M5 Junction 10 Improvements Scheme

Project Design Report - Part 1

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Rule 8 (1) (b)

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M5 Junction 10 Improvement Scheme

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Contents

1 Introduction

1.1.1 This document is the Project Design Report for the M5 Junction 10 Improvements Scheme (the Scheme). The purpose of this document is to show how a due regard for good design and the environment in which the Scheme is located, have been key components in the development of the preliminary design (DF3 design stage) for the Scheme.

1.1.2 This report sets out the objectives and the design vision for the Scheme. It then discusses the physical constraints, environmental designations identified as part of the assessment process and how these have influenced the design. The report also reflects upon how the design has responded to the design principles set out in The Road to Good Design published by Highways England in 2018.

1.2 Scheme Background

1.2.1 Gloucestershire faces significant challenges to achieve its vision for economic growth. The Joint Core Strategy (JCS) is a partnership between Gloucester City Council, Cheltenham Borough Council (CBC) and Tewkesbury Borough Council (TBC) which sets out a strategic planning framework for the three areas. The Adopted JCS 2011-2031 is a coordinated strategic development plan, adopted in December 2017, which shows how the region will develop and includes a shared spatial vision targeting 35,175 new homes and 39,500 new jobs by 2031. Major development of new housing (c.9,000 homes) and employment land is proposed in the JCS in strategic and safeguarded allocations to the west and north-west of Cheltenham, these being: West Cheltenham (Golden Valley); North West Cheltenham (Elms Park); and safeguard land to the west and the north-west of Cheltenham. The West Cheltenham development, in turn, is linked to wider economic investment, including a government supported cyber business park (Cyber Central UK) adjacent to the Government Communications Headquarters (GCHQ) site in west Cheltenham.

1.2.2 The existing M5 Junction 10 only provides access and egress to and from the north, with no connectivity to M5 south; this causes existing traffic to cross Cheltenham through various routes to access and leave the M5 from the south using other M5 junctions. This contributes significantly to existing traffic flows across Cheltenham, with significant congestion at peak times. To unlock the housing and job opportunities, a highway network is needed that has the capacity to accommodate the increased traffic it will generate, within a sustainable transport context.

1.2.3 Upgrading M5 Junction 10 to an all movements junction has been identified as a key infrastructure requirement to enable the housing and economic development proposed by the JCS and supported in the Gloucestershire Local Enterprise Partnership's (GFirst LEP) Strategic Economic Plan and the transport network sought by Gloucestershire County Council (GCC) (Host Authority) in the adopted Gloucestershire Local Transport Plan. Improvements to M5 J10 are critical to maintaining the safe and efficient operation of the junction; and enabling the planned development and economic growth. A bid was submitted in March 2019 to Homes England to the Housing Infrastructure Fund (HIF), wherein an investment case was made for the following infrastructure improvements. Funding was successfully awarded by Homes England in March 2020 for:

- Element 1: Improvements to Junction 10 on the M5 and a new road linking Junction 10 to west Cheltenham.
- Element 2: A38/A4019 Junction Improvements at Coombe Hill.
- Element 3: A4019 widening, east of Junction 10.
- Element 4: An upgrade to Arle Court Park and Ride.

1.2.4 Elements 1 and 3 comprise the M5 Junction 10 Improvements Scheme (the Scheme). The upgrade to Arle Court Park and Ride (now known as the Arle Court Transport Hub)

(Element 4) and the junction improvements at Coombe Hill (Element 2) were included as part of the package of improvements funded by Homes England. As they are located some distance from M5 Junction 10 and do not form part of the proposed improvement of the junction, GCC has decided to take these two elements (no.2 and no.4) forward as separate packages of work in order to accelerate the programme for these elements, and will deliver them through separate planning strategies.

1.2.5 An application for a Development Consent Order (DCO) under S.22 of the Planning Act 2008 is being submitted for the construction of improvement works to M5 Junction 10, consisting of a new all-movements motorway junction; a new West Cheltenham Link Road (the Link Road from the A4019 to the B4634 (Old Gloucester Road)[1]), and the widening of the A4019 (Tewkesbury Road)[2] east of the junction to the Gallagher Retail Park Junction. A small section of the A4019 will be realigned to the west of the junction.

[1] B4634 Old Gloucester Road referred to subsequently as the 'B4634'.
[2] A4019 Tewkesbury Road referred to subsequently as the 'A4019'.

2 Description of the Scheme

2.1.1 An overview of the proposed infrastructure improvement elements that make up the Scheme is illustrated in Figure 2-1.

2.1.2 Figure 2-1The location of the Scheme relative to the nearest urban areas of Cheltenham and Gloucester is shown in Figure 2-2. Details of the two JCS strategic allocated sites and two safeguarded sites are shown in Figure 2-3. Further details of the Scheme design, including the landscape design are shown in the Environmental Masterplan figures provided in Appendix E.

2.2 Location of the Scheme

2.2.1 Junction 10 (of the M5) is located 76 km to the south of Birmingham, 64 km to the north of Bristol, 8 km to the south of Tewkesbury, 6.5 km to the north-west of Cheltenham, and 12 km to the north-east of Gloucester. It is the northernmost of four junctions serving the Gloucester and Cheltenham urban areas.

2.2.2 This places the junction in a strategically important location for the region, particularly as north and west Cheltenham are the locations of a number of large retail parks and employment areas, and the location of planned future housing and business development.

2.2.3 The options assessment exercises undertaken determined that the current location of the M5 Junction 10, and alignment of the A4019 should be retained to support the planned housing development outlined in the JCS. Therefore, the Scheme is sited within these existing locations.

2.3 Scheme objectives

2.3.1 The objectives for the Scheme are:

1. Support economic growth and facilitate growth in jobs and housing by providing improved transport network connections in west and north-west Cheltenham.
2. Enhance the transport network in the west and north-west of Cheltenham area with the resilience to meet current and future needs.
3. Improve the connectivity between the Strategic Road Network (SRN) and the local transport network in west and north-west Cheltenham.
4. Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.
5. Provide safe access to services for the local community and including for users of sustainable transport modes within and to west and north-west Cheltenham.

2.4 The Scheme

2.4.1 The Scheme comprises the following infrastructure works:

- An all-movements junction at M5 Junction 10 (scheme element 1).
- A new West Cheltenham Link Road east of Junction 10 from the A4019 (scheme element 2).
- Widening of the A4019 to the east of Junction 10 (scheme element 3).

M5 Junction 10

2.4.2 The improvements to M5 Junction 10 are to increase the capacity of the junction, and to upgrade the current restricted movements junction to an all-movements junction. To enable travel both south and north on the M5, the two existing Junction 10 sliproads will be removed, and four new slip roads will be constructed to provide access and egress to the M5 in all directions.

2.4.3 Two new overbridges will be constructed over the M5, centered either side of the existing overbridge carrying the A4019 over the M5, which will then be demolished. The new overbridges will create a new elongated shaped roundabout junction over the M5. The A4019 will be realigned to provide an appropriate entry angle to the new roundabout. A dedicated route for cyclists and pedestrians will be provided at grade through the junction (see the section below on the A4019 Widening). As a result of the new slip roads, the Piffs Elm and the Leigh Brook culverts[3] that pass under the M5 will be extended. The alignment of the new southbound on and northbound off slip roads means that an extension of the River Chelt culvert under the M5 will not be required.

2.4.4 The new roundabout will be lit.

West Cheltenham Link Road

2.4.5 The West Cheltenham Link Road (the 'Link Road') is a proposed new two lane 1.4km road, with an active travel corridor (comprising a segregated cycleway (3m) and footway (2m)), from the B4634 to the A4019. The Link Road is intended to provide greater connectivity between the reconfigured M5 Junction 10 and the West Cheltenham Golden Valley Development. The development of the Link Road design considered other route corridors between the A4019 and the B4634, including an upgrade of the existing Withybridge Lane. The route option selected was chosen on the basis of it having the best combination of low flood risk, good connectivity between Junction 10 and the West Cheltenham Development Area, and low impact to local residents and environmental receptors (including the listed buildings on Withybridge Lane, and the scheduled monument at Moat House).

2.4.6 The design of the Link Road includes flood relief structures across the floodplain to the north of the River Chelt, and a single span bridge over the River Chelt.

2.4.7 Two new junctions connect the Link Road with the existing A4019 (to the north) and the B4634 (to the south):

- A4019 - a four-arm signalised junction with the northern arm ultimately providing access to the new developments to the north of the A4019, as safeguarded in the JCS.
- B4634 - a new four arm signalised junction on the B4634 to connect the West Cheltenham Golden Valley Development to the M5 Junction 10 via the Link Road and the A4019. The location of this junction is close to Hayden Hill Farm on the B4634, and approximately 300m east of the junction for Withybridge Lane.

2.4.8 Street lighting along the Link Road will be limited to the two new junctions and the sections of the Link Road adjacent to the junctions.

A4019 Widening

2.4.9 The A4019 links the M5 Junction 10 to north-west Cheltenham. The section of the A4019 covered by the Scheme runs from just west of the M5 Junction 10 (at the junction of Stoke Road and the A4019) eastwards through to the existing dual carriageway at the Gallagher Retail Park (finishing just east of the B4634 and A4019 junction).

2.4.10 The Scheme will widen the A4019 to a two-lane dual carriageway from Withybridge Lane, eastwards through to the Gallagher Retail Park, where the Scheme will tie into the existing dual carriageway. Widening of the A4019 through Uckington will be predominantly to the southern side of the A4019. Widening to the east of Uckington will be to the northern side of the A4019. To the west of Junction 10 the existing section of two-lane dual carriageway will be replaced with single lanes.

2.4.11 The height of the A4019 in the vicinity of the Withybridge Lane junction will be raised to remove an existing low point that experiences surface water flooding.

2.4.12 Two new signalised junctions will be created on the A4019 (between Uckington and the Gallagher Retail Park) to provide access from the A4019 into the future North West Cheltenham Development area. Changes will also be made (as part of the Scheme) to

[3] Leigh Brook culvert is referred to as the Barn Farm culvert in design documents.

the layout of the junction of the A4019 with the B4634 at the eastern end of the Scheme (referred to as the Gallagher junction).

2.4.13 For residents and businesses whose current access is directly onto the A4019 (for example those in Uckington, and along the southern side of the A4019 in north-west Cheltenham), short sections of new access roads will be created alongside the widened A4019 to facilitate ease of access both westbound and eastbound. This includes a new access road connecting Cooks Lane with the Link Road.

2.4.14 The Scheme includes a segregated cycleway (3m width) and footway (2m width) on the northern side of the A4019, which with the exception of a short section of shared use path through Uckington, will extend for the full length of the proposed A4019 widening. This active travel corridor will provide connectivity for pedestrians and cyclists between north-west Cheltenham and the junction of the A4019 and Stanboro Lane (west of M5 Junction 10), and will tie into an existing shared use path at the eastern end of the Scheme, and an existing footway at the western end.

2.4.15 Street lighting will extend for most of the length of the A4019 within the Scheme boundary. Sections of the A4019 to the east and west of Uckington will not be lit so as to provide mitigation for bats. An underpass (the Withybridge A4019 underpass) will be provided underneath the A4019, just east of the Junction 10, to provide further mitigation for bats. The underpass will also allow access for walkers, cyclists and horse riders (WCH).

2.5 Design vision

2.5.1 Whilst achieving the Scheme objectives described above, the design vision for the Scheme aims to:

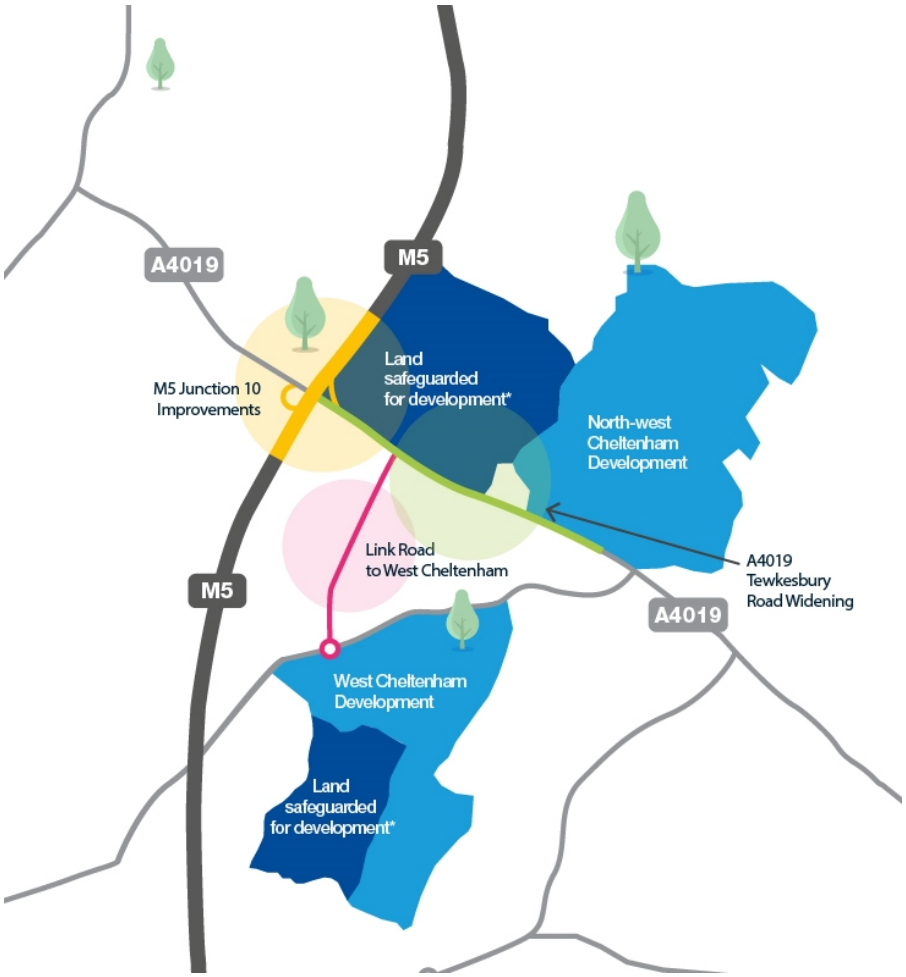
- Unlock the housing and employment opportunities within the west and north-west Cheltenham developments through the provision and future proofing of improved transport network connections.
- Integrate the Scheme into the distinct and varying landscape characters present, and manage impacts on the flood zone locally.
- Provide enhancements for sustainable travel and for biodiversity, addressing requirements for Biodiversity Net Gain (BNG).
- To produce a landscape design that contributes to the landscape character of the area and provides visual amenity and screening, with the aim of embedding the Junction 10, the widened A4019 and the Link Road into the landscape.

Figure 2-1 – Showing the alignment of the M5 Junction 10 Improvements Scheme (the Scheme)

Figure 2-1 provided in Appendix C.

Figure 2-2 – Location of the Scheme

Figure 2-3 – Location of the Scheme elements (M5 Junction 10 Improvements, A4019 Widening, and the Link Road to West Cheltenham), shown in the context of the allocated land at West and North West Cheltenham, and the two safeguarded land areas. (Safeguarded land is land which has been identified for development in the future and is protected from conflicting development).*



3 Geographical, Environmental and Socio-Economic Context

3.1 Description of the Scheme area

3.1.1 The Scheme area is a largely flat or broadly undulating lowland landscape set in the Severn Vale. It is predominantly rural, with land use being a combination of arable and pasture (of excellent to moderate agricultural value), with medium to large fields bounded in many instances by hedges or hedgerows. Traditional orchards are widespread, and the area also contains important areas of lowland meadow and floodplain grazing marsh.

3.1.2 The greatest concentrations of residential properties and community facilities relative to the Scheme are found in the main settlements of Gloucester and Cheltenham. The smaller villages of Staverton and Boddington to the west, Hayden to the east and Staverton Bridge to the south are the largest settlements within the study area, with the hamlet of Uckington spread either side of the A4019 in a key location for the Scheme. There are several isolated properties and farmsteads in the rural areas between these settlements. Notably, there is a cluster of 14 properties at Withybridge Gardens, adjacent to the existing M5 Junction 10.

3.1.3 Multiple watercourses cross the Scheme area, including the River Chelt and Leigh Brook running from east to west as eventual tributaries to the River Severn, at least 7.5 km downstream of the Scheme.

3.1.4 The area to the north of the A4019 and east of the M5 is affected by surface water and fluvial flooding. Land just south of the A4019 and extending either side of the existing M5 Junction 10 is essentially floodplain for the River Chelt and falls within Flood Zones 2 and 3, where medium and high probability of flooding is recognised. To the immediate north of the A4019 is the floodplain of the Leigh Brook, an ordinary watercourse. This is not included in Flood Zone 3 but is known to flood. There is also land in Flood Zone 3 near Stoke Orchard, to the north-east of M5 Junction 10, associated with the River Swilgate and its tributary Dean Brook. Flood zones are shown in Figure 3-1.

3.1.5 There are two groundwater bodies (designated under the Water Framework Directive) within the study area.

3.1.6 The dominant arable and grassland habitats are interspersed with pockets of other terrestrial habitats, notably broadleaved and mixed plantation woodland, traditional orchards, hedges and hedgerows, and unimproved and semi-improved neutral grassland. Along with the watercourses, these areas provide the sites of greater nature conservation value within the Scheme area.

3.1.7 There are 31 designated heritage assets within 1km of the Scheme, the most notable of which is Moat House, a Scheduled Monument with a group of Grade II listed buildings 100m south of the A4019.

3.1.8 There is one area of known historic landfill within the Scheme area, at Colman's Farm, located to the north of the M5 Junction 10 adjacent to the motorway.

3.1.9 The climate of the Scheme area is typified by relatively mild winters and warm summers with higher than UK average mean and maximum monthly temperatures. In the future it is projected that, on average, the Scheme area is likely to experience hotter, drier summers and warmer, wetter winters. Alongside these changes in the average conditions, it is likely that climate change will increase the frequency and severity of extreme weather events such as heavy rainfall, storms and heatwaves.

Existing road corridor

3.1.10 The M5 and the A4019 form the existing road corridor for the Scheme:

- The M5 Junction 10 was opened originally in March 1971 as part of the section of

motorway between Tewkesbury and south Gloucester (Junctions 9-12). It provides free-flow links from the southbound M5 to the A4019 towards Cheltenham and for traffic heading west from Cheltenham to join the northbound M5. The A4019 passes over the M5 on a dual carriageway overbridge.

- The A4019 links Cheltenham with the A38 at Coombe Hill, crossing the M5 via an overbridge. Approximately 600m either side of the M5 overbridge the A4019 is a two-lane dual carriageway, before reverting into a single carriageway eastwards up to the signalised junction with the B4634. From this junction the A4019 continues as a two-lane dual carriageway up to the roundabout junction with Princess Elizabeth Way, Kingsditch Lane and Tewksbury Road. Along the length of the A4019 from M5 Junction 10 to the signalised junction with the B4634 there are several crossings providing access to both the north and south.

3.1.11 Withybridge Lane joins the A4019 from the south, at a point approximately 500m east of Junction 10. Withybridge Lane is a 50mph single carriageway with property and field accesses located to both sides of the carriageway throughout.

3.1.12 The restricted format of the M5 Junction 10 currently, means that slip roads exist only to the north and from the north, with no southern access slip roads. This means that traffic from Cheltenham must access the southbound M5 via either Junctions 9 or 11, and puts increased pressure on already congested local roads and particularly on Junction 11, which provides access to and from southern Cheltenham on the A40. The restricted format of the Junction 10 also limits emergency service operations on and off the M5.

3.1.13 The limitations on the M5 Junction 10 mean that traffic uses the existing highway network via Cheltenham to access the M5 to the south via M5 Junction 11 and M5 Junction 11a, causing congestion and journey time unreliability. This traffic is likely to affect air quality and noise for receptors near the affected road network.

3.1.14 The current A4019 overbridge provides the minimum level of headroom (without being considered a low bridge), and also requires remedial works.

Connectivity

3.1.15 Whilst there are some public rights of way (PRoW) within and through the Scheme area, the M5 and A4019 currently act as barriers, limiting or funnelling movement for walkers, cyclists and horse riders (WCH). Access across these PRoWs is therefore interrupted and the position of existing crossing infrastructure, which includes footbridges and subways, is likely to have shaped the preferred routes of WCH for recreation and commuting within the area surrounding the Scheme.

3.1.16 A pedestrian footway follows the northbound carriageway along much of the A4019 from Coombe Hill. At the western end of the M5 overbridge the footway ends and becomes a grass verge. It is evident from observations that the verge is used by pedestrians up to the junction of the M5 southern slip road, with pedestrians then continuing along the footway towards Cheltenham.

3.1.17 The Scheme will include a new active travel corridor for pedestrians and cyclists along the length of the A4019 within the extents of the Scheme, and will retain all existing PRoWs. The active travel corridor aligns closely with the A4019 for much of its route in order to avoid additional land take from the existing properties and businesses. An offline crossing under the A4019 will also be created for WCH, connecting the bridleway (ref. number AUC1) to Withybridge Lane.

3.2 Sensitive areas and statutory and non-statutory designations

3.2.1 Environmental designations were identified during the environmental assessment work undertaken as part of the Scheme design process, and have informed the parameters of the design. These designations are listed in Table 3-1 below, with their locations and relative proximity to the Scheme shown in Figure 3-1.

Table 3-1 – Environmental designations and distance to the Scheme

Environmental designation	Distance to the Scheme
Conservation designations	
- Severn Estuary - designated as a Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar and Site of Special Scientific Interest (SSSI)	7.5 km downstream from the closest Scheme interaction. 23 km south-west of the Scheme (in a direct line). From where the River Chelt joins the River Severn, the Severn Estuary designations are a further 40 km downstream.
- Walmore Common SPA	17.5 km south-west of the Scheme
- Wye Valley and Forest of Dean SAC	21 km south-west of the Scheme
- Coombe Hill canal SSSI	3 km west of the Scheme
- Cleeve Common SSSI	4.5 km east of the Scheme
- Bredon Hill SAC	12.5 km north of the Scheme
- Dixon Wood SAC, SSSI	8.3 km north-east of the Scheme
- Cotswold Beechwoods SAC	9 km south of the Scheme
Landscape designations	
- Cotswolds Area of Outstanding Natural Beauty (AONB)	4.5 km east of the Scheme
Flood designations	
Flood zones	The Scheme is within the floodplains of the River Chelt and Leigh Brook: - Land south of the A4019 and extending either side of the existing M5 Junction 10 is essentially floodplain for the River Chelt and falls within Flood Zones 2 and 3, where medium and high probability of flooding is recognised. - To the immediate north of the A4019 is the floodplain of the Leigh Brook, an ordinary watercourse. This is not included in Flood Zone 3 but is known to flood. There is also land in Flood Zone 3 near Stoke Orchard, to the north-east of M5 Junction 10, associated with the River Swilgate and its tributary Dean Brook.
Heritage designations	
There are 31 designated heritage assets within 1km of the Scheme and a further 65 non-designated heritage assets. The most notable of these are:	
- The Scheduled Monument and four Grade II listed buildings located at Moat House	100 m south of the A4019 at Uckington

Environmental designation	Distance to the Scheme
- Two Grade II listed buildings near the Uckington & Elmstone Hardwicke Village Hall	160 m north of the A4019 at Uckington
- Two Grade II listed buildings and associated with archaeological remains of Withybridge Mill. An additional Grade II listed building is located nearby, but not associated with Withybridge Mill.	200 m west of the Link Road.
Air quality designations	
- Tewkesbury Town Centre Air Quality Management Area (AQMA)	5 km north of the Scheme
- Cheltenham Town Centre AQMA	1.9 km south-east of the Scheme
Noise Important Area (NIA) designations	
- NIA 3950	On the A4019 to the west of Uckington
- NIA 3951 (National Highways)	Covers the existing M5 Junction 10
- NIA 3952 (National Highways)	800m north of existing M5 Junction 10
- NIA 3949 (Gloucestershire)	On the A4019 at Uckington
- NIA 3948 (Gloucestershire)	On the A4019 to the west of the Gallagher junction
- NIA 11920 (Gloucestershire)	On the A4019 at the eastern end of the Scheme
- NIA 3893 (Gloucestershire)	On the A4019 350 m from the eastern end of the Scheme

Figure 3-1 - Environmental constraints plan

Figure 3-1 provided in Appendix D.

3.3 Environmental and socio-economic receptors

3.3.1 The environmental and socio-economic context of the Scheme is defined by the respective environmental and community and recreational receptors relative to the Scheme. These have been identified as affected by the Scheme in accordance with the criteria set out in the Design Manual for Roads and Bridges (DMRB), and are described in the tables below. The Scheme design has been influenced by the need to mitigate any potential impact on these key receptors. Following the non-statutory consultation, further design refinements which enhance the mitigation of the Scheme have been incorporated into the preliminary design.

3.3.2 Table 3-2 to Table 3-5 below outline these receptors and summarise these mitigation considerations including the revisions since the non-statutory consultation.

- Table 3-2 - Environmental receptors – identified through a programme of environmental surveys.
- Table 3-3 - Community receptors – identified through a programme of consultation with affected homeowners, landowners and tenant farmers.

- Table 3-4 - Recreational receptors.
- Table 3-5 – Physical receptors.

3.3.3 Design refinements made following consultation

3.3.4 Consultation with stakeholders and local residents contributed to the development of the design. Key refinements were:

- The selection of the preferred route with the new gyratory roundabout at Junction 10 centred around the existing Piffs Elm overbridge, rather than offset to the north or south of it.
- Removal of the proposed link road between Cooks Lane and Moat Lane, with access into Cooks Lane provided from the Link Road instead.
- The retention of vehicle access through Withybridge Lane, rather than closure of the lane to through traffic.

Table 3-2 – Environmental receptors

Environmental receptor	Potential impacts considered and mitigation included in the preliminary design
Land designated for conservation	No direct impacts have needed to be considered as the Scheme is located some distance from all areas designated for conservation value. Indirect effects through the Scheme's drainage system will be minimised through the inclusion of swales and attenuation basins to remove pollutants from the highway drainage before it is discharged into the surface watercourses that flow into the River Severn.
Scheduled monuments	Infrastructure works have been avoided in the vicinity of the scheduled monument of Moat House (Uckington). Access for residents in Cooks Lane (eastbound on the A4019) has been provided via the Link Road, rather than the creation of a new lane connecting to Moat Lane (as presented at the non-statutory consultation). This will also avoid any increases in traffic past the scheduled monument (and listed buildings).
Listed buildings	Impacts to the listed buildings in the vicinity of the Scheme have been avoided as a result of decisions to locate any infrastructure works away from these receptors. In particular: - The design decision not to upgrade Withybridge Lane to provide the Link Road element of the Scheme, thereby avoiding direct impacts and setting impacts to listed buildings around Millhouse Farm (on Withybridge Lane). - The design decision to remove the new lane link between Cooks Lane and Moat Lane (see details above for scheduled monuments).
Buried archaeology	A programme of geophysical assessment and archaeological evaluation trenching has been undertaken to understand the presence and significance of buried archaeology. Further investigation will be undertaken in advance of any construction works.
Veteran trees	An arboricultural assessment undertaken identified a single veteran tree near to the Scheme. This is located east of Withybridge Lane, and will not be impacted directly by the Scheme.
Noise important areas (NIAs)	Locations along the A4019 and M5 are designated as NIAs. Noise barriers are proposed as part of the design to mitigate the effects of increased noise to people living within areas designated as NIAs.

Environmental receptor	Potential impacts considered and mitigation included in the preliminary design
Existing surface watercourses (River Chelt, Leigh Brook)	Existing surface watercourses are impacted directly by the Scheme in three locations: - The River Chelt – at the River Chelt bridge, where the Link Road crosses the river. The bridge has been designed as a clear span bridge with the bridge abutments set >4m back from the river bank. This will avoid direct impacts to the river and the river banks. - The River Chelt – at the River Chelt culvert, where the M5 crosses the river. Extensions to the culvert (and subsequent greater impacts to the river from vegetation loss and shading) have been avoided through the design of the interchange bridges and the subsequent shortening of the slip road tie in point. - The Leigh Brook – at the Leigh Brook culvert, where the M5 crosses this watercourse. This culvert has been widened to accommodate the north facing slip roads. The culvert, and Leigh Brook has not altered the design.
Existing hedgerows	Existing hedgerows form important ecological habitats within the Scheme area. The Link Road has been aligned so that it crosses hedgerows at an angle where possible, so as to minimise the length of hedgerow removed as a result of the Scheme.

Table 3-3 – Community receptors

Community receptor	Potential impacts considered and mitigation included in the preliminary design
Properties immediately to the east and west of M5 Junction 10	Most of the properties immediately to the east and the west of the M5 will be demolished as a result of the construction of the new gyratory roundabout and slip roads at Junction 10. Feedback from residents at the non-statutory consultation was for the design option which gave them the opportunity to have their properties to be purchased by the Scheme, and led to the selection of the current design centred around the existing A4019 overbridge.
Properties in Uckington	The widening of the A1049 through Uckington has been primarily to the south of the existing alignment so as to minimise direct impacts to the greater number of properties to the north of the A4019 in this location.
Properties along the A4019 east of the Fire Station	The widening of the A1049 to the east of the Fire Station has been primarily to the north of the existing alignment so as to minimise direct impacts to the greater number of properties to the south of the A4019 in this location.
Informal Traveller site	Maintaining safe access to this location has been a key consideration in the design.
Land use and access - Scheme wide	Access: - Existing accesses to agricultural land from the A4019 and also across the alignment of the Link Road will be impacted directly by the Scheme. New access points have been created as part of the design to ensure access to all relevant land parcels is retained after construction. - The design of the River Chelt bridge provides sufficient headroom, and space between the bridge abutments and the river, for livestock and small vehicles to pass under the bridge.

	- Ease of access for residents living along the A4019 (and the side roads of Cooks Lane and Homecroft Drive) has been maintained through the creation of local service roads through to one of the signalised junctions on the A4019. Land use: - Agricultural land use was assessed through discussions with all farmers whose land was directly impacted by the Scheme. This resulted in the relocation of a number of the attenuation basins (south of Barn Farm, and at the southern end of the Link Road for example) into areas that were less impactful on the farm's activities.
Community receptors within Noise Important Areas (NIAs) – Scheme wide	Noise barriers are included in the design to reduce noise impacts to people living within areas designated as NIAs, including Cooks Lane and Uckington.

Table 3-4 – Recreational receptors

Recreational receptor	Potential impacts considered and mitigation included in the preliminary design
Public rights of way (PRoW)	All existing PRoWs will be retained as part of the Scheme design. Public footpath (ref. AUC11) will be diverted slightly southwards to pass under the new River Chelt bridge. The design of the bridge has allowed for sufficient headroom for pedestrian access (and equestrian access if the horse is led rather than ridden) underneath the bridge for both this PRoW, and PRoW ref. ABO24 which runs along the southern side (left bank) of the River Chelt. - Bridleway ref. AUC1 will be extended through the new underpass underneath the A4019, through to Withybridge Lane, to the south of the A4019. - Footpath ABO14 part 2 to the west of the M5 and south of the A4019. A connection along an access road will be incorporated into the Scheme although no formal footway connection is planned. - Footpath AUC8 is to the east of Uckington and to the north of the A4019. Retained and will be connected into the Scheme.
Existing footways	There is an existing pedestrian footway along the northbound carriageway along much of the A4019 from Coombe Hill to Cheltenham, except for the section across the M5 Junction 10, although there is a desire line through the verge in this location. The Scheme design will enhance this existing footway through the creation of a segregated footway and cycleway along the length of the A4019 within the extents of the Scheme. A similar active travel corridor will be created alongside the Link Road.
Bus stops	The bus stops located on the A4019 between Cooks Lane and Uckington have been relocated closer to Uckington and the signalised crossing in this location. The bus stops on the A4019 adjacent to the North West Cheltenham Development Area are considered the most likely to have high usage due to the suitability of this location to serve the adjacent development. These bus stops have therefore been upgraded to lay-by type bus stops.

Table 3-5 – Physical constraints

Physical constraint	Potential impacts considered and mitigation included in the preliminary design
Natural flood pattern of the River Chelt	During periods of high flow on the River Chelt, water overtops the right bank (at approximately NGR 911 247) and flows westwards across the line of the Link Road, towards the M5, where it drains through the Piffs Elm culvert under the M5. The design of the Link Road includes a series of culverts underneath it so as not to impede this flow of water. A flood storage area has been created within the design between Withybridge Lane and the M5 to collect this floodwater within a localised area whilst it drains through Piffs Elm culvert. The inclusion of the flood storage area will reduce the area affected by this flood event. Flooding also occurs periodically over the A4019 east of the junction with Withybridge Lane. The Scheme design has raised the height of the A4019 to prevent this from occurring in the future (within the parameters of a 1 in 100 year flood event with 53% climate change).
Floodplain of the River Chelt	The land between the A4019 and the B4634 contains the floodplain for the River Chelt. To minimise its impact, the route for the Link Road crosses the east of this area where the floodplain is not as extensive.
Piffs Elm culvert	The existing Piffs Elm culvert allows floodwater to pass under the M5. This culvert has been retained (and extended) as part of the Scheme design, and the level (22.76m AOD) of the culvert has determined the excavated depth of the flood storage area. This in turn has determined the overall area required for the flood storage area to ensure that a sufficient level of flood storage is provided (within the parameters of a 1 in 100 year flood event with 53% climate change). Ground conditions preclude the use of alternative, nature-based solutions in this location.
Piffs Elm service culvert	The existing service culvert carries a number of utility services underneath the M5. The Scheme will divert these services via a new service culvert created to the north of Junction 10. The existing culvert will be infilled to make it redundant and no longer require inspection, maintenance, or repair in the future.
132kV electricity lines	Overhead electricity lines cross the line of the Link Road just north of its junction with the B4634. The location of the attenuation basin has been selected so as to minimise the amount of construction work required underneath these electricity lines.
Existing direct access of residents onto the A4019	The existing accesses for residents link directly onto the A4019. The design improves safety for these residents and other road users through the creation of local service roads linking through to the signalised junctions. This has avoided residents living to the south of the A4019 for example needing to make significant detours west along the A4019 to turn round before traveling east.
Existing land access off the A4019 and Withybridge Lane	Existing land accesses onto the A4019 and Withybridge Lane have been retained through the creation of access points and access tracks off the A4019 and the Link Road. The River Chelt bridge has been designed with sufficient headroom, and space between the bridge abutments and the river, to enable access for small vehicles and livestock under the bridge.

4 Design principles

4.1 Scheme response to context and design principles

Design process

4.1.1 The iterative design process employed for the production of the preliminary design of the Scheme has responded to the complex range of environmental and engineering constraints applicable to the Scheme. This section of the Project Design Report provides examples of how the multidisciplinary approach has developed a design that is aligned to each of the ten principles set out by National Highways (NH) in their 'The Road to Good Design' guidance. At a broader level, this section also describes how the design, and the development of that design has sought to promote sustainable development, as defined in NH's GG103 (Introduction and general requirements for sustainable development and design), and therefore meets the requirements of both this document and NH's Licence, with regards to sustainable development and design. Sustainability has been embedded in the design process through the development of a sustainability framework tool, a proactive optioneering of the designs and systematically documenting of the process. The Sustainability Framework Tool (SFT) has been developed to align with National Highways' and Gloucestershire County Council's sustainability requirements and maintains focus on sustainable outcome performance improvement. Further information on the sustainability in the design process and application of the SFT is included in the Appendix A and a high-level summary is provided in Appendix B.

4.1.2 The Scheme design has been developed to take into account the geographical and environmental context (including landscape) where possible, and to deliver a Scheme that minimises or avoids impacts on the surrounding environment. This has been achieved through the development of a design in which:

- Existing vegetation is retained where possible;
- New planting contributes to the landscape character of the area, as well as providing visual amenity and screening, as per the landscape strategy for the Scheme. The combination of the retained vegetation and the new planting is designed to create green corridors through the Scheme, providing connectivity for wildlife and a net gain for biodiversity compared to the existing environment.
    - The planting at Junction 10 is designed to reinstate the screening effect and integrate the new infrastructure created by the Scheme at this location back into the landscape.
    - Planting along the new embankments of the A4019 to designed help embed this route back into the landscape and provide some buffer to the proposed site allocations north of the A4019, as well as ensuring visual amenity for receptors; typically, this includes roadside hedgerows with trees.
    - Planting of hedgerows along the Link Road with supplementary blocks of wood and individual trees along the embankments, particularly around the River Chelt bridge, is designed to reflect the local character of road infrastructure and provide some screening for visual receptors, whilst creating an attractive route for all users.
- Direct impacts to the floodplain of the River Chelt are minimised through the selection of the route corridor for the Link Road that avoids as much of the floodplain as possible; and the installation of a series of culverts underneath sections of the Link Road so as to minimise impedance of floodwater from the River Chelt.
- The route alignment has been selected to avoid impacts to buildings (for example at Uckington), and key environmental features such as existing hedgerows along the route of the Link Road, and the scheduled monument of Moat House at Uckington.

Principle 1: Good road design makes roads safe and useful

4.1.3 Four of the objectives of the Scheme include components around improving the usability, connectivity and resilience of the road network, both within the Scheme, and within the wider Cheltenham and Gloucester areas. One of the objectives is to provide safe access to services for the local community.

4.1.4 The preliminary design has sought to deliver these objectives by providing the infrastructure elements that improve access for all road users; that provide greater connectivity to the wider road network for people in west and north-west Cheltenham; and that have a greater resilience to climate change, in particular flood risk. The inclusion of service roads for residents' access to the A4019 will improve safety for residents and other road users. The inclusion of the active travel corridor along the A4019 and the Link Road provides a traffic free route for pedestrians and cyclists to traverse the Scheme.

Principle 2: Good road design is inclusive

4.1.5 The Scheme has been designed so that it is as accessible as possible for all users. An active travel corridor, with segregated cycleway and footway is included along the length of the Link Road and the A4019 (within the extent of the Scheme), with signalised crossing points at all junctions. At either end of the A4019, the cycleway and footway tie into existing shared use footways. The widths of the cycleway and footway have been reviewed against land availability to provide a segregated cycleway and footway where possible whilst limiting the land taken by the Scheme.

4.1.6 Bus stops along the A4019 have been retained, with the locations of the existing stops reviewed and changed in the Scheme design to fit better with expected demand, and to be located closer to the new signalised crossing points.

4.1.7 The creation of an offline route underneath the A4019 provides new traffic free connectivity for all users of bridleway ref. AUC1 through to Withybridge Lane.

Principle 3: Good road design makes roads understandable

4.1.8 The signage through the Scheme has been designed in accordance with The Traffic Signs Regulations and General Directions (2016) and the Traffic Signs Manual to ensure that drivers are faced with the types and layouts of signs that they are already experienced with.

4.1.9 Direction signing uses map type signs wherever possible to provide drivers with information about the layout ahead. Speed limits are clearly signed, and no U-turn signs are repeated along the A4019 to mitigate against illegal manoeuvres.

4.1.10 In addition, the design improves legibility in itself, by developing a highway layout that accords with user understanding, becoming a more intuitive network.

Principle 4: Good road design fits in context

4.1.11 The Scheme is designed to fit within the context of the existing landscape, with a planting design that integrates the Scheme into the varying environmental characteristics that exist within the Scheme area, comprising a gently undulating vale landscape featuring a mixture of arable and pastoral fields, and flat low-lying floodplain farmland to the south and west, where tributaries to the River Severn form a network of smaller rivers, streams, brooks and ditches. The landscape is more rural at the western end of the Scheme (to the west of Uckington), with an increasing urban character as the Scheme approaches Cheltenham. The M5 forms a major feature through the landscape, with the carriageway raised slightly above the surrounding flat landscape with small, vegetated embankments to either side. The landscape design for the Scheme uses new planting:

- To replace the woodland and scrub along the M5 and around the new Junction 10 to reinstate the screening effect and integrate the new infrastructure created by the Scheme back into the landscape.
- Along the new embankments of the A4019 to help embed this route back into the landscape and provide some buffer to the proposed site allocations north of the A4019,

as well as ensuring visual amenity for receptors; typically, this includes roadside hedgerows with trees.

- Provide hedgerows along the Link Road with supplementary blocks of wood and individual trees along the embankments, particularly around the River Chelt bridge, to reflect the local character of road infrastructure and provide some screening for visual receptors, whilst creating an attractive route for all users.

4.1.12 The new planting will use species mixes that match those found locally.

4.1.13 Slopes have been designed at 1:3 grade to better fit the low lying landscape and to enable successful establishment of planting which will provide visual screening, help to integrate the Scheme with the existing vegetation pattern, and will provide habitats for wildlife.

Principle 5: Good road design is restrained

4.1.14 The Scheme design has been developed to reduce the overall footprint where possible, and to ensure the Scheme meets its objectives without being overdesigned. At an early stage in the design the decision was taken to reject the creation of a new motorway junction, and focused on utilising the existing A4019 and Junction 10. Subsequent design development of the Link Road reduced the size of the road from a dual carriageway to a two lane road following a review of traffic forecasts, and replaced the 200m viaduct structure crossing the River Chelt floodplain with two sets of box culverts.

4.1.15 Further examples that were identified later in the production of the preliminary design:

- Redesign of the access point into the land safeguarded for development (to the north west of Cheltenham) so that the land take is minimised.
- Use of a retaining wall around the existing NTRS substation to reduce the footprint of the earthworks of the new Junction 10, and thereby enable the substation to be retained.
- The height of the River Chelt bridge has been designed as a compromise between providing access, and having a much higher bridge with the additional fill and landtake requirement, and visual intrusion into the low-lying landscape, that would be required in order to construct a bridge with enough headroom for mounted equestrians and larger farm machinery to pass through.

4.1.16 The span of the River Chelt Bridge has been increased to provide a minimum of 4m horizontal clearance to the top of the riverbank. This reduces impact on the watercourse and maintains the PRoW access along the riverbank.

Principle 6: Good road design is environmentally sustainable

4.1.17 The Scheme is aiming to establish a positive Biodiversity Net Gain (BNG) and is implementing landscape and water management measures to achieve this. Habitat creation measures aim for a net gain in biodiversity and contribute to the Gloucestershire Nature Recovery Network. Particular examples for the Scheme are:

- An area of farmland to the southeast of the motorway junction will be transformed into an area supporting wetland habitats, scrub, woodland and species-rich grassland, whilst also fulfilling its role as a flood storage area.
- The embankments along the Link Road will be planted with blocks of woodland and hedgerows with trees. The A4019 planting comprises hedgerows and trees to the north and south, as well as trees within the central reserve and areas of species rich grassland.

4.1.18 In the development of the designs for the individual structures within the Scheme, the National Highways Carbon tool has been used to compare the embodied carbon of different options for the structures. Embodied carbon was used as a key assessment criterion in selecting the preferred option, such as the selection of reinforced earth for the bridge abutments and wingwalls rather than reinforced concrete or steel. Additionally, the columns in the abutments are proposed to be sleeved to reduce the load effects on the beams and substructure reducing the impact on cost and thus on the environment. Reduced beam depth for precast concrete beams have been proposed for interchange

bridges with increased grade of concrete reducing the overall depth of the superstructure and hence the fill saving in cost and environment.

Principle 7: Good road design is thorough

4.1.19 A whole team approach has been applied to the development of the design to ensure that Scheme elements were considered from the outset from both an engineering and environmental perspective. This has ensured that all design elements have been developed in a holistic way. Consultation with stakeholders and the local community has ensured that the design fits into context and reflects an understanding of people and place.

4.1.20 All relevant guidance and applicable standards were considered during the design process and several design iterations produced, for example for the location and the height of the River Chelt bridge, until a solution was identified which met both engineering, environmental (including flood risk) and access requirements.

4.1.21 A design decisions log was kept, allowing for design decisions to be recorded and understood by future project teams, ensuring that the design taken forward to the next design stage is carried out in a consistent way. Structural analysis models were developed for each structure to refine sizes of the respective elements. This enabled greater accuracy of the quantities of materials required, the embodied carbon, and their cost.

4.1.22 Particular examples for the Scheme are:

- Through the implementation of interim design fixes and reviews, the headroom under the interchange bridges at Junction 10 was reduced by approximately 500mm, resulting in a significant saving in earthworks quantities.
- The use of highways departure from standards, combined with the above, reduced the gradients and lengths of the slip roads at Junction 10. In addition to an overall saving in the materials required, this also enabled an extension to the River Chelt culvert to be avoided, as the south facing slip roads did not extend as far south as the River Chelt culvert.

Principle 8: Good road design is innovative

4.1.23 The project team have undertaken an iterative process to explore innovative approaches to be included within the design. This has enabled flexibility to incorporate changes in the design, due to surveys, consultation and design review, and ensure betterment in the design. The use of glass reinforced plastic (GRP) has been selected for re-lining of the existing Piffs Elm culvert so as to reinstate the design life of this existing structure in line with Scheme proposals, and thereby avoiding the need to replace this structure.

4.1.24 Any issues with clashes between the design of the different disciplines has been identified in the design reviews through an extensive use of 3D BIM modelling for all design disciplines.

Principle 9: Good road design is collaborative

4.1.25 A collaborative approach to the design has been a key factor in the development of the preliminary design. Implemented through collaboration between the client and design teams, across the design teams, and with all stakeholders.

- Client/Design collaboration - Parameters for the design were set through discussions between the Atkins design teams and GCC early in the design process. Further reviews were undertaken as the design developed.
- Design team collaboration - Regular weekly meetings were conducted involving the engineering and environmental teams to ensure a thorough understanding across the teams of the potential constraints and opportunities for efficiencies. The environmental considerations fed into the design through these meetings and provided the opportunity to influence and develop a robust design proposal for the Scheme. The collaborative approach applied allowed the project team to draw on experienced team members across the UK and globally, whilst contributing to driving operational

efficiencies for a more considered design by understanding of the environmental and engineering constraints and identifying appropriate solutions.

- Stakeholder collaboration - Consultation with stakeholders on the Scheme included both informal (non-statutory) (undertaken in October 2020) and formal (statutory) consultation (held early December 2021 to February 2022) and further supplementary and targeted consultation (August to September 2022). For the non-statutory and statutory consultations, a dedicated website and portal was set up for the duration of the consultation. These contained key information and documents in relation to the Scheme proposals and the consultation. Both consultations involved a series of face-to-face and virtual consultation events, where the project team presented the Scheme designs and answered questions from attendees. For the targeted consultation, details were provided to affected landowners and prescribed consultees for their information, followed by a face-to-face information share event. Alongside these consultation events, a number of non-statutory consultation meetings have occurred to discuss the Scheme with specific stakeholders and to obtain and provide information on the Scheme. These have included regular meetings with the Environment Agency, Natural England, Historic England, the Local Planning Authorities: Cheltenham Borough Council, Gloucester City Council and Tewkesbury Borough Council, and the developers of the allocated and safeguarded land site (Bloor Homes and Persimmon Homes).

Principle 10: Good road design is long lasting

4.1.26 In the Scheme design, the structures have been designed to last for 120 years, the pavements for 40 years, and road surfacing to last for 10 to 20 years with routine maintenance intervention.

4.1.27 Structural assessments were carried out for the existing structures being retained and proven to have sufficient load capacity. The long term durability and maintenance requirements of existing structures were also considered, with the GRP lining proposed for the existing Piffs Elm culvert designed to have a 120 year design life to match the proposed extensions at either end.

4.1.28 Maintenance requirements and whole life costs (not just construction costs) were a key consideration in the assessment of structural options and choosing a preferred option. In some cases, options with higher construction (capital) costs were chosen over those with lower construction costs as long term maintenance (operational) costs were lower. As an extension to this approach, the span lengths of the interchange bridges at Junction 10 were designed as a 38.5m clear span to allow for any future upgrade of the M5 to an All Lane Running carriageway layout, with no requirement to widen the bridge, whilst still maintaining the 2.5m wide verges.

4.1.29 The Scheme has considered its vulnerability to climate change, and has included the required allowance for changes caused by climate change in the Scheme design. For example, the drainage design ensures that all drainage infrastructure, i.e. carrier pipes, swales, attenuation features, and surface water collection systems are sized with an increased allowance of 40% to account for increases in rainfall intensities due to climate change.

4.1.30 The lighting for the Scheme has been optimised and over designing is avoided to minimise potential light pollution effects to find a balance between safety and the environment. LED lighting allows for remote control through a Central Management System which in turn helps with energy efficiency and saving. The use of LEDs is a good investment in the long term as it will result in reduced on-going maintenance and operational costs, including a significant reduction in traffic management and energy costs.

4.1.31 The durability of retaining structures and earthworks has been considered in the design and option selection process, with the aim of minimising future maintenance requirements. All the bridges are proposed to be integral thus removing the requirement of periodic maintenance of bearings / expansion joints. Also, as integral bridges do not have any joints, it reduces the chances of any water seepage within the structural elements causing corrosion of reinforcement.

4.1.32 The consideration of durability in design is also reflected in the choice of materials, such as sulphate resistant cement proposed in foundations to protect them against contaminated ground (mostly sulphates).

4.1.33 Futureproofing has been considered within the design process, with space provided within the designed alignment of the A4019 for the creation of new junctions to connect into the safeguarded land area. The planting has been designed to use locally hardy native species where possible, which will both help to integrate the scheme into the existing landscape and minimise any future maintenance requirements. In addition, riverbank protection is proposed for the River Chelt where affected by the Scheme, to prevent future erosion of the banks and ensure access underneath the bridge is retained.

Appendices

Appendix A. Embedding Sustainability into Design

A.1.1 Atkins has employed our three-step process for this Scheme, to provide our design engineers with the tools required to incorporate sustainability into their existing processes and decision making:

1. Develop a sustainability framework tool with project-specific objectives and measurable targets, aligned with GCC's sustainability objectives. This has enabled us to measure performance throughout the design.
2. Proactively optioneer designs, with rapid, iterative assessment of design options informing design development.
3. Systematically document the process, with simple, easily digestible outputs, communicated internally to GCC, focusing on improvements in sustainability performance and progress against project-specific targets.

A.1.2 A bespoke version of the Atkins Sustainability Framework Tool (SFT) has been developed for GCC and the M5 J10 Scheme to align with the National Highway's (NH's) Sustainable Development Strategy (SDS) released in April 2017. The SFT is similarly being used across wider NH Delivery Integration Partners (DIP) Schemes to help drive sustainability performance improvements via proactive optioneering, whilst collating and synthesising key supporting evidence.

A.1.3 The SFT for M5 J10 has been developed based on the Plan, Do, Check, Act principles of ISO14001, as a mechanism to ensure National Highway's sustainability requirements are central in delivering our programme of works for the M5 J10. The SFT additionally enables appropriate monitoring to be in place to drive better outcomes across the five capitals defined in the SDS: financial, natural, social, human and manufactured, as illustrated in Appendix B. The SFT aligns with the principles and content of GG103.

- **Plan: Integrating sustainability early** - The SFT has been used to capture the agreed interpretation and definition of GCC's sustainability requirements for the M5 J10 Scheme. The targets are translated into practical action plans required at a project level during the design stage.
- **Do: Delivering sustainability outcomes** - The SFT has been used to iteratively assess design options and solutions, recording decisions made and lessons learnt, and facilitating challenge.
- **Check: Monitoring progress and driving performance improvement** - The SFT includes visual Red, Amber, Green (RAG) indicators, with two additional levels to further encourage and showcase exceptional performance, as well as dashboards that summarise performance against targets. This has allowed a clear, consistent visualisation of progress and the documentation and communication of outcomes for the M5 J10 concept design.
- **Act: Sharing lessons learnt and best sustainability practices** - The SFT is designed to enable monitoring and tracking of performance throughout the project lifecycle. Key lessons learnt, and best practices captured through the SFT have been shared between project staff and GCC and are designed to be more widely shared with other NH projects and the wider business.

A.1.4 By applying the bespoke SFT for the Scheme, we have been able to pull together sustainability outputs from across disciplines, aligning outcomes, influencing decisions and generating further innovation. This approach has integrated sustainability/ environmental assessment within the design process. Application of the SFT has provided clarity, assigned practical actions at a project level and avoided mystifying sustainability subjects. It has helped make sustainable planning and design simple, developing a process within which to challenge the teams and drive them to achieve the best sustainability performance, as demonstrated by the sustainable outcomes identified in Appendix B.

Appendix B. Overview of sustainability targets and performance for the Scheme

Sustainability Framework Tool (SFT) extract from the Sustainability Statement

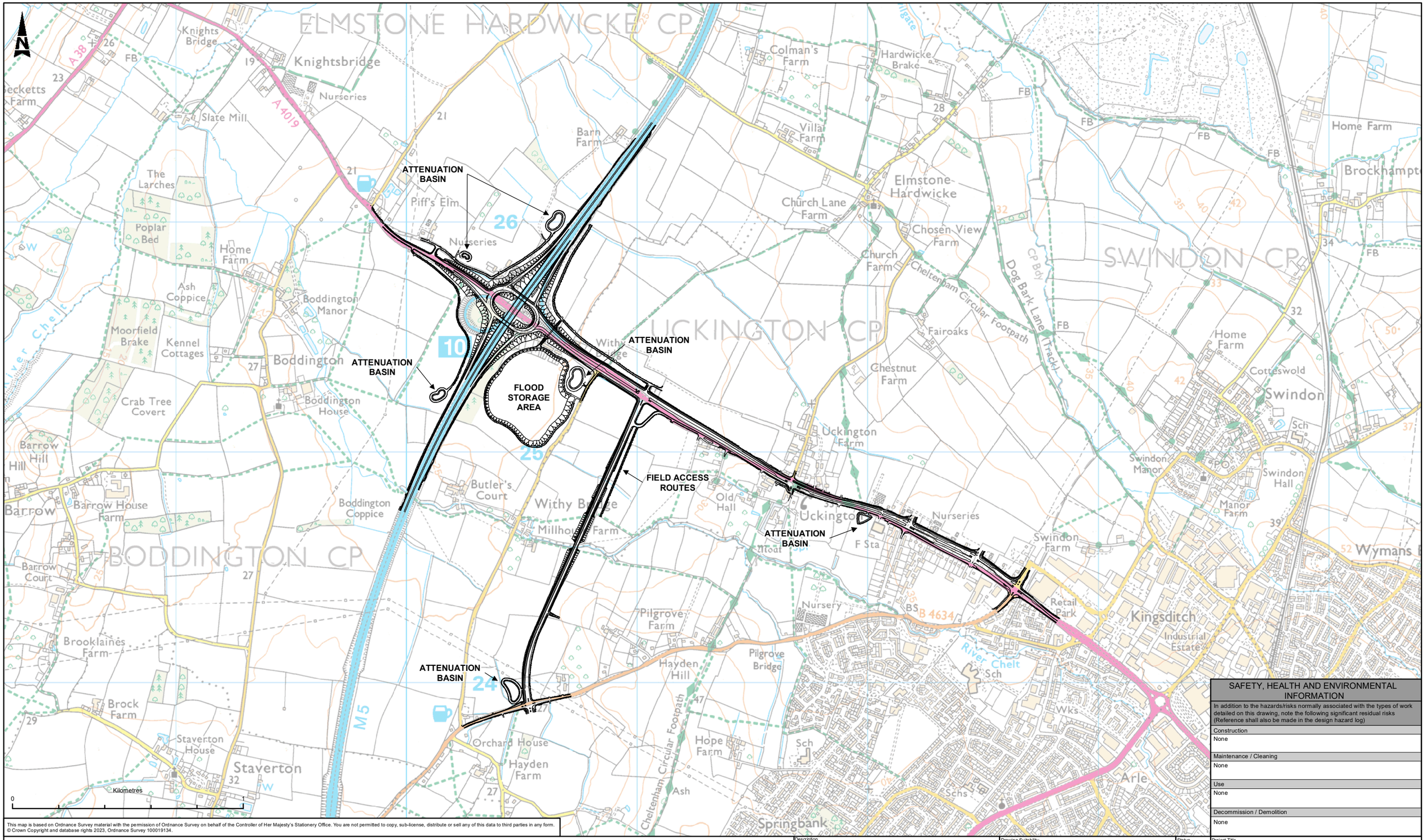
No	Five Capitals	Themes defined by NH	Core Objectives	M5 J10 Client Scheme requirements	Suggested Target	Target Level	Performance Level
1.1a	Financial	Supporting Economic Growth	Capacity supports national and local economic growth	Support economic growth and facilitate growth in jobs and housing by providing improved transport network connections in west and north-west Cheltenham.	The Scheme results in an increase in jobs and has a benefit on GDP (gross domestic product).	> 250 (Major)	> 250 (Major)
1.1b	Financial	Supporting Economic Growth	Capacity supports national and local economic growth	Support economic growth and facilitate growth in jobs and housing by providing improved transport network connections in west and north-west Cheltenham.	The Scheme supports regeneration, spatial development, enhances diversity and equality and participation. The Scheme leads to Improvement/no reduction on character and quality of the built and natural landscape Improvement/no deterioration of nearby cultural heritage sites and historic assets.	Major benefits	Moderate benefits
1.2	Financial	Is Long Lasting	Route operation is a good Investment in the Long Term	Support economic growth and facilitate growth in jobs and housing by providing improved transport network connections in west and north-west Cheltenham.	Design has long term durability and takes into consideration whole life costing to inform design decisions. Consideration of population growth (higher demand), climate change (extreme weather), demographic change (aging population) and technology (More efficient & lower emission vehicles) has also been demonstrated.	Moderate use and incorporation	Some use and incorporation
2.1	Human	Makes roads safe, useful and understandable	Improves Safety	Provide safe access to services for the local community and including for users of sustainable transport modes within and to west and north-west Cheltenham.	The design will improve the safety of road users and road workers. Safety has been considered throughout the design process.	Major improvement	Major improvement
2.2	Human	Makes roads safe, useful and understandable	Improves Safety	Provide safe access to services for the local community and including for users of sustainable transport modes within and to west and north-west Cheltenham.	The design will improve the understandability of the road network.	Significant improvement	Significant improvement
2.3	Human	Sustainability Leadership	Improving knowledge and understanding of sustainability	-	Improve knowledge and understanding of sustainability across the (internal) project team. All design engineers to have completed at least one Design for Life module. Across the team ensure someone has done each module.	100% completion rate	Part complete
2.4	Human	Thoroughly delivering sustainability	Integrated approach to Sustainability	Enhance the transport network in the west and north-west of Cheltenham area with the resilience to meet current and future needs.	Through the design we have financially accounted for the triple bottom line and whole lifecycle in terms of Environment, Economic and Social Costs and Benefits.	Fully embedded	Fully embedded

No	Five Capitals	Themes defined by NH	Core Objectives	M5 J10 Client Scheme requirements	Suggested Target	Target Level	Performance Level
2.5	Human	Fits in with the Context	Protects and supports national and local regeneration, landscape, cultural heritage sites and historic features	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	The design conserves and enhances the character and quality of built and natural landscape.	Minor improvement	Minor improvement
2.6	Human	Fits in with the Context	Protects and supports national and local regeneration, landscape, cultural heritage sites and historic features	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	The design minimises the impact on nearby cultural heritage sites and historic assets.	Minor negative impacts	Minor negative impacts
3.1a	Natural	Carbon Management	Reducing Carbon	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Iterative carbon assessment completed, carbon workshop carried out, opportunities identified, progress to embed in design tracked. This includes reduction in carbon footprint of the embodied carbon emissions associated with the design and construction of the Scheme.	Moderate reduction (10-20%)	Moderate reduction (10-20%)
3.1b	Natural	Carbon Management	Reducing Carbon	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Iterative carbon assessment completed, carbon workshop carried out, opportunities identified, progress to embed in design tracked. This includes reduction in carbon footprint during operation and decommissioning.	No increase	Minimal increase
3.2	Natural	Climate Change	Climate Resilience	Enhance the transport network in the west and north-west of Cheltenham area with the resilience to meet current and future needs.	Resilience to current extreme weather and future climatic conditions specific to the local and surrounding area have been identified, assessed and incorporated into the Scheme.	Moderately incorporated	Climate resilience fully incorporated
3.3	Natural	Biodiversity	To support and improve biodiversity associated with the road network.	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	The design ensures there is no net biodiversity loss and encourages gains.	Major biodiversity net gain	Major biodiversity net gain
3.4	Natural	Environmentally sustainable waste and materials management	Minimising waste and the need for new materials	Enhance the transport network in the west and north-west of Cheltenham area with the resilience to meet current and future needs.	Zero waste to landfill (excluding hazardous waste).	Zero waste to landfill	90-95%
3.5	Natural	Air Quality	To support wider Government initiatives targeted at improving air quality	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Minimise any adverse air quality impacts where feasible.	No/minimal impacts	No/minimal impacts

No	Five Capitals	Themes defined by NH	Core Objectives	M5 J10 Client Scheme requirements	Suggested Target	Target Level	Performance Level
3.6	Natural	Water Environment	To support wider Government initiatives targeted at improving air quality	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Minimise any adverse impacts on water quality where feasible.	Moderate improvement	Moderate improvement
3.7	Natural	Land Contamination	To support wider Government initiatives targeted at improving air quality	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Minimise any adverse impacts on soil quality where feasible.	Moderate improvement	No/minimal impacts
3.8	Natural	Light Pollution	To support wider Government initiatives targeted at improving air quality	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Minimise any adverse impacts on light pollution where feasible.	Moderate reduction	Moderate reduction
4.1	Social	Well-being	Increased well-being and collaboration	Provide safe access to services for the local community and including for users of sustainable transport modes within and to west and north-west Cheltenham.	The Scheme explores opportunities to improve the well-being of road users and communities affected by the network.	Moderate improvement	Major improvement
4.2	Social	Noise	Consider and mitigate all impacts of noise	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	The Scheme uses all opportunities to improve the noise produced by the network.	No significant adverse impacts	Moderate adverse impacts
4.3	Social	Stakeholder engagement	To ensure all stakeholder requirements are considered	-	Scheme seeks to involve a diverse range of local stakeholders and maximises opportunities for stakeholder engagement at each PCF stage.	Full engagement	Full engagement
4.4	Social	Is Inclusive	Accessibility	Provide safe access to services for the local community and including for users of sustainable transport modes within and to west and north-west Cheltenham.	Scheme incorporates the accessibility needs and ensures social inclusion of all road users and stakeholders.	Fully incorporated	Fully incorporated
5.1a	Manufactured	Circular Economy	Implement a circular approach	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Scheme seeks to minimise resource-use during construction, operation (non-user) and maintenance.	5-10% Moderate reduction	No reduction
5.1b	Manufactured	Circular Economy	Implement a circular approach	Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.	Scheme seeks to minimise waste generation during construction, operation (non-user) and maintenance.	Significant reduction (10%)	No reduction

No	Five Capitals	Themes defined by NH	Core Objectives	M5 J10 Client Scheme requirements	Suggested Target	Target Level	Performance Level
5.2	Manufactured	Responsible Sourcing in Supply Chain	Responsible Sourcing in supply chain	-	Scheme maximises use of responsibly sourced materials that minimise adverse impacts on people and their environment.	10-20%	<10%
5.3	Manufactured	Security of Supply	Managing the risk from security of supply	-	High risk materials due to security of supply identified and the information used within the optioneering.	Fully used and incorporated	Minimal use and incorporation

Appendix C. Showing alignment of the M5 Junction 10 Improvements Scheme



LEGEND

—— SCHEME ALIGNMENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)
Construction
None
Maintenance / Cleaning
None
Use
None
Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P03	SD	SL	CC	LJ	03/03/23

Drawing Suitability: **PUBLISHED** | Status: **A1**

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 2-1 SCHEME OVERVIEW

ATKINS
Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
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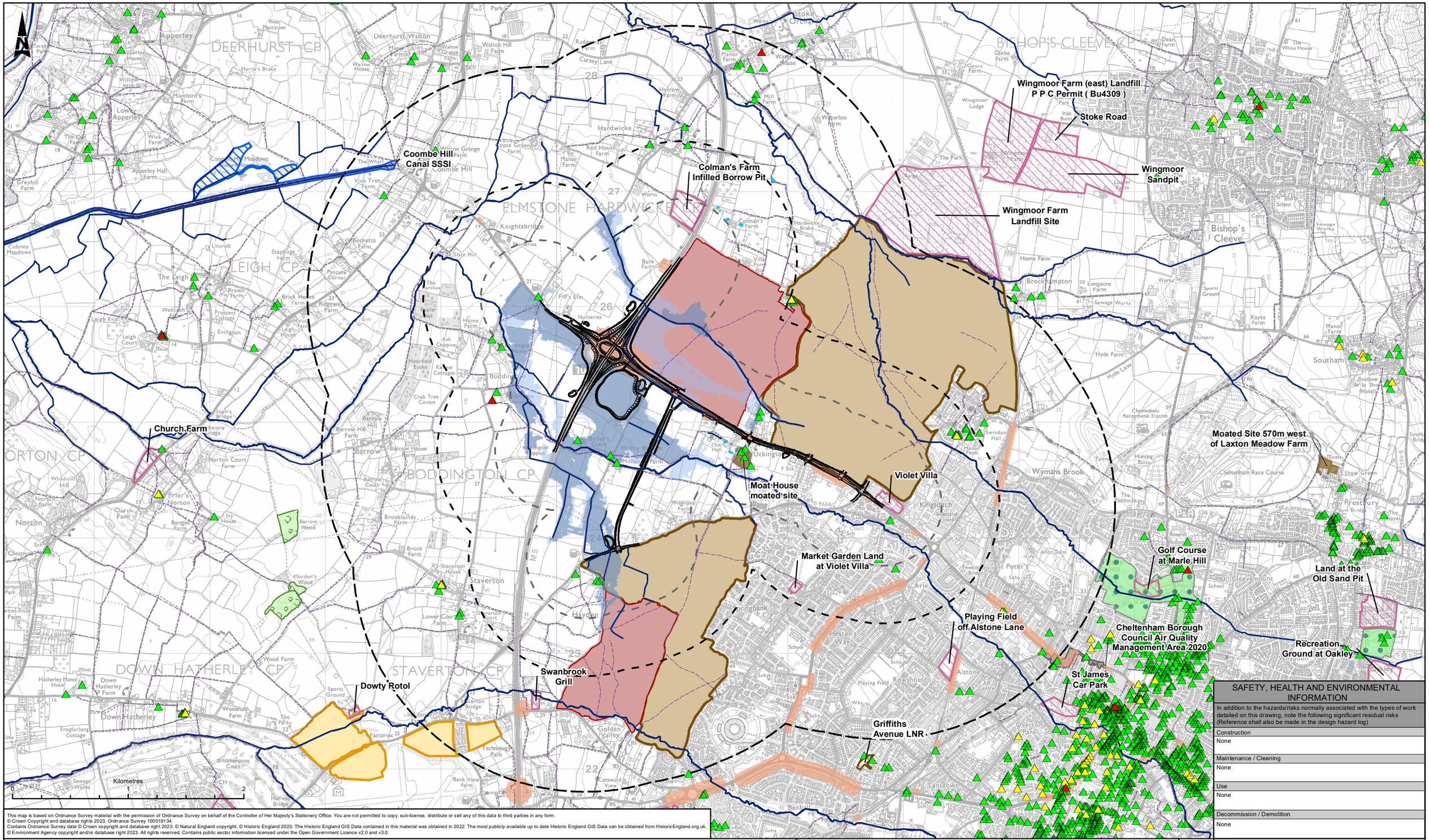
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Drawing Number: Project | Originator | Volume: GCCM5J10 - ATK - EGN ZZ - GS - GI - 000001 (Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:15,000	5214106	1 of 1	P03

Appendix D. Environmental Constraints Plan



LEGEND

- PROPOSED ALIGNMENT
- 500M STUDY AREA
- 1KM STUDY AREA
- 2KM STUDY AREA
- SITES OF SPECIAL SCIENTIFIC INTEREST (SSSI)
- ANCIENT WOODLAND
- SCHEDULED MONUMENTS
- REGISTERED PARKS AND GARDENS
- HISTORIC LANDFILL SITES
- NOISE IMPORTANT AREAS
- AIR QUALITY MANAGEMENT AREAS
- MODELLED 100 YEAR FLOOD EXTENT
- MODELLED 1000 YEAR FLOOD EXTENT
- SAFEGUARDED AREAS
- LOCAL NATURE RESERVES

ALLOCATED SITES

- EMP 1 - STAVERTON / GLOUCESTERSHIRE AIRPORT BUSINESS PARKS
- NORTH AND NORTH WEST CHELTENHAM - STRATEGIC ALLOCATION
- CONFIRMED GCN PONDS
- RIVER NETWORK AND WFD RIVER WATERBODIES
- EXISTING PUBLIC RIGHTS OF WAY (PROW)

LISTED BUILDINGS

- GRADE I
- GRADE II*
- GRADE II

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	JM	CC	VA	LJ	13/06/23

Drawing Suitability: **PUBLISHED** | Status: **A1**

ATKINS
Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
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Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Project Title: M5 J10 Improvements Scheme

Drawing Title: FIGURE 3-1
ENVIRONMENTAL CONSTRAINTS PLAN

Drawing Number: Project | Originator | Volume
GCCM5J10 - ATK - EGN
ZZ - GS - GI - 000002
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:30,000	5214106	1 of 1	P02

Appendix E. Environmental Masterplan for the Scheme

Environmental masterplan comprises 18 sheets

Appendix E. Environmental Masterplan for the Scheme

Document title	Location of plan
Environmental Key Plan Regulation 5(2)(j)	Part 1
Environmental Master Plan Key	Part 1
Environmental Master Plan – Sheet 1 of 16	Part 1
Environmental Master Plan – Sheet 2 of 16	Part 1
Environmental Master Plan – Sheet 3 of 16	Part 1
Environmental Master Plan – Sheet 4 of 16	Part 1
Environmental Master Plan – Sheet 5 of 16	Part 1
Environmental Master Plan – Sheet 6 of 16	Part 1
Environmental Master Plan – Sheet 7 of 16	Part 2
Environmental Master Plan – Sheet 8 of 16	Part 2
Environmental Master Plan – Sheet 8 of 16	Part 2
Environmental Master Plan – Sheet 9 of 16	Part 2
Environmental Master Plan – Sheet 10 of 16	Part 2
Environmental Master Plan – Sheet 11 of 16	Part 2
Environmental Master Plan – Sheet 12 of 16	Part 2
Environmental Master Plan – Sheet 13 of 16	Part 2
Environmental Master Plan – Sheet 14 of 16	Part 2
Environmental Master Plan – Sheet 15 of 16	Part 2
Environmental Master Plan – Sheet 16 of 16	Part 2
Proposed Indicative River Chelt Link Road River Cross-Sections	Part 2

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE WORKS PLANS SHOULD BE READ IN CONJUNCTION WITH THE DEVELOPMENT CONSENT ORDER AND LANDSCAPE DRAWINGS.

KEY:

SHEET XX — SHEET USED AS PART OF THIS DRAWING SERIES.

EXISTING ORDNANCE SURVEY DATA

DEVELOPMENT CONSENT ORDER (DCO) BOUNDARY

SCHEME EXTENT

Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description: Design Fix 3 – Final (Bus Lane Update)						
A1	C01	SS	SS	CDC	BM	27/06/23

Drawing Suitability: APPROVED - PUBLISHED — Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: ENVIRONMENTAL KEY PLAN

Drawing Number: GCCM5J10 ATK ELS ZZ DR LL 000115

Original Size:	Scale:	Project Ref. No:	Sheet:	Rev:
A1	AS SHOWN	5197035	1 of 1	C01

This Drawing is saved on ProjectWise. Plotted: 09/06/2023 20:39:50 By: CHAD1473

LANDSCAPE KEY :

GENERAL

- EXTENT OF HIGHWAY WORKS
- MAINTENANCE BAY

HIGHWAYS

- PROPOSED PUBLIC RIGHT OF WAY
- EXISTING PUBLIC RIGHT OF WAY
- EXISTING PUBLIC RIGHT OF WAY TO BE REMOVED
- PROPOSED REFLECTIVE NOISE BARRIER 2m HIGH
- PROPOSED ABSORPTIVE NOISE BARRIER 2m HIGH
- PROPOSED HIGHWAY FENCE LINE
- OTR — PROPOSED OTTER FENCE
- BDG — PROPOSED BADGER FENCE
- EXISTING FENCE LINE
- ORDER LIMITS
- PROPOSED LANE MARKINGS
- PROPOSED EARTHWORK SLOPE
- PROPOSED TRAFFIC SIGN AND SIGN POST
- PROPOSED GATE

STRUCTURES

- PROPOSED OVERBRIDGE
- PROPOSED UNDERBRIDGE/CULVERT
- RW — PROPOSED RETAINING WALL

LIGHTING

- PROPOSED LIGHTING COLUMN & LUMINAIRE

DRAINAGE

- PROPOSED POND WITH POND ACCESS TRACK
- PROPOSED DITCHES
- CU CU CU — CULVERT

ENVIRONMENTAL ELEMENTS:

ECOLOGY PROTECTION MEASURES

- MAMMAL CROSSINGS (Tunnels)
- BAT HOP-OVER PLANTING
- COMPENSATORY BAT ROOST STRUCTURE

LANDSCAPE KEY :

- RETAINED VEGETATION
- EXISTING DWELLING AND GARDEN - TO BE RETAINED
- EXISTING HEDGEROW - TO BE RETAINED
- EXISTING HEDGEROW - TO BE ENHANCED
- LE 1.2: GRASSLAND WITH BULBS
- LE 1.3: SPECIES RICH GRASSLAND
- LE 2.1: WOODLAND
- LE 2.2: WOODLAND EDGE
- LE 2.4: LINEAR BELTS OF SHRUBS AND TREES
- LE 2.5: SHRUBS WITH INTERMITTENT TREES
- LE 2.6: SHRUBS
- LE 2.8: SCRUB
- LE 3.1: AMENITY TREES AND SHRUB PLANTING
- LE 4.2: NATIVE SPECIES HEDGEROWS(Trimmed)
- LE 4.3: NATIVE SPECIES HEDGEROWS(Untrimmed)
- LE 4.4: NATIVE HEDGEROWS WITH TREES
- LE 5.1: INDIVIDUAL TREES
- LE 6.1: WATER BODIES & ASSOCIATED PLANTS
- LE 6.2: BANKS & DITCHES - SOWN WITH WET GRASSLAND
- LE 6.4: WET GRASSLAND WITH MARGINAL PLANTING
- LOWLAND MEADOWS - PRIORITY HABITAT
- ACCESS ROUTES

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE LANDSCAPE PLAN DRAWINGS. REFER TO DRAWING NOS. GCCM5J10-ATK-ELS-ZZ-DR-LL-000117 to 000124
3. PLANT SPECIES WILL BE PROPOSED AT DETAIL DESIGN. SPECIES ARE TO BE NATIVE AND/OR NON-INVASIVE AND SUITABLE FOR THE LOCATIONS. EVERGREEN/ SEMI-EVERGREEN SPECIES TO BE INCLUDED WHERE VISUAL SCREENING IS REQUIRED. NH AND GCC ARE TO BE CONSULTED ON THE FINAL DESIGN/SPECIES CHOICE TO ENSURE THAT THEIR DEIGN STANDARDS, H&S REQUIREMENTS AND MAINTENANCE CAPABILITIES ARE COMPLIED WITH WHERE POSSIBLE SPECIES RICH FLOWERING GRASSLAND IS TO BE USED ACROSS THE SCHEME. LOW GROWING OR THAT WHICH CAN BE CUT REGULARLY CAN BE PROPOSED TO VISIBILITY SPLAYS.
4. FINAL OPTIONS FOR THE DESIGN OF THE NOISE BARRIERS SHOULD BE PRESENTED TO DIRECTLY AFFECTED PROPERTIES AND THE LPA TO ENSURE THE BARRIER IS ACCEPTABLE FOR NOISE AND VISUAL AMENITY. OPTIONS SHOULD INCLUDE PLANTING TO THE BARRIERS AND ALTERNATIVE FINSHES.

Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Design Fix 3 – Final (Bus Lane Update)						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
A1	C01	SS	SS	CDC	BM	27/06/23

Drawing Suitability: APPROVED - PUBLISHED — Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: ENVIRONMENTAL MASTER PLAN KEY

Drawing Number: GCCM5J10 ATK ELS ZZ DR LL 000116

Original Size:	Scale:	Project Ref. No:	Sheet:	Rev:
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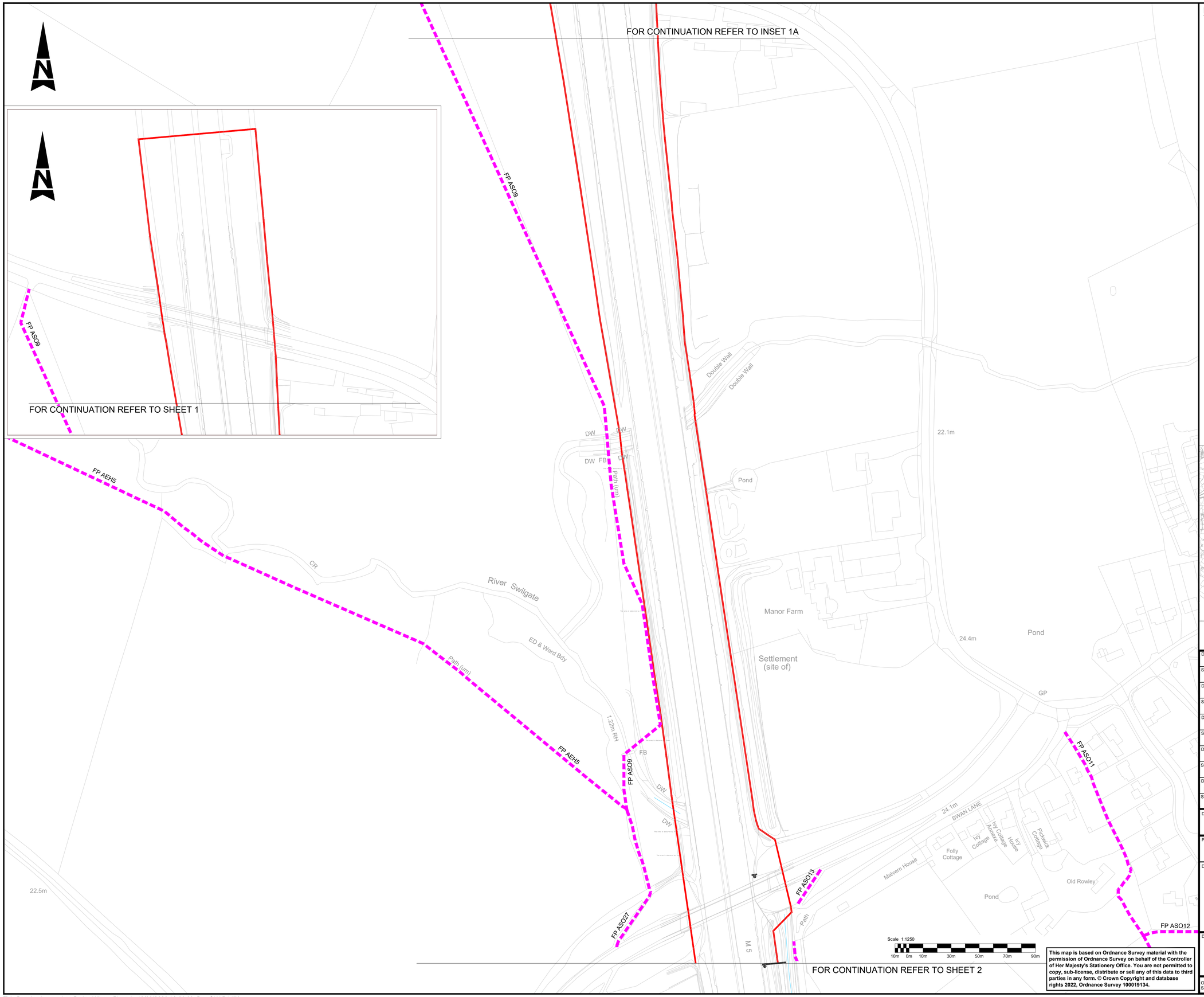
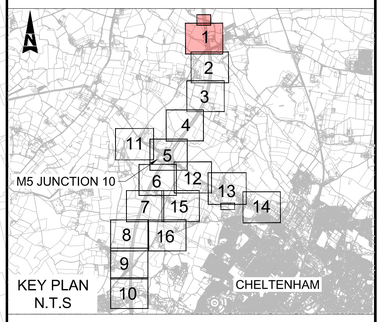


NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE WORKS PLANS SHOULD BE READ IN CONJUNCTION WITH THE DEVELOPMENT CONSENT ORDER AND LANDSCAPE DRAWINGS
3. BUS STOPS TO CONSIDER HAVING GREEN ROOFS.
4. BADGER FENCE LINE WILL ALSO BE OTTER PROOF.
5. SIGNAGE: SIGHT LINES HAVE BEEN TAKEN INTO CONSIDERATION WITHIN THE LANDSCAPE DESIGN PROPOSAL,TO BE RESOLVED FURTHER IN THE DETAIL DESIGN STAGE.
6. ALLOWANCE HAS BEEN MADE FOR ARTIFICIAL BADGER SETTS WITHIN THE ORDER LIMITS TO REPLACE THOSE LOST. LOCATIONS ARE NOT SHOWN ON THIS PLAN DUE TO THE PERSECUTION FACED BY BADGERS, BUT ARE INCLUDED IN THE DRAFT BADGER LICENCE. ARTIFICIAL SETTS TO INCLUDE APPROPRIATE PLANTING.
7. ALLOWANCE FOR PLACING OF BRASH PILES WITHIN DORMICE LICENCE AREA.
8. BAT HOP OVERS TO COMPRISE TALL PLANTING (MIN 6M TALL. THIS MAY BE FENCING FOR INITIAL PERIOD WHILST VEGETATION ESTABLISHES)
9. ECOLOGICAL ENHANCEMENT. PROPOSED BANK REPROFILING, AQUATIC, MARGINAL AND RIPARIAN PLANTING AND IN-CHANNEL ENHANCEMENTS ALONG WATER COURSE. ADJACENT AREA TO BE 20% COVER WOODLAND.
10. ATTENUATION BASIN TO INCLUDE FEATURES TO ENHANCE BIODIVERSITY SUCH AS SUBMERGED AND MARGINAL PLANTING; VARIATIONS IN BED TOPOGRAPHY; SHALLOW BANK SLOPES TO CREATE DRAWDOWN ZONES; ISLAND FEATURES; AND MARGINAL SHELVES. ADDITIONAL SURROUNDING PLANTING SHOULD ALSO BE INCLUDED TO HELP EMBED THE POND INTO THE LANDSCAPE. USE OF GRASSCRETE OR SIMILAR TO MAINTENANCE TRACK WHERE APPROPRIATE/FEASIBLE.



KEY PLAN
N.T.S

Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Design Fix 3 – Final (Bus Lane Update)						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
A1	C01	SS	SS	CDC	BM	27/06/23

Drawing Suitability: APPROVED - PUBLISHED — Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: ENVIRONMENTAL MASTER PLAN SHEET 01 OF 16

Drawing Number: GCCM5J10 ZZ ATK DR ELS LL 000117

Original Size:	Scale:	Project Ref. No:	Sheet:	Rev:
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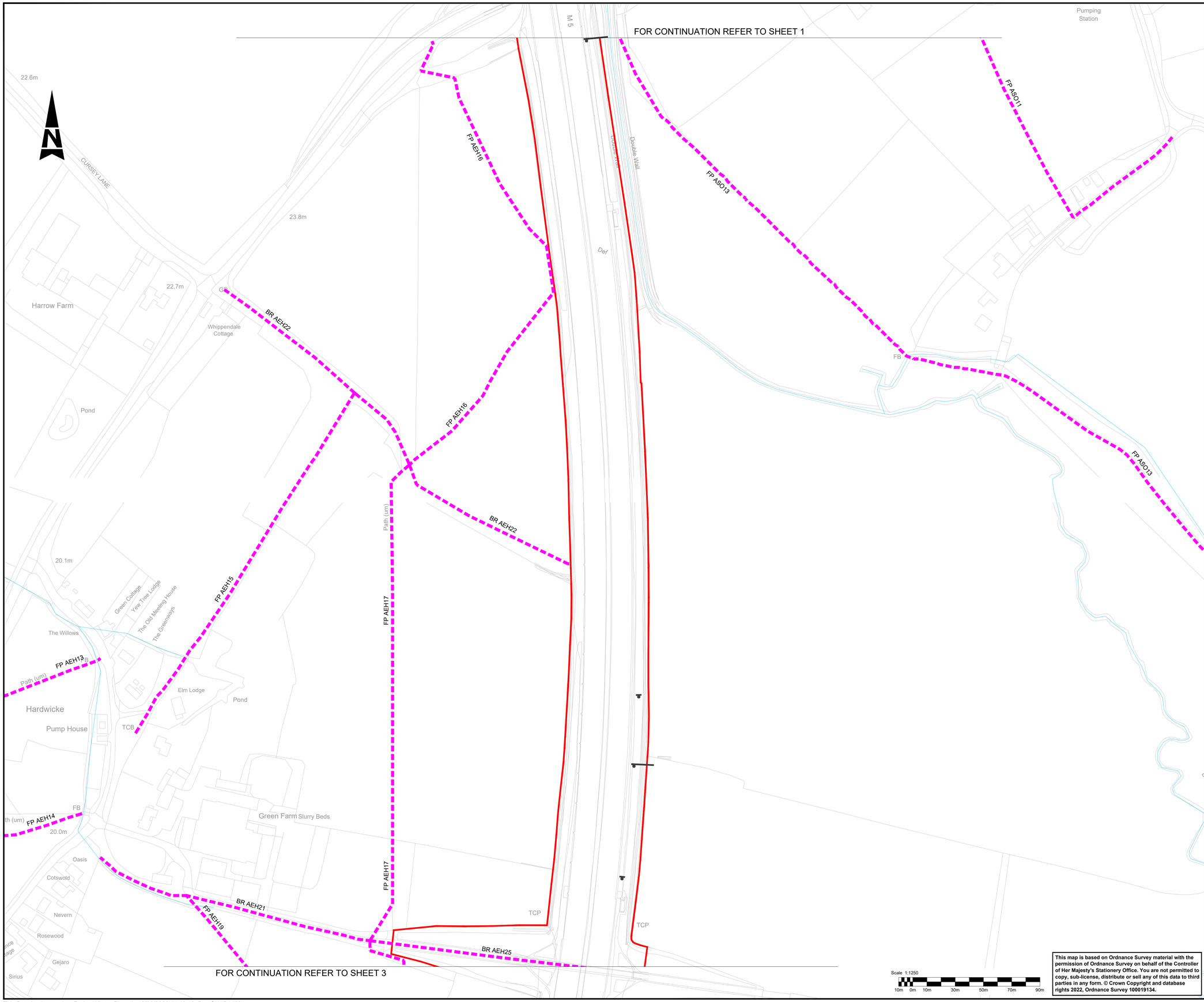

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE WORKS PLANS SHOULD BE READ IN CONJUNCTION WITH THE DEVELOPMENT CONSENT ORDER AND LANDSCAPE DRAWINGS
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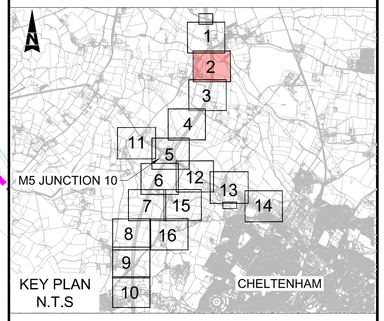

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Description

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Description

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Description

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Description

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Description

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Description

Design Fix 3 – Final (Bus Lane Update)

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
A1	C01	SS	SS	CDC	BM	27/06/23

Drawing Suitability: APPROVED - PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: ENVIRONMENTAL MASTER PLAN SHEET 02 OF 16

Drawing Number: GCCM5J10 ATK ELS ZZ DR LL 000118

Original Size:	Scale:	Project Ref. No:	Sheet:	Rev:
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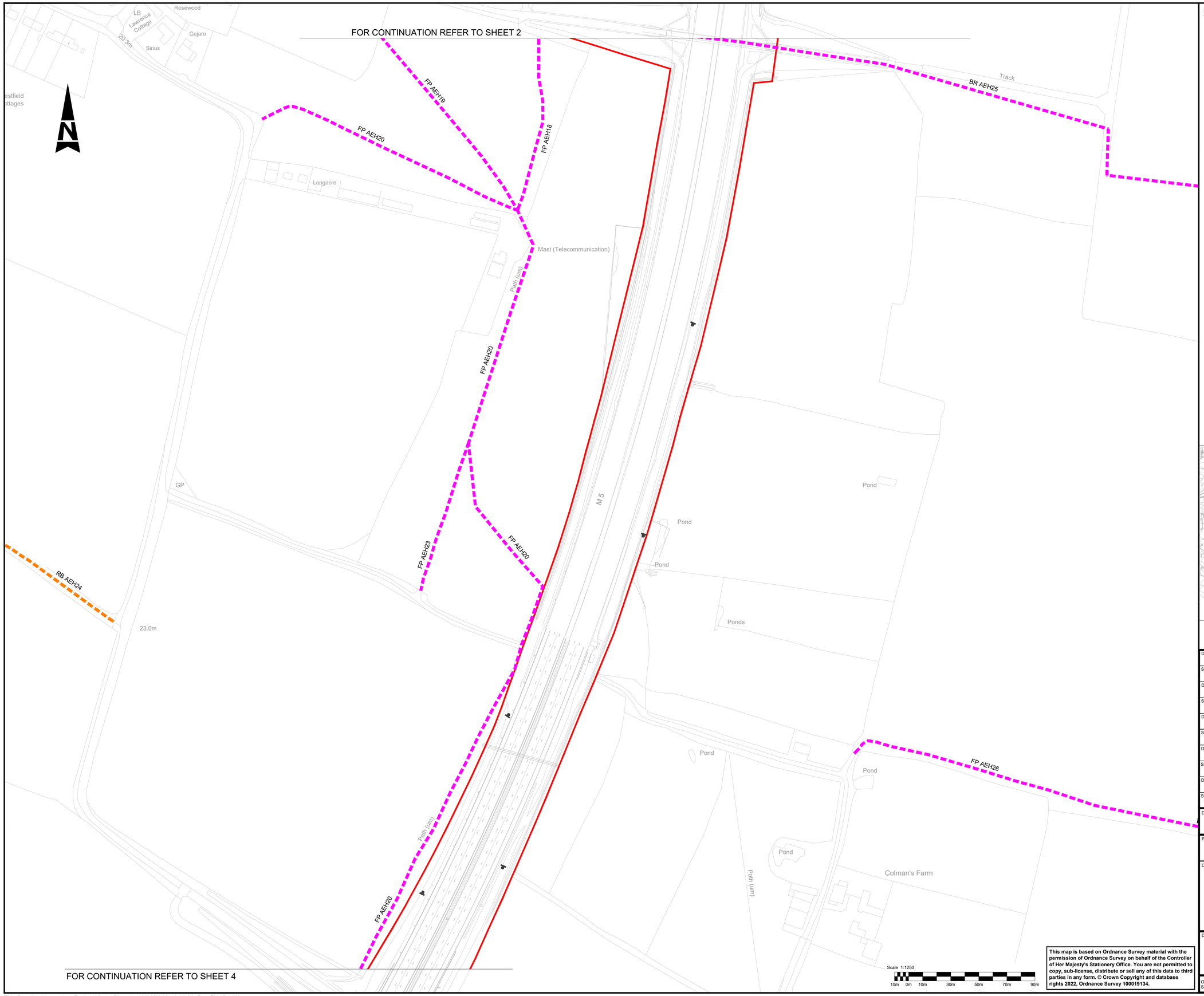

NOTES:

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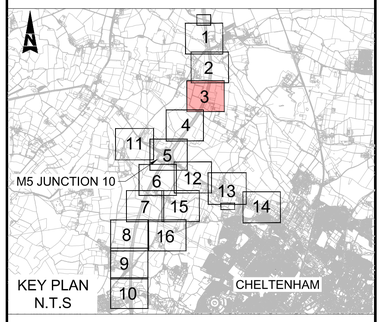

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Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Design Fix 3 – Final (Bus Lane Update)						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
A1	C01	SS	SS	CDC	BM	27/06/23

Drawing Suitability: APPROVED - PUBLISHED — Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: ENVIRONMENTAL MASTER PLAN SHEET 03 OF 16

Drawing Number: GCCM5J10 ATK ELS ZZ DR LL 000119

Original Size:	Scale:	Project Ref. No:	Sheet:	Rev:
A1	AS SHOWN	5197035	3 of 16	C01

FOR CONTINUATION REFER TO SHEET 3

FP AEH20

MINOR PRUNING BACK/VEGETATION CLEARANCE FOR SIGNAGE INSTALLATION AND VISIBILITY SPLAYS

THIS HEDGE HAS BEEN DESIGNATED AS ECOLOGICAL ENHANCEMENT (NATIVE SPECIES RICH HEDGEROW WITH TREES ADJACENT TO DITCH) VERY HIGH DISTINCT HABITAT.

ECOLOGICAL ENHANCEMENT - SEE NOTE 9

BASIN - SEE NOTE 10

Barn Farm

M5

FOR CONTINUATION REFER TO SHEET 5

Scale 1:2500

50m 0m 50m 100m 150m

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE WORKS PLANS SHOULD BE READ IN CONJUNCTION WITH THE DEVELOPMENT CONSENT ORDER AND LANDSCAPE DRAWINGS
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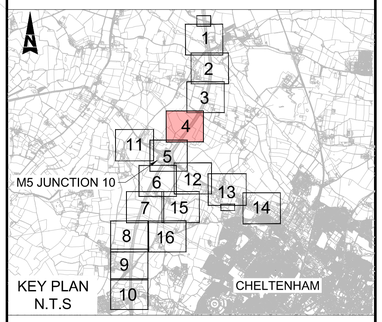


KEY PLAN N.T.S

Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Design Fix 3 – Final (Bus Lane Update)						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
A1	C01	SS	SS	CDC	BM	27/06/23

Drawing Suitability: APPROVED - PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: ENVIRONMENTAL MASTER PLAN SHEET 04 OF 16

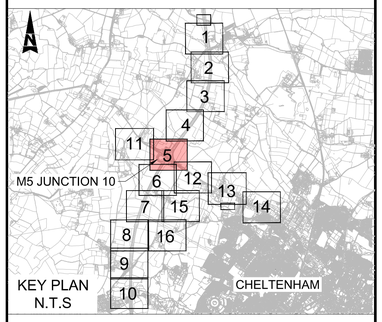
Drawing Number: GCCM5J10 ATK ELS ZZ DR LL 000120

Original Size:	Scale:	Project Ref. No:	Sheet:	Rev:
A1	AS SHOWN	5197035	4 of 16	C01

This Drawing is saved on ProjectWise. Plotted: 13/06/2023 11:30:04 By: CHAD1473

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE WORKS PLANS SHOULD BE READ IN CONJUNCTION WITH THE DEVELOPMENT CONSENT ORDER AND LANDSCAPE DRAWINGS
3. BUS STOPS TO CONSIDER HAVING GREEN ROOFS.
4. BADGER FENCE LINE WILL ALSO BE OTTER PROOF.
5. SIGNAGE: SIGHT LINES HAVE BEEN TAKEN INTO CONSIDERATION WITHIN THE LANDSCAPE DESIGN PROPOSAL,TO BE RESOLVED FURTHER IN THE DETAIL DESIGN STAGE.
6. ALLOWANCE HAS BEEN MADE FOR ARTIFICIAL BADGER SETTS WITHIN THE ORDER LIMITS TO REPLACE THOSE LOST. LOCATIONS ARE NOT SHOWN ON THIS PLAN DUE TO THE PERSECUTION FACED BY BADGERS, BUT ARE INCLUDED IN THE DRAFT BADGER LICENCE. ARTIFICIAL SETTS TO INCLUDE APPROPRIATE PLANTING.
7. ALLOWANCE FOR PLACING OF BRASH PILES WITHIN DORMICE LICENCE AREA.
8. BAT HOP OVERS TO COMPRISE TALL PLANTING (MIN 6M TALL. THIS MAY BE FENCING FOR INITIAL PERIOD WHILST VEGETATION ESTABLISHES)
9. ECOLOGICAL ENHANCEMENT. PROPOSED BANK REPROFILING, AQUATIC, MARGINAL AND RIPARIAN PLANTING AND IN-CHANNEL ENHANCEMENTS ALONG WATER COURSE. ADJACENT AREA TO BE 20% COVER WOODLAND.
10. ATTENUATION BASIN TO INCLUDE FEATURES TO ENHANCE BIODIVERSITY SUCH AS SUBMERGED AND MARGINAL PLANTING; VARIATIONS IN BED TOPOGRAPHY; SHALLOW BANK SLOPES TO CREATE DRAWDOWN ZONES; ISLAND FEATURES; AND MARGINAL SHELVES. ADDITIONAL SURROUNDING PLANTING SHOULD ALSO BE INCLUDED TO HELP EMBED THE POND INTO THE LANDSCAPE. USE OF GRASSCRETE OR SIMILAR TO MAINTENANCE TRACK WHERE APPROPRIATE/FEASIBLE.



KEY PLAN N.T.S

Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Design Fix 3 – Final (Bus Lane Update)						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
A1	C01	SS	SS	CDC	BM	27/06/23

Drawing Suitability: APPROVED - PUBLISHED — Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: ENVIRONMENTAL MASTER PLAN SHEET 05 OF 16

Drawing Number: GCCM5J10 ATK ELS ZZ DR LL 000121

Original Size:	Scale:	Project Ref. No:	Sheet:	Rev:
A1	AS SHOWN	5197035	5 of 16	C01

Scale 1:1250

10m 0m 10m 30m 50m 70m 90m

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. THE WORKS PLANS SHOULD BE READ IN CONJUNCTION WITH THE DEVELOPMENT CONSENT ORDER AND LANDSCAPE DRAWINGS
3. BUS STOPS TO CONSIDER HAVING GREEN ROOFS.
4. BADGER FENCE LINE WILL ALSO BE OTTER PROOF.
5. SIGNAGE: SIGHT LINES HAVE BEEN TAKEN INTO CONSIDERATION WITHIN THE LANDSCAPE DESIGN PROPOSAL,TO BE RESOLVED FURTHER IN THE DETAIL DESIGN STAGE.
6. ALLOWANCE HAS BEEN MADE FOR ARTIFICIAL BADGER SETTS WITHIN THE ORDER LIMITS TO REPLACE THOSE LOST. LOCATIONS ARE NOT SHOWN ON THIS PLAN DUE TO THE PERSECUTION FACED BY BADGERS, BUT ARE INCLUDED IN THE DRAFT BADGER LICENCE. ARTIFICIAL SETTS TO INCLUDE APPROPRIATE PLANTING.
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9. ECOLOGICAL ENHANCEMENT. PROPOSED BANK REPROFILING, AQUATIC, MARGINAL AND RIPARIAN PLANTING AND IN-CHANNEL ENHANCEMENTS ALONG WATER COURSE. ADJACENT AREA TO BE 20% COVER WOODLAND.
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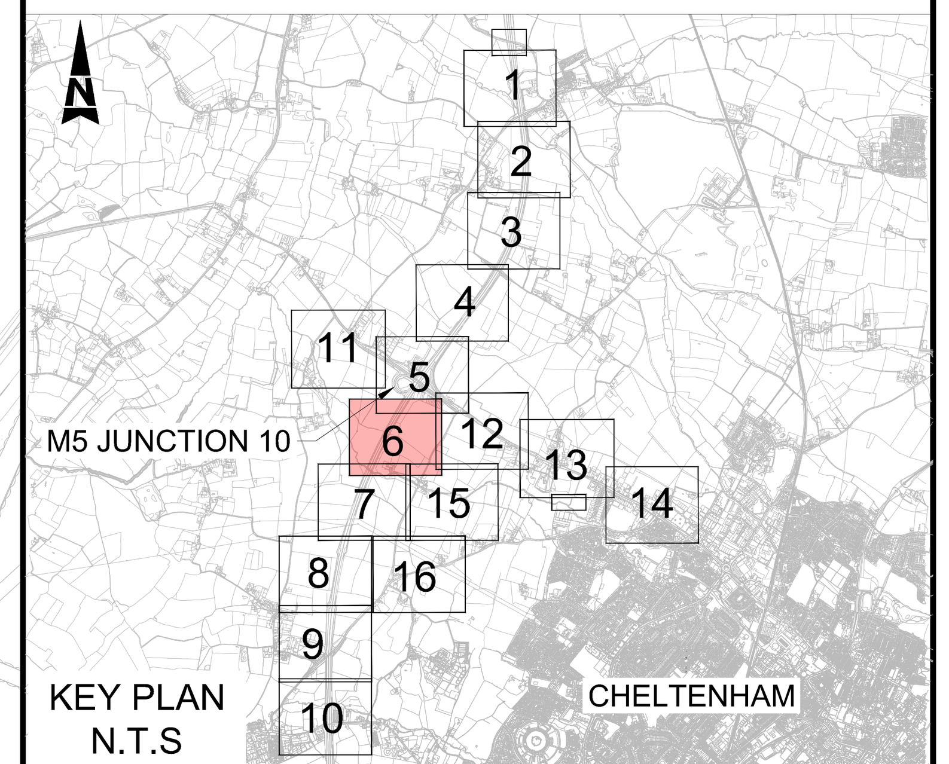

KEY PLAN
N.T.S

Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description: Design Fix 3 – Final (Bus Lane Update)						
Status A1	Revision C01	Drawn SS	Checked SS	Reviewed CDC	Authorised BM	Issue Date 27/06/23

Drawing Suitability: APPROVED - PUBLISHED | Status: A1

Project Title
M5 Junction 10 Improvements Scheme

Drawing Title
ENVIRONMENTAL MASTER PLAN
SHEET 06 OF 16

Drawing Number
GCCM5J10 ATK ELS
ZZ DR LL 000122

Original Size: A1	Scale: AS SHOWN	Project Ref. No: 5197035	Sheet: 6 of 16	Rev: C01

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