K. Preliminary transport assessment

MOTT MACDONALD

Preliminary Transport Assessment

Cambridge Waste Water Treatment Plant Relocation

20 October 2020

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Mott MacDonald
22 Station Road
Cambridge CB1 2JD
United Kingdom

T +44 (0)1223 463500
mottmac.com

Anglian Water Group Ltd
Lancaster House
Ermine Business Park
Lancaster Way
Huntingdon
PE29 6XU

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Executive summary

Mott MacDonald has been commissioned by Anglian Water to conduct a preliminary transport assessment for three potential sites for the relocation of the existing Cambridge Waste Water Treatment Plant (WWTP).

The existing 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 in the early stages of planning its relocation.

Following initial optioneering and site screening to identify three preferred sites (1, 2 and 3) for relocation of the WWTP, a preliminary assessment has been undertaken of the transport considerations for each of the site options.

This preliminary transport assessment set out the following considerations in relation to Sites 1, 2 and 3:

- The potential access requirements in terms of location and likely dimensions
- Details of any goods vehicle restrictions which might impact on site operations
- Details of off-site junctions where an impact might be expected and where the authorities might seek mitigation in the event of any of the sites being granted planning approval
- Details of the transport proposals being promoted for the area including those associated with development and those by the public bodies and how these might impact on / interact with the different relocation proposals.

Based upon these initial findings, and a preliminary review of existing highway infrastructure and constraints, the below site recommendations were made.

For Site 3, access options are constrained as both of the two potential routes would have significant issues to overcome to provide access for the predicted traffic levels associated with the proposed site. The access route via High Ditch Road (designated as HDR-01 and shown in Appendix A.6) would need significant highway improvement to accommodate the safe movement of predicted HGVs and would also require the removal of existing 18T weight restrictions so that HGVs can access/egress the site via Low Fen Drove Way. Furthermore, the alternative access route, designated as HSR-01 (Appendix A.7), which routes along Horningsea Road via Junction 34 of the A14 (Fen Ditton) was found to also have 18T weight restrictions and currently only caters for movements to and from the west.

For both sites 1 and 2, the recommended point of access is from Butt Lane (see drawings BTL-01 for Site 1 and BTL-06 for Site 2, in Appendix A.2 & A.3).

Analysis of the Butt Lane/ Park and Ride/ A10 junction indicates that, during the PM peak, the junction is likely to operate at capacity without the WWTP included and so some improvements may be sought as part of any approvals process should access be provided from Butt Lane.

The initial analytical work set out in the Preliminary Transport Assessment used existing available survey data (for Site 1 and 2 this was available via the Waterbeach New Town Transport Assessment and was collected between 2014 and 2016, and for Site 3 via the Wing (Newmarket Road) development Transport Assessment collected in 2013). For any future assessment work, including any formal planning submissions, new surveys will be required as the County Council typically requires surveys to be no older than three years old[1].

As well as surveying the existing WWTP site to understand the route that vehicles take to get to the site and the existing levels of trip generation (probably using Automatic Number Plate Recognition (ANPR) techniques), the following traffic surveys are likely to be needed on the local and strategic network:

a. For sites 1 and 2
    i. Landbeach Road/A10,
    ii. Butt Lane/ A10,
    iii. Butt Lane/ Park and Ride Link Road,
    iv. Park and Ride/ A10 junction,
    v. A14 Junction 33,
    vi. Mere Way/ Butt Lane,
b. For Site 3[2]
    i. A14 Junction 33
    ii. A14 Junction 34,
    iii. Horningsea Road/Low Fen Drove Way,
    iv. A14 Junction 35,
    v. A1303/High Ditch Road.

The survey data required for the above locations would include:

- Manual Classified Count surveys for each of the junctions on two weekdays covering the 3-hour peak periods.
- Automatic Traffic Counts for a two-week period at the location of the site access and potentially on the A10 to show day-to-day variations in traffic flow across a representative period.

The scope of analysis needed for the Transport Assessment for the new WWTP site would be dependent on the scale of traffic movements expected to be generated by the proposed development. However, regardless of this, the Transport Assessment would be expected to have the following structure:

- **Policy Review** – this section would provide a summary of the relevant and emerging planning policy at a national and local level that relate to the proposed site and surrounding transport network;
- **Baseline Transport Conditions** – this section would provide an audit of the existing transport conditions in the area surrounding the development including highway conditions, public transport availability and personal injury collision analysis;
- **Development Proposals** - outlines the details of the proposed development;

[1] Cambridgeshire County Council Transport Assessment Guidance: https://www.cambridgeshire.gov.uk/asset-library/imported-assets/Transport%20Assessment%20Guidelines%20Sept%202019%20Publication%20Version.pdf

[2] Depending on the access location chosen

Development Trip Generation, Distribution and Assignment - this section would detail the trip generation for the proposed site through interpretation of the existing site surveys and re-distribute these trips on the network based on the results of the ANPR survey. Should the proposed site trips be expected to expand or result in additional trips on the network beyond those at the existing site, the trip generation would be appropriately factored up to reflect the trip increase;

- **Junction Capacity Modelling and Impact Assessment** – would present the results of the junction modelling assessment with and without the proposed development for the future year. This would assess the impact of the development on the highway network and determine whether this is 'severe' in accordance with the requirements of the National Planning Policy Framework and therefore additional mitigation measures are needed;
- **Mitigation Measures -** identifies suitable measures to help mitigate the transport impacts of the development should the impact assessment demonstrate that such measures are needed; and
- **Summary and Conclusions** - this would draw together the findings of the TA.

It is anticipated that, given the complexities of the construction works needed for the site, that a Construction Management Plan would need to be submitted as an outline at the development consent application stage, with a final version secured through planning obligation or condition.

It is also anticipated that a Travel Plan would be needed to demonstrate how workers would be encouraged to travel to the site by sustainable modes.

We would recommend early engagement with Cambridgeshire County Council and Highways England to make them aware of the preferred site/s and site access; and suggest frequent pre-application scoping discussions as the development progresses, including the preparation of a Transport Assessment Scoping Note to agree the assessment methodology in advance of developing the Transport Assessment.

1 Introduction/Overview

Mott MacDonald has been commissioned by Anglian Water to conduct a preliminary transport assessment for three potential sites for the relocation of the existing Cambridge Waste Water Treatment Plant (WWTP)

1.1 Background

1.1.1 The two local planning authorities, Cambridge City Council and South Cambridgeshire District Council, are promoting the regeneration of the area previously known as the Cambridge Northern Fringe East (CNFE). Development of the area, now known as North East Cambridge (NEC), is supported by planning policy in the recently adopted Cambridge Local Plan and the South Cambridgeshire Local Plan and subject to an emerging Area Action Plan.

1.1.2 The existing Cambridge Waste Water Treatment Plant (WWTP), which provides waste water and sludge treatment for the residents and businesses of Cambridge, as well as a number of surrounding villages, lies within the NEC site and occupies a significant part of the area designated for regeneration.

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

1.1.4 The government announced in March 2019 that funding would be granted for the relocation of Cambridge WWTP and, as a result, Anglian Water is currently in the early stages of planning its relocation.

1.1.5 Following initial optioneering and site screening to identify the three preferred sites (1, 2 and 3) for relocation of the WWTP, a preliminary assessment is needed to provide a high-level overview of the transport considerations for each of the site options.

1.1.6 This preliminary transport assessment includes consideration of the following in relation to Sites 1, 2 and 3:

- Estimated vehicle movements during construction and operation
- The potential access requirements in terms of location and likely dimensions
- Details of any goods vehicle restrictions which might impact on site operations
- Details of off-site junctions where an impact might be expected and where the authorities might seek mitigation in the event of any of the sites being granted approval for development consent
- Details of the transport proposals being promoted for the area including those associated with development and those by the public bodies and how these might impact on / interact with proposals.

1.2 Existing site

1.2.1 The existing Cambridge Waste Water Treatment Plant (WWTP) is located just south of the A14 within the administrative boundary of Cambridge City (see Figure 1.1).

1.2.2 To the immediate north lies the A14, a strategic stretch of dual carriageway with an east to west function running from the east coast of England at Felixstowe, through Ipswich and Bury St Edmunds, and past Cambridge before joining the M6 towards Birmingham. The A14 also provides key interchanges with other routes on the strategic network such as the M1, A1(M) the A11 and the M11.

1.2.3 North west of the existing WWTP, the A14 connects to the A10 via Junction 33 of the A14, a grade separated junction known as the Milton Interchange. Through this interchange, the A10 acts as a key radial route into Cambridge, serving a large number of settlements between Cambridge and King's Lynn, including Ely, Milton, Waterbeach and Landbeach.

1.2.4 To the immediate east, the WWTP site is bordered by the Fen Line, on which Greater 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, the WWTP site is also bordered by the River Cam.

1.2.5 To the south of the WWTP lies an area of largely industrial land use as well as Cambridge North train station.

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

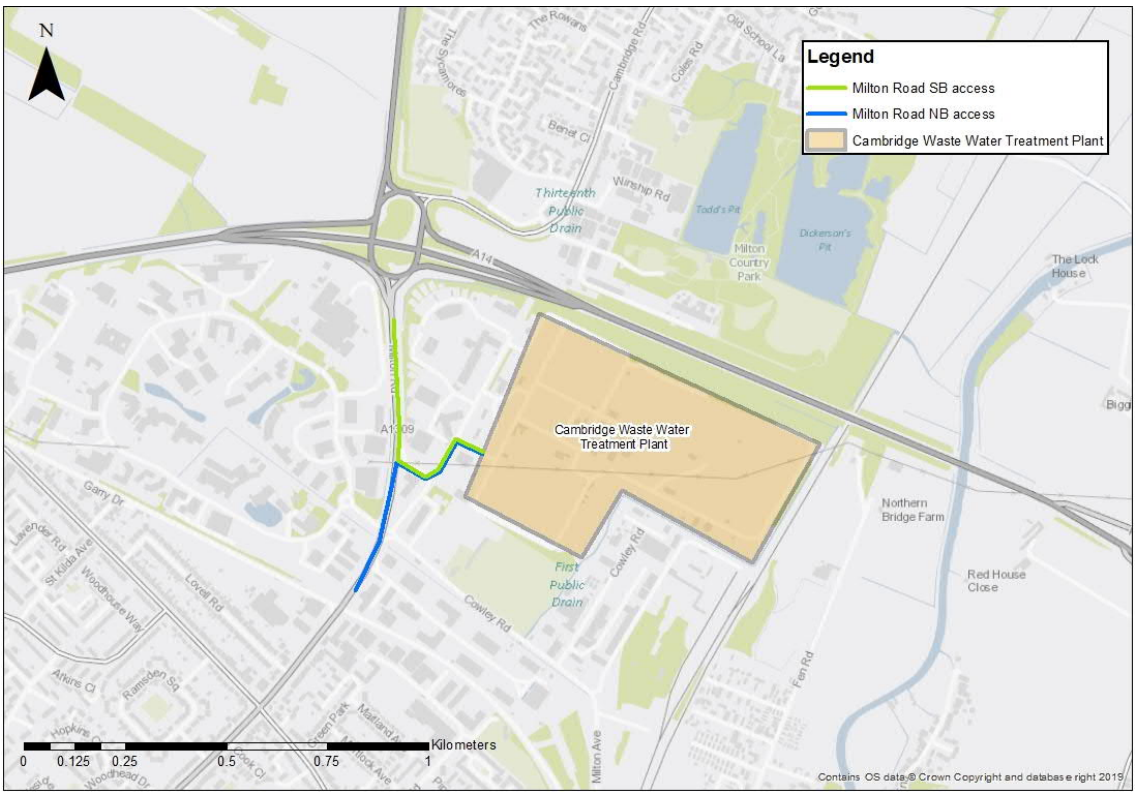
Figure 1.1: Existing WWTP site

Source: Mott MacDonald

1.3 Existing site access

1.3.1 The existing WWTP site can be accessed from Cowley Road, which connects to Milton Road via a signalised junction approximately 400m to the south of Junction 33 of the A14. Currently at this junction, there is dedicated slip lane access for southbound traffic, allowing largely unopposed movement into the site. For northbound traffic there is a dedicated right-hand turn facility, allowing vehicles to queue at the junction minimising blocking back along Milton Road.

Figure 1.2: Existing site access into the WWTP



Source: Mott MacDonald

1.4 Existing operational site movements

Heavy Good's Vehicles

1.4.1 To better understand Heavy Goods Vehicle (HGV) movements associated with the existing site, monthly import and export data was obtained from Anglian Water to estimate average daily HGV movements. HGV movements include liquid sludge imports, biosolids exports, non-routine tanker movements and septic waste movements.

1.4.2 Flow is presented as an average daily total, and a flat profile has been applied, based on the operational hours of the site (08:00-20:00), to estimate average movements per hour (See Table 1.1).

Table 1.1: Operational HGV movements

Service vehicle	Average daily vehicle movements	Hours of operation	Average hourly vehicle movements
Liquid sludge imports	58	12	4.83
Biosolids exports	10	12	0.83
Non-routine tanker movements	12	12	1
Septic waste movements	50	12	4.17
Total	**130**	12	**10.73**

Source: Anglian Water

1.4.3 Table 1.1 shows that the average daily HGV movements at the existing site equals 130. When these movements are applied using a flat profile across a 12-hour operational period (08:00-20:00), average hourly vehicle movements equate to just over 10 vehicles per hour.

Staff

1.4.4 In addition to HGV movements, further data has also been provided regarding the number of operational staff present at the site throughout the week (See Table 1.2).

Table 1.2: Operational/ Staff movements

Vehicle Type	Number	Frequency
Vans made up of:		
Sludge Technicians	2	Daily
Operations Team	2	Daily
Maintenance Technician	1	Mon-Friday
CHP Technician	1	Mon-Friday
Cars	6	Daily
Chemical Deliveries	3	Per Week
Other Service Vehicles	2	Per Week
Maximum Daily Total	**17**	

Source: Anglian Water

1.4.5 Given the rotational shift patterns of employees working at the existing site, there is potential for a maximum of 17 staff-based trips on any given day. This equates to an additional 34 one-way movements, which again, are likely to be spread out across the 12-hour operational profile of the site.

1.5 Future operational site movements

Heavy Good's Vehicles

1.5.1 Due to a marked increase in the capacity of works, total HGV movements at the proposed site are predicted to differ slightly from the existing site. Although the predicted increase is considered to be minimal in the context of a future Transport Assessment; future operational HGV movements have been provided below in Table 1.2 for reference.

Table 1.3: Future operational HGV movements

Service vehicle	Average daily vehicle movements	Hours of operation	Average hourly vehicle movements
Liquid sludge imports	62	12	5.17
Biosolids exports	10	12	0.84
Non-routine tanker movements	14	12	1.16
Septic waste movements	60	12	5
Total	**146**	12	**12.16**

Source: Anglian Water

At the new site, average daily vehicle movements are estimated to increase to 146, which equates to an average hourly flow of 12 vehicle movements per hour.

Staff

1.5.2 The total number of operations staffs required at the new site is not predicted to change. However, given the limited number of staff movements at the existing site, any associated change to staff movements is likely to be considered negligible in the context of a Transport Assessment.

1.6 Potential site locations

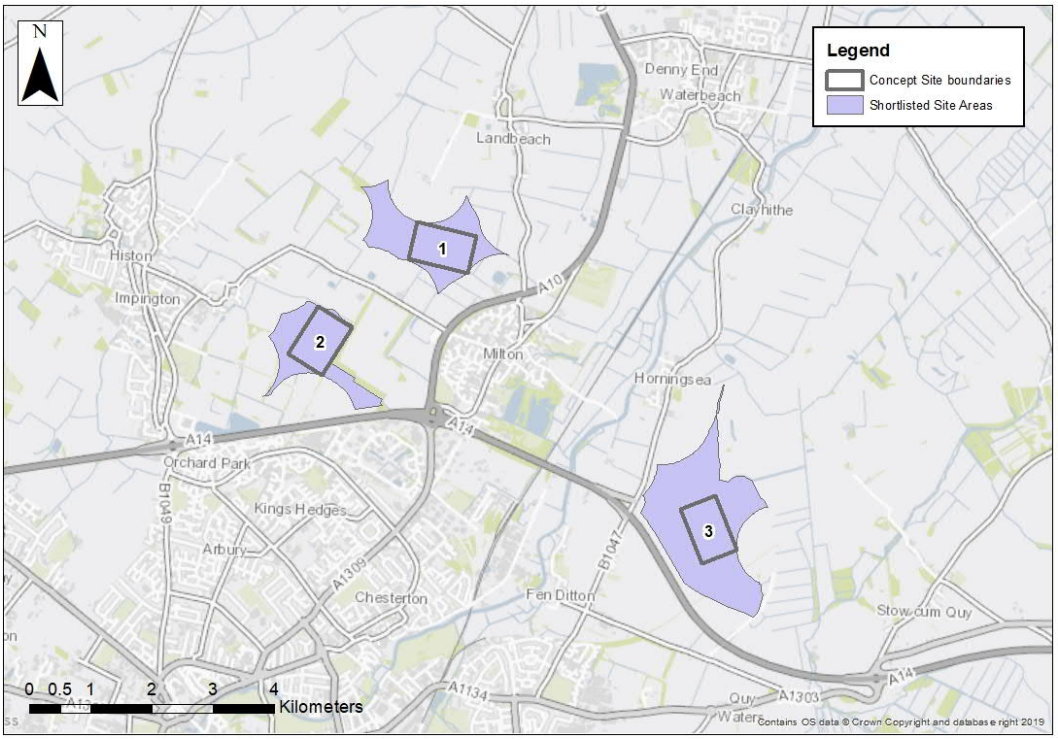
1.6.1 In total, there are three proposed sites for relocation of the Cambridge WWTP. These sites were identified through a site selection study undertaken by Mott MacDonald on behalf of Anglian Water. These sites are as follows:

- Site 1
- Site 2
- Site 3

1.6.2 Site 1 and 2 are located in close proximity to each other, to the west of the A10 (See Figure 1.3). Due to their similar access requirements and close proximities, Site 1 and Site 2 are assessed together.

1.6.3 Site 3 is located further apart, to the east of the A10 (See Figure 1.3) and is therefore assessed separately.

Figure 1.3: Proposed Site Locations: Site 1, 2 and 3



Source: Mott MacDonald

Site 1 and Site 2

1.6.4 The proposed Sites 1 and 2 are located approximately 2km to the north west of the existing WWTP site.

1.6.5 Both Site 1 and 2 are located northwest of the Milton Interchange (Junction 33 of the A14) and to the west of the A10 (See Figure 1.4). As a result of the proposed relocation, operational traffic associated with the WWTP would no longer use the A1309 (Milton Road) and instead would access either of the proposed sites from accesses on Butt Lane, or potentially via Landbeach Road for Site 1 via the A10. Both the proposed relocation sites are within the administrative boundary of South Cambridgeshire District.

1.6.6 Site 1 is located to the north west of Milton village between Butt Lane and the A10, and Site 2 is located to the west of Milton village between Butt Lane and the A14.

1.6.7 To the north of Site 1 lies an area of largely agricultural land use and to the northeast are the villages of Landbeach and Waterbeach. To the east are agricultural fields and the A10. To the south is Butt Lane and to the west of the proposed sites, Butt Lane becomes Milton Road and leads through the villages of Impington and Histon to the A14 junction 32.

1.6.8 To the north of Site 2 is Butt Lane. To the east of Site 2 is Mere Way, the Cambridge Recycling Centre and Milton Park and Ride. To the south of Site 2 lies the A14, the Milton Interchange, Cambridge Science Park and the CNFE/NEC area. To the west, and as noted above, Butt Lane becomes Milton Road and leads through the villages of Impington and Histon to the A14 junction 32.

Figure 1.4: Proposed Site Locations: Site 1 and 2

Source: Mott MacDonald

Site 3

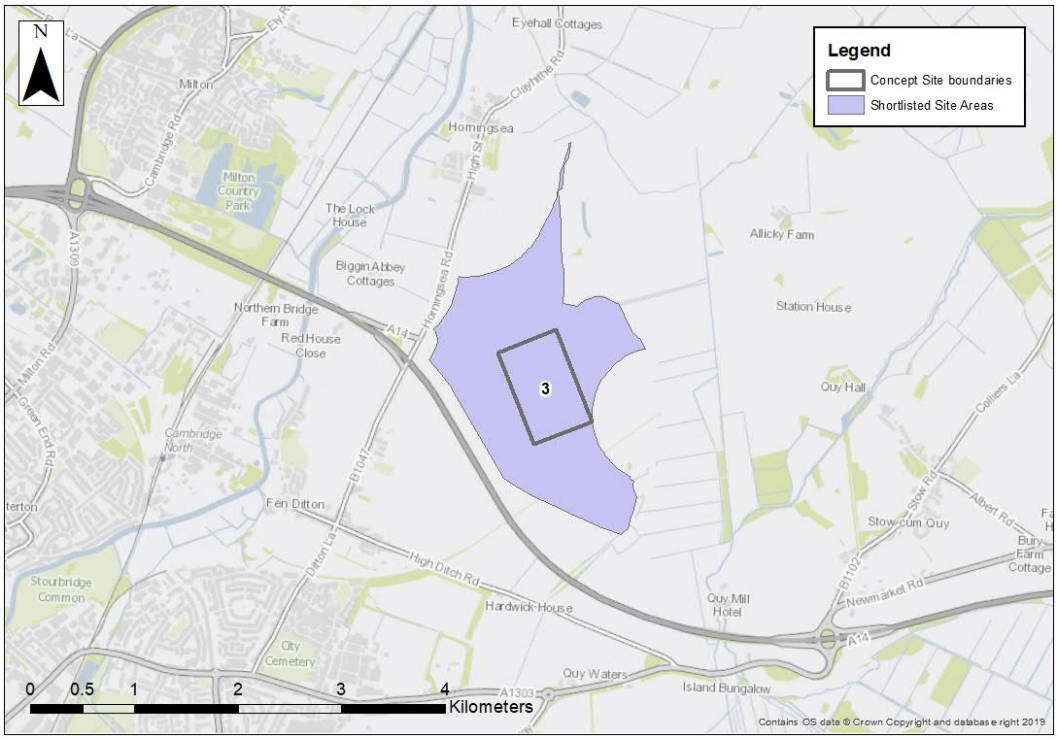
1.6.9 Site 3 is located approximately 2km east of the existing WWTP site, within the administrative boundary of South Cambridgeshire District. Site 3 is located approximately 2.5km due east of the Milton Interchange (Junction 33 of the A14) and east of the B1047 (See Figure 1.5).

1.6.10 As a result of the proposed relocation, operational traffic associated with the WWTP would no longer use the A1309 (Milton Road) and instead would likely access Site 3 from either Horningsea Road, north of Junction 34 of the A14; or via the A1303/Junction 35 of the A14 and route via High Ditch Road and Low Fen Drove Way.

1.6.11 Directly to the north, northeast and east of Site 3 is comprised of largely agricultural land use. Further east (approximately 2km) lies the rural village of Stow-Cum-Quy. Junction 35 of the A14, a key interchange serving the village of Stow cum Quy and the A1303 lies to the southeast. Within Site 3 lies a disused railway line which appears to route northeast from central Cambridge. Whist further south lies the A14, a key strategic link with east to west function routing between Rugby and Ipswich via Huntingdon, Cambridge and Bury St Edmunds.

1.6.12 To the west of Site 3 lies Junction 34 of the A14, a junction intersected by Horningsea Road which provides an on and off slip for A14 traffic traveling from and to the west. Horningsea Road connects Fen Ditton to the south with the village of Horningsea in the north.

Figure 1.5: Proposed Site Location: Site 3



Source: Mott MacDonald

1.7 Local Highway Network, Site 1 and Site 2

1.7.1 The highway network local to Site 1 and Site 2 is detailed below.

Butt Lane/ Milton Road

1.7.2 Butt Lane sits between sites 1 and 2, and is a single carriageway with east to west routing running from the signalised T-junction with the A10, which is approximately 750m north of Junction 33 of the A14. The Butt Lane approach to this junction is restricted to left turn out movements only. Therefore, any vehicles travelling to the A14 from Butt Lane have to turn right into the Butt Lane/ Milton Park and Ride access, which leads to a signalised junction with the A10, allowing vehicles to turn right on to the A10 southbound.

1.7.3 Butt Lane itself is subject to national speed limit at the proposed site locations. A shared use footway/cycleway is present along the south side of Butt Lane, which extends between Impington Village and Milton Park and Ride. The route connects into a footbridge over the A10 to Milton village.

Mere Way

1.7.4 Mere Way (Public Right of Way 162/3) runs north to south and is located to the east of Site 2 and through the approximate centre of Site 1. Mere Way is a predominantly unpaved byway running southwest from the south of Akeman Street, Landbeach, across Milton Road before continuing towards an underpass of the A14. The Byway is currently subject to a Traffic Regulation Order prohibiting vehicles other than cycles utilising this route. There are no formal crossing facilities for Mere Way crossing Butt Lane/ Milton Road. Given the location of Mere

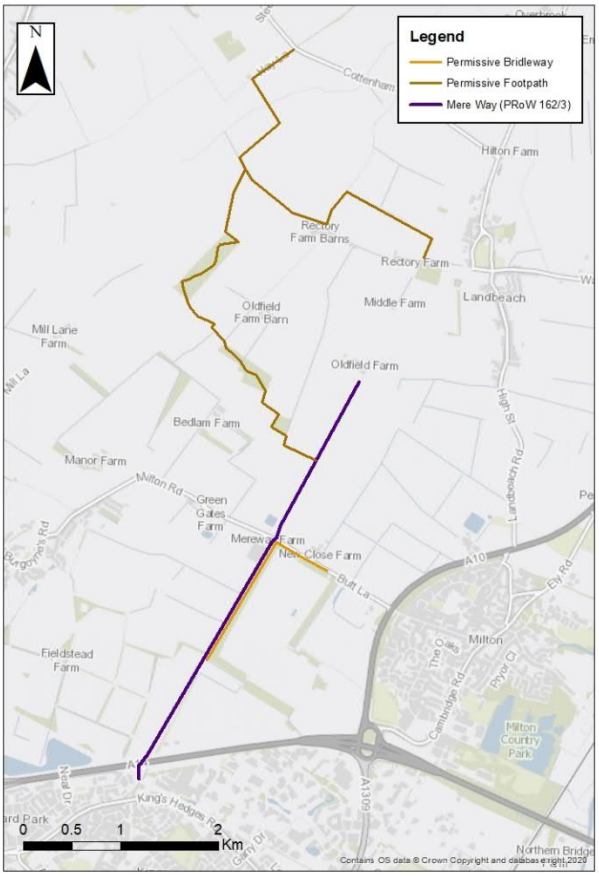
Way this is an important consideration when siting the WWTP as the provision of this facility would likely need to continue going forward.

1.7.5 It is worth noting that there are committed improvements along Mere Way as part of the Phase 1 Waterbeach development. These are discussed in more detail in the sections below. It is anticipated that future improvements to provide a public transport corridor along Mere Way, involving potential widening to allow for a segregated public transport route (or a similar public transport facility, which in the longer term could form part of the wider Cambridge Autonomous Metro (CAM) proposals) and maintenance track, are being considered by the Greater Cambridge Partnership as part of the Science Park to Waterbeach route. This route is identified in the Transport Strategy for Cambridge and South Cambridgeshire as a 'potential cycling improvement for the A10 (N) corridor with provision of a '4m Busway Maintenance track'. This is discussed further in later sections when considering committed and planned infrastructure.

Permissive footways/ bridleways

1.7.6 In addition to the location of Mere Way, Figure 1.6 below shows a permissive footpath located within the site boundary for Site 1 and in close proximity to Site 2. Permissive footpaths and permissive bridleways are not legal rights of way but are routes that the landowner has allowed the public to use through agreement.

Figure 1.6: Permissive footpath and bridleway



Source: Cambridgeshire County Council[3]

[3] my.cambridgeshire.gov.uk

HGV restrictions

1.7.7 To understand the Heavy Goods Vehicle (HGV) restrictions within the local area of the site, Cambridgeshire County Council's HGV Policy and advisory freight map[4] have been reviewed. The advisory freight map indicates there are weight limits in place to the east of the A10, meaning that any HGVs or OGVs needing to access either site would need to do so via the A10 and the relevant access road from Butt Lane or Landbeach Road.

1.7.8 Whilst there are no restrictions in place to prevent HGVs from travelling through Impington and Histon to reach the A14 when travelling to the proposed sites from the west, this may need further discussion with Cambridgeshire County Council (CCC) concerning the appropriate routing of HGVs in this area given constraints on the local network and local amenity issues.

1.8 Local Highway Network, Site 3

1.8.1 The Highway Network specific to Site 3 is detailed below:

Horningsea Road

1.8.2 Horningsea Road is a single carriageway B-road routing north to south between the villages of Horningsea and Fen Ditton and is approximately 5.75m in width. Horningsea Road passes over the A14 via a bridge, which is connected to the A14 to the west via a signalised on-slip and off-slip, Junction 34 of the A14. Vehicles wishing to access Horningsea Road travelling to/ from the east have to either use junction 35 to the east or perform a U-turn at Junction 33, the Milton Interchange.

1.8.3 Horningsea Road (B1047) is subject to national speed limit between Fen Ditton to the south and Horningsea to the north, where the speed limit is reduced to 30mph through these villages. A shared use pedestrian and cycleway approximately 2m wide is present along the west side of Horningsea Road, which extends across the entire stretch between Fen Ditton and Horningsea.

High Ditch Road

1.8.4 High Ditch Road is a single carriageway B-road routing east to west between the village of Fen Ditton and the A1303, approximately 950m west of Junction 35 of the A14 (the Quy Interchange). High Ditch Road is subject to national speed limit for a single-carriageway road (60mph) and varies in width between approximately 4.9m to 5.6m. The road surface appears to have been surface dressed in recent years, with generally intact edgings. The northern side of the carriageway is unbounded by hedges or fencing. High Ditch Road has a weight limit in place of 18 Tonnes, effectively banning most large heavy goods vehicles from using this route.

Low Fen Drove Way

1.8.5 Low Fen Drove Way is a narrow (less than 4m wide) single carriageway road routing northwest to southeast around the proposed site location. At its junction with Horningsea Road to the northwest, Low Fen Drove Way forms a single carriageway of varying width. Approximately 970m east, Low Fen Drove Way becomes a dirt track and a Byway which continues south for the majority of Low Fen Drove Way until its approach to the High Ditch Road junction. Here, Low Fen Drove Way is no longer a dirt track and instead is hard surfaced and joins a single carriageway to form a bridge over the A14. The bridge is arched, with poor forward visibility on approach from both sides. Once across the A14, Low Fen Drove Way forms a forked priority junction with High Ditch Road. This junction has poor edges and surface, and in its current state

[4] https://www.cambridgeshire.gov.uk/residents/travel-roads-and-parking/roads-and-pathways/heavy-or-abnormal-loads-on-the-highway/

is unlikely to support frequent heavy loading by lorries. As Low Fen Drove Way is partly a Byway; it appears to have a national speed limit of 60mph due to an absence of signage to say differently but the formal status of the route would require further checking with the authorities should Site 3 be taken forward for more detailed assessment.

Low Fen Drove Way byway

1.8.6 Low Fen Drove Way byway (Public Right of Way 85/14) runs north to south and is located to the east of Site 3. It follows the existing routing of the unpaved dirt track section of Low Fen Drove Way (See Figure 1.7).

Figure 1.7: Low Fen Drove Way byway: PRoW 85/14

Source: Cambridgeshire County Council

1.8.7 In addition to the Low Fen Drove Way byway (shown above), there are numerous other Public Rights of Way (PRoWs) surrounding Site 3, including an extensive network of footpaths connecting the rural settlements of Stow-cum-Quy, Lode, Waterbeach and Horningsea. To the north, there is a 4.5km long bridleway routing southeast, connecting north Horningsea to Stow-cum-Quy.

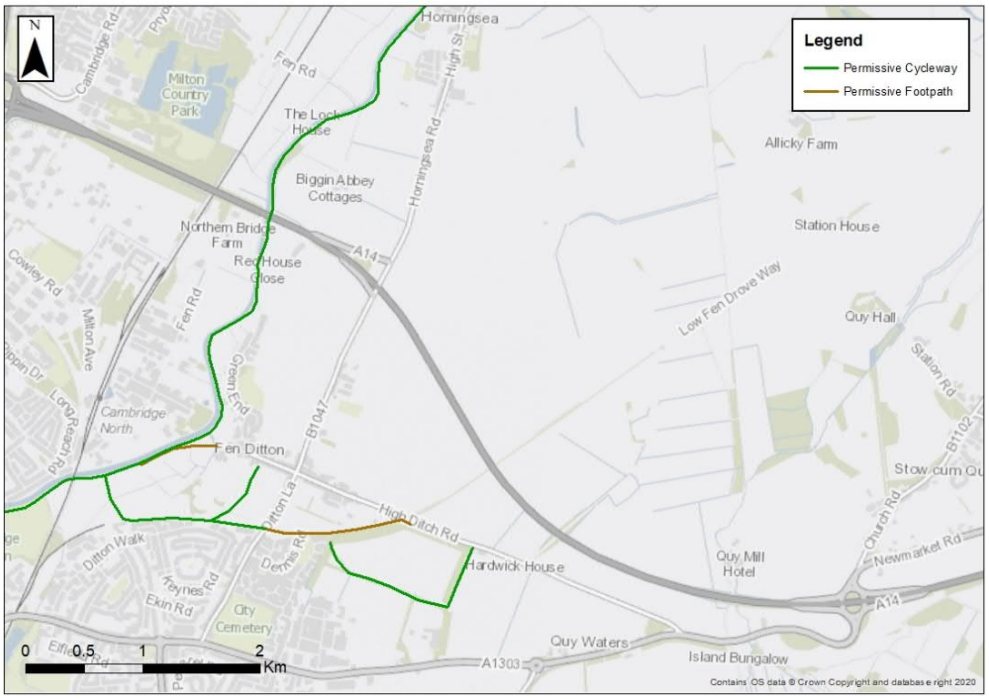
Permissive footpaths/bridleways

1.8.8 Figure 1.8 below shows the permissive footpaths and permissive cycleways located within close proximity to the west of Site 3. Permissive footpaths and permissive cycleways are not legal rights of way but are routes that the landowner has allowed the public to use through agreement.

1.8.9 Alongside the river Cam, there is a permissive cycleway which routes approximately 6km north from Chesterton to Waterbeach. In addition to routing north, this permissive cycleway branches east towards Barnwell, before connecting north with High Ditch Road, approximately 800m east of Fen Ditton. There is also a small 1km section of permissive footpath which serves as a cut through from the north of Barnwell to High Ditch Road (See Figure 1.8).

1.8.10 There are proposals to make improvement to the existing pedestrian and cycle facility alongside Horningsea Road as part of the Horningsea Greenways project.

Figure 1.8: Permissive footpaths and bridleways



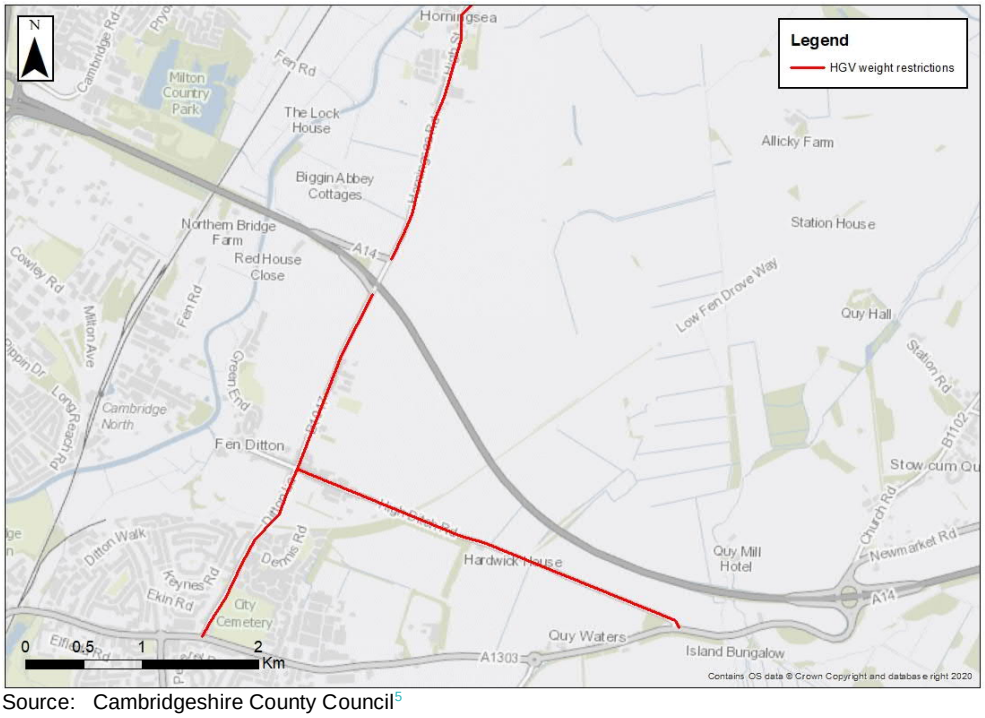
Source: Cambridgeshire County Council

HGV restrictions

1.8.11 To understand the HGV restrictions within the local area of the site, CCC's HGV Policy and advisory freight map have been reviewed. The advisory freight map indicates there are access only weight limits in place along Horningsea Road (B1047) through both Fen Ditton and Horningsea (See Figure 1.9). These restrictions also continue north along the B1047 through Waterbeach, up until the A10.

1.8.12 For HGV's wishing to access the proposed site via Horningsea Road, it may be possible to do so via Junction 34 of the A14. Construction and operation of the site would be dependent on amendment of the current Traffic Regulation Order, which is within the power of CCC, but would be subject to consideration of any objections and therefore any changes could not be guaranteed.

Figure 1.9: Environmental HGV weight limit restriction plan map



Source: Cambridgeshire County Council[5]

1.8.13 It is worth noting that there are additional HGV restrictions along High Ditch Road (See Figure 1.10). However, these (18 T) restrictions are also 'access only' restrictions. For HGV's wishing to access the proposed site via Low Fen Drove Way, it may be possible to do so via High Ditch Road. Access to the proposed site could route from the southeast via the A1303 and Junction 35 of the A14. Construction and operation of the site would be dependent on amendment of the current Traffic Regulation Order, which is within the power of CCC, but would be subject to consideration of any objections and therefore any changes could not be guaranteed.

[5] https://my.cambridgeshire.gov.uk/?tab=maps

2 Construction Impacts

2.1.1 To better understand Heavy Goods Vehicle (HGV) movements associated with the construction of the new site and associated ancillary infrastructures; preliminary analysis was conducted to estimate the number of daily HGV movements.

2.1.2 At each stage of construction, an estimate of the average daily movements associated with each Site is displayed below in Table 2.1.

2.1.3 It is important to note that although the daily HGV movements look largely similar between each site option; the duration of each stage will vary depending on which site option is selected. Duration of construction stage is dependent on both the specific infrastructure requirements chosen as the preferred option, and/or the distance required to tunnel.

Table 2.1: Daily HGV movements during each construction stage

Site	1	2	3	Comments
Typical daily movements for WWTP construction	55	55	55	Every workday throughout entire construction period
Tunnel spoil removal during tunnelling period	36	35	36	Twice per week during tunnelling period (12-24 months)
Movement during large concrete pour	163	163	163	Daily during large concrete pour (approx. 6 days)
Spoil removal related to ancillary infrastructure – (dependant on infrastructure choice)	54 - 108	54 - 108	54 - 108	Daily for 1-2 weeks

Source: Mott MacDonald

2.1.4 Given the above information, it is likely that during peak construction, particularly during the large concrete pour phase, constructional based traffic could equate to an additional 200-300 movements.

2.1.5 Although these estimates are preliminary in nature, it is recommended that once a preferred option has been consulted upon, a Construction Management Plan is put in place to mitigate the associated impacts of constructional base flow on the local transport network.

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3 Assessment Assumptions

3.1.1 For the purposes of this high-level transport assessment, the following assumptions have been applied:

- The majority of vehicle movements to the proposed Sites 1 and 2, follow the A10 corridor between the A14 Milton Interchange and Butt Lane/ Landbeach Road junctions. The assessment for these site locations concentrates on the potential impact at these junctions.
- The majority of vehicle movements to the proposed Site 3, follow the A14 corridor between Junction 33, the A14 Milton Interchange and Junction 35 of the A14 Quy Interchange. The assessment for this site location concentrates on the potential impact at key junctions between these interchanges.
- The number of vehicle trips travelling to and from the site is largely the same across all site locations. For the purposes of HGV movements, it is assumed that these comprise approximately 73 vehicles per day (146 trips) based on survey data and advice provided by Anglian Water, previously referred to in Section 1.5.
- The number of trips by Car and LGV are based on figures provided by Anglian Water, outlined in Section 1.4. However, the accuracy and spatial distribution of these trips would need to be established through surveys for any future Transport Assessment to confirm suitable access layout designs and associated off-site impacts.
- The distribution of trips associated with Site 1 and 2 are assumed to be the same for Milton Interchange, Milton Park and Ride and Butt Lane. However, when considering an alternative access into Site 1, increased trip movements via Landbeach Road would also be considered.
- The distribution of trips associated with Site 3 assumes traffic from/to the west would continue on the A14 and travel either via Junction 34, or Junction 35, while trips to/from the east travel via the Quy Interchange. However, it is noted that distribution to/from this site would be dependent on the location of the site access, and the acceptable routing of HGVs.
- The number of daily vehicle trips associated with construction is largely similar between all site options. However, the routing of these vehicles will vary between sites, dependant on the aforementioned assumptions associated with site access. To fully understand the potential impact of all constructional based impacts of the development on the network, a Construction Management Plan will need to be provided.

4 Potential Access locations

Due to the close proximity of Site 1 and 2, site access location analysis has been considered together. The site access locations for Site 3 are considered separately.

4.1 Site 1 and Site 2

4.1.1 A high-level assessment was undertaken to assess the viability of providing connectivity to the proposed sites 1 and 2 from the existing highway infrastructure and includes the following access options:

- Landbeach Road for Site 1;
- Butt Lane for Site 1 and 2; and
- A10 for Site 1.

4.1.2 A high-level consideration of the positives and negatives associated with each of these is shown in Table 4.1.

Table 4.1: Potential site access location analysis

Access Location	Description	Positives	Negatives	Proposed Junction Type (assumed)
A10	Strategic road network, 50mph, wide two-way single carriageway	Direct access from main highway network; and No access via local highway network required.	High speed road; Construction of new (major) junction required to facilitate access; New junction layout dictated by predominant A10 traffic flows; Existing high accident rate on A10 corridor; Significant infrastructure improvements planned for A10; Unable to access both proposed sites; and Journey times may be affected by traffic queues on A10 during peak times.	Roundabout or signal controlled junction
Butt Lane	Local road network, 50mph, two-way, single carriageway	Existing commercial sites and operations along Butt Lane; and Possible to access both proposed sites	Local highway network; Access to residential settlement of Impington May require improvements to existing A10 junction for capacity reasons; Access to A10 via existing Park & Ride site (may have limited highway tenure);	Priority junction with ghost island
Landbeach Road	Local road network, 50mph, two-way, single carriageway	Existing traffic flows relatively low.	Local highway network; Access to residential settlement of Landbeach; May require improvements to existing A10 junction for safety reasons; Unable to access both proposed sites; High number of accidents recorded at existing A10 junction; and Poor visibility	Priority junction with ghost island

Source: Mott MacDonald

4.1.3 As a result of this initial assessment, further work was conducted to assess the viability of access from each of the identified roads. The locations of the proposed access routes are shown in Appendix A.1 and summarised within Table 4.2 below.

Table 4.2: Viability analysis of identified access roads

Location Ref	Location Description	Approx. Length	Positives	Negatives	Recommendations
A10-01	Access to Site 1, located on western side of A10, approx. 300m NE of junction with Butt Lane	400m	Direct access from main highway network; Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (300m NE of Butt Lane and 300m SW of private access to Milton Maze); Construction of new (major) junction to facilitate access; Located at commencement of existing lay-by; and Access route to site may bisect multiple land parcels.	Not suitable due to existing highway arrangement, uncertainty to future development of highway corridor and potential prohibitive costs associated with new (major) junction.
BTL-01	Access to Site 1, located on northern side of Butt Lane, approx. 275m West of junction with A10.	525m	Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (200m W of Park & Ride site and 150m E of private access to commercial development); and Access route to site may bisect multiple land parcels.	Preferred access location for Site 1 subject to further design considerations for effective width of Butt Lane.
BTL-02	Access to Site 1, located on northern side of Butt Lane, approx. 525m West of junction with A10.	460m	Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (90m W of private access to commercial development and 30m E of private access to farm); Construction of new junction may be restricted by existing boundary constraints; and Access route to site may bisect multiple land parcels.	Not recommended due to existing horizontal constraints and close proximity to existing accesses.
BTL-03	Access to Site 1, located on northern side of Butt Lane, approx. 825m West of junction with A10.	475m	Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (200m W of private access to farm and 125m E of private access to commercial development); Construction of new junction may be restricted by existing boundary constraints; Access route to site may bisect multiple land parcels; and	Not recommended due to existing horizontal constraints and close proximity to Mere Way.

Location Ref	Location Description	Approx. Length	Positives	Negatives	Recommendations
				Uncertainty with respect to future development of Mere Way as NMU route.	
BTL-04	Access to Site 2, located on southern side of Butt Lane, approx. 825m West of junction with A10.	410m	Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (200m W of private access to farm and 125m E of private access to commercial development); Construction of new junction may be restricted (width) by existing boundary constraints; and Uncertainty with respect to future development of Mere Way as NMU route.	Not recommended due to existing horizontal constraints and close proximity to Mere Way.
BTL-05	Access to Site 2, located on southern side of Milton Road, approx. 975m West of junction with A10.	400m	Located at field boundary to minimise impact upon land parcels;	Close proximity to existing junctions (35m W of private access to farm; and Construction of new junction may be restricted (width) by existing boundary constraints.	Not recommended due to existing horizontal constraints and close proximity to existing accesses.
BTL-06	Access to Site 2, located on southern side of Milton Road, approx. 1175m West of junction with A10.	375m	Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (100m W of private access track and 200m E of private access to commercial development); Proximity to bend may affect required Sight Stopping Distances; and Proximity to residential property (The almonds at approx. 125m).	Preferred access location for Site 2 subject to further design considerations for sight stopping distances and effective width of Butt Lane
BTL-07	Access to Site 2, located on southern side of Milton Road, approx. 430m West of junction with A10.	800m	Uses existing junction location; Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (125m E of private access track to farm); Joint use of access road to waste disposal site; Trip generation of combined uses may require larger junction layout. Interaction needed to cross Mere Way	Not recommended due to interaction needed to cross Mere Way and greater costs associated with longer access route.
BTL-08	Access to Site 2, located on southern side of Milton Road, approx. 590m West of	645m	Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (30m W of private access to farm and 30m E of private access to farm);	Not recommended due to proximity to existing accesses.

Location Ref	Location Description	Approx. Length	Positives	Negatives	Recommendations
	junction with A10.				
BTL-09	Access to Site 2, located on southern side of Milton Road, approx. 955m West of junction with A10.	400m	Uses existing junction location; Located at field boundary to minimise impact upon land parcels;	Close proximity to existing junctions (30m W of private access to farm); Construction of new junction may be restricted (width) by existing boundary constraints; and Uncertainty with respect to future development of existing commercial development; Joint use of access road to commercial development; Trip generation of combined uses may require larger junction layout.	Not recommended due to proximity to existing accesses.
LBR-01	Access to Site 1, located on southern side of Landbeach Road, approx. 275m North of junction with A10	550m	Located at field boundary to minimise impact upon land parcels;	Proximity to existing junctions (110m N of private access to Milton Maze and 300m S of private access to Farm and Children's Nursery); and Proximity to bend (approx. 160m) may affect required Sight Stopping Distances.	Not recommended due to existing horizontal alignment and local character of highway.

Source: Mott MacDonald

Recommended site access

4.1.4 Based upon the above initial findings, and a preliminary review of existing highway infrastructure and constraints, the recommended point of access for Site 1 and Site 2 should be from Butt Lane for both sites, with BTL-01 for Site 1 and BTL-06 for Site 2.

4.1.5 It should be noted that due to the effective width of Butt Lane in certain locations, mitigation or remedial works may be necessary beyond the extent of new site access construction to facilitate safer passing widths by predicted large HGVs requiring access to the potential WWTP sites.

4.2 Site 3

4.2.1 A high-level assessment was undertaken to assess the viability of providing connectivity to the proposed Site 3 from the existing highway infrastructure and includes the following access options:

- Low Fen Drove Way via High Ditch Road
- Horningsea Road;

4.2.2 A high-level consideration of the positives and negatives associated with each of these options is shown in Table 4.3.

Table 4.3: Potential Site access location analysis

Access Location	Description	Positives	Negatives	Proposed Junction Type (assumed)
Low Fen Drove Way via High Ditch Road	Local road network, one-way, single carriageway and dirt track	Existing traffic levels are low.	Local highway network; Access to residential settlement of Fen Ditton	Priority junction with ghost island
Horningsea Road	Local road network, 60mph, two-way, single carriageway with cycleway	Close proximity to major highway infrastructure - Junction 34 of the A14	Local highway network; Access to residential settlement of Horningsea; HGV restrictions present along entire section May require improvements to Junction 34 for safety reasons; May require U-turn movements at Junction 33 (Milton) to allow travel to/ from A14 east; and, Future of Junction 34 is uncertain	Priority junction with ghost island

Source: Mott MacDonald

4.2.3 As a result of this initial assessment, further work was conducted to assess the viability of access from each of the identified roads. The locations of the proposed access routes are shown in Appendix A.8 and summarised within Table 4.4 below.

Table 4.4: Viability analysis of identified access roads

Location Ref	Location Description	Approx. Length	Positives	Negatives	Recommendations
HDR-01	Access to Site 3 via Low Fen Drove Way, located approximately 900m west of junction of High Ditch Road with Newmarket Road	1350m	Uses existing infrastructure for over half of the route and uses routes that are expected to have lower levels of existing traffic flows than the proposed access route options for Site 1 and 2.	May require highway improvements at junction with Newmarket Road to facilitate new HGV trips; Requires highway improvements to increase the width of High Ditch Road (approx. 5m to 6m); Requires highway improvements at junction with High Ditch Road to facilitate new HGV trips; Highway improvements to increase the width of Low Fen Drove Way (approx. 5.5m) may also result in an increased width of existing earthwork embankments; Existing bridge structure over the A14 is too narrow for two-way traffic (approx. 5.0m) which may result in the introduction of signal-controlled operation; Forward sight visibility is restricted over the existing bridge structure over the A14; Access commences within '18T Except for Access' restriction; and; Access route to the site may bisect multiple land parcels.	Although plausible, the costs associated with highway improvements to facilitate vehicular access may be prohibitive.
HSR-01	Access to Site 3, located East of Horningsea Road, approx. 280m North of junction with A14	540m	Within close proximity to major highway infrastructure. Shorter approx. access length	Highway improvements at the junction with Horningsea Road to facilitate new HGV trips; Within close proximity to existing farm track junction (40m south); Highway improvements to increase the width of Low Fen Drove Way (approx. 3.5m); A14 access only for trips to and from the west, access from the east would take place via local road network; Route via local road network for access to and from east would pass through '18T Except for Access' restriction;	Existing access constraints in the form of environmental weight restrictions may preclude this option unless alternative route(s) are considered.

Location Ref	Location Description	Approx. Length	Positives	Negatives	Recommendations
				Access commences within '7.5T Except for Access' restriction; Access route to the site may bisect multiple land parcels; and; Future of Junction 34 is uncertain.	

Source: Mott MacDonald

Recommended site access: Site 3

4.2.4 Based upon the above findings, there are limited options for access to Site 3 and both proposed routes have significant issues to overcome to enable access for the predicted traffic levels associated with the proposed site. These are discussed further below:

4.2.5 The access route via High Ditch Road as shown as HDR-01 in Appendix A.6 would need significant highway improvement to accommodate the safe movement of predicted HGVs. HDR-01 would also require a one-way 'shuttle' operation across the existing structure over the A14 to address both the restrictive passing width and forward visibility constraints. The existing structure over the A14 is of sufficient structural integrity to accommodate HGVs, although it is recommended that further investigations be carried out to confirm that this is still valid for this scheme. In addition to this, access from High Ditch Road would require the removal of existing 18T weight restrictions so that HGVs can access/egress the site via Low Fen Drove Way.

4.2.6 The access route shown as HSR-01 (Appendix A.7) would require highway improvements to accommodate the safe movement of predicted HGVs but not to the extent of HDR-01. However, access from the A14 via Junction 34 (Fen Ditton) is restrictive and only currently caters for movements to and from the west. Similarly, to HDR-01, any origins and destinations to the east would need to leave/enter the A14 from Junction 35 (Stow-cum-Quy) and follow the local road network, on which there are 18T weight restrictions (except for access). Further consideration should be given to using Junction 33 (Milton) for vehicles routing to and from the East by means of a 'U'-turn at the junction, although the capacity implications would need to be considered in greater detail.

4.2.7 As stated above, access to Site 3 via HSR-01 is entirely dependent upon the future of Junction 34, which at present, is being consulted upon as part of a wider Cambridge Eastern Access Study. Taking the possibility of future removal into consideration, access to Site 3 may only be possible from Junction 35, via HDR-01. The Cambridge Eastern Access Study is outlined in greater detail in Section 0.

4.3 Preliminary Design

4.3.1 An initial concept design for each of the proposed access locations has been developed to further assess the viability of new junctions at these locations and is shown in Appendix A.2 for access location BTL-01 into Site 1, Appendix A.3 for BTL-06 into Site 2 and Appendix A.7 for HSR_01 into Site 3. The proposed access arrangements are based upon a priority junction with ghost island as defined within the DfT's highway design guidance DMRB CD123. A swept path analysis has also been undertaken using Autodesk Vehicle Tracking software which shows that the proposed junction arrangements can accommodate a maximum legal articulated vehicle (See Appendix **A.4, A.5** and **A.8**).

4.4 Further commentary

4.4.1 Based upon this preliminary assessment there is minimal difference between either Site 1 or Site 2, assuming that access would be from Butt Lane. There is benefit to Site 1 in having an access location closer to the A10, marginally reducing travel times and having a lower overall construction cost due to a reduced works requirement on Butt Lane. However, further consideration may also need to be given to co-ordination with wider highway and junction improvement proposals along the A10 corridor, currently being considered by the CPCA, to ensure continuity and validity of design.

Site 3 has greater access route constraints than sites 1 and 2. The option of accessing Site 3 from Horningsea Road is considered preferable from a cost perspective assuming that the 'U' turn provision via Junction 33 could be accommodated. However, considerations should remain for access via High Ditch Road as the associated infrastructure improvements could provide a suitable mitigated alternative.

5 Location of potential off-site impacts to the A10 corridor

This section considers the potential off-site access impacts associated with the relocation of the WWTP to Sites 1 or 2. The section highlights where authorities might seek mitigation in the event of the site being granted development consent at either of these sites. There is also consideration of the committed development and infrastructure in the local area that would need to be considered as part of a Transport Assessment for either of the proposed sites.

The same exercise is undertaken for Site 3 in Section 6.

5.1 Current conditions

5.1.1 The A10, north of Cambridge, is a key transport link running north to south between Cambridge and King's Lynn via Ely. It forms part of the Primary Route Network, with CCC being the highway authority for the section through Cambridgeshire. To the south, the A10 connects to junction 33 of the A14, known as the Milton Interchange. This grade separated junction serves as a main access junction into Cambridge and provides vital access to jobs in the science park and the northern fringe area of Cambridge. To the north the A10 passes through numerous towns and villages and serves as a key radial route into Cambridge.

5.1.2 The majority of junctions along the A10 are simple priority junctions, with only four roundabouts along the entire stretch between Ely and Cambridge. Within the study area, between Cambridge Science Park and Waterbeach, the speed limit along the A10 is 50mph. North of Waterbeach the posted speed limit increases to 60mph, outside of residential areas.

5.1.3 Within the study area, the A10 west of Milton carries in the order of 22,000 vehicles daily (2-way flow). The two-way flow for each peak period along sections of the A10 are shown in Table 4.1. Flow was sourced from automatic traffic counts recorded in December 2014. Given these flows are 5 years old they are anticipated to now be higher than shown.

Table 5.1: AM and PM 2-Way Peak Hour Base Flow

Section of A10 (2014 traffic counts)	AM (vehicles)	PM (vehicles)
A10 north of Cambridge Research Park (CRP) roundabout	1,229	1,348
A10 north of Denny End Road	1,294	1,409
A10 between Denny End Road and Car Dyke Road	1,157	1,339
A10 south of Car Dyke Road	1,283	1,634
A10 west of Milton	1,562	1,911

Source: Peter Brett Associates: Waterbeach Barracks and Airfield Outline Planning Application, based on 2014 data.[6]

5.2 Future growth and infrastructure proposals

5.2.1 The Local Plan policies for both City and South Cambridgeshire Districts identify extensive growth in the A10 corridor which include the new town north of Waterbeach, the Cambridge Science Park, North East Cambridge and at sites around Ely (these being considered by East Cambridgeshire District Council as Local Planning Authority for that district). Between them,

[6] Waterbeach Barracks & Airfield Outline Planning Application: Environmental Statement - Chapter_9_Transport

these developments could bring up to around 17,000 new homes and 14,000 new jobs into the wider corridor.

5.2.2 The Cambridge Science Park has numerous small to medium scale applications which have been permitted, but mitigation has been limited to the local highway network south of the Milton Interchange, and therefore does not require significant further consideration at this stage.

5.2.3 An area action plan is currently being devised for North East Cambridge (NEC) by South Cambridgeshire and Cambridge City Councils. NEC is an allocated site in the South Cambridgeshire District Local Plan but is not committed in planning application terms at this stage beyond a limited number of specific sites. It has therefore not been given further consideration as part of this preliminary transport assessment, although it is acknowledged that this may need to be considered as part of a formal Transport Assessment for the WWTP in the future. This would need to be confirmed through pre-application scoping discussions with CCC and Highways England (HE) as the relevant Highway Authorities. The relocation of the WWTP is expected to remove traffic flow from Milton Road to the south of the A14 as trips reroute on approach to the Milton interchange to travel north on the A10.

5.2.4 The Waterbeach New Town (WNT) development is located north of the proposed sites, on the former Waterbeach Barracks site. The WNT has planning permission for the initial 'early phase development' (otherwise known as phase 1) which comprises 1,600 dwellings, a primary school, and 411 jobs. A transport mitigation package has been secured through planning conditions and S106 agreement to mitigate the impacts of the development. This first phase of development is considered to be committed and therefore the assessments of the proposed infrastructure local to the proposed sites including improvements to the Butt Lane/ A10/ Park and Ride junctions, Landbeach Road/ A10 junction and Milton Interchange have been considered in later sections.

5.2.5 There are also infrastructure improvements to Mere Way as part of WNT Phase 1 to surface it and provide suitable crossing facilities on Butt Lane. This would not typically be considered in terms of junction performance but should be a consideration in siting and planning the proposed development. It is also worth noting that, although not yet committed in planning terms, the route along Mere Way is also being considered as part of the GCP's Science Park to Waterbeach scheme and referred to specifically in the WNT S106 agreement to ensure the developer works proactively with GCP to ensure the designs of both schemes are aligned.

5.2.6 The future WNT phases will be subject to a monitoring and management approach. This is where the transport performance of built-out phases of development are monitored, and additional transport assessments undertaken in advance of each additional phase being permitted. Each assessment would be required to assess the transport impacts of each phase both individually and cumulatively (with already permitted phases). The associated mitigation measures would need to be identified where the transport impacts are considered to be severe in order to satisfy National Policy Planning Framework requirements. This approach has enabled the first phase of development to be permitted in advance of the A10 improvements being fully developed by the CPCAs Ely to Cambridge Transport Study (ECTS), through securing alternative interim measures that could be implemented in the event that the A10 improvements are not be realised within timescales needed to facilitate the WNT Phase 1 development.

5.2.7 At present the A10 improvements are identified in the Combined Authority's Local Transport Plan and the Combined Authority's 2019/20 Business Plan. The CPCA has made a bid to dual the A10 between Cambridge and Ely through the Large Local Majors (LLM) investment programme run by the Department for Transport. The bid refers to a start date for the A10 dualling of 2024. The scheme is not committed in planning terms and has therefore not been

considered further at this stage. However, this should continue to be considered as a having a potentially significant impact on the WWTP as proposals for the site are developed.

5.2.8 The A14 improvements currently being built by HE include capacity improvements to the Milton Interchange and an additional lane on the A14 Cambridge Northern Bypass in each direction between Histon and Milton Interchange. These improvements are expected to be completed by the end of 2020, given their advanced status, these were considered as part of the WNT Phase 1 assessment.

5.2.9 The anticipated and committed developments and infrastructure in the local area, with timescales are set out in Appendix B. It should be noted that some forthcoming development and infrastructure improvements are in their early stages and have not been considered further as part of this assessment due to their current planning status and the assumption that only committed development and infrastructure would need to be considered at this time. Going forward the status of these developments and infrastructure proposals may change, and therefore it is important to review and monitor these and other schemes as the development progresses. It would also be advisable to agree with CCC and HE which schemes need to be formally considered as part of the Transport Assessment for the site.

Junction performance

5.2.10 The Transport Assessment accompanying the WNT planning application details the performance of key junctions in the area in 2021 for the Phase 1, the full development and without the development scenario in place.

5.2.11 Within the amended WNT Paramics Modelling report[7], microsimulation modelling was conducted to assess the impacts of the proposed development with the proposed mitigation measures in place, compared to the future year scenario without the development included.

5.2.12 For the purposes of the WWTP relocation we are most interested in how the local junctions operate with the committed development and infrastructure improvements in place, e.g. including WNT Phase 1. With this considered, the so-called HE&A10_Dev (Core Test) scenario best represents the future do-minimum conditions of the surrounding A10 network before the relocation of the WWTP.

5.2.13 The HE&A10_Dev (Core Test) scenario includes Phase 1 of WNT with the following mitigation measures also included:

- A10/Humphries Way/ Landbeach Road junctions
- A10 capacity enhancement between Butt Lane and Milton Park and Ride
- Widening of the A10 south of the Park and Ride site
- Changes to Denny End Road signals
- Vehicular access from Research Park roundabout
- HE A14 improvement Scheme at Milton Interchange
- Signalisation of Landbeach / A10 junction
- Toucan crossing over A10 north of Waterbeach Road
- Toucan crossing over A10 south of CRP roundabout
- Toucan crossing over A10 at Denny End Road

[7] Transport_Assessment_Paramics_Modelling_Addendum_August_2018

5.2.14 Additional tests were also undertaken to identify the junction performance if the sustainability aspirations (including trip banking, mode shift and re-assignment as reported in the May 2018 modelling and TA) of the WNT site are achieved, and with 'split link' tests. These included adjustments made to lane allocation and traffic signals on Milton Road south of Milton Interchange to prevent traffic blocking back to the A14 westbound off slip.

5.2.15 The section below provides the results of the LinSig modelling extracted from the WNT Transport Assessment Addendum Appendix G (Part 2[8],3[9] and 4[10]) and identifies the potential implications for the WWTP.

5.2.16 LinSig modelling indicates the performance of each arm through demonstrating the mean max queues, degree of saturation and the practical reserve capacity of the junction. The Degree of Saturation (DoS) values indicates the following:

- Between 0 and less than 90 the arm is within practical capacity
- Between 90 and less than 100 the arm is within theoretical capacity
- 100 and over the arm is over theoretical capacity

5.2.17 Practical Reserve Capacity (PRC) values indicate:

- A positive PRC indicates that the junction has spare capacity as demonstrated for the AM peak and therefore may be able to accept more traffic.
- A negative PRC indicates that the junction is over capacity and is suffering from traffic congestion and would experience queuing and delay as a result.

Butt Lane/ Park and Ride/ A10 junction

5.2.18 The proposed improvements to the Butt Lane/ Park and Ride/ and A10 junctions comprise the removal of a left turn stop line into Butt Lane for A10 northbound traffic, the widening of the southbound flare on the A10 on approach to the Milton Interchange, and reduction/ removal of hard standing islands at the Park and Ride junction to ease movements and maximise capacity.

Table 5.2: Core Test with mitigation: Park and Ride/ A10 junction

	AM			PM		
Arm	Demand (pcu)	Mean Max Queue	Degree of saturation	Demand	Mean Max Queue	Degree of saturation
Park and Ride	75	2.8	53.2%	127	7.9	91.8%
A10 northbound	1024	10.7	58.1%	1702	60.9	96.4%
A10 southbound	1446	33.9	88.9%	932	10.5	91.6%

Source: Transport_Assessment_Addendum_Appendix_G_(2_of_5)_October_2018

5.2.19 Table 5.2 above displays LinSig outputs for the Park and Ride/ A10 Junction under the Core Test with mitigation scenario during 2021. The LinSig outputs demonstrate that the Park and Ride/ A10 Junction performs within practical capacity during the AM peak with a maximum Degree of Saturation (DoS) of 88.9% on the worst performing arm. In the PM Peak, the junction

[8] Transport_Assessment_Addendum_Appendix_G_(2_of_5)_October_2018
[9] Transport_Assessment_Addendum_Appendix_G_(3_of_5)_October_2018
[10] Transport_Assessment_Addendum_Appendix_G_(4_of_5)_October_2018

is operating over practical capacity but within theoretical capacity as all three arms have a DoS over 90%.

5.2.20 It is worth noting that the sustainability sensitivity test, with the mode share and trip banking aspirations for the WNT Phase 1 being achieved, showed that the junction operated within practical capacity in the PM peak with a lower maximum DoS of 83.3%.

5.2.21 Further tests were also conducted at the junction to represent 25% more traffic to and from WNT. In the AM peak it caused the A10 to go over practical capacity with 90.8% DoS. In the PM peak, the A10 northbound had a DoS of 99.9% whilst the Park and Ride exit had a DoS of 91.6%.

Table 5.3: Core Test with mitigation: Butt Lane/ A10 junction

	AM			PM		
Arm	Demand (pcu)	Mean Max Queue	Degree of saturation	Demand	Mean Max Queue	Degree of saturation
Butt Lane	60	2.1	35.4%	144	7.4	84.5%
A10 northbound	1004	2.3	56.8%	1694	13	95.7%
A10 southbound	1544	5.1	80.2%	1044	4.5	54.4%

Source: Transport_Assessment_Addendum_Appendix_G_(2_of_5)_October_2018

5.2.22 Table 5.3 above displays LinSig outputs for the Butt Lane/ A10 Junction under the Core Test with mitigation scenario during 2021. The LinSig outputs demonstrate that the Butt Lane/ A10 Junction performs within practical capacity during the AM peak with a maximum Degree of Saturation (DoS) of 80.2%. In the PM Peak, the junction is operating over practical capacity as the A10 northbound displays a DoS of 95.7%.

5.2.23 It is worth noting that with the sustainability sensitivity test, the junction remains within capacity with maximum DoS of 82.6% during the PM peak.

5.2.24 Further tests were also conducted at the junction to represent 25% more traffic to and from WNT at the request of CCC. In the AM peak the A10 southbound arm goes over capacity with DoS of 90.8%. In the PM Peak, Butt lane is pushed over practical capacity with a DoS of 92.8% and the A10 northbound is worsened further with a DoS of 98.3%.

5.2.25 The practical reserve capacity of the combined Butt Lane/Park and Ride/ A10 junction is 1.4 and -7.1 during the AM and PM peaks respectively. Meaning there is some available capacity in the AM Peak scenario, but the PM peak scenario the junction has no available capacity with the Phase 1 mitigation measures in place.

Implications for the WWTP

5.2.26 The potential impacts at these junctions would be dependent on the traffic levels associated with the WWTP. It is assumed, for the purposes of this high-level assessment, that most traffic associated with the relocated WWTP would travel from the A14 to both proposed sites via the Park and Ride junction. On this basis the northbound A10 approach to the Park and Ride/ A10 junction has limited available capacity during the AM Peak for those travelling to either of the proposed sites via Butt Lane. During the PM peak vehicles are expected to exit from the Park and Ride arm on to the A10 and travel southbound. This movement was shown to be over practical capacity resulting in some delay and queuing with the Phase 1 WNT proposals and mitigation in place. Therefore, this junction is expected to require further consideration and

assessment as part of the WWTP application once more is known about the existing and proposed traffic generation for the relocated site. At this preliminary stage in the assessment process, it is not expected that any increases in inter-junction link capacity would be needed including on the A10.

5.2.27 In addition, assessment would also be needed of the Park and Ride/ Butt Lane access, given this would be used by all vehicles travelling to and from the A14 via the A10.

5.2.28 Should proportions of vehicles, such as HGVs, travel differently to the above assumption e.g. from the proposed sites in the AM peak or to the site during the PM peak this would follow the tidal flow experienced by traffic on the A10 at present and in the future, then it is likely to result in additional delay and congestion unless mitigation measures are identified.

A10/ Humphries Way/ Landbeach Road

5.2.29 The A10/Humphries Way/ Landbeach Road junction proposals include signalisation of the junction, and provision of a 3m wide cycleway on either side of the carriageway traveling in each direction. This design resulted from safety concerns at the junction, by providing allocated gap for vehicles to travel into and out of Landbeach Road onto the A10.

Table 5.4: Core Test with mitigation: A10/ Humphries Way/ Landbeach Road junction

	AM			PM		
Arm	Demand (pcu)	Mean Max Queue	Degree of saturation	Demand	Mean Max Queue	Degree of saturation
Humphries Way	194	3.0	45.0%	149	3.0	59.6%
A10 eastbound	598	7.7	55.3%	1239	28.5	89.5%
Landbeach Road	232	7.2	77.8%	128	5.8	81.5%
A10 westbound	957	12.9	74.2%	714	7.9	51.4%

Source: Transport_Assessment_Addendum_Appendix_G_(3_of_5)_October_2018

5.2.30 Table 5.4 above displays LinSig outputs for the A10/ Humphries Way/ Landbeach Road Junction under the Core Test with mitigation scenario. The LinSig outputs demonstrate that the A10/ Humphries Way/ Landbeach Road Junction performs within capacity during both the AM and PM peak periods with a maximum Degree of Saturation (DoS) of 89.5%.

5.2.31 The practical reserve capacity of the Milton Interchange junction is 0.6 in the PM peak, which although positive, means it is within capacity it is close to being over capacity.

5.2.32 The additional sustainability test showed that the junction to operate within capacity for both the AM and PM peaks with a maximum DoS of 79.7% and 78.8% respectively.

5.2.33 Further tests were conducted at the junction to represent 25% more traffic to and from WNT. In the AM peak the junction remained under capacity with a maximum DoS of 77.4%. In the PM peak, the A10 eastbound was over practical capacity with a DoS of 91.6%.

Implications for the WWTP

5.2.34 The Landbeach Road junction improvements are shown to remain within capacity but with very little available reserve capacity during the PM peak. This junction would require further

consideration and assessment should access be taken from Landbeach Road for Site 1 and would need to consider the trip generation associated with the proposed sites.

Milton interchange

5.2.35 The proposals for the Milton Interchange are to provide additional capacity at the junction. It should be noted that the HE schemes for this junction are committed, although interim measures were also identified as part of the WNT Phase 1 development.

Table 5.5: Core Test with mitigation: Milton Interchange

	AM			PM		
Arm	Demand (pcu)	Mean Max Queue	Degree of saturation	Demand (pcu)	Mean Max Queue	Degree of saturation
A10 southbound	1157	19.3	87.3%	914	12.6	77.1%
Cambridge Road	1276	1.3	67.2%	1127	1.8	59.3%
A14 westbound	1485	183.6	126.8%	641	7.7	58.9%
Milton Road	563	7.6	71.1%	900	13.2	83.2%
A14 eastbound	564	9.0	67.4%	1124	16.4	86.6%

Source: Transport_Assessment_Addendum_Appendix_G_(4_of_5)_October_2018

5.2.36 Table 4.5 above displays LinSig outputs for the Milton Interchange Junction under the Core Test with mitigation scenario. The LinSig outputs demonstrate that the Milton Interchange performs within capacity during the PM peak with a maximum Degree of Saturation (DoS) of 86.6%. In the AM Peak, the junction is operating over capacity on the A14 westbound off slip, here the arm has a DoS of 126.8%. In addition, this arm has a mean max queue length of 184 PCU's, extending beyond the available length of slip road, meaning vehicles queue onto the A14 mainline flow.

5.2.37 The practical reserve capacity of the Milton Interchange junction is -41.1 in the AM peak and 4.0 in the PM peak. This indicates that, during the AM Peak, the Milton Interchange is operating over capacity and is very little capacity headroom in the PM peak

5.2.38 Further tests were conducted at the junction to represent 25% more traffic to and from WNT. In the AM peak these caused the A14 westbound to remain over capacity with an increased DoS of 127.9% as well as also causing the A10 arm to operate marginally over practical capacity with a DoS of 90.0%. In the PM peak, the A14 eastbound increased over practical capacity to a DoS of 92.7%.

Implications for the WWTP

5.2.39 It is assumed, for the purposes of this high-level assessment, that most traffic associated with the relocated WWTP would travel predominantly from the A14 to proposed sites via the A10 and Park and Ride junction. The assessment undertaken as part of the WNT Phase 1 has indicated that both eastbound and westbound approaches to the Milton Interchange would need to be considered for the assessment of the WWTP development. In particular, the westbound approach is expected to operate over capacity in the 2021 AM Peak with the WNT phase 1 and mitigation in place. During the PM peak vehicles are expected to exit on to the A10 and travel southbound towards the Milton Interchange junction. Although this junction is not operating near

capacity in the PM peak, the potential impacts of the WWTP on this junction would be dependent on the traffic levels associated with the relocated WWTP.

5.2.40 Should other vehicles such as HGVs travel in the opposite direction, such as away from the proposed sites in the AM peak and to the site during the PM peaks, they are likely to experience additional congestion and delay as they would follow the tidal flow experienced at the Milton Interchange and on the A14.

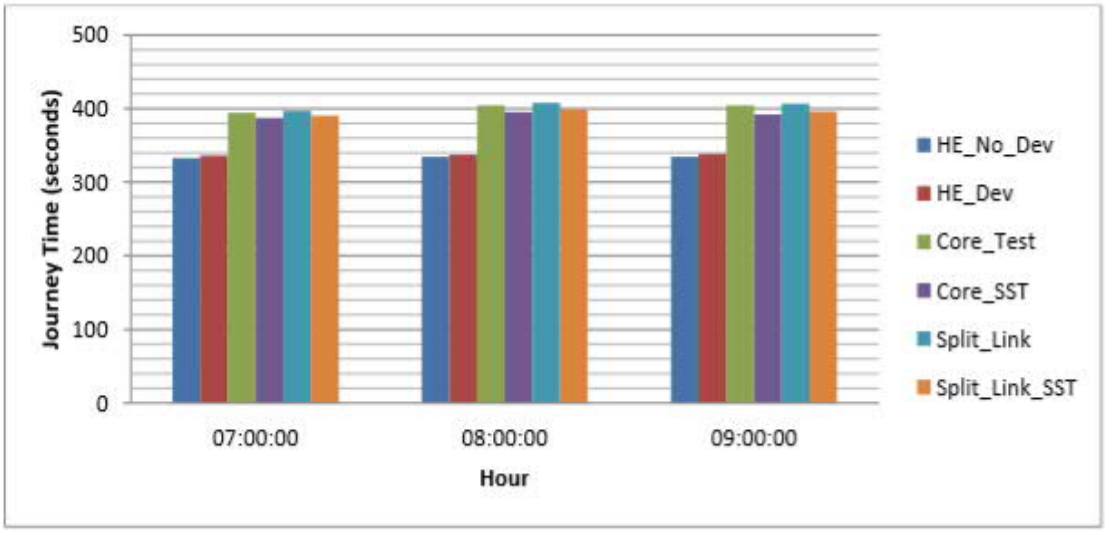
A10 Journey times

5.2.41 The WNT TA considered modelled journey times for both northbound and southbound journeys along the A10 between Milton Interchange and Cambridge Research Park (CRP). For the purposes of considering journey times under the HE&A10_Dev (Core Test) scenario, it is assumed that most traffic travelling to Site 1 and 2 would travel from the A14 (northbound on the A10) during the AM peak and towards the A14 (southbound on the A10) during the PM peak.

5.2.42 Journey times under the HE&A10_Dev (Core Test) scenario are highlighted and compared with the HE_No_Development scenario below, which is the future year without the WNT or mitigation in place.

Northbound journey times between Milton Interchange and CRP in the AM peak

Figure 5.1: AM Milton Interchange to CRP roundabout journey times

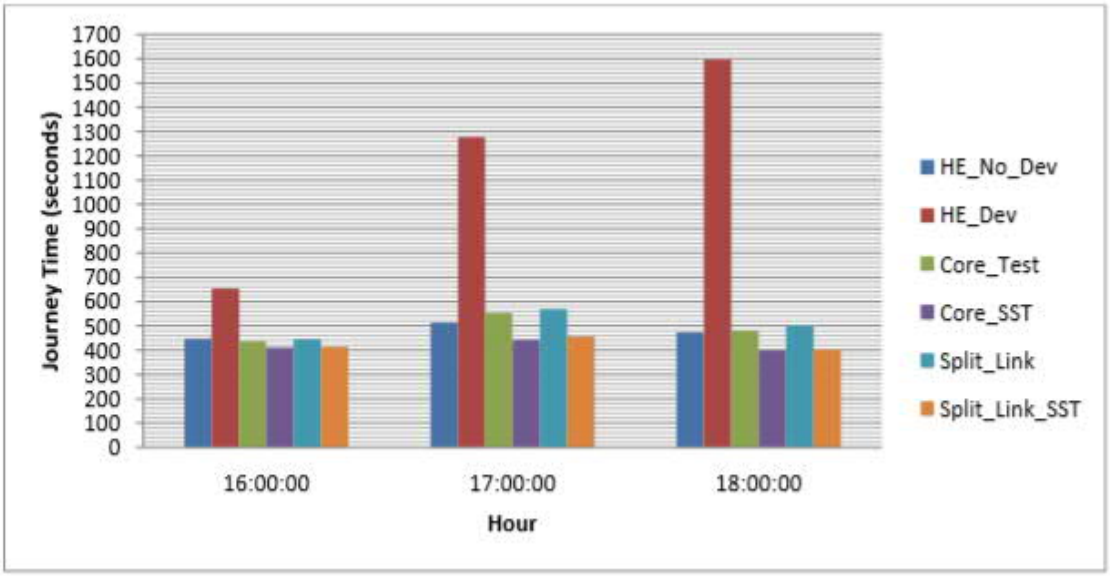


Source: Transport Assessment Paramics Modelling Addendum – August 2018

5.2.43 Figure 5.1 shows that in the AM peak, northbound journey time increases in the order of around 60 seconds from approximately 340 seconds to 400 seconds between the with development and without development scenarios.

Southbound journey times between CRP and Milton Interchange in the PM peak.

Figure 5.2: PM CRP roundabout to Milton Interchange journey times



Source: Transport Assessment Paramics Modelling Addendum – August 2018

5.2.44 Figure 5.2 shows that in the PM peak, southbound journey times do not increase at all, except marginally in the PM peak hour starting at 17:00 by approximately 50 seconds from 510 seconds to 560 seconds between the without development and with development scenarios.

5.3 Junction Impacts Summary

5.3.1 The Milton Interchange, and Butt Lane/ Park and Ride/ A10 junctions are shown to perform over capacity with the Waterbeach Phase 1 development in place. These junctions would need further analysis with consideration of the actual trip generation for the relocated site to understand the potential implications and whether short term mitigation measures could be implemented in advance of the A10 improvements being fully developed and implemented.

5.3.2 For further commentary on transport proposals being promoted for the area including those associated with development (e.g. Waterbeach New Town) and those by the public bodies (e.g. A14 improvements by HE) please see Appendix B – Committed Developments and Transport proposals.

6 Location of potential off-site impacts to the A14 corridor

This section considers the potential off-site access impacts associated with the relocation of the WWTP to Site 3. This highlights where authorities might seek mitigation in the event of the site being granted development consent. There is also consideration of the committed development and infrastructure in the local area that would need to be considered as part of a Transport Assessment for the proposed site.

6.1 Current conditions

6.1.1 The A14, north of Cambridge, is a key transport link running east to west between Rugby and Ipswich via Huntingdon, Cambridge and Bury St Edmunds. It forms part of the Primary Route Network, with Cambridgeshire County Council being the highway authority for the section through Cambridgeshire. To the west, the A14 connects to Junction 19 of the M1, before merging to form the M6 towards Birmingham. To the east, the A14 connects Cambridgeshire with Suffolk via Bury St Edmunds and Ipswich before terminating at Felixstowe, one of the UK's major ports. Centrally the A14 is intersected by the A1(M) and the M11, providing a good onwards connection to both London and the North. To the north of Cambridge, the A14 is connected to the A10 at Junction 33, known as the Milton Interchange. This grade separated junction serves as a main access junction into Cambridge and provides vital access to jobs at the Cambridge Science Park and the northern fringe area of Cambridge.

6.1.2 Within the study area of the A14, between Junction 33, the Milton Interchange and Junction 35, the Quy Interchange, the speed limit along the A14 is 70mph. Along this section, the A14 east of Milton carries in the order of 50,000-75,000 vehicles daily (2-way flow). Average Annual Daily Flow (AADF) for each section of interest along the A14 are shown in Table 5.1 below.

Table 6.1: AADFs (2-way) along the A14 corridor

Year	A14 AADF (2-way) flow between Junction 33 and Junction 34	A14 AADF (2-way) flow between Junction 34 and Junction 35
2016	71,229	55,394
2017	68,587	56,068
2018	68,994	51,965

Source: Department for Transport Traffic Flows – AADF[11]

6.2 Future Growth and Infrastructure proposals

6.2.1 As outlined in Section 5.2, Local Plan policies for both City and South Cambridgeshire Districts identify extensive growth along the A10/A14 corridor which include the new town north of Waterbeach, the Cambridge Science Park and North East Cambridge.

6.2.2 Further to this, there are infrastructure proposals and future growth propositions found further east, within the wider A14 corridor, which include the development of land both North of Cherry

[11] https://data.gov.uk/dataset/208c0e7b-353f-4e2d-8b7a-1a7118467acc/gb-road-traffic-counts

Hinton (S/1231/18/OL)[12] and North of Newmarket Road (S/2682/13/OL), which form part of the Cambridge East Area Action Plan.

6.2.3 The North of Cherry Hinton development comprises 1,200 residential dwellings, including retirement living facilities, a local centre, primary and secondary schools. Although the traffic associated with this development would need to be considered as committed as part of any assessment for the WWTP, the TA doesn't cover the junctions of interest for the purposes of this preliminary transport assessment.

6.2.4 The "Cambridge Wing development", north of Newmarket Road is proposed to be located on the northeast edge of Cambridge, approximately two miles northeast of Cambridge City Centre. It aims to provide affordable housing for Cambridge and cater for the increasing growth at key employment centres, such as the Cambridge Science Park. Outline planning consent was granted in 2016 for the development which includes the following:

- Up to 1,300 new homes;
- Primary School;
- Community hall;
- Flexible mixed-use units;
- Public Open spaces;
- Mixed use recreational facilities including club houses and a pavilion.

Junction performance

6.2.5 The Transport Assessment (TA) accompanying the Cambridge Wing development planning application[13] (S/2682/13/OL) details the performance of the surrounding road network for the 2013 base year. Whilst now somewhat dated, and therefore not suitable for formal assessment, the data can still usefully be used to provide a high-level indication of potential network issues that would need more formal consideration in due course.

6.2.6 Base year flows were determined through local surveys and were then factored up to 2026 'Do minimum' (DM) and 'Do something' (DS, including CWWTPR) scenarios using proportional growth rates obtained from 2011 and 2026 Cambridge Sub-Regional Model (CSRM) modelling results.

6.2.7 With and without development modelling results were further investigated and 12 key junctions were assessed through junction modelling using the LinSig, PICADY and ARCADY tools as appropriate. The junctions pertinent to the location of potential off-site impacts associated with Site 3 include:

- Newmarket Road/High Ditch Road Priority T-Junction
- A14 Junction 35 Roundabout (Quy Interchange)
- Horningsea Road/A14 Westbound on-slip signalised T-Junction
- Horningsea Road/A14 Eastbound off-slip signalised T-Junction

[12] North of Cherry Hinton Development: S/1231/18/OL - 1200 residential dwellings (including retirement living facility (within Use Class C2/C3)) a local centre comprising uses within Use Class A1/A2/A3/A4/A5/B1a/D1/D2 primary and secondary schools community facilities open spaces allotments landscaping and associated infrastructure.

[13] Wing Development Planning Application: S/2682/13/OL - up to 1300 homes primary school food store community facilities open spaces landscaping and associated infrastructure and other development. | Land North Of Newmarket Road Cambridge. Received 18/12/2013.

6.2.8 Table 6.2, Table 6.3 & Table 6.4 below provide Paramics model flows and junction modelling results extracted from the Cambridge Wing Development Transport Assessment. The potential implications for the WWTP are identified and referenced to the proposed Site 3.

6.2.9 It is worth noting that the flow data obtained for the Wing Development Transport Assessment, on which both the base and forecast year are based, dates back to 2013. Cambridgeshire County Council Transport Assessment guidance[14] states that any data used for assessment must be no more than 3 years old. Therefore, although the junction performance may provide an insight into the potential network performance in the area, we would recommend erring on the side of caution in drawing any definitive conclusion from the data. Should Site 3 be taken forward, there would need to be up to date traffic surveys collected for the area.

Newmarket Road/High Ditch Road Priority T-Junction

6.2.10 PICADY results for the Newmarket Road/High Ditch Road Priority T-Junction were not published within the Wing Development TA. However, modelling results were commented on anecdotally in the Wing Development TA, stating that, the Newmarket Road/High Ditch Road junction is over capacity on the minor arm during the AM Peak.

6.2.11 It is important to note that the CSRM model was displaying evidence of 'rat running' along High Ditch Road during this period and therefore no improvements were proposed to alleviate the capacity at this arm to prevent further encouragement of this behaviour. Any proposed improvements to this junction as a result of improving access into Site 3 would need to take this possibility into account.

A14 Junction 35 Roundabout (Quy Interchange)

6.2.12 Table 5.2 below displays ARCADY outputs for the Quy Interchange Junction (Junction 35) under the Do-Something 2026 scenario with the Wing development in place. The ARCADY outputs demonstrate that the Quy Interchange Junction does not perform within capacity during either of the AM or PM peaks, with a maximum Ratio of Flow to Capacity (RFC) value greater than 1 in both cases. An RFC value of above 0.85 indicates that a junction is operating above its desirable capacity. Whilst, an RFC value above 1.0 indicates that the junction is operating outside of its theoretical capacity.

6.2.13 In the AM Peak, the junction is operating well above theoretical capacity on both the A1303 Newmarket Road North approach as well the A14 (East) approach, with RFC values of 1.72 and 1.19 and mean max queue lengths of 575 and 78 PCU's respectively. In the case of the A1303 Newmarket Road North, a queue length of 575 PCU's results in queues extending far beyond the available flare length of the roundabout. Vehicles would be forced to queue onto the A1303 mainline flow, for up to 3km in length. For the A14 (East), a queue length of 78 PCU's results in queues extending to almost the entire length of the available 250m long two lane off-slip.

Table 6.2: A14 Junction 35 Performance (Quy Interchange)

A14 Junction 35 (Quy Interchange)	AM			PM		
	Demand (PCU/hr)	Max Queue (PCU's)	Max RFC	Demand (PCU/hr)	Max Queue (PCU's)	Max RFC
A1303 Newmarket Road (North)	1684	575	1.72	1247	4	0.79

[14] Cambridgeshire County Council Transport Assessment Guidance: https://www.cambridgeshire.gov.uk/asset-library/imported-assets/Transport%20Assessment%20Guidelines%20Sept%202019%20Publication%20Version.pdf

A14 Junction 35 (Quy Interchange)	AM			PM		
A14 (East)	709	78	1.19	566	0	0.07
A1303 Newmarket Road (South)	987	1	0.48	1620	12	0.93
A14 (West)	1221	14	0.95	1387	422	1.75

Source: ES_Addendum_-_Appendix_5_-_TA_Updates_-_Part_1_WSP_Response_to_AECOM[15]

6.2.14 In the PM Peak, the junction is operating well above theoretical capacity for the A14 (West) approach, with an RFC value of 1.75. Here, a queue length of 422 PCU's results in severe safety issues. The entire length of the 300m long, two lane off-slip is fully saturated, causing heavy block backs onto the A14. Queues on the A14 (West) itself could stretch as far as 2km.

Horningsea Road/A14 Westbound on-slip signalised T-Junction

6.2.15 Table 5.3 below displays LinSig outputs for the Horningsea Road/A14 Westbound on-slip Junction (Junction 34) under the revised Do-Something 2026 scenario. The outputs demonstrate that this half of Junction 34 performs well within theoretical capacity during both the AM and PM peaks, with a maximum Degree of Saturation (DoS) below 1.0 in all cases[16]. Degree of Saturation (DoS) is defined above in Section 5.2.16.

Table 6.3: Horningsea Road/A14 Westbound on-slip junction performance

A14 Westbound on-slip	AM		PM	
	Max DoS	Queue (vehs)	Max DoS	Queue (vehs)
Horningsea Road South	0.58	7	0.89	34
Horningsea Road North	0.73	4	0.52	5

Source: ES_Addendum_-_Appendix_5_-_TA_Updates_-_Part_2_WSP_Response_to_CCC[17]

6.2.16 In the PM peak Horningsea Road South has a max DoS value of 0.89, meaning this arm is typically operating over practical capacity, but below theoretical capacity. A queue length of 34 vehicles here would result in queuing along Horningsea Road South. However, queues would not extend back far enough to cause any safety concern or further delay at other junctions.

6.2.17 In all other scenarios, the junction appears to be operating without congestion, below practical capacity, with all DoS values below 0.85.

Horningsea Road/A14 Eastbound off-slip signalised T-Junction

6.2.18 Table 5.4 below displays LinSig outputs for the Horningsea Road/A14 Eastbound off-slip Junction (Junction 34) under the revised Do-Something 2026 scenario. The outputs demonstrate that this half of Junction 34 performs well within practical capacity during both the AM and PM peaks, with a max DoS value below 0.85 in all cases. As a result, queues are minimal and there are no safety concerns concerning tail backs onto the A14.

[15] Wing Development Planning Application: S/2682/13/OL - ES_Addendum_-_Appendix_5_-_TA_Updates_-_Part_1_WSP_Response_to_AECOM

[16] The original planning application (S/2682/13/OL) actually reports junction performance in terms of RFC values. However, this has been corrected to DoS as the junction is clearly stated to have been modelled in LinSig.

[17] Wing Development Planning Application: S/2682/13/OL - ES_Addendum_-_Appendix_5_-_TA_Updates_-_Part_2_WSP_Response_to_CCC

Table 6.4: Horningsea Road/A14 Eastbound off-slip junction performance

A14 Westbound on-slip	AM		PM	
	Max DoS	Queue (vehs)	Max DoS	Queue (vehs)
Horningsea Road South	0.32	4	0.49	7
A14 Eastbound off-slip	0.62	4	0.60	7
Horningsea Road North	0.65	10	0.43	9

Source: ES_Addendum_-_Appendix_5_-_TA_Updates_-_Part_2_WSP_Response_to_CCC[18]

Implications for the WWTP

6.2.19 It is assumed, for the purposes of this high-level assessment, that most traffic associated with the relocated WWTP would travel predominantly from Junction 35 of the A14 to Site 3 via High Ditch Road.

6.2.20 The assessment undertaken as part of the Cambridge Wing development has indicated that by 2026, multiple approaches to Junction 35 (Quy Interchange) will be above current theoretical capacity in both the AM & PM peak. Although this assessment is dated, all approaches to the Quy Interchange would need to be considered for the assessment of the WWTP development.

6.2.21 In the AM peak, vehicles are expected to exit Junction 35 and travel southbound towards the Newmarket Road/High Ditch Road junction. Although there is currently no evidence to suggest that this junction is operating near capacity in the AM peak, the potential impacts of the WWTP on this junction would be dependent on the traffic levels associated with the relocated WWTP. Therefore, careful consideration should also be given to the Newmarket Road/High Ditch Road Junction.

6.2.22 More up to do date traffic flow information will need to be surveyed to replace the existing 2013 survey data and careful consideration will need to be made regarding the emerging Cambridge Eastern Access Project (below).

6.3 Cambridge Eastern Access Project

6.3.1 As highlighted in Section 4.2.7, one of the key factors, to be taken into consideration when assessing the reliability of Site 3, is the Cambridge Eastern Access Project.

6.3.2 As part of the Greater Cambridge Partnerships (GCP's) aim to create better and greener transport networks; access to Cambridge from the east has been identified as one of four high quality public transport routes into Cambridge that could also form an integral part of the Cambridgeshire Autonomous Metro (CAM).

6.3.3 The Cambridge Eastern Access Project is looking at access to and from the city from the east to enable greater utilisation of more sustainable modes of transport.

6.3.4 The projects aims and objectives are to:

- Identify a variety of options which will improve the reliability, safety, capacity and speed of sustainable transport connections for those accessing Cambridge from the east;

[18] Wing Development Planning Application: S/2682/13/OL - ES_Addendum_-_Appendix_5_-_TA_Updates_-_Part_2_WSP_Response_to_CCC

- Improve connections between existing settlements and identify the best measures that could be put in place to ensure connections are in place at the opening of new developments, thereby reducing the need for trips to be made by private car.

6.3.5 The scheme is not committed in planning terms and has therefore not been considered further at this stage. However, the potential removal of Junction 34 should continue to be considered moving forward, as there is potential to significantly impact upon the relocation of WWTP to Site 3.

6.3.6 As proposals for the site are developed further, it would be advisable to agree with GCP, CCC and HE if the removal of Junction 34 needs to be formally considered as part of the Transport Assessment for the site.

7 Assessment Summary

7.1.1 This preliminary transport assessment has included a review of the current and future highway network conditions in order to establish the potential implications for the relocation of the WWTP. The recommended location for site access to Site 1 and Site 2 is from Butt Lane, despite the analysis of the Butt Lane/ Park and Ride/ A10 junction for 2021 with all committed development and infrastructure in place, indicating that during the PM peak the junction is likely to operate at capacity without the WWTP included. As a result, further assessment would likely be needed to determine the peak hour trip generation for the site (including employee movements) and what implications this might have on this junction and others in the local area. In addition, there are other developments and infrastructure improvements likely to come forward in the corridor in the shorter and longer term. Although some schemes such as the A10 improvements may provide a betterment for the corridor, additional growth at the CNFE/NEC and the remaining phases of WNT, would attract additional demand to the corridor.

7.1.2 Based upon access route provision alone, this preliminary transport assessment has shown that, before mitigation, it would be harder to promote Site 3 over the other site locations currently proposed. However, if other factors influence the preference to Site 3 then access from either Horningsea Road or High Ditch Road may be suitable.

7.1.3 Despite existing weight restrictions in place along Horningsea Road, access to Site 3 via this route is considered more feasible due to the higher costs associated with the infrastructure changes needed to mitigate the impact of access to Site 3 from High Ditch Road. However, access via High Ditch Road should still be considered as an option, particularly with further mitigation measures in mind as it provides an additional routing option through a less sensitive area, with lower recorded flows.

7.1.4 In any event, the WWTP, along with the other developments coming forward in the corridor would be required to mitigate any impacts on the network that are considered to be severe. Next steps and recommendations for the transport aspects of the site are therefore detailed in the next section.

8 Recommendations

This preliminary transport assessment has provided an overview of the site access options, the committed development and infrastructure in the local area, and the off-site junctions which would be likely to require further assessment and consideration.

8.1 Potential survey requirements

8.1.1 The likely survey requirements based on further assessment being required for Sites 1, 2 and 3 are detailed below. We would recommend that the below survey specification be discussed and agreed with Cambridgeshire County Council and Highways England, as the relevant highway authorities, to ensure the scope and timing of the surveys are acceptable for use in a Transport Assessment for the site.

8.1.2 Cambridgeshire County Council Transport Assessment guidance (2019)[19] recommends that all traffic surveys undertaken for that purpose should be:

- Undertaken in neutral months during normal traffic flow and usage condition
- Avoiding non-school holiday periods
- In typical weather conditions
- Based on data that is no more than three years old.

8.1.3 The guidance also notes that Automatic Traffic Count (ATC) surveys should be undertaken within the vicinity of the proposed site access to provide speed data and justification for the peak periods used within the assessment. We would therefore recommend that surveys described in the following sections are undertaken going forward.

8.2 Surveys of the existing site

8.2.1 To fully understand the trip generation for the existing site, and the route that vehicles take to get to the site, the following surveys are likely to be needed:

- Multimodal surveys would be required for the existing WWTP site to identify the all-day/hour-by-hour trip generation by each mode across 1-2 working days
- To identify the distribution of staff trips on the network, Automatic Number Plate Recognition (ANPR) surveys would ideally be needed for 1-2 working days, to isolate vehicles travelling to and from the existing site, at the following locations:
  - Site access (in and out),
  - Milton Road (north and southbound),
  - A14 on and off slips,
  - A10 (north and southbound)

8.3 Surveys of the Local and Strategic Network

8.3.1 Review existing survey information available to determine whether it is suitable for use in the transport assessments for site. We initially suggest that the following junctions be considered for assessment:

[19] Cambridgeshire County Council Transport Assessment Guidance: https://www.cambridgeshire.gov.uk/asset-library/imported-assets/Transport%20Assessment%20Guidelines%20Sept%202019%20Publication%20Version.pdf

c. For sites 1 and 2
   i. Landbeach Road/A10,
   ii. Butt Lane/ A10,
   iii. Butt Lane/ Park and Ride Link Road,
   iv. Park and Ride/ A10 junction,
   v. A14 Junction 33,
   vi. Mere Way/ Butt Lane,
d. For Site 3[20]
   i. A14 Junction 33
   ii. A14 Junction 34,
   iii. Horningsea Road/Low Fen Drove Way,
   iv. A14 Junction 35,
   v. A1303/High Ditch Road.

8.3.2 The survey data required for the above locations would include:

- Manual Classified Count surveys for each of the junctions on 2 weekdays covering the 3-hour peak periods.
- An ATC for a two-week period at the location of the site access and potentially on the A10.

8.3.3 The existing survey data concerning Site 1 and 2 available through the Waterbeach New Town Transport Assessment was mostly collected in 2014-2016. The existing survey data concerning Site 3 available through the Wing Development Transport Assessment was collected in 2013. As a result, new surveys would be needed as the County Council typically requires surveys to be no older than three years old[21]. More recent survey data may be available from Cambridgeshire County Council or the Greater Cambridge Partnership (at a cost) which we would explore with them.

8.4 Proposed analytical approach and initial scope of a future Transport Assessment

8.4.1 The scope of analysis needed for a Transport Assessment for the purpose of relocating the site would be dependent on the scale of traffic movements expected to be generated by the proposed development. Although it is recognised that some of this traffic will already be on the network, for Site 1 and Site 2, it is likely to reassign to the A10 and either Butt Lane or Landbeach Road, on which there are junctions which are at or approaching capacity in peak periods. For Site 3, traffic is likely to reassign across the A14 and re-route through either Junction 33, 34 or 35, dependent on the existing sites origin and destination matrix and the chosen access location.

8.4.2 It is anticipated that, for low levels of traffic flow reassigning during peak periods, the assessment may require junction capacity assessments using Junction 9 software for priority junctions and roundabouts, and LinSig for signalised junctions.

8.4.3 In the event that the relocated site is shown to result in significant reassignment of traffic flows and/ or additional trip generation, the Cambridgeshire County Council (CCC) and Highways England (HE) may require use of the County Council's Paramics model. This is a

[20] Depending on the access location chosen

[21] Cambridgeshire County Council Transport Assessment Guidance: https://www.cambridgeshire.gov.uk/asset-library/imported-assets/Transport%20Assessment%20Guidelines%20Sept%202019%20Publication%20Version.pdf

microsimulation model which, unlike LinSig or Junctions 9, is better able to assess congested networks particularly where blocking back occurs between junctions.

8.4.4 The Transport Assessment for lower levels of increase would be expected to have the following structure:

- **Policy Review** – this section would provide a summary of the relevant and emerging planning policy at a national and local level that relate to the proposed site and surrounding transport network;
- **Baseline Transport Conditions** – this section would provide an audit of the existing transport conditions in the area surrounding the development including highway conditions, public transport availability and personal injury collision analysis;
- **Development Proposals** - outlines the details of the proposed development;

  Development Trip Generation, Distribution and Assignment - this section would detail the trip generation for the proposed site through interpretation of the existing site surveys and re-distribute these trips on the network based on the results of the ANPR survey. Should the proposed site trips be expected to expand or result in additional trips on the network beyond those at the existing site, the trip generation would be appropriately factored up to reflect the trip increase;
- **Junction Capacity Modelling and Impact Assessment** – would present the results of the junction modelling assessment with and without the proposed development for the future year. This would assess the impact of the development on the highway network and determine whether this is 'severe' in accordance with the requirements of the National Planning Policy Framework and therefore additional mitigation measures are needed;
- **Mitigation Measures -** identifies suitable measures to help mitigate the transport impacts of the development should the impact assessment demonstrate that such measures are needed; and
- **Summary and Conclusions** - this would draw together the findings of the TA.

8.4.5 It is anticipated that, given the complexities of the construction works needed for the site, that a Construction Management Plan would also need to be submitted as an outline at the development consent application stage, with a final version secured through planning obligation or condition.

8.4.6 The numbers of staff employed at the WWTP are not available at this stage, although it is anticipated that a Travel Plan is likely to be needed to demonstrate how workers would be encouraged to travel to the site by sustainable modes.

8.5 Engagement with transport authorities

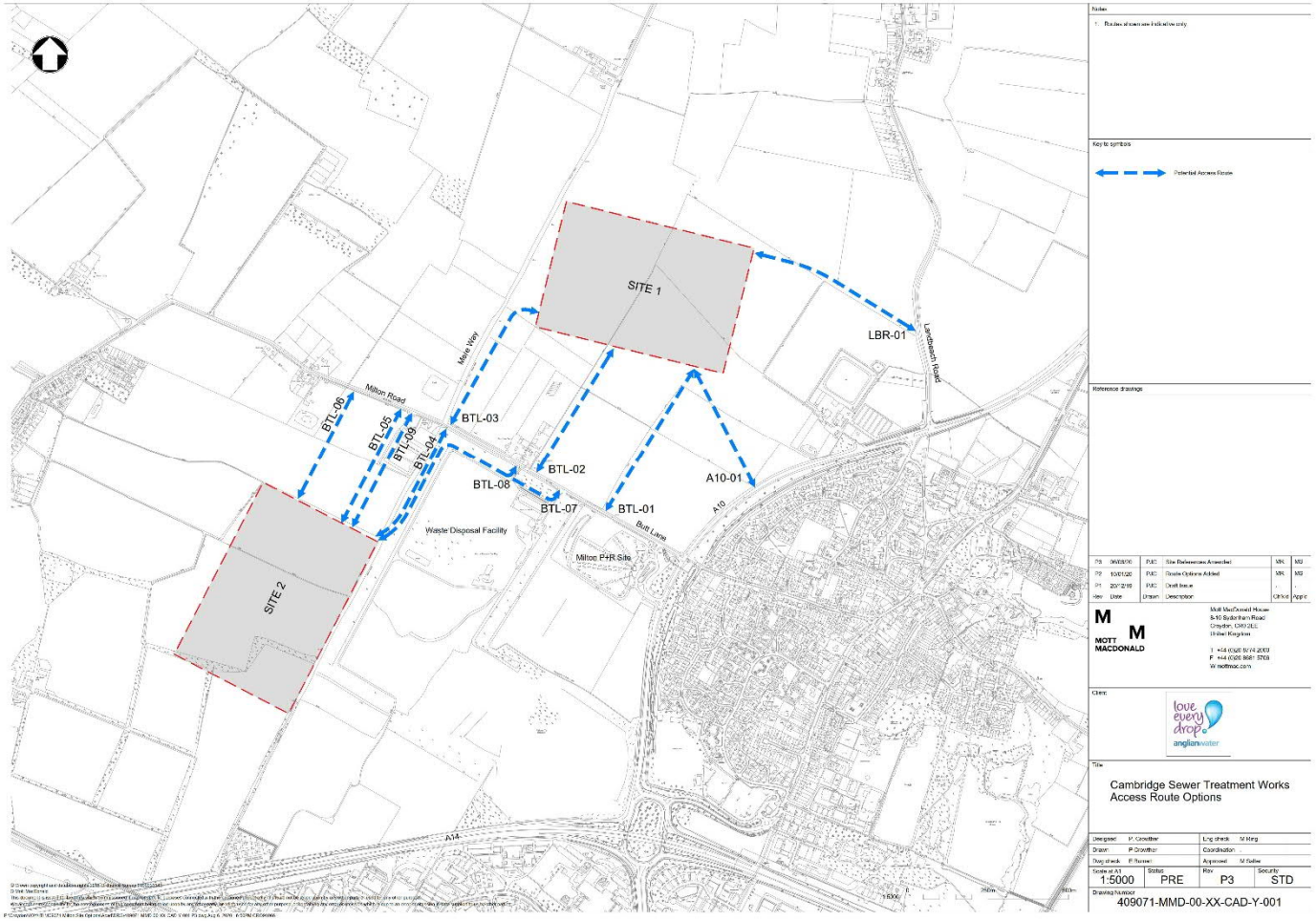
8.5.1 We would recommend early engagement with CCC and HE to make them aware of the preferred site/s and discuss the principle of development and site access. In order to inform these discussions, we would recommend further surveying of the existing site to identify the distribution of site traffic in the first instance, and then identify whether there are likely to be any changes in trip generation resulting from the relocation proposals.

8.5.2 Following this, we would look to undertake pre-application scoping discussions with CCC and HE as the development progresses. This would involve preparing a Transport Assessment Scoping Note and undertaking an initial face to face pre-application meeting to discuss and agree the assessment methodology in advance of developing the Transport Assessment. We would also look to consult with the authorities throughout the development of the TA.

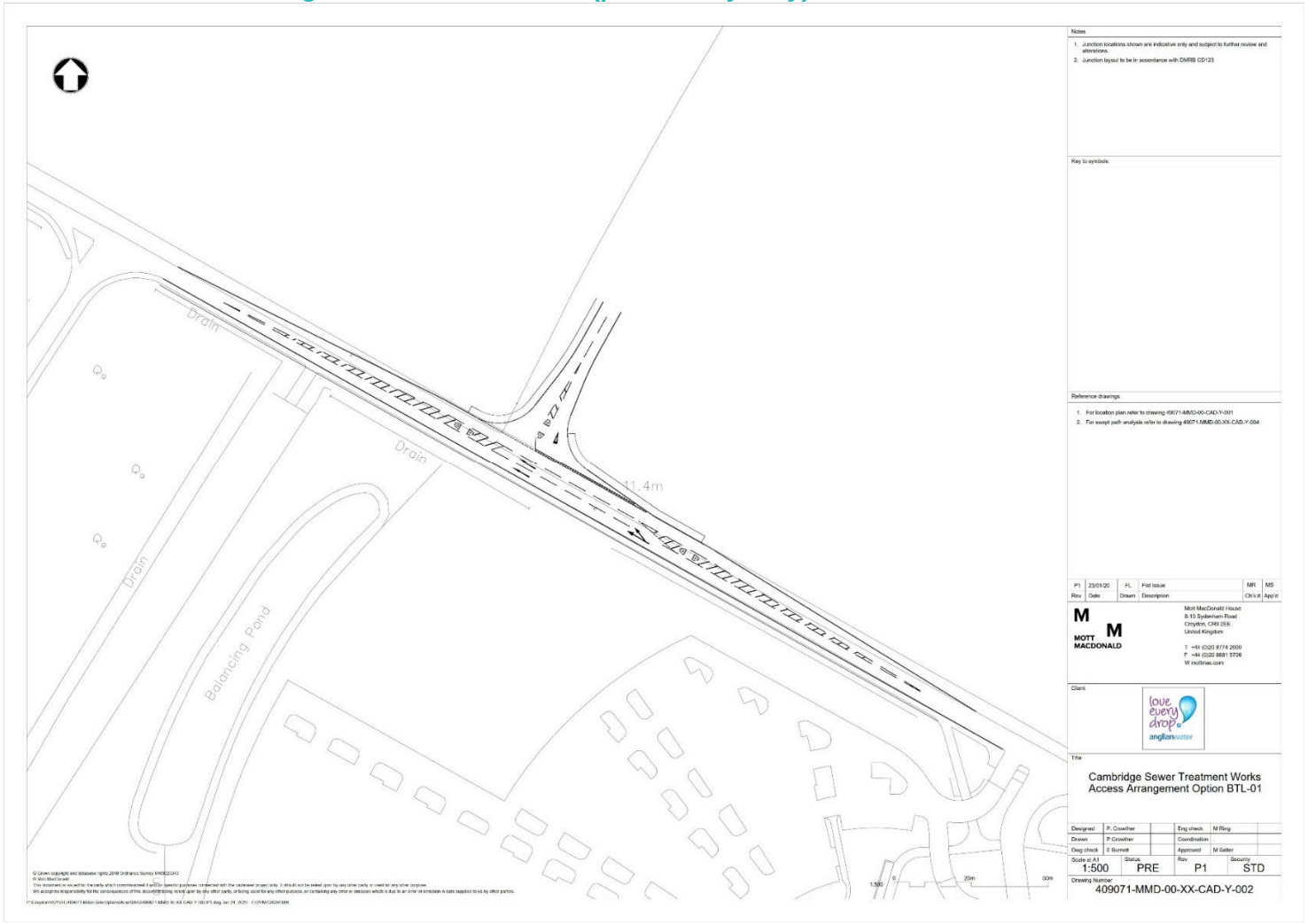
Appendices

A. Drawings

A.1 Proposed access routes into Site 1 and Site 2 for further viability analysis (indicative only).

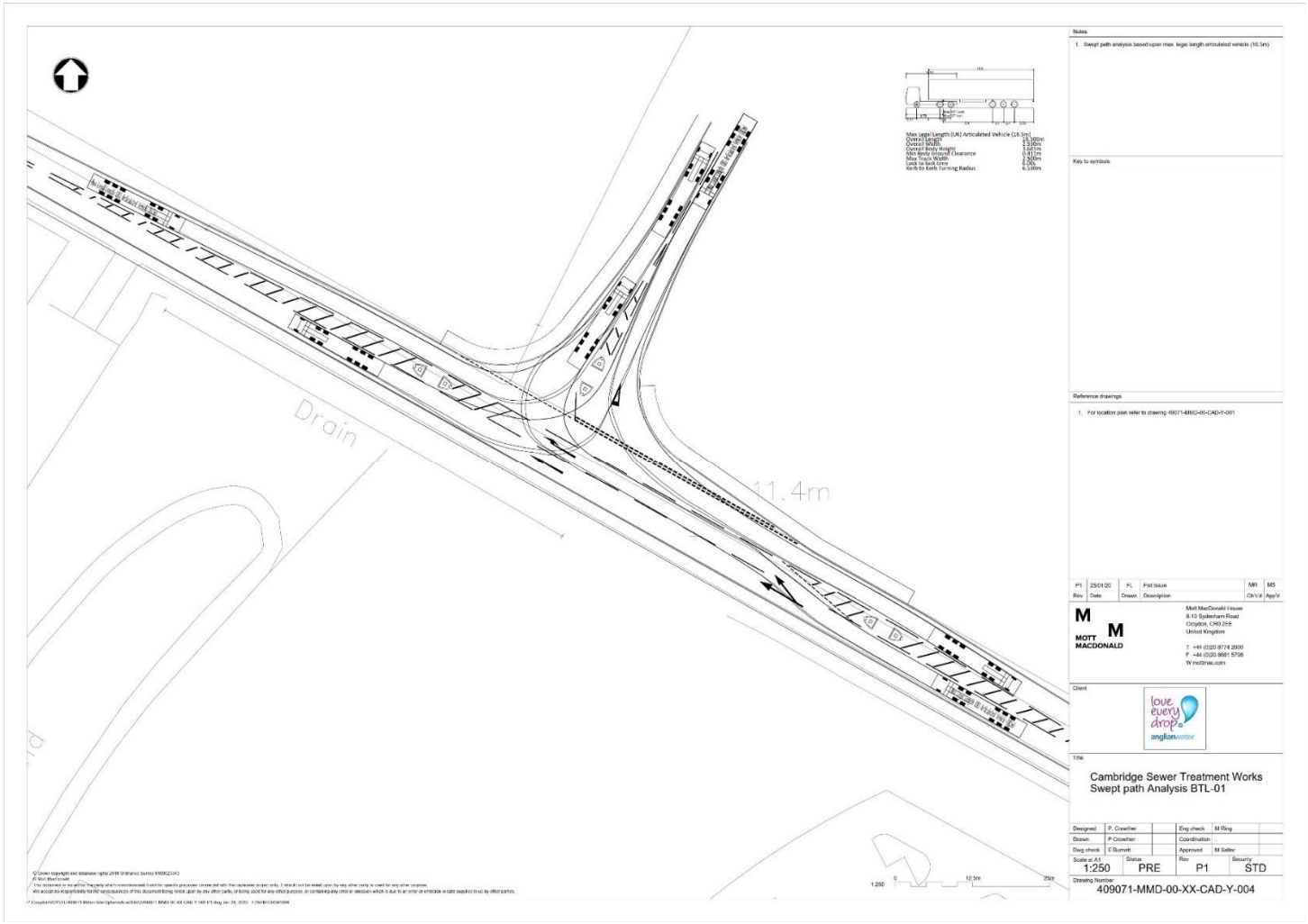


A.2 BTL-01 access drawing for access into Site 1 (preliminary only)

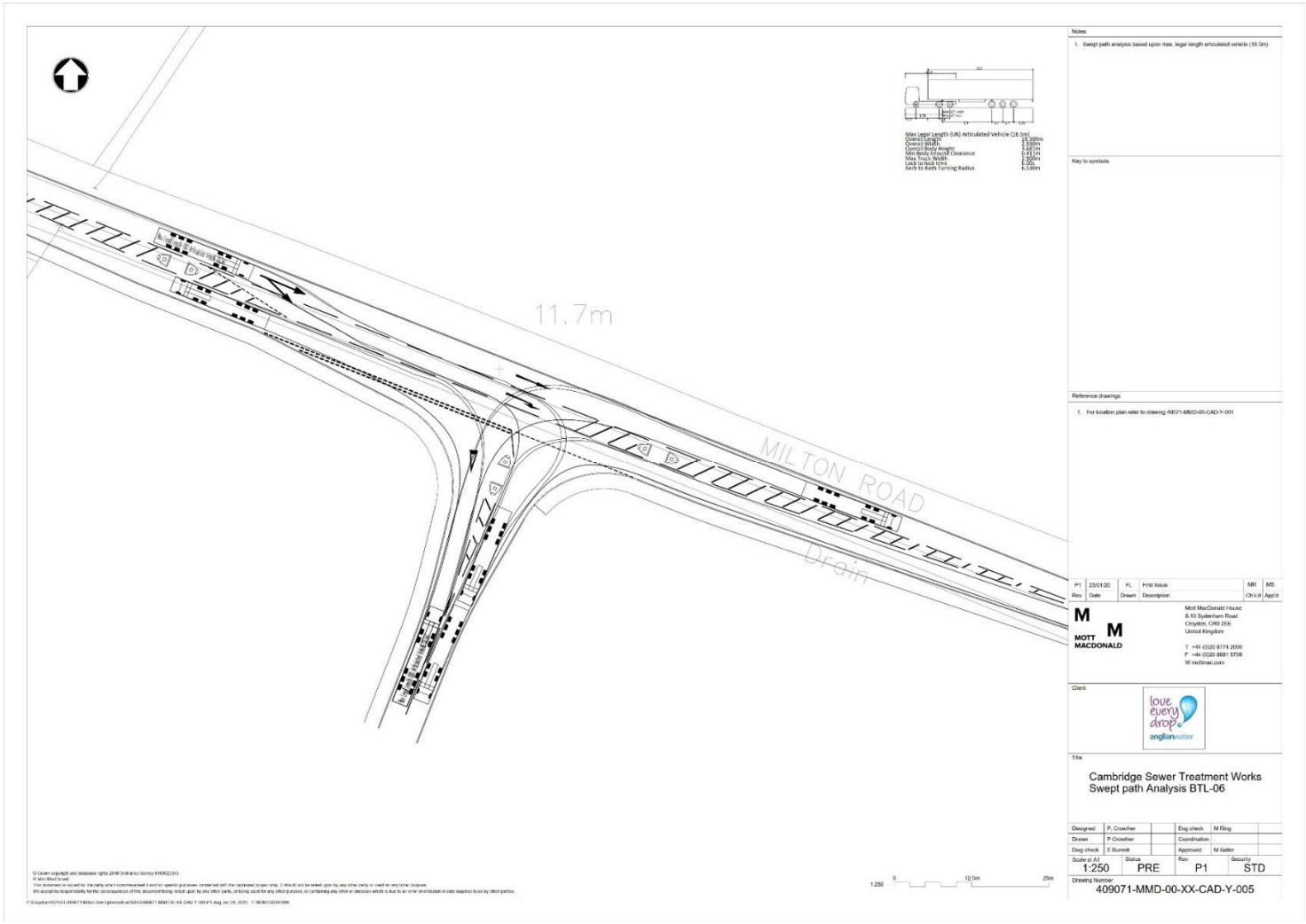


A.3 BTL-06 access drawing for access into Site 2 (preliminary only)

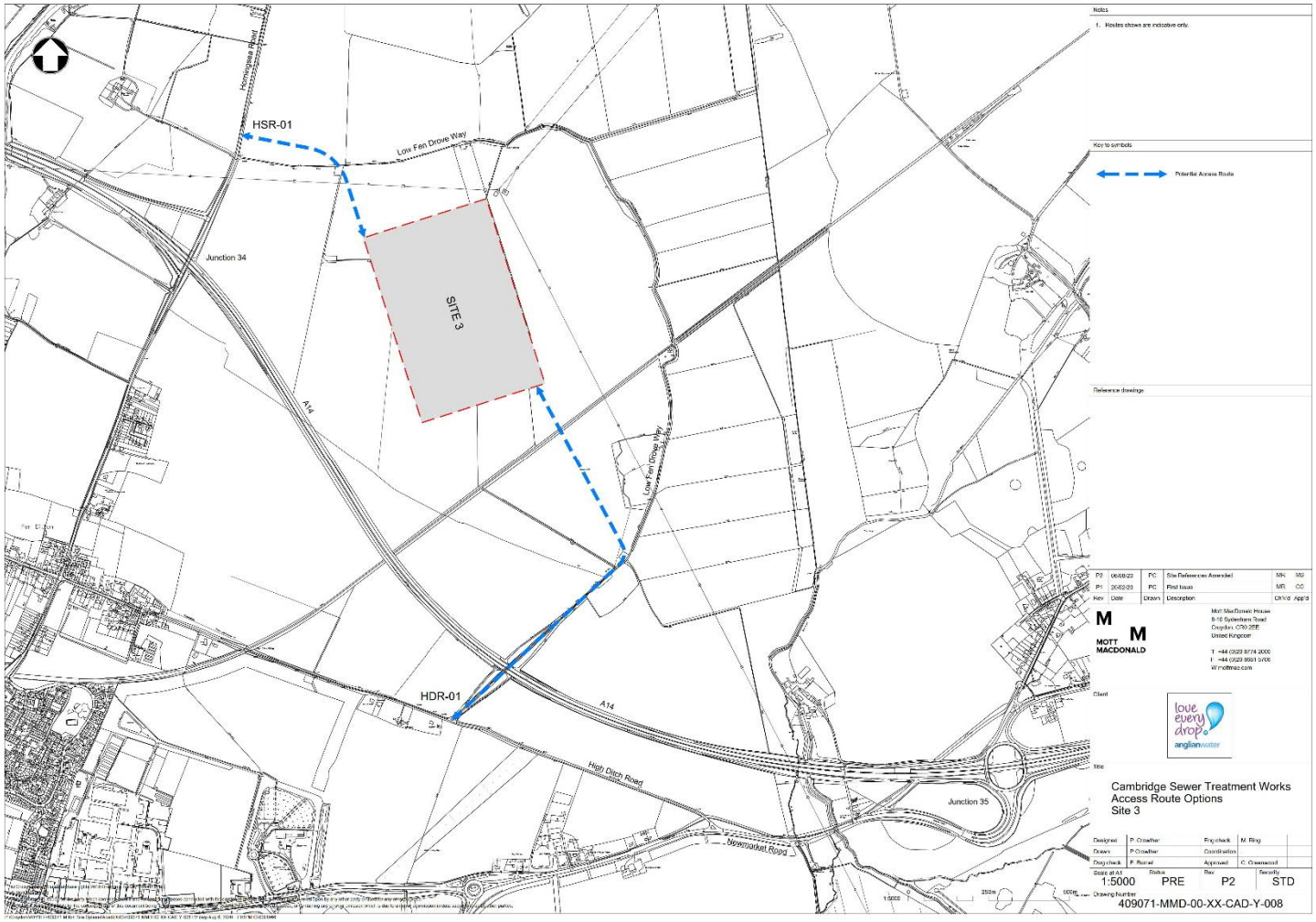
A.4 Swept Path Analysis: Access location BTL-01



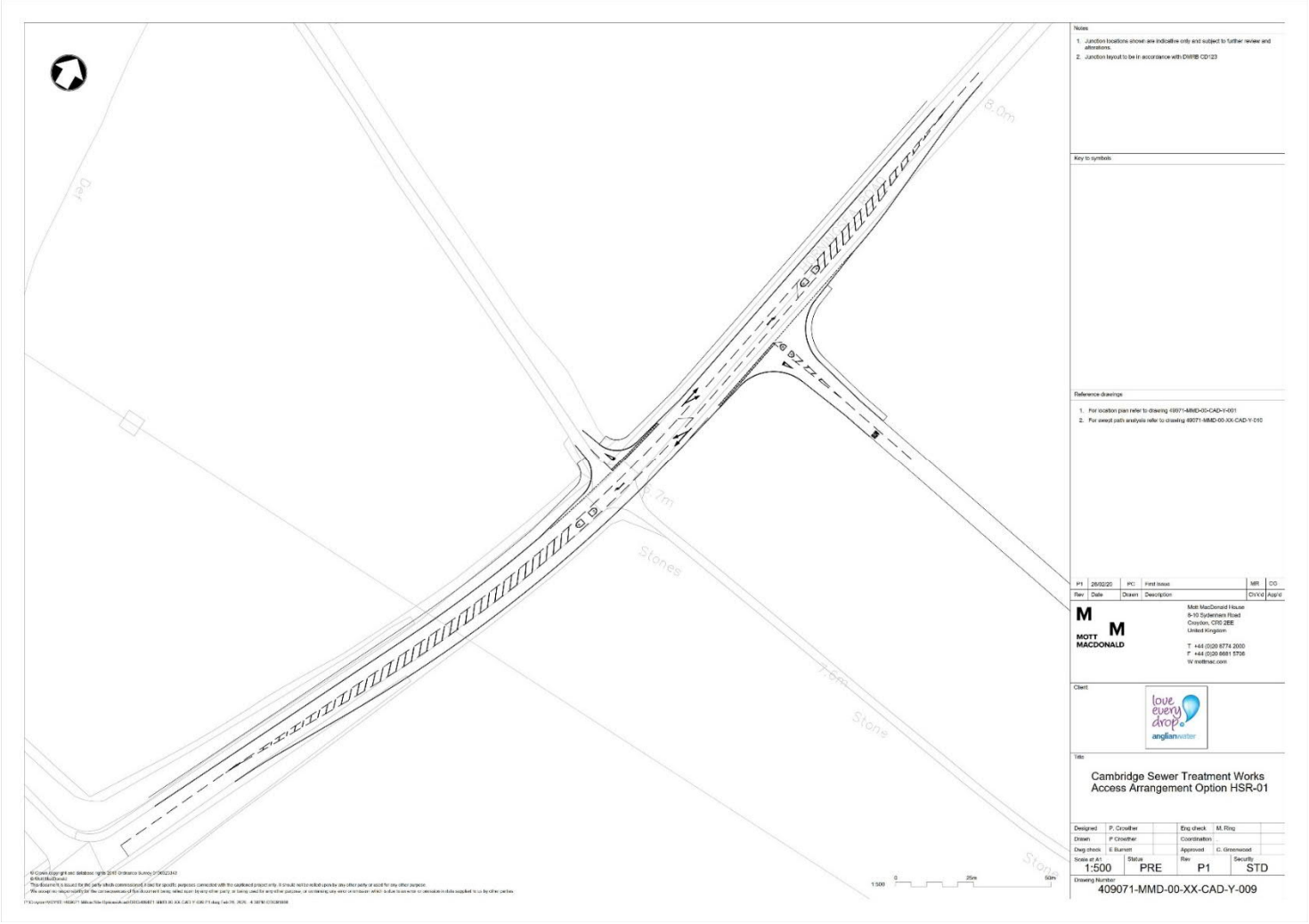
A.5 Swept Path Analysis: Access location BTL-06



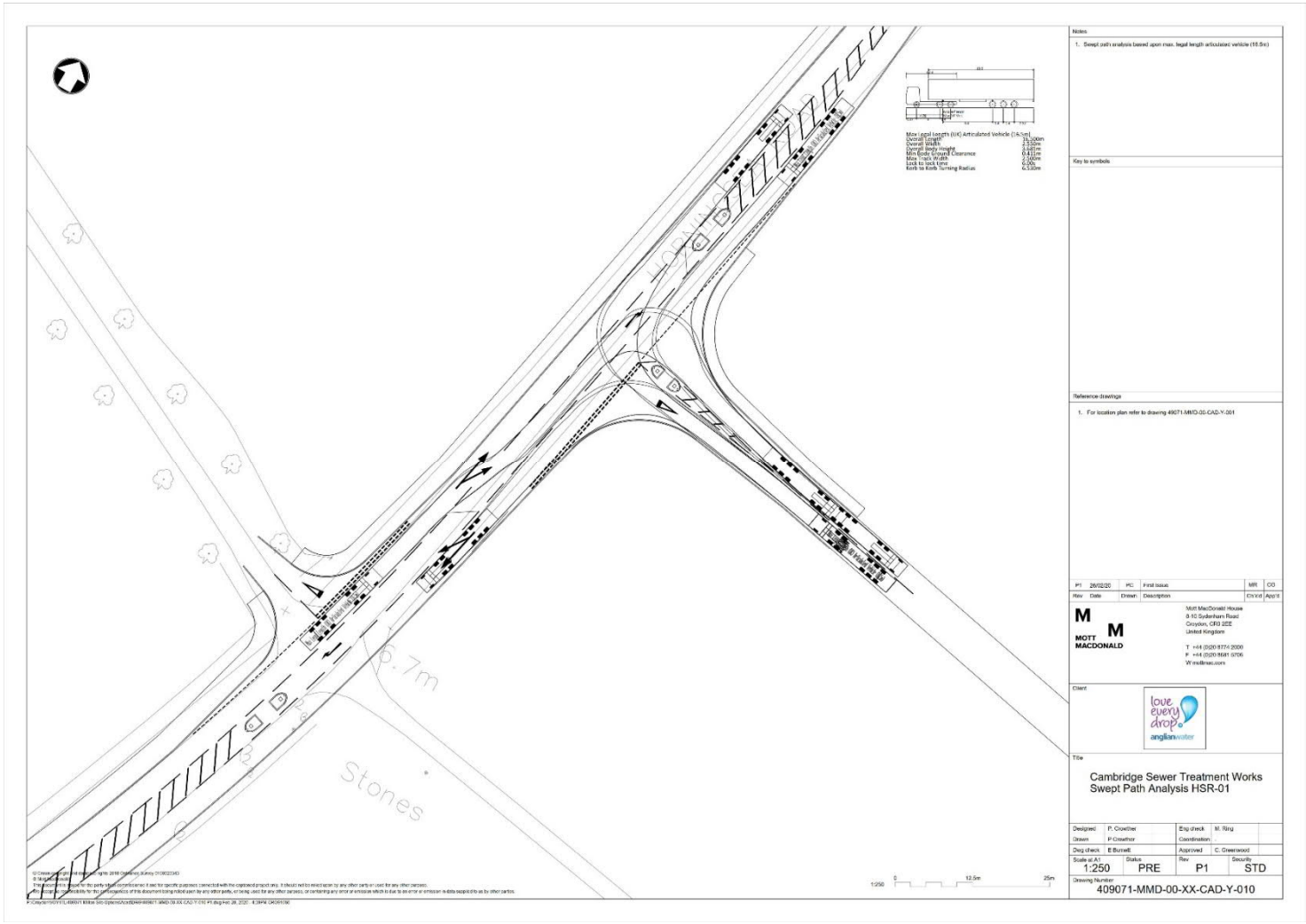
A.6 Proposed access routes into Site 3 for further viability analysis (indicative only).



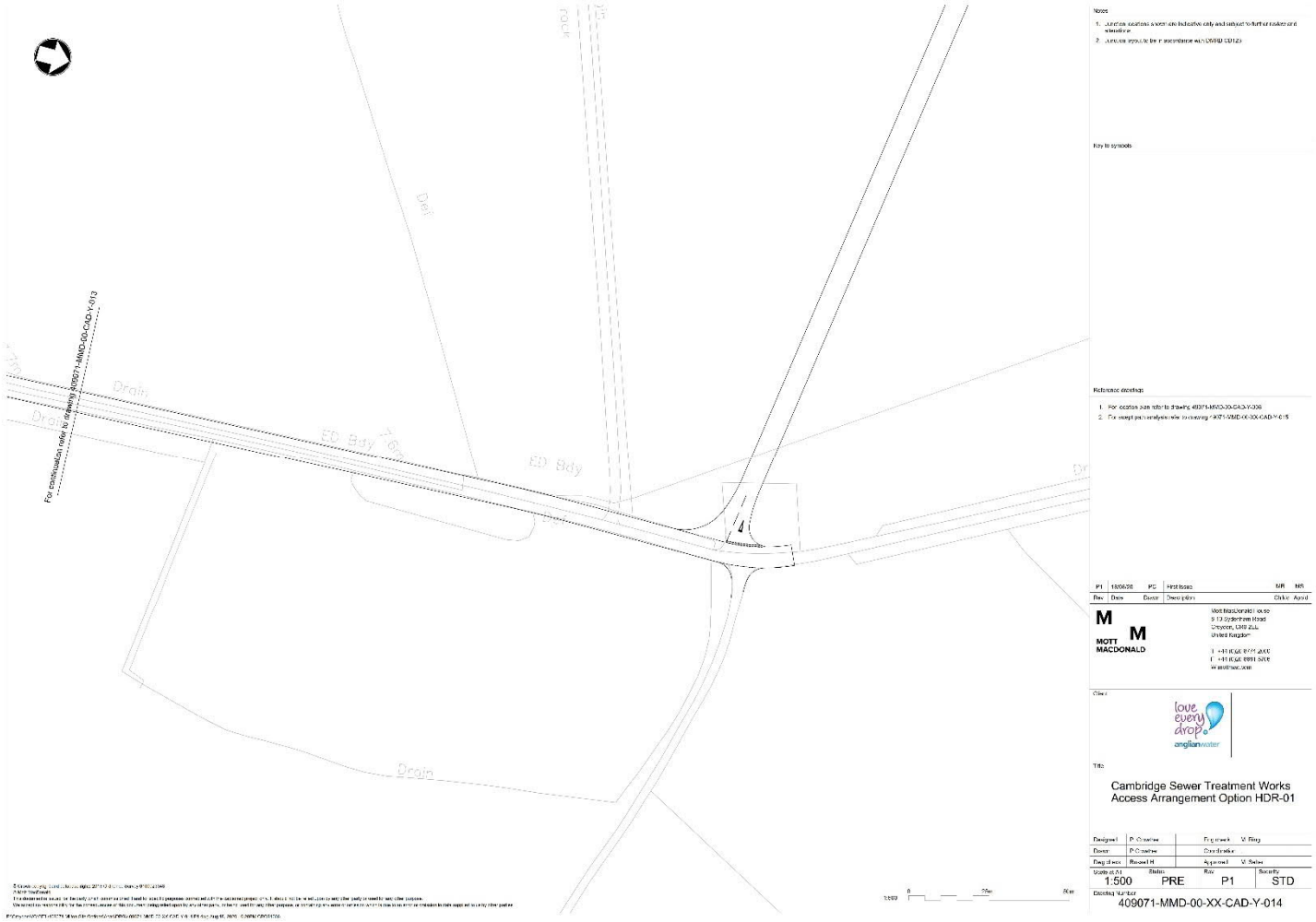
A.7 HSR-01 access drawing for access into Site 3 (preliminary only)



A.8 Swept Path Analysis: Access location HSR-01



A.9 HDR-01 access drawing for access into Site 3



B. Committed developments and transport proposals

Table B.1: Committed developments and transport proposals

Scheme/ Development	Description	Implications for WWTP	Current status	Timescales
Waterbeach New Town – Early Transport Scenario (1600 dwellings, 411 jobs and primary school)	- **Milton interchange** - the proposals include investment in the short-term improvements at the junction. Indicative proposal for improvement works (drawings: Drawings 30509-001-011, 30509-M-001-014 and 30509-M-001-015) are to support development occupation up to 1,350 units. A longer-term scheme will be subject to the A10 Ely to Cambridge Transport Study. - The S106 outlines the PBA short-term solution to increase the capacity of the A10 at its junction with the Milton Interchange, including but not limited to the construction of an extension to the southbound flare. - Signal timing changes to allow better egress from Cambridge Road arm by increasing the inter-green at the A10 North entry. - **Landbeach Road/ A10 junction** - Signalisation to improve safety. - **Landbeach NMU bridge** - A bridge across the A10 for non-motorised users to provide connection between the southern end of the WNT site towards Landbeach.	At present WNT would either provide a financial contribution towards the HE scheme (see A14 improvements), or a similar short term improvement using the PBA design. Any longer-term solution will be subject to the A10 improvements study. Cars and HGVs travelling to/ from WWTP are likely to use this junction to access the strategic road network. The implications in terms of capacity are considered in Section 5 of this report. Signals would have to cope with potential increase in traffic to and from WWTP, the signal timings may need to be revisited depending on the level of traffic associated with the proposed site. The changes associated with this junction would need to be modelled with potential increase in cars and HGV traffic to/from WWTP. This is mostly likely to impact the citing of the site access if off Landbeach Road.	committed	Completion 2020/2021 Year 5 is the expected trigger point Occupation of 300-500 dwellings. Occupation of 1600 dwellings Occupation of 150 dwellings

Scheme/ Development	Description	Implications for WWTP	Current status	Timescales
	- **Butt Lane** and **Park & Ride/ A10** –Widening the A10 southbound lane south of Butt Lane and reducing the size of existing traffic islands to facilitate increased A10 capacity and turning movements. - **Mere Way** – includes improvements to provide a high-quality cycle connection into Cambridge. From Landbeach the route continues along Akeman Street to cross Butt Lane and connect to existing Cambridge Guided Busway. The improvements comprise providing 3m minimum width, resurfacing, solar stud lighting, improved access controls and crossing facilities on Butt Lane. See PBA drawing 30509_2003_SK06 - Extension of Milton Park and Ride services every 30 minutes for up to 874 dwellings and every 10 minutes thereafter.	A bridge across the A10 would be beneficial to the WWTP as it would reduce potential conflict between HGV traffic and non-motorised users. Widening the southbound lane on the A10 to the south of Butt Lane would improve capacity, the junctions would need to be modelled to understand fully the implications for WWTP. Mere Way is an existing Byway that would need to remain/ be considered as part of siting of the proposed WWTP. Increased number of buses left turning out of and right turn into Butt Lane, are unlikely to pose significant implications for junction performance		
Waterbeach New Town – Outline - Phase 2 onwards (6,500 dwellings)* *Total allocation 10,000 although it's only the above proposals that outline planning has been sought for	Future phases to be monitored and managed through a scheme led transport mitigation package policy refers to: - New P&R at or close to The Application site - New Busway to serve the site - A Capacity enhanced A10 - Strategic Improvements to the A14 and A10 Milton Interchange - Relocation of the Rail Station Safe and direct access into the site from the A10 with two new junctions. These accesses would be designed to encourage and prioritise access by bus.	At present the Phase 2 and onwards for WNT are subject to further assessment and suitable mitigation measures being identified. It is questionable whether this would need to be considered as part of the Planning application for the development.		Anticipated build out completion 2033-2038
A10 improvements – highways and public transport	The A10 Ely to Cambridge Transport Study recommended a suite of improvements to the corridor encompassing walking and cycling measures, improved public transport from	The A10 improvements, if implemented would add significant highway capacity to the corridor which would benefit WWTP. Preliminary	Business Case work ongoing by	To be defined through business case process. A10 dualling potentially

Scheme/ Development	Description	Implications for WWTP	Current status	Timescales
	Waterbeach to Cambridge with accompanying travel hubs, junction improvements, and dualling of the A10.	alignment has been released and will likely provide implications for site location, particularly Site 1. The client team may wish to engage with the CPCA at an appropriate time to understand and influence this.	CPCA for highway works and GCP on non-highway works.	within 7-10 years subject to scheme delivery programme and statutory processes.
CNFE (now known as North East Cambridge)	Includes the last remaining significant brownfield site in Cambridge (land east of Milton Road). Would likely include significant residential and employment development, extent of which is still to be defined through a forthcoming Area Action Plan (AAP). Any accompanying transport improvements yet to be defined.	Unknown at this stage pending AAP but unlikely to include significant highway works.	Commitment in terms of AAP but details as yet undefined	Draft AAP anticipated during 2020
A14 improvements	Milton Interchange - Initial scheme is to be implemented as part of the A14 upgrades being implemented by Highways England to improve the on/off slip roads to the west of the junction, as well as adding a further southbound lane across the A14 overbridge. The scheme was designed anticipating 1,400 dwellings at Waterbeach		construction	Completed by the end of 2020
Science Park developments	Various recent applications on the site for further employment uses. Some reworking of main site access arrangements secured (i.e.: on Milton Road, Cambridge).	Would bring local operational benefits on Milton Road in vicinity of Science Park but implications for WWTP would be marginal.	Secured via planning applications	Depending on development delivery timescales

Source: Mott MacDonald