effects of severance and fear and intimidation and would improve road safety.

2.8.22 The above mitigation measures would reduce the likelihood of severance and fear and intimidation to pedestrians and cyclists through the wider footpath, speed restriction and provide additional safe crossing point between Horningsea Road and Low Fen Drove Way.

Secondary mitigation

2.8.23 Secondary measures related to the mitigation of traffic and transport related impacts are contained within the Construction Traffic Management Plan (CTMP) (Application Document Reference 5.4.19.7), the Code of Construction Practice Part A and B (Application Document Reference 5.4.2.1, 5.4.2.2), the Construction Worker Travel Plan (CWTP) (Application Document Reference 5.4.19.9), and the Operation Worker Travel Plan (OWTP) (Application Document Reference 5.4.19.8). In addition, an Operational Traffic Management Plan would be prepared post consent in relation to the management of operational traffic movements.

2.8.24 Table 2-8 provides a summary of the management plans which form part of the overall mitigation measures for the Proposed Development across construction, decommissioning, and operation.

Table 2-8: Management plans

Document	Purpose	Key measures
Code of Construction Practice Part A & B (Application Document Reference 5.4.2.1, 5.4.2.2)	Sets out best practice for construction	- Outlines construction working hours
Construction Traffic Management Plan (Application Document Reference 5.4.19.7)	Details the overall traffic management strategy for construction traffic.	- Commitment to not travel through the settlements of Horningsea and Fen Ditton - Commitment for construction vehicles to not travel during the AM and PM peak hours - Minimise disruption to PRoWs by implementing

Document	Purpose	Key measures
		controlled gated access or providing diversions
Construction Workers Travel Plan (Application Document Reference 5.4.19.9)	Details construction work and programme, site access requirements for staff, staff travel patterns and expected workforce locations	- Reduce single occupancy vehicle travel - Encourage sustainable travel
Operational Workers Travel Plan (Application Document Reference 5.4.19.8)	Details operation work and programme, site access requirements for staff, staff travel patterns and expected workforce locations	- Reduce single occupancy vehicle travel - Encourage sustainable travel

2.8.1 Specific measures in the CoCP, CTMP, CWTP relevant to traffic and transport are described below.

Construction

Code of Construction Practice

2.8.2 Section 5.10 (Working Hours) of Part A Table 5-1 sets out the working hour restrictions applied to the construction of the Proposed Development. This section also reinforces the commitment for ongoing communication in relation to works activities and timing.

2.8.3 Section 7.7 (Traffic and Transport) of Part A includes:

- measures for temporary traffic control during the construction period and restrictions on construction vehicle movements through the Fen Ditton and Horningsea;
- a requirement for all PRoW to be restored to the same condition as before the works took place or to a standard which is acceptable to the Local Highway Authority; and
- a requirement for the use of safety gates to be put in place and users allowed to safely cross the construction working area.

Construction Traffic Management Plan

2.8.4 Measures within the CTMP (Application Document Reference 5.4.19.7) include but are not limited to the following and are referred to in relation to all areas of the transport network potentially affected by the Proposed Development;

- section 4.2 (Access route strategy) which requires all deliveries will be made outside of peak hours (08:00-09:00, 15:00-16:00, and 17:00-18:00) unless it is determined to be essential that the delivery is to be completed during peak hours;

- section 5.2 (Temporary access points and construction road signage) which requires the use of temporary signage along all proposed construction haul roads. As a minimum this will include internal haul road speed limits, warning (hazard signs), potential vehicle or pedestrian crossing points, distances to destinations, height/width restrictions and passing places;
- section 6.3 (Adherence to Designated Routes) which includes a requirement for a strategy for reporting noncompliance as well as encouraging local residents to report HGV movements within villages (Fen Ditton and Horningsea);
- section 6.3 (Adherence to Designated Routes) and section 6.9 (Facilitate safe movement of users of the highway (including NMUs) requirement to provide connectivity/access to community facilities and residential properties during works;
- section 6.4 (Vehicle Scheduling) which requires adherence to works hours;
- section 6.5 (Deliveries) which requires the management of deliveries and a scheduling system to avoid AM PM peaks; and
- section 7.2 (Monitoring Strategy) requires that the Principal Contractor(s) to implement a system for monitoring the movement of vehicles associated with the construction of the Proposed Development. This will include the following;
  - documented pre-commencement meetings with the site management team as a contractual requirement;
  - active traffic management; and
  - FORS and CLOCS accreditation.

Abnormal loads

2.8.5 Section 4.2 (Access route strategy) which identifies the potential for conflict could as a result of an abnormal load accessing the land required for the proposed WWTP and the need for additional support in order to make the required turning movement from or onto Horningsea Road. It indicates that mitigation required to prevent impact on other users of the highway network would be temporary considered on an individual basis, including appropriate vehicle escort and marshalling where required and scheduled outside peak hours (i.e., school start and finishing times.

Horningsea and Horningsea Road

2.8.6 The following measures are of particular relevance to Horningsea and Horningsea Road:

- Section 4.2 (Access route strategy) which:

    - identifies the off and on slip of the A14 as a potential conflict area which may require traffic marshalling during peak hours;
    - recognises the potential conflict of site access points CA2/CA3 which will cross the existing footway / cycleway on the west side of Horningsea Road which may require marshalling during peak hours and/or traffic management measures to provide a safe crossing point for site traffic and pedestrians and cyclists; and
    - requires that all deliveries will be made outside of peak hours (08:00-09:00, 15:00-16:00, and 17:00-18:00) (unless it is determined to be essential that the delivery is to be completed during peak hours).
- Section 6.9 (Facilitate safe movement of users of the highway (including NMUs)) which:
    - refers to site access point COA3, CA6, CA2/CA3 which indicates the majority of the highway works can be carried out under TM that maintains vehicular access on Horningsea Road, under temporary signal control. And requires that the existing footway / cycleway to the west of the Horningsea Road carriageway will be maintained at all times with suitable barriers separating the footway from the works; and
    - requires that speed restrictions to Horningsea Road will be put in place for the duration of the works in accordance with the Temporary Traffic Regulation Order (TRO) (the detail of which will be subject to agreement with Cambridgeshire County Council and any other relevant stakeholders).
- Section 7.2 (Monitoring Strategy) requires that the Principal Contractor(s) implement a system for monitoring the movement of vehicles associated with the construction of the Proposed Development, which includes ANPR cameras along Horningsea Road.

Fen Ditton

2.8.7 The following measures are of particular relevance to Fen Ditton:

- Section 6.9 (Facilitate safe movement of users of the highway (including NMUs)) which:
    - indicates that for the temporary site access point COA3, CA6, CA2/CA3 (to access land required for the construction of the Transfer tunnel, shafts 4 and 5 and the southern section of Waterbeach Pipeline) the majority of highway works will be carried out under traffic management that maintains vehicular access on Horningsea Road, under temporary signal control;

  - requires the existing footway / cycleway to the west of the Horningsea Road carriageway to be maintained at all times with suitable barriers separating the footway from the works; and
  - recognises that there is no viable alternative route for pedestrians and cyclists from Horningsea to Fen Ditton (important as this is a route to Fen Ditton Primary School), and that any site crossing points on the footway will need to be controlled with suitable traffic management and traffic marshalls where appropriate.

Waterbeach and Clayhithe

2.8.8 The following measures are of particular relevance to roads in Waterbeach (Burgess's Drove, Bannold Drove, Bannold Road, Clayhithe Road):

- section 6.9 (Facilitate safe movement of users of the highway (including NMUs) which includes:
  - a requirement for speed restrictions to Burgess's Drove, Bannold Drove and Bannold Road as well as Clayhithe Road will be put in place in accordance with a temporary TRO which will be set out within the DCO;
  - a requirement to avoid HGV movements through Waterbeach during school drop-off and pick-up hours throughout term time; and
  - a temporary parking restriction on Bannold Road junction with Denny End Road / Car Dyke Lane.

Cowley Road

2.8.9 The following measure is of particular relevant to Cowley Road, section 4.2 (Access route strategy) which identifies the potential for conflict with the footpath/cycleway along Cowley Road which may require diversion and traffic management measures (subject to agreement with the Local Highway Authority (LHA) for pedestrians and other NMUs.

Construction Workers Travel Plan

2.8.10 The measures within the CWTP include:

- Management of the Travel Plan through the appointment of a Travel Plan Coordinator (TPC)
- Raising awareness of sustainable travel with welcome packs which will include:
  - A map showing the location of the development in relation to the local area, highlighting the nearby bus stops;
  - Bus and Train journey planners / apps;
  - A map showing local cycle routes; and

  - Information relating to traffic-related environmental concerns, congestion problems and car sharing to raise awareness.

- Promote walking through the TPC by implementing the following initiatives:
  - Raise awareness of the health benefits of walking through site inductions;
  - Provide details of local food outlets for lunch breaks, at induction;
  - Ensure that walking routes on site are well maintained and lit with any defects reported to the site manager;
  - Provide safe tool storage on site; and
  - Provide adequate welfare facilities on site, including showers and lockers.

- Promote cycling through the TPC by implementing the following initiatives: Provide a minimum of 40 safe secure cycle parking stands on site;
  - Ensure adequate welfare facilities on site, including showers and lockers, are available for use by staff arriving by non-motorised means;
  - Investigate the potential to set up a Bicycle User Group (BUG) or cooperate with an existing local group to encourage staff to cycle to work;
  - Promote the availability of cycling information, including route maps and useful tips and guidance through site inductions; and
  - Establish contact with local cycle shops to attract discounts on equipment.

- Developing personalised travel plans. The TPC would be responsible for providing staff with personalised travel plans.

- Promotion of car sharing schemes/initiatives through the TPC.

<u>Operation</u>

2.8.11 An Operational Logistics Traffic Plan and updated Operational Workers Travel Plan (~~framework OWTP provided in~~ Application Document Reference 5.4.19.8) will set out mitigation measures relating to vehicle movements associated with the operation of the proposed WWTP. The purpose of these is summarised below:

- Operational Logistics Traffic Plan: details the overall traffic management strategy for operational traffic; and

- Outline Workers Travel Plan: details operation work and programme, site access requirements for staff, staff travel patterns and expected workforce locations.

2.8.12 Post grant of the DCO and prior to commencement of operation, the framework OWTP will be updated. This will remain a 'live' document and periodically modified in line with the review cycles set out in the plan, including but not limited to an updated to incorporate the findings of a travel survey to be completed 6 months after the commencement of operation. The updated OWTP will be shared with CCC highways.

2.8.13 Operation and maintenance activities related to the proposed WWTP would be subject to operational management plans and procedures. The management plans and procedures will sit within the EMS required under the environmental permitting regime. These would be 'live' documents that identify the environmental risks and legal obligations associated with the operations of the Proposed Development once construction has been completed. These specify the management measures the operator will implement in order to prevent or minimise the environmental effects associated with the Proposed Development.

Secondary mitigation relevant to each phase of the Proposed Development

Construction

2.8.14 During the construction phase, the CoCP and associated management plans specify the range of measures to avoid and minimise impacts that may occur in construction.

- Section 3 of the CoCP, Community Consultation and Engagement, requires a proactive approach to communication with the local community and stakeholders. Through a Community Liaison Plan, the local community and stakeholders will be informed of the works taking place, including durations, particularly where these will involve works outside of the core working hours or impact community facilities and business and local infrastructure such as PRoW / cycleways.
- Section 5.10 of the CoCP, Working Hours Table 5-1, sets out the working hour restrictions applied to the Proposed Development. This section also reinforces the commitment for ongoing communication in relation to works activities and timings.
- Section 7.6 of the CoCP Part A (Application Document Reference 5.4.2.1), Traffic and transport, and the CTMP (Application Document Reference 5.4.19.7) contain measures pertaining to vehicle movements.

2.8.15 In addition to the CoCP, a CTMP has been developed. The CTMP secures the commitments in relation to the management of construction vehicle movements. The CTMP sets out the detailed management measures, procedures and best practices required for managing the impact construction traffic on the local and strategic road networks during the construction period.

2.8.16 A Community Liaison Framework Plan (Application Document Reference 7.8) sets out the approach to ongoing communication with residents, the community, and businesses, including communication in relation to traffic and transport matters.

2.8.17 A Construction Workers Travel Plan (CWTP, Application Document Reference 5.4.19.9) has also been developed to minimise the impact of staff during construction. These will include details on active travel initiatives, car-sharing schemes, and staff parking strategies.

Management of worksites

2.8.18 Abnormal loads would be subject to a mandatory permits and obligatory advance warning to relevant stakeholders such as the police, the highway authorities and bridge and structure owners such as Network Rail.

2.8.19 Under the environmental permit the imports of waste, including sludge from other sewage treatment would be considered as a Directly Associated Activities (DAA) and the movements of hazardous loads within the proposed WWTP would be subject to risk assessment as part of the permitting application. Spills from accidents within the proposed WWTP would be managed according to operating control plans also required to be in place as part of our permit. The transport of hazardous loads on the local and strategic road network would be subject to regulations governing the transport of dangerous goods.

Decommissioning

2.8.20 Decommissioning of the existing WWTP would be subject to a Outline Decommissioning Plan which is to be agreed with the Environment Agency. A Outline Decommissioning Plan (Application Document Reference 5.4.2.3) describes measures applied to this activity.

Operation

2.8.21 An Operational Management Plan and Operational Workers Travel Plan (Application Document Reference 5.4.19.8) ~~-~~form part of the mitigation measures for the operation of the proposed WWTP. The purpose these plans is summarised below:

- Operational Logistics Traffic Plan: details the overall traffic management strategy for operational traffic; and
- Operational Workers Travel Plan: details operation work and programme, site access requires for staff, staff travel patterns and expected workforce locations.

2.8.22 The Operational Workers Travel Plan (~~framework OWTP provided in Application (~~Application Document Reference 5.4.19.8) aims to promote and encourage sustainable transport to the site, this has been developed according to the following principles:

- Reduce the overall need to travel;

- Where travel is essential promote sustainable transport options as the main modes of travel for staff and visitors to the Waste Water Treatment Plant;
- Reduce vehicle carbon emissions by supporting growth in electric cars and reducing single occupancy car travel to and from work;
- Ensure all staff and visitors are made aware of the Travel Plan measures; and
- Ensure continued progress in improving sustainable transport usage through continued management and review of the Travel Plan.

3 Policy Review

3.1 National Policy Statement for Waste Water

3.1.1 The National Policy Statement (NPS) for Waste Water (DEFRA, 2012) is a framework document for planning decisions on nationally significant waste water infrastructure.

3.1.2 The Planning Act 2008 (GOV UK, 2008) sets out the thresholds for nationally significant infrastructure in the waste water sector. The Act empowers the examination of applications and subsequent decisions on the following waste water Nationally Significant Infrastructure Projects (NSIPs) in England:

- construction of waste water treatment plants which are expected to have a capacity exceeding a population equivalent of 500,000 when constructed; or
- alterations to waste water treatment plants where the effect of the altercation is expected to be to increase by more than a population equivalent of 500,000 the capacity of the plant.

3.1.3 The Government's key policy objectives are:

- sustainable development – to seek waste water infrastructure that allows us to live within environmental limits and that helps ensure a strong, healthy, and just society, having regard to environmental, social, and economic considerations;
- public health and environmental improvement – to continue to meet its obligations under the Urban Waste Water Treatment Directive (UWWTD) by providing suitable collection and treatment systems to limit pollution of the environment;
- to improve water quality in the natural environment and meet The Government's obligations under related European Directives, such as the Habitats Directive, the Water Framework Directive (WFD) and its Daughter Directives;
- to reduce water consumption by households and industry which will have the knock-on effect of reducing waste water production and therefore demand for waste water treatment infrastructure;
- to reduce demand for waste water infrastructure capacity by diverting surface water drainage away from the sewer system by using Sustainable Drainage Systems (SuDS);
- climate change mitigation and adaptation – in line with the objectives of Defra's mitigation and adaption plans to help diver the UK's obligation to reduce greenhouse gas emissions by 80% by 2050; and

- waste Hierarchy – to apply the waste hierarchy in terms of seeking to first reduce waste water production, to seek opportunities to re-use and recycle resources and to recover energy and raw materials where possible.

3.2 National Planning Policy Framework

3.2.1 The National Planning Policy Framework (NPPF) (DLUHC, 2021) sets out the Government's planning policies for England. It provides a framework within which locally prepared plans for housing and other development can be produced. The NPPF sets out the Government's vision for delivering sustainable development with the goal of achieving social progress, economic well-being, and environmental protection.

3.2.2 The National Planning Policy Framework (NPPF) (DLUHC, 2021)sets out the Government's planning policies for England. It provides a framework within which locally prepared plans for housing and other development can be produced. The NPPF sets out the Government's vision for delivering sustainable development with the goal of achieving social progress, economic well-being, and environmental protection. The NPPF lists transport policy objectives as:

- transport issues should be considered from the earlies stages of plan-making and development proposals;
- the potential impact of development on transport network should be addressed;
- opportunities to promote walking, cycling and public transport should be identified and pursued;
- the environmental impacts of traffic and transport infrastructure should be identified, addressed, and considered including appropriate opportunities for avoiding and mitigating any adverse effects; and
- patterns of movement, streets, parking, and other transport considerations should be integrated to the scheme design.

3.2.3 The NPPF considers developments should take account of/ensure that:

- sustainable transport modes have been promoted;
- safe and suitable access to the site can be achieved for all users;
- the design of streets, parking areas, other transport elements are in line with the current national guidance, including the National Design Guide and National Model Design Code; and
- improvements can be undertaken within the transport network that cost effectively limit the impacts of the development.

3.3 National Planning Practice Guidance

3.3.1 The National Planning Practice Guidance (DLUHC, 2021) identifies priorities and needs which should be considered, including:

- giving 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 are for bus or other public transport services, and appropriate facilities that encourage public transport use;
- addressing the needs for people with disabilities and reduced mobility in relation to all modes of transport;
- creating places that are safe, secure and attractive – which minimise the score for conflicts between pedestrians, cyclists and vehicles; and
- allowing 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 safe, accessible, and convenient locations.

3.4 DfT WebTAG Guidance

3.4.1 Web-based Transport Analysis Guidance (WebTAG) (DfT, 2022) is the transport appraisal guidance and toolkit. It consists of software tool and guidance on transport modelling and appraisal methods that are applicable for highways and public transport interventions.

3.4.2 Analysis using TAG guidance is required for all interventions that require government approval. For interventions that do not require government approval this guidance would serve as a best practice guide.

3.5 DfT, WebTAG Updates on Covid-19

3.5.1 As part of the 2020 Spring Budget, the Office for Budgetary Responsibility (OBR) published a revised economic and fiscal outlook and associated forecasts of the UK economy in the long-term (OBR, 2020). On 14th July, OBR published the 2020 Fiscal Sustainability Report, updating medium-term growth forecasts to 2024 to take into account COVID-19 impacts (OBR, 2020).

3.6 Cambridgeshire and Peterborough Minerals and Waste Local Plan

3.6.1 The Cambridgeshire and Peterborough Minerals and Waste Local Plan (Cambridgeshire County Council, 2021) was adopted by Cambridgeshire County Consul and Peterborough Council on 28 July 2021. It sets out policies to guide mineral and waste management developments.

3.6.2 The objectives of the Minerals and Waste Local Plan are:

- ensure a steady supply of minerals (construction materials) to supply the growth that is planned for the area; and
- enable to have new modern waste management facilities, to manage waste in a better way.

3.6.3 New mineral and waste management developments must:

- provide appropriate opportunities to promote sustainable transport modes can be, or have been, taken up, to the degree reasonably available given the type of development and its location. If, at the point of application, commercially available electric Heavy Commercial Vehicles (HCVs) are reasonably available, then development which would increase HCV movements should provide appropriate electric vehicle charging infrastructure for HCVs;
- provide safe and suitable access to the site can be achieved for all users of the subsequent development;
- mitigate any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety; and
- develop binding agreements covering lorry routing arrangements and/or HCV signage for mineral and waste traffic. If any such agreements are necessary and reasonable to make a development acceptable.

3.6.4 All new development proposals must demonstrate how the latest identified HCV Route Network is, and where reasonable and practical to develop it.

3.6.5 During all phases of development, including construction, operation and restoration, proposals must take provision for suitable and appropriate diversions to affect PRoWs.

3.7 Cambridgeshire Long Term Transport Strategy

3.7.1 The Cambridgeshire Long Term Transport Strategy (LTTS) (Cambridgeshire County Council, 2015) identifies the major infrastructure requirements that are needed in order to address existing problems on Cambridgeshire's transport network as well as the required future infrastructure to account for planned growth.

3.7.2 The objectives of the LTTS are to:

- ensure that the transport network supports sustainable growth and continued economic prosperity;
- improve accessibility to employment and key services;
- encourage sustainable alternatives to the private car, including rail, bus, guided bus, walking and cycling, car sharing and low emission vehicles;
- encourage healthy and active travel, supporting improved well-being;

- make the most efficient use of the transport network;
- reduce the need to travel;
- minimise the impact of transport on the environment; and
- prioritise investment where it can have the greatest impact

3.7.3 The LTTS include proposals public realm improvements, of which the following are relevant to the relocation of the CWWTP:

- capacity improvements on the A10; and
- a more comprehensive network of cycling and walking links to and from key destinations around the county.

3.8 Transport Strategy for Cambridge City and South Cambridgeshire

3.8.1 The Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) (Cambridgeshire County Council, 2014) was adopted by Cambridgeshire County Council of 4 March 2014 and ensures that local councils plan together for sustainable growth.

3.8.2 The strategy has two main roles:

- Provide a detailed policy framework schemes programme for the area addressing current problems and is consistent with Cambridgeshire Local Transport Plan 2011 – 2026.
- Support the Cambridge and South Cambridgeshire Local Plans and take account of future levels of growth in the area.

3.8.3 In line with the strategy, all new developments will be required to make provision for integrated and improved transport infrastructure to ensure that most people can travel by foot, bicycle or by passenger transport. All new developments must maximise access by walking, cycling and public transport.

3.8.4 Access to areas of employment and key services should be maximised by:

- providing a transport network that if efficient and effective;
- providing good accessibility to services and for businesses; and
- providing public transport and cycle network to routes near major employment, education, and service centres.

3.8.5 All new developments must provide safe and convenient pedestrian and cycle environments including adequate and convenient cycle parking and ensure effective and direct integration with the wider network. Where development opportunities arise, land should be released to improve the existing cycle network.

3.8.6 Where there is a requirement for new distributor roads or through routes as part of a development, adherence to the need to prioritise pedestrians, cyclists and public transport. This includes:

- providing the highest possible standard of pedestrian, cycling and public transport infrastructure as part of the road where feasible and necessary;
- discouraging speeding;
- restricting through access for general motor traffic (unless specifically required as part of the development); and
- ensuring that there are safe and appropriate access arrangements to the adjoining public highway network and minimising the possibility of additional car traffic in the local area as a result of the new road.

3.8.7 The strategy applies to both roads that will be passed to the county council through a relevant legal agreement and those that will remain in third party ownership.

3.9 Cambridgeshire County Council's Transport Investment Plan

3.9.1 The Transport Investment Plan (TIP) (Cambridgeshire County Council, 2022)sets out the transport infrastructure, services and initiatives that are required to support the city growth.

3.9.2 The TIP will set out all transport schemes that the County Council has identified for potential future delivery to support growth. These range from strategic schemes identified via the various County Council transport strategy documents including those emerging from the Greater Cambridge Partnership (formerly known as Greater Cambridge City Deal) programme to those that are required to facilitate the delivery of Local Plan development sites and for which Section 106 contributions will be sought through negotiations with developers following the Transport Assessment process, through to detailed local interventions.

3.9.3 The TIP is used to:

- monitor how many Section 106 agreements have been secured towards the delivery of each specific project;
- prioritise projects for more detailed scheme development and for allocation of available funds; and
- identify funding gaps in order to inform future funding bids as opportunities arise.

3.9.4 Funding for the schemes will come from a range of sources. Where specific impacts are identified through the Transport Assessment process, S106 and Community Infrastructure Levy (CIL) will continue to play a vital role in securing appropriate schemes that fully mitigate the impact of a particular development.

3.10 Greater Cambridge Greater Peterborough Strategic Economic Plan

3.10.1 The Strategic Economic Plan (Greater Cambridge Greater Peterborough, 2021) aims to release the area's potential for continued economic growth, through a targeted range of interventions (termed 'intervention packages').

3.10.2 The following intervention packages have been prioritised:

- Digital Connectivity and Exploitation
- Transport Connectivity
- Removing Skills Barriers to Growth
- Provision of Incubation and Innovation Space
- Accelerating Business Growth by Targeted Support Through a Growth Hub
- Alconbury Weald Enterprise Campus

3.10.3 The Greater Cambridge Greater Peterborough Enterprise Partnership's Local Transport Board developed a program of the following transport interventions:

- improve transport infrastructure and services to support the internationally competitive economy of the area; and
- support economic and housing growth and regeneration.

3.10.4 The programme is formed of four parts:

- Major Transport Schemes
- Trunk Road, Motorway and Major Rails Schemes
- Local Transport Projects
- Local Sustainable Transport Programme

3.10.5 Where it is appropriate Section 106 payments will be requested form developers to help fund infrastructure. S106 contributions can typically only be justified where infrastructure is directly tied to a development.

3.11 Cambridgeshire and Peterborough Combined Authority Local Transport Plan

3.11.1 The Transport Plan (Cambridgeshire & Peterborough Combined Authority, 2020) replaces the Interim Local Transport Plan, which was published in June 2017. The Plan describes how transport interventions can be used to address current and future challenges and opportunities for Cambridgeshire, and Peterborough.

3.11.2 The key areas identified for action, and to be supported through the Local Transport Plan, include:

- reducing emissions from taxis, buses, coaches, and HGVs;
- mandating consideration of electric vehicle charging points for all new or upgraded highway infrastructure;
- maintaining low emissions through the planning process, and long-term planning; and
- improving public health.

3.11.3 To deliver these objectives the Transport Plan provides "healthy streets" and high-quality public realm. The use of active travel as a part of multi-modal trips will be encouraged wherever possible.

3.11.4 The Transport Plan prioritises active travel modes developing such as walking and cycling. The Plan supports A47 upgrade (including the junction between the A1 and A47) between Kings Lynn, Wisbech and Peterborough.

3.11.5 A new draft LTP is currently being consulted on with key changes including: a true reflection on the Sustainable Growth Ambition Statement, providing a rigorous process for transport scheme prioritisation and development, and setting the framework for a Delivery Plan to be adhered to and monitored. The word 'connectivity' has also been added in the name of the Plan, to better reflect the impact of the internet on transport. This draft helps to shape the direction of travel for transport following the pandemic, having a greater focus on achieving ambitions for economic, environmental, and societal improvements.

3.11.6 There have been many changes locally, and globally, which contributes towards the LTCP update being needed. Some of these changes include:

- The government's new plan to cut carbon;
- The government's new national cycling and walking policies; and
- The combined Authority's refreshed focus on sustainable economic growth.

3.12 Cambridgeshire Local Transport Plan

3.12.1 The Cambridgeshire Local Transport Plan (LTP) (Cambridgeshire County Council, 2015) outlines Cambridgeshire County Council's plans and policies for the future of transport in Cambridgeshire. It covers the 20 year period from 2011 to 2031 with the aim of creating communities where people want to live and work now and in the future.

3.12.2 The priorities of the LTP are as follows:

- enabling people to thrive, achieve their potential and improve their quality of life;

- supporting and protecting vulnerable people;
- managing and delivering the growth and development of sustainable communities;
- promoting improved skill levels and economic prosperity across the county, helping people into jobs, and encouraging enterprise; and
- meeting the challenges of climate change and enhancing the natural environment.

3.12.3 Based on these priorities, Cambridgeshire County Council has extracted a set of transport challenges:

- improving the reliability of journey times by managing demand for road space, where appropriate and maximising capacity and efficiency of the existing network;
- reducing the length of the commute and the need to travel by private car;
- marking sustainable modes of transport a viable and attractive alternative to the private car;
- future-proofing its maintenance strategy and new transport infrastructure to cope with the effects of climate change;
- ensuring people – especially those at risk of social exclusion – can access the services they need within reasonable time, cost, and effort;
- addressing the main causes of road accidents in Cambridgeshire;
- protecting and enhancing the natural environment by minimising the environmental impact of transport; and
- influencing national and local decisions on land-use and transport planning that impact on routes through Cambridgeshire.

3.12.4 The LTP also sets out committed schemes, of which the following are relevant to the relocation of the CWWTP:

- Cambridge Science Park Station (delivered by Network Rail)
- Cambridge Science Park Station busway access
- Chisholm Trail cycle route, Cambridge.

3.13 South Cambridgeshire Local Plan

3.13.1 The South Cambridgeshire Local Plan (South Cambridgeshire District Council, 2018) replaced the South Cambridgeshire Local Development Framework. The Local Plan covers the period up to 2031.

3.13.2 The Local Plan focuses on the capacity for sustainable transport modes what measures need to be provided in the sub region.

3.13.3 The Local Plan requires an Air Quality Assessment and a Transport Assessment submission for any planning applications. A Transport Assessment is required to consider the implications of additional or alternative forms of development on highway capacity.

3.13.4 Transport, Access, and Parking requirements of the plan are summarised below:

- development and transport systems are planned to integrate with adjoining development in Cambridge City, to reduce the need to travel and to maximise the use of sustainable transport modes, so as to achieve a modal share of no more than 40% of trips by car (excluding passengers). This includes the provision of employee travel plans, residential travel planning, and other similar measures which could include car clubs;
- adequate highway capacity is required to serve all stages of development; and
- car parking and secure cycle parking should be provided in accordance with Policy TI/3. Car clubs are encouraged to minimise the amount of land given over to car parking. This must be explored through the Transport Assessment and Travel Plan.

3.13.5 The development impact on natural sources should be considered as well. This includes surface water drainage and sewage discharge and the need to take account of the impact of the development of the wider catchment.

3.14 Cambridge Local Plan

3.14.1 The Cambridge Local Plan (Cambridge City Council, 2018) replaces the Cambridge Local Plan 2006 and sets out policies and proposals for future development and spatial planning requirements to 2031.

3.14.2 The local plan aims to:

- promote greater pedestrian and cycling priority through and to the city centre, and potentially incorporating public realm and cycle parking improvements; and
- promote sustainable transport and access for all to and from major employers, education and research clusters, hospitals, schools, and colleges.

3.14.3 The Cambridge Local Plan makes a major shift to a sustainable development strategy based upon significant growth located on the edges of Cambridge and the delivery of new settlements is South Cambridgeshire.

3.15 Cambridgeshire County Council's Transport Assessment Guidance

3.15.1 The Transport Assessment guideline (Cambridgeshire County Council, 2019) was produced by Cambridgeshire County Council (CCC) and provides guidance on when a TA is required and what it should contain.

3.15.2 Any developments that produce any of the following flows require a TA:

- any development generating 60 or more two-way vehicle movements in any peak hour; and
- any development generating approximately 400 person trips a day.

3.15.3 The following mandatory sections should be covered within the TA:

- Background. The section provides a high level overview of the proposal.
- Description of Development. The section provides a clear and comprehensive account of what is proposed for the site and how this differs from previous uses. The section also describes the proposed access arrangements.
- Planning and Transport Policy Context. The section sets out how the proposal relate to national, sub-regional and local transport and planning policy and identifies whether there is a policy/strategic-fit.
- Existing Networks and Baseline Conditions. The section provides details of the existing transport networks around the site including road, bus, rail, pedestrian and cycling links. Baseline conditions and future traffic flows should be identified. Committed developments / background growth and committed transport schemes should be considered.
- Trip Generation, Distribution and Assignment. The section sets out the number of trips that the proposed development will result in, broken down by time, type, and purpose. The trip generation methodology should be clearly set out within the section. Trip Assignment and Distribution section should set out where trips will travel from and to and via what routes. It should be evidenced and supported by a clear justification for the methodology used.
- Future Year Assessment. The section should include traffic flow diagrams and junction assessment for relevant parts of the network for the assessment years (Base year, Future year).
- All-Mode Gap Analysis / Mitigation. The section sets out how the proposal will overcome identified gaps in the pedestrian and cycle provision to improve the site's connectivity. This part of a Transport Assessment also includes Public Transport Accessibility section, Site Access and the Study Area Road Network section, and Access for All section.

- Mitigation Summary. The sections should set out the mitigation package proposed, to subsequently be secured through planning conditions and Section 106 agreements.
- A Travel Plan is expected for any developments where a Transport Assessment is required. The exact level of Travel Plan should be agreed with Cambridgeshire County Council.

3.16 Greater Cambridge City Deal

3.16.1 The Greater Cambridge City Deal (Greater Cambridge Greater Peterborough et al., 2014) aims to enable a new wave of innovation-led growth by investing in the infrastructure, housing and skills that will facilitate the continued growth of the Cambridge Phenomenon. It acknowledges the region's strong track record of delivering growth and seeks to support those existing, and new, businesses in achieving their full potential.

3.16.2 The deal agreed between Government and Greater Cambridge allows Greater Cambridge to maintain and grow its status as a prosperous economic area. The deal aims to:

- create an infrastructure investment fund with an innovative Gain Share mechanism;
- accelerate delivery of 33,480 planned homes;
- enable delivery of 1,000 extra new homes on rural exception sites;
- deliver over 400 new Apprenticeships for young people;
- provide £1bn of local and national public sector investment, enabling an estimated £4bn of private sector investment in the Greater Cambridge area;
- create 45,000 new jobs; and
- create a governance arrangement for joint decision making between the local councils.

3.16.3 The City Deal represents a step change in the ability of local partners to deliver the infrastructure necessary to support the area's ambitious growth plans. This transformative approach to infrastructure will deliver the scale and nature of investment necessary to ensure the transport network supports the economy and acts as a catalyst for sustainable growth.

3.17 Cambridge City Access

3.17.1 Cambridge City Access (Greater Cambridge Partnership, 2019) project aims is to deliver numerous project that will make sustainable travel modes more attractive to people living in the Greater Cambridge area.

3.17.2 In 2020 it was agreed to implement a series of projects as set out below:

- six experimental road closure schemes;
- expanding the electric bus pilot;
- consolidation delivery Pilot to limit the number of delivery vehicles entering the city centre;
- using traffic signals to help business and cycles move faster and more easily;
- increasing availability of cycle parking;
- developing an integrated parking strategy to manage car parking across Greater Cambridge and support uptake of sustainable transport; and
- support of E-Cargo Bike Scheme to provide bikes for business and residents to try out.

3.17.3 Alongside these short-term measures, the City Access project is exploring ways of reducing congestion and pollution by providing better public transport in the future including a future bus network concept. To deliver the network, the City Access analysis different options including road space relocation, changes to parking, congestion, or pollution charging.

3.18 Waterbeach Neighbourhood Development Plan

3.18.1 The Waterbeach Neighbourhood Development Plan (Waterbeach Parish Council, 2022) was prepared by the Waterbeach NP Group on behalf of the community. It relates to the use of land and development of the area from 2020 to 2031.

3.18.2 The plan includes several policies, all of which contribute towards meeting sustainable objectives underpinning the Neighbourhood Plan Vision to ensure that new development will benefit and protect the existing communities and environment. These ten objectives are summarised below:

- creating a diverse community that have sustainable work-life patterns;
- a safe, accessible, and attractive cycle and footpath network providing key connections throughout the village;
- good provisions in place for mobility impaired people;
- effective management of traffic impacts to maintain the residential environment and minimise congestion;
- protect and enhance PRoW networks;
- village High Street amenities to continue providing essential services to the local community;
- develop a balanced economy with a variety of jobs at an appropriate scale;

- retain distinctive rural character of existing settlements;
- increase green space access and maintain/increase biodiversity; and
- enable access to local residents/workers to appropriate local housing provisions.

3.18.3 Once adopted, the South Cambridge District Council (SCDC) will have the duty of implementing this Neighbourhood Plan due to their responsibility for development management in the Waterbeach parish, closely monitored by the WPC.

3.19 North East Cambridge Area Action Plan (NECAAP) (2021)

3.19.1 This planning policy framework which will guide the development of the new low-carbon city district in North East Cambridge (NEC). NEC will have a greater focus on health and active travel, with particular emphasis on walking and cycling:

- Policy 16 Sustainable connectivity: NEC will be designed around walkable neighbourhoods and healthy towns to promote sustainable travel. New pedestrian and cycle connections will be developed in line with this objective;
- Policy 17 Connecting to the wider network: To improve connectivity between NEC and other areas, development will be required to contribute to new and improved connections for non-motorised users (NMU);
- Policy 18 Cycle parking: cycling parking should be provided in excess of the minimum requirement listed in the 2018 Cambridge Local Plan. A minimum 5-10% of cycle parking should be provided to accommodate for non-standard cycles and electric charging points will also need to be considered. Developers must provide justification in the Travel Plan for the level and type of cycle parking infrastructure proposed to demonstrate it will meet the trip budget listed in Policy 22; and
- Policy 22 Managing motorised vehicles: Development proposals will be supported where it can be demonstrated that they can be delivered within the vehicle trip budget. Development will not be permitted if proposals exceed the vehicle trip budget. The maximum vehicular trip budget for the Area Action Plan area on to Milton Road is 3,900 two-way trips in the AM peak, 3,000 two-way trips in the PM peak. For access on to King’s Hedges Road, the maximum vehicle trip budget is 780 two-way trips in the AM peak and 754 two-way trips in the PM peak.

4 Existing Networks and Baseline Transport Conditions

4.1 Existing Cambridge WWTP

4.1.1 To the immediate north of the existing Cambridge WWTP lies the A14, a strategic dual carriageway road, routing eastwards from the M6 near Birmingham, past Cambridge, to Felixstowe. The existing Cambridge WWTP connects to the A14 via Junction 33, a grade separated signalised junction known as the Milton Interchange. The settlement of Waterbeach can be reached from the Milton Interchange by heading northbound via the A10.

4.1.2 The eastern side of the existing Cambridge WWTP is bordered by the Fen Line, on which Great Northern and Greater Anglia run train services from Cambridge and Cambridge North to numerous stations across the wider East of England region, including King's Lynn to the north. Further to the east of the existing Cambridge WWTP lies the River Cam.

4.1.3 To the south of the existing Cambridge WWTP lies an area of largely industrial land use as well as Cambridge North mainline railway station.

4.1.4 To the immediate west lies the A1309 (Milton Road), a key radial route into Cambridge City centre.

4.1.5 CCC is the local highway network authority for local transport infrastructure, with the exception of the A14 which falls under the jurisdiction of National Highways.

4.1.6 The existing Cambridge WWTP can be accessed from Cowley Road, which connects to Milton Road via a signalised junction approximately 400m south of the Milton Interchange. Currently at this junction, there is dedicated slip lane access for southbound traffic, allowing largely unopposed movement into the existing Cambridge WWTP. For northbound traffic, there is a dedicated right-hand turn facility, allowing vehicles to queue at the junction, minimising any blocking back along Milton Road.

4.2 Waterbeach

Walking

4.2.1 Appendix A, Figure A.7 details the existing PRoW within the settlement of Waterbeach. The vast majority of PRoW are located to the south of Waterbeach (Footpath 247/3, 247/4, 247/5 and 247/6).

4.2.2 The PRoW situated to the west of Waterbeach Green and north of Gibson Close (Footpath 247/1 and 247/2) lead directly to a footway along the A10. This provides a more pedestrian friendly and direct route connecting the A10 to Waterbeach, in comparison to using Denny End Road and Car Dyke Road to access and egress Waterbeach.

4.2.3 Within the existing network of Waterbeach, pavements run along at least one side of a road. This provides a generally pedestrian accessible provision across the settlement.

4.2.4 Bannold Road is a quiet two-way residential road with consistent street lighting throughout, but varying levels of footpath provision, notably onwards from the Way Lane/Bannold Road junction eastbound where pavements are either only found on one side of the road or are absent. Bannold Drove is a lane with grass verges on both side with no pedestrian infrastructure.

4.2.5 From the southeast of Waterbeach, Clayhithe Road is a two-way road with grass verges on both sides. Clayhithe Road provides a direct connection from Waterbeach to the settlement of Horningsea, further to the south. Pedestrian infrastructure is available on one side of Clayhithe Road coming into Waterbeach, but the pavements remain narrow at a width of generally less than a metre.

4.2.6 To the west towards the outskirts of Waterbeach, Denny End Road and Car Dyke Road provide access and egress to and from the settlement. Both roads have a varying level of pedestrian infrastructure provision, with some narrow pavements or no pedestrian infrastructure.

4.2.7 Appendix A, Figure A.8 provides an overview of the 2km walking catchment in the area surrounding Waterbeach. This catchment has been calculated based on an origin point of Station Road.

4.2.8 The walking catchment analysis for Waterbeach illustrated in Figure A.8 demonstrates that most destinations within Waterbeach can be reached within a 2km walking distance of the origin point.

Cycling

4.2.9 Cycle routes in Waterbeach are shown in Appendix A, Figure A.9.

4.2.10 National Cycle Route 11 connects Waterbeach to Cambridge City Centre where the route begins to the east of the existing railway station and travels along the River Cam beside the settlements of Horningsea and Fen Ditton. This scenic route does not provide a direct connection with Cambridge city centre but does provide connections to the settlements of Horningsea and Fen Ditton, alongside the Chisholm Trail via the Chisholm Trail Bridge over the River Cam (Greater Cambridgeshire Partnership, 2021).

4.2.11 As part of the Walking, Cycling, Horse-Riding Assessment and Review, user count surveys have been undertaken at different locations around the proposed WWTP site. This can be found be in Appendix F: Recreational User Counts (Application Document Reference 5.4.19.4). This included a user count survey for National Cycle Route 11/ Footpath 162/~~1 (~~1 (PC3 River Cam) between 08:00-09:00am, 12:00:1:00pm, and 04:00-05:00pm on the following days:

- Saturday 2nd July 2022
- Thursday 7th July 2022

- Thursday 21st July 2022
- Tuesday 2nd August 2022

4.2.12 The total users on this route are outlined in Table 4-1 below, with an overall summary of activity by location provided in Figure 4.1 below.

Table 4-1:- Total Users Counts for River Cam (PC3)

Date	Total users at River Cam (PC3)
Saturday 2nd July	443
Thursday 7th July	123
Thursday 21st July	94
Tuesday 2nd August	0
Total	660

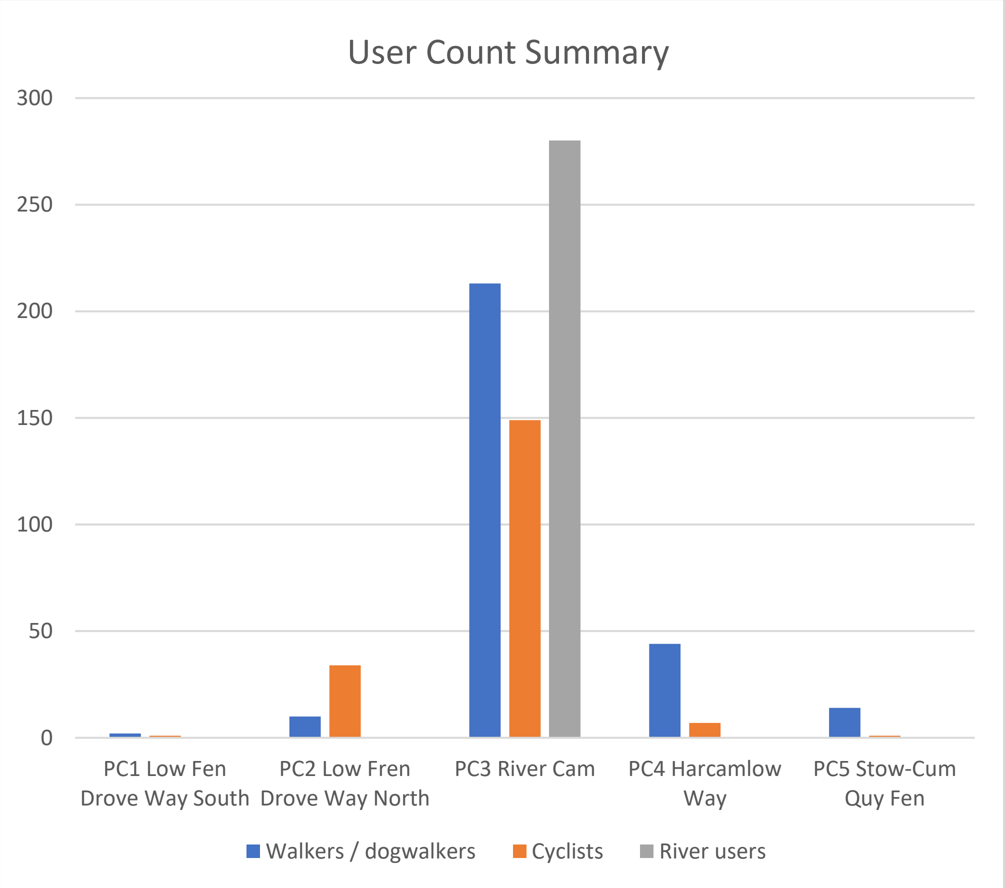

Figure 4.1: Overall Summary of Activity by Location

4.2.13 The results of the user count surveys demonstrate that whilst the route does not provide a direct connection to Cambridge city centre, it is nevertheless popular with cyclists, joggers, walkers, and those accessing the river for rowing activities.

4.2.14 (Waterbeach Cycling Campaign, 2020)The Waterbeach Greenway (Greater Cambridge Partnership, 2021) will provide a direct active travel route to travel from Waterbeach into Cambridge. The route will run almost in parallel to the railway line between Waterbeach railway station and Cambridge North railway station. Currently, the scheme is undergoing detailed design.

4.2.15 It is expected that the Waterbeach Greenway will improve accessibility to the overall cycle network in Cambridgeshire from Waterbeach. The Greenway effectively connects to other cycling routes once in Cambridge, such as the recently completed Chisholm Trail, a mostly off-road and traffic-free route between Cambridge North station and Cambridge station.

4.2.16 Appendix A, Figure A.10 provides an overview of the 5km cycling catchment surrounding Waterbeach. The cycling catchment has been developed based on an origin point on Station Road.

4.2.17 The 5km cycling catchment demonstrates cycling connectivity in the areas surrounding Waterbeach. The whole of Waterbeach itself is covered within the catchment which would suggest that the entirety of the settlement is accessible by bike. The cycling catchment also shows that the settlements of Cottenham (to the west), Landbeach (to the southwest), Milton (to the south), Horningsea and Fen Ditton (to the southeast) are accessible by bike.

Public transport

4.2.18 Waterbeach is served by series of bus services which connect the settlement to Milton and Cambridge to the south, and to Littleport to the north. Waterbeach railway station also provides a direct link to Cambridge North station and Cambridge station. The bus routes and stops, as well as Waterbeach railway station are shown in Appendix A, Figure A.11.

4.2.19 Route 9 Cambridge-Littleport, has services every hour Mondays - Saturdays and has stops on Denny End Road and Station Road (at the junction with Lode Road). The route 19 Landbeach-Cambridge service however is far less frequent and only operates Mondays-Fridays four times a day with services every two and a half hours from 7am – 10am and then a service at 12pm and a service at 5pm peak. These four services all stop on High Street, Bannold Road and Denny End Road.

4.2.20 Bus stops within Waterbeach on construction traffic routes feature the following facilities:

- the Pembroke Avenue bus stops feature bus shelters. Neither stop features real time bus information screens;
- the Winfold Road bus stops feature no bus shelters or real time bus information screens;
- the southbound Barracks bus stop features a bus shelter. The northbound bus stop has no bus shelter. Neither stop features real time bus information screens;
- the Waddlelow bus stops feature no bus shelters or real time bus information screens;

- the southbound Gibson Close bus stop features both a bus shelter and a real time bus information screen. The northbound bus stop has no bus shelter or real time bus information screen;
- the southbound Recreation Ground bus stop features both a bus shelter and a real time bus information screen. The northbound bus stop has no bus shelter or real time bus information screen;
- the Car Dyke Road bus stops feature no bus shelters or real time bus information screens. Access to the westbound stop is inhibited by vegetation overgrowth;
- St Andrew's Hill bus stops feature no bus shelters or real time bus information screens; and
- Lode Avenue bus stops feature no bus shelters or real time bus information screens.

4.2.21 The existing Waterbeach railway station is situated to the southeast of Waterbeach along Station Road. Network Rail (NR) operates the station and is served by Great Northern and Greater Anglia rail services.

4.2.22 Great Northern runs southbound services to London King's Cross via Cambridge, Royston and Letchworth Garden City, and northbound services to King's Lynn via Ely, Littleport, Downham Market and Watlington. During peak hours, services run every 30 minutes. At all other times the services are hourly.

4.2.23 Greater Anglia provides peak hour services to Liverpool Street in London via stops including Cambridge North, Cambridge, and Stansted Mountfitchet and to King's Lynn via the same stops as mentioned above.

4.2.24 Table 4-2~~Table 4-2~~ summarises the number of passenger services at Waterbeach railway station.

Table 4-2: Rail passenger services at Waterbeach

Weekday Services Calling at Waterbeach		Between 0700hrs and 10000hrs (3 hours)	Between 1600hrs and 1900hrs (3 hours)	Daily service count
Great Northern Service	Southbound: Towards Cambridge and London	6	6	20
	Northbound: Ely and Kings Lynn	3	3	12
Greater Anglia Services	Southbound: Cambridge and London	6 (All to Kings Cross)	6 (All to Kings Cross)	22
	Northbound: Ely and Kings Lynn	3	3	12

Weekday Services Calling at Waterbeach	Between 0700hrs and 10000hrs (3 hours)	Between 1600hrs and 1900hrs (3 hours)	Daily service count
Total	18 (6 per hour)	18 (6 per hour)	68

Source: National Rail

4.2.25 In addition to the above stopping services, there are other passenger and freight services between Cambridge and Ely that do not stop at Waterbeach.

4.2.26 An Automatic Half Barrier (AHB) level crossing is located on Station Road. No pedestrian and cycle bridge is available to facilitate crossing, which means all road users coming in or out of Waterbeach via the Station Road-Clayhithe Road route must wait at the barriers. The level crossing is therefore frequently used as it is located on the only existing access/egress route for users coming in or out of Waterbeach via Clayhithe Road.

4.2.27 Cycle parking is provided at Waterbeach railway station. 12 cycle parking spaces can be found on the northbound platform.

4.2.28 A station car park is available to the south of Waterbeach railway station and can be accessed via Clayhithe Road. A total 83 parking spaces are available. The car park is located approximately 110m southeast of the level crossing.

Local road network

4.2.29 Waterbeach can be accessed via Denny End Road and Car Dyke Road from the west off of the A10. The Car Dyke Road/A10 junction is a priority T-junction. The Denny End Road/10 junction is a signal-controlled junction.

4.2.30 The existing Waterbeach WRC can be accessed from Bannold Drove and Long Drove via Bannold Road. Bannold Drove and Long Drove are both narrow country lanes with grass verges on both sides.

4.2.31 Bannold Drove is a country lane with a width of about 3.5-5m with grass verges on both sides. No pedestrian infrastructure or street lighting is available.

4.2.32 Long Drove is a country lane with a width of about 2.5-3m with grass verges on both sides. No pedestrian infrastructure or street lighting is available.

4.2.33 The Waterbeach Pipeline construction compound will be accessed during construction via Clayhithe Road, a two-way road which has limited pedestrian footways and no street lighting.

4.2.34 The A10 is a major road which lies to the immediate west of Waterbeach and connects the settlement to Milton and Cambridge to the south and Chittering and Stretham to the north. There are varying speed limits on the A10; the section between Denny End Road and Car Dyke Road has a speed limit of 40mph.

4.2.35 The main road network within Waterbeach settlement is comprised of Denny End Road, Car Dyke Road, High Street, Bannold Road, and Station Road.

Traffic flows

4.2.36 Existing traffic flows in Waterbeach have been determined using traffic data collected in December 2021. Surveys were carried out on one weekend day (4th December 2021) and on consecutive neutral weekdays (7th and 8th December 2021). Survey locations are shown in Section 5.1.

4.2.37 Manual classified counts (MCC) including queue length analysis were carried out at the following junctions in Waterbeach:

- Ely Road/Denny End Road;
- Denny End/Bannold Road;
- Bannold Road/Way Lane;
- Bannold Road/Bannold Drove;
- Way Lane/Burgess Road;
- Burgess Road/Rosemary Road;
- Cambridge Road / Chapel Street / Green Side;
- Chapel Street/Andrews Hill; and

4.2.38 Car Dyke Road/A10 Ely Road.

Table 4-3

~~4.2.38~~4.2.39 ~~Table 4-3~~ provides an overview of the junctions, key movements and observed traffic in Waterbeach.

Table 4-3: Surveyed junctions in Waterbeach

Junction name	Characteristics	Method of control	Key movements
Ely Road/Denny Ed Rd	Three arms junction	Signalised	Ely Rd southbound Ely Rd northbound
Denny End Rd/Bannold Rd	Three arms junction	Non-signalised	Denny End Rd northbound Denny End Rd southbound
Bannold Rd/Way Ln	Three arms junction	Non-signalised	Bannold Rd southbound Way Ln westbound
Bannold Rd/Bannold Drove	Three arms junction	Non-signalised	Bannold Rd westbound Bannold Rd eastbound
Way Ln/Burgess Rd	Three arms junction	Non-signalised	Way Ln northbound

Junction name	Characteristics	Method of control	Key movements
			Way Ln southbound
Burgess Rd/ Rosemary Rd	Three arms junction	Non-signalised	Burgess Rd westbound Burgess Rd eastbound
Cambridge Road/Chapel St/Green Side	Three arms junction	Non-signalised	Cambridge Rd westbound Cambridge Rd eastbound
Chapel St/Andrews Hill	Three arms junction	Non-signalised	Chapel St northbound Chapel St southbound
Car Dyke Rd/ A10 Ely Rd	Three arms junction	Non-signalised	Ely Rd northbound Ely Rd southbound

~~4.2.39~~4.2.40 A level-crossing survey was also carried out on the section of Clayhithe Road approaching Waterbeach railway station

Collision analysis

~~4.2.40~~4.2.41 The Waterbeach personal injury collision (PIC) map is shown in Appendix A, Figure A.12. PIC data was obtained from CCC for the five-year period from November 2016 to November 2021. PIC data is shown in Appendix D: PIC Data Analysis.

~~4.2.41~~4.2.42 A total of 21 slight collisions were recorded in Waterbeach. Of these 21, 11 slight accidents were recorded within Waterbeach itself. Two separate slight accidents involved a collision between a vehicle and a cyclist, and between a vehicle and a pedestrian. These 11 slight collisions do not form a cluster and no pattern could be observed for their occurrence. At the A10/Denny End Road junction, eight slight collisions were recorded. Of these, three collisions involved a right-turning vehicle from the A10 onto Denny End Road while the remaining six did not involve any vehicle manoeuvres. Despite a high concentration of slight collisions at the A10/Denny End Road junction, no particular pattern could be observed. One slight collision was recorded on the section of the A10 between Denny End Road and Car Dyke Road.

~~4.2.42~~4.2.43 Nine serious collisions occurred in Waterbeach. Of these, two occurred in Waterbeach itself and did not involve vulnerable users. One collision at the Bannold Road/Cody Road junction involved one cyclist. The remaining six collisions took place on the section of the A10 between Denny End Road and Car Dyke Road, or at the junctions of these two roads. Half of these collisions involved a right-turning vehicle (two vehicles turning into Denny End Road, one vehicle turning into Car Dyke Road) from the A10 while the other half did not involve any manoeuvres. Two separate accidents involved an old age pensioner (OAP) and a child. No particular pattern can be observed for the occurrence of collisions in Waterbeach itself. Despite a high concentration of serious collisions at the A10/Denny End Road junction, no pattern can be observed. An overview of serious collisions is provided in Table 4-4~~Table 4-4~~.

Table 4-4: Overview of serious collisions

Location	Date and time	Road surface conditions	No. of vehicles	Weather
C210 Station Rd Waterbeach	20.02.2016, 17:08	Dry	3	Fine without high winds
Clayhithe Road B1047	31.7.2016, 01:45	Dry	1	Fine without high winds
Waterbeach A10 to Denny End Road	12.10.2016, 12:30	Wet/damp	1	Raining without high winds
Ely Road A10 at junction with Car Dyke Road	18.08.2017, 16:45	Dry	2	Fine without high winds
A10 Ely Road	27.06.2018, 07:28	Dry	2	Fine without high winds
Cody Road at junction with Bannold Road	23.05.2019, 20:55	Dry	2	Fine without high winds
Ely Road (A10) at junction with Denny End Road	06.11.2019, 18:50	Dry	2	Fine without high winds
Ely Road (A10) at junction with Denny End Road	11.11.2019, 12:50	Wet/damp	2	Fine without high winds
Ely Road (A10) – 143 metres from junction with Denny End Road	04.07.2020, 21:00	Dry	1	Fine without high winds

Source: CCC

~~4.2.43~~4.2.44 Two fatal collisions occurred on the section of the A10 between Denny End Road and Car Dyke Road in the vicinity of Waterbeach. Neither collision involved any pedestrians or cyclists. Table 4-5~~Table 4-5Table 4-5Table 4-5Table 4-5~~ summarises the recorded conditions for fatal collisions.

Table 4-5: Overview of fatal collisions

Location	Date and time	Road surface conditions	No. of vehicles	Weather
Ely Road at junction with unclassified road	14.05.2020, 10:27	Dry	3	Fine without high winds
Ely Road (A10) – 29m from	22.01.2021, 15:53	Dry	2	Fine without high winds

Location	Date and time	Road surface conditions	No. of vehicles	Weather
junction with Waterbeach Road				

Source: CCC

~~4.2.44~~4.2.45 CCC defines a collision cluster as "a junction or 100 metre length of road (in a 3-year period) with: 6 or more injury collisions; 3 or more fatal or serious collisions; or 5 or more injury collisions providing that one of them is fatal or serious. A "sliding scale" is used for the number of collisions required for a longer length of road to become a collision site." (Cambridgeshire County Council, 2021)

~~4.2.45~~4.2.46 Within the settlement of Waterbeach itself, no collision cluster can be identified due to the low concentration of collisions in the area.

~~4.2.46~~4.2.47 For the section of the A10 between Denny End Road and Car Dyke Road, and the section of the A10 approaching towards the A10/Denny End Road junction, a collision cluster can be identified composed of:

- five serious collisions; and
- nine slight collisions

~~4.2.47~~4.2.48 The A10/Denny End Road junction is a staggered T-junction with a 40mph speed limit. Table 4-6~~Table 4-6~~ below provides an overview of the collisions making part of the cluster.

Table 4-6: Overview of collision cluster

Severity	Location	Date	Road surface conditions	No. of vehicles	Weather
Serious	A10 (Ely Road) - 143 metres from junction with Denny End Road	04.07.2020	Dry	1	Fine without high winds
Serious	Waterbeach A10 (Ely Road) to Denny End Road	12.10.2016	Wet/damp	1	Raining without high winds
Serious	A10 (Ely Road)	27.06.2018	Dry	2	Fine without high winds
Serious	A10 (Ely Road) at junction with Denny End Road.	11.11.2019	Wet/damp	2	Fine without high winds

Severity	Location	Date	Road surface conditions	No. of vehicles	Weather
Serious	A10 (Ely Road) at junction with Denny End Road	06.11.2019	Dry	2	Fine without high winds
Slight	A10 (Ely Road) at junction with Denny End Road	26.11.2019	Dry	2	Fine without high winds
Slight	A10 (Ely Road) at junction with Denny End Road	06.06.2016	Dry	3	Fine without high winds
Slight	A10 (Ely Road) at junction with Denny End Road	06.08.2016	Dry	4	Fine without high winds
Slight	A10 (Ely Road) at junction with Denny End Road	25.02.2016	Dry	2	Fine without high winds
Slight	A10 (Ely Road) - exact location not known	13.04.2016	Wet/damp	2	Fine without high winds
Slight	A10 (Ely Road)	12.12.2017	Frost/Ice	1	Fine without high winds
Slight	A10 (Ely Road) at junction with Denny End Road	05.01.2018	Dry	2	Fine without high winds
Slight	A10 (Ely Road) at junction with Denny End Road	31.08.2019	Dry	2	Fine without high winds
Slight	A10 (Ely Road)	22.10.2019	Dry	3	Fine without high winds

Source: CCC

~~4.2.48~~4.2.49 PIC data provided by CCC covers the period November 2016 to November 2021. PIC data provided for the year 2021 is provisional at best. Additionally, contributory factors have not been included in the data which would make it challenging to determine if the road layout is causing road safety concerns. A further review of the A10/Denny End Road junction (including a road safety audit) would be required to better understand the cause for the observed collision ~~cluster~~cluster.

4.3 Horningsea

Walking

4.3.1 Appendix A, Figure A.13 details the existing PRoW within the settlement of Horningsea. Horningsea is directly served by two footpaths (Footpath 130/4 and 130/6), both to the north of the settlement. Footpath 130/4 runs directly north of Horningsea from Clayhithe Road, providing an off-road path running parallel to this road (which features no pavement north of the settlement), whilst also connecting with Footpath 130/5. Footpath 130/6 begins approximately 200m further north along Horningsea Road from Footpath 130/4, and heads in an easterly direction.

4.3.2 Approximately 300m to the north of Footpath 130/6 runs Bridleway 130/8, which runs in an easterly direction around Harcamlow Way parallel to Footpath 130/6. As part of the Walking, Cycling, Horse-Riding Assessment and Review, user count surveys have been undertaken at different locations around the proposed WWTP site. This included a user count survey for Bridleway 130/8 PC4 Harcamlow Way) between 08:00-09:00am, 12:00:1:00pm, and 04:00-05:00pm on the following days:

- Saturday 2nd July 2022
- Thursday 7th July 2022
- Thursday 21st July 2022
- Tuesday 2nd August 2022

4.3.3 The total users on this route are outlined in Table 4-7 below, with an overall summary of activity by location provided in Figure 4.2 below.

Table 4-7: Total Users Counts for Harcamlow Way (PC4)

Date	Total users at Harcamlow Way (PC4)
Saturday 2nd July	34
Thursday 7th July	14
Thursday 21st July	6
Tuesday 2nd August	0
Total	54

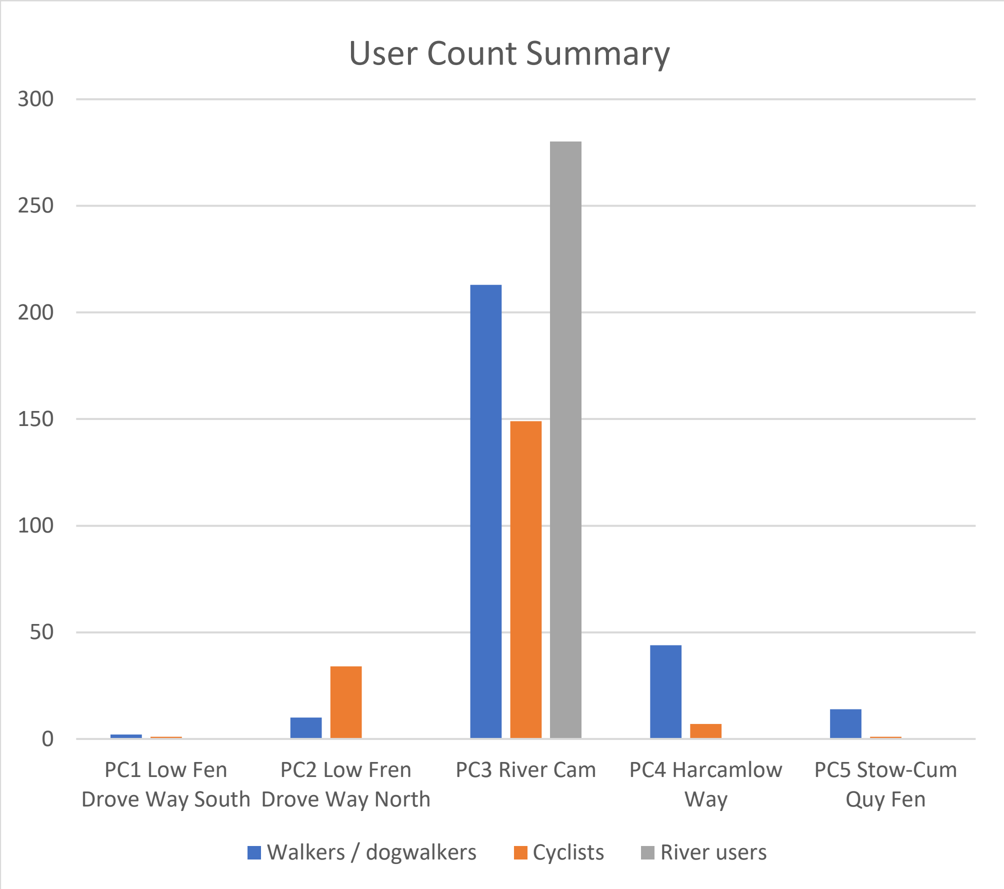

Figure 4.2: Overall Summary of Activity by Location

4.3.4 The results of the user count surveys demonstrate that Bridleway 130/8 is predominantly used by farm vehicles and cars, with only a small number of pedestrians and cyclists using this route.

4.3.5 Footpath 162/1 runs parallel to Horningsea along the opposite bank of the River Cam. To access this path, which provides an off-road route south to Cambridge, pedestrians would need to head directly south along Horningsea Road, and use Footpath 85/7 to access Baits Bite Lock, which features a bridge across the river. User Count surveys have been undertaken for Footpath 162/1 (National Cycle Route 11) as part of the Walking, Cycling, Horse-Riding Assessment and Review. The results of this can be found in Section 4.2 (Waterbeach) and in Table 4-1 and Appendix F.

4.3.6 Within the existing network of Horningsea, pavements run along both sides of Horningsea Road throughout most of the settlement. Coupled with the 30mph speed limit within the settlement, this provides a mostly pedestrian-friendly walking space. There are however no pedestrian crossing facilities within Horningsea.

4.3.7 Construction traffic will not travel directly through Horningsea itself, as agreed in Phase 2 Consultation. When accessing construction access points of the Waterbeach Pipeline works corridor to the north of the settlement, construction vehicles travel southbound along Clayhithe road from Waterbeach. When accessing sites to the south of the settlement, construction vehicles will approach from the south via Junction 34 of the A14.

4.3.8 Appendix A, Figure A.14 provides an overview of the 2km walking catchment in the area surrounding Horningsea. The walking catchment has been developed based on an origin point on High Street.

4.3.9 The walking catchment analysis for Horningsea in Figure A.14 demonstrates that the settlement has good pedestrian access to the north via Clayhithe Road using Footpath 130/4 (see paragraph 4.3.1), and to the south using the shared use Fen Ditton to Horningsea Cycleway. The latter allows the settlement of Fen Ditton to be reached within 2km of the origin point on High Street. To the west, pedestrians can access the River Cam at Baits Bite Lock within 2km of the origin point on High Street by using Footpath 85/7.

Cycling

4.3.10 A shared use pedestrian and cycleway, the Fen Ditton to Horningsea Cycleway, runs immediately south of the settlement alongside Horningsea Road for 2km to the settlement of Fen Ditton. The cycle path provides a safe connection over the A14 via a bridge at Junction 34 of the A14, to the south of Horningsea. It is lit along its length using studded solar lighting embedded into the cycleway surface.

4.3.11 The proposed Horningsea Greenway will utilise this section of cycleway, providing an active travel route between Horningsea and Midsummer Common in Cambridge. The proposed route will include a new wider path on the A14 bridge (Greater Cambridgeshire Partnership, 2021), and will provide wider connections to other Greenways, notably the proposed Swaffham and Bottisham Greenways and the recently completed Chisholm Trail (Greater Cambridgeshire Partnership, 2021).

4.3.12 North of the Fen Ditton to Horningsea Cycleway, on the High Street within Horningsea itself, there is limited cycling infrastructure. There is no publicly available cycle parking within the settlement.

4.3.13 National cycle route 11 runs along the River Cam beside Horningsea and provides a potential cycling connection to Cambridge City Centre. To access this route from Horningsea however, cyclists would need to head directly south along Horningsea Road, and use Footpath 85/7 to access Baits Bite Lock, which features a bridge across the river. As demonstrated in Table 4-1 and Figure 4.1~~Figure 4.1Figure 4.1Figure 4.1Figure 4-1~~ (see Section 4.2), this scenic route does not provide a direct connection with the city centre but is nevertheless popular with cyclists, joggers, walkers, and those accessing the river for rowing activities.

4.3.14 Appendix A, Figure A.15 provides an overview of the cycle network in and in the vicinity of Horningsea.

4.3.15 Appendix A, Figure A.16 provides an overview of the 5km cycling catchment surrounding Horningsea. The cycling catchment has been developed based on an origin point on High Street.

4.3.16 The 5km cycling catchment for Horningsea in Appendix A, Figure A.16 demonstrates that the settlement has good cycling access to the north via Clayhithe Road to the north, allowing the settlement of Waterbeach to be reached within a 5km cycle of the origin point on High Street. To the south, cyclists can access the settlement of Fen Ditton using the Fen Ditton to Horningsea Cycleway within a 2km cycle of the origin point, with further onward travel Barnwell and the outskirts of Chesterton accessible within a 5km cycle of the origin point.

Public transport

4.3.17 Horningsea is served by the Landbeach-Cambridge bus route 19 that runs services twice in the morning at 07:00 and 09:30 and twice in the afternoon at 12:30 and 17:55. This service operates from two sets of bus stops (St John's Lane and Priory Road stops) on the High Street in the settlement and only operates on weekdays (Stagecoach, 2022). This bus route provides connections with Drummer Street Bus Station in Cambridge to the south, and Waterbeach Station to the north, allowing for further onward travel.

4.3.18 Bus stops within Horningsea feature the following facilities:

- the St John's Lane southbound stop features a bus shelter. The northbound stop features no bus shelter. Neither stop features real time bus information screens; and
- Priory Road stops feature no bus shelters and no real time bus information screens.

4.3.19 Appendix A, Figure A.17 provides an overview of bus routes serving Horningsea.

4.3.20 The nearest railway station is Waterbeach, located approximately 2.5km to the north.

Local road network

4.3.21 Horningsea can be accessed from the south via Horningsea Road. This road can be accessed from a signal-controlled junction servicing an eastbound only off-slip of the A14 (junction 34), or along the B1047 north from Fen Ditton. To the north, Horningsea can be accessed via Clayhithe Road, which runs south of Waterbeach via an Automatic Half Barrier (AHB) level crossing over the railway.

4.3.22 The Fen Ditton to Horningsea shared pedestrian/cycleway (and eventually the Horningsea Greenway) crosses over both junctions using a signalised toucan crossing.

4.3.23 Horningsea Road is a single carriageway road with a width of about 7m, with the Fen Ditton to Horningsea shared pedestrian/cycleway running along the western side of the carriageway. Beyond junction 34 of the A14, no streetlighting is present.

4.3.24 Clayhithe Road is a single carriageway road with a width of about 7m with grass verges on both sides. No pedestrian infrastructure or street lighting is present.

4.3.25 No construction traffic will travel either northbound or southbound along the High Street from Horningsea.

Traffic flows

4.3.26 Existing traffic flows in Waterbeach have been determined using traffic data collected in December 2021. Surveys were carried out on one weekend day (4th December 2021) and on consecutive neutral weekdays (7th and 8th December 2021). Survey locations are shown in Section 5.1.

4.3.27 The following junctions were surveyed in Horningsea using MCCs which included queue length analysis:

- Horningsea Road/Low Fen Drove Way/Biggin Lane;
- B1047 Horningsea Road/A14 off-slip; and
- B1047 Horningsea Road/A14 on-slip.

4.3.28 An automatic traffic count (ATC) was also installed on Horningsea Road, immediately to the south of the Horningsea Road/Low Fen Drove Way/Biggin Lane junction, to capture two-way flows. ATC results are available in Table 4-8~~Table 4-8~~.

Table 4-8 Summary of ATC two-way flows on Horningsea Road

5-day AM Peak Avg flow NB	5-day AM Peak Avg flow SB	5-day PM Peak Avg flow NB	5-day PM Peak Avg flow SB
393	716	698	423

4.3.29 Table 4-9~~Table 4-9~~ provides an overview of the key movements at the surveyed junctions in Horningsea.

Table 4-9 Surveyed junctions in Horningsea

Junction Name	Characteristics	Method of Control	Key Movements
Horningsea Rd/Low Fen Dr/Biggin Ln	Crossroad	Non-signalised	Horningsea northbound Horningsea southbound
B1047 Horningsea Road/A14 off-slip	Three arms junction	Signalised	Horningsea northbound Horningsea southbound
B1047 Horningsea Road/A14 on-slip	Three arms junction	Signalised	Horningsea northbound Horningsea southbound

Collision analysis

4.3.30 The Horningsea PIC map is shown in Appendix A, Figure A.18. PIC data was obtained from CCC for the five-year period from November 2016 to November 2021. PIC data is shown in Appendix D: PIC Data Analysis.

4.3.31 One slight collision has been recorded in Horningsea itself, approximately 200m south from the Priory Road bus stop in 2018. No vulnerable users were involved.

4.3.32 A total of five collisions were recorded in the vicinity of Horningsea excluding accidents recorded at junction 34 of the A14. Of these five, two slight collisions were recorded in 2018 and 2020 respectively. Neither collision involved vulnerable users. No particular pattern can be identified to explain the occurrence of these collision.

4.3.33 Three serious collisions were recorded and occurred on Horningsea Road. No vulnerable users were involved. No pattern can be identified in determining the occurrence of these collisions. Table 4-10~~Table 4-10~~ summarises the recorded conditions for serious collisions.

Table 4-10 Overview of serious collisions

Location	Date and time	Road surface conditions	No. of vehicles	Weather
Clayhithe Road	28.09.2020, 16:04	Dry	3	Fine without high winds
Clayhithe Road	27.02.2021, 11:01	Dry	3	Fine without high winds
Horningsea Road	09.05.2021, 21:44	Dry	1	Fine without high winds

Source: CCC

4.3.34 On the A14 approaching Junction 34 and Junction 34 itself, four collisions were recorded. As per CCC's definition of collision clusters, these four collisions do not form a cluster. No pattern can be identified in determining the occurrence of these collisions. An overview of these collisions is provided in Table 4-11~~Table 4-11~~.

Table 4-11 Overview of collisions in the vicinity of the A14

Severity	Location	Date and time	Road surface conditions	No. of vehicles	Weather
Fatal	A14 - 143 metres from junction 34	13.05.2021, 09:13	Dry	1	Fine without high winds
Serious	Junction 34 of the A14	23.11.2017, 17:27	Dry	3	Fine without high winds
Slight	A14 on-slip near junction with B1047 Horningsea Road	15.07.2021, 21:05	Dry	1	Fine without high winds
Slight	Junction 34 of the A14	24.10.2018, 09:58	Dry	2	Fine without high winds

Source: CCC

4.3.35 No collision cluster has been identified in or around Horningsea as per CCC's definition of collision clusters.

4.3.36 PIC data provided by CCC covers the period November 2016 to November 2021. PIC data provided for the year 2021 is provisional. From the information available the road layout does not appear to be a contributory cause to road safety concerns. ~~a~~

4.4 Fen Ditton

Walking

4.4.1 Appendix A, Figure A.19 details the existing PRoWs within the settlement of Fen Ditton. Fen Ditton is directly served by five footpaths (Footpaths 85/9, 85/1, 85/2, 85/3 and 85/16).

4.4.2 Footpath 85/9 starts on High Ditch Road on the eastern edge of Fen Ditton, and travels for approximately 1km south, providing an off-road pedestrian connection to the A1303 Newmarket Road. This footpath also provides a pedestrian route between Fen Ditton and the Cambridge Ice Arena and the Newmarket Road Park & Ride bus facility.

4.4.3 Footpath 85/1 starts at the Junction of Church Street and the High Street within Fen Ditton. It travels approximately 0.5km south, providing an off-road pedestrian connection to Howard Road in Barnwell. Footpath 85/2 starts approximately 150m to the west of Footpath 85/1 and travels south-west running parallel to the river Cam. It provides a connection to the recently completed Chisholm Trail (Greater Cambridgeshire Partnership, 2021), a recently completed walking and cycling route, which provides a partial off-road and traffic-free route between Cambridge railway station and Cambridge North railway station. The trail also links Addenbrooke's Hospital and the Biomedical Campus in the south and to the business and science parks in the north.

4.4.4 Footpath 85/3 starts on Church Street/Green End and runs north, connecting with Footpaths 85/4 and 85/6. Footpath 85/16 is a short 50m path running from Green End to the river Cam. It does not provide a through route to any other paths or roads.

4.4.5 Within Fen Ditton itself, High Ditch Road, the High Street, and the B1047 Horningsea Road feature pavements on both sides of the road. Signalised toucan crossings are provided on the B1047 Horningsea Road at both the junction with the High Street/High Ditch Road and outside Fen Ditto Community Primary School to the north of the settlement. Church Street and Green End only feature a narrow footway on one side of the road. Despite this, existing pedestrian facilities provide a mostly pedestrian friendly walking space.

4.4.6 Table 4-12~~Table 4-12~~ provides pedestrian (including cyclists and equestrians) flows on Horningsea Road / Low Fen Drove Way and Low Fen Drove Way / High Ditch Road.

Table 4-12 Pedestrian movements

	Horningsea Rd / Low Fen Drove Way	Low Fen Drove Way / High Ditch Rd
AM peak (08:00 – 09:00)	4	4
PM peak (17:00 – 18:00)	20	16

Source: Mott MacDonald

4.4.7 Appendix A, Figure A.20 provides an overview of the 2km walking catchment in the area surrounding Fen Ditton. This has been calculated from an origin point of Horningsea Road.

4.4.8 The 2km walking catchment analysis for Fen Ditton Appendix A, Figure A.20 demonstrates that the settlement has good pedestrian access to the north, where it is possible to reach the southern extent of Horningsea. To the east, it is possible to reach facilities including Newmarket Road Park & Ride and Cambridge Ice Arena. Pedestrian access to the west of Fen Ditton is impacted by the River Cam, which creates severance between Fen Ditton and Chesterton. However, the Chisholm Trail Bridge does help to improve pedestrian access across the river Cam to destinations such as Cambridge North Station (see paragraph 4.4.11).

Cycling

4.4.9 The Fen Ditton to Horningsea Cycleway~~, as described earlier in paragraph 4.3.7,~~ runs immediately north of the settlement alongside the B1047 Horningsea Road for 2km north to the settlement of Horningsea.

4.4.10 A separate shared use pedestrian and cycleway also runs on the opposite side of the B1047 Horningsea Road for approximately 200m from the junction with the High Street/High Ditch Road to Fen Ditton Community Primary School. There are two signalised toucan crossings providing a connection between this route and the Fen Ditton to Horningsea Cycleway. This route is also lit via street lighting.

4.4.11 To the south of the junction between the B1047 Horningsea Road and the High Street/High Ditch Road, a shared use pedestrian and cycleway runs along the eastern edge of the B1047 Ditton Lane for approximately 360m. This provides a connection between Fen Ditton and National Cycle Route 51, an off-road cycle path that provides a route towards Cambridge, including connections with the recently completed Chisholm Trail (Greater Cambridgeshire Partnership, 2021). National Cycle Route 51 also provides a longer distance cycle route, connecting Cambridge with Ipswich and Colchester to the east, and Bedford, Milton Keynes, and Oxford to the west.

4.4.12 National Cycle Route 51 can also be accessed from Fen Ditton by cycling southbound on Footpath 85/1.

4.4.13 Fen Ditton will be served by both the proposed Horningsea Greenway and Swaffhams Greenway (Greater Cambridge Partnership, 2021). The Horningsea Greenway will utilise the existing Fen Ditton to Horningsea Cycleway, providing an active travel route between Fen Ditton and Horningsea. The draft route will include a new wider path on the A14 bridge (Greater Cambridgeshire Partnership, 2021). The Swaffhams Greenway will provide an active travel route to Swaffham Prior in the east (including a connection to the proposed Bottisham Greenway) and Midsummer Common in the west (including a connection with the recently completed Chisholm Trail).

4.4.14 Appendix A, Figure A.21 provides an overview of the cycle network in the vicinity of Fen Ditton.

4.4.15 Appendix A, Figure A.22 provides an overview of the 5km cycling catchment surrounding Fen Ditton. The cycling catchment has been developed based on an origin point on Horningsea Road.

4.4.16 The 5km cycling catchment for Fen Ditton in Appendix A, Figure A.22 demonstrates that the settlement has good cycling access to the north, where it is possible to reach Waterbeach station within 5km using Horningsea Road/Clayhithe Road. To the east of Fen Ditton, it is possible to reach destinations including Cambridge Ice Arena and Newmarket Road Park & Ride within a 2km cycle. To the south and west of Fen Ditton, the cycling catchment is far wider and includes destinations such Cambridge city centre, Cambridge station, Chesterton, and Cambridge North station.

Public transport

4.4.17 Fen Ditton is served by the Landbeach-Cambridge bus route 19 that runs services twice in the morning at 07:26 and 09:56 and twice in the afternoon at 12:55 and 18:20. This service operates from one set of bus stops (Blue Lion PH stops) on the High Street in the settlement and only operates on weekdays (Stagecoach, 2022).

4.4.18 The southbound Blue Lion PH stop features a bus shelter. The northbound Blue Lion PH stop has no bus shelter. Neither bus stop features real time bus information screens.

4.4.19 This bus route provides connections with Drummer Street Bus Station in Cambridge to the south, and Waterbeach Station to the north, allowing for further onward travel.

4.4.20 The nearest railway station is Cambridge North, located approximately 1.1km to the east. The shortest route to access this station involves using the Chisholm Trail Bridge over the River Cam.

4.4.21 Public transport services and related infrastructure is shown in Appendix A, Figure A.23.

Local road network

4.4.22 Fen Ditton can be accessed from the north via the B1047 Horningsea Road. This road can be accessed from a signal-controlled junction servicing an eastbound only off-slip of the A14 (junction 34), or along the B1047 Horningsea Road south from Horningsea. To the south, Fen Ditton can be accessed via the B1047 Ditton Lane, itself providing a connection to the A1303 Newmarket Road. The settlement can also be reached from two unclassified roads (High Ditch Road to the east, and Church Street/Green End to the west).

4.4.23 The Fen Ditton to Horningsea shared pedestrian/cycleway (and eventually the Horningsea Greenway) crosses over both junctions using a signalised toucan crossing.

4.4.24 The B1047 Horningsea Road is a single carriageway road with a width of about 7m, with the Fen Ditton to Horningsea shared pedestrian/cycleway running along the western side of the carriageway. For the first 200m north of the junction with the High Street/High Ditch Road, a separate shared pedestrian/cycleway runs on the opposite side of the carriageway.

4.4.25 The High Street and High Ditch Road are single carriageway roads, both with widths of about 7m and pavements on both sides of the road.

Traffic flows

4.4.26 The following junctions were surveyed in Fen Ditton:

- High Ditch Road / Low Fen Drove Way;
- A14 Junction 35; and
- A1303 Newmarket Road / High Ditch Road.

4.4.27 Table 4-13~~Table 4-13~~ provides an overview of the junctions in Fen Ditton.

Table 4-13 Surveyed junctions in Fen Ditton

Junction Name	Characteristics	Method of Control	Key Movements
High Ditch Road / Low Fen Drove Way	Three arm junction	Non-signalised	High Ditch Road westbound High Ditch Road eastbound
A14 Junction 35	Four-arm roundabout	Non-signalised	Newmarket Road northbound Newmarket Road southbound
A1303 Newmarket Road / High Ditch Road	Three arm junction	Non-signalised	Newmarket Road westbound Newmarket Road eastbound

Collision analysis

4.4.28 The Fen Ditton PIC map is shown in Appendix A, Figure A.24. PIC data was obtained from CCC for the five-year period from November 2016 to November 2021. PIC data is shown in Appendix D: PIC Data Analysis.

4.4.29 A total of eight slight collisions were recorded in the vicinity of Fen Ditton and on High Ditch Road (excluding the accidents shown at Junction 34 of the A14). Of these, six were recorded in Fen Ditton itself. The two collisions located immediately outside of the Fen Ditton Primary School involved a collision between a vehicle and children. At the High Ditch Road/B1047 Horningsea Road junction, two slight collisions occurred between vehicles and did not involve any vulnerable users. Further north along B1047 Horningsea Road (close to the Musgrove Way bus stop), two slight collisions occurred between vehicles with no vulnerable users involved. No particular pattern could be observed to explain the occurrence of these collisions.

4.4.30 To the east of Fen Ditton on High Ditch Road, two slight collisions occurred. Both collisions involved a collision between a vehicle and two children. No particular pattern could be observed to explain the occurrence of these collisions.

4.4.31 Three serious collisions were recorded in the vicinity of Fen Ditton. Of these, two instances involved a collision between a vehicle and a cyclist, and a vehicle and a pedestrian respectively. No particular pattern could be observed to explain the occurrence of these collisions. Table 4-14~~Table 4-14~~ summarises the recorded conditions for serious collisions in the vicinity of Fen Ditton.

Table 4-14 Overview of serious collisions in the vicinity of Fen Ditton

Location	Date and time	Road surface conditions	No. of vehicles	Weather
High Ditch Road	07.10.21, 18:55	Dry	1	Fine without high winds
High Street at junction with Ditton Lane	12.10.19, 23:41	Wet/damp	2	Raining without high winds
Outside 56 B1047 Horningsea Road	05.10.16, 19:14	Dry	1	Fine without high winds

Source: CCC

4.4.32 A summary of the collisions recorded on the A14 approaching Junction 34 of the A14, and Junction 34 itself is available at the Collision analysis section.

4.4.33 No fatal collisions were recorded in Fen Ditton.

4.4.34 No collision cluster has been identified in or around Fen Ditton as per CCC's definition of collision clusters.

4.4.35 PIC data provided by CCC covers the period November 2016 to November 2021. PIC data provided for the year 2021 is provisional at best. From the information available the road layout does not appear to be a contributory cause to road safety concerns.

4.5 Milton

Walking

4.5.1 Appendix A, Figure A.25 demonstrates that no PRoWs currently exist either within or starting from Milton.

4.5.2 Pedestrians looking to access the nearest PRoW, Footpath 162/1 along the River Cam, will need to walk approximately 1.3km along Fern Road from the centre of Milton. This narrow lane features no pavements along much of its length and requires pedestrians to cross over an ~~Automatic Half Barrier (AHB~~AHB~~)~~ level crossing.

4.5.3 Within the existing network of Milton, pavements run along both sides of Cambridge Road/High Street through the centre of the settlement. There are three pedestrian crossing facilities on this road (one raised table zebra crossing, one zebra crossing, and one traffic island). Coupled with the 30mph speed limit and some traffic calming measures within the settlement, this provides a mostly pedestrian friendly walking space on the main route through Milton. Most side roads and residential streets within Milton also feature pavements on both sides of the road.

4.5.4 Construction traffic will not travel through Milton itself. Construction vehicles will instead use the A10, which bypasses the settlement to the west, travelling either northbound towards Waterbeach, or southbound towards Junction 33 of the A14 (The Milton Interchange).

4.5.5 The A10 features no pedestrian facilities, aside from a pedestrian footbridge linking separate sides of Butt Lane. This provides a pedestrian route between Milton and the Milton Road Park and Ride bus facility.

4.5.6 Appendix A, Figure A.26 provides an overview of the 2km walking catchment in the area surrounding Fen Ditton. The walking catchment has been developed based on an origin point of High Street.

4.5.7 The walking catchment for Milton in Appendix A, Figure A.26 demonstrates that almost all destinations within Milton can be reached within a 2km walking distance. To the east, pedestrians can reach the River Cam crossing at Baits Bite Lock using Fen Rd within a 2km walking distance of the origin point. To the south, the Jane Coston Bridge over the A14 allows pedestrians to reach Cambridge Science Park within a 2km walking distance of the origin point, and to the west a footbridge over the A10 provides access to Milton Road Park & Ride within a 2km walking distance of the origin point.

Cycling

4.5.8 Within the existing network of Milton, Cambridge Road/High Street features both on-road advisory cycle lanes, and a shared pedestrian and cycleway on the eastern side of the road. The shared pedestrian and cycleway runs north to south from the junction between Ely Road and North Lodge Park, to southern edge of Milton. It then crosses over the A14 via the Jane Coston Cycle Bridge, providing a connection between Milton and Chesterton and connecting Cambridge Road with Cowley Road. This provides the most direct cycling route into the centre of Cambridge.

4.5.9 Within Milton itself, there is limited cycle parking, aside from two cycle racks outside the shops adjacent to Edmund Close.

4.5.10 Local cycle routes are also available via off-road paths through Milton Country Park, and along Coles Road and Fen Road. The Fen Road cycle route provides a connection to National Cycle Route 11 along the River Cam (Sustrans, 2022). As demonstrated in Table 4-1 and Figure 4.1~~Error! Reference source not found.~~ (see Section 4.2), this National Cycle Route 11 does not provide a direct connection with the city centre but is nevertheless popular with cyclists, joggers, walkers, and those accessing the river for rowing activities.

4.5.11 The proposed Waterbeach Greenway will pass through Milton. This will include a western spur from Waterbeach leading to the north of Milton settlement, and another travelling east to the river and Haling Way. The route will continue along an existing path through Milton Country Park to the Jane Coston Bridge across the A14. A new, more direct route to Cambridge North railway station will involve the construction of an underpass under the A14. In both cases, the route will end at Cambridge North, providing a direct link to the Chisholm Trail (Greater Cambridgeshire Partnership, 2021). The cycling network in the vicinity of Milton is shown in Appendix A, Figure A.28.

4.5.12 Appendix A, Figure A.28 provides an overview of the 5km cycling catchment surrounding Milton. The cycling catchment has been developed based on an origin point on High Street.

~~4.5.11~~

~~4.5.12~~4.5.13 The 5km cycling catchment for Milton in Appendix A, Figure A.28 demonstrates that the settlement has good cycling access to the north, where it is possible to reach Waterbeach and Waterbeach station within 5km of the origin point using Ely Road. To the south, by using the Jane Coston Cycle Bridge, cyclists can reach Cambridge city centre, Cambridge Science Park, Chesterton, and Cambridge North station within 5km of the origin point. There is limited cycling permeability to the east of Milton; however, cyclists can reach Impington within 5km of origin point by using Butt Lane.

~~4.5.13 Appendix A, Figure A.28 provides an overview of the 5km cycling catchment surrounding Milton. The cycling catchment has been developed based on an origin point on High Street.~~

Public transport

4.5.14 Milton is directly served by three bus routes: the hourly Milton-Cambridge city centre bus route 9, bus route Citi 2, and bus route 604. These operate from 5 sets of stops (Winship Road, Barnabas Court, Edmund Close, Waggon & Horses, and College of West Anglia stops). Milton Park-and-ride is also accessible from the centre of Milton.

4.5.15 Bus stops within Milton feature the following facilities:

- Winship Road stops both feature bus shelters and real time bus information screens;

- Barnabas Court stops only feature a bus shelter on the southbound stop, with no real time bus information screens;
- Edmund Close stops also only feature a bus shelter on the southbound stop, with no real time bus information screens;
- Waggon and Horses stops feature only a bus shelter on the southbound stop but do have real time bus information screens; and
- College of West Anglia stops only feature a bus shelter on the southbound stop, with no real time bus information screens.

4.5.16 Bus route 9 operates between Littleport in the north and Cambridge in the south and provides a half hourly service in the morning peak 06:30, and an hourly service throughout the rest of the day until 19:00. It operates from 5 sets of bus stops throughout Milton (Winship Road, Barnabas Court, Edmund Close, Waggon & Horses, and College of West Anglia stops) (Stagecoach, 2022).

4.5.17 Bus route Citi 2 provides a service between Milton (Winship Road, Barnabas Court, Edmund Close, Waggon & Horses, and College of West Anglia stops) and Addenbrooke’s Hospital (via the centre of Cambridge) in the morning peak, and from Addenbrooke’s Hospital (via the centre of Cambridge) to Milton in the evening peak, and on to Waterbeach and Landbeach. During the day, the service starts at Addenbrooke’s Hospital and terminates at the Cambridge North Station. The bus service begins at 06:35 and ends at 22:45, and operates services every 20 minutes (Stagecoach, 2022)

4.5.18 Bus route 604 Line operates in a loop running from Milton to Impington via Butt Lane, before returning to Milton via the A14. The service is designed to serve students of Impington Settlement College. It therefore operates on school weekdays only, with a single outbound service at 8:30 from the Winship Road stop, and a single return service to the College of West Anglia stop via the A14. It operates from 5 sets of bus stops throughout Milton (Winship Road, Barnabas Court, Edmund Close, Waggon & Horses, and College of West Anglia stops), but can only be accessed from northbound bus stops (Stagecoach, 2022).

4.5.19 Milton Park-and-Ride can be accessed from the centre of Milton by walking down Butt Lane and crossing a footbridge over the A10; a distance of approximately 800m. This facility offers a bus service that runs towards Drummer Street Bus Station in Cambridge. This bus service operates every 15 minutes from 06:45 to 18:00 and every 20 minutes 18:00 until 19:40 Monday to Saturday, and every 15 minutes from 08:45 until 17:45 on Sundays. A return bus service operates at the same frequencies until 20:00 Monday to Saturday, and 18:05 on Sundays (Cambridge Park & Ride, 2022). Milton Park-and-ride also features 50 cycle parking spaces, and indoor waiting area facilities including toilets.

4.5.20 The nearest railway station is Cambridge North which is located approximately 2km from the centre of Milton.

4.5.21 Public transport services and related infrastructure are shown in Appendix A, Figure A.29.

Local road network

4.5.22 From the north, Milton can be accessed from the A10 Ely Road via Ely Road (unclassified road) from the north by using a southbound only slip road, and from the south by turning right using an unsignalized junction. A10 Ely Road (unclassified road) is a single carriageway road approximately 7m in width, with a pavement running alongside the east of the road for until the road reaches the junction of North Lodge Park, when it becomes a shared use pedestrian and cycleway as it travels through Milton. Ely Road (unclassified road) has a 50mph speed limit until it reaches Milton, where it drops to 30mph as it travels through the settlement.

4.5.23 An unsignalised junction on the A10 approximately 750m to the south of the A10 Ely Road junction can also be used to access Milton from the north, via Humphries Way and Landbeach Road. This junction features unsignalized pedestrian crossings and a short 130m stretch of shared pedestrian and cycleway. Both Humphries Way and Landbeach Road feature carriageway widths of approximately 6m. Humphries Way features pavements on both sides of the carriageway, while Landbeach Road only features a pavement on its western side until it reaches the junction with High Street. Both roads have a 30mph speed limit.

4.5.24 The A10 is wide single carriageway road with a width of approximately 10m. It bypasses Milton to the west and connects with Junction 33 of the A14 (The Milton Interchange). The road features no pavements and has a 50mph speed limit along the stretch of road running parallel to Milton.

4.5.25 From the south, Milton can be accessed from Junction 33 of the A14 (The Milton Interchange) via Cambridge Road. Between Junction 33 (The Milton Interchange) and the roundabout junction providing access to a Tesco superstore, industrial units, and Milton Country Park, Cambridge Road is a single carriageway with width of approximately 8m and a 50mph speed limit. A shared-use pedestrian and cycleway runs along the southern side of road; however, this is heavily overgrown, and is likely no longer used, since the Jane Coston Bridge provides a safer alternative pedestrian/cycle route over the A14.

4.5.26 To the immediate north beyond the previously mentioned roundabout junction, the speed limit on Cambridge Road drops to 30mph, and the carriageway features advisory cycle lanes on both sides.

Traffic flows

~~4.5.26~~4.5.27 Table 4-15~~Table 4-15~~ provides an overview of the junctions and the associated key movements in Milton.

Table 4-15 Surveyed junctions in Milton

Junction name	Characteristics	Method of control	Key movements
Milton Interchange (J33)	5-arm Roundabout	Signalised	A10 northbound Cambridge Rd north-east A14 eastbound Milton Road southbound A14 westbound
A1309 Milton Rd/Cowley Rd	Three arm junction	Signalised	Milton Rd northbound Milton Rd southbound
Cowley Rd West/Cowley Rd East	Three arm junction	Non-signalised	Cowley Rd westbound Cowley Rd eastbound
Milton Rd/Cowley Park	Three arm junction	Signalised	Milton Rd northbound Milton Rd southbound
Milton Rd/Kings Hedges Rd/Green End Rd	Cross-junction	Signalised	Milton Rd northbound Milton Rd southbound
Green End Rd NE/Green End Rd SE	Three arm junction	Non-signalised	Green End Rd westbound Green End Rd eastbound

Collision analysis

~~4.5.27~~4.5.28 The Milton PIC map is shown in Appendix A, Figure A.30. PIC data was obtained from CCC for the five-year period from November 2016 to November 2021. PIC data is shown in Appendix D: PIC Data Analysis. The PIC study area does not include roads within Milton. A PIC analysis of the section of the A10 between Junction 33 of the A14 (the Milton Interchange) and Ely Road is provided. The PIC analysis of the A10 includes the northbound approach of Junction 33 (the Milton Interchange) as well as off-slip and on-slip roads to the A14.

~~4.5.28~~4.5.29 30 slight collisions were recorded on the section of the A10 adjacent to Milton.

~~4.5.29~~4.5.30 Five serious collisions were recorded on the section of the A10 adjacent to Milton. Of these, one collision involved a powered two-wheeler. No particular pattern can be observed to explain the occurrence of these collisions. Table 4-16~~Table 4-16~~ provides an overview of serious collisions which occurred on the section of the A10 adjacent to Milton.

Table 4-16 Overview of serious collisions

Location	Date and time	Road surface conditions	No. of vehicles	Weather
Milton - A10 at junction with Landbeach Road	29.06.2017, 07:08	Dry	2	Fine without high winds
A10 - entrance to Rectory Farm	18.03.2017, 16:06	Dry	2	Fine without high winds
A10 Milton bypass - near Park and Ride service	07.07.2021, 16:13	Dry	2	Fine without high winds
A10 Milton bypass junction with Landbeach Road	08.01.2020, 17:00	Dry	2	Fine without high winds
A10 Milton bypass near junction with Humphries Way	20.04.2021, 17:55	Dry	2	Fine without high winds

Source: CCC

~~4.5.30~~4.5.31 Table 4-17~~Table 4-17~~ provides information on the one fatal collision recorded on the section of the A10 adjacent to Milton. No vulnerable users were involved.

Table 4-17 Overview of fatal collision

Location	Date and time	Road surface conditions	No. of vehicles	Weather
A10 (Ely Road) - 100 metres south west of junction with Humphries Road	09.03.2017, 08:23	Dry	2	Fine without high winds

Source: CCC

~~4.5.31~~4.5.32 CCC defines a collision cluster as “a junction or 100 metre length of road (in a 3-year period) with: 6 or more injury collisions; 3 or more fatal or serious collisions; or 5 or more injury collisions providing that one of them is fatal or serious. A "sliding scale" is used for the number collisions required for a longer length of road to become a collision site.” (Cambridgeshire County Council, 2021)

~~4.5.32~~4.5.33 Based on this definition, a single collision cluster has been identified at Junction 33 (the Milton Interchange) roundabout (TIP ID 0176). The cluster is comprised of nine slight collision. Table 4-18~~Table 4-18~~ provides an overview of the accidents making part of the cluster.

Table 4-18 Overview of collision cluster (TIP ID 0176)

Location	Date	Road surface conditions	No. of vehicles	Weather
Milton Road - A10 roundabout, A10 over A14	21/02/17, 12:52	Dry	1	Fine without high winds
A14	25/05/17, 18:13	Dry	2	Fine without high winds
Milton Road A1309 / A10	05/05/16, 09:00	Dry	2	Fine without high winds
Milton road (A1309) at junction with A10	13/06/21, 10:46	Dry	2	Fine without high winds
A10 roundabout - junction with A14	28/06/21, 16:10	Dry	2	Fine without high winds
Milton road (a1309) near junction with A10	14/01/20, 12:25	Wet/Damp	2	Fine without high winds
Milton bypass (A10).	05/03/19, 13:00	Dry	2	Fine without high winds
A10 junction with A14	18/10/19, 00:45	Wet/Damp	1	Raining without high winds
Under junction 33 (the Milton Interchange) westbound A14	16/09/17, 16:53	Wet/Damp	3	Raining without high winds

Source: CCC

~~4.5.33~~4.5.34 Of these nine collisions, two collisions involved a collision between a car and a powered two-wheeler in light and dry conditions in February 2017 and June 2021 where both vehicles were travelling in the same direction and collided. ~~N~~

~~4.5.34~~4.5.35 PIC data provided by CCC covers the period November 2016 to November 2021. PIC data provided for the year 2021 is provisional at best. From the information available the road layout does not appear to be a contributory cause to road safety concerns.

4.6 Chesterton

Walking

4.6.1 Appendix A, Figure A.31 details the existing PRoWs within Chesterton. Chesterton is directly served by two PRoWs (Footpath 39/13 and 39/21).

4.6.2 Footpath 39/13 begins just south of the junction between Fen Road and Fallowfield, and heads northeast following the northern bank of the River Cam. It continues this route until it becomes Footpath 162/1, which follows the river Cam north to Waterbeach, including connections with Footpath 85/6 at Baits Bite Lock.

4.6.3 Footpath 39/21 begins on Water Street, and heads south over the River Cam via the Green Dragon Bridge. Just south of this bridge, it connects with Footpath 39/20 heading south to Garlic Row, and Footpath 39/22 which runs along the southern bank of the River Cam. Footpath 39/22 subsequently connects with Riverside to the south, and Footpath 39/17 to the north.

4.6.4 Within the existing network of Chesterton, construction vehicles will travel from the junction between Milton Road/Green End Road, and will use Green End Road, Water Lane, and Fen Road to access the Waterbeach Pipeline works corridor. Green End Road features pavements on both sides of the road, five pedestrian crossings (three signalised crossings, two zebra crossings, and one unsignalised crossing with a raised table), traffic calming measures (speed bumps), and a 20mph speed limit. This provides a mostly pedestrian friendly walking space.

4.6.5 Water Lane features pavements on both sides of the road, two unsignali~~z~~sed pedestrian crossings with tactile paving, traffic calming measures (speed bumps), and a 30mph speed limit. This provides a mostly pedestrian friendly walking space.

4.6.6 Fen Road features pavements on both sides of the road from Water Lane until the junction with Cheney Way. This section of Fen Road also features an unsignalis~~z~~ed pedestrian crossing with tactile paving, traffic calming measures, and a 30mph speed limit, making it a mostly pedestrian friendly walking space.

4.6.7 Beyond the junction with Cheney Way, pedestrians walking along Fen Road must use a narrow pavement on the western side of the road, which is overgrown in several places. This route also requires pedestrians to cross over an ~~Automatic Half Barrier (AHB)~~AHB level crossing, with no footway present for a 75m stretch of Fen Road north of this crossing.

4.6.8 Appendix A, Figure A.32 provides an overview of the 2km walking catchment in the area surrounding Chesterton.

4.6.9 The walking catchment for Chesterton in Appendix A, Figure A.32 demonstrates that there is good pedestrian access to the north of the origin point, with destinations including Cambridge Science Park located.

4.6.10 Within a 2km walking catchment of the origin point to the south, the walking catchment is more limited, owing to severance caused by the railway line and River Cam.

Cycling

4.6.11 Within the existing network of Chesterton, Milton Road features advisory cycle lanes on both sides of the carriageway, from the junction with the Cambridgeshire Guided Busway to the junction between Milton Road and Green End. The northbound cycle lane also features an underpass underneath the Cambridgeshire Guided Busway. This route forms part of the National Cycle Network Route 51.

4.6.12 Green End Road features segregated cycleways on both sides of the carriageway heading south from the Milton Road/Green End Road junction until the roundabout junction between Green End and Nuffield Road. These segregated cycle lanes are separated from the main carriageway by parking bays and green infrastructure, and also feature floating bus stops. This route forms part of the National Cycle Network Route 51.

4.6.13 Beyond the roundabout junction between Green End and Nuffield Road, Green End Road features advisory cycle lanes on both sides of the carriageway, with double yellow line restrictions to prevent parking. These head south along Green End following the junction with Scotland Road, until the roundabout junction between Green End, High Street, and Water Lane. This route forms part of the National Cycle Network Route 51.

4.6.14 Water Lane features a short 100m two-way segregated cycle lane running from the junction with Fallowfield Road to the junction with Lilley Close. At the junction with Fallowfield Road, cyclists can leave the road to join Footpath 39/13 along the River Cam. This provides onward connections to Waterbeach via Footpath 162/1, and the Chisholm Trail southbound via the Chisholm Trail Bridge over the River Cam.

4.6.15 Within Chesterton itself, there is limited cycle parking infrastructure, aside from four cycle racks outside the Nisa Local store on Green End, and three cycle racks on Fen Road by the entrance of Footpath 93/13.

4.6.16 The cycling network in the vicinity of Chesterton is shown in Appendix A, Figure A.33.

4.6.17 Appendix A, Figure A.34 provides an overview of the 5km cycling catchment surrounding Chesterton. The cycling catchment has been developed based on an origin point on Cowley Road.

4.6.18 The 5km cycling catchment for Chesterton in Appendix A, Figure A.34 demonstrates that the settlement has good cycling access in all directions. Destinations that can be reached with a 5km cycling distance of the origin point include the centre of Cambridge, Cambridge Science Park, Cambridge North station, and Cambridge Station, alongside the settlements of Milton and Fen Ditton.

Public transport

4.6.19 The main construction traffic routes within Chesterton are served by 8 bus routes: bus route Citi 2, bus route 9, bus route X9, bus route 606, B the busway, C the busway, the park-and-ride service, and bus route 114. These operate from seven sets of stops along the proposed route for construction traffic (Milton Road southbound, Scarsdale Close, Sherbourne Close, Franks Lane, Ashfield Road northbound, Fallowfield, and Izaak Walton Way). The Cambridgeshire Guided Busway can also be accessed within a short distance of Fen Road, at stops located adjacent to Cambridge North Station.

4.6.20 Bus stops along the construction traffic route within Chesterton feature the following facilities:

- Milton Road (southbound) stop features a bus shelter with a real time bus information screen;
- Scarsdale Close stops are floating bus stops with no bus shelters and no real time bus information screens;
- Sherbourne Close stops are floating bus stops that only feature a bus shelter on the southbound stop with a real time bus information screen. The northbound stop features no shelter or real time bus information screens;
- The southbound Franks Lane stop is a floating bus stop with no shelter. The northbound Franks Lane stop is a standard bus stop with no shelter. Neither bus stop features real time bus information;
- Ashfield Road (northbound) stop features no bus shelter or real time bus information screen;
- Fallowfield stops features no bus shelters or real time bus information screens; and
- Izaak Walton Way stops features no bus shelters or real time bus information screens.

4.6.21 Bus route Citi 2 provides a service from Chesterton (Milton Road southbound, Scarsdale Close, Sherbourne Close, Franks Lane, Ashfield Road northbound stops) to Addenbrooke's Hospital in the south and Waterbeach/Landbeach in the north during the morning and evening peaks. During the day, Bus Route Citi 2 travels between Addenbrooke's Hospital in the south and Cambridge North Station in the north. The bus service begins at 06:35 and ends at 22:45, and operates services every 20 minutes (Stagecoach, 2022).

4.6.22 Bus route 9 operates between Littleport in the north and Cambridge Drummer Street Bus Station in the south and provides a half hourly service in the morning peak 06:30, and an hourly service throughout the rest of the day until 19:00 (Stagecoach, 2022). It operates from the Milton Road (southbound) bus stop.

4.6.23 Bus route X9 operates between Littleport in the north and Cambridge Drummer Street Bus Station in the south, on the same route as bus route 9. It operates between 7:30 and 18:25, offering an hourly service during the day, and a half hourly service in the evening peaks (Stagecoach, 2022). It operates Monday and Friday only and serves the Milton Road (southbound) bus stop.

4.6.24 Bus route 606 operates between Impington Settlement College to the north, and Cambridge Drummer Street bus station to the south. It caters for students at local schools. This bus service therefore runs ~~2~~ two bus services a day: a morning service beginning at Cambridge Drummer Street bus station at 08:10, and an afternoon service beginning at Impington Settlement College at 15:30 (Stagecoach, 2021). It operates on school days only and serves the Scarsdale Close, Sherbourne Close, Franks Lane, Ashfield Road, and Water Lane bus stops.

4.6.25 B the busway operates between Cambridge city centre (New Square) to the south, and Hinchingbrooke Hospital in Huntingdon to the north, which a short spur to Cambridge North station. It utilises the Cambridgeshire Guided Busway between Cambridge North station and St Ives. From Monday to Saturday, it operates services every 30 minutes beginning at 04:59 and ending at 23:10 (Stagecoach, 2022). On Sundays and public holidays, it offers hourly services beginning at 06:49 and ending at 22:15. It serves the Milton Road (southbound) bus stop.

4.6.26 C the Busway operates between Long Road Sixth Form College in Trumpington to the south, via Cambridge towards Huntingdon town centre to the north. It utilises the Cambridgeshire Guided Busway between Cambridge North station and St Ives. It operates eight services per day: four southbound services in the morning peak at 10–20-minute intervals between 06:33 and 07:13, and four northbound services in afternoon at 10–20-minute intervals between 15:05 and 15:45 (Stagecoach, 2022). It serves the Milton Road (southbound) bus stop, meaning that only the morning peak services can be accessed from this stop.

4.6.27 The closest station to Chesterton is Cambridge North, located approximately 1.4km from the centre of Chesterton. Cambridge North can be accessed via a pedestrian footpath running from Moss Bank, itself accessed from Fen Road. Cambridge North is operated by Network Rail and provides access to Great Northern and Greater Anglia Services.

4.6.28 Great Northern runs southbound services to London King's Cross via Welwyn Garden City from Platform 1, and northbound services to King's Lynn via Ely, Littleport, Downham Market and Watlington from Platform. During peak hours, services run every 30 minutes. At all other times the services are hourly.

4.6.29 Greater Anglia provides southbound services to London Liverpool Street via stops including Cambridge, Bishop Stortford from Platform 1, running every 30 minutes. A southbound service to Stansted airport also departs from Platform 1, running every hour. Northbound services to Norwich and Ely operate from Platform 2. Services to Norwich depart every 30 minutes, with services to Ely departing every 20 minutes.

4.6.30 Cambridge North station also provides access to the B the busway route from Cambridge North Station stops. This forms part of the Cambridgeshire Guided Busway.

4.6.31 Public transport services and related infrastructure are shown in Appendix A, Figure A.35~~A.34~~.

Local road network

4.6.32 From the north, construction vehicles will access Chesterton using Milton Road. Milton Road is generally a wide single carriageway road approximately 10m in width. It includes pavements on both sides of the road, and advisory cycle lanes on both sides of the carriageway. There is also a signalised pedestrian crossing. To the north, Milton Road crosses over the Cambridgeshire Guided Busway with an at gradient signalised crossing. A bus lane on the northbound carriageway of Milton Road runs from this junction approximately 100m to the south.

4.6.33 The junction between Milton Road, Green End Road, and Kings Hedges Road is a four-way signalised crossroads junction. Each junction arm features two approach and turning lanes, with the exception of Milton Road from the north, which features three approach and turning lanes. All four junction arms feature signalised pedestrian crossing, with tactile paving and pedestrian islands.

4.6.34 Green End Road is a single carriageway road. For the first 400m south from the junction with Milton Road, Green End Road and Kings Hedges Road, it has a carriageway width of approximately 6m, and is flanked on both sides by green infrastructure, parking bays, segregated cycle lanes, pavements, and four sets of floating bus stops. There is also a zebra crossing. There are traffic calming measures (speed bumps) and a 20mph speed limit

4.6.35 For the remining 650m stretch of Green End Road, running south from the mini-roundabout junction between Green End Road and Nuffield Road, the carriageway has a width of approximately 8m, including advisory cycle lanes on both sides of the carriageway, flanked by pavements. There are also two zebra crossings, a signalised pedestrian crossing, and an unsignalised pedestrian crossing with a raised table). There are traffic calming measures (speed bumps) and a 20mph speed limit

4.6.36 Water Street is a single carriageway road with a width of approximately 6m. It has pavements on both sides of the road, and a short 100m two-way segregated cycle lane running from the junction with Fallowfield Road to the junction with Lilley Close. It has traffic calming measures (speed bumps) and a 30mph speed limit.

4.6.37 Fen Road is a single carriageway road with a width of approximately 6m. It has pavements on both sides of the road from the junction with Fallowfield until the junction with Cheney Way. From there, Fen Road crosses an Automatic Half Barrier (AHB) level crossing over the railway, with no footway present for a 75m stretch of Fen Road north of this crossing. A narrow footway runs along the north side of Fen Road beyond this point. Fen Road has a 30mph speed limit.

Traffic flows

4.6.38 The following junctions were surveyed in Chesterton using MCCs which included queue length analysis:

- Scotland Road / Green End Road; and
- Green End Road / High Street / Water Lane

4.6.39 Table 4-19~~Table 4-19Table 4-19Table 4-19Table 4-19~~ provides an overview of the junctions in Chesterton.

Table 4-19 Surveyed junctions in Chesterton

Junction name	Characteristics	Method of control	Key movements
Scotland Road / Green End Road	Three arm junction	Non-signalised	Green End Road westbound Green End Road eastbound
Green End Road / High Street / Water Lane	Three arm roundabout	Non-signalised	Green End Road / High Street westbound High Street / Green End Road eastbound

Collision analysis

4.6.40 The Chesterton PIC map is shown in Appendix A, Figure- A.36~~A.35~~. PIC data was obtained from CCC for the five-year period from November 2016 to November 2021. PIC data is shown in Appendix D: PIC Data Analysis. The PIC study area for the purpose of the assessment only covers the construction route, which extends southbound along Milton Road, Green End Road, Water Lane, Water Street and to the northern extent of Fen Road. No other roads in the vicinity of Chesterton are covered within PIC analysis.

4.6.41 A total 33 slight collisions were recorded within the Chesterton PIC study area. Of these, 13 collisions took place on the section of Green End Road between the Milton Road/Green End Road junction and the Green End Road roundabout. Dry road conditions were noted for ten collisions and wet/damp road conditions were noted for three collisions. This section of Green End Road (between the Milton Road/Green End Road junction and the Green End Road roundabout) features a number of junctions but a majority of collisions did not involve any turning manoeuvre. The five collisions that did involve a turning manoeuvre are summarised in Table 4-20~~Table 4-20Table 4-20Table 4-20Table 4-20~~.

Table 4-20 Overview of slight collisions involving a turning manoeuvre on Green End Road

Location	Date and time	Road surface conditions	No. of vehicles	Manoeuvre
Kendal Way near junction with Green End Road	25/07/19	Dry	2	Left turn
Green End Road at junction with Scotland Road	15/02/17	Dry	2	Right turn
Green End Road junction with Nuffield Road	25/01/17	Dry	2	Right turn

Location	Date and time	Road surface conditions	No. of vehicles	Manoeuvre
Green End Road at junction with Franks Lane.	15/06/19	Dry	2	Right turn
Green End Road at junction with Scotland Road	15/10/20	Wet/damp	2	Right turn

Source: CCC

4.6.42 Three of these collisions involved a collision between a car and cyclist at:

- Kendal Way near the junction with Green End Road;
- Green End Road junction with Nuffield Road; and
- Green End Road junction with Franks Lane

4.6.43 One collision involved a collision between a car and a powered two-wheeler at the Green Road junction with Scotland Road.

4.6.44 No fatal collisions were recorded within the Chesterton PIC study area.

4.6.45 Ten serious collisions were recorded within the Chesterton PIC study area. Of these, five collisions involved a turning manoeuvre, summarised in Table 4-21~~Table 4-21~~Table 4-21Table 4-21~~Table 4-21~~.

Table 4-21 Overview of serious collisions involving a turning manoeuvre

Location	Date and time	Road surface conditions	No. of vehicles	Manoeuvre
Green End Road at junction with Green Park	09/07/17, 14:00	Dry	2	Left turn
Green End Road at junction with Water Lane	01/03/17, 07:55	Dry	2	Right turn
Green End Road at junction with road leading to Brown's Field Youth and Community centre	07/09/18, 07:35	Dry	2	Right turn
Green End Road at junction with Nuffield Road	12/03/18, 18:42	Wet/damp	2	Right turn
Green End Road near junction with Milton Road (A1309)	13/04/21, 17:07	Dry	2	Right turn

Source: CCC

4.6.46 All collisions involving a turning manoeuvre also involved a collision between a car and a cyclist. The occurrence of collisions between a car and a cyclist is explained by the lack of cycling infrastructure on Green End Road prior to late 2018/2019 which made cyclists more vulnerable to cars, especially those making turning manoeuvres. Since 2019, footpaths have been narrowed to create a partially segregated cycle lane of around 1.7m-2m width running parallel to Green End Road.

4.6.47 With the exception of the Green End Road/Milton Road junction, none of the junctions where collisions involving turning manoeuvres have been recorded (Table 4-20~~Table 4-20Table 4-20Table 4-20Table 4-20~~ and Table 4-21~~Table 4-21Table 4-21Table 4-21Table 4-21~~) are signalised. The Green End Road junctions with Kendal Way, Franks Lane, and Green Park are priority T-junctions. The Green End Road junctions with Scotland Road and Nuffield Road are both unsignalised roundabouts. The Green End Road junction with the access road to the Brown's Field Youth and Community Centre is unsignalised.

4.6.48 No collision clusters have been identified based on CCC's definition.

4.6.49 PIC data provided by CCC covers the period November 2016 to November 2021. PIC data provided for the year 2021 is provisional at best. From the information available the road layout does not appear to be a contributory cause to road safety concerns A

4.7 Strategic road network

A10

4.7.1 The study area considers the section of the A10 between Waterbeach and junction 33 of the A14 (the Milton Interchange), also known as Ely Road. The A10 is a single carriageway road that links London in the south, to Kings Lynn in the north.

4.7.2 A shared-use footpath of approximately 1.3m width lies on the southbound lane of the A10 and provides a walking and cycling connection between the settlements of Milton and Waterbeach. No active travel infrastructure is available on the northbound lane of the A10.

4.7.3 Table 4-22~~Table 4-22Table 4-22Table 4-22Table 4-22~~ Provides an overview of the observed flows during the peak hours of 08:00-09:00 and 17:00-18:00 for traffic accessing and egressing the A10 via Junction 33 (the Milton Interchange) of the A14. Traffic surveys were carried out in December 2021.

Table 4-22 AM peak (08:00-09:00) and PM peak (17:00-18:00) traffic flows on the A10

Road	AM peak (08:00-09:00)		PM peak (17:00-18:00)	
	Car/van	HGV	Car/van	HGV
A10 northbound	1,233	91	1,217	31
A10 southbound	1,171	82	1,043	48

A14

4.7.4 The study area considers the section of the A14 between junction 33 (the Milton Interchange), junction 34, and junction 35 (the Stow Cum Quy Interchange). The A14 is part of the Strategic Road Network and provides key connections to radial routes for access to Cambridge City and other settlements in the area.

4.7.5 Table 4-23~~Table 4-23Table 4-23Table 4-23Table 4-23~~ shows the 2019 and 2020 two-way Annual Average Daily Traffic (AADT) for the sections of the A14 between Junctions 33, 34 and 35 using AADT data obtained from the DfT's road traffic statistics (DfT, 2022) (DfT, 2022). A percentage is also shown to demonstrate the difference in two-way AADT in 2019 compared to 2020 when COVID-19 lockdowns occurred.

Table 4-23 Two-way AADT on the A14

Link	2019 two-way AADT	2020 two-way AADT	Percentage difference
A14 between junction 33 (the Milton Interchange) and junction 34	62,420	44,487	-29%
A14 between junction 34 and junction 35 (the Stow Cum Quy Interchange)	50,966	36,566	-28%

Source: DfT

5 Existing Traffic Flows

5.1 Survey background/methodology

5.1.1 ~~Mott MacDonald appointed Intelligent Data Collection to carry out t~~Traffic surveys were carried out on the 4th, 7th, and 8th December 2021 across 24 locations to capture vehicle, pedestrian, and cyclist movements, to establish a 2021 baseline. Locations, survey durations, and survey types were agreed in advance with CCC. ~~-~~

5.1.2 Appendix A, Figure A.37 ~~A.36~~ shows the locations and survey types

~~5.1.2~~5.1.3 contains the detailed survey results.

~~5.1.3~~5.1.4 In agreement with CCC, at the Traffic Working Group meeting in on the 13 April 2022, an additional set of automatic traffic counts (ATC) were carried out between the 17th of May to the 30th of May 2022 across nine locations, shown in Appendix A, Figure A.38 ~~A.37~~. This was carried out to check the robustness of the December 2021 data, which forms the 2021 baseline for modelling.

~~5.1.4~~5.1.5 A comparison between the December 2021 and the May 2022 data has been carried out in Table 5-1. The ATC and MCC comparisons can be found in Appendix I: MCC and ATC comparisons.

Table 5-1 Comparison of December 2021 and May 2022 survey data

Road	Comparison to 2021 peak flows (- denotes MCC higher)
Denny End Road	8.0%
Bannold Road	3.5%
Car Dyke Road	-1.1%
Horningsea Road	1.0%
Milton Road	-0.4%
Green End Road	-3.1%
Water Street	-10.5%

~~5.1.5~~5.1.6 The observed increase on Denny End Road during the 17th of May to 30th May 2022 survey period occurs as a result of cumulative construction vehicle movements required for the Waterbeach New Town development (planning ~~R~~refence S/0559/17OL.)

~~5.1.6~~5.1.7 The survey comparison check was discussed and agreed with CCC officers at the TWG on 30 June 2022.

5.2 Traffic volumes

5.2.1 Table 5-2~~Table 5-2Table 5-2Table 5-2Table 5-2~~ provides traffic volumes for the surveyed junctions during the peak hours in the 4th, 7th, 8th December 2021 period.

Table 5-2: Traffic volumes in the 4th, 7th, 8th December 2021 period.

Junction	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Car	HGV	Car	HGV
Ely Road/Denny Ed Rd	1156	423	1328	233
Denny End Rd/Bannold Rd	521	105	544	80
Bannold Rd/Way Ln	200	35	202	29
Bannold Rd/Bannold Drove	27	9	13	5
Way Ln/Burgess Rd	193	21	220	25
Burgess Rd/ Rosemary Rd	24	5	18	4
Cambridge Road/Chapel St/Green Side	482	98	566	90
Chapel St/Andrews Hill	450	80	558	53
Car Dyke Rd/Ely Rd	1346	420	1456	258
Horningsea Rd/Low Fen Dr/Biggin Ln	359	81	382	43
B1047 Horningsea Road/A14 off-slip	781	181	773	82
B1047 Horningsea Road/A14 on-slip	1115	233	1306	141
Milton Interchange (J33)	3635	964	3696	515
A1309 Milton	2176	530	2034	254

Junction	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Car	HGV	Car	HGV
Rd/Cowley Rd				
Cowley Rd West/Cowley Rd East	495	164	463	72
Milton Rd/Cowley Park	1259	403	1258	189
Milton Rd/Kings Hedges Rd/Green End Rd	1375	481	1480	228
Green End Rd NE/Green End Rd SE	466	172	481	83

5.2.2 Base year observed traffic data are also shown in traffic flow diagrams (Application Document Reference 5.4.19.5)

5.3 Existing pedestrian and cyclist counts

5.3.1 Table 5-3 provides the number of pedestrians and cyclists for the surveyed junctions in the 4th, 7th, 8th December 2021 period.

Table 5-3: Pedestrian and cyclists count in the 4th, 7th, 8th December, 2021 period

Junction name	Workday						Weekend
	AM (07:00-08:00)	AM (08:00 - 09:00)	AM (09:00 - 10:00)	PM (16:00-17:00)	PM (17:00-18:00)	PM (18:00-19:00)	(12:00-13:00)
Denny End Rd / Bannold Rd	2	5	6	5	6	5	17
Bannold Rd / Way Lane	5	27	3	3	0	3	0
Bannold Rd / Bannold Drove	8	30	12	4	2	0	21
Way Lane / Burgess Rd	3	11	3	1	1	0	6
Burgess Rd / Rosemary Rd	18	27	10	6	4	9	27

Junction name	Workday						Weekend
	AM (07:00-08:00)	AM (08:00 - 09:00)	AM (09:00 - 10:00)	PM (16:00-17:00)	PM (17:00-18:00)	PM (18:00-19:00)	(12:00-13:00)
Cambridge Rd / Green Side	8	34	39	29	22	20	40
Chapel St / St Andrews Hill	33	74	37	31	30	28	60
Horningsea Rd / Low Fen Drove Way	0	0	0	2	0	0	4
Horningsea Rd / A14 Off-slip	9	10	7	5	6	7	4
Horningsea Rd / A14 On-slip	9	10	7	7	6	7	6

5.3.2 The survey shows modest level of NMU movement across all junctions on both workday and at the weekend.

5.3.3 Among all surveyed junctions, Chapel St/St Andrews Hill junction experiences the highest flow throughout the week. This is likely due to the variety of amenities provided in adjacent to the junction (e.g., cafes, restaurants and parking space), as well as the proximity to ~~the~~ Waterbeach railway station and being on the way to the local primary school. However, overall movement level remains moderate, with the number of pedestrians and cyclists spotted counted at around 50 during workday non-peak hours and below 80 during peak hours and weekend.

5.3.4 Numbers of NMU both before and after workday peak hours also appear low (below 50 across all junctions). Therefore, the mitigation measure within the CTMP (Application Document Reference 5.4.19.7) which requires all construction deliveries to be made outside of peak hours (08:00 to 09:00, 15:00 to 16:00 and 17:00 to 18:00) would manage construction vehicles and NMU interactions. A WCHAR has been completed and is available in Appendix E: WCHAR~~Appendix E~~.

6 Committed Developments

6.1.1 The ~~Long List of Other Developments~~cumulative schemes considered in the assessment are common to those considered within the ES Chapter 22: Cumulative Effects Assessment (Application Document Reference ~~5.4.21.1~~5.2.22) has been used to derive a future baseline in order to understand operational traffic movements.

6.1.2 Owing to the use of the TEMPro growth factor (see Section 7.3 for explanation) and the agreement with CCC that a singular factor is able to account for future trip generation in the area, including from committed developments, no further information on trip generation has been taken from the TAs for relevant schemes where the information is publicly available. This includes the use of the Waterbeach New Town East - Transport Assessment (WSP, 2018).

6.1.3 A TEMPro growth factor has been used to determine the growth of traffic based on a 2021 baseline (built using traffic survey data collected in December 2021 and May 2022), for the future baseline year 2026, opening year 2028 and year 10 operational year 2038. The TEMPro growth factor used also encapsulates and accounts for traffic, both during construction and operation, of committed developments in the area. This has been agreed with CCC on 18 January 2022.

6.1.4 In August 2022 TEMPro version 8 has been released, containing updated projections of trip-end growth (DfT, 2022). There is no evidence found to indicate trips rates have changed from those used in the previous version. Therefore, the applied growth factors are unlikely to change.

6.1.5 Key developments to be accounted for in terms of cumulative demand on the transport network include (these have been reviewed for further schemes and proposals that have come forward):

- Waterbeach New Town, including the relocation of the Waterbeach Station;
- Marleigh Development;
- Land north of Cherry Hinton; and
- Cambridge Eastern Access Scheme (CEAS).

6.1.6 There are no National Highways plans for the A14 that would affect junction 33 (the Milton Interchange) or junction 34 (Horningsea Road) to be considered as part of any future baseline to be assessed within this TA.

6.1.7 Improvements or alterations associated with either CCC's Local Cycling and Walking Infrastructure Plan and Greater Cambridgeshire Planning's (GCP), this includes plans for the CEAS and Greater Cambridge Greenways project, have been considered as part of any future baseline to be considered with the assessment for traffic and transport.

6.1.8 Waterbeach New Town and the Waterbeach Station relocation are the main large-scale developments planned for Waterbeach. This New Town project will provide up to 6500 dwellings and much more for the community. The new station aims to have pedestrian and cyclist friendly infrastructure/facilities, with application permission granted for relocation in 2020.

6.1.9 There are development plans for the safeguarded land on the Cambridge Airport site (part of the Cambridge EAAP), not occurring until the relocation of Marshall's airside activities, set to be 2030 but not yet confirmed. The plan brings approximately 7,000 homes built on the airport site, with 2,900 of these by 2041. A planning application for the residential institutional uses of the location is likely to be submitted 2022/23.

6.1.10 Marleigh is a thriving, growing community, being a 15-minute cycle from Cambridge city center and part of the Cambridge EAAP. The latest phase (Phase 2) began in April 2022, with the whole scheme delivering 1,300 new homes once completed. Marleigh Primary and Nursery Academy opened in September 2022, having a student capacity of 450. The whole project is set to be completed by 2024.

6.1.11 The Cherry Hinton North development (land north of Cherry Hinton) has had planning submission over summer 2022, after getting outline planning permission granted in 2020 (this location being part of the Cambridge EAAP). This development scheme will include bringing 1,200 new homes, two schools and designated cycle lanes. Construction of new homes are set to commence Spring 2023, with latest updates from June 2022 including ongoing archaeology work and beginning work on temporary construction access junctions.

6.1.12 The CEAS is a strategic plan for improvements to public transport, cycling and walking for those travelling into Cambridge from the east, with public support. There are three main separate areas of work as part of this project being: 1. Improvements to public transport, cycling and walking on Newmarket Road which can be delivered prior to 2025, as well as potential relocation of the Newmarket Road Park and Ride, 2. Longer term improvements which can be delivered after 2025, and 3. The upgrading of the Cambridge to Newmarket railway line. This project aims to reduce the congestion during peak times that won't be able to support future growth along the Cambridge Eastern Access corridor.

7 Trip Generation, Distribution, and Assignment During Construction

7.1 Trip generation associated with construction activities

7.1.1 This section provides an overview of construction vehicle movements for the duration of construction. An overview of the total number of construction vehicle movements is provided, followed by the peak period construction vehicle movements for the main works site and associated pipeline infrastructure. For clarity, peak period construction vehicle movements have been split by location.

7.1.2 Construction movements are required for:

- movement of materials and construction equipment to the Proposed Development;
- movement of the construction workforce to and from the Proposed Development;
- movement of excavated material from the area of land required for the construction of the waste water waste water transfer tunnel, the Waterbeach pipeline and the final effluent pipeline to the area of land required for the proposed WWTP and landscaping;
- movement of waste from the Proposed Development construction locations; and
- the movement of some materials to construction areas that are classed as dangerous loads or that are classed as abnormal loads (DfT, 2022).Abnormal loads will be required for access platforms, process tanks, and pipe bridges.

7.1.3 Construction activities will interact with existing transport infrastructure (such as existing roads, footpaths, and PRoW) due to:

- temporary use of land to install structures such as new pipelines, waste water transfer tunnel and for temporary compound areas;
- temporary use of land for haul routes;
- open cut excavation crossing Horningsea Road to install final effluent pipeline; and
- use of existing level crossings as part of the construction route (see figures for Waterbeach and Chesterton, available in the Transport Assessment in Application Document Reference 5.4.19.3).

7.1.4 Certain construction activities will require a temporary increase in construction vehicle movements, examples of this could be:

- delivery of imported aggregate for project infrastructure and temporary working platforms;
- completion of large concrete pours to bases of process units;
- delivery of precast concrete units for tank walls; and
- delivery of asphalt to roads.

7.1.5 Construction is expected to take place between 2024-2028, with the peak of construction traffic movements occurring in 2026.

7.1.6 For construction the peak is in Year 3 (assumed to be 2026), with a peak 630 movements required on Horningsea Road and the A14 off-slip and on-slip. However, this assumes that the construction of the proposed WWTP (including permanent access and landscape masterplan), the waste water transfer tunnel and the Waterbeach Pipeline traffic would all occur simultaneously.

7.1.7 This peak total daily movement is comprised of construction movements from all structures of the Proposed Development:

- The peak traffic flow for the proposed main WWTP (including permanent access and landscape masterplan): 492 daily total movements
- The peak traffic flow for the Transfer tunnel: 72 daily total movements
- The typical day traffic flow for the Waterbeach Pipeline: 66 daily total movements

7.1.8 For the number of construction vehicle movements for the Waterbeach Pipeline, typical construction vehicle numbers have been used instead of the peak vehicle numbers. This is because the peak represents a site set up or taken down scenario, that would not coincide with the other peak periods. The sequencing of the construction programme is such that the Waterbeach Pipeline peak construction activities and the associated construction vehicle movements, would not occur at the same time as the construction of the proposed main WWTP (including permanent access and landscape masterplan) and the waste water transfer tunnel. However, by including the typical daily construction flows in the reasonable worst-case scenario an allowance is made for a delay to the Waterbeach programme.

7.1.9 The peak daily construction movements required for the Waterbeach Pipeline would amount to:

- For road links in Waterbeach (north of the A14): 82 HGVs and 28 workforce movements
- For sites on Horningsea Road and on Cowley Road (south of the A14): 90 HGVs and 28 workforce movements

7.1.10 In terms of construction movements for the Waterbeach Pipeline, it is anticipated that these activities will be highest during the first 8 weeks of construction when all the equipment including the pipe sections, pipe rings, plant and machinery are delivered to site and the compound area set up. During this period, a temporary haul road surface will also be constructed along both the access tracks and working strip as required by ground conditions. Construction vehicle movements will then peak again during the last 8 weeks when the temporary haul road is removed from site along with the plant and machinery and the compounds dismantled.

7.1.11 To take account of sub-regional growth in housing and employment, a proportionate approach to forecasting future traffic growth has been agreed with CCC and National Highways through the TWG. The forecasting uses factors from the DfT Trip End Model Presentation Programme (TEMPro) to convert baseline traffic flows to future year traffic flows. Application Document Reference 5.4.19.1 contains full details of these counts and a summary of the baseline traffic flows for all links within the traffic and transport study area.

7.1.12 The growth predictions to 2040 have been reviewed to understand the potential for change to baseline traffic volumes that may occur should expected peak years alter due to programme changes. The percentage point increase in TEMPro growth factors is shown in Table 7-1.

Table 7-1: TEMPro growth factor increase

Years	Difference to construction Year 3 (2026) (percentage point increase)
2021-2026	-
2021-2027	0.61%
2021-2028	1.21%
2021-2029	1.82%
2021-2030	2.43%
2021-2031	3.04%
2021-2032	3.62%
2021-2033	4.21%
2021-2034	4.79%
2021-2035	5.37%
2021-2036	5.96%
2021-2037	6.54%
2021-2038	7.12%
2021-2039	7.69%
2021-2040	8.28%

7.1.13 Without the Proposed Development the growth traffic volumes would be expected to continue. It is however noted that the trip budget within the NECAAP under policy 22 would be expected to apply.

7.1.14 Should the expected construction start date of 2024 alter and subsequently change the peak year for construction movements, assuming a delay of 2 years, the assessed baseline would remain valid as future baseline traffic for 2028 increase is forecast by 1.21% and would not materially change the findings of the transport assessment.

Activities requiring construction vehicle movements

7.1.15 Figure 7.1~~Figure 7.1~~ below shows the estimated number of construction vehicle movements per day (two way) required for the construction of the main WWTP. It is anticipated that during the peak construction period, there will be 280 HGV movements per day (two way). In addition, there will be 212 Light Goods Vehicle (LGV) delivery and construction worker arrivals/departures. This makes a total of 492 daily vehicle movements the peak number of vehicles for consideration of the impacts of the proposed development occurring around August 2026 to October 2026, year two of the construction phase.

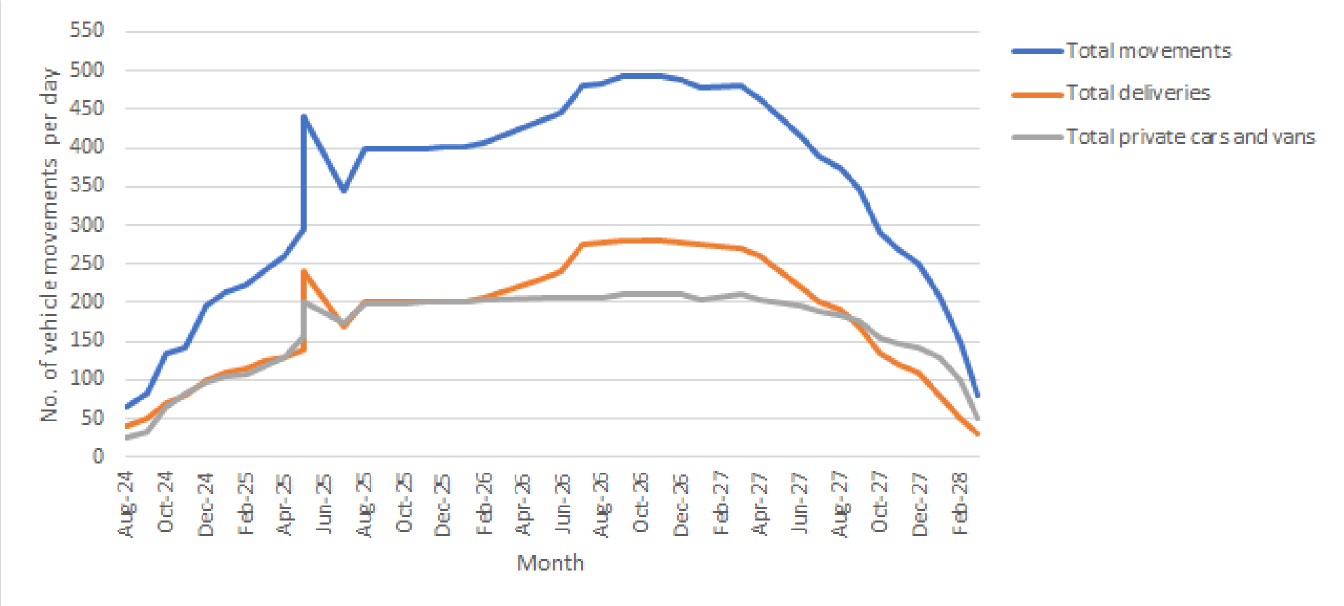

Figure 7.1: Vehicle movements throughout the assumed construction programme

Source: Anglian Water Services

7.1.16 Construction will require a number of HGV movements for the duration of the programme, which may include the deliveries of abnormal loads. Table 7-2 provides an overview of activities and required typical HGV movements over the duration of construction.

Table 7-2: Typical HGV movements over the duration of construction

Typical Heavy goods vehicle movement per day during construction period (civils)	Number of vehicle movements per day
3 concrete pours (assume batch off site)	18
Stone deliveries for drainage or working areas	8
Diesel deliveries, waste skips, general material and plant deliveries	24
M & E equipment deliveries while civil programme on going	6
Typical Heavy goods vehicle movement per day during construction period (civils)	56

Source: Anglian Water Services

7.1.17 Table 7-3 summarises activities which would require a temporary increase in construction vehicle movements.

Table 7-3: Construction activities creating high volumes of vehicle movements

Vehicle movement for specific tasks	Vehicle movements per day	Notes
Imported stone for site infrastructure and temporary working platforms assume max 600T per day	60	Start of contract
Large concrete pours to bases of process units. Assume max pour 400cum	133	Happening during full programme but no other concrete works but pre-M&E starting
Arrival of precast concrete units for tank walls assume 2 per hour	40	Happening during full programme but no other concrete works but pre-M&E starting
Tarmac to roads assume 300ton delivered per day	30	End of works

Source: Anglian Water Services

Construction of the proposed WWTP, outfall and FE, and Transfer tunnel

7.1.18 This section summarises the construction vehicle movements in the vicinity of Horningsea and Fen Ditton for the duration of construction. Construction activities and vehicle movements would be carried out for the main works site, the outfall, and the transfer pipeline

Proposed main WWTP, FE and outfall

7.1.19 The expected duration for the construction vehicles along Horningsea Road is from Year 1 to Year 5 (assumed to be 2024 to early 2028), with the peak construction period for the Proposed Development expected in Year 3 from September to November 2026.

7.1.20 A daily total 492 vehicle movements will be required during the peak construction traffic period for the proposed main WWTP, of these:

- 212 daily workforce movements are required
- 280 HGV daily total movements are required

7.1.21 A typical hourly profile of construction vehicle movements across a day is detailed in Table 7-4. Three peak periods have been identified during which no construction vehicles may travel. This commitment is listed in the CTMP (Application Document Reference 5.4.19.7).

Table 7-4: Indicative construction vehicle movements during peak construction period at the proposed WWTP

Hours	Main site access – HGV	Main site access – daily deliveries / supervisor movements	Main site access – workforce mobilisation
6-7am (mobilisation)			75
7-8am	35	8	
8-9am (peak AM no construction traffic)			
9-10am	35	8	
10-11am	35	8	
11am - 12pm	35	8	
12 - 1pm	35	8	
1 -2pm	35	8	
2 -3pm	35	8	
3 - 4pm (school peak no construction traffic)			
4 - 5pm	35	8	
5 - 6pm (PM peak no construction traffic)			
6-7pm (mobilisation)			75

Source: Anglia Water Services with Mott MacDonald calculations
**Rounding may cause discrepancies in totals.*

<u>Transfer tunnel</u>

7.1.22 The peak construction traffic period for the Transfer Tunnel is shown in Table 7-5. the peak construction period is expected in Year 3 (assumed to be 2026). Construction vehicles will access the works corridor for the Transfer Tunnel via access points CA2/CA3 (B1047) and CA01 (Cowley Road).

7.1.23 A daily total 72 construction vehicle movements will be required for the Transfer tunnel. Of these:

- 45 daily total HGV movements are required
- 27 staff and workforce movements are required

7.1.24 A typical hourly profile of construction vehicle movements is detailed in Table 7-5. Three peak periods have been identified during which no construction vehicles may travel. This commitment is listed in the CTMP (Application Document Reference 5.4.19.7).

Table 7-5: Indicative construction vehicle movements during June 2026 (peak construction period) for the Transfer Tunnel

Hours	Transfer tunnel – HGV	Transfer tunnel – daily deliveries / supervisor movements and workforce movements
6-7am (Mobilisation)		
7-8am	5	10
8-9am (peak AM no construction traffic)		
9-10am	5	1
10-11am	5	1
11am - 12pm	5	1
12 - 1pm	5	1
1 -2pm	5	1
2 -3pm	5	1
3 - 4pm (school peak no construction traffic)		
4 - 5pm	5	1
5 - 6pm (PM peak no construction traffic)		
6-7pm (Mobilisation)	5	10

Source: Anglia Water Services
** Rounding may cause discrepancies in totals.*

7.1.25 The numbers above represent the reasonable worst-case scenario where the total peak vehicle flows for all proposed WWTP, Transfer tunnel, Waterbeach Pipeline elements are assigned to the road network in the AM and PM peak hours, as that is when the highest volume of vehicle flows are likely to occur. In practice, this would be unlikely to occur as the construction of the Waterbeach Pipeline is to be programmed to be complete prior to the start of the works for the proposed WWTP and Transfer Tunnel, and the CoCP does not allow for standard construction vehicle movements during the peak hours.

7.1.26 A commitment was made in Phase 2 Consultation for construction traffic to avoid travelling through the settlement of Horningsea along Clayhithe Road. All vehicular access to these works is via the main site access point. Three peak periods have been identified during which no construction vehicles may travel. This commitment is listed in the CTMP (Application Document Reference 5.4.19.7).

Construction of the Waterbeach Pipeline

7.1.27 This section summarises the construction vehicle movements in the vicinity of Waterbeach and Clayhithe for the duration of construction. Construction activities and vehicle movements would be carried out for the construction of the Waterbeach Pipeline and the subsequent decommissioning of the Waterbeach Recycling Centre at later phases of the construction programme.

7.1.28 For the Waterbeach Pipeline, work sites would be accessed via access points summarised in Table 7-6.

Table 7-6: Construction access points

Access point reference	Location
COA1	Cowley Road access point
CA1	Fen Road
CA2 / CA3	B1047 Horningsea Road
CA6	Main access
C0A3	Low Fen Drove Way
CA16	Horningsea Road layby area
COA9	Grange Farm Access
C0A20 (*proposed new name*)	Hatridge's Lane
COA13	Burgess Drove (*southern end by level crossing*)
CA25	Burgess Drove *(western side)*
COA14	Burgess Drove (*eastern side)*
COA15	Bannold Road
CA28	Long Drove
COA17 – COA19	Bannold Drove

7.1.29 The construction activities required for the Waterbeach Pipeline are sequential and will begin in the settlement of Waterbeach. As construction progresses, the construction team(s) will head south to build out the pipeline and access the works corridor via access COA1, CA1, CA2/CA3. Outside of this standard period of construction for the Waterbeach Pipeline, peak flows have been added to the road network at all other locations except for Horningsea Road / Junction 34 of the A14 and the permanent access. In line with section 9.3 (**Reasonable worst-case scenario**), the hourly profile for the construction of the Waterbeach Pipeline has been based on the maximum vehicle movements per day to the north and to the south in the eight-week periods before and after the 35–44-week period:

7.1.30 Construction vehicle movements travelling to work sites north of the A14: 82 daily

7.1.31 Construction vehicle movements travelling to work sites south of the A14: 90 daily

7.1.32 An additional 28 workforce movements are required daily. However, these would only be required between 6-7AM and **6-7PM, resulting** in 14 workforce movements in the AM and 14 workforce movements in the PM.

Table 7-7~~Outside of this standard period of construction for the Waterbeach Pipeline, peak flows have been added to the road network at all other locations except for Horningsea Road / Junction 34 of the A14 and the permanent access. In line with section 9.3 (**Reasonable worst-case scenario**), the hourly profile for the construction of the Waterbeach Pipeline has been based on the maximum vehicle movements per day to the north and to the south in the eight-week periods before and after the 35–44-week period:~~

~~Construction vehicle movements travelling to work sites north of the A14: 82 daily~~

~~Construction vehicle movements travelling to work sites south of the A14: 90 daily~~

~~An additional 28 workforce movements are required daily. However, these would only be required between 6-7AM and **6-7PM, resulting** in 14 workforce movements in the AM and 14 workforce movements in the PM.~~

~~Table 7-7Outside of this standard period of construction for the Waterbeach Pipeline, peak flows have been added to the road network at all other locations except for Horningsea Road / Junction 34 of the A14 and the permanent access. In line with section 9.3 (**Reasonable worst-case scenario**), the hourly profile for the construction of the Waterbeach Pipeline has been based on the maximum vehicle movements per day to the north and to the south in the eight-week periods before and after the 35–44-week period:~~

~~Construction vehicle movements travelling to work sites north of the A14: 82 daily~~

~~Construction vehicle movements travelling to work sites south of the A14: 90 daily~~

~~An additional 28 workforce movements are required daily. However, these would only be required between 6-7AM and **6-7PM, resulting** in 14 workforce movements in the AM and 14 workforce movements in the PM.~~

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~~Construction vehicle movements travelling to work sites north of the A14: 82 daily~~

~~Construction vehicle movements travelling to work sites south of the A14: 90 daily~~

~~An additional 28 workforce movements are required daily. However, these would only be required between 6-7AM and **6-7PM, resulting** in 14 workforce movements in the AM and 14 workforce movements in the PM.~~

~~7.1.29 Table 7-7Outside of this standard period of construction for the Waterbeach Pipeline, peak flows have been added to the road network at all other locations except for Horningsea Road / Junction 34 of the A14 and the permanent access. In line with section 9.3 (**Reasonable worst-case scenario**), the hourly profile for the construction of the Waterbeach Pipeline has been based on the maximum vehicle movements per day to the north and to the south in the eight-week periods before and after the 35–44-week period:~~

- ~~Construction vehicle movements travelling to work sites north of the A14: 82 daily~~

- ~~Construction vehicle movements travelling to work sites south of the A14: 90 daily~~
- ~~An additional 28 workforce movements are required daily. However, these would only be required between 6-7AM and 6-7PM, resulting in 14 workforce movements in the AM and 14 workforce movements in the PM.~~

~~7.1.30~~7.1.33 ~~Table 7-7~~ provides an overview of the activities required for the construction of the Waterbeach Pipeline as well the associated typical vehicle movements per day. North refers to vehicle movements travelling north of the A14 towards Waterbeach. South refers to vehicle movements travelling south of the A14 towards the existing WWTP. The higher number of vehicle movements is used by default.

~~7.1.31~~7.1.34 For the number of construction vehicle movements for the Waterbeach Pipeline, as stated within the assumptions of the RWCS (Section 9.3 Reasonable Worst Case Scenario), typical construction vehicle numbers have been added to the road network at Horningsea Road / Junction 34 of the A14 and the permanent access instead of the peak vehicle numbers. This has been done because the sequencing of the construction programme has been set up such that the peak construction activities and the associated construction vehicle movements for the Waterbeach Pipeline cannot occur at the same time as the construction of the proposed main WWTP (including permanent access and landscape masterplan) and the waste water transfer tunnel. Instead during this time, the Waterbeach standard construction vehicle movements would travel through Horningsea Road / Junction 34 of the A14 and the permanent access.

~~7.1.32~~7.1.35 At Horningsea Road / Junction 34 of the A14 and the permanent access, standard Waterbeach Pipeline construction flows have been added. This amounts to 65 standard daily vehicle movements.

~~7.1.33~~7.1.36 Outside of this standard period of construction for the Waterbeach Pipeline, peak flows have been added to the road network at all other locations except for Horningsea Road / Junction 34 of the A14 and the permanent access. In line with section 9.3 (**Reasonable worst-case scenario**~~**Reasonable worst-case scenario**~~~~**Reasonable worst-case scenario**~~~~**Reasonable worst-case scenario**~~~~**Reasonable worst-case scenario**~~), the hourly profile for the construction of the Waterbeach Pipeline has been based on the maximum vehicle movements per day to the north and to the south in the eight-week periods before and after the 35–44-week period:

- Construction vehicle movements travelling to work sites north of the A14: 82 daily
- Construction vehicle movements travelling to work sites south of the A14: 90 daily
- An additional 28 workforce movements are required daily. However, these would only be required between 6-7AM and 6-7PM, resulting in 14 workforce movements in the AM and 14 workforce movements in the PM.

Table 7-7: Typical large vehicle / HGV movements associated with the Waterbeach Pipeline

Activity	Duration	North / South	Vehicle movements per day (HGV)	Vehicle movements per hour over 8 hours (HGV)	Staff vehicles movements per day
Deliveries of hardstanding, pipe sections, pipe rings, plant and machinery and compound equipment i.e., site cabins etc.	8 weeks	North	68-82	10	28
		South	76-90	11	28
Deliveries of specific infrastructure requirements i.e., kiosks/pumps, removal of spoil from excavations	35-44 weeks	North	20	3	28
		South	40	5	28
Removal of hardstanding, plant and machinery, compound equipment i.e., site cabins etc.	8 weeks	North	68-82	10	28
		South	76-90	11	28

Source: Anglia Water Services

~~7.1.34~~7.1.37 Based on the above movements, the hourly profile for the construction of the Waterbeach Pipeline is provided in Table 7-8. Three peak periods have been identified during which no construction vehicles may travel. This commitment is listed in the CTMP (Application Document Reference 5.4.19.7).

Table 7-8: Hourly profile for construction vehicle movements required for the Waterbeach Pipeline

	Waterbeach Pipeline – North sites		Waterbeach Pipeline – South sites	
Hours	**HGV**	**LGV/Car (worker and staff movements)**	**HGV**	**LGV/Car (worker and staff movements)**
6-7am (Mobilisation)	0	14	0	14
7-8am	10		11	0
8-9am (peak AM no construction traffic)	0	0	0	0
9-10am	10	0	11	0
10-11am	10	0	11	0
11am-12pm	10	0	11	0
12-1pm	10	0	11	0
1-2pm	10	0	11	0
2-3pm	10	0	11	0
3-4pm (school peak no construction traffic)	0	0	0	0
4-5pm	10	0	11	0
5-6pm (PM peak no construction traffic)	0	0	0	0
6-7pm (Mobilisation)	0	14	0	14
Total	108		116	

Source: Anglia Water Services

~~7.1.35~~7.1.38 The peak construction traffic will be during spring and summer 2024 with lower levels of construction movements in Waterbeach between 2024-2026 for the duration of the construction work. As per the Reasonable worst-case scenario~~Reasonable worst-case scenarioReasonable worst-case scenarioReasonable worst-case scenarioReasonable worst-case scenario~~ section, for the sake of modelling, this peak is assumed to take place in Year 3 of construction (currently assumed to be between September and November 2026).

~~7.1.36~~7.1.39 Cars are expected to arrive between 06:00-07:00 and leave between 18:00-19:00. HGVs are expected to arrive and depart between 09:00 and 15:00. Therefore, all construction traffic would be expected to travel outside of peak hours in a typical working day.

Decommissioning

~~7.1.37~~7.1.40 Decommissioning will take place at the existing Cambridge WWTP will start towards the end of Year 4 (currently assumed to be 2027) and will be completed in early 2028). The activities required to decommission the existing WWTP for the purpose of permit surrender, require varying volumes of vehicle movements and staff to be present on site. The full list of decommissioning activities are described in Section 4.3 (Decommissioning) in Chapter 2 of the ES.

~~7.1.38~~7.1.41 Table 7-9 below provides a summary of the daily and peak hour movements required for all decommissioning activities, assuming an 8-hour work day and that all decommissioning activities occur at the same time, which is unlikely to happen in practice.

Table 7-9: Decommissioning - daily and peak hour movements in 2028

	Daily vehicle movements	Typical vehicle movements required per hour (8-hour workday)
LGV	64	8*
HGV	86	11*

**AM and PM peak hour values have been rounded*
Source: Anglian Water

~~7.1.39~~7.1.42 In total across all decommissioning activities, decommissioning will require a total 150 vehicle movements, or 75 vehicles, for the duration of the decommissioning at the existing Cambridge WWTP.

~~7.1.40~~7.1.43 10% of all decommissioning traffic has been assumed to originate from the east and 90% from the west of the Milton Interchange (junction 33 of the A14) to access the existing WWTP via Cowley Road. This is based on a review of potential locations of raw materials and an assumption as to where they may be transported from.

~~7.1.41~~7.1.44 The decommissioning phase has been set as part of the construction phase and therefore falls under the requirements set out by the CTMP (Application Document Ref 5.4.19.7). Construction vehicles, including decommissioning vehicles, may not travel during the peak periods, identified as:

- 08:00 to 09:00;
- 15:00 to 16:00; and
- 17:00 to 18:00.

7.2 Highway network assignment

7.2.1 This section provides an overview of the methodology used to determine the assignment of Proposed Development vehicular trips on the road network.

7.2.2 The methodology focuses solely on the assignment of construction and operation traffic (considered in section 7.1). There are no trips associated with residential and non-residential uses, such as retail, and education with the Proposed Development

7.2.3 The construction route has been designed based on the principle that, whenever possible, the primary Cambridgeshire Road Network or Strategic Road Network should be used to route construction vehicles to and from the construction site.

Construction routing for the main WWTP corridor, the Transfer tunnel, the FE main and outfall

7.2.4 The regional plan in Appendix A, Figure A.2 shows the strategic roads that are proposed to be used to access the main works site as part of the permanent access including the A14 and B1047 Horningsea Road.

7.2.5 The regional vehicle routing plans for the permanent access to the proposed WWTP shows the proximity of local community facilities and infrastructure including bus stops and Fen Ditton Community Primary School to the proposed site and the access options. It also shows the weight restrictions and restricted turning movements on B1047 Horningsea Road. For access to the main works site, the construction route follows the strategic road network of the A14 and shows that vehicles will not be routing through the settlements of Horningsea or Fen Ditton.

7.2.6 The distributional split of traffic flows has been based on the location of identified construction material shown in Appendix A, Figure A.39~~A.38~~. The majority of construction material is located to the west of the proposed site location. Therefore, 10% of construction traffic has been assumed to originate from the east and 90% from the west.

Proposed WWTP

7.2.7 The works corridor for the proposed WWTP will be accessed via:

- access point COA3 (Low Fen Drove Way) for the construction of the temporary access which will enable construction for the permanent access
- access point CA6 (Horningsea Road) for the construction of the main WWTP

7.2.8 All construction vehicles will travel along the proscribed construction route to access the works corridors.

7.2.9 The delivery of construction materials is assumed to share a similar a profile to the delivery of construction materials, with 10% of deliveries coming from the east and 90% from the west.

Transfer tunnel

7.2.10 The Transfer Tunnel works corridor is proposed to be accessed via access point COA1 (Cowley Road) and access point CA2 / CA3 (B1047 Horningsea Road), to the immediate south of junction 34 of the A14. All construction vehicles will travel along the construction route set out in Appendix A, Figure A.2 to access the works corridors.

7.2.11 The delivery of construction materials is assumed to share a similar a profile to the delivery of construction materials as shown in Appendix A, Figure~~ ~~ A.39~~A.38~~, with 10% of deliveries coming from the east and 90% from the west.

Final Effluent (FE) main and outfall

7.2.12 The FE main and outfall works corridor is accessed through access point CA6 via the new arm of junction 34, part of the proposed permanent access option 1b. On the public highway, construction vehicles associated with the FE main, and outfall will only travel along the construction route to access the works corridors.

7.2.13 The delivery of construction materials is assumed to share a similar a profile to the delivery of construction materials as previously set out, with 10% of deliveries coming from the east and 90% from the west.

Construction routing for the Waterbeach Pipeline

7.2.14 The construction activities required for the Waterbeach Pipeline are sequential and would begin in the settlement of Waterbeach and the areas surrounding Clayhithe Road. As construction progresses, construction vehicles will also head south to build out the pipeline and access the works corridor via access points CA2 / CA3, CA1, COA1, south of the A14.

7.2.15 Access points COA17-COA19, CA28, COA15, COA14, CA25, COA13 would be accessed via the A10-Denny End Road-Bannold Road-Bannold Drove/Long Drove/Burgess' Drove route. Access points COA20, COA9, CA16 would be accessed via the A10-Car Dyke Road-Cambridge Road-Station Road-Clayhithe Road route.

7.2.16 Access point CA2/CA3 would be accessed by travelling eastbound on the A14 and taking the A14 off-slip at Junction 34 of the A14 to then head southbound on Horningsea Road.

7.2.17 Access point CA1 would be accessed by heading southbound on Milton Road, then taking the Green End Road-Water Lane-Water Street-Fen Road route.

7.2.18 Access point COA1 would be accessed via the existing WWTP, via the Milton Road / Cowley Road junction.

7.2.19 The delivery of construction materials is assumed to share a similar a profile to the delivery of construction materials as previously set out, with 10% of deliveries coming from the east and 90% from the west.

7.3 Highway Network Growth

7.3.1 Trip generation has been calculated up to the year 2038 using survey data collected in December 2021 (further information is contained in the Survey background/methodology~~Survey background/methodologySurvey background/methodologySurvey background/methodologySurvey background/methodology~~ section). 2021 is therefore assumed to be the existing year with 2026[1] as the base year. To estimate the future 2026 base year, TEMPro growth factors for the area of Cambridgeshire have been applied to the 2021 existing year flows. The applied factors are outlined in Table 7-10.

Table 7-10: TEMPro growth factors

Base year to scenario Year	TEMPro growth factors
2021 – 2026	1.0475
2021 – 2028	1.0602
2021 – 2033	1.0915
2021 – 2038	1.1220

7.3.2 To predict future growth as accurately as possible, TEMPro growth factors reflects all planned growth in the area and are in line with the most recent Road Traffic Forecast (2018). However, as land-use developments are a source of uncertainty, TEMPro growth factors provides a blanket overview, and do not predict where growth will exactly appear. It is therefore suggested to apply unadjusted growth factors to estimate the future baseline as the proposed WWTP will not generate a significant number of homes or new jobs in the area owing to the nature of the Proposed Development.

7.3.3 The future growth for operation year 1 plus 10 (assumed to be 2038) has been predicted based on TEMPro growth factors for the Cambridgeshire area. Due to future uncertainty associated with factors projecting 10+ years into the future, this forecast would need to be re-adjusted closer to the assessed year.

7.3.4 A 2050 scenario has also been considered and the modelling and assessment outcomes have been determined to be similar to the 2038 assessment year. Additionally, it is difficult to determine the exact accuracy of projections of background traffic growth to 2050.

~~7.3.4~~7.3.5 The TEMPro calculations are contained in~~ ~~Appendix K.

8 Trip Generation, Distribution, and Assignment During Operation

8.1 Operational re-assignment of vehicles

8.1.1 Once the proposed WWTP is operational, the existing Cambridge WWTP and the existing Waterbeach WRC will stop operating and be decommissioned. Operational vehicle movements from these two locations will be reassigned. Associated vehicle movements travelling between the existing Cambridge WWTP and the proposed WWTP will not need to use Cowley Road or Milton Road to access the proposed WWTP. Junction 33 of the A14 (the Milton Interchange) will be used for operational vehicle movements needing to travel east from the proposed WWTP.

8.1.2 Once operational, the proposed WWTP will be accessed via Junction 34 of the A14 via the permanent access road and the permanent access from the reconfigured signalised junction on the B1047 Horningsea Road.

8.1.3 An outline Operational Workers Travel Plan (Application Document Reference 5.4.19.8) forms part of the secondary mitigation measures for the operation of the proposed WWTP. The purpose of this plan is to provide details of the operational requirements for staff, staff travel patterns and expected workforce locations.

8.1.4 Monthly import and export data from 2020 for the existing Cambridge WWTP has been obtained from The Applicant to estimate the operational average daily HGV movements. HGV movements include liquid sludge imports, biosolids exports, non-route tanker movements and septic waste movements. Based on these data, the directional split of deliveries during operation is assumed to be 52% from the east and 48% from the west. A technical note is available in Appendix C, 'Origin-destination analysis of deliveries to the existing WWTP' (Application Document reference 5.4.19.3) and summarises the origin-destination analysis of deliveries to the existing Cambridge WWTP.

8.1.5 In addition, further data have also been provided by The Applicant regarding the number of operational staff movements (cars and LGVs) associated with the Proposed Development which are based on current operational movements for the existing Cambridge WWTP. Cars and LGV movements would be required for:

- site technicians (sludge, STW and maintenance);
- CHP technicians
- treatment, maintenance;
- network and sludge managers;
- technical support; and
- office workers.

8.1.6 The average and daily peak hour movements are detailed in Table 8-1~~Table 8-1~~.

Table 8-1: Operational related traffic daily and peak hour movements

Vehicle type	AM peak hour			PM peak hour			Daily total		
	Arrival	Departure	Total	Arrival	Departure	Total	Arrival	Departure	Total
Cars and LGV	33	0	33	0	28	28	46	46	92
HGV	6	6	12	6	6	12	73	73	146
Total	39	6	45	6	34	40	119	119	238

Source: Anglian Water with Mott MacDonald calculations

8.1.7 Based on these vehicle movements, the hourly profile of operational vehicle movements is summarised in Table 8-2.

Table 8-2: Assumed typical hourly profile for operational vehicle movements

Hours	HGV	Daily deliveries / supervisor movements (cars and LGV)	office workers (cars and LGV)
Out of hours (overnight)	48	0	0
7-8am	12	4	0
8-9am (peak AM no operational traffic)	0	0	30
9-10am	12	4	0
10-11am	12	4	0
11am - 12pm	12	4	0
12 - 1pm	12	4	0
1 -2pm	12	4	0
2 -3pm	12	4	0
3 - 4pm (school peak no operational traffic)	0	0	0
4 - 5pm	12	4	0
5 - 6pm (PM peak no operational traffic)	0	0	30

Hours	HGV	Daily deliveries / supervisor movements (cars and LGV)	office workers (cars and LGV)
Total	146	32	60

Source: Anglian Water with Mott MacDonald calculations

8.1.8 The vehicle movements outlined in Table 8-1~~Table 8-1~~ have been distributed on the highway network for the permanent vehicular access to the proposed WWTP for the future year 2038. The distributional split of vehicle movements has been based on the operational split of 52% from the east and 48% from the west. Further detail is provided in 'Technical Note Sludge Imports' in Appendix C.

Arrivals

8.1.9 It is proposed that those travelling from the east would travel in a westerly direction along the A14 exiting at the Milton Interchange (junction 33) and re-joining the A14 eastbound. Then exiting the A14 at junction 34 via B1047 Horningsea Road and entering the proposed WWTP to the east via the permanent access road.

8.1.10 It is proposed that those travelling from the west would travel in an easterly direction along the A14 exiting the A14 at junction 34 via B1047 Horningsea Road and entering the proposed WWTP to the east via the permanent access road.

Departures

8.1.11 For operational vehicles travelling eastbound, the proposed WWTP would be departed by travelling southbound via B1047 Horningsea Road and heading westbound on the A14 at junction 34, then departing the A14 at the Milton Interchange (junction 33) and re-joining the A14 eastbound.

8.1.12 It is proposed that those travelling westbound would depart the proposed WWTP southbound via B1047 Horningsea Road and westbound at junction 34 on the A14.

Abnormal operations

8.1.13 At times, repairs to the transfer pipelines may be required. These activities are not likely to occur frequently, and in each instance are expected to take up to a week and require two to three vans. Abnormal operations are unlikely to follow the same set highway assignment to standard operations and will use the operational access points within the Scheme Order Limits to access the pipelines.

8.2 Visitors to the Discovery Centre (non-staff visitors)

8.2.1 The Proposed Development includes a visitor centre (the Discovery Centre) which will be integrated within the Gateway Building in the proposed WWTP. The gross floor area (GFA) of the Discovery Centre is 209m^2. The parking requirements for the Gateway Building are set out in section 2.6~~2.62.5~~ ('Internal road network of the proposed WWTP~~Internal road network of the proposed WWTP~~').

8.2.2 To calculate the anticipated trip generation of the Discovery Centre, suitable all-person trip rates have been extracted from the industry standard TRICS database (TRICS Consortium Limited, n.d.) using a selection of analogous sites. For weekday trips, sites within the '07 Leisure, I (Art Galleries/Museums/Exhibitions)' land use category were interrogated. It was considered that this land use category best represented the Discovery Centre.

8.2.3 In order to establish a reasonable set of comparable sites, the following selection criteria has been used:

- In any region except London, surveyed since January 2014.
- All location types except town centre.
- Limited public transport options available.
- Between 200m^2 and 5,000m^2 of floorspace.

8.2.4 Based on the above criteria for the 'Office land use category in England', three museum/exhibition sites were available. Two of these sites were in city locations that did not closely match that of the Discovery Centre, and therefore the results were filtered to one site that more closely matched the Discovery Centre in terms of floorspace and public transport provision.

8.2.5 The selected site (including TRICS® code, survey date, floorspace, and parking provision) used to represent trip rates for the Discovery Centre is shown in Table 8-3. It should be noted that whilst the selected site was stated as having a car park, no information on the number of parking spaces was available within TRICS® database.

Table 8-3: TRICS site Art Galleries/Museums/Exhibitions

Ref.	Description	Borough	Location	Floorspace	Total FTE employees	Total parking spaces
DN-07-I-02	County Museum	Letterkenny	Edge of town centre	750m^2	5	n/a

Source: TRICS

8.2.6 The TRICS® outputs in Table 8-3 have been used to extract 'all-person' trip rates per 100sqm of floorspace. Based on these outputs, the total person trip generation for the Discovery Centre are estimated and shown in Table 8-4.

8.2.7 It should be noted that no trips were identified as being undertaken during the AM or PM peak hours owing to the anticipated use patterns of the Discovery Centre. These trips are therefore not modelled within the peak hours.

8.2.8 The TRICS® outputs for the site selection is available at Appendix H.

8.2.9 As the site is currently vacant, the current number of trips to the site is zero. The expected trip generation for the site will also reflect the net change in trips to the Gateway building.

Table 8-4: Total all person daily trip rates for discovery centre (no peak hour trips)

	In	Out	Total
Daily all person trips	6	7	13

Source: TRICS

8.2.10 In addition to the trips identified in Table 8-4, it is estimated that there would be up to 60 vehicle movements per day by office workers using the Gateway Building alongside the intermittent proposed discovery centre trips.

Mode split

8.2.11 The expected peak hour mode split for the discovery centre has been derived from the TRICS outputs for the sites identified in Table 8-5. The resulting mode split is shown in Table 8-6.

Table 8-5: Trip mode share from selected TRICS sites - Art Galleries/Museums/Exhibitions

Mode of travel	Mode share
Car	67.6%
Pedestrians	32.4%
Light Goods Vehicle	0%
Bus	0%
Taxis	0%
Other Goods Vehicles	0%
Public Service Vehicles	0%
Rail	0%
Motorcycles	0%
Cyclists	0%

Source: TRICS

8.2.12 The outputs in Table 8-5 have been used produce the expected daily trips for the Gateway building by mode of travel. This is shown in Table 8-6.

Table 8-6: Expected daily trips for the discovery centre

Vehicle type	Total daily trips (09:00-18:00)		
	Arrivals	Departures	Total
Car	3	4	7
Car passenger	1	1	2
Pedestrian	2	2	4
Light Goods Vehicle	0	0	0
Other Goods Vehicle	0	0	0
Taxi	0	0	0
Cycle	0	0	0
Bus passenger	0	0	0
Train passenger	0	0	0
Motorcycle	0	0	0
Public Service Vehicle	0	0	0

Source: TRICS

8.2.13 The expected daily trips in Table 8-6 has been used to inform the reasonable worst case scenario with the higher number of visitor trips by car, noting that the assumption is that all visitor trips occur outside of the AM or PM peak hours. The Operational Workers Travel Plan, Application Document Reference 5.4.19.8, sets out the framework to reduce the single use car mode share for both staff and visitors.

9 Junction Modelling

9.1 Overview

9.1.1 The baseline and reasonable worst-case scenarios are tested for junctions affected by construction, decommissioning, and operational traffic. Local junction models have been produced to replicate existing and future traffic in the assessed areas. The baseline traffic is analysed using sites survey which were completed on a neutral day in December 2021. The future traffic has been estimated using TEMPro 7.2 growth factors. The construction, decommissioning, and operation traffic data has been received from Anglian Water Services Limited. Local junction models are created using geometry and signal settings provided by Cambridgeshire County Council.

9.1.2 Traffic modelling has considered the following committed developments in the vicinity of the Proposed Development:

- Waterbeach New Town, including the relocation of the Waterbeach Station;
- Marleigh Development;
- Land north of Cherry Hinton;
- Cambridge Eastern Access Scheme (CEAS); and
- NECAAP, with special reference to policy 22 which specifies a trip budget.

9.1.3 These committed developments have been considered but are not reflected within the modelling due to the testing of the RWCS, which assumes that these committed developments would not be operational / open during the construction of the Proposed Development.

9.1.4 Traffic modelling has been tested the reasonable worst-case (RWC) scenario in construction. The RWC scenario considers the peak of construction activity which occurs in year 3 of construction and represents a scenario without proposed mitigation measures to fully understand the impact of peak construction traffic on the road network. A full list of assumptions built into the RWC scenario is available in section 9.3 ('Reasonable worst-case scenario~~Reasonable worst-case scenario~~').

9.1.5 The 2021 baseline results suggest that junctions operate within capacity or close to capacity. In comparison in the future baseline (2026, 2028, 2033 and 2038), some junctions are exceeding their operational capacity on particular arms. This is happening due to background traffic growth.

9.1.6 In the future construction and decommissioning scenarios (2026 and 2028) some junctions operate above capacity in the peak hours due to background traffic growth. Running construction traffic during the peak hours would therefore not be acceptable. This would be addressed by the mitigation measures secured through the CTMP and CoCP which restrict construction vehicle movements to travel outside of peak hours. An overview of the mitigation measures secured within the CTMP and CoCP is available in section 2.8~~2.82.7~~ ('Secondary mitigation').

9.1.7 In the future operational scenario (2038) 10-year post-opening of the proposed main WWTP, junctions relevant to the operation of the proposed main WWTP operate within or close to capacity in the peak hours. An OTL~~M~~P would be required to fully manage operational vehicles during the peak hours.

9.2 Methodology

9.2.1 For the purposes of this TA, as agreed with CCC in the TA Scoping Note (Appendix B), the existing base year is 2021 and the peak construction year is 2026.

9.2.2 The future year assessment has been undertaken for two forecast years, this is in line with WebTAG guidance: the year of commencing operation and a second forecast year, typically 5 years after the first year of operation. In recognition of CCC TA assessment guidance, when considering the strategic network, a design year 10 years post-full operation shall also be considered for all access options. Therefore, the first year of operation will be 2028, year 5 will be 2033 and year 10 will be 2038.

9.2.3 Assessment years are summarised as:

- Existing 2021 baseline - Existing/surveyed conditions to understand prevailing conditions (as per surveys undertaken and CCC counts). An overview of existing flows for the year 2021 is available in Section 5 (Existing Traffic Flows~~Existing Traffic Flows~~).
- Future baseline Construction Year 3 (assumed to be 2026) “Without Construction” scenario (existing plus committed development)
- Future Construction Year 3 (2026) “With Construction” scenario (existing plus committed development) - peak construction year (2026) – existing 2026 baseline (as above scenario) with added construction flows, plus cumulative schemes which are forecast to be built by 2026.
- Future baseline Year 5 Construction (assumed to be early 2028) “Without Decommissioning” scenario (plus cumulative schemes which are forecast to be built in the coming years)
- Future Year 5 Construction (assumed to be early 2028) “With Decommissioning” scenario (existing plus committed development): corresponds to the 2028 baseline with added decommissioning flows, and cumulative schemes which are forecast to be built in the coming years.
- Future baseline Operation Year 1 + 5 (assumed to be 2033) “Without Operation” scenario (plus cumulative schemes)
- Future Operation Year 1 + 5 (assumed to be 2033) “With Operation” scenario (existing plus committed development): 5-years after the opening of the Proposed Development. This scenario corresponds to the 2033 baseline with added operational flows, plus traffic from cumulative schemes.

- Future baseline Operation Year 1 + 10 (assumed to be 2038) "Without Operation" scenario (plus cumulative schemes)
- Future Operation Year 1 + 10 (assumed to be 2038) "With Operation" scenario, which takes account of the changes which are expected to arise because of the Proposed Development in the future design year of 2038, 10 years after the opening of the Proposed Development. The Proposed Development is considered in context of both the net change from the existing baseline scenario and future baseline scenario to account for the changes associated with the cumulative schemes.

9.2.4 All junctions have been modelled using software LinSig for signalised junctions, and Junctions 9 for priority junctions:

- LinSig software measures junction performance expressed as degrees of saturation (DoS), queue lengths (PCU) and flow.
  - A DoS value greater than 100% means that an approach or turning movement has a higher level of traffic flow than its theoretical capacity. As a result, queues and delays are likely to occur.
  - Mean Maximum Queue (MMQ) is the average of the maximum queue lengths in each cycle and is measured in Passenger Car Units (PCU), a unit used to represent general traffic where vehicle types are assigned a conversion factor to the equivalent number of cars based on the amount of road space they take up (TfL, 2021).
  - Within LinSig, one PCU represents a distance of 5.75m.
- Junctions 9 software measures performance at ratio of flow to capacity (RFC).
  - An RFC value greater than 1 means that an approach or turning movement has a higher level of traffic flow than its theoretical capacity. As a result, queues and delays are likely to occur.

9.2.5 PCU factors have been used in the modelling and are summarised in Table 9-1. Traffic flow diagrams are provided in Appendix 5.4.19.5 and are set out in vehicle numbers, and traffic modelling is based on PCU factors.

Table 9-1: PCU factors

Car	LGV	OGV1	OGV2	Bus	M/C	P/C
1.0	1.0	1.5	2.3	2.0	0.4	0.2

9.3 Reasonable worst-case scenario

9.3.1 Owing to the complexity and size of the Proposed Development, the main structures (proposed WWTP and FE pipeline and outfall, Transfer tunnel, Waterbeach Pipeline) have been assessed based on the assumption that their construction and associated peak construction vehicle movements occur at the same time. This allows for the assessment of the road network in a reasonable worst-case scenario (RWCS). Where no issues with junction capacity and delays have been identified in this scenario, it is unlikely that issues may arise on the road network in practice as the peak construction periods of the different elements of the proposed WWTP and FE pipeline and outfall, Transfer tunnel, Waterbeach Pipeline do not occur simultaneously.

9.3.2 Peak traffic, where a combination of temporary activity is likely to increase the typical traffic movements is tested as part of the Reasonable Worst-Case (RWC) scenario. The RWC scenario represents the absolute peak of short-term intermittent activities that may be required in the peak hour(s) as part of the construction of the Proposed Development. Therefore, the RWC scenario tests the peak of construction activity, which would occur in year 3 of construction.

9.3.3 For the assessment of construction and to represent the RWC scenario, a number of robust assumptions have been made:

- the hourly construction flows (based on the daily maximum flows over an 8-hour working day) for each of the individual elements of the scheme (proposed WWTP, the outfall and FE pipeline, the waste water transfer tunnel and Waterbeach Pipeline) have been determined and added together on the worst case assumption that they occur at the same time;
- for the Waterbeach Pipeline, the construction flows do not correspond to the absolute peak of (atypical) vehicle movements owing to the sequencing of construction which guarantee that construction activities where the absolute peak Waterbeach traffic movements would be required do not occur at the same time as the construction of other structures;
- the hourly construction flows as identified in the first assumption have been added to the network peak hours (08:00-09:00, 15:00-16:00, 17:00-18:00);
- no reduction in the worst case scenario construction peak hour(s) flow has been made to account for the application of the CTMP and CoCP which seeks to restrict construction vehicle movements to before and after the peak hours;
- the sequencing of the construction programme is such that the construction of structures (i.e., proposed WWTP (including permanent access and landscape masterplan), waste water transfer tunnel, Waterbeach Pipeline) of the Proposed Development would not occur simultaneously; and
- Worker mobilisation has been modelled to take place in the peak hours.

9.3.4 The results of the RWCS should therefore be viewed in the context of the above cumulative worst-case assumptions.

9.3.5 The modelling and assessment of the RWCS represents a situation where the total peak vehicle flows for all proposed WWTP and FE pipeline and outfall, Transfer tunnel, Waterbeach Pipeline elements are assigned to the road network in the AM and PM peak hours, as that is when the highest volume of vehicle flows are likely to occur. In practice, this would be unlikely to occur as the construction of the

Waterbeach Pipeline is programmed to be completed prior to the start of the works for the proposed main WWTP and FE pipeline and outfall, and Transfer Tunnel, and the CoCP does not allow for standard construction vehicle movements during the peak hours.

9.3.6 The reasonable worst case scenario also provides an indication of the impacts of some short term activities that are required, for instance concrete pours and directional drilling (see table Table 7-3 for full list) that may require some construction traffic to run in the peak periods. It is unlikely that these activities would be able to be carried out simultaneously at the Proposed Development and~~d~~ for all of the required vehicles to be active at the same time in the peak hour. However, to demonstrate the effects of such a combination the TA provides such a test.

9.4 Assumptions built into the model

9.4.1 The traffic modelling has been based on an 8-hour working day. This accounts for the restrictions on peak hour travel (08:00-09:00, 15:00-16:00, 17:00-18:00). Where mitigation does not apply this would equate to an 11-hour working day. All assessments have been based on an 8-hour working day. For consistency and comparison purposes, only the 8-hour working day has been used across mitigated and unmitigated scenarios.

9.4.2 The modelling has been based on the following set of assumptions in construction:

- the model only considers the AM and PM peak hours (08:00-09:00 and 17:00-18:00);
- no construction traffic is allowed to travel through the settlements of Horningsea and Fen Ditton;
- construction traffic will primarily make use of the Strategic Road Network and primary road network, the A14 and the A10;
- on the A14, 90% of construction traffic has been assumed to originate from the west and 10% from the east when travelling to work sites based on the location of construction material; and
- to account for construction deliveries, worker movements and worker mobilisation, a standard 8-hour working day has been calculated which includes the peak hour restrictions set out by the CTMP. An 8-hour working day is what remains once worker mobilisation and CTMP restrictions have been accounted for.

9.4.3 In operation, the following assumptions have been made within the traffic model:

- the model only considers the AM and PM peak hours (08:00-09:00 and 17:00-18:00);

- operational Traffic ~~Management~~ Logistics Plan (OTL~~M~~P) mitigation measures would restrict travel through Horningsea and Fen Ditton by HGV traffic and manage HGV arrivals and departures during peak hours as necessary;
- operational traffic should primarily make use of the Strategic Road Network and primary road network, such as the A14 and A10;
- on the A14, 50% of operational traffic has been assumed to originate from the west and 50% from the east when travelling to work sites, this is based on operational HGV vehicle movements related to the existing Cambridge WWTP;
- overnight deliveries account for 30% of the HGV traffic entering and exiting the site, this is based on the operational vehicle movement pattern experienced at the existing Cambridge WWTP; and
- to account for operational deliveries, worker movements and worker mobilisation, a standard 8-hour working day has been calculated which includes the peak hour restrictions set out by the OTL~~M~~P. An 8-hour working day is what remains once worker mobilisation and OTL~~M~~P restrictions have been accounted for.

9.4.4 For decommissioning, the following assumptions have been made within the traffic model:

- the model only considers the AM and PM peak hours (08:00-09:00 and 17:00-18:00);
- decommissioning vehicle movements should primarily make use of the Strategic Road Network and primary road network, such as the A14;
- on the A14, 90% of decommissioning traffic has been assumed to originate from the west and 10% from the east of the junction 33 (Milton Interchange) when travelling to the existing Cambridge WWTP; and
- to account for decommissioning activities, worker movements and worker mobilisation, a standard 8-hour working day has been calculated which includes the peak hour restrictions set out by the CTMP. An 8-hour working day is what remains once worker mobilisation and CTMP restrictions have been accounted for.

9.5 Permanent access model outputs

Overview

9.5.1 This section provides an overview of the modelling outputs for all considered access options to the proposed WWTP. A summary of alternative access options considered is available in Chapter 3: Site Selection and Alternatives of the Environmental Statement (Application Document Reference 5.2.3). The preferred access option (Option 1b) has been modelled for the future years 2026, 2028, 2033, and 2038 with the results presented under the relevant headings.

Permanent access: modelled years 2021, 2026, 2028, 2033 and 2038

9.5.2 A junction capacity assessment of the construction routes has been undertaken and the agreed assessment junctions modelled using LinSig V3 or Junctions 9 as appropriate. The junctions have been modelled both with and without development traffic for the following scenarios:

- the 2021 existing baseline
- the construction year 3 (assumed to be 2026)
- decommissioning in Year 4 2028
- the operation year 2033 (5 years post year 1 of opening, currently assumed to be 2028)
- the operation year 2038 (10 years post year 1 of opening, currently assumed to be 2028)

9.5.3 The following junctions, which form part of the construction route, have been modelled and assessed:

- Horningsea Road / junction 34 of the A14
- A10 / Denny End Road
- A10 / Car Dyke Road
- Milton Interchange (junction 33 of the A14)
- Milton Road / Cowley Road
- Milton Road / Green End Road / Kings Hedges
- Green End Road / Water Lane

<u>Horningsea Road / Junction 34 of the A14</u>

9.5.4 This junction currently consists of two three-arm signal-controlled T junctions, both with controlled pedestrian and cyclist crossing facilities. Each junction serves an on-slip and off-slip of the A14.

9.5.5 Given the layout of the junction, the traffic flows for the Horningsea Road Bridge Southbound / right turn onto A14 Westbound on-slip approach are calculated by the sum of all right turning manoeuvres from the A14 Off-slip plus the sum of flows the Horningsea Road Southbound approach.

<u>2021 existing baseline</u>

9.5.6 The operation of the junction has been assessed for the 2021 existing baseline AM and PM peak hours using LinSig and is shown in Table 9-2. For the 2021 baseline, the LinSig model used represents the current layout of the junction prior to the construction of the preferred access option (Option 1b).

Table 9-2: 2021 baseline performance for Horningsea Road / Junction 34

Approach	Flow	DoS	MMQ (PCU)
2021 AM peak hour (08:00 - 09:00) baseline results			
Horningsea Road Southbound (SB)	814	82.3%	24.9
A14 Off-slip	580	82.1%	18.3
Horningsea Road Bridge Northbound (NB)	123	12.4%	2.1
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	1350	80.6%	11.1
Horningsea Rd NB / left turn onto A14 WB on-slip	549	32.3%	1.9
2021 PM peak hour (17:00 - 18:00) baseline results			
Horningsea Road Southbound (SB)	577	61.3%	14.7
A14 Off-slip	455	62.0%	12.2
Horningsea Road Bridge Northbound (NB)	266	28.1%	5.3
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	1009	~~59.9%~~65.7%	~~1.4~~5.5
Horningsea Rd NB / left turn onto A14 WB on-slip	875	~~51.3%~~55.2%	7.9~~4.2~~

DoS = *Degrees of Saturation*. MMQ = *Mean Maximum Queue*. PCU = *Passenger Car Unit*

6.3.7. In the 2021 baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 82.3% on the Horningsea Road Southbound approach with an associated MMQ of 24.9 PCU. In the PM peak hour, the maximum DoS of 62.0% is on the A14 Off-slip approach with an associated MMQ of 12.2 PCU.

6.3.8. Based on the site observations, the pedestrian phase on A14 on-slip is called once every two cycles in the AM Peak. Allowing for this observation adds 8 seconds bonus green time in 2021 base AM peak scenario. The bonus green is an extension of the effective green period available to traffic. The give-way parameters modelled remain as per the software model defaults.

2026, 2028, 2033, and 2038 future baselines

9.5.7 Upon the completion of the preferred access option (Option 1b) by the 2026 future baseline, the junction will consist of one four-arm signal-controlled crossroads junction serving the A14 Offslip, Horningsea Road and the site access, and one three-arm signal-controlled T junction serving the A14 Onslip and Horningsea Road. The controlled pedestrian and cyclist crossing facilities over the A14 Onslip and Offslip will remain in place.

9.5.8 The pedestrian phase on A14 on-slip is called once every two cycles in the AM Peak. Allowing for this observation adds 8 seconds bonus green time in 2026 with construction AM peak scenario. The bonus green is an extension of the effective green period available to traffic. The give-way parameters modelled remain as per the software model defaults.

9.5.9 The operation of the junction has been assessed for the 2026, 2028, 2033, and 2038 future baseline AM and PM peak hours using LinSig software and is shown in Table 9-3.

9.5.10 For the 2026, 2028, 2033, and 2038 future baselines, the LinSig model used represents the preferred access option (Option 1b) outlined in the paragraph above.

Table 9-3 - future baseline performance at Horningsea Road / junction 34

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Flow	DoS	MMQ (PCU)	Flow	DoS	MMQ (PCU)
Year 3 (2026) Base						
Horningsea Road SB	851	91.3%	30.7	604	73.6%	18.0
A14 Off-slip	606	89.9%	21.5	~~476~~541	74.2%	14.5
Horningsea Road Bridge NB	129	13.4%	2.3	278	32.6%	4.9
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	1411	85.3%	16.0	1056	69.9%	14.3
Horningsea Rd NB / left turn onto A14 WB on-slip	574	33.8%	2.0	915	57.7%	8.8
Operation Year 1 (2028) Base						
Horningsea Road SB	863	92.6%	32.3	612	83.0%	16.1
A14 Off-slip	615	91.2%	22.4	482	80.9%	12.5
Horningsea Road Bridge NB	130	13.5%	2.1	282	36.2%	3.8
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	1431	89.5%	18.2	1070	75.8%	11.5
Horningsea Rd NB / left turn onto A14 WB on-slip	582	35.2%	2.9	928	61.7%	9.1
Operation Year 1 +5 (2033 Base)						

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
Horningsea Road SB	888	95.3%~~93.7%~~	35.7~~33.8~~	630	76.7%	19.3
A14 Off-slip	633	93.9%~~91.8%~~	24.6~~23.3~~	496	77.4%	15.5
Horningsea Road Bridge NB	134	13.9%~~13.7%~~	2.2~~2.1~~	290	34.0%	5.2
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	1473	92.2%~~92.2%~~	20.8~~20.5~~	1101	73.3%	17.3
Horningsea Rd NB / left turn onto A14 WB on-slip	599	36.2%~~36.2%~~	2.9~~2.9~~	955	60.2%	9.5
Operation Year 1 +10 (2038) Base						
Horningsea Road Southbound	933	100.1%	46.7	662	89.8%	19.4
A14 Off-slip	664	98.6%	30.6	521	87.4%	14.7
Horningsea Road Bridge NB	141	14.6%	2.5~~4~~	305	39.1%	4.2
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	1546	93.9%	~~27.0~~24.2	1157	83.3%	16.2
Horningsea Rd NB / left turn onto A14 WB on-slip	629	37.0%	2.4	1103	66.7%	10.7

9.5.11 In the Year 3 (2026) future baseline the assessment indicates that this junction operates with a maximum DoS of 91.3% in the AM Peak hour on the Horningsea Road southbound approach with an associated MMQ of 30.7 PCU. In the PM peak hour, the maximum DoS of 74.2% is on the A14 Off-slip approach with an associated MMQ of 14.5 PCU.

9.5.12 In the Operation Year 1 (2028) future baseline the assessment indicates that this junction operates in the AM peak hour with a maximum DoS of 92.6% on the Horningsea Road SB approach with an associated MMQ of 32~~3~~.3~~8~~ PCU. In the PM peak hour, the maximum DoS of 83.0% is on the Horningsea Road SB approach with an associated queue of 16.1 PCU.

9.5.13 In the Operation Year 1 + 5 (2033) future baseline the assessment indicates that this junction operates in the AM peak hour with a maximum DoS of 95~~3~~.3~~7~~% on the Horningsea Road SB approach with an associated MMQ of ~~33.8~~35.7 PCU. In the PM peak hour, the maximum DoS of 77.4% is on the A14 off-slip approach with an associated queue of 15.5 PCU.

9.5.14 The DoS outputs from the modelling indicate that the background growth in the 2028 and 2033 traffic may cause the junction to reduce resilience in managing peak hour traffic demand. However, the indicative queue lengths the modelling demonstrates can be accommodated within the existing lanes without causing an issue to the surrounding highway network.

9.5.15 In the Operation Year 1 +10 (2038) future baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 100.1% on the Horningsea Road SB approach with an associated MMQ of 46.7 PCU. In the PM peak hour, the maximum DoS of 89.8% is on the Horningsea Road SB approach with an associated queue of 19.4 PCU.

9.5.16 The DoS outputs from the modelling for the Operation Year 1 +10 (2038) baseline indicate that the background growth in traffic has further reduced the junction's resilience to managing peak hour traffic demand. Due to the forecast being 2038 and the likely change in traffic patterns following national and local policy driving greater public transport and walking and cycling usage. The traffic flow assessment for this should be treated as a sensitivity test and only used to demonstrate the small changes the operational traffic will have at this junction.

Construction Year 3(2026)

9.5.17 The total two-way peak hour flows for Junction 34 of the A14 in the RWCS Year 3 (2026) construction year ("With Construction" scenario) for the construction of the main proposed WWTP is provided in Table 9-4.

Table 9-4:Junction 34 of the A14: without and with construction

	Year 3 (2026) Without construction		Year 3 (2026) Construction traffic only		Year 3 (2026) With construction	
Link	**08:00-09:00**	**17:00-18:00**	**08:00-09:00**	**17:00-18:00**	**08:00-09:00**	**17:00-18:00**
B1047 Horningsea Rd	1581	1811	45	148	1626	1959
A14 on-slip	490	657	45	148	535	805
A14 off-slip	597	474	148	45	745	519

9.5.18 The results in the construction assessment section are tested using the reasonable worst-case scenario. The scenario assumes the peak vehicle periods for the main proposed WWTP and Transfer tunnel coincide with the typical Waterbeach Pipeline construction on Horningsea Road. Due to measures in the CoCP and CTMP that limit working hours for HGV and staff mobilisation to outside of peak traffic hours and school pick-up time, this is unlikely to be realised. However, this represents a potential busiest activity scenario for consideration of short-term impacts due to activities, such as concrete pours or horizontal drilling, that must be completed once commenced and may run in to peak traffic hours.

9.5.19 Further detail of the involvement of stakeholders as part of the CTMP management and monitoring measures is set out in the CTMP (Application Document Reference 5.4.19.7) and ensures that the notification and agreement of short-term high impact activities are coordinated to minimise impacts on the transport network.

9.5.20 The pedestrian phase on A14 on-slip is called once every two cycles in the AM Peak. Allowing for this observation adds 8 seconds bonus green time in 2026 with construction AM peak scenario. The give-way parameters modelled remain as per the software model defaults.

9.5.21 The LinSig results showing the comparison between the 2026 future baseline and 2026 future baseline with added RWCS construction flows in the AM (08:00-09:00) and PM (17:00-18:00) peak hours are provided in Table 9-5~~Table 9-5Table 9-5~~Table 9-5~~Table 9-5~~.

Table 9-5: Option 1b LinSig results for year 2026 without and with operational traffic in the AM (08:00-09:00) and PM (17:00-18:00) peak periods

Arm	Year 3 (2026) Without construction traffic				Year 3 (2026) With construction traffic (without CTMP mitigation)			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Horningsea Rd SB	30.7	91.3%	18.0	73.6%	26.5	84.2%	67.7	115.9%
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	16.0	85.3%	14.3	69.9%	88.1	103.7%	129.6	115.7%
Horningsea Rd NB / left turn onto A14 WB on-slip	2.0	33.8%	8.8	57.7%	2.9	35.4%	8.9	58.5%
Horningsea Rd Bridge NB	2.3	13.4%	4.9	32.6%	2.0	12.4%	7.1	50.3%
A14 off-slip	21.5	89.9%	14.5	74.2%	37.9	104.1%	15.5	79.8%
Option 1b site access	-	-	-	-	5.1	79.0%	6.3	47.2%

9.5.22 To test the realistic worst-case assumptions and where short-term activities would run through the AM and PM peak hours, for instance concrete pours or directional drilling, Table 9-5~~Table 9-5Table 9-5Table 9-5Table 9-5~~ above provides an illustration of the junction operation. This indicates that the junction would operate in the 2026 future baseline AM peak hour with added construction flows with a maximum indicative DoS of 104.1% on the A14 off-slip approach with a queue of 37.9 PCU. In the 2026 future baseline PM peak hour with added construction flows, the maximum indicative DoS of 115.9% is illustrated on the Horningsea Rd SB approach with a queue of 67.7 PCU. The length between the stop-line at the on-slip signalised junction and the egress of the off-slip junction has a maximum queue length of approximately 30.3 PCU (174m) between the two junctions. Therefore, the queue lengths of 88.1 PCU and 129.6 PCU in the AM and PM peak respectively are over the maximum queue length limit, indicating that that there would be occasions where there could be queuing back from the on-slip junction to the off-slip junction.

9.5.23 Whilst the results show the junction operating with added construction flows with DoS greater than 100% in the AM and PM peak hours, it should be noted that these modelling outputs represent the reasonable worst-case scenario which assumes that the construction of all elements of the Proposed Development (main proposed WWTP, outfall and FE, Transfer tunnel, Waterbeach Pipeline) would occur simultaneously and in the AM and PM peak periods. In practice for the short-term activities they would be unlikely to coincide in this way. The CoCP and CTMP measures would ensure stakeholders were informed of short term high volume works and appropriate signage and information provided to the mitigate these short-term impacts.

9.5.24 The hours outside of AM and PM peaks have significantly lower traffic volumes compared to the peak hours. This is demonstrated in Table 9-6~~Table 9-6Table 9-6Table 9-6Table 9-6~~, which compares the traffic volume with construction in the hour before the AM and PM peaks (07:00 to 08:00 and 16:00-17:00) and traffic volume with construction during the peak hours (08:00-09:00 and 17:00-18:00).

Table 9-6: Comparison of traffic flow for the year3 (2026) with added construction flows in AM (08:00-09:00) and PM (17:00-18:00) peaks and the hour before the AM (07:00-08:00) and PM (16:00-17:00) peaks.

Arm	AM (08:00 - 09:00)	AM 07:00 – 08:00)	Difference (PCU)	Difference (% change)	PM (17:00 – 18:00)	PM 16:00 – 17:00)	Difference (PCU)	Difference (% change)
	PCU	**PCU**	**PCU**	**%**	**PCU**	**PCU**	**PCU**	**%**
B1047 Horningsea Rd (entire link two-way)	2135	1442	-693	-32~~48~~%	2202	1723	-479	-~~28~~22%
A14 on-slip	595	501	-94	-15~~9~~%	863	824	-39	-5%
A14 off-slip	813	775	-38	-5%	580	584	4	1%

9.5.25 The results of Table 9-6~~Table 9-6~~ above demonstrate that on average, the junction has ~~24~~17% less traffic outside of AM peak hour and ~~11~~9% less traffic outside of PM peak hour in the 2026 future baseline with added construction flows. Therefore, operating the construction traffic outside of peak hours as set out within the CTMP and CoCP will significantly reduce the impact on the junction.

~~9.5.26~~ This operation of the junction outside of the peak hours is demonstrated in Table 9-7 below, which provides LinSig results showing the comparison between the 2026 future baseline and 2026 future baseline with added construction flows in the hour before the AM (07:00-08:00) and PM (16:00-17:00) peaks. This represents how the junction will operate in 2026 with added construction traffic where the CTMP and CoCP mitigation is applied.

Table 9-7: Option 1b LinSig results for Year 3 (2026) without and with construction traffic before AM peak hour (07:00-08:00) and before PM peak hour (16:00-17:00)

Arm	Year 3 (2026) Without construction traffic				Year 3 (2026) With construction traffic (with CTMP mitigation)			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Horningsea Rd SB	8.9	69.3%	5.1	47.5%	8.9	69.3%	6.4	43.5%
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	2.3	61.9%	5.1	53.6%	9.9	73.2%	28.6	87.5%
Horningsea Rd NB / left turn onto A14 WB on-slip	2.5	28.2%	6.9	54.3%	1.9	27.1%	5.1	49.9%
Horningsea Rd Bridge NB	0.9	9.7%	4.5	48.5%	1.0	9.7%	6.6	45.6%
A14 off-slip	12.2	70.8%	8.2	53.8%	12.4	72.6%	14.4	75.3%
Option 1b site access	-	-	-	-	3.2	59.2%	6.3	47.2%

~~9.5.27~~9.5.26 The results of the modelling summarised above show that with mitigation as outlined in the CTMP and CoCP and with construction traffic operating outside of the AM and PM peak hours, the proposed Option 1b site access junction would operate in the 2026 future baseline AM peak hour with added construction traffic flows with a maximum DoS of 73.2% on Horningsea Rd Bridge SB / right turn onto A14 WB on-slip approach with a queue of 9.9 PCU. In the 2026 future baseline PM peak hour with added construction traffic flows, the maximum DoS of 87.5% will be on the Horningsea Rd Bridge SB / right turn onto A14 WB on-slip approach with a queue of 28.6 PCU. In both the AM and PM peaks, the queue lengths on the Horningsea Rd Bridge SB / right turn onto A14 WB on-slip approach are within the maximum queue length limit where there would be no queuing back from the on-slip junction to the off-slip junction.

~~9.5.28~~9.5.27 Overall, the above results demonstrate that the junction operates within operational capacity when construction traffic operates in line with mitigation measures outlined in the CTMP and CoCP.

Decommissioning, Construction Year 5 (2028)

~~9.5.29~~9.5.28 The peak hour flows required to travel through Junction 34 of the A14 in the 2028 decommissioning year (“With Decommissioning” scenario) for the operation of the proposed WWTP are provided in Table 9-8

~~9.5.30~~9.5.29 .

Table 9-8: Junction 34 of the A14: without and with decommissioning 2028

Link	Year 4 Construction (2028) Without decommissioning		Year 3 (2026) Construction Traffic Only		Year 5 Construction (2028) With decommissioning	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
B1047 Horningsea Rd (entire link two-way)	1474	1404	34	34	1508	1438
A14 on-slip	496	665	34	34	530	689
A14 off-slip	604	480	39	6	643	486

~~9.5.31~~9.5.30 The pedestrian phase on A14 on-slip and off-slip are called once every two cycles in the AM Peak. Allowing for this observation adds 8 seconds on on-slip and 5 seconds on off-slip bonus green time in 2028 decommissioning AM peak scenario. The bonus green is an extension of the effective green period available to traffic. The give-way parameters modelled remain as per the software model defaults.

~~9.5.32~~9.5.31 The comparison LinSig results for Junction 34 between the 2028 future baseline and the 2028 future baseline with added decommissioning flows in the AM and PM peaks are summarised in Table 9-9.

Table 9-9:- Option 1b LinSig results for year 2028 without and with decommissioning traffic in the AM (08:00-09:00) and PM (17:00-18:00) peak periods

Arm	Year 4 (2028) without decommissioning				Year 4 (2028) with decommissioning			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Horningsea Rd SB	32.3	92.6%	16.1	83.0%	32.3	92.6%	18.0	73.1%
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	22.4	91.2%	12.5	80.9%	~~40.6~~44.0	97.0%	24.1	83.6%
Horningsea Rd NB / left turn onto A14 WB on-slip	2.1	13.5%	3.8	36.2%	2.9	35.2%	9.0	58.6%
Horningsea Rd Bridge NB	18.2	89.5%	11.5	75.8%	2.1	13.5%	4.8	32.5%
A14 off-slip	32.3	92.6%	16.1	83.0%	22.4	91.2%	15.1	77.0%
Option 1b site access	-	-	-	-	1.6	35.9%	1.6	35.9%

~~9.5.33~~9.5.32 The results of the modelling summarised above show that allowing for the realistic worst-case assumptions that the proposed Option 1b site access junction would operate in the 2028 future baseline AM peak hour with added decommissioning flows with a maximum DoS of 97.0% on the Horningsea Rd Bridge SB / right turn onto A14 WB on-slip approach with a queue of ~~40.6~~44.0 PCU. In the 2028 future baseline PM peak hour with added decommissioning flows, the maximum DoS of 83.6% will be on the Horningsea Rd Bridge SB / right turn onto A14 WB on-slip approach with a queue of 24.1 PCU. The length between the stop-line at the on-slip signalised junction and the egress of the off-slip junction has a maximum queue length of approximately 30.3 PCU (174m) between the two junctions. Therefore, the queue length of ~~40.6~~44.0 PCU in the AM peak is over the maximum queue length limit, indicating that that there would be occasions where there could be queuing back from the on-slip junction to the off-slip junction. In the PM peak, the queue length of 24.1 PCU is within the maximum queue length limit where there would be no queuing back from the on-slip junction to the off-slip junction.

~~9.5.34~~9.5.33 The results show the junction operating with added decommissioning flows with a queue length greater the maximum queue length limit on the Horningsea Rd Bridge SB / right turn onto A14 WB on-slip approach in the AM peak. However, it should be noted that these modelling outputs represent the reasonable worst-case scenario which assumes that the construction of all elements of the Proposed Development (main proposed WWTP, outfall and FE, Transfer tunnel, Waterbeach Pipeline) would occur simultaneously and in the AM peak period. In practice, this would not happen, based on the construction programme which clearly sets out a phased approach to construction, and the commitment for construction vehicles to not travel during the AM and PM peak periods, as set out within the CTMP and CoCP.

~~9.5.35~~9.5.34 The hours outside of AM and PM peaks (07:00-08:00 and 16:00-17:00) have significantly lower traffic volumes compared to the peak hours Table 9-~~10 compares~~10 compares the traffic volume with construction outside the peak and during the peak hours.

Table 9-10:- Comparison of traffic flow for the Year 5 (2028) with added decommissioning flows in AM (08:00-09:00) and PM (17:00-18:00) peaks and the hour before the AM (07:00-08:00) and PM (16:00-17:00) peaks.

Arm	AM (08:00 -09:00)	AM 07:00 – 08:00)	Difference (PCU)	Difference (% change)	PM (17:00 – 18:00)	PM 16:00 – 17:00)	Difference (PCU)	Difference (% change
	PCU	**PCU**	**PCU**	**%**	**PCU**	**PCU**	**PCU**	**%**
B1047 Horningsea Rd (entire link two-way)	2102	1399	-703	-~~50~~33%	2064	1579	-485	-~~31~~23%
A14 on-slip	541	445	-96	-~~22~~17%	707	667	-40	-6%
A14 off-slip	662	622	-39	-6%	496	500	4	1%

~~9.5.36~~9.5.35 The results of Table 9-~~10 above~~10 above demonstrate that on average, the junction has ~~26~~18% less traffic outside of AM peak hour and 10~~2~~% less traffic outside of PM peak hour in the 2028 future baseline with added decommissioning flows. Therefore, operating the construction traffic outside of peak hours as set out within the CTMP and CoCP will significantly reduce the impact on the junction.

Operation year 2033 (5 year post-opening sensitivity test)

~~9.5.37~~9.5.36 The peak hour flows required to travel through Junction 34 in the 2033 operational year ("With Operation" scenario) for the operation of the proposed WWTP are provided in Table 9-11 below.

Table 9-11: Junction 34 of the A14: without and with operation Year 1 + 5 (2033)

Link	2033 without operation		2033 operational traffic only		2033 with operation	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
B1047 Horningsea Rd (entire link two-way)	1518	1603	45	40	1563	1643
A14 on-slip	511	684	45	40	556	724
A14 off-slip	622	494	45	40	667	534

~~9.5.38~~9.5.37 The comparison LinSig results for Junction 34 between the 2033 future baseline and the 2033 future baseline with added operational flows in the AM and PM peaks are summarised in Table 9-12~~Table 9-12Table 9-12Table 9-12Table 9-12~~.

~~9.5.39~~9.5.38 The pedestrian phase on A14 on-slip and off-slip are called once every two cycles in the AM Peak. Allowing for this observation adds 8 seconds on on-slip and 5 seconds on off-slip bonus green time in 2033 operational AM peak scenario. The bonus green is an extension of the effective green period available to traffic. The give-way parameters modelled remain as per the software model defaults.

Table 9-12: Option 1b LinSig results for operation Year 1 +5 (2033) without and with operational traffic in the AM (08:00-09:00) and PM (17:00-18:00) peak periods

Arm	2033 without operation				2033 with operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Horningsea Rd SB	35.7~~33.8~~	95.3%~~93.7%~~	19.3	76.7%	38.1	97.0%	19.0	75.3%

Arm	2033 without operation				2033 with operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	20.8~~20.5~~	92.2%~~92.2%~~	17.3	73.3%	24.3	93.3%	25.3	86.5%
Horningsea Rd NB / left turn onto A14 WB on-slip	2.9~~2.9~~	36.2%~~36.2%~~	9.5	60.2%	2.9	36.2%	9.5	60.2%
Horningsea Rd Bridge NB	2.2~~2.1~~	13.9%~~13.7%~~	5.2	34.0%	2.3	14.1%	5.1	33.4%
A14 off-slip	24.6~~23.3~~	93.9%~~91.8%~~	15.5	77.4%	~~23.3~~24.6	93.9~~1.8~~%	15.8	79.2%
Option 1b site access	-	-	-	-	0.2	5.1%	1.6	35.9%

~~9.5.40~~9.5.39 The results of the modelling in Table 9-12~~Table 9-12Table 9-12Table 9-12Table 9-12~~ show that the vehicles routing through junction 34 of the A14 to arrive and depart the proposed permanent access junction would operate in the 2033 future baseline AM peak hour with added operational flows with a maximum DoS of ~~93.7~~97.0% on the Horningsea Road southbound approach with a queue of ~~33.8~~38.1 PCU. In the PM peak, in the 2033 future baseline with added operational flows, the maximum DoS of 86.5% will be on the Horningsea Rd Bridge southbound / right turn onto A14 westbound on-slip approach with a queue of 25.3 PCU. The length between the stop-line at the on-slip signalised junction and the egress of the off-slip junction has a maximum queue length of approximately 30.3 PCU (174m) between the two junctions. Therefore, the queue length of 25.3 PCU is within the maximum queue length limit in the PM peak where there would be no queuing back from the on-slip junction to the off-slip junction.

~~9.5.41~~9.5.40 Operational results presented in Table 9-12~~Table 9-12Table 9-12Table 9-12Table 9-12~~ represent the reasonable worst-case scenario, where it has been assumed that operational vehicles would travel during AM and PM peak periods. An OTL~~M~~P would be required to effectively manage operational traffic and operational working patterns. In addition, the typical operational vehicle hourly profile demonstrates that a third of HGV movements would take overnight further reducing the likelihood of significant volumes of peak HGV vehicle movements.

Operation year 1 +5 2038 (10 year post-opening sensitivity test)

~~9.5.42~~9.5.41 The two-way flows required to travel through junction 34 in the 2038 operational year during the operational phase is provided in Table 9-13.

Table 9-13: Junction 34 of the A14: without and with operation 2038

Link	Year 1 + 10 (2038) without operation		Year 1 +1- (2038) operational traffic only		Year 1 +1- (2038) with operation	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
Horningsea Road	1595	1686	45	45	1640	1731
A14 on-slip	536	719	45	45	581	764
A14 off-slip	653	519	45	45	698	564

Source: Mott MacDonald

~~9.5.43~~9.5.42 The comparison LinSig results for junction 34 between the 2038 future baseline and the 2038 future baseline with added operational flows in the AM and PM peaks are summarised in Table 9-14~~Table 9-14Table 9-14Table 9-14Table 9-14~~.

~~9.5.44~~9.5.43 The pedestrian phase on A14 on-slip and off-slip are called once every two cycles in the AM Peak. Allowing for this observation adds 8 seconds on on-slip and 5 seconds on off-slip bonus green time in 2033 operational AM peak scenario. The bonus green is an extension of the effective green period available to traffic. The give-way parameters modelled remain as per the software model defaults.

Table 9-14:- Option 1b LinSig results for year 2038 without and with operational traffic in the AM (08:00-09:00) and PM (17:00-18:00) peak periods

Arm	Year 1 + 10 (2038~~) without~~) without operation				Year 1 + 10 (2038~~) with~~) with operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Horningsea Rd SB	46.7	100.1%	19.4	89.8%	47.8~~43.4~~	100.5%~~98.8%~~	21.0	78.9%
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	24.2	93.9%	16.2	83.3%	39.9~~37.1~~	97.9%~~98.2%~~	32.0	93.0%
Horningsea Rd NB /	2.4	37.0%	10.7	66.7%	3.1~~3.1~~	38.0%~~38.0%~~	10.6	63.3%

Arm	Year 1 + 10 (2038~~) without~~) without operation				Year 1 + 10 (2038~~) with~~) with operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
left turn onto A14 WB on-slip								
Horningsea Rd Bridge NB	2.5	14.6%	4.2	39.1%	2.4~~2.2~~	14.6%~~14.4%~~	5.2	33.9%
A14 off-slip	30.6	98.6%	14.7	87.4%	30.6~~27.8~~	98.6%~~96.4%~~	18.6	87.4%
Option 1b site access	-	-	-	-	0.1~~0.1~~	2.6%~~2.6%~~	0.8	19.6%

~~9.5.45~~9.5.44 For the reasonable worst-case scenario, the results of the modelling summarised above shows that:

- the vehicles routing through junction 34 of the A14 to arrive and depart the proposed permanent access junction would operate in the 2038 future baseline AM peak hour with added operational flows with a maximum DoS of 100.5% on the Horningsea Road southbound approach with a queue of 47.8 PCU.
- In the PM peak in the 2038 future baseline with added operational flows, the maximum DoS of 93.0% will be on the Horningsea Rd Bridge southbound / right turn onto A14 westbound on-slip approach with a queue of 32.0 PCU.
- The length between the stop-line at the on-slip signalised junction and the egress of the off-slip junction has a maximum queue length of approximately 30 PCU (174m) between the two junctions.

~~9.5.46~~9.5.45 Therefore, the queue length of 39.9 PCU in the AM peak and 32.0 PCU in the PM peak is above the maximum queue length limit, indicating that that there would be occasions where there could be queuing back from the on-slip junction to the off-slip junction.

~~9.5.47~~9.5.46 Whilst the results show the junction operating with added construction flows with a DoS greater than 100% in the AM peak hour, it should be noted that the operational results presented above represent the reasonable worst-case scenario, where it has been assumed that operational vehicles would travel during AM and PM peak periods. An OTL~~M~~P would be required to effectively manage operational traffic and operational working patterns.

~~9.5.48~~9.5.47 As noted in the 2033 analysis the typical operational vehicle hourly profile demonstrates that a third of HGV movements would take place overnight further reducing the likelihood of significant volumes of peak HGV vehicle movements. Alongside this, the Operational Worker Travel Plan (Application Document Reference 5.4.19.8) will reduce the volume of workforce traveling by single occupancy car.

~~9.5.49~~9.5.48 It should also be noted that the use of TEMPro growth factors in operation covers a 17-year period from the 2021 baseline to the 2038 future baseline. Over that 17-year period, background traffic growth increases to the extent where the effects on the 2038 baseline junction models should be treated as indicative.

~~9.5.50~~9.5.49 Background traffic growth from committed developments in the surrounding area, and in Cambridgeshire, have been determined to have an effect on junction 34 of the A14. This is illustrated in Table 9-14~~Table 9-14~~~~Table 9-14~~~~Table 9-14~~~~Table 9-14~~ which shows it is likely that junction 34 would have already been operating close to or over capacity in the 2038 future baseline ("without operation") even without the addition of operational traffic from the Proposed Development. As this is a matter relating to background traffic growth, this has been considered to be a cumulative effect. In relation to the effect of the Proposed Development in operation in the peak periods, it can be seen that operational vehicle movements in isolation are not large enough to cause an effect, relative to the traffic flows observed in 2038 at junction 34 in the peak periods, as illustrated in Table 9-13.

~~9.5.51~~9.5.50 Mitigation in relation to projected future growth and subsequent changes to traffic volumes as a result of committed developments would be managed through the policy objectives outlined within the Local Transport and Connectivity Plan (LTCP) (Cambridgeshire & Peterborough Combined Authority, 2020), with reference to the 'decide and provide' approach. This requires new developments to clearly set out what mode shares will need to be achieved and how it will be monitored. This has been set out in full within the Operational Workers Travel Plan (Application Document Reference 5.4.19.8).

~~9.5.52~~9.5.51 The OWTP for the Proposed Development aims to reduce the number of trips made to and from the proposed WWTP by private car during the operational phase. This will include initiatives to promote sustainable travel and car-sharing initiatives to increase multi-occupancy car-journeys.

~~9.5.53~~9.5.52 As noted in paragraph 9.3.42 above, construction vehicles will aim to travel outside of AM and PM peak periods as set out within the CTMP and CoCP. Table 9-14~~Table 9-14~~~~Table 9-14~~~~Table 9-14~~~~Table 9-14~~ demonstrates that the hours outside of AM and PM peaks (07:00-08:00 and 16:00-17:00) have significantly lower traffic volumes compared to the peak hours. Table 9-~~15 compares~~15 compares the traffic volume with construction outside the peak and during the peak hours for 2038.

Table 9-15: Comparison of traffic flow for the operation Year 1 + 10 (2038) with added construction traffic in AM (08:00-09:00) and PM (17:00-18:00) peaks and the hour before the AM (07:00-08:00) and PM (16:00-17:00) peaks.

Arm	AM (08:00 -09:00)	AM 07:00 – 08:00)	Difference (PCU)	Difference (% change)	PM (17:00 – 18:00)	PM 16:00 – 17:00)	Difference (PCU)	Difference (% change
	PCU	**PCU**	**PCU**	**%**	**PCU**	**PCU**	**PCU**	**%**
B1047 Horningsea Rd (entire link two-way)	2232	1491	741	-~~50~~33%	2232	1685	-547	-~~32~~25%
A14 on-slip	544	524	20	-4%	765	699	-66	-9%
A14 off-slip	690	583	107	-16~~8~~%	526	531	5	1%

~~9.5.54~~9.5.53 The results ~~within Table~~within Table 9-15 above demonstrate that on average, the junction has ~~24~~17% less traffic outside of AM peak hour and 12~~3~~% less traffic outside of PM peak hour in the 2038 future baseline with added operational flows. Therefore, operating the construction traffic outside of peak hours as set out within the CTMP and CoCP will significantly reduce the impact on the junction.

~~9.5.55~~9.5.54 This operation of the junction outside of the peak hours is demonstrated ~~in Table~~in Table 9-~~16 ,~~16, which provides LinSig results showing the comparison between the 2038 future baseline and 2038 future baseline with added operational flows in the hour before the AM (07:00-08:00) and PM (16:00-17:00) peaks. This represents how the junction will operate in 2038 with added construction traffic where the CTMP and CoCP mitigation is applied.

Table 9-16: Option 1b LinSig results for operation Year 1 +10 (2038) without and with operational traffic before AM peak hour (07:00-08:00) and before PM peak hour (16:00-17:00)

Arm	2038 without operation				2038 with operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Horningsea Rd SB	10.3	76.0%	5.7	51.8%	9.7	70.1%	5.3	43.8%
Horningsea Rd Bridge SB / right turn onto A14 WB on-slip	2.7	68.2%	6.1	60.4%	2.3	64.6%	7.2	67.2%
Horningsea Rd NB / left turn onto A14 WB on-slip	2.9	30.8%	8.4	59.5%	3.6	36.7%	8.4	59.5%
Horningsea Rd Bridge NB	0.9	10.4%	5.1	53.0%	0.9	9.8%	4.5	45.5%
A14 off-slip	14.2	77.6%	9.4	59.0%	11.8	70.9%	10.4	65.1%
Option 1b site access	-	-	-	-	0.1	1.9%	0.6	14.7%

~~9.5.56~~9.5.55 The results of the modelling summarised above shows that the vehicles routing through junction 34 of the A14 to arrive and depart the proposed Option 1b site access junction would operate in the 2038 operation phase in the hour before the AM peak with a maximum DoS of 70.9% on the A14 off-slip approach with a queue of 11.8 PCU. In the hour before the PM peak, the junction would operate in the 2038 operation phase with a maximum DoS of 67.2% on the Horningsea Rd Bridge SB / right turn onto A14 WB on-slip approach with a queue of 7.2 PCU. The length between the stop-line at the on-slip signalised junction and the egress of the off-slip junction has a maximum queue length of approximately 30.3 PCU (174m) between the two junctions. Therefore, the queue length of 7.2 PCU in the hour before the PM peak is within the maximum queue length limit, and as such there would be no queuing back from the on-slip junction to the off-slip junction in the PM peak.

~~9.5.57~~9.5.56 Overall, the above results demonstrate that the junction operates within operational capacity when construction traffic operates in line with mitigation measures outlined in the CTMP and CoCP.

A10 / Denny End Road

~~9.5.58~~9.5.57 This junction is at three-arm signal-controlled junction with signalised pedestrian crossing facilities. The construction route would travel through this junction to access the Waterbeach Pipeline works corridor via the following access points as shown in Appendix A, Figure A.2:

- COA17 – COA18
- CA29
- COA14
- CA26
- COA13
- COA12
- COA20
- COA9
- CA16

~~9.5.59~~9.5.58 The operation of this junction in 2033 and 2038 has not been assessed as the operational flows in these locations are low enough in volume that no noticeable effect on the junction would be observed.

2021 existing baseline

~~9.5.60~~9.5.59 The operation of the junction has been assessed for the 2021 existing baseline AM and PM peak hours using LinSig software and is shown in Table 9-17.

Table 9-17: 2021 baseline performance at A10 / Denny End Road

Approach	Flow (PCU)	DoS*	MMQ (PCU)
2021 AM peak hour (08:00 – 09:00) baseline results			
A10 (southbound)	819	64.5%	11.6
A10 (northbound)	722	63.4%	6.7
Denny End Road	187	63.6%	5.2
2021 PM peak hour (17:00 – 18:00) baseline results			
A10 (southbound)	609	63.6%	10.8
A10 (northbound)	646	58.1%	10.7
Denny End Road	369	62.9%	8.5

*DoS = Degrees of Saturation. MMQ = Mean Maximum Queue. PCU = Passenger Car Unit.

~~9.5.61~~9.5.60 In the 2021 baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 64.5% on the A10 (southbound) approach with an associated MMQ of 11.6 PCU. In the PM peak hour, the maximum DoS of 63.6% is on the A10 (southbound) approach with an associated MMQ of 10.8 PCU.

Year 3 (2026) and Year 5 (2028) future baselines

~~9.5.62~~9.5.61 The operation of the junction has been assessed for the 2026 and 2028 future baseline AM and PM peak hours using LinSig software and is shown in Table 9-18.

Table 9-18: Future baseline performance at A10 / Denny End Road

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Flow	**DoS**	**MMQ (PCU)**	**Flow**	**DoS**	**MMQ (PCU)**
2026 Base						
A10 (southbound)	857	67.5%	12.5	653	66.5%	11.5
A10 (northbound)	755	66.2%	7.2	692	60.8%	11.6
Denny End Road	196	66.7%	5.6	386	65.8%	9.1

~~9.5.63~~9.5.62 In the 2026 future baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 67.5% on the A10 (southbound) approach with an associated MMQ of 12.5 PCU. In the PM peak hour, the maximum DoS of 66.5% is on the A10 (southbound) approach with an associated MMQ of 11.5 PCU.

Construction year 3 (2026)

~~9.5.64~~9.5.63 The two-way flows required to travel through the A10 / Denny End Road junction in the RWCS 2026 construction year (“With Construction” scenario) for the Waterbeach Pipeline are provided in Table 9-19.

Table 9-19: A10 / Denny End Road: without and with construction

Link	2026 Without Construction		2026 With Construction	
	08:00-09:00	**17:00-18:00**	**08:00-09:00**	**17:00-18:00**
A10 (Ely Road)	2132	2006	2153	2026
Denny End Road	514	547	535	567

~~9.5.65~~9.5.64 A comparison of LinSig results for A10 / Denny End Road for the 2026 baseline and 2026 baseline with added construction flows are outlined below in Table 9-20.

Table 9-20: A10 / Denny End Road LinSig results for Year 3 (2026) without and with construction traffic

Arm	Year 3 (2026) without construction				Year 3 (2026) with construction			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
A10 (southbound)	12.5	67.5%	11.5	66.5%	13.9	72.3%	11.7	67.9%
A10 (northbound)	7.2	66.2%	11.6	60.8%	7.4	70.9%	11.8	62.6%
Denny End Road	5.6	66.7%	9.1	65.8%	6.4	71.4%	10.1	69.6%

~~9.5.66~~9.5.65 The results of the modelling summarised above demonstrate that the junction operates in the 2026 future baseline AM peak hour with added construction flows with a maximum DoS of 72.3% on the A10 (southbound) approach with an associated MMQ of 13.9 PCU. In the PM peak hour, the maximum DoS of 69.6% is on the Denny End Road approach, with an associated MMQ of 10.1 PCU.

~~9.5.67~~9.5.66 These modelling outputs represent the reasonable worst-case scenario (RWCS) which assumes that the construction of all elements of the Proposed Development (main proposed WWTP, outfall and FE, Transfer tunnel, Waterbeach Pipeline) will occur simultaneously and in the AM and PM peak periods. In practice, this would not happen, based on the construction programme which clearly sets out a phased approach to construction, and the commitment for construction vehicles to not travel during the AM and PM peak periods, as set out within the CTMP and CoCP.

A10 / Car Dyke Road

~~9.5.68~~9.5.67 This junction is a three-arm priority T junction without controlled pedestrian crossing facilities. The construction route would travel through this junction to access the Waterbeach Pipeline works corridor via access points COA17-COA19, CA28, COA15, COA14, CA25, CA13, CAO20, COA9, CA16 as shown in Appendix A, Figure A.2.

~~9.5.69~~9.5.68 The operation of this section in 2033 and 2038 has not been assessed as the operational flows in these locations are low enough in volume that no noticeable effect on the junction would be observed.

~~9.5.70~~9.5.69 The Waterbeach New Town planning application has proposed an alternative junction arrangement for the A10 / Car Dyke Lane junction would need to be in place by 2031. For the assessment it has been assumed that this is not implemented during the construction period for the project and so the following analysis is based on the current junction layout.

2021 existing baseline

~~9.5.71~~9.5.70 The operation of this junction has been assessed for the 2021 existing baseline AM and PM peak hours using Junctions 9 software and is shown in Table 9-21~~Table 9-21Table 9-21Table 9-21Table 9-21~~.

Table 9-21: 2021 baseline performance at A10 / Car Dyke Road

Approach	Queue (PCU)*	Delay (s)	RFC
2021 AM peak hour (08:00 - 09:00) baseline results			
Car Dyke Road	1.3	17.60	0.57
A10 (northbound)	0.5	11.46	0.35
2021 PM peak hour (17:00 - 18:00) baseline results			
Car Dyke Road	0.9	14.80	0.46
A10 (northbound)	0.9	13.18	0.48

RFC = Ratio of flow to capacity. PCU = Passenger Car Unit. S = *Seconds*.

~~9.5.72~~9.5.71 In the 2021 baseline the assessment shows that this junction operates in the AM peak hour with a maximum RFC of 0.57 on the Car Dyke Road approach with an associated queue of 1.3 PCU. In the PM peak hour, the maximum RFC of 0.48 is on the A10 (northbound) approach with an associated queue of 0.9 PCU. 2026 and 2028 future baselines.

~~9.5.73~~9.5.72 The operation of this junction has also been assessed for the 2026 and 2028 future baseline AM and PM peak hours using Junctions9 software and is shown in Table 9-22.

Table 9-22: Future baseline performance at A10 / Car Dyke Road

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Queue (PCU)	**Delay (s)**	**RFC**	**Queue (PCU)**	**Delay (s)**	**RFC**
2026 Base						
Car Dyke Road	1.6	20.32	0.62	1.0	16.80	0.50
A10 (northbound)	0.6	12.16	0.37	1.0	14.30	0.51

~~9.5.74~~9.5.73 In the 2026 future baseline the assessment shows that this junction operates with a maximum RFC of 0.62 on the Car Dyke Road approach in the AM peak with an associated queue of 1.6 PCU. In the PM peak hour, the maximum RFC of 0.51 on the A10 (northbound) approach with an associated queue of 1.0 PCU.

Construction year 3 (2026)

~~9.5.75~~9.5.74 The two-way flows required to travel through the A10 / Car Dyke Road junction in the RWCS 2026 construction year ("With Construction" scenario) for the Waterbeach Pipeline are provided in Table 9-23.

Table 9-23: A10 / Car Dyke Road: without and with construction

Link	2026 Without Construction		2026 With Construction	
	08:00-09:00	**17:00-18:00**	**08:00-09:00**	**17:00-18:00**
A10 (Ely Road)	2132	2006	2153	2026
Car Dyke Road	491	477	512	498

~~9.5.76~~9.5.75 A comparison of Junctions 9 results for A10 / Car Dyke Road the 2026 baseline and 2026 baseline with added construction flows are outlined below in Table 9-24.

Table 9-24: A10 / Car Dyke Road Junctions 9 results for Year 3 (2026) without and with construction traffic

Arm	2026 without construction				2026 with construction			
	AM		PM		AM		PM	
	Queue (PCU)	RFC	Queue (PCU)	RFC	Queue (PCU)	RFC	Queue (PCU)	RFC
Car Dyke Road	1.6	0.62	1.0	0.50	1.9	0.65	1.3	0.56
A10 (northbound)	0.6	0.37	1.0	0.51	0.8	0.43	1.2	0.54

~~9.5.77~~9.5.76 The results of the modelling summarised above demonstrate that the junction operates in the 2026 future baseline AM peak hour with added construction flows with a maximum RFC of 0.65 on the Car Dyke Road approach with an associated queue of 1.9 PCU. In the PM peak hour, the maximum RFC of 0.56 is on the Car Dyke Road approach, with an associated queue of 1.3 PCU.

~~9.5.78~~9.5.77 These modelling outputs represent the reasonable worst-case scenario (RWCS) which assumes that the construction of all elements of the Proposed Development (main proposed WWTP, outfall and FE, Transfer tunnel, Waterbeach Pipeline) will occur simultaneously and in the AM and PM peak periods. In practice, this would not happen, based on the construction programme which clearly sets out a phased approach to construction, and the commitment for construction vehicles to not travel during the AM and PM peak periods, as set out within the CTMP and CoCP.

Milton Interchange

~~9.5.79~~9.5.78 This junction is at five arm controlled roundabout junction with no controlled pedestrian crossing facilities. Construction vehicles will travel through this junction to access the construction works corridor for the main proposed WWTP, the outfall and FE, the Transfer Tunnel and the Waterbeach Pipeline.

2021 existing baseline

~~9.5.80~~9.5.79 The operation of the junction has been assessed for the 2021 existing baseline AM and PM peak hours using LinSig software and is shown in Table 9-25.

Table 9-25: 2021 baseline performance at Milton Interchange

Approach	Flow	DoS	MMQ (PCU)
	2021 AM peak hour (08:00 - 09:00) baseline results		
Milton Road	853	54.2%	5.5
Milton Road Circulatory (Circ)	970	58.1%	8.3
A14 Eastbound Off-slip	1502	56.6%	6.2
A14 Eastbound Off-slip Circ	1042	71.7%	6.1
A10	1049	53.2%	5.1
A10 Circ	1353	65.9%	14.1
Cambridge Road	464	44.7%	1.6
Cambridge Road Circ	1951	39.9%	0.3
A14 Westbound Off-slip	971	74.2%	6.2
A14 Westbound Off-slip Circ	1830	74.6%	9.3
	2021 PM peak hour (17:00 - 18:00) baseline results		
Milton Road	1491	78.1%	10.3
Milton Road Circ	1078	75.%	9.7
A14 Eastbound Off-slip	694	46.5%	2.9
A14 Eastbound Off-slip Circ	1387	60.1%	8.7
A10	975	51.0%	5.9
A10 Circ	1033	67.8%	12.5
Cambridge Road	570	47.3%	1.6
Cambridge Road Circ	1433	34.4%	0.3
A14 Westbound Off-slip	596	39.9%	3.0
A14 Westbound Off-slip Circ	1215	63.6%	8.6

DoS = *Degrees of Saturation*. MMQ = *Mean Maximum Queue*

~~9.5.81~~9.5.80 In the 2021 baseline the assessment shows that this junction operates in the 2021 baseline in the AM peak hour with a maximum DoS of 74.6% on the A14

Westbound Off-slip circulatory approach in the AM peak hour with an associated MMQ of 9.3 PCU. In the PM peak hour, the maximum DoS of 78.1% is on the Milton Road approach with an associated MMQ of 10.3 PCU. This is a recognised operation pattern of the Milton Interchange and discussed with CCC.

Year 3 (2026), Year 5 (2028), operation Year 1 + 5 (2033), and operation Year 1 +10 (2038) future baselines

~~9.5.82~~9.5.81 The operation of the junction has also been assessed for the 2026, 2028, 2033, and 2038 future baseline AM and PM peak hours using LinSig software and is shown in Table 9-26~~Table 9-26Table 9-26Table 9-26Table 9-26~~.

Table 9-26: Future baseline performance at Milton Interchange

	AM peak (08:00 – 09:00)			**PM peak (17:00 – 18:00)**		
	Flow	**DoS**	**MMQ (PCU)**	**Flow**	**DoS**	**MMQ (PCU)**
2026 Base						
Milton Road	893	66.7%	6.7	1562	81.7%	11.3
Milton Road Circ	1016	55.3%	8.5	1129	78.8%	10.0
A14 Eastbound Off-slip	1574	72.3%	6.6	727	48.6%	3.2
A14 Eastbound Off-slip Circ	1091	75.2%	8.3	1453	62.9%	9.3
A10	1099	57.4%	5.7	1021	49.5%	5.8
A10 Circ	1417	67.5%	14.3	1082	77.4%	12.5
Cambridge Road	486	51.6%	2.0	597	51.5%	1.8
Cambridge Road Circ	2043	41.7%	0.3	1501	36.1%	0.3
A14 Westbound Off-slip	1017	77.7%	6.7	625	47.6%	3.4
A14 Westbound Off-slip Circ	1917	78.2%	9.4	1273	62.9%	8.6
2028 Base						
Milton Road	903	71.6%	7.1	1584	82.7%	11.6

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Flow	**DoS**	**MMQ (PCU)**	**Flow**	**DoS**	**MMQ (PCU)**
Milton Road Circ	1028	54.3%	8.5	1142	79.8%	9.7
A14 Eastbound Off-slip	1593	73.3%	6.7	735	53.6%	3.3
A14 Eastbound Off-slip Circ	1103	76.0%	6.5	1470	62.0%	9.6
A10	1112	52.2%	5.0	1033	50.2%	5.9
A10 Circ	1433	75.2%	14.3	1094	78.2%	10.9
Cambridge Road	492	50.7%	1.9	604	52.4%	1.8
Cambridge Road Circ	2067	42.2%	0.3	1519	36.5%	0.3
A14 Westbound Off-slip	1030	78.6%	6.8	632	35.6%	3.0
A14 Westbound Off-slip Circ	1940	79.1%	9.3	1288	74.0%	8.6
2033 Base						
Milton Road	931	65.8%	6.8	1627	85.2%	12.4
Milton Road Circ	1060	59.5%	8.5	1177	82.2%	10.0
A14 Eastbound Off-slip	1640	76.0%	7.1	758	48.7%	2.6
A14 Eastbound Off-slip Circ	1138	78.3%	10.2	1514	80.4%	13.2
A10	1146	67.3%	6.8	1064	49.9%	5.9
A10 Circ	1478	64.8%	14.5	1128	84.5%	10.9
Cambridge Road	507	54.6%	2.1	623	54.6%	2.0
Cambridge Road Circ	2130	43.6%	0.4	1565	37.6%	0.3

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Flow	**DoS**	**MMQ (PCU)**	**Flow**	**DoS**	**MMQ (PCU)**
A14 Westbound Off-slip	1061	81.1%	7.2	651	38.7%	3.1
A14 Westbound Off-slip Circ	1999	81.3%	9.6	1328	73.8%	11.9
			2038 Base			
Milton Road	957	64.0%	6.7	1674	87.6%	13.3
Milton Road Circ	1089	63.2%	8.6	1210	84.5%	10.3
A14 Eastbound Off-slip	1685	78.6%	7.8	779	52.1%	3.4
A14 Eastbound Off-slip Circ	1169	80.5%	8.9	1558	67.4%	10.4
A10	1177	71.4%	7.4	1093	53.0%	6.4
A10 Circ	1518	65.3%	14.6	1159	82.8%	13.0
Cambridge Road	521	57.6%	2.4	640	58.3%	2.3
Cambridge Road Circ	2188	44.7%	1.1	1608	38.7%	0.4
A14 Westbound Off-slip	1090	83.1%	7.7	669	55.0%	3.8
A14 Westbound Off-slip Circ	2053	83.6%	10.4	1364	65.6%	10.2

DoS = *Degrees of Saturation*. MMQ = *Mean Maximum Queue*. PCU = *Passenger Car Unit*

~~9.5.83~~9.5.82 In the 2026 future baseline the assessment shows that this junction operates in the AM peak with a maximum DoS of 78.2% on the A14 Westbound Off-slip circulatory with an associated MMQ of 9.4 PCU. In the PM peak hour, the maximum DoS of 81.7% is on the Milton Road approach with an associated MMQ of 11.3 PCU.

~~9.5.84~~9.5.83 In the 2028 future baseline the assessment shows that this junction operates in the AM peak with a maximum DoS of ~~83.6~~79.1% on the A14 Westbound Off-slip circulatory with an associated MMQ of ~~10.4~~9.3 PCU. In the PM peak hour, the maximum DoS of 82.7% is on the Milton Road approach with an associated MMQ of 11.6 PCU.

~~9.5.85~~9.5.84 In the 2033 future baseline the assessment shows that this junction operates in the AM peak with a maximum DoS of 81.3% on the A14 Westbound Off-slip circulatory with an associated MMQ of 9.6 PCU. In the PM peak hour, the maximum DoS of 85.2% is on the Milton Road approach with an associated MMQ of 12.4 PCU.

~~9.5.86~~9.5.85 In the 2038 future baseline the assessment shows that this junction operates in the AM peak with a maximum DoS of 83.6% on the A14 Westbound Off-slip circulatory with an associated MMQ of 10.4 PCU. In the PM peak hour, the maximum DoS of 87.6% is on the Milton Road approach with an associated MMQ of 13.3 PCU.

Construction year 3 (2026)

~~9.5.87~~9.5.86 The two-way flows required to travel through the Milton Interchange in the RWCS 2026 construction year ("With Construction") scenario for the construction of the main proposed WWTP is shown in Table 9-27.

Table 9-27: The Milton Interchange: without and with construction (two-way flows)

	2026 Without Construction		2026 With Construction	
Link	**08:00-09:00**	**17:00-18:00**	**08:00-09:00**	**17:00-18:00**
Milton Road (includes Arm D of J33)	2693	2278	2738 (+45)	2324 (+46)
J33 Arm A (A10 approach)	2190	2033	2219 (+29)	2057 (+24)
J33 Arm B (Cambridge Road)	935	1184	935 (+0)	1184 (+0)
J33 Arm C (A14 on and off slips)	1589	1426	1611 (+22)	1447 (+21)
J33 Arm E (A14 on and off-slips)	2210	1889	2277 (+67)	1953 (+64)

~~9.5.88~~9.5.87 A comparison of LinSig results for the Milton Interchange in the 2026 future baseline ("Without Construction") and 2026 construction year are outlined below in Table 9-28.

Table 9-28: Milton Interchange LinSig results for Year 3 (2026) without and with construction traffic

Arm	2026 without construction				2026 with construction			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Milton Road	6.7	66.7%	11.3	81.7%	6.3	63.3%	11.4	82.2%
Milton Road Circ	8.5	55.3%	10.0	78.8%	8.7	59.1%	10.0	81.7%

Arm	2026 without construction				2026 with construction			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
A14 Eastbound Off-slip	6.6	72.3%	3.2	48.6%	6.8	75.1%	3.2	48.6%
A14 Eastbound Off-slip Circ	8.3	75.2%	9.3	62.9%	8.7	78.7%	9.6	65.1%
A10	5.7	57.4%	5.8	49.5%	6.4	60.9%	7.0	49.3%
A10 Circ	14.3	67.5%	12.5	77.4%	14.5	69.6%	13.0	68.1%
Cambridge Road	2.0	51.6%	1.8	51.5%	2.1	53.8%	2.1	53.5%
Cambridge Road Circ	0.3	41.7%	0.3	36.1%	0.4	43.8%	0.4	38.0%
A14 Westbound Off-slip	6.7	77.7%	3.4	47.6%	7.0	79.9%	3.2	40.4%
A14 Westbound Off-slip Circ	9.4	78.2%	8.6	62.9%	9.7	80.9%	9.2	71.0%

~~9.5.89~~9.5.88 The results of the modelling summarised above demonstrate that the junction operates in the 2026 future baseline AM peak hour with added construction flows with a maximum DoS of 80.9% on the A14 Westbound Off-slip circulatory with an associated queue of 9.7 PCU. In the 2026 future baseline PM peak hour with added construction flows, the maximum DoS of 82.2% is on the Milton Road approach, with an associated queue of 11.4 PCU.

~~9.5.90~~9.5.89 These modelling outputs represent the reasonable worst-case scenario (RWCS) which assumes that the construction of all elements of the Proposed Development (main proposed WWTP, outfall and FE, Transfer tunnel, Waterbeach Pipeline) will occur simultaneously and in the AM and PM peak periods. In practice, this would not happen, based on the construction programme which clearly sets out a phased approach to construction, and the commitment for construction vehicles to not travel during the AM and PM peak periods, as set out within the CTMP and CoCP.

Decommissioning year 5 (2028)

~~9.5.91~~9.5.90 The two-way flows required to travel through the Milton Interchange in the RWCS 2028 decommissioning year ("With Decommissioning") scenario for the construction of the main proposed WWTP is shown in Table 9-29.

Table 9-29: The Milton Interchange: without and with decommissioning (two-way flows)

	2028 Without Decommissioning		2028 With Decommissioning	
Link	**08:00-09:00**	**17:00-18:00**	**08:00-09:00**	**17:00-18:00**

	2028 Without Decommissioning		2028 With Decommissioning	
Milton Road (includes Arm D of J33)	2726	2306	2764 (+38)	2325 (+19)
J33 Arm A (A10 approach)	2217	2058	2234 (+17)	2058 (+0)
J33 Arm B (Cambridge Road)	947	1198	947 (+0)	1198 (+0)
J33 Arm C (A14 on and off slips)	1608	1443	1610 (+2)	1445 (+2)
J33 Arm E (A14 on and off-slips)	2237	1911	2237 (+0)	1928 (+17)

~~9.5.92~~9.5.91 A comparison of LinSig results for the Milton Interchange in the 2028 future baseline ("Without Construction") and 2028 decommissioning year are outlined below in Table 9-30.

Table 9-30: Milton Interchange LinSig results for Year 5 (2028) without and with decommissioning traffic

Arm	2028 without Decommissioning				2028 with Decommissioning			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Milton Road	7.1	71.6%	11.6	82.7%	7.1~~7.1~~	71.6% ~~71.6%~~	11.0~~11.0~~	79.5% ~~79.5%~~
Milton Road Circ	8.5	54.3%	9.7	79.8%	8.5~~8.4~~	54.3% ~~54.3%~~	10.0~~10.0~~	82.8% ~~82.2%~~
A14 Eastbound Off-slip	6.7	73.3%	3.3	53.6%	8.8~~8.5~~	77.3% ~~73.3%~~	2.7~~2.7~~	46.9% ~~46.9%~~
A14 Eastbound Off-slip Circ	6.5	76.0%	9.6	62.0%	8.4~~9.9~~	63.4% ~~73.1%~~	10.3~~10.3~~	73.6% ~~73.6%~~
A10	5.0	52.2%	5.9	50.2%	5.0~~6.6~~	52.2% ~~65.4%~~	6.9~~6.9~~	58.5% ~~58.5%~~
A10 Circ	14.3	75.2%	10.9	78.2%	15.1~~16.7~~	77.4% ~~71.7%~~	11.9~~11.9~~	66.2% ~~66.2%~~
Cambridge Road	1.9	50.7%	1.8	52.4%	2.2~~2.1~~	54.2% ~~55.1%~~	2.0~~2.0~~	51.1% ~~51.1%~~
Cambridge Road Circ	0.3	42.2%	0.3	36.5%	0.3~~0.4~~	42.7% ~~44.3%~~	0.4~~0.4~~	36.7% ~~27.5%~~
A14 Westbound Off-slip	6.8	78.6%	3.0	35.6%	6.5~~7.7~~	78.8% ~~85.6%~~	3.3~~3.3~~	45.1% ~~45.1%~~

Arm	2028 without Decommissioning				2028 with Decommissioning			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
A14 Westbound Off-slip Circ	9.3	79.1%	8.6	74.0%	9.6~~9.0~~	80.9% ~~83.7%~~	11.2~~1~~ ~~1.2~~	65.5% ~~65.5%~~

~~9.5.93~~9.5.92 The results of the modelling summarised above demonstrate that the junction operates in the 2028 future baseline AM peak hour with added decommissioning flows with a maximum DoS of ~~85.6~~80.9% on the A14 Westbound Off-slip circulatory with an associated queue of ~~7.7~~9.6 PCU. In the 2028 future baseline PM peak hour with added decommissioning flows, the maximum DoS of 82.8~~2~~% is on the Milton Road circulatory ~~Milton Road circulatory~~, with an associated queue of 10.0 PCU.

~~9.5.94~~9.5.93 These modelling outputs represent the reasonable worst-case scenario (RWCS) which assumes that the vehicle movements related to the decommissioning of the existing Cambridge WWTP will occur simultaneously and in the AM and PM peak periods. In practice, this would not happen, based on the construction programme which clearly sets out a phased approach to construction, and the commitment for construction vehicles to not travel during the AM and PM peak periods, as set out within the CTMP and CoCP.

Operation year 1 +5 (2033) (5 year post-opening)

~~9.5.95~~9.5.94 In operation year 2033 in the AM peak, 10% of operational trips to the site will come from the east. In operation year 2033 in the PM peak, 10% of operational trips leaving the site will head east along the A14. Due to the lack of an eastbound on-slip on Junction 34 of the A14, trips to and from the site coming from the east will be required to use Junction 33 (Milton Interchange) of the A14 to either access Junction 34 when entering the site or access the A14 eastbound carriageway upon leaving the site.

~~9.5.96~~9.5.95 The two-way flows for the 2033 operation year for operational vehicles required to travel through the Milton Interchange for the operational phase of the main proposed WWTP traffic is provided in Table 9-31.

Table 9-31: The Milton Interchange: without and with operation in operation Year 1 +5 (2033)

Link	2033 Without operation		2033 With operation	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
Milton Road (includes Arm D of J33)	2806	2119	2806 (+0)	2119 (+0)
J33 Arm A (A10 approach)	2282	2374	2282 (+0)	2374 (+0)
J33 Arm B (Cambridge Road)	975	1233	975 (+0)	1233 (+0)

Link	2033 Without operation		2033 With operation	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
J33 Arm C (A14 on and off slips)	1656	1486	1660 (+4)	1490 (+4)
J33 Arm E (A14 on and off-slips)	2303	1968	2303 (+0)	1968 (+0)

~~9.5.97~~9.5.96 Milton Interchange has therefore been modelled with and without development traffic for the 2033 operation year, which is shown in Table 9-32.

Table 9-32: Milton Interchange LinSig results for with and without operational traffic in operation Year 1 +5 (2033)

Arm	2033 Without operation				2033 With operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Milton Road	6.8	65.8%	12.4	85.2%	9.7	65.8%	15.9	80.3%
Milton Road Circ	8.5	59.5%	10.0	82.2%	9.4	37.8%	11.2	76.7%
A14 Eastbound Off-slip	7.1	76.0%	2.6	48.7%	9.7	76.0%	4.3	48.7%
A14 Eastbound Off-slip Circ	10.2	78.3%	13.2	80.4%	15.5	77.3%	19.9	64.8%
A10	6.8	67.3%	5.9	49.9%	8.6	65.8%	10.1	58.6%
A10 Circ	14.5	64.8%	10.9	84.5%	20.3	77.7%	11.0	61.9%
Cambridge Road	2.1	54.6%	2.0	54.6%	2.8	56.6%	3.0	54.2%
Cambridge Road Circ	0.4	43.6%	0.3	37.6%	1.3	43.8%	2.8	37.8%
A14 Westbound Off-slip	7.2	81.1%	3.1	38.7%	9.8	77.8%	4.3	40.1%
A14 Westbound Off-slip Circ	9.6	81.3%	11.9	73.8%	14.1	77.0%	17.2	72.3%

~~9.5.98~~9.5.97 The results of the modelling summarised above demonstrate that the junction operates in the 2033 future baseline AM peak hour with added operational flows with a maximum DoS of 77.8% on the A14 Westbound Off-slip approach with an associated queue of 9.8 PCU. In the 2033 future baseline PM peak hour with added construction flows, the maximum DoS of 80.3% is on the Milton Road Circulatory, with an associated queue of 15.9 PCU.

~~9.5.99~~9.5.98 Operational results presented above represent the reasonable worst-case scenario, where it has been assumed that operational vehicles would travel during AM and PM peak periods. An OTL~~M~~P would be required to effectively manage operational traffic and operational working patterns. Additionally, the typical operational vehicle hourly profile demonstrates that a third of HGV movements would take place overnight further reducing the likelihood of significant volumes of peak HGV vehicle movements

Operation year 1 +10 (2038) (10 year post-opening)

~~9.5.100~~9.5.99 The two-way flows for the 2038 operation year for operational vehicles required to travel through the Milton Interchange for the operational phase of the main proposed WWTP traffic is provided in Table 9-33.

Table 9-33: Milton Interchange: without and with operation in in operation Year 1 +10 (2038)

Link	2038 Without operation		2038 With operation	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
Milton Road (includes Arm D of J33)	2885	2440	2885 (+0)	2440 (+0)
J33 Arm A (A10 approach)	2346	2178	2346 (+0)	2178 (+0)
J33 Arm B (Cambridge Road)	1002	1268	1002 (+0)	1268 (+0)
J33 Arm C (A14 on and off slips)	1702	1527	1706 (+4)	1531 (+4)
J33 Arm E (A14 on and off-slips)	2367	2023	2367 (+0)	2023 (+0)

~~9.5.101~~9.5.100 As per the description in paragraph 9.5.94~~9.5.94~~~~9.5.94~~~~9.5.94~~~~9.5.95~~, Milton Interchange has also been modelled with and without development traffic for the 2038 operation year, which is shown in Table 9-34.

Table 9-34: Milton Interchange LinSig results with and without operational traffic in operation Year 1 +10 (2038)

Arm	2038 without operation				2038 with operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Milton Road	6.7	64.0%	13.3	87.6%	10.1	67.6%	17.0	82.6%
Milton Road Circ	8.6	63.2%	10.3	84.5%	9.4	55.4%	11.2	78.8%
A14 Eastbound Off-slip	7.8	78.6%	3.4	52.1%	10.9	78.6%	4.7	50.5%

Arm	2038 without operation				2038 with operation			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
A14 Eastbound Off-slip Circ	8.9	80.5%	10.4	67.4%	15.9	79.4%	20.3	64.4%
A10	7.4	71.4%	6.4	53.0%	8.6	67.6%	8.6	48.7%
A10 Circ	14.6	65.3%	13.0	82.8%	21.0	79.8%	14.4	80.4%
Cambridge Road	2.4	57.6%	2.3	58.3%	3.1	60.4%	2.9	57.7%
Cambridge Road Circ	1.1	44.7%	0.4	38.7%	1.7	45.0%	1.4	38.9%
A14 Westbound Off-slip	7.7	83.1%	3.8	55.0%	10.4	80.0%	4.5	41.3%
A14 Westbound Off-slip Circ	10.4	83.6%	10.2	65.6%	14.5	79.2%	18.2	74.3%

~~9.5.102~~9.5.101 The results of the modelling summarised above demonstrate that the junction operates in the 2038 future baseline AM peak hour with added operational flows with a maximum DoS of 80.0% on the A14 Westbound Off-slip with an associated queue of 10.4 PCU. In the 2038 future baseline PM peak hour with added construction flows, the maximum DoS of 82.6% is on the Milton Road approach, with an associated queue of 17.0 PCU.

~~9.5.103~~9.5.102 Operational results presented above represent the reasonable worst-case scenario, where it has been assumed that operational vehicles would travel during AM and PM peak periods. An OTL~~M~~P would be required to effectively manage operational traffic and operational working patterns. Additionally, the typical operational vehicle hourly profile demonstrates that a third of HGV movements would take place overnight further reducing the likelihood of significant volumes of peak HGV vehicle movements.

Milton Road / Cowley Road

~~9.5.104~~9.5.103 This junction is at three arm-controlled T junction with controlled pedestrian crossing facilities. The junction would be used by construction, operational and decommissioning vehicles to access the works corridor at access points 13 (Fen Road) and 14 (Cowley Road).

2021 existing baseline

~~9.5.105~~9.5.104 The operation of the junction has been assessed for the 2021 existing baseline AM and PM peak hours using LinSig software and is shown in Table 9-35.

Table 9-35: 2021 baseline performance for Milton Road / Cowley Road

Approach	Flow	DoS	MMQ (PCU)
	2021 AM peak hour (08:00 - 09:00) baseline results		
Milton Road (southbound)	1843	49.8%	5.5
Cowley Road	166	34.6%	1.7
Milton Road (northbound)	819	46.7%	2.3
	2021 PM peak hour (17:00 - 18:00) baseline results		
Milton Road (southbound)	741	25.0%	2.4
Cowley Road	393	46.2%	3.4
Milton Road (northbound)	1215	46.5%	5.3

DoS = *Degrees of Saturation*. MMQ = *Mean Maximum Queue*. PCU = *Passenger Car Unit*

~~9.5.106~~9.5.105 In the 2021 baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 49.8% on the Milton Road (southbound) approach with an associated MMQ of 5.5 PCU. In the PM peak hour, the maximum DoS of 46.5% is on the Milton Road (northbound) approach with an associated MMQ of 5.3 PCU.

Year 3 (2026) and Year 5 (2028) future baselines

~~9.5.107~~9.5.106 The operation of the junction has also been assessed for the 2026 and 2028 future baseline AM and PM peak hours using LinSig software and is shown in Table 9-36~~Table 9-36Table 9-36Table 9-36Table 9-36~~.

Table 9-36: future baseline performance at Milton Road / Cowley Road

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Flow	**DoS**	**MMQ (PCU)**	**Flow**	**DoS**	**MMQ (PCU)**
			2026 Base			
Milton Road (southbound)	1930	54.5%	6.7	777	29.2%	3.0
Cowley Road	174	32.5%	1.6	411	48.8%	3.5
Milton Road (northbound)	858	48.8%	2.3	1272	48.4%	5.6
			2028 Base			
Milton Road (southbound)	1954	55.2%	6.7	786	29.4%	3.0
Cowley Road	176	32.8%	1.6	416	49.5%	3.5
Milton Road (northbound)	869	49.7%	2.4	1288	49.0%	5.7

~~9.5.108~~9.5.107 In the 2026 future baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 54.5% on the Milton Road (southbound) approach with an associated MMQ of 6.7 PCU. In the PM peak hour, the maximum DoS of 48.8% is on the Cowley Road approach with an associated MMQ of 3.5 PCU.

~~9.5.109~~9.5.108 In the 2028 future baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 55.2% on the Milton Road (southbound) approach with an associated MMQ of 6.7 PCU. In the PM peak hour, the maximum DoS of 49.5% is on the Cowley Road approach with an associated MMQ of 3.5 PCU.

Construction Year 3 (2026)

~~9.5.110~~9.5.109 The vehicle movements that would be required for the decommissioning phase in 2026 are summarised in Table 9-37.

Table 9-37: Decommissioning phase: Year 3 (2026) Without construction and with Construction (two-way flows)

Link	Year 3 (2026) Without construction		Year 3 (2026) With construction	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
Cowley Road	691	551	711 (+20)	571 (+20)
Milton Road	2834	2397	2874 (+40)	2437 (+40)

~~9.5.111~~9.5.110 A comparison of LinSig results for Milton Road / Cowley Road for the 2026 baseline and 2026 baseline with added construction flows are outlined below in Table 9-38.

Table 9-38: Milton Road / Cowley Road LinSig results for Year 3(2026) without and with construction traffic

Arm	Year 3 (2026) Without construction				Year 3 (2026) With construction			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Milton Road (southbound)	6.7	54.5%	3.0	29.2%	6.7	56.4%	3.1	30.9%
Cowley Road	1.6	32.5%	3.5	48.8%	1.8	35.7%	3.7	48.8%
Milton Road (northbound)	2.3	48.8%	5.6	48.4%	2.3	48.8%	5.9	50.4%

~~9.5.112~~9.5.111 The results of the modelling summarised above demonstrate that the junction operating in the 2026 future baseline AM peak hour with added construction flows has a maximum DoS of 56.4% on the Milton Road (southbound) approach with an associated queue of 6.7 PCU. In the 2026 future baseline PM peak hour with added construction flows, the maximum DoS of ~~48.8~~50.4% is on the ~~Cowley Road~~Milton Road (northbound) approach, with an associated queue of 5.9 PCU.

Decommissioning Year 5 (2028)

~~9.5.113~~9.5.112 The vehicle movements that would be required for the decommissioning phase in 2028 are summarised in Table 9-39.

Table 9-39: Decommissioning phase: Year 5 (2028) with and without decommissioning (two-way flows)

Link	Year 5 (2028) Without decommissioning		Year 5 (2028) With decommissioning	
	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00
Cowley Road	700	558	719 (+19)	577 (+19)
Milton Road	2869	2426	2888 (+19)	2445 (+19)

~~9.5.114~~9.5.113 A comparison of LinSig results for Milton Road / Cowley Road for the 2028 baseline and 2028 baseline with added decommissioning flows are outlined below in Table 9-40.

Table 9-40: Milton Road / Cowley Road LinSig results for Year 5(2028) with and without decommissioning vehicle movements

Arm	Year 5 (2028) Without decommissioning				Year 5 (2028) With decommissioning			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Milton Road (southbound)	6.7	55.2%	3.0	29.4%	6.7	55.8%	3.1	30.2%
Cowley Road	1.6	32.8%	3.5	49.5%	1.6	32.8%	3.5	49.0%
Milton Road (northbound)	2.4	49.7%	5.7	49.0%	2.4	49.7%	5.7	49.0%

~~9.5.115~~9.5.114 The results of the modelling summarised above demonstrate that the junction operates in the 2028 future baseline AM peak hour with added decommissioning flows with a maximum DoS of 55.8% on the Milton Road (southbound) approach with an associated queue of 6.7 PCU. In the 2028 future baseline PM peak hour with added decommissioning flows, the maximum DoS of 49.0% is on the Milton Road (northbound) approach, with an associated queue of 5.7 PCU.

~~9.5.116~~9.5.115 No mitigation is likely to be required at the Milton Road / Cowley Road junction given the capacity results. The commitment for construction vehicles to only travel outside of the AM and PM periods via the CTMP and CoCP would still be a requirement.

Milton Road / Green End Road / Kings Hedges

~~9.5.117~~9.5.116 This junction is a four arm controlled crossroads junction with pedestrian crossing facilities.

2021 existing baseline

~~9.5.118~~9.5.117 The operation of the junction has been assessed for the 2021 existing baseline AM and PM peak hours using LinSig software and is shown in Table 9-41.

Table 9-41: 2021 baseline performance for Milton Road / Kings Hedges / Green End

Approach	Flow	DoS	MMQ (PCU)
	2021 AM peak hour (08:00 - 09:00) baseline results		
Milton Road (southbound)	735	76.1%	6.5
Green End	364	79.9%	7.8
Milton Road (northbound)	531	83.2%	13.8
Kings Hedges	343	84.2%	7.4
	2021 PM peak hour (17:00 - 18:00) baseline results		
Milton Road (southbound)	743	59.4%	8.3
Green End	283	69.3%	5.4
Milton Road (northbound)	458	68.8%	10.0
Kings Hedges	289	70.3%	5.5

DoS = *Degrees of Saturation*. MMQ = *Mean Maximum Queue*. PCU = Passenger Car Unit.

~~9.5.119~~9.5.118 In the 2021 baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 84.2% on the Kings Hedges approach with an associated MMQ of 7.4 PCU. In the PM peak hour, the maximum DoS of 70.3% on the Kings Hedges approach with an associated MMQ of ~~12.1~~5.5 PCU.

~~9.5.120~~9.5.119 On the Milton Road (southbound) approach in the 2021 baseline, the highest MMQ of 8.3 PCU indicated in the model is in the PM peak hour. There is approximately an 18.6 PCU distance from the proceeding junction at Lovell Road, so there is space for the queuing identified in the model without further impact.

~~9.5.121~~9.5.120 On the Green End approach in the 2021 baseline, the highest MMQ of 7.8 PCU indicated in the model is in the AM peak hour. There is approximately an 18.2 PCU distance from the proceeding junction at Scarsdale Close, so there is space for the queuing identified in the model without further impact.

~~9.5.122~~9.5.121 On the Milton Road (northbound) approach in the 2021 baseline, the highest MMQ of 13.8 PCU indicated in the model is in the AM peak hour. There is approximately an 18.7 PCU distance from the proceeding junction at Cook Close, so there is space for the queuing identified in the model without further impact.

~~9.5.123~~9.5.122 On the Kings Hedges approach in the 2021 baseline, the highest MMQ of 7.4 PCU indicated in the model is in the AM peak hour. There is approximately a 28.9 PCU distance from the proceeding junction at Ramsden Square, so there is space for the queuing identified in the model without further impact.

Year 3 (2026) future baseline

~~9.5.124~~9.5.123 The operation of the junction has also been assessed for the 2026 and 2028 future baseline AM and PM peak hours using Junctions9 software and is shown in Table 9-42~~Table 9-42~~.

Table 9-42: future baseline performance at Milton Road / Green End / Kings Hedges

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Flow	DoS	MMQ (PCU)	Flow	DoS	MMQ (PCU)
			2026 Base			
Milton Road (southbound)	769	79.6%	6.9	778	62.3%	8.9
Green End	380	83.5%	8.6	296	72.3%	5.8
Milton Road (northbound)	566	87.1%	15.4	479	71.9%	10.8
Kings Hedges	358	87.9%	8.5	302	73.4%	5.8

~~9.5.125~~9.5.124 In the 2026 future baseline the assessment shows that this junction operates in the AM peak hour with a maximum DoS of 87.9% on the Kings Hedges approach with an associated MMQ of 8.5 PCU. In the PM peak hour, the maximum DoS of 73.4% is on the Kings Hedges approach with an associated MMQ of 5.8 PCU.

~~9.5.126~~9.5.125 In both the 2026 future baseline in the AM and PM peak, there is space for the queuing identified in the model across all junction arms without further impact on any of the proceeding junctions.

Construction Year 3 (2026)

~~9.5.127~~9.5.126 A comparison of LinSig results for Milton Road / Green End / Kings Hedges for the 2026 baseline and 2026 baseline with added construction flows are outlined below in Table 9-43

Table 9-43: Milton Road / Green End / Kings Hedges LinSig results for Year 3 (2026) without and with construction traffic

Arm	Year 3 (2026) Without construction				Year 3 (2026) With construction			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Milton Road (south bound)	6.9	79.6%	8.9	62.3%	6.9	79.6%	9.1	62.3%

Arm	Year 3 (2026) Without construction				Year 3 (2026) With construction			
	AM		PM		AM		PM	
	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS	Queue (PCU)	DoS
Green End	8.6	83.5%	5.8	72.3%	9.9	88.1%	6.6	75.2%
Milton Road (north bound)	15.4	87.1%	10.8	71.9%	15.4	87.1%	11.1	74.5%
Kings Hedges	8.5	87.9%	5.8	73.4%	8.5	87.9%	5.8	73.4%

~~9.5.128~~9.5.127 The results of the modelling summarised above demonstrate that the junction operates in the 2026 future baseline AM peak hour with added construction flows with a maximum DoS of 88.1% on the Green End approach with an associated queue of 9.9 PCU. In the 2026 future baseline PM peak hour with added construction flows, the maximum DoS of 75.2% is on the Green End approach, with an associated queue of 6.6 PCU.

~~9.5.129~~9.5.128 No mitigation is likely to be required at the Milton Road / Green End / Kings Hedges junction given the capacity results. The commitment for construction vehicles to only travel outside of the AM and PM periods via the CTMP and CoCP would still be a requirement.

Green End Road / Water Lane

~~9.5.130~~9.5.129 This junction is at three arm priority (unsignalised) roundabout junction without pedestrian crossing facilities.

2021 existing baseline

~~9.5.131~~9.5.130 The operation of the junction has been assessed for the 2021 existing baseline AM and PM peak hours using Junctions9 software and is shown in Table 9-44.

Table 9-44: Baseline performance for Water Lane / High Street / Green End Road

Approach	Queue (PCU)	Delay (s)	RFC
2021 AM peak hour (08:00 – 09:00) baseline results			
Water Lane	0.6	9.22	0.37
High Street	0.3	9.42	0.24
Green End Road	0.7	6.85	0.42
2021 PM peak hour (17:00 – 18:00) baseline results			
Water Lane	0.6	8.95	0.37
High Street	0.3	9.32	0.24
Green End Road	0.7	6.57	0.42

RFC = Ratio of flow to capacity. PCU = Passenger Car Unit. S = *Seconds*.

~~9.5.132~~9.5.131 In the 2021 baseline the assessment shows that this junction operates in the AM peak hour with a maximum RFC of 0.37 on the Water Lane approach with an associated queue of 0.6 PCU. In the PM peak hour, the maximum RFC of 0.42 is on the High Street approach with an associated queue of 0.7 PCU.

Year 3 (2026) future baseline

~~9.5.133~~9.5.132 The operation of the junction has been assessed for the 2026 future baseline AM and PM peak hours using Junctions9 software and is shown in Table 9-45.

Table 9-45: Future baseline performance at Green End Road / Water Lane

	AM peak (08:00 – 09:00)			PM peak (17:00 – 18:00)		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
			2026 Base			
Water Lane	0.5	8.59	0.33	0.7	9.57	0.39
High Street	0.3	8.85	0.24	0.4	9.79	0.26
Green End Road	0.6	6.03	0.36	0.8	7.11	0.44

~~9.5.134~~9.5.133 The assessment shows that this junction operates in the 2026 baseline in the AM peak hour with a maximum RFC of 0.36 on the Green End Road approach with an associated queue of 0.6 PCU. In the PM peak, the assessment shows that this junction operates in the 2026 baseline with a maximum RFC of 0.44 on the Green End Road Approach with an associated queue of 0.8 PCU. ~~.~~

Construction Year 3 (2026)

~~9.5.135~~9.5.134 A comparison of Junctions 9 results for Green End / Water Lane for the 2026 baseline and 2026 baseline with added construction flows are outlined below in Table 9-46.

Table 9-46: Green End / Water Lane Junctions 9 results for year 3 (2026) without and with construction traffic

Arm	Year 3 (2026) Without construction				Year 3 (2026) With construction			
	AM		PM		AM		PM	
	Queue (PCU)	RFC	Queue (PCU)	RFC	Queue (PCU)	RFC	Queue (PCU)	RFC
Water Lane	0.5	0.33	0.7	0.39	0.6	0.37	0.7	0.41
High Street	0.3	0.24	0.4	0.26	0.3	0.25	0.4	0.26
Green End Road	0.6	0.36	0.8	0.44	0.6	0.38	0.9	0.47

~~9.5.136~~9.5.135 The results of the modelling summarised above demonstrate that the junction operates in the 2026 future baseline AM peak hour with added construction flows with a maximum RFC of 0.38 on the Green End Road approach with an associated queue of 0.6 PCU. In the 2026 future baseline PM peak hour with added construction flows, the maximum RFC of 0.47 is on the Green End approach with an associated queue of 0.9 PCU.

~~9.5.137~~9.5.136 No mitigation is likely to be required at the Green End Road / Water Lane junction given the capacity results. The commitment for construction vehicles to only travel outside of the AM and PM periods via the CTMP and CoCP would still be a requirement.

10 Summary and Conclusion

10.1 Overview

10.1.1 The Transport Assessment (TA) has been prepared ~~by Mott MacDonald~~ for a DCO application for the relocation of the existing Cambridge WWTP and the construction of associated infrastructure. It is proposed to relocate the existing Cambridge WWTP to the immediate east of junction 34 of the A14.

10.1.2 The proposed WWTP involves the construction of a new waste water treatment plant and STC together with the associated developments of waste water and treated effluent transfer infrastructure, comprising a waste water transfer tunnel from the existing Cambridge WWTP to the proposed WWTP, treated effluent transfer pipeline and storm water overflow pipeline with an outfall to the River Cam, and a transfer pipeline from the Waterbeach New Town development area off Bannold Drove (Waterbeach) to the proposed WWTP, either via the existing works or direct when the existing works is decommissioned. Other associated development includes a new access road connecting the Proposed Development to the local road network at Horningsea Road and the interception and diversion of several rising mains at the site of the existing Cambridge WWTP to relocate their discharge point from the existing inlet works to the new waste water transfer tunnel.

10.1.3 The associated pipelines are required to transfer wastewater from the existing WWTP using a new tunnel constructed from an interception point at the existing WWTP to the new WWTP. The waste water transfer tunnel corridor is a wide area extending eastwards from the existing Cambridge (Milton) WWTP to the new Cambridge WWTP crossing below the existing railway line, the River Cam, Horningsea Road and the A14 along its route.

10.1.4 The treated effluent transfer pipelines to extend from the new WWTP to a new discharge location on the east bank of the River Cam, close to the current discharge location. The treated effluent pipeline corridor extends west from the boundary of the site area crossing Horningsea Road and running parallel to the A14 to a section of the River Cam directly north of the A14 bridge and upstream of Baits Bite Lock. The proposed corridor is in the field to the south of the driveway to Biggin Abbey.

10.1.5 A new pipeline (rising main) is required from Waterbeach to the new WWTP in order support the development of Waterbeach New Town. From the Waterbeach New Town development area, the new main/pipeline will route east/south east crossing under the railway but avoiding the new Waterbeach railway station platform before continuing southwards through fields. It will cross to the east side of the River Cam after about 1.9km and continue southward to the east of the village of Horningsea before crossing under the A14. It will then continue southward for approximately another 400m before routing west and connecting into the existing Cambridge (Milton) WWTP, crossing under the Horningsea Road, the River Cam, Fen Road, and the railway on route.

10.1.6 The Proposed main WWTP spans 22 hectares (ha) and sits within a larger 95ha development area, which includes associated WWTP infrastructure such as pipelines.

10.1.7 The TA has been written based on CCC's transport assessment guidelines (Cambridgeshire County Council, 2019). The scope of the TA has been previously agreed with CCC officers. A TA scoping response from CCC can be found at Appendix B.

10.1.8 The Proposed Development has also been assessed against relevant national and local transport planning policy and guidance such as the NPPF, NPS For Waste Water (DEFRA, 2012) and CCC local policy (Cambridgeshire County Council, 2019).

10.2 Transport network and operation

10.2.1 A reasonable worst-case scenario was used to test potential effects of the construction phase (2026) and the operational phase of the Proposed Development for 2028, opening year and sensitivity tests for 2033 and 2038. The reasonable worst case considered the construction of all elements of the Proposed Development to occur simultaneously in the AM and PM peak periods.

10.2.2 This test provides a suitable high volume of vehicles to account for the very busiest months of the project. That assessment has led to the commitments to manage vehicles through the CoCP and CTMP. The key elements of these documents show the effects of the reasonable worst-case scenario is mitigated through:

- a phased approach within the construction programme which aims to minimise the overlap between different sets of construction activities; and
- a commitment within the CTMP and CoCP to disallow construction vehicle movements in the peak time periods of 08:00 to 09:00, 15:00 to 16:00 and 17:00 to 18:00.

10.2.3 The reasonable worst-case test also was used to illustrate effects on the highway network for elements that could be short term activities. Short term activities would be concrete pours or horizontal drilling operations, where constant movement of HGVs or LGVs might be required and the restriction of working hours could not be applied for the two to three days that these operations would require. These effects would be mitigated through the CTMP and its function as a community liaison and information forum. This would involve providing information to stakeholders so that the busiest and potentially disruptive short-term works could be notified in advance and managed to minimise impacts on users of the affect junctions.

10.2.4 Trip generation has been calculated up to the year 2038 using survey data collected in December 2021. TEMPro growth factors for the area of Cambridgeshire have been applied to the 2021 existing year flows. The assessment has noted that the percentage increase to the year 2033 and 2038 indicates that key routes Horningsea Road and Milton Interchange would be likely to be operating at or very close to the maximum operational capacity and the effect this has on illustrating likely impacts that the operational phase sensitivity tests could have on the highway network.

10.2.5 The construction modelling illustrates that the highway network, without the COCP or CTMP measures applied, operates satisfactorily in construction phase across the construction routes for the Waterbeach Pipeline and transfer tunnel. These routes use the A10 and local routes in and around Waterbeach or use Milton Road, Cowley Road, Green End Road and Fen Lane in Cambridge.

10.2.6 Capacity issues, without CTMP mitigation, is indicated on Horningsea Road at the junction with the A14. Once mitigation is applied, to limit all construction traffic to outside of peak traffic hours of 08:00 to 09:00, 15:00 to 16:00 and 17:00 to 18:00, the operation of the junction is within standard operational limits. The Milton Interchange junction is also indicated as showing capacity constraints, again with the CTMP measures on applied this effect is mitigated.

10.2.7 As noted previously where short-term impacts are assumed to be tested by applying the highest possible traffic flow, unmitigated, no further assessment is undertaken to mitigate theses effects as they will be managed through the CTMP measures for stakeholder engagement and notification to ensure local road users are informed of potential delays and effects of the short-term activities.

10.2.8 The operational phase of the Proposed Development has a small increase in HGV vehicle trips over the existing WWTP. The key issue shown by the junction modelling is that the operational phase 2028 is indicated to operate satisfactorily. It indicates that the background traffic growth by 2033 and 2038 sensitivity test will have grown to cause the junction potential operational concerns. The project has put in mitigation measures to manage the development traffic in the form of Operational Workers Travel Plan and Operation Traffic Management Plan.

10.3 Construction and operation mitigation

10.3.1 Embedded mitigation measures (mitigation by design) would involve proposed changes to Horningsea Road, as summarised in Table 2-7 and in the Mitigation Measures section (Section 2.8~~2.82.7~~) of the TA.

10.3.2 As previously noted, mitigation measures to minimise the impact of development flows on the road network are set out in the CTMP and CoCP and will involve limiting construction vehicle movements to hours outside of the peak hours.

10.3.3 Physical changes to the layout of the Horningsea Road junction increases the width of the shared footway and cycleway. A new pedestrian crossing island to the north of the Horningsea Road junction is created to connect pedestrians and cyclist to the Proposed Development site. A new footway is provided on the eastern side of Horningsea Road to connect the proposed development to Low Fen Drove Way.

10.3.4 The PRoW network is improved by creating a new connection between Stow-Cum - Quy and the Proposed Development enabling increased connectivity to the east.

Further, a series of permissive paths around the Proposed Development will increase opportunities for walking and cycling between Low Fen Drove Way and Horningsea Road.

10.3.5 A Construction Workers Travel Plan and an Operational Workers Travel Plan have been included and set out the key objectives related to active travel and mode shift envisaged for the Proposed Development. Both Travel Plans will be monitored by a Travel Plan Coordinator (TPC), who will also oversee the implementation of the measures outlined within the Travel Plans and provide regular updates on mode shift targets. The TPC will be appointed at a later stage.

10.3.6 Active travel measures are included within the Construction Workers Travel Plan and the Operational Workers Travel Plan for construction and operational staff and site visitors. These have been produced in line with CCC’s Travel Plan requirements (Cambridgeshire County Council, 2019).

10.3.7 Operational management plan for deliveries and servicing sets out the operation and servicing schedules for HGV deliveries and how these are managed and controlled to minimise impacts on the local highway network.

References

Anglian Water. (2021). *Our net zero strategy to 2030.* Retrieved from https://www.anglianwater.co.uk/siteassets/household/environment/net-zero-2030-strategy-2021.pdf

Cambridge City Council. (2018). *Cambridge Local Plan.* Retrieved from Cambridge City Council: https://www.cambridge.gov.uk/media/6890/local-plan-2018.pdf

Cambridge Park & Ride. (2022). *Milton*. Retrieved from https://cambridgeparkandride.info/milton-times.shtml

Cambridgeshire & Peterborough Combined Authority. (2020). *Local Transport Plan.* Retrieved from https://cambridgeshirepeterborough-ca.gov.uk/what-we-deliver/transport/local-transport-plan/

Cambridgeshire County Council. (2014). *Transport Strategy for Cambridge and South Cambridgeshire.* Retrieved from https://www.scambs.gov.uk/media/11028/transport-strategy-for-cambridge-and-south-cambridgeshire.pdf

Cambridgeshire County Council. (2015). *Local Transport Plan (LTP).* Retrieved from https://www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/transport-plans-and-policies/local-transport-plan

Cambridgeshire County Council. (2015). *Long Term Transport Strategy*. Retrieved from https://www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/transport-plans-and-policies/long-term-transport-strategy

Cambridgeshire County Council. (2019). *Transport assessment guidelines.* Retrieved from https://www.cambridgeshire.gov.uk/asset-library/transport-assessment-requirements.pdf

Cambridgeshire County Council. (2021). *Cambridgeshire and Peterborough Minerals and Waste Local Plan*. Retrieved from https://www.cambridgeshire.gov.uk/business/planning-and-development/planning-policy/adopted-minerals-and-waste-plan

Cambridgeshire County Council. (2021). *Road safety*. Retrieved from https://www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/roads-and-pathways/road-safety

Cambridgeshire County Council. (2022). *Transport Investment Plan.* Retrieved from https://www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/transport-plans-and-policies/transport-investment-plan

DEFRA. (2012). *National policy statement for waste water*. Retrieved from GOV UK: https://www.gov.uk/government/publications/national-policy-statement-for-waste-water

DfT. (2022). *National Trip End Model (NTEM)*. Retrieved from data.gov.uk: https://www.data.gov.uk/dataset/11bc7aaf-ddf6-4133-a91d-84e6f20a663e/national-trip-end-model-ntem

DfT. (2022). *Road traffic statistics - site number: 46492.* Retrieved from https://roadtraffic.dft.gov.uk/manualcountpoints/46492

DfT. (2022). *Road traffic statistics - site number: 77143.* Retrieved from https://roadtraffic.dft.gov.uk/manualcountpoints/77143

DfT. (2022). *Transport analysis guidance*. Retrieved from https://www.gov.uk/guidance/transport-analysis-guidance-tag

DfT. (2022). *Transporting abnormal loads*. Retrieved from GOV UK: https://www.gov.uk/esdal-and-abnormal-loads#:~:text=An%20'abnormal%20load'%20is%20a,of%20more%20than%202.9%20metres

DLUHC. (2021). *National Planing Policy Framework*. Retrieved from https://www.gov.uk/government/publications/national-planning-policy-framework--2

DLUHC. (2021). *Planning practice guidance*. Retrieved from https://www.gov.uk/government/collections/planning-practice-guidance

GOV UK. (2008). *Planning Act 2008*. Retrieved from https://www.legislation.gov.uk/ukpga/2008/29/contents

Greater Cambridge Greater Peterborough. (2021). *Strategic Economic Plan.* Retrieved from https://www.lepnetwork.net/media/1112/greater-cambridge-greater-peterboro-sep.pdf

Greater Cambridge Greater Peterborough et al. (2014). *Greater Cambridge City Deal* . Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/321722/Greater_Cambridge_City_Deal_Document.pdf

Greater Cambridge Partnership. (2019). *City Access*. Retrieved from https://www.greatercambridge.org.uk/city-access

Greater Cambridge Partnership. (2021). *Swaffhams Greenways.* Retrieved from https://www.greatercambridge.org.uk/transport/transport-projects/greenways/swaffhams-greenways

Greater Cambridge Partnership. (2021). *Waterbeach Greenway*. Retrieved from https://www.greatercambridge.org.uk/transport/transport-projects/greenways/waterbeach-greenway

Greater Cambridge Shared Planning. (2022). *Policy I/EVL Parking and electric vehicles*. Retrieved from https://consultations.greatercambridgeplanning.org/greater-cambridge-local-plan-first-proposals/explore-theme/infrastructure/policy-iev-parking-and?msclkid=1544fce4b98911eca64ac88ad259a547

Greater Cambridgeshire Partnership. (2021). *Chisholm Trail*. Retrieved from https://www.greatercambridge.org.uk/transport/transport-projects/chisholm-trail

Greater Cambridgeshire Partnership. (2021). *Horningsea Greenway*. Retrieved from https://www.greatercambridge.org.uk/transport/transport-projects/greenways/horningsea-greenway

OBR. (2020). *Fiscal sustainability report - July 2020*. Retrieved from https://obr.uk/frs/fiscal-sustainability-report-july-2020/

South Cambridgeshire District Council. (2018). *South Cambridgeshire Local Plan 2018.* Retrieved from https://www.scambs.gov.uk/planning/local-plan-and-neighbourhood-planning/the-adopted-development-plan/south-cambridgeshire-local-plan-2018/

Stagecoach. (2021). *606.* Retrieved from https://tiscon-maps-stagecoachbus.s3.amazonaws.com/Timetables/East/CAMBRIDGE/CA-606-AUG%202021.pdf

Stagecoach. (2022). *19 - Landbeach - Cambridge*. Retrieved from https://bustimes.org/services/19-haverhill-linton-burrough-green-2

Stagecoach. (2022). *2 Bus Route & Timetable: Ely - Addenbrooke's*. Retrieved from https://www.stagecoachbus.com/routes/east/2/ely-addenbrooke-s/xebo002.o

Stagecoach. (2022). *604 Line* . Retrieved from https://moovitapp.com/index/amp/en-gb/public_transportation-line-604-East_Anglia-2102-1824435-30179771-1

Stagecoach. (2022). *9 Bus Route & Timetable: Cambridge - Littleport*. Retrieved from https://www.stagecoachbus.com/routes/east/9/cambridge-littleport/xeao009.o

Stagecoach. (2022). *the Busway - A, B, C.* Retrieved from https://thebusway.info/pdfs/tt/ABC.pdf

Sustrans. (2022). *Route 11*. Retrieved from https://www.sustrans.org.uk/find-a-route-on-the-national-cycle-network/route-11

TfL. (2021). *Traffic Modelling Guidelines.* Retrieved from https://content.tfl.gov.uk/traffic-modelling-guidelines.pdf

TRICS Consortium Limited. (n.d.). *The TRICS® database*. Retrieved from TRICS: https://www.trics.org/default.aspx

Waterbeach Cycling Campaign. (2020). *Response to Waterbeach Cambridge Consultation 2020*. Retrieved from http://www.waterbeachcc.com/index.html

Waterbeach Parish Council. (2022). Retrieved from https://www.scambs.gov.uk/media/19884/waterbeach-np-made-version-march-2022-reduced-1.pdf

WSP. (2018). *Waterbeach New Town East - Transport Assessment .*

Appendices

Appendix A - Figures

A.1 Extent of the Proposed Development during construction

A.2 Construction access

A.3 Construction site and access points for the proposed WWTP and Transfer Tunnel

A.4 Construction site and access points for the Waterbeach pipeline and the northern section from Waterbeach to the proposed WWTP

A.5 Construction site and access points for the Waterbeach pipeline, southern section from WWTP main site to the existing WWTP site

A.6 Construction site and access points for the existing WWTP for decommissioning phase

~~A.6~~A.7 PROW Routes – Waterbeach

A.8 Walking Network – Waterbeach

A.9 Cycle Routes – Waterbeach

A.10 Cycling Network – Waterbeach

A.11 Bus routes – Waterbeach

A.12 Collision – Waterbeach

A.13 PROW Routes – Horningsea

A.14 Walking Network – Horningsea

A.15 Cycle Routes – Horningsea

A.16 Cycling Network – Horningsea

A.17 Bus routes – Horningsea

A.18 Collision – Horningsea

A.19 PROW Routes – Fen Ditton

A.20 Walking Network – Fen Ditton

A.21 Cycle Routes – Fen Ditton

A.22 Cycling Network – Fen Ditton

A.23 Bus routes – Fen Ditton

A.24 Collision - Fen Ditton

A.25 PROW Routes – Milton

A.26 Walking Network – Milton

A.27 Cycle Routes – Milton

A.28 Cycling Network – Milton

A.29 Bus routes – Milton

A.30 Collision – Milton

A.31 PROW Routes – Chesterton

A.32 Walking Network – Chesterton

A.33 Cycle Routes – Chesterton

A.34 Cycling Network – Chesterton

A.35 Bus Routes - Chesterton

A.36 Collisions – Chesterton

A.37 Traffic count locations - December 2021

A.38 Traffic count locations – May 2022

A.39 Construction material locations

Appendix B: Scoping Note

Appendix C: Origin-destination Analysis of Deliveries to the Existing Cambridge WWTP

Appendix D: PIC Data Analysis

Appendix E: WCHAR

Appendix F: Recreational User Counts

Appendix G: Swept Path Analysis

Appendix H: Discovery Centre TRICS® Data

Appendix I: MCC and ATC comparisons

Appendix J: Consultation 2 ~~stakeholder~~ Stakeholder F~~f~~eedback

Appendix K: TEMPro Growth Factor Technical Note

Appendix L: ATC Speed / Count Surveys

Get in touch

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https://infrastructure.planninginspectorate.gov.uk/projects/eastern/cambridge-waste-water-treatment-plant-relocation/