Graven Hill, D1 Site, Bicester
Transport Assessment

Prepared for
Graven Hill Purchaser Ltd

June 2022

Alan Baxter

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Appendices

1.0
Introduction

Graven Hill Purchaser Ltd (the Applicant) is proposing the redevelopment of former MOD land in Bicester, Oxfordshire, as a logistics park. The D1 Site (the Site) is part of the wider Graven Hill development area, the masterplan for which gained outline planning permission in 2014 (11/01494/OUT).

This Transport Assessment has been prepared by Alan Baxter Ltd (ABA) for review by the local planning authority, Cherwell District Council (CDC), and local highway authority, Oxfordshire County Council (OCC), as part of an outline planning application.

It sets out the key transport assumptions that will inform the development of proposals for the site. It includes an overview of baseline transport conditions, and identifies key policy documents. An overview of the initial logistics park proposals for the site is provided. A trip generation exercise is presented, with a comparison against consented vehicular trips. Trip distribution is also reviewed, and a proportional impact assessment has been undertaken on two local roundabouts. Proposals for new vehicular accesses are detailed, and have been modelled. The analysis contained in the Transport Assessment, together with the considerations in the Travel Plan (submitted separately), has been used to influence the illustrative site layout and built form.

Pre-application advice was provided by CDC and OCC. A Transport Scoping Note was submitted in March 2022 and reviewed by OCC, and a series of workshops took place. Through this pre-application process, OCC confirmed on the basis of trip generation and distribution, the scope of the impact assessment, the standards to be used for parking, and the principle of the new vehicular access. The OCC pre-app response, follow up email thread with comments and confirmations, and minutes from two meetings are shown in **Appendix H** of this document.

2.0
Site Context

2.1 Site Description – Existing

The Graven Hill development area is located approximately 2km to the south of the centre of Bicester. The outline permission for this area was for development of 1,900 homes, a primary school, local shops, a pub/restaurant/hotel and employment floorspace, with associated open space and highways. Whilst much of the northern end has been delivered, the logistics park is proposed for the southern portion of the area that remains undeveloped, on land parcels D1 and EL1 (the site). The site has consent for employment usage, including B1(a) office, B1(b) R&D, B1(c)/B2 light industry, and B8 warehousing (see Figure 2-2). As former MOD land, there are a number of existing buildings on site, including warehouses and ancillary buildings, along with areas of hardstanding and disused rail tracks. A detailed site location plan is shown in **Appendix A.**

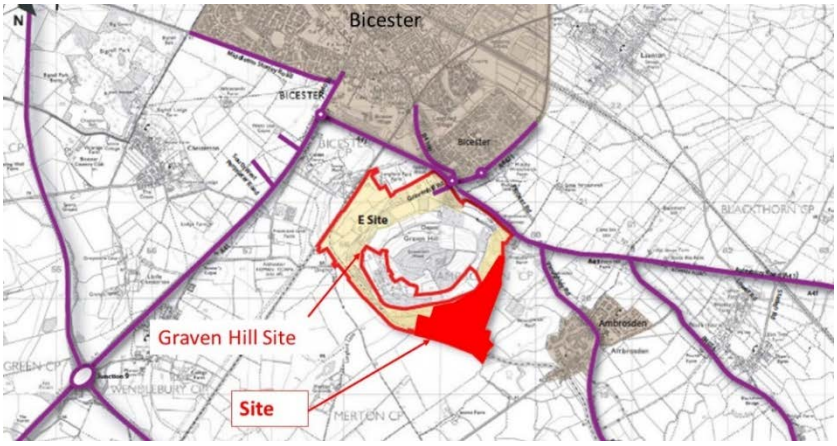

Figure 2-1 Site Location

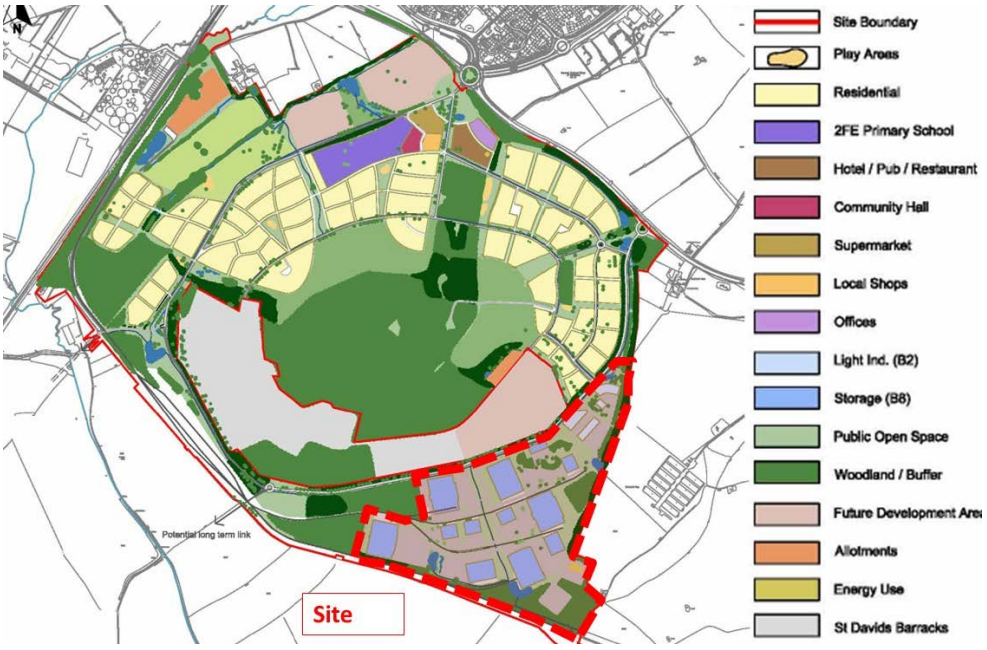

Figure 2-2 Site Context Within Outline Application Strategic Masterplan

Figure 2-3 Site Aerial

2.2 Policy

There is a range of national and local policy and guidance documents that outline the planning policy framework for development in Bicester.

National Policies and Guidance

National planning policies and guidance relevant to the transport aspects of this development are set out in the following key documents:

- National Planning Policy Framework (2021)
- Planning Practice Guidance (2016)
- Manual for Streets (DfT, 2007) & Manual for Streets 2 (CIHT, 2010)
- Local Transport Note 1-20: Cycle Infrastructure Design (DfT, 2020)

These provide the overarching guidance to inform the development. Furthermore, with regards to design standards, Manual for Streets has been used to inform street geometry, as well as various documents in the Design Manual for Roads and Bridges (DMRB). For the design of cycle infrastructure, this is set out in LTN 1-20.

Local Policies and Guidance

Local planning policies and adopted guidance relevant to the transport aspects of this development are set out in the following key documents:

- The Cherwell Local Plan 2011-2031 (Adopted 2015)
    - Graven Hill is listed as a "strategic employment site" within Bicester. The development of the site would "identify Bicester as a prime location for investment through the creation of significant jobs-led economic growth to address the town's historic housing/jobs imbalance". Furthermore, is it cited as an example of the effective re-use of existing land and buildings.
    - The Council also has the ambition to improve the linkages between Bicester Business Park, Bicester Village, Graven Hill, the town centre and improved railway station for the Town to take advantage of the improvements to East-West rail
    - Additionally, the Local Plan states that a policy from the 1996 Local Plan is still saved, which is Policy TR10 concerning heavy vehicles. This states that wherever possible, heavy goods vehicle operating centres should not be located in residential areas, and should have good access direct to the strategic road network.

- Connecting Oxfordshire: Local Transport Plan 2015-2031 (Adopted 2015)
    - Addresses wider growth, and new jobs and homes expected in the county by 2031. Proposes transport solutions in order to address the impact on the transport network.
    - Identifies Bicester as growing in economic importance. States that growth in Bicester and other towns creates strong arguments for upgraded transport infrastructure in the area
    - Encourages prioritising the use of public transport and/or cycling along main roads in growth towns
- Oxfordshire Cycling Design Standards (2017)
    - Provides guidance on the provision of cycle infrastructure within Oxfordshire, making it a first choice for users
    - Sets out the principle of cycling in new developments. Sets out cycle facility specifications for different typologies, such as quiet streets, busier roads, junctions, and off-carriageway facilities

Local Policies and Guidance – Parking Standards

Regarding policy for parking standards, the Cherwell Local Plan states that applicants are to have regards to policies from Oxfordshire County Council (OCC), such as the Parking Policy. Guidance on parking is set out in the following documents:

- Oxfordshire Parking Policy (2014)
    - Sets out an overall parking policy for Oxfordshire, and is linked to the Local Transport Plan.
    - Provides overarching guidance on various parking typologies, and addresses management, charging, enforcement etc. However, does not provide specific parking standards.
- Oxfordshire Electric Vehicle Infrastructure Strategy (2021)
    - Provides standards for electric vehicle charging requirements in developments
    - For non-residential development, a minimum of 25% spaces are to be provided with electric charging points.
    - Fast charging is stated as being most commonly used for the workplace. For HGV parking, there isn't a requirement for charging.

Furthermore, some parking standards are set out in the OCC document "Parking Standards for New Residential Developments". However, this doesn't include commercial uses. Following discussion with OCC during the pre-app process, it was therefore agreed that the parking standards as set out the Graven Hill

Outline Application (from 2011) would be followed, albeit with the electric vehicle charging requirements in the Oxfordshire Electric Vehicle Infrastructure Strategy. Based on this, the proposed parking standards would therefore be the following:

Table 2-1 Proposed Parking Standards

Use Class	Car Parking			Cycle Parking - Minimum Provision
	Maximum Provision	Disabled Spaces	EV Spaces	
B8 Storage or Distribution	1 space per 200sqm	6%	25%	1 space per 500sqm + 50% visitor
E(g(i) Office (formerly B1a)	1 space per 30sqm			1 space per 150sqm + 50% visitor

2.3 Committed Developments

Bicester has seen notable development and growth in recent years. In the Graven Hill Outline Application, a compressive traffic analysis was undertaken, based on the traffic conditions and projections at the time. However, when the Outline Application was approved, the development itself became a committed development, that other subsequent developments would have had to take account of. Furthermore, the consented Graven Hill, including the residential and commercial components, was then incorporated into the Oxfordshire County Council's area-wide SATURN model, along with other committed developments.

As such, the Graven Hill Outline Application's vehicular trips are already accounted for on the highway network. Any change would therefore be a comparative exercise. This is considered further in Section 5.0.

3.0
Transport Context

3.1 Rail

Within Bicester there are two rail stations: Bicester Village and Bicester North. These enable journeys to London (50-60 mins), Birmingham (60-70 mins), and Oxford (20 mins).

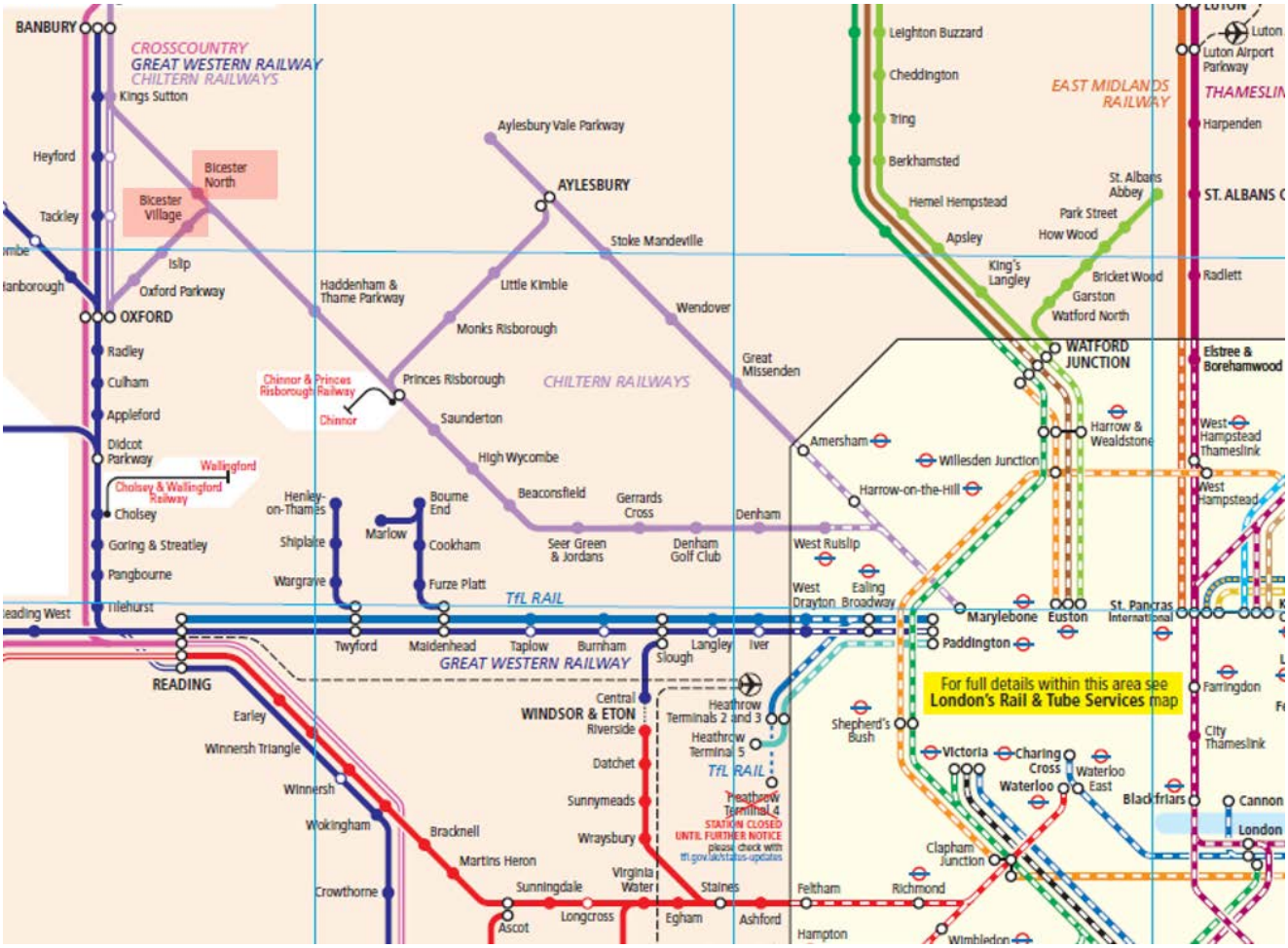

Figure 3-1 Rail Network

Bicester Village is located approximately 2km north of the site, and is approximately a 5-minute drive, or 10-minute cycle. A half hourly service is available to London Marylebone (a 50-60 minute journey time), and Oxford (a 16 minute journey time). Car and cycle parking is available at the station.

Bicester North is located approximately 3.5km north of the site, and is approximately a 10-minute drive, or 20-minute cycle. A half hourly service is available to London Marylebone (a 50-70 minute journey time), with an hourly service to Banbury (a 15 minute journey time), and an hourly service to Birmingham Snow Hill (a 70-80 minute journey time). Car and cycle parking is available at the station.

3.2 Bus

Bicester has a local bus service, with radial routes from the town centre to local and regional destinations. Bicester's rail stations are also served. A bus map is shown in Figure 3-2. As the site is former MOD land which is not currently accessible to the public, the closest bus stop is 800m to the northeast (or a 10 min walk), on the A41 near Symmetry Park. There are two services, which are the 17 and 18.

Further north, buses serve the residential component of the Graven Hill development. There are bus stops in proximity to the Rodney House roundabout, which is 1.3km to the north of the site (or a 20 min walk). Bus services were introduced relatively recently, in January 2021, being the 29 and H5 services. The services are summarised in Table 3-1.

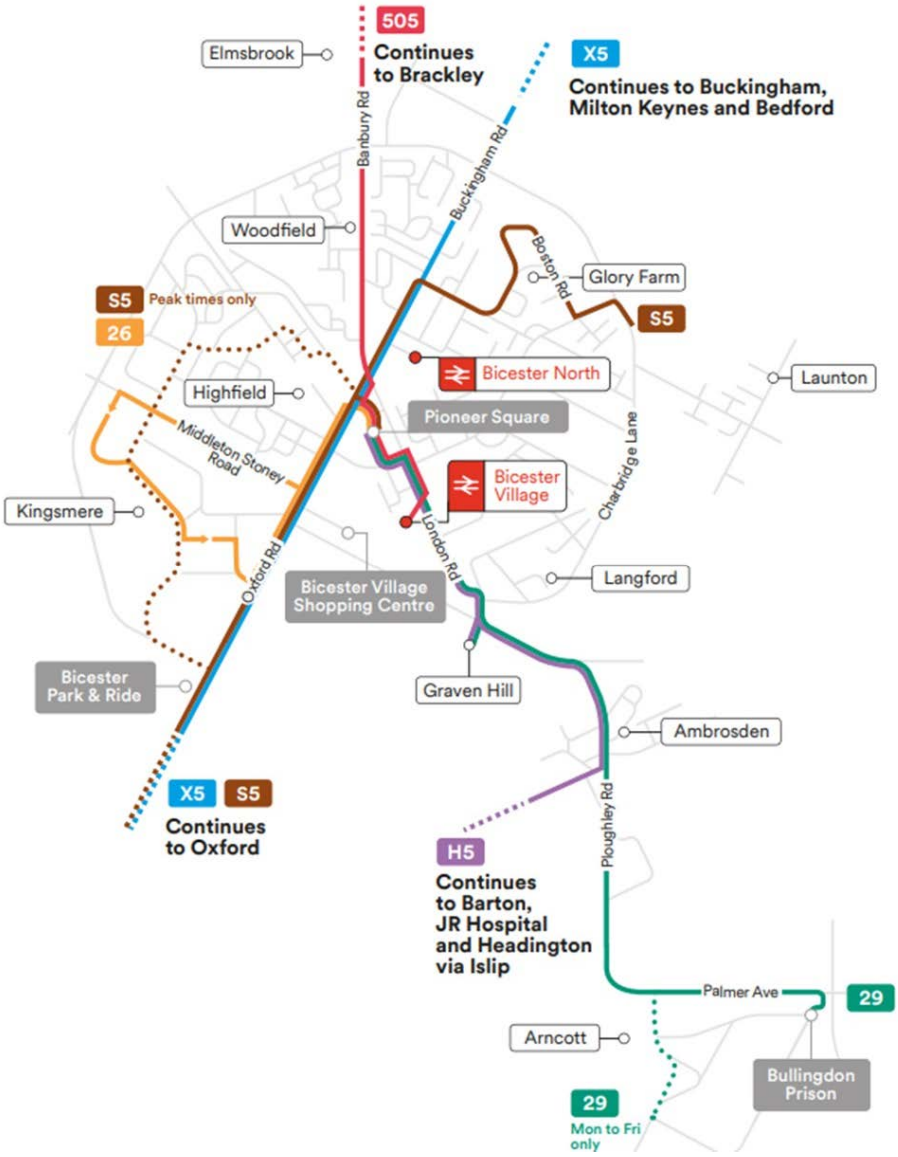

Figure 3-2 Bicester Bus Network

Table 3-1 Local Bus Services

Bus/Coach Number	Stop Location	Walking Distance from Site	Route	One-way Frequency
17	Symmetry Park (Westbound)	10 min	Aylesbury - Bicester	Hourly
18	Symmetry Park (Westbound)	10 min	Buckingham - Steeple Claydon - Bicester	Every 2 Hours
29	Graven Hill	20 min	Headington - Ambrosden - Bicester	Hourly
H5	Graven Hill	20 min	JR Hospital (Oxford) - Islip - Ambrosden - Bicester	Hourly

3.3 Walking

Falling within secure ex-MOD land, pedestrian provision to the site largely consists of footways adjacent to vehicular carriageways along private roads. There are no public rights of way connecting to or crossing the site at present. Given this context, it is difficult to assess the existing provision on the immediate site in terms of pedestrian accessibility, particularly given that the proposals are for a wholesale redevelopment. Furthermore, there are no specific amenities (e.g. local shops) within a walkable distance.

. A summary of the pedestrian context on site, including isochrones and key routes to bus stops, is shown on Figure 3-3.

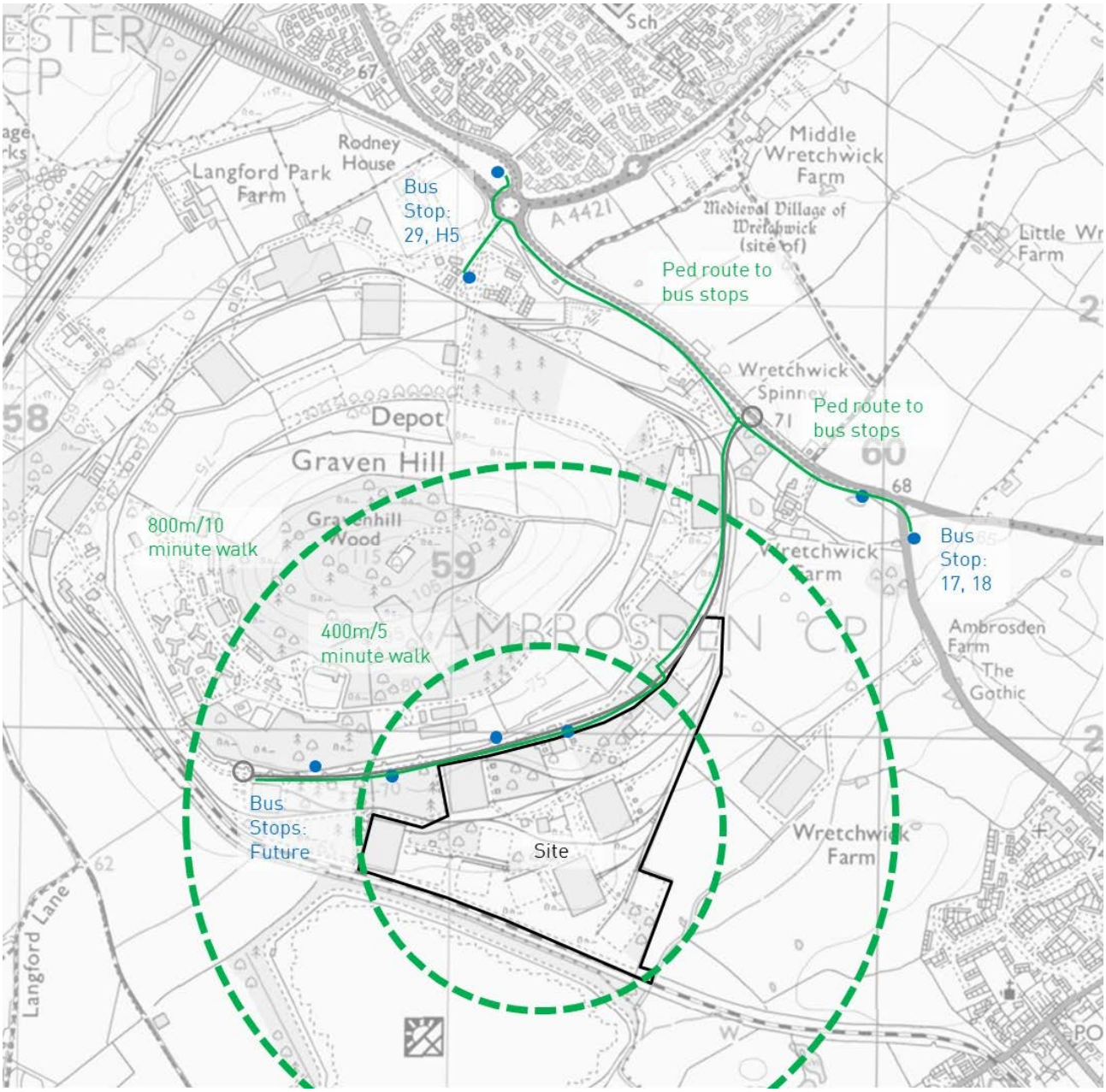

Figure 3-3 Walking Routes

3.4 Cycling

National Cycle Network Route 51 passes through Bicester. This is an east-west route, running from Oxford to Felixstowe, via Milton Keynes and Ipswich. Through Bicester, it largely consists of on-road and traffic-free (e.g. shared footway) routes. In the vicinity of the site, there are cycle routes at the A41/Graven Hill Road roundabout. These largely consist of on-footway routes that were delivered as part of the roundabout improvement works.

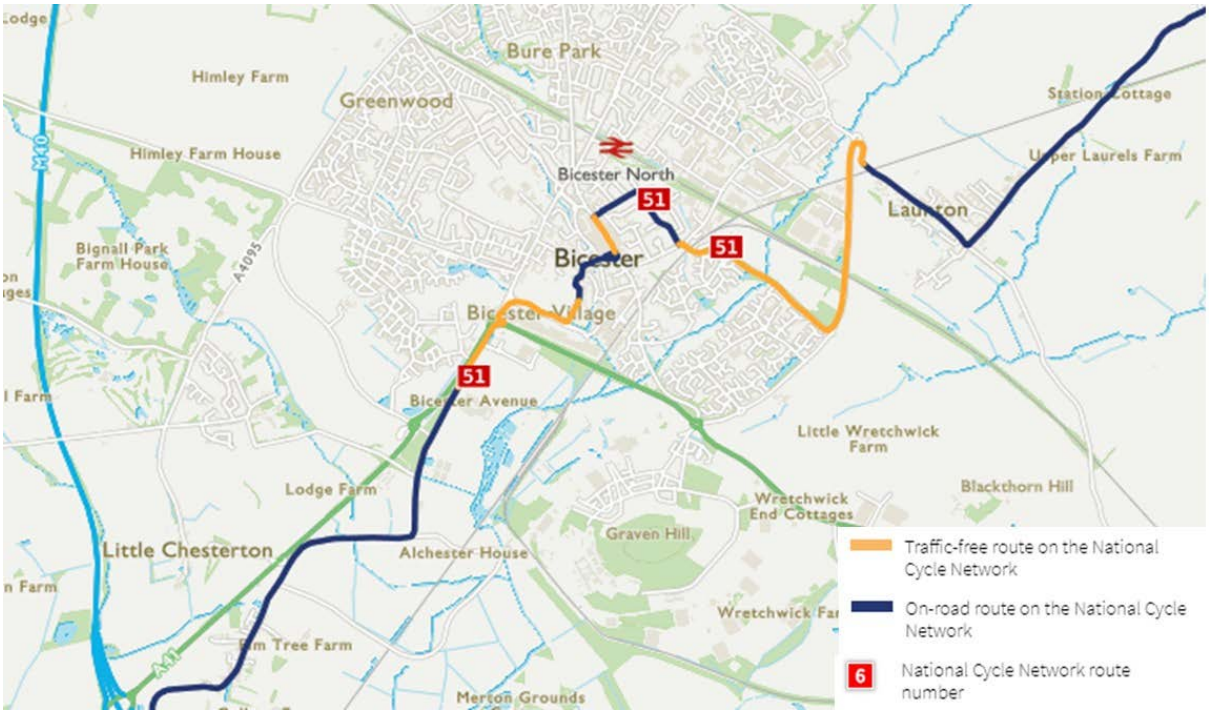

Figure 3-4 National Cycle Network Route 51

From the site itself, many amenities will be within a 5-10 minute cycle. These include Bicester Village station, parts of the south of the town centre, and local amenities as part of the Graven Hill development. Cycle isochrones are shown on Figure 3-5. This will be enabled via a high-quality off-road cycleway delivered as part of the EAR (see Section 3.6), plus at the Pioneer Roundabout. However, in terms of other onward routes beyond this, the cycle route provision is more limited. Of note are widened crossings and paths suitable for combined pedestrian and cycle usage that were delivered as part of the works at the Rodney House roundabout.

Figure 3-5 Cycle Isochrones

3.5 Highway Network

The site is in proximity to key strategic highways, with the A41 in particular running close to the site. Connections are available to the M40 and the A34 (see Figure 3-6). Convenient journeys are available to London (1hr 30 min drive via the M40 south), Birmingham (1 hr 10 min drive via the M40 north), and Oxford (30-minute drive via the A41 & A34). In terms of local provision, there are various private roads through the site, which would have served the various MOD buildings. These connect to the A41 to the north, via the Pioneer roundabout.

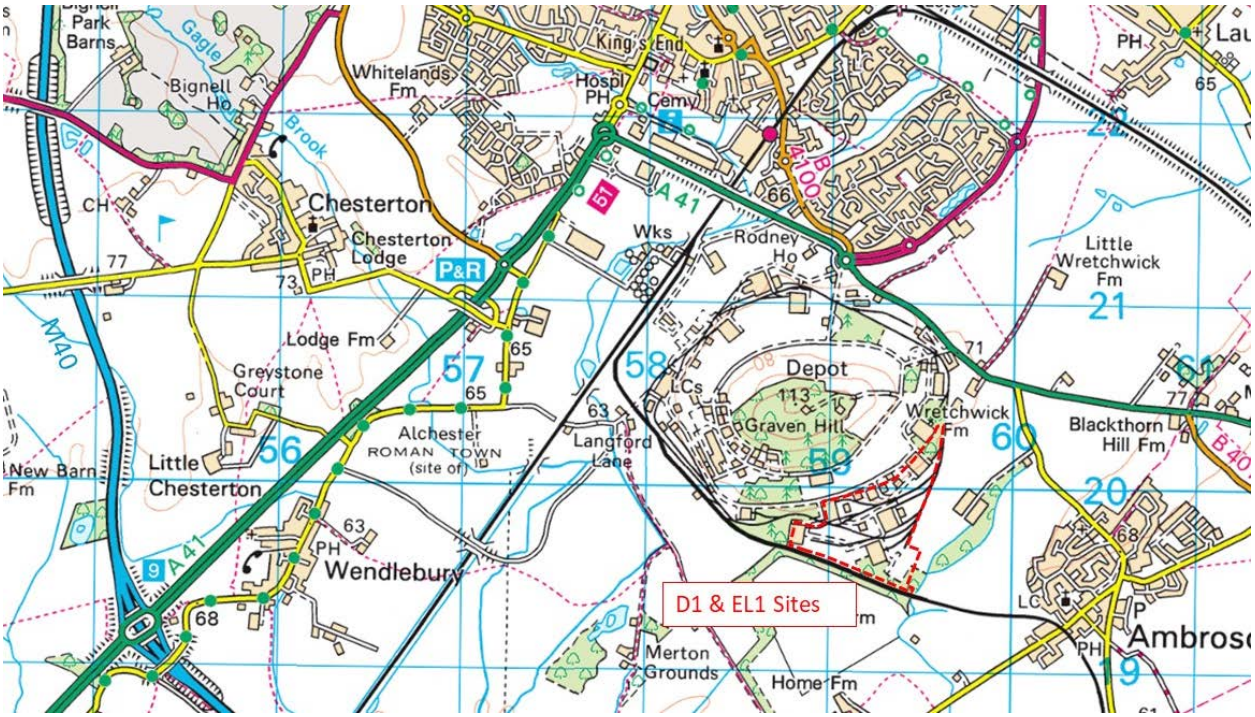

Figure 3-6 Strategic Highways

3.6 Planned Transport Improvements

The Graven Hill development will bring notable transport improvements to the area, including new roads, pedestrian and cycle routes, and extensions to local bus routes.

Most immediately to the site, the Employment Access Road (EAR) will be constructed, running along the northern perimeter of the site, and connecting north to the A41, with a new roundabout (the 'Pioneer Roundabout'). Whilst there was already a local road for MOD purposes, the EAR is designed for the employment land expected to be delivered as part of the Graven Hill masterplan. The EAR is being delivered by Graven Hill Village Development Company (GHVDC). This was given planning permission in April 2021 (ref: 20/02415/F), with an anticipated completion of October 2022. The road includes two lanes, a 2m footway and 3m cycleway on one side (which is on the southern side as it passes the site), and pedestrian crossings. At the western end, it includes a roundabout, enabling vehicles to turn back. Both roundabouts also include facilities for pedestrians and cyclists to cross. The EAR is shown in Figure 3-7. The road would be delivered without any specific D1 and EL1 site accesses, other than a reprovision to the existing internal road network.

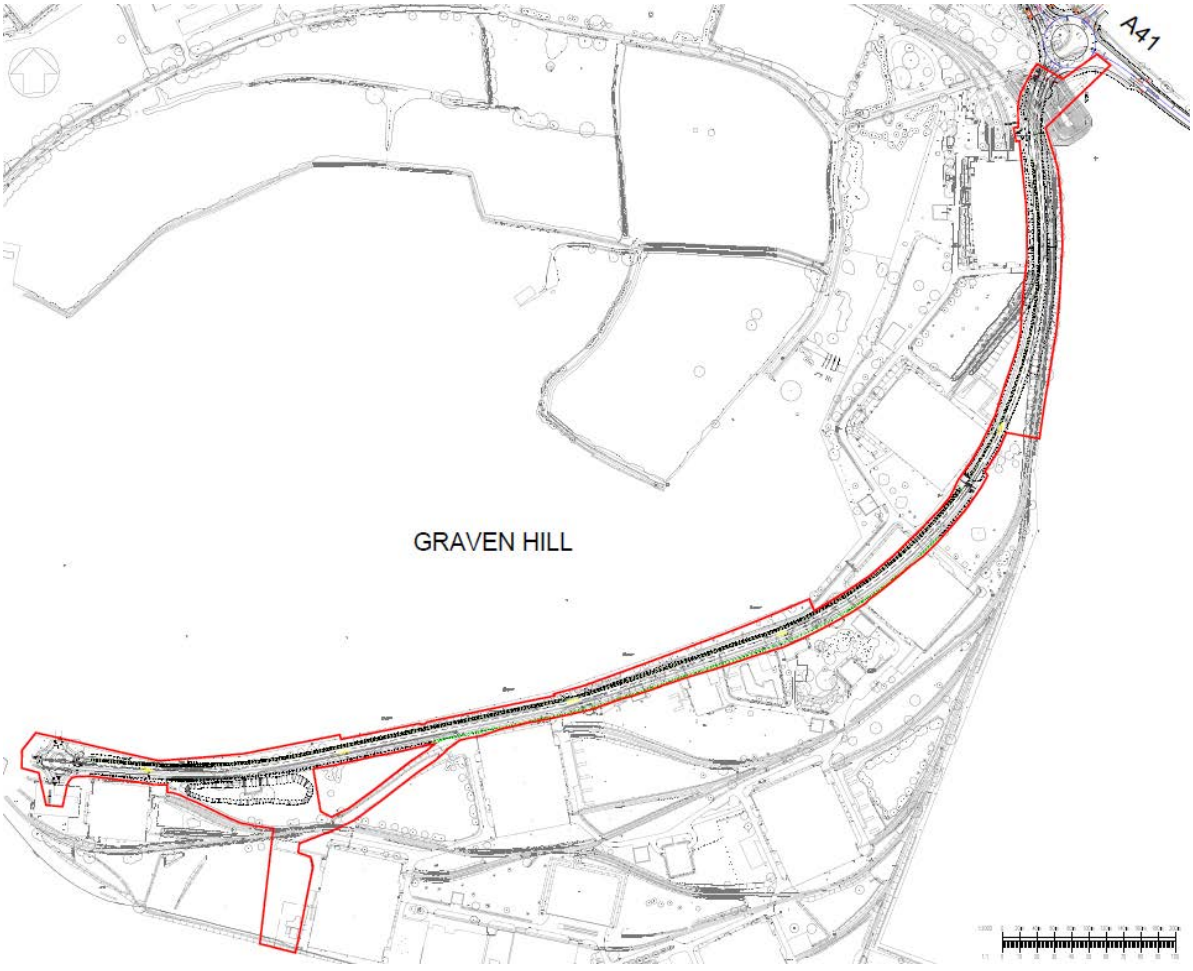

Figure 3-7 Employment Access Road (EAR)

Furthermore, there are longer term ambitions to extend the road to the west, connecting to the A41. This would become the South East Perimeter Road (SEPR). A route alignment for this was chosen in 2016. This has yet to be delivered, however, and would require crossing MOD land and a railway.

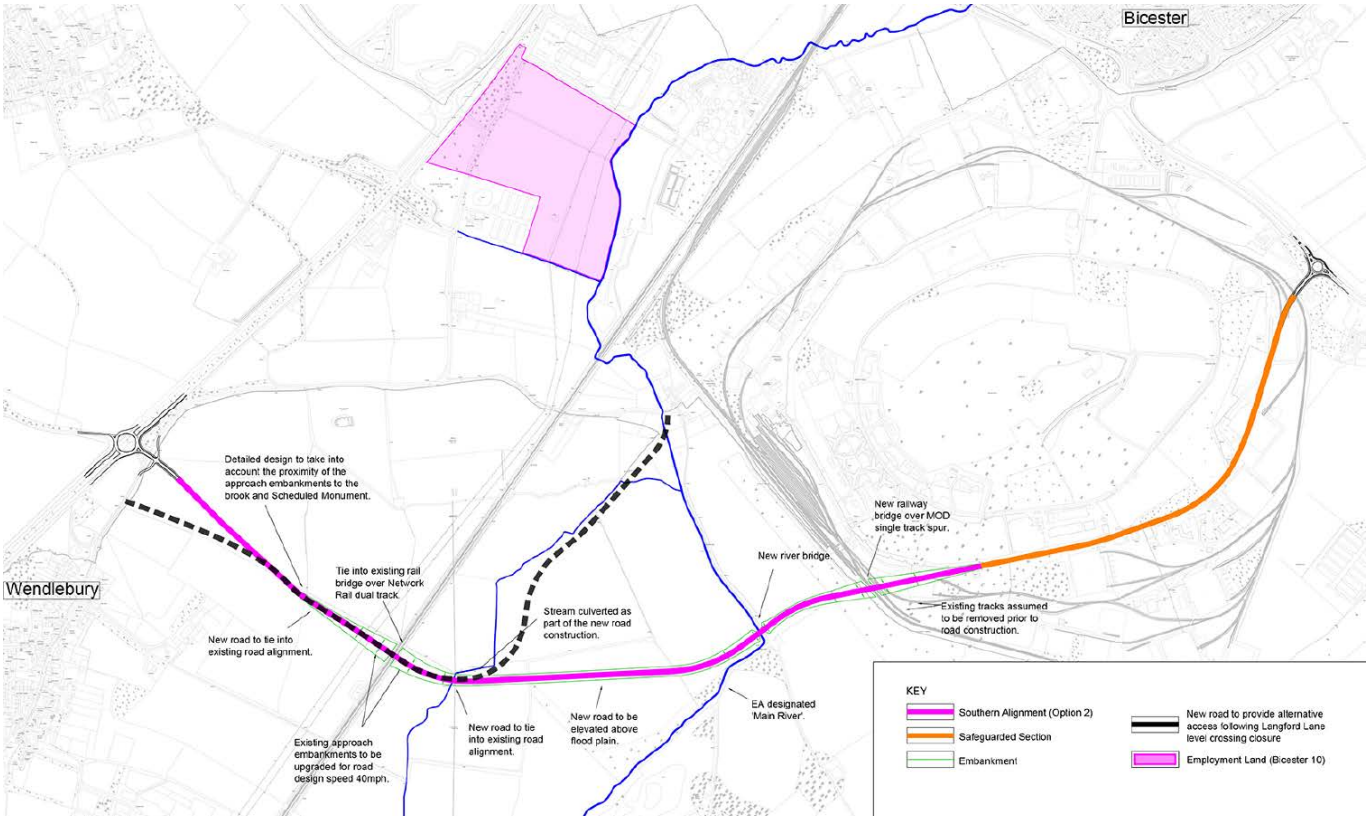

Figure 3-8 South East Perimeter Road (SEPR)

In terms of bus provision, existing routes are proposed to be extended within the Graven Hill masterplan area, in order to serve new development here. This includes a number of new bus stops. Along the northern perimeter of the site, two sets of bus stops will be delivered as part of the EAR. These would be bus cages in the carriageway, along with shelters and flags. At present, the exact service and frequency at these bus stops is unknown, but it would be expected to build on the existing provision within the vicinity of the site (see Section 3.2).

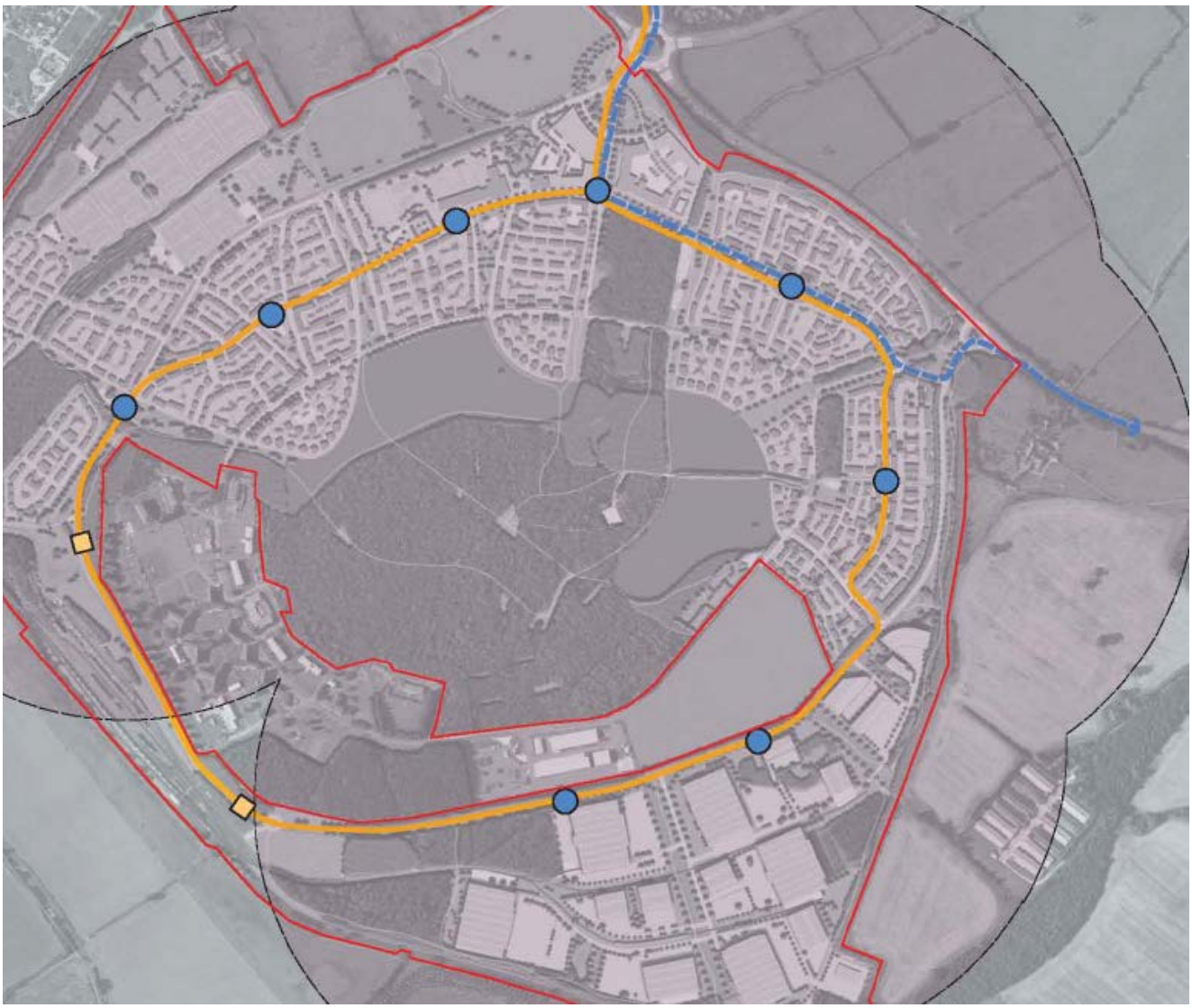

Figure 3-9 Graven Hill Bus Routes (proposed at Outline Application)

In terms of broader strategic transport improvements, "East West Rail" is a long-term project to link Oxford to Cambridge via a number of towns, and includes a stop at Bicester Village. The first section, Oxford to Bicester, was delivered in 2016. The second, from Bicester to Bletchley, is currently under construction and anticipated to be complete by 2025. When complete, this rail project would establish Bicester on a strategic business and knowledge corridor.

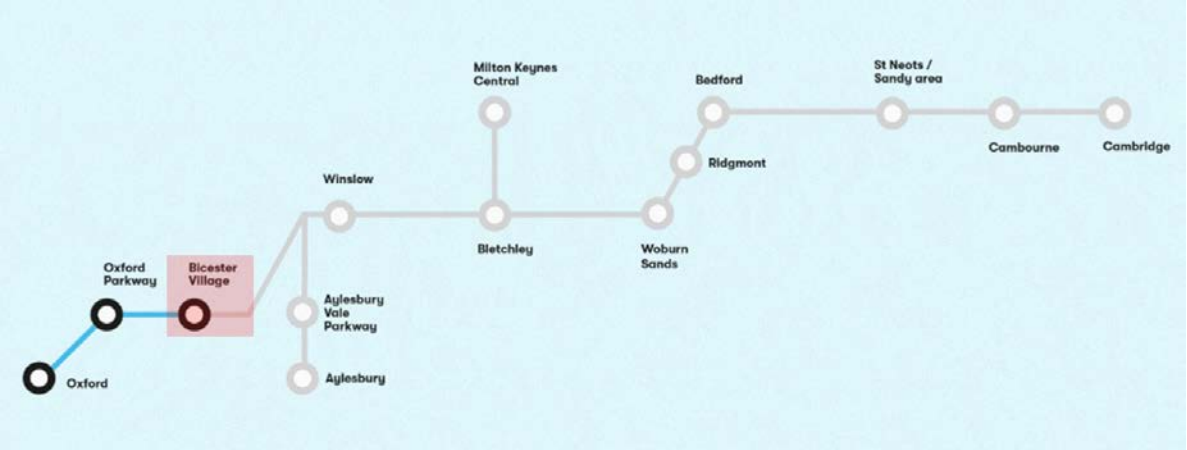

Figure 3-10 East West Rail

4.0
Development Proposals

4.1 Masterplan

The outline proposals are for 104,008sqm of B8 Storage or Distribution Use, including 9 new warehouse buildings (indicative masterplan scheme only). The indicative masterplan is shown in Figure 4-1, with a larger scale drawing shown in **Appendix A**.

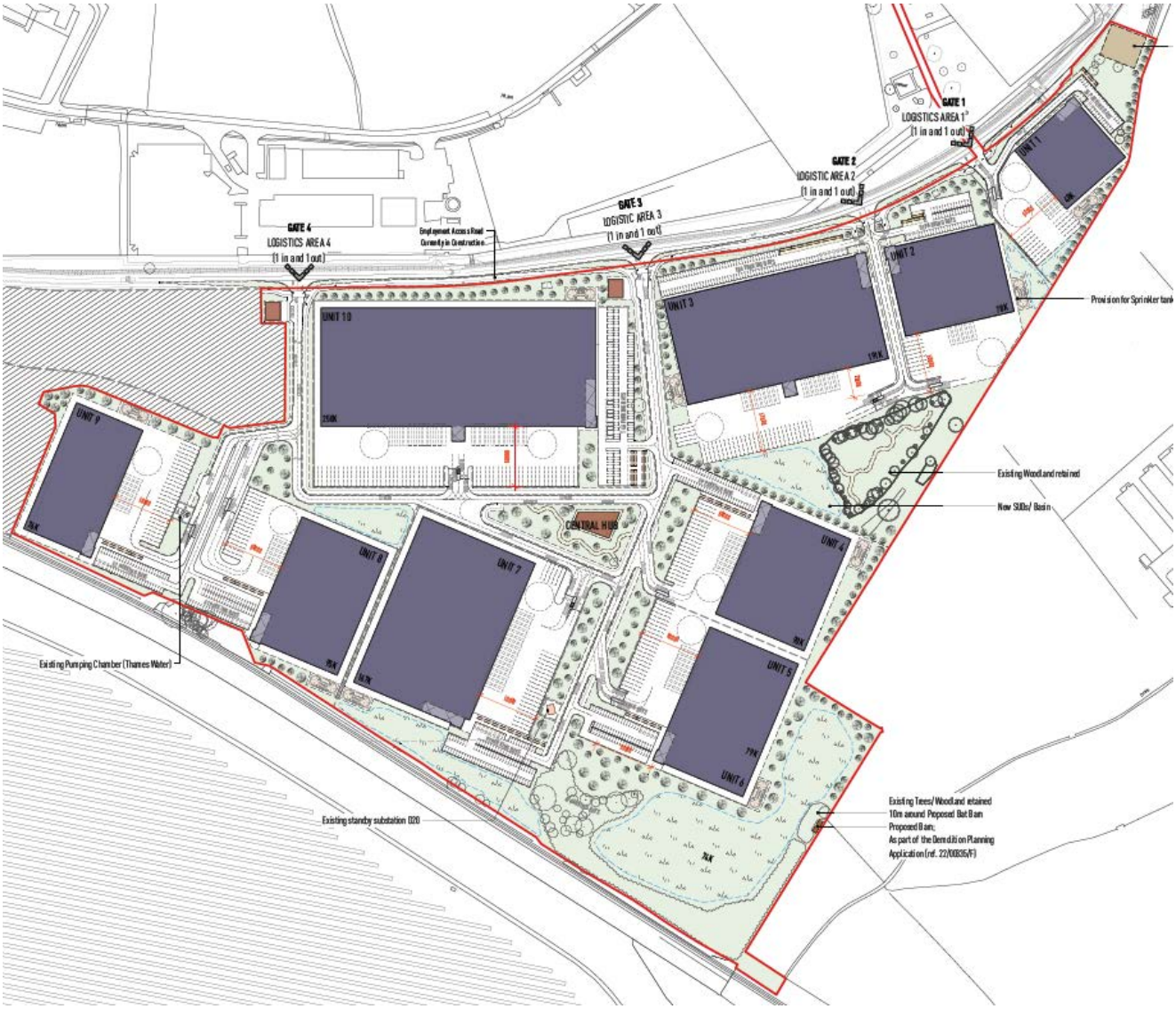

Figure 4-1 Indicative Masterplan

4.2 Access Strategy

The site would be accessed via the EAR, located along its northern perimeter. As an addition to the works currently being delivered by GHVDC, four vehicular accesses are proposed to be constructed on the EAR, to access various areas of the site. Accesses 1 and 2 would serve warehouse units located immediately adjacent to the EAR. Accesses 3 and 4 would provide access to an internal road network within the site which would serve the remainder of the warehouse units via local accesses. Each unit would have surface car parking and HGV parking associated with it.

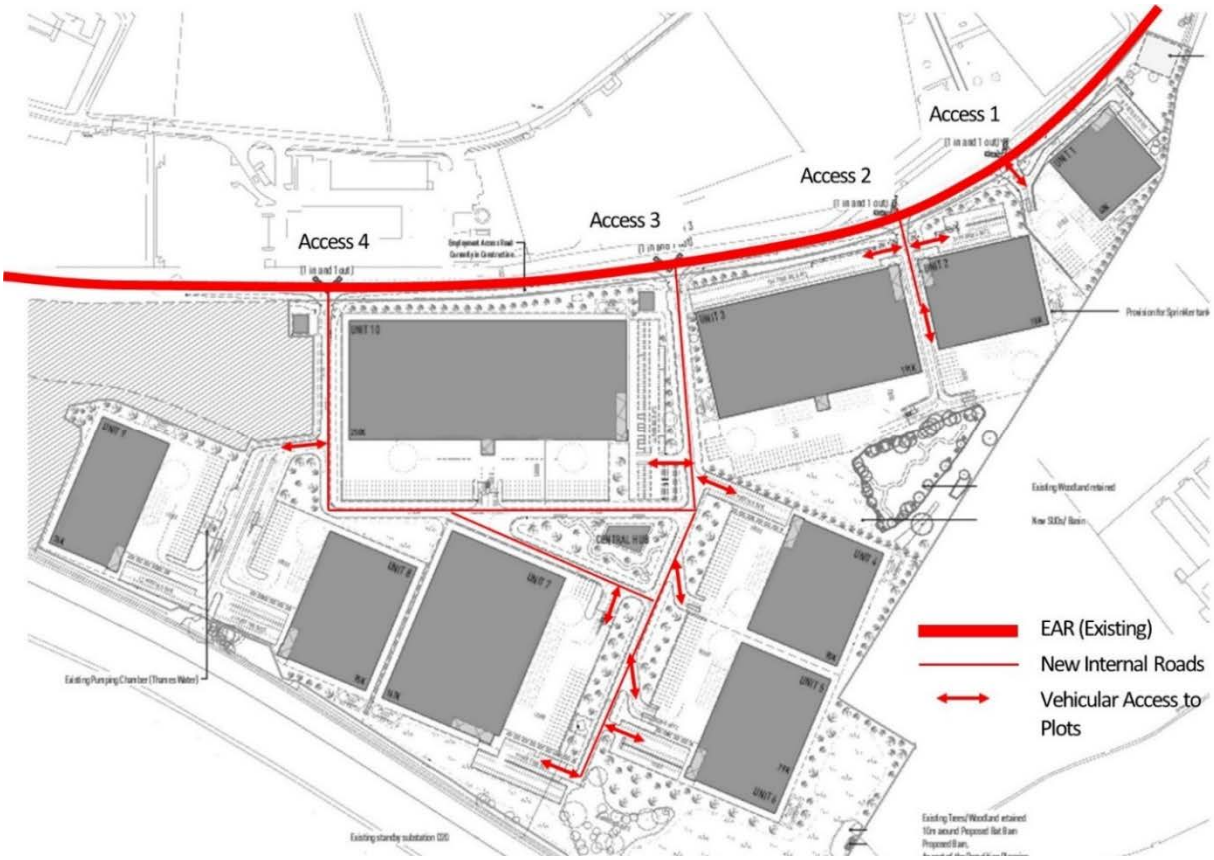

Figure 4-2 Vehicular Access Principles

In terms of sustainable transport provision, there would already be a footway and cycleway delivered as part of the EAR, which would be maintained. Furthermore, new cycle crossings would be provided at each of the new vehicular accesses – see further information in Section 4.3. These would be designed in accordance with LTN 1-20. The EAR cycle lanes would also be extended within the site, in order to cater for further cycle journeys. A 3m cycleway would be provided alongside the loop road, served from Accesses 3 and 4. Cycle parking would also be provided within the site (see Section 4.6). Footways would also be provided in coordination with the internal road network, in order to serve the various units. These would be designed with appropriate gradients, tactile paving etc., and have level access in order to provide for DDA compliant access to all of the units. In each unit car park area, sufficient space for a drop-off and waiting area will be provided.

For bus usage, stops are being provided as part of the EAR works. These would be bus cages in the carriageway, along with shelters and flags. No laybys are anticipated to be necessary, given that vehicular numbers would be low (see Section 5.0), and that bus frequencies to serve the logistics usage would similarly be low. Given that the footway is on the south side, bus stops are being provided on this side only. For any departing passenger it would be expected they would board a westbound bus and the bus would turn at the roundabout to the west before continuing eastwards.

4.3 EAR Upgrades

In order to enable vehicular access to the site, as well as provide cycle and pedestrian access, upgrades would be required to the EAR, being the four accesses (see Figure 4-2). These are proposed to be priority junctions. As discussed with OCC, there is the longer-term ambition for the EAR to be extended to the west and become the SEPR, and the access designs should therefore not preclude this. As such, there are two scenarios considered:

- **Proposed Scenario**: EAR constructed as far as the roundabout to the west of the site (see Figure 3-7). Vehicular traffic is assumed to be only that of the development, with no bypass traffic. Priority junctions constructed, with cycleway provision and pedestrian crossings in accordance with LTN 1-20.

- **Future Scenario (with SEPR)**: EAR is extended to west to connect to the A41. Bypass traffic to be accounted for, with right turn lanes provided for approaching traffic from the west. Cycleway provision and pedestrian crossings in accordance with LTN 1-20.

Outline designs (1:500 general arrangement plans) for the junctions for both of these scenarios are included in **Appendix B**. The "proposed scenario" is shown on drawings 1923/50/15, 16 and 17, and the "future scenario (with SEPR)" is shown on drawings 1923/50/10, 11 and 12. [1]

The general principle of enabling these accesses to be retrofitted for future SEPR use is that sufficient space has been left for carriageway widening, in order to enable right turn lanes to be introduced. The example of Access 2 is shown in Figure 4-3 and Figure 4-4 (with full drawings of all the accesses in the appendix). The footway and cycleway are located sufficiently far to the south, so that when carriageway widening occurs the grass verge can simply be removed to enable this. The extent of adoption as proposed by GHVDC for the EAR (minus any vehicular accesses) is shown in red on the drawings. An additional extent of adoption, to enable future carriageway widening, is shown in blue on the drawings. The additional extent means that sufficient space would be within public ownership, and be within OCC's control, at such time they deem necessary to introduce carriageway widening to support the SEPR.

In terms of the cycleway and footway, these have been designed in accordance with LTN 1-20. There is an existing 3m cycleway and 2m footway on the south side of the EAR. At each vehicular access, these would be diverted to a crossing point which is sufficiently far south so that a car can stop if a cyclist is crossing. This is a "full set back" crossing as defined by LTN 1-20, and appropriate road markings would be provided accordingly. Furthermore, provision has been made for onward pedestrian and cycle movement within the

[1] Approved EAR drawings used as a base for this design were received from Waterman on 01/04/2022

site. The detail of this would be developed as part of a Reserved Matters Application; however, the junction proposals have been developed to allow for appropriate tie-ins for onward movement.

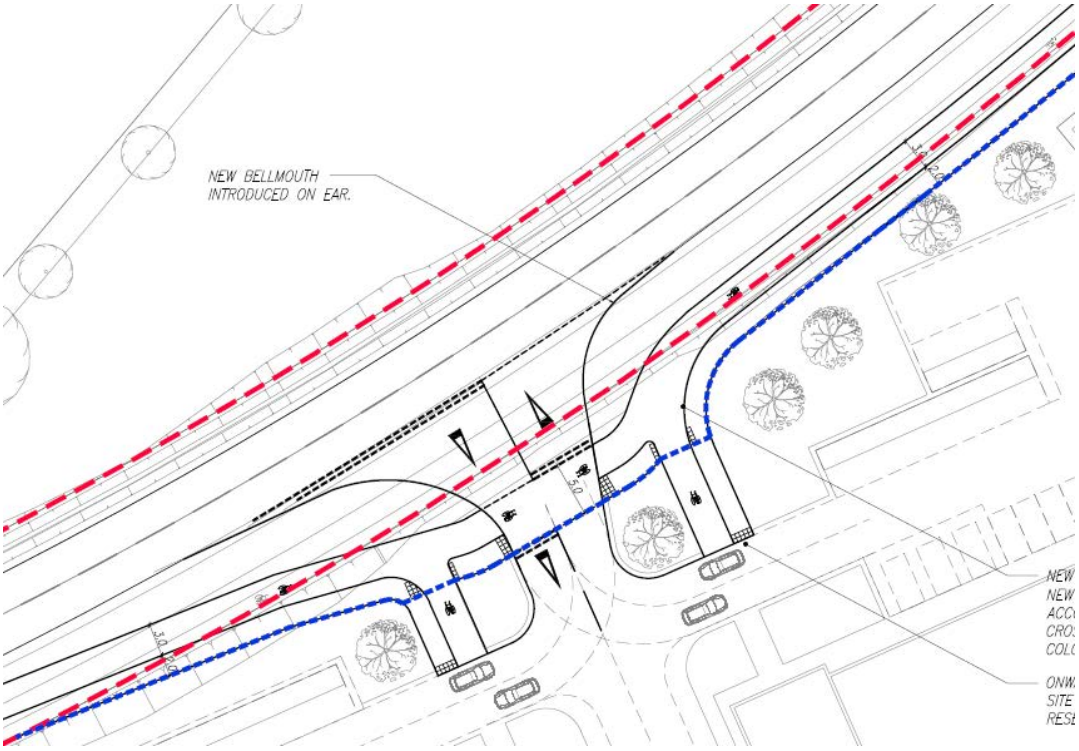

Figure 4-3 Gate 2 – Proposed Scenario

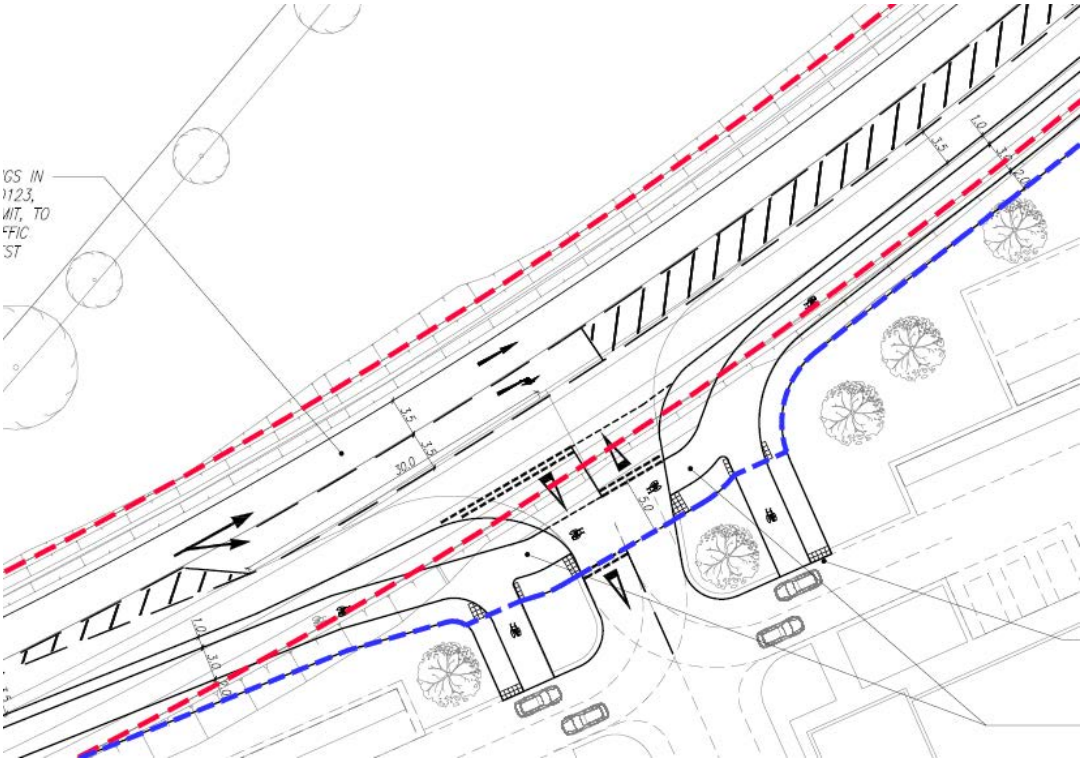

Figure 4-4 Gate 2 – Future Scenario (with SEPR)

These designs were discussed with OCC as part of the pre-app process, where they agreed to the principles (see **Appendix H**). Detailed comments from them on the design were subsequently incorporated into the junction designs.

Vehicle swept path analysis has also been undertaken and is shown on drawings. A 16.5m max legal articulated vehicle, and a 12m rigid vehicle tracked for all accesses for both scenarios. Visibility splays are also provided, for all accesses and for both scenarios. Furthermore, each access has been modelled in Junctions 8. This is summarised in Section 7.2.

4.4 Car Parking

A total of **678** car parking spaces is proposed, based on the development quantum and the parking standards as summarised in Table 2-1.

Although the site is proposed as 100% B8 usage, as a robust worst case, E(g)(i) standards have been applied to the ancillary offices in order to demonstrate that this could be accommodated on site if necessary[2].

Disabled parking is proposed at a rate of 6%. Electric vehicle parking (which could be either regular or disabled spaces) is proposed at a rate of 25%. These are proposed to be fast chargers, which are the most commonly used for the workplace.

The proposed car parking can be summarised as follows:

Table 4-1 Proposed Car Parking

	Area (sqm)		Car Parking			
Unit	Warehouse	Ancilliary Office	Regular	Disabled	Total	EV (regular or disabled)
Unit 1	4,050	443	33	2	35	9
Unit 2	6,690	531	48	3	51	13
Unit 3	15,087	909	99	6	106	26
Unit 4	7,737	609	55	4	59	15
Unit 5	9,244	609	63	4	67	17
Unit 6	14,717	810	95	6	101	25
Unit 7	8,276	587	57	4	61	15
Unit 8	6,552	479	47	3	50	13
Unit 9	22,118	1,137	140	9	148	37
		Total	637	41	**678**	169

[2] Note: the basis of this was agreed with OCC during pre-app consultation

Parking areas would be surface car parking, located adjacent to each unit. This is shown in the indicative masterplan in **Appendix A**.

4.5 Operational Vehicle Parking

For operational vehicle parking, generally there aren't specific standards. The parking quantum is typically based on the operational needs of each facility. However, a total of 224 bays for large vehicle parking are proposed as a starting point, based on similar precedents. It is expected that these numbers could be subsequently refined following agency advice, and based on an assessment of the likely operational requirements for the proposed units. These details will be confirmed at the Reserved Matters stage.

4.6 Cycle Parking

A total of **345** cycle parking spaces is proposed, based on the development quantum and the parking standards as summarised in Table 2-1. These are both long stay and visitor spaces. Long stay cycle parking would be provided in secure, covered cycle stores, which would be located in well overlooked and convenient locations which provide easy access to proposed units and cycle routes. Additionally, ancillary changing and showering facilities would be provided within individual units. Short stay cycle parking would be provided as Sheffield stands or other cycle parking solutions, and would be located near to the main entrances of buildings. The proposed cycle parking can be summarised as follows:

Table 4-2 Proposed Cycle Parking

Use Class	Area (sqm)	Cycle Parking		
		Long Stay	Visitor	Total
B8 Storage or Distribution	94470	189	94	283
E(g)(i) Office	6113	41	20	61
	Total:	230	115	345

5.0
Trip Generation

5.1 Scope Summary, and Key Time Periods

As there is an extant consent for the site, there will already be consented vehicular trips on the highway network from the previously proposed employment usage for the D1 and EL1 sites. As this employment usage is now proposed as a 100% B8 usage, the scope of the traffic impact is therefore a comparative exercise of the trip generation and distribution.

In terms of time periods, the conventional AM peak period of 0800-0900 and PM peak period of 1700-1800 has been analysed. However, as a 100% logistics scheme, there will also be interpeak periods where there is greater HGV usage. In considering the appropriate time periods to analyse, the OGV trips rates from the outline consent have been reviewed. A trip profile is shown in Figure 5-1, with full trip rates available in **Appendix C**.

Additionally, proposed B8 trip rates have been analysed. These are covered more fully in Section 5.4 (along with a summary of site selection). A trip profile is shown in Figure 5-2, and full trips are available in **Appendix D**.

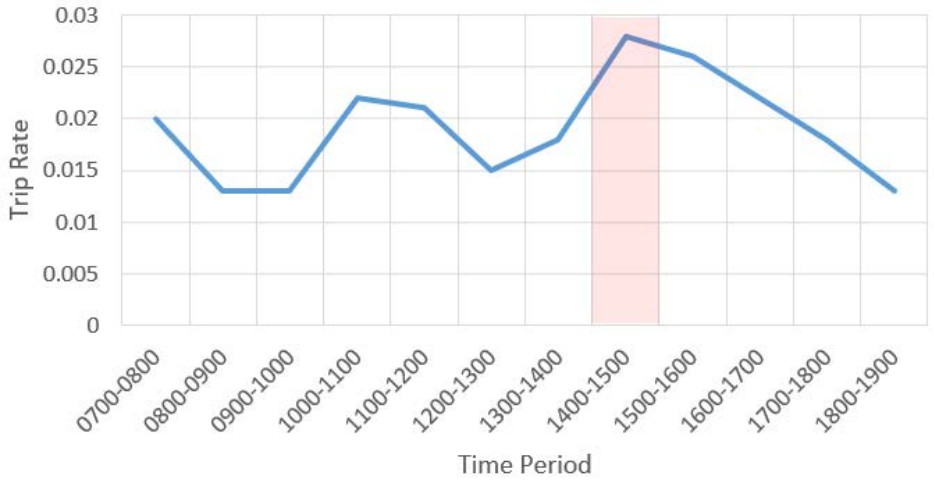

Figure 5-1: OGV Trip Profile – Consented

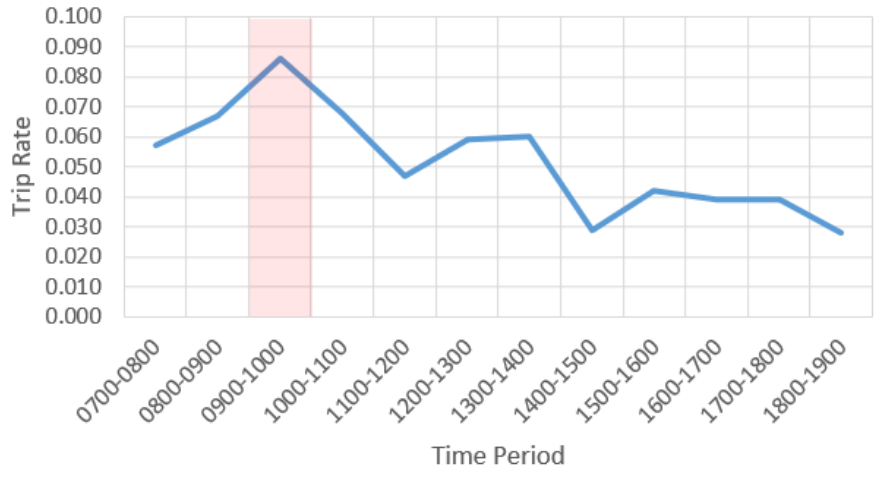

Figure 5-2: OGV Trip Profile – Proposed

The trip profile from the consented B8 OGV trips show an afternoon peak of 1400-1500. However, the trip profile from the proposed B8 OGV trips show a mid-morning peak of 0900-1000. Therefore, the following time periods will be considered:

- AM Peak (0800-0900)
- Mid-Morning Peak (0900-1000)
- Afternoon Peak (1400-1500)
- PM Peak (1700-1800)
- 12 hr Daily (0700-1900)

5.2 Consented Vehicular Trips

The wider Graven Hill development, consented in 2014, includes new vehicular trips generated on the highway network. The proposed logistics park is located on the D1 and EL1 parcels within the Graven Hill development area. These parcels had been designated for employment usage, including B1(a) office, B1(b) R&D, B1(c)/B2 light industry, and B8 warehousing.

The vehicular trips for the consented development are given in the Transport Assessment from the 2011 outline planning application, and are summarised in Table 5-1 below, with the trips for employment uses highlighted.

Table 5-1 Graven Hill Vehicle Trips Consented

Land Use	Size	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
		In	Out	Total	Out	In	Total
Residential	1,900 units	147	537	685	488	299	787
B1(a) Office	2,160m^2	31	3	32	3	24	26
B1(b) R&D	2,400m^2	34	3	36	3	26	29
B1(c)/B2 Light Industry	20,520m^2	101	53	154	43	88	131
B8 Warehousing	66,680m^2	17	8	25	8	20	29
Primary School	420 pupils	56	11	68	1	2	3
Local Retail	2,323m^2	34	31	65	21	22	43
Hotel/Restaurant/ Bar	100 rooms	22	25	47	25	19	44
Total		442	671	1,112	592	500	1,092

Whilst the outline planning application analysed the AM and PM peak periods, full trip rates are also available in the planning documents' appendices. Therefore in considering the mid-morning and afternoon peaks, these appendices have been reviewed. Consented trip rates for each planning use class are therefore given below, and are also available in **Appendix C**.

Consented B1 (a) and B1 (b) Trip Rates

In the outline planning application, the B1(a) and B1 (b) trip rates were taken from the 2006 South West Bicester TA (ref: 06/00967/OUT). These are as follows:

Table 5-2: Consented B1(a) and B1 (b) Car Driver Trip Rates

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
B1(a) & B1(b)	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
	1.42	0.12	1.54	0.95	0.17	1.12	0.28	0.31	0.59	0.12	1.09	1.21	5.07	4.81	9.9

Consented B1 (c) and B2 Trip Rates

In order to calculate car trip rates for B1 (c) and B2 usage, the outline planning application's methodology was to take total person trip rates, reduce by 5% for internalisation, and multiply by 70% to calculate car drivers (i.e. 66.5% of total person trip rates being car drivers). The total person trip rates are summarised in Table 5-3, and car driver trip rates in Table 5-4. Furthermore, OGV trip rates are given directly in the outline application. These are summarised in Table 5-5.

Table 5-3: Consented B1 (c) and B2 Total Person Trip Rates

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
B1 (c) & B2	0.737	0.392	1.129	0.429	0.319	0.748	0.449	0.446	0.895	0.312	0.648	0.960	5.270	5.396	10.666

Table 5-4: Consented B1 (c) and B2 Car Driver Trip Rates

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
B1 (c) & B2	0.490	0.261	0.751	0.285	0.212	0.497	0.299	0.297	0.595	0.207	0.431	0.638	3.505	3.588	7.093

Table 5-5: Consented B1 (c) and B2 OGV Trip Rates

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
B1 (c) & B2	0.027	0.027	0.054	0.030	0.013	0.043	0.043	0.033	0.076	0.023	0.023	0.046	0.357	0.318	0.675

Consented B8 Trip Rates

Similar to the methodology for the B1(c)/B2 trip rates, for B8 trip rates the outline application took total person trip rates and multiplied by 66.5% to calculate car driver trip rates. OGV trip rates are given directly.

Table 5-6: Consented B8 Total Person Trip Rates

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
B8	0.038	0.019	0.057	0.075	0.024	0.099	0.028	0.097	0.125	0.019	0.046	0.065	0.513	0.536	1.049

Table 5-7: Consented B8 Car Driver Trip Rates

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
B8	0.025	0.013	0.038	0.050	0.016	0.066	0.019	0.065	0.083	0.013	0.031	0.043	0.341	0.356	0.698

Table 5-8: Consented B8 OGV Trip Rates

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
B8	0.005	0.008	0.013	0.005	0.008	0.013	0.017	0.011	0.028	0.007	0.011	0.018	0.118	0.111	0.229

Consented Trips - Summary

A summary of the consented trip rates from the various land uses is therefore given as follows:

Table 5-9: Consented Trip Rates - Summary

Land Use	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Car Drivers:															
B1(a) & B1(b)	1.420	0.120	1.540	0.950	0.170	1.120	0.280	0.310	0.590	0.120	1.090	1.210	5.070	4.810	9.900
B1 (c) & B2	0.490	0.261	0.751	0.285	0.212	0.497	0.299	0.297	0.595	0.207	0.431	0.638	3.505	3.588	7.093
B8	0.025	0.013	0.038	0.050	0.016	0.066	0.019	0.065	0.083	0.013	0.031	0.043	0.341	0.356	0.698
OGVs:															
B1 (c) & B2	0.027	0.027	0.054	0.030	0.013	0.043	0.043	0.033	0.076	0.023	0.023	0.046	0.357	0.318	0.675
B8	0.005	0.008	0.013	0.005	0.008	0.013	0.017	0.011	0.028	0.007	0.011	0.018	0.118	0.111	0.229

The outline application assumed the following development quantum:

Table 5-10: Consented Employment Land Use

Land Use	Quantum (sqm)
B1a	2160
B1b	2400
B1c/B2	20520
B8	66680

Therefore, the consented trips on the highway network are summarised as follows:

Table 5-11: Consented Trips

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
Land Use	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Car Drivers:															
B1(a)	31	3	33	21	4	24	6	7	13	3	24	26	110	104	214
B1(b)	34	3	37	23	4	27	7	7	14	3	26	29	122	115	238
B1 (c) & B2	101	53	154	59	44	102	61	61	122	43	88	131	719	736	1455
B8	17	8	25	33	11	44	12	43	55	8	20	29	227	238	465
Total	182	67	250	135	62	197	86	118	204	56	159	215	1178	1193	2372
OGVs:															
B1 (c) & B2	6	6	11	6	3	9	9	7	16	5	5	9	73	65	139
B8	3	5	9	3	5	9	11	7	19	5	7	12	79	74	153
Total	9	11	20	9	8	17	20	14	34	9	12	21	152	139	291

5.3 Supplanted Vehicular Trips

The consented vehicular trips for parcels D1 and EL1 will be supplanted on the highway network with new vehicular trips from the proposed logistics park.

The area for the proposed logistics park (parcels D1 and EL1) covers all of the consented employment uses except for one consented employment building – the existing Unit D8 warehouse – which will be outside the red line boundary, and will not be supplanted. This unit is 4185sqm. Using the consented trip rates, the consented trips retained on the network for Unit D8 are as follows:

Table 5-12: Retained Trips (Unit D8)

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
Mode:	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Car Driver	1	1	2	2	1	3	1	3	3	1	1	2	14	15	29
OGV	0	0	1	0	0	1	1	0	1	0	0	1	5	5	10

The retained trips in Table 5-12 can be subtracted from the consented trips in Table 5-11, in order to calculate the supplanted trips on the network:

Table 5-13: Supplanted Vehicular Trips

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
Mode:	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Car Driver	181	67	248	133	61	194	86	115	201	56	157	213	1164	1178	2343
OGV	9	11	19	9	8	17	19	14	33	9	12	21	147	135	282

These supplanted trips can also be summarised in PCUs. This assumes, as a worst case, that all OGVs will have a PCU value of 2.3[3]:

Table 5-14: Supplanted Vehicular Trips (PCUs)

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
Mode:	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Car Driver	181	67	248	133	61	194	86	115	201	56	157	213	1164	1178	2343
OGV	20	24	44	21	18	39	45	31	76	21	27	48	338	310	648
Total	201	91	292	154	79	233	130	147	277	77	184	261	1502	1488	2991

[3] Note: see assumed PCU values for various vehicle types here: https://content.tfl.gov.uk/traffic-modelling-guidelines.pdf

5.4 Proposed Vehicular Trips

Proposed Trip Rates

In order to calculate the proposed vehicular trips, fresh B8 trip rates have been sourced from the TRICs database. These are available in full in **Appendix D**. Appropriate sites were selected and are the following:

BE-02-F-01 **FRESH FRUIT DISTRIBUTOR**
THAMES ROAD
BEXLEY
CRAYFORD
Edge of Town
Industrial Zone
Total Gross floor area: 20400 sqm
Survey date: THURSDAY *20/09/18*
Survey Type: MANUAL

DV-02-F-02 **LIDL DISTRIBUTION CENTRE**
CHILLPARK BRAKE
NEAR EXETER
CLYST HONITON
DEVON
Free Standing (PPS6 Out of Town)
Out of Town
Total Gross floor area: 50000 sqm
Survey date: WEDNESDAY *03/04/19*
Survey Type: MANUAL

SF-02-F-02 **WAREHOUSING**
WALTON ROAD
FELIXSTOWE
SUFFOLK
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 22270 sqm
Survey date: THURSDAY *11/07/13*
Survey Type: MANUAL

TW-02-F-01 **ASDA DISTRIBUTION CENTRE**
TYNE & WEAR
MANDARIN WAY
WASHINGTON
PATTISON IND. ESTATE
Edge of Town
Industrial Zone
Total Gross floor area: 31000 sqm
Survey date: FRIDAY *13/11/15*
Survey Type: MANUAL

From these sites, the following trip rates are derived for the proposed B8 usage:

Table 5-15: Proposed B8 Trip Rates

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
Mode	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Cars & LGVS	0.066	0.017	0.083	0.026	0.012	0.038	0.028	0.036	0.064	0.018	0.079	0.097	0.399	0.388	0.787
OGV	0.037	0.030	0.067	0.048	0.038	0.086	0.012	0.017	0.029	0.017	0.022	0.039	0.307	0.314	0.621
Total Vehicles	0.103	0.047	0.150	0.074	0.050	0.124	0.040	0.053	0.093	0.035	0.101	0.136	0.706	0.702	1.408

Note that in the dataset cars, LGVs, and OGVs are provided, in addition to total vehicles. Since LGVs have a PCU of 1.0 (see in subsequent analysis), a trip rate for cars & LGVs is used.

Note also that these proposed B8 trip rates are larger than the consented B8 trip rates, which had a total daily trip rate of 0.698 for cars, and 0.229 for OGVs (see Table 5-9). However, using these larger trip rates is considered a robust approach in subsequent analysis.

Proposed Trips

On the basis of 104,008sqm of B8 logistics usage, the following vehicular trips can be calculated:

Table 5-16: Proposed Vehicular Trips

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
Mode	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Cars & LGVS	69	18	86	27	12	40	29	37	67	19	82	101	415	403	818
OGV	38	31	70	50	40	89	12	18	30	18	23	41	319	326	646
Total Vehicles	107	49	156	77	52	129	42	55	97	36	105	141	734	730	1464

These can be further expressed in PCUs, assuming as a worst case that 100% of OGVs will be HGVs and have a PCU of 2.3, and that cars and LGVS have a PCU of 1.0:

Table 5-17 Proposed Vehicular Trips (PCUs)

Mode	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Cars & LGVS	69	18	86	27	12	40	29	37	67	19	82	101	415	403	818
OGV	88	72	160	115	91	206	29	41	69	41	53	93	734	751	1485
Total PCU	157	89	247	142	103	245	58	78	136	59	135	194	1149	1154	2303

5.5 Net Vehicular Trips

In comparing the proposed trips generated by the logistics park to the supplanted trips of the outline consented development, the resulting net trips generated by the proposals can be calculated, in both vehicles and PCUs:

Table 5-18 Net Vehicular Trips

Mode	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Cars & LGVS	-112	-49	-162	-106	-49	-155	-57	-78	-134	-37	-75	-112	-749	-775	-1525
OGV	30	21	50	41	32	72	-7	4	-3	9	11	20	172	192	364
Total Vehicles	-83	-29	-111	-65	-17	-82	-64	-74	-137	-29	-64	-92	-576	-583	-1160

Table 5-19 Net Vehicular Trips (PCUs)

Mode	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Total Vehicles	-44	-2	-46	-13	24	12	-73	-69	-141	-17	-49	-67	-353	-334	-687

This generally shows a decrease in proposed vehicular traffic compared to what has been consented. For example, in the AM peak there is a decrease of 111 total vehicles, or 46 PCUs. In the PM peak there is a decrease of 92 vehicles, or 67 PCUs. Daily there is an overall decrease of 1160 vehicles, or 687 PCUs. These decreases are largely driven by the removal of office, and other B1 components, from the proposals. The B8 usage that is proposed instead is generally less intensive during the peak periods, and in terms of overall daily volumes.

In terms of the other time periods analysed, during the mid-morning peak (0900-1000) there is a reduction of 82 vehicles; however, there is an increase of 12 PCUs. This is again due to the supplanting of B1 office

with B8 trips. Resultantly, the increase in logistics trips (particularly with OGVs) is greater than the decrease of office trips during this time period. However, in overall terms, the AM peak (0800-0900) is nonetheless the busiest period for the development, with 247 PCUs, versus the mid-morning peak (0900-1000) with 245 PCUs (see Table 5-17). Furthermore, these numbers are also somewhat conservative, as they assume that all OGVs will be HGVs with a PCU of 2.3, and in reality there will likely be more of a mix, and therefore generate a lesser number of PCUs. In terms of traffic impact on the local highway network, this is considered further in Section 7.0.

During the mid-day peak (1400-1500), there is a decrease of 137 vehicles, or 141 PCUs.

6.0
Trip Distribution

6.1 Consented Trip Distribution

In the Graven Hill outline application, a trip distribution was assumed for employment usage as follows:

Table 6-1 Consented Vehicular Trip Distribution[4]

Location	%	Route
Bicester N/E	13.6%	GRN - A4421 - Buckingham Road
Bicester C	13.6%	GRN - B4100
Bicester W/S	13.6%	GRN - A41 - B4030
North	8.3%	GRN - A4421 (North)
East	11.4%	PR - A41 (East)
M40	2.9%	GRN - A41 - M40
A34 South	32.5%	GRN - A41 - A34
West	4.1%	GRN - A41 - B4030 - A4095
Total	100%	

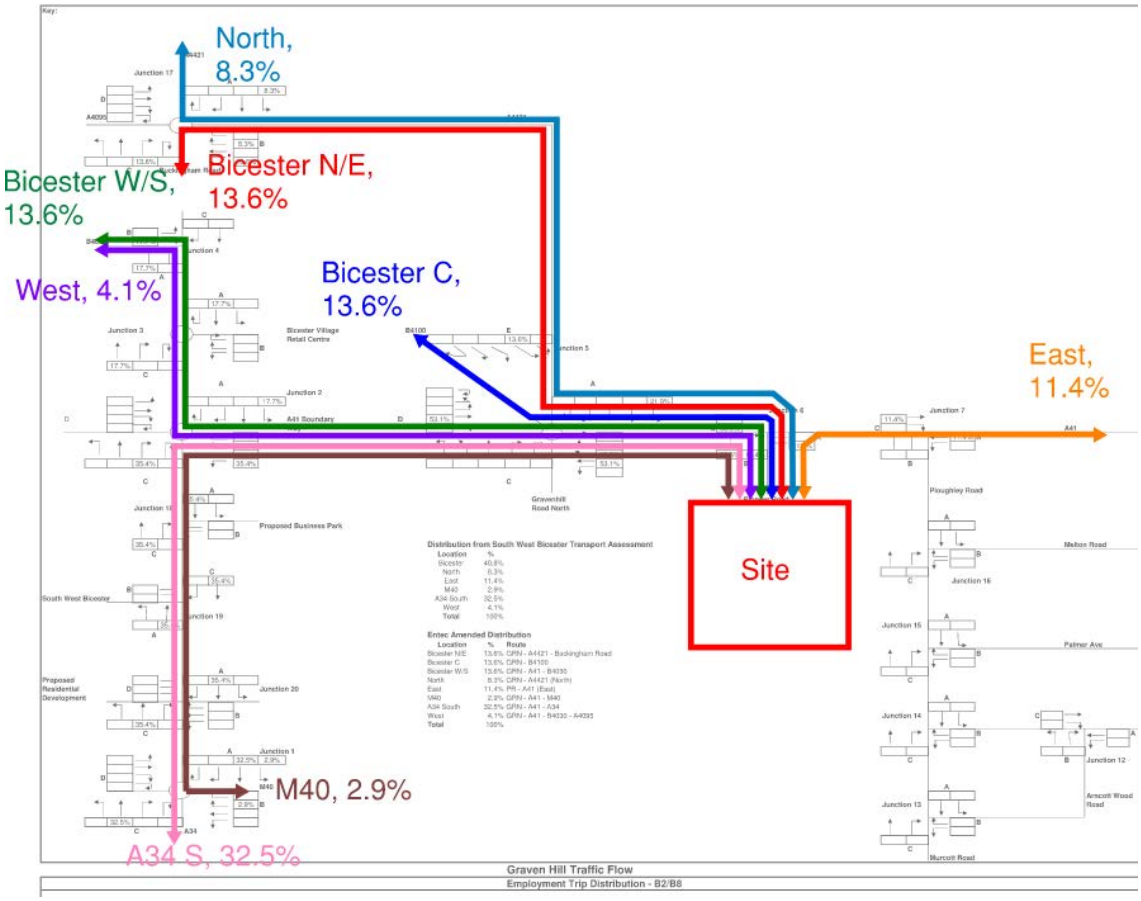

Figure 6-1 Consented Vehicular Trip Distribution

[4] Taken from trip distribution diagram in Appendix E of Outline Consent TA

This is separated into B1 and B2/B8 usages, although the percentage assignments to the various origins/destinations are the same. See consented distribution diagrams in full in **Appendix E**. As such, it is proposed that the trip distribution for the newly proposed B8 logistics usage should be unchanged from that of the consented B8 usage.

6.2 Trip Distribution with SEPR

However, with the long-term extension of the EAR westwards to connect with the A41, thus completing the SEPR, there would be a change in trip distribution. In particular, with origins/destinations to the south, where using the SEPR would be convenient for users of the D1 site. All of the traffic to/from these destinations would be assumed to be via the SEPR. Furthermore, some trips to/from Bicester W/S and the West may also use the SEPR – this is assumed to be 20% of traffic to/from these destinations.

The trip distribution assumed once the SEPR is complete is therefore shown as follows:

Table 6-2 Vehicular Trip Distribution with SEPR

Location	Consented % Assignment	**SEPR to/from East**	**SEPR to/from West**
Bicester N/E	13.6%	13.6%	
Bicester C	13.6%	13.6%	
Bicester W/S	13.6%	10.9%	2.7%
North	8.3%	8.3%	
East	11.4%	11.4%	
M40	2.9%		2.9%
A34 South	32.5%		32.5%
West	4.1%	3.3%	0.8%
	Totals:	**61.1%**	**38.9%**

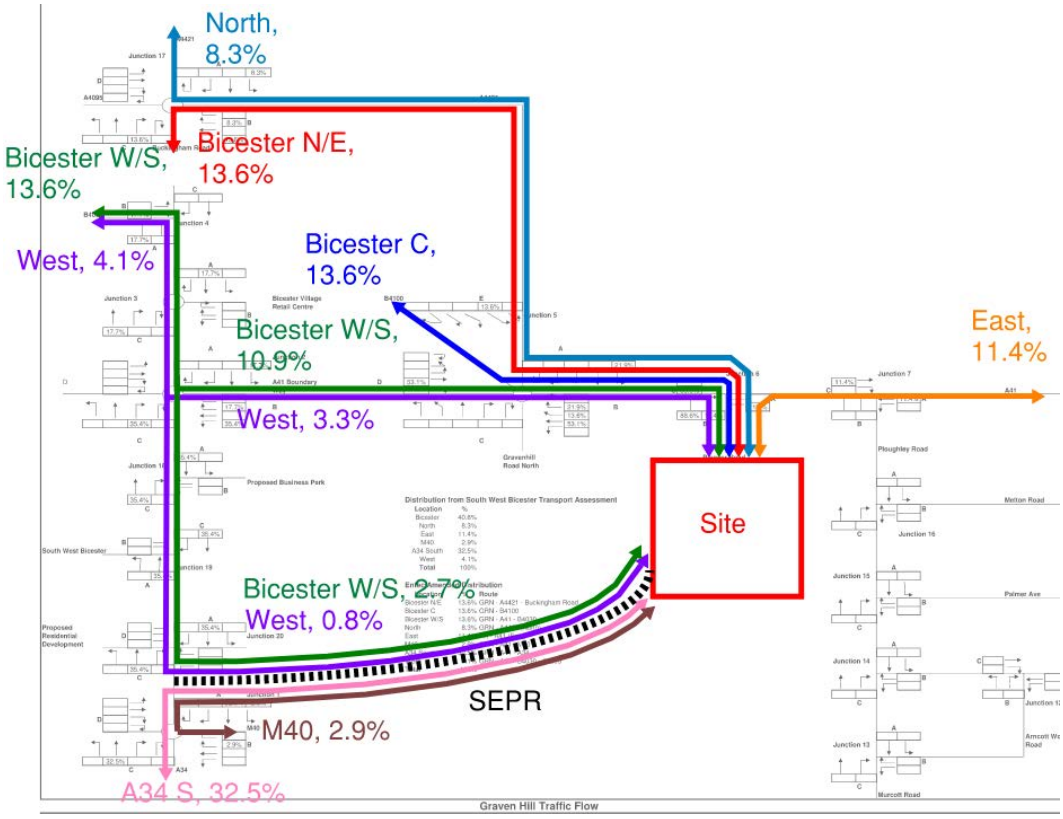

Figure 6-2 Vehicular Trip Distribution with SEPR

7.0
Traffic Impact

7.1 Wider Junctions

As shown in Section 5.0 , there is a net decrease in vehicular traffic in the majority of time periods analysed. In terms of the impact on wider junctions, a proportional analysis can be undertaken on the Pioneer Roundabout (A41/EAR), and "Rodney House" Roundabout (A41 / Graven Hill Rd / A4421 / London Road). This is in both a 'without' SEPR scenario (i.e. EAR delivered), and 'with' SEPR scenario (i.e. EAR extended).

For this exercise, the trip generation as summarised in Section 5.0 can be multiplied by the trip distributions as summarised in Section 6.0. The resultant share of total traffic generated through each roundabout for each scenario is as follows:

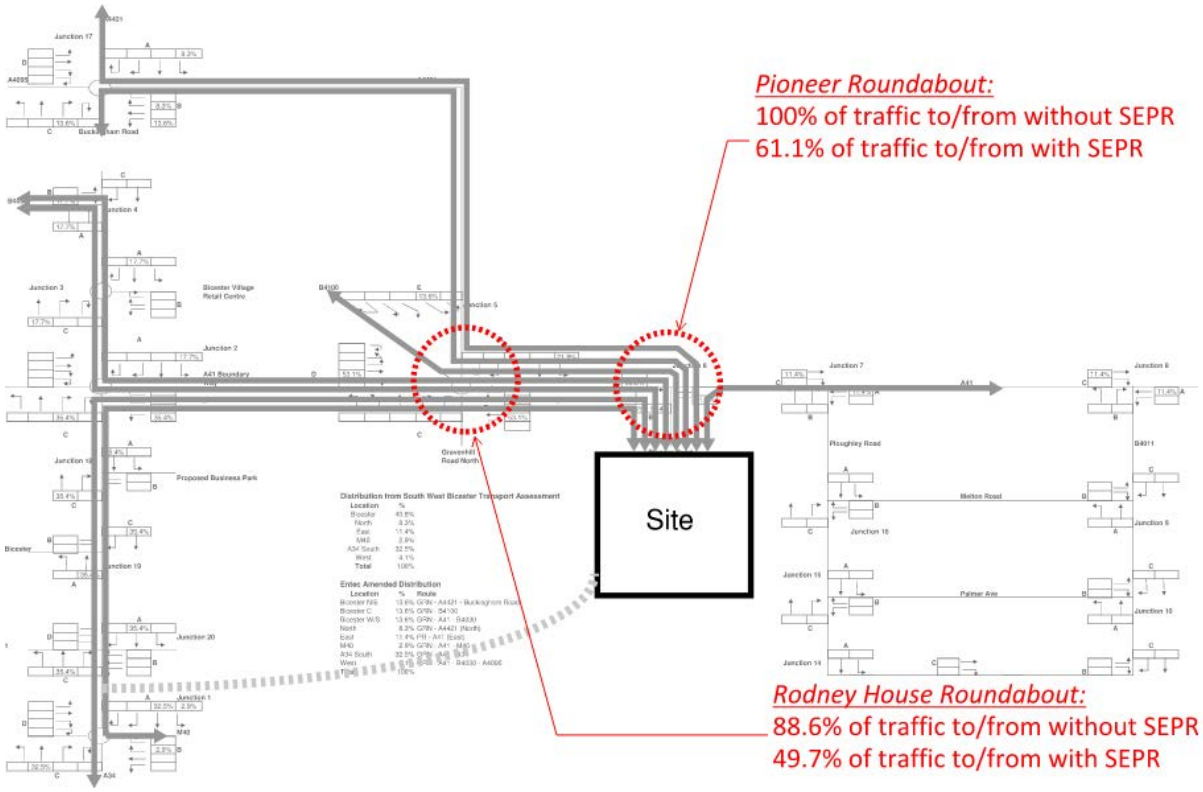

Figure 7-1 Percentage of development traffic through wider junctions

Pioneer Roundabout

A summary of the total traffic generated from the development through the Pioneer Roundabout, during different time periods and in different scenarios, and for proposed vs consented (in PCUs), is as follows:

Table 7-1 Pioneer Roundabout – Traffic Summary (PCUs)

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Without SEPR	*100% of development traffic*														
Consented	201	91	292	154	79	233	130	147	277	77	184	261	1502	1488	2991
Proposed	157	89	247	142	103	245	58	78	136	59	135	194	1149	1154	2303
Net Change	-44	-2	-46	-13	24	12	-73	-69	-141	-17	-49	-67	-352	-333	-687
With SEPR	*61.1% of development traffic*														
Consented	123	56	179	94	48	143	80	90	169	47	112	159	917	909	1827
Proposed	96	55	151	87	63	150	35	48	83	36	82	119	702	705	1407
Net Change	-27	-1	-28	-8	15	7	-44	-42	-86	-11	-30	-41	-215	-204	-419

This shows that the greatest hourly volume of development traffic through the roundabout will 292 PCUs. This is for the consented scheme in the AM peak, in the 'without' SEPR scenario.

In most time periods, the proposed scheme will result in a net decrease in vehicular traffic compared to the consented scheme. An exception is the mid-morning peak (0900-1000), where there is an increase from 233 to 245 PCUs, largely driven by OGV trips from the greater B8 usage. However, this 245 PCUs is still less than the maximum of 292 PCUs seen in the consented AM peak, which will also have more significant background traffic during this period. Therefore, it can be assumed that the Pioneer Roundabout will have sufficient capacity to accommodate the traffic from the proposed development.

Moreover, the effect of the SEPR will be to reduce traffic generated from the development through the roundabout. Although there may be larger background traffic through the roundabout at this point, similarly there will be a net decrease in the proposed scheme compared to the consented. During the mid-morning peak there will be a maximum of 150 PCUs for the proposed scheme, although this will be less than the 179 PCUs for the consented scheme in the AM peak.

Rodney House Roundabout

A summary of the total traffic generated from the development through the Rodney House Roundabout, in different time periods and in different scenarios, and for proposed vs consented (in PCUs), is as follows:

Table 7-2 Rodney House Roundabout – Traffic Summary (PCUs)

	AM Peak (0800-0900)			Mid Morning Peak (0900-1000)			Midday Peak (1400-1500)			PM Peak (1700-1800)			Daily (0700-1900)		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
Without SEPR	*88.6%*	*of development traffic*													
Consented	178	81	259	137	70	207	116	130	246	68	163	231	1330	1318	2650
Proposed	139	79	218	126	92	217	51	69	120	53	119	172	1018	1023	2041
Net Change	-39	-1	-40	-11	22	11	-64	-61	-125	-15	-44	-59	-312	-295	-608
With SEPR	*49.7%*	*of development traffic*													
Consented	100	45	145	77	39	116	65	73	138	38	91	130	746	740	1486
Proposed	78	44	123	70	51	122	29	39	68	30	67	96	571	574	1145
Net Change	-22	-1	-23	-6	12	6	-36	-34	-70	-9	-24	-33	-175	-166	-341

This shows that the greatest hourly volume of development traffic through the roundabout will 259 PCUs. This is for the consented scheme in the AM peak, in the 'without' SEPR scenario.

Similar to the Pioneer Roundabout, the proposed scheme will generate larger traffic volumes than the consented scheme during the mid-morning peak (217 versus 207 PCUs). However, this will ultimately still be less than the largest traffic generated by the consented scheme during the AM peak (259 PCUs), during which there will also be more significant background traffic. Therefore, it can be assumed that the Rodney House Roundabout will have sufficient capacity to accommodate the traffic from the proposed development.

The effect of the SEPR will be to reduce traffic generated from the development through the roundabout.

7.2 Local Accesses

The four vehicular accesses, as summarised in Section 4.3, have been modelled in Junctions 8. This is for both the "proposed scenario" and the "future scenario (with SEPR)". For the future scenario, SATURN model data was obtained for the SEPR bypass flows[5]. This is shown in **Appendix F**.

It is anticipated that traffic generated by the proposed uses would be shared across the various accesses based on the floorspace of each unit served as follows:

Table 7-3 Daily Trips on Local Accesses

Gate	Units Served:	Floorspace (sqm)	% of Development Served by Gate	Daily Trips via Gate
Gate 1	Unit 1	4493	4.3%	63
Gate 2	Unit 2	7220		
	Unit 3	17715	24.0%	351
Gates 3&4	Unit 4	8,346		
	Unit 5	9,853		
	Unit 6	15,527		
	Unit 7	8,863		
	Unit 8	7,031		
	Unit 9	23,255		
	Plant/ Amenity	1705	71.7%	1050
	Total:	104008	100%	1464

The largest volumes would be seen on Accesses 3 & 4, which link to a loop road servicing a number of units. There would be roughly 525 daily trips on each of these accesses. Each junction has been modelled in Junctions 8 using the trip generation and distribution given above to determine the potential for queue formation and delays. This has been performed for both the "proposed" scenario (i.e. no SEPR) and "future" scenarios (i.e. SEPR delivered). SATURN modelling data has been used for the link flows on the SEPR (see base data in **Appendix F**). The modelling has been performed for AM and PM peaks. For the "proposed" scenario these were 0800-0900 and 1700-1800. For the "future" scenario they were 0730-0830 and 1700-1800, due to the SATURN model data showing peak demands on the SEPR at this time.

The Junction 8 reports of the modelled junctions can be found in **Appendix G**. Model files can be provided for review on request. A summary of the results is given as follows:

[5] Source: Tetra Tech via Oxfordshire County Council, 29/04/22

Table 7-4 Summary of EAR junctions' performance in "proposed" scenario

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)
	Graven Hill - no bypass									
Junction G1 - Stream B-AC	0.00	0.00	0.00	A		0.02	9.99	0.01	A	
Junction G1 - Stream C-AB	0.00	0.00	0.00	A		0.00	0.00	0.00	A	
Junction G1 - Stream C-A	-	-	-	-	0.00	-	-	-	-	9.99
Junction G1 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G1 - Stream A-C	-	-	-	-		-	-	-	-	
Junction G2 - Stream B-AC	0.07	10.23	0.03	B		0.09	8.89	0.05	A	
Junction G2 - Stream C-AB	0.00	0.00	0.00	A		0.00	0.00	0.00	A	
Junction G2 - Stream C-A	-	-	-	-	10.23	-	-	-	-	8.89
Junction G2 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G2 - Stream A-C	-	-	-	-		-	-	-	-	
Junction G3 - Stream B-AC	0.10	10.57	0.05	B		0.14	9.37	0.08	A	
Junction G3 - Stream C-AB	0.00	0.00	0.00	A		0.00	0.00	0.00	A	
Junction G3 - Stream C-A	-	-	-	-	10.57	-	-	-	-	9.37
Junction G3 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G3 - Stream A-C	-	-	-	-		-	-	-	-	
Junction G4 - Stream B-AC	0.10	10.32	0.05	B		0.14	9.27	0.08	A	
Junction G4 - Stream C-AB	0.00	0.00	0.00	A		0.00	0.00	0.00	A	
Junction G4 - Stream C-A	-	-	-	-	10.32	-	-	-	-	9.27
Junction G4 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G4 - Stream A-C	-	-	-	-		-	-	-	-	

Table 7-5 Summary of EAR junctions' performance in "future" scenario (with SEPR)

	AM					PM				
	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)
	Graven Hill - with bypass									
Junction G1 - Stream B-C	0.00	0.00	0.00	A		0.01	14.77	0.01	B	
Junction G1 - Stream B-A	0.00	0.00	0.00	A		0.03	23.36	0.02	C	
Junction G1 - Stream C-AB	0.01	14.44	0.01	B	14.44	0.00	11.92	0.00	B	19.27
Junction G1 - Stream C-A	-	-	-	-		-	-	-	-	
Junction G1 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G1 - Stream A-C	-	-	-	-		-	-	-	-	
Junction G2 - Stream B-AC	0.11	22.14	0.06	C		0.19	18.98	0.11	C	
Junction G2 - Stream C-AB	0.07	14.48	0.03	B		0.02	11.80	0.01	B	
Junction G2 - Stream C-A	-	-	-	-	18.43	-	-	-	-	17.88
Junction G2 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G2 - Stream A-C	-	-	-	-		-	-	-	-	

Junction G3 - Stream B-C	0.05	17.79	0.03	C	20.40	0.09	15.74	0.05	C	21.47
Junction G3 - Stream B-A	0.14	31.48	0.07	D		0.25	27.80	0.14	D	
Junction G3 - Stream C-AB	0.09	13.92	0.05	B		0.03	11.33	0.02	B	
Junction G3 - Stream C-A	-	-	-	-		-	-	-	-	
Junction G3 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G3 - Stream A-C	-	-	-	-		-	-	-	-	
Junction G4 - Stream B-AC	0.18	25.09	0.09	D	19.73	0.34	22.88	0.17	C	21.29
Junction G4 - Stream C-AB	0.09	13.88	0.05	B		0.03	11.53	0.02	B	
Junction G4 - Stream C-A	-	-	-	-		-	-	-	-	
Junction G4 - Stream A-B	-	-	-	-		-	-	-	-	
Junction G4 - Stream A-C	-	-	-	-		-	-	-	-	

In the "proposed" scenario the Ratio of Flow to Capacity (RFC) values were shown to be well within acceptable range. All delays are negligible and traffic flows freely. The greatest delays are estimated to be in the AM peak with 10.57s per vehicle. The longest queues are calculated at 0.14 PCU for Gates 3 and 4 in the PM peak. The junction analysis yielded a Level of Service (LOS) for all streams for the AM and PM peaks of either classification A or B. In summary, the junctions have a negligible impact on the overall capacity of the EAR and no congestion is to be expected at any time.

In the "future" scenario (with SEPR), similarly RFC values are well within the acceptable range. Stream B-A at Gate 3 has a delay of 31.48s and a Level of Service of D in the AM Peak. Similarly, stream B-AC at Gate 4 has a Level of Service of D with a delay of 25.09s. In the PM peak, only stream B-A at Gate 3 has a LOS of D at a delay of 27.8s. Although this would mean some delay, this would be expected for lanes exiting the site onto a busy bypass road. There is likely little probability of queues forming at these arms (the longest queue 0.18 PCU) and congestion would not transfer to other areas since this is the minor arm exiting the site.

The modelling results presented in the above tables show that the junctions will operate well. The short queues at the various site accesses will be comfortably accommodated by the provided queueing space. The longest queues are contained within the minor arm which will not have a negative effect on the dominant flows on the EAR.

In summary, the proposed junctions in both scenarios can be considered adequate for the development proposed.

8.0
Outline Strategy for Construction Access

8.1 Introduction

It is expected that a Construction Logistics Plan (CLP) would be conditioned as part of the planning permission. This could be as part of a subsequent Reserved Matters Application. It is expected that this could be discharged by the Contractor, based on their preferred construction access arrangements and management procedures. However, in the interim an outline strategy for construction access is summarised in this TA.

8.2 Vehicle Routing and Site Access

Construction vehicle usage is expected to include the transport of materials and equipment, and the export of material off site. In terms of vehicular access, the existing internal road network which serves the various former MOD buildings can therefore be used accordingly.

In terms of phasing considerations, the EAR is anticipated to be complete by October of 2022. Therefore the road and bell mouth to access the D1 site should be available for construction vehicles for building demolition purposes. Should the programme for the EAR be delayed for any reason, then access arrangements would need further coordination based on the revised programme.

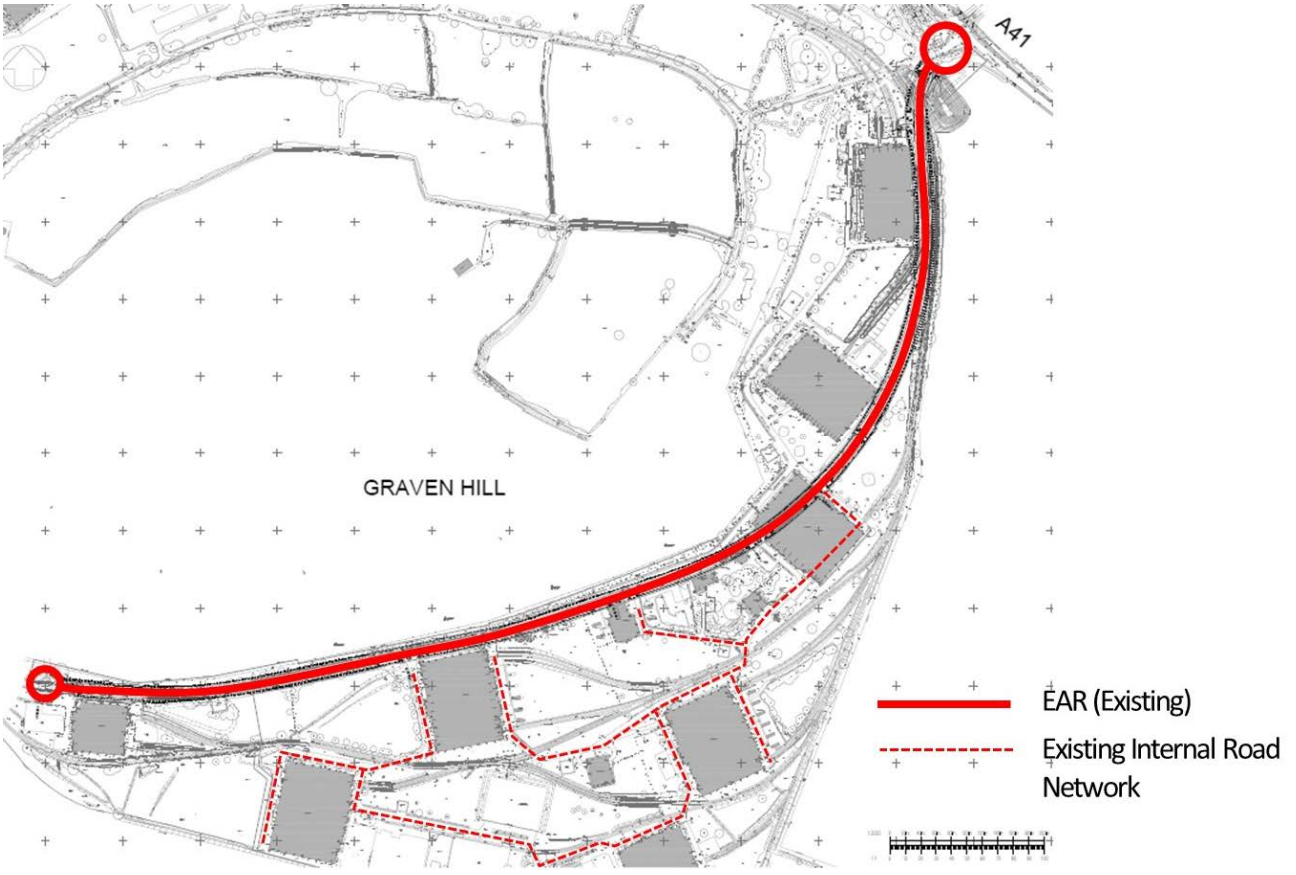

Figure 8-1 Potential Construction Vehicle Routings

In terms of any impact of construction vehicles on the highway network, this would be considered minimal. More generally, the new highways in the area have been designed to facilitate a longer term southern relief road, linking the A41 as a bypass at the south of Bicester. The EAR as it passes the site would eventually form part of this, although in the short term will terminate at the existing roundabout to the west. The Pioneer Roundabout will have similarly been designed for more substantial traffic volumes as part of this relief road scheme. Furthermore, traffic volumes in the short to medium term would be minimal, as the EAR only serves the D1 site, which has not yet been redeveloped. Therefore ample highways capacity will be available on the local highway network.

8.3 Strategies to Reduce Impacts

The overarching aim of a detailed Construction Logistics Plan will be to reduce the impact of the construction activities on neighbours and the surrounding public highway and movement networks.

- Key objectives in achieving this aim are likely to be as follows:
- Promote smarter operations that reduce the need for construction travel or that reduce or eliminate trips in peak periods
- Encourage construction workers to travel to the site by non-car modes
- Encourage the use of greener vehicles and sustainable freight modes to lower emissions
- Enhance road safety

To achieve the objectives, it is anticipated that the contractor and their project manager will:

- Produce a detailed Construction Logistics Plan
- Communicate site delivery and servicing facilities to workers and suppliers
- Schedule deliveries and monitor site vehicle movements
- Carefully manage site waste disposal and collection
- Assess safety risks of key activities and identify appropriate actions/mitigations

8.4 Implementing, Monitoring and Updating

The CLP would provide the framework for understanding and managing construction vehicle activity into and out of a proposed development, encouraging modal shift and reducing overall vehicle numbers.

It should include a strategy for monitoring vehicle movements to/from the site and mitigating associated impacts on surrounding streets and neighbouring properties, and a process for updating the CLP in response to monitoring.

9.0
Conclusion

This Transport Assessment has analysed the transport elements of the proposed D1 and EL1 site at Graven Hill, in Bicester. This is an outline application for a 100% logistics usage.

The development would be accessible by a range of transport modes, including by bus, cycle, vehicle, and on foot. Balanced levels of parking are proposed, based on standards agreed with OCC. A series of upgrades are proposed to the Employment Access Road currently being delivered, which enable vehicular access, whilst reproviding cycle and pedestrian access, and maintaining bus stops. Detailed proposals for these have been included. The cycle and pedestrian access would continue within the site, along with vehicular access to each unit, and it is expected that this would be subsequently detailed during a Reserved Matters Application.

The traffic impact of the development has been assessed. This is in reference to an extant permission for employment usage on the site. The assessment finds that the proposals generate less traffic when compared to the consented scheme. Whilst there are a greater number of HGVs due to the logistics usage, the overall traffic levels are still less than consented. A proportional impact assessment has been undertaken on the Pioneer Roundabout and Rodney House Roundabout. Furthermore, Junctions 8 modelling has been undertaken on the four proposed vehicular accesses to the site. This modelling also accounts for a future scenario, where the EAR is extended west to join the A41 to become the SEPR, and there is bypass traffic on the road. This scenario is similarly reflected in the junction designs for the priority accesses, and provision has been made for highway upgrades should they be taken forward in the future.

Appendix A
Development Proposals

Key Plan

KEY

- Site Boundary
- Site by others
- Existing Buildings
- Existing Water tanks/ Reservoirs
- Existing Concrete hardstanding
- Existing Services (Substation, Generators, Thames water pump)

GENERAL NOTE

Site Area : **311,088m2** (76.87 Acres / 31.11 Hectare)

P7	28/04/2022	DRAFT FOR PLANNING (OUTLINE)
P6	10/03/2022	FOR PLANNING (DEMO)
DRAFT	09/03/2022	DRAFT FOR COMMENTS
P5	17/09/2021	DRAFT FOR PRE-APP
P4	26/02/2021	PRE-APP_EL1 SITE ADDED
P3	04/11/2020	SITE BOUNDARY FINALISED
P2	20/05/2020	SITE BOUNDARY UPDATED
P1	15/05/2020	FOR INFORMATION

Revisions

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Client: Graven Hill Purchaser Ltd

Project: Graven Hill D1 Site, Bicester

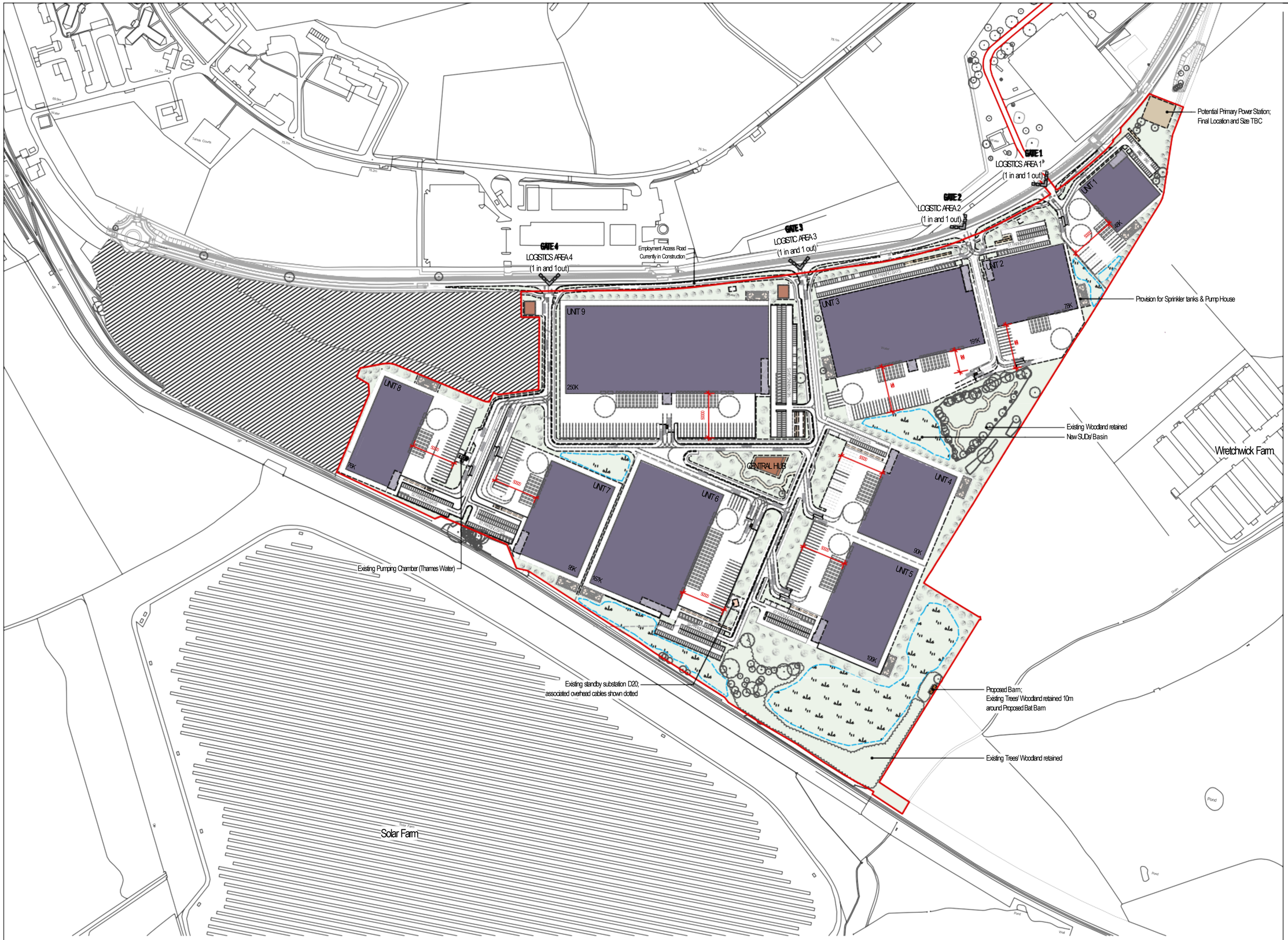
Project No.: 410

Drawing Title: Site Location Plan

Status	Drawn	Checked
PLANNING	JH	GO
Scale		Date
1:2500 @A1		May 2020
Drawing Number		Revision
410_S-00		P7

Site Location Plan

0m 40m 100m 200m 400m



KEY

- Site Boundary
- Site by others
- Proposed Cafe / Plants / Bins
- Proposed Logistics Warehouse
- Proposed Logistics Office
- Existing D20 Substation
- Green spaces
- Proposed Basin
- Potential Primary Power Station
- Existing Trees
- Proposed Trees

N

INDICATIVE PROPOSED PLAN_

0m 40m 100m 200m 400m

Revisions	
P2	09/05/2022 DRAFT FOR PLANNING (OUTLINE)
P1	28/04/2022 DRAFT FOR PLANNING (OUTLINE)

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Client: Graven Hill Purchaser Ltd

Project: Graven Hill D1 Site, Bicester

Project No.: 410

Drawing Title: INDICATIVE PROPOSED PLAN

Status	Drawn	Checked
PLANNING	JH	GO

Scale: 1:2000 @A1

Date: APR.2022

Drawing Number: 410_S-50

Revision: P2

GRAVEN HILL D1 SITE - RESTRICTIONS REMAINING (S-51 Rev P1)

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	AREA 1 GIA		AREA 2 GIA		AREA 3 GIA	
	sq.m	sq.ft	sq.m	sq.ft	sq.m	sq.ft
UNIT 1	4,493	48,357				
UNIT 2			7,220	77,718		
UNIT 3			17,715	190,685		
UNIT 4					8,346	89,835
UNIT 5					9,853	106,054
UNIT 6					15,527	167,133
UNIT 7					8,863	95,402
UNIT 8					7,031	75,676
UNIT 9					23,255	250,315
CENTRAL HUB					477	5,137
NLA TOTAL PER AREA	4,493	48,357	24,936	268,403	73,352	789,552
SUB-STATION	854	9,193				
PLANT/ BINS 1					171	1,843
PLANT/ BINS 2					171	1,843
BAT BARN					32	339
TOTAL PER AREA	5,347	57,550	24,936	268,403	73,726	793,576

	WAREHOUSING AREA GIA		ANCILLIARY OFFICE AREA GIA		
	sq.m	sq.ft	sq.m	sq.ft	Office %
UNIT 1	4,050	43,594	443	4,763	10
UNIT 2	6,690	72,005	531	5,713	7
UNIT 3	15,087	162,390	909	9,782	5
UNIT 4	7,737	83,281	609	6,554	7
UNIT 5	9,244	99,500	609	6,554	6
UNIT 6	14,717	158,411	810	8,723	5
UNIT 7	8,276	89,082	587	6,320	7
UNIT 8	6,552	70,525	479	5,151	7
UNIT 9	22,118	238,074	1,137	12,242	5
	94,470	1,016,862	6,113	65,799	

	PARKING		
	LARGE	STANDARD	DISABLED
	18.5*3.5m	2.4 X 4.8m	3.6 X 6m
UNIT 1	13	33	2
UNIT 2	9	48	3
UNIT 3	32	100	6
UNIT 4	21	55	4
UNIT 5	23	63	4
UNIT 6	25	95	6
UNIT 7	19	57	4
UNIT 8	26	47	3
UNIT 9	56	139	9
	224	637	41
	902		

	TOTAL GIA	
	sq.m	sq.ft
TOTAL DEVELOPMENT	104,008	1,119,529
TOTAL NLA	102,780	1,106,312
TOTAL NLA WAREHOUSE	102,303	1,101,175

	sq.m	acres
TOTAL SITE AREA	305,153	75.4

	sq.m	acres	sq.m	acres	sq.m	acres
SITE AREA	16,310	4	64,664	16	224,179	55

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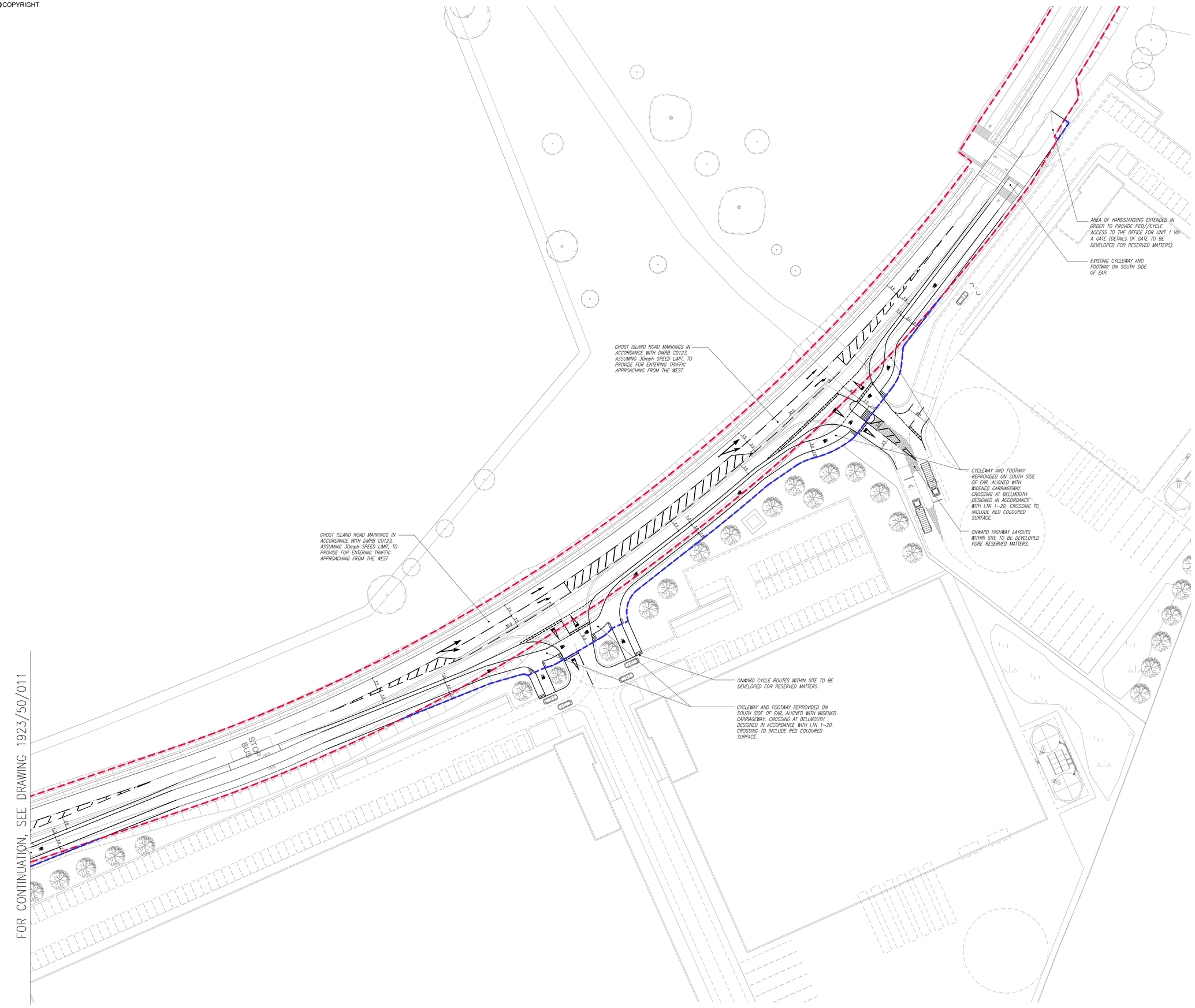
Appendix B
Highway Proposals and Tracking



notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING.
3. KEY:

EXISTING EAR ADOPTION BOUNDARY.

SUGGESTED ADDITIONAL ADOPTION BOUNDARY.

FOR INFORMATION ONLY

D	01.06.22	BACKGROUND UPDATED.	MBr
C	13.05.22	ROAD MARKINGS UPDATED.	MBr
B	22.04.22	BACKGROUND UPDATED.	MBr
A	01.04.22	CYCLEWAY AMENDED.	MBr
	23.03.22	ISSUED FOR INFORMATION.	MBr

job
GRAVEN HILL,
BICESTER

title
EMPLOYMENT ACCESS ROAD,
GATE 1 & 2 HIGHWAY IMPROVEMENTS,
FUTURE SCENARIO

drawn: UJ
checked: MBr
date: MAR'22
scale (original - A1): 1:500

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