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For and on behalf of
Bloor Homes South Midlands

ENVIRONMENTAL STATEMENT

Milton Keynes East,
Land at Willen Road,
Willen Road,
Newport Pagnell,
Milton Keynes

Prepared by
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1.0 NON-TECHNICAL SUMMARY

1.0.1 This Environmental Statement has been prepared to support a hybrid planning application at Land at Willen Road, Milton Keynes on behalf of Bloor Homes South Midlands. The proposals comprise:-

- Outline planning application with all matters reserved except for means of access in relation to highway access from Willen Road and pedestrian/cycle access in relation to the crossing of the A422, for the demolition of the existing structures on site and the creation of a residential development of up to 800 dwellings comprising affordable housing, a primary school, local centre, public open space, red ways, sustainable urban drainage systems and all associated works.

1.0.2 The site forms part of the wider allocation set out in the Milton Keynes East SPD. The application site is situated within the administrative boundary of Milton Keynes Council, in the parish of Newport Pagnell. The proposals are accompanied by master plan which demonstrates how the site is proposed to be developed. This ES has been prepared with regard to this master plan.

1.0.3 This Environmental Statement (ES) has been undertaken in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations). The Environmental Statement (ES) informs the EIA process by undertaking an assessment of the likely significant environmental effects of the proposed development, as outlined in Regulation 18 of the EIA Regs, and helps decision makers, including the local planning authority, statutory consultees and key stakeholders understand the potential effects of the proposed development. Essentially the ES informs the planning authority's decision on whether planning permission should be granted. This section provides a non-technical summary (NTS) of the ES.

1.1 Site and Surrounding Area

1.1.1 The site has an area of 45.8 hectares and is located to the south of the A422, east of Willen Road and west of the River Ouzel. It is mostly agricultural land, peppered with clusters of dwellings (which do not form part of the site), while the southern part of the site is a sand & gravel quarry in the final stages of being worked and restored.

1.1.2 The agricultural land is designated as grade 3, and there is little mature vegetation across the site. The majority of the site is in Flood Zone 1, with the exception of eastmost part of the site which forms a floodplain near the River Ouzel to the east of the site; this falls

within Flood Zones 2 & 3.

1.1.3 There are no listed buildings on or adjacent to the site, the closest being 800 metres to the south-east.

1.1.4 The River Ouzel and adjacent land buffer form a wildlife corridor, and the area is a mixture of amber and red risk zones for Great Crested Newts. Aside from evidence of protected species records, there are no other wildlife designations within the application site.

1.1.5 The site forms part of the Milton Keynes East Strategic Urban Extension (MKE) site allocation which is outlined in an adopted SPD and looks to deliver around 5000 homes, employment, schools, local centres, green infrastructure, public transport infrastructure, and other associated infrastructure in this part of Milton Keynes.

1.2 Proposed Development

1.2.1 This Environmental Statement has been prepared in support of an application for:

> *"Outline planning application with all matters reserved except for means of access in relation to highway access from Willen Road and pedestrian/cycle access in relation to the crossing of the A422, for the demolition of the existing structures on site and the creation of a residential development of up to 800 dwellings comprising affordable housing, a primary school, local centre, public open space, red ways, sustainable urban drainage systems and all associated works.".*

1.2.2 The proposal is for up to 800 homes, primary school, local centre, and associated infrastructure, green space, landscaping, and playing fields. The proposal is likely to come forward in the form of a hybrid planning application.

1.2.3 The green space will form new wildlife corridors, linear park and formal green spaces, and be used for drainage attenuation, recreation and biodiversity enhancement. No built development will take place in flood zones 2 or 3, and trees and hedgerows will be retained where possible.

1.2.4 Two vehicular access points are proposed on the east side of Willen Road. Pedestrian and cycle links will be provided to and through the site, including connections to existing footpaths FP014 and FP015. The main roads will be designed to allow public transport access.

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1.3 EIA Process & Methodology

1.3.1 This ES has been produced following the scoping opinion from Milton Keynes Council, dated 14th October 2020, which confirmed the scope of Environment Statement would be required, this document has been prepared. Officers have advised that there is potential for environmentally significant impacts on heritage, ecology, transport, landscape, noise/air quality and cumulative impacts.

1.3.2 This ES is structured to provide the information identified as being required within the scoping opinion provided by Milton Keynes Council.

1.3.3 This ES has been carried out in accordance with the following regulations, guidance and advice on good practice:

- Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations (2017): and
- Environmental Impact Assessment Guidance, Department for Communities and Local Government, (2017).

1.3.4 The methodologies that have been used in the ES measure the effects relating to each of the environmental topics. These are based on recognised good practice and guidelines specific to each subject area, details of which are provided within each individual technical section, prepared by suitably qualified experts in that field.

1.3.5 Within the ES, the following table has (unless otherwise noted) been used to determine the significance of effects resulting from the proposed development. It is broadly accepted that the significance of effects reflects the relationship between the following two factors:

- The actual change taking place to the environment (i.e. the 'magnitude' or severity of an effect); and
- The sensitivity, importance or value of the affected resource or 'receptor' (such as archaeology).

		Sensitivity of Receptors			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	**High**	Major	Major/ Moderate	Moderate	Moderate/ Minor
	Medium	Major/ Moderate	Moderate	Moderate/ Minor	Minor
	Low	Moderate	Moderate/ Minor	Minor	Negligible
	Negligible	Moderate/ Minor	Minor	Negligible	Negligible/ None

Table: 1.1 Matrix for Determining the Significance of Effects

1.3.6 The levels of significance shown in the above matrix are defined as:

- **Major positive or negative effect** - where the proposed development would cause a substantial improvement (or deterioration) to the existing environment.
- **Moderate positive or negative effect** - where the proposed development would cause a noticeable improvement (or deterioration) to the existing environment;
- **Minor positive or negative effect** - where the proposed development would cause a barely perceptible improvement (or deterioration) to the existing environment; and
- **Negligible** - where the proposed development would result in no discernible improvement or deterioration to the existing environment.

1.4 Legislation and Policy

1.4.1 Planning policy relevant to the proposed development is contained within the National Policy Planning Framework (the Framework), National Planning Practice Guidance (NPPG), the local development plan as well as various other adopted and endorsed documents. In this instance the development plan comprises the following documents;

- Plan: MK (adopted March 2019) and,
- Newport Pagnell Neighbourhood Plan (2016)

1.4.2 The key policies of relevance to the application are set out in chapter 4. These policies are also fully assessed in the Planning Statement that accompanies the application. There is also a site specific SPD, the Milton Keynes East Milton Keynes East Strategic Urban Extension Development Framework Supplementary Planning Document which provides details on how the Council wish to see this allocation developed.

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1.5 Consideration of Alternatives

1.5.1 The 2017 EIA regulations require an applicant to consider alternatives under Regulation 18 3(d).

1.5.2 The appropriateness of the site to meet Milton Keynes's housing figures has already been considered within the plan making process. Chapter 5 of the ES considers that there are no reasonable alternatives available to development of the site for what is proposed in this application. Accordingly, developing the land off Willen Road for other purposes would not be a reasonable alternative.

1.5.3 Based on the assessments carried out it can be concluded that the option of not developing this specific site would fail to meet the planning policy objectives of the Plan:MK as well as the Milton Keynes East Strategic Urban Extension Development Framework Supplementary Planning Document.

1.6 Archaeology

1.6.1 The accompanying archaeological work undertaken by Triskelion and detailed further at Chapter 6, has concluded that;

> *'The proposed development would have no adverse indirect effect on or harm the significance of any other non-designated or designated heritage asset. With respect to the cultural heritage of the built environment the Planning (Conservation Areas and Listed Buildings) Act 1990 does not apply as no harm has been identified to the significance of a Listed Building arising from development within its setting. In determining the application, the Council's duty to have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses is disengaged.'*

1.7 Ecology

1.7.1 RSK undertook a number of ecological surveys of the site, which are detailed further in chapter 7. Following these they have concluded that;

> *'The development of the Site will take place on habitats that primarily include arable and improved grassland. An area of species-rich lowland meadow will be lost but a bespoke habitat creation scheme will see new lowland meadow created. The River Ouzel corridor will be maintained in its entirety together with a suitable buffer and this together with the creation of grassland and attenuation lagoons will provide continued foraging habitat for bats and farmland birds. As a precautionary measure it has been assumed great crested newt are present and use will be made of the local District Licensing Scheme to offset any potential impacts on great crested newt.'*

1.7.2 Subject to suitable mitigation outlined within the ecological reports and outlined later in chapter 7 the proposed development will not cause unacceptable harm to biodiversity species or habitats.

1.8 Landscape

1.8.1 Pegasus Group have undertaken numerous site visits and desk based assessments to identify the key viewpoints and constraints affecting the development, outlined in further detail in the accompanying report and Chapter 8 of this document. The LVIA concludes that there would be some localised significant visual effects due to proximity and direct nature of views, gained from properties and PRoW within the site during construction and at year 1 operation.

1.8.2 None of the remaining visual receptors within the study area, however, have been assessed as experiencing significant visual effects. In addition, none of the landscape character areas or landscape elements of the Site including the River Ouzel have been assessed as being subject to significant effects, including cumulative landscape effects.

1.8.3 Overall, the LVIA concludes that the proposed development responds well to the characteristics of the receiving environment, mitigating visual effects, whilst not compromising the requirements of the proposed development.

1.9 Transport

1.9.1 RSK have undertaken numerous assessments of the highway impacts, detailed in the accompanying reports and outlined in Chapter 9. This chapter considers the effects of traffic generated by the residential development upon sensitive receptors along the road frontages and using the road links. Assessments have been undertaken for the construction phase and the operational phase, and consideration has been made for cumulative effects with other known developments in the area. The assessments did not identify any significant effects.

1.10 Construction Impacts

1.10.1 The construction impacts on neighbouring properties in respect of air quality and noise have been considered by RSK and Cole Jarman respectively and outlined in Chapter 10 of this Statement and accompanying reports. In terms of the air quality RSK have concluded;

'Following the implementation of measures to minimise construction dust impacts, the residual construction period effects are predicted to be negligible.'

1.10.2 Whilst in terms of noise Cole Jarman found;

'An AVO Level 1 assessment has been conducted showing that dwellings located close to the A422 are 'high' with regard to noise during periods of overheating.

An initial AVO Level 2 assessment has been undertaken which has shown that with suitable acoustic vents to all habitable rooms within the 'high' risk area internal noise levels during periods of overheating can be suitably controlled.

During cooler periods it has been found that a suitable level of amenity can be provided within the proposed residences, with acoustically enhanced glazing and ventilation openings necessary for some dwellings. Acoustic performance requirements for the relevant façade elements are provided.'

1.10.3 Subject to suitable mitigation for existing and future residents the construction impacts of the scheme will be within accepted limits.

1.11 Summary

1.11.1 This Environmental Statement Non-technical Summary demonstrates that the development would not have environmentally significant impacts. It is accepted that there will be other impacts associated with the development that do not reach the threshold of being environmentally significant with or without considering mitigation. The development proposes a number of mitigation measures to address these matters that would be secured through the planning application. This is addressed in chapter 9.

1.11.2 This Environmental Statement documents the Environmental Impact Assessment process and any impacts arising from the project. Based on the assessment carried out, no significant environmental impacts have been identified as resulting from the development. It is considered that planning permission can be granted without a requirement for further assessment of environmental impacts.

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2.0 INTRODUCTION

2.1 Overview

2.1.1 This Environmental Statement (ES) has been co-ordinated by DLP on behalf of Bloor Homes South Midlands in the preparation and submission of an outline planning application for the development of land off Willen Road, Newport Pagnell.

2.1.2 Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the '2017 Regulations') require that any proposed development falling within the description of a Schedule 2 development, will be subject to an EIA where such development is likely to have significant effects on the environment by virtue of such factors as its nature, size or location (Regulation 2(b)).

2.1.3 The proposed development falls under the category of "urban development projects" Schedule 2, 10, (b)). As set out later in the ES, the development site exceeds the indicative threshold of 0.5ha stated in the Regulations and the Development has the potential to give rise to likely significant effects on the environment and the Local Planning Authority has confirmed in a Screening Opinion, reference 20/01181/EIASCO dated 14th October 2020, that EIA is required.

2.1.4 The Environmental Impact Assessment (EIA) has been undertaken in accordance with the arrangements set out in the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017.

2.1.5 The EIA process identifies and assesses the likely significant environmental impacts of the proposed development of 'Land off Willen Road' and establishes an appropriate range of measures in order to avoid, mitigate and reduce any significant impacts identified. The EIA Regulations (and subsequent updates) apply the amended EU Directive 201452/EU. This ES contains the findings of the EIA.

2.1.6 The EIA has been undertaken by a team of specialist consultants with expertise in individual fields. The project team consists of:

- **Bloor Homes** – Applicant
- **DLP Planning** - Planning and EIA co-ordination
- **Pegasus Design** – Masterplanning and Landscape
- **RPS** –Highways

- **Briary Energy** – Sustainability
- **Travis Baker** – Flood Risk and Drainage
- **Triskelion Heritage** – Heritage
- **RSK** – Ecology and Air Quality
- **Rolton Group** – Ground Conditions
- **Cole Jarman** - Noise

2.1.7 Copies of this Environmental Statement will be available to view on the website of Milton Keynes Council and at the Council's offices. You can purchase a copy of the Environmental Statement by contacting DLP Planning. There will be a cost to cover the cost of printing the Statement.

2.1.8 The ES should be read in conjunction with other reports and documents submitted as part of the application. These include:-

- Indicative Master plan
- Parameters plans
- Planning Statement
- Design and Access Statement
- Transport Assessment
- Tree Schedule
- Flood Risk Assessment and Drainage Strategy
- Phase 1 Ground Investigation Report

2.2 The Site

2.2.1 The site comprises an area of 40.78 hectares. It is bounded to the east by the River Ouzel and beyond that is further agricultural land which also forms the southern boundary. The application site and the land beyond the eastern and southern boundaries (Berkeley Group) forms part of the wider Milton Keynes East allocation. The A422 runs along the northern boundary, with a small section of the site located on the opposite side of this road.

2.2.2 The site can be split into two distinct main areas; one is generally made up of a mixture of arable farmland and pasture, set within large fields separated by mature hedgerows whilst the other comprises land used for mineral extraction but now fully remediated. There is a scattering of farm buildings across the site, including Caldecote Farm, Caldecote Cottage and Moat Cottage, which are excluded from the site area whilst immediately abutting the north-eastern edge is Caldecote Mill. There will be two vehicular accesses located off Willen Road.

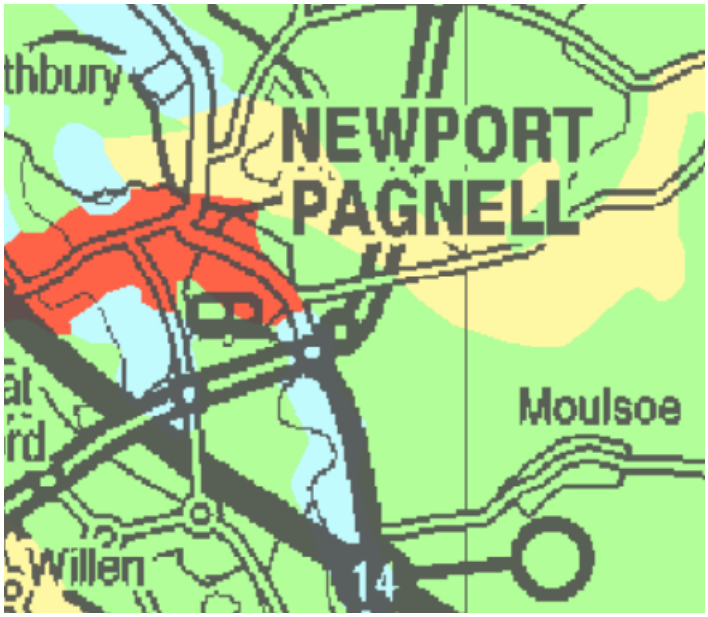

Figure 2.1: Extract from the Agricultural Land Classification map

2.2.3 The land is shown on the Natural England Agricultural Land Classification maps as being good to moderate (grade 3) soil quality, see Figure 2.1 above.

2.2.4 Across the site there are scattered areas of trees, including a belt running east to west through the middle of the site. It is the intention of the developer to retain this belt and to create a buffer corridor either side whilst other trees on site would be retained where possible. There are no protect trees on or near the site.

2.2.5 Milton Keynes Council has produced a borough-wide character assessment, in addition to the National Character Assessment. The application site is located wholly within 'LCT2 – River Valley'. This is split into 2 categories of 'rural river valley' and 'urban river valley' with these both further subdivided into five categories, with the site being categorised as 'LCA 2d – Ouzel North Urban River Valley'.

2.2.6 The River Ouzel is identified as Wildlife Corridor in Plan MK, a non-statutory designation together a Minerals Primary Focus Area. There are no statutory ecological designations on the site.

2.2.7 The site is not within proximity of any Scheduled Monuments or an area of archaeological importance. However, there are a number of entries in the Historical Environment Record and potential items of interest are shown in Figure 2.12 of the MKE SPD.

2.2.8 There are no listed buildings or conservation areas immediately adjoining the site. The nearest listed buildings are located over 700m to the south in Willen, 900m to the east on

the London Road and over 1km to the north in Tickford End. The nearest conservation area is that which covers the town centre of Newport Pagnell to the north of the site. The southern edge of the conservation area lies approximately 370m away from the northern edge of the allocated site. The intervening land is a mix of agricultural and sports fields whilst there is also a tree belt running along the River Ouzel immediately to the south of the conservation area which acts as a screen.

2.2.9 The eastern edge of the site lies within flood zones 2 and 3. The extent of flood zones 2 and 3 has been reviewed as part of the drainage strategy to accompany the planning application.

2.2.10 There are two public rights of way across the site. FP14 runs along the eastern boundary of the site, lading up from Tongwell Street to Marchend Road, whilst FP15 runs east west across the site along Caldecote Lane and past Caldecote Mill.

2.2.11 There are no services or facilities in the immediate vicinity of the site, although two public rights of way cross the site. However, adjoining the northern parcel of the site is the Willen Road Sports Ground which includes football, tennis, skate park and cricket pitches as well as Newport Pagnell Town Football Club. Presently two public footpaths provide access across this area with the main vehicular and pedestrian accesses being from Willen Road.

2.2.12 The site lies to the southeast of Newport Pagnell, with the residential estate built around Alexandra Drive being the closest properties to the site excluded those adjacent to the development. Immediately to the west is a parcel of land allocated for employment purposes (Under ownership of Newlands). Similarly, land to the southwest on the opposite side of the M1, known as Tongwell is used for employment purposes. Further to the south is the district of Willen which again separated from the site by the motorway. There is also an existing sewer that runs underground across the site for which a 6m easement exists on either side and will need to be maintained.

2.2.13 Willen Road runs north to south connecting Willen and Newport Pagnell. It also connects into the A422 which runs west-east from the centre of Milton Keynes to Interchange Park, an industrial estate south-east of Newport Pagnell.

2.3 The Development Proposal

2.3.1 This Environmental Statement has been prepared in support of an application for:

"Outline planning application with all matters reserved except for means of access in relation to highway access from Willen Road and pedestrian/cycle access in relation to the crossing of the A422, for the demolition of the existing structures on site and the creation of a residential development of up to 800 dwellings comprising affordable housing, a primary school, local centre, public open space, red ways, sustainable urban drainage systems and all associated works."

2.3.2 The application relates to a parcel of land within the wider Milton Keynes East allocation, which is to deliver approximately 5000 new dwellings. The current site would provide approximately 16% of these units.

2.3.3 The Design and Access Statement provides an evolution of the scheme master plan and fully designed elements of the proposals. The proposals are explored in more detail in the sub-chapters below.

2.4 Residential

2.4.1 Up to 800 residential dwellings are proposed across the development area. These would be accommodated on a gross developable area of c.17.62 hectares, with a density of between 35-40 dwellings per hectare (dph).

2.4.2 As indicated on the accompanying master plan for the application site, the dwellings would be accommodated at different densities across the site whilst the majority of the development would be up to 2.5 storeys. However, where appropriate, 3 storey development is proposed. A detailed explanation from the distribution of building heights and densities is provided within the accompanying Design and Access Statement and this will inform subsequent reserved matters applications and detailed plans.

2.5 Primary School

2.5.1 A 2.2-hectare site has been designated for a two-form entry primary school. The site has been located within the site but accessed off the southern spine road to allow easy access from Willen Road and for the adjacent developments taking place within the allocation. The site for the school is adjacent to the local centre to help encourage shared trips.

2.5.2 It is expected that the school building would be accommodated in the southern parcel of the allocated area between the SUDs corridor, proposed spine road and the greenway meaning it is in a highly sustainability connected part of the site.

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2.6 Local Centre

2.6.1 A site of 0.5ha has been identified within the master plan for a local centre which would be adjoining the school to ensure it is equally accessible and to encourage shared trips.

2.6.2 Presently two buildings are intended on this area although the precise configuration and occupancy would be resolved through the reserved matters stage.

2.7 Play facilities

2.7.1 The master plan shows that the following areas of open space and play facilities will be included within the site:

- Local Park Minimum size 1-2ha
- Pocket Parks Minimum size up to 1ha
- Amenity Open Space Minimum size up to 1000m^2
- Neighbourhood Play Area Minimum size 0.3ha (excluding 20m buffer)
- Local Play Area Minimum size 0.04ha (excluding 20m buffer)
- Playing Fields 0.52ha per 1000

2.7.2 Each of the facilities has been sized to meet the requirements of the Local Plan and the MKE SPD. They have been sited to ensure maximum accessibility and also benefit from the required set back distances to dwellings.

2.8 Pedestrian and vehicle access

2.8.1 The development will be served by two access points from Willen Road; one new access point to the north which will serve as the main estate road through the northern section of the site before running down parallel with the greenway to connect into the wider allocation beyond the southern boundary of this site. The second access will utilise the existing access to the quarry and will form the main vehicular route to the school, local centre and southern dwellings before extending further east into the wider allocation.

2.8.2 The location of these secondary roads, along with the access points and spine roads themselves, has been in part dictated by the existing on-site features, such as the existing access and farmhouses and the belt of trees that demarcates the quarry.

2.8.3 There are two existing bus routes which run along Willen Road, Route 1 and C10 with existing stops located close to the existing quarry access. Additional bus stops will be provided along Willen Road and the main estate roads to ensure all residents will be within 400m of a point of access to the bus service as set out in the MKE SPD.

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2.9 Highways and movement

2.9.1 Within the development, the master plan shows a number of secondary roads and indicative estate roads. Willen Road itself will be upgraded to a Grid Road whilst the main internal roads will be constructed as Local Distributor Roads.

2.9.2 The site will be well interconnected with the wider allocation including the employment area to the west and the surrounding Berkely development to the east and south.

2.9.3 Redways are proposed throughout the site. These have been designed to provide direct access to the main trip generators in the site, the school, local centre and the sports ground. Provision has also been made for a redway alongside the main greenway which runs diagonally north to south through site.

2.9.4 The redway network is proposed to connect into Newport Pagnell whilst there will also be a connection that provides direct access to Willen Road Sports Ground to the north.

2.10 Open Space, ecology and recreation

2.10.1 The master plan has been designed to incorporate appropriate open space provision in accordance with LPA requirements. This would include the following:-

- Public Open Space
- Linear Park
- Sports Pitches
- Flood Attenuation
- Play Areas
- Ecology Mitigation

2.10.2 The main open space for the site is located along the SUDs corridor which follows the northern boundary of the former quarry and runs across to the River Ouzel and the flood plain. There is also a separate sports pitch area to the north of the A422 which connects with the Willen Road Sports Ground and is identified in the Newport Pagnell Neighbourhood Plan as a recreation area.

Linear Park

2.10.3 The location of this linear park is largely contiguous with the extent of flood zones 2 and 3 (see below) but additional allowance for green space outside the flood plain has been made to accommodate surface water attenuation ponds.

Sports Pitches

2.10.4 The sports pitch has been designed to meet appropriate standards and is set within a 2-hectare site as per Council standards and in accordance with the MKE SPD. It has been located to the north of the development on the opposite side of the A422. This allows them to form an extension of the well-established Willen Road Sports Ground site, as set out in the Newport Pagnell Neighbourhood Plan, which immediately borders this parcel of land.

2.10.5 Other informal open spaces have been provided within the development. This includes an area through the vertical centre of the site, following the path of the existing sewer lines, which will form a key greenway connecting the allocation with the surrounding villages. All open space is showing has being interconnecting, which is important to allow the movement of wildlife.

2.10.6 Throughout the site as far as possible save to provide access, all existing hedgerows are shown as being retained as are all category A and B trees.

2.11 Flood Risk and Drainage

2.11.1 The east of the site lies within flood zone 2 and 3 and no built development is proposed within this area.

2.11.2 The extent of the flood zone has informed the master plan. The master plan indicates suitable drainage attenuation through the use of attenuation ponds. The extent of flood attenuation has been calculated within the Flood Risk Assessment and Drainage Strategy which has be prepared by RPS.

2.12 Noise and air quality attenuation

2.12.1 Noise and Air Quality Assessments have been undertaken to support the application. The impact of construction works including the potential to create dust is considered elsewhere within the ES. The site is not located within an Air Quality Management Area.

2.13 Archaeology and heritage

2.13.1 The site has been subject to a desk-based heritage assessment and geophysical investigation. An Archaeological Evaluation has been undertaken.

2.13.2 This has shown that in built heritage terms, there are no constraints to the development. The proposal will have no impact on any listed building nor the conservation area to the

north.

2.13.3 The MKE SPD and Historic Environment Record identify that within the site is the cluster of Caldecote Mill and the deserted Medieval Village and Caldecote moated site. The nearest listed building is Moulsoe Farmhouse which is located approximately 475m to the southeast.

2.13.4 The desktop survey of the site and subsequent geophysical survey has shown that the site does not contain any designated heritage assets for which there would be a presumption in favour of preservation in situ and against development. There are several non-designated heritage assets within the site with the potential to contribute to an increased understanding of settlement and agricultural activity of the Prehistoric, Roman, Saxon and Early-Medieval periods at the local level.

2.14 Construction

2.14.1 Phasing is to be agreed as part of the planning application process. Construction of parcels, or combination of parcels, will follow as each Reserved Matters application is approved by the Local Planning Authority. The assessment assumes a consistent build out rate but acknowledges this may be quicker or slower dependant on market conditions.

2.14.2 Once approved, the access road would be constructed and the site infrastructure implemented prior to any dwelling or other buildings being commenced, as required by the SPD. This would include the creation of new vehicular access points into the site and the construction of the main link road roads, at least in part where it connects to the scheme boundary and adjoining development beyond.

2.14.3 In this initial phase it is also anticipated that:

- Site hoardings would be erected
- Tree protection measures, as set out in the accompanying arboricultural assessment will be established;
- Any required early ecological enhancements will be undertaken
- Initial regrading works will be undertaken, including stripping topsoil and storing for future use; and
- Any diversion of public rights of way as required will be undertaken

2.14.4 Following on from the initial establishment of the site, and the grant of reserved matters approval for initial phases of development the base of secondary internal roads constructed and all necessary utilities and drainage works would be installed; including

attenuation ponds shown on the drainage strategy, which have been designed to work on a phase by phase basis.

2.14.5 Alongside the establishment of infrastructure, preparation of ground works and installation of foundations would take place at this stage. This is likely to include:

- Excavation for foundations for the new dwellings and other buildings;
- Potential for some limited piled foundations (to be investigated)
- Installation of ground slabs

2.14.6 It is anticipated that a Construction Environmental Management Plan (CEMP) will be approved prior to development commencing. This will include measures to limit the construction impacts of the development, including reducing the risk of pollution, contamination and use/waste of materials. This will amongst other issues, address issues of storage, to mitigate against the risk of any contamination of the nearby water course, and transport, minimising impacts on the local community.

2.14.7 The construction of buildings will involve the preparation of poured and piled foundations, the creation of structures in brick, block and wood frame and the application of finishes, including wood boarding and render as set out in the accompanying Design and Access Statement, followed by fitting out, including the creation of internal walls, kitchens, bathrooms and services. Windows will be specified in accordance with the requirements of any noise mitigation strategy.

2.14.8 Alongside the development of homes and other buildings landscaping works will be undertaken. This will involve the creation of a sports pitch in accordance with the submitted master plan within the wider area of open space which runs through the middle of the site and parallel to the river.

2.14.9 Other landscape works will include:

• tree and vegetation planting and seeding to a plan to be agreed at reserved matters stage. Where structural planting is necessary, this will take place at an early stage to allow time to mature

- The creation of paths/redways/greenways through landscaped areas.
- Creation of play areas as shown on the indicative master plan.

2.14.10 It is anticipated that a construction traffic management plan (CTMP) will be submitted prior to the works commencing which will cover issues such as vehicle routing and hours/days

of operation.

2.14.11 Deliveries and vehicle unloading will take place within the site, away from the public highway so as not to affect those using Willen Road.

2.14.12 Detailed assessments of the likely significant effects on the environment that could result from the construction works are covered as appropriate within the relevant topic specific chapters.

2.15 Demolition

2.15.1 The development involves limited to no demolition.

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3.0 THE ENVIRONMENTAL ASSESSMENT PROCESS

3.1 Overview

3.1.1 This chapter sets out the broad method of approach taken to carry out the EIA. It provides an outline of the assessment methodology and the issues addressed in the ES.

3.2 The EIA Process

3.2.1 EIA is a process by which information about the environmental impacts of a project is collected, evaluated, and taken into account. The ES enables decision-makers to consider the analysis of effects and the proposed measures to address them in the development application. The EIA process has a number of key characteristics:

- It is systematic, comprising a sequence of tasks defined both by regulation and by practice.
- It is analytical, requiring the application of specialist skills from the environmental sciences.
- It is impartial, its objective being to inform the decision-maker rather than to promote the project.
- It is consultative, with provision being made for obtaining information and feedback from interested parties including local authorities and statutory agencies.
- It is interactive, allowing opportunities for environmental concerns to be addressed during the planning and design of a project.

3.3 The Scope of the Assessment

3.3.1 This ES is structured to address the issues identified in the detailed Scoping Opinion provided by Milton Keynes Council (the LPA) on 14th October 2020 (Appendix 3.1) which contained information to allow judgement as to the issues to be covered in the Environmental Statement.

3.3.2 As part of the Scoping Process, the LPA consulted:

- MKC Archaeological Officer
- MKC Conservation Officer
- MKC Landscape Architect
- MKC Environmental Health Officer
- MKC Highways Officer
- MKC Countryside Officer (Ecology)
- MKC Urban Design
- MKC Flood and Water Management (LLFA)
- MKC Development Plan (Planning Policy)
- Historic England

- Highways England
- Anglian Water
- Bedford Group of Internal Drainage Boards
- Central Bedfordshire Council

3.3.3 In addition, the following parties were notified of the Scoping Opinion request:

- Moulsoe Parish Council
- Newport Pagnell Town Council
- Great Linford Parish Council
- Campbell Park Parish Council
- Ward councillors for Newport Pagnell ward
- Ward councillors for Broughton ward
- Ward councillors for Olney ward

3.3.4 As set out in the National Planning Practice Guidance, the Environmental Statement must include at least the information reasonably required to assess the likely significant environmental effects of the development listed in regulation 18(3) and comply with regulation 18(4). In the view of the Local Planning Authority, EIA was required due to the urbanising effect of the development including the cumulative impact of the entire allocation and the loss of agricultural land, the loss of natural resources (open land), the generation of waste and potential increase pollution.

3.3.5 The LPA acknowledged that there would be other effects as a result of the development, such as increased traffic movements and construction impacts, but that these would not be likely to give rise to unusually complex or potentially hazardous environmental effects that would require detailed assessment through EIA. Therefore, factors listed under Regulation 4(2) such as population, human health, soil, water, material assets and cultural heritage, (including architectural and archaeological aspects) have not been covered in detail as part of the EIA process.

3.3.6 The topic areas that were identified to be addressed in the EIA were: heritage, ecology, landscape, transport, construction impacts and cumulative impacts. The methodology of the technical assessments for each of the topic areas includes the consideration of the significance, assessment of alternatives and phasing.

3.3.7 Ecology and Biodiversity: The EIA gives particular consideration to the effects of the proposed development on:

- Ecological designations including the wildlife corridor along the river
- Existing habitats on the site.
- Faunal species.

3.3.8 Landscape impact: The EIA gives particular consideration to the below effects:

- Impact on the landscape character and the visual environment, including sensitive receptors
- Impact of construction and operational phase effects
- Impact on the night-time visual environment

3.3.9 Construction Impacts: As part of the assessment of effects on air quality and noise during the construction period of this development proposal, focus has been placed in this EIA on the below impacts: (to clarify with consultants):

- Air quality (including nitrogen dioxide levels) as a result of construction traffic generation in the vicinity of the site
- Assessment of impacts at the construction phases.
- Impact of increased traffic generated by the construction of the proposed development on the living conditions of the nearby residents.

3.3.10 Furthermore, as above, it was highlighted that due to the scale of the development, waste through the construction process could have a significant impact. This has been addressed as appropriate within the individual chapters, as with the environmental impacts of increased traffic (noise and air quality).

3.4 Insignificant effects

3.4.1 Regulation 4(2) of the EIA Regulations sets out that the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors:

a) Population and human health;
b) Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC(a) and Directive 2009/147/EC(b);
c) Land, soil, water, air and climate;
d) Material assets, cultural heritage and the landscape;
e) The interaction between the factors referred to in sub-paragraphs (a) to (d).

3.4.2 As set out above, matters relating to pollution and human health (air quality and noise), biodiversity and landscape have been assessed in the following chapters. However, for clarity, set out below is a review of other potential impacts of the development and why they are not considered to lead to significant environmental effects and have therefore not been assessed in more detail.

Population and human health

3.4.3 The IEMA set out that Human health has three elements – heath protection, health

improvement and improving services.

3.4.4 The likely significant effects on population and human health are considered to be as a result of increased transport activity in the area. Primarily, the impact of noise from increased traffic and on local air quality both may have an impact on the local population and their health, as will the impact of existing noise sources, such as the A422 and M1, on future residents. Therefore, the transport modelling outputs have been taken into account in preparation of the noise and air quality chapters which form part of this ES.

3.4.5 The area around the site does not contain any existing public facilities or services, leading to limited public movements (on foot) in the area, meaning there is limited scope for significant effects as a result of severance of communities.

3.4.6 The existing nature of the A422 and the M1 means that they have some HGV vehicle movements along its length. The development would not increase the frequency of these movements (aside from some increase in construction traffic) in fact with the closure of the quarry it would result in a reduction of these movements.

3.4.7 The development would also not lead to movement of hazardous materials, meaning, when combined with the limited existing movements on foot, there will not be a significant effect on the environment as a result of increased fear and intimidation of road users. The provision of a new redway through the centre of the site which would connect into existing public footpaths FP008 and FP014 which will also increase the amenity of the pedestrian environment, further decreasing the potential for significant impacts on the environment.

3.4.8 Other impacts on population and human health are considered to be the increased pressure on the availability of and access to day to day facilities, such as schools and doctors' surgeries. The development will provide for an increase in primary education facilities to increase capacity meaning there will be no significant impact as a result of under provision of these services.

3.4.9 A Health Centre will be provided as part of the wider allocation on land outside the control of the Applicant. It is anticipated that a financial contribution will be required under a section 106 toward health facilities.

3.4.10 In a similar manner, secondary education will be dealt with as a result of a financial contribution to be secured via the s106 agreement.

Land, soil and climate

3.4.11 The site is an allocated site for residential development. As set out in the consideration of alternatives, the site forms an integral part of the Council's land supply requirement. Therefore, although the development site would utilise 70.78 hectares of land, if this site were not developed, an alternative site, similar in size would need to be found elsewhere.

3.4.12 The allocation of the site in the MKE SPD and the determination of the Council's development strategy, as currently set out in Plan: MK, has considered alternatives and it has deemed the release of greenfield sites such as this necessary as brownfield sites of this size and scale are not available.

3.4.13 The site can be split into two distinct parcels, with the northern section predominately in agricultural use and the southern parcel forming the quarry. The northern parcel borders the River Ouzel where the land is used for pasture whilst the section closest to the A422 is used for crops. There are a number of farmhouses across the northern parcel which are excluded from the application site.

3.4.14 Combined with this, the site soil is of good though unexceptional quality, with the site primarily assessed as being grade 3, meaning its loss is unlikely to lead to significant negative impacts on the production of food and fibre.

3.4.15 The nature of the development is unlikely to lead to any negative impact on soil quality. The proposed use is unpolluting and unlikely to result in any effects on either the site or the surrounding area.

3.4.16 The southern part of site is currently a quarry, although permission expires shortly on this and the area is being remediated in accordance with the details submitted under condition 10 of application ref 12/01284/MIN.

3.4.17 The development has potential to have some impact on the climate as a result of the operation of the development. This would principally be through increased traffic movements and the resultant increase in associated emissions. These have been considered as appropriate in the air quality chapter.

3.4.18 There is potential for an increase in carbon dioxide emissions as a result of activity in the proposed dwellings. However, this impact is not considered to be significant, and can be offset by the inclusion of renewables together with sustainable construction principles which are encouraged by the Council's local plan policies. These elements can be secured

and regulated through the planning application process. The application is accompanied by a Sustainability and Energy Statement.

Material assets, cultural heritage and the landscape

3.4.19 The material assets on the site include the existing dwellings, the public footpath and Willen Road. The proposed development is not considered to have any significant effects on material assets as the dwellings are excluded from the red line area whilst the footpath and Willen Road will both be upgraded as part of the proposals to accommodate the increased usage that will arise due to the development.

3.4.20 There development would not affect the setting or character of any conservation area or listed buildings given the distances from each which exceeds 475m at the closest point.

3.4.21 The site does lie within a minerals safe guarded area as defined in the Milton Keynes Mineral Local Plan. Part of the site is presently quarried for sand and gravel however this extraction is nearing completion and the land will be remediated to allow for the development to take place.

3.4.22 The site does not lie in or near any landscapes defined for their national or international value, but it does lie in an area defined as LCA 2d Ouzel North Urban River Valley. Whilst not having the same status as say an AONB, the loss of the land could be considered to have a significant effect on the local landscape. Therefore, landscape has been subject to a more detailed assessment.

3.5 Methodology

3.5.1 The EIA for the application 'Land off Willen Road' has been carried out in accordance with the following regulations, guidance and advice on good practice comprising of:

- Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations (2011)
- Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations (2017)
- Environmental Impact Assessment Guidance, Department for Communities and Local Government, (2017)

3.5.2 The methodologies that have been used to assess the effects relating to each of the environmental topics are based on recognised good practice and guidelines specific to each subject area, details of which are provided within each individual technical section, prepared by suitably qualified experts in that particular field.

3.5.3 Any assumptions made in carrying out the EIA are set out in the individual technical chapters. However, for clarity a number of general assumptions have been made:

- Baseline conditions are those assessed at the time data was collected, which was during 2020 and early 2021.
- Assessments have been based on data collected on site as well as through existing published sources. Sources of information are noted as appropriate in individual chapters.
- The EIA has been undertaken based on the description of development set out in chapter 1.
- For completeness, the EIA has assessed the impact of the whole development of the allocated site as set out in the MKE SPD.
- It is assumed that none of the other surrounding uses change, aside from those listed earlier which have been considered by way of cumulative impact.

3.6 Approach to EIA

3.6.1 The following main stages have been followed during the assessment:

- Establishing the existing / baseline environmental conditions at the Site;
- Identifying planning policy context and relevant guidance for the Proposed Development;
- Determining the criteria to assess/classify the level of any identified environmental effects arising from the Proposed Development during construction and operation (once completed);
- Identifying, predicting and assessing the likely significance of the environmental effects, both positive and negative, of the Proposed Development;
- Identifying suitable mitigation, enhancement and monitoring measures to prevent, reduce or remedy any likely significant negative environmental effects;
- Assessing the significance of any residual effects remaining following the implementation of mitigation measures; and
- Considering the potential environmental effects of the Proposed Development in combination with environmental effects from other developments (referred to as ‘cumulative’ environmental effects).

3.6.2 The ES which presents an assessment of the potential for likely significant environmental effects (both positive and negative) associated with the Proposed Development and identifies mitigation (not already incorporated into the development proposals) and enhancement measures to minimise any likely significant effects where necessary.

3.7 Determining Significance

3.7.1 The ES considers the likely significant environmental effects of the Proposed Development during construction and once completed. Likely significant negative environmental effects have been avoided where possible and measures have been incorporated into the design of the Proposed Development to prevent, reduce and where

possible offset any likely significant negative environmental effects and to provide enhancement opportunities. Significance reflects the relationship between two factors and it is broadly accepted that the significance of effects reflects the relationship between the following two factors:

- The actual change taking place to the environment (i.e. the 'magnitude' or severity of an effect); and
- The sensitivity, importance or value of the affected resource or 'receptor'

3.7.2 The level of significance is generally defined as set out below, although there is some variance in the technical chapters with how the impact is assessed:

- **Major positive or negative effect** - where the Proposed Development would cause a substantial improvement (or deterioration) to the existing environment;
- **Moderate positive or negative effect** - where the Proposed Development would cause a noticeable improvement (or deterioration) to the existing environment;
- **Minor positive or negative effect** - where the Proposed Development would cause a barely perceptible improvement (or deterioration) to the existing environment; and
- **Negligible** - where the Proposed Development would result in no discernible improvement or deterioration to the existing environment.

3.8 Mitigation

3.8.1 Measures to avoid, minimise or manage any significant adverse environmental effects, or to ensure realisation of significant beneficial effects, are assumed to have been incorporated into the design of the Proposed Development from the outset. The nature of the measures assumed are outlined within the individual topic chapters as appropriate.

3.8.2 It is also assumed that where measures are not capable of being set out in the Description of Development or the accompanying plans these will subject of appropriate planning conditions if required. The assessment is of the Proposed Development incorporating these measures. Where nevertheless, the assessment of the Proposed Development has identified potential for significant adverse environmental effects, the scope for mitigation of those effects, has been considered.

3.9 Structure of the Environmental Statement

3.9.1 The ES comprises of the following chapters:

- Chapter 1: Non-Technical Summary
- Chapter 2: Introduction

- Chapter 3: The Environmental Impact Assessment Process
- Chapter 4: Planning Policy Context
- Chapter 5: Consideration of Reasonable Alternatives
- Chapter 6: Heritage
- Chapter 7: Biodiversity/Ecology
- Chapter 8: Landscape
- Chapter 9: Transport
- Chapter 10: Construction Impacts – Air Quality, Noise, Vibration
- Chapter 11: Cumulative Impacts
- Chapter 12: Proposed Mitigation and Monitoring
- Chapter 13: Summary and Conclusion

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4.0 PLANNING POLICY CONTEXT

4.1 Background

4.1.1 This Chapter of the ES sets out in summary, the planning policy background against which the Proposed Development is to be considered. The majority of the remaining chapters in this ES, in turn, set out the specific legislation and policies against which each of the environmental issues identified has been assessed. A full assessment of relevant Planning Policies is available in the Planning Statement which accompanies the planning application and should be referred to for a comprehensive analysis.

4.2 National Planning Policy Framework

4.2.1 In July 2021, the Government issued a revised National Planning Policy Framework ('the Framework'). The Framework sets out the Government's commitment to achieving sustainable development. Sustainable development has three strands according to the Framework, an economic role, a social role and an environmental role.

4.2.2 The Framework is an important material consideration when determining planning applications and the Framework is clear that proposals which accord with the development plan, should be approved without delay.

4.2.3 The Government's National Planning Policy Guidance (NPPG) provides further reference and guidance on the interpretation of the Framework and the means whereby government policy should be applied.

4.2.4 Guidance in the NPPG on the EIA process has been taken into account in preparing this ES.

4.3 The Development Plan

4.3.1 Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires that the determination of planning applications is undertaken in accordance with the development plan, unless material considerations indicate otherwise.

4.3.2 The development plan relevant to this application therefore comprises the following:

- Plan MK, the Local Plan (adopted March 2019)
- Newport Pagnell Neighbourhood Plan (adopted June 2016) although only a small section of the site falls within the area of this Plan.

4.3.3 The Key Policies of relevance to the application are listed below. These are fully assessed in the Planning Statement that accompanies this application:

Plan:MK (2016-2031)

- Policy DS1 Settlement Hierarchy
- Policy DS2 Housing Strategy
- Policy SD1 Place-Making Principles for Development
- Policy HN1 Housing Mix and Density
- Policy HN2 Affordable Housing
- Policy HN5 Self Build and Custom Housebuilding
- Policy CT2 Movement and Access
- Policy CT3 Walking and Cycling
- Policy CT5 Public Transport
- Policy CT10 Parking Provision
- Policy INF1 Delivering Infrastructure
- Policy FR1 Managing Flood Risk
- Policy FR2 Sustainable Drainage Systems (SUDs) and Integrated Flood Risk Management
- Policy NE3 Biodiversity and Geological Enhancement
- Policy NE4 Green Infrastructure
- Policy L4 Public Open Space Provision in New Estates
- Policy D1 Designing a High Quality Place
- Policy D2 Creating a Positive Character
- Policy D3 Design of Buildings
- Policy D4 Innovation Design and Construction
- Policy D5 Amenity and Street Scene
- Policy CC1 Public Art
- Policy CC2 Location of Community Facilities
- Policy CC4 New Community Facilities

Newport Pagnell Neighbourhood Plan

- Policy NP6 – Cycle and Pedestrian Routes
- Policy NP7 – Developer Contribution Policy
- Policy NP8 – Playing Fields and associated development

4.3.4 Although it doesn't form part of the Development Plan, another key document that has helped shape the proposal is the Milton Keynes East SPD which was adopted in March 2020 and relates to the delivery of the entire urban extension known as Milton Keynes East.

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5.0 CONSIDERATION OF REASONABLE ALTERNATIVES

5.0.1 The EIA Regulations require that when alternative approaches to development have been considered, these are outlined in the ES with the main reasons for their choice.

5.0.2 The 2017 EIA regulations require an applicant to consider alternatives under Regulation 18 3(d). Where alternatives have been considered, paragraph 2 Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations, requires applicants to "*outline the main alternatives studied and an indication of the main reasons for the choice made, taking into account the environmental effects* ".

5.0.3 Given that the site is of a strategic nature specific reference has been made to the Sustainability Appraisal (dated November 2017), which highlights the Council's preferred options in the Local Plan for employment/commercial development.

5.0.4 In the Initial Sustainability Appraisal of Plan:MK it was found that of the eight identified strategic sites considered, three were deemed to be particularly difficult to develop due to the significant constraints and infrastructure requirements that were needed. The current site, identified as option B, together with another option were considered suitable for allocation subject to appropriate mitigation being incorporated to address various constraints together with a well designed and implemented proposal(s).

5.0.5 The approach taken to site selection considered a number of criteria including the connectivity to existing services and facilities, providing a safe, affordable and sustainable community, impact on biodiversity, air quality and noise pollution together with supporting and encouraging levels of employment and job creation.

5.0.6 Whilst the current site would see the development of green field land, which was a negative of the location, it scored well in terms of being able to provide an affordable, sustainable community with good access to facilities and its connection with and ability to support existing employment uses.

5.1 Alternatives

Do nothing

5.1.1 The 'do nothing' scenario was not considered as the proposed development site is an allocated development site and an integral part of the LPA's housing land supply. If the 'do nothing' option were taken forward, this would potentially lead to increased levels of

ad hoc, unplanned development that could have greater environmental impacts due to the need for developers to consider more unsustainable locations.

Alternative Location

5.1.2 The proposed development site is allocated for development in the Plan:MK and the Milton Keynes East SPD, whilst the northern parcel is also identified as a recreation expansion in the Newport Pagnell Neighbourhood Plan (NPNP). Therefore, no alternative locations have been considered for the development. The appropriateness of the site for development was considered through the preparation of the local plan, SPD and NPNP.

Alternative Design Options

5.1.3 Although no alternative locations have been considered for the development, alternatives have been considered for the layout of development on the site.

5.1.4 Alternatives were considered based on the requirements of the Local Plan which sets out in various policies guidelines that development should be in general accordance with. Within the scope of these policies, main considerations have been the location of the various proposed land uses across the site, including the primary school, local centre and open space provision.

5.1.5 The master plan was generally tested with the LPA at an early stage through pre-application discussions informing an iterative process, with consideration of the local centre in particular being located centrally and further west within the site, rather than to the east? as is shown on the submitted master plan.

5.1.6 The current location was selected due to its gateway location to the wider allocation and locating both the community hub and school together should help minimise trip generation and maximise use of non-car modes of transport. The location also allows connectivity to the north-south green link.

5.1.7 The constraints of landscape features and areas of higher probability of flooding have informed the final locations of open spaces across the site. Alternative locations for sports pitches were considered and discounted given the allocation of land to the north of the A422 within the Newport Pagnell Neighbourhood Plan and the opportunity to enhance the existing and well established Willen Road Sports Ground.

5.1.8 The site is relatively unconstrained in planning terms and lies beyond the southern edge of Newport Pagnell. It has been allocated for development within the Local Plan and the

Milton Keynes East SPD and partially within the Newport Pagnell Neighbourhood Plan, although this relates to the expansion of the Willen Road Sports Ground only.

5.1.9 The SPD was subject to a Sustainability Appraisal which considered potential alternatives to the allocation. This noted that whilst the site would result in the loss of some 'best and most versatile' agricultural land, the location presented a logical location that performs well against sustainability objectives, specifically in relation to the connectivity that could be achieved between the new and existing employment uses on the opposite side of the motorway.

5.1.10 Based on the assessments carried out, it can also be concluded that the option of not developing the site would fail to meet the planning policy objectives of Plan:MK as the necessary housing within the plan would not be delivered. Accordingly, not developing land off Willen Road or developing it for other purposes would not be a reasonable alternative.

5.1.11 It has therefore been concluded that there are no reasonable, available, alternatives available to developing the site at land off Willen Road.

5.1.12 Based on the assessments carried out it can also be concluded that the option of not developing the site would fail to meet the planning policy objectives of Plan: MK as the housing delivery objectives of the plan would undermined. In order to meet the objectives of Plan:MK it would be necessary to rely on unplanned, speculative development proposals. This would be counter to the interests of a plan led planning system and could not assure that sufficient employment land would become available.

5.1.13 Accordingly, not developing land at Milton Keynes East or developing it for other purposes would not be a reasonable alternative. Therefore, it can be concluded that there are no reasonable, available, alternatives available to developing the site at Milton Keynes East.

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6.0 HERITAGE

6.1 Introduction

6.1.1 Bloor Homes South Midlands have commissioned Triskelion Heritage assisted by Robinson Wild Consulting to prepare a Historic Environment Desk-Based Assessment ("HEDBA") for an area of land east of Willen Road, Newport Pagnell, Buckinghamshire (hereafter the "Site"). The HEDBA was commissioned to accompany a planning application for a proposed residential development, and associated infrastructure and landscaping at the site, and has subsequently been developed into this technical Annex of an Environmental Statement as part of an environmental impact assessment of the proposed development.

6.1.2 The site is located c.1.3km to the southeast of the centre of Newport Pagnell and c.3.7km to the northeast of Milton Keynes (Figure 1). The site extends to an area of c.41 hectares and is centred, approximately, at National Grid Reference SP 8829 4235. It consists of two parcels of land intersected by the A422 (Figure 2). The larger parcel of land to the south of the A422 is bounded to the north by hedge-line fronting the A422, the River Ouzel and floodplain to the east, fields and the M1 to the south and hedge-line fronting Willen Road to the west. It is characterised by generally level arable fields, some currently under pasture, with an area of former gravel extraction in the southwest of the site. There are visible earthworks in the form of ridge and furrow in the fields under pasture. There are also two large residential properties, Caldecote Cottage and Moat Cottage with associated land situated in this section of the site. They do not form part of the proposed residential development. The smaller triangular-shaped parcel of land situated to the north of the A422 is an arable field bounded to the north and east by fields, the A422 to the south and hedge- and treeline to Newport Pagnell Town Football and Social Club to the west.

6.1.3 The site lies within a known landscape of Prehistoric, Romano-British, Medieval and Post-Medieval period activity and in historic and archaeological terms the principal interest of the site is associated with the deserted Medieval settlement of Caldecote (MKHER ID: MMK91 / Triskelion UID: 16; MMK87 / Triskelion UID: 18) and the possible evidence for associated agricultural activity in the form of ridge and furrow cultivation contained within the north part of the site.

6.1.4 The aim of this assessment is to determine, in so far as is reasonable by desk-based research, controlled archaeological investigation comprising geophysical survey,

earthwork survey, and an evaluation, and viewpoint analysis, the presence or absence of heritage assets and the character, survival and state of preservation of such assets on and near the site, and the likely impacts of the proposed development upon such assets and their settings.

6.1.5 The assessment comprises an examination of data obtained from the Milton Keynes Historic Environment Record (MKHER) and desktop research. It also incorporates other available published and unpublished data. It has not been possible to undertake archival research due to the Covid-19 Pandemic and the resultant closure of the Centre for Buckinghamshire Studies. A first site visit was conducted on 16th March 2020 in dry, bright conditions and a second on 16th December 2020 also in dry bright conditions. Further research has been undertaken with the aim of understanding the settlement morphological characteristics of medieval Caldecote (not to be confused with Caldecotte in Bow Brickhill parish, approximately 6km to the south) (see 4.6.1 below). Similarly, the assessment of visual impacts was supplemented to incorporate viewpoint analysis following consultation with Historic England and the Senior Archaeological Officer for the Council. This involved taking in views to and from the site from several locations outside of the original 1km assessment area but within a 2km radius of the deemed centre of the site. The locations were the Willen Conservation Area to the south of the site, the Grade II listed former Moulsoe Buildings Farmhouse (now forming part of a Holiday Inn hotel) to the southeast, and the town of Newport Pagnell to the north (see 12.2.2 below)

6.1.6 The Assessment Area was drawn up following consultation of the MKHER and an initial review of known heritage assets, both designated and non-designated, within the site and a 1km radius of its deemed centre at NGR: SP 8829 4235.

6.1.7 Certain areas within the site are Archaeological Notification Sites as assigned by Milton Keynes Council. Consequently, Nick Crank, the Senior Archaeological Officer for the Council, was contacted. Mr Crank confirmed that an approach and scope for a staged assessment of the archaeological interests on the site may extend to comprise geophysical survey and field evaluation to inform an assessment.

6.1.8 Subsequently, the site has been subject to a geophysical survey carried out by Magnitude Surveys (ref: MSSP696) in accordance with a Written Scheme of Investigation approved by Mr Crank. The full survey report is presented in Appendix 6.4. In summary, the survey detected a range of anomalies of archaeological, agricultural, natural, and modern origins. The results suggest that the majority of the area is/was covered in ridge and furrow. Other

archaeology, probably earlier but visible from 'beneath' the ridge and furrow is visible but is primarily located to the east, on the lowest terraces flanking the river.

6.1.9 Based on the research undertaken for the assessment, this report highlights any potential direct and indirect impacts to any heritage assets and provides options for appropriate measures for the treatment of known or suspected heritage assets within the framework of the planning process. This report has been prepared in accordance with The Chartered Institute for Archaeologists, Standard and Guidance for Historic Environment Desk-Based Assessment (2017).

6.1.10 In summary, there are no designated heritage assets within the site or the Assessment Area. There are 57 records (Triskelion UID: 2 – 42) in the MKHER relating to non-designated heritage assets (monuments and find spots) within the site and the Assessment Area. Within the site, there are 27 entries in the MKHER (Triskelion UID: 13 – 30). These predominantly (17 entries) relate to the Caldecote Medieval deserted complex/settlement (MKHER ID: MMK91 / Triskelion UID: 16; MKHER ID: MMK87 / Triskelion UID: 18) and a Post-Medieval manor house (MKHER ID: MMK90 / Triskelion UID: 21;) and cottages. There are ten recording events (find spots) (MMK ID: 982-90 / Triskelion UID: 13; MMK ID: 89 / Triskelion UID: 28) on the north (A422) (MMK ID: 982-90 / Triskelion UID: 13) and east boundary of the site (MMK ID: 89 / Triskelion UID: 28) which record finds dated to the Early Neolithic to Late Bronze Age periods. The site also contains evidence for Medieval ridge and furrow cultivation in the form of well-preserved standing earthworks however these are not entered on the MKHER.

6.1.11 There are no World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields or Conservation Areas wholly or partly within the site or the Assessment Area. The site is not situated within an Area of Archaeological Potential however, certain areas within it are Archaeological Notification Sites as assigned by Milton Keynes Council.

6.1.12 Triskelion Heritage reserves the right to amend, add or remove any elements of this document to respond to the publication of any new evidence, policy, guidance, etc. after the submission of the planning application.

6.2 Legislative and Planning Policy Background

6.2.1 At the national level, the principal legislation governing the protection and enhancement

of archaeological assets is the Ancient Monuments and Archaeological Areas Act 1979. The 1979 Act provides protection to Scheduled Monuments. The consent of the Secretary of State for Culture, Media and Sport is required for works which might affect a Scheduled Monument at either above or below ground level. There are no Scheduled Monuments within the Site or the Assessment Area.

6.2.2 With respect to the cultural heritage of the built environment the Planning (Conservation Areas and Listed Buildings) Act 1990 applies. The Act sets out the legislative framework within which works and development affecting listed buildings and conservation areas must be considered. This states that: -

> *"In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses" (s66(1))*
>
> *"In the exercise, with respect to any buildings or other land in a conservation area, of any [functions under or by virtue of] any of the provisions mentioned in subsection (2), special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area." (s72(1))*

6.2.3 There are no Listed Buildings within the Site or the Assessment Area. The nearest Listed Building to the site is Moulsoe Buildings Farmhouse (Historic England NHLE List Entry Number: 1212914) which is situated on the east side of the A509 London Road which runs to the east of the site. The site is not situated in a Conservation Area. The nearest Conservation Area is Newport Pagnell, the southern boundary of which (of the Conservation Area) is c. 500m to the north of the boundary of the site and outside of the Assessment Area. It is proposed that the northern tip of the site which is intersected by the A422 will be used as Sports Pitches.

6.2.4 Other known sites of cultural heritage/archaeological significance can be entered onto county-based Historic Environment Records under the Town and Country Planning Act 1990.

6.2.5 The place of heritage assets (such as non-designated archaeological sites, Scheduled Monuments, Registered Parks and Gardens, Conservation Areas, Listed Buildings and non-designated historic buildings) within the planning system is governed by Section 16 (Conserving and enhancing the historic environment) of the **National Planning Policy Framework** (the 'NPPF', Revised July 2018, Updated February 2019 and updated July

2021).

6.2.6 The NPPF sets out land-use planning principles which should underpin both plan-making and decision-taking. Central to the NPPF is a presumption in favour of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. Achieving sustainable development means that the planning system has three interdependent overarching objectives, these being economic, social and environmental. In determining planning applications, local planning authorities are required to take account of viability, design, well-being and the protection and enhancement of the historic environment, amongst others. This then should allow for any proposals to be considered in the context of the overarching objectives which lead to the achievement of sustainable development.

6.2.7 Section 16 'Conserving and enhancing the historic environment' sets out the policies relating to conserving and enhancing the historic environment. It directs that heritage assets are conserved in a manner appropriate to their significance so that they can be enjoyed for their contribution to the quality of life of existing and future generations.

6.2.8 The NPPF defines 'Heritage Assets' as "A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest."

6.2.9 The definition extends to both designated heritage assets and non-designated heritage assets, the latter being those which are identified by a local planning authority as having local interest, and sometimes recorded as being of such through local listing.

6.2.10 Non-designated heritage assets are more specifically dealt with under the **Planning Practice Guidance** ('PPG')(2019), a supplementary guidance document to the NPPF in which it states, *"These are buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting consideration in planning decisions, but which are not formally designated heritage assets. In some areas, local authorities identify some non-designated heritage assets as 'locally listed'*." The PPG contains a section on the historic environment that provides advice on enhancing and conserving the historic environment, and viable uses for heritage assets; sets out the approach to assessing harm to heritage assets; and details what is meant by the term public benefits in the context of development, amongst others.

6.2.11 The following paragraphs from Section 16 of the NPPF are particularly relevant and are quoted in full:

Paragraph 194. "In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum, the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation."

Paragraph 195. "Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal."

Paragraph 197. "In determining applications, local planning authorities should take account of:

a) the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;

b) the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and

c) the desirability of new development making a positive contribution to local character and distinctiveness."

Paragraph 203. "The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset."

Paragraph 204. "Local planning authorities should not permit the loss of the whole or part of a heritage asset without taking all reasonable steps to ensure the new development will proceed after the loss has occurred.

Paragraph 205. "Local planning authorities should require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted."

6.2.12 In considering any planning application for development, the local planning authority must

have regard to the national policy framework detailed in the NPPF and other material considerations.

6.2.13 With respect to local policy, the **Plan: MK 2016 – 2031 Local Plan Document** adopted in 2019 is the statutory document that comprises the adopted statutory document for making planning decisions in Milton Keynes. The policy relating to heritage assets and relevant to the application for the site are reproduced below.

Policy SD9 GENERAL PRINCIPLES FOR STRATEGIC URBAN EXTENSIONS

"A. Proposals for Strategic Urban Extensions, and the documents required under SD10 to guide their development, should be prepared in accordance with the principles set out below. This policy will also be applied to any planning application(s) for unallocated strategic development sites.

……..

3. To be supported by or incorporate:

i) *Environmental impact and transport assessment.*

ii) *An archaeological investigation (with reference to the Historic Environment Record and further assessment if required) and consideration of the Historic Landscape Characterisation to inform the layout of development.*

……."

Policy SD12 MILTON KEYNES EAST STRATEGIC URBAN EXTENSION

"C. The development framework and subsequent applications for planning permission will establish the quantum and form of development in more detail, but proposals for development will be expected to meet the following criteria:

…….

9. Be informed by appropriate surveys of archaeology, built heritage and ecology where appropriate mitigation of impact as consistent with other policies of the Plan and the NPPF. An archaeological field study, including a Geophysical Survey, where appropriate following desk- based assessment, will required to identify potential below ground archaeology. Where feasible, the Council will expect below ground archaeology to be kept in situ in preference to its removal.

Policy HE1 HERITAGE AND DEVELOPMENT

"A. Proposals will be supported where they sustain and, where possible, enhance the significance of heritage assets which are recognised as being of historic, archaeological, architectural, artistic, landscape or townscape significance. These heritage assets include:

1. *Listed Buildings;*
2. *Conservation Areas;*

3. *Scheduled Ancient Monuments and non-designated Archaeological sites;*
4. *Registered Parks and Gardens;*
5. *Assets on the MK New-Town Heritage Register; and*
6. *Other places, spaces, structures and features which may not be formally designated but considered to meet the definition of 'heritage assets' as defined in Annex 2 of the NPPF.*

B. *Where appropriate, development proposals must provide an impartial and objective heritage assessment. Where necessary, the Council will require suitably qualified specialists to undertake the heritage assessment. The heritage assessment shall:*

1. *Assess and describe the significance of the heritage assets affected, identifying those elements that contribute to that significance and, where appropriate, those that do not. The level of detail shall be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of proposals on their significance. Limited and localised alterations to an unlisted building in a conservation area need not be supported by the level of detail required to convey the impact on significance caused by development in the setting of a listed building or by proposed alterations to the built fabric of a listed building.*
2. *Be of an analytical and interpretive nature rather than simply provide a description of the assets and the proposed works.*
3. *Provide a sound justification for the works, based on the economic, social and environmental benefits delivered by the scheme, for example, promoting the long term care for a heritage asset and/or its setting.*
4. *Explain how the scheme has taken account of the significance of the assets in its scope, design and detail, in order to minimise or avoid harm to the heritage assets affected.*
5. *Assess the nature and extent of any harm or public benefit arising from the scheme.*
6. *Where harm is caused by the proposal, the assessment shall explain why such harm is unavoidable or required to deliver public benefits that outweigh the harm caused.*

…….

F. *Proposals that result in harm to the significance of non-designated heritage assets will be resisted unless the need for, and benefits of the development clearly outweigh the harm, taking into account the asset's significance and importance, and only once all feasible solutions to avoid and mitigate that harm have been fully implemented.*

G. *In assessing any potential harm or enhancement to the significance of a heritage asset(s) the following will be considered:*

1. *Avoiding successive small scale changes that lead to a cumulative loss or harm*

to the significance of the asset or historic environment;

2. *Respecting the character, appearance, special interest and setting of the asset and historic environment;*
3. *Retaining architectural or historic features which are important to the character and appearance of the asset (including internal features) in an unaltered state; and*
4. *Retaining the historic form and structural integrity of the asset.*

I. *Proposals will be accompanied by an appropriate desk-based assessment and field evaluation where development is proposed affecting an unscheduled site of known archaeological interest or with the potential to include heritage assets with archaeological interest (General requirement for applications affecting heritage assets).*

J. *The ability to record evidence of our past should not be a factor in deciding whether the loss of significance should be permitted. Where harm to or loss of heritage assets occurs as a consequence of development it will be necessary for developers to record and advance understanding of the significance of the affected assets in a manner proportionate to their importance and the impact (NPPF paragraph 141). Recording techniques should keep in step with current best practice and in particular the use of photogrammetry and fine grain LIDAR ground scans where unavoidable loss will occur. In the case of heritage assets of greater than local importance the results of this recording work should be published in the relevant local or period journal or in book form according to the scale and significance of the assets affected. Where significant archaeological remains are found, provision shall be made for public open days, exhibitions and/or popular publications/booklets. Where archaeological remains are preserved within public open space appropriate on-site interpretation and a strategy for long term care (and funding thereof) shall be produced as part of a holistic approach to the long term stewardship of the open space in question and agreed with the body responsible for the same. Where recording or assessment results in a physical archive for deposition at an appropriate museum or archive facilities, consideration of resources for its storage, interpretation and public access should be made in order to capture the heritage significance of that asset for future generations.*

6.3 Location, Geological and Topographical Background

6.3.1 The site is located c.1.3km to the south-southeast of the centre of Newport Pagnell and c.3.7km to the northeast of Milton Keynes (Figure 1). The site extends to an area of c. 41 hectares and is centred, approximately, at National Grid Reference SP 8829 4235. It consists of two parcels of land intersected by the A422 (Figure 2). The larger parcel of land to the south of the A422 is bounded to the north by hedge-line fronting the A422, the River Ouzel and floodplain to the east, fields and the M1 to the south and hedge-line fronting Willen Road to the west. It is characterised by a mixture of generally flat arable

and pastoral fields with a gravel extraction site in the southwest of the site. There are visible earthworks in the form of ridge and furrow in the fields under pasture. There are also two large residential properties, Caldecote Cottage and Moat Cottage with associated land situated in this section of the site. They do not form part of the proposed residential development. The smaller triangular-shaped parcel of land situated to the north of the A422 is an arable field bounded to the north and east by fields, the A422 to the south and hedge- and treeline to Newport Pagnell Town Football and Social Club to the west.

6.3.2 The main vehicular access to the site is via a single-track road leading off Willen Road and which provides access to the residential properties. The site can also be accessed on foot by a public footpath from the A422 and via a footbridge over the M1 and a public footpath through fields. The screening effect of hedges, trees and the intervening landform of the floodplain, river and fields allows for very limited, or non-permeability, either visual or physical, to the site from the major roads to the north (A422), south (M1), east (A509) and west (Willen Road).

6.3.3 The Milton Keynes Landscape Character Assessment (Gillespies and Milton Keynes Council, 2016) documents the National Character Area in which the site is situated as NCA 88 Bedfordshire and Cambridgeshire Claylands. The area is further defined as Landscape Character Type: Milton Keynes: LCT 2 River Valley with the immediate area of the site further defined as forming Landscape Character Area: LCA 2d Ouzel North Urban River Valley. This LCA consists of a triangle of land between the A509 (east of the site), M1 (south) and Newport Pagnell (southwest) centred on the River Ouzel floodplain which is mostly within the Ouse Valley Linear Park. The area is dominated by major roads including the M1, the A422 dual carriageway and the A509 which the Assessment states impedes access to the area and separates it from the main urban and rural areas to the north, south and east.

6.3.4 The Assessment states that the condition of the landscape is moderate as a result of widespread land cover change due to the presence of development on the edge of Milton Keynes and major roads (M1, A422 and A509) that has disrupted the valley landscape. As the majority of the area is in floodplain there is little built development in the area, which is bounded by the M1 to the southwest, Newport Pagnell to the north and the A509 to the east effectively disconnecting it from the surrounding landscape. The main watercourse in the area is the River Ouzel, also known as the River Lovat, which runs along a section of the east boundary of the site. It is one of the main tributaries of the River Great Ouse

which runs to the north. The Ouzel flows north running parallel with the Grand Union Canal from the south of the Borough through Milton Keynes to join the Great Ouse at Newport Pagnell.

6.3.5 The British Geological Survey identifies the bedrock underlying the site as Sandstone, Siltstone and Mudstone - Kellaways Formation. This sedimentary bedrock was formed approximately 164 to 166 million years ago in the Jurassic period in an environment previously dominated by shallow seas. The superficial deposits are Felmersham Member – Sand and Gravel. These deposits formed up to 3 million years ago in the Quaternary period. They are fluvial in origin and detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains, and levees of a river (BGS, 2020).

6.3.6 More detail may be found in Appendix 6.2: Geoarchaeological Desk-based Assessment.

6.3.7 The Milton Keynes Historic Landscape Characterisation (Figure 6.3) categorises the site as Enclosure (Pre 18th Century Regular) and Enclosure (20th Century) Meadow. The Characterisation study considers that each landscape type has a distinct form that can be related to its origins and development. Regular shaped fields are indicative of surveyed or ‘planned countryside’ whereas fields more irregular in character can be indicators of much older landscapes.

6.3.8 Regular enclosed land is defined in the Characterisation study as having regular field patterns with medieval or post-medieval origins. It is given a sensitivity rating of ‘Medium’ as regular enclosed land is little altered and as such is of landscape value however, isolated fragments such as on the site are considered of lower potential. The Characterisation Study states that the archaeological potential for this landscape type, which is declining rapidly, is considered Medium/High and is typically associated with ridge-and-furrow and deserted medieval settlements/moats.

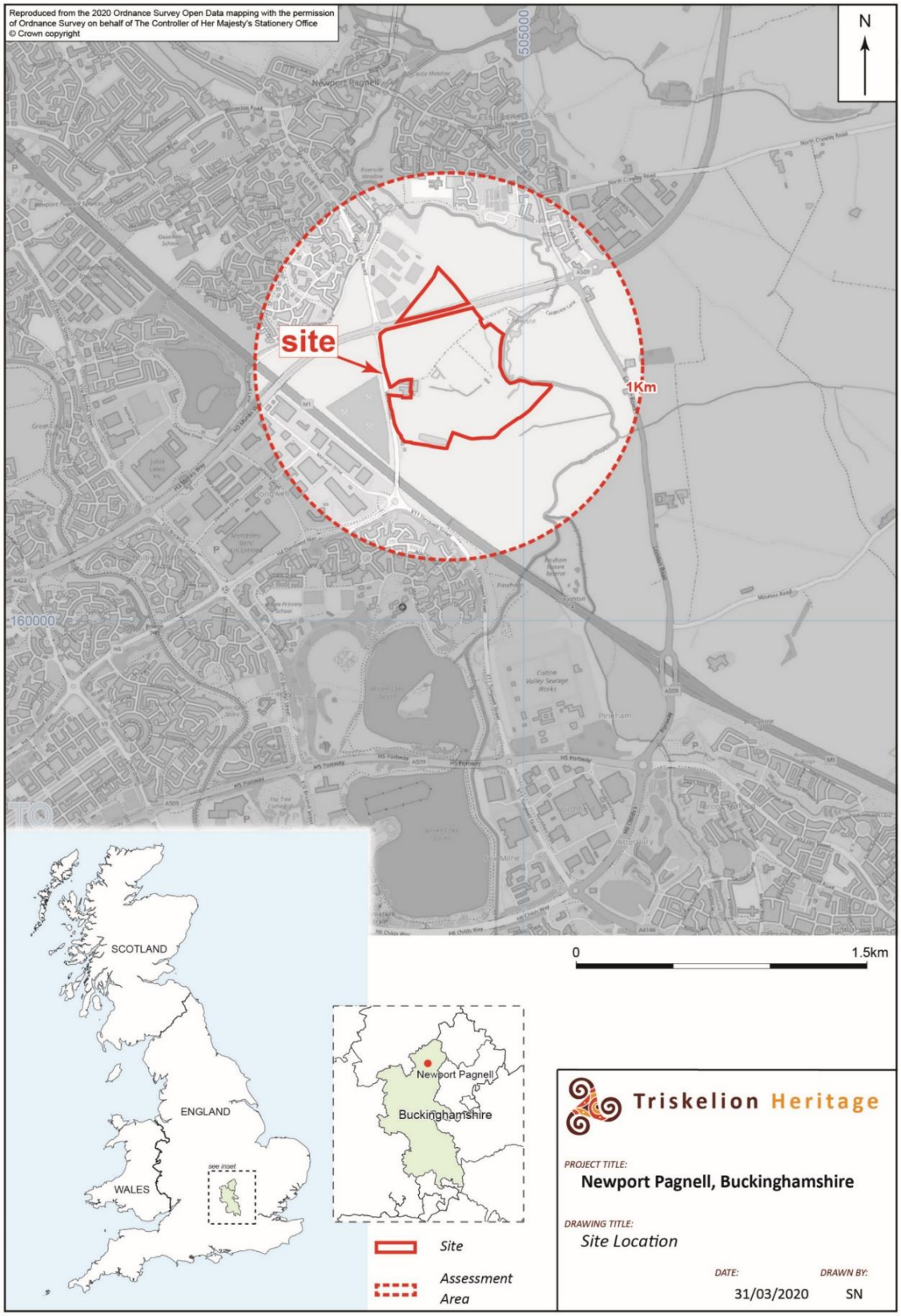

Figure 6.1: Site Location Plan

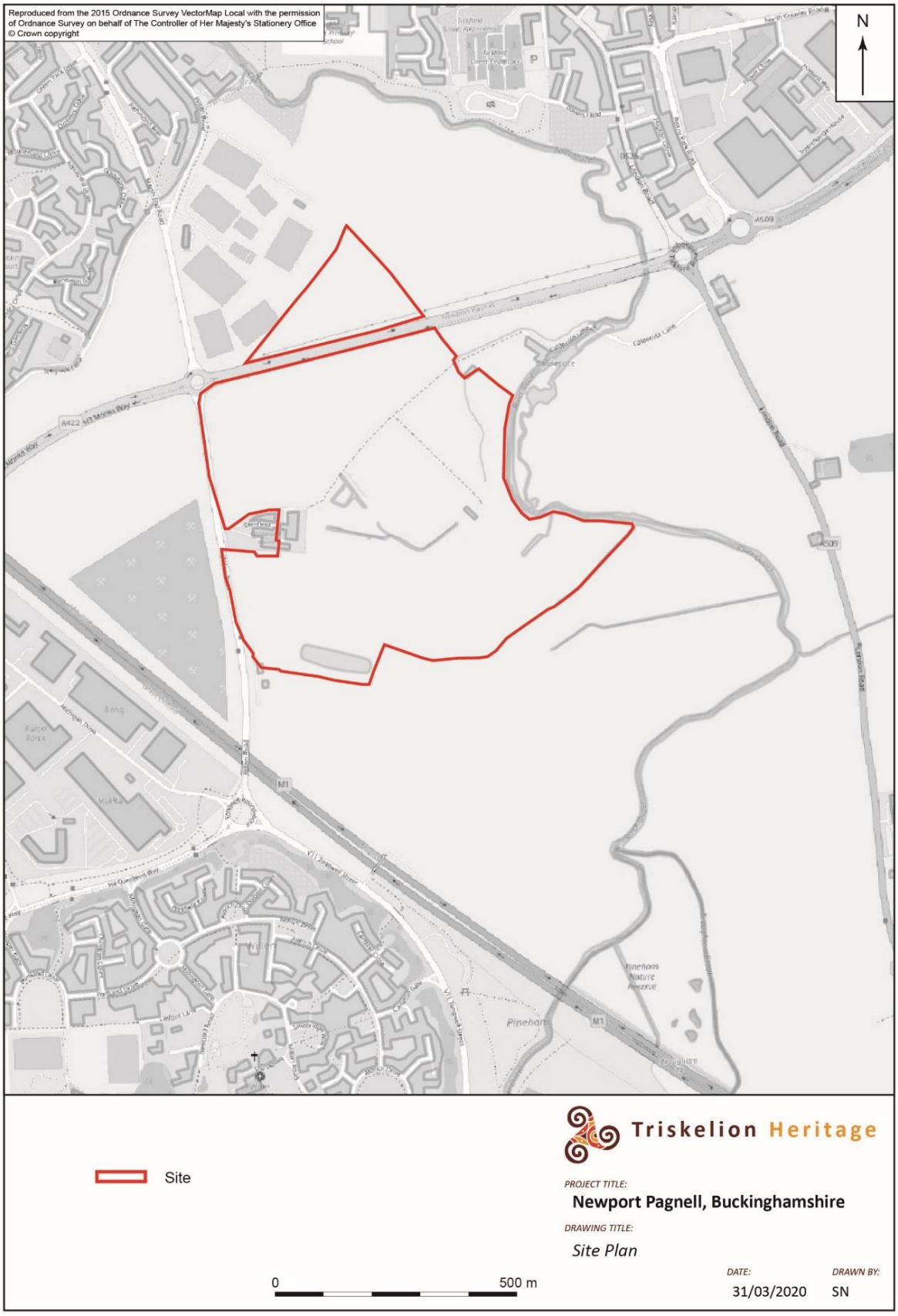

Figure 6.2: Site Plan

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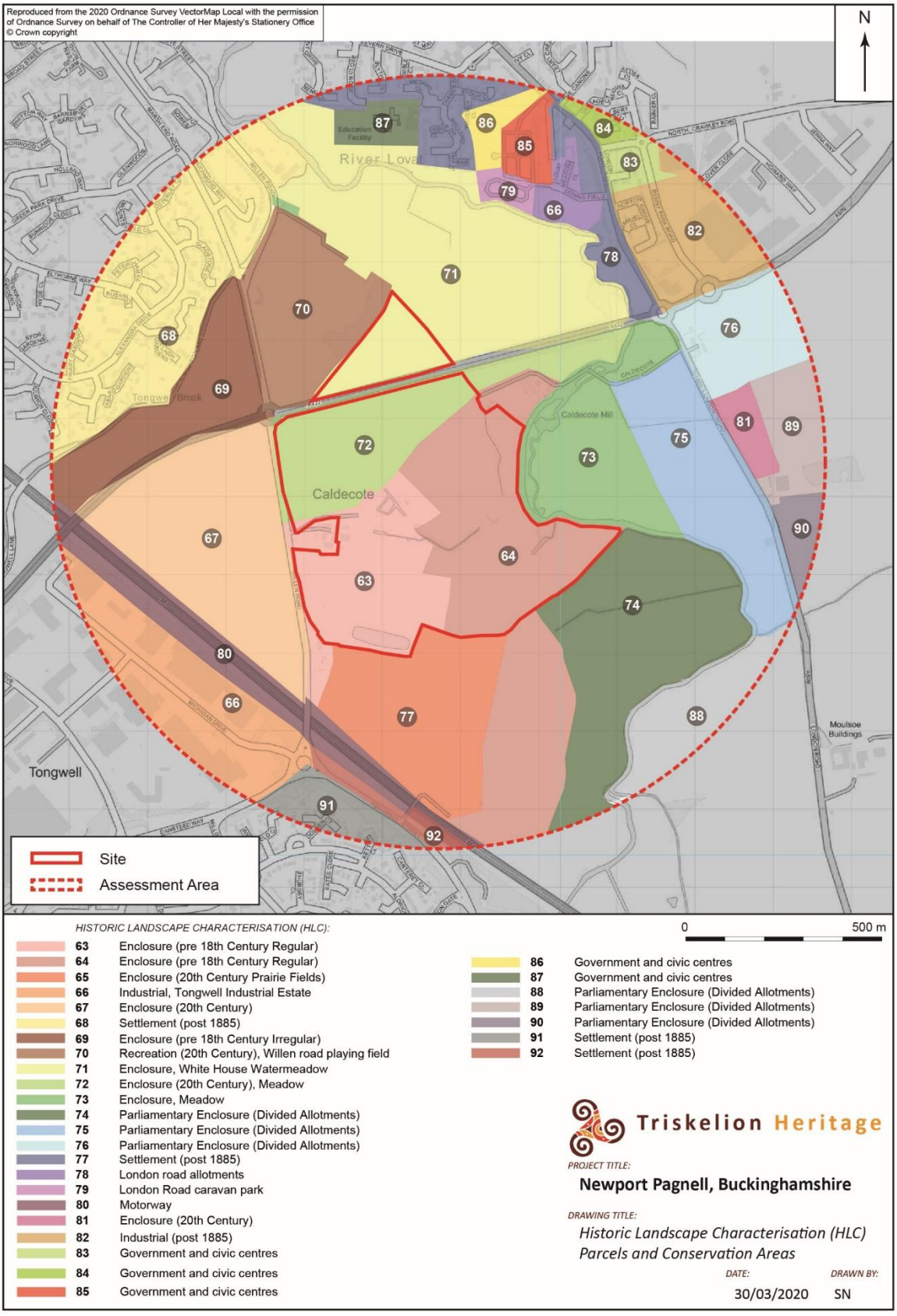

Figure 6.3: A detail from the Milton Keynes Historic Landscape Characterisation

6.4 Archaeological and Historical Background

Introduction

6.4.1 The following section is a summary of the historic environment data found within a 1km radius of the site. This wider area is referred to as the 'Assessment Area'. The data has been compiled from the Milton Keynes Historic Environment Record (MKHER), and other documentary and cartographic sources. Due to the Covid-19 Pandemic, it was not possible to carry out archival research at the Centre for Buckinghamshire Studies. The data collected is considered to provide a good indication of the character, distribution, and survival of any potential heritage assets within and near the site and helps define its significance. The locations of the identified heritage assets and recording events within the Assessment Area are shown in Figures 6.4 and 6.5, respectively, below and are also detailed in a gazetteer embedded within the figures and in Appendix 6.1.

6.4.2 The most reliable published general summary of the archaeological context for the site remains is *The Changing Landscape of Milton Keynes* by RA Croft & D Mynard, (1993). This text has been consulted and where found to enhance the background narrative recourse has been made to it.

6.4.3 In summary, there are no designated heritage assets within the Site or the Assessment Area. There are 57 records (Triskelion UID: 2 – 42) in the MKHER relating to non-designated heritage assets (monuments and find spots) within the site and the Assessment Area. Within the site, there are 27 entries in the MKHER (Triskelion UID: 13 – 30). These predominantly (17 entries) relate to the Caldecote Medieval Manorial deserted complex/settlement (MKHER ID: MMK91 / Triskelion UID: 16; MKHER ID: MMK87 / Triskelion UID: 18) and a Post-Medieval manor house (MKHER ID: MMK90 / Triskelion UID: 21;) and cottages. There are ten recording events (find spots) (MMK ID: 982-90 / Triskelion UID: 13; MMK ID: 89 / Triskelion UID: 28) on the north (A422) (MMK ID: 982-90 / Triskelion UID: 13) and east boundary of the site (MMK ID: 89 / Triskelion UID: 28) which record finds dated to the Early Neolithic to Late Bronze Age periods. The site also contains evidence for Medieval ridge and furrow cultivation in the form of well-preserved standing earthworks however these are not entered on the MKHER.

6.4.4 It should be noted that the site is understood to contain a potential monument, formerly known as Caldecote Moated site, which was considered by the English Heritage Monument Protection Programme but was left in abeyance to be considered with the village earthworks at a later date. This was never carried out (Giggins, 2008). In 2008, the

Milton Keynes Council Senior Archaeological Officer produced a report (Giggins, 2008) for the purposes of English Heritage reconsidering these monuments for scheduling following recent archaeological work and documentary research. The monuments have not been scheduled in the interim period and it is therefore assumed that a re-assessment of the evidence was not carried out, or if re-assessed, it was considered insufficient to support scheduling and/or that the monuments are not of sufficient national importance to warrant it. The monuments which were to be considered under the Programme do not have any formal protection and are considered non-designated heritage assets. We return to this issue below in text section 6.9.

6.4.5 Controlled investigation in the form of a watching brief (2004) (MKHER ID: EMK785 / Triskelion UID: 47); trial trenching (2010; 2013) (MKHER ID: EMK1120; EMK400 / Triskelion UID: 50; 57) and topographical survey (2013) (MKHER ID: 1195 / Triskelion UID: 51) has been undertaken within the south of the site. No archaeological features or deposits were identified as part of the watching brief, or in the trial trenching carried out in 2013. The trial trenching carried out in 2010 referred to remnants of the Medieval manorial settlement being present on the site including an open field system. Of note, was the evidence for limited Prehistoric human activity defined by a relatively substantial pit which contained a small assemblage of flint artefacts of Neolithic/Bronze Age date. Geophysical Survey was undertaken for this Assessment and is summarised below (section 6.13) as was an earthwork survey (section 6.12) and further trial trench field evaluation (section 6.15).

6.4.6 Entries relating to recording events (Triskelion UID: 2 - 12; 31 – 42) and archaeological interpretation (Desk-Based Assessment) and controlled investigations in the MKHER (Triskelion UID: 43 – 46; 49; 52 – 56; 61 - 62) within the Assessment Area indicate that the site lies proximate to areas of archaeological activity in the Prehistoric (to the south and west of the site) (MKHER ID: MMK934 / Triskelion UID: 2; MKHER ID: MMK933 / Triskelion UID: 3; MKHER ID: MMK502 / Triskelion UID: 5; MKHER ID: MMK929 / Triskelion UID: 11; MKHER ID: MMK930 / Triskelion UID: 10), Roman (to the north east and east) (MKHER ID: MMK454 / Triskelion UID: 31; MKHER ID: MMK455 - 58 / Triskelion UID: 40), and Medieval periods.

6.4.7 There are no World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields or Conservation Areas wholly or partly within the site or the assessment area.

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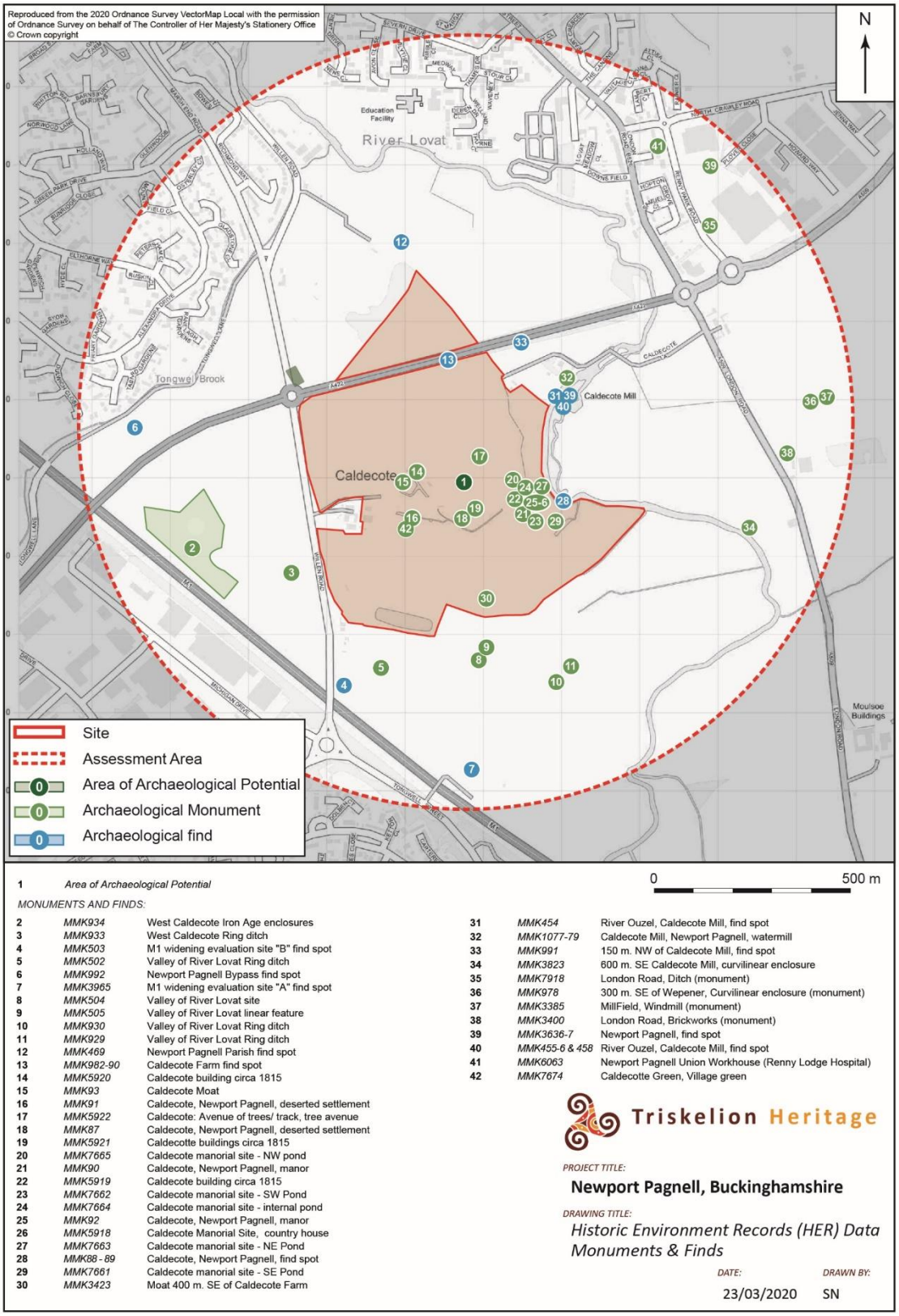

1 *Area of Archaeological Potential*

MONUMENTS AND FINDS:

2	*MMK934*	West Caldecote Iron Age enclosures
3	*MMK933*	West Caldecote Ring ditch
4	*MMK503*	M1 widening evaluation site "B" find spot
5	*MMK502*	Valley of River Lovat Ring ditch
6	*MMK992*	Newport Pagnell Bypass find spot
7	*MMK3965*	M1 widening evaluation site "A" find spot
8	*MMK504*	Valley of River Lovat site
9	*MMK505*	Valley of River Lovat linear feature
10	*MMK930*	Valley of River Lovat Ring ditch
11	*MMK929*	Valley of River Lovat Ring ditch
12	*MMK469*	Newport Pagnell Parish find spot
13	*MMK982-90*	Caldecote Farm find spot
14	*MMK5920*	Caldecote building circa 1815
15	*MMK93*	Caldecote Moat
16	*MMK91*	Caldecote, Newport Pagnell, deserted settlement
17	*MMK5922*	Caldecote: Avenue of trees/ track, tree avenue
18	*MMK87*	Caldecote, Newport Pagnell, deserted settlement
19	*MMK5921*	Caldecotte buildings circa 1815
20	*MMK7665*	Caldecote manorial site - NW pond
21	*MMK90*	Caldecote, Newport Pagnell, manor
22	*MMK5919*	Caldecote building circa 1815
23	*MMK7662*	Caldecote manorial site - SW Pond
24	*MMK7664*	Caldecote manorial site - internal pond
25	*MMK92*	Caldecote, Newport Pagnell, manor
26	*MMK5918*	Caldecote Manorial Site, country house
27	*MMK7663*	Caldecote manorial site - NE Pond
28	*MMK88 - 89*	Caldecote, Newport Pagnell, find spot
29	*MMK7661*	Caldecote manorial site - SE Pond
30	*MMK3423*	Moat 400 m. SE of Caldecote Farm
31	*MMK454*	River Ouzel, Caldecote Mill, find spot
32	*MMK1077-79*	Caldecote Mill, Newport Pagnell, watermill
33	*MMK991*	150 m. NW of Caldecote Mill, find spot
34	*MMK3823*	600 m. SE Caldecote Mill, curvilinear enclosure
35	*MMK7918*	London Road, Ditch (monument)
36	*MMK978*	300 m. SE of Wepener, Curvilinear enclosure (monument)
37	*MMK3385*	MillField, Windmill (monument)
38	*MMK3400*	London Road, Brickworks (monument)
39	*MMK3636-7*	Newport Pagnell, find spot
40	*MMK455-6 & 458*	River Ouzel, Caldecote Mill, find spot
41	*MMK6063*	Newport Pagnell Union Workhouse (Renny Lodge Hospital)
42	*MMK7674*	Caldecotte Green, Village green

Triskelion Heritage

PROJECT TITLE:
Newport Pagnell, Buckinghamshire

DRAWING TITLE:
Historic Environment Records (HER) Data
Monuments & Finds

DATE: 23/03/2020 *DRAWN BY:* SN

Figure 6.4: Historic Environment Records (HER) Data – Monuments and Finds

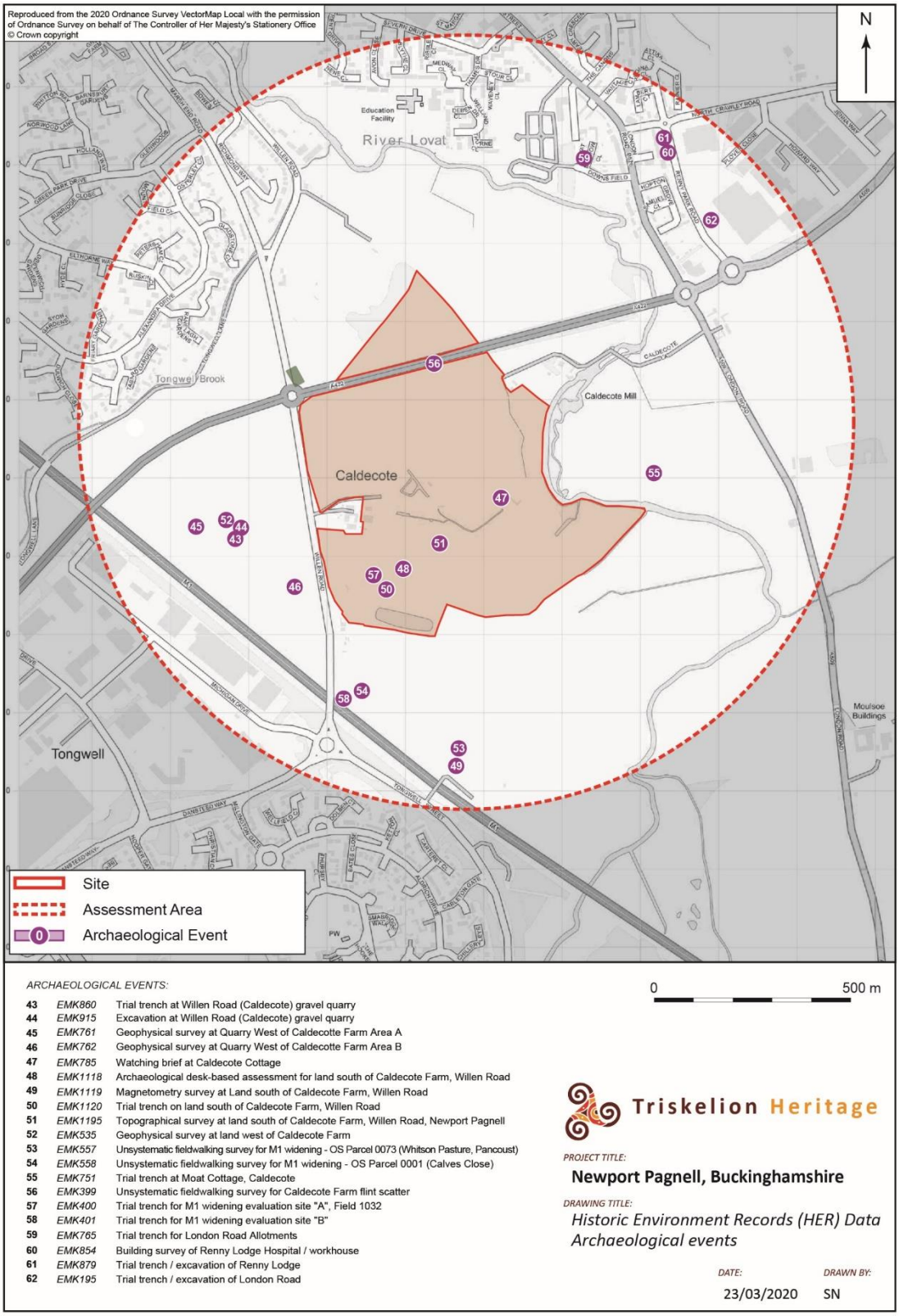

Figure 6.5: Historic Environment Records (HER) Data – Archaeological Events

dynamic development solutions ™

6.5 Prehistoric Period: Palaeolithic (500,000 - 12,000 BC), Mesolithic (12,000 – 4,000 BC) and Neolithic (4,000 – 1,800 BC), Bronze Age (1,800 - 600 BC), Iron Age (600 - 43 AD)

6.5.1 There are no known archaeological deposits from the Palaeolithic and Mesolithic Periods within the site. Within the Assessment Area to the east of the site next to the River Ouzel, a finished axe-head (Findspot MKHER ID: MMK3636; Triskelion UID: 39) and an unretouched flake (Findspot MKHER ID: MMK3637; Triskelion UID: 39) of possible Palaeolithic date were recorded. Also, within the Assessment Area, to the west of the site, a punch struck blade (Findspot MKHER ID: MMK992; Triskelion UID: 6) of possible Early Mesolithic to Late Neolithic date has been recorded.

6.5.2 During systematic fieldwalking in 1976-7, there were multiple finds (MKHER ID: MMK982-90; Triskelion UID: 13) of artefacts of Early Neolithic to Late Bronze Age Date recorded in the north of the site on the boundary with the A422.

6.5.3 The aerial photographic (cropmark) evidence suggests that there are sub-surface features indicating significant activity in the area to the south of the site during the Early Neolithic to Late Bronze Age periods. The cropmarks suggest that there are four ring ditches (MKHER ID: MMK502 / Triskelion UID: 5; MKHER ID: MMK504 / Triskelion UID: 8; MKHER ID: MMK929 / Triskelion UID: 11; MKHER ID: MMK930 / Triskelion UID: 10) and one straight linear feature (; MKHER ID: MMK505 / Triskelion UID: 9), however there are no traces of these on the ground (as reported). An archaeological interpretation (MKHER ID: EMK1118 / Triskelion UID: 48) undertaken for the south of the site in 2010 reports two Bronze age ring ditches and other possible features have been identified from aerial photography.

6.5.4 To the west of the site, controlled archaeological investigations (MKHER ID: EMK860; EMK915; EMK761; EMK762; EMK: 535 / Triskelion UID: 43 46; 52) within the Assessment Area, have revealed the remains of a substantial settlement with a number of features including annular and rectilinear enclosures of Early Iron Age to Roman date (MKHER ID: MMK934 / Triskelion UID: 2. . Also, in this area, aerial photographic evidence suggests that there may be a ring ditch of Early Neolithic to Late Bronze Age date (MKHER ID: MMK933 / Triskelion UID: 3).

6.5.5 This evidence was interpreted to mean that there is a moderate to high probability of prehistoric remains being present within the proposed development area. While there is little certainty, the area alongside the river is perhaps of somewhat higher potential, but in

general the river terraces were favoured settlement and farming zones from the third millennium BC onwards. In the event, field investigations did not bear out this potential.

6.6 Romano-British Period (43- 410 AD)

6.6.1 There is evidence of activity during this period to the east of the site and focused in the area of the later Caldecote Mill. The precise position of a Ford is known (MKHER ID: 457 / Triskelion UID: 40), near to which pottery and a quern indicate a small riverside dwelling (MKHER ID: 454 / Triskelion UID: 31).

6.6.2 This evidence was interpreted to mean that there is a moderate to high probability of Romano-British remains being present within the proposed development area. While there is little certainty, based on earlier finds suggesting activity during this period, and the known position of a Ford, the area alongside the river is perhaps of somewhat higher potential. In the event, field investigations did not bear out this potential.

6.7 Saxon/Early Medieval Period (410 - 1066 AD)

6.7.1 Evidence for early and mid-Saxon activity in the Milton Keynes area is relatively good. Newport Pagnell was established as a trading settlement at the confluence of the Ouse and Ouzel during the late Saxon period.

6.7.2 There is limited evidence to suggest that earlier Saxon settlements drifted or moved in the later Saxon or very early Medieval periods to present village locations (Croft and Mynard 1993 15) and therefore middle or earlier Saxon antecedents to the present settlements at Willen and Newport are to be sought elsewhere, and the terraces along the Ouzel could be considered a favoured location.

6.7.3 This evidence was interpreted to mean that there is a moderate to high probability of Saxon and early Medieval remains being present within the proposed development area. While there is little certainty, the area alongside the river is perhaps of somewhat higher potential. The extensive evidence of ridge and furrow, typical of early medieval agriculture, may suggest that the majority of the area was used for arable farming, but previous use for scattered shifting settlements should not be ruled out. In the event, field investigations did not bear out this potential.

6.8 Medieval Period (1066 - 1485 AD)

6.8.1 Caldecote Mill was mentioned in the Domesday Survey and was an important possession

of Tickford Priory. It was destroyed by fire in the 19th Century and not rebuilt. There were two fees in Caldecote at the time of the Survey, both of which afterwards went to form the property known as Caldecote Manor. It is first called a manor in 1426 when the recorded tenant was Thomas Caldecote. Aerial photography has allowed for the identification of the site of a Medieval hamlet on the site which has been identified through soil marks, however, opinions differ on the exact nature of the deserted settlement at Caldecote. These are variously a deserted Medieval village with 2 moats although there is no evidence of house platforms or streets, or a small manorial complex with associated buildings, the “moats” being the remains of a manorial enclosure (MKHER ID: MMK87 / Triskelion UID: 18; MMK92 / Triskelion UID: 25). Some research has been undertaken (Giggins, 2008) on the exact nature of the site which summarises hypotheses that there was probably a triangular village green with buildings either side. However, the evidence presented is not sufficiently compelling to suggest the presence of such. The research, based on analysis of map, documentary and archaeological evidence suggests that the previous assumption that there was a large medieval moated site at Caldecote was probably incorrect. The linear water features shown on 19th century maps and as parch marks on aerial photographs next to the River Ouzel, indicate a planned formal garden for a large house, with a complex of water features. Although the location of the manor house has not been formerly identified though map or archaeological evidence, it can be suggested by the location of a straight road leading north-west from the probable garden which cuts across ridge and furrow and formerly terminated at the Newport Pagnell to Fenny Stratford Road.

6.8.2 Croft and Mynard 1993 (19) note that on the east bank of the Ouzel settlements were regularly spaced at 1.5-2km intervals and located on the lower terraces (but above the flood-plain) and while this was observed in what was then the Milton Keynes area the proposed development site is only just outside that boundary and the observation may be equally applicable. Another feature observed that may relate to the proposed development area is that within Milton Keynes some parishes were poly-focal – Willen (to the south) was one with a subservient focus at Caldecote – which is within the proposed red-line boundaries. Willen and Caldecote were one ‘vill’ in the 14th century but were split and Caldecote merged with Newport Pagnell (Croft and Mynard 1993, 171).

6.8.3 This evidence was interpreted to mean that there is a moderate to high probability of Medieval settlement remains being present within the proposed development area. While there is little certainty, the area alongside the river (and in separate ownership – Moat

Cottage) is almost certainly of higher potential for a manorial centre, while ridge-and-furrow covers much of the central fields within the red line. However, subsequent investigations (below) did not bear this out and the potential for evidence of settlement activity separate to evidence for agricultural production land use is considered to be low.

6.9 Medieval and Postmedieval Settlement at Caldecote

6.9.1 Further research has been undertaken with the aim of understanding the settlement morphological characteristics of medieval Caldecote (not to be confused with Caldecotte in Bow Brickhill parish, approximately 6km to the south). This research has been supplemented by archaeological investigation (Magnitude Surveys, 2020; Cotswold Archaeology, 2021). As summarised above, research has been impeded by the Covid-19 Pandemic and the resultant closure of the Centre for Buckinghamshire Studies and libraries. It has therefore not been possible to access all available sources, particularly books with are held in repositories, and research has been restricted to online sources. Notwithstanding this, it is considered that this research, combined with that previously undertaken, and the results of archaeological investigations on the site, contribute to an improved understanding of the medieval settlement at Caldecote.

6.9.2 Section 6.4 above (Archaeological and Historical Background) briefly sets out and discussed the hypotheses on the morphological characteristics of the medieval settlement. In summary, Caldecote is a subject of debate and opinions differ - it has been variously considered a village and a manorial complex. This research expands on the brief discussion of these hypotheses above.

6.9.3 A connection is made between the emergence of the consideration of Caldecote as a deserted medieval village ("DMV") and its inclusion in the list of what were then classed as DMVs compiled in 1968 by Professor Maurice Beresford and John Hurst. This list was published in the gazetteer of the book 'Deserted Medieval Villages.' (1971). The rationale for its inclusion is not currently known as unfortunately, it has not been possible to review a copy of the book. However, it is likely due in part to the documentary evidence, both Domesday Survey and that which records Caldecote forming part of a vill with Willen in the fourteenth century (p.171, Croft and Mynard, 1993. N.B. p.21 states that "'vills', …. developed into the villages that survived into the pre-city landscape." This statement indicates an earlier prevailing view that may explain the assignment of DMV status to Caldecote.). To quote directly from Beresford in his paper, 'The Lost Villages of Medieval England' (p.136, 1951),

"a vill in Domesday Book which is now only a farm warrants investigation."

6.9.4 The University of Hull hosts a website dedicated to the study of Deserted Medieval Settlements made possible due to a legacy bequeathed by Maurice Beresford. Each of the settlements listed as known in 1968 have an individual page and it is understood that each settlement has undergone recent review. It is noted that the entry for Caldecote has a 'Site type' of 'Doubtful' and is one of seven settlements now classed as such (Beresford's Lost Villages Blog post 'Currently completed counties – Buckinghamshire', 2014). The entry provides information derived from the same sources reviewed for the discussion in the HEDBA, notably the Victoria County History for Buckinghamshire (1927) and the historic environment records. The text mentions the debate about settlement characteristics noted above and the recent consideration that the site is a manorial complex with no evidence of an associated settlement.

6.9.5 As noted above, in 2008, the Milton Keynes Council Senior Archaeological Officer produced a report (Giggins, 2008) for submission to English Heritage with the purpose of making the case for the reconsideration of the scheduling of monuments on the site which were associated with the medieval settlement. The monuments have not been scheduled in the interim period. The report explicitly states that a previous presumption that there was a large medieval moated site at Caldecote was probably incorrect. The report summarises hypotheses on settlement characteristics with reference and suggests in several places that there was probably a triangular green with buildings on either side (Figure x HER Data – Monuments and Finds, near Triskelion UIDs: 14 – 15). However, the evidence presented is not sufficiently compelling to suggest the presence of such.

6.9.6 The report concludes that,

"The presence of the Green indicates the medieval origins of the settlement and it is probable that the manorial site will also be found to be medieval in origin."

6.9.7 There is an entry in the historic environment record relating to a village green (Triskelion UID: 42; MKHER ID: MMK7674) but it is of uncertain date. Rather interestingly in this context, the HER also contains an entry for a small irregular shaped moat which it states forms part of the deserted medieval village (Triskelion UID: 15; MKHER ID: MMK93). The location of the purported moat is in the area which has previously been considered a village green. This feature does not appear on the early maps which show ponds in an arrangement which does not suggest that they once formed a uniform feature such as a moat. The map regression suggests that what was considered a possible medieval moat,

was a feature created in the period between 1834 and 1880. Recent archaeological investigation (Cotswold Archaeology, 2021) in the area (Area 6) to the west of this feature confirmed the presence of a well and that the area appeared to have been artificially extended in the east where it was defined by a drainage channel running from south to north.

6.9.8 We do not agree that the green indicates the medieval origins of the settlement but rather it is the archaeological evidence in the form of earthwork features including (visible) ridge and furrow that indicate its origins. Archaeological evidence from the site, specifically several earthwork features recorded (Cotswold Archaeology, 2021) between the ridge and furrow and the riverbank appear to form part of a contemporary medieval landscape (Figure 6.20 below). These features included drainage ditches and banks. The purpose appears to have been to maximise the area of useable land between the open fields and the river by improving drainage, and by extending the area itself with artificial platforms. This evidence would accord with the view that during the twelfth and thirteenth centuries there was a period of growth characterised by the increase in the number and size of settlements bringing marginal land into cultivation (p.1, Taylor-Moore, 2014).

6.9.9 Medieval rural settlements were marked by great regional diversity in form, size, and type and there is debate on settlement morphological characteristics which will not be covered here. This research has indicated that there are also conflicting views about the siting of villages, which are variously considered to have been placed at the centre of a parish or township (Historic England) or alternatively (and contradictory!) were rarely sited at the centre of their parish, but at preferred locations adjacent to water sources and at road junctions (p.21, Croft and Maynard. 1993).

6.9.10 We know that the site has Saxon/Early Medieval antecedents from the documentary evidence (the Domesday Survey) although there is no archaeological evidence for activity of this period on the site. The Survey documents two fees in Caldecote, both of which afterwards went to form the property known as Caldecote Manor. In 1086, the first fee was held by William, son of Ansculf, the tenant of Newport Pagnell. The Survey entry documents 1 household, and land and resources including 2 ploughlands, meadow, woodland and a mill. Also associated with the entry for Caldecote is that for Willen (to the south) which is not directly referenced. It is documented as being in the ownership of Count Robert of Mortain and is evidently a more substantial holding, having more households and land and resources, than that of William Fitz Ansculf. Based on this, and

evidence of parish registers dating to the late eleventh century and a mid-twelfth century reference to a church at Willen (replaced in the late seventeenth century) (p.171, Croft and Mynard, 1993), it may be persuasively concluded that Willen was the larger (village) settlement with a subservient focus at Caldecote, likely constituting a small outlying centre of agricultural production with an associated manorial complex.

6.9.11 There appears to be a prevailing understanding that the medieval settlement morphological characteristics of Caldecote are that of a village, although references to such are interspersed with references to it being a hamlet, and therefore lack consistency (Archaeological Services & Consultancy Ltd, 2010). As noted above, there is debate about the size of medieval settlements and how to define a village and hamlet, and the differences between the two. Detailed discussion of these is not required here, and for the purposes of this research it is considered that the references to the possible presence of a green, surrounded by buildings (Giggins, 2008) and a moated site (Archaeological Services & Consultancy Ltd, 2010. discussed above) suggest a consideration that the settlement was not inconsequential. This is highlighted with reference to the entry on the DMV website that notes the conflicting consideration that the manorial complex did not have an associated settlement. This research has concluded, given the evidence for agricultural production on the site and in the wider area, that it is likely that medieval Caldecote constituted a manorial complex (further discussed below. For clarity, the 'manorial' focus is near 'Moat Cottage shown on Figures 6.7 – 6.9 below) with some associated small-scale settlement comprising of workers' housing. However, there is no evidence for dwellings of the medieval period on the site, for example in the form of grassed over house or croft site platforms, or in the areas identified in the historic environment record as containing such. It is evident that the medieval layout of the settlement is not known (Historic Environment Records; p.11, Archaeological Services & Consultancy Ltd, 2010). Recent archaeological investigations - the geophysical survey or earthwork survey (see below) – have also failed to find any such evidence to contribute to our understanding of this, notwithstanding the further evidence for agricultural land use during that period (to emphasise the point that had such evidence of settlement been present the survey would almost certainly have revealed it).

6.9.12 The Victoria County History (1927) states that Caldecote was probably the site of a manor house which existed there in 1426 (the first recorded reference to a manor) and 1750 and references documentary evidence for this (ref: Chan. Inq. p.m. 5 Hen. VI, no. 16; Com. Pleas D. Enr. Mich. 24 Geo. II, m. 77).

6.9.13 The manor was the dominant form of tenure during the medieval period and a territorial unit of lordship, although lords were not often resident within their manors since many owned more than one. The lord had customary and legal rights over the manorial land and its resources. The rights included warrens, fisheries, woodlands and mills, amongst others. Manors were involved with exploiting the land and generally consisted of the capital messuage which included the residence, dovecotes, fishponds, barns and granaries and mills, and arable fields, meadows, and wastes.

6.9.14 Both the documentary (as referenced in 'Caldecote Manorial Site, Newport Pagnell - significant deeds' and 'Report on the SMV & Manorial Site At Caldecote, Newport Pagnell, Milton Keynes'. Giggins, 2008) and archaeological evidence (of the mill and field systems) suggest that Caldecote was the site of a manorial centre. The documentary evidence, specifically that of deeds of the sixteenth and seventeenth centuries note the buildings on the site which in 1656 comprised a capital mansion, dovehouse, stables and barns. In 1688, a possible mortgage conveyance refers to a house, yards, gardens and orchards. Aerial photographs suggest the presence of fishponds, which are believed to be of post-medieval date and are unsurprising given the proximity to the river Ouzel. It is possible that these have medieval antecedents as fishponds would have implied lordly status as freshwater fish was an important part of the aristocratic diet (p.9, Campbell. 2012).

6.9.15 The construction of fishponds was often closely related to that of moats and it is believed that the original manor house at Caldecote had a moat. Moats were begun to have been built around the middle of the twelfth century, but the tradition reached its peak between 1200 and 1325 (p.8, Taylor-Moore, 2014). Although moats served many purposes and they undoubtedly had some economic and defensive benefits, their main role seems to have been as status symbols rather than a practical military defence. The concentration of moated sites in the area is high and there are typically found to be one or two to a parish. Of particular interest is the HER entry (Triskelion UID: 30; MKHER ID: 3423) for a moat close to the southern boundary of the site and to the south-west of the area believed to be where the manor house was sited (the site of the original manor house and attendant buildings are not known but are believed to be sited where Moat Cottage and its gardens are situated today). Identified by aerial photography, it was observed that the ridge and furrow appeared to continue over the feature. This identification of a feature situated some distance away from the site of the manor house is not unusual when considered in the context of the evidence for a moat at Willen which suggests that it could have served a similar function at Caldecote. At Willen, a rectangular moat enclosing an area of 26m x

20m was excavated in 1973. The excavations revealed that the island formed by the moat, which is dated to the early thirteenth century, had never contained a substantial structure and was probably used as a garden or a secure area for raising stock (p.9, Taylor-Moore, 2014).

6.9.16 This research has briefly considered the relationship between the manor and a possible small-scale settlement. It is considered that after the twelfth century there appears to be a distancing of manor houses from settlements (Foster, 2013) and research by Campbell, (2012) on manor-settlement relationships indicates that rather than acting as foci around which a settlement was built, it was more common for manor houses to be located at the periphery of the settlement (p.7). Detailed analysis on the distance between manor and settlement in the twelfth and thirteenth centuries indicates that the distance increased with examples of settlements being built c.250 – 500m away. The distance between the perceived site of the manor and the post-medieval settlement where the green has been identified is c.350m and would therefore reflect these research findings.

6.9.17 The documentary evidence (as referenced in 'Report on the SMV & Manorial Site At Caldecote, Newport Pagnell, Milton Keynes'. Giggins, 2008) indicates that the original manor was demolished in the mid-eighteenth century and the map evidence shows a small number of buildings of post-medieval date at Caldecote. It is possible that the medieval settlement extended to several buildings which could be called a hamlet, although as noted above, there is no evidence for these on the site. The absence of evidence for these, and the shrinkage of the settlement could be as a result of the land being laid to pasture and the clearing of the manor to make way for a larger grander house and gardens, for which there is evidence on the site. This was a common reason for the abandonment and shrinkage of manorial centres and associated settlements in the post-medieval period in this area.

6.9.18 This research has concluded that it is likely that medieval Caldecote constituted a manorial complex and may have had an associated small-scale settlement comprising of workers' housing, although there is no evidence for these. It is noted that given that the perceived site of the original manor is in separate ownership, it is not possible to carry out detailed investigation which means that any such identification can only be provisional.

6.9.19 It has also concluded that based on the archaeological evidence for the medieval period and a considered assessment of the archaeological potential of the site, that it would not constitute a strong case for scheduling. As Historic England state, scheduling is reserved

for carefully selected sites, which create a representative sample of sites from different epochs. It is here considered that Caldecote does not represent a good or representative example. Scheduling can be the only and best means of protecting nationally important sites with the vast majority of archaeology managed at the local level which is the case with this site being situated within an Archaeological Notification Area. Scheduling is therefore not appropriate or required.

6.10 Post Medieval Period (1486 – Present)

6.10.1 This evidence (below) is interpreted to mean that there is a low to probability of Post-Medieval remains being present within the proposed development area. Clearly the existing farms are of some antiquity but, while surrounded by the proposed development, are themselves not within the red-line of the proposed development.

6.10.2 For the map regression, Christopher Saxton's, map of Oxfordshire, Buckinghamshire and Berkshire of 1560 was examined but not used for interpretation (or reproduced here) because it lacked sufficient detail to be useful.

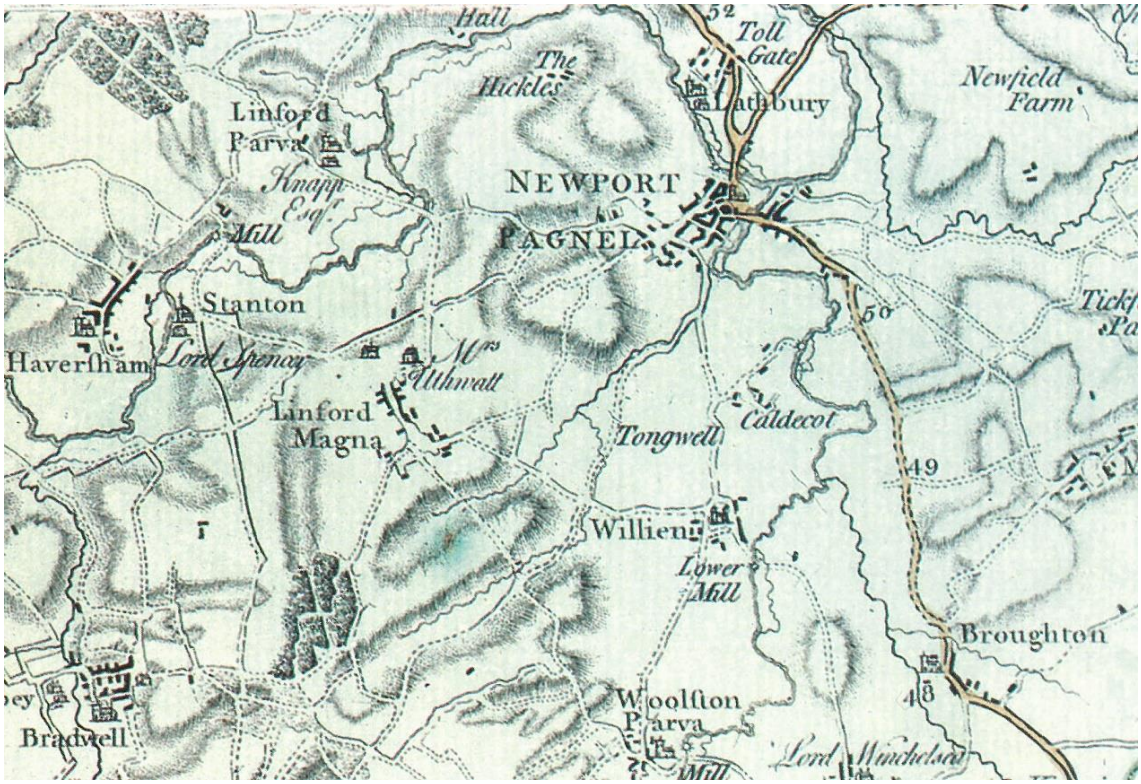

Figure 6.6: County Map, Thomas Jefferys, 1770 (reprinted in 1818) (source: The Centre for Buckinghamshire Studies (scanned copy).

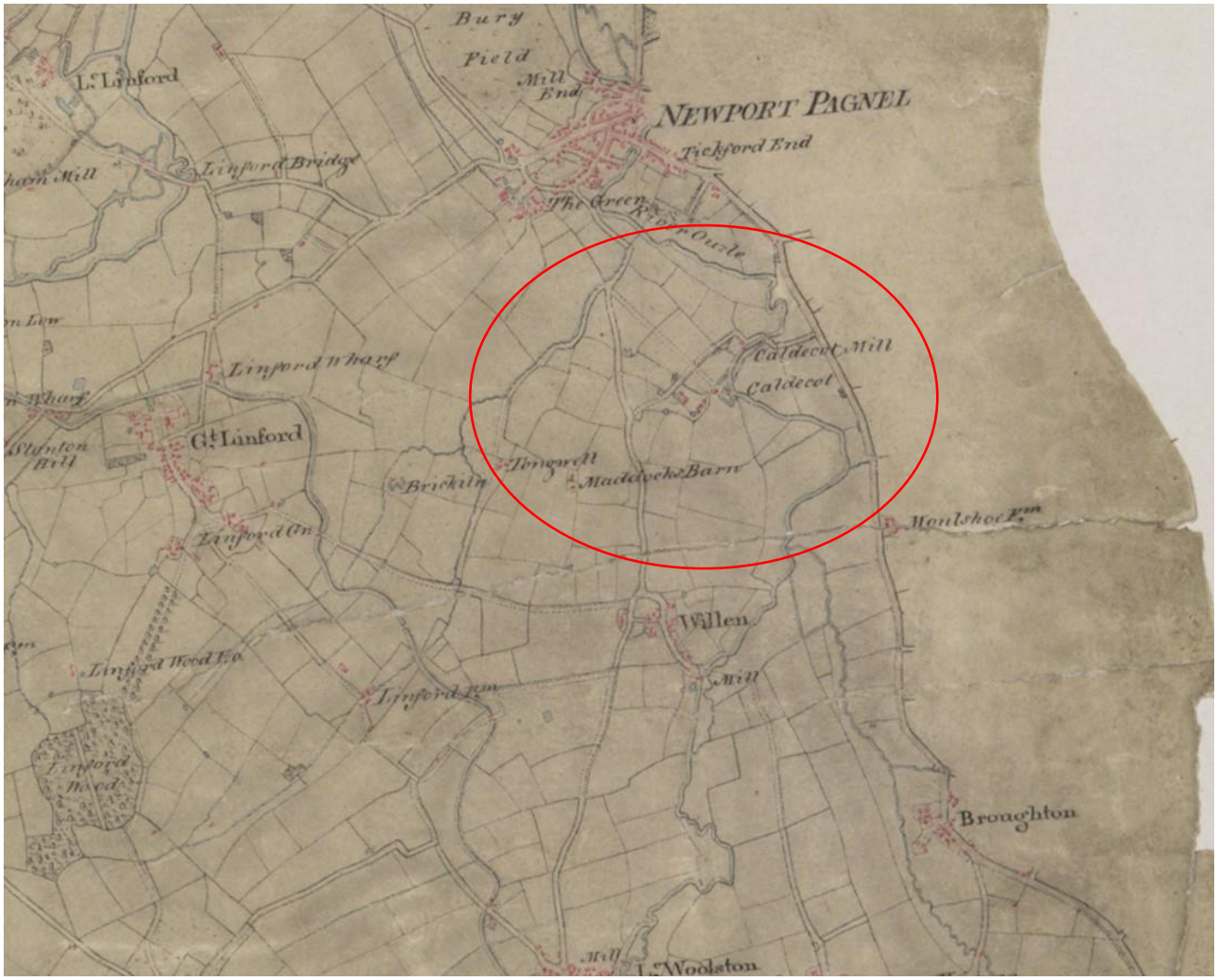

Figure 6.7: Ordnance Survey, 1815 (provided by N Crank, Milton Keynes Council). The Ordnance Survey of 1834 was, like the Saxton map, not of sufficient detail to warrant reproduction.

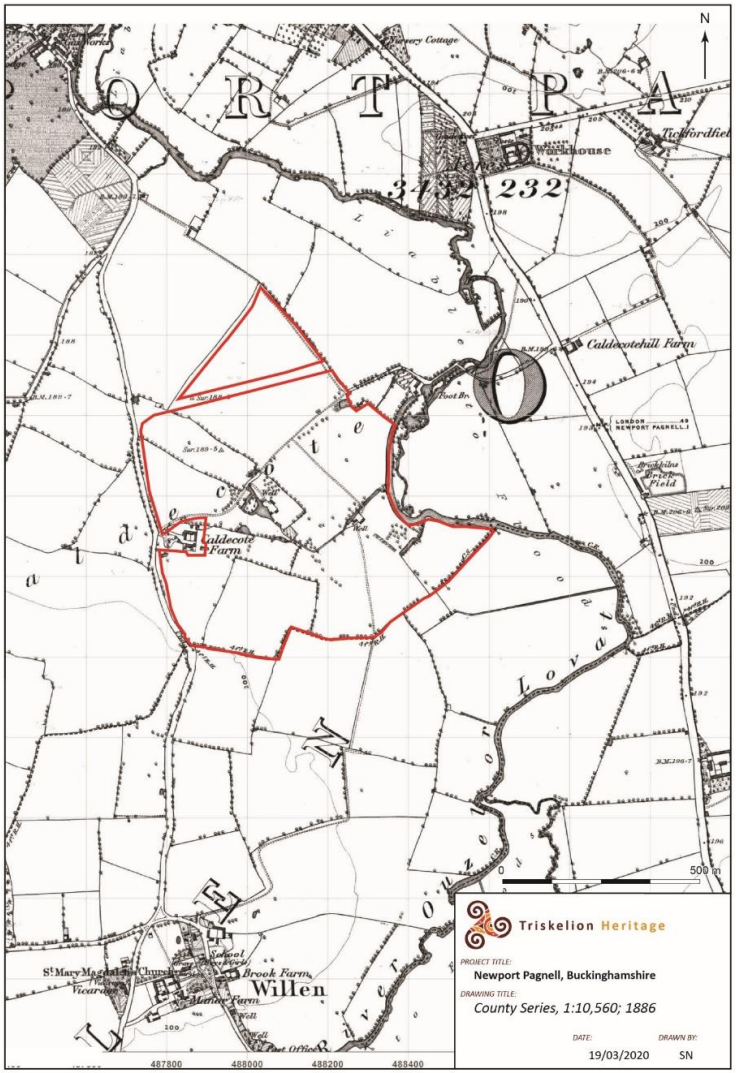

Figure 6.8: Ordnance Survey, County Series, 1: 10,560 (6 inches to 1 mile), 1886

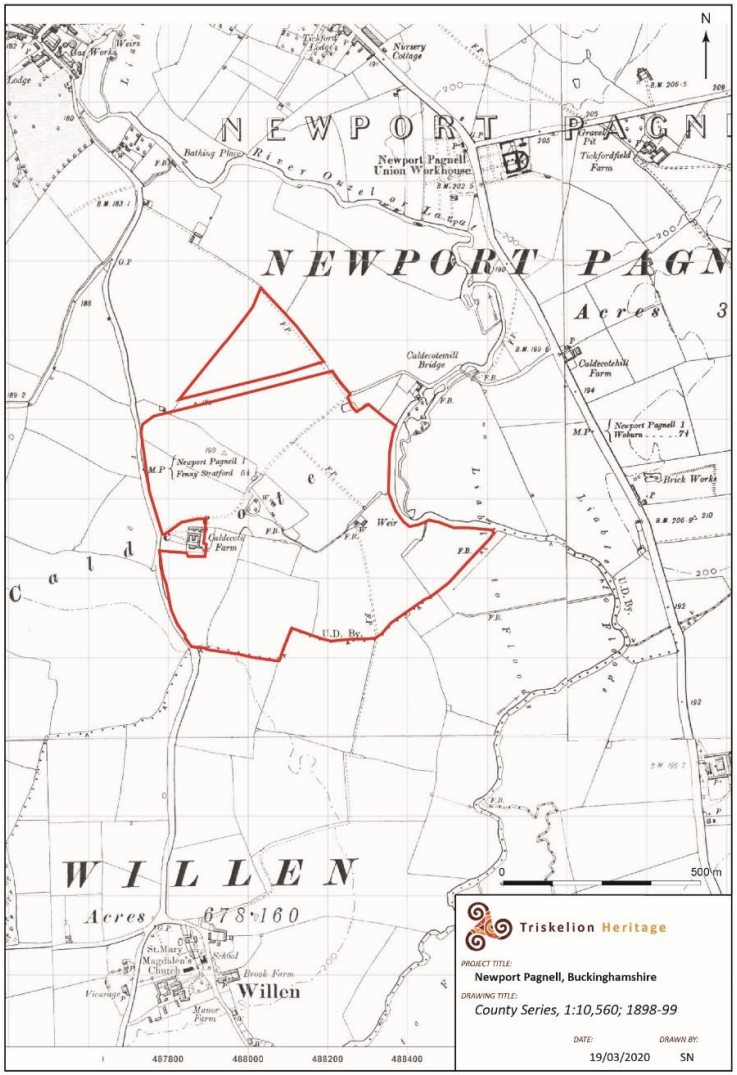

Figure 6.9: Ordnance Survey, County Series, 1: 10,560 (6 inches to 1 mile), 1898-99

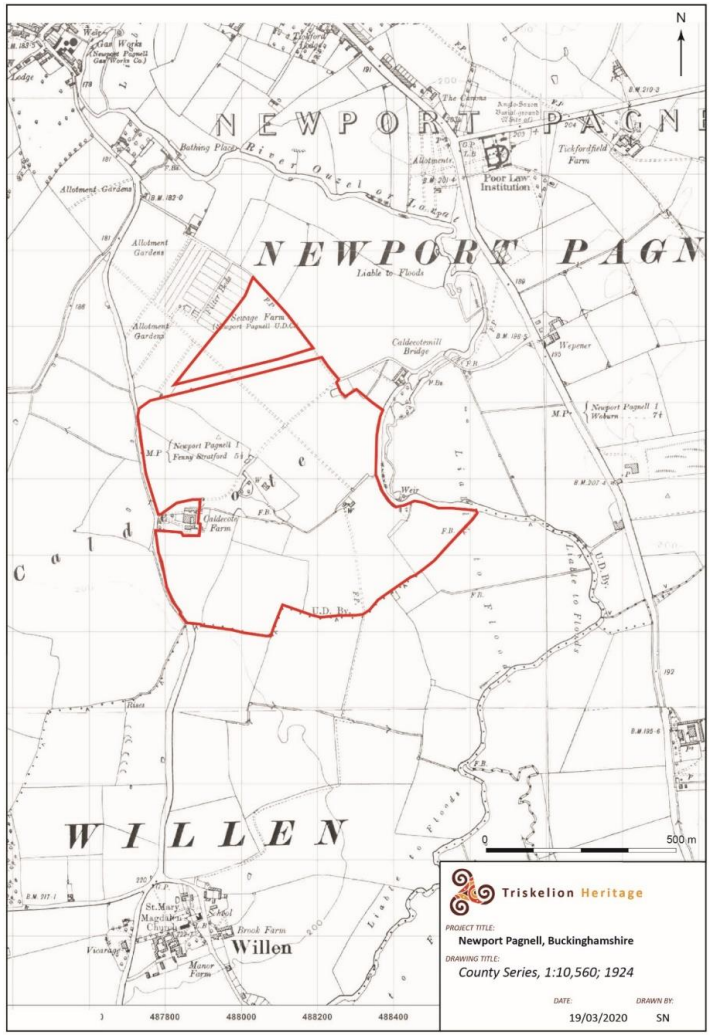

Figure 6.10: Ordnance Survey, 1: 10,560 (6 inches to 1 mile), 1924

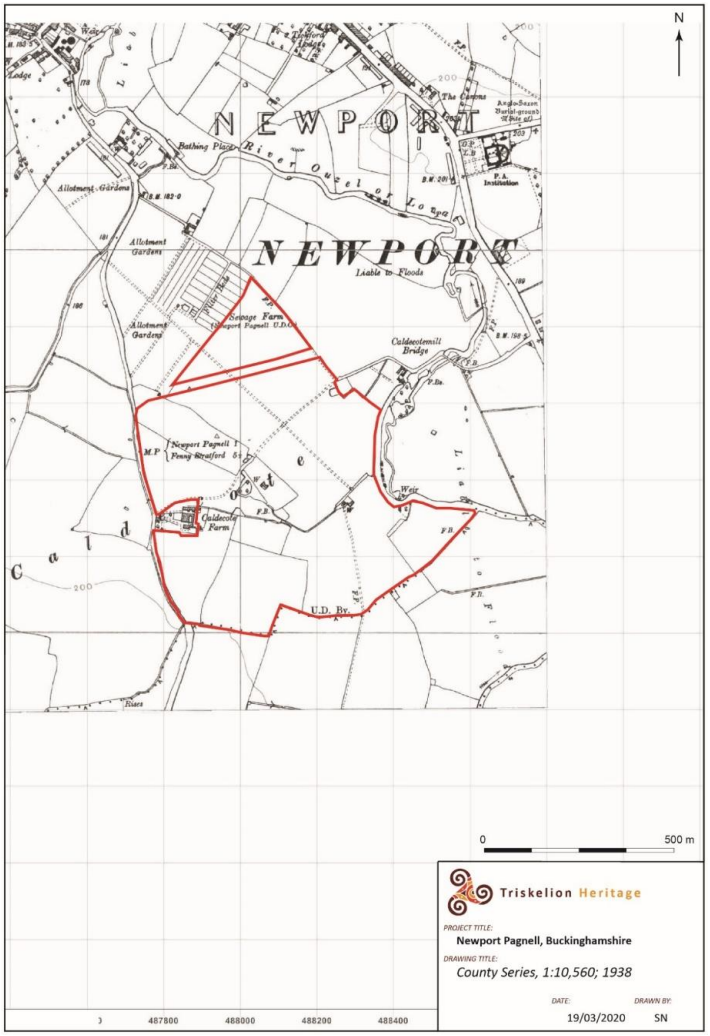

Figure 6.11: Ordnance Survey, 1: 10,560 (6 inches to 1 mile), 1938

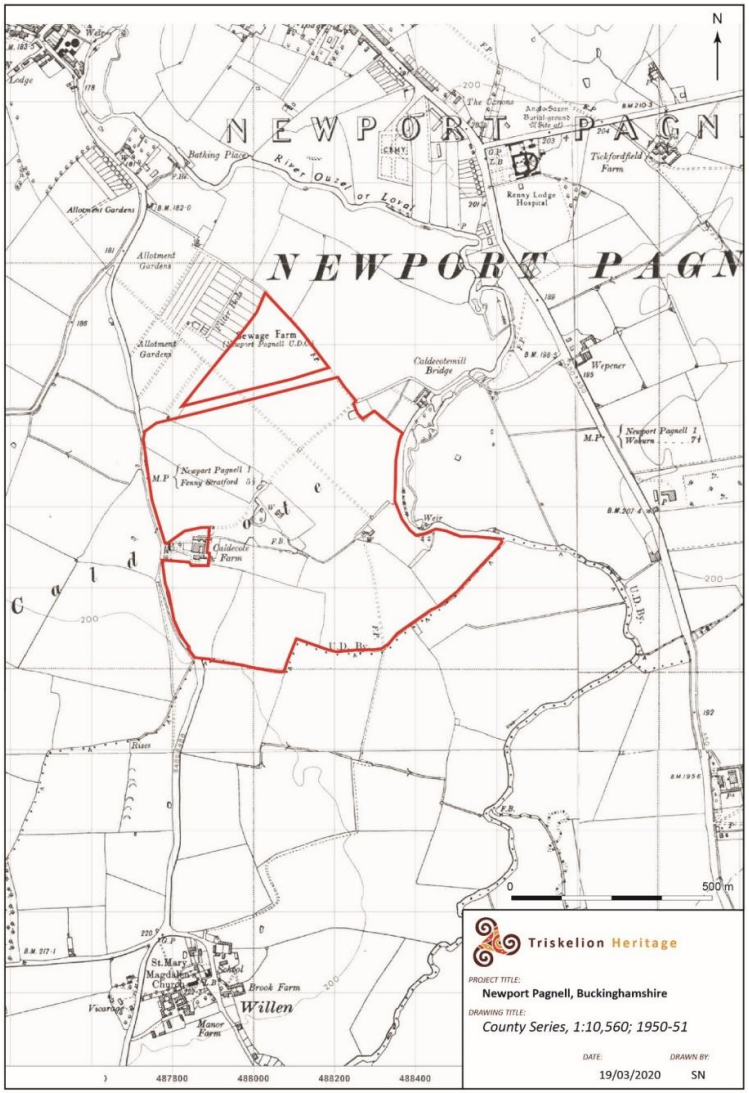

Figure 6.12: Ordnance Survey, 1: 10,560 (6 inches to 1 mile), 1950-51

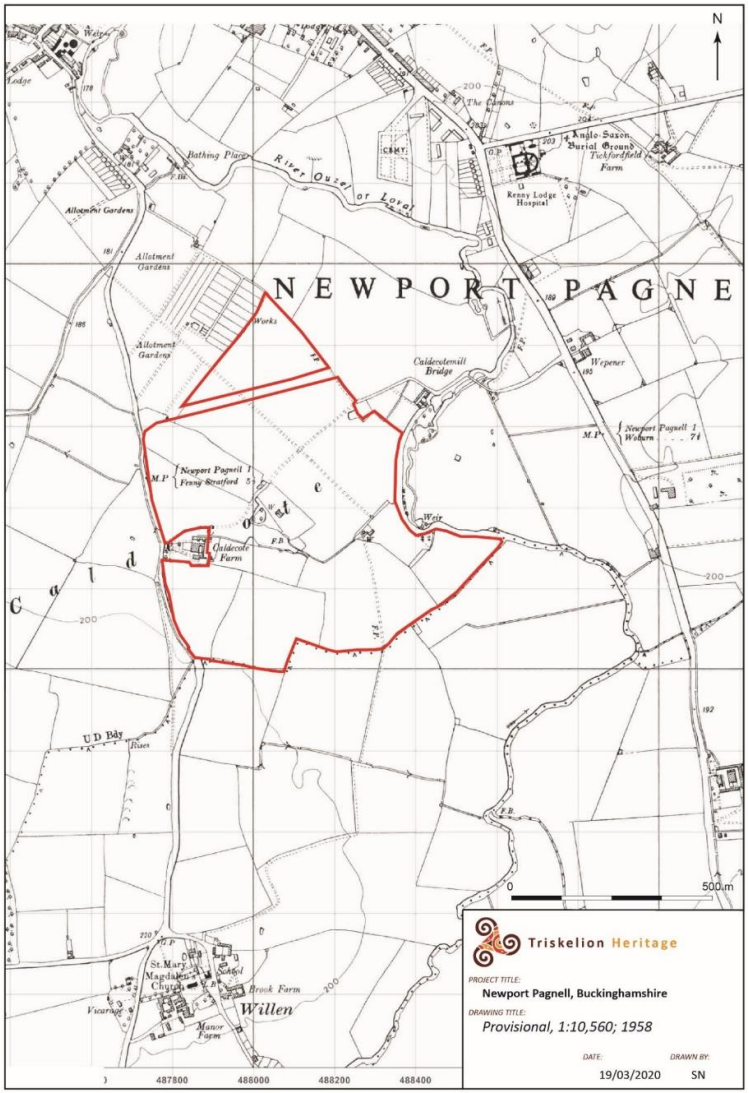

Figure 6.13: Ordnance Survey, 1: 10,560 (6 inches to 1 mile), 1958

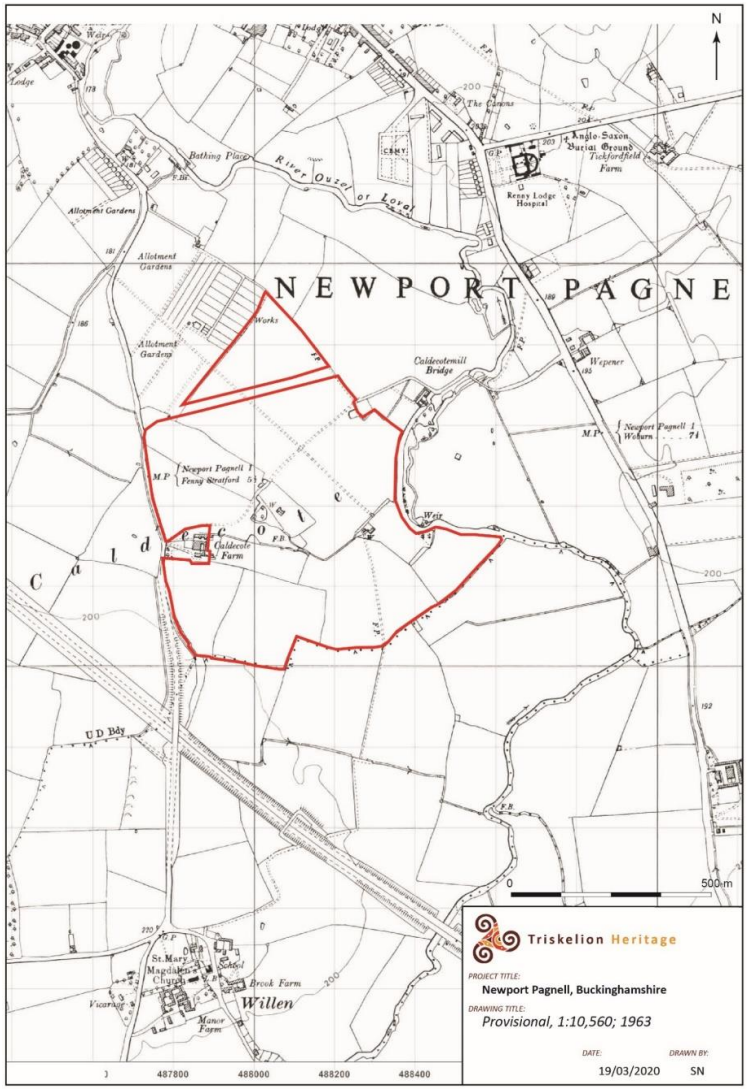

Figure 6.14: Ordnance Survey, 1: 10,560 (6 inches to 1 mile), 1963

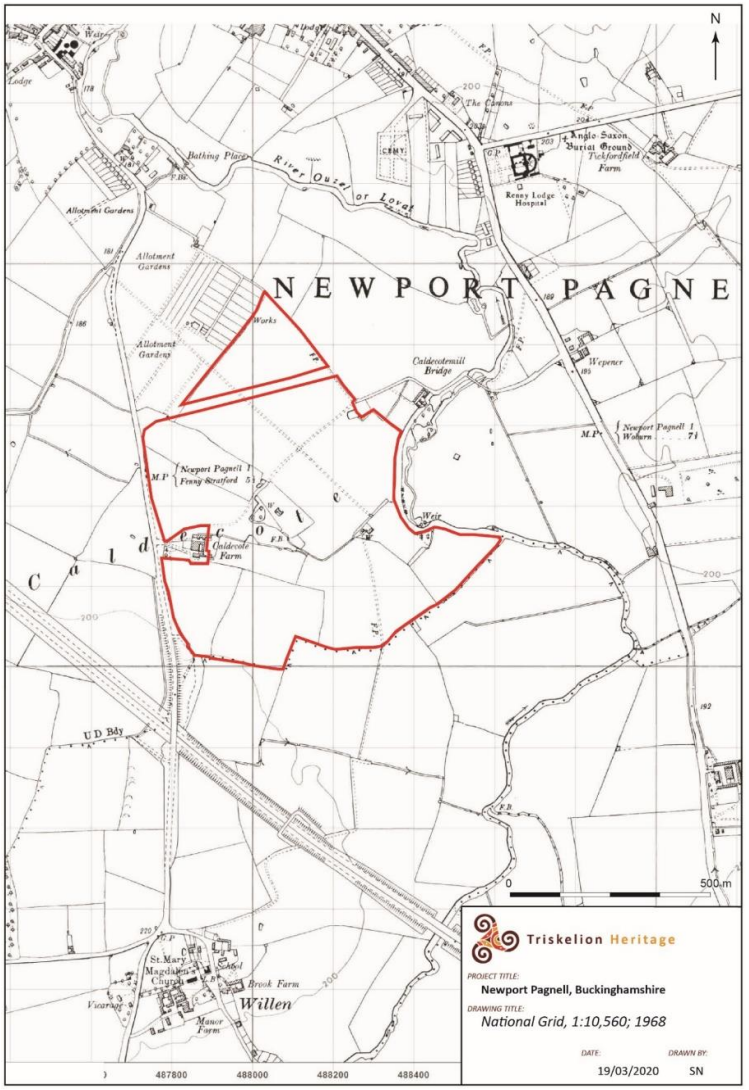

Figure 6.15: Ordnance Survey, 1: 10,560 (6 inches to 1 mile), 1968

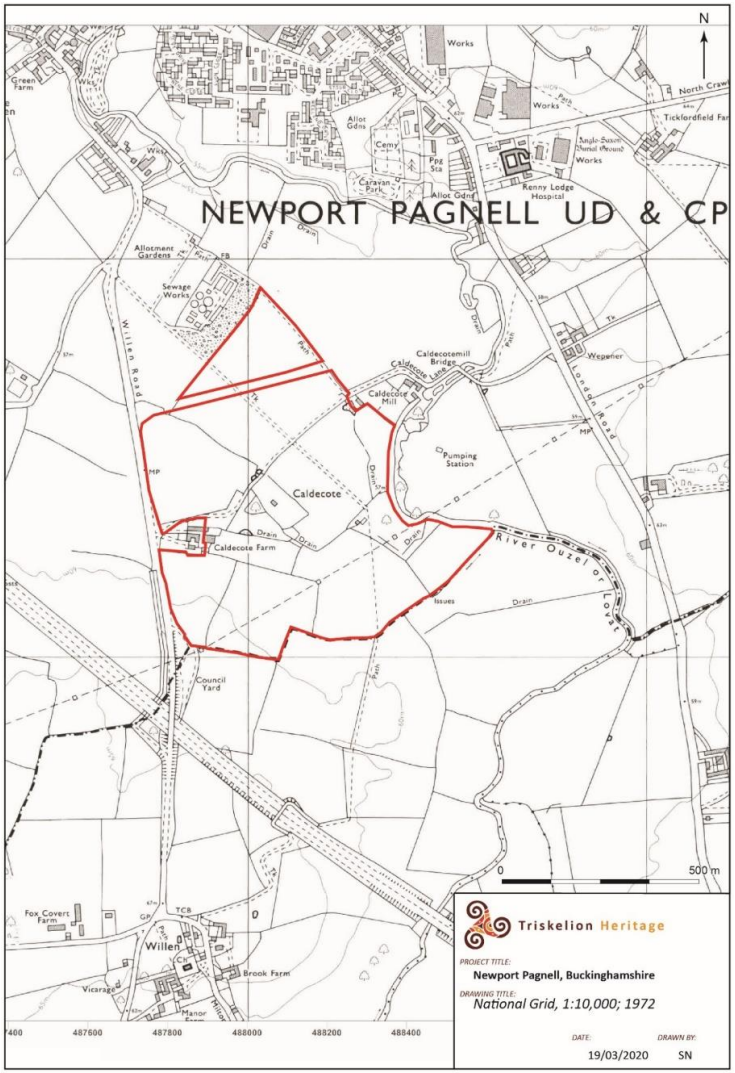

Figure 6.16: Ordnance Survey, 1: 10,560 (6 inches to 1 mile), 1972

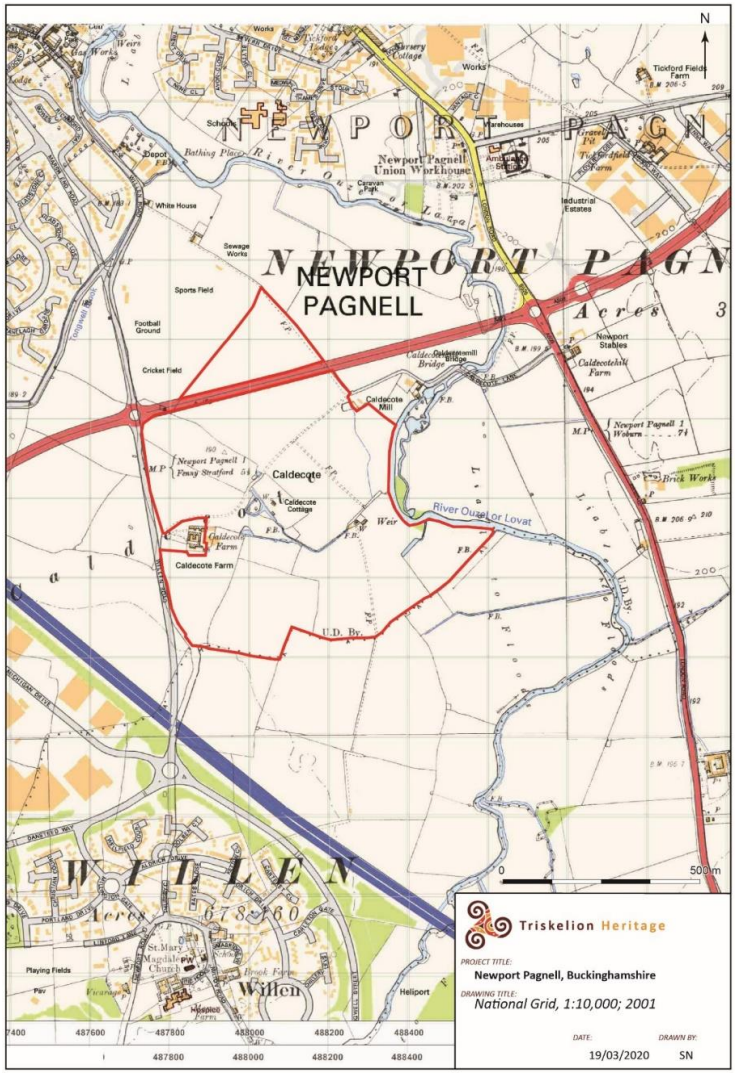

Figure 6.17: National Grid, 1: 10,000 (6.25 inches to 1 mile), 2001

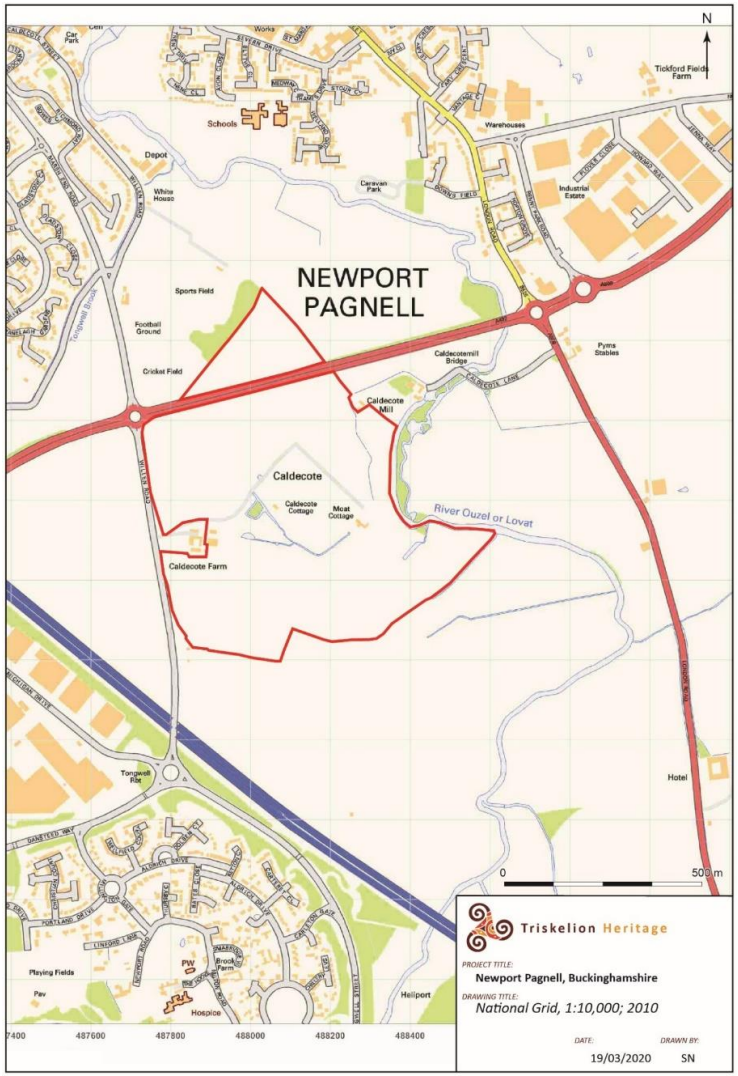

Figure 6.18: National Grid, 1: 10,000 (6.25 inches to 1 mile), 2010

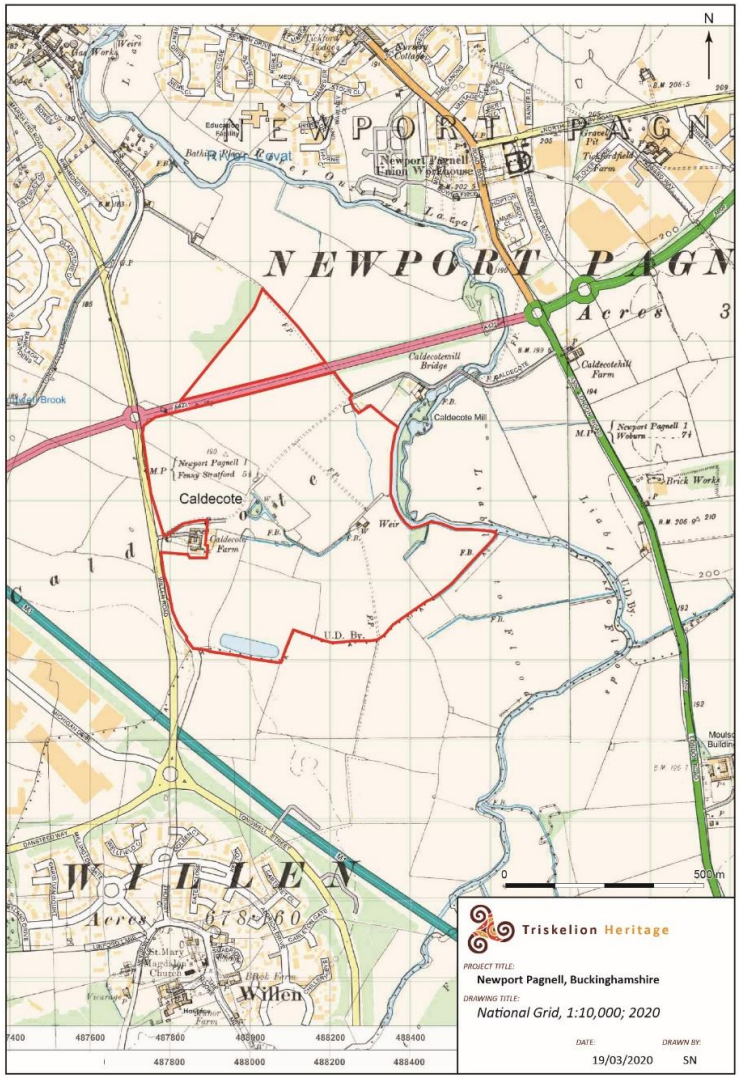

Figure 6.19: National Grid, 1: 10,000 (6.25 inches to 1 mile), 20

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6.11 Geoarchaeological Potential

6.11.1 A Geoarchaeological Desk-based Assessment was commissioned from ARCA; Department of Archaeology and Anthropology University of Winchester. This is presented in full below, as Appendix 6.2.

6.11.2 The summary of that desk-based assessment states:

- A geoarchaeological desk-based assessment of geotechnical records and British Geological Survey (BGS) records on land east of Willen Road, Newport Pagnell, Buckinghamshire, was carried out at the request of Triskelion Heritage Ltd. Lithological data were taken from these records and transferred to a RockWorks 15 database for interpretation and analysis of lithostratigraphic cross sections.
- The Jurassic bedrock, Kellaways Formation, lies between 51.65m OD (4.55m bgl) and 55.50m OD (1.5m bgl) in the north of the site. It is unconformably overlain by Oadby Member till that primarily occupies a buried valley /channel lying east to west across the centre and south of the site. The Felmersham Member fluvial sand and gravel forms a terrace that unconformably overlies these units and, on occasion, is recorded in outcrop. An informal unit, the Soil Profile, consists of top soils and clayey units with varying amounts of sand and/or gravel. It is generally thin <0.50m, however, rare instances exist of thicker deposits. The unit is believed to be oxidised. Holocene Alluvium is mapped by the BGS as a thin border to the River Ouzel widening in the southeast of the site. No test pits or boreholes sample this unit on the site, however, 1.2m of clay is recoded in a borehole south of the site.
- Thick Made Ground, which is believed to be modern backfill, is recoded in test pits in the quarry (under restoration) that lies on the southern border of the site. A single borehole in the centre of the site also records Made Ground that truncates the sand and gravel.
- No significant organic remains are recorded in the stratigraphy.

6.11.3 The archaeological and palaeoenvironmental potential is assessed thus:

- The sand and gravel terrace deposits were probably laid down in cold conditions inhospitable to the presence of man. Human groups were intermittently present during Devensian interstadials and the exploitation of river gravel is a possibility (White and Pettitt 2012). No Palaeolithic deposits are known from the site and only two artefacts of possible Palaeolithic date are recorded from the environs (Robinson Wild et al 2020 p19). The upper 1 – 2m of the deposit is probably oxidised as a result of a fluctuating water table. Nonetheless, since the sampling of these deposits can only properly be achieved by the recording of section faces (borehole cores are too small for lithological analysis) the potential to recover archaeological or palaeoenvironmental information must be Low.
- The Soil Profile on the terrace is probably oxidised and as a result the palaeoenvironmental potential is Low. The potential for organic deposits to be preserved in the flood plain alluvium on the riverbank and in the southeast of the site is a possibility but is also considered to be Low. Archaeological potential on the site has been classed as Medium/High (Robinson Wild et al 2020 p11).

6.11.4 The following conclusions are drawn:

- The top of the bedrock mudstone is a weathered blue clay and lies as close as 1.50m to the ground surface. Weathered till may also present a similar lithology but will include flint and chalk clasts. On the site it has a minimum depth of 1.10m bgl (TP13). The till occupies the centre and south of the site located primarily within the buried valley.
- The Felmersham Member sand and gravel outcrops or lies close to the surface across the site. It has a variable thickness with a maximum of 4.30m. the top 1-2m is probably oxidised.
- On the site there are no test pits or boreholes that sample the floodplain alluvium which is mapped close to the River Ouzel. To the southeast of the site there is a single record (SP84SE877) of 1.20m of clay overlying gravel. On the terrace flood alluvium will be rare and incorporated into the Soil Profile.
- Made Ground is recorded in the test pits in the quarry. It is also found in one location only (SP84SE400) in the centre east of the site where it truncates the top of the gravel terrace.
- The Soil Profile is most likely oxidised a circumstance which is not conducive to the preservation of organic remains. The palaeoenvironmental potential of the Soil Profile and the Felmersham Member is believed to be low. No archaeologically significant organic remains are recorded on or in the environs of the site.

6.12 Earthwork Survey

6.12.1 In order to supplement the desk-based assessment, an earthwork survey was undertaken by Cotswold Archaeology. The complete survey results are presented in Appendix 6.3. The Discussion from the complete report is replicated below.

6.12.2 The survey recorded upstanding earthworks dating from the medieval to Modern periods. The earliest features were characterised by pockets of surviving ridge and furrow occupying cultivable land along the edge of the River Ouzel; these were likely associated with the small medieval settlement at Caldecote Mill. Several features were recorded between the ridge and furrow and the riverbank, which appear to form part of a contemporary medieval landscape. These features included drainage ditches and banks. The purpose appears to have been to maximise the area of useable land between the open fields and the river by improving drainage (Area 6 and 11), and by extending the area itself with artificial platforms (Area 11). Post medieval landscape use was characterised by the construction of a low causeway, which may have served to access a manorial site (MKHER ID: MMK87 / MMK92). Later features belonged to the later 20th century when local electrification and sewerage schemes saw the excavation of service trenches and erection of pylons across the site.

Figure 6.20: Interpretative earthwork survey drawing

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6.13 Geophysical Survey

6.13.1 In order to supplement the desk-based assessment a geophysical survey of the site was undertaken by Magnitude Surveys. The complete report is presented in Appendix 6.4. The geophysical survey carried out in accordance with a Written Scheme of Investigation approved by Mr Crank, the Senior Archaeological Officer at Milton Keynes Council. For summary purposes two illustrations are provided – a grey scale plot in Figure 6.47 below followed by the interpretive plot as Figure 6.48. These suggest that the majority of the area is/was covered in ridge and furrow. Other archaeology, probably earlier but visible from 'beneath' the ridge and furrow is visible but is primarily located to the east, on the lowest terraces flanking the river.

6.13.2 The Conclusions of that survey are as follows:

- A fluxgate gradiometer survey has successfully been undertaken across the survey area. The geophysical survey has detected a range of anomalies of archaeological, agricultural, natural and modern origins. Natural variations have been detected that likely relate to alluvium deposited by the adjacent stream. Broad ferrous anomalies of modern origin relate to field boundaries and services that have been identified across the survey area.
- Anomalies of possible archaeological origin have been identified in the east of the survey area. A possible enclosure or field system was identified connecting to trackways. One of the trackways correlates to an edge of the area of ridge and furrow visible in satellite imagery and the data, which could indicate a contemporary provenance, or a prolonged use of the trackway. Some of the anomalies of possible archaeological origin appear to be disturbed by ridge and furrow which may suggest they pre-date the ridge and furrow regime. However, because these anomalies are disturbed and are located near a service crossing the area, it has made their identification uncertain.
- Historic agricultural activity is evident throughout the survey area in the form of former mapped field boundaries, ridge and furrow cultivation and modern ploughing trends.
- A series of features of undetermined origin were also identified. These could relate to archaeological, agricultural, natural or modern processes.

Figure 6.21: Grey scale data plot of the entire survey area

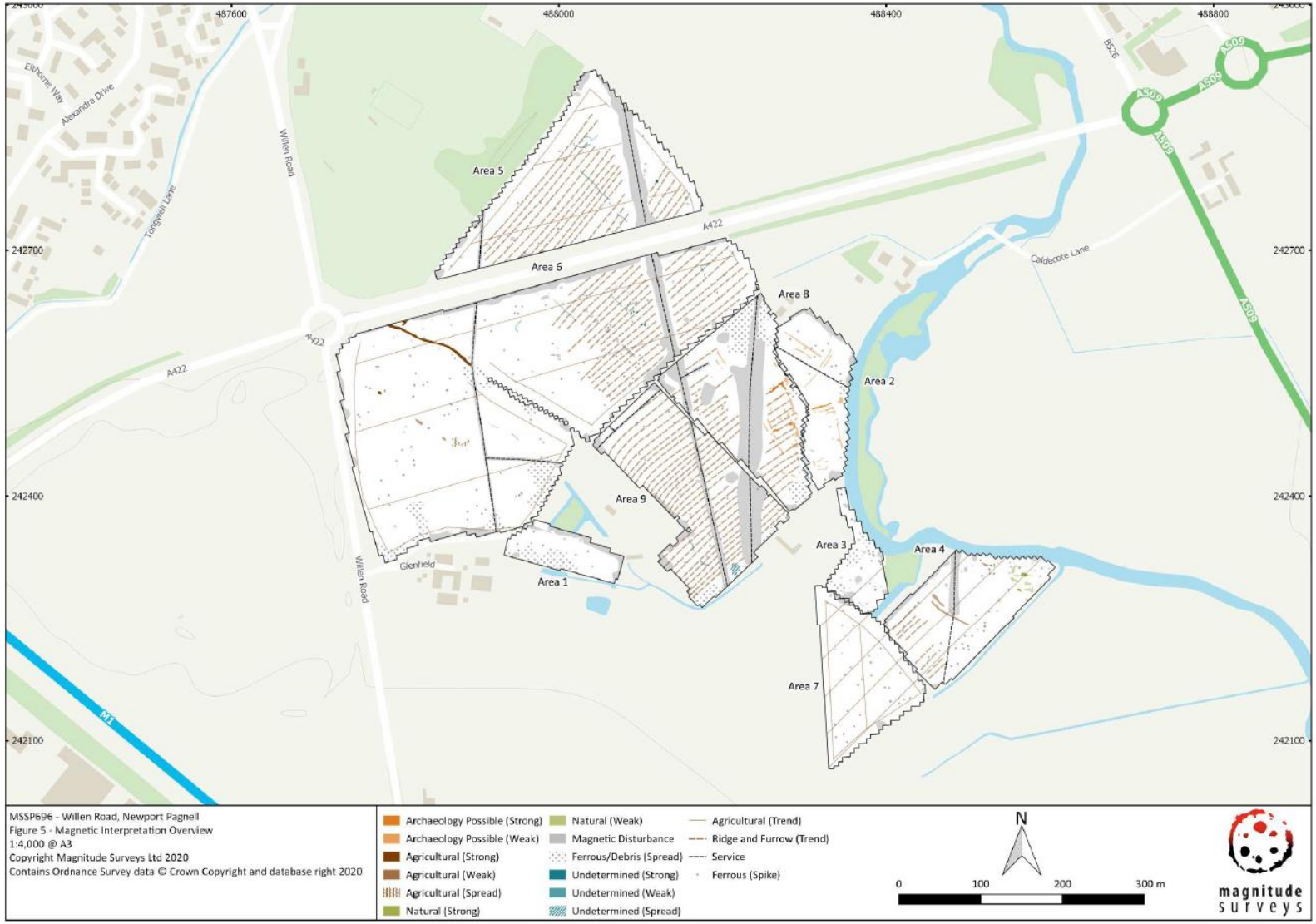

Figure 6.22: Interpretation of the data with archaeological features picked out in orange-brown colours

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6.14 Site Conditions

6.14.1 A site visit was undertaken on 16th March 2020 in dry, bright conditions. The locations from which the photographs were taken, and directions of view are shown in Figure 6.23 below.

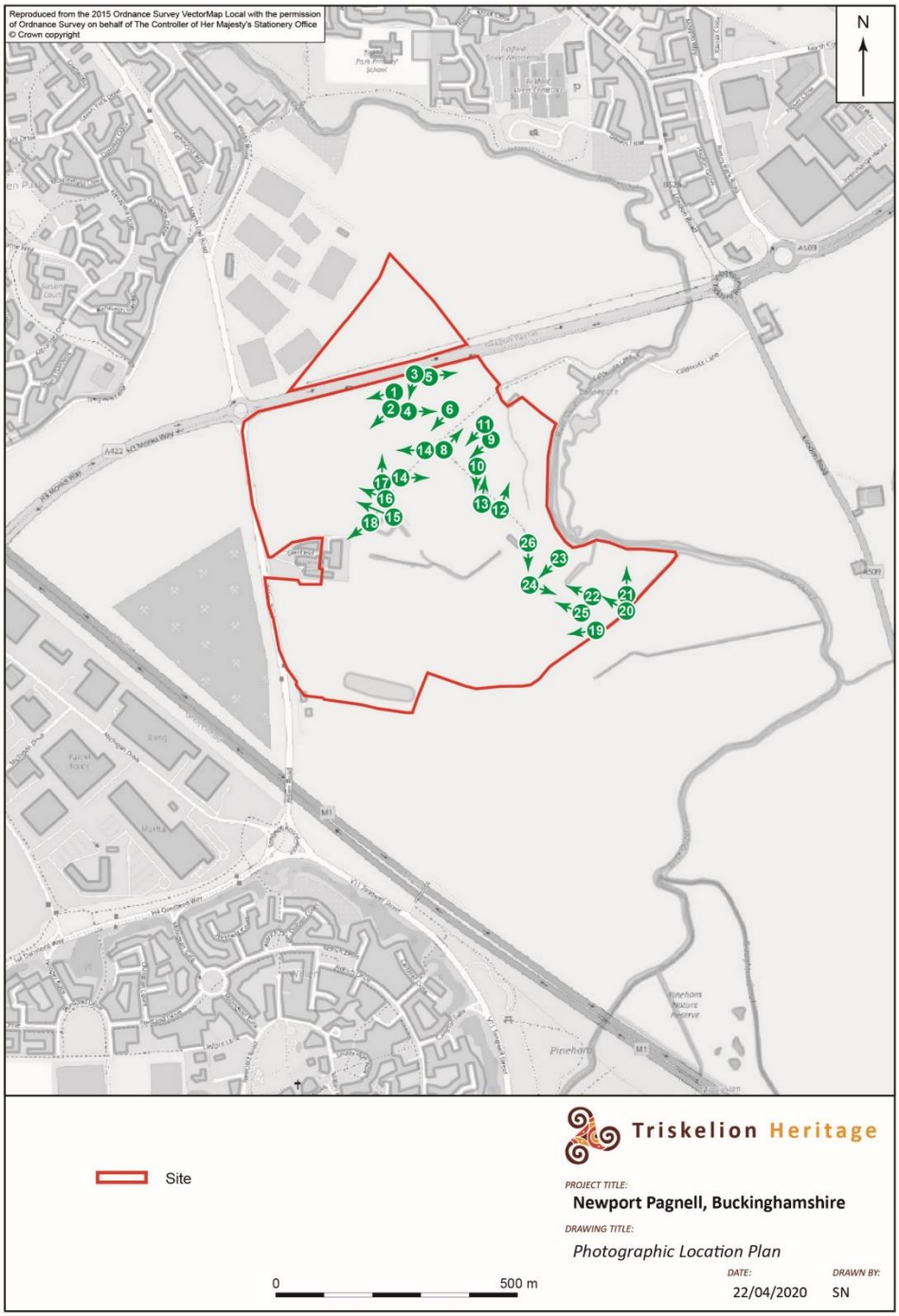

Figure 6.23: Guide Plan for Photographic Survey

Figure 6.24: Plate 1: View from the north boundary (A422) into the site, looking west

Figure 6.25: Plate 2: View from the north boundary (A422) into the site, looking southwest (1)

Figure 6.26: Plate 3: View from the north boundary (A422) into the site, looking southwest (2)

Figure 6.27: Plate 4: View from the north boundary (A422) into the site, looking southeast

Figure 6.28: Plate 5: View from the north boundary (A422) into the site, looking east

Figure 6.29: Plate 6: View from the south side of the site to Caldecote Farm, looking southwest

Figure 6.30: Plate 7: View from the south side of the site to the northern boundary (A422), looking northwest

Figure 6.31: Plate 8: View from the south side of the site to the northern boundary (A422), looking northeast

Figure 6.32: Plate 9: View from the north side of the site to the ridge and furrow, looking southwest

Figure 6.33: Plate 10: View from the north side of the site to the ridge and furrow, looking south

Figure 6.34: Plate 11: View from the north side of the site to the ridge and furrow, looking west

Figure 6.35: Plate 12: View from the north side of the site to the ridge and furrow, looking northeast

Figure 6.36: Plate 13: View from the north side of the site, looking north

Figure 6.37: Plate 14: View from the north side of the site to the ridge and furrow, looking east

Figure 6.38: Plate 15: View from the single-track access road, looking northwest (1)

Figure 6.39: Plate 16: View from the single-track access road, looking north

Figure 6.40: Plate 17: View from the single-track access road, looking northeast

Figure 6.41: Plate 18: View from the single-track access road, looking west

Figure 6.42: Plate 19: View from the south of the site towards the gravel extraction site, looking west

Figure 6.43: Plate: 20: View from the south of the site towards Caldecote Cottage, looking northwest

Figure 6.44: Plate 21: View from the south of the site towards Caldecote Cottage, looking north

Figure 6.45: Plate 22: View from the south of the site towards Caldecote Cottage, looking northwest

Figure 6.46: Plate 23: View from the south of the site towards the gravel extraction site, looking southwest

Figure 6.47: Plate 24: View from the south of the site, looking southeast

Figure 6.48: Plate 25: View from the south of the site, looking northwest

Figure 6.49: Plate 26: View from the south of the site, looking south

6.15 Results of an Archaeological Evaluation

6.15.1 The proposed development site was the evaluated, archaeologically, by means of the

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excavation of trial trenches by Cotswold Archaeology in January 2021. The summary and discussion of the evaluation report (presented in full in Appendix 6.5) are presented below.

6.16 Summary

Project name: Willen Road
Location: Newport Pagnell, Milton Keynes
NGR: 488112 242539
Type: Evaluation
Date: 18th January to 5th February 2021
Planning reference:
SMC:
OASIS ID: cotswold2-411865
Location of Archive: To be deposited with Milton Keynes Museum and the Archaeology Data Service (ADS)
Accession Number: EMK1439
Site Code: WNP21

6.16.1 In January 2021, Cotswold Archaeology carried out an archaeological evaluation of the land East of Willen Road, Newport Pagnell, Buckinghamshire. A total of 41 trenches out of the proposed 63 trenches were excavated. A very high water table, large areas of standing water and near-constant rainfall prevented the remainder if the trenches from being opened.

6.16.2 Trial trenching revealed a very limited number of archaeological features, finds or deposits across the area; mainly consisting of Medieval to post-Medieval drainage ditches and field boundaries. The results suggest an extended period of use as pastoral land, latterly in association with Caldecote Farm and Mill, with a brief period of arable agriculture in the high Medieval period, evidenced by the standing remains of Ridge and Furrow across the central, southern part of the site.

6.16.3 Very few archaeological artefacts were recovered, making precise dating of features difficult, and further supporting low levels of human activity or input within the area. Small quantities of artefacts were recovered including four flints, four pieces of animal bone, six sherds of Late Iron Age / Roman pottery, nineteen sherds of Medieval pottery – largely dating from between the late 11th-14th centuries - and five post-medieval artefacts. 80% of the finds were recovered from the pasture land in the central, eastern part of the site towards the river (Trenches 43-49).

6.17 Discussion

6.17.1 Trial trenching revealed very few archaeological finds or features across the area; 8.1

mainly consisting of Medieval drainage systems and field boundaries. The quantities of finds material were correspondingly low, with a few sherds of Romano-British pottery and a small number of Medieval sherds, the majority of which were recovered from the area between Moat House and the River Ouzel (Trenches 44, 46, 48 & 49). The environmental remains recovered were equally poor, with the scattered, windblown remains of charred crops, either representing intentional or unintentional fires or crop processing nearby.

6.17.2 The chief characteristic of the area is of damp, and sometimes wet, pastureland, 8.2 with the area perhaps more affected by a frequently high water table, such as occurred during the evaluation, than by flooding - alluvial deposits were only recorded in one location adjacent to the river.

Prehistory

6.17.3 No prehistoric features were recorded in the trenches, with just four unstratified 8.3 struck flints recovered from the entire site. The lack of either features or finds suggests that the area may well have been used as summer pasture for much of the prehistoric period – no ditches were recorded that might reasonably be interpreted as prehistoric field systems, perhaps corroborating this.

Late Iron Age/ Roman

6.17.4 With a substantial settlement around 500m to the west of site (MKHER ID: 8.4.MMK934) and the possible small riverside dwelling to the east (MKHER ID: 454), the lack of a late Iron Age and Roman presence was perhaps unexpected. No dated features and just five unstratified and one residual LIA/Roman pottery sherds were recovered from the eastern part of site toward the river, again perhaps suggesting that the site may have been under pasture throughout this period.

Medieval

6.17.5 No early or middle Anglo-Saxon finds were recovered from the site. The earliest 8.5 stratified material was represented by two small groups of Late Saxon St Neots ware, both found within ditches between Moat House and the river and both in assemblages that included clearly later Medieval material, dating them to perhaps the 12th century. It is suggested that the area did not come under direct occupation until the late 11th or early 12th centuries, allied to the expansion of settlement and farming activity onto previously unused or pasture land at this period.

6.17.6 The earlier suggestion that there may have been a larger medieval hamlet 8.6 surrounding

Caldecote Farm and Moat House has now been refuted. The last area remaining to prospect for this would be the western pasture field, but this is clearly under Medieval ridge and furrow and therefore highly unlikely to be harbouring Medieval settlement remains – where trenching has taken place within the eastern ridge and furrow field no underlying features were recorded. It is likely that the ridge and furrow fields would have been ploughed at the point of initial settlement at Caldecote Farm, perhaps in the 11th century, and put back to pasture by the end of the 14th century.

6.17.7 There is however some limited evidence for Medieval activity between the ridge and 8.7 furrow field and the river, with two (possibly three) ditches – one in trench 49 a re-cut boundary ditch, the other in Trench 46 possibly part of a small enclosure (Figure 6.6, Figure 6.9 and Figure 6.10). Both held small assemblages of Medieval pottery dating them perhaps to around the 12th century. There were two further small, undated ditches in Trench 44 and it is possible that at least some of the features in the flooded, unexcavated Trench 48 represent contemporary drainage ditches.

6.17.8 It is likely that the fields with extant ridge and furrow, along with those that have 8.8 since become ploughed out to the north, would have been taken out of arable production by the late 14th century and put to pasture. These low-lying, damp areas would have been among the first to have been removed from ploughing following the famine and plague of the 14th century, and the consequent reduction in population. These areas had been ploughed initially to feed a growing population, they would now have been more profitably, and far less labour-intensively, used to rear sheep for wool.

6.17.9 The moated site at Moat House is most likely to have been constructed in the 13th 8.9 or early 14th century, the floruit of lowland moat building. However, the ridge and furrow to the east respects the moated site, and the small areas to the south are without ridge and furrow, so it is suggested that this area, pre-moat, was part of the original occupation site. To construct a moat around a house in this period often involved moving the main domestic site down the contour into ground where water could be effectively channelled in, not so here.

Post-Medieval

6.17.10 There is no archaeological evidence for post-medieval occupation outside of the 8.10 main domestic sites of Caldecote Farm and Moat House. There is a small area of well-structured, but undated, strip-quarrying in Trench 45 along the roadway at the east – potentially taking gravel for the construction of the roadways themselves – and a small

number of post-Medieval to modern pits containing buried rubble etc. in Trenches 35 and 43 (Figure 6.5 and Figure 6.6). The few sherds of pottery recovered from the northern part of the site represent middening within the ploughed fields.

6.17.11 The eastern and southern parts of the site clearly remained as pasture through to 8.11 the present day with the northern fields returning to arable only in the post-war period as the ridge and furrow is clearly visible on the 1945 Google aerial photograph. A small number of Enclosure and post-Enclosure field boundaries were recorded, some visible on 19th century maps, some on the 1945 aerial, and some dated by their alignments and associations.

Undated

6.17.12 A number of excavated and unexcavated features remain undated, either by finds, 8.12 map evidence or association.

6.17.13 The small, circular feature in Trench 13 perhaps most resembles the remnants of an 8.13 haystack drainage gully, potentially of Roman or Medieval/post-Medieval date (Figure 6.4). It would not be a great leap to see these fields as hay meadows at some stage.

6.17.14 Within Trench 14, three unexcavated narrow, and presumably therefore shallow, 8.14 ditches were aligned parallel to the ridge and furrow visible on the 1945 Google AP within this field, perhaps representing the bases of deeper furrows.

6.17.15 A ditch running through Trenches 24 and 26 is visible on the OS maps up until 8.15.1937-61 and on the 1945 AP. Excavated ditches in Trenches 30 and 35 to the south run parallel to this ditch (Figure 6.5).

6.17.16 The ditch at the east end of Trench 47 has a corresponding, slight bank parallel to 8.16 the west and forms a part of a small earthwork ditch-and-bank system of unknown date (Figure 6.6). Clearly not ridge and furrow this system has the look of a small water-meadow and would likely be of post-Medieval date.

6.17.17 Trench 48 contained a number of possible linear and pit-like features, some of 8.17 which could represent part of a drainage system. Whether all the potential linear features represent ditches is uncertain, and similarly the pit-like features. Their fills were dark and organic-looking and they may well have been of natural origin (Figure 6.6)

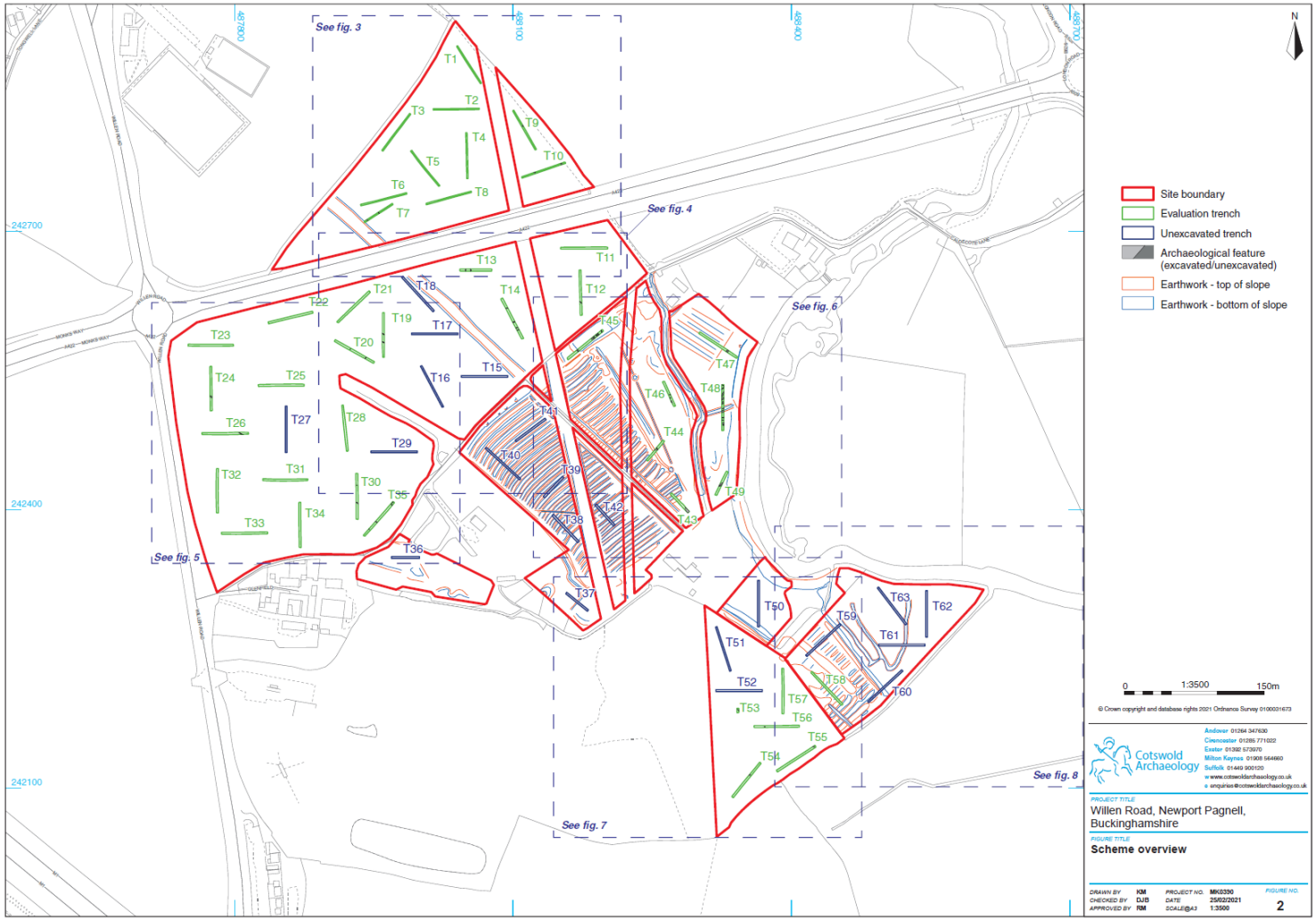

Figure 6.50: Overall plan of the archaeological evaluation

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6.18 Proposed Development and Potential Heritage Impacts

6.18.1 Bloor Homes South Midlands wishes to obtain planning permission for a proposed residential development, and associated landscaping and access on the site, as shown on the submitted master plan.

6.19 Direct Impacts

6.19.1 The assessment of the heritage assets discovered on the site and within the Assessment Area has been undertaken in the knowledge of the uncertainties that arise when trying to assess a resource that is not wholly known and is often poorly understood. It should be noted that the assessment is based on information held in source repositories, published and unpublished data. None of these represent exhaustive and comprehensive sources of information on the presence/absence of archaeological features. However, from the data available it is possible to quantify and qualify the known heritage resource, to determine the potential for yet unknown or unrecorded heritage features to be present, and to identify areas within the site where activities are likely to have compromised archaeological survival. These factors have been taken into consideration during the preparation of this report.

6.19.2 It is also noted that what appear to be the more sensitive assets are excluded from the red line area of proposed development.

6.19.3 With respect to pre-existing impacts which may have disturbed or destroyed hitherto unknown or unrecorded archaeological remains at the site, it is apparent that there has been ploughing across some areas of the site, which would have had an impact upon archaeological remains.

6.19.4 The impact on any archaeological remains would arise from pre-construction activities – such as ground preparation/improvement. Construction activities with the potential to impact upon archaeological remains include excavations for the foundations of buildings, excavations for services such as drains and sewers and excavations in order to lay the sub-grade as a base for roads, paths and circulation areas.

6.19.5 Archaeological Assets include:

- Surviving ridge and furrow in Area 9 and western portions of Area 8 (on Figure 6.48 above) are in an area designated Public Open Space or are excluded from the proposed development so no impact on the archaeology is anticipated.

- Archaeological remains identified by geophysical survey in Area 2 and the eastern portion of Area 8 are in an area designated Public Open Space so minimal impact on the archaeology is anticipated.
- Geophysical anomalies of uncertain character were identified in Area 5 (north of the A422), and in Area 4 in the south-east corner. These may be archaeological, agricultural or natural in origin – the former in Area 5 would be likely to be affected while those in Area 4 are in areas designated as Public Open Space and so impacts are likely to be minimal.

6.19.6 The complete summation of likely direct impacts is presented below.

6.20 Indirect Impacts on Significance of Assets and Setting

6.20.1 The effect of development on the significance of the setting of heritage assets (including archaeological assets) is a material consideration in determining a planning application and the NPPF advises local planning authorities that they should require an applicant to provide a description of the significance of the archaeological assets affected and the contribution of their setting to that significance.

6.20.2 Setting is defined as the surroundings in which a heritage asset is experienced, and all heritage assets have a setting, irrespective of the form in which they survive and whether they are designated or not. Therefore, all the heritage assets identified during this assessment have settings and it is right and proper for this assessment to identify the key attributes of the heritage assets and their settings and the potential impact upon the these occasioned by proposed development within the site.

6.20.3 To identify these key attributes, it is necessary to consider the physical surroundings of the assets, including relationships with other heritage assets, including the way the assets are appreciated and the assets' associations and patterns of use.

6.20.4 A consideration of these attributes allows an estimation to be made of whether, how and to what degree setting contributes to the heritage assets. Development can affect the settings of heritage assets and the ability to understand, experience and appreciate them.

6.20.5 An assessment of the scope of the magnitude and effect of any impact on settings is part of the remit of this assessment and has been undertaken with reference to the Historic England document The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning: 3. It is noted that Historic England states that while heritage assets such as archaeological sites which consist solely of buried remains may not be readily understood by a casual observer, they nonetheless retain a presence in the landscape (in terms of their location, topographical position, and spatial relationship with other heritage

assets) and so, like all heritage assets, have a setting. While the form of survival of an asset may influence the contribution that its setting makes to its significance, it does not follow that the invisibility of the asset necessarily reduces that contribution. The value of a heritage asset can be harmed or lost through alteration within or destruction of its setting. Current policy states that the extent of a setting is not fixed and may change as the asset and its surroundings evolve. It is acknowledged that a setting may make a positive or negative contribution to the value of a heritage asset, it may affect the ability to appreciate that value or it may be neutral.

6.20.6 Setting is most commonly framed with reference to visual considerations and so lines of sight to or from a heritage asset across, though into and out of its setting will play an important part in considerations of setting. However, non-visual considerations also apply, such as spatial associations and an understanding of the historic relationship between places. To undertake an assessment of significance of the settings to a level of thoroughness proportionate to the relative importance of the assets, the settings of which may be affected by development on the site, this assessment has sought to describe the setting for each significant cultural heritage asset and provide a measure of the contribution that the setting plays in the value of the asset.

6.20.7 Many heritage assets within any given landscape may be visible from several locations – publicly accessible areas such as footpaths, streets and the open countryside and private spaces such as dwellings and private land. Many sightlines from, to, into and across heritage assets are, therefore, incidental and are not intrinsically or intimately associated with the significances assigned to any given heritage asset. However, there are instances where the characteristics of sightlines may have been intentionally designed and as part of the setting are integral to the significance.

6.20.8 As a result of the site visit and taking into account the considerations discussed above, it is concluded that due to the combination of distance and the screening effects of the intervening landform, built environment and natural environment the evidential, historic, aesthetic, communal, archaeological, and architectural values and setting of the one designated heritage asset which is situated outside of the Assessment Area, being the Grade II Listed Moulsoe Buildings Farmhouse, would not be harmed by the proposed development. It is further concluded that based on the separation of distance and the screening effect of the intervening landform, the proposed development would have no adverse effect on the settings of most of the heritage assets in the immediate or wider

vicinity. We return to this in more detail below in section 6.23.

6.20.9 The assessment of how the proposed development will potentially impact upon the setting of the identified heritage assets has been undertaken using the guidance detailed by Historic England. This recommends that the following factors are considered when assessing a development's impact:

- Location and Siting
- Form and Appearance
- Additional Effects
- Permanence

6.20.10 The overall objective of the assessment of setting is to provide a realistic assessment of any indirect effects with reference to cultural heritage assets and their settings and allow for an informed decision-making process. The broad approach adopted has followed the Historic England guidance and takes the form of a series of steps:

- Step 1: identify heritage assets and their settings
- Step 2: assessment of, whether how and to what degree these settings make a contribution to the significance of the heritage assets
- Step 3: assessment of the effects of the proposed development, whether beneficial or harmful, on that significance

6.20.11 In order to identify heritage assets and their settings an Assessment Area has been established comprising an area of land extending up to 1km from the deemed centre of the site. A 1km radius was chosen as it represents the furthest distance at which it was anticipated that a perceptible measure of magnitude of change to settings might bring about an adverse impact to the settings of heritage assets. Beyond that distance, it is considered that the general sweep and interest within any given sightline across the landscape would be such that any impact upon the setting of any heritage asset arising from development within the undulating topography and current built environment of the landscape would be sufficiently diluted so as to render the impact immaterial.

6.21 Criteria for Assessment of Significance of Heritage Assets

6.21.1 Heritage assets may be valued for several reasons: based on criteria such as rarity or degree of preservation and the Environmental Impact Assessment (EIA) process identifies this value as 'importance'. Some resources, not remarkable in terms of rarity or state of preservation terms, may nonetheless be considered to have value for a particular community, especially if they are accessible and contribute to local distinctiveness, identity or economy. For the purposes of this assessment, assets have been considered

principally regarding their value to the quality and understanding of Britain's history, as set out in national legislation priorities and frameworks. This is based upon extensive research and investigations and is summarised in Volume 1 of the HEDBA. Additionally, the international, regional, and local perspective of the site and its component assets has also been considered. In addition, the significance of heritage assets was considered using professional judgment and discrimination in the light of guidance and advice provided in the National Planning Policy Framework (NPPF,2019) and Planning Practice Guidance – Conserving and Enhancing the Historic Environment (PPG, 2019). Identified assets are characterised according to their intrinsic importance. A six-fold scale derived from the Design Manual for Roads and Bridges (Highways Agency, 2009, Design Manual for Roads and Bridges – Volume 11 – Environmental Assessment) has been utilised to characterise the value of identified assets, incorporating any relevant designations or best-practice, so that any identified sites can be gauged according to these and assigned a value level as defined in Table 6.1. This approach allows a robust consideration of multiple elements to determine significance and likewise level of impact and has been widely consulted upon and used in heritage impacts assessments over many years.

Significance / Importance	**Description**	**Value of Setting Attribute and Effect on Significance of Heritage Asset**
Very High: International	Archaeological sites or monuments or landscapes of international significance and listed on the World Heritage Site List, or other sites monuments or landscapes of comparable quality	Makes a major contribution to the significance of the heritage asset, for example because it is itself a significant heritage asset or because it is a very prominent feature of the setting. Substantial change to this attribute would almost certainly considerably reduce the significance of the setting as it relates to the asset and would not normally be reversible Detracts highly from the significance of the heritage asset and has no heritage value in its own right. This might be because it is a very prominent feature of the setting, involves large-scale activities or produces copious emissions. Removal or mitigation of the intrusion would almost certainly increase the significance of the setting in relation to the asset.
High: National Importance / Significance	Scheduled Monuments, Listed Buildings Grade I, archaeological sites or assets of comparable quality, Registered battlefields, Registered Parks and Gardens	
Medium: Regional/County	Conservation Areas and archaeological sites and remains which are not of national importance, historic landscapes of regional/county	Makes a moderate contribution to the significance of the heritage asset, for example, because it is itself a locally significant heritage asset or a notable feature of the setting. Substantial change to this attribute would almost certainly reduce the integrity of the asset's setting and to some degree reduce the significance of the setting as it relates to

Significance / Importance	Description	Value of Setting Attribute and Effect on Significance of Heritage Asset
	importance. Listed Buildings Grade II	the asset. Such changes may be temporary or reversible but might persist for a longer term. Detracts somewhat from the significance of the heritage asset but is not a very prominent feature of the setting and does not involve large-scale activities or emissions. The attribute itself may have some heritage value, thus offsetting its intrusiveness. Removal or mitigation of the intrusion would increase the significance of the setting in relation to the asset.
Low: Locally significant	Archaeological sites that are of local importance, historic buildings on Local Lists or of, historic landscapes of local importance	Makes a minor contribution to the significance of the asset, for example having no heritage value in itself or comprising a small element in the setting. Substantial change to this attribute might lead to a slight loss of its overall integrity or significance of the setting of the asset. The changes may be short term. Comprises a small intrusive element in the setting of the asset, or one that is itself a heritage asset. The intrusiveness may be limited to a short term. Removal of the attribute would not normally be justified but mitigation would be beneficial
Negligible: Not significant	Areas in which investigations have produced no or only minimal evidence for archaeological remains or where previous large-scale disturbance or removal of deposits can be demonstrated.	Makes no apparent contribution to the setting of the asset.
Unknown	Archaeological sites whose importance cannot be determined with the information currently at hand. This can include sites where the extent of buried remains is unknown.	

Table: 6.1 Factors for Assessing the Value of Heritage Assets

6.22 Criteria for Assessing the Magnitude of Development Impacts on Assets

6.22.1 A direct impact is a physical effect on an asset arising at the same time as and occurring because of physical changes to the asset. For example, groundworks associated with construction directly disturbing archaeological remains. With respect to assets the pathway of a direct impact usually leads to a predictable outcome – a greater or lesser

physical impact which is detrimental to the preservation and survival of a part or whole of an asset. However, the impact pathway is nevertheless significant because pathways lend themselves to varying approaches to mitigation such as elimination, prevention, control, compensation and offsetting (see below). With respect to assets impacts can also be indirect, in that the setting of an asset, within or beyond the boundaries of a proposed development can be affected by the proposed development. In addition, impacts are considered beneficial or adverse; reversible or irreversible; short, medium, or long term; and temporary or permanent.

6.22.2 For the purposes of assessing direct impacts to assets the pre-eminent characteristic of the impact is the scale to which the impact alters the asset. This can be gauged by cross-referencing the potential impact activities with each known asset. In addition, the type of impact is judged to arrive at a magnitude. The scale ranges from Negligible, through Minor and Moderate to Substantial and the type of impact can be beneficial or adverse. A matrix can be completed which provides a rating based upon the scale and type of impact and extent or components of the assets affected. The magnitude of impact to individual assets is a matter of professional judgment and is based on a five-fold scale (major, moderate, minor, negligible and no change) based on the Design Manual for Roads and Bridges (Highways Agency, 2009, Design Manual for Roads and Bridges – Volume 11 – Environmental Assessment). The range of impact magnitude is explained in Table 6.2.

Impact Magnitude	Description
Substantial Adverse	Substantial harm to a heritage asset's setting, such that the significance of the asset would be totally lost or substantially reduced (e.g. the significance of a designated heritage asset would be reduced to such a degree that its designation would be questionable or the significance of an undesignated heritage asset would be reduced to such a degree that its categorisation as a heritage asset would be questionable).
Substantial Beneficial	Comprehensive improvement to the asset through restoration or enhancement, causes major benefit to the asset that increases its integrity and significance. Such change would almost certainly increase the significance of the asset. Prevention of further degradation of the asset consistent with safeguarding its heritage significance. Increase accessibility and understanding of visible assets by removal of visibly intrusive element
Moderate Adverse	Partial loss or alteration of the significance of a heritage asset. Considerable harm to a heritage asset's setting, such that the asset's significance would be materially affected/considerably devalued, but not totally or substantially lost. This equates to less than substantial harm in the terms of the NPPF.

Moderate Beneficial	Improvement to asset condition/preservation through enhancement or protection. Either: causes long-term improvement of the asset, involving some increase in its integrity or significance. Or: reverses an existing process of adverse change. Reduce rate of current degradation. Improve setting. Enhance existing character
Minor Adverse	Some measurable depreciation to the attributes and quality of asset. Slight loss of the significance of a heritage asset. This could include the removal of fabric that forms part of the heritage asset, but that is not integral to its significance (e.g. the demolition of later extensions/additions of little intrinsic value). Some harm to the heritage asset's setting, but not to the degree that it would materially compromise the significance of the heritage asset. Perceivable level of harm, but insubstantial relative to the overall interest of the heritage asset. This equates to less than substantial harm in the terms of the NPPF, at the lower end of the scale.
Minor Beneficial	Some measurable improvement to the attributes and quality of asset. Either: delivers some improvement to the asset that does not increase its overall integrity or significance. Or: arrests an existing process of adverse change. Reintroduce accessibility to below- ground heritage asset.
Neutral	No loss or alteration of asset, no discernible impact either adverse or beneficial, or Very slight loss or detrimental alteration to asset or Very slight benefit to condition/preservation of asset
Source: Based on DMRB, Vol. 11 Environmental Assessment, Section 3, Part 2, HA 208/7, Cultural Heritage	

Table: 6.2 Factors in the Assessment of Magnitude of Impact to Archaeological Remains

6.22.3 The significance of the effect on assets is a combination of the importance of the assets and the magnitude of the impact prior to mitigation. The significance of the effect is expressed using a six-fold scale (Substantial, Moderate-Substantial, Moderate, Minor-Moderate, Minor and Neutral) again derived from on the Design Manual for Roads and Bridges. The required combination for identified remains has been undertaken with the aid of a matrix, as shown in Table 6.3, to assist professional judgements regarding importance and impact magnitude in order that a reasonable and balanced assessment of effect significance (either beneficial or adverse) can be reached. In summary, the significance of the effect assignment is based both on a matrix that assists judgements regarding the importance of the assets and the magnitude of the impact prior to mitigation, and professional judgement of post-mitigation outcomes.

6.22.4 Proposed development affecting a heritage asset may have no impact on its significance or may enhance its significance and therefore cause no harm. Paragraph 193 of the NPPF considers the impact of a proposed development on the significance of a designated heritage asset and notes two categories of harm – substantial and less than substantial. The PPG goes further and directs that it is no longer enough to simply identify the category of harm with further articulation about where the proposal sits within that category now

also required (Paragraph 018).

6.22.5 In response to the directive in paragraph 018 of the PPG, the impact of the proposed development on the significance of the two Conservation Areas (Exeter St David's and Exeter Central) and other designated heritage assets within the Assessment Area has been assessed by drawing on a methodology for environmental impact assessment to quantify the significance of effect of the proposed development.

6.22.6 The significance of the effect on assets is a combination of the importance of the assets and the magnitude of the impact. The required combination for identified heritage assets and their respective key features/elements has been undertaken with the aid of a matrix, as shown in Table 6.3 below, to assist professional judgements regarding importance and impact magnitude in order that a reasonable and balanced assessment of effect significance (either beneficial or adverse) can be reached. In summary, the significance of the residual effect assignment is based both on a matrix that assists judgements regarding the importance of the assets and the magnitude of the impact, and professional judgement.

6.22.7 The assessment of impacts using this (EIA) methodology is not exactly the same as an assessment of impacts under the NPPF. The terminology is different, and the policy assessment in NPPF is geared to harmful impacts whereas the EIA assessment is geared to a range of effects that may or may not lead to significant impacts. In both cases, however, it is the impact on the heritage significance of the asset, as the receptor, that is key. For the purposes of this assessment, it is necessary to have regard to the provisions of the NPPF. Paragraphs 194 and 195 of the NPPF make it very clear that substantial harm amounts to the total or near complete loss of significance of a designated heritage asset. The NPPF use of 'substantial harm' sets a high threshold for significance of effect, shown in the table below graphically as effects which are of Substantial effect shown in red emboldened text (Table 6.3 below).

6.22.8 The assessment of impacts and effects following the NPPF differs in criteria and terminology from those used by Historic England (formerly English Heritage) for assessing significance in the context of managing change and formalised in Conservation Principles, Policies and Guidance (2008). Notwithstanding the criteria and terminology differences, Conservation Principles also allows for system aided judgement through the incorporation of a values-based benchmark which helps to ensure a consistency of approach. The 'interests' expressed in Conservation Principles (archaeological, architectural, artistic and

historic) are referenced in NPPF and do not clearly relate to the assessment of significance from EIA practice, but are nonetheless discernible in Table 6.4 below.

IMPORTANCE OF ASSET		NPPF Classification: Less than Substantial Harm		NPPF Classification: Substantial Harm	
	Very High	Neutral	Moderate	Substantial	Substantial
	High	Neutral	Moderate	Substantial	Substantial
	Medium	Neutral	Minor-Moderate	Moderate-Substantial	Substantial
	Low	Neutral	Minor	Minor-Moderate	Moderate
	Negligible	Neutral	Minor	Minor	Minor-Moderate
	Unknown	Neutral	Neutral	Minor	Moderate
		Neutral	Minor	Moderate	Substantial
		MAGNITUDE OF IMPACT TO ASSET			
		Based on DMRB, Vol. 11 Environmental Assessment, Section 3, Part 2, HA 208/7, Cultural Heritage			

Table: 6.3 Effect Significance Matrix for Assets

6.22.9 Using the above methodology, the impact of the proposed development has been considered in the context of the legislative and planning policy related decisive issues. The decisive issues are the impacts upon the prevailing character and appearance of the conservation area and the special architectural, historic significance and setting of the listed heritage assets.

6.23 Assessment of Indirect Impacts to Heritage Assets in Wider Landscape

6.23.1 In order to identify heritage assets and their settings an Assessment Area was established comprising an area of land extending up to 1km from the deemed centre of the site. A 1km radius was chosen as it represents the furthest distance at which it was anticipated that a perceptible measure of magnitude of change to the settings of heritage assets might bring about an adverse impact on those settings. to the settings of heritage assets. Beyond that distance, it was considered that the general sweep and interest within any given sightline across the landscape would be such that any impact upon the setting of

any heritage asset arising from development within the undulating topography and existing natural and current built environment of the wider landscape would be sufficiently diluted so as to either have no impact or render any impact that arises as negligible. Additionally, and with reference to national planning policy (para 189, NPPF, 2019) and guidance (para 009, PPG, 2019; pps.1-2; 8-9;13, Historic England, 2017) proportionality, and the nature and scale of the development were also taken into consideration.

6.23.2 Following consultation with Historic England and the Senior Archaeological Officer for the Council, the remit of the assessment was extended to incorporate viewpoint analysis. This involved taking in views to and from the site from several locations outside of the 1km assessment area but within a 2km radius of the deemed centre. The locations were the Willen Conservation Area to the south of the site, the Grade II listed former Moulsoe Buildings Farmhouse (now forming part of a Holiday Inn hotel) to the southeast, and the town of Newport Pagnell to the north. These visual receptors were identified by Historic England and agreed with the Senior Archaeological Officer. It is understood that these locations were identified due to their designated status in respect of the conservation area and the former farmhouse, and for containing several heritage assets in respect of the town. There is no established or recognised inter-relationship either between these visual receptors or the site. They are separate and incidental elements within the wider landscape.

6.23.3 As with the impact assessment, the methodological approach to the analysis was a synthesis of established guidance, best practice, and professional judgement. Regard was given to the components of Landscape & Visual Impact Assessment (LVIA) (Landscape Institute and the Institute of Environmental Management and Assessment, 2013), specifically, the assessment of visual effects (or impact, of development) which comprises the assessment of effects on specific views and on the general visual amenity experienced by people (s2.21). To expand, visual impacts are the effects on people of the changes in available views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced. Views are related to consideration of the wider landscape (p.7, Historic England, 2017) of which the visual receptors form a part. A full LVIA for the heritage assets was not deemed necessary given the scale and nature of the development within its topographic context and our professional judgment on the limited nature and magnitude of impacts upon available views.

6.23.4 The locations of the viewpoints and directions of view are shown in Figure 6.51 below. The photographs which informed the viewpoint analysis (below) were taken on 17th December 2020 in dry and bright conditions.

6.23.5 Before considering the conclusions of the analysis, it is important to outline the nature and scale of the proposed development and detail its location, which are key factors in the analysis. The development will be residential and the buildings domestic in scale being of two-storeys in height. It is therefore considered that based on the combination of height and the screening effect of trees and vegetation to extensive sections of the immediate boundaries of the site, and more importantly, the site's situation within a triangle formed of a motorway (M1) and busy 'A' roads (A509 and A422), the development will not be prominent or intrusive in the wider landscape.

6.23.6 Reference is made above to specific and available views, with a particular emphasis on the latter which is also a key factor in this analysis. As evidenced by the photographs (Figures 6.52 – 6.66), there are no available views to or from the site to any of the visual receptors.

6.23.7 Willen Conservation Area is bounded to the north and north-east by significant and dense development formed of late twentieth century housing, and the M1. This permanent development and the separation of distance means that there is no inter-visibility between the Willen Conservation Area and the site.

6.23.8 The southern boundary of the historic settlement of Newport Pagnell has also experienced significant and dense mid-late twentieth century development. This, with some enclosed fields and the A422 dual carriageway comprises the intervening landform between the town and the site. Here, the separation of distance is a key contributary factor to the unavailability of views to and from the site.

6.23.9 The former Moulsoe Buildings Farmhouse now forms part of a Holiday Inn hotel. Consequently, its setting has undergone significant and irreparable change through conversion, the construction of a large car park attendant with the change of use and proximity to the busy A509 road. The former farmhouse is screened from the road by tall trees and vegetation. This has the effect of significantly reducing views to the road and to the landscape to the west, and therefore the site. Given the tree and vegetation cover obscuring the view from the front of the building, the photographs were taken from a grass verge toward the site which was not visible from that specific viewpoint given the built and

natural intervening landform.

6.23.10 The analysis has concluded that the proposed development will not constitute a visual intrusion in the wider landscape or impact on the general amenity of views to and from the visual receptors as a consequence of there being no uninterrupted views to or from the site. An assessment of potential impact on the settings of the visual receptors by reference to visual and/or experiential considerations has therefore not been undertaken as it is considered unnecessary and disproportionate.

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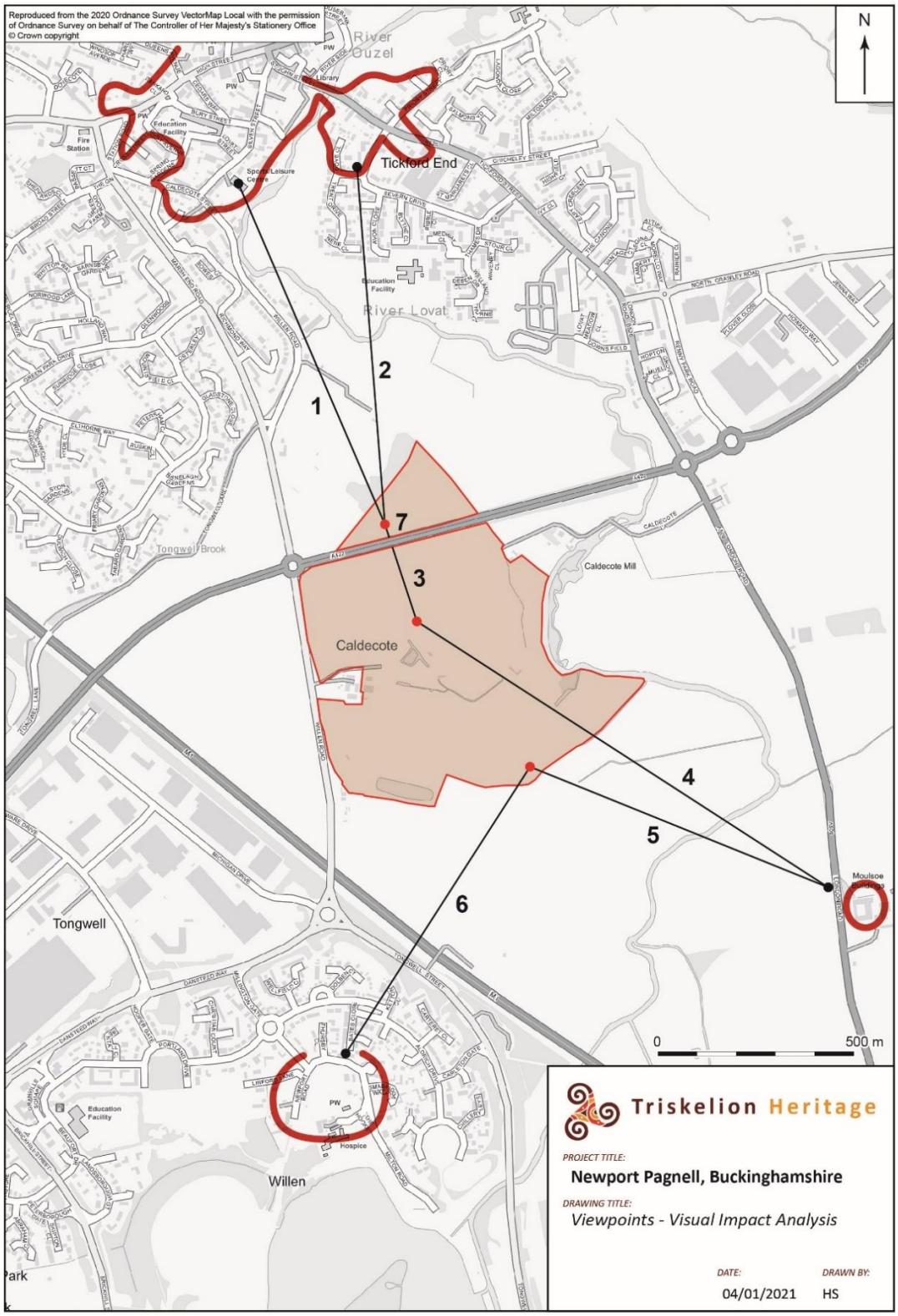

Figure 6.51: Locations of heritage assets / viewpoints and views illustrated in figures below.

Figure 6.52: Viewpoint 6; View from the Willen Conservation Area to the site, looking north-east

Figure 6.53: Viewpoint 6; View from the M1 to the site, looking north-east

Figure 6.54: Viewpoint 6; View from the site boundary to the M1 (and Willen Conservation Area), looking south-west

Figure 6.55: Viewpoint 5; View from the site boundary to the A509 (and the former Moulsoe Buildings Farmhouse), looking south-east

Figure 6.56: Viewpoint 3; View from the centre of the site to the A422 (and Newport Pagnell), looking north-west

Figure 6.57: Viewpoint 4; View from the centre of the site (and the former Moulsoe Buildings Farmhouse), looking south-east

Figure 6.58: Viewpoint 1; View from Newport Pagnell to the site, looking south-east

Figure 6.59: Viewpoint 2; View from Newport Pagnell to the site, looking south

Figure 6.60: Holiday Inn hotel – former Moulsoe Buildings Farmhouse

Figure 6.61: Holiday Inn hotel car park – former Moulsoe Buildings Farmhouse

Figure 6.62: Viewpoint 4; View from the access road of the Holiday Inn hotel to the A509 (and the site), looking north-west

Figure 6.63: Viewpoint 4; View from the access road of the Holiday Inn hotel to the A509 (and the site), looking north-west

Figure 6.64: Viewpoint 1; View from the north section of the site (and to Newport Pagnell), looking north-west

Figure 6.65: Viewpoint 2; View from the north section of the site (and to Newport Pagnell), looking north

Figure 6.66: Viewpoint 2; View from the north section of the site (and to Newport Pagnell), looking north

Triskelion Unique Identifier	Identifier	Status Significance	Asset Type	Grid Reference	Impact
13	MKHER ID: MMK982, 983, 984, 985, 986, 987, 988, 989, 990	Non-Designated Local significance	Find Spot Caldecote Farm, Early Neolithic through to Late Bronze Age, Early Iron Age to Roman - 800 BC to 409 AD	Grid Ref: SP 88120 42700 (point)	Moderate to substantial Impact on negligible significant asset = **minor-moderate adverse effects**
14	MKHER ID: MMK5920	Non-Designated Local significance	Monument Caldecote building circa 1815 (2). BUILDING (19th Century - 1801 AD to 1900 AD).	Grid Ref: SP 88038 42405 (point)	Moderate to substantial Impact on negligible significant asset = **minor-moderate adverse effects**
15	MKHER ID: MMK93	Non-Designated Local significance	Monument Caldecote Moat (1). MOAT (Medieval - 1066 AD to 1539 AD). (1) Small irregular shaped moat & part of deserted medieval village.	Grid Ref: SP 88010 42380 (point)	Moderate to substantial Impact on negligible significant asset = **minor-moderate adverse effects**
16	MKHER ID: MMK91	Non-Designated Local significance	Monument Caldecote, Newport Pagnell. DESERTED SETTLEMENT (Medieval - 1066 AD to 1539 AD).	Grid Ref: SP 88029 42288 (point)	Moderate to substantial Impact on negligible significant asset = **minor-moderate adverse effect**
17	MKHER ID: MMK5922	Non-Designated Local significance	Landscape Caldecote: Avenue of trees/ track	Grid Ref: SP 88203 42446 (point)	Moderate to substantial Impact on negligible significant asset = **minor-moderate adverse effects**
18	MKHER ID: MMK87	Non-Designated Local significance	Site Caldecote, Newport Pagnell. DESERTED SETTLEMENT (Medieval - 1066 AD to 1539 AD). Site of a medieval hamlet	Grid Ref: SP 88170 42290 (point)	Moderate to substantial Impact on negligible significant asset = **minor-moderate adverse effects**
19	MKHER ID: MMK5921	Non-Designated Local significance	Monument Caldecotte buildings circa 1815 (3). BUILDING (Undated). Building shown on 1815 2" = 1 mile OS map	Grid Ref: SP 88194 42303 (point)	Moderate to substantial Impact on negligible significant asset = **minor-moderate adverse effects**
20	MKHER ID: MMK7665	Non-Designated Local significance	Monument Caldecote manorial site - NW pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD);	Grid Ref: SP 88294 42379 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
21	MKHER ID: MMK90	Non-Designated Local significance	Place Caldecote, Newport Pagnell. MANOR (Medieval - 1066 AD to 1539 AD); MANOR (18th Century - 1701 AD to 1800 AD).	Grid Ref: SP 88332 42322 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**

22	MKHER ID: MMK5919	Non-Designated Local significance	Monument Caldecote building circa 1815 (1). BUILDING (19th Century - 1801 AD to 1900 AD).	Grid Ref: SP 88310 42331 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
23	MKHER ID: MMK7662	Non-Designated Local significance	Monument Caldecote manorial site - SW Pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD).	Grid Ref: SP 88348 42281 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
24	MKHER ID: MMK7664	Non-Designated Local significance	Monument Caldecote manorial site - internal pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD).	Grid Ref: SP 88327 42355 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
25	MKHER ID: MMK92	Non-Designated Local significance	Monument Caldecote, Newport Pagnell. MANOR (Medieval - 1066 AD to 1539 AD).	Grid Ref: SP 88335 42340 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
26	MKHER ID: MMK5918	Non-Designated Local significance	Monument Caldecote Manorial Site. COUNTRY HOUSE (16th Century to 17th Century - 1501 AD to 1700 AD); COUNTRY HOUSE (17th Century to 18th Century - 1601 AD to 1800 AD).	Grid Ref: SP 88351 42328 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
27	MKHER ID: MMK7663	Non-Designated Local significance	Monument Caldecote manorial site - NE Pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD).	Grid Ref: SP 88353 42365 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
28	MKHER ID: MMK88 - 89	Non-Designated Local significance	Find Spot Caldecote, Newport Pagnell. FINDSPOT (Medieval - 1066 AD to 1539 AD). Dredged material from river FINDSPOT (Iron Age - 800 BC to 42 AD).	Grid Ref: SP 88420 42330 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
29	MKHER ID: MMK7661	Non-Designated Local significance	Monument Caldecote manorial site - SE Pond. POND	Grid Ref: SP 88402 42276 (point)	Minor Impact on locally significant (negligible to low) asset = **minor adverse effects**
30	MKHER ID: MMK3423	Non-Designated Local significance	Monument 400 m. SE of Caldecote Farm. MOAT (Medieval - 1066 AD to 1539 AD). Possible moated site visible on aerial photograph	Grid Ref: SP 88220 42075 (point)	Substantial Impact on locally significant (negligible to low) asset = **minor-moderate adverse effects**

42	MKHER ID: MMK7674	Non-Designated Local significance	Place Caldecotte Green. VILLAGE GREEN (18th Century to 20th Century - 1701 AD to 2000 AD). Maps from 1760 onwards show a triangular area with ponds and several buildings on the east and west sides in the C18th century	Grid Ref: SP 88029 42287 (point)	Substantial Impact on locally significant (negligible to low) asset = **minor-moderate adverse effects**
Un-numbered	Un-numbered	Non-designated Local significance	Geophysical anomalies Area 2		Minor Impact on locally (low) significant asset = minor adverse effects
Un-numbered	Un-numbered	Non-designated Local significance	Geophysical anomalies Area 4		Minor Impact on locally (low) significant asset = minor adverse effects
Un-numbered	Un-numbered	Non-designated Local significance	Geophysical anomalies Area 5		Substantial Impact on locally significant (negligible to low) asset = **minor-moderate adverse effects**
Un-numbered	Un-numbered	Non-designated Local significance	Geophysical anomalies Area 6		Substantial Impact on locally significant (negligible to low) asset = **minor-moderate adverse effects**
Un-numbered	Un-numbered	Non-designated Local significance	Geophysical anomalies Area 8		Substantial Impact on locally significant (negligible to low) asset = **minor-moderate adverse effects**
Newport Pagnell Conservation Area	Un-numbered	Medium: Regional/County	Conservation Area		Neutral impact upon a medium important asset = Neutral effect
Willen Conservation Area	Un-numbered	Medium: Regional/County	Conservation Area		Neutral impact upon a medium important asset = Neutral effect
Mulsoe Buildings Farmhouse on London Road	Un-numbered	Medium: Regional/County	Listed Building Grade II		Neutral impact upon a medium important asset = Neutral effect

Table: 6.4 Tabulated sites with significance and magnitude of probable impacts

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6.24 Conclusions

6.24.1 The proposed development on the site takes the form of a residential development, and associated infrastructure and landscaping. This includes areas of Public Open Space which for master planning purposes, as well as archaeological sensitivity, were designated as Public Open Space prior to the completion of this ES / HEDBA.

6.24.2 There are no registered World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens, Registered Battlefields, Conservation Areas or Listed Buildings wholly or partly within the site. Therefore, this assessment confirms that the site does not contain any designated heritage assets for which there would be a presumption in favour of preservation in situ and against development. There are several non-designated heritage assets within the site with the potential to contribute to an increased understanding of settlement and agricultural activity of the Prehistoric, Roman, Saxon and Early-Medieval periods at the local level.

6.24.3 This assessment enables an informed, sustainable, and responsible approach to the promotion of development of the site. The information provided meets the expectations of NPPF and local planning policy in that the applicant has described the significance of heritage assets that may be affected by the proposed development and has also assessed any contribution made by the settings of the identified heritage assets. It is considered that the level of detail provided is proportionate to the assets' importance and is sufficient to allow the local planning authority to understand the potential impact of the proposal on the significance of the assets. The proposed development could lead to harm to some of the non-designated heritage assets identified within the red-line boundary by means of direct, irreversible and permanent adverse impact. These assets were judged to be of relatively low significance and extensive investigation by means of earthwork survey, geophysical survey, geoarchaeological studies and a 'trial trench' archaeological evaluation did not reveal evidence to revise this assessment of significance. However, mitigation in the form targeted archaeological excavation prior to construction may be an appropriate response allowing a record of the remains to be made.

6.24.4 The proposed development would have no adverse indirect effect on or harm the significance of any other non-designated or designated heritage asset. With respect to the cultural heritage of the built environment the Planning (Conservation Areas and Listed Buildings) Act 1990 does not apply as no harm has been identified to the significance of a Listed Building arising from development within its setting. In determining the

application, the Council's duty to have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses is disengaged.

6.24.5 With respect to national policy considerations relevant to non-designated heritage assets, the Council is directed to make "*a balanced judgement . . . . having regard to the scale of any harm or loss and the significance of the heritage asset*". The scale of harm/loss to a known heritage asset is substantial and an ordinary (unweighted) balancing of the harm or loss against the significance of the asset is required. However, the Council is not obliged to refuse consent in the light of such harms. Rather it must make a balanced judgement with respect to the non-designated heritage asset. The relevant guidance in these matters (The Chartered Institute for Archaeologists (2014)) notes that while recommendations on further archaeological/heritage work may be justified, in most circumstances within the planning framework the provision or recommendations to the local planning authority will be the responsibility of the relevant planning archaeologist. This document does not wish to prejudge the opinion of the Archaeological Officer at Milton Keynes Council, but it is considered appropriate and helpful to offer options for reducing or mitigating harm, should planning permission be granted.

6.24.6 The extent of the requirement should be proportionate to the nature and level of the assets' significance and this has been considered in the proposals above. The intent of the condition would be to mitigate any harm to heritage assets and require the applicant, or the successor(s) in title, to record and advance understanding of the significance of any heritage assets to be affected (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. Targeted archaeological investigation would allow the extent and nature of the remains to be understood in more detail and could be used to inform the design and implementation of an archaeological excavation and this is considered the most appropriate form and process for such mitigation. This advice is in line with the relevant provisions in the NPPF, and current local planning policy.

6.24.7 This Environmental Impact Assessment enables an informed, sustainable, and responsible approach to the promotion of redevelopment of land east of Willen Road, Newport Pagnell. It is concluded that there are no axiomatic reasons arising from historic environment considerations to refuse planning permission.

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6.25 Sources

General

6.25.1 Milton Keynes Historic Environment Record (MKHER)

6.25.2 Centre for Buckinghamshire Studies

6.26 Published Works

Beresford, M.W (1951) *The Lost Villages of Medieval England.* The Geographical Journal. Vol. 117, No. 2 (Jun 1951). The Royal Geographical Society (with the Institute of British Geographers)

British History Online 'Parishes: Newport Pagnell', in A History of the County of Buckingham: Volume 4, ed. William Page (London, 1927), pp. 409-422. British History Online http://www.british-history.ac.uk/vch/bucks/vol4/pp409-422

Buckinghamshire County Council (2006) Buckinghamshire & Milton Keynes Historic Landscape Characterisation. County Archaeological Service

Campbell, J (2012) Understanding the relationship between manor house and settlement in medieval England. Ruralia VIX, 2013

Cotswold Archaeology (2021) Land East of Willen Road, Newport Pagnell, Milton Keynes. Archaeological Earthwork Survey.

Croft R A & D Mynard (1993) *The Changing Landscape of Milton Keynes.* Buckinghamshire Archaeological Society.

Department for Communities and Local Government (2014) *Planning Practice Guidance. Conserving and enhancing the historic environment.* London: Department for Communities and Local Government

Foster, J (2013) The archaeological investigation into deserted medieval villages of eastern Yorkshire. Issue 3, The Posthole. University of York

Hey G and J Hind, eds. (2014) Solent – Thames Research Framework for the Historic Environment: Resource Assessments and Research Agendas

Historic England (2018) Medieval Settlements. Introductions to Heritage Assets.

Historic England (2017) Heritage Assets: Historic Environment Good Practice Advice in Planning: 3

HMSO (1979) Ancient Monuments and Archaeological Areas Act. London: HMSO

International Council on Monuments and Sites (ICOMOS) (2010) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties

Landscape Institute and the Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment*. Third Edition.

Milton Keynes Council & Gillespies (2016) *Milton Keynes Landscape Character Assessment*. London: Gillespies

Milton Keynes Council & Gillespies (2016) *Milton Keynes Landscape Character Assessment: Figures.* London: Gillespies

Ministry of Housing, Communities and Local Government (2021) *National Planning Policy Framework*. London: Ministry of Housing, Communities and Local Government

Rippon, S and B. Morton (2020) *Review of Medieval Settlement Research 2007 – 16.* Medieval Settlement Research 35, 1 -13. The Journal of the Medieval Settlement Research Group.

Taylor-Moore, K with contributions by C Dyer (2014) Solent Thames Historic Environment Research Framework. Resource Assessment. Medieval Buckinghamshire (AD 1066 – 1540). Oxford Wessex Archaeology

The Chartered Institute for Archaeologists (2014, updated 2017) *Standard and Guidance for Historic Environment Desk-Based Assessment*. Reading: The Chartered Institute for Archaeologists

The Highways Agency (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 2 HA 208/ 07 Cultural Heritage

6.27 Unpublished Works

Archaeological Services & Consultancy Ltd (2010) Desk-Based Assessment: Land South of Caldecote Farm, Willen Road, Milton Keynes.

Giggins, B (2006) Report on the SMV & Manorial Site at Caldecote, Newport Pagnell, Milton Keynes

6.28 Web-Based Sources

http://mapapps.bgs.ac.uk/geologyofbritain/home.html

Beresford's Lost Villages (University of Hull) - www.dmv.hull.ac.uk

Open Domesday - www.opendomesday.org

Victoria County History - www.victoriacountyhistory.ac.uk/explore/

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7.0 BIODIVERSITY/ECOLOGY

7.1 Introduction

The Proposed Project

7.1.1 A detailed description of the proposed project is provided in Chapter 2 (Introduction).

7.1.2 This Chapter appraises the likely effects of the Proposed Project in respect of terrestrial ecology. It considers the effects on ecological features during the construction, operational and decommissioning stages.

7.1.3 The Chapter also identifies proposed mitigation measures to prevent, minimise or control likely negative (i.e., adverse) effects on the ecology of the site and surrounding area arising from the Proposed Project.

7.1.4 This Chapter should be read together with the introductory chapters of this Environmental Appraisal (Chapters 1 – 5). This ecological appraisal has been informed by data from other technical chapters including Chapter 8 (Landscape) and Chapter 10 (Air quality, noise and vibration).

7.1.5 This chapter is supported by the following Appendices:

- Appendix 7.1 – Extended Phase 1 Survey Report
- Appendix 7.2 – Phase 2 Ecological Survey Reports
- Appendix 7.3 – Biodiversity Net Gain Calculation- using the DEFRA metric.

7.2 Scope and Methodology

Study Area

7.2.1 The appraisal of ecological affects from the project has been based on the site boundary (Figure 7.1), with effects on the surrounding area considered where appropriate (e.g., lighting and noise impacts beyond the site boundary).

7.2.2 Desk study data was requested within 2 km of the site boundary.

7.2.3 Ecological surveys were carried out within the Ecological Survey Area (Appendix 7.1 – Figure 1).

Appraisal Methodology

7.2.4 The ecological appraisal involved the following key stages:

- Identifying potential effects that could arise from the whole lifespan of the project.
- A background data search to obtain archival records of sites and species.
- Identifying ecological features (e.g., habitats, species, ecosystems and their functions/processes, previously known as ecological receptors) through field surveys and the background data search.
- Considering the ecological value of the ecological features leading to identification of important ecological features.
- Identifying potential impacts and assessment of effects on the integrity or conservation status of the ecological features.
- Identifying cumulative impacts; and
- Incorporating ecological mitigation measures to avoid or reduce effects, and compensation measures to balance any unavoidable effects, and enhancement to provide net benefits for biodiversity over and above requirements for avoidance, mitigation and compensation.

Desk Study

7.2.5 A desk study was carried out to identify designated sites within 10km from the site boundary; and 1km to identify any records of protected and notable species potentially relevant to the proposed project. Only records from within the last 10 years are regarded as reliable and therefore included within this appraisal.

7.2.6 The desk study was carried out using data from the following sources:

- Buckinghamshire and Milton Keynes Environmental Records Centre received October 2018; and,
- Multi-Agency Geographic Information for the Countryside (MAGIC) website (http://magic.defra.gov.uk).

7.2.7 The MAGIC website was consulted to determine whether any statutory designated sites are present within or near to the site. This website includes information on European designations, Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and the internationally designated Wetland of International Importance, i.e., Ramsar sites, nationally designated Sites of Special Scientific Interest (SSSIs), and Ancient Woodland.

7.2.8 In addition, available online aerial photography was examined to understand the wider habitat context. The habitat connections between the designated sites and other areas were also assessed from aerial photography, in conjunction with available maps and site designations. In addition to physical connections such as linear woodland, hedges and watercourses, an appraisal was made of the potential of habitat within the survey area to support local populations of protected and notable species occurring in the surrounding area. Particular attention was given to protected and notable habitats and species included under Schedules 1, 5, 8 and 9 of the Wildlife and Countryside Act 1981 (as

amended); Schedules 2 and 4 of The Conservation of Habitat & Species Regulations 2017 (as amended); and Species and Habitats of Principal Importance in England, listed under the National Environment and Rural Communities Act 2006.

Extended Phase 1 Habitat Survey

7.2.9 A Preliminary Ecological Appraisal survey was undertaken following the Phase 1 Habitat Survey methodology (JNCC, 2010) as extended for Ecological Impact Assessment in Guidelines for Baseline Ecological Assessment (Institute of Environmental Assessment, 1995). This involved a survey undertaken on the 24 October 2018, recording and mapping habitat types and other ecological features. The methodologies used and results of these surveys are presented in Appendix 7.1, with a summary presented under section 7.5 baseline conditions. The surveys were undertaken by RSK Environment ecologists. Habitats within the boundary were classified according to the standard Phase 1 Habitat Survey methodology (JNCC 2010).

7.2.10 Results from subsequent detailed protected species surveys are presented in Appendix 7.2.

7.2.11 If found, a note was made of visible instances of invasive non-native plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Reporting of the Environmental Effect and Significance Criteria

7.2.12 The assessment of likely significant environmental effects as a result of the proposed scheme has taken into account the construction and operational phases.

7.2.13 The duration of the effect has been assessed as either ‘short-term’, ‘medium-term’ or ‘long-term’. Short-term is considered to be up to 1 year, medium-term is considered to be between 1 - 10 years and long-term is considered to be greater than 10 years.

7.2.14 Determining Sensitivity of Receptor

7.2.15 The sensitivity of affected receptors has been considered on a scale of high, medium, low or negligible.

Determining the Magnitude of Change

7.2.16 The magnitude of change has been considered as the change experienced from the baseline conditions at the sensitive receptor and has been considered on a scale of large, medium, small or negligible.

Determining the Level of Effect

7.2.17 The level of effect attributed to each effect has been assessed based on the magnitude of change due to the proposed scheme and then sensitivity of the affected receptor, as well as a number of other factors that are outlined in more detail in Chapter 2: Introduction.

7.2.18 In addition, in line with the CIEEM (2018) guidelines, the importance of an ecological feature, as determined with reference to legal, policy and/or nature conservation considerations, has been assessed within the following geographical context (see Table 7.1 for example criteria):

- International.
- National (i.e., England).
- Regional (i.e., South East England).
- County (i.e., Buckinghamshire).
- District (i.e., Milton Keynes); and
- Local (the site plus a 1km radius).

7.2.19 Where the value is considered less than this it is considered 'negligible'.

Value/Sensitivity of Resource/Receptor	Example Criteria
Very High (International)	An internationally designated site or candidate/proposed site (Special Protection Area (SPA), potential SPA, Special Area of Conservation (SAC), candidate SAC and/or Ramsar site). A sustainable area of a habitat listed in Annex I of the Habitats Directive or smaller areas of such habitat which are essential to maintain the viability of the larger whole. Sustainable population of an internationally important species or site supporting such a species (or supplying a critical element of their habitat requirement) i.e.: - IUCN Red List species that is listed as critically endangered, endangered or vulnerable; or - Species listed in Annex IV of the Habitats Directive; or - Sites that support 1% or more of a biogeographic population of a species.

Value/Sensitivity of Resource/Receptor	Example Criteria
High (National)	A nationally designated site (Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR)) or a discrete area which meets the selection criteria for national designation (e.g. SSSI selection criteria). An area formally selected by Defra as a Nature Improvement Area. A sustainable area of a priority habitat identified in the UK BAP or of smaller areas of such habitat, which are essential to maintain the viability of the whole. Sustainable population of a nationally important species or site supporting such a species (or supplying a critical element of their habitat requirement) i.e.: - Species listed on Schedules 5 and 8 of the WCA (1981). - UK Red Data Book species. - Other species listed as occurring in 15 or fewer 10 km squares in the UK: or - Sites supporting 1% or more of a national population.
Medium – High (Regional)	Sites/populations which exceed the County-level designations but fall short of SSSI selection guidelines, including the following: - Sustainable areas of key habitat identified in the Regional BAP or smaller areas of such habitat, which are essential to maintain the viability of the whole. - Population of a species listed as being nationally scarce which occurs in 16-100 10 km squares in the UK. - Population of a species listed in a Regional BAP or relevant Natural Area on account of its regional rarity or localisation; or - Sites supporting 1% or more of a regional population.
Medium (County)	Some designated sites (including Sites of Importance for Nature Conservation, County Wildlife Sites, Sites of Metropolitan Importance). A viable area of habitat identified in the County BAP. Sustainable populations of the following species: - Species listed in a County/Metropolitan 'red data book' or BAP on account of its rarity/localisation in a county context; or, - Sites supporting 1% or more of a county population.
Local	- Very low importance and rarity, local scale: - Areas of habitat considered to appreciably enrich the habitat resource within the ecological study area itself. - A small population of a species of conservation concern i.e., listed in the Local BAP.

Table: 7.1 Resource/Receptor Evaluation

7.2.20 Following the classification of an effect, a clear statement is made as to whether the effect

is “significant” or “not significant”. Under the CIEEM 2018 guidelines the significance of effect on the ecological features has been determined based on the analysis of the factors that characterise the impact. A significant effect is defined as “an effect that either supports or undermines biodiversity conservation objectives for the ecological feature or for biodiversity in general”.

7.2.21 Using CIEEM guidelines and approach, significant effects are identified with regard to an appropriate geographical scale, using the following terms:

- significant at the international level.
- significant at the national level.
- significant at the regional level.
- significant at the county level.
- significant at the local level; and
- not significant.

7.2.22 To allow a consistent approach across all disciplines, the standard levels of significance defined in the 2018 CIEEM guidelines are set out in Table 7.2 alongside the equivalent definitions of effect used elsewhere in this ES, for example a Significant effect at the international level under the CIEEM guidance would equate to a Major significant effect using the standard EIA assessment methodology. As a deviation from the standard EIA methodology, minor effects identified within this chapter have been classified as negligible to ensure that as per the CIEEM guidelines require a clear statement is made as to whether the effect is “significant” or “not significant”.

Significance following the CIEEM guidelines	Equivalent effect categories and significance definitions following the standard EIA methodology followed elsewhere in this ES
Significant at the international level	Major
Significant at the national level	Major
Significant at the regional level	Moderate
Significant at the county or district level	Moderate
Significant at the local level	Minor
Not significant	Negligible

Table: 7.2 Summary and comparison of EIA and CIEEM based measures of significance of ecological effects

Nature of Impacts

7.2.23 Once the ecological receptors (designated site, habitat, assemblage or species) have been identified and their value defined, a judgment is made as to whether the proposed project is likely to result in impacts upon each of the identified receptors and, if appropriate,

the nature of those impacts.

Interactive Effects

7.2.24 This environmental appraisal considers the interaction of effects with other disciplines, such as landscape, air quality, noise and vibration.

7.3 Consultation Undertaken

7.3.1 Table 7.3 provides an overview of the consultation that has been undertaken to inform the proposed scheme and EIA, including the consideration of likely significant effects and the methodology for assessment.

Date	Form of consultation	Contact and Body / Organisation	Summary	Response to Comments
14.10.2020	EIA Scoping Opinion response letter	Elizabeth Verdegem, Milton Keynes Council	MKC highlighted that phase 2 ecology surveys will be required and that without this information it would not be possible to provide further advise. The strategy must demonstrate a biodiversity offsetting approach to show a net gain using the appropriate biodiversity impact assessment metric and follow the mitigation hierarchy, as outlined in the NPPF paragraph 170 and Policy NE3 of Plan: MK. The development would need to protect ecology and biodiversity; it was recommended that consideration should be given to any advice provided by Natural England in their consultation response.	Phase 2 surveys undertaken, and results outlined in this ES Chapter. A biodiversity net gain calculation has been undertaken with the results presented as part of this ES. Consideration given to the protection of ecology and biodiversity.
02.12.2020	Briefing note letter based on ES Scoping response from MKC	Ellen Satchwell, DLP Planning	The ES should inform any significant effects on ecology and the natural environment and, detail appropriate mitigation strategies as an integral part of the master planning process, including an overall green infrastructure strategy. The ecologists will need to confirm phase 2 ecology surveys work and have further engagement with the LPA as part of the pre-app to confirm the extent of the survey work. The LPA suggests that there are amber and red risk zones for great crested newt (GCN). The only ponds near to the site are in the quarry and no access was granted. It has been suggested that the project make use of the GCN District Level Licensing Scheme to minimise survey work and survey constraints. Biodiversity Gains needs to be demonstrated.	Significant effects and appropriate mitigation outlined within this ES chapter. Phase 2 surveys undertaken, and results outlined in this ES Chapter. Local District licensing scheme will be used to mitigate any potential impacts on GCN. A biodiversity net gain calculation has been undertaken with the results presented as part of this ES.

Table: 7.3 Summary of Consultation

7.4 Relevant Legislation, Policy and Guidance

Legislative Framework

7.4.1 The following legislation relevant to the proposed project comprises:

- The Conservation of Habitats and Species Regulations 2017 (as amended).
- the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1979).
- EC Wild Birds Directive 1979 (European Directive 79/409/EEC on the conservation of wild birds).
- Wildlife and Countryside Act 1981 (as amended).
- Natural Environment and Rural Communities Act (2006).
- Countryside and Rights of Way Act 2000.
- Hedgerows Regulations 1997.
- Environment Act 2016.
- Protection of Badgers Act 1992.

Planning Policy

7.4.2 Relevant planning policy at the national and local level includes:

- National Planning Policy Framework (NPPF).
- The Milton Keynes Plan: MK 2013 – 2031.
- The Newport Pagnell Neighbourhood Plan.
- Milton Keynes Council – Biodiversity Supplementary Planning Guidance June 2021
- Milton Keynes East SPD

Non-statutory Policies

7.4.3 Section 40 of the NERC Act places a legal duty on every public authority to have regard to the purpose of conserving biodiversity. As such, local biodiversity projects and partnerships have been set up to manage local lists of Priority Habitats and Species and implement BAPs for each. In Buckinghamshire, the Biodiversity Group of the Buckinghamshire and Milton Keynes Natural Environment Partnership (NEP) have set out targets for creation and restoration of 14 habitats. Those relevant to the project are hedgerows, and lowland meadows.

7.4.4 Local wildlife sites (or county wildlife sites or sites of importance for nature conservation) are sites of local conservation interest designated by the local planning authority.

Guidance

7.4.5 The guidance used during the preparation of this Chapter is summarised as follows:

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, September 2018 (Ref.

10.3); and
- BS42020:2013 Biodiversity – Code of practice for planning and development (Ref. 10.4).

7.5 Baseline Conditions

7.5.1 The following description of the baseline conditions is based upon a review of Figure 7.1 as well as the detailed preliminary ecological appraisal (PEA) (Appendix 7.1), which includes an Extended Phase 1 Habitat Survey and desk study data, including biological records, online data sources and aerial photography. Results of Phase 2 surveys carried out in 2019 are also presented (as detailed in Appendix 7.2). The Extended Phase 1 Habitat Survey map is presented in Figure 7.2.

Designated Sites

7.5.2 Information from the MAGIC website and, Buckinghamshire and Milton Keynes Environmental Record Centre identified a number of statutory and non-statutory designated sites within or in close proximity to the Site Boundary. Internationally and nationally designated sites identified within 10km are described below. The location of statutory designated sites is shown in Figure 7.3

7.5.3 There are no designated sites of international importance within the site boundary or within the desk study area (10km).

7.5.4 There are no designated sites of national importance which partially lie within or immediately adjacent to the site boundary.

7.5.5 There are four designated sites within the wider desk study area which are of national importance:

Site	Interest features
Marston Thrift SSSI is *c.*8.4 km southeast of the site.	It is characteristic of ancient, semi-natural woodland, including ash and maple woodland. Damp grassland communities are supported by the rides. The site is important for butterflies including locally uncommon species, such as purple hairstreak *Quercusia quercus*.
Howe Park Wood SSSI is *c.*8.7 km from the site	It is an ancient semi-natural woodland dating back to the 13th and 11th century. There are a range of soils and drainage with a history of low intensity management. The wood is known to support a rich diversity of moth with over 300 species

Site	Interest features
Oxley Mead SSSI is *c*.9.2 km from the site	It is an ancient meadow with a nationally rare grassland type, typically confined to major southern and central English river valleys.
Wavendon Heath Ponds SSSI is *c*.9.3 km from the site	Wavendon Heath Ponds comprises three ponds with acidic mire that supports uncommon plant communities through eastern England; there are two meadows of unimproved and semi-improved acid grassland traversed by a small stream; and an area of damp birch woodland.

Table: 7.4 Designated Sites Within 10km of the Site Boundary

7.5.6 There are seven non-statutory designated sites, with one of these extending c.45 m into the site boundary and a further six located within 1km. Two of the sites are local wildlife sites (LWSs), one biological notification site (BNS) and four Milton Keynes wildlife corridor sites (MKWCs). The corridors have been identified along major road, rail, woodland and waterway corridors that run through the Milton Keynes area. MKWCs have status equivalent to LWSs in the Milton Keynes Local Plan. The sites are considered of local importance for nature conservation. The following designated sites are located within 1km of the search area and listed in order of their distance from the site boundary:

- River Ouzel Wet Corridor MKWC (partially within the site boundary).
- M1 Road Corridor MKWC (c.40 m).
- Tongwell Lake LWS (c.150 m).
- Broughton Brook Wet Corridor MKWC (c.570 m).
- Willen Lake LWS (c.840 m).
- Bridge South of Newport Pagnell BNS (c.920 m).
- Railway Walk Rail Corridor MKWC (c.950 m).

7.5.7 Buckinghamshire also defines Biodiversity Opportunity Areas (BOA) to deliver biodiversity targets at a landscape scale. The site is within the Ouzel Valley Local BOA. Important habitats include eutrophic standing water, fen, hedgerows, lowland meadows, ponds, reedbeds, rivers and streams.

Extended Phase 1 Habitat Survey

7.5.8 The following habitat types were recorded during the Extended Phase 1 Habitat Survey carried out in 2018 by RSK Environment Ltd:

- scattered broadleaved trees.
- dense scrub.
- arable.
- improved grassland.
- semi-improved grassland.
- tall ruderals.
- standing water.

- running water.
- hedgerow; and,
- dry ditch.

7.5.9 Detailed habitat descriptions and a map of their distribution are provided in Appendix 7.1.

7.5.10 There is Impatiens glandulifera (Himalayan balsam) growing along the eastern boundary of Area 3, along the banks of the River Ouzel. This plant species is an invasive non-native species (INNS) and is listed on Schedule 9 of the Wildlife and Countryside Act (1981). It is an offence to cause it to spread int the wild.

Phase 2 Surveys

7.5.11 The following Phase 2 surveys were carried out at the site in 2019 by RSK Environment Ltd; the full methodologies, results and assessments are provided in Appendix 7.2. The results are summarised below.

7.5.12 Note a walkover survey was conducted in July 2021 confirming that there have been no material changes to the habitat types present and therefore the survey work described below is considered a robust baseline against which to assess the potential for significant effects.

Phase 2 Vegetation NVC Survey

7.5.13 An updated survey undertaken in May 2019 identified two traditional ridge-and-furrow fields which were suspected to be semi-improved grassland due to the presence of herb-rich areas. A National Vegetation Classification (NVC) survey was undertaken in June 2019 to provide information on the ecological value of the fields.

7.5.14 Field one could not be surveyed using the NVC survey method due to recent topping at the time of the survey however, it appeared to be similar to field two during the survey in May 2019.

7.5.15 Field two most closely matches MG5b Cynosurus cristatus - Centaurea nigra grassland, Galium verum sub-community which is typical of ridge-and-furrow and classifies as the priority habitat ‘lowland meadow’. Field one is assumed to have a similar composition. This grassland is typical of ancient hay meadows, which are long established.

Hedgerow Survey

7.5.16 Hedgerows within the ecological survey area were surveyed in June 2019 to identify any hedgerows categorised as ‘important’ under the Hedgerows Regulations Act 1997. Most

of the hedges on the site are species poor with a ground flora largely dominated by Common Nettle and false oat grass. Two hedgerows within the ecological survey area were categorised as important under the Hedgerows Regulations.

Breeding Bird Surveys

7.5.17 The site contains lowland meadow habitats which are particularly important for ground nesting farmland birds. The majority of breeding activity was focused on the hedgerows and River Ouzel corridor. The site supports an assemblage of birds typical of the area and habitat. Surveys completed in April and June 2019 identified a total of 46 species of which 32 species were confirmed as breeding, or possibly breeding.

7.5.18 Barn Owls were confirmed to be nesting in a mature oak tree to the south of Area 3. They are protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)

7.5.19 The River Ouzel was identified as having habitat suitable for kingfisher and they have been recorded within 1km of the area through background data searches. Surveys were undertaken in June 2019. No nests or evidence of foraging was found on the site and no individuals were observed using the river corridor.

7.5.20 Twelve Birds of Conservation Concern (BoCC) on the red or amber list were recoded; including the following, red-listed species: Willow Tit (not thought to be breeding), Skylark, Starling, Song Thrush, House Sparrow, Linnet and Yellowhammer.

7.5.21 Using the criteria adapted from Fuller (1980) the site has a breeding bird assemblage that is of importance at a District level (25-49 species).

Water Vole Survey

7.5.22 The River Ouzel was identified as having habitats suitable for water vole however, no records of them were found in the background data search. Surveys were conducted on two visits between June and September 2019 however, no evidence of water vole was recorded during any of the surveys

Bat Surveys

7.5.23 The preliminary roost assessment identified two buildings with moderate potential and one with low potential for roosting bats. The ground level roost assessment and aerial inspection rated four trees as having high potential, 14 with moderate and 24 with low potential for roosting bats. Endoscope surveys and emergence / re-entry surveys of these trees did not identify any bat roosts.

7.5.24 At least 10 bat species were recorded on the site during the monthly transect surveys and static monitoring detector surveys, including Barbastelle. Barbastelle bat is afforded additional protection under the Habitat Regulations 2017 (as amended) as an Annex ll bat species.

7.5.25 The majority of the bat foraging activity was associated with the River Ouzel corridor.

7.5.26 Wray et al. (2010) was used to appraise the value of the site for its commuting and foraging bat assemblage; the site was assessed as potentially having 'regional' significance.

Otter Survey

7.5.27 The River Ouzel and habitat within a 50m buffer (where access allowed) were identified as suitable for otter and the BDS returned records of otter within 1km of the site. Surveys were conducted at the same time as the water vole surveys in 2019. A single spraint and scattered feeding remain were found along the riverbank on both surveys. No holts or couches were observed during the survey.

Badger Survey

7.5.28 There is suitable foraging and sett-building habitat on the site for badgers including, arable fields, dense scrub, steep wooded banks and an area of plantation woodland however, no badger setts or field signs were recorded.

Hazel Dormouse Survey

7.5.29 Suitable habitat for Hazel Dormice was identified in the hedgerows forming the site boundaries and running through the site. The hedgerows provide connectivity internally and to the wider hedgerow network surrounding the site. Patches of dense scrub on the site and areas of semi-natural broadleaved woodland adjacent to the site also provide suitable habitat for Hazel Dormice.

7.5.30 Nut searches and Nest-tube surveys were completed between May and October 2019. No evidence of hazel dormice was found during these surveys.

Reptile Survey

7.5.31 Areas of scrub and field margins are suitable for reptiles and there were several brash piles, creating suitable hibernacula at the time of the survey. There are also areas of standing water suitable for grass snakes. The site is ecologically connected to suitable habitat to the south and east.

7.5.32 Surveys were carried out in April and May 2019. Two grass snakes were found on the site, suggesting there is a low population of grass snakes using the site. No other common reptiles were recorded at the site.

Great Crested Newt

7.5.33 There are 10 records of great crested newt (GCN) from places within 10km of the site boundary, the most recent in 2017. The extended phase 1 survey identified habitats suitable for GCN. There was one dry pond on the site at the time of the survey that may be seasonally wet, and a large, well-vegetated pond located in the gardens of the property in the centre of Area 3 outside the red line boundary. Additionally, the hedgerows and ditches provide ecological connectivity to the wider landscape.

7.5.34 Access to survey the ponds within 500m was refused and it has not been possible to confirm the absence of GCN on site. Therefore, as a precautionary measure, this chapter has assumed that GCN are present on the site and the scheme will make use of the local District Level Licencing Scheme to offset any potential impacts to GCN.

Biodiversity Baseline Condition Assessment

7.5.35 A study of the effects on biodiversity in connection with the removal of habitats for the proposed residential development was carried out as a desk-based exercise, using the results of Extended Phase 1 Habitat survey and the Indicative Master plan (ref: P19_2619_07_N)). A Biodiversity Net Gain calculation for the project has been undertaken and the resulting spreadsheet (RSK 27 July 2021 Appendix 7.3) indicates that there are 50.72 habitat baseline units (excluding lowland meadow priority habitat), 32.48 hedgerow baseline units and 8.44 river units. The creation of trees and scrub, grassland areas including attenuation ponds will result in 81.37 biodiversity units post development, leading to a net gain of 60.44% in habitat units. The majority of hedgerows will be retained, some of the more porous hedgerows will be enhanced and new hedgerows will be created resulting in 33.36 hedgerow units post development, a gain of 2.71%. Lastly two long linear SUDS will be created to mitigate the section of dry and wet ditches that will be lost. Current proposals will result in 14.10 river units, a gain of 67.02%

7.5.36 The lowland meadow has been identified as Priority Habitat and therefore a Biodiversity Net Gain Calculation cannot be undertaken, as the metric will not allow any loss of Priority Habitat, therefore bespoke mitigation is required. 3.88 ha of Lowland meadow will be lost and it is proposed to recreate 6.72 ha, over a half more than the area to be lost (see Figure 7.4). A detailed habitat creation and maintenance plan will be developed taking account

of the complexities in recreating this habitat type to ensure the success of this mitigation.

7.5.37 The Milton Keynes Biodiversity Supplementary Planning Documents states that development proposals should seek to maintain and protect biodiversity and seek a measurable net gain in biodiversity.

7.6 Assessment of Receptors

7.6.1 The assessment of effect is based on the project description; a detailed description of the proposed project is provided in Chapter 2 (Project Description).

Issues to be Scoped Out

7.6.2 Based on the results of baseline surveys, the following ecological receptors or potential impacts have been scoped out of the appraisal in this chapter. This is either due to absence during baseline surveys or due to the intrinsic value of the receptor or impacts upon the receptor being classed as negligible.

- Statutory designated sites outside of the site boundary.
- Non - Statutory designated sites located more than 1km from the site boundary.
- scattered broadleaved trees – negligible value.
- dense scrub – negligible value.
- arable – negligible value.
- improved grassland – negligible value.
- tall ruderals – negligible value.
- Water vole – no impacts anticipated (none recorded).
- Badger – no impacts anticipated (none recorded).
- Hazel dormouse – no impacts anticipated (none recorded).

7.6.3 As identified in Section 7.5 there are no Statutory designated sites in close proximity to the site boundary. Given that there will no direct land take from these sites and the distance from the site and the lack of obvious impact pathways no direct or indirect impacts are envisaged. Therefore, Statutory designated sites have been scoped out of the assessment.

7.6.4 There are four local wildlife sites located within 1km of the site boundary. Of these the River Ouzel wet corridor is the site most likely to be directly affected. The M1 road corridor is considered unlikely to be directly affected and Broughton Brook and Williston lake are located a sufficient distance (over 500m) for direct effects to be unlikely to occur.

7.6.5 A number of habitat types identified that are not listed as UK priority habitat were considered to be of negligible biodiversity value, being common and widespread in the

UK. These habitat types have therefor not been considered further in this assessment.

7.6.6 Likewise, those legally protected species for which phase 2 surveys have confirmed absence are not considered further.

Issues to be Scoped In

7.6.7 The following ecological features/ receptors are assessed in this Chapter:

- River Ouzel Wet Corridor MKWC.
- Semi – improved grassland - lowland meadows (Priority Habitat).
- Watercourses including, standing and running water.
- Hedgerows (Priority Habitat).
- Invasive plant species.
- Breeding birds, including barn owls.
- Bats.
- Otter.
- Reptiles; and,
- GCN

7.6.8 Table 7.5 lists the nature conservation importance assigned to the important ecological features scoped into this assessment. The value of the ecological features has been assigned on a site-by-site (i.e., project-specific) basis. Therefore, Table 7.5 lists first the value of the ecological features implied by legislation or nature conservation designations, and second the value in context of the proposed project, the site and its surroundings. Where species surveys have been undertaken and a species ruled out as being present or unlikely to be present this species is not considered further in this assessment.

Ecological Feature	General UK Value Inferred by Legislation and Action Plans	Intrinsic Value in the Context of the Development Area	Justification of Intrinsic Value of Feature in the Context of the Proposed Project in Reference to Baseline
River Ouzel Wet Corridor (MKWC)	Local, MKWCs have status equivalent to LWSs in the Milton Keynes Local Plan.	County	The waterway corridor runs through the Milton Keynes area. The site is considered of local importance for nature conservation. The River Ouzel itself is the most significant biodiversity feature of the area, with the river following a natural meandering course. As well as the watercourse itself, the river corridor contains associated habitats including willow pollarded, native black poplar and scrub and wetland vegetation. Semi-improved neutral floodplain grassland is the dominant land cover - in variable condition from improved and species poor to other areas which are actively managed for conservation and amenity.
Grassland – lowland meadows	National, as lowland meadows are a UK Priority Habitats	County	Lowland meadow has been some of the fastest declining priority habitats. There is now less than 6,000 ha remaining in England' (Natural England 2013). The grassland is likely to be of at least County significance, due to the floristic diversity. Lowland meadows are also an important foraging resource and nesting habitat for protected species.
Watercourses	National, as standing water is a UK Priority Habitats	Local	There are several ditches present within the site, some are seasonally wet with predominantly species poor flora and of low conservation value. Additionally, the River Ouzel runs adjacent to the eastern boundary. Some of the watercourses may be used by protected species, such as Otter and Grass Snake. Impacts on these species are discussed separately.

Ecological Feature	General UK Value Inferred by Legislation and Action Plans	Intrinsic Value in the Context of the Development Area	Justification of Intrinsic Value of Feature in the Context of the Proposed Project in Reference to Baseline
Hedgerows	National, as hedgerows (with 80% or more cover of at least one woody UK native species) are a UK Priority Habitats	Local	There are 15 boundary hedgerows within the survey area; two were categorised as 'important' under the Hedgerows Regulations. Hedgerows are important habitat for many species of birds, bats, insects, and reptiles (e.g., 130 priority BAP species are known to be significantly associated with hedgerows) and provide important wildlife habitat and corridors linking other habitats.
Invasive plant species	N/A Listed on Schedule 9 of the Wildlife and Countryside Act	Local	Invasive species have been recorded along the River Ouzel. Works may cause the spread of these species, in the absence of mitigation.
Breeding birds, including barn owl	National, Key legislation relating to birds is the Wildlife and Countryside Act, 1981 (as amended). Some are designated on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Many bird species are listed as a UK Priority Species.	County / District	The River Ouzel corridor, hedgerows and grassland, predominantly the lowland meadow fields provide suitable habitat for nesting birds. Based on survey data and guidance, the site has a breeding bird assemblage that is of importance at a District level. Of these species, 18 are designated as Annex I species under on the EU Birds Directive; one (barn owl) is listed under Schedule 1 of The Wildlife and Countryside Act 1981; a total of 17 species are listed as amber or red under the latest Birds of Conservation Concern (BOCC) report (Eaton *et al.* 2015) and ten are listed under Section 41 of the NERC Act, namely willow tit, skylark, starling, song thrush, house sparrow, dunnock, bullfinch, linnet, yellowhammer and reed bunting. Bird surveys have identified an assemblage of breeding birds considered to be important at the county level.

Ecological Feature	General UK Value Inferred by Legislation and Action Plans	Intrinsic Value in the Context of the Development Area	Justification of Intrinsic Value of Feature in the Context of the Proposed Project in Reference to Baseline
Bats	International, bats are listed as a European Protected Species in the Habitats and Species Regulations, 2010.	Possibly Regional	No bats were recorded roosting in the buildings or trees within the site boundary. The grassland, wooded areas and River Ouzel as well as the habitats on the field boundaries (hedgerows, scrub and lines of scattered broad-leaved trees) provide suitable habitat for foraging and commuting bats. These habitats are also connected to suitable habitat in the surrounding landscape and have been assessed as being of moderate potential for commuting and foraging bats. There were 10 species of bat recorded across the site, including Barbastelle bat which is afforded additional protection under the Habitat Regulations 2017 (as amended) as an Annex ll bat species. Overall, the assemblage of foraging bats recorded is considered to be of potentially Regional importance.
Otter	National, listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and listed as a European Protected Species on Schedule 2 of the Conservation (Natural Habitats, etc.) Regulations 1994. The Otter is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP)	Local	Otters are known to be present in the local area and field signs have been recorded along the River Ouzel. The River Ouzel Wet Corridor runs along the eastern edge of the site and will be retained. No holts are present within the site boundary.

Ecological Feature	General UK Value Inferred by Legislation and Action Plans	Intrinsic Value in the Context of the Development Area	Justification of Intrinsic Value of Feature in the Context of the Proposed Project in Reference to Baseline
Reptile	National, listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)	Local	Reptiles are present in low numbers in suitable habitats within the site boundary.
GCN	National, listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)	Local	GCN are known in the local area but no surveys could be undertaken within 500m of the site due to lack of access permission. Habitats on site are suitable for GCN. Due to the lack of survey data a precautionary approach has been taken and it is assumed that GCN are present on site, but it is not possible to assess the conservation value of any resident population.

Table: 7.5 Nature Conservation Value of each Ecological Receptor

dynamic development solutions ™

7.7 Primary or Embedded Mitigation

Construction

7.7.1 The following primary embedded mitigation measures would be considered an integral part of the proposed scheme (see Section 7.2) and has been taken into consideration when appraising the ecological impacts of the Proposed Project:

- Construction Environmental Management Plan (CEMP) – a CEMP will be produced outlining how construction impacts will be minimised including standard pollution prevention control measures to prevent surface water pollution and pollution from accidental spillages as well as minimising changes to air quality.
- A Biodiversity Net Gain calculation for the project has been undertaken and the resulting spreadsheet included (RSK 27 July 2021) this indicates that there are 70.16 habitat units (excluding lowland meadow priority habitat) and 38.48 hedgerow units. Post development the creation of trees and scrub, grassland areas including attenuation ponds will result in 76.85 biodiversity units leading to a net gain of 9.5%. Although the majority of hedgerows will be retained, there will be a slight loss of 4 hedgerow units leading to a 10% loss in hedgerow area.
- The lowland meadow has been identified as Priority Habitat and therefore a Biodiversity Net Gain Calculation cannot be undertaken, as the metric will not allow any loss of Priority Habitat, therefore bespoke mitigation is required. 3.867 ha of Lowland meadow will be lost and it is proposed to recreate 4.743 ha, over a quarter more than the area to be lost (see Figure 7.4). A detailed habitat creation and maintenance plan will be developed taking account of the complexities in recreating this habitat type to ensure the success of this mitigation.
- A lighting strategy that will seek to minimise light spill keeping it highly directional and to enable dark corridors to be maintained along retained areas of open space to ensure foraging conditions maintained for foraging bat species, particularly the Ouzel Brook corridor.
- Retention of the Ouzel Brook corridor in its entirely with a significant buffer zone between the corridor and the residential development to safeguard this important wildlife corridor.
- Planting of native species rich hedgerows around periphery of proposed sports pitches north of the A422 and ensuring hedgerows along edge of A422 allowed to grow tall and bushy. This will encourage bats to fly high above the road reducing potential for incidental mortality through collision with vehicles, whilst enhancing connectivity for bats in the wider landscape.
- Retention of the majority of the boundary hedgerow network.
- Provision of a north to south greenway (along route of existing sewer).
- Production of a Landscape and Ecology Mitigation Plan (LEMP) that will outline extensive habitat creation across the draft master plan, including new lowland meadow and other habitat types and long-term management and monitoring requirements. The LEMP will also outline mitigation strategies for bats, reptiles, otters and breeding birds outlining measures to safeguard these species during the Construction Phase.
- Taking a precautionary approach by assuming GCN are present and engaging in the Local District Licensing Scheme to offset any potential impacts on this species.

7.7.2 Mitigation and enhancement measures are outlined in Figure 7.4.

Operation

7.7.3 The following primary embedded mitigation measures would be considered an integral part of the proposed scheme (see Chapter 2) has been taken into consideration when appraising the ecological impacts of the Proposed Project:

- Balancing facility to attenuate drainage reducing pollution and high flow impacts on local watercourses.
- Wastewater directed to foul sewer not watercourses.
- Road and parking areas to incorporate petrol and oil interceptors; and,
- LEMP for the operational phase that encompasses Management plan and appropriate management of retained and created open space to enhance habitats such as new species-rich lowland and also manage recreation pressure to these retained and created habitats.

7.8 Secondary mitigation

7.8.1 Where complete avoidance of impacts is not possible through embedded mitigation, additional mitigation measures are to be implemented, these are termed secondary mitigation. Monitoring requirements will be identified where appropriate.

7.9 Assessment of Effects

7.9.1 The primary embedded mitigation measures outlined above are considered an integral part of the scheme and therefore potential effects arising from the project are considered with this these mitigation measures in place.

7.9.2 The following aspects of the proposed project could cause negative impacts on the ecological receptors during construction and operational phases of the development.

Predicted Impacts During Construction

7.9.3 Potential impacts on ecological features associated with site preparation and construction include:

- Permanent loss of habitat to accommodate the residential development.
- Temporary loss of habitat through siting and subsequent removal of site offices, compounds and storage areas of construction materials.
- Fragmentation of habitats or severance of ecological corridors during construction.
- Disturbance of species and potential for incidental mortality within and adjacent to the site boundary due to construction noise, vibration and site personnel.
- Disturbance/displacement of species within and adjacent to the Site Boundary by an increase in artificial lighting.

- Impacts on adjacent habitats (and the species that use them), for example through noise and visual disturbance and accidental pollution.
- Surface water runoff and diffuse pollution.

7.9.4 These potential impacts are discussed below:

Non-statutory Designated Sites

7.9.5 The River Ouzel Wet Corridor (MKWC) falls within the eastern boundary of the site and is of local importance. There will be no direct habitats loss however, there could be potential effects arising from the construction works including, disturbance such as noise and lighting, diffuse pollution from surface water and from accidental spillages as well as changes to air quality.

7.9.6 The embedded mitigation measures outlined in Section 7.7 and illustrated on Figure 7.4 has outlined measures to protect the River Ouzel Wet Corridor and, to minimise the potential effects that could arise during the construction of the proposed residential development. With these embedded measures in place the magnitude of change is low. Therefore, there is likely to be an **Indirect, Short-Term, Temporary** effect for the duration of the construction period, which would result in a **Non-Significant** effect using CIEEM guidance and a **Minor to Negligible Negative** significance using EIA specific assessment methodology.

7.9.7 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Habitats – Lowland Meadows (Priority Habitats)

7.9.8 There is approximately 3.9 ha of lowland meadow on the site which will be permanently lost to the proposed development. The lowland meadow is considered to be of county importance.

7.9.9 Due to the loss of this grassland as a result of the proposed development, the magnitude of change, prior to mitigation, is high and will result in a **Permanent** effect, that would be **Significant** at the County Level using CIEEM guidance and a **Moderate Negative** significance using EIA specific assessment methodology.

7.9.10 As outlined in the Biodiversity Net Gain Report (RSK July 2021) 6.72 ha of lowland meadow will be created on former arable fields or improved grassland. The methodology and mechanism how this will be achieved will be outlined in the LEMP (Section 7.7) lowland meadow will be created and managed appropriately in two locations, the first

location of 1.96 ha is adjacent to the attenuation lagoons in the flood zone and the second location is to the north of Monks Way (A422) (see figure 7.4), an area of 4.76 ha. It is recognised that it is not possible to fully re-create lowland meadow habitat. However, the habitat creation if undertaken carefully has the potential to result in a **Direct, Long-Term, Permanent** effect, that would be **Significant** using CIEEM guidance and a **Moderate Positive** significance using EIA specific assessment methodology.

7.9.11 No secondary mitigation measures are envisaged as being required. Due to the difficulty in creating lowland meadow habitat and the time taken for such habitat to reach optimal condition it is acknowledged that a residual effect will remain. By creating substantially more habitat than will be lost and the long-term management regime outlined in the LEMP the residual effect will be minimised.

Habitats – Ditches

7.9.12 There are approximately 1.4 km of ditches on the site, of which approximately 200m will be permanently lost to the proposed development. The construction phase could result in alterations to the hydrology of the site and could cause pollution from surface water discharge and from accidental spillages.

7.9.13 As part of the embedded measures, the CEMP will outline standard measures to prevent waste from the site entering adjacent habitats including, sustainable drainage features (SuDs) and attenuation facilities which will ensure discharge to the River Ouzel at greenfield rates. Additionally, the creation of these SuDs and attenuation features will help mitigate for the loss of aquatic features on the site.

7.9.14 With these embedded mitigation measures in place the magnitude of change is low. Therefore, there is likely to be a **Direct, Permanent** effect, that would be **Significant** at the local level using CIEEM guidance and of **Minor Positive** significance using the EIA specific assessment methodologies.

7.9.15 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Habitats – Hedgerows (Priority Habitat)

7.9.16 There are approximately 3.78 km of hedgerows, on site the majority of which were considered species-poor dominated by hawthorn.

7.9.17 As outlined in Section 7.7 the majority of the boundary hedgerows will be retained.

However, the proposed development is likely to result in the permanent loss of approximately 600 m of hedgerows considered to be of local importance only. In addition, there will be new hedgerow planting around the periphery of the new sports pitches. The magnitude of change, prior to mitigation, is medium. There is likely to be a **Direct, Long-Term, Permanent** effect on the hedgerows that are lost, which would be **Significant** at the local level using CIEEM guidance and of **Minor Negative** significance using the EIA assessment methodology.

7.9.18 There is also the potential for direct impacts from construction including dust, contamination, temporary siting and storing of materials, however, the CEMP will outline measures to reduce any impacts such as these. Therefore, the magnitude of change, prior to mitigation, is low; there is likely to be an **Indirect, Short-Term, Temporary** effect, which would be **Non-Significant** using CIEEM guidance and of **Negligible** significance using the EIA assessment methodology.

7.9.19 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Habitat – Invasive Plant Species

7.9.20 Himalayan balsam has been identified along the river ouzel. Without the embedded measures, the plant could spread across the site and to the wider landscape by the river. However, the CEMP would endeavour to outline sufficient biosecurity measure to prevent the spread of this invasive species, whilst the LEMP would identify long term control measures. Therefore, the magnitude of change, prior to mitigation, is low; there is likely to be an **Indirect, Short-Term, Temporary** effect, which would be **Non-Significant** using CIEEM guidance and of **Minor Positive** significance using the EIA assessment methodology.

7.9.21 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Protected Species - Breeding Birds

7.9.22 As outlined above ecological survey work has identified that the Site supports a reasonably diverse assemblage of breeding birds; a total of 46 species were recorded during the breeding bird survey, the assemblage being of County importance.

7.9.23 In the absence of embedded mitigation there will be a loss of both nesting habitat (the barn owl box) and a loss of foraging habitat. The LEMP will outline the provision of

alternate nest boxes alongside the River Ouzel corridor in the flood zone in the far eastern corner ensuring continued access to foraging habitat in the wider countryside. The creation of new grassland alongside the River Ouzel and the attenuation lagoons that will provide suitable foraging habitat in the longer-term, see Figure 7.4

7.9.24 The construction works could potentially disturb or displace barn owls due to the noise and visual intrusion of the construction works. The measures identified above will ensure barn owls have an alternate nesting location and continued access to foraging habitat in the wider countryside. The magnitude of change, prior to mitigation, is moderate. Therefore, there is likely to be a **Direct, Long-Term, Temporary** effect on barn owls during construction, which would be **Significant** using CIEEM guidance and of **Minor Negative** significance using EIA specific assessment methodology.

7.9.25 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

7.9.26 In the absence of embedded mitigation there will be a loss of foraging and nesting habitat for both hedgerow and ground nesting bird species. Removal of vegetation and loss of open ground during construction could have impacts on hedgerow and ground nesting birds if carried out during the bird nesting season. It is also likely that any bird species on the site during construction could also suffer disturbance from noise, and lighting as a result of construction activities. This may result in temporary displacement and is considered a low magnitude impact. The CEMP would outline measures to minimise any effects arising from construction works that would occur during the bird breeding season, such as timing vegetation clearance to the winter months avoiding the bird nesting season. The LEMP and indicative master plan include new areas of habitat creation including new species-rich grassland and new hedgerow planting which would provide additional nesting and foraging opportunities for bird species. which could possibly affect the breeding success for that season in the individual species involved. The magnitude of change, prior to mitigation, is low.

7.9.27 Therefore, there is likely to be an **Indirect, Short-Term, Temporary** effect on the breeding birds during construction, that would be **Non-Significant** using CIEEM guidance and of **Minor Negative** significance using EIA specific assessment methodology.

7.9.28 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Protected Species – Bats

7.9.29 No bats have been recorded roosting in any buildings or trees on the site during surveys. However, features suitable for roosting bats are still present within the site boundary. Trees will be removed during construction and precautionary measures set out in the CEMP will be followed to avoid potential impacts on roosting bats. Therefore, there is likely to be an **Indirect, Short-Term, Temporary** effect during construction, that would be **Non-Significant** using CIEEM guidance and of **Negligible** significance using EIA specific assessment methodology.

7.9.30 Bat activity surveys have confirmed the presence of 10 bat species including the Annex ll listed Barbastelle bat. Commuting and foraging activity was recorded along the field margins and principally along the River Ouzel. These habitats are connected to other suitable habitats in the surrounding landscape and were assessed as having moderate potential for commuting and foraging bats. The proposed development will result in the loss of some hedgerows and features used by commuting bats and therefore, is likely to cause some disruption to commuting routes. In addition, the loss of open grassland will result in the loss of c.11.5 ha of foraging habitat. Yet, good connectivity to the wider landscape will remain through the retention of the River Ouzel corridor and boundary hedgerows, including enhancements along the edges of the A422 to facilitate bats to cross over the existing road. In addition, the creation of new habitats as outlined in the LEMP including attenuation lagoons and species-rich grassland will ensure good quality foraging habitat is available.

7.9.31 The magnitude of change, prior to mitigation, for commuting and foraging bats, is moderate. It is likely that there will be a **Direct, Long-Term, Permanent** effect as a result of the habitat loss, would be **Significant** using CIEEM guidance and of **Minor Negative** significance using EIA specific assessment methodology.

7.9.32 Temporary lighting, noise and vibration during construction could also cause adverse effects on commuting and foraging bats. However, these impacts will be minimised by the retention of the River Ouzel corridor and a significant buffer which will not be lit and offer some protection from noise and vibration. The lighting plans outlined in the embedded measures, that will seek to minimise light spill keeping it highly directional and to enable dark corridors to be maintained along retained areas of open space to ensure foraging conditions maintained for foraging bat species.

7.9.33 Therefore, the magnitude of change, prior to mitigation, is low. It is likely that there will be

an **Indirect, Short-Term, Temporary** effect, that would be **Non-Significant** using CIEEM guidance and of **Negligible** significance using EIA specific assessment methodology.

7.9.34 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Protected Species – Otter

7.9.35 No otter resting places including holts were recorded however, otter field signs were recorded along the River Ouzel. Otters are not restricted to the river corridor and will readily use surrounding habitats including ditches for foraging. However, as part of the embedded measures, the River Ouzel will be safeguarded throughout the construction works.

7.9.36 Temporary lighting, noise and vibration during construction could disturb otters in the local area. However, these impacts will be minimised by the CEMP and lighting plans outlined in the embedded measures, which will ensure the retention of dark corridors and restricted working to daylight hours. The retention of the River Ouzel corridor (see Figure 7.4) and its substantial buffer will ensure the continued availability of the River Ouzel as foraging habitat.

7.9.37 The magnitude of change, prior to mitigation, is low. Therefore, there is likely to be an **Indirect, Short-Term, Temporary** effect, which would be **Non-Significant** using the CIEEM guidelines and **Negligible** significance using the EIA specific assessment methodology.

7.9.38 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Protected Species – Reptiles

7.9.39 The ecological survey work has identified that a small population of grass snakes are present along field boundaries. A small number of individual reptiles could be disturbed and potentially suffer incidental injury or mortality when site clearance works commence, in particular the removal of vegetation, topsoil and any material that could be used as a refuge. Although habitat suitable for reptiles is present on the site, there is additional habitat of good quality within the surrounding area, including the River Ouzel.

7.9.40 The risk of injury or killing will be minimised by measures outlined in the CEMP, whilst the habitat creation measures outlined in the LEMP and retention of the River Ouzel corridor

(See Figure 7.4) ensuring the continued availability of foraging habitat.

7.9.41 The magnitude of change is low, and there is likely to be a **Direct, Short-Term, Temporary** effect on the impacts from the site clearance works, which would be **Non-Significant** using the CIEEM guidelines and **Negligible** significance using the EIA specific assessment methodology.

7.9.42 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Protected Species - GCN

7.9.43 Although surveys could not be completed to determine GCN absence due to remediation taking place on site, local records of the species and consultation with the LPA have suggested that GCN are likely to be present on the site.

7.9.44 Habitats within the site boundary are suitable for GCN (c.11.5 ha) and will be permanently lost as a result of the proposed development and this could also result in incidental of individual GCN when site clearance works commence.

7.9.45 The magnitude of change, prior to any mitigation, is high. However, the embedded measures outlined in section 7.7 include a precautionary approach, whereby GCN are assumed to be present and that there will be engagement in the Local District Licensing Scheme to offset any potential impacts on this species which would ensure the continued favourable conservation status of GCN within the wider landscape. Therefore, it is likely that although there will be a **Direct, Permanent** effect on GCN due to the site clearance and construction works, the overall impacts arising from the proposed works would be **Non-Significant** using the CIEEM guidelines and **Negligible** significance using the EIA specific assessment methodology.

7.9.46 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Biodiversity Net Gain

7.9.47 A Biodiversity Net Gain calculation for the project has been undertaken and the resulting spreadsheet included (RSK 27 July 2021) indicates that there are 50.72 habitat baseline units (excluding lowland meadow priority habitat), 32.48 hedgerow baseline units and 8.44 river units. Post development the creation of trees and scrub, grassland areas including attenuation ponds will result in 81.37 biodiversity units post development, leading to a net

more porous hedgerows will be enhanced and new hedgerows will be created resulting in 33.36 hedgerow units post development, a gain of 2.71%. Lastly two long linear SUDS will be created to mitigate the section of dry and wet ditches that will be lost. Current proposals will result in 14.10 river units, a gain of 67.02%.

7.9.48 Bespoke mitigation is proposed for the loss of 3.88 ha of lowland meadow priority habitat and 6.72 ha will be created on ex arable and improved grassland. (see below).

Predicted Impacts During Operation

7.9.49 During the operational phase of the project the following aspects of the proposed project could cause impacts on the ecological receptors:

- Potential for incidental mortality and displacement of legally protected species.
- Disturbance arising from recreational use of the retained and created habitats.
- Disturbance of retained and created habitat from noise and lighting.
- Modification of habitats and introduction of undesirable species (such as injurious weeds or invasive alien species) as a result of traffic movements, reinstatement works and landscaping.
- Positive effects and biodiversity gain arising from habitat creation.

7.9.50 The assessment has considered the embedded measures outlined in section 7.7.

Non statutory Designated Sites

7.9.51 The proposed residential development could cause disturb created and retained habitat through noise, lighting and visual disturbance from new residents and disturbance arising from recreational use of the surrounding area, including the River Ouzel Wet Corridor. These impacts could include:

- Littering and fly tipping.
- Increase in disturbance to wildlife from additional people and pets.

7.9.52 Measures outlined in the LEMP and lighting plan will endeavour to safeguard the River Ouzel Wet Corridor ensuring a suitable buffer from the development to minimise noise and lighting disturbance. The LEMP would also outline suitable measures to manage the recreational usage of retained and created habitat including an appropriate path network, directional fencing and appropriate signage and interpretation. The magnitude of change from the above impacts, when considering the embedded measures is low. Therefore, there is likely to be a **Direct, Long-Term, Permanent** effect on the River Ouzel Wet Corridor, which would be **Non-Significant** using the CIEEM guidelines and **Negligible** significance using the EIA specific assessment methodology.

7.9.53 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Habitats – Lowland Meadows (Priority Habitats)

7.9.54 The LEMP would outline an appropriate long-term management regime for the areas of lowland meadow creation including a monitoring regime and a feedback loop to allow for remedial measures should the habitat creation not be achieving the desired aims. The magnitude of change, when considering the embedded measures is low. Therefore, there is likely to be a **Direct, Long-Term, Permanent Positive** effect, which would be **Significant** using the CIEEM guidelines and **Moderate** significance using the EIA specific assessment methodology.

7.9.55 Due to the difficulty in creating lowland meadow habitat and the time taken for such habitat to reach optimal condition it is acknowledged that a residual effect will remain. By creating substantially more habitat than will be lost and the long-term management regime outlined in the LEMP the residual effect will be minimised.

Other retained and created habitats

7.9.56 The LEMP would outline an appropriate long-term management regime for the areas of retained and including a monitoring regime and a feedback loop to allow for remedial measures should the habitat creation not be achieving the desired aims.

7.9.57 Considering the LEMP, the effect on the other retained and created habitats during the operational phase would Therefore, there is likely to be a **Direct, Long-Term, Permanent Positive** effect, which would be **Significant** using the CIEEM guidelines and **Moderate** significance using the EIA specific assessment methodology.

7.9.58 No secondary mitigation measures are envisaged as being required and no residual effects have been identified.

Habitat – Invasive Plant Species

7.9.59 Measures to avoid the spread of Himalayan Balsam during the operation of the proposed residential development will be outlined in the LEMP. If appropriate the LEMP would also prescribe a control programme of Himalayan Balsam within the River Ouzel Corridor aiming to irradicate the species from the section of the River Ouzel Corridor adjacent to the development. This would constitute a **Direct, Long-Term, Permanent** impact, which would be **Significant** using the CIEEM guidelines and minor positive significance using the EIA specific assessment methodology.

Protected Species - Breeding Birds

7.9.60 The LEMP would outline an appropriate long-term management regime for the areas of retained and including a monitoring regime and a feedback loop to allow for remedial measures should the habitat creation not be achieving the desired aims.

7.9.61 There is likely to be a short-term reduction in nesting opportunities therefore the LEMP will outline secondary mitigation measures, the provision of alternate nesting locations in the form of bird boxes which could include boxes for priority species such as swift and house martins on appropriate buildings. There is likely to be a residual effect due to increased predation of nesting birds by household pets. The LEMP will outline measures, perhaps an education programme or leaflet for new residents explaining the importance of controlling domestic pets would be the best way to manage this residual risk.

Protected Species – Bats

7.9.62 The LEMP would outline an appropriate long-term management regime for the areas of retained, including a lighting design to minimise lighting of these areas and including a monitoring regime and a feedback loop to allow for remedial measures should the habitat creation not be achieving the desired aims.

7.9.63 There is likely to be a short-term reduction in roosting opportunities, therefore the LEMP will outline secondary mitigation measures, the provision of alternate roosting locations in the form of bat boxes which could include boxes on appropriate buildings and within areas of retained and created habitats. No residual risks have been identified.

Protected Species – Otter

7.9.64 By safeguarding the River Ouzel with an appropriate buffer (see Figure 7.4), together with appropriate measures embedded in the operational design to maintain and safeguard water quality no operational impacts on otters are envisaged.

Protected Species – Reptiles

7.9.65 The LEMP would outline an appropriate long-term management regime for the areas of retained and including a monitoring regime and a feedback loop to allow for remedial measures should the habitat creation not be achieving the desired aims.

7.9.66 There is likely to be a short-term reduction in hibernation opportunities therefore the LEMP will outline secondary mitigation measures, the provision of artificial hibernacula within areas of retained and created habitats, principally the River Ouzel corridor. There is likely to be a residual effect due to increased predation of reptiles by household pets. The

LEMP will outline measures perhaps an education programme or leaflet for new residents explaining the importance of controlling domestic pets would be the best way to manage this residual risk.

Protected Species - GCN

7.9.67 Due to engagement in the local GCN district Licencing Scheme no operational impacts on GCN are envisaged.

7.10 Summary

7.10.1 The development of the Site will take place on habitats that primarily include arable and improved grassland. An area of species-rich lowland meadow will be lost but a bespoke habitat creation scheme will see new lowland meadow created. The River Ouzel corridor will be maintained in its entirety together with a suitable buffer and this together with the creation of grassland and attenuation lagoons will provide continued foraging habitat for bats and farmland birds. As a precautionary measure it has been assumed great crested newt are present and use will be made of the local District Licensing Scheme to offset any potential impacts on great crested newt.

7.10.2 The operation stage of both outline and detailed planning areas are not considered likely to cause additional negative effects on ecology after mitigation.

7.10.3 Mitigation measures include:

- Implementation of a CEMP and LEMP including creation of species–rich lowland meadow.
- Buffer zone along River Ouzel River Wet Corridor and retention of corridor in its entirety.
- Landscaping including creation and enhancement of grassland, scrub and shrub planting.
- Erection of barn owl box on far eastern side of development within area of retained grassland in flood zone.
- Erection of bird and bat boxes on retained trees and potentially buildings within the development.
- Implementation of a lighting strategy to maintain foraging areas for bats.
- New hedge planting around playing fields north of the A422 and management of hedgerows along road to promote tall busy growth to facilitate the passage of bats over and across the existing A422.

7.10.4 Mitigation and enhancement measures are outlined on Figure 7.4.

7.10.5 A summary of the likely significant effects of the Proposed Development on Ecology is provided in Table 7.6.

Ecological Feature	Description of Potential Effects	Summary of Embedded Mitigation and secondary mitigation	Significance of Residual Effect
River Ouzel Wet Corridor (MKWC)	Habitat disturbance from noise and lighting and potential pollution. Spread of invasive Himalayan Balsam.	Implementation of CEMP outlining pollution prevention control measures and appropriate biosecurity measures to prevent spread of Himalayan Balsam. Development of lighting strategy to minimise effects of lighting and retention of corridor with a substantial buffer to ensure retention of dark corridors enabling continued foraging for bat species and otters. LEMP will outline sympathetic nature conservation management of the corridor including an eradication programme for Himalayan Balsam.	No residual effects identified.
Grassland – lowland meadows	Habitat loss	Creation of new lowland meadow to the north of A422 and within flood zone, with an appropriate monitoring and management regime in place to ensure habitat creation achieves the desired aims. No Secondary mitigation identified.	Moderate residual effect due to difficulty taken to create new lowland meadow habitat and time for meadow to establish.
Watercourses	Habitat loss and potential for surface water runoff and diffuse pollution	Implementation of CEMP outlining pollution prevention control measures and flood attenuation. Creation of attenuation lagoons will create additional wetland habitat. Retention of Rivel Ouzel corridor in its entirety with a substantial buffer. LEMP will outline sympathetic nature conservation management of retained and created habitats.	No residual effects identified.
Hedgerows	Habitat loss	Retention of majority of boundary hedgerow and planting of new hedgerow habitat around periphery of sports fields to north of A422. LEMP will outline sympathetic nature conservation management of retained and created habitats.	No residual effects identified.

Ecological Feature	Description of Potential Effects	Summary of Embedded Mitigation and secondary mitigation	Significance of Residual Effect
Invasive plant species	See measures under River Ouzel	See measures under River Ouzel	No residual effects identified.
Breeding birds, including barn owl	Loss of foraging habitat and nesting sites	Provision of new barn owl nesting habitat adjacent to retained foraging habitat in flood zone. Creation of new lowland meadow habitat and new hedgerow planting will create new foraging and nesting opportunities.	Residual effect due to short term lack of nesting locations which will be addressed by provision of bird boxes on retained trees and new buildings, including boxes for priority species such as swift. Increase in predation due to domestic pets which will be addressed by an education programme for new residents.
Bats	Loss of foraging habitat and roosting sites. Disturbance from new lighting	Creation of new lowland meadow habitat and new hedgerow planting will create new foraging and roosting opportunities. Development of lighting strategy to minimise effects of lighting and retention of River Ouzel corridor with a substantial buffer to ensure retention of dark corridors enabling continued foraging for bat species and connectivity to wider landscape. Management of hedgerows adjacent to A422 to facilitate the passage of bats over and across the existing road.	Residual effect due to short term lack of roosting locations which will be addressed by provision of bat boxes on retained trees and new buildings.
Otter	Loss of foraging habitat and roosting sites. Disturbance from new lighting and noise	Development of lighting strategy to minimise effects of lighting and retention of River Ouzel corridor with a substantial buffer to ensure retention of dark corridors enabling continued foraging for otter species and connectivity to wider landscape	No residual effects identified.

Ecological Feature	Description of Potential Effects	Summary of Embedded Mitigation and secondary mitigation	Significance of Residual Effect
Reptile	Loss of habitat and incidental mortality	Retention of River Ouzel corridor with a substantial buffer and creation of lowland meadow habitat in flood Zone will ensure continued habitat available for reptiles. Destructive search prior to construction works to ensure no incidental mortality.	No residual effects identified.
GCN	Loss of habitat and incidental mortality	Engagement with District Licensing scheme to aid conservation and enhancement of GCN populations off site to offset any potential impacts on site. Works on site likely to require a destructive search to minimise potential for incidental mortality.	No residual effects identified.

Table: 7.6 Summary of Potential Effects, Mitigation and Residual Effect

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8.0 LANDSCAPE AND VISUAL

8.1 Introduction

8.1.1 This chapter of the ES considers the landscape and visual effects of the Proposed Development (outlined in ES Chapter 1). This chapter assesses the likely significant effects associated with the existing physical landscape and potential changes to its character and the visual amenity.

8.1.2 The main objectives of the assessment are as follows:

- Identify, evaluate, and describe the current landscape character of the Application Site and its surroundings.
- Determine the sensitivity of the landscape to the type of development proposed.
- Identify potential visual receptors (i.e. people who would be able to see the development) and representative viewpoints, and evaluate their sensitivity to the type of changes proposed.
- Identify and describe any likely effects of the development on identified landscape and visual receptors.
- Evaluate the magnitude of change and its significance.
- Identify and integrate any mitigation measures that may help in offsetting or reducing adverse effects.
- Assess the residual effects upon the identified landscape and visual receptor.

8.1.3 This chapter is supported by the following figures and appendices:

Figures

- 8.1: Site Location Plan
- 8.2: Screened ZTV
- 8.3: Environmental Designations Plan
- 8.4: Topography Plan
- 8.5: Viewpoint Location Plan

Appendices

- 8.1: Methodology
- 8.2: Landscape Effects Summary Table
- 8.3: Visual Effects Summary Table
- 8.4: Viewpoints 1-10
- 8.5: Photomontage wirelines

Methodology

8.1.4 This LVIA has been undertaken with regard to the latest published guidelines and the detailed methodology provided in Appendix 8.1.

8.1.5 The assessment has been undertaken regarding best practice, as outlined within

published guidance:

- Landscape Institute, Institute of Environmental Management and Assessment, (2013), Guidance for Landscape and Visual Impact Assessment, Routledge (3rd Edition)
- Christine Tudor, Natural England, (October 2014), An Approach to Landscape Character Assessment, Natural England (1st Edition)
- Landscape Institute, (2011), Photography and Photomontage in Landscape and Visual Assessment, Advice Note 01/11, Landscape Institute

8.1.6 The nature of the proposed Development is at the centre of this assessment. An illustrative master plan has been prepared as well as Parameter Plans which form part of the application submission. The Illustrative Master plan provides just an indicative way the proposed Development could be built out within the defined parameters. This chapter considers both forms of the proposals but only assesses the parameters.

8.1.7 The Parameter Plans form part of the body of information that set out the concepts for the Proposed Development within defined limits. Parameter Plans set absolute limits for the maximum envelope of the buildings. This plan is diagrammatic and shows no detail of building placement.

8.1.8 The Illustrative Master plan is not a fully resolved architectural study, but it is designed to show a more realistic proposal. It is a modelled and articulated development proposal that sits within and never above the Parameter Plans.

8.1.9 The fundamental considerations in the assessment of landscape and visual effects are:

- The sensitivity of landscape character areas, landscape elements and visual receptors rated on a scale of High/Medium/Low; and
- The scale of magnitude of change (High/Medium/Low/ Negligible) and whether it is beneficial or adverse, that these receptors are likely to experience as a result of the construction phase, the completed Proposed Development at year 1 and at year 15 (residual).

8.1.10 The combination of the sensitivity and magnitude of change determines an effect (adverse or beneficial) which is rated on a scale of Major/Moderate/Minor/Negligible.

8.1.11 A high rated effect would be more likely from high sensitivity receptors such as visual receptors of residential properties and Public Rights of Way (PRoW) where these receptors would receive a pronounced or noticeable change in their view. A low rated effect would be more likely from the least sensitive receptors, such as visual receptors of transport corridors or commercial properties, as viewers would be affected for a smaller

period of time as they would experience transient views and their activity would not encourage a focus on the landscape.

8.1.12 Where it is considered that the Proposed Development would result in no change, e.g. no improvement or deterioration in the existing view is identified, the effect is assessed as negligible.

8.1.13 A likely significant effect will occur where the combination of the variables results in the Proposed Development having a definitive effect on the view. A not significant effect will occur where the appearance of the proposed development is not definitive, and the effect continues to be defined principally by its baseline condition.

8.1.14 In the assessment, in accordance with GLVIA 3, a distinction is drawn between what are significant and non-significant effects. Major effects are significant, Moderate are potentially significant, Minor or Negligible effects are not significant. Significant effects only are described within this chapter.

Scoping and Consultation

8.1.15 An EIA Scoping Opinion (Appendix 3.1) was received from Milton Keynes Council on 14th October 2020. Consultation regarding the scope of the LVIA assessment, location of assessment viewpoints, and photomontage was carried out with the Landscape Officer at Milton Keynes Council.

Study Area

8.1.16 The extent of the study area was established by initial desk-based research and field work up to approximately 2km from the Site (Site location shown at Figure 8.1). Initial fieldwork was undertaken to define an appropriate study area and was made based on views from eye level of a person standing on the ground. An initial SZTV (shown at Figure 8.2) was carried out for up to 8km to establish potential visibility of the Site. The visibility of the Site is strongly influenced by the landform and by extent and type of land use. The study area ranges from up to 2km to the east and up to 0.5km to the north, south and west. Field work was undertaken from publicly accessible viewpoints within the immediate settlement and wider countryside. The representative viewpoints recorded form the basis of the visual assessment.

Assumptions and Limitations

8.1.17 In undertaking the landscape and visual assessment in relation to the Proposed Development and surrounding area, there are limitations and constraints affecting the

outputs from this work. These include:

- The baseline assessment has been based on information readily available at the time of undertaking the assessment.
- During site visits, weather conditions, the time of day and seasonal factors have influenced the visual assessment and photographic record of the site. Every effort has been made to ensure that the photographs and their locations are representative of the variety of receptors and views from a range of distances and directions as appropriate.
- The assessment of operational effects at year 1 assumes winter conditions, unless otherwise stated. Winter baseline views (Viewpoints) illustrating deciduous trees out of leaf, were recorded in February 2021. The assessment of residual effects at year 15 assumes summer conditions.
- Access to assess the predicted visual effects from private individual properties outside the Site has not been obtained. As a result, the assessment of likely effects of residential areas has been made from vantage points with representative views taken from the nearest available public viewpoint. GLVIA 3 (Paragraph 6.17) suggests that effects of development on visual amenity are dealt with separately from the LVIA as a 'Residential Amenity Assessment'. This level of assessment has not been part of the scope of this chapter.
- The effects of lighting were not part of the scope of work and are therefore not considered within this chapter.
- The assessed development at year 1 is based on the parameter plans/drawings that accompany the application. The development at year 15 is assessed on the assumption that the Proposed Development is delivered in line with these drawings.
- The focus of this chapter is on landscape and visual effects arising from the Proposed Development. For effects on cultural heritage and ecology, please refer to Chapters 6 and 7 respectively.

8.2 Legislation and Planning Policy Context

Legislation

8.2.1 Legislation of relevance to this assessment includes the following:

- European Landscape Convention: Guidelines for managing landscapes 2010;
- Planning (Listed Buildings and Conservation Areas) Act 1990 - regarding Listed Building protection; and
- Countryside and Rights of Way Act 2000 - regarding Public Rights of Way.

Planning Policy Framework

8.2.2 This chapter has been carried out with reference to national and local planning policy.

National Policies

8.2.3 The revised National Planning Policy Framework (NPPF) July 2021 aims to provide one concise document which sets out the Government's planning policies for England. The NPPF promotes a presumption in favour of sustainable development, which is defined as "*meeting the needs of the present without compromising the ability of future generations*

to meet their own needs" (Paragraph 7), providing it is in accordance with the relevant up-to-date Local Plan, as well as policies set out in the NPPF.

8.2.4 A key environmental objective is outlined as "*protecting and enhancing our natural, built and historic environment; including making effective use of land*".

8.2.5 Section 12 of the NPPF sets out guidance in relation to the delivery of 'achieving well-designed places'. The NPPF requires that development responds to local character, is visually attractive, and is integrated into the natural environment. Paragraph 130 of the NPPF states that planning policies and decisions should ensure that developments:

- "…add to the overall quality of the area, not just for the short term but over the lifetime of the development;
- are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;
- are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change…; and
- establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit…"

8.2.6 Planning policies and decisions should contribute to 'conserving and enhancing the natural environment' (Paragraph 174) by:

- "protecting and enhancing valued landscapes… (in a manner commensurate with their statutory status or identified quality in the development plan); and
- recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services - including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland…"

8.2.7 Designations within, or close to (within 2km of), the Site are illustrated at Figure 8.3: Designations Plan.

Local Policies

8.2.8 The Site lies predominantly within the administrative boundaries of Milton Keynes Council. Plan: MK was adopted in March 2019 and constitutes the Development Plan guiding future applications on Milton Keynes East Strategic Urban Extension (MKE SUE) site, covered by Policy SD12 (not repeated here). The site lies entirely within the MKE SUE. Of relevance to this Chapter:

- “7. A strategic green infrastructure framework and network of green spaces to meet strategic and local requirements that follows guidance in the Council’s

Landscape Character Assessment and Green Infrastructure Strategy to ensure ecological connectivity, protect the identity and character of nearby settlements and mitigate any significant impacts on the landscape in accordance with Policy NE5.

- 8. The creation of a linear park through the site that broadly correlates with the River Ouzel floodplain and existing green infrastructure assets of value within and adjacent to it."

8.3 Baseline Conditions

8.3.1 The following provides a description of the baseline landscape character and features sensitivity and are summarised in Appendix 8.2: Landscape Effects Summary Table.

Landscape Character

National Character Areas

8.3.2 The National Character Area (NCA) profiles, produced by Natural England, provide a broad range of information including an outline of the key characteristics of a given area, and identify opportunities for positive environmental change. The Site is within NCA 88 Bedfordshire and Cambridgeshire Claylands. The NCA provides a broad description of a wide area including the Site. For this report the local level character assessment, which provides a more refined description of local character, is assessed.

Local Landscape Character

8.3.3 The Milton Keynes Landscape Character Assessment (Gillespies, June 2016) provides a detailed review of the landscape character of the Borough and describes and evaluates Landscape Character Types (LCT) and Landscape Character Areas (LCA).

<u>Urban River Valley</u>

8.3.4 The Site is within LCT 2 Urban River Valley which comprises the river valley floodplains of the River Great Ouse and its main tributaries including the River Ouzel, and the River Tove. The area is characterised by slow flowing meandering river in sinuous valley floor; areas of pasture close to the river; open field patterns; weirs and historic mills; river inconspicuous within the landscape; and tranquil character.

8.3.5 Key characteristics include:

- Slow flowing meandering river in sinuous valley floor
- Valley floor widens in urban areas with extensive areas of open water due to mineral extraction
- Wide accessibility due to large scale landscape restoration of mineral extraction sites and creation of linear parks

8.3.6 General landscape management guidelines include:

- Promote improvements to the river, water edge and pond habitats to encourage increased biodiversity value through marginal planting and localised bank profiling and sympathetic maintenance of drainage ditches.
- Encourage reversion of arable to pasture within floodplain.
- Promote the management of riparian vegetation including floodplain pollards, new specimens including Black Poplar and where appropriate more extensive areas of wet woodland.
- Encourage the increased use of the river for appropriate recreation that respects landscape character.
- Improve right of way signage.
- Improve PRoW connections from urban and rural settlements to the right of way network promoting new links where absent.
- Maintain access to the Linear Parks around Milton Keynes from the existing urban areas. When development opportunities arise consider providing new or improved access when appropriate.
- Promote the creation of additional public bridging points across the rivers.
- Promote visual enclosure.
- Consider if there is further scope to minimise the visual impact of the main transport corridors including the M1 and A5 by introducing additional planting.

8.3.7 The Site is within LCA 2d Ouzel North Urban River Valley. Inherent landscape sensitivities include tranquil, open field pattern and river valley floor landscape. The condition of the landscape within this area is described as "*moderate as a result of widespread land cover change due to the presence of development on the edge of Milton Keynes and major roads (M1, A422 and A509) that has disrupted the valley landscape*."

8.3.8 Specific landscape management guidelines for the LCA are to "*Promote the continued management and enhancement of the River Ouzel corridor and access from the adjacent urban areas. Promote the development of the Ouzel Valley Linear Park, extending the Ouzel Valley Park northwards between Willen and Newport Pagnell*."

8.3.9 Receptor Sensitivity: The quality and condition of the landscape is good and considered to be of medium value. The 'Ouzel North Urban River Valley' is of **Medium** susceptibility to the Proposed Development. This results in a medium sensitivity overall.

<u>Clay Lowland Farmland</u>

8.3.10 The Site is adjacent to LCT 4 Clay Lowland Farmland; an area of relatively low-lying land at the eastern and southeast edge of Milton Keynes. The area is characterised by low lying and generally flat landscape; mixed arable, pasture and recreational land uses; limited woodland cover; few field trees; dominated by major transport routes; large scale arable fields with overgrown hedges; and extensive and open views to the clay plateau

and towards Milton Keynes.

8.3.11 Key characteristics include:

- Low lying and generally flat landscape on the urban edge of Milton Keynes
- Mixed arable, pasture and recreational land uses
- Large scale arable fields with overgrown hedges and smaller areas of pasture for horses and stabling
- Wide range of urban fringe activities and uses including garden centres, allotments, individual industrial premises to the southeast of Milton Keynes
- Limited woodland cover
- Conifer shelterbelts
- Few field trees except in the vicinity of Wavendon House
- Dominated by major transport routes
- Scattered villages with a mix of characters
- On-going residential and commercial development adjacent to this LCT
- Locally more intact historic landscape to the east of Wavendon
- Gravel, sand and clay workings and restoration
- Extensive and open views to the clay plateau, wooded Greensand Ridge and towards Milton Keynes
- The open agricultural landscape of LCA 4b provides a visually important setting for the Greensand Ridge.

8.3.12 General landscape management guidelines include:

- Promote indigenous plant species and use of species.
- Encourage multi-functionality of rural land adjacent to urban areas.
- Promote the creation of new woodland blocks and copses throughout the area to strengthen the character of the area providing visual relief from extensive arable fields and providing additional screening of existing and proposed development at Milton Keynes.
- Promote hedgerow restoration and improvements throughout the area to provide visual and ecological links between existing and proposed woodland.
- Promote traditional methods of hedgerow management including coppicing, laying and gapping up.
- Encourage progressive removal of conifer hedgerows and shelter belts where appropriate and replacement with native species.

8.3.13 The Site is within LCA 4a Broughton to Tickford Clay and Lowland Farmland, for which the following specific guidelines apply "*Develop a strategy to screen the M1 through additional off-site woodland planting and management of the on-site highway planting*."

8.3.14 The condition of the landscape within this area is described as "*moderate due to the influence of the M1 to the south, and a field pattern that has fragmented as a result of amalgamation. Woodland and tree cover is sparse and age structure is generally restricted to mature or young trees…The M1 appears to provide a boundary to built development in the south and as a result there is little new built development in the area*."

8.3.15 Receptor Sensitivity: The quality and condition of the landscape is good and considered to be of medium value. The 'Broughton to Tickford Clay and Lowland Farmland' is of medium susceptibility to the Proposed Development. This results in a **Medium** sensitivity overall.

Landscape Elements and Features of the Site

Topography

8.3.16 The Site sits on land generally above c.61m AOD (shown on Figure 8.4) with the southwest corner adjacent to Willen Road at a higher elevation falling towards the floodplain of the River Ouzel or Lovat (c.58m AOD). The area of sand and gravel extraction has caused local variations in landform. The topography is of medium value and susceptibility to the Proposed Development due to the area of floodplain around the river. This results in a **Medium** sensitivity overall.

Land use/landcover

8.3.17 Most of the area is in agricultural use with a large area of sand and gravel extraction in the south. Several properties (Caldecote Farm, Caldecote Cottage and Moat Cottage) not included within the red line, lie within the Proposed Development area.

8.3.18 The quality and condition of the land use/landcover is considered to be of low value and susceptibility to the Proposed Development. This results in a **Low** sensitivity overall.

Trees and Hedgerows

8.3.19 A tree survey has been carried out by Aspect Arboriculture and accompanies the wider application. Eight hedgerows, 63 tree groups and 137 individual trees have been identified across the Site. The quality of the trees generally falls within categories C and B with one Category A English Oak.

8.3.20 The quality and condition of the trees and hedgerows is good, and they are considered to be of medium value and susceptibility to the Proposed Development. This results in a **Medium** sensitivity overall.

River Ouzel corridor (watercourse and vegetation)

8.3.21 The eastern fields of the Site sit within the River Ouzel Corridor. Existing vegetation sits mainly on the eastern banks outside of the Site. It is the defining feature of the 'Ouzel North Urban River Valley' LCA and therefore of importance in terms of character features of the Site.

8.3.22 The quality and condition of the corridor is good and is considered to be of medium value and susceptibility to the Proposed Development. This results in a **Medium** sensitivity overall.

Visual Baseline

8.3.23 A baseline study of the Site has been undertaken to determine the relationship of the Site and its surroundings, the visibility of the Site within the wider landscape and the effect that this would have on visual characteristics.

8.3.24 This visual study has contributed to the body of evidence that allowed an informed understanding of the inter-visibility and relationship between the Site and its surroundings and how this relationship can be maintained and enhanced with the Proposed Development. The assessment of potential effects that the Proposed Development would have on views is tested against this baseline.

Zone of Theoretical Visibility

8.3.25 The Screened Zone of Theoretical Visibility Plan (Figure 8.2: Screened ZTV) and Viewpoints Locations Plan (Figure 8.5: Viewpoint Location Plan) identifies the potential locations from which the development may be theoretically visible. The screened ZTV has been produced using ArcGIS and generated using OS Terrain 5 data combined with OS Open Map Local data. This uses terrain data and considers the screening effects of woodlands, groups of trees and buildings in the landscape. It does not include smaller hedgerows and individual trees or other vertical elements within the landscape. It presents an estimate in terms of theoretical visibility and the actual extent of the area from which the proposed solar farm would be visible is likely to be much smaller. It does not include the wider MKE SUE.

Representative Receptors

8.3.26 The following provides a description of visual receptor groups summarised in Appendix 8.3: Visual Effects Summary Table and refers to Appendix 8.4: Viewpoints 1-10.

<u>Residents/Community</u>

8.3.27 The residential edge of Tickford (Viewpoint 6), Caldecote Farm, Caldecote Cottage, Moat Cottage, Caldecote Mill and users of the recreation ground are considered within this assessment.

8.3.28 Views at the urban edge of Tickford (to the northeast) are rural in nature, and not within a landscape designation, they and are considered medium value. Residents are of high

susceptibility. The combined value and susceptibility results in a **High** sensitivity for residents.

8.3.29 Caldecote Farm, Caldecote Cottage, and Moat Cottage are located adjacent to the redline but not within it. Caldecote Mill is located at the eastern edge of the Site and is surrounded by vegetation. A combined high value and susceptibility results in a **High** sensitivity for residents.

8.3.30 The recreation ground is located to the north of the Site (Viewpoint 4). Users are generally focussed on activities within the area. The combined medium value and susceptibility results in a **Medium** sensitivity for recreation ground users.

PRoW Users

8.3.31 There are several PRoW within and around the Site. Views are generally rural in nature and not within a landscape designation and are considered medium value. PRoW users are of high susceptibility. The combined value and susceptibility results in a high sensitivity for PRoW users. The following PRoW have been considered within the assessment.

8.3.32 PRoW footpath Moulsoe FP014 running broadly north-south through the Site to the M1 (Viewpoint 1).

8.3.33 PRoW footpath Newport Pagnell FP007 running broadly southwest from Willen Road towards the Site (Viewpoint 4).

8.3.34 The PRoW footpath Newport Pagnell FP008 passing broadly southeast along the edge of the recreational area, east of the treed mound and through the parcel of the Site north of the A422 (Viewpoint 5).

8.3.35 PRoW Footpath Moulsoe FP018 running broadly east from the A422 towards a local high point, with wide open views across the surrounding area and west towards the Site (Viewpoint 9).

8.3.36 PRoW footpath Moulsoe FP004 running broadly north down the hill from the edge of Moulsoe. From the edge of Moulsoe views are open and long ranging (Viewpoint 10).

Road Users

8.3.37 Highway users are of medium susceptibility and medium value resulting in a **Medium** sensitivity for receptors overall. The following surrounding roads have been considered within the assessment.

8.3.38 Views from Willen Road bridge over the M1 from which there are glimpsed partial elevated views towards the Application Site (Viewpoint 2), and from the section which runs along the eastern edge of the Site (Viewpoint 3).

8.3.39 The A422 which runs through the north of the Site (Viewpoint 5).

8.3.40 Caldecote Lane (Viewpoint 7) leads to a few properties including Caldecote Mill and is not a through route.

8.3.41 London Road (Viewpoint 8) runs north south to the east of the Site. There are potential oblique partial, glimpsed views towards the site experienced by traffic in a broadly north/south direction.

Representative Viewpoints

8.3.42 A series of ten representative views surrounding the Site have been identified through desk-top and field studies, and discussion with the Landscape Officer at Milton Keynes Council. The selection of viewpoints is not intended to cover every possible view of the Site, but rather they are representative of a range of receptor types at varying distances and orientations. The viewpoints (shown on Figure 8.5: Viewpoint Location Plan) represent a range of receptor groups and views experienced by residents/community, PRoW users and road users.

8.3.43 The Baseline views found at Appendix 8.4: Viewpoints 1-10 and sensitivity of associated visual receptors is discussed in the following section. The following text provides a summary of receptor sensitivity and should be read in conjunction with the relevant Appendices.

8.3.44 The representative viewpoints demonstrate the relative visibility of the Application Site (and existing features or development on it) and its relationship with the surrounding landscape and built forms. The selection of the key viewpoints was based on the following criteria and discussed with the LPA:

- The requirement to provide an even spread of representative viewpoints within the visual envelope.
- The requirement to provide representative viewpoints that consider a human's normal field of vision (i.e. panoramic views).
- From locations which represent a range of near (local views), middle, and long-distance views.
- Whilst private views are relevant, public viewpoints, i.e. from roads and public rights of way and other areas of open public access, are selected since they

tend to have a higher incidence of receptors affected.
- Views from sensitive receptors within designated landscapes.

8.3.45 A visual appraisal has been carried out to determine the relationship of the Site within its surroundings and its approximate extent of visibility within the wider landscape from publicly accessible locations. The Site visit to record viewpoint photography was carried out in February 2021. These winter views provide a worst-case baseline view when vegetation is out of leaf, providing maximum visibility.

8.3.46 Representative views have been taken close to local properties and edge of settlement locations. Views from PRoW and local roads have been recorded from gaps in hedgerows and gateways where views are available. Viewpoints from PRoW within the Proposed Development layout boundary have not been included within the selection of views as it is assumed that there would be a direct significant impact to receptors with such a direct view.

8.3.47 The following provides a description of the individual baseline views and sensitivity of associated visual receptors and refers to Appendix 8.4: Viewpoints 1-10.

Viewpoint 1: From PRoW footpath Moulsoe FP014, looking north

8.3.48 PRoW footpath Moulsoe FP014 runs broadly north-south through the Application Site to the M1. Caldecote Farm, Caldecote Cottage and Moat Cottage are visible in the mid ground of the view which add to the rural view. The view is tranquil in appearance looking north; the M1 motorway is visible and audible in the background. Changes to the landform caused by quarrying are visible to the northwest. The flood plain is to the east of the view.

8.3.49 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered medium value. PRoW users are of high susceptibility. The combined value and susceptibility results in a **High** sensitivity for PRoW users at this viewpoint.

Viewpoint 2: From Willen Road, bridge over the M1, looking northeast

8.3.50 From the road bridge there is a glimpsed partial vie of the Application Site. Moat Cottage is distinguishable to the centre of the view, with the Interchange Industrial Park visible beyond it. Traffic is visible moving along London Road. Existing boundary vegetation around the southern boundary of the Site. The landscape appears generally flat. Trees along the River Ouse are perceptible to the west of Musloe which sits at a higher elevation on the skyline.

8.3.51 The view is at the urban fringe and relatively rural in nature, not within a landscape

designation; it is considered medium value. Highway users are of medium susceptibility. The combined value and susceptibility results in a **Medium** sensitivity for receptors at this viewpoint.

Viewpoint 3: From Willen Road, looking east

8.3.52 The view from this point along Willen Road is channelled north-south by hedgerow vegetation. The Application Site boundary is clearly visible in the centre of the view. Caldecote Farm is perceptible beyond the immediate fencing. Most of the Site is obstructed from view.

8.3.53 The view is at the urban in nature, not within a landscape designation; it is considered low value. Highway users are of medium susceptibility. The combined value and susceptibility results in a medium sensitivity for receptors at this viewpoint.

Viewpoint 4: From PRoW Footpath Newport Pagnell FP007, looking southeast

8.3.54 The footpath runs broadly southwest towards the Site. The Site sits beyond a raised area of land on which there are trees and shrubs, screening any potential view of the Site. Existing vegetation is visible along the northwest edge of the parcel north of the A422. The northern edge of the parcel south of the A422 is distinguishable to the fore of Caldecote Farm within the view. Traffic is visible and audible along the A422.

8.3.55 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered medium value. PRoW are of high susceptibility, and recreation ground users medium. The combined value and susceptibility results in a **High** sensitivity for PRoW users and **Medium** for recreation ground users at this viewpoint.

Viewpoint 5: From PRoW Footpath Newport Pagnell FP008, looking southwest

8.3.56 The PRoW footpath passes broadly southeast along the edge of the recreational area, passing east of the treed mound and through the parcel of the Site north of the A422. The view is from the point it crosses the A422 and into the main part of the Site. Traffic along the road is noisy and fast moving. Due to the managed hedgerow along the Site boundary the view is relatively open across the northern field of the Site towards Moat Cottage, Caldecote Cottage and Caldecote Farm. Tongwell Industrial Estate is visible to the southwest. The view across the Site is flat with most of the Site obscured by the layering effect of hedgerows and vegetation across the Site.

8.3.57 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered medium value. PRoW users are of high susceptibility, road users are

medium. The combined value and susceptibility results in a **High** sensitivity for PRoW users and **Medium** for road users at this viewpoint.

Viewpoint 6: From the edge of Tickford End, looking south

8.3.58 The footpath passes along the southern edge of Tickford End following the route of the River Ouzel. The view is flat and open across the immediate fields with occasional riverside trees filtering views. The northeast edge of the Site north of the A422 is visible in the centre of the view.

8.3.59 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered medium value. Residents are of high susceptibility. The combined value and susceptibility results in a **High** sensitivity for residents represented by this viewpoint.

Viewpoint 7: From Caldecote Lane, looking southwest

8.3.60 Caldecote Lane leads to a few properties and is not a through route. The view is open and rural in nature across the flat floodplain. Vegetation along the River Ouzel screens views towards the site. The Site is not immediately obvious within the view. The layering of intervening vegetation across the flat landscape provides a treed skyline.

8.3.61 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered low value. Users of the lane are low sensitivity and susceptibility. The combined value and susceptibility results in a **Low** sensitivity at this viewpoint.

Viewpoint 8: From London Road, looking west

8.3.62 Oblique partial, glimpsed views towards the site from London Road are experienced by fast moving traffic in a broadly north/south direction. As with other views from this direction, the layering of intervening vegetation (including vegetation along the River Ouzel) across the flat landscape provides a treed skyline. This view is from a high point along London Road from which you are looking slightly down towards the River Ouzel and the Site. The Site is not immediately obvious within the view.

8.3.63 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered medium value. Road users are of medium susceptibility. The combined value and susceptibility results in a **Medium** sensitivity for road users at this viewpoint.

Viewpoint 9: From PRoW footpath Moulsoe FP018, looking southwest

8.3.64 PRoW Footpath Moulsoe FP018 runs broadly east from the A422 towards a local high point. The view is rural in nature and views are more tranquil in nature than in the lower

areas closer to the Site. Landmark buildings in Milton Keynes such as the Theatre and Xscape Building are visible on the skyline. In the mid-ground, London Road, Tongwell Industrial Estate and the A422 are visible. The Site is not immediately obvious.

8.3.65 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered medium value. PRoW users are of high susceptibility. The combined value and susceptibility results in a **High** sensitivity for PRoW users at this viewpoint.

Viewpoint 10: From PRoW footpath Moulsoe FP004, looking northwest

8.3.66 PRoW footpath Moulsoe FP004 runs broadly north down the hill from the edge of Moulsoe. From the edge of Moulsoe views are open and long ranging. Tongwell Industrial Estate and Monks Way are perceptible in the view. The A422 and Interchange Park Industrial Estate are visible to the northwest. The Site itself is obscured by the hill in the centre of the view and is not clearly visible.

8.3.67 The view is at the urban fringe and rural in nature, not within a landscape designation; it is considered medium value. PRoW users are of high susceptibility. The combined value and susceptibility results in a **High** sensitivity for PRoW users at this viewpoint.

8.4 Potential Impacts of the Proposed Development

Construction Phase

8.4.1 It is considered inevitable for any development of the scale proposed, there would be the potential for significant effects to some extent on the landscape character and visual amenity. The following section summarises the significant effects only and should be read in conjunction with Appendix 8.2: Landscape Effects Summary Table and Appendix 8.3: Visual Effects Summary Table.

8.4.2 Construction works would include such activities as earthmoving and groundworks, formation of roads, new junctions with existing roads, site infrastructure (roads, bridges, drainage and services), construction of buildings and related features/surfacing, installation of lighting, creation of open spaces, SUDS features, GI, and other landscape treatments.

8.4.3 Potential mitigation measures to reduce the temporary landscape and visual effects during the construction phase are (but not limited to) the following:

- The use of solid hoardings around the construction site, where construction activity is in proximity to visual receptors, to screen construction activity from

the ground level, including from representative visual receptors.

- Avoiding siting construction haul routes adjacent to existing residential properties.
- Controlling the lighting of construction compounds and machinery to minimise upward and outward light pollution through lantern design, direction and baffling and ensuring that the minimum area only is lit, for the minimum period.
- Limiting the compaction and disruption to the soil structure within the previously undeveloped areas, so that soil permeability within the new open space areas is not reduced.
- Restricting the movement of stockpiles and materials to minimise vehicle tracking across the Site.
- Locating compounds and stockpiles in the least visible locations within the Site, including for rendering facades to aid in integrating their form within views and agreeing the siting of compounds with the LPA.
- Protecting all retained vegetation on site during construction by fencing, installed before the commencement of construction activity of any phase of the Development and in compliance with BS5837:2012 Trees in relation to design, demolition and construction - Recommendations.

8.4.4 It is anticipated the environmental controls (or mitigation measures) to eliminate, reduce or offset likely significant adverse effects on the environment during the construction phase will be secured by appropriately worded planning conditions and obligations.

8.4.5 The impacts during the construction phase are generally more likely to result in temporary significant adverse effects due to additional movement and change generated by construction activity within the Site. This contrasts with the more 'settled' appearance of the completed development and further integration of built form with the establishment of new planting over time.

Effects on Landscape Receptors

8.4.6 The nature of the construction works would introduce temporary structures, facilities and a change of land use. The changes would be phased, happening in different areas across the Site over the duration of the construction period. This stage of the development would involve the removal of agricultural land, trees and hedgerows and a change in land use.

8.4.7 No significant effects were assessed during construction. Moderate not-significant effects were assessed for LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley, topography, trees and hedgerows, and River Ouzel corridor (watercourse and vegetation). Minor not-significant effects were assessed for LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland, and land use/land cover.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Local Character Area			
LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley	Medium	Medium	Moderate (Not significant)
LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland	Medium	Low	Minor (Not Significant)
Landscape Elements and Features within the Site			
Topography	Medium	Medium	Moderate (Not Significant)
Land use/land cover	Low	Medium	Minor (Not significant)
Trees and hedgerows	Medium	Medium	Moderate (Not significant)
River Ouzel corridor (watercourse and vegetation)	Medium	Medium	Moderate (Not significant)

Table: 8.1 Summary of Landscape Effects – Construction

Effects on Visual Receptors

Residents/Community

8.4.8 Properties within or at the edge of the site boundary (namely Caldecote Farm, Caldecote Cottage and Moat Cottage) would experience major significant impacts during the construction phase due to their proximity to the site.

8.4.9 Moderate non-significant effects were for high sensitivity receptors assessed at the residential edge of Tickford and Caldecote Mill, where views are more obscured and set back from the construction phase. Effects on users of the recreation ground were assessed as Minor (not significant).

PRoW Footpath Users

8.4.10 Major significant effects would be experienced along PRoW Moulsoe FP014 at the southern edge of the Site, and PRoW Newport Pagnell FP008 along the A422, this is due primarily to the direct proximity view of construction in these areas.

8.4.11 Non-significant effects were assessed at most Viewpoints representing high sensitivity PRoW footpath users including Newport Pagnell FP007 within Willen Road sports ground, footpath Moulsoe FP018 located on high ground to the east and Moulsoe FP004 on high ground to the southeast.

Road Users

8.4.12 No significant effects were assessed during construction at all Viewpoints representing road users including Willen Road and the bridge over the M1, Caldecote Lane and London

Road. Effects on low sensitivity receptors of the A422 would be moderate (not significant) due to the proximity of the road to the northern edge of the Site.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Residents/community			
Edge of Tickford End	High	Low	Moderate (Not significant)
Caldecote Farm, Caldecote Cottage, Moat Cottage	**High**	**High**	**Major (significant)**
Caldecote Mill	High	Low	Moderate (Not significant)
Users of the recreation ground	Medium	Low	Minor (Not significant)
PRoW Users			
PRoW footpath Moulsoe FP014	**High**	**High**	**Major (significant)**
PRoW Footpath Newport Pagnell FP007	High	Low	Moderate (Not significant)
PRoW Footpath Newport Pagnell FP008	**High**	**High**	**Major (significant)**
PRoW footpath Moulsoe FP018	High	Low	Moderate (Not significant)
PRoW footpath Moulsoe FP004	High	Negligible	Negligible
Road Users			
Willen Road, bridge over the M1	Low	Medium	Minor (Not significant)
Willen Road	Low	Medium	Minor (Not significant)
A422	Low	High	Moderate (Not significant)
Caldecote Lane	Low	Low	Minor (Not significant)
London Road	Low	Medium	Minor (not significant)

Table: 8.2 Summary of Visual Effects – Construction

Operation Year 1

8.4.13 This stage of the development takes into consideration the Proposed Development after completion at year 1 prior to the establishment of proposed mitigation measures. The assessment has been carried out under the assumption that the built form will be articulated in some way within the maximum parameters and using an appropriate palette of materials. Potential design is explained in more detail within the Design and Access Statement.

8.4.14 As part of the master-planning process the possibility for significant effects on the local area has been considered and the master plan and landscape strategy developed to help reduce these effects and create a positive environmental setting for the Proposed Development. Careful consideration has been given to the overall distribution of different

land-uses, building massing and heights to ensure that the Proposed Development sits sympathetically within the locality. The potential to retain existing, and plant new, trees within the layout has also been considered along with the wider visual effect of the Proposed Development.

8.4.15 The following section summarises the significant effects and should be read in conjunction with Appendix 8.2: Landscape Effects Summary Table and Appendix 8.3: Visual Effects Summary Table.

Effects on Landscape Receptors

8.4.16 No significant effects have been assessed at year 1. Moderate not-significant effects were assessed for LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley, and River Ouzel corridor (watercourse and vegetation). Minor not-significant effects were assessed for LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland, topography, land use/land cover and trees and hedgerow.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Local Character Area			
LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley	Medium	Medium	Moderate (Not significant)
LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland	Medium	Low	Minor (Not Significant)
Landscape Elements and Features within the Site			
Topography	Medium	Low	Minor (Not Significant)
Land use/land cover	Low	Low	Minor (Not Significant)
Trees and hedgerows	Medium	Low	Minor (Not Significant)
River Ouzel corridor (watercourse and vegetation)	Medium	Medium	Moderate (Not significant)

Table: 8.3 Summary of Landscape Effects – Year 1

Effects on Visual Receptors

Residents/Community

8.4.17 Properties within or at the edge of the site boundary (namely Caldecote Farm, Caldecote Cottage and Moat Cottage) would experience major significant impacts on completion of the Proposed Development due to their proximity to the site.

8.4.18 Moderate non-significant effects were for high sensitivity receptors assessed at the residential edge of Tickford and Caldecote Mill, where views are more obscured and set

back from the Proposed Development. Effects on users of the recreation ground were assessed as Minor (not significant).

PRoW Footpath Users

8.4.19 Major significant effects would be experienced along PRoW Moulsoe FP014 at the southern edge of the Site, Newport Pagnell FP007 within Willen Road Sports ground and PRoW Newport Pagnell FP008 along the A422, this is due primarily to their proximity to the Proposed Development.

8.4.20 Non-significant effects were assessed at most Viewpoints representing high sensitivity PRoW footpath users including, footpath Moulsoe FP018 located on high ground to the east and Moulsoe FP004 on high ground to the southeast.

Road Users

8.4.21 Non-significant effects were assessed at all Viewpoints representing road users including Willen Road and the bridge over the M1, Caldecote Lane and London Road. Effects on low sensitivity receptors of the A422 would be moderate (not significant) due to the proximity of the road to the northern edge of the Site.

Receptor	**Sensitivity**	**Magnitude of Change**	**Significance of Effects**
Residents/community			
Edge of Tickford End	High	Low	Moderate (Not significant)
Caldecote Farm, Caldecote Cottage, Moat Cottage	**High**	**High**	**Major (significant)**
Caldecote Mill	High	Low	Moderate (Not significant)
Users of the recreation ground	Medium	Low	Minor (Not significant)
PRoW Users			
PRoW footpath Moulsoe FP014	**High**	**Medium**	**Major (significant)**
PRoW Footpath Newport Pagnell FP007	**High**	**Medium**	**Major (significant)**
PRoW Footpath Newport Pagnell FP008	**High**	**Medium**	**Major (significant)**
PRoW footpath Moulsoe FP018	High	Low	Moderate (Not significant)
PRoW footpath Moulsoe FP004	High	Negligible	Negligible
Road Users			
Willen Road, bridge over the M1	Low	Medium	Minor (Not significant)
Willen Road	Low	Medium	Minor (Not significant)
A422	Low	Medium	Moderate (Not significant)

Caldecote Lane	Low	Low	Minor (Not significant)
London Road	Low	Medium	Minor (not significant)

Table: 8.4 Summary of Visual Effects – Year 1

Operation Year 15

8.4.22 This stage of the development takes into consideration the Proposed Development after completion at year 15. This is assessed at year 15 (summer), to allow for the establishment of the planting proposed in the Strategic Landscape Master Plan. The assessment has been carried out under the assumption that the built form will be articulated in some way within the maximum parameters and using an appropriate palette of materials. Potential design is explained in more detail within the Design and Access Statement.

8.4.23 The design and layout of the Proposed Development has taken into consideration landscape and visual constraints and opportunities identified from baseline research and local policy requirements to reduce the potential for adverse effects and take advantage of the landscape and visual opportunities present within the Site and includes the following measures:

<u>Landscape Character and Structure of the Landscape</u>

- Use of planting to integrate into the natural and built environment, responding to local character to minimise landscape impact.
- Respect the character of the landscape of the Site, responding to existing field patterns, watercourse (River Ouzel), and hedgerows.
- Enhancement of tree planting, to retain the treed character along the River Ouzel, screening views of development to the east.
- Location of built development responds to the existing landform, offset from the flood zone and River Ouzel corridor.

<u>Provision of Green Infrastructure</u>

- Conserve and enhance natural or semi-natural vegetation characteristic of the area through locally native plant selection. Protecting and enhancing biodiversity.
- Provision of strategically significant green spaces with a network of attenuation basins, paths and cycleways.
- Incorporate sustainable drainage systems.
- Provision of a variety of locally characteristic green infrastructure and the retention and enhancement of the green corridors associated with the River Ouzel.
- Contribution to the existing Treed character.

Enhancement of Routes

- Management, maintenance, upgrading and extension of the PRoW network.
- Enhancement of the character and associated landscaping along the primary green corridor.
- Provision of public amenity space and pedestrian linkage to the surrounding network of PRoW.
- Provide cycle route to link to Willen road and A422.

Boundaries and Edges

- Integration of proposed built form into the landscape/townscape by locating it within a framework of existing and proposed vegetation.
- Landscape and boundary treatments respond to existing natural boundaries created by the structure of existing hedgerows, tree belts and transport routes.
- Retention and reinforcement/enhancement of existing structural vegetation.
- Set back of built form from green space to maintain visual corridors.

Woodlands and Trees

- Protection of and connection of disjointed hedgerows.
- Retention and additional tree planting in green space and urban areas.
- Introduction of appropriate new tree planting within areas of open space and River Ouzel Corridor.

8.4.24 This section summarises the significant effects remaining after mitigation measures outlined and should be read in conjunction with Appendix 8.2: Landscape Effects Summary Table and Appendix 8.3: Visual Effects Summary Table.

Effects on Landscape Receptors

8.4.25 No significant effects have been assessed at year 15. Minor not-significant effects were assessed for LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley, topography, land use/land cover and trees and hedgerow, and River Ouzel corridor (watercourse and vegetation). Negligible effects were assessed for LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Local Character Area			
LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley	Medium	Low	Minor (Not Significant)
LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland	Medium	Negligible	Negligible
Landscape Elements and Features within the Site			
Topography	Medium	Low	Minor (Not Significant)
Land use/land cover	Low	Low	Minor (Not Significant)
Trees and hedgerows	Medium	Low	Minor (Not Significant)

River Ouzel corridor (watercourse and vegetation)	Medium	Low	Minor (Not Significant

Table: 8.5 Summary of Landscape Effects – Year 15

Effects on Visual Receptors

Residents/Community

8.4.26 No significant effects have been assessed at year 15. Properties within or at the edge of the site boundary (namely Caldecote Farm, Caldecote Cottage and Moat Cottage) would experience moderate significant impacts at year 15 due to more settled and maturing landscape.

8.4.27 Effects have been assessed as negligible for high-medium sensitivity receptors at the residential edge of Tickford and Caldecote Mill and users of the recreation ground, where views are more obscured and set back from the Proposed Development and where maturing mitigation measures will further screen any visible built form.

PRoW Footpath Users

8.4.28 No significant effects have been assessed at year 15. Significant effects on PRoW Moulsoe FP014 at the southern edge of the Site, Newport Pagnell FP007 within Willen Road sports ground and PRoW Newport Pagnell FP008 along the A422, would be reduced by year 15. This is due to the more settled nature of the Proposed Development and proposed planting.

8.4.29 Negligible effects were assessed at most Viewpoints representing high sensitivity PRoW footpath users including footpath Moulsoe FP018 located on high ground to the east and Moulsoe FP004 on high ground to the southeast.

Road Users

8.4.30 Non-significant effects were assessed at all Viewpoints representing road users including Willen Road and the bridge over the M1, A422, Caldecote Lane and London Road.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Residents/community			
Edge of Tickford End	High	Negligible	Negligible
Caldecote Farm, Caldecote Cottage, Moat Cottage	High	Low	Moderate (Not significant)
Caldecote Mill	High	Negligible	Negligible
Users of the recreation ground	Medium	Negligible	Negligible
PRoW Users			
PRoW footpath Moulsoe FP014	High	Low	Moderate (Not significant)

PRoW Footpath Newport Pagnell FP007	High	Low	Moderate (Not significant)
PRoW Footpath Newport Pagnell FP008	High	Low	Moderate (Not significant)
PRoW footpath Moulsoe FP018	High	Negligible	Negligible
PRoW footpath Moulsoe FP004	High	Negligible	Negligible
Road Users			
Willen Road, bridge over the M1	Low	Low	Minor (Not significant)
Willen Road	Low	Low	Minor (Not significant)
A422	Low	Low	Minor (Not significant)
Caldecote Lane	Low	Negligible	Negligible
London Road	Low	Low	Minor (Not significant)

Table: 8.6 Summary of Visual Effects – Year 15

Cumulative Effects

8.4.31 Details of the cumulative sites assessed within this chapter can be found at Chapter 11.

Methodology for Cumulative Assessment

8.4.32 The first step in the cumulative assessment is an initial assessment to ascertain which of the landscape character receptors, representative viewpoints and principal visual receptors have potential to undergo significant cumulative effects as result of the addition of the Proposed Development.

8.4.33 A significant cumulative effect will occur where the addition of the Proposed Development to the cumulative development within the allocation site, will result in a change to landscape character or view that is characterised primarily by the presence of built form, so that other patterns and components are no longer definitive.

8.4.34 It should be noted that even if the Proposed Development is assessed to have a significant effect on a landscape character receptor or view, it does not necessarily follow that the cumulative effect will also be significant.

8.4.35 As with the assessment of effects of the Proposed Development in isolation, the significance of cumulative effects is determined through a combination of the sensitivity of the landscape receptor or view and the magnitude of change upon it. The sensitivity of landscape receptors and views is the same in the cumulative assessment as in the assessment of the proposed development in isolation. However, the cumulative magnitude of change is assessed in a different way, as described in the Methodology (Appendix 8.1) to this Chapter.

8.4.36 Cumulative visual effects can arise in four reasonably distinctive ways:

- Simultaneously / in combination, where two or more cumulative developments are seen together at the same time from the same viewpoint, and in the same field of view. The effects of an extension of an existing development or the positioning of a new development such that it would be seen as extending the presence of built infrastructure.
- In succession - where two or more developments are present in views from the same location but cannot be seen in the same field of view and the observer must turn to see them.
- In sequence - where two or more cumulative developments are not seen from the same viewpoint, even if the observer turns around to extend his/her perception of the surrounding landscape. The receptor must move to another location to see cumulative developments. The frequency of occurrence greatly depends on factors such as: distance to developments, distance to another viewpoint and speed of travel.
- Perceived - where the observer is unable or unwilling to gain a view of another development but is aware of its presence.

8.4.37 The following section summarises the significant effects and should be read in conjunction with Appendix 8.2: Landscape Effects Summary Table and Appendix 8.3: Visual Effects Summary Table.

Effects on Landscape Receptors

8.4.38 No significant cumulative effects have been assessed. Moderate not-significant effects were assessed for LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley and River Ouzel corridor (watercourse and vegetation). These character areas will be largely urbanised following the development of the cumulative and the Proposed Sites. Minor not-significant effects were assessed for LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland, topography, land use/land cover, and trees and hedgerow.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Local Character Area			
LCT 2 Urban River Valley, LCA 2d Ouzel North Urban River Valley	Medium	Medium	Moderate (Not significant)
LCT 4 Clay Lowland Farmland, LCA 4a Broughton to Tickford Clay and Lowland Farmland	Medium	Low	Minor (Not Significant)
Landscape Elements and Features within the Site			
Topography	Medium	Low	Minor (Not Significant)
Land use/land cover	Low	Low	Minor (Not Significant)
Trees and hedgerows	Medium	Low	Minor (Not Significant)

River Ouzel corridor (watercourse and vegetation)	Medium	Medium	Moderate (Not significant)

Table: 8.7 Summary of Landscape Effects – Year 1

Effects on Visual Receptors

Residents/Community

8.4.39 No significant cumulative effects have been assessed for properties within the site boundary (namely Caldecote Cottage and Moat Cottage) due to their proximity within the Development Site. Caldecote Farm would experience moderate (not significant) effects due to its proximity to the cumulative employment Site west of Willen Road. Non-significant cumulative effects were for high sensitivity receptors assessed at the residential edge of Tickford, Caldecote Mill, and users of the recreation ground.

PRoW Footpath Users

8.4.40 Major significant effects would be experienced along PRoW Moulsoe FP014 at the southern edge of the Site. The viewpoint is located within the wider MKE scheme elements of which may be visible within the view to the west and east where the proposed Grid Road would also be visible to the south. There would be a combined sequential view of the cumulative and Development Site from this point.

8.4.41 Non-significant effects were assessed at most Viewpoints representing high sensitivity PRoW footpath users including Newport Pagnell FP007 within Willen Road sports ground, PRoW Newport Pagnell FP008 along the A422, footpath Moulsoe FP018 located on high ground to the east and Moulsoe FP004 on high ground to the southeast.

Road Users

8.4.42 Minor (not significant) effects were assessed at all Viewpoints representing road users including A422, Willen Road and the bridge over the M1, Caldecote Lane and London Road.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Residents/community			
Edge of Tickford End	High	Low	Moderate (Not significant)
Caldecote Mill, Caldecote Cottage, Moat Cottage	High	Negligible	Negligible
Caldecote Farm	High	Low	Moderate (Not significant)
Users of the recreation ground	Medium	Low	Minor (Not significant)

PRoW Users			
PRoW footpath Moulsoe FP014	**High**	**High**	**Major (significant)**
PRoW Footpath Newport Pagnell FP007	High	Low	Moderate (Not significant)
PRoW Footpath Newport Pagnell FP008	High	Low	Moderate (Not significant)
PRoW footpath Moulsoe FP018	High	Negligible	Negligible
PRoW footpath Moulsoe FP004	High	Negligible	Negligible
Road Users			
Willen Road, bridge over the M1	Low	Medium	Minor (Not significant)
Willen Road	Low	Medium	Minor (Not significant)
A422	Low	Low	Minor (Not significant)
Caldecote Lane	Low	Low	Minor (Not significant)
London Road	Low	Medium	Minor (not significant)

Table: 8.8 Summary of Visual Effects – Year 1

8.5 Summary

Introduction

8.5.1 This chapter has assessed the likely significant effects of the Proposed Development upon the receiving environment; landscape character and elements associated with the Application Site and identified visual receptors.

Baseline conditions

8.5.2 The Site is not located within any statutory or local/non-statutory landscape designations.

8.5.3 The Site is within LCT 2 Urban River Valley which comprises the river valley floodplains of the River Great Ouse and its main tributaries including the River Ouzel, and the River Tove. The area is characterised by slow flowing meandering river in sinuous valley floor; areas of pasture close to the river; open field patterns; weirs and historic mills; river inconspicuous within the landscape; and tranquil character.

8.5.4 The eastern fields of the Site sit within the River Ouzel Corridor. Most of the area is in agricultural use with a large area of sand and gravel extraction in the south. Several properties (Caldecote Farm, Caldecote Cottage and Moat Cottage) not included within the red line, lie within the Proposed Development area.

8.5.5 Eight hedgerows, 63 tree groups and 137 individual trees have been identified across the Site.

8.5.6 Representative viewpoints and visual receptors include residents and community the residential edge of Tickford (to the northeast), Caldecote Farm, Caldecote Cottage, Moat Cottage, Caldecote Mill and users of the recreation ground. PRoW footpaths include Moulsoe FP014 running broadly north-south through the Site to the M1, Newport Pagnell FP007 running broadly southwest from Willen Road towards the Site, Newport Pagnell FP008 passing broadly southeast along the edge of the recreational area, Moulsoe FP018 running broadly east from the A422 towards a local high point, with wide open views across the surrounding area, and Moulsoe FP004 running broadly north down the hill from the edge of Moulsoe. Road users include views from Willen Road bridge over the M1, the A422 which runs through the north of the Site, Caldecote Lane, and London Road.

Likely Significant Effects

Construction Phase

8.5.7 The nature of the construction works would introduce temporary structures, facilities, and a change of land use. The changes would be phased, happening in different areas across the Site over the duration of the construction period. This stage of the development would involve the removal of agricultural land, trees and hedgerows and a change in land use. No significant landscape effects were assessed during construction. Significant effects were assessed for receptors at Caldecote Farm, Caldecote Cottage, Moat Cottage, PRoW footpath Moulsoe FP014 and Newport Pagnell FP008 due to the proximity of views to the construction phase.

Operational Phase

8.5.8 As part of the master-planning process the possibility for significant effects on the local area has been considered and the master plan and landscape strategy developed to help reduce these effects and create a positive environmental setting for the Proposed Development. Careful consideration has been given to the overall distribution of different land-uses, building massing and heights to ensure that the Proposed Development sits sympathetically within the locality. The potential to retain existing, and plant new, trees within the layout has also been considered along with the wider visual effect of the Proposed Development.

8.5.9 No significant landscape effects (including cumulative) have been assessed at year 1 or 15. Significant effects were identified for properties within or at the edge of the site boundary (namely Caldecote Farm, Caldecote Cottage and Moat Cottage), PRoW footpath Moulsoe FP014, and Newport Pagnell FP007 and FP008, due to their proximity to the site. The implementation and maturing of landscape proposals would reduce visual

effects over time to non-significant. No significant cumulative visual effects were identified.

Receptor	Sensitivity	Magnitude of Change	Significance of Effects
Construction			
Caldecote Farm, Caldecote Cottage, Moat Cottage	High	High	Major (significant)
PRoW footpath Moulsoe FP014	High	High	Major (significant)
PRoW Footpath Newport Pagnell FP008	High	High	Major (significant)
Year 1			
Caldecote Farm, Caldecote Cottage, Moat Cottage	High	High	Major (significant)
PRoW footpath Moulsoe FP014	High	Medium	Major (significant)
PRoW Footpath Newport Pagnell FP007	High	Medium	Major (significant)
PRoW Footpath Newport Pagnell FP008	High	Medium	Major (significant)
Year 15			
No significant effects assessed			
Cumulative			
No significant effects assessed			

Table: 8.9 Summary of Significant Effects Only

Conclusion

8.5.10 This LVIA has been carried out with regards to the best practice and techniques for landscape character assessment. The assessment has considered the existing context, potential change to the receiving landscape and influence on the visual amenity of the identified receptors. The assessment has concluded that there would be some localised significant visual effects due to proximity and direct nature of views, gained from properties and PRoW within the site during construction and at year 1 operation.

8.5.11 None of the remaining visual receptors within the study area, however, have been assessed as experiencing significant visual effects. In addition, none of the landscape character areas or landscape elements of the Site including the River Ouzel have been assessed as subject to significant effects, including cumulative landscape effects.

8.5.12 Overall, the Proposed Development has been considered as responding well to the characteristic of the receiving environment, mitigating visual effects, whilst not compromising the requirements of the Proposed Development. Table 8.9 above provides a summary of significant effects.

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9.0 TRANSPORT AND ACCESS

9.1 Introduction

9.1.1 This chapter of the Environmental Statement (ES) assesses the environmental effects of the Proposed Development in terms of transport.

9.1.2 In particular, it considers the likely environmental effects on the highway network in terms of severance, pedestrian amenity (including cyclists), fear and intimidation, driver and pedestrian delay, accidents and safety as a result of the changes to traffic flows from the Proposed Development. It addresses the impact of the Development for each of the potential parameters and assesses the impact within the study area and on any identified sensitive receptors.

9.1.3 This chapter draws on the Transport Assessment (TA), which has been prepared as a separate document, the scope of which was discussed with the Highway Authority, being Milton Keynes Council (MKC). The TA contains detailed operational analyses regarding the determination of and assessment of travel characteristics associated with the proposed development. The TA also contains comprehensive figures and plans relating to the proposals and should be read in conjunction with this ES Chapter.

9.1.4 This chapter describes the assessment methodology, the transport policy context, the existing baseline conditions at the site and surroundings, the development proposals and any required transport mitigation measures to prevent, reduce or offset any significant adverse effects.

9.1.5 The following Appendices have been included to accompany this Chapter:

- Appendix 9.1: Boundary Plans (Land Controlled by Bloor Homes and Development Site).
- Appendix 9.2: Cycle Maps.
- Appendix 9.3: PIA Data.
- Appendix 9.4: AADT Location Plan.

9.2 Planning Policy Assessment and Methodology

9.2.1 National policy on transport and land uses establishes broad policy objectives that reflect Government aspirations for integrating land development and transport. The role of local government to develop strategies based on specific local requirements, which deliver on national aspirations.

9.2.2 The development proposals have been evaluated against the following national and local transport policies and guidance:

a. National Policy:
   - National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019).
   - National Planning Practice Guidance (2014) Travel Plans, Transport Assessments and Statements.

b. Local Policy:
   - Plan: MK 2016 – 2031 (adopted March 2019).
   - Milton Keynes East Development Framework SPD (March 2020).
   - Mobility Strategy for Milton Keynes 2018 – 2036 (LTP4) (February 2018).

9.2.3 A comprehensive review of the above policy and guidance documents is set out in the corresponding Transport Assessment.

Institute of Environmental Assessment (IEA): Guidelines for the Environmental Assessment of Road Traffic

9.2.4 Guidelines for the Environmental Assessment of Road Traffic (Guidance Note No. 1) were published in 1993 by the Institute of Environmental Assessment (IEA) (now the Institute of Environmental Management and Assessment (IEMA)). These guidelines have been used to gauge the significance of the changes in environmental conditions caused by road traffic (IEA, 1993).

Design Manual for Roads and Bridges (DMRB) LA 104 Revision 1: Environmental Assessment and Monitoring

9.2.5 The Design Manual for Roads and Bridges (DMRB) is a series of technical documents produced by the Highways Agency (HA) (now Highways England, HE). Document LA 104 sets out the requirements for environmental assessment of projects, including reporting and monitoring of significant adverse environmental effects. This document is an update of the previous DMRB Volume 11.

9.3 Assessment Criteria and Assignment of Significance

Extent of the Study Area

9.3.1 The IEA Guidelines recommend two rules to be considered when assessing the impact of development traffic on a highway link:

- Rule 1: Include highway links where traffic flows will increase by more than 30%; and
- Rule 2: Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

9.3.2 The 30% threshold is based upon research and experience of the environmental impacts of traffic, with less than a 30% increase generally resulting in imperceptible changes in the environmental impacts of traffic apart from within sensitive locations.

9.3.3 The guidance considers that projected changes in traffic flow of less than 10% at specifically sensitive links/locations create no discernible environmental impact. In such instances, detailed appraisal of the various environmental effects arising from this change is not required.

9.3.4 Paragraph 3.20 of the IEA Guidelines gives examples of sensitive locations as being locations where specific environmental problems may occur such as accident high risk sites (black-spots), conservation areas, hospitals, and links with high pedestrian flows (e.g. near to schools).

9.3.5 For the purpose of this assessment the consideration of the effects of the Proposed Development will be undertaken on the following links and junctions surrounding the site:

Links:

- A422 Monks Way (east and west of Marsh End Roundabout).
- Willen Road (north and south of Marsh End Roundabout).
- Tongwell Street (north of Pineham Roundabout).
- B526 London Road (north of Tickford Roundabout).
- A509:
    - between Tickford Roundabout and Renny Lodge Roundabout.
    - east of Renny Lodge Roundabout.
    - south of Tickford Roundabout.
    - between Northfield Roundabout and M1 J14.
    - between Pineham Roundabout and Northfield Roundabout.
    - west of Pineham Roundabout.
- A5130 (east of Northfield Roundabout).
- Michigan Drive.
- Dansteed Way.

Junctions:

- Marsh End Roundabout.
- Tickford Roundabout.
- Renny Lodge Roundabout.
- Tongwell Roundabout.
- Pineham Roundabout.
- Northfield Roundabout.
- M1 J14 Broughton Interchange.

9.3.6 Column 3 in Table 2.1 of the IEA Guidelines sets out a list of environmental effects that

should be assessed for their significance. Each of these potential effects is set out herein. It is on this basis that the assessment in this chapter has been undertaken. It is acknowledged at paragraph 2.4 of the IEA Guidelines that not all the effects listed in the guidance (and reproduced below) would be applicable to every development.

Severance

9.3.7 Severance is defined within the IEA Guidelines as:

> *"the perceived division that can occur within a community when it becomes separated by a major traffic artery."*

9.3.8 The term is used to describe a complex series of factors that separate people from places and other people. Severance can also result from difficulty in crossing a heavily trafficked road.

9.3.9 The guidance indicates that severance impacts are considered 'slight', 'moderate' and 'substantial' with changes in traffic flows of 30%, 60% and 90% respectively. However, the Guidelines acknowledge that the measurement and prediction of severance is extremely difficult.

9.3.10 Where relevant, effects on severance are considered within this chapter.

Driver Delay

9.3.11 Where roads affected by development are at or near capacity, the traffic associated with such development can cause or add to vehicle delays. Many roads are typically at or near capacity during the weekday morning (08:00 to 09:00) and evening (17:00 to 18:00) peak hours. Other sources of delay for non-development traffic can include:

- At the proposed site access where there will be additional turning movements.
- On the roads passing the application site where there is likely to be additional traffic.
- At other key intersections along the road that might be affected by increased traffic.
- At junctions where the ability to find gaps in the traffic may be reduced, thereby lengthening delays.

9.3.12 Driver delay can be established at key junctions using conventional modelling techniques identifying the average delay in seconds. However, the IEA Guidelines identify that such delays are:

> *"…only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system".*

9.3.13 Where relevant, the effects on driver delay are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the above guidance document.

Pedestrian Amenity

9.3.14 The term 'pedestrian amenity' is broadly defined as the relative pleasantness of a journey. It is affected by traffic flow, speed and composition as well as footway width and the separation/protection from traffic.

9.3.15 It encompasses the overall relationship between pedestrians and traffic, including fear and intimidation, as detailed below.

9.3.16 The IEA Guidelines suggests a tentative threshold for judging the significance of changes in pedestrian amenity of where traffic flow (or its lorry component) is halved or doubled.

Fear and Intimidation

9.3.17 Fear and intimidation are the most emotive and difficult effect to quantify and assess. There are no commonly agreed thresholds for quantifying the significance of changes in pedestrian amenity, although the IEA Guidelines refer to a useful study that could be referenced when considering any effect. These thresholds are replicated in Table 9.1.

Degree of Hazard	Average Traffic Flow over 18-hour Day (veh/hour)	Total 18-hour Heavy Good Vehicle Flow	Average Speed over 18-hour Day
Extreme	1,800+	3,000+	20+
Great	1,200-1,800	2,000-3,000	15-20
Moderate	600-1,200	1,000-2,000	10-15

Table: 9.1 Example of Fear and Intimidation

Note: although no category is given in the guidance for flows less than the above thresholds, for the purposes of this assessment any flows below the thresholds have been categorised as 'small' and would not be considered as significant.

9.3.18 Where relevant, the effects on pedestrian amenity are considered within this chapter and the magnitude of impact identified using the above example.

Accidents and Safety

9.3.19 Where relevant, the effects on accidents and safety are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the above guidance document.

Hazardous Loads (to be confirmed)

9.3.20 At this stage, it is assumed that the Proposed Development would not result in any hazardous loads, however this is to be confirmed.

Air Pollution

9.3.21 The potential effects relating to air quality because of development related traffic are set out in Chapter 10: Air Quality.

Noise and Vibration

9.3.22 The potential effects relating to noise and vibration because of development related traffic are set out in Chapter 10: Noise and Vibration.

Visual Effects

9.3.23 The visual effect of traffic is complex and subjective and includes both visual obstruction and visual intrusion. The IEA Guidelines state that obstruction refers to the blocking of views, by structures for example, and intrusion refers to the more subjective impact by traffic on an area of scenic beauty or of historical or conservation interest.

9.3.24 It goes on to state that increases in the number of large or high-sided vehicles may have an intrusive impact in areas of scenic beauty and in historic or conservation areas and acknowledges that in most situations the changes in traffic resulting from a development will have little impact.

9.3.25 Where relevant, the visual effects of traffic are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the above guidance document. The visual effects of the Proposed Development are considered in Chapter 8.

Identification of Receptors

9.3.26 In terms of transport, receptors include people that are living in and using facilities, and using transport networks, in the area. Paragraph 2.5 of the IEA Guidelines explains that locations that may be sensitive to changes in traffic conditions could be:

- People at home.
- People in workplaces.
- Sensitive groups such as children, the elderly or the disabled.
- Sensitive locations such as hospitals, churches, schools or historical buildings.
- People walking or cycling.
- Open spaces.
- Recreational sites.

- Shopping areas.
- Sites of ecological / nature conservation value.
- Sites of tourist / visitor attraction.

9.3.27 The identification of receptors has been based on the study area i.e. the local road links likely to be affected by development traffic.

Receptor Sensitivity / Value

9.3.28 As a general guide, the determination of receptor sensitivity is based on the criteria of value, adaptability and tolerance.

9.3.29 Given that all persons are deemed to be of equal value, sensitivity to changes in transport conditions is generally focussed on vulnerable user groups who are less able to tolerate, adapt to or recover from changes. Table 9.2 summarises the broad criteria for identifying receptor sensitivity.

Sensitivity	**Typical Descriptors**
Very High	Receptors of very high importance and rarity, international scale and very limited potential for substitution.
High	Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident clusters (with reference to accident data), retirement homes, urban/residential roads without footways that are used by pedestrians.
Medium	Traffic flow sensitive receptors, including congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycleways, community centres, parks, recreation facilities.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

Table: 9.2 Definitions of Sensitivity

9.3.30 Road links with descriptions of high or medium sensitivity have been considered against the Rule 2 threshold (10% change in traffic flows) described above. Other links with descriptions of low or negligible sensitivity have been considered against the Rule 1 threshold (30% change in traffic flows). Where necessary, professional judgement has been applied in identifying the relevant category for each link.

Magnitude of Impact

9.3.31 The approach to the assessment of the magnitude of impact varies by impact type. The IEMA Guidelines set out thresholds that can be used to identify the magnitude of impact through the use of receptors (as set out above).

9.3.32 Generic significance criteria are applied throughout this Environmental Statement with the degree of significance in accordance with the DMRB guidelines LA 104 'Environmental Assessment and Monitoring' assessing the Proposed Development's impact based on Very High, High, Medium, Low and Negligible. These will be used, together with the assessment of magnitude of effect and receptor sensitivity, to determine the significance of effects.

9.3.33 DMRB LA 104 also sets out the 'Magnitude of Impact' as 'Major, Moderate, Minor, Negligible and No Change'.

Significance of Effects

9.3.34 The approach to the assessment of significance of effects follows that set out in Table 9.3, provided in the Design Manual for Roads and Bridges (DMRB) HE LA 104 Revision 1. The significance of the effect is formulated as a function of the receptor or resource environmental value (or sensitivity) and the magnitude of the proposed development value (change). The category descriptions for Sensitivity of Receptor are based upon the level of importance and rarity of that receptor. The magnitude of impact is dependent upon the level of quality and magnitude in relation to the change as a result of the Proposed Development.

		Magnitude of Impact (Degree of Change)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Environmental value (Sensitivity Receptor)	**Very High**	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Table: 9.3 Significance of Effect Categories

9.3.35 The broad definitions of these significance levels are as follows:

- **Neutral**: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
- **Neutral**: No effects or those that are beneath levels of perception, within normal

bounds of variation or within the margin of forecasting error.

- Slight: Effects at this level are not material in the decision-making process. A slight impact would see fewer movements of HGV's or traffic flows would be lower in terms of percentage increase than a moderate impact. There would also be suitable pedestrian facilities provided which includes wide footways and crossing facilities.
- **Moderate**: Effects at this level can be considered to be material decision-making factors. A moderate impact would see reduced vehicle movements and delay compared with the severe impact and the percentage increase in HGV movements would be lower in terms of percentage increase. Pedestrian facilities including footways and crossing facilities would be present but may require some improvement.
- **Large**: Effects at this level are likely to be material in the decision-making process. A large impact would see reduced vehicle movements and delay compared with the severe impact, although the percentage increase in HGV movements is still high. There would also be an impact on pedestrians as there would be limited footway provision and crossing facilities available. The impact on sensitive environments will be less.
- **Very Large**: Effects at this level are material in the decision-making process. This level of impact would see a significant change in vehicle movements especially HGVs and the level of pedestrian provisions would be very limited, i.e. no footway provision or crossing facilities available. The impact to drivers would also be affected through increased delay and increased delay for pedestrians crossing the road. The location of the impact will also affect local communities and sensitive environments such as schools, churches etc.

9.3.36 Where the above matrix offers more than one significance option, professional judgement has been used to decide which effect is most appropriate.

9.3.37 Based on the above it is considered the impact would be considered as 'significant' whereby the increase in traffic falls within the 'severe' category in terms of significance of effect, i.e. where the magnitude of impact is major and the sensitivity of the receptors are very high or high or where the magnitude of impact is moderate and the sensitivity of the receptor is very high.

9.4 Baseline Conditions

Study Area

9.4.1 The IEMA Guidance described under the methodology section identifies that traffic flow increases of 30% represent a reasonable threshold for inclusion of highway links within the assessment process, although a lower threshold may be appropriate where there are higher HGV flows. It also suggests that other specifically sensitive areas should be included where traffic flows have increased by 10% or more. Such sensitive areas may include accident black spots or links with high pedestrian flows.

9.4.2 For the purpose of this assessment the consideration of the effects of the proposed development will be undertaken on the links and junctions listed above, and the effects of the changes in traffic composition and volume will be assessed in relation to the significance criteria.

Site Description and Location

9.4.3 The Development Site is part of a larger area of land that is allocated for development. The Development Site is located at the north-western corner of the wider Milton Keynes East Strategic Urban Extension (MKE-SUE). Plans detailing the Development Site area controlled by Bloor Homes and the wider MKE-SUE are included within Appendix 9.1.

9.4.4 The existing site mostly consists of agricultural land, a former quarry and some residential uses. The site is bound by the A422 Monks Way to the north, Willen Road to the west and agricultural land to the east and south of the site.

9.4.5 In the wider context, the Development Site is located at the north-western corner of the wider SD12 allocation to the east of the M1 motorway, south of Newport Pagnell. The M1 motorway runs on a broadly south-east / north-west alignment to the south of the site and the A509 is located further east of the site and has a north-south alignment.

Surrounding Highway Network

9.4.6 The Development Site is well connected to the local road network (via Willen Road) within Milton Keynes and Newport Pagnell and to the strategic road network via the M1 Junction 14.

9.4.7 Access to the site will be via two new signal-controlled junctions to be provided on Willen Road. Willen Road is located to the west of the site in a north-south alignment and connects with the A422 Monks Way in the north via a priority roundabout (Marsh End Roundabout).

9.4.8 Willen Road is currently a two-lane single carriageway, approximately seven metres wide and subject to the national speed limit of 60mph. There are no parking restrictions on Willen Road and the road is classified as a district distributor road in accordance with MKC's 'A Highway Guide for Milton Keynes'. As part of the proposals, Willen Road will be widened to provide two lanes in each direction for most of its length, up to the M1 bridge south of the site.

9.4.9 To the north of the site, Willen Road (S) joins the A422 Monks Way and Willen Road (N)

at a four-arm roundabout, known as the Marsh End Roundabout.

9.4.10 From Marsh End Roundabout, further north of the site, Willen Road (N) provides one of the main routes into central Newport Pagnell and is subject to the national speed limit up to its entrance to Newport Pagnell, where it become Marsh End Road and is subject to a 30mph speed limit.

9.4.11 To the east of Marsh End Roundabout, the A422 Monks Way runs to the north of the site in an east to west direction and connects with the A509 and London Road at a four-arm roundabout, known as the Tickford Roundabout. Monks Way is a two-lane dual carriageway, operating at the national speed limit (70mph) and approximately 7.8 metres in width in each direction.

9.4.12 The Tickford Roundabout joins the adjacent Renny Lodge Roundabout in a dumbbell junction arrangement connected by two-lane dual carriageway. From the Tickford Roundabout, Renny Park Road forms a second access into Newport Pagnell, but primarily serves the Interchange Park Employment area.

9.4.13 To the south of the site, Willen Road (S) bridges over the M1 and connects with Michigan Drive/Dansteed Way and Tongwell Street at a priority roundabout (Tongwell Roundabout), just south of the M1. Tongwell Street to the south of the roundabout provides access to the A509 via Pineham Roundabout. The A509 provides access to Milton Keynes city centre to the southwest and the M1 junction 14 to the northeast of the Pineham Roundabout.

9.4.14 In summary, the site is well connected to the local road network (via Willen Road) within Milton Keynes and Newport Pagnell, and to the strategic road network via the M1 Junction 14.

9.4.15 As part of this assessment the consideration of the effects of the Proposed Development will be undertaken on a number of links and junctions within the vicinity of the Development Site, as detailed later in this Chapter.

Pedestrian and Cycle Access

9.4.16 Existing public footpaths (Moulsoe FP007/Moulsoe FP014 and Moulsoe FP015) are located to the north of the site that cross the dual carriageway of the A422 Monks Way, providing connections to Newport Pagnell and Tickford. Pedestrians following the footpaths are currently required to cross the dual carriageway and the central reservation.

9.4.17 The Moulsoe FP007 and Moulsoe FP014 footpaths join at the dual carriageway of A422 Monks Way, circa 250 metres east of the Marsh End Roundabout. The Moulsoe FP007 extends from the north of the A422, connecting with Willen Road (N). Whilst the Moulsoe FP014 extends to the south of the A422 in a northwest / southeast alignment through the Bloor Homes' proposed Development Site and wider MKE expansion area, connecting to Tongwell Street to the south.

9.4.18 Footpath Mousloe FP015 crosses the A422 approximately 200 metres to the east of where the FP007 and FP014 footpaths join at the A422.

9.4.19 No footway is currently provided along Willen Road (S) or on the A422 Monks Way. A short footway is provided on each side for the length of the bridge where Willen Road crosses the M1, to the south of the site. This footway is circa two metres in width on the western side of Willen Road and circa three metres in width on the eastern side. There is street lighting provided along Willen Road.

9.4.20 No pedestrian crossing facilities are provided at the Marsh End Roundabout to the north of the site (Willen Road (S)/A422 Monks Way/Willen Road (N) junction). Short footways and dropped kerbs with a central island on Willen Road (S) are provided on the northern arm of the Tongwell Roundabout to the south of the site. A pedestrian/cycle link is provided on the north side of Michigan Drive (Redway Super Route H4), which connects Willen Road (S) to Dansteed Way and to the residential areas of Milton Keynes further south. No footways are provided on Tongwell Street. The pedestrian/cycle link also runs along the northern side of Dansteed Way, connecting to the industrial, retail and residential areas further west.

9.4.21 Cycling is an important mode of sustainable travel and is generally considered suitable for distances of up to three miles (4.8 kilometres) for regular journeys in urban areas, and five miles (eight kilometres) for commuting journeys (source: LTN 2/08, Cycle Infrastructure Design). Topography is not an impediment to cycling within the vicinity of the site.

9.4.22 There are a large number of cycle routes across Milton Keynes and these are categorised as:

- Redway Super Route.
- Redway.
- Leisure Route / Traffic-Free / Quiet Route.

9.4.23 The Milton Keynes Redway Super Route H4 connects the site from the Tongwell Roundabout to the south of the site, along Dansteed Way. This main route provides links to other Redway and traffic-free/quiet routes across Milton Keynes. There are also Redway and traffic-free/quiet routes to the north of the site, which provide connections to Newport Pagnell.

9.4.24 A copy of the existing cycle map for Milton Keynes is provided in Appendix 9.2.

Road Safety

9.4.25 Personal Injury Data (PIA) records for the surrounding area including key routes and junctions have been obtained from MKC and reviewed for the latest five-year period from February 2015 to January 2020. The data and study area can be found attached at Appendix 9.3.

9.4.26 During the latest five-year period a total of 67 injury accidents were recorded within the study area, one accident was fatal, eight were serious and 58 accidents were slight.

9.4.27 The PIA analysis for each of the key routes/junctions is set out below. It should be noted that due to police confidentiality requirements, contributory factors and description of the fatal accident were not available. It is therefore not possible to understand the circumstances of the fatal collision.

Willen Road

9.4.28 A total of two slight incidents occurred along Willen Road. One slight accident occurred 160 metres south of the Caldecote Farm access and it resulted from a collision between a car travelling south and a road sweeping vehicle. The car driver failed to notice the slow traffic and collided with the rear of road sweeping vehicle. Another slight accident occurred in the darkness and it resulted from a collision between a van turning right and a car travelling north. It was attributed to the car driver travelling north failing to look properly and being careless/reckless/in a hurry.

Marsh End Roundabout

9.4.29 A total of five accidents were recorded at Marsh End Roundabout, one of which was serious. The serious accident occurred in the daylight and it resulted from a collision between two cars. The accident was caused by one of the car drivers' following too close and another car driver travelling too fast and being an inexperienced driver. A slippery road was also identified as a causation factor of the incident. The weather condition was wet.

9.4.30 All four slight incidents recorded at Marsh End Roundabout involved cars only.

A422 Monks Way

9.4.31 A cluster of four slight accidents occurred along the A422 between Marsh End Roundabout and Tickford Roundabout.

9.4.32 One accident involved a collision between a car and a bicycle, which was caused by the car driver failing to look properly. The three other slight accidents all involved two cars each, all were caused by car drivers failing to judge the other persons' path. One accident also included losing control, failing to look properly and distraction in vehicle was also identified as a causation factor of one of the accidents.

Tickford Roundabout

9.4.33 A cluster of five slight accidents occurred at Tickford Roundabout in daylight. One accident involved a collision between a van and three cars, two accidents involved collisions between two cars on the roundabout, a goods vehicle being rolled onto its side.

9.4.34 The causes of the accidents include:

- Car drivers' being careless / reckless / in a hurry, failing to judge other persons path and losing control.
- Car driver exiting roundabout being careless / reckless / in a hurry and losing control.
- Overloaded or poorly loaded vehicle and having poor turn or manoeuvre.
- Car drivers failing to look properly.

London Road (A509)

9.4.35 A total of six accidents were recorded on London Road, of which one was serious. The serious accident occurred in the daylight, 650 metres north of the Holiday Inn Hotel and involved a collision between a car travelling south and a car travelling north. The car travelling north crossed into the opposite lane and collided with the car going south. The cause was due to the car driver travelling north being fatigued, being ill or mental, being impaired by drugs, being careless / reckless / in a hurry and failing to look properly. Distraction in vehicle was also identified as a causation factor of the incident.

9.4.36 Five slight accidents occurred on this road with four taking place in the daylight and one in darkness.

9.4.37 Two accidents resulted from a collision between a car and a motorbike, another involved a collision between a goods vehicle travelling south and a pedestrian, one accident

resulted from a collision between two cars travelling south and another accident involved a collision between three cars.

9.4.38 The causes of the accidents include:

- Car drivers' failing to look properly.
- Pedestrian wearing dark clothing at night.
- Motorbike having poor turn or manoeuvre and the car driver failing to look properly and to signal.
- Car driver's failing to judge other persons path and losing control.
- One of the car drivers being distracted in vehicle and failing to judge other persons path or speed.

Renny Lodge Roundabout

9.4.39 A cluster of five accidents occurred at Renny Lodge Roundabout, of which one was serious and four were slight.

9.4.40 The serious accident occurred in the daylight and involved a collision between two cars travelling south. The causation factor was identified as one of the car drivers' travelling too fast, having poor turn or manoeuvre and failing to judge other persons path or speed. The weather was wet.

9.4.41 Three slight accidents occurred in daylight and one in darkness and included: a collision between a goods vehicle travelling southwest and a car travelling the same direction, a collision between a car travelling northeast and a car travelling on Renny Park Road entering the roundabout, a collision between a van and a goods vehicle and a collision between two cars.

9.4.42 The causes of the accidents include:

- Goods vehicle driver having poor turn or manoeuvre and failing to look properly.
- Car driver entering the roundabout failing to judge other persons path or speed, having poor turn or manoeuvre and being careless / reckless / in a hurry.
- Van driver failing to judge other persons path or speed and being careless/reckless/in a hurry.
- Car drivers travelling too fast and being impaired by alcohol.

Tongwell Roundabout

9.4.43 A total of three slight accidents were recorded at Tongwell Roundabout, two occurred in daylight and one in darkness. The accidents involved a collision between a car traveling southeast on Michigan Drive and a car approaching the roundabout, collision between two cars entering the roundabout and a goods vehicle colliding with the splitter island of

the roundabout. The weather condition was wet.

9.4.44 The causes of the accidents include:

- Car traveling southeast making a poor turn or manoeuvre.
- Car drivers failing to look properly, to judge other persons path or speed as well as being careless / reckless/ in a hurry.
- Car driver having fatigue, illness or disability.

Pineham Roundabout

9.4.45 A total of ten accidents were recorded at Pineham Roundabout, of which one was serious. The serious accident occurred in the daylight and involved a motorbike losing control while entering the roundabout. It was attributed to the rider travelling too fast, failing to look properly, sudden braking, losing control and failing to judge other persons path or speed. The weather condition was fine without high winds.

9.4.46 Of the nine slight accidents, eight occurred in daylight and one in darkness. The accidents involved:

- Collision between a car approaching the roundabout and a van travelling north.
- Motorbike (the weather condition was raining without high winds).
- Collision between a bus and a car entering the roundabout.
- Collision between a goods vehicle and a car entering the roundabout.
- Collision between a bicycle and a car travelling east.
- Car losing control and colliding with a barrier while exiting the roundabout.
- Collision between two cars and a van travelling west.
- Collision between two cars.
- Car travelling north and a bicycle travelling west.

9.4.47 The causes of the accidents include:

- Van failing to judge other persons path or speed and making a poor turn or manoeuvre.
- Motorbike losing control due to slippery road and deposit on road.
- Car driver overshooting the junction.
- Goods vehicle driver having poor turn or manoeuvre, being careless/reckless/in a hurry and being fatigued.
- Bicycle failing to look properly, failing to judge other persons path or speed and being careless / reckless / in a hurry.
- Car driver travelling too fast. The weather condition was raining without high winds.
- Van driver failing to look properly and to the car drivers driving too slow for conditions and failing to judge other persons path or speed.
- Bicycle not displaying lights at night or in poor visibility.
- Unknown.

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Tongwell Street

9.4.48 One serious accident was recorded at the junction with Carleton Gate. It occurred in the daylight and involved a collision between a car turning right onto Tongwell Street and a van travelling northwest on Tongwell Street. The causation factor was identified as the van driver having illness or disability. The weather condition was fine without high winds.

Summary

9.4.49 A detailed PIA review has been undertaken and has concluded, from the information available, that the incidents recorded on the local highway network are attributable to factors unrelated to the design of the highway network. Whilst there are 67 accidents recorded, the study area is a large area of the local highway network and covers a five-year period.

9.4.50 The majority of accidents involved motorised vehicles, with only a small proportion of accidents involving non-motorised users such as cyclists and pedestrians. The causes of accidents for motorised users generally relate to human error such as failing to look properly, travelling too fast/slow, failing to judge other people's speed, driving reckless, losing control, fatigue/illness/disability. Whilst the causes of non-motorised users include motorised vehicles failing to look properly and cyclists/pedestrians not being clearly visibility to other road users (either by not wearing visible clothing/having lights).

9.4.51 The PIA data has not highlighted any potential deficiency in the design of the highway network and hence it is considered there are no prevailing highway safety issues that need to be addressed within the study area.

9.5 Observed Traffic Flows

9.5.1 For the purposes of this assessment, traffic count survey data has been obtained for a number of junctions and links as follows.

Automatic Traffic Counts (ATCs)

9.5.2 Automatic Traffic Count (ATCs) data, has been obtained for surveys undertaken by Intelligent Data Collection Ltd between 27th June and 3rd July 2019 for the following junctions/links:

- Northfield Roundabout (W) and Northfield Roundabout (E).
- Tongwell Street – Tongwell Street Car Park / Carleton Gate (N).
- Willen Road – Tongwell Roundabout (S) / Glenfield (N).
- A422 Monks Way – M1 Overbridge (W) / Marsh End Roundabout (E).

- A422 – Marsh End Roundabout (W) / Tickford Roundabout (E).

Manual Classified Counts Traffic Counts (MCCs)

9.5.3 Manual Classified Count (MCCs) and queue length data has been obtained for surveys undertaken on 27th June 2019 for the junctions/links listed below. Due to an error in the data for Pineham Roundabout, this junction was resurveyed on 8th October 2019. The surveys were undertaken between 07:00-10:00 hours, 11:00-13:00 hours and between 16:00-19:00 hours.

- Pineham Roundabout – Tongwell Street (N)/A509 Portway (E) / Tongwell Street (S)/A509 Portway (W).
- Tongwell Roundabout – Willen Road (N) / Tongwell Street (SE)/Dansteed Way (SW) / Michigan Drive (NW).
- Marsh End Roundabout – Willen Road (N)/A422 (E) / Willen Road (S) / A422 Monks Way (E).
- Tickford Roundabout – B526 London Road (N) / A509 (E) / A509 London Road (S)/A422 (W).
- Renny Lodge Roundabout – Renny Park Road (N) / A509 (E) / A509 (W).

9.5.4 MCC data has also been obtained for surveys undertaken on High Street.

9.5.5 MCC morning (08:00-09:00) and evening (17:00-18:00) peak hour data (2018) for the two junctions listed below has been extracted from the Caldecote Farm TA (application reference 19/02402/FUL). Queue length data has been obtained for surveys carried out on 27th June 2019 for the junctions/links listed below:

- M1 J14 Broughton Interchange.
- Northfield Roundabout via A509.

9.5.6 The 24-hour Annual Average Daily Traffic (AADT) figures for specific links are provided in Table 9.4. A plan showing the location of the AADT locations is provided in Appendix 9.4.

Link	Total Vehicles (AADT)	HGVs (AADT)	HGV Percentage	Mean Speed (mph)
Willen Road (N)	15,937	188	1%	36*
Willen Road (S)	14,210	211	1%	41*
High Street	13,969	143	1%	20
A422 Monks Way (W)	23,626	814	3%	60
A422 Monks Way (E)	24,385	853	3%	45*
B526 London Road North	12,710	150	1%	30
A509 London Road South	20,698	1,558	8%	60
Renny Park Road	4,523	277	6%	30
A509 Tickford RAB E	24,385	853	3%	70
A509 Renny Lodge RAB E	25,972	1,051	4%	-
Michigan Drive	3,548	201	6%	30
Dansteed Way	11,838	164	1%	30
Tongwell Street (Pineham RAB N)	11,794	528	4%	47*
Tongwell Street (Pineham RAB S)	11,794	528	4%	60
A509 West	19,327	449	2%	45*
A509 East (west of Northfield Roundabout)	19,327	449	2%	45*
A509 (South M1 J14)	49,619	3,045	6%	-
A5130 (east of Northfield Roundabout)	12,014	178	1%	40
M1 J14	118,318	21,414	18%	70

Table: 9.4 2019 Baseline Existing 24 Hour AADT Flows (two-way)

*Note: *speeds based on survey data. Speed limits included (where known) for other links as no speed survey data available for these – = no speed data available.*

Link	Total Vehicles (AADT)	HGVs (AADT)	HGV Percentage	Mean Speed (mph)
Willen Road (N)	16,455	195	1%	36*
Willen Road (S)	14,672	218	1%	41*
High Street	14,423	148	1%	20
A422 Monks Way (W)	24,395	840	3%	60
A422 Monks Way (E)	25,179	881	3%	45*
B526 London Road North	13,124	155	1%	30
A509 London Road South	21,371	1,608	8%	60
Renny Park Road	4,670	286	6%	30
A509 Tickford RAB E	25,179	881	3%	70
A509 Renny Lodge RAB E	26,817	1,085	4%	-
Michigan Drive	3,663	208	6%	30
Dansteed Way	12,223	169	1%	30
Tongwell Street (Pineham RAB N)	12,177	545	4%	47*
Tongwell Street (Pineham RAB S)	12,177	545	4%	60
A509 West	19,956	464	2%	45*
A509 East (west of Northfield Roundabout)	19,956	464	3%	45*
A509 (South M1 J14)	51,234	3,144	6%	-
A5130 (east of Northfield Roundabout)	12,405	183	1%	40
M1 J14	122,168	22,111	18%	70

Table: 9.5 2021 Baseline Existing 24 Hour AADT Flows (two-way)

*Note: *speeds based on survey data. Speed limits included (where known) for other links as no speed survey data available for these links. – = no speed data available.*

Potential Sensitive Receptors

9.5.7 Based on the above, Table 9.6 highlights the sensitivity assessment for each receptor group for the Proposed Development, for which assessments are made.

Receptor	Sensitivity	Sensitive to Change	Qualification
Willen Road (N)	Low	No	No existing residential properties or footways, and not directly accessed from road link.
Willen Road (S)	Medium	Yes	No existing residential properties or footways, but directly accessed from road link.
High Street	Medium	Yes	Existing residential properties and shopping areas along frontage of road, footways
A422 Monks Way (W)	Low	No	No existing properties or other sensitive use.
A422 Monks Way (E)	Low	No	No existing properties or other sensitive use.
B526 London Road North	Low	No	Existing residential properties but not located nearby.
A509 London Road South	Low	No	No existing residential properties or footways, and not located nearby.
Renny Park Road	Low	No	Existing industrial properties and footways, but not located nearby.
A509 Tickford RAB (E)	Low	No	Existing industrial properties set back and footway on northern side, but not located nearby.
A509 Renny Lodge RAB (E)	Low	No	Existing industrial properties set back on northern side, no footways, but not located nearby.
Michigan Drive	Low	No	Existing industrial properties, footway on eastern side, but not directly accessed from road link.
Dansteed Way	Low	No	Existing industrial properties on northern side and residential properties on southern side, footway on eastern side, footway on southern side, but not directly accessed from road link.
Tongwell Street (Pineham RAB N)	Low	No	Existing residential properties on southern side, M1 motorway and agricultural land on northern side, no footways.
Tongwell Street (Pineham RAB S)	Negligible	No	Willen Lake to the west and existing industrial properties to the east and west, footway on eastern side.
A509 West (west of Pineham RAB)	Low	No	Willen Lake to the north and south, existing industrial properties to the east, footways setback.
A509 East (west of Northfield RAB)	Low	No	Agricultural land on the northern side and industrial properties setback on the southern and northern sides, no footways.
A509 (South M1 J14)	Low	No	Agricultural land on the western side, industrial property on the eastern side, no footways.
A5130 (east of Northfield Roundabout)	Negligible	No	Industrial properties on the northern side, residential properties on the southern side land, some footway provision setback.
M1 J14	Low	No	Agricultural land, no footways/pedestrian crossing facilities. Main route from the M1.

Table: 9.6 Sensitivity of Receptors

9.5.8 Based on the above, Willen Road (S) has been assessed against the Rule 2 threshold.

All other road links above have been assessed against the Rule 1 threshold.

9.6 Future Baseline Conditions

Future Baseline Traffic Flows

9.6.1 The following baseline future year assessment has been undertaken:

- 2031 Base – weekday morning and evening peak hours (baseline flows + committed development).
- 2033 Base – weekday morning and evening peak hours (baseline flows + committed development).
- 2041 Base – weekday morning and evening peak hours (baseline flows + committed development). For M1 Junction 14 and Northfield Roundabout only, in accordance with Highways England requirements.

9.6.2 The traffic growth methodology is based on the DfT using forecast from TEMPRO version 7.2 and the NTM. The level of growth provided by the NTM growth factors together with the committed developments is considered to provide a robust assessment.

9.6.3 In addition to the NTM traffic growth, which implicitly allows for committed developments in the local area, this assessment also considered traffic which will be generated by known consented or likely to be consented proposals, and occupied by each of the future assessment years of 2031, 2033 and 2041 (in accordance with Planning Policy Guidance and agreed with MKC), these being:

1. Tickford Fields, application reference 20/00133/OUTEIS – application submitted on 20th January 2020 and is awaiting a decision.
2. Caldecote Farm, application reference 19/02402/FUL– submitted on 11th September 2019. Application was withdrawn and is pending a resubmission.

9.6.4 The traffic movements associated with local committed developments have been obtained from the relevant Transport Assessment reports submitted as part of the various planning applications. The assessment does not include the impacts of the wider MKE development as agreed with MKC, with the Bloors development being considered within the wider MKE planning application.

9.6.5 The traffic flows for the highway network in the vicinity of the site are summarised in Tables 9.7 to 9.9 for the base scenarios of 2031, 2033 and 2041 (including committed development). The traffic flows are provided in terms of 24-hour Annual Average Daily Traffic (AADT) figures and 18-hour Annual Average Weekday Traffic (AAWT).

9.6.6 A detailed review of the transport impacts of the committed developments is included

within the Transport Assessment report.

Link	AADT Total Vehicles (24-hour)	HGVs (24-hour)	AAWT Total Vehicles (18-hour)	HGVs (18-hour)
Willen Road (N)	18,734	222	20,247	239
Willen Road (S)	16,703	248	18,053	268
High Street	16,420	168	17,747	182
A422 Monks Way (W)	27,772	956	30,016	1,034
A422 Monks Way (E)	28,665	1,003	30,980	1,084
B526 London Road North	14,941	176	16,147	191
A509 London Road South	24,330	1,831	26,295	1,979
Renny Park Road	5,317	326	5,746	352
A509 Tickford RAB E	28,665	1,003	30,980	1,084
A509 Renny Lodge RAB E	30,530	1,235	32,997	1,335
Michigan Drive	4,171	237	4,507	256
Dansteed Way	13,916	193	15,040	208
Tongwell Street (Pineham RAB N)	13,864	620	14,983	670
Tongwell Street (Pineham RAB S)	13,864	620	14,983	670
A509 West	22,719	528	24,554	570
A509 East (west of Northfield Roundabout)	22,719	528	24,554	570
A509 (South M1 J14)	58,328	3,579	63,039	3,869
A5130 (east of Northfield Roundabout)	14,122	209	15,263	226
M1 J14	139,084	25,172	150,319	27,206

Table: 9.7 2031 Baseline Future Flows (two-way)

Link	AADT Total Vehicles (24-hour)	HGVs (24-hour)	AAWT Total Vehicles (18-hour)	HGVs (18-hour)
Willen Road (N)	19,130	226	20,675	244
Willen Road (S)	17,056	253	18,434	274
High Street	16,767	172	18,122	186
A422 Monks Way (W)	28,359	977	30,650	1,056
A422 Monks Way (E)	29,270	1,024	31,635	1,107
B526 London Road North	15,256	180	16,489	195
A509 London Road South	24,844	1,870	26,851	2,021
Renny Park Road	5,429	333	5,867	360
A509 Tickford RAB E	29,270	1,024	31,635	1,107
A509 Renny Lodge RAB E	31,175	1,262	33,694	1,363
Michigan Drive	4,259	242	4,603	261
Dansteed Way	14,210	197	15,358	213
Tongwell Street (Pineham RAB N)	14,156	633	15,300	684
Tongwell Street (Pineham RAB S)	14,156	633	15,300	684
A509 West	23,199	539	25,073	582
A509 East (west of Northfield Roundabout)	23,199	539	25,073	582
A509 (South M1 J14)	59,560	3,655	64,371	3,950
A5130 (east of Northfield Roundabout)	14,420	213	15,585	231
M1 J14	142,022	25,704	153,495	27,781

Table: 9.8 2033 Baseline Future Flows (two-way)

Link	AADT Total Vehicles (24-hour)	HGVs (24-hour)	AAWT Total Vehicles (18-hour)	HGVs (18-hour)
A509 East (west of Northfield Roundabout)	24,613	572	26,601	618
A509 (South M1 J14)	63,189	3,878	68,294	4,191
A5130 (east of Northfield Roundabout)	15,299	226	16,535	245
M1 J14	150,677	27,271	162,849	29,473

Table: 9.9 2041 Baseline Future Flows (two-way)

9.7 Embedded Mitigation Measures

9.7.1 The Proposed Development has been designed to provide a permeable development, to ensure the site is well connected and fully integrated within the surrounding area, in order to maximise access by sustainable modes.

9.7.2 The development proposals have also been carefully designed to coordinate with the local

highway network improvements proposed as part of the committed developments (namely Caldecote Farm Employment Site), located on the opposite side of Willen Road and the wider MKE-SUE to the east / south-east of the Site.

9.7.3 It is important to understand the local highway improvements that will be delivered as part of this Development in the context of improvements that will be delivered as part of the committed developments, in terms of how these have been integrated. It should be noted that these mitigation measures have been taken into account when assessing the environmental effects on the local transport network.

9.7.4 A summary of the transport improvements proposed for this Development are include below for ease of reference:

- Willen Road Northern Access – this will tie into the proposed signal-controlled junction to serve the Caldecote Farm Employment Site in the form of a signal-controlled crossroad junction. The junction improvement will include the provision of a pedestrian / cycle crossing across the site access road arm of the junction to accommodate pedestrian and cycle movements.
- Willen Road Southern Access – located approximately 190 metres to the south of the northern access on the eastern side of Willen Road. This will be a new signal-controlled junction which will include the provision of pedestrian / cycle crossings on all arms to accommodate pedestrian and cycle movements.
- Pedestrian access to be provided in the north-western corner of the site to connect to the Marsh End Roundabout and the Redway and pedestrian / cycle crossing to be delivered in conjunction with the Employment Site.
- A new Redway route along the eastern side of Willen Road between the Tongwell Roundabout and the Northern Access, connecting to the Redway being provided between the Northern Access and the Marsh End Roundabout in conjunction with the Employment Site. It is proposed that Willen Road (S), south of the proposed Southern Access will be a key pedestrian/cycle link to the Tongwell Roundabout.
- To improve pedestrian and cycle connections to the north towards Newport Pagnell it is proposed to provide a new footbridge with ramps and steps to accommodate pedestrian and cycle movements over the A422 along the route of Footpaths 007 and 014.
- Willen Road will be widened to a two-lane dual carriageway and will then taper down to a two-way single carriageway on the approach to the M1 overbridge, in accordance with the aspirations of the MKE SUE to upgrade Willen Road to a grid road.
- In conjunction with the Employment Site, the speed limit on Willen Road between Tongwell Roundabout to the south to the entrance to Newport Pagnell (Marsh End Road) to the north, will be reduced from the national (60mph) to 40mph.
- The Southern Access will provide a direct link to the southeast of the site to the wider MKE-SUE, connecting directly to the new Grid Road / Redway to be delivered by the wider MKE-SUE.
- Other pedestrian / cycle connections are to be provided from the eastern side

of the Development Site, connecting to the wider MKE-SUE to the east.

9.7.5 In terms of car parking provision for the development, this will be in accordance with the MKC's requirements and will also include active and passive electric vehicle charging facilities. This will enable residents that do require a car to minimise the impact of those journeys on the environment.

9.7.6 Cycle parking will be provided in accordance with the MKC SPD minimum cycle parking standards by use class.

9.7.7 A Framework Residential Travel Plan will be prepared for the proposed Development Site, which seeks to promote sustainable travel and to minimise single occupancy trips by private car. This will be an evolving management tool with targets and monitoring to ensure it is successful in achieving these aims. The Travel Plan will act as a mitigation measure in that it minimises vehicle movements.

9.7.8 The Caldecote Farm Employment Site proposals include:

- New signal-controlled crossroads junction on Willen Road (directly opposite the Caldecote Farm access / Development Site).
- Improved pedestrian / cycle linkages to Newport Pagnell including pedestrian / cycle crossing facilities at the Marsh End Roundabout (at grade), to the north of the site. This crossing will improve sustainable and active travel linkages to Newport Pagnell.
- A new 3-metre Redway (footway / cycle) on Willen Road (western side, crossing to the eastern side to the north of the site access junction).
- Improvements to existing public transport services including relocated stops on Willen Road, with raised kerbs, shelters with seating and real-time information display screens. These improvements will promote bus travel and improve the overall experience at these bus stops. It is also understood that a contribution will be provided to improve bus service frequency.
- A financial contribution to enable the timing of the existing Willen Road bus services to be extended to cover the early shift at the Employment Site and to enable a weekend service to be provided. This S106 financial contribution will enable the Council to enhance the existing bus service provision accordingly.

9.7.9 As agreed with MKC:

- Significant enlargement of the Marsh End Roundabout junction.
- The introduction of traffic signal control on all four arms.
- Widening on the A422 eastbound and westbound approaches to increase the length of the three-lane sections.
- Provision of pedestrian / cycle crossings on the A422 arm to the east of the junction as part of the proposed new Redway.
- Significant widening on the Willen Road (N) arm, including the provision of the new Redway on the eastern side to the south of the site access, connecting to

existing provision just to the north of Tongwell Lane and a new Redway on the eastern side to the north of the site access connecting to Marsh End Roundabout.

- Significant widening of the Willen Road (S) arm to provide two full lanes northbound and southbound between the Marsh End Roundabout and the proposed site access junction along with the provision of the new Redway route.

9.8 Assessment of Effects

Assessment of Construction Effects

9.8.1 Construction traffic associated with the proposed development would access the site via Willen Road. Construction vehicles will be encouraged to access the site via the arterial routes, such as the A422 West and East; it is likely that a large proportion of construction vehicles will use the M1 and these will be encouraged to travel via the A509/A422 from J14.

9.8.2 For the purposes of this assessment an average build-out rate of approximately 80 dwellings per year has been assumed, based on the 10-year construction programme. This would be fully dependent upon market conditions; however, this is considered to represent a worst case as the construction programme may be slower.

9.8.3 Based on other similar residential sites, the construction of an equivalent of 100 dwellings per annum typically generates a total of 16 HGV movements each day. As such, in a worst-case the proposed development is anticipated to generate on average 25 HGV movements each day during construction.

9.8.4 For the scale and rate of development that has been assumed, it is anticipated that there will be 75 FTE (full-time equivalent) construction workers on-site at a time, over the 10-year construction period.

9.8.5 Given the proposed construction operating hours of (08:00-18:00 hours Monday – Friday 08.00 -13.00 Saturday No works on Sundays or Bank Holiday's.) it is anticipated that most of the construction traffic would arrive before the peak hours and some would leave before the evening peak hour. Their impact on the network during peak periods would therefore be reduced. It is also usual for several construction staff to arrive together in work vans and, as such, each construction worker would not generate their own individual car trip on the network.

9.8.6 Furthermore, the contractor will seek to resource staff locally where possible and local transport pick-ups organised/on-site parking provided, thereby minimising the number of

staff vehicle trips associated with the construction work. The Client is committed to preparing a Construction Workers Travel Plan to encourage sustainable travel to and from the site, given the location of the Development.

9.8.7 In terms of the overall number of construction-related vehicles, the impact is considered to be less than the operational phase of development and as such the construction impact has not been assessed further.

9.8.8 Furthermore, traffic associated with the construction of the proposed development is assessed to be low when compared to the traffic flows on the surrounding highway network. It is anticipated that any excavated material that is deemed suitable will be used as part of the proposed landscaping works, leaving delivery of construction material and personnel as the major vehicle movements associated with the construction phase; although some movements associated with the transporting of excavated materials may be needed.

9.8.9 Construction work carried out on the existing road network will be set out in accordance with the Department for Transport's Chapter 8: Traffic Safety Measures and signs for road works and temporary situations (2009), which provides a standard of good practice on how traffic management during highway construction should be carried out, i.e. placement of traffic cones/ barriers, temporary road signs/ traffic lights etc. As there are currently no footways on Willen Road, no/minimal construction effects on pedestrian routes are expected on this route. However, any other pedestrian routes will be maintained during the construction period or diverted with clear signage. Pedestrians will be kept clear of any construction works by the provision of barriers and signage in accordance with the Department for Transport's Chapter 8 manual.

9.8.10 On this basis, and in accordance with the IEA Guidelines, the construction traffic flows would result in imperceptible effects. The magnitude of impact is therefore predicted to be minor and the sensitivity low, which is neutral or slight in terms of the EIA regulations.

Further Mitigation

9.8.11 Based upon the above, there is no requirement for any further mitigation.

9.8.12 Notwithstanding this, construction would be undertaken in accordance with a Construction Environmental Management Plan (CEMP). The CEMP would form the basis of more detailed plans and method statements, including measures to manage delivery times, routeings, wheel cleaning etc. and details of how the CEMP will be implemented and

monitored. It is expected that the preparation of a CEMP will be conditioned.

Assessment of Operational Effects

9.8.13 The assessment of impacts determines both the change in magnitude of the impacts as well as their absolute levels. In determining the extent of the study area to be included as part of the ES, reference is made to the IEMA guidelines which states that as a rule of thumb that highway links only need to be considered whereby there is a change in traffic greater than 30% (or the number of heavy goods vehicles will increase by more than 30%) (Rule 1), or more than 10% where the links contain sensitive links (Rule 2)).

9.8.14 The following proposed future year assessments have been undertaken:

- 2031:
  - Base – weekday morning and evening peak hours (baseline flows + committed development).
  - Proposed – weekday morning and evening peak hours (baseline flows + committed development + proposed development traffic (650 units only)).
- 2033:
  - Base – weekday morning and evening peak hours (baseline flows + committed development).
  - Proposed – weekday morning and evening peak hours (baseline flows + committed development + proposed development traffic (800 units)).
- 2041 (for M1 Junction 14 and Northfield Roundabout only):
  - Base – weekday morning and evening peak hours (baseline flows + committed development).
  - Proposed – weekday morning and evening peak hours (baseline flows + committed development + proposed development traffic (800 units)).

9.8.15 The AADT/AAWT traffic flows for the highway network in the vicinity of the site are shown in Tables 9.10 to 9.15 for the proposed scenarios (including committed development and proposed development traffic).

Road Link	Vehicle Flow (24-hour)					
	2031 Base (incl. committed)		2031 Proposed		% Increase	
	Tot Veh	HGV	Tot Veh	HGV	Tot Veh	HGV
Willen Road (N)	19,301	222	19,616	222	2%	0%
Willen Road (S)	18,055	543	19,857	543	10%	0%
High Street	16,420	168	16,420	168	0%	0%
A422 Monks Way (W)	29,534	1,011	30,751	1,011	4%	0%
A422 Monks Way (E)	31,383	1,250	32,069	1,250	2%	0%
B526 London Road North	16,851	176	16,851	176	0%	0%
A509 London Road South	26,679	2,023	27,132	2,023	2%	0%
Renny Park Road	7,646	326	7,709	326	1%	0%
A509 Tickford RAB E	30,915	1,030	31,148	1,030	1%	0%
A509 Renny Lodge RAB E	30,775	1,235	30,945	1,235	1%	0%
Michigan Drive	4,171	237	4,346	237	4%	0%
Dansteed Way	14,307	392	14,920	392	4%	0%
Tongwell Street (Pineham RAB N)	14,548	723	15,336	723	6%	0%
Tongwell Street (Pineham RAB S)	14,028	620	14,617	620	4%	0%
A509 West	22,765	528	22,765	528	0%	0%
A509 East (west of Northfield RAB)	23,172	720	23,372	720	1%	0%
A509 (South M1 J14)	58,781	3,772	58,980	3,772	0%	0%
A5130 (east of Northfield RAB)	14,122	209	14,122	209	0%	0%
M1 J14	139,523	23,531	140,176	25,351	0%	0%

Table: 9.10 2031 Proposed Flows AADT 24-hour (two-way traffic)

Road Link	Vehicle Flow (18-hour)					
	2031 Base (incl. committed)		2031 Proposed		% Increase	
	Tot Veh	HGV	Tot Veh	HGV	Tot Veh	HGV
Willen Road (N)	20,860	239	21,201	239	2%	0%
Willen Road (S)	19,513	587	21,461	587	10%	0%
High Street	17,747	182	17,747	182	0%	0%
A422 Monks Way (W)	31,919	1,093	33,235	1,093	4%	0%
A422 Monks Way (E)	33,918	1,351	34,660	1,351	2%	0%
B526 London Road North	18,212	191	18,212	191	0%	0%
A509 London Road South	28,834	2,187	29,324	2,187	2%	0%
Renny Park Road	8,264	352	8,332	352	1%	0%
A509 Tickford RAB E	33,412	1,113	33,665	1,113	1%	0%
A509 Renny Lodge RAB E	33,261	1,335	33,445	1,335	1%	0%
Michigan Drive	4,507	256	4,697	256	4%	0%
Dansteed Way	15,463	424	16,126	424	4%	0%
Tongwell Street (Pineham RAB N)	15,723	782	16,575	782	5%	0%
Tongwell Street (Pineham RAB S)	15,162	670	15,798	670	4%	0%
A509 West	24,604	570	24,604	570	0%	0%
A509 East (west of Northfield RAB)	25,004	778	25,260	778	1%	0%
A509 (South M1 J14)	63,529	4,076	63,745	4,076	0%	0%
A5130 (east of Northfield RAB)	15,263	226	15,263	226	0%	0%
M1 J14	150,794	27,399	151,499	27,399	0%	0%

Table: 9.11 2031 Proposed Flows AAWT 18-hour (two-way traffic)

Road Link	Vehicle Flow (24-hour)					
	2033 Base (incl. committed)		2033 Proposed		% Increase	
	Tot Veh	HGV	Tot Veh	HGV	Tot Veh	HGV
Willen Road (N)	19,697	226	20,060	226	2%	0%
Willen Road (S)	18,407	549	20,488	549	11%	0%
High Street	16,767	172	16,767	172	0%	0%
A422 Monks Way (W)	30,120	1,032	31,525	1,032	5%	0%
A422 Monks Way (E)	31,988	1,271	32,7280	1,271	2%	0%
B526 London Road North	17,166	180	17,166	180	0%	0%
A509 London Road South	27,193	2,062	27,716	2,062	2%	0%
Renny Park Road	7,759	333	7,832	360	1%	0%
A509 Tickford RAB E	31,521	1,051	31,790	1,051	1%	0%
A509 Renny Lodge RAB E	31,420	1,262	31,617	1,262	1%	0%
Michigan Drive	4,259	242	4,461	242	5%	0%
Dansteed Way	14,601	396	15,309	396	5%	0%
Tongwell Street (Pineham RAB N)	14,841	736	15,750	736	6%	0%
Tongwell Street (Pineham RAB S)	14,321	633	15,000	633	5%	0%
A509 West	23,245	539	23,245	539	0%	0%
A509 East (west of Northfield RAB)	23,652	731	23,883	731	1%	0%
A509 (South M1 J14)	60,013	3,847	60,243	3,487	0%	0%
A5130 (east of Northfield RAB)	14,420	213	14,420	213	0%	0%
M1 J14	142,462	25,883	143,215	25,883	1%	0%

Table: 9.12 2033 Proposed Flows AADT 24-hour (two-way traffic)

Road Link	Vehicle Flow (18-hour)					
	2033 Base (incl. committed)		2033 Proposed		% Increase	
	Tot Veh	HGV	Tot Veh	HGV	Tot Veh	HGV
Willen Road (N)	21,228	244	21,681	244	2%	0%
Willen Road (S)	19,894	593	22,143	593	11%	0%
High Street	18,122	186	18,122	186	0%	0%
A422 Monks Way (W)	32,554	1,115	34,072	1,115	5%	0%
A422 Monks Way (E)	34,572	1,374	35,428	1,374	2%	0%
B526 London Road North	18,553	195	18,553	195	0%	0%
A509 London Road South	29,390	2,229	29,995	2,229	2%	0%
Renny Park Road	8,385	360	8,464	360	1%	0%
A509 Tickford RAB E	34,067	1,136	34,358	1,136	1%	0%
A509 Renny Lodge RAB E	33,958	1,363	34,171	1,363	1%	0%
Michigan Drive	4,603	261	4,821	261	5%	0%
Dansteed Way	15,781	428	16,545	428	5%	0%
Tongwell Street (Pineham RAB N)	16,040	796	17,023	796	6%	0%
Tongwell Street (Pineham RAB S)	15,478	684	16,212	684	5%	0%
A509 West	25,123	582	25,123	582	0%	0%
A509 East (west of Northfield RAB)	25,563	790	25,812	790	1%	0%
A509 (South M1 J14)	64,861	4,158	65,110	4,158	0%	0%
A5130 (east of Northfield RAB)	15,585	231	15,585	231	0%	0%
M1 J14	153,970	27,974	154,784	27,974	1%	0%

Table: 9.13 2033 Proposed Flows AAWT 18-hour (two-way traffic)

Road Link	Vehicle Flow (24-hour)					
	2041 Base (incl. committed)		2041 Proposed		% Increase	
	Tot Veh	HGV	Tot Veh	HGV	Tot Veh	HGV
A509 East (west of Northfield RAB)	25,066	764	25,296	764	1%	0%
A509 (South M1 J14)	63,643	4,070	63,873	4,070	0%	0%
A5130 (east of Northfield RAB)	15,229	226	15,229	226	0%	0%
M1 J14	151,117	27,449	151,869	27,449	0%	0%

Table: 9.14 2041 Proposed Flows AADT 24-hour (two-way traffic)

Road Link	Vehicle Flow (18-hour)					
	2041 Base (incl. committed)		2041 Proposed		% Increase	
	Tot Veh	HGV	Tot Veh	HGV	Tot Veh	HGV
A509 East (west of Northfield RAB)	27,091	826	27,340	826	1%	0%
A509 (South M1 J14)	68,784	4,399	69,032	4,399	0%	0%
A5130 (east of Northfield RAB)	16,535	245	16,535	245	0%	0%
M1 J14	163,324	29,666	164,137	29,666	0%	0%

Table: 9.15 2041 Proposed Flows AAWT 18-hour (two-way traffic)

9.8.16 Tables 9.12 and 9.13 show that consideration of the effects of the Proposed Development should be undertaken on Willen Road (S), as a percentage increase in total 24-hour traffic of 11% is predicted because of the development proposal.

9.8.17 In accordance with the advice provided within the IEA Guidelines document, a detailed environmental assessment has therefore been undertaken for Willen Road (S) to determine the significance of the effect of the development traffic flows on receptors along it/using it.

Severance

9.8.18 Severance is only likely to occur on highly trafficked roads and result from the perceived division within a community when it becomes separated by a major traffic artery.

9.8.19 Willen Road (S) will have the highest increase in traffic flows (11%) as this road will provide the main vehicle accesses to the Proposed Development. Willen Road (S) is currently a moderately trafficked road and serves as an access road for Caldecote Farm (with no existing residential community). The development proposals will replace much of the agricultural land with residential development, a primary school and local centre; this will result in increased traffic flows (11%). There will be a nominal increase in HGV traffic.

9.8.20 The future highway improvements and proposals will minimise the traffic impacts and will improve the severance of the road, especially with the introduction of two signal-controlled junctions (which will have pedestrian and cyclist crossing facilities) and the reduction of the speed limit (in conjunction with the Employment Site) on Willen Road between Tongwell Roundabout to the south to the entrance to Newport Pagnell (Marsh End Road)

to the north, from the national speed limit (60mph) to 40mph. The pedestrian and cycle improvements proposed as part of this Development and other highway improvements proposed as part of the Caldecote Farm development would also minimise the severance.

9.8.21 It is therefore considered that the magnitude of impact on severance would be low and the sensitivity low, which would be slight in terms of the EIA Regulations.

Driver Delay

9.8.22 Driver delays occur when traffic flows are high, and roads are at or near capacity. This typically occurs when traffic flows are at their peak, during the weekday morning and evening peak hours.

9.8.23 Driver delay has been determined at the two proposed access junctions on Willen Road for the following assessment scenarios.

- 2031 / 2033 Baseline flows + committed development weekday morning and evening peak hours: Willen Road (N) / Roxhill Site Access only.
- 2031 Baseline flows + committed development + proposed development traffic (650 units only) weekday morning and evening peak hours: Proposed Northern and Southern Access Junctions.
- 2033 Baseline flows + committed development + proposed development traffic (800 units only) weekday morning and evening peak hours: Proposed Northern and Southern Access Junctions.

9.8.24 The average delay (in terms of seconds per Passenger Car Unit (PCU) for each movement is provided in Tables 9.16 to 9.19.

Link Name	Link No.	2031 Baseline + Committed		2031 Baseline + Committed + Development	
		AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
Willen Road (N)	1/1	16.1	10.0	15.2	7.9
	1/2+1/3	13.7	13.4	12.6	11.4
Willen Road (S)	2/1	13.5	17.9	6.1	5.8
	2/2	12.8	16.8	9.8	6.0
Roxhill Site Access	3/1	72.7	85.1	72.4	78.2
Proposed Northern Access	6/1	-	-	83.6	60.6
	6/2	-	-	146.8	77.9

Table: 9.16 Willen Road (N) Northern Access – 2031 Predicted Driver Delay (Average Delay Per PCU (s/pcu)

Link Name	Link No.	2033 Baseline + Committed		2033 Baseline + Committed + Development	
		AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
Willen Road (N)	1/1	16.6	10.0	17.2	8.7
	1/2+1/3	13.7	13.4	13.3	11.4
Willen Road (S)	2/1	13.6	18.1	6.6	6.4
	2/2	12.8	16.9	11.3	6.7
Roxhill Site Access	3/1	72.7	85.1	66.2	75.4
Proposed Northern Access	6/1	-	-	73.2	58.7
	6/2	-	-	154.3	78.1

Table: 9.17 Willen Road (N) Northern Access – 2033 Predicted Driver Delay (Average Delay Per PCU (s/pcu)

Link Name	Link No.	2031 Baseline + Committed		2031 Baseline + Committed + Development	
		AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
Proposed Southern Access	2/1	-	-	79.8	72.6
	2/2	-	-	73.0	70.0
Willen Road (S)	3/1 + 3/2	-	-	7.5	7.9
Willen Road (N)	5/1	-	-	13.9	5.8
	5/2	-	-	5.7	5.5

Table: 9.18 Willen Road (N) Southern Access – 2031 Predicted Driver Delay (Average Delay Per PCU (s/pcu)

Link Name	Link No.	2033 Baseline + Committed		2033 Baseline + Committed + Development	
		AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)	AM Peak Hour (08:00-09:00)	PM Peak Hour (17:00-18:00)
Proposed Southern Access	2/1	-	-	85.4	75.3
	2/2	-	-	74.6	72.1
Willen Road (S)	3/1 + 3/2	-	-	7.6	8.2
Willen Road (N)	5/1	-	-	14.5	5.7
	5/2	-	-	5.6	5.6

Table: 9.19 Willen Road (N) Southern Access – 2033 Predicted Driver Delay (Average Delay Per PCU (s/pcu)

9.8.25 The results show that Willen Road at the junction with the Roxhill Site Access will not

experience significant delays in the 2031 and 2033 assessment scenarios. The Roxhill Site Access will experience some delays (between 73 and 85 seconds) in both the morning and evening peak hours for both scenarios.

9.8.26 With the introduction of the proposed Northern Access and addition of development traffic (2031 & 2033 development scenarios), there are insignificant changes in delays for Willen Road (S) and the Roxhill Site Access. The proposed Northern Access will experience delays (of between 154 seconds in the morning peak hour and 59 seconds in the evening peak hour for the 2033 Baseline + Committed + Development scenarios).

9.8.27 The model results for the proposed Southern Access for the 2031 Baseline + Committed + Development scenarios show that the Southern Access will experience delays (of 80 seconds in the morning peak hour and 70 seconds in the evening peak hour). Driver delays will slightly increase in the 2033 Baseline + Committed + Development morning and evening peak hour scenarios.

9.8.28 Overall, the greatest driver delay is for the proposed Northern Access in the morning peak hour (154 seconds). The junction has been modelled to find the optimum balance between the high volume of traffic travelling on Willen Road (particularly the southbound direction on Willen Road (S)) in the morning peak hour), to maximise capacity and traffic flowing through the junction, providing sufficient operational capacity for the proposed Northern and Southern Accesses whilst.

9.8.29 It is considered that Willen Road is of a medium sensitivity, based on the volumes of traffic using the link; however, the driver delay effect because of the development traffic would be slight in terms of the EIA Regulations. On this basis, the magnitude of impact on driver delay is likely to be minor.

Pedestrian Delay

9.8.30 The Proposed Development has been designed to ensure the site is well connected and fully integrated within the surrounding area to maximise access on foot. This Development and other development sites in the area propose a number of pedestrian connections and improvements.

9.8.31 This Development will provide pedestrian (and cycle) crossing facilities at the proposed two new Northern and Southern access junctions. These will tie-in with the proposed pedestrian (and cycle) crossing facilities to be implemented at the new access junction for the Employment Site and at the Marsh End Roundabout.

9.8.32 Pedestrian demand at both the Northern and Southern Access junctions has been assumed to be 50%, i.e., the pedestrian stages will be demanded every other cycle, which means the maximum pedestrian wait time would be 120 seconds (or two minutes).

9.8.33 This Development will provide further enhancements to Willen Road with the provision of a new Redway route along the eastern side of Willen Road between Tongwell Roundabout and the Northern Access. This will connect with the new Redway being provided between the Northern Access and the Marsh End Roundabout in conjunction with the Employment site. The new Redway will connect to the existing facilities in Newport Pagnell in the north and the existing facilities at the Tongwell Roundabout to the south. It is proposed that Willen Road (S), south of the proposed Southern Access will be a key pedestrian/cycle link to the Tongwell Roundabout.

9.8.34 To improve pedestrian and cycle connections to the north towards Newport Pagnell it is proposed to provide a new footbridge with ramps and steps to accommodate pedestrian and cycle movements over the A422 along the route of Footpaths 007 / 014.

9.8.35 The new pedestrian / cycle bridge across the A422, dedicated crossing facilities at the new access junctions and the new Redway on Willen Road, will improve connections, making it safer and easier for pedestrians to use and cross these roads. It should also be noted that in conjunction with the Employment Site, the speed limit on Willen Road between Tongwell Roundabout to the south to the entrance to Newport Pagnell (Marsh End Road) to the north, will be reduced from the national (60mph) to 40mph. Pedestrians will be at the heart of the internal design of the Site to ensure the best experience for pedestrians.

9.8.36 The IEMA Guidelines set out that pedestrian delay is perceptible or considered significant beyond a lower delay threshold of 10 seconds, for a link with no crossing facilities. A 10 second pedestrian delay in crossing a road broadly equates to a two-way link flow of approximately 1,400 vehicles per hour. There is no guidance for road links with pedestrian crossing facilities.

9.8.37 The maximum hourly 2033 baseline traffic flow on Willen Road (S) would be 2,368 vehicle movements, which would increase to 2,501 vehicle movements with the addition of development traffic. There are currently no crossing facilities along Willen Road and whilst the Proposed Development will result in increased traffic flows, the new signal-controlled access junctions will provide dedicated crossing facilities for both pedestrians and cyclists.

9.8.38 It is important to mention that currently there are no/minimal pedestrian facilities and movements along Willen Road. Whilst this Development and the Employment site will increase pedestrian movements along this link, the pedestrian improvements proposed will accommodate the forecast pedestrian movements. Given the scale of improvements for this link it is difficult to fully compare the existing environment to the proposed; however, it is considered that the magnitude of impact on pedestrian delay would be low. The sensitivity of the pedestrian delay effect because of the development traffic would be low, which would be slight in terms of EIA.

Pedestrian Amenity

9.8.39 As set out above, there are no commonly agreed thresholds for quantifying the significance of changes in pedestrian amenity, although the IEMA Guidelines refer to a useful study that could be referenced when considering any effect.

9.8.40 The study sets out that moderate (the lowest category) fear and intimidation could occur when the average hourly traffic flow over an 18-hour day is between 600 and 1,200 vehicle movements per hour, and the total HGV flow over an 18-hour period is between 1,000 and 2,000 movements and when average vehicle speeds over an 18-hour day are between 10 and 15 mph. When the average hourly traffic flow over an 18-hour day is between 1,200 and 1,800 vehicle movements per hour, and the total HGV flow over an 18-hour period is between 2,000 and 3,000 movements and when average vehicle speeds over an 18-hour day are between 15-20 mph.

9.8.41 The average 18-hour weekday traffic flow along Willen Road (S) is 19,894 (1,105 average hourly flows) vehicle movements under 2033 baseline conditions, increasing to 22,143 (1,230 average hourly flows) vehicle movements with the addition of the proposed development. The increase in 18-hour daily flows on Willen Road (S) would raise the existing lower moderate threshold of fear and intimidation to 'moderate'. However, the Development would generate a nominal increase in HGV movements, and these would remain in the low (moderate) threshold category.

9.8.42 Currently there are no footways or crossings along Willen Road, it is therefore considered that the 'pleasantness' of a pedestrian's journey along this route will not be adversely affected by the development traffic or the construction traffic flows. Pedestrian movements will increase along this road as a result of the proposed developments of Caldecote Farm Employment site and this site; however a raft of highway, pedestrian / cycle infrastructure improvements are also proposed to accommodate any future increases.

9.8.43 It should also be noted that in conjunction with the Employment Site, the speed limit on Willen Road between Tongwell Roundabout to the south to the entrance to Newport Pagnell (Marsh End Road) to the north, will be reduced from the national (60mph) to 40mph.

9.8.44 Subsequently, the magnitude of the pedestrian amenity effect because of the development traffic would therefore be minor and the sensitivity low, which would be slight in terms of the EIA Regulations.

Accidents and Safety

9.8.45 Personal Injury Accident (PIA) data has been obtained from MKC for the surrounding highway network for the latest five-year period available. A review of the accidents classified as 'fatal', 'serious' or 'slight' is set out previously in this Chapter.

9.8.46 The analysis demonstrates that a total of 67 injury accidents were recorded within the study area, one accident was fatal, eight were serious and 58 accidents were slight.

9.8.47 Whilst there will be a level of additional traffic associated from the Proposed Development along Willen Road and the local highway network, it is not expected that it would have a material adverse effect on accidents and safety, due to the proposed improvements in the highway and pedestrian / cycle infrastructure. Hence it is considered that the Proposed Development would not significantly alter the injury accident rate.

9.8.48 It is therefore considered that the magnitude of impact on accidents and safety would be minor. The significance of the accidents and safety effects because of the development traffic would be low, which would be neutral or slight in terms of the EIA Regulations.

Visual Effects

9.8.49 The Development will result in an increase in flows on the existing Willen Road. There would be no new visual obstruction introduced by the Proposed Development itself; however, the highway improvements proposed as part of the Caldecote Farm Employment Site and this Development Site for Willen Road would result in a change in the design and layout of Willen Road, accommodating the additional traffic forecast for this route (as a result of the two developments and in conjunction with the wider MKE-SUE).

9.8.50 The two new signal-controlled junctions proposed (one as part of the Employment Site), new shared footways/cycleways would result in some visual obstruction along Willen

Road and the increased traffic (resulting from the development), would increase the visual intrusion; however, these improvements will help to minimise the transport impacts of the development proposals.

9.8.51 As set out herein, there would be a nominal increase in HGV movements associated with the operational phase of the proposed development. It is therefore considered that the magnitude of impact in terms of visual effects would be low and the sensitivity would be low. The significance of the visual effect because of the development traffic would therefore be low or slight in terms of the EIA Regulations.

Further Mitigation and Monitoring

9.8.52 Based upon the above results and the non-significant nature of the potential effects, there is no requirement for any further mitigation in terms of environmental effects.

9.8.53 The Framework Travel Plan will include for an annual monitoring of vehicle movements at the site and to assess these against agreed targets. This will be ongoing and if the monitoring identifies that targets are not being met then corrective measures could be adopted. This will be undertaken as part of the Travel Plan, which will be secured through the Section 106 Agreement.

9.9 Residual Effects

Construction Residual Effects

9.9.1 Whilst the construction traffic has been assessed to have a minor effect, it is still appropriate to ensure that some controls are in place on traffic movements through the provision of a Construction Logistics Plan (CLP). The construction traffic accessing the site will be controlled by the use of a construction vehicle routeing agreement so that a clear route, agreed by the highway authority, is adhered to which will minimise the effect of construction traffic on inappropriate areas. The routeing agreement could include restrictions on delivery times if considered necessary by the highway authority.

9.9.2 Following the implementation of a construction vehicle routeing agreement, the construction traffic will remain a slight effect.

Operational Residual Effects

9.9.3 As noted above, there is no requirement for any further mitigation in terms of environmental effects associated with the operational phase. The assessment of severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety, and

visual effects resulting from additional traffic on Willen Road and local road network will therefore remain as previously stated.

Activity	Description of Impact	Short / Medium / Long Term	Magnitude of Impact	Sensitivity	Significance of Effect	Notes
Construction Phase	Increase in Traffic Flows	Medium Term	Low	Low	Slight	n/a
Operational Phase	Severance	Long Term	Low	Low	Slight	n/a
Operational Phase	Driver Delay	Long Term	Low	Medium	Slight	n/a
Operational Phase	Pedestrian Delay	Long Term	Low	Low	Slight	n/a
Operational Phase	Pedestrian Amenity	Long Term	Minor	Low	Slight	n/a
Operational Phase	Accidents and Safety	Long Term	Low	Low	Slight	n/a
Operational Phase	Visual Effects	Long Term	Low	Low	Slight	n/a

Table: 9.20 Summary of Likely Environmental Effects on Transport

9.10 Assessment of Cumulative Effects

9.10.1 An assessment of the potential Cumulative effects related to traffic and transport is included in Chapter 11.

Inter-relationships

9.10.2 There is an inter-relationship with this chapter and Chapter 10: Air Quality & Noise and Vibration in so far as this chapter consider the effects associated with changes in traffic flows. These have used the traffic flows produced for this chapter.

9.11 Conclusions

9.11.1 This chapter has considered the effects of traffic generated by the residential development upon sensitive receptors along the road frontages and using the road links. Assessments have been undertaken for the construction phase and the operational phase, and consideration has been made for cumulative effects with other known developments in the area. The assessments did not identify any significant effects, as summarised in Table 9.20.

10.0 CONSTRUCTION IMPACTS – AIR QUALITY, NOISE & VIBRATION

10.1 AIR QUALITY - Non Technical Summary

10.1.1 RSK Environment Ltd (RSK) was commissioned to undertake an assessment of the potential air quality and dust impacts of the construction phase of the proposed development.

10.1.2 During the construction phase, impacts of the proposed development may potentially arise due to fugitive dust and particulate matter emissions. The risk was assessed according to a widely used method published by the Institute of Air Quality Management (IAQM), 'Guidance on the assessment of dust from demolition and construction'.

10.1.3 Mitigation measures have been recommended to reduce the dust risk for general site activities and construction-specific activities, as well as emissions from plant associated with construction related activities. With the implementation of the appropriate measures, no significant impacts are anticipated.

10.2 Introduction

10.2.1 This chapter reviews the existing air quality conditions at the application site and surroundings. National and local policies are described, and standard assessment methodologies identified.

10.2.2 The likely impacts of the construction phase of the proposed development on air quality at surrounding existing sensitive receptors are assessed. Where required, mitigation measures are proposed.

10.3 Legislation and Guidelines

10.3.1 EU and UK legislation and national and local planning policy relating to air quality is summarised in Table 10.1 below.

Document	Summary
Legislation	
Environment Act 1995	UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy (NAQS). The latest *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – 'Working Together for Clean Air'* (2007) sets air quality standards and objectives for key air pollutants to be achieved between 2003 and 2020. The long term NAQS objective for PM_{10} is 40 µg/m^3 measured as an annual mean. The short term objective for PM_{10} specifies that a 24 hour mean PM_{10} level of 50 µg /m^3 is not to be exceeded more than 35 times per year. The long term NAQS objective for Particulate matter less than 2.5 microns ($PM_{2.5}$) is 25 µg /m^3 measured as an annual mean to be achieved by 2020. Part IV of the Environment Act 1995 requires local authorities in the UK to review air quality in their area. If an exceedance of any NAQS objectives at one or more sensitive receptors seems likely then the local authority must declare an air quality management area (AQMA), and prepare an action plan for improving air quality in that area.
The Air Quality Standards	The Air Quality Standards Regulations 2010 transpose into UK law the EU Directive 2008/50/EC. The regulations set legally binding air quality limit values for the concentrations of a number of pollutants. The limit value for PM_{10} is retained as an annual mean of 40 µg/m^3 and 24 hour mean of 50 µg/m^3 (not to be exceeded more than 35 times per year). The limit value for $PM_{2.5}$ is retained as 25 µg/m^3 to be met by 2015. The regulations also specify a National exposure reduction target for $PM_{2.5}$ to be met by 2020.
Planning Policy	
National Planning Policy Framework (NPPF)	In 2021 the revised National Planning Policy Framework (NPPF) was published, superseding the previous NPPF with immediate effect. The NPPF includes a presumption in favour of sustainable development. Section 15 of the NPPF deals with Conserving and Enhancing the Natural Environment, and states that the intention is that the planning system should prevent *'development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability' and goes on to state that 'new development* [should be] *appropriate for its location' and 'the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as wells as the potential sensitivity of the site or wider area to impacts that could arise from the development.'*

National Planning Policy Framework (NPPF)	With specific regard to air quality, the NPPF states that: "*Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*
Local Plan: Plan:MK 2016 - 2031	The Milton Keynes Local Plan (MK:Plan) provides the overall spatial vision and framework for the future development for the area. Policy NE9 states the following: *'Prevailing air quality and potential impacts upon air quality arising from airborne emissions, dust and odour associated with the construction and operation of a proposal (including vehicular traffic) will be considered when determining planning applications. Proposals that would result in or be subject to unacceptable risk to human health and the natural environment from air pollution, or would prejudice compliance with national air quality objectives, will be refused.'*
Guidance	
Guidance on the Assessment of Dust from Demolition and Construction	The Institute of Air Quality Management (IAQM) published a guidance document in 2014 (Holman *et al*., 2014) on the assessment of air quality impacts of construction. The guidance was produced to provide advice to developers, consultants and environmental health officers. The emphasis of the methodology is on assessing the risk of impacts (in terms of disamenity, particulate matter concentrations and risk to health and impacts upon sensitive ecological receptors) and to recommend mitigation measures appropriate to the level of risk identified.

Table: 10.1 Legislation and Planning Policy

10.4 Consultation

10.4.1 The EIA Scoping Opinion (ref: 20/01181/EIASCO) outlines the requirements for an assessment of the impacts on air quality and dust during the construction period to be included in the ES.

10.4.2 Further, the council states that operational phase impacts from existing sources are considered unlikely to have significant impacts in the long term, provided an appropriate layout is proposed. However, it is required that these topics are covered as a part of the planning application, but not significant enough to require coverage in the ES.

10.4.3 Therefore, the following ES chapter outlines the construction dust assessment, while a

standalone air quality assessment covering the operational phase impacts will be prepared to form part of the planning application.

10.4.4 The Environmental Protection team at MKC was consulted in the preparation of this assessment and the approach as stated above was agreed with MKC.

10.5 Assessment Scope and Methodology

Construction Dust and Particulate Matter

10.5.1 Construction works for the proposed development have the potential to lead to the release of fugitive dust and particulate matter. An assessment of the likely significant effects of construction phase dust and particulate matter at sensitive receptors has therefore been undertaken following the IAQM's construction dust guidance.

10.5.2 In accordance with the IAQM 2014 guidance, the risk of dust and emissions affecting sensitive receptors in the area around the proposed development site was assessed based on the 'area sensitivity' and the magnitude of emissions from each of the following types of construction activity:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

10.5.3 For each activity, the risk of site-derived dust and emissions affecting local sensitive receptors was determined. The risk category may be different for each of the activities and depends on the potential emissions magnitude and the sensitivity of the area. Three different types of impact are considered:

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM10; and
- Harm to ecological receptors.

10.5.4 It is understood that there will be no demolition works during the development of the site and this has therefore not been considered further within this report.

10.5.5 The full construction dust assessment methodology is presented in Appendix 10.1.

Emissions to Air from Construction Traffic and Plant

10.5.6 Exhaust emissions from construction phase vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the application

site and in the vicinity of the application site itself. Detailed information on the construction phase plant is not available at this stage (and would not be until after appointment of the main construction contractors), therefore a qualitative impact assessment has been undertaken based on professional judgement and considering the following factors (where available):

- The likely duration of the construction phase;
- The potential number and type of plant that could be required; and
- The number and proximity of sensitive receptors to the application site boundary.

10.6 Existing Environment

10.6.1 Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.

10.6.2 A desk-based study has been undertaken including a review of monitoring data available from Milton Keynes Council (MKC) and estimated background data from the Local Air Quality Management (LAQM) Support website operated by the Department for Environment, Food and Rural Affairs (Defra).

10.6.3 There were 3 automatic monitoring locations and a diffusion tube network of 40 monitoring locations in Milton Keynes in 2019.

10.6.4 MKC carry out monitoring of PM10 and PM2.5 concentrations at one location within the borough. However, this monitoring locations is located almost 5km from the proposed site, and is therefore not considered likely to be representative of the conditions on site.

10.6.5 In addition to the local monitoring data, estimated background air quality data available from the LAQM-Tools website may be used to establish likely background air quality conditions at the proposed development site. This website provides estimated annual average background concentrations of PM10 and PM2.5 on a 1km2 grid basis. Table 10.2 reproduces estimated annual average background concentrations for the grid square containing the proposed development site for years 2021 and 2022.

10.6.6 No exceedances of the PM10 or PM2.5 air quality objectives (AQO) are predicted.

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Support Website (µg/m^3)	
	PM_{10}	$PM_{2.5}$
2021	16.2	10.3
2022	16.0	10.1
Air Quality Objective	40	25*

Table: 10.2 Estimated Background Annual Average PM10 and PM2.5 Concentrations at the proposed Development Site

10.7 Assessment of Impacts

Fugitive Construction Dust and Particulate Matter

10.7.1 Fugitive dust emissions arising from construction activities are likely to be variable in nature and will depend upon the type and extent of the activity, soil type and moisture, road surface conditions and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust.

10.7.2 Fugitive dust arising from construction is mainly of a particle size greater than the PM10 fraction (which can potentially impact upon human health. However, it is noted that construction activities may contribute to local PM10 concentrations. Appropriate dust control measures can be highly effective for controlling emissions from potentially dust generating activities identified above, and adverse effects can be greatly reduced or eliminated.

Potential Dust Emission Magnitude

10.7.3 With reference to the IAQM criteria, the dust emission magnitudes for earthworks, construction and trackout activities are summarised in Table 10.3, based on information provided by the client.

Activity	IAQM Criteria	Dust Emission Magnitude
Earthworks	-Total area where earthworks will take place is estimated by the client to be >10,000m^2 -The number of heavy earthmoving vehicles is estimated to be >10 at any one time -Height of stockpiled materials is predicted to be 4-8m. -The SI report suggests the soil on site contains clays, sands and gravel. -The total weight of material to be moved is estimated to be >100,000 tonnes. -Work to take place during drier periods.	**Large**
Construction	-Total volume of buildings to be built is >100,000m^3 -No on-site concrete batching and sandblasting proposed -Dusty materials such as concrete on site	**Medium - Large**
Trackout	-The maximum number of heavy-duty vehicle (HDV) outward a movement in any one day is anticipated to be 10-50. -The SI report suggests the soil on site contains clays, sands and gravel. -Extent of unpaved road within the site is <50m.	**Medium**

Table: 10.3 Summary of Dust Emission magnitudes (Before Mitigation)

Sensitivity of the Area

10.7.4 As per the IAQM construction dust guidance, the sensitivity of the area takes into account a number of factors, including:

- The sensitivity of individual receptors in the area;
- The proximity and number of those receptors;
- In the case of PM10, the local background concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

10.7.5 Figure 10.1 and Figure 10.2 show maps indicating the construction and trackout buffers, respectively, for assessing the sensitivity of the area.

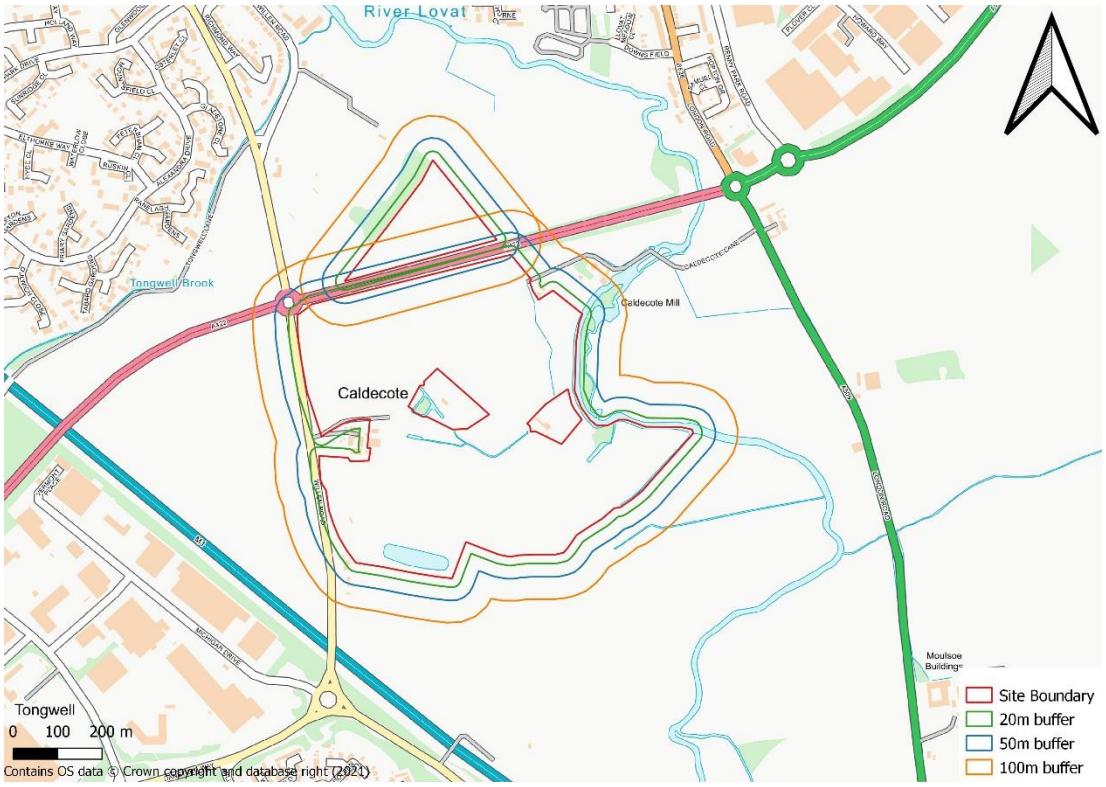

Figure 10.1: Construction and Earthwork Buffers

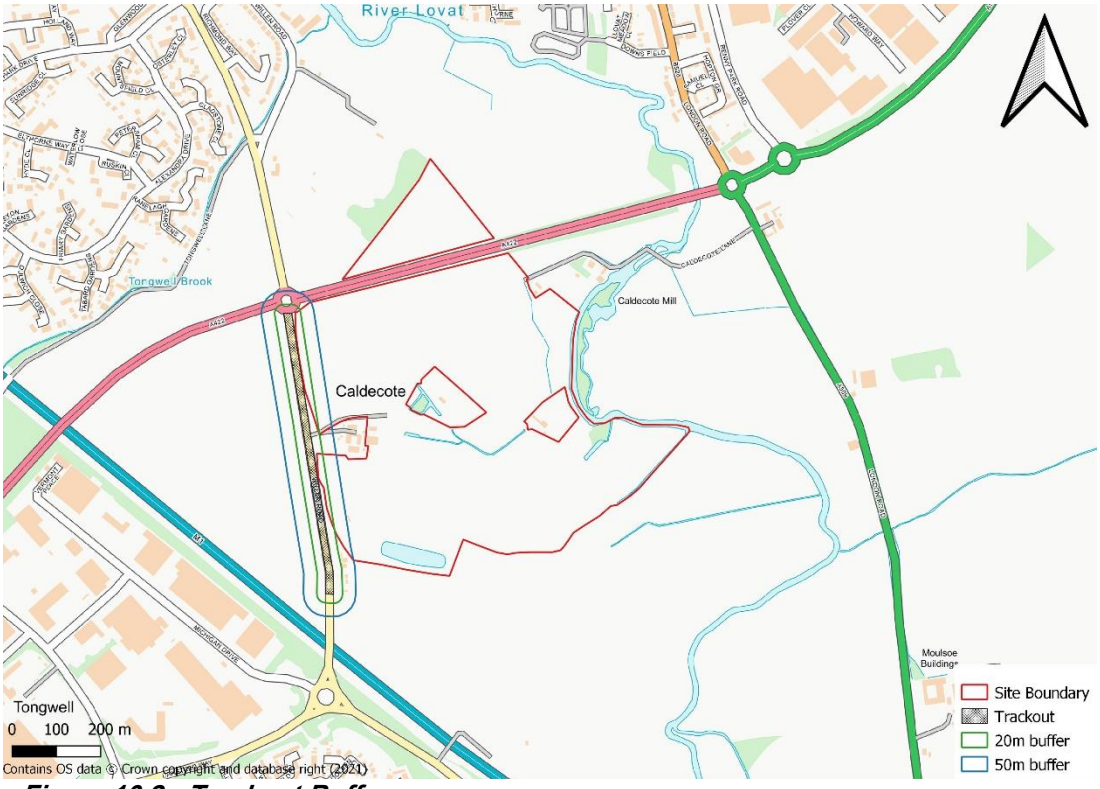

Figure 10.2: Trackout Buffers

10.7.6 Table 10.4 presents the determined sensitivity of the area. Earthworks and construction activities may cause impacts up to 350 m from the proposed development site boundary,

whereas trackout activities are only considered relevant up to 50 m from the edge of the roads likely to be affected by trackout (up to 200 m from the site access), as per the IAQM construction dust guidance.

10.7.7 Following the IAQM construction dust guidance, no ecological receptors have been identified within 50 m of the proposed site or anticipated trackout route.

Potential Impact		Sensitivity of the surrounding area		
		Earthworks	**Construction**	**Trackout**
Dust soiling	Receptor sensitivity	High	High	High
	Number of receptors and distance from the source	1-10 Residential receptors within 20m of the site boundary	1-10 Residential receptors within 20m of the site boundary	1-10 Residential receptors within 20m of the site boundary
	Overall Sensitivity of the Area	**Medium**	**Medium**	**Medium**
Human health	Receptor sensitivity	High	High	High
	Annual mean PM_{10} concentration	<24µg/m^3	<24µg/m^3	<24µg/m^3
	Number of receptors and distance from the source	1-10 Residential receptors within 20m of the site boundary	1-10 Residential receptors within 20m of the site boundary	1-10 Residential receptors within 20m of the site boundary
	Overall Sensitivity of the Area	**Low**	**Low**	**Low**

Table: 10.4 Summary of the Sensitivity of the Area to Dust soiling and Human Health

10.7.8 The dust emission magnitude identified for each construction phase have been combined with the sensitivity of the area in Table 10.4 to determine the risk of impacts of construction activities before mitigation, as summarised in Table 10.5.

Potential Effect	Dust Risk Effect		
	Earthworks	**Construction**	**Trackout**
Dust soiling	Medium Risk	Medium Risk	Low Risk
Human health	Low Risk	Low Risk	Low Risk

Table: 10.5 Summary of the Dust Risk from Construction Activities

Exhaust Emissions from Plant and Vehicles

10.7.9 The operation of vehicles and equipment powered by internal combustion engines results

in the emission of exhaust gases containing the pollutants NOx, PM10, volatile organic compounds, and carbon monoxide. The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition.

10.7.10 Based on the temporary nature of the construction activities, it is considered unlikely that vehicle movements associated with staff commutes to and from the site would have a significant impact on local air quality. Plant would be used to facilitate earthworks and construction. The operation of site equipment and machinery will result in emissions to atmosphere of exhaust gases, but with suitable controls and site management such emissions are unlikely to be significant.

10.8 Mitigation

10.8.1 The dust emitting activities of the construction phase can be effectively controlled by appropriate dust control measures and any adverse effects can be greatly reduced or eliminated.

10.8.2 The dust risk categories identified have been used to define appropriate, site-specific mitigation methods. These mitigation methods are outlined in Appendix 10.2.

10.8.3 Prior to commencement of construction activities, it is anticipated that an agreement on the scope of a dust management plan (DMP, this may be as part of a Construction Environmental Management Plan (CEMP)) for the construction phase will be reached with the local authority to ensure that the potential for adverse environmental effects on local receptors is minimised. The DMP should include inter alia, measures for controlling dust and general pollution from site construction operations and include details of any monitoring scheme, if appropriate. Controls should be applied throughout the construction period to ensure that emissions are mitigated.

10.8.4 The air quality impact of increased traffic during the construction phase will be temporary in nature and will be along traffic routes employed by haulage/construction vehicles and workers. Any effects on air quality will be temporary i.e. during the construction period only and can be minimised by the employment of mitigation measures for operating vehicles.

10.8.5 To reduce any effects of construction plant on local air quality, it is recommended that plant used on-site comply with the NOx, PM and CO emissions standards specified in the EU Directive 97/68/EC and subsequent amendments as a minimum, where they have net

power of between 37kW and 560kW. The emissions standards vary depending on the net power the engine produces.

10.9 Summary of Effects

10.9.1 Following the implementation of measures to minimise construction dust impacts, the residual construction period effects are predicted to be negligible.

10.10 References

Air Quality (England) Regulations 2000, 928. London, Her Majesty's Stationery Office.

Air Quality (England) (Amendment) Regulations 2002, 3043. London, Her Majesty's Stationary Office.

Department for Environment, Food and Rural Affairs, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1), London: The Stationary Office.

Department for Environment, Food and Rural Affairs, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 2), London: The Stationary Office.

Department for Environment, Food and Rural Affairs, 2016. Part IV of the Environment Act 1995: Local Air Quality Management: Technical Guidance LAQM, London: Crown.

Department for Environment, Food and Rural Affairs, 2014. LAQM Support [online] Available at: http://laqm.defra.gov.uk/ [Accessed February 2021].

Ministry of Housing, Communities and Local Government, (2019). National Planning Policy Framework.

IAQM, (2014), v1.1. Guidance on the assessment of dust from demolition and construction.

10.11 NOISE AND VIBRATION – Introduction

10.11.1 This Noise Chapter has been prepared by Cole Jarman Ltd (CJ) to set out an assessment of the likely significant noise effects associated with the Proposed Development, a detailed description of which can be found in Chapter 2.

10.11.2 The following factors are considered:

- Construction noise and vibration to existing receptors.

10.11.3 This chapter should be read in conjunction with its associated figures and appendices, as listed below:

- Appendix 10.3: Noise Survey
- Appendix 10.4: Example Code of Construction.

- Appendix 10.5: Construction Noise Assessment
- Appendix 10.6: Noise Assessment

10.11.4 This noise chapter has been prepared by Matthew Heyes and checked by Richard Masey, both of Cole Jarman Ltd. All consultants at Cole Jarman hold academic qualifications necessary to operate as professional acoustics consultants, holding technical qualifications in acoustics or a related field.

10.11.5 Matthews Heyes, who has completed the Noise Assessment (Appendix 10.6) and environmental statement for the Proposed Development is an Associate Director at Cole Jarman and a full Member of the Institute of Acoustics. He has over 12 years' experience working as an acoustic consultant and holds a BSc (Hons) in Acoustics.

10.11.6 Richard Masey, who was responsible for checking this chapter, is a Senior Consultant at Cole Jarman and is a full Member of the Institute of Acoustics (IOA). He has over 8 years' experience working as an acoustic consultant, holds the IOA Diploma in Acoustics and Noise Control and a BA in Sound Design.

10.11.7 Cole Jarman are sponsor members of the Institute of Acoustics, with all consultants being at individual membership grades ranging from "Associate" to "Member". Cole Jarman is also a corporate member of the Institute of Environmental Management and Assessment.

10.12 Legislation, Policy and Guidance

National Planning Policy Framework (NPPF)

10.12.1 The National Planning Policy Framework (NPPF), published in March 2012 and updated in July 2021, is currently the relevant document for defining the national policy toward noise sensitive development. It refers to the Noise Policy Statement for England (NPSE), which is discussed in the subsequent section.

10.12.2 The current policy on sustainable development influences the emphasis of any noise assessment. The development of a quiet, rural site is by most measures less sustainable than the development of a site located near existing infrastructure and facilities. The rating of development sites based on prevailing noise levels should reflect this.

10.12.3 Specifically, on the subject of noise, paragraph 185 of NPPF states:

> *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well*

as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:
a. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
b. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

10.12.4 Paragraph 185 references the Noise Policy Statement for England and no other particular standards.

10.12.5 On the general issue of amenity, paragraph 130 states that planning policies and decisions should ensure that developments:

"create places that […] promote health and well-being, with a high standard of amenity for existing and future users…"

10.12.6 Further to this, paragraph 174 states that planning policies and decisions should contribute to and enhance the natural and local environment by:

"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution"

10.12.7 A notable inclusion in the July 2018 edition of NPPF is the 'agent of change' principle in paragraph 187. In terms of noise, this principle requires that those proposing a new noise sensitive development incorporate sufficient mitigation such that the operation of existing premises in the area is not unreasonably restricted in order to control noise impact upon the new development:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Noise Policy Statement for England (NPSE)

10.12.8 This NPSE does not set quantitative guidelines for the suitability of noise sensitive development in an area depending on the prevailing levels of noise. Absent, therefore, is reference to specific noise levels which determine whether noise sensitive development is suitable and, if so, whether particular mitigation factors need to be considered.

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10.12.9 Instead, the NPSE sets out three aims. The first aim of the Noise Policy Statement for England:

> *"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."*

10.12.10 The second aim of the Noise Policy Statement for England:

> *"Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."*

10.12.11 The third aim of the Noise Policy Statement for England:

> *"Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."*

10.12.12 Paragraph 2.24 states that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. It also states that this does not mean that such adverse effects cannot occur.

10.12.13 In essence, therefore, each development site must be judged on its ability to deliver on each of the stated aims. Quantifying the prevailing noise levels is therefore an essential first step in assessing a given site.

10.12.14 The NPSE refers to SOAEL, the Significant Observed Adverse Effect Level. This is defined as the level above which significant adverse impacts on health and quality of life occur. Given the overall thrust of the NPSE, the SOAEL is therefore an important assessment standard although the document also comments that:

> *"It is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times."*

10.12.15 Attention is drawn to the fact that the SOAEL is the level above which significant adverse effects can be observed. Importantly, it should be noted that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable and it is not necessary to seek to achieve no impact at all.

Planning Practice Guidance (PPG)

10.12.16 The Department for Communities and Local Government 'Planning Practice Guidance' (PPG) was published on 6 March 2014 and updated in July 2019.

10.12.17 The PPG on Noise expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment. Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment.

10.12.18 The PPG includes a section on noise, which states:

> *"Plan-making and decision making need to take account of the acoustic environment and in doing so consider:*
>
> *whether or not a significant adverse effect is occurring or likely to occur;*
>
> *whether or not an adverse effect is occurring or likely to occur; and*
>
> *whether or not a good standard of amenity can be achieved."*

10.12.19 It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to Significant Observed Adverse Effect Level (SOAEL), the Lowest Observed Adverse Effect Level (LOAEL) and the No Observed Effect Level (NOEL).

10.12.20 The guidance then presents a table, which is reproduced as Table 10.6 overleaf. The implication of the final line of the table is that only the 'noticeable and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

Response	Examples of Outcomes	Increasing effect level	Action
NOEL (No Observed Effect Level)			
Not present	No Effect	No Observed Effect	No specific measures required
NOAEL (No Observed Adverse Effect Level)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
LOAEL (Lowest Observable Adverse Effect Level)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL (Significant Observed Adverse Effect Level)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table: 10.6 PPG Table

10.12.21 Under the topic of further considerations relating to mitigating the impact of noise on residential developments, the PPG states:

"Noise impacts may be partially offset if residents have access to one or more of:
a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;

a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended

benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;

a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).”

10.12.22 This is not to say that access to the above items is mandatory, rather that it can help to offset any noise impacts.

10.12.23 The PPG also considers the potential risk of conflict between new development and existing businesses. It states that it may be necessary for mitigation to be put in place as part of a new development, to avoid existing activities having a significant adverse effect on residents or users of the proposed scheme. It goes on to state:

“The agent of change will also need to define clearly the mitigation being proposed to address any potential significant adverse effects that are identified. Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects, but can help to achieve a satisfactory living or working environment, and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring).

It can be helpful for developers to provide information to prospective purchasers or occupants about mitigation measures that have been put in place, to raise awareness and reduce the risk of post-purchase/occupancy complaints.”

10.12.24 It goes on to make the further note:

“For noise sensitive developments, mitigation measures can include […] optimising the sound insulation provided by the building envelope.”

10.13 Assessment Methodology and Significance Criteria

Scoping and Consultation

10.13.1 The assessment set out within this chapter has been requested by Milton Keynes Council via a formal scoping response dated 14th October 2020. The relevant information is reproduced below:

“Air Quality, Noise and Vibration – construction

Construction of this scale is considered likely to cause significant impacts to the existing residents, through both scale, location and duration of impact. An assessment of the impacts on air quality, dust, noise and vibration during the construction period should be included in the ES.”

"Air Quality, Noise and Vibration – operational

Operationally it is considered unlikely that any existing sources of noise (such as the A422), odour etc would be likely to have significant adverse impacts in the long term, provided an appropriate layout is proposed. These topics should be covered as part of the planning application, but are not likely to be significantly enough to require coverage as part of the ES."

10.13.2 Based on the scoping response above it is only necessary to assess the impact of construction activities within the chapter. Operational noise has been scoped out of this Environmental Statement by the Council.

Significance Criteria

10.13.3 The following matrix has been adopted as a means to identify the overall significance of the effects which have been identified. The sensitivity of all receptors (proposed and existing dwellings) has been taken to be "Medium" and therefore only the second row of the table below applies:

		Magnitude of Impact (Adverse / Beneficial)			
	Significance of Effect of (Adverse / Beneficial)	**High**	**Medium**	**Low**	**Very Low**
Sensitivity of Receptor	**High**	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible

Table: 10.7 Impact Matrix

10.13.4 The purpose of the assessment set out within this chapter was first to identify the magnitude of the noise and vibration related impacts. The descriptors set out above can be qualified as follows:

- **High**: Total loss of or major alteration to key elements of baseline conditions.
- **Medium**: Loss or alteration to one of the key baseline elements.
- **Low**: A minor shift away from baseline conditions.
- **Very Low**: None or very little change from baseline conditions (i.e. impact is negligible).

10.13.5 To determine the significance of and effect related to a given factor, in this case construction noise and vibration, impacts are considered together with receptor sensitivity.

Effects can be either beneficial or adverse depending on context. It is also relevant to consider factors such as context and effect duration when determining the overall significance.

10.13.6 Where an effect is assessed as having no, or very little adverse influence, it will be classed as Negligible. Up to Minor Adverse effects are considered acceptable in the context of residential receptors and taking account the relevant National Policy and Guidance.

Assessment of Construction Noise

10.13.7 Construction noise is inherently temporary in nature and so any impacts will be temporary or short term only.

10.13.8 The noise impact from construction operations will be limited to dwellings located close to the site. The potential impacts from construction noise was therefore assessed to the following assessment positions:

- AP1 – Houses to the northwest of site on Ranelagh Gardens - Approx. 300m from the nearest proposed dwellings
- AP2 – Caldecote Farm - Approx. 20m from the site boundary the nearest proposed dwellings
- AP3 – Caldecote Cottage - Approx. 50m from the site boundary the nearest proposed dwellings
- AP4 – Moat Cottage - Approx. 30m from the site boundary the nearest proposed dwellings
- AP5 – Caldecote Mill - Approx. 150m from the site boundary the nearest proposed dwellings

10.13.9 To evaluate the impact at the above positions, guidance has been taken from BS 5228-1:2009; which covers noise control recommendations relating to open construction sites. It provides guidance concerning methods of predicting and measuring noise, and assessing its impact on those exposed to it. It is therefore relevant to consider on this site.

10.13.10 Example method 1 in Annex E of BS 5228-1 provides guidance on how to set threshold noise levels which can be used to identify potential significant effects at receptors. Ambient noise levels on site without construction noise are rounded to the nearest 5 dB and compared against the construction noise emission levels. If the construction noise level exceeds the category value shown in the table below, then a potential significant impact is indicated.

Assessment category and threshold value period	Threshold value, in dB (LAeq,T)		
	Category A[A]	Category B[B]	Category C[C]
Night-time (23.00−07.00)	45	50	55
Evenings and weekends[D]	55	60	65
Daytime (07.00−19.00) and Saturdays (07.00−13.00)	65	70	75
NOTE 1 A potential significant effect is indicated if the LAeq, T noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total LAeq, T noise level for the period increases by more than 3 dB due to site noise. NOTE 3 Applied to residential receptors only.			
[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. [B] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. [C] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. [D] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.			

Table: 10.8 Construction Noise

10.13.11 The noise thresholds above are based on the existing noise climate at the assessment positions. The existing noise climate is quantified within the Baseline Conditions section later in this chapter. Where the noise measurements were not fully representative of the noise climate at the assessment positions the noise levels have been adjusted to take account of the difference in distance losses and angle of view changes between the source and measurement position and assessment position where appropriate.

10.13.12 Following any necessary adjustments, the noise levels at the nearest dwellings are all below the Category A threshold values and so the following thresholds apply:

Period	Hours	Total Noise Levels at Designated Noise Sensitive Locations	
		Ambient Construction Noise Level $L_{Aeq,T}$, dB	**Period T over which the Ambient $L_{Aeq,T}$ is applicable, hours**
Mondays to Fridays	0700-1900	65	any 4 hours
Mondays to Fridays (if permitted)	1900-2300	55	any 1 hour
Saturdays (if permitted)	0700-1300	65	any 4 hours
	1300-1900	55	any 1 hour
	1900-2300	55	
Sundays (if permitted)	0700-0900	55	
	0900-1900	55	any 1 hour
	1900-2300	55	
Any day (if permitted)	2300-0700	Construction Noise Levels subject to negotiation with EHO	

Table: 10.9 Construction Noise Limits

10.13.13 Where it is not possible to meet the above construction noise criteria, limits have been set out in terms of the duration and frequency for which any given impactful construction activity should follow. Limiting construction activity in this way ensures that a pragmatic approach is taken; ensuring work can be undertaken on the site in a reasonable way, whilst providing an acceptable noise climate with periods of respite to nearby receptors.

10.13.14 As no detailed scheme of construction is known at this stage, it is necessary to make reasonable assumptions when undertaking the analysis of construction noise emissions to existing dwellings. An assessment of noise from potential construction activities typically associated with the construction of housing was undertaken to assess the potential impacts.

10.13.15 Based on Cole Jarman's experience of construction activities on similar sized and types of developments the following are expected to be representative of the activities which will be undertaken on site:

- Establishing site compound
- Erecting Site Hoarding
- Haul Road Construction
- Use of Site Compound
- Drainage Works
- Remediation – Earthworks
- Remediation – process Area
- Ground Water Treatment

- Residential Substructure – Piling & Groundbeams
- Residential Substructure – Rafts
- Superstructure
- External Works
- Landscaping

10.13.16 As it is currently unknown if piling will be required for the foundations of the dwellings and so the impact of both piling activities and works associated within installing rafts were considered to ensure a robust assessment.

10.13.17 The noise levels for the equipment used within the assessment were taken from BS5228-1;2009+A1:2014. The relevant noise level data was corrected for the expected percentage activity "on-time" to determine the expected activity noise level at 10m from each source. This noise level was then corrected to take account of distance losses to the nearest dwelling as appropriate.

10.13.18 Details of the equipment assumed to be used for each construction activity, along with the estimated percentage on times and typical noise level at 10m are shown in attached Appendix 10.5.

10.13.19 As the location of the construction activities is not known, it has been assumed that the activity would be undertaken at a position on the closest boundary of the site to each assessment position. In reality, such noise source placement would only be expected to occur relatively briefly if at all.

10.13.20 In addition, the distances required between construction activity and receptors to ensure that relevant criteria are met were calculated.

10.13.21 Where Category A thresholds in the Table 10.9 are not exceeded, this has been determined to be a Low Adverse temporary impact and therefore no more than a Minor Adverse Effect. In situations where the thresholds have the potential to be exceeded, additional noise control and construction practice guidance is provided to ensure that the significance of any construction noise related effect remains no more than Minor Adverse.

10.13.22 It important to note that the impact/effect is inherently limited due to the temporary nature of the noise source and this is taken into account when quantifying the significance of the effect.

Assessment of Construction Vibration

10.13.23 As with noise, vibration associated with construction activities is inherently temporary in

nature and so any impacts will be in the short term only. A pragmatic approach needs to be taken when assessing the vibration effects of any construction project.

10.13.24 Guidance for assessing the impacts has been taken from BS 5228-2:2009 , BS 7385-2:1993 and BS ISO 4866:2010 .

10.13.25 Section B.2 of BS 5228-2:2009 Annex B relates to human response to varying levels of vibration. Table B.1 from the standard is set out below:

Vibration level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Table: 10.10 Guidance on effects of vibration levels (Table B.1 from BS 5228-2:2009)

10.13.26 Section B.3 of BS 5228-2:2009 Annex B relating to structural response to vibration refers to BS 7385:1993 "*Evaluation and measurement for vibration in buildings*" Part 2 "*Guide to damage levels from groundborne vibration*".

10.13.27 The introduction to BS 7385:1993 states:

> *"There is a lack of reliable data on the threshold of vibration-induced damage in buildings both in countries where national standards already exist and in the UK. This Part of BS 7385 has been developed from an extensive review of UK data, relevant national and international documents and other published data. Although a large number of case histories was assembled in the UK database, very few cases of vibration-induced damage were found…*
> *This Part of BS 7385 sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated."*

10.13.28 The standard sets out guide values for transient groundborne vibration, above which cosmetic damage could typically occur. The standard states:

> *"The vibration levels suggested are judged to give a minimal risk of vibration induced damage. Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK."*

10.13.29 The guide values are presented in the following table T4, which is adapted from BS

7385:1993-2:

Type of Building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s at 4Hz and above	
Unreinforced or light framed structures. Residential or light commercial type buildings	15mm/s at 4Hz increasing to 20 mm/s at 15Hz	20mm/s at 15Hz increasing to 50 mm/s at 40Hz and above
Note 1: Values referred to are at the base of the building		
Note 2: For light structures, at frequencies below 4 Hz, a maximum displacement of 0.6mm (zero to peak) should not be exceeded.		

Table: 10.11 Continuous vibration limit values for cosmetic damage according to BS7385:2

10.13.30 The standard suggests minor damage is possible at vibration magnitudes which are greater than twice the quoted values, and major damage to a building structure may occur at values greater than four times the vibration limit.

10.13.31 The classification of damage into categories is described in BS ISO 4866:2010 as follows:

Cosmetic. *The formation of hairline cracks on drywall surfaces or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in mortar joints of brick/concrete block construction.*

Minor. *The formation of large cracks or loosening and falling of plaster or drywall surfaces, or cracks through bricks/concrete blocks.*

Major. *The damage to structural elements of the structure, cracks in support columns, loosening of joints, splaying of masonry cracks, etc.*

10.13.32 It is proposed that all construction operations shall be such that they do not regularly exceed a peak particle velocity vibration level of 5 mm/s at any nearby sensitive location, providing full information is provided to the nearby residents and business on times when such works are to be undertaken. A peak velocity vibration level of 10 mm/s considered an upper limit for isolated events.

10.13.33 Construction related vibration giving rise to a peak particle velocity of ≤5 mm/s at any nearby sensitive location, or up to 10 mm/s for isolated events (i.e. one-off occurrences) is considered to be a Low Adverse temporary impact and therefore no more than a Minor Adverse Effect.

10.13.34 Where these thresholds are exceeded, this may give rise to a Medium Adverse temporary impact and therefore up to Moderate Adverse Effect. The impact/effect is inherently limited due to the temporary nature of the noise source and this is taken into account when quantifying the significance of the effect.

10.14 Baseline Conditions

Existing Noise Climate

10.14.1 Baseline noise levels were quantified across the site in February 2021. Full details of the noise survey are provided within Appendix 10.3, with the relevant information summarised below.

10.14.2 A mix of attended/unattended environmental noise measurement were undertaken at the site in the following locations. Attended measurement positions are referred to as MPx and unattended noise loggers at LPx:

- MP1 – Free-field position located 1.2m above local ground level on the western boundary of the site, approximately 20m from the Kerb of Willen Road.
- MP2 – Free-field position located 1.2m above local ground level towards the middle of the site, approximately 160m from the Kerbs of both Willen Road and the A422.
- MP3 – Free-field position located 1.2m above local ground level towards the southern end of the western boundary of the site, approximately 115m from the Kerb of Willen Road.
- MP4 – Free-field position located 1.2m above local ground level on the southern boundary of the site.
- LP1 – Free-field position located 1.2m above local ground level at the northern site boundary, approximately 20m from the kerb of the A422.
- LP2 – Free-field position located 1.2m above local ground level on the existing bunding to the west of Caldecote Farm.
- LP3 – Free-field position located 1.2m above local ground level towards the eastern end of the southern site boundary.

10.14.3 The noise measurements at the site were made during a period of National Lockdown associated with the COVID 19 Pandemic and so it is appropriate to consider additional methods to ensure that the measured noise levels are representative.

10.14.4 The development site is covered by the DEFRA noise maps, which are England wide noise maps based on 2017 traffic flows. The maps cover all major trunk roads in England; around the development site the M1, A422 and A509 are all covered by the maps. In order

to validate the results of the survey, the noise levels shown on the noise maps were compared to the measured noise. Full details of this comparison are provided within Appendix 10.3.

10.14.5 The comparison has shown that the noise levels measured across the site were generally between 3-6 dB lower than would usually be expected without the effect of the national lockdown. The higher noise levels taken from the national noise maps were therefore used within the assessment to ensure a robust assessment.

10.14.6 The results at the unattended measurement positions were used to set noise limits for construction activities. The measured baseline noise levels at these positions are presented in the following table:

Location	Daytime (0700-2300)
	dB $L_{Aeq,16h}$
LP1	65
LP2	55
LP3	52

Table: 10.12 Measured noise levels at the unattended positions

10.14.7 The measured levels at the attended positions are shown in Appendix 10.3.

10.15 Mitigation and Assessment of Effects

Overview

10.15.1 In formal EIA, it is normal practice to consider the potential significance of an unmitigated effect, set out the required mitigation to sufficiently control said effect, then set out the residual effect.

10.15.2 Construction related effects are inherently temporary in nature and therefore it is more appropriate to consider them inclusive of the mitigation measures that are to be adopted. An assessment of construction related effects is set out in the following sections.

Construction Noise

10.15.3 Construction activities have the potential to generate significant levels of noise. The related impact could therefore be Medium Adverse but Temporary at the closest existing receptors. Due to the temporary nature of construction activities, there will be no impact or effect in the long term.

10.15.4 Works will be undertaken in line with the best practicable means approach detailed within the example code of construction provided in Appendix 10.4 and this has been taken into account in the assessment of effect of resulting construction noise.

10.15.5 The worst case noise levels from each activity at assessment position was calculated by locating the activity at the closest position on site to the receptor. The resulting noise levels are shown below:

Construction Activity	Calculated Noise Level, dB $L_{Aeq, 4h}$				
	AP1	AP2	AP3	AP4	AP5
Establish site compound	54	77	69	74	60
Site hoarding	51	75	67	71	57
Haul road construction	55	79	71	75	61
Use of site compound	49	72	64	69	55
Drainage works	55	79	71	75	61
Remediation - Earthworks	61	84	76	81	67
Remediation - Process area	54	78	70	74	60
Groundwater treatment	39	62	55	59	45
Residential substructure - piling	62	85	77	82	68
Residential substructure - Rafts	54	78	70	74	61
Superstructure	51	75	67	71	57
External Works	53	77	69	73	59
Landscaping	47	70	62	67	53

Table: 10.13 Calculated worst case noise levels

10.15.6 The results above relate to an absolute worst case assessment, where the activities are located as close to the assessment positions as possible. This arrangement of source and receptors is expected to be highly unlikely to occur for any significant length of time, if at all.

10.15.7 In the rare occurrence where activities occur in the arrangement described above, this is likely to only be for a short duration, thereby limiting the significance of any resulting effect to Minor Adverse.

10.15.8 Where the construction activities are undertaken further away from the existing receptors, the noise impact on them will reduce commensurately. The minimum distance required between each activity and assessment position to achieve the relevant noise criteria are shown in the table below:

Construction activity	Calculated minimum distance from assessment position, metres				
	AP1	AP2	AP3	AP4	AP5
Establish site compound	90	90	90	90	90
Site hoarding	70	70	70	70	70
Haul road construction	100	100	100	100	100
Use of site compound	50	50	50	50	50
Drainage works	100	100	100	100	100
Remediation - Earthworks	200	200	200	200	200
Remediation - Process area	90	90	90	90	90
Groundwater treatment	20	20	20	20	20
Residential substructure - piling	210	210	210	210	210
Residential substructure - Rafts	100	100	100	100	100
Superstructure	70	70	70	70	70
External Works	80	80	80	80	80
Landscaping	40	40	40	40	40

Table: 10.14 Minimum distance to achieve noise thresholds

10.15.9 Any activity occurring at a greater distance (between source and receiver) than the distances set up above will give rise to noise levels below the relevant criteria.

10.15.10 Where activities are to be undertaken closer to the assessment positions than shown in Table 9 above it is recommended that the timing of the works are scheduled to ensure that they don't occur for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive month period in line with guidance within BS 5228.

10.15.11 Following this approach will ensure construction related noise effects are limited to Minor Adverse in the worst case where the relevant criteria may be exceeded. Local residents should be informed before any works are undertaken in this way; good community liaison is an important factor to mitigating construction related effects.

10.15.12 By taking the best practical means approach detailed above, construction noise related impacts can be controlled to be Low Adverse in the worst case and temporary. The significance of construction noise is therefore assessed to be Minor Adverse in the worst case.

Vibration

10.15.13 As detailed above, the closest property to the site is Caldecote Farm, located 20m from the site boundary. General construction activities, such as those shown in Appendix 10.5 would not be expected to exceed the relevant threshold values at this distance.

10.15.14 Construction related vibration is therefore assessed not to give rise to more than a Low

Adverse temporary impact and therefore no more than a Minor Adverse Effect.

10.15.15 The vibration impact from construction activities shall also be further minimised using Best Practicable Means techniques and so the following will not be allowed on site:

- No machine shall be permitted which uses a system of dropping a heavy weight, power assisted or by gravity, for the purpose of breaking up paving or foundations.
- Where possible non-percussive demolition techniques, including the use of electronic or hydraulic pulverisers, will be used. Where practicable building elements will be removed from their position before being broken up or crushed at a low level, behind localised screens, or off-site.

10.16 Summary

10.16.1 This chapter of the Environmental Statement has been prepared by Cole Jarman, including appendices 10.3 to 10.5.

10.16.2 The chapter sets out and assessment of the impact of noise and vibration relating to the construction of the proposed dwellings. Best Practice Construction methods have been set out to ensure that the noise and vibration impact is suitably controlled.

10.16.3 Noise and vibration related construction effects have been assessed to give rise to no more than a Low Adverse impact and therefore are of Minor Adverse effect significance in the worst case. All construction noise and vibration related effects are temporary and therefore inherently limited.

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11.0 CUMULATIVE IMPACTS

11.0.1 Cumulative impacts are not defined within the Regulations or Directive. For the avoidance of doubt consideration has been undertaken of both cumulative and combination effects. The impact of the scheme on individual receptors and groups of receptors has been considered.

11.0.2 Guidance on EIA Screening sets out that cumulative impacts are "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". (Commercial Estates Group Ltd v Secretary of State for Communities and Local Government [2014] EWHC 1138 (Admin))

11.0.3 Projects are required to be considered in combination and not 'salami sliced' to ensure that EIA Directives are met. Schedule 4 of Part 1 of the EIA Regulations 2017 sets out a need to assess the 'whole development'.

11.0.4 Case precedent (R v. Swale BC ex p. RSPB [1991] 1 PLR 6) has held that consideration must be given to whether planning applications may give rise to cumulative effects.

11.0.5 Paragraph 180 of the National Planning Policy Framework sets out that:

> *'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.*
>
> *In doing so they should:*
>
> a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life
>
> b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
>
> c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'

11.0.6 Cumulative impacts were referred to in the Sustainability Appraisal in terms of assessing the objectives of the Plan against the sustainability objectives of the council. It identified a conflict when it came to combating climate change, air, soil and noise quality as well as biodiversity but found they were compatible when it came to providing safe, affordable communities, access to education, improving water and flood risk together with a number

of other socio-economic categories. There was no consideration of the cumulative impacts on an allocation by allocation basis.

The Scoping Opinion

11.0.7 In its formal scoping response, dated 14th October 2020, Milton Keynes Council confirmed that;

> *'It is noted that your submission states the "remaining parts of the wider allocation, including the allocation wide infrastructure application for MKE, will be coming forward at a later stage," but as set out above, it is considered highly necessary to consider the cumulative impacts of the whole of MKE as part of the ES.*

11.0.8 *It is expected that both main applications by the main landowners will be submitted in the first quarter of 2021, both are currently subject to Scoping Opinion, and are in pre-application discussions. While the construction periods may well be different due to the varying scale of the developments, the timings will not be so significantly different that the impacts should not be considered cumulatively*.' It should be noted that a planning application has been submitted for the adjoining part of the allocation on behalf of the landowners St James Group Ltd. under reference 21/00999/OUTEIS. The application is described as ;

> *"Hybrid planning application encompassing:*
>
> *(i) outline element (with all matters reserved) for a large-scale mixed-use urban extension (creating a new community) comprising: residential development; employment including business, general industry and storage/distribution uses; a secondary school and primary schools; a community hub containing a range of commercial and community uses; a new linear park along the River Ouzel corridor; open space and linked amenities; new redways, access roads and associated highways improvements; associated infrastructure works; demolition of existing structures and*
>
> *(ii) detailed element for strategic highway and multi-modal transport infrastructure, including: new road and redway extensions; a new bridge over the M1 motorway; a new bridge over the River Ouzel; works to the Tongwell Street corridor between Tongwell roundabout and Pineham roundabout including new bridge over the River Ouzel; alignment alteration"*

11.0.9 Having regard to the scoping response (Appendix 3.1) this chapter outlines the cumulative impacts of the developments which will make up the MKE urban extension. The Plan MK outlines that between 2016 and 2031 26,500 new dwellings will be delivered across the Borough, with 5,000 of them being located within the area identified as the Milton Keynes East urban extension.

11.0.10 The allocated land is presently divided between a number of landowners with a mix of uses including employment, located alongside the M1, housing and open space.

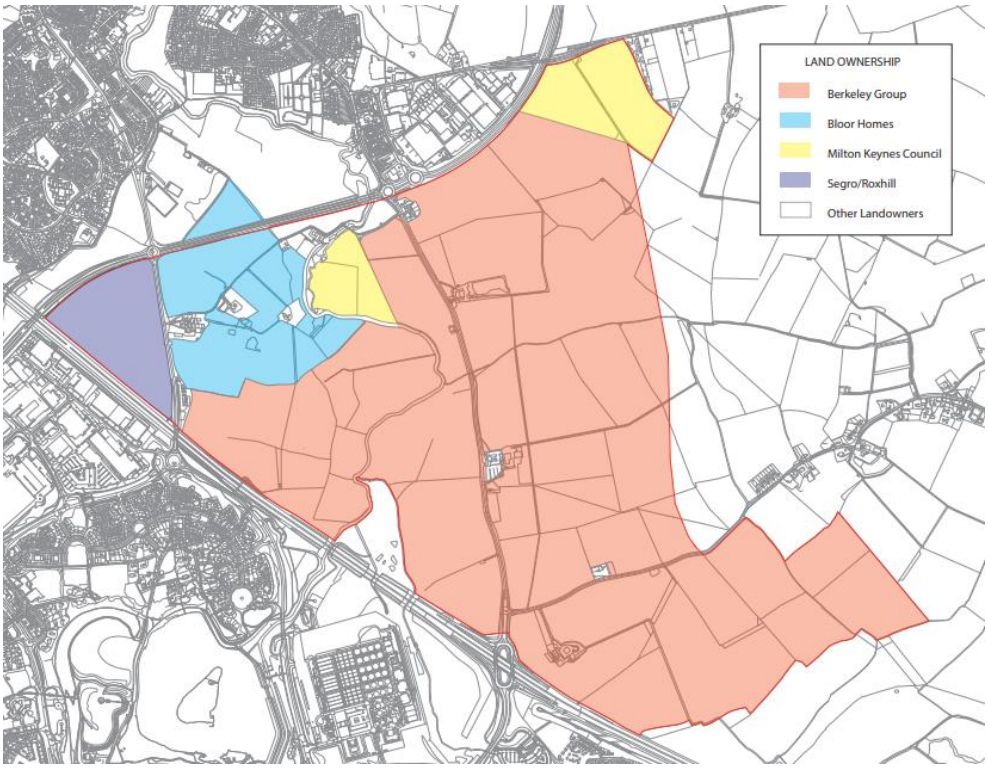

Figure 11.1: Land Ownership plan from MKE SPD

11.0.11 The MKE SPD outlines a requirement for a number of infrastructure improvements including; two new grid roads between the A509 and the M1, the upgrading of Willen Road to a grid road, four new primary schools, a new secondary school, a mixed use community hub, a park and ride facility, a linear park running vertically through the centre of the allocation, playing fields, road bridge across the M1 and numerous pedestrian and cycle pathways to be built.

11.0.12 The SA did consider the cumulative impacts of the MKE development, stating that the site would enable the delivery of a secondary school which would benefit not just MK but also Central Bedfordshire. The anticipated infrastructure works were also highlighted as the improvements are one of the key drivers behind the MKE allocation.

11.1 Wider Impacts

11.1.1 Whilst the LPA's Scoping Opinion referred only to the cumulative impacts of the MKE allocation it is considered prudent to give some consideration in respect of other committed 'reasonably foreseeable' schemes in the vicinity of the site. This has been

interpreted to include all land with current planning permission or allocated in adopted development plans for development.

Scope of Assessment

11.1.2 Schedule 4 of Part 1 of the Environmental Impact Assessment Regulations 2017 sets out that Environmental Statements should consider '*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*'.

11.1.3 Cumulative impacts are not defined within the Regulations or Directive. For the avoidance of doubt consideration has been undertaken of both cumulative and combination effects. The impact of the scheme on individual receptors and groups of receptors has been considered. We have considered the following impacts:

- Archaeology
- Noise
- Air Quality
- Visual Intrusion
- Biodiversity
- Drainage
- Traffic
- Socio-economic

11.1.4 Due regard has therefore been given to the following local developments which are either ongoing or committed:

Reference	Description	Address
21/00999/OUTEIS	Hybrid planning application encompassing: (i) outline element (with all matters reserved) for a large-scale mixed-use urban extension (creating a new community) comprising: residential development; employment including business, general industry and storage/distribution uses; a secondary school and primary schools; a community hub containing a range of commercial and community uses; a new linear park along the River Ouzel corridor; open space and linked amenities; new redways, access roads and associated highways improvements; associated infrastructure works; demolition of existing structures and (ii) detailed element for strategic highway and multi-modal transport infrastructure, including: new road and redway extensions; a new bridge over the M1 motorway; a new bridge over the River Ouzel; works to the Tongwell Street corridor between Tongwell roundabout and Pineham roundabout including new bridge over the River Ouzel; alignment alteration	Milton Keynes East Land East And West of A509 London Road Newport Pagnell

20/03322/REM	Reserved Matters for x46 units at Brooklands (plot substitution of 17/02226/REM)	Land At Brooklands, Newport Road, Broughton, Milton Keynes
20/00133/OUTEIS	Outline planning application (all matters reserved except access) for the demolition of the existing farm buildings on site and the development of up to 930 dwellings (including affordable dwellings), primary school, local centre, open space, sports pitches, play areas, pavilion/wellbeing centre and other associated works	Tickford Fields Farm North Crawley Road Newport Pagnell
18/02664/REM	Reserved matters application for 111 dwellings pursuant to outline planning approval 14/01544/OUT	Land at Brooklands, Newport Road, Broughton, Milton Keynes
18/02561/FUL	Development of 38 dwellings with associated external works.	Parcel E, Fen Street, Brooklands, Milton Keynes
17/02553/REM	Reserved matters application pursuant to outline planning permission 14/01544/OUT for the development of Parcel D at Brooklands Square for 46 houses and associated parking and public realm for siting, design, external appearance and landscape.	Land at Brooklands, Newport Road, Broughton, Milton Keynes
17/02415/FUL	Erection of 20 new build dwellings with associated ancillary works	Street Record Worrelle Avenue, Middleton, Milton Keynes
17/02254/REM	Reserved matters (Appearance, Landscaping, Layout and Scale) pursuant to outline permission 11/01340/MKPCO for 62 dwellings	Broughton Manor Business Park, Newport Road, Broughton, Milton Keynes
17/02226/REM	Reserved matters application pursuant to outline planning permission 14/01544/OUT for access, appearance, landscaping, layout and scale for 260 new dwellings at Brooklands parcels 5B and 6B	Brooklands Parcel 5B - 6B Fen Street Brooklands Milton Keynes
17/00850/REM	Reserved matters application pursuant to outline permission 04/00586/OUT for erection of 383 dwellings, retail floor space (Use Class A1), restaurant and café floor space (Use Class A3), nursery floor space (Use Class D1) and flexible retail/café/restaurant/business floor space (Use Class A1/A3/B1), 9 berth layby marina; with associated car parking, roads, landscaping, private and public open space, and other infrastructure works	Site At Campbell Park H3 And H4 Overgate Campbell Park Milton Keynes
17/00541/FUL	Residential development of 118 dwellings (35 affordable) together with associated works including landscaping and infrastructure	Land Off Tongwell Street Atterbury, Broughton, Milton Keynes
17/03063/REM	Reserved Matters application for 111 dwellings pursuant to outline planning approval 14/01544/OUT consisting in a partial	Land At Brooklands Newport Road, Broughton, Milton

	Re-plan of 16/03397/REM (amended by 17/01469/MMAM).	Keynes
16/02793/REM	Reserved matters application pursuant to outline permission 14/01544/OUT for the erection of 55 new residential apartments comprising 1 x 3 bedroom unit, 42 x 2 bedroom units and 12 x 1 bedroom units, 1070m2 of A1, A3 and A5 use class retail and 810m2 of D2 use class gym facilities, as well as associated car parking and landscaping	Brooklands Parcel Site A&C, Land To East of Peninsular Court Brooklands, Milton Keynes
16/02695/REM	Reserved matters application pursuant to outline permission 14/01544/OUT for access, appearance, landscaping, layout and scale for 276 dwellings at BDW Phases 2B, 3B, 3C, 4A.	Land At Brooklands Newport Road Broughton Milton Keynes
16/02271/REM	Reserved matters application pursuant to planning permission 06/00709/MKPC for approval of all reserved matters for 65 dwellings and associated car parking.	Parcel 7C Land South of Countess Way And West of Cranmore Circle, Broughton, Milton Keynes
16/00086/REM	Reserved matters application pursuant to outline application 14/01544/OUT for access, appearance, landscaping, layout and scale of 225 dwellings at Brooklands BDW Phase 2A	Land At Brooklands, Newport Road, Broughton, Milton Keynes
18/03002/FUL	Demolition of existing buildings and erection of 77 dwellings with landscaping and associated works	Site North of Redhouse Park, Newport Pagnell
18/01608/REM	Reserved matters application, pursuant to outline planning permission 16/02937/OUT, for the appearance, landscaping, layout and scale of 141 dwellings and associated works.	Site South of Hales Folly Farm, Long Street Road, Hanslope
17/03385/REM	Approval of reserved matters of appearance, landscaping, layout and scale for the erection of 150 dwellings, including associated works, pursuant to outline permission 16/02106/OUT.	Land Off Castlethorpe Road, Hanslope
17/01536/OUT	Outline application for the erection of up to 32 dwellings with access from Fox Covert Lane	Land To The East of Maltings Field, Castlethorpe
16/00349/FUL	Erection of 86 residential dwellings with access from Tickford Street, associated car parking and landscaping, construction of a 72 space car park to serve the adjacent Aston Martin building and change of use of three existing frontage buildings from Sui Generis to use class B1 and/or D1 use and all other ancillary and enabling works	Former Aston Martin Lagonda Site, Tickford Street, Newport Pagnell

11.1.5 The proposals at MKE are well catered for by existing infrastructure and, whilst there may be an increase in road traffic on surrounding roads during the construction, it is not felt the impact will be so great that it will cause unacceptable impacts to existing residents.

11.1.6 Similarly, each development will have its own monitoring and protection scheme in place to ensure noise and dust do not cause adverse issues to surrounding residents.

11.1.7 The cumulative impacts of various developments, including those outlined above and the wider allocation of MKE, in relation to each of the individual elements outlined at 11.1.4 above are considered in further detail here.

Archaeology/ Heritage

11.1.8 Chapter 6 deals with archaeology and heritage within the site and wider area. This confirms that whilst the setting of the listed buildings adjacent to the allocation will have their setting altered by the development, suitable mitigation will ensure the impact is not significant. Similarly, the underground archaeology will be protected by ensuring those areas aren't developed or that suitable excavation and mitigation measures are put in place across the entire allocation to protect any remains. It is therefore considered to be negligible cumulative impacts on archaeology and heritage.

Noise

11.1.9 Noise impact has already been assessed within Chapter 10 of this ES, with the greatest consideration given to the existing dwellings which are dotted across the site as these are the nearest noise receptors. It is accepted that there will be some impact to these units through the construction process and then when the site is operational. These properties are already subject to a certain level of background noise arising from Willen Road to the west and also the M1 and A422 to the south and north respectively.

11.1.10 It is considered that with suitable mitigation measures and respectful working practices the impact will be within specified guidelines.

11.1.11 The Institute of Air Quality Management's 'Guidance on the assessment of dust from demolition and construction', as mentioned in Chapters 10 and 11 of this ES, states that human receptors within 350m of a development need to be considered in terms of mitigation. The only site identified above within this 350m boundary is the larger part of the allocated site which has been submitted under reference 21/00999/OUTEIS.

11.1.12 This site, if approved, would likely have a tandem timeline for delivery of the first phases to the site subject of this ES. Both sites would be subject to appropriate mitigation measures to ensure that when the dwellings are delivered, continuing noise would not cause unacceptable harm to the future residents. The cumulative impacts in terms of noise are therefore considered to be negligible.

Air Quality

11.1.13 Chapter 10 of this ES considers the air quality impacts of the development during

construction and operational phases. Whilst there was considered to be some impact to air quality during these phases, subject to suitable mitigation measures the impact will be within acceptable parameters. In terms of cumulative impacts, as outlined in the preceding paragraph, the wider MKE allocation is the only site of those identified in the table above that are within the 350m boundary.

11.1.14 This site would be subject to similar mitigation measures which would help ensure that there would be no cumulative impacts in terms of air quality when considering the allocation as a whole.

Landscape

11.1.15 As outlined in Chapter 8 of this ES and the SPD, there will be a visual impact on the landscape caused by the proposal given its location on predominately green field land. The site is seen in the wider context of the urban setting of Milton Keynes and the highway network which barriers three sides of the site. A comprehensive landscape scheme, as outlined within Chapter 8 and the accompanying planning application, will help to mitigate this impact.

11.1.16 In terms of the cumulative impact of the wider allocation, this has been considered in greater detail within Chapter 8. This outlines that the landscaping will complement each parcel across the entire allocation thereby creating a connected and comprehensive character across the entire allocation that will also assimilate well within the wider landscape.

Biodiversity

11.1.17 Biodiversity has been assessed within Chapter 7 of this ES with fuller consideration given to the impact within this site and also the wider allocation. The site and wider allocation presently provide a modest biodiversity habitat which will be impacted by the proposed development.

11.1.18 The mitigation outlined within Chapter 7 together with the similar mitigation provided within the adjoining site's submission, show how this impact will be minimised. There will also be benefits across the scheme with new areas of landscaping and open space provided throughout the allocation to encourage a greater diversity of species. As such whilst it is acknowledged there will be some impact cumulatively, the scale is considered to be limited.

Drainage/flooding

11.1.19 Part of the site covered by this ES is located within flood zones 2 and 3 however the master plan has shown that development will be excluded from these areas. Suitable SUDs and drainage will be incorporated across the current site and wider allocation to ensure that any cumulative impacts in terms of drainage and flooding are adequately mitigated for.

Traffic

11.1.20 The highways and traffic impacts are considered in greater details at Chapter 9 of this ES including the wider allocation. The existing road network will be upgraded in certain sections to accommodate the anticipated increase in highway traffic and to ensure the development and wider allocation are well connected.

11.1.21 Whilst there will be an increase in construction traffic during the construction phase, the information contained in Chapter 9 outlines that this will not have an adverse impact on the existing highway network. Similarly, during the operational phase the proposed infrastructure improvements will have been implemented to ensure that the increase in traffic can be suitably accommodated.

Socio-economic Impacts

11.1.22 The scheme to which this ES relates and the wider allocation will create a significant number of jobs during the construction phases which will boost the economy of the local and wider areas. Once completed the schemes will deliver a significant number of new homes, including a proportion of affordable and social housing together with new local shops and facilities, which will have a positive impact on the social and economic outcomes of communities.

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12.0 PROPOSED MITIGATION AND MONITORING

	Proposed Mitigation and Monitoring
Air Quality	**Communication:** • Develop and implement a stakeholder communications plan. • Display the name and contact details of persons accountable on the site boundary. • Display the head or regional office information on the site boundary. **Management:** • Develop and implement a dust management plan. • Record all dust and ait quality complaints, identify causes and take measures to reduce emissions. • Record exceptional incidents and action taken to resolve the situation. • Carry out regular site inspections to monitor compliance with the dust management plan and record results. • Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken. • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible. • Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site. • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site run off of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove potentially dusty materials from site as soon as possible. • Cover, seed or fence stockpiles to prevent wind whipping. • Ensure all vehicles switch off engines when stationary. • Avoid the use of diesel or petrol powered generators where possible. • Produce a Construction Logistics Plan to manage the delivery of goods and materials. • Only use cutting, grinding and sawing equipment with dust suppression equipment. • Ensure an adequate supply of water on site for dust suppressant. • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate. • Ensure equipment is readily available on site to clean up spillages of dry materials. • No on-site bonfires and burning of waste materials on site. ***Earthworks:*** • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Only remove the cover in small areas during work and not all at once. **Construction:** • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.

	• Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored silos with suitable emissions control systems. **Trackout:** • Use water assisted dust sweepers on the site access and local roads. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving the site are covered to prevent escape of materials. • Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable. • Install hard surfaced haul routes which are regularly damped down. • Install a wheel wash with a hard-surfaced road to the site exit where site layout permits. • The site access gate to be located at least 10m from receptors where possible.
Ecology	Measures to Mitigate for Potentially Significant Effects – Construction Phase: **Milton Keynes Wetland Corridor:** • All hedgerows and trees to be retained within the proposed development shall be protected during construction in line with standard arboriculturalist best practice (BS5837:2012) or as otherwise directed by a suitably competent arboriculturalist. This will involve the use of protective areas of retained trees/hedgerows. • Storage areas for chemicals, fuels, etc will be sited well away from watercourses and ponds (minimum 10m),and stored on an impervious base within an oil-tight bund with no drainage outlet. • Spill kits with sand, earth or commercial products approved for the stored materials shall be kept close to storage areas for use in case of spillages. • Damping down potential sources of dust. • Good working practice will be adopted with regards to minimising generation of noise. • Adherence to the former Environment Agency Pollution Prevention Guidelines. • Where possible, and with prior agreement of the sewage undertaker, silty water should be disposed of to the foul sewer or via another suitable form of disposal, e.g. tanker off-site. • Water washing of vehicles, particularly those carrying fresh concrete and cement, mixing plant, etc. will be carried out in a contained area as far from watercourses and ponds as practicable (minimum 10m), to avoid contamination. • Refuelling of plant will take place in a designated area, on an impermeable surface, away from the watercourse (minimum 10m). • Implementation of engineering safeguards as part of construction works to control surface water runoff and avoid contamination of watercourses and ponds. This could include measures such as the use of temporary silt traps in order to form an intercept for silt and other potential pollutants. Newport Pagnell Gravel Pits BNS – Northern Part of the Allocation Only • Implementation of general construction safeguards for example as per those set out above. • Sensitive timing of works in proximity to/within the BNS. • Consideration of sensitive working methods (for example to minimise noise) in proximity to/within the BNS. • Consideration of the use of temporary visual barriers during construction of the redway (if brought forward). • Delivery of proportionate compensation for temporary habitat losses.

Roosting bats – buildings:

- Installation of bat boxes on retained trees or integral bat boxes to new dwellings.
- Sensitive timing of works (for example carrying out demolition in the winter months when bats are less likely to be present).
- Detailed internal inspections of the buildings prior to works commencing.
- Sensitive removal of key features of the buildings by hand under ecological supervision, such as roof tiles, flashing and soffit boxes.
- Any bats found during the works will be captured by a licensed Ecologist and carefully released in one of the installed bat boxes.
- Delivery of toolbox talks so that the correct action is taken if a bat is found when the Ecologist is not directly supervising demolition.

Badger (licensed strategy):

- An Ecologist will input into the detailed design to ensure that suitable areas of badger foraging and sett creation habitat are retained or compensated for. Particular consideration will be given to ecological corridors and how these relate to off-site habitats for badger to minimise the potential for habitat fragmentation or sett isolation.
- An update badger survey will be carried out such that any mitigation strategy is informed by up to date survey work.
- An Ecologist will review the finalised layout and determine whether any existing or new setts require closure. This would take into account direct effects (whereby a sett lies under the development footprint), or indirect effects (such as isolation of setts) incorporating an assessment the habitat connections around and across the site, between setts and potential commuting routes and foraging areas for badger.
- An Ecologist will review the finalised layout and determine whether any existing or new setts (if occupied by badger) may be disturbed by construction activities. This will be based on an assessment of the nature and distance of the nearest proposed works and the proposed works methods (e.g. the size and type of machinery that will be used in proximity to the sett).
- Following the above, an Ecologist will determine whether Natural England licensing is required to destroy/damage/disturb setts. A licence will be obtained as required, and the application would provide full details of any sett closure methodologies, construction of artificial setts (if required), and other mitigation measures to safeguard retained setts and minimise disturbance. This would then be implemented in full prior to and/or during construction in accordance with the licence.

Construction safeguards:

- Any trenches or deep pits within the site that are to be left open overnight will be provided with a means of escape should a badger enter. This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water.
- Any temporarily exposed open pipes (>150mm outside diameter) should be blanked off at the end of each working day so as to prevent badgers gaining access as may happen when contractors are offsite.
- Any trenches/pits will be inspected each morning to ensure no badgers have become trapped overnight. Should a badger become trapped in a trench it will likely attempt to dig itself into the side of the trench, forming a temporary sett. Should a trapped badger be encountered a suitably qualified ecologist will be contacted immediately for further advice.
- The storage of topsoil or other ‘soft’ building materials in the site will be given careful consideration. Badgers will readily adopt such mounds as setts. So as

	to avoid the adoption of any mounds, these will be kept to a minimum and any essential mounds subject to daily inspections with consideration given to temporarily fencing any such mounds to exclude badgers. • The storage of any chemicals at the site will be contained in such a way that they cannot be accessed or knocked over by any roaming badgers. • Fires will only be lit in secure compounds away from areas of badger activity and not allowed to remain lit during the night. • Unsecured food and litter will not be left within the working area overnight. ***Hedgehog:*** • The general construction safeguard set out above would minimise potential effects on hedgehog in relation to noise, vibrations and lighting, whilst the safeguards set out for badger should minimise hazards within the site, should hedgehogs enter during the construction period. ***Great Crested Newt:*** • Translocation exercise to capture and relocate Great Crested Newts to a suitably prepared receptor area in advance of any habitat losses. • Destructive searches of key habitat features under ecological supervision following translocation exercise. • Creation Great Crested Newt aquatic and terrestrial habitats. • Enhancement of retained habitats to benefit Great Crested Newts. • Calculations of habitat losses and gains with the aim of achieving a net gain in Great Crested Newt habitat. • Connectivity measures incorporated into the detailed layout including use of dropped kerbs and wildlife friendly gulleypots where required. • Details of post-development site safeguards. • Details of specific long-term management measures to benefit Great Crested Newt such as areas of grassland which will be managed solely for Great Crested Newts, woodland management and aquatic vegetation management in waterbodies. ***Reptiles:*** • An Ecologist will input into the detailed design to ensure that suitable areas of reptile habitat are retained or compensated for and that adequate greenspace will be provided which could serve as a reptile release area if required. An Ecologist will review the final layout and carry out an exercise to determine whether reptile displacement, reptile translocation, or a combination of the two is the most suitable approach to safeguard reptiles. • Where a translocation is required, the Ecologist will identify and agree a suitable release site, which will be prepared in advance of any capture exercise (for example with the construction of hibernacula and refugia piles). In the highly unlikely event that it is not possible to release reptiles to a suitable on-site area, an off-site release area will be identified. • An Ecologist will produce a detailed Reptile Mitigation Strategy supported by relevant drawings. The strategy will include as a minimum the rationale for the mitigation solution, detailed methods for • implementation of any displacement/translocation exercise, a work timetable will trigger points for delivery and details of ecological enhancements which will be implemented to benefit reptiles. **Other mitigation - Construction Phase:**

Minor negative, non-significant effects have been identified with regards to the veteran Grey Poplar tree, retained habitats, commuting and foraging bats (with regards to lighting), Otter, breeding birds and wintering birds.

Commuting/foraging bats:

To minimise potential negative effects as a result of lighting during the construction phase, temporary lighting will be minimised, wherever practical. Where required for health and safety, security or other reasons, it will be positioned so as to minimise light-spill onto sensitive features including woodlands, watercourses and hedgerows in order to maintain dark (less than 1 lux) corridors for bats. Construction compounds and welfare facilities which may require lighting, will be sited away from such features. If required, in order to ensure dark corridors are created, consideration will be given to further reducing potential light spill, for example fitting hoods or cowls to temporary lighting, or the use of motion activated lighting.

Breeding birds:

To avoid an offence under the Wildlife and Countryside Act 1981 (as amended), the potential loss of active bird nests during construction will be avoided by either undertaking clearance of potential bird nesting habitat outside of the bird nesting season (March to August inclusive) or, if necessary, preceding any clearance with an inspection by a suitably qualified ecologist. Any nests identified will be cordoned off and protected until they cease to be active. Disturbance from noise will be minimised by the adoption of good working practice, as set out in the general construction safeguards.

Measures to Mitigation for Potentially Significant Effects – Operational Phase

Newport Pagnell Gravel Pits BNS – Users of Potential Redway Link Only:

- Consideration of the routing of the redway to site is as far from the lakes as practicable.
- Consideration of surface materials which would absorb noise (for example avoiding the use of boardwalks).
- Consideration of the use of fencing and signage to deter unauthorised access.
- Consideration of the use of permanent noise and visual buffers such as planting or acoustic fencing.
- Consideration of appropriate compensation for any permanent habitat loses (for example new tree or shrub planting).

Commuting/foraging bats:

- For at least a 20m width buffer alongside Chicheley Brook and woodland W1 (careful consideration to any lighting required for the sports ground will be required here).
- For at least a 20m width buffer along the northern allocation boundary adjacent to Newport Pagnell Gravel Pits BNS.
- For at least a 5m buffer along the edges of woodlands W2 and W3 and the proposed green space link between them.
- Along tree line TL3.
- Along retained hedgerows H2, H3, H4, H6, H7, H8, H9, H11, H13, H14 and H15.

Badger:

Roads within operational development may create barriers to movement of badgers and may lead to a risk of traffic accidents, particularly where these cross commuting corridors. At the detailed design stage an Ecologist will review the proposed layout and carry out a risk assessment.

Otter:

Potential significant effects are identified in relation to human disturbance and other associated effects (such as trampling of bankside vegetation and littering). An undisturbed buffer zone of at least 10m in width will be incorporated into the detailed layout.

Hedgehog:

- Connectivity will be maintained across new gardens with the incorporation of "hedgehog holes" between all dwellings.
- A leaflet will be provided to new residents explaining the purpose of the hedgehog holes and information on hedgehog friendly gardening practices (such as checking bonfires before lighting).
- Suitable hedgehog foraging habitat will be incorporated within on-site greenspace (such as grassland/scrub/woodland edge mosaics).
- Accessible water resources will be provided for hedgehogs within green space (such as pongs with gently sloping edges).
- Consideration will be given to the incorporation of speed restrictions at locations where hedgehogs will potentially crossroads (for example where internal roads cross hedgerows).
- Consideration will be given to the provision of additional cover and sheltering opportunities for hedgehog within retained habitats, for example through planting or incorporating hedgehog domes (or similar).

Great Crested Newt

A Natural England licence will be obtained and would include mitigation for permanent habitat losses, including the creation of new aquatic habitat. The licence application would also include details of the maintenance, management and monitoring which would be implemented at the operational stage, to ensure new and retained habitats are maintained in a favourable condition for Great Crested Newt.

Other mitigation – operational phase

Minor negative, non-significant effects have been identified at the operational stage with regards to the veteran Grey Poplar tree, habitats, roosting bats, breeding birds and wintering birds. Additional mitigation measures are set out below in accordance with best practice and to avoid potential offences under relevant legislation.

Veteran Grey Poplar Tree:

The veteran tree will be subject to appropriate management by an Arboriculturalist in order to prolong its natural life as far as possible, which will be set out in a LEMP.

	Habitats: Permanent habitat losses will be mitigated through the provision of high quality on-site greenspace within the development, creating a variety of habitats for wildlife. ***Roosting bats:*** The mitigation measures set out with regards to operational lighting will benefit roosting bats. ***Breeding birds:*** At least 10 swallow nesting cups will be installed on suitable buildings within the operational development. Kingfisher will benefit from the creation of the buffer zone along Chicheley Brook, as this will ensure the brook remains as undisturbed as possible. ***Wintering birds:*** • Provision of trees and shrubs into the detailed landscape proposals which bear berries in autumn and winter. • Incorporation of shall depressions or scrapes which fill with water during winter. • Incorporation of management regimes which are favourable for wintering birds, for example grass cutting regimes which retain seed sources for farmland bird species.
Landscape	**Construction phase effects mitigation:** • The use of hoarding around the construction site, where construction activity is in close proximity to visual receptors, to screen construction activity from the ground level, including from representative visual receptors. • Controlling the lighting to funnel illumination towards the ground and the siting of construction compounds and machinery to minimise upward and outward light pollution. • Liaison with the LPA to ensure that site construction traffic use a designated route to and from the site in order to alleviate pressure on neighbouring sensitive receptor areas. Incorporation of vehicular cleansing stations to all site exits to minimise dust and mud debris being distributed to the main public carriageway. • Locating compounds and stockpiles in the least visible locations within the site, and agreeing siting of compounds with the LPA. • Protection of all retained vegetation on the site during construction by fencing, to be installed before the commencement of any phase of development, and in compliance with BS5837:2012 – Trees in relation to design, demolition and construction – Recommendations. **Operation phase effects mitigation:** • The incorporation of new structural landscape buffers along the site boundaries to provide a soft, natural development edge and visual integration. • Extensive tree planting across the car parks and at key points within the public realm. Not only will this planting soften the perceived built elevations, but it will introduce a strong landscape element into the context of the wider development parcel and will also assist in placemaking. The use of a high quality palette of species will ensure that seasonal, visual interest is achieved. • The creation of a natural area along the Chicheley Brook provides opportunities to introduce native planting, including wildflower species, as well as nesting boxes and habitats for pollinators.

	• Safe access routes for pedestrians across the site, via new areas of public realm, will be established and ensure that access to the wider countryside is maintained.
Noise	Based on an indicative layout as used in the Noise Technical Report (Appendix 10.3) a glazing and ventilation strategy gives detail of likely requirements for facades facing existing noise sources (such as, most dwellings with facades facing the A509 and North Crawley Road; dwellings along the north-eastern side boundary; and facades of dwellings to the northern edge of the indicative residential development). Once finalised building locations have been decided within each of the zones this can be confirmed. A 4.0m high acoustic barrier to the eastern and south-eastern corner of the site, adjacent to the A509 and North Crawley Road, has also been included within the mitigation strategy. It should be noted that the requirement for noise bund/barrier to the southern boundary of the site are expected to reduce as the detailed development proposals are established (including building type and design).

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13.0 SUMMARY AND CONCLUSION

13.1 Overview

13.1.1 The assessment of the proposed development presented within this Environmental Statement has shown that if the identified additional mitigation is implemented during the design, conduction and operational stages, the identified significant effects can be reduced to a level which is not significant.

13.1.2 Likely significant environmental effects have been prevented and measures incorporated into the proposed development to mitigate any likely significant environmental effects and, where practicable, provide environmental enhancements.

13.1.3 Significant environmental enhancement measures have been built into the design. These measures have been assessed as part of the EIA process and included within the relevant technical chapters. Proposed permanent mitigation measures include, but are not limited to:

13.2 Landscape

13.2.1 The incorporation of new structural landscape buffers along the site boundaries, SUDs corridor and Greenway link to provide a soft, natural development edges and visual integration;

13.2.2 Extensive tree planting across the car parks and at key points within the public realm. Not only will this planting soften the perceived built elevations, but it will introduce a strong landscape element into the context of the wider development parcel and will also assist in placemaking. The use of a high-quality palette of species will ensure that seasonal, visual interest is achieved;

13.2.3 The creation of a replacement species–rich lowland meadow provides opportunities to introduce native planting, including wildflower species, as well as nesting boxes and habitats for pollinators; and

13.2.4 Safe access routes for pedestrians across the site, via new areas of public realm, will be established and ensure that access to the wider countryside is maintained and enhanced.

13.3 Ecology

13.3.1 Implementation of a CEMP and LEMP including creation of species–rich lowland meadow.

13.3.2 Buffer zone along River Ouzel River Wet Corridor and retention of corridor in its entirety.

13.3.3 Landscaping including creation and enhancement of grassland, scrub and shrub planting.

13.3.4 Installation of barn owl box on far eastern side of development within area of retained grassland in flood zone.

13.3.5 Erection of bird and bat boxes on retained trees and potentially buildings within the development.

13.3.6 Implementation of a lighting strategy to maintain foraging areas for bats.

13.3.7 New hedge planting around playing fields north of the A422 and management of hedgerows along road to promote tall busy growth to facilitate the passage of bats over and across the existing A422.

13.3.8 An Ecologist will produce a detailed GCN Mitigation Strategy supported by relevant drawings. The strategy will include as a minimum the rationale for the mitigation solution, detailed methods for implementation of any displacement/translocation exercise, a work timetable with trigger points for delivery and details of ecological enhancements which will be implemented to benefit reptiles.

13.3.9 A number of species-specific mitigation measures are to be included into the detailed design to cover Hedgehog, Bats, Badgers, Reptiles, Breeding birds, reptiles and their habitats.

13.4 Noise

13.4.1 A glazing and ventilation strategy provides detail of likely requirements for facades facing existing noise sources (e.g. A509, A422 and the M1).

13.4.2 An acoustic barrier, a minimum of 2m in height, will be installed along the length of the A422 adjacent to the northern boundary and up to 50m in a southerly direction from the roundabout along the Willen Road.

13.5 Air Quality

13.5.1 The main impacts on Air Quality are anticipated to be in the construction phase of the

development.

13.5.2 A Construction Environmental Management Plan and Dust Management Plan will be produced, and a large amount of management mitigation is put forward to ensure appropriate mitigation is provided during the construction phase. The effects of development traffic on local air quality is judged to not be significant, especially regarding the conservative nature of the assessment. No additional traffic mitigation is therefore required to reduce the direct effects of the development on local air quality.

13.5.3 The Local Planning Authority has indicated that it does not consider that the proposal will have significant environmental impacts as a result of cumulative impacts, either as result of cumulative impacts with other developments or resulting from the development assessed as part of this EIA.

13.5.4 This Environmental Statement documents the Environmental Impact Assessment process and any impacts arising from the project. Where significant effects have been identified as a result of the project, it has been demonstrated that mitigation can reduce the magnitude of these so that they are no longer significant.

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