Land at Lotmead Farm

Environmental Statement Addendum

August 2023

Document title:	Environmental Statement Addendum
Project:	Land at Lotmead Farm, Swindon
Client:	Countryside Sovereign Swindon LLP

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1 Introduction

1.1 This Environmental Statement Addendum (ESA) is prepared in support of a Section 73 application to vary Conditions 41, 42, 43 and 46 of the Outline Planning Permission ref. S/OUT/19/0582 ('the Outline Permission') dated 30 March 2021 relating to development at the Lotmead Site of the New Eastern Villages (NEV), Swindon (the Site).

1.2 Secondary changes proposed within the Section 73 application are amendments to the wording of Conditions 9 (Phasing), 10 (Design Codes), 46 (Strategic Surface Water Management) and 47 (Surface Water Management Scheme (Phases) for Phase 1.

1.3 The Outline Permission (ref. S/OUT/19/0582) grants consent for the redevelopment of the Site to provide:

- up to 2,500 homes
- up to 1,780sqm of community/retail uses
- up to 2,500sqm of employment use
- sports hub
- playing pitches
- 2no. 2 form entry primary schools
- green infrastructure
- indicative primary access road corridors to A420
- improvements to Wanborough Road and associated works

1.4 Following the granting of Outline Planning Permission, Countryside Sovereign Swindon LLP (CSS) acquired the Site. CSS is committed to building out the phased development and a full technical review has taken place of the consent and a proving layout produced.

1.5 As a result of this, inconsistencies were identified between the FRA Addendum and the approved Parameter Plans, the Illustrative Masterplan and the technical evidence and assessments submitted at the time of the outline consent.

1.6 As such, CSS has amended the Drainage Strategy and FRA Addendum to regularise its contents with the rest of the Outline Permission. As set out within the Section 73 application documents, the key change proposed is to substitute the FRA Addendum with a revised FRA Addendum and Drainage Strategy, prepared by Hydrock.

1.7 Further details on these changes are presented within **Chapter 2 – Proposed Development and Additional Information**.

1.8 The Outline Permission was subject to Environmental Impact Assessment (EIA) which assessed the Proposed Development on the basis of the delivery of the quantum of development in accordance with a series of parameter plans (PPs) and strategies for the management of the development (e.g. outline drainage strategy).

1.9 The findings of the EIA were presented in an Environmental Statement (ES) that accompanied the outline application (the Original ES).

1.10 Given the changes to the FRA and the proposed drainage strategy, an Environmental Statement Addendum (this document) has been prepared in order to provide a full review and update of the assessments undertaken and presented within the Original ES. Given the time that has passed since the Original ES, it also provides a review of the baseline environment and revises the assessments where applicable. This ESA should be read in conjunction with the Original ES.

2 The Proposed Development and Additional Information

2.1 The Proposed Development is as described and assessed within the Original ES, with the exception of the updated Drainage Strategy and FRA. The Revised Flood Risk Assessment Addendum is provided as **Appendix 2.1** and Strategic Site wide surface Water Drainage Strategy as **Appendix 2.2**. There are no changes to the previously assessed parameter plans or quantum of development.

2.2 In line with the Original ES, the assessed parameters for the Proposed Development comprise:

- up to 2,500 homes
- up to 1,780sqm of community/retail uses
- up to 2,500sqm of employment use
- sports hub
- playing pitches
- 2no. 2 form entry primary schools
- green infrastructure
- indicative primary access road corridors to A420
- improvements to Wanborough Road and associated works

2.3 The Site area measures approximately 168.7 ha. The Proposed Development comprises approximately 71.7ha of developable land (including retained buildings and road infrastructure) and the provision of 97ha of Green Infrastructure.

2.4 Indicative phasing was presented within the Original ES in order to inform the EIA where necessary.

2.5 It was assumed that construction and operation of the Proposed Development could occur in tandem for some periods. As a result, it is possible that construction could take place alongside occupation/operation of completed parts of the Proposed Development.

2.6 Within the Original ES, it was also assumed that that construction of all elements of the scheme would have commenced by 2021 and the construction phase will continue for several years thereafter. Due to the time that has elapsed since the Original ES it is assumed that construction would now begin in 2024.

2.7 As per the Original ES, it is anticipated that the development will progress at an average delivery rate of 150 dwellings per annum. Based on the development of 2,500 dwellings, assuming the first 200 dwellings will be constructed at a slower rate of 50 dwellings per annum, the completion of development can be expected in circa 2043 (c. 19 years).

2.8 Full details of the Proposed Development are contained within Chapter 4 of the Original ES.

Additional Information

2.9 The principal change proposed is to amend Section 3 of the Drainage Strategy to remove the requirement for prioritisation of plot scale source control features and new above ground conveyancing features. This will enable a predominantly piped drainage solution to tertiary basins in open space. Drained swales are proposed to run alongside strategic roads, with piped sewers to be used to convey surface water runoff to tertiary basins or ponds.

2.10 These changes will enable a drainage design to be approved pursuant to the relevant conditions, which better aligns with the assessment that was undertaken at outline stage, including the Parameter Plans and Illustrative Masterplan, as well as the optimising the overall residential capacity.

2.11 To demonstrate this, plans have been submitted with the Section 73 application, which overlay the proposed Strategic Site Wide Drainage Strategy with the approved Illustrative Masterplan. This show that the Drainage Strategy directly aligns with the approved plans, with all substantial drainage features within open space and limited negative impact on residential development areas.

2.12 The revised FRA and Drainage Strategy is provided in the following appendices:

- **Appendix 2.1** – Revised Flood Risk Assessment Addendum (22006-HYD-P0-XX-RP-C-0004)
- **Appendix 2.2** - Strategic Site Wide Surface Water Drainage Strategy (22006-HYD-P0-XX-DR-C-2220 revision P06)

3 ESA Scope and Approach

3.1 The technical scope of the ESA matches the scope of the Original ES. As such the following technical chapters have been included (see Table 3.1).

Table 3.1: Technical Scope of ESA

Chapter	Title	Author
4	Socio-Economics and Human Health	Savills
5	Water Resources	Hydrock
6	Ground Conditions	Hydrock
7	Transportation	Peter Evans Partnership
8	Ecology	FPCR Environment and Design Ltd
9	Landscape and Visual	David Jarvis Associates Ltd
10	Noise and Vibration	Noise.co.uk
11	Air Quality	Stantec UK Limited
12	Archaeology & Cultural Heritage	RPS

3.2 Each technical chapter includes a review and update of the assessments and presents any new or different impacts and effects identified since the Original ES. This includes a review of the current baseline environment.

Land Use and Agriculture

3.3 Reading Agricultural Consultants Ltd (RAC) prepared a Land Use and Agriculture assessment in 2019, which was presented in Chapter 7 of the Original ES for the Proposed Development.

3.4 A review has been undertaken of the revised Drainage Strategy and FRA Addendum to confirm whether there are any changes which have the potential to materially affect the conclusions of the Original ES in relation to land use and agriculture.

3.5 The assessment presented in the Original ES was based on the premise that all the agricultural land within the Site will be removed from agricultural production at the start of construction activities. The assessment found that the Proposed Development will involve the loss to

agriculture of over 160 hectares of moderate to poor quality land in Subgrade 3b and Grade 4 but there would be no loss of the best and most versatile (BMV) agricultural land. The loss of agricultural land was concluded to be a direct, permanent minor adverse effect which is not significant in EIA terms.

3.6 In terms of agricultural enterprise and business, it was concluded that, given the Proposed Development will remove all the land associated with the previous dairy enterprise on the Site, a major adverse effect on the farm holding would occur.

3.7 No effects on agricultural resources are anticipated during the operation of the Proposed Development.

3.8 The proposed changes do not alter the overall developable area and are in line with the assessed parameters plans. It is therefore considered that the proposed changes will not change the previous EIA conclusions for Land Use and Agriculture presented in Chapter 7 of the Original ES. As such a separate Land Use and Agriculture ESA chapter has not been included.

Cumulative Assessment

3.9 In relation to the information for inclusion in an ES, Schedule 4(5)(e) of the 2017 EIA Regulations requires a description of the likely significant effects of the development on environment resulting from "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".

3.10 National planning practice guidance advises that "Each application (or request for a screening opinion) should be considered on its own merits. There are occasions, however, when other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a proposed development. The local planning authorities should always have regard to the possible cumulative effects arising from any existing or approved development." (ID 4-024-20170728).

3.11 Chapter 2 of the Original ES set out the list of projects considered within the assessment (see Table 2.1 of Original ES). Given the time that has passed since the Original ES, a review has been undertaken of the committed schemes in the area to account for any schemes which have come forward since the EIA was undertaken or which now form part of the baseline.

3.12 Existing and approved schemes of a significant size (e.g. 50+ units, 1,000sqm non-residential development) in the vicinity of the Site (circa 5km) have been included. Based upon professional judgement and experience of EIA's, this distance is considered an appropriate radius in which to identify other developments in order to establish the significance of cumulative environmental and socio-economic effects. These committed schemes form the basis for the assessment of potential cumulative effects taking into account the availability of information at the time of assessment. Table 3.2 contains the updated list of committed schemes considered within the ESA.

Table 3.2: List of Committed Schemes

Site Address	Application Reference	Description of development	Approx Distance from Site (m)
Land North Of A420 Eastern Villages Swindon(South Marston / Rowborough)	S/OUT/13/1555	Up to 2,380 dwellings together with a mixed use local centre and area (including A1 retail up to 1,500 sq.m metres, services (A2), restaurants, pubs and takeaways (A3, A4, A5), business uses (B1) up to 1,000 sq.m metres)	450m
Land At Symmetry Park Shrivenham Road South Marston SN3 4RS	S/OUT/14/0253	40ha of employment development including B1b (research and development/light industrial), B1c (light industrial), B2 (general industrial) and B8 (warehouse and distribution), new landscaping and junction to A420.	180m
Great Stall East - Land South Of The A420 South Marston Swindon	S/OUT/17/1990	Outline planning application (with means of access to the A420 not reserved) for up to 1,550 homes; education provision including a 10 form entry secondary school and a 3 form entry primary school with attendant sports pitches; a sports hub and open space; a park and ride; a local centre up to 1,000sqm including classes A1, A2, A3, A4, A5 and D1 uses; public open space/green infrastructure; new informal and formal recreation spaces; and the formation of a new permanent access from the A420	100m
Land East Of The A419, Between Commonhead Roundabout And Land North Of Wanborough Road, Swindon Wilts	S/19/0703	The construction of a new road, to link the A419 Commonhead Roundabout to the proposed New Eastern Villages (NEV) development.	Adjacent
Former South Marston Hotel And Spa Old Vicarage Lane South Marston Swindon SN3 4SH	S/18/1579	Demolition of existing hotel buildings and redevelopment to provide up to 70no. dwellings and associated ancillary works - Without complying with conditions 18, 19 and 20 from previous permission S/OUT/15/1985 (Resubmission).	1400m
Redlands Eastern Villages Swindon Swindon	S/OUT/16/0021	Outline Planning Application for the erection of up to 370no. dwellings, a local convenience store/community facility, primary school, open space, landscaping, access points to and from Wanborough Road and northern site boundary and eastern boundaries and associated infrastructure.	400m
Land At Catsbrain Farm Highworth Road Swindon SN3 4SZ	S/OUT/19/0215	Outline planning application (with the means of access off Kingsdown Road not reserved) for the development of up to 190 residential dwellings (Use Class C3) and a convenience store (Use Class A1) and associated open space, growing spaces, landscaping, highways improvements, road and drainage infrastructure. All other matters reserved	3300m

Site Address	Application Reference	Description of development	Approx Distance from Site (m)
WhSmith Headquarters WhSmith Site Greenbridge Road Stratton St Margaret Swindon SN3 3JE	S/OUT/20/1390	Outline planning application with details of access (matters of layout, scale, landscaping and appearance are reserved), comprising the demolition of existing distribution warehouse and offices, the erection of up to 228 residential dwellings (Use Class C3) and associated works.	2200m
Former Oakfield Campus Marlowe Avenue Swindon	S/19/0192	Erection of 239no. dwellings and community hub building (Class D1/B1(a) uses) including public open space, play facilities, car parking, landscaping and associated works.	2200m
Phase 3 Badbury Park Land At Commonhead Swindon	S/OUT/18/1140	Outline planning application for the erection of up to 300 dwellings and public open space with associated works, including noise attenuation bunds, structural landscaping and drainage infrastructure. - All matters reserved.	4400m

3.13 The following technical chapters provide a full review and update of the assessments, where appropriate, including a review of the current baseline given the time that has passed since the Original ES.

3.14 Where applicable updated policy or guidance relevant to the environmental topics scoped into the EIA has been considered within the revised assessments. Further details on this are set out within Chapter 4 -12.

4 Socio-Economics and Human Health

4.1 Introduction

4.1.1 This chapter of the ES Addendum has been produced by Savills and provides an update to the baseline conditions and assessment of impacts and effects outlined in the Original ES.

4.1.2 The scope of the Chapter remains unchanged relative to the Original ES. The baseline environment has been updated, primarily following the updated of socioeconomic and demographic data from the latest ONS Census carried out in 2021.

4.1.3 The ES Addendum has assessed the following changes in significant effects following the update of the assessment:

- The effect on construction workers in the wider impact area becomes a major beneficial significant effect;
- The effect on operational workers in the wider impact area becomes a moderate beneficial significant effect;
- The effect of resident spending on local retail and leisure businesses is no longer significant and becomes negligible;
- The effect of adults engaging in active travel becomes moderate beneficial a significant effect.

4.1.4 No significant adverse effects have been identified. Several significant beneficial effect were identified, including:

- Significant beneficial effect on construction workers in the wider impact area;
- Significant beneficial effect on all workers in the wider impact area during operation;
- Significant beneficial effect on residents looking for housing;
- Significant beneficial effect on adults engaging in active travel.

4.2 Assessment Criteria & Methodology

Previous Assessment

4.2.1 The Original ES assessed the following significant effects to occur during the construction period:

- Minor beneficial effect from the creation of direct, indirect and induced employment during construction
- Minor beneficial effect from the economic productivity generated (measured as Gross Value Added)

4.2.2 The Original ES assessed the following significant effects to occur during the operational period:

- Minor beneficial effect from the creation of direct, indirect and induced employment during construction

- Moderate beneficial effect from expenditure of new residents in the economy
- Minor beneficial effect on revenue to Local Authority (business rates, Council Tax and New Homes bonus)
- Major beneficial effect from increased number of affordable and market homes (assessment includes consideration of accessible housing)
- Minor beneficial effect on access to open space and nature
- Minor beneficial effect on active travel and public transport connections

Legislative Context, Technical Guidance and Best Practice

Legislative Context

4.2.3 There is no legislation specifically relevant to the undertaking of a socio-economic impact assessment.

Guidance and Best Practice

4.2.4 There is no new or updated guidance and best practice relevant to the assessment of Socio-Economic and Human Health effects. The guidance identified in the Original ES remain the most up to date documents:

- Homes and Communities Agency (HCA) Additionality Guide (2014) 4th Ed.;
- HCA Employment Densities Guide (2015) 3rd Ed.;
- Public Health England - Health and environmental impact assessment: a briefing for public health teams in England; and
- IEMA Primer for Human Health.

Baseline Data Collection

4.2.5 The Socio-Economic and Human Health Chapter assesses the effects of the Proposed Development on the population, a receptor under the 2017 EIA Regulations.

4.2.6 The updated baseline information on the socio-economic and health conditions of the area will be collated from a variety of sources, including:

- ONS Census 2011 data, and Census 2021 data if available;
- Latest datasets produced by the Office for National Statistics and NOMIS;
- Oxford Economics Employment and GVA Projections;
- Public Health England;
- Latest evidence-base documents from Swindon Borough Council.

Assessment Methodology

4.2.7 The methodology followed in this Chapter of the ES Addendum is largely in line with that outlined in the Original ES, with exceptions mentioned hereafter where applicable. The Chapter

generally also uses the same terminology with regards to describing assessed impacts, receptor sensitivity and effects.

Predicting effects

4.2.8 This section presents the approach to the assessment of socio-economic impacts of the proposed development, consistent with the requirements of the Town and Country Planning (Environmental Impact assessment) Regulations 2017.

4.2.9 The stages of the assessment include:

- Review of legislation, policy and guidance, to establish the baseline of community expectations for the Proposed Development;
- Definition of socio-economic baseline conditions, including a review of the existing demographic, economic and health profile of the local population;
- Impact assessment, to consider the nature, scale and performance of the potential impacts and effects on the relevant impacts areas during both the construction and operational phase of the Proposed Development, and also consider proposed mitigation measures where there are any likely significant adverse effects;
- Cumulative impacts and effects assessment, and residual impacts and effects;
- Summary of impacts and effects.

4.2.10 Quantitative assessment has been used where possible and the significance criteria ensures that there has been a consistent identification of effects applied during the assessment. Due to the complexity of socio-economic issues and the numerous interactions that can occur, it is not possible to predict the precise nature or scale of all impacts. Qualitative assessment has therefore also been used where necessary.

4.2.11 The assessment of likely significant effects has been undertaken using the following methodology and/or tools.

4.2.12 The methodology for assessing the impact of construction employment considers:

- An analysis of the current state of the construction sector in the Local and Wider Impact Areas and South West region, such as labour force need, number of workers, turnover;
- An estimation of total construction costs and duration.
- The assessment of construction employment benefits follows best practice guidance (for example the Homes and Communities Agency's Additionality Guide 2016), applying assumptions to account for leakage, displacement and multiplier effects.

4.2.13 The methodology for assessing the impact on the economic productivity generated during the construction phase considers the average productivity per worker in the South West region.

4.2.14 The methodology for assessing employment impacts involves the following key stages:

- An analysis of the current state of the local economy such as economic activity and unemployment in the Local and Wider Impact Areas and in the South West region;
- An assessment of the employment potential of the non-residential and residential space included within the proposal;

- An assessment of the employment potential derived from residential expenditure of new households at the site;

- The assessment of employment benefits follows best practice guidance (for example the Homes and Communities Agency's Additionality Guide 2016), applying assumptions to account for leakage, displacement and multiplier effects.

4.2.15 The methodology for assessing the impact on the economic productivity generated during the operational phase considers the average productivity per worker in the South West region for the industrial sector included on Site.

4.2.16 The methodology for assessing the impact on retail and leisure businesses in the local and wider impact area considers the average household spending per good type (convenience, comparison, food and beverages) and the retention rate of this spending in the impact area. This methodology differs from the Original ES, which did not appear to account for retention rates.

4.2.17 The methodology for assessing the impact on local population accessing services funded by Swindon Borough Council considers the scale of public sector revenue to be generated by the scheme, including:

- Council Tax attributable to the Proposed Development, estimated by taking the average of house value Band D and E and the number of units delivered;

- Business Rates attributable to the Proposed Development, estimated by comparing the proposed floorspace, by land use, to comparable business rates valuation from the Valuation Office Agency for similar land uses in the Local Impact Area, and accounting for Swindon Borough Council's retention rate;

- New Homes Bonus payments to Swindon Borough Council, estimated in line with the latest guidance from DLUHC, as an annual payment over four years.

4.2.18 The methodology for assessing the impact of housing considers the scale of the proposed residential development and the context of annual housing delivery targets in Swindon.

4.2.19 The methodology for assessing the impact on open space and nature considers Swindon Borough Council's Open Space Audit, with reference to the identified surplus or deficit of open space.

4.2.20 The methodology for assessing the impact on active travel will consider the proposed measures to promote active travel, with reference to relevant literature and local evidence-base on the benefit and use of sustainable travel. This will also account for the London Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment Tool.

Defining Sensitivity, Magnitude and Effect Significance

4.2.21 The assessment of likely significant environmental effects is carried out with reference to receptor sensitivity and impact magnitude.

Receptor Sensitivity

4.2.22 Changes brought by the development, whether adverse or beneficial, have different levels of significance depending on their scale, the length of the impact, and the number of people (or receptors) affected, and the relative sensitivity of that receptor. The sensitivity criteria used to provide a consistent identification of effects in the assessment are shown in Table 4.1. The Original ES also included 'Very high' and 'Very low' sensitivity levels, which are not used in the ES Addendum.

Table 4.1 Defining Receptor Sensitivity

Receptor value / sensitivity	Receptor type
High	Evidence of direct and significant socio-economic challenges relating to receptor. Accorded a high priority in local, regional or national economic and regeneration policy.
Medium	Some evidence of socio-economic challenges linked to receptor, which may be indirect. Change relating to receptor has medium priority in local, regional and national economic and regeneration policy.
Low	Little evidence of socio-economic challenges relating to receptor. Receptor is accorded a low priority in local, regional and national economic and regeneration policy.
Negligible	Very little or no evidence of socio-economic challenges relating to receptor. Receptor is not a priority in local, regional and national economic and regeneration policy.

4.2.23 To arrive at a judgement on the significance of effect on population, the assessment has considered the sensitivity of different population groups, or receptors. **Table 4.2** below draws on **Table 4.1** to identify these receptors and their sensitivity. The assessment of the receptors' sensitivity is based on the baseline research section below (**Section 4.3**).

Table 4.2 Sensitivity Assessment

Receptor	Sensitivity	Commentary
Construction workforce in the local and wider impact areas	Medium	The construction labour market in the wider impact area is bigger than the UK's as a proportion of total employment. On the other hand, over half of job seekers are looking for a job in construction, indicating high sensitivity to new employment opportunities.
Economy and construction industry of the local and wider impact areas	Medium	The average worker productivity in the construction sector is marginally higher in the in Swindon than in the region, but lower than the UK. The construction sector in Swindon and the wider impact area represents a lower proportion of overall output than in the region or UK.
Workforce in the local and wider impact areas, across all industries	High	The unemployment rate is higher in Swindon that the regional or national average. The economic activity rate in Swindon is also lower than the region's or that of the wider impact area. Growth in employment is identified as a strategic priority for the economy.
Economy and wider industries in the local and wider impact areas	Medium	Swindon and the Wider Impact Area have higher worker productivity that the national and regional average. However Swindon is noted to have experience low productivity growth in recent years.
Retail and leisure businesses operating in the local and wider impact area	Low	The average worker productivity in Swindon and the Wider Impact Area in these sectors is similar to that of the UK, but higher than the region. These sectors represent a lower share of total economic output in Swindon and the wider impact area than the region or UK.

Local population who access and are supported by services funded by Swindon Borough Council	Low	The income to SBC from Business Rates and Council Tax has been increasing steadily in the last years, from a low of £108m in 2013/14 to current revenues of circa £160m.
Local residents requiring affordable homes and private rented accommodation	High	The 2017 SHMA notes a series of challenges facing the local housing market. Swindon is estimated to only have 4.6 years' worth of housing supply.
Local residents living in Ridgeway or Covingham and Dorcan Wards	Medium	The 2014 Swindon Open Space Audit and Assessment notes that the local wards benefit from good quality and quantity of accessible open spaces, nevertheless noting some issues for play space and allotments.
Local population who undertake low levels of physical activity	High	Swindon has a lower share of adults engaging in active travel on three or more days than the region or country, and a lower share of adults who walk for transport. Latest data recorded during the Covid-19 pandemic suggest that the situation has worsened, with decreasing share of physically active adults.

Impact Magnitude

4.2.24 The magnitude of an impact has been described as High, Medium, Low, or Negligible. Impacts are either Adverse or Beneficial in nature. Such terms are relative to the receptor affected by the impact.

4.2.25 The magnitude of impacts is determined through professional judgement with reference to planning policy, best practice guidance, and relevant contextual factors. For example, employment generation of 100 new jobs could be considered a major beneficial impact in a settlement of 1,000 residents, but it would have a lower magnitude in a larger settlement of 100,000 residents. Magnitude is defined in line with Table 4.3 below. The Original ES also included 'Very high' and 'Very low' magnitude levels, which are not used in the ES Addendum.

Table 4.3 Defining Impact Magnitude

Magnitude of Impact (degree of change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Significance Criteria

4.2.26 The predicted level of effect is based upon the consideration of magnitude of impact and sensitivity of the resource/receptor to come to a professional judgement of how important this effect is. This is outlined in the significance matrix in Table 4.4 below.

4.2.27 Effects can either be classified as beneficial or adverse.

4.2.28 In line with the Original ES, effects that are minor, or greater, in scale are considered to be significant in EIA terms, with other effects considered insignificant.

Table 4.4 Matrix of Effect Significance

Receptor Sensitivity	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Geographical Scope

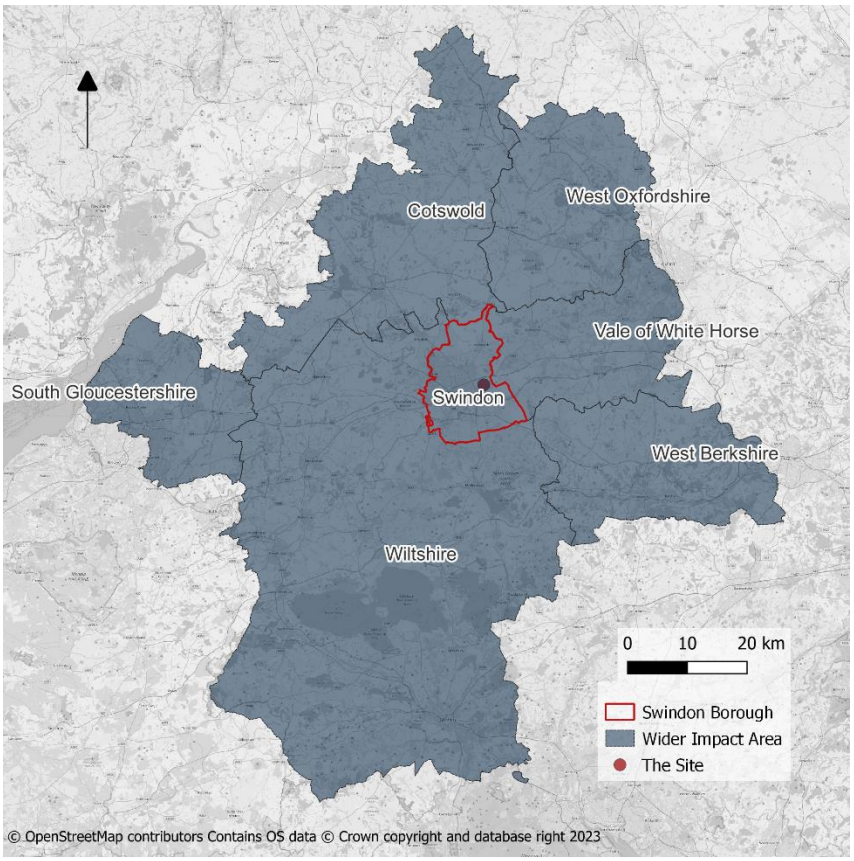
4.2.29 The concept of defining a primary area of influence or zone of impact to enable assessment is standard in EIA practice. However, there is no standard measure of scale, and the relevant area differs for each project and Site context, and is not directly transferrable to socio-economic impact assessment due to the mobility and network of potential receptors. In addition, barriers to access, such as major roads or rivers, can also affect the area of influence.

4.2.30 In the context of this ES Addendum, the geographical scope is assumed to remain the same as in the Original ES, defining the following impact area:

- Local impact area: Swindon Borough Council
- Wider impact area: Swindon Borough Council, alongside Cotswold, Wiltshire, Vale of White Horse, West Berkshire, South Gloucestershire and West Oxfordshire.

4.2.31 Figure 4.1 below maps the local impact area and the wider impact area in reference to the location of the Site.

Figure 4.1 Site, Local Impact Area and Wider Impact Area



Source: Savills 2023

Temporal Scope

4.2.32 There is no change in temporal scope. Potential impacts and effects upon socio-economic receptors will be assessed in relation to temporary and permanent impacts. As a general rule, temporary impacts relate to the construction phase of development and permanent impacts relate to the occupation phase once the development is fully operational.

Assumptions and Limitations

4.2.33 By the nature of the methodology, estimates of change in the socio-economic elements such as economic and employment effects are subject to uncertainty. The estimates in this chapter are based on good practice, but there would likely be a degree of uncertainty around estimates. This chapter's estimated effects are likely to be in a range of +/- 20% of figures given to account for this uncertainty, as is standard practice with this type of estimates.

4.2.34 The economic analysis and conclusions presented in this assessment assume that there are no major macro-economic shocks to the UK economy. Ongoing issues include the economy's recovery from Covid-19, the Russo-Ukrainian War, and rising inflation. The potential impact of such external factors means these figures should be kept under review into the future.

4.3 Baseline Environment

Current Baseline

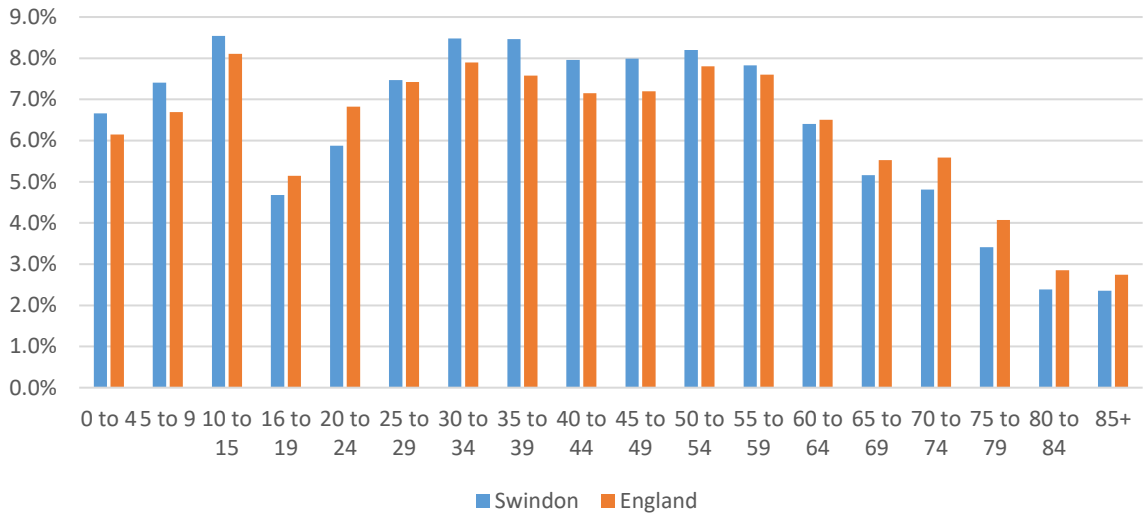
Population and Age Profile

4.3.1 In 2021 there were 233,700 residents living in the local impact area of Swindon and accounts for 15.2% of the population living in the wider impact area (1,539,500).[1]

4.3.2 The most recent population estimates from the 2021 Census shows that the population in Swindon has now increased by over 24,000, demonstrating growth of 11.6% period from 2011-2021. This is higher than the level of growth seen across England (6.6%).

4.3.3 Figure 4.2 demonstrates the population profile in Swindon compared to England. The latest population estimates show that in Swindon there is a younger population compared to the UK average. In Swindon the population aged between 30 and 55 years old accounts for 37.4% of the resident population, compared to 34.6% across the UK

Figure 4.2 Age Profile in Swindon and England in 2021



Source: ONS Census (2021)

[1] ONS Census (2021) Population and Household Estimates. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationandhouseholdestimatesenglandandwalescensus2021

Public Health Profile

4.3.4 Swindon's 2017-22 Health and Wellbeing Strategy[2] and Swindon's 2021-22 Joint Strategic Needs Assessment[3] provided an overview of the health and wellbeing profile of residents, and identify priorities to address. The documents note the following key challenges:

- An aging population, with people aged 60+ anticipated to experience the highest growth
- The impact of unhealthy lifestyles characterised by obesity, physical inactivity, poor diet and alcohol misuse.
- A growing need for savings across the public sector finances, including health and social care services.
- Inequalities in mental and physical health within the population, most particularly within most disadvantaged communities and in areas experiencing highest levels of deprivation.

Economic Activity and Employment Rates

4.3.5 Amongst the resident population of Swindon, the economic activity rate (78.9%, 116,700 people) is lower than the average for the wider impact area (84.7%) and region (80.5%), but similar to the UK (78.3%). The proportion of residents in employment (74.5% 110,500) is lower in Swindon than the average across the wider impact area (82.7%), suggesting that there may be fewer good employment opportunities locally. The employment rate is similar to the UK (75.5%), but lower than the region (78.3%).

4.3.6 Overall there are 220 Job Seekers Allowance (JSA) claimants in the local impact area and 1,220 in the wider impact area seeking employment. This includes 165 JSA claimants in the local impact area and 850 claimants in the wider impact area seeking work in construction trades.[4]

4.3.7 The unemployment rate is twice as high in Swindon (5.5%) as it is in the region (2.7%), and higher than the UK (3.6%).

Employment Market and Industry

4.3.8 The sectors which generate the highest proportion of jobs in Swindon are Wholesale and Retail Trade, accounting for 15.7% of jobs, just 1.3 percentage points above the national average.[5] Compared to the national average, there is a higher concentration of jobs in Swindon in administration, financial and insurance activities and transportation and storage. This reflects Swindon's strategic location on the M4 and the Thames Valley corridor.

4.3.9 Construction employment in Swindon currently accounts for 3.5% of all employment available. This is lower than the wider impact area (5.3%) and national average (5%). However, there has been significant investment in this sector. The third round of Local Growth Funding awarded to

[2] Swindon Borough Council (2017) Health and Wellbeing Strategy 2017-2022, Accessible from: https://www.swindon.gov.uk/downloads/file/5264/health_and_wellbeing_strategy_2017-2022
[3] Swindon Borough Council (2022) Joint Strategic Needs Assessment (JSNA) for Swindon, Accessible from https://www.swindonjsna.co.uk/wp-content/uploads/2023/03/Swindon-JSNA-summary-full-report-2021-22.pdf
[4] ONS (2023) Job Seeker's Allowance by Occupation
[5] ONS (2023) Business Register and Employment Survey

Swindon and Wiltshire LEP was £22.03m to construct two new facilities at Wiltshire College, including a new Construction, Life Sciences, Engineering and Higher Education facility.

4.3.10 The Economic Strategy To 2026, published by Swindon Borough Council, highlights the challenges that the local economy has recently faced.[6] This includes slow productivity growth in recent years compared to other fast growing neighbours, constrained linked to skills levels and educational attainment, some worklessness in the most deprived areas The Council identifies that new and diverse jobs are therefore needed to enable Swindon to provide opportunities for residents. This needs to be supported by new housing delivery and by enhancing the attractiveness of Swindon as a place to live, visit and work in.

4.3.11 The latest commuting estimates from the 2011 ONS Census show the substantial movement in the labour market to jobs outside of the borough. While Swindon attracts 23,905 workers living outside the borough, 24,708 Swindon residents are leaving the borough to work elsewhere.[7]

Economic Productivity and Output

4.3.12 Total economic output (measured as Gross Value Added) generated in the Swindon economy totalled 8.7 billion in 2020, and £50.7 billion in the wider impact area. This equates to £68,160 and £59,320 per worker respectively. This is higher than the South West regional average (£44,280 per worker) and the UK's average (£50,600).[8]

4.3.13 The construction sector in Swindon had a GVA of £250m in 2020, and produces an output of over £43,500 per worker. This compares to an average productivity of £46,820 in the wider impact area, £41,760 across the South West, and £48,700 in the UK. Compared to the wider impact area, region and country, the construction sector in Swindon represent a lower share of total economic output (3%, and 5.4% in the impact area, compared to over 6%).

4.3.14 Combined, the 'Accommodation and Food service' and 'Wholesale and retail trade' sectors have an average worker productivity of £28,170 in Swindon and £27,210 in the wider impact area, compared to £24,140 in the south west and £28,420 in the UK. These two sectors represent 8.3% of Swindon's economic output, compared to 9.15% in the wider impact area, 12.1% I the region and 11.6% in the UK.

Local Authority Revenue

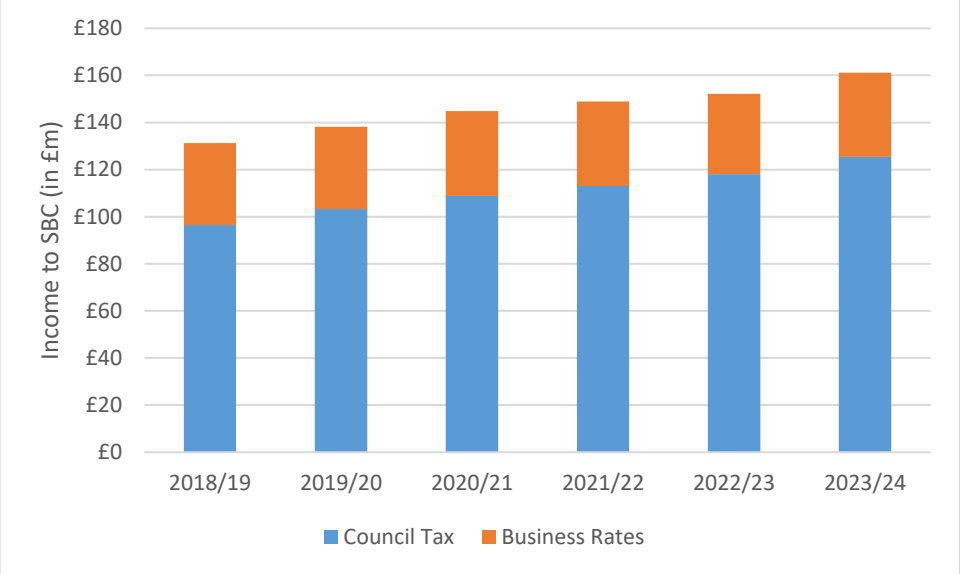
4.3.15 For the financial year 2023/24, income from Council Tax and Business Rates is estimated to reach £161.2 million for Swindon Borough Council[9], which is up slightly from £152.2 million in the previous year (2022/23).[10]

4.3.16 The Original ES noted that from 2010 to 2017/18, the total income from Council Tax and Business Rates had fluctuated, with the lowest collection in 2013/14 (£107.9 million) and the

[6] Swindon Borough Council () Economic Strategy to 2026, Available from: https://www.swindon.gov.uk/downloads/download/587/economic_strategy
[7] Data from the 2021 Census is not available at the time of writing
[8] Oxford Economics (2023) UK Local Authority Districts Databank
[9] Swindon Borough Council (2023) Council Tax Booklet (2023-24), Available from: https://www.swindon.gov.uk/downloads/file/8877/council_tax_booklet_202324
[10] Swindon Borough Council (2022) Council Tax Booklet (2022-23), Available from: https://www.swindon.gov.uk/downloads/file/7966/council_tax_booklet_202223

highest in 2012/13, at nearly £140m. As shown in Figure 4.3, since then total income from Council Tax and Business Rates has been steadily increasing.

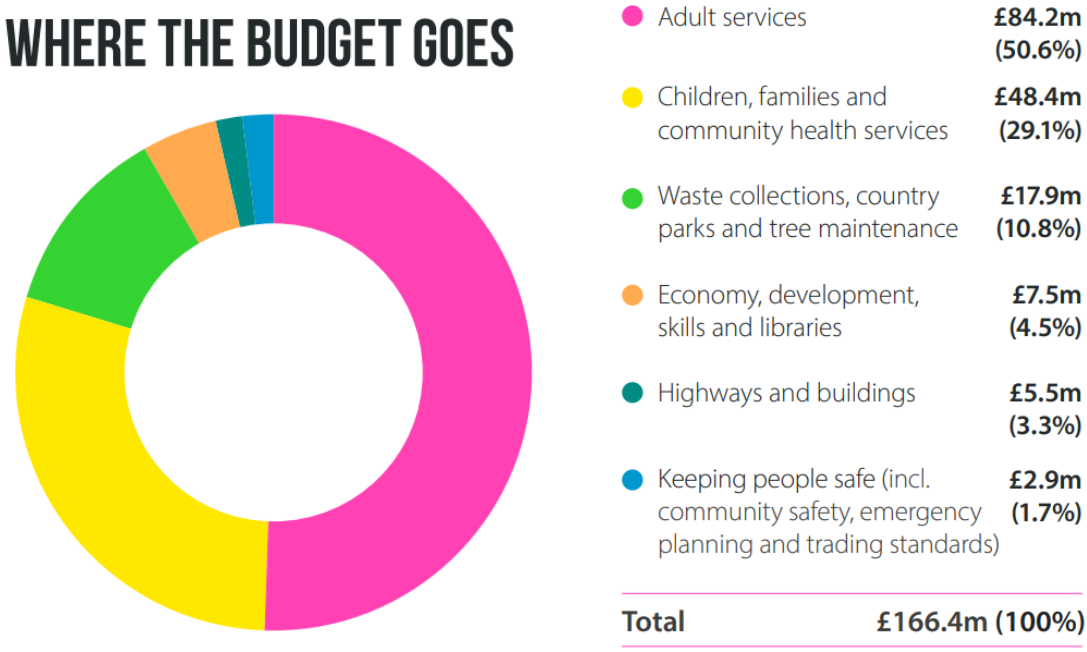
Figure 4.3 Income to Swindon Borough Council from Council Tax and Business Rates



Source: SBC Annual Report and Council Tax 2018/19 to 2023/24

4.3.17 Together with other sources of income, such as the central government grant, the Local Authority funds services such as adult social care and communities and housing. Figure 4.4 shows how total local government spending is divided between local services.

Figure 4.4 Extract from Swindon Borough Council's Statement of Accounts (2023/2024)



Source: SBC (2023)

Local Housing Market

4.3.18 Swindon has a higher proportion of terraced housing (29.0%), compared to the South West region (22.3%) and England (23.0%). There is a lower proportion of detached houses in Swindon (22.3%) compared to the South West region (30.0%) but similar to England (22.9%).

4.3.19 According to the 2017 Swindon and Wiltshire Strategic Housing Market Assessment (SHMA) there are a number of challenges in the local housing market. There are growing number of concealed families living within households and more instances of overcrowding. For example, across Swindon and Wiltshire (geography of the SHMA), overcrowding increased from 10,811 to 14,947 households (an increase of 4,136) over the 10-year period 2001-11.

4.3.20 The 2017 SHMA notes that there is an objectively assessed need for 27,520 homes in the Swindon Housing Market Area over 2016-2036, or 1,376 per annum on average. This is lower than the target stated in the Local Plan adopted in March 2015, or 1,466 per annum. The annual delivery target in the emerging local plan is set at 1,200 dwellings per year. Nevertheless Swindon is estimated to only have 4.6 years' worth of housing supply.

Other Wider Determinants of Health

Open Natural Space

4.3.21 There is no update to the baseline conditions since the original ES. The 2014 Swindon Open Space Audit and Assessment provides the most recent and robust assessment of access to open natural space for existing residents. The Proposed Development is located on the boundary between Ridgeway ward (more rural) and Covingham and Dorcan (within the settlement boundary of Swindon). The following conclusions are drawn from the assessment regarding the quantity, quality and accessibility of open space:

- Ridgeway – "The rural nature of this ward means open space is generally contained within the villages, a majority of which is semi-natural in character and located at Wanborough village. The area is well provided for in terms of allotments and outdoor sports facilities; however there is a lack of playspace available for the residents" and

- Covingham and Dorcan – "There is a slight surplus of total open space in Covingham and Dorcan. A high proportion of the total amount of open space consists of general recreational spaces, resulting in a lack of playspaces, outdoor sports facilities and allotments". "Accessibility is generally fairly good throughout the ward, although access to allotments remains poor"

Access to active travel options

4.3.22 According to the 2021-22 JSNA, across Swindon, the level of active travel on three or more days per week is a few percentage points below that of the regional and the national average, standing at 12.4% compared to 16.9% and 1.5% respectively. The JSNA notes a drop in the proportion of adults engaging in active travel between 2018-19 and 2019-20, from around 23% to 12.4%. This is likely caused by Covid-19 pandemic and lockdown restrictions in late March 2020 which significantly reduced the number of people commuting to work.

4.3.23 The JSNA notes that before 2019-20, Swindon had a lower proportion of adults walking for transport (around 18-23) compared to around a quarter regionally and nationally. This rate dropped by 11 percentage points in 2019-20, compared to just a 8 points drop in England and South West. The share of people who cycle for transport has followed a similar trend with a drop in recent years.

Future Baseline

4.3.24 The following estimations have been made regarding how each aspect of the baseline environment will likely change in the future over the next 10 years:

- Population – ONS projections estimate that Swindon's population could increase by 5.0% from 2021 to 2031, and a further 4.0% from 2031 to 2041. The 2022 JSNA notes that population increases are driven both by people living longer and by more people coming to live in Swindon than leaving.
- Employment opportunities – Oxford Economics projections show that over 2021-2031 employment is expected to increase, but at a lower rate in the local impact area (2.1 %) compared to the wider impact area (7.1%).
- Economic output (GVA) – Oxford Economics projections show that over 2021-2031, GVA is expected to increase, but at a lower rate in the local impact area (11%) compared to the wider impact area (17.7%).
- Local Authority Revenues – The Central Government has been trialling a pilot whereby some Local Authorities are retaining 100% of business rates revenue. The government aimed to increase the level of business rates retained by local government from the current 50% to 75% in April 2020. Latest evidence shows that the rate of retention for SBC still remains at 50%.[11] It is expected that SBC will receive a proportional uplift in business rates revenue in line with the policy change. Council Tax revenue is expected to increase in line with housing prices and housing delivery.

4.4 Updated Assessment of Impacts and Effects

4.4.1 This section updates the assessment of the potential socio-economic effects that are anticipated to arise from the Proposed Development during construction and once operational. The potential impacts and the significance of the effects are characterised in the absence of mitigation measures, beyond those identified and described as inherent design mitigation.

4.4.2 The effects during construction are anticipated to be short to medium term duration (temporary), while effects during operation are anticipated to be of long term duration (permanent), unless otherwise stated.

4.4.3 Potential impacts and effects relate to:

- Employment generation during the Construction Phase;
- Economic productivity (GVA) generated during the Construction Phase;
- Employment generation during the Operation Phase;
- Economic productivity (GVA) generated during the Operation Phase;
- Provision of new homes for residents of the Housing Market Area;
- New resident spending in retail and leisure businesses in the local area;

[11] DLUHC (2023) Business rates levy and safety net calculator 2021 to 2022, Available from: https://www.gov.uk/government/publications/business-rates-levy-and-safety-net-calculator-2021-to-2022

- Residents' access to public services funded by Swindon Borough Council;
- Provision of open space;
- Promotion of active travel within the Proposed Development.

4.4.4 The exact parameters of the employment space are not yet confirmed. For the purpose of the update of the assessment, the employment mix has been set in line with the Original ES. This had been chosen based on the likely 'worst case' scenario for employment generation, informed by densities for employment generating uses, as set out in the HCA (2014) Employment Densities Guide. In line with the Original ES, floorspace measures are assumed to be given in Gross Internal Area (GIA).

4.4.5 This update of the assessment of the Proposed Development's impacts and effects therefore considers the following parameters:

- Up to 2,500 homes
- Up to 1,000 sqm of net additional employment space in Use Class E(g)(iii) Industrial Processes (former B1c 'Light Industrial)
- Up to 1,780 sqm of community or retail uses, including
  - 680 sqm of early years space provision
  - 600 sqm of retail space in Use Class E(a) 'Display or retail sale of goods, other than hot food' (former A1)
  - 500 sqm of café and restaurant space in Use Class E(b) 'Sale of food and drink for consumption (mostly) on the premises (former A3/A4)
- No. 2 Form Entry Primary School
- c. 1,300 sqm Sports Hub with six playing pitches and changing facilities.
- Green infrastructure

Construction Impacts and Effects

4.4.6 In terms of construction impacts, the most significant effects are likely to be on the generation of employment and economic productivity. The population is not expected to increase significantly during construction are workers are unlikely to relocate to the local area. Therefore, population, housing and social infrastructure have been scoped out of the assessment of construction effects.

Construction Employment

4.4.7 The construction of the Proposed Development would help support construction firms operating in the economic impact area, and provide jobs in the industry. The Proposed Development would lead to the creation of new direct and indirect jobs, through supply chain benefits and new expenditure introduced to the local economy.

Direct Employment

4.4.8 To calculate the number of jobs required for the construction of the Proposed Development, the average output per construction worker in the South West region (Department for Business,

Energy, and Industrial Strategy, 2022) is used in combination with the estimated construction cost of the Proposed Development and duration:

- In 2019, the construction costs were estimated to amount to £360m. Due to price inflation in the construction industry, to reflect the latest changes in the cost of construction materials the cost of the Proposed Development has been rebased using the BCIS Tender Price Index. Q1 2019 set an Index of 331, compared to an Index of 383 as of Q2 2023. This results in construction costs amounting to £416.6m.

- In line with the Original ES, the duration of the construction phase is assumed to remain 20 years.

4.4.9 The total headcount of workers is converted into Full Time Equivalent (FTE) using a factor of 96%, based on ONS data in average weekly hours in the construction sector. This is summarised in Table 4.5 below.

Table 4.5 Construction Employment Generated by the Proposed Development

	Calculation Step	Estimate
A	Construction Cost	c. £416,556,000
B	Annual construction turnover in South West	£23,252 million
C	Headcount of Employees in Construction sector in South West	198,300
D	Average turnover per employee (B / C)	£121,900
E	Construction job years (A / D)	3,420
F	Construction duration (in years)	20
G	On-site FTE jobs (E / F)	170

Source: Savills (2023), Turley (2019), BEIS (2022). Note figures are rounded and may not add up

4.4.10 The table above shows that the construction phase would generate 3,420 construction job years on-site, or 170 FTE jobs over the 20 year construction period.

4.4.11 Given that construction is made up of many discrete elements of work undertaken by specialists, additional construction workers may be employed on the Site for shorter periods.

4.4.12 Due to the nature of the construction industry and different stages involved with the Proposed Development, not all trades would be required on the Site permanently and some would be on Site for less time than others. The construction process would include a range of occupational levels including unskilled or labouring jobs to more senior positions, as well as across a range of professional disciplines. The Proposed Development could facilitate the growth of the local construction industry by enabling firms to expand and potentially take on employees.

4.4.13 Occupational and skill demand in the construction sector revolves around specialist skills, i.e. electricians, plumbers, bricklayers, carpenters and plant operating trades. These skills tend to be contract labour offered by construction / building firms locally. In addition, low skilled manual labour would be expected to be in demand. In this case, employment tends to be contracted via Job Centres and Employment Agencies on a needs basis.

Indirect and Additional Employment

4.4.14 Businesses in the local and regional economy would benefit from the trade linkages that would be established to construct the Proposed Development, meaning that further indirect jobs would be supported locally in suppliers of construction materials and equipment.

4.4.15 The Proposed Development would set off a chain reaction of increases in expenditure, such as through the sale of building materials, design services, legal services and insurance. In turn, this can result in jobs close to the Site, generating an increase in demand for goods and services, and generate growth in the local economy. The above forms the multiplier effects.

4.4.16 As outlined in the methodology, the generation of jobs during construction would also be impacted by leakage and displacement effects. Construction workers residing outside of the economic impact area could be employed in the construction and benefit from it. Similarly, the construction of the Development could divert time and resources away from other construction projects likely to also generate employment.

4.4.17 Following the methodology outlined in the HCA 2014 Additionality Guide, the leakage rate is estimated as the first step in estimating 'additionality'. In 2011, 4% of the construction employees working in Swindon Borough Council had commuting distance extending beyond the Wider Impact Area.

4.4.18 The second step is estimating displacement. Displacement is where the proposed activity could displace another activity in the target area; thereby reducing its additionality. This is estimated by taking into account statistics published by the CITB in its South East labour market report. It assessed that the construction workforce need in the South East was half that of the UK average. This could suggest lower demand for construction workers and therefore lower displacement. To remain conservative, a 'low' displacement rate of 25% has been applied as per the HCA 2014 Additionality Guide.

4.4.19 The third step is estimating the indirect benefits of the construction activity – that is, the benefits to companies in the supply chain, and to the local economy by the new expenditure introduced to the area from the construction workers. There would be strong linkages across the region related to the construction activity. In this instance the construction's multiplier is 1.80, estimated using the 2018 UK Input-Output Analytical Tables[12]. The Tables provide a national multiplier effect of 2.18, locally adjusted to 1.80 using an 18% discount factor, in line with the HCA 2014 Additionality Guide (the discount is applied twice, to first estimate regional multiplier effects, subsequently discounted a second time to estimate local multiplier effects).

4.4.20 Table 4.6 below shows the total number of net additional construction jobs generated by the Proposed Development.

Table 4.6 Estimating Net Additional On- and Off-Site Construction Jobs

	Calculation Step	Jobs
A	On-site workers per annum	170
B	Leakage effect (- A * 24%)	-5
C	On site construction jobs for workers of the impact area (A + B)	165
D	Displacement effect (- C * 25%)	-40
E	Multiplier effect ((C + D) * 1.80)	1000
F	Total Off-site jobs (D + E)	60
G	Net additional on- and off-site construction jobs for workers of the impact area (C+F)	220

Source: Savills (2023) Note figures are rounded and may not add up

4.4.21 It is estimated that the construction phase would generate 170 on-site FTE construction jobs per year on average over a 20 year construction period. Once leakage, displacement, and

[12] ONS (2022) 2018 UK Input-Output Analytical Tables

multiplier effects are taken into account, the number of net additional jobs per annum for construction workers of the wider impact area rises to 220.

4.4.22 The construction employment generated by the proposed development represents 5.5% of the construction workforce in Swindon (4,000), and 26% of all jobseekers in the Wider Impact Area seeking employment in the construction sector (850). The Proposed Development is therefore estimated to have a positive impact of high magnitude on the medium sensitivity construction workforce in the wider impact area. This is anticipated to result in a **temporary major beneficial effect**, which is significant.

Economic Productivity

4.4.23 ONS data on labour productivity has been used to estimate the economic productivity effect of the construction phase.[13] Average worker productivity in the South West is estimated at £54,100 per worker.

4.4.24 This results in an average productivity of £6.3m per annum, or £125.8m overall over the 20 year construction period.

4.4.25 The GVA of the construction sector is estimated at £250m in Swindon, and £2,755m in the wider impact area. The Proposed Development will contribute to 2.5% of Swindon's construction sector's GVA and 0.2% of the Wider Impact Area's. This would result in a negligible impact on the medium sensitivity economy and construction industry. This results in a **temporary negligible effect**, which is not significant.

Occupation Impacts and Effects

Operational Employment

4.4.26 Operational phase jobs would be generated once the construction has been completed and the Proposed Development is occupied. The assessment considers the following likely significant effects arising from the Proposed Development.

- Creation of a range of permanent opportunities from the proposed logistics and industrial uses.
- Indirect economic effects through the supply chain, services and the local spend of employees.

Direct Employment

4.4.27 Table 4.7 below shows the on-site employment generated in the Proposed Development. All employment-generating floorspace currently on site (c. 1,500 sq.m of commercial space) is proposed to be retained, and therefore Table 4.7 shows the net additional floorspace only.

4.4.28 To estimate the potential on-site Full Time Equivalent jobs upon completion we take the floorspace per land use in the Proposed Development and in the Reference Case, and divide this by the assumed employment density for the given land use, based on the HCA 2015 Employment Density Guide. We then adjust this figure downward in line with the vacancy rates. These assumptions are set out in Table 4.7 below.

[13] ONS (2021) Region by industry labour productivity 1998-2019; adjusted using ONS (2023) Gross Value Added (Average) at basic prices: CP SA £m

4.4.29 It is anticipated that some of the future residents of the Proposed Development would be homeworkers. This is estimated using ONS data on the average household size in the study area (2.3), the percentage of residents of working age (16-64 years old, 64%), the percentage of residents who are economically active in the area 79%, and finally the share of homeworkers in the region (7%). A discount factor of 83% is then applied to convert total homeworkers to FTE jobs. This result in an average of full-time equivalent worker per home.

4.4.30 The Proposed Development is therefore estimated to generate 350 additional on-site FTE jobs relative to existing site.

Table 4.7 Estimating On-Site Employment

Land Use	Floorspace	Employment Density	Vacancy Rate	Employment (FTE)
Proposed				
Homeworkers	2,500 units	0.07 workers per unit	n.a.	170
Light Industrial	1000 sqm GIA	47 NIA sqm / FTE	7.4%	20
Retail	600 sqm GIA	15 NIA sqm / FTE	1.9%	35
Café	500 sqm GIA	15 NIA sqm / FTE	1.9%	30
Nursery	680 sqm GIA	15 GIA sqm / FTE	n.a.	45
Primary School	2 FE, 420 pupils	11.9 pupils / FTE	n.a.	35
Gym/Leisure	1300 sqm GIA	83 GIA sqm / FTE	n.a	15
Total Proposed On-site Jobs				**350**

Source: Countryside Sovereign Swindon LLP (2023), HCA Employment Density Guide (2015), CoStar (2023), Department for Education (2021/22), ONS (2023). Note figures are rounded and may not add up.

Indirect Employment

4.4.31 The Proposed Development is also likely to have indirect/off-site employment effects. These are considered as indirect multiplier effects which include:

- Supply linkage multiplier: Such effects occur due to purchases made as a result of the Proposed Development, and further purchases associated with linked firms along the supply chain.

4.4.32 The total net employment effects is also estimated, in accordance with the HCA Additionality Guide (2014), to account for leakage, displacement, and multiplier effects. The assumptions used to calculate net additional employment are outlined in Table 4.8.

Table 4.8 Net Additional Employment Assumptions

Land Use	Leakage	Displacement	Local Multiplier
Proposed			
Retail	4%	25%	1.50
Light industrial	3%	25%	1.50
Café	4%	25%	1.30
Nursery	4%	25%	1.50
Primary School	3%	25%	1.30
Gym/Leisure	4%	25%	1.35
Notes:			

- *Leakage assumptions are based on distance travelled to work by industry (workplace population) available from ONS 2011 Census, and on HCA Additionality Guide (2014), estimating leakage of residents from outside of the wider impact area, travelling 60km and over for work.*
- *We use Homes and Communities Agency Additionality Guide (2014) to estimate displacement effects, assuming a low displacement rate. We assume that a low displacement rate is applicable to the primary school activity, even though it is a public service, as it is anticipated to offer more employment options to local teachers.*
- *We use ONS 2018 Input-Output tables to estimate local multipliers effects and a discount factor of 44%, in line with the HCA Additionality Guide. Supply-induced multiplier effects also account retail and Food & Beverage jobs supported by the resident spending.*

4.4.33 Table 4.9 sets out the steps taken to estimate net additional on- and off-site employment in the Proposed Development in line with the HCA Additionality Guide, accounting for leakage, displacement, multiplier effects and new resident expenditure.

Table 4.9 Net Additional Operational Employment

	Step Involved	Net additional employment in the Proposed Development
A	Operational on-site employment (gross, direct)	350
B	Leakage to workers from outside the economic impact area (A * leakage rate)	-5
C	On-site jobs to residents of the economic impact area (A + B)	345
D	Displacement effects (C * (0 – displacement rate))	-45
E	Multiplier effects ((C + D) * displacement rate)	170
F	Total off-site jobs (D + E)	130
G	Net additional employment (C + F)	470

Source: Savills (2023) Note figures are rounded and may not add up

4.4.34 The Proposed Development is therefore estimate to generate 470 new on- and off-site employment opportunities for residents of Swindon and the wider impact area once fully operational.

4.4.35 The employment opportunities created represent 2% of the number of unemployed people in the wider impact area (19,500) and 8% of unemployed people in Swindon (6,200). The Proposed Development would therefore have a positive impact of low magnitude on the high sensitivity workforce in the local and wider impact area. This would result in a **permanent moderate beneficial effect**, which is significant.

Economic Productivity

4.4.36 ONS data on labour productivity has been used to estimate the economic productivity effect of the operational phase.[14] Table 4.10 below shows the estimated average labour productivity per worker in the South West region for each of the proposed land uses.

Table 4.10 Labour Productivity in the South West by Sector

Sector / Land Use	Average productivity per worker	Total Labour Productivity in Proposed Development
Homeworkers	£65,870	£11,147,000
Light Industrial	£72,900	£1,035,000
Retail	£40,400	£1,085,000
Restaurant & Cafe	£24,630	£551,200
Primary School	£42,110	£1,124,000
Nursery & early years	£42,110	£1,452,000
Sports Hub / Gym / Leisure	£20,050	£235,500
Total Productivity		**£16,630,000**

Source: Savills (2023), ONS (2021)

4.4.37 The employment opportunities created by the Proposed Development would generate a Gross Value added of £16,630,000 per annum.

4.4.38 This represents just 0.2% of the annual economic output of Swindon, and only 0.03% of the annual economic output of the Wider Impact Area. The Proposed Development would therefore have a negligible impact on the medium sensitivity economy and industries in the wider impact area. This results in a **permanent negligible effect**, which is not significant.

Resident Expenditure

4.4.39 The new residents living in the Proposed Development (2,500 new households) will be bringing additional spending in local shops, restaurants and cafes in Swindon.

4.4.40 The impact of new residents on local spending is estimated using the average weekly household expenditure in South West on convenience and comparison goods and on food & beverage.[15] We use data on market share of Swindon shops to estimate what proportion of new resident spending will be retained by local shops.[16] Multiplying the product of these figures by 52 provides an estimate of the annual spending per household that is retained in shops in Swindon. This is summarised in Table 4.7, and amounts to £4,080, £4,790, and £1,740 for convenience and comparison goods and Food & Beverage respectively, or £10,620 in total.

[14] ONS (2021) Region by industry labour productivity 1998-2019; adjusted using ONS (2023) Gross Value Added (Average) at basic prices: CP SA £m
[15] ONS (2019) Detailed household expenditure by countries and regions:
[16] Nathaniel Lichfield & Partners (2017) Swindon Retail and Leisure Needs Assessment

Combined, the 2,500 new dwellings would generate £26.5m of new retail and food & beverage spending per annum in Swindon.

Table 4.11 Average Weekly Spending and Retention Rate for Convenience and Comparison Goods and Food & Beverage in Swindon

	Retail Good	Convenience Goods	Comparison Goods	Food & Beverage
A	Average weekly spending	£79	£103	£137
B	Retention Rate	99.6%	89.5%	90.9
C	Annual spending per household retained in Swindon (A * B * 52)	£4,080	£4,790	£1,740

Source: Savills 2023, ONS (2019), NLP (2017) Note figures are rounded and may not add up

4.4.41 Additional spending in local shops and restaurant could help support new employment opportunities, as calculated in Table 4.8 below. The average turnover per employee in the retail sector is estimated using the annual turnover in the region (£65,535m) and the number of employees (307,000)[17]. This results in an average turnover of £213,470 per worker. The average turnover per employee in the food service sector is estimated the annual turnover in the region (£6,818m) and the number of employees (184,000)[18]. This results in an average turnover of £37,100 per worker.

4.4.42 Table 4.8 shows that with an average annual retail spending of £8,800 per household, the 2,500 new dwellings would generate total spending of £22m in retail shops in Swindon. With an average annual spending of £1,780 on food & beverage, the 2,500 new dwellings would generate a total spending of £4,4m in restaurant and cafes in Swindon. Compared to the average turnover per employee, this would indicate that the Proposed Development could support 105 retail jobs and 120 jobs in food services.

Table 4.12 Retail Employment Supported by New Resident Spending

	Calculation Step	
A	Annual Retail turnover in South West (2020-22 average)	£65,535m
B	Employees in Retail sector in South West (2020-22 average)	307,000
C	Average turnover per Retail employee in South West (A/B)	£213,470
D	Annual Food Services turnover in South West (2020-22 average)	£6,818m
E	Employees in Food services sector in South West (2020-22 average)	184,000
F	Average turnover per Food Service sector employee (D/E)	£37,100
G	Number of Dwellings	2,500
H	Total Retail Spending (G * (£4,080+ £4,790))	£22.2m

[17] ONS, Business population estimates, 2020-22 average
[18] Ibid

I	Total Food & Beverage Spending (G * £1,740)	£4.4m
J	Retail Jobs Supported (H / C)	105
K	Food services jobs supported (I / F)	120

Source: Savills 2023, BEIS 2022 Note figures are rounded and may not add up

4.4.43 ONS data on worker productivity in the retail and food service sectors has been used to estimate the Gross Value Added (GVA) of the retail and F&B jobs supported by the Proposed Development.[19] The Retail sector in the South West is estimated to have an average labour productivity of £40,400 per worker, and £24,630 per worker in the food services sector. Multiplied by the number of jobs supported by the Proposed Development, this would represent £7.1m in GVA per annum.

4.4.44 This represents 1% of the economic output of the retail and food service sectors in Swindon, and just 0.2% of the output of these sectors in the Wider Impact Area. The Proposed Development would therefore have a negligible impact on the low sensitivity retail or leisure businesses operating in the Wider Impact Area. This would result in a **permanent negligible effect**, which is not significant.

Local Authority Revenue

4.4.45 The Proposed Development will result in an increase in Public Sector revenues for Swindon Borough Council, through a range of revenue streams, including Council Tax, Business Rates and New Homes Bonus.

Council Tax

4.4.46 Development and occupation of new housing can also increase Council Tax revenue to Swindon District Council. Although the mix of homes to be delivered is unconfirmed at the current point in time, this assessment assumes the delivery of a range of homes. The eventual mix of homes delivered will directly impact upon the scale of Council Tax accrued.

4.4.47 On this basis, the Proposed Development is expected to generate circa £4 million in additional Council Tax payments annually to Swindon Council once fully occupied, equating to circa £80.4 million over 20 years at anticipated 2023 rates. This could provide an important source of revenue funding for Swindon Council in order to deliver public services as well as investing in maintaining and enhancing infrastructure within the locality. It must be noted that this estimates only includes council tax payments for market units. Affordable units would also be liable to pay council tax, but on the basis that residents of affordable units would likely benefit from discounts, these have been excluded from the calculations.

Business Rates

4.4.48 Businesses pay non-domestic rates (known as business rates) to contribute to the cost of the local authority providing public services within which the business property is situated. The Government has introduced a Business Rate Retention Scheme (BRRS), which became

[19] ONS (2021) Region by industry labour productivity 1998-2019; adjusted using ONS (2023) Gross Value Added (Average) at basic prices: CP SA £m

operational in April 2013. It provides a direct link between business rates growth and the amount of money local authorities have to spend on local people and local services.

4.4.49 Local authorities are now able to keep at least 50% of the growth in business rates revenue that is generated in their administrative area. The Government's intention is that this will provide a strong financial incentive for local authorities to promote economic growth, as well as providing a greater degree of discretion in terms of how this additional revenue is spent. In December 2017, the government announced the aim of increasing the level of business rates retained by local government from the current 50% to the equivalent of 75% in April 2020. This is being piloted in a selection of local authorities, which does not include Swindon Borough Council.

4.4.50 We estimated likely revenues from business rates by comparing the proposed floorspace to the rateable values of comparable uses and properties in the vicinity of the Development. Rateable values are obtained from the Valuation Office Agency. It is estimated that the Proposed Development would generate up to approximately £100,350 in business rate revenue per annum, of which at least 50% – or circa £49,170 – could be retained by Swindon District Council.

4.4.51 Increased local authority revenue will be important for expenditure on local services funded by Swindon Borough Council, such as children's services, adult social services and communities and housing.

New Homes Bonus

4.4.52 With the construction of the Proposed Development, Swindon would receive further income via the NHB. It should be noted that the method for calculating NHB is likely to change in the future. The government undertook a consultation process to determine the future of the NHB programme. The consultation period ended in early April 2020 and the government is currently reviewing the consultation feedback. Consequently, the estimate for NHB is indicative and could be subject to change.

4.4.53 For this assessment the existing method of calculation has been used. The value of NHB is four times the average Council Tax Band D in England (£1,966). It is paid to local authorities for new housing delivery over a 0.4% baseline. The delivery of affordable unit also provides a bonus of £350 per affordable unit. To estimate NHB the projected housing delivery rate within Swindon was investigated. In Swindon, it is estimated that 66% of all housing will be over this baseline during the forecast period of 2022/23 to 2026/27. This means that around 1,657 of the proposed units could qualify for NHB, generating a total of around £12.6 million to be received by Swindon Borough Council, spread over a 4 year period following delivery of the units.

Cumulative Public Sector Revenues

4.4.54 Combined, the council tax, business rates and New Homes Bonus are estimated to add up to £34.3m in public sector revenues over a 20 year period (at a Net Present Value of 3.5%). This is a high level estimate assuming that the delivery of housing and employment floorspace is spread evenly over time with constant delivery each year, which is unlikely. On average annually over the 20 years, Swindon council would receive £1.7m. This represents 1.1% of the anticipated revenues from Council Tax and Business Rates for 2023/24.

4.4.55 The Proposed Development is therefore estimated to have a positive impact of low magnitude on the low sensitivity local population who access services funded by SBC. This results in a **permanent minor beneficial effect**, which is not significant.

Housing

4.4.56 The Proposed Development would deliver 2,500 homes over a 20 year period, providing a mix if sizes and tenure, catering to a range of housing need. On average, this would result in the delivery of 125 dwellings per annum.

4.4.57 This represents 8.5% of the annual housing delivery target in the adopted Swindon Local Plan, and 10.4% of the target in the emerging local plan. The Proposed Development is therefore estimated to have a positive impact of medium magnitude on the high sensitivity local residents requiring affordable homes and private rented accommodation. This would result in a **permanent major beneficial effect**, which is significant.

Open Space and Nature

4.4.58 As outlined in the Original ES, “Once complete the development will provide outdoor public amenity space such as allotments (c.2.6 ha) and walking trails. The site area (excluding the primary road infrastructure to the A420) is c.160ha and green infrastructure (GI) will cover c.97 ha.”.

4.4.59 It is expected that the open space provision of will have positive impact on the community. On the basis that the above provision is policy compliant, the magnitude of impact is estimated to be low. The sensitivity of the local residents living in Ridgeway or Covingham and Dorcan Wards was estimated to be medium. This is anticipated to result in a **permanent minor beneficial effect**, which is not significant.

Active Travel

4.4.60 The Proposed Development is anticipated to deliver a range of features that would promote and encourage active travel for residents. In line with policy, the Development will deliver a walking and cycle network that is integrated within exiting networks, and will provide good connectivity within the site and to the surrounding area, both for commuting and recreational purposes. Routes will link to the proposed primary, secondary and further education facilities, the district centre and employment areas within the wider developments.

4.4.61 In line with policy, the masterplan of the Proposed Development incorporates a series of principles promoting active travel:

- A street and place design that gives pedestrians and cyclists priority
- Filtered permeability to provide journey time advantages to non-car modes
- Inclusion of green spines with vehicle cross overs characterised by a speed reducing layout and vulnerable road user priority
- Fast and efficient links to local and town centre destinations and open space.

4.4.62 The Proposed Development is also anticipated to make off-site contributions towards sustainable transport solutions that will facilitate active travel around the Site. This includes new footway, cycleway, crossing facilities, traffic calming measures.

4.4.63 As a result of these measures, the Proposed Development is estimated to have a positive impact of low magnitude on the high sensitivity local population who undertake low levels of physical activity. This is anticipated to result in a **permanent moderate beneficial impact**, which is significant.

Mitigation Measures and Enhancement Actions

4.4.64 As a result of inherent mitigation proposed as part of the Proposed Development, a number of the effects assessed for construction and operational phases would be beneficial and therefore would not give rise to a requirement for enhancement or additional mitigation measures. Similarly, other effects assessed as negligible or not significant require no mitigation.

4.4.65 On the basis that no significant adverse effects were assessed, no mitigation measures are required. No enhancement actions are proposed. This is in line with the Original ES, which also neither identified any significant adverse effect nor provided mitigation measures.

Residual Effects

4.4.66 On the basis that no mitigation measures or enhancement actions were proposed or required, the residual effects are anticipated to remain as identified above.

Cumulative Effects

4.4.67 Nine of the ten cumulative schemes have been considered for the assessment of cumulative effects. The scheme with Planning Application reference S/19/0703, which proposes to deliver a new road, is scoped out of the assessment since it is not expected to have any significant impact on socioeconomic receptors.

4.4.68 The assessment of cumulative effects has been carried out by reviewing supporting documents submitted as part of each scheme's planning application. It must be noted that some planning applications do not provide the level of detail required to fully define their impact magnitude on sensitive receptors.

Construction

Construction Employment

4.4.69 The construction of the cumulative sites would help support construction firms operating in the wider impact area and provide jobs in the construction industry. Due to lack of detailed information on the cost and duration of the construction phases of these sites it is not feasible to make detailed projections.

4.4.70 Of the nine planning application reviewed, only one had supporting documents estimating employment generated by its construction phase, amounting to 250 jobs per annum. Nevertheless, the other eight schemes are also assumed to require some form of demolition or construction activity, which would involve construction workers and generate construction employment in the economic impact area.

4.4.71 Cumulative sites are therefore expected to support a range of construction employment opportunities. Some of the construction stages of the cumulative schemes would overlap with the Proposed Development's, providing further employment opportunities for local construction workers.

4.4.72 It is estimated that the cumulative developments combined with the Proposed Development would have a beneficial impact of high magnitude on the medium sensitivity of construction workers in the wider impact area. The cumulative effect would therefore remain a **temporary major beneficial effect**.

Economic Productivity

4.4.73 The construction of the cumulative schemes will contribute to increasing the economic productivity of the construction sector in the wider impact area. Due to limited information on the construction employment generated by the cumulative schemes, it is not possible to estimate the increase in economic output.

4.4.74 The cumulative developments combined with the Proposed Development are assumed to have a positive impact of low magnitude on the medium sensitivity economy and construction industry. The cumulative effect would therefore become a **temporary minor beneficial effect**.

Occupation Phase

Operational Employment

4.4.75 Only two of the nine cumulative schemes had supporting information estimating the number of operational jobs created, amounting to 2,364 FTE jobs. The schemes are anticipated to deliver a minimum of 6,500 sqm of employment floorspace combined. They are also estimated to deliver a combined number of 5,327 homes, which would likely include homeworkers.

4.4.76 The cumulative developments combined with the Proposed Development are assumed to have a positive impact of medium magnitude on the high sensitivity workforce in the local and wider impact area. The cumulative effect would therefore become a **permanent major beneficial effect**.

Economic Productivity

4.4.77 The operational employment created by the cumulative schemes will contribute to increasing the economic productivity in the wider impact area. Due to limited information on the full employment generated by the cumulative schemes, it is not possible to estimate the increase in economic output.

4.4.78 The cumulative developments combined with the Proposed Development are assumed to have a positive impact of low magnitude on the medium sensitivity economy and industries in the wider impact area. The cumulative effect would therefore become a **permanent minor beneficial effect**.

Resident Expenditure

4.4.79 The cumulative schemes are estimated to deliver 5,327 new homes. Using the Proposed Development scheme to estimate average spending per household and average induced economic output, would result in averages of £10,620 per year per household in spending and £2,840 of GVA. The cumulative schemes would therefore generate around £56.6m of spending in local shops per annum, and £15.1m of GVA.

4.4.80 £15.1m in annual GVA would still represent only 0.5% of the annual GVA of the retail and food services sectors in the Wider Impact Area. The cumulative development combined with the Proposed Development would have a negligible impact on the low sensitivity retail or leisure businesses operating in the Wider Impact Area. The cumulative effect would remain a **permanent negligible effect**, which is not significant.

Local Authority Revenue

4.4.81 None of the supporting documents submitted with the planning applications of cumulative schemes provided details of likely public sector revenues.

4.4.82 Using an average annual council tax receipt of £2,137 per home (average of Band D and E in Swindon), the 5,327 homes cumulative schemes would generate up to £11.4m in council tax income. It is not possible to estimate likely income from business rates or New Homes Bonus.

4.4.83 Combined the cumulative developments and the Proposed Development would generate around £13.1m in Local Authority Revenue per annum, which represents 8% of the anticipated revenues from Council Tax and Business Rates for 2023/24. The cumulative impact would be a positive impact of medium magnitude on the low sensitivity local population who access services funded by SBC. The cumulative effect would remain a **permanent minor beneficial effect**, which is not significant.

Housing

4.4.84 Combined, the Proposed Development and the Cumulative schemes would deliver over 7,800 new homes. This represents over a third of the housing deliver target in the Emerging Local Plan (21,600). The cumulative development combined with the Proposed Development would have a positive impact of high magnitude on the high sensitivity local residents requiring affordable homes and private rented accommodation. The cumulative effect would remain a **permanent major beneficial effect**, which is significant.

Open Space and Nature

4.4.85 All cumulative schemes will be expected to deliver open space provision in line with policy, through on-site provision. Any shortfall in on-site provision will be expected to be mitigated or through off-site delivery. On this basis, cumulative developments are assumed to have a negligible impact. The cumulative effect would remain a **permanent minor beneficial effect**.

Active Travel

4.4.86 A high-level review of planning application documents has shown that most schemes will deliver pedestrian or cyclist infrastructure, will facilitate connectivity to the existing network, and will implement highway crossing and highway improvements. The extent to which these measures will enable active travel is uncertain. The cumulative effect is therefore estimated to remain a **permanent moderate beneficial impact**, which is significant.

4.5 Assessment Summary

4.5.1 In comparison to the Original ES, the ES Addendum has assessed the following changes in effects following the update of the baseline and assessment:

- The effect on construction workers in the wider impact area becomes a major beneficial significant effect instead of a minor beneficial insignificant effect;
- The effect of construction GVA changes to a negligible effect from a minor beneficial insignificant effect;
- The effect on operational workers in the wider impact area becomes a moderate beneficial significant effect instead of a minor beneficial insignificant effect;
- The effect of operational GVA remains negligible;
- The effect of resident spending on local retail and leisure businesses becomes negligible and is no longer moderate beneficial significant;
- The effect of Local Authority revenues remains a minor beneficial insignificant effect;

- The effect on of residents looking for housing remains a major beneficial significant effect;
- The effect on access to open space and nature remains a minor beneficial effect.
- The effect of adults engaging in active travel becomes a moderate beneficial significant effect, from a minor beneficial effect.

4.5.2 Therefore, no significant adverse effects have been identified. Several significant beneficial effect were identified, including:

- Significant beneficial effect on construction workers in the wider impact area;
- Significant beneficial effect on all workers in the wider impact area during operation;
- Significant beneficial effect on residents looking for housing;
- Significant beneficial effect on adults engaging in active travel.

5 Water Resources

5.1 Introduction

5.1.1 This chapter of the ES Addendum has been produced by Hydrock Consultants Limited and considers the environmental impacts of the proposals on water resources at the Site and in the wider area. The likely significant effects on groundwater quality resulting from potential ground contamination are assessed separately in **Chapter 6: Ground Conditions**.

5.1.2 This chapter provides a description of the methods used in the assessment, followed by an assessment of the relevant baseline conditions at the Site and it's hydrological setting. This is followed by an assessment of the likely potential effects of the Proposed Development during the construction works and once the Proposed Development is completed and operational. Mitigation measures have been identified where appropriate to avoid, reduce or offset any adverse effects identified and/or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

5.1.3 The baseline conditions of the Site have been derived from a desk study.

5.1.4 The key information sources for this chapter are the following reports, which are included in **Appendix 5.1**:

- Peter Brett Associates (now part of Stantec): Flood Risk Assessment. Lotmead Farm Villages. Ref: 27970/4003, dated 29/03/2019.
- Peter Brett Associates (now part of Stantec): Flood Risk Assessment Addendum. Lotmead Farm Villages. Ref: 27970/4003/TN001, dated 22/08/2019.
- Peter Brett Associates (now part of Stantec): Hydraulic Modelling Report. Lotmead Farm Villages. Ref: 27970/016, dated 03/03/2015.
- Hydrock. Response to Conditions 40, 41 and 42 – Updated Woodland Details. Lotmead Farm. Ref: 22006-HYD-XX-XX-FR-TN-0001 P04, dated 05/10/2022.
- Hydrock. Revised Addendum to Flood Risk Assessment. Lotmead Farm. Ref: 22006-HYD-P0-XX-RP-C-0006, dated 01/03/2023.

5.2 Assessment Criteria & Methodology

Previous Assessment

5.2.1 Outline Permission (Ref: S/OUT/19/0582) for the Proposed Development at the Site was granted in March 2021.

5.2.2 The Outline Permission was subject to Environmental Impact Assessment (EIA) which assessed the Proposed Development. The findings of the EIA were presented in an Environmental Statement (ES) (Turley. Environmental Statement. Lotmead Farm Villages. Ref: AINA3007, dated April 2019) that accompanied the outline application (the Original ES).

5.2.3 The Water Resources chapter was largely based on a desk study and established the baseline conditions from a desk-based Flood Risk Assessment, hydraulic modelling and the Environment Agency's (EA's) online mapping. The assessment concluded that the impacts of the Proposed Development were largely negligible for the construction and operational phases, and for those receptors where a moderate or significant impact was anticipated, this was reduced to negligible following the implementation of mitigation measures.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

5.2.4 Legislation and guidance documents used in the assessment of the Site are summarised in the following subsections.

Environmental Protection Act (1990)

5.2.5 This legislation makes provision for the improved control of pollution arising from certain industrial and other processes; to re-enact the provisions of the Control of Pollution Act 1974 relating to waste on land.

Environmental Improvement Plan (2023)

5.2.6 The Environmental Improvement Plan includes key policies to achieve clean and plentiful water including incentivising sustainable land use, modernising wastewater treatment, use of nature-based solutions, and increasing efficiency in new developments to promote a sustainable and resilient water supply.

Water Resources Act (1991)

5.2.7 The Water Resources Act regulates water resources, water quality and pollution, and flood defence. The Act provides the general structure for the management of water resources and sets out the standards expected for controlled waters and what is considered to be water pollution.

Flood and Water Management Act (2010)

5.2.8 This legislation takes forward some of the proposals in the three previous strategy documents published by the UK Government: Future Water; Making Space for Water; and the UK Government's response to the Sir Michael Pitt's Review of the Summer 2007 floods. The Act

also takes forward parts of the draft Flood and Water Management Bill[1] and takes into account pre-legislative scrutiny of the draft Bill by the Environment, Food and Rural Affairs Committee.

Land Drainage Act (1991)

5.2.9 The Land Drainage Act consolidates the enactments relating to internal drainage boards, and to the functions of such boards and of local authorities in relation to land drainage, with amendments to give effect to recommendations of the Law Commission.

Flood Risk Regulations (2009)

5.2.10 The Flood Risk Regulations transpose the EU Flood Directive (2007) into UK law, and set out a number of tasks which County Councils and other relevant councils are required to follow.

Anti-Pollution Works Regulations (1999)

5.2.11 These Regulations prescribe: the contents of anti-pollution works notices served under section 161A of the Water Resources Act 1991; the procedure to be followed in relation to appeals against such notices; and the compensation for rights of entry in connection with anti-pollution works paid under section 161B of the Water Resources Act 1991.

Water Act (2003)

5.2.12 The Water Act enables the Government to implement proposals set out in Water for Life Cm 8230 (the 'Water White Paper') published by the Government on 8 December 2011[2].

Water Industry Act (1991)

5.2.13 This Act consolidates enactments relating to the supply of water and the provision of sewerage services, with amendments to give effect to recommendations of the Law Commission.

Water Environment (Water Framework Directive) (England and Wales) Regulations (2017)

5.2.14 These Regulations revoke and replace the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 which transposed the Water Framework Directive 2000/60/EC into UK law. This serves the dual purpose of consolidating the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, which had been amended a number of times, and making aspects of the Regulations more detailed and transparent. This is in response to a Reasoned Opinion of the European Commission relating to transposition of the Water Framework Directive.

The National Planning Policy Framework (NPPF)[3]

5.2.15 The NPPF establishes the Government's planning policies for England and how they are expected to be applied. It also sets out the Government's requirements for the planning system and provides a framework within which local communities and councils can produce their own distinctive local and neighbourhood plans reflecting the needs and priorities of their communities.

[1] Defra and Welsh Assembly Government (April 2009) Draft Flood and Water Management Bill
[2] HM Government (2011) Water for Life
[3] Ministry of Housing, Communities and Local Government (July 2021) National Planning Policy Framework.

5.2.16 Section 14 of the NPPF requires local authorities to adopt proactive strategies to mitigate and adapt to climate change, taking into account flood risk, coastal change and water supply.

5.2.17 In relation to flood risk, the primary aim of the NPPF is to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and wherever possible, to direct development towards areas at least risk of flooding. In terms of flood risk, the NPPF prescribes 'Sequential and Exception Tests' to protect people and property from flooding which all Local Planning Authorities are expected to follow, with a view to achieving sustainable development.

5.2.18 Paragraph 159 of the NPPF states that, 'inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk'…, with paragraph 161 stating 'all plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property'.

5.2.19 Paragraph 167 states that 'when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment'.

5.2.20 Footnote 55 to the NPPF states that:

'A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.'

5.2.21 Section 15 of the NPPF sets out that development should not contribute to unacceptable levels of water pollution and should help to improve water quality in the local environment wherever possible.

5.2.22 Paragraph 174 of the NPPF states: *'Planning policies and decisions should contribute to and enhance the natural and local environment by: ….. (e) 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 or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;'…*

Flood Risk and Coastal Change Planning Practice Guidance[4]

5.2.23 The Planning Practice Guidance on Flood Risk and Coastal Change provides additional technical guidance on flood risk and coastal change to support the NPPF. In terms of the general planning approach to development and flood risk, the Planning Practice Guidance sets out the following main steps to be followed:

a) Assess flood risk;

[4] Ministry of Housing, Communities and Local Government (2022) Flood Risk and Coastal Change Planning Practice Guidance.

b) Avoid flood risk; and

c) Manage and mitigate flood risk.

5.2.24 Paragraph 2 of the Planning Practice Guidance states '*The National Planning Policy Framework sets out strict tests to protect people and property from flooding which all local planning authorities are expected to follow. Where these tests are not met, new development should not be allowed*.'

5.2.25 Paragraph 9 of Planning Practice Guidance notes that '*Where SuDS are required in accordance with paragraphs 167 and 169 of the National Planning Policy Framework applicants need to submit a sustainable drainage strategy containing proportionate information on the proposed sustainable drainage systems as part of their planning application'.*

5.2.26 The Planning Practice Guidance paragraph 23 states that *'The (Sequential) approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding'*.

5.2.27 The Planning Practice Guidance defines:

- Flood Zones, which are split into Zone 1 (low probability), Zone 2 (medium probability), Zone 3a (high probability) and Zone 3b (the 'functional floodplain') (paragraph 78);
- The flood risk vulnerability of different land uses (Annex 3); and
- The compatibility of different use classes within certain Flood Zones (paragraph 79).

5.2.28 The Planning Practice Guidance paragraph 55 states that "*Sustainable drainage systems (or SuDS) are designed to control surface water run off close to where it falls, combining a mixture of built and nature-based techniques to mimic natural drainage as closely as possible, and accounting for the predicted impacts of climate change*."

5.2.29 Paragraph 56 states "*where possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:*

a) into the ground (infiltration);

b) to a surface water body;

c) to a surface water sewer, highway drain, or another drainage system;

d) to a combined sewer."

5.2.30 Paragraph 58 states that the "*planning authority should be satisfied that the minimum standards of operation for the proposed sustainable drainage system are appropriate, and that there are clear maintenance and adoption arrangements in place for the lifetime of the development*."

5.2.31 The Planning Practice Guidance reiterates that Local Planning Authorities and developers should seek flood risk management opportunities (such as safeguarding land), and to reduce the causes and effects of flooding (such as through the use of SuDS in developments).

5.2.32 The Planning Practice Guidance notes that when considering a major development, as defined in the Town and Country Planning (Development Management Procedure) (England) Order5, SuDS should be provided in developments unless it is demonstrated to be inappropriate.

5.2.33 The Planning Practice Guidance defines Flood Zones, which are split into Zone 1 (low probability), Zone 2 (medium probability), Zone 3a (high probability) and Zone 3b (the 'functional floodplain'); the flood risk vulnerability of different land uses; and, the compatibility of different use classes within certain Flood Zones.

Flood Risk Assessments: Climate Change Allowances guidance (2022)

5.2.34 The Flood Risk Assessments: Climate Change Allowances was published by the Environment Agency to set out guidance for local planning authorities, developers and their agents on making allowances for the future effects of climate change on flood risk within Flood Risk Assessments, to help minimise vulnerability and provide resilience to flooding and coastal change.

Waste Supply, Wastewater and Water Quality Planning Practice Guidance (2019)

5.2.35 The 'Planning Practice Guidance on Water Supply, Wastewater and Water Quality' indicates that, subject to limited exemptions, water supply is unlikely to be a consideration for most planning applications as water supply is normally addressed through the Local Plan. With regards to water quality, paragraph 6 states plan-making may need to consider:

- *'how to help protect and enhance local surface water and groundwater in ways that allow new development to proceed and avoids costly assessment at the planning application stage. For example, can the plan steer potentially polluting development away from the most sensitive areas, particularly those in the vicinity of drinking water supplies (designated source protection zones or near surface water drinking water abstractions)*

- *where an assessment of the potential impacts on water bodies and protected areas under the Water Environment Regulations 2017 may be required, consider the type or location of new development*

- *whether measures to improve water quality, for example sustainable drainage schemes, can be used to address impacts on water quality in addition to mitigating flood risk.'*

Swindon Borough Local Plan (2015)

5.2.36 The Site lies within the proposed Swindon New Eastern Villages (NEV) strategic allocation (NC3) in the Swindon Borough Local Plan 2026 (Local Plan). The following local policies are relevant to the Proposed Development and water resources:

- Policy EN6: Flood Risk – this policy details the specific requirements for developments relating to flood risk, and sets the requirement for a site-specific flood risk assessment, in line with national planning policy.

- Policy IN2: Water Supply and Wastewater – this policy details specific requirements regarding water resource infrastructure. The policy identifies possible methods (new facilities, expansion of existing facilities etc.) for the provision of capacity to serve future development. Part d of the policy indicates that:

[5] Her Majesty's Stationery Office (2015) Town and Country Planning (Development Management Procedure) (England) Order.

- 'Where necessary, the council will seek improvement to water and/or sewerage/ wastewater treatment infrastructure related and appropriate to the development so the improvements are completed prior to occupation of the development.'

- Policy NC3: this policy promotes the New Eastern Villages for 6,000 residential units, 40 ha of employment land, retail, community and other complementary uses, with associated infrastructure, open space and landscaping. The policy includes provision for a new sewage treatment facility, if required, and requires that:

  'The risk of flooding from the development is minimised, both within the development and at existing neighbouring communities in accordance with Policy EN6.'

  New Eastern Villages Planning Obligations Supplementary Planning Document (2016)

5.2.37 The NEV Planning Obligations Supplementary Planning Document (SPD) identifies the infrastructure package required to serve the NEV, including utility provision, onsite flood mitigation works and SuDS.

Sustainable Drainage Systems (SuDS) Vision for New Eastern Villages Supplementary Planning Document (2017)

5.2.38 This SPD was developed to support masterplanning within the NEV development area, including the Lotmead Farm Villages Site. This SPD comprises a guide which sets out the objectives and principles for drainage infrastructure within the NEV development. It also provides information on local considerations, interdependencies, opportunities and constraints.

Swindon Borough Council Level 1 Strategic Flood Risk Assessment (2019)

5.2.39 Swindon Borough Council (SBC) commissioned a review and updates to their Level 1 Strategic Flood Risk Assessment in 2019. The updated SFRA provides an overview of flood risk within the borough to enable the application of the Sequential Test and to identify where the Exception Test may be required. It also sets out general recommendations for development within the borough with regard to flood risk.

Swindon Local Flood Risk Management Strategy (2014)

5.2.40 The Swindon Local Flood Risk Management Strategy (LFRMS) focuses on 'local flooding' such as flooding caused by surface water runoff, groundwater, and small ditches and streams. The aim of the LFRMS is to manage flood risk in a way that will benefit people, property and the environment.

Baseline Data Collection

5.2.41 A desktop study has been undertaken to establish the baseline hydrological conditions and other relevant surface water features within the vicinity of the Site to determine potential effects that the Proposed Development may have on water resources and flood risk.

5.2.42 Baseline data relating to the Site and its surroundings have been compiled using the following sources:

- Topographic survey carried out in October 2013 and updated in February 2022.

- Review of online EA data, existing hydraulic modelling, and British Geological Survey (BGS) mapping.

- Review of SBC's Strategic Flood Risk Assessment, including mapping.

- Consultation with the EA, SBC (in their role as Lead Local Flood Authority) and Thames Water.

Assessment Methodology

5.2.43 This section presents the general methodology used to identify the baseline conditions as well as assess the potential impacts and likely significant effects of the Proposed Development on water resources in the study area.

5.2.44 In order to comply with the NPPF and Local Policy, the following assessments were undertaken:

- Potential sources of flooding, including recorded data of previous flood events.
- Flood alleviation measures already in place, their state of maintenance and repair.
- Potential impacts of flooding to the site and identification of mitigation measures, as required.
- Hydraulic modelling to update the development proposals and refine the mitigation measures proposed as part of the development.
- Residual risks after implementation of necessary mitigation measures, allowing for the future impacts of climate change.
- Updates to the assessment of surface water runoff and foul flows from the site, and the identification of SuDS features as necessary to achieve the required discharge rates for the Proposed Development.

5.2.45 This updated assessment was based on the findings of the 2019 Flood Risk Assessment (FRA) carried out by Peter Brett Associates and hydraulic modelling carried out to support the 2019 FRA, along with further hydraulic modelling carried out by Hydrock to update the modelling in line with recent changes to the development proposals.

5.2.46 The methodology used for the identification and assessment of likely significant impacts on water resources is as follows:

- Assessment of the baseline conditions at the Site and within the study area, including existing water resources present, current levels of flood risk arising from fluvial, tidal, pluvial, groundwater and infrastructure failure flooding.
- Assessment of likely potential impacts arising from the Proposed Development on the baseline water resources in the study area.
- Identifying the significance of the predicted impacts on water resources in the study area.
- Identifying the likely mitigation measures required to alleviate the impacts identified.
- Determining the residual impacts following the implementation of identified mitigation measures and identifying the overall environmental impact of the Proposed Development.

Assessment of Significance

5.2.47 The following receptors have been identified as relevant for the assessment of environmental impacts, in line with the Original ES:

- Future occupants of the Proposed Development.
- Occupants of the existing commercial and residential buildings to be retained on-site.

- Occupants of the existing commercial and residential developments surrounding the Site.
- Offsite land.
- The River Cole.
- Other watercourses on and near the Site (Dorcan Stream, Liden Brook and the existing drainage ditches A and B).
- Secondary A Aquifers (superficial deposits and bedrock) underlying the Site.

5.2.48 The sensitivity of receptors has been assessed based on the criteria provided in Table 5.1 below. Please note that this chapter assesses the potential risks to surface and groundwater from a drainage perspective. Other risks to groundwater quality in underlying aquifers due to other aspects of the development are assessed in **Chapter 6: Ground Conditions.**

Table 5.1 Sensitivity of Receptors

Sensitivity	Description
Very High	Very high importance and rarity, international scale and very limited potential • Within Flood Zone 3b. • Large areas of site at high risk of Surface Water Flooding. • No capacity within discharge receiving environment (drainage system and/or waterbody), with previous internal property flooding recorded within the catchment as a result of drainage system / waterbody surcharging. • Water quality recorded as 'high' within discharge receiving waterbody, and/or areas classified of international ecological importance.
High	High importance and rarity, national scale, and limited potential for substitution, such as: • Within Flood Zone 3a. • Some high risk of Surface Water Flooding. • No capacity within discharge receiving environment (drainage system and/or waterbody). • Water quality recorded as 'good' within discharge receiving waterbody, and/or areas classified of national ecological importance.
Medium	Medium importance and rarity, regional scale, limited potential for substitution, such as: • Within Flood Zone 2. • Medium risk of Surface Water Flooding. • Limited capacity within discharge receiving environment (drainage system and/or waterbody). • Water quality recorded as 'moderate' within discharge receiving waterbody, and/or areas classified of regional ecological importance.
Low	Low importance and rarity, local scale, such as: • Within Flood Zone 1 and other sources of flood risk identified. • Low risk of Surface Water Flooding. • Unlimited capacity within discharge receiving environment (drainage system and/or waterbody).

	• Water quality recorded as 'poor' within discharge receiving waterbody, and/or areas classified of local ecological importance.

Assessment of Magnitude

5.2.49 The magnitude of an impact is usually split into four categories, Major, Moderate, Minor or Negligible. An impact can be either beneficial or adverse, with the nature of some impacts depending on the receptor so that a particular impact can result in a beneficial impact on one receptor and an adverse impact on another. The assessment of potential magnitude has been made in accordance with the criteria set out in Table 5.2 below.

Table 5.2 Magnitude of Impact

Magnitude	Description
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse). Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial). Such as significant change in: • Water quality of receiving watercourse. • NPPF Flood Risk Vulnerability Classification. • Flood risk (fluvial, tidal, surface water). • Water supply volume. • Foul drainage volume.
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of / damage to key characteristics, features or elements (Adverse). Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial). Such as moderate change in: • Water quality of receiving watercourse. • NPPF Flood Risk Vulnerability Classification. • Flood risk (fluvial, tidal, surface water). • Water supply volume. • Foul drainage volume.
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse). Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring (Beneficial). Such as small change in: • Water quality of receiving watercourse. • NPPF Flood Risk Vulnerability Classification. • Flood risk (fluvial, tidal, surface water). • Water supply volume.

	• Foul drainage volume.
Negligible	No discernible change or alteration to environmental conditions, whether adverse or beneficial. Such as no change or barely perceptible change in: • Water quality of receiving watercourse. • NPPF Flood Risk Vulnerability Classification. • Flood risk (fluvial, tidal, surface water). • Water supply volume. • Foul drainage volume.

5.2.50 For those effects which are found to have an impact, the spatial extent and duration will be quantified using the following descriptors:

- 'Temporary' impacts, those associated with the construction phase or a short period of time following completion of the project.
- 'Permanent' impacts, those associated with the completed development.
- 'Direct' impacts, those occurring through direct interaction of an activity with an environmental impact.
- 'Indirect' impacts, those that do not occur as a direct result of the project, or occur through complex pathways.

Significance of Impact

5.2.51 The significance of a potential impact is based on the combination of the magnitude of the impact and the likelihood of the impact occurring. A matrix is presented in Table 5.3, setting out how the overall significance of an impact is assessed.

Table 5.3 Significance of Impact

		Impact Magnitude			
		Major	**Moderate**	**Minor**	**Negligible**
Likelihood	**High**	Major significance	Major significance	Moderate significance	Negligible significance
	Medium	Major significance	Moderate significance	Minor significance	Negligible significance
	Low	Moderate significance	Minor significance	Minor significance	Negligible significance
	Negligible	Minor significance	Negligible significance	Negligible significance	Negligible significance

Geographical Scope

The geographical scope for this assessment would comprise the same scope as the Original ES. This includes the Site and its immediate surroundings, including nearby receptors such as the River Cole downstream of the site.

Temporal Scope

5.2.52 The temporal scope of this assessment will include the construction and operational phases of the development. In line with local and national planning policy, a maximum lifetime of 100 years will be assessed. This is in line with the Original ES.

5.3 Baseline Environment

5.3.1 The following sub-sections describe the findings of the baseline assessment, and have been used to determine the likely impacts of the Proposed Development.

Site Description

5.3.2 The Site currently comprises agricultural land with a small business park in the south-west.

5.3.3 The Site is approximately 165 hectares and is located on the eastern edge of Swindon to the north east of Wanborough Road and the A419.

5.3.4 The Site is predominantly flat, with very little change in topography across the Site. The Site elevation falls slightly over a long distance in a north-easterly direction from 93.5 metres Above Ordnance Datum (m AOD) in the southwest of the site to 88.5m OD in the northeast of the site.

Site History

5.3.5 The Site has remained mostly unchanged since the earliest mapping (1878), other than the construction and demolition of a few structures around the farm building area (the location of the present-day business park). Two large above-ground tanks (by the farm courtyard); and some cow sheds (slightly northeast of the centre of the site) were constructed at some point between 1969 and 1977.

5.3.6 An airfield was present around 1km north of the site between 1978 and 1992, by which point it was the Site of a vehicle manufacturer and test track.

5.3.7 Various large warehouses, factories and depots have been located within 1km of the site boundary since the late 1970s.

Geology

5.3.8 Based on a review of BGS online mapping, the bedrock geology at the Site comprises Ampthill and Kimmeridge Clay Formation, which is overlain by superficial deposits of Alluvium across the north and east of the Site. Localised Made Ground is likely to be present in some areas as a result of farming activities.

Hydrology and Hydrogeology

5.3.9 Several watercourses are present on-site, including the River Cole which flows along the Site's northern boundary, the Dorcan Stream which flows through the western portion of the Site, and the Liden Brook which forms the Site's eastern boundary. There are also two drainage ditches, designated as Ditch A and Ditch B, which flow through the east and centre of the site respectively.

5.3.10 During the investigation, groundwater seepage was observed in six of the trial pits at depths ranging from 1.3m below ground level (bgl) to 3.20m bgl.

5.3.11 The Alluvium at the Site serves as a Secondary A aquifer, while the Ampthill and Kimmeridge Clay Formation (undifferentiated) is unproductive in terms of groundwater.

5.3.12 The Site is located outside any Source Protection Zone, and there are no groundwater abstractions within a 1km radius of the Site.

Tidal and Fluvial Flood Risk

5.3.13 A review of the baseline information (such as the EA's Flood Map for Planning) has confirmed that the baseline tidal and fluvial flood risk remains as classified within the Original ES. The Site is located at a minimum elevation of approximately 88.5m AOD and is located a considerable distance from any tidal waterbodies, therefore, the risk of tidal flooding is 'negligible'.

5.3.14 Owing to the many watercourses flowing through the Site, areas surrounding the River Cole, the Dorcan Stream, the Liden Brook, and the two drainage ditches are located within Flood Zone 2 (between 0.1% and 1% annual probability of flooding) and Flood Zone 3 (greater than 1% annual probability of flooding). This results in considerable portions of the north, west, east and centre of the Site being at 'medium' to 'high' risk of flooding.

Pluvial Flood Risk

5.3.15 A review of the baseline information (such as the EA's Flood Risk from Surface Water mapping) has confirmed that the baseline pluvial flood risk remains as classified within the Original ES. Based on the EA's Flood Risk from Surface Water mapping, the Site is classified as being at 'very low' risk (less than 0.1% annual probability of flooding) to 'high' risk (greater than 3.3% annual probability) of pluvial flooding.

5.3.16 During the 'high' risk event, flooding is largely concentrated within narrow corridors surrounding the River Cole, Dorcan Stream, Liden Brook, and the two drainage ditches on-site. Flood depths are largely indicated to remain below 0.30m across the site, although some areas are predicted to reach depths of up to 0.90m, predominantly in topographically low areas or within/adjacent to existing drainage features.

5.3.17 During the 'medium' risk event (between 1% and 3.3% annual probability) flooding is shown to be more widespread across the site, with the flood extents largely aligning with the fluvial Flood Zones seen in the EA's Flood Map for Planning. Flooding is again shown to be largely centred around the existing watercourses with depths remaining below 0.30m in most areas, but up to 0.90m in places.

5.3.18 During the 'low' risk event (between 0.1% and 1% annual probability) flooding is again shown to be consistent with the Flood Zone 2 outline as depicted on the EA's Flood Map for Planning. Larger flood extents are predicted, spreading outwards from the narrow watercourse corridors with flood depths remaining below 0.30m in most areas but with increased areas having predicted depths of up to 0.90m.

Water Quality

5.3.19 The River Cole catchment (including the Dorcan Stream) is currently designated as having an overall status of 'Poor', with the most recent update in 2022 indicating a 'Poor' ecological status while the chemical status 'does not require assessment'.

5.3.20 The Liden Brook Catchment is assessed separately to the River Cole catchment and was designated as having an overall 'Poor' status in the most recent update in 2022. The ecological status was designated as 'Poor' while the chemical status 'does not require assessment'.

Water Supply and Sewer Capacity

5.3.21 The Site is currently largely undeveloped and therefore has little water supply and sewerage infrastructure. It is therefore concluded that there are no risks to water supply and sewer capacity in the baseline scenario.

5.4 Updated Assessment of Impacts and Effects

5.4.1 The baseline study has been used to assess any impacts that result from the Proposed Development during its construction and occupation. These are presented in Tables 5.4 and 5.5 respectively. This includes consideration of the likely impacts of the identified receptors on the Proposed Development and its eventual occupants, and any impacts of the Proposed development and the new use of land on these receptors.

5.4.2 The tables list all impacts, including those which have been assessed as being of negligible or minor significance. This is to demonstrate that they have been considered and discounted in terms of the EIA, although certain actions will be embedded in the design of the Proposed Development and these are mentioned in the tables. Impacts deemed to be of moderate significance are considered further as relevant to the EIA process.

5.4.3 The significance of the impacts listed in the table are considered to be the significance of the impacts including any embedded mitigation.

5.4.4 A number of embedded mitigation measures, including the adoption of best working practices, will provide inherent mitigation of temporary adverse effects on water resources during the construction phase and occupation phases.

5.4.5 Adoption of best working practices and measures to protect water resource would include those measures set out in the EAs Guidance for Pollution Prevention (GPPs), such as:

- GPP1 (Understanding your environmental responsibilities - good environmental practices).
- GPP6 (Working at construction and demolition sites).
- GPP5 (Works and maintenance in or near water) to maintain adequate stand-off distances for plant, stored materials, and excavations from existing watercourses and water bodies.
- GPP4 (Treatment and disposal of wastewater where there is no connection to the public foul sewer) to ensure effective management and disposal of effluent.
- Bunding of all above ground fuel and chemical storage, safe storage and disposal of materials in line with GPP2, GPP8 and GPP26.
- Pollution incident response planning, and an emergency spill response kit would be maintained on-site during construction, to limit the consequence of a pollution event in line with GPP21 and GPP22.
- Effective silt management and suppression of dust and air-borne particulates.
- Vehicle management systems, signage and road markings would be put in place wherever possible during construction and operation to reduce the potential conflicts between vehicles and thereby reduce the risk of collision.
- Speed limit enforcement on Site to reduce the likelihood and significance of any collisions.

5.4.6 As part of the design process, a site-specific Construction Environmental Management Plan (CEMP) would be developed to adequately manage and minimise environmental impacts resulting from the construction of the proposed development. The following mitigation measures would be included within the CEMP:

- Works within the watercourses or ditches to be carried out during periods of low flows and works to be carried out in the dry where possible.

- Bypass measures or overpumping arrangements would be installed to maintain flows where required.

- The interceptor ditch would be constructed during dry periods to allow bank vegetation to establish prior to the ditch becoming 'active'.

- Temporary silt barriers would be installed for any watercourse or ditch crossings to minimise sediment mobilisation whilst allowing flows to pass downstream.

- Temporary measures to control surface water runoff quality and quantity, such as:

  - 8m clearance from any materials stores to all ditches and waterbodies

  - Oils, chemicals and other potentially contaminative construction materials to be stored in areas designed to prevent accidental spillages

  - Dust suppression and management of water-borne silt

  - Temporary restriction of surface water runoff rates and attenuation to store runoff.

5.4.7 Due to the site being partially located in Flood Zones 2 and 3, a sequential approach to land use management has been adopted in spatially planning the proposed development, whereby all development will be located in areas outside of the future design flood extent (i.e., the 1 in 100 year plus climate change flood extent, as set out in the EA's updated guidance on climate change allowances for FRAs).

5.4.8 The Liden Brook floodplain restoration scheme has also been assessed as embedded mitigation as this would form a core part of the development and provide mitigation required to facilitate development within the centre of the site. The proposed floodplain restoration scheme includes the provision of an interceptor ditch and a raised bund to collect and divert overland flows form the Liden Brook into a proposed new flood corridor which runs adjacent to the existing Liden Brook channel. To the west of the interceptor ditch and flood corridor is another raised bund to stop any further overland flow routes that may be caused during a flood event travelling west and further into the site. The flood corridor and bund ruin adjacent to the Liden Brook channel for approximately 1km before allowing flow to re-enter the channel and continue to flow north and join the River Cole.

5.4.9 The scheme also includes areas of bank lowering to allow flow from the Liden Brook onto the flood corridor in smaller return period events.

Construction Phase Impacts and Effects

5.4.10 Table 5.4 below outlines the potential significant impacts on water resources during the construction phase.

Table 5.4 Potential Impacts on Water Resources (Construction Phase)

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Fluvial Flooding	River Cole (Medium Sensitivity)	Potential increase in flooding	Medium	Minor	Negligible (due to embedded mitigation)	Negligible	Due to the changes in land cover during the construction phase, there is potential for an increase in runoff from the Site entering the River Cole and causing an increase in flood flows in the watercourse in the absence of mitigation. However, as the CEMP (which will include contaminative materials stores, dust suppression and management of water-bourne silt, temporary restriction of runoff rates and attenuation to store runoff) is considered embedded mitigation, the likely impact of the Proposed Development would be negligible.
	Other Watercourses (Medium Sensitivity)	Potential increase in flooding	Medium	Minor	Negligible (due to embedded mitigation)	Negligible	Due to the changes in land cover during the construction phase, there is potential for an increase in runoff from the Site entering the other watercourses and causing an increase in flood flows in the absence of mitigation. However, as the CEMP (which will include contaminative materials stores, dust

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
							suppression and management of water-bourne silt, temporary restriction of runoff rates and attenuation to store runoff) is considered embedded mitigation, the likely impact of the Proposed Development would be negligible.
	Occupants On-site (High Sensitivity)	Potential risk to safety of occupants	Medium	Moderate/ Minor	Moderate/ Minor	Moderate / Minor Adverse Direct Temporary	Workers on-site would be considered a high sensitivity receptor due to their vulnerability to the risks of flooding. Proposed Development is largely limited to areas outside Flood Zones 2 and 3, aside from the floodplain restoration scheme and the proposed river crossings. These works should be carried out during periods of low flows to prevent higher risks to the occupants on-site, and would be dealt with via a construction risk assessment and method statement.
Pluvial Flooding	Occupants On-site (High Sensitivity)	Potential risk to safety of occupants	Medium	Minor	Negligible (due to embedded mitigation)	Negligible	Workers on-site would be considered a high sensitivity receptor due to their vulnerability to the risks of flooding. The proposed construction works would have the potential to alter existing pluvial flood regimes during periods of heavy rainfall. In the absence of mitigation, i.e., the CEMP, the risk of pluvial flooding could increase due to an

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
							increase in surface water discharge rates. However, the CEMP is considered embedded mitigation and will include temporary measures to control surface water runoff from the Site, such as the provision of adequate drainage infrastructure and SuDS.
Water Quality	River Cole (High Sensitivity)	Potential deterioration in water quality	High/ Medium	Major/ Moderate	Negligible (due to embedded mitigation)	Negligible	The River Cole is located in a surface water safeguard zone, as designated on the EA's Drinking Water Safeguard Zones map. The proposed construction works could give rise to temporary deterioration in water quality within this watercourse. However, the CEMP will include temporary mitigation measures to manage water quality, and is considered embedded mitigation.
	Other Watercourses (High Sensitivity)	Potential deterioration in water quality	High/ Medium	Major/ Moderate	Negligible (due to embedded mitigation)	Negligible	The other watercourses on-site are located in a surface water safeguard zone, as designated on the EA's Drinking Water Safeguard Zones map. The proposed construction works could give rise to temporary deterioration in water quality within these watercourses. However, the CEMP will include temporary mitigation measures to manage water quality, and is considered embedded mitigation.

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Water Supply and Sewer Capacity	Occupants of existing developments on-site (High Sensitivity)	Additional demand on water supply and sewer capacity	Low	Negligible	Negligible	Negligible	The occupants of the existing development on-site are considered a high sensitivity receptor. The construction process would create additional demand for water supply and sewer capacity for construction effluent and runoff. The Phase 1 and 2 WCS have identified that there is sufficient water supply capacity and the Local Plan and SPD indicate that sewer capacity issues will be addressed by Thames Water in a timely manner.
	Occupants of existing developments off-site (High Sensitivity)	Additional demand on water supply and sewer capacity	Low	Negligible	Negligible	Negligible	The occupants of the existing development off-site are considered a high sensitivity receptor. The construction process would create additional demand for water supply and sewer capacity for construction effluent and runoff. The Phase 1 and 2 WCS have identified that there is sufficient water supply capacity and the Local Plan and SPD indicate that sewer capacity issues will be addressed by Thames Water in a timely manner.

Occupation Phase Impacts and Effects

5.4.11 Table 5.5 below outlines the potential significant impacts on water resources during the construction phase.

Table 5.5 Potential Impacts on Water Resources (Operational Phase)

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Fluvial Flooding	River Cole (Medium Sensitivity)	Potential increase in flooding	Medium	Moderate/ Minor	Moderate/ Minor	Moderate/ Minor Beneficial Direct Permanent	The completed development, including the floodplain restoration scheme, could potentially give rise to changes in the fluvial flood risk from the River Cole. Through the implementation of the floodplain restoration scheme, and the location of all other development outside the floodplain, there would be a minor/moderate beneficial impact on flood risk in the area.
	Other Watercourses (Medium Sensitivity)	Potential increase in flooding	Medium	Moderate	Moderate/ Minor	Moderate/ Minor Beneficial Direct Permanent	The completed development, including the floodplain restoration scheme, could potentially give rise to changes in the fluvial flood risk from the other watercourses on-site. The floodplain restoration scheme has reconnected the Liden Brook floodplain with its channel and has provided a wider corridor along the Brook to enable additional storage of flood water during high flow events. Therefore, there would be a limited beneficial impact on flood risk in the area.

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
	Occupants On-site (High Sensitivity)	Potential risk to safety of occupants	Medium	Moderate/ Minor	Moderate/ Minor	Moderate/ Minor Beneficial Direct Permanent	The completed development, including the floodplain restoration scheme, could potentially give rise to changes in the flood risk to occupants on-site in absence of mitigation. However, as discussed in paragraphs 5.4.7 to 5.4.9 above, all development on-site would be located within Flood Zone 1 due to the beneficial impacts of the floodplain restoration scheme.
	Offsite Land (Medium Sensitivity)	Potential increase in flooding	Medium	Minor/ Negligible	Minor/ Negligible	Minor/ Negligible Beneficial Direct Permanent	The completed development, including the floodplain restoration scheme, could potentially give rise to changes in flood risk to offsite land in absence of mitigation. Through the implementation of the floodplain restoration scheme and the location of other proposed development outside the flood extents on-site, there would be limited beneficial impact to offsite land.

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
	Occupants Off-site (High Sensitivity)	Potential risk to safety of occupants	Medium	Negligible	Negligible	Negligible	The completed development, including the floodplain restoration scheme, could potentially give rise to changes in flood risk to offsite occupants in absence of mitigation. Through the implementation of the floodplain restoration scheme and the location of other proposed development outside the flood extents on-site, there would be no impact on flood risk to occupants off-site.
Pluvial Flooding	Occupants On-site (High Sensitivity)	Potential risk to safety of occupants	Medium	Moderate/ Minor	Moderate/ Minor	Moderate/ Minor Beneficial Direct Permanent	The completed development, including the floodplain restoration scheme, could potentially give rise to changes in the overland pluvial flow routes on-site. The proposed SuDS on-site would capture and store runoff in appropriate locations and the floodplain restoration scheme would direct overland flows into more suitable locations adjacent to the watercourse.
	Occupants Off-site (High Sensitivity)	Potential risk to safety of occupants	Medium	Moderate/ Minor	Negligible (due to mitigation measures)	Negligible	The completed development, including the floodplain restoration scheme, could potentially give rise to changes in the overland pluvial flow routes on-site. There would be no increase in pluvial flows off-site due to the implementation of SuDS across the development.

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Water Quality	River Cole (High Sensitivity)	Potential deterioration in water quality	High/ Medium	Major/ Moderate	Negligible (due to mitigation measures)	Negligible	The River Cole is located in a surface water safeguard zone, as designated on the EA's Drinking Water Safeguard Zones map. Due to the implementation of SuDS across the Site, treatment trains and pollution control measures would be implemented, which would mitigate against the risks to water quality in the River Cole.
	Other Watercourses (High Sensitivity)	Potential deterioration in water quality	High/ Medium	Major/ Moderate	Negligible (due to mitigation measures)	Negligible	The other watercourses are located in a surface water safeguard zone, as designated on the EA's Drinking Water Safeguard Zones map. Due to the implementation of SuDS across the Site, treatment trains and pollution control measures would be implemented, which would mitigate against the risks to water quality in the watercourses present on-site.

Source	Receptor	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Water Supply and Sewer Capacity	Occupants of existing developments on-site (High Sensitivity)	Additional demand on water supply and sewer capacity	Low	Negligible	Negligible	Negligible	The occupants of the existing on-site developments are considered a high sensitivity receptor. The complete development would increase the demand for water supply and for sewer capacity for construction effluent and runoff. The Phase 1 and 2 WCS have identified that there is sufficient water supply capacity and the Local Plan and SPD indicate that sewer capacity issues will be addressed by Thames Water in a timely manner.
	Occupants of existing developments off-site (High Sensitivity)	Additional demand on water supply and sewer capacity	Low	Negligible	Negligible	Negligible	The occupants of existing off-site developments are considered a high sensitivity receptor. The completed development would increase the demand for water supply and for sewer capacity for effluent and runoff from the occupied development. The Phase 1 and 2 WCS have identified that there is sufficient water supply capacity and the Local Plan and SPD indicate that sewer capacity issues will be addressed by Thames Water in a timely manner.

Cumulative Impacts

5.4.12 Schedule 4(5)(e) of the 2017 EIA Regulations Requires an assessment on the likely significant impacts of the development on the environment resulting from the "accumulation of impacts 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".

5.4.13 With regard to Water Resources, a review of the cumulative impacts associated with proposed developments within the immediate vicinity of the Site has been undertaken. Any cumulative sites beyond the immediate vicinity of the Site have been discounted due to their distance from the Site and the likely localised nature of any cumulative impacts on Water Resources.

Table 5.6 Cumulative Projects

Site Address	Application Reference	Description of development	Distance from Site (m)
Land East Of The A419.	S/19/0703	The construction of a new road, to link the A419 Commonhead Roundabout to the proposed New Eastern Villages (NEV) development.	Adjacent
Great Stall East - Land South Of The A420 South Marston Swindon	S/OUT/17/1990	Outline planning application for up to 1,550 homes; education provision including a 10 form entry secondary school and a 3 form entry primary school with attendant sports pitches; a sports hub and open space; a park and ride; a local centre up to 1,000sqm including classes A1, A2, A3, A4, A5 and D1 uses; public open space/green infrastructure; new informal and formal recreation spaces; and the formation of a new permanent access from the A420	100m
Land At Symmetry Park Shrivenham Road South Marston SN3 4RS	S/OUT/14/0253	40ha of employment development including B1b (research and development/light industrial), B1c (light industrial), B2 (general industrial) and B8 (warehouse and distribution), new landscaping and junction to A420.	180m
Redlands Eastern Villages Swindon Swindon	S/OUT/16/0021	Outline Planning Application for the erection of up to 370no. dwellings, a local convenience store/community facility, primary school, open space, landscaping, access points to and from Wanborough Road and northern site boundary and eastern boundaries and associated infrastructure.	400m
Land North Of A420 Eastern Villages Swindon (South Marston / Rowborough)	S/OUT/13/1555	Up to 2,380 dwellings together with a mixed-use local centre and area (Including A1 retail up to 1,500 sq.m metres, services (A2), restaurants, pubs and takeaways (A3, A4, A5), business uses (B1) up to 1,000 sq.m metres)	450m

5.4.14 It is anticipated that the proposed developments included in this assessment of cumulative effects will have undertaken a Flood Risk Assessment and developed a drainage strategy to address any risks associated with the developments.

5.4.15 It is also anticipated that good working practices will be adopted during the construction of these projects.

Construction Phase Cumulative Impacts

5.4.16 Local and national planning policy requires that any off-site impacts on flood risk and water quality as a result of development are to be mitigated. It is therefore considered that all proposed developments within the vicinity of the Site would provide on-site mitigation for any potential adverse impacts resulting from these developments during construction.

5.4.17 The cumulative developments could potentially give rise to impacts on water supply and sewer capacity, however, it is noted that the Phase 1 and 2 WCS have identified that there is sufficient water supply capacity and the Local Plan and SPD indicate that sewer capacity issues will be addressed by Thames Water in a timely manner.

5.4.18 As such, cumulative effects relating to flood risk, water quality, water supply and sewer capacity resulting from the construction phase of the cumulative schemes, or combinations thereof, would remain negligible.

Occupation Phase Cumulative Impacts

5.4.19 Similar to the construction phase impacts, local and national policy requires off-site impacts on flood risk and water quality to be mitigated on the development site. It is therefore considered that the cumulative impacts of the Proposed Development and the cumulative schemes would be negligible in occupation.

5.4.20 The cumulative developments could potentially give rise to impacts on water supply and sewer capacity. However, it is noted that the Phase 1 and 2 WCS have identified that there is sufficient water supply capacity and the Local Plan and SPD indicate that sewer capacity issues will be addressed by Thames Water in a timely manner. On this basis, the cumulative effects relating to water supply and sewer capacity are anticipated to be negligible.

5.5 Assessment Summary

5.5.1 The existing Site currently comprises predominantly agricultural land with a small business park located in the southwest. The Site is approximately 165 hectares in size and is located on the eastern edge of Swindon, to the northeast of Wanborough Road and the A419. The Site is located largely within Flood Zone 1 (land defined as having less than 0.1% annual probability of flooding) denoting a 'low' risk of flooding. However, owing to the many watercourses flowing through the site, some areas surrounding the watercourses are located within Flood Zone 2 (between 0.1% and 1% annual probability) and Flood Zone 3 (greater than 1% annual probability), denoting a 'medium' and 'high' risk of flooding respectively.

5.5.2 Environment Agency mapping shows that the Site is at 'very low' to 'high' risk of flooding from surface water in various areas, with the 'medium' and 'high' risk flood extents closely aligning with the Flood Zones 2 and 3 extents. The watercourses on-site are currently classified as having a 'poor' ecological status.

5.5.3 The effects of the Proposed Development upon Water Resources have been informed by a review of various information sources, including a previous Flood Risk Assessment and other reports prepared for the Outline Planning permission, along with updated hydraulic modelling and the results of a Site Investigation for ground conditions and contamination. Based on this information, the effects were qualitatively assessed using professional judgement.

5.5.4 During the construction Phase, changes in conditions at the Site have the potential to result in temporary adverse effects on fluvial flooding, pluvial flooding, water quality, and water supply and sewer capacity. However, measures would be put in place to mitigate these impacts in line with local and national planning policy, and industry standards. This would largely be dealt with via a Construction Environmental Management Plan, which would set out the measures necessary to adequately manage and minimise environmental impacts resulting from the Proposed Development. The residual effects during the construction phase would therefore be negligible for all receptors.

5.5.5 The occupation phase of the Proposed Development would include the fully built-out development, including the floodplain restoration scheme, which could give rise to impacts on the existing watercourses on-site and flood risk. Through the careful design of these elements, and mitigation measures proposed, the potential effects would be managed so as to not increase the risk of flooding elsewhere. The floodplain restoration scheme would re-connect the floodplain of the Liden Brook with its channel, and provide a wider corridor along the Brook to enable additional storage of flood water during high flow events, thereby providing a beneficial impact on flood risk in the area.

5.5.6 A surface water drainage strategy has been set out, which includes measures to control the rate at which surface water runoff leaves the Site and to provide treatment of runoff, thus ensuring that flood risk is not increased and the quality of surface water runoff discharged off-site is acceptable.

5.5.7 The development would introduce new land uses on a previously undeveloped site, which would increase the foul water discharge and demand on water supply. The Phase 1 and 2 Water Cycle Studies have confirmed that there is sufficient capacity in the surrounding water supply network, and the Local Plan and SPD indicate that any sewer capacity issues will be addressed by Thames Water in a timely manner.

5.5.8 Therefore, the residual effects for the occupied development would be negligible, aside from the impacts on fluvial flood risk which would see a minor beneficial impact.

6 Ground Conditions

6.1 Introduction

6.1.1 This chapter of the ES Addendum has been produced by Hydrock Consultants Limited.

6.1.2 This chapter considers the environmental impacts of the proposals in terms of existing ground conditions at the Site.

6.1.3 The assessment involves consideration in terms of the naturally occurring geological conditions and any man-made deposits, known as Made Ground. Consideration is given to the physical nature of the rocks, soils and Made Ground, together with information on existing chemical contamination and geotechnical features arising from the former and existing uses of the Site. The hydro-geological regime, comprising the groundwater in any permeable deposits (rock, soil or Made Ground) beneath the Site, and the hydrological regime (surface water), are described in so much as they interact with land contamination.

6.1.4 The condition of the Site has been derived from a desk study, a walk-over survey and intrusive ground investigations.

6.1.5 The key information sources for this chapter are the following reports which are included in **Appendix 6.1** and **6.2**:

- **Appendix 6.1** - Hydrock. Desk Study and Ground Investigation Report. Lotmead Farm. Ref: 20786-HYD-XX-XX-RP-GE-1001, dated 09/12/21; and
- **Appendix 6.2** - Hydrock. Technical Note Phase 1 New Boundary. Phase 1 Lotmead Farm, Swindon. Ref: 20786-HYD-XX-XX-TN-GE-1002, dated 17/08/22.

6.1.6 The baseline conditions were surveyed and reported in September 2021 and August 2022 and the findings are considered to be representative of the Site.

6.1.7 The assessment of environmental impacts is divided into two phases: the Construction Phase (short to medium term), which includes site preparation and construction; and the Occupation Phase (long term), which starts as soon as construction is complete and the development starts being used as intended.

6.2 Assessment Criteria & Methodology

Previous Assessment

6.2.1 Outline Permission (ref. S/OUT/19/0582) was granted for the development of the Site in March 2021.

6.2.2 The Outline Permission was subject to Environmental Impact Assessment (EIA) which assessed the Proposed Development. The findings of the EIA were presented in an Environmental Statement (ES) (Turley. Environmental Statement. Lotmead Farm Villages. Ref: AINA3007, dated April 2019) that accompanied the outline application (the Original ES).

6.2.3 The Ground Conditions chapter was solely based on desk study information at the time and highlighted potential risks that may occur and as a result the main conclusion for all the phases was that appropriate ground investigation is undertaken and any ground improvement, remediation/mitigation, together with appropriate design and construction techniques, is implemented.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

6.2.4 Legislation and guidance documents used in the assessment of the Site are summarised in the following subsections.

Building Act 1984

6.2.5 The Building Act of 1984, along with the Building Regulations of 2010, outline the specific tasks that necessitate approval under building regulations. These regulations also detail the procedures for obtaining such approval and establish the technical criteria that must be met in order to meet the standards for construction projects.

6.2.6 The Building Regulations mandate the implementation of reasonable measures to prevent health and safety hazards arising from contaminants present in the ground that will be in contact with buildings and related structures.

The Town and Country Planning Act 1990.

6.2.7 Ensures that a development is suitable for use and there are no unacceptable risks taking into account the use of the land, including on unstable and contaminated land. This includes the physical integrity of the Proposed Development, usually regulated by the Building Control Officer, and the physical and chemical integrity of the Site, usually regulated by the Environmental Health Officer (but in conjunction with The Environment Agency in the case of Special Sites, involving particular classes of contamination, or where the pollution of Controlled Waters is an issue).

Environmental Protection Act (EPA 1990) Part IIA

6.2.8 Part IIA EPA 1990 requires Local Authorities to identify land that is posing unacceptable risks to human health or the environment. It provides for the identification of such land as ‘contaminated land’ and sets out the framework under which remediation can be secured and the allocation of liability for remediation costs between appropriate persons. For land to be identified as ‘contaminated land’ under Part IIA there must be a significant pollutant linkage comprising the contaminated substance, a receptor capable of sustaining harm of the severity defined in the Statutory Guidance (see below) and a pathway to connect the source and receptor. Local Authorities are required to maintain a register of sites that are identified as ‘contaminated land’ under the EPA 1990. The Part IIA regime

is not designed to be used to facilitate remediation of land in connection with the development of land under the Town and Country Planning Act 1990.

Water Regulations Act 1991 (as amended by the Anti-Pollution Works Regulations 1999)

6.2.9 The Environment Agency has the power to issue a works notice requiring a person on whom it is served to carry out specified works or operations where any poisonous, noxious or polluting matter or any waste matter is in or is likely to enter any controlled waters, including coastal waters, inland fresh waters and ground waters.

Pollution Prevention and Control Act 1999

6.2.10 The 1999 Act provides for a unified system of environmental permitting. Within this the Environmental Permitting (England and Wales) Regulations 2010 (as amended) include within the environmental permitting regime water discharge activities and groundwater activities. An environmental permit is required for specified water discharge activities and groundwater activities. Certain water discharge and groundwater activities may benefit from an exemption from the environmental permitting regime, provided that they fulfil specified conditions.

Control of Pollution (oil storage) (England) Regulations 2001

6.2.11 The Regulations specify requirements that must be met in relation to the storage of oil in any container with a storage capacity of more than 200 litres that is situated wholly or partly above ground, outside a building. Under the Regulations, any container in which oil is stored must be of sufficient strength and structural integrity so as not to leak or burst in ordinary use and must be within a secondary containment system. Failure to comply with the Regulations is a criminal offence.

The Environment Agency's Approach to Groundwater Protection (February 2018 (V1.2))

6.2.12 The document supersedes Groundwater Protection: Principles and Practice (GP3) and contains position statements which provide information about the EA’s approach to managing and protecting groundwater.

Construction Code of Practice for the Sustainable Use of Soils on Construction Sites 2009, (updated 2018)

6.2.13 The Code of Practice has been developed by Department for Environment, Food and Rural Affairs (Defra) in order to assist anyone operating within the construction sector to sustainably manage soil resources.

Land Contamination Risk Management (LCRM) (last updated 2021), Environment Agency

6.2.14 LCRM (2021) provides a technical, phased approach to managing risk arising from land affected by contamination.

Pollution Prevention Guidance notes (PPGs), Environment Agency (revoked but still relevant)

6.2.15 The PPGs have been developed by the Environment Agency in order to assist businesses to comply with their legal requirements. The PPGs provide legal and good practice advice on a number of topics, including:

- maintenance and works undertaken in or near water;
- safe dewatering of underground ducts and chambers;
- storage of oil above ground;

- waste management; and
- construction and demolition activities.

National Planning Policy

6.2.16 The National Planning Policy Framework (NPPF) (updated July 2021) sets out the Government's planning policy to England and how these are expected to be applied. NPPF advice relevant to the assessment of impacts on geology, soils and land quality is summarised below.

6.2.17 Paragraph 174 (e) & (f) states that 'Planning policies and decisions should contribute to and enhance the natural and local environment by':

- (e) '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 or land instability.'; and
- (f) 'Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'

6.2.18 Paragraph 183 (a), (b) & (c) states that 'Planning policies and decisions should ensure that':

- (a) 'a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation)';
- (b) 'after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act (1990); and
- (c) 'adequate site investigation information, prepared by a competent person, is available to inform these assessments.'

6.2.19 Paragraph 184 states that 'Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests within the developer and /or landowner.'

Swindon Borough Local Plan 2026

6.2.20 The Local Plan for Swindon Borough Council is the Swindon Borough Local Plan 2026, adopted 26 March 2015 (ISBN 978-0-9554998-0-7).

6.2.21 The following policies are considered relevant and are discussed further below:

- Theme 7: Natural and Built Environment EN7: Pollution;
- Theme 7: Natural and Built Environment EN8: Unstable Land; and
- Theme 7: Natural and Built Environment EN9: Contaminated Land

6.2.22 **Policy EN7 'Pollution'** is relevant to the development in relation to ground contamination:

- a. Development that is likely to lead to emissions of pollutants such as noise, light, vibration, smell, fumes, smoke, soot, ash, dust, grit or toxic substances that may adversely affect existing development and vulnerable wildlife habitats, shall only be permitted where such emissions are controlled to a point where there is no significant loss of amenity for existing land uses, or habitats.

- b. Similarly; where development would be adversely affected by the emission of pollutants from an existing use; the proposal will only be permitted where the users of the future development are protected from loss of amenity from those emissions in accord with Policy DE1.

6.2.23 The policy is aimed at all forms of development including residential, retail, industrial and commercial premises, ensuring the protection of the environment from potentially polluting neighbours, and the protection of users of any Proposed Development from existing pollution within the environment. In most cases this may entail controls placed on incoming development to ensure that the amenities of existing occupiers in the adjoining area are not adversely affected from potentially polluting neighbours and that future occupiers of the development itself enjoy good environmental quality.

6.2.24 **Policy EN8 'Unstable Land'** is relevant to the Proposed Development in relation to ground stability:

6.2.25 (a) Development of land that is either known to be unstable, or is strongly suspected of instability, shall only be permitted when:

- an evaluation has been submitted of the level and precise nature of any instability; and
- there are no significant adverse impacts on adjacent sites; and
- the extent of remedial measure required to achieve a level of land stability suitable for the purpose use, capable of supporting future development loads has been identified.

6.2.26 (b) Where planning permission is granted, conditions may be imposed requiring the execution of any necessary remedial works.

6.2.27 (c) Where a site is affected by land stability issues responsibility for securing a safe development rests with the developer and/or landowner, who will be required to carry out the above.

6.2.28 This policy aims to ensure that where development occurs it can accommodate the specific physical conditions of the land. Development that does not take account of unstable ground conditions can potentially suffer severe structural problems in later life. The situation can result in rebuilding and high financial costs to occupiers/owners.

6.2.29 **Policy EN9 'Contaminated Land'** is relevant to the development in relation to ground contamination:

6.2.30 (a) Development of land that is either contaminated, or is strongly suspected of being contaminated, shall only be permitted when:

- an evaluation has been submitted of the level and precise nature of any contamination and need for removal or treatment; and
- the potential of existing contaminants to pollute both surface water and ground water, both during and after construction has been established; and
- the decontamination measures required to achieve a level of land quality suitable for the proposed end use have been identified; and
- measures are taken to ensure that migrating gas is safely dealt with where development is proposed on land adjacent to an uncontrolled 'gassing' landfill site.

6.2.31 (b) Where planning permission is granted, conditions may be imposed requiring the execution of any necessary remedial works.

6.2.32 (c) Where a site is affected by land contamination responsibility for securing a safe development rests with the developer and/or landowner, who will be required to carry out the above.

6.2.33 It is the responsibility of the prospective developer to investigate the existence and extent of any contamination and to assess the viability of development in economic terms.

6.2.34 In considering proposals for development, the Local Planning Authority should take account of the risks of and from land contamination and how these can be managed or reduced. As a consequence, the Local Planning Authority may, when granting planning permission on a site which may potentially be contaminated impose:

- conditions requiring the developer to first investigate and assess the extent of contamination; and
- where necessary, require that remedial action be taken to neutralise the hazard prior to development commencing.

Baseline Data Collection

6.2.35 The study area for the Ground Conditions assessment is confined to the Site area shown on the Exploratory Hole Location Plan from the Hydrock Desk Study and Ground Investigation Report included in Appendix 6.1 (Drawing 20786-HYD-XX-XX-DR-GE-1002-P10 dated 15/10/21) and the Exploratory Hole Location Plan from the Hydrock Technical Note also included in Appendix 6.1 (Drawing 20786-HYD-XX-XX-DR-GE-1013-P2, dated 17/08/22).

6.2.36 The Illustrative Master Plan Drawing (Planit Intelligent Environments LLP. PL1461.1 Lotmead Villages East Swindon. Ref: PL1461.1-PLA-00-XX-DR-U-002-S4, dated 17/01/19) shows the approximate site boundary of the Proposed Development which is adequately covered by the baseline surveys.

Surveys

6.2.37 The baseline for the existing soil and groundwater conditions are assessed by site investigation (desk study, walk-over survey and preliminary ground investigation works) comprising:

- A Desk Study and site walkover;
- A ground investigation for the majority of the Site took place between 31 August and 23 September 2021 (Ref: 20786-HYD-XX-XX-RP-GE-1001, dated 09/12/21) and comprised:
    - 4 cable percussive boreholes to a maximum depth of 10m bgl;
    - 144 trial pits to a maximum depth of 3.60m bgl with 8 soakaway tests;
    - 20 hand excavated trial pits to a maximum depth of 0.2m bgl; and
    - 13 Transport Research Laboratory Dynamic Cone Penetration tests.
- A ground investigation for ‘Phase 1’ located in the southern end of the Site took place in April 2022 (Ref: 20786-HYD-XX-XX-TN-GE-1002, dated 17/08/22) and comprised:
    - 12 trial pits;
    - 13 cone penetration tests (CPTs);
    - 1 cable percussive borehole;
    - 1 TRL-DCP test.

6.2.38 Soil samples were analysed for a range of chemical contaminants and geotechnical index tests were carried out to assess the physical nature of the ground.

Assessment Methodology

6.2.39 Environmental issues related to ground contamination are considered by risk assessment of contaminant linkages. A contaminant linkage is said to exist where three conditions are satisfied:

- there is a source of chemical contaminant with the potential to cause harm to human health, property (including buildings) or the water environment;
- there is a receptor (e.g. people, property, the water environment) which might be harmed by the source of contamination; and
- there is a pathway by which the source can reach the receptor, so that harm can be caused.

6.2.40 On any particular site, there may be multiple sources, pathways and receptors and each source-pathway-receptor contaminant linkage must be examined and the risk assessed. This is usually done in a series of stages or tiers, starting with a general, more conservative approach, but becoming more in-depth and site-specific if a more detailed approach is warranted (usually where the issues are very complex to resolve). The stages of assessment are listed in Table 6.1.

Table 6.1 - Risk Assessment Stages

Hazard Identification
Firstly, all the potential contaminant linkages are listed, and judgement is used to determine which of these can be considered plausible, i.e. there is a realistic probability that environmental damage might take place. Only the plausible linkages need be considered further, in the generic risk assessment.
Generic Risk Assessment
All the plausible linkages are considered in the light of ground investigation test results. The average concentrations of chemicals in the ground are compared, using specified statistical techniques, with published values which are deemed indicative of minimal risk, for example to human health, plant life or the water environment. These values are known as Generic Assessment Criteria (GAC). The assessment is known as generic because very conservative, general, assumptions have been made in the derivation of the assessment criteria. It should be remembered that heavy metals and other substances are naturally occurring, as well as originating from man-made materials. Both naturally occurring and any man-made deposits are included in the risk assessment process.
Detailed Risk Assessment
Where concentrations exceed the generic assessment criteria, this might be an indication that mitigation measures may be required. More detailed risk assessment, using site-specific conditions rather than generic ones, can be undertaken. Often, the generic assumptions are very wide-ranging, but the actual site conditions may be more restricted, and this further assessment may indicate that no mitigation is warranted. Where mitigation measures are proven to be necessary, these can include engineering work (also known as remediation), such as removal or treatment of the contaminant source or severing the pathway between the contaminant and the potential receptor, thereby breaking the linkage.
Risk Evaluation

Risk Evaluation is used frequently in the decision-making process. This may involve more in- depth scientific analysis or professional judgment and local experience and can take place at any stage in the assessment process. The generic criteria are by design very conservative in terms of providing protection to health. Consequently, a moderate exceedance of a criterion does not mean a sudden change from acceptable risk to unacceptable risk. Risk Evaluation takes things like this into account.

6.2.41 The methodology used for the identification and assessment of likely significant impacts on ground conditions arising from the Proposed Development is set out as follows:

- Establishing baseline conditions in the absence of the Proposed Development, including the ground and groundwater conditions (geology, soils and hydrogeology), existing (chemical) land quality, and presence and sensitivity of geology, soils and groundwater resources to land contamination;
- Identifying and assessing the potential impacts of the Proposed Development on geology, soils, hydrogeology and land quality as a result of the construction of the Proposed Development and its operation;
- Evaluating the significance of the predicted changes on localised ground conditions and groundwater resources around the site;
- Determining what mitigation measures, if any, are required during the development's design, construction or operational lifetime; and
- Determining the level of significance attributed to potential impacts and whether there will be any likely significant environmental impacts for the purposes of the EIA Regulations.

Significance of Impact

6.2.42 The significance of a potential impact is based on the combination of the magnitude of the impact and the likelihood as given in the matrix in Table 6.2.

6.2.43 Note that the degree of 'significance' is not the same as the legal definition of 'significant harm' as defined by the Environmental Protection Act 1990.

6.2.44 Table 6.2 below, illustrates how the significance of an impact is determined and provides definitions for each category of significance.

Table 6.2 - Impact Significance

		Impact Magnitude			
		Major	**Moderate**	**Minor**	**Negligible**
Likelihood	**High**	Major significance	Major significance	Moderate significance	Negligible significance
	Medium	Major significance	Moderate significance	Minor significance	Negligible significance
	Low	Moderate significance	Minor significance	Minor significance	Negligible significance
	Negligible	Minor significance	Negligible significance	Negligible significance	Negligible significance

Assessment of Significance – Ground Conditions

6.2.45 The following receptors are considered in the assessment of environmental impacts relating to ground conditions:

- site preparation and construction workers;
- off-site population;
- the surrounding ecosystem;
- end users of the site (residents, workers, visitors, etc.);
- structures, and the construction materials used, in the development;
- landscape planting and private gardens in the development;
- the groundwater environment; and
- the surface water environment.
- degradation of soils/rocks with respect to protected areas/mineral resources and land stability

6.2.46 The sensitivity of these receptors is a matter of professional judgement. With respect to contamination and human populations, the methodology of LCRM (2021) has been followed with the result that the most sensitive receptors within a particular group are required to be protected. The sensitivity of the water environment, insofar as it relates to ground conditions, depends on whether it is used for human consumption or provides support for aquatic ecosystems. In this report, the sensitivity is taken to be the likelihood that one of the sensitive receptors suffers the impact. The levels of likelihood are set out in Table 6.3.

Table 6.3 - Levels of Likelihood (Rudland et al 2001)

Classification	Definition
High likelihood	There is a contaminant linkage and an event that either appears very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Medium likelihood	There is a contaminant linkage and all elements are present and in the right place, which means that it is possible that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low likelihood	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Negligible	There is a contaminant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

6.2.47 The risk from radon has been assessed by reference to the radon atlas and other guidance produced by the former Health Protection Agency, British Geological Survey and Building Research Establishment, as explained in Hydrock's Phase 1 and Phase 2 Reports for the Site (Hydrock. Desk Study and Ground Investigation Report. Lotmead Farm. Ref: 20786-HYD-XX-XX-RP-GE-1001, dated 09/12/21; and Hydrock. Technical Note Phase 1 New Boundary. Phase 1 Lotmead Farm, Swindon. Ref: 20786-HYD-XX-XX-TN-GE-1002, dated 17/08/22).

Impact Magnitude

6.2.48 The significance of impact is judged by the magnitude of impact (see Table 6.4). Table 6.4 is based on a combination of professional judgement and published guidance. At one end of the scale is no measured impact (negligible magnitude). At the other end of the scale are the most serious (major magnitude) impacts. The latter includes, for example, short-term, high-dose, acute impacts such as death, severe illness or a sudden, large-scale, pollution incident. Moderate impacts including chronic (long-term small dose) illness or diffuse pollution are in the middle ground (low or medium magnitude). The table has been derived so as far as is practicable, the impacts of one type are not disproportionate to the impacts of another. In terms of contamination, for example, the magnitude of the impact would be the degree of exceedance of the assessment criteria and whether this takes place locally or across large areas of the Site.

6.2.49 Table 6.4 includes all the potential impacts considered in order to demonstrate they have been taken into account during the EIA process, although they may not all be relevant to the Proposed Development site.

Table 6.4 - Impact Magnitude

Receptor	Magnitude of Impact			
	Major	**Moderate**	**Minor**	**Negligible**
General definition with respect to contamination impacts to human health, new planting and controlled waters.	Concentration of contaminants is likely to (or is known from previous data to) exceed that indicative of unacceptable intake or contact. i.e. much greater than required for “significant harm or the significant possibility of significant harm” under EPA1990 Part 2A. Concentrations are high enough to cause acute (short-term) impacts.	Concentration of contaminants is likely to (or is known from previous data to) exceed that indicative of unacceptable intake or contact. I.e. greater than required for “significant harm or the significant possibility of significant harm” under EPA1990 Part 2A.	Concentration of contaminants is likely to (or is known from previous data to) exceed that indicative of no harm but not unacceptable intake or contact. I.e. greater than the GAC screening value but less than that required for “significant harm or the significant possibility of significant harm” under EPA1990 Part 2A.	Concentration of contaminants is likely to (or is known from previous data to) be less than that indicative of no harm. I.e. less than the GAC screening value.
Human health.	Short-term (acute) impacts likely to result in significant harm e.g. high conc. of cyanide on the surface of an informal recreational area.	Long-term (chronic) impacts likely to result in significant harm e.g. high conc. of contaminants close to the surface of a development site.	Harm but probably not significant harm unless particularly sensitive individual within the receptor group. May be aesthetic/olfactory impacts.	No measurable impacts.
New planting.	Complete and rapid die- back of	Stressed or dead plants in	Damage to plants in landscaped areas, e.g.	No measurable impacts.

Receptor	Magnitude of Impact			
	Major	Moderate	Minor	Negligible
	landscaped areas.	landscaped areas.	stunted growth, discoloration.	
Controlled waters.	Short-term pollution, e.g. major spillage into controlled water. Substances leaching from contaminated soil cause receiving waters to exceed surface water and groundwater quality indicators (EQS/DWS) over a large area.	Pollution of sensitive water resources, e.g. leaching into major or minor aquifers or rivers. Substances leaching from contaminated soil cause receiving waters to exceed surface water and groundwater quality indicators (EQS/DWS) in limited areas.	Pollution of non-sensitive water bodies e.g. leaching into non-classified groundwater or minor ditches. Substances leaching from contaminated soil cause receiving waters to slightly exceed surface water and groundwater quality indicators (EQS/DWS) (based on professional judgement).	No measurable impacts. Substances leaching from contaminated soil do not cause receiving waters to exceed surface water and groundwater quality indicators (EQS/DWS).
Ecosystems.	Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Damage to a protected area of international significance (e.g. Ramsar site).	Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Damage to a protected area of national significance (e.g. Site of Special Scientific Interest).	Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Damage to a locally important area.	No measurable impacts. Plausible contaminant linkage but no important or protected area.
Site workers.	Risk assessment required to determine required personal protective equipment (PPE) and this may involve high level of protection similar to USEPA Level A, B or C.	Risk assessment required to determine required personal protective equipment (PPE) and this may involve high level of protection similar to USEPA Level B, C or D.	Risk assessment required to determine required personal protective equipment (PPE) and this may involve moderate level of protection similar to USEPA Level C or D.	No measurable impacts, but simple personal protective equipment (PPE) required (similar to USEPA Level D protection, i.e. overalls, boots,

Receptor	Magnitude of Impact			
	Major	Moderate	Minor	Negligible
				goggles, hard hat).
Buildings etc. impacts from flammable ground gas.	Catastrophic damage, e.g. gas explosion causing collapse.	Damage renders unsafe to occupy.	Buildings etc. impacts from flammable ground gas.	No measurable impacts.
Damage to building products form chemicals in the ground (e.g. sulfate attack of concrete or organic solvent decay of plastics).	Maximum soil concentration exceeds industry accepted trigger value over a large area.	Maximum soil concentration exceeds industry accepted trigger value in limited areas.	Maximum soil concentration slightly exceeds industry accepted trigger value in limited areas.	Maximum soil concentration less than industry accepted trigger value.
Human health impacts from ground gases, such as radon and ground gas where exceedance of a risk-based trigger indicates the potential for harm.	Contaminant linkage identified over a large area.	Contaminant linkage identified in limited areas.	Contaminant linkage uncertain.	Plausible contaminant linkage not established.
Degradation of soils/rocks with respect to protected areas/mineral resources and land stability	Destruction or degradation of designated sites. Loss of mineral/aggregate resource. Prolonged land instability on site affecting site users and amenities within the site's immediate environs	Disruption of active quarries and mining activities. Partial removal of mineral/aggregate resource. Episodic land instability associated with construction works, e.g. collapse of excavation.	Degradation of a small area of a geological outcrop/feature.	No degradation of a geological outcrop/feature.

Impact Significance

6.2.50 The significance of a potential impact is based on the combination of the magnitude of the impact and the receptor sensitivity as given in the matrix in Table 6.2.

6.2.51 Note that the degree of 'significance' is not the same as the legal definition of 'significant harm' as defined by the Environmental Protection Act 1990.

6.2.52 Any potential impact rated as 'moderate significance' or higher is considered significant in terms of the EIA Regulations and is discussed under mitigation measures.

Impact Type

6.2.53 Impacts are judged to be adverse or beneficial and temporary or permanent, direct or indirect, primary, secondary or cumulative.

6.2.54 An adverse impact is negative or unfavourable. Any adverse impact will be considered with mitigation. The opposite is a beneficial impact, which is positive or favourable.

6.2.55 A direct impact occurs through direct interaction of an activity with an environmental impact. Indirect impacts are those which are not a direct result of the project, they are often the result of complex pathways.

6.2.56 A primary impact is one which can be directly attributed to the Proposed Development/action. A secondary impact is one which is indirect or induces changes.

6.2.57 A temporary impact will only occur during the Construction Phase or for a short period of time after completion of the project. A permanent impact will be an impact that remains after completion of the project.

6.2.58 Potential Impacts have been considered with respect to each phase of the project:

- Construction Phase;
- Occupation Phase.

6.3 Baseline Environment

6.3.1 The following sections describe the findings of the baseline studies and has been used to determine the likely contaminant linkages which could give rise to unmitigated environmental impacts and the features that could give rise to unmitigated geotechnical impacts. The conceptual site model has been derived from an understanding of the Site setting, geology, hydrology and hydrogeology, plus the history of the land use on and around the Site.

Site Description

6.3.2 The Site currently comprises agricultural land with a small business park in the south-west.

6.3.3 The Site is approximately 165 hectares and is located on the eastern edge of Swindon to the north east of Wanborough Road and the A419.

6.3.4 There is very little change in topography across the Site with the majority of it being level. The Site elevation falls slightly over a long distance in a north-easterly direction from 93.5metres Ordnance Datum (m OD) in the southwest of the Site to 88.5m OD in the northeast of the Site. The current buildings are likely to have used asbestos containing building materials in their construction.

Site History

6.3.5 The Site has remained mostly unchanged since the earliest mapping (1878), other than the construction and demolition of a few structures around the farm building area (the location of the present-day business park). Two large above-ground tanks (by the farm courtyard); and some cow sheds (slightly northeast of the centre of the Site) were constructed at some point between 1969 and 1977.

6.3.6 An airfield was present around 1km north of the Site between 1978 and 1992, by which point it was the location of a vehicle manufacturer and test track.

6.3.7 Various large warehouses, factories and depots have been located within 1km of the Site boundary since the late 1970s.

Geology and Soils

6.3.8 Based on British Geological Survey (BGS) mapping, the bedrock geology at the Site consists of Ampthill and Kimmeridge Clay Formation (undifferentiated). Superficial deposits (Alluvium) are recorded across the north and east of the Site. Localised Made Ground is likely to be present as a result of farming activities and cut to fill to create the current development platform for the existing structures.

6.3.9 The published information for the site designations indicated the following designations on-site:

- Grade 3b Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

6.3.10 There are no Environmental Designations within 2km of the Site.

6.3.11 With the exception of localised areas of General Made Ground associated with existing farmyards, farm tracks and stockpiles, the Site is typically covered with topsoil or topsoil (Made Ground with rare anthropogenic content) over a sequence of natural soils of superficial Alluvium/ Naturally Reworked Ampthill and Kimmeridge Clay Formation over the cohesive deposits of the Ampthill and Kimmeridge Clay Formation. A sandy lens of material was encountered in the Ampthill and Kimmeridge Clay

Formation between 0.9 metres below ground level (m bgl) and 1.1m bgl down the centre of the site. As anticipated by geological mapping, the superficial deposits were not encountered in the south-eastern part of the Site.

6.3.12 There are a series of 2 large stockpiles in the centre of the Site and some smaller stockpile next to the existing farm buildings in the south of the Site which comprise natural materials mixed with abundant anthropogenic content.

6.3.13 The ground conditions as proven by the investigations undertaken at the Site typically comprise:

- General Made Ground encountered at depths ranging between 0.25m bgl and 0.80m bgl with the exception of TP155 where it was encountered to 2.20m bgl due the partial backfilling of a slurry pit with crushed material in the centre of the Site. The General Made Ground typically comprised a mixture of sand, clay with gravel of, brick, concrete, glass, flint and limestone with cobbles of brick and concrete and debris of metal, plastic, rope, tile and occasional wood.

- Topsoil (Made Ground) with anthropogenic content was encountered in the western half of the Site and was between 0.20m and 0.45m thick. The topsoil (Made Ground) typically comprised brown, slightly sandy CLAY with abundant rootlets.

- Topsoil with no anthropogenic content was encountered in the eastern half of the Site and was between 0.20m and 0.50m thick. The topsoil typically comprised a dark brown mottled yellowish brown slightly gravelly sandy CLAY with frequent rootlets.

- The Alluvium/Naturally Reworked Ampthill and Kimmeridge Clay Formation was encountered to a maximum depth of 3.2m bgl and is between 0.2m and 2.9m thick, with an average thickness of 0.86m. The Alluvium/Naturally Reworked Ampthill and Kimmeridge Clay Formation generally consisted comprising soft to firm (occasionally stiff) slightly gravelly slightly sandy silty CLAY with occasional calcareous nodules.

- The reworked material of the Ampthill and Kimmeridge Clay Formation was encountered above the Ampthill and Kimmeridge Clay Formation to depths ranging from 0.80m to 1.7mbgl. The reworked material of the Ampthill and Kimmeridge Clay Formation consisted of firm friable brownish grey mottled orangish brown slightly gravelly CLAY. Calcite crystals were noted indicating the potential presence of high sulphates.

- The Ampthill and Kimmeridge Clay Formation was encountered at depths ranging between 0.2m bgl and 3.2m bgl. The base of the Ampthill and Kimmeridge Clay Formation was not proven to a maximum depth of 10m bgl.

Hydrogeology

6.3.14 During the investigation, groundwater seepage was observed in six of the trial pits at depths ranging from 1.3m bgl to 3.20m bgl.

6.3.15 The Alluvium at the Site serves as a Secondary A aquifer, while the Ampthill and Kimmeridge Clay Formation (undifferentiated) is unproductive in terms of groundwater.

6.3.16 The Site is located outside of a Source Protection Zone, and there are no groundwater abstractions within a 1km radius of the Site.

Hydrology

6.3.17 Two branches of the River Cole form the north-eastern corner of the Site as they join before flowing north-east. The Dorcan Stream, flowing roughly south to north, forms the western Site boundary and joins the River Cole.

Waste Management

6.3.18 There are waste exemptions on the Site associated with operations at Lotmead Farm and relate to:

- spreading waste on agricultural land to confer benefit;
- use of waste in construction;
- screening and blending of waste;
- deposit of waste from dredging of inland waters;
- deposit of agricultural waste consisting of plant tissue under a Plant Health notice;
- burning waste in the open;
- cleaning, washing, spraying or coating relevant waste;
- use of waste for a specified purpose; and
- storage of waste in a secure place.

Radon

6.3.19 The Site is in a Radon Affected Area where recorded radon levels in 1-3% of homes are above the action level but no radon protection measures are required for new buildings at this location in line with current guidance.

Unexploded ordnance (UXO)

6.3.20 A non-specialist UXO assessment indicates a low bomb risk and no further assessment is required,.

Potentially Contaminative Land Uses

6.3.21 Based on historical land uses, and its current use, the overall risk from land contamination at the Site ranges from low to high with the following moderate to high risks identified:

- Asbestos was encountered in the General Made Ground within the vicinity of the southern farmyard during laboratory analysis (1 of 9 localised samples at a concentration of 0.099% Asbestos (w/w)). No associated visible ACMs were identified with the positive trial pit location. Subject to further ground investigation, it should be assumed that asbestos may be present within the General Made Ground in the vicinity of TP136A, although, the extent of the contamination has not been delineated. Mitigation measures may be required, subject to further ground investigation.
- Slightly elevated concentrations of PAHs and asbestos presence recorded in the stockpiled material at the Site.
- The screening exercise has identified no significant risk to plant life.

Soil and Ground Gas Contamination

6.3.22 Only limited and localised evidence of Made Ground has been encountered and the Site is generally underlain by natural soils.

6.3.23 The presence of other areas of Made Ground cannot be entirely ruled-out, however, these are likely to be localised to the existing farmyards/structures and possible backfill materials for known services and are unlikely to be present in significant volumes.

6.3.24 However further investigation of the farmyards and within the footprints of existing buildings will be required post-demolition and further assessment may be required.

6.3.25 In accordance with CL:AIRE RB17 (Card et al 2012), Characteristic Situation 1 (CS1 - Very Low Hazard Potential) conditions apply and no ground gas protection measures are considered to be required based on the areas investigated to date.

6.3.26 The Site is in a Radon Affected Area where recorded radon levels in 1-3% of homes are above the action level but no radon protection measures are required for new buildings at the Site.

Groundwater Contamination

6.3.27 The assessment has identified no significant risk to controlled waters.

Proposed mitigation measures

6.3.28 The mitigation measures proposed to remove unacceptable risks include:

- The excavation and removal of the stockpiles from the Site to an appropriate facility.
- Further supplementary ground investigation works within the vicinity of TP136A and the southern farmyard, associated with Plot 1 of the NDA area. The investigation should focus on delineating the type, quantity and extent of any asbestos contamination and make recommendations based on contamination being localised to a ‘hotspot’ or more pervasive through to the General Made Ground. Dependant on the findings, the installation of a 600mm engineered cover system comprising topsoil and subsoil over a bonded geogrid break layer (e.g. TX160G) may be a requirement within the areas of General Made Ground. The mitigation strategy will also be dependent on the cut/fill in levels within this Plot.
- Further investigation, assessment, delineation and removal of the Made Ground around TP138A (if required).
- Undertake Asbestos Refurbishment/Demolition Survey of all structures for retention or demolition, in order to mitigate the risks of asbestos during removal and demolition activities.

6.3.29 The methodology for the remediation should be presented in a Remediation Strategy, which will need to be submitted to the warranty provider and the regulatory authorities for approval.

6.3.30 In addition, the production of a Materials Management Plan and its approval by a Qualified Person will be required to allow reuse of suitable material at the Site, where proposed.

6.3.31 Verification reports by a competent independent geo-environmental specialist will be required following completion of any remedial works.

6.4 Updated Assessment of Impacts

6.4.1 The baseline study has been used to assess any impacts as a result of the Proposed Development during the construction and occupation. These are given in Table 6.5 and Table 6.6 respectively. This includes consideration of the likely impacts of the present quality of the land on the Proposed Development and its eventual users, and any impacts the Proposed Development and new use of this land might have on the contamination and geotechnical status of the Site and surrounding area.

6.4.2 The tables list ALL impacts, including those which have been assessed to be negligible or of minor significance. This is to demonstrate that they have been considered and discounted in terms of the EIA, although certain actions will be embedded in the design of the Proposed Development and these are mentioned in the tables. Impacts deemed to be of moderate significance are considered further relevant to the EIA process.

6.4.3 Note that the term “toxic” is used as shorthand notation to include all likely harmful impacts such as toxic, carcinogenic, mutagenic etc.

Impact During Construction Phase: short to medium term

6.4.4 Table 6.5 outlines the potential significant impacts from land contamination during the construction phase.

Table 6.5 - Potential Significant Impacts from Ground and Hazardous Substances (Construction Phase)

Sources	Possible Pathways	Receptors	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Made Ground, associated with the stockpiling of materials (S1).	Ingestion, inhalation or direct contact (P1).	Site users (R1).	Toxic Impacts	Medium	Minor	Minor	Adverse Direct Primary Temporary	Asbestos has been recorded within two of the five stockpiles tested along with elevated concentrations of PAHs. It is recommended that the stockpiles are removed and disposed of off-site.
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts					
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts					
Pesticides and herbicides from the agricultural nature of the site (S2).	Ingestion, inhalation or direct contact (P1).	Site users (R1).	Toxic Impacts	Low	Negligible	Negligible	Adverse Direct Primary Temporary	Chemical testing did not highlight any elevated concentrations of pesticides or herbicides of concern.

Cont…

Sources	Possible Pathways	Receptors	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Localised Made Ground, associated with the existing farm buildings, workshops, slurry pits/tanks, fuel tanks, silos, access tracks and structures (S3).	Ingestion, inhalation or direct contact (P1).	Site users (R1).	Toxic Impacts	Medium	Minor	Minor	Adverse Direct Primary Temporary	Asbestos encountered within the General Made Ground in the vicinity of the two slurry tanks in the south-western corner of the site and the presence of asbestos should be assumed within the General Made Ground. A capping solution or removal is recommended to mitigate the potential risk to receptors. Further investigation and assessment is recommended once full access is possible.
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts	Low	Minor	Minor	Adverse Direct Primary Temporary	With the exception of asbestos highlighted above no further contaminants of concern were highlighted within the General Made Ground across the majority of the site with the exception of a hotspot of PAHs encountered in the area of TP138A in the south of the site. Further investigation and assessment is recommended once full access is possible.
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P8).	Surface water and ecology (R4).	Toxic Impacts					
	Base flow from contaminated groundwater (P9).		Toxic Impacts					
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts					
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts					

Sources	Possible Pathways	Receptors	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
	Root uptake by plants (P4).	Flora and fauna (R5)	Toxic Impacts					
Ground gases (carbon dioxide and methane) from organic materials in the Made Ground / alluvial deposits (S4).	Migration, build up and explosion (P2/P3).	Site users (R1) and buildings (R2).	Toxic Impacts	Low	Moderate	Minor	Adverse Direct Primary Temporary	Only limited and localised evidence of Made Ground has been encountered in the vicinity of the existing farm structures and no gas generating material were observed during the site investigation and as a result gas monitoring was considered not to be necessary. . As such, no ground gas protection is considered to be required based on the areas investigated to date. However further investigation of the farmyards will be required once full access is possible, which may require further assessment to be carried out.
Asbestos within fabric of existing buildings (S5).	Fugitive dust (P1).	Site users (R1).	Toxic Impacts	High	Major	Major	Adverse Direct Primary Temporary	Asbestos may be present within farm buildings and structures. Careful removal will be required from buildings during demolition. However, removal under controlled conditions should limit release of fibres to the air and the ground.
		Neighbours (R1).	Toxic Impacts	Negligible	Major	Minor	Adverse Direct Primary Temporary	
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts	Low	Major	Moderate	Adverse Direct Primary Temporary	
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts					

Sources	Possible Pathways	Receptors	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Silt particles (suspended solids) from exposed soil during site preparation works.	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts	Low	Major	Moderate	Adverse Direct Primary Temporary	Environmental protection during construction (as would be managed within a Construction Environmental Management Plan (CEMP)) should be achieved by following industry standard codes of practice. These will include requirements to prevent silt inflow to water courses.
Spillage of fuel/chemicals brought to site by contractors.	Leaching through unsaturated zone (P5). Surface run-off (P7).	Groundwater (R3). Surface water and ecology (R4).	Toxic Impacts	Low	Major	Moderate	Adverse Direct Primary Temporary	Unlikely to be significant spillage of contaminants as contractors should follow required site practices in line with the CEMP.
Removal of soils	Ingestion, inhalation or direct contact (P1).	Site users (R1).	Toxic Impacts	Negligible	Major	Negligible	Adverse Direct Primary Permanent	The site is not a significant mineral resource site , SSSI or RIGS.
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts					
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts					

Impact During Occupation Phase: long term

6.4.5 Table 6.6 outlines the potential significant impacts from land contamination during the Occupation Phase.

Table 6.6 Potential Impacts from Ground and Hazardous Substances (Occupation Phase)

Sources	Possible Pathways	Receptors	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Made Ground, associated with the stockpiling of materials (S1).	Ingestion, inhalation or direct contact (P1).	Site users (R1).	Toxic Impacts	Low	Moderate	Minor	Adverse Direct Primary Temporary	It is anticipated that the stockpiles will be removed from the site as part of the proposed works.
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts					
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts					
Pesticides and herbicides from the agricultural nature of the site (S2).	Ingestion, inhalation or direct contact (P1).	Site users (R1).	Toxic Impacts	Low	Negligible	Negligible	Adverse Direct Primary Permanent	Chemical testing did not highlight any elevated concentrations of pesticides or herbicides of concern.

Cont…

Sources	Possible Pathways	Receptors	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Localised Made Ground, associated with the existing farm buildings, workshops, slurry pits/tanks, fuel tanks, silos, access tracks and structures (S3).	Ingestion, inhalation or direct contact (P1).	Site users (R1).	Toxic Impacts	Low	Moderate	Minor	Adverse Direct Primary Permanent	It is anticipated that the implementation of a capping solution or removal to mitigated the potential risk to receptors will be done during construction.
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts	Low	Moderate	Minor	Adverse Direct Primary Permanent	It is anticipated that the implementation of a capping solution or removal to mitigated the potential risk to receptors will be done during construction.
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P8).	Surface water and ecology (R4).	Toxic Impacts					
	Base flow from contaminated groundwater (P9).		Toxic Impacts					
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts					
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts					
	Root uptake by plants (P4).	Flora and fauna (R5)	Toxic Impacts					

Sources	Possible Pathways	Receptors	Impact	Likelihood	Magnitude	Significance	Impact Type	Comments
Ground gases (carbon dioxide and methane) from organic materials in the Made Ground / alluvial deposits (S4).	Migration, build up and explosion (P2/P3).	Site users (R1) and buildings (R2).	Toxic Impacts	Low	Moderate	Minor	Adverse Direct Primary Permanent	Only limited and localised evidence of Made Ground has been encountered in the vicinity of the farm structures and no gas generating material were observed during the site investigation and as a result gas monitoring was considered not to be necessary. . As such, no ground gas protection is considered to be required based on the areas investigated to date. However further investigation of the farmyards will be required once full access is possible, which may require further assessment to be carried out.
Asbestos within fabric of existing buildings (S5).	Fugitive dust (P1).	Site users (R1).	Toxic Impacts	Negligible	Major	Minor	Adverse Direct Primary Permanent	It is anticipated that careful removal of asbestos from buildings will be undertaken during demolition.
		Neighbours (R1).	Toxic Impacts	Negligible	Major	Minor	Adverse Direct Primary Permanent	
	Inhalation of fugitive dust (P1).	Neighbours (R1).	Toxic Impacts	Negligible	Major	Minor	Adverse Direct Primary Permanent	
	Leaching through unsaturated zone (P5).	Groundwater (R3).	Toxic Impacts					
	Surface run-off (P7).	Surface water and ecology (R4).	Toxic Impacts					

6.4.6 The assessed impacts are minor (or less) due to the inherent mitigation to be carried out by design, which will need to be undertaken to the satisfaction of the warranty provider and Local Authority. The following further works will be required with regard to Ground Conditions:

- supplementary ground investigation following demolition of existing site structures to confirm the ground conditions are acceptable.
- removal of tipped waste and Made Ground associated with the stockpiles;
- appropriate asbestos survey of existing building(s) and any asbestos removed;
- production of a Remediation Strategy and Verification Plan (and agreement with the regulatory bodies and the warranty provider);
- supervision of the construction of foundations by a suitably qualified geotechnical engineer.
- production of a Materials Management Plan relating to reuse of soils at the Site and import of soils to the Site;
- remediation and mitigation works; and
- verification of the earthworks, remediation and mitigation works.

Cumulative Impacts

6.4.7 Schedule 4(5)(e) of the 2017 EIA Regulations requires an assessment of the likely significant impacts of the development on environment resulting from "the cumulation of impacts 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".

6.4.8 With regard to Ground Conditions a review of the cumulative impacts associated with proposed developments within 500m (included in Table 6.7) has been undertaken. Any cumulative sites beyond 500m of the Site have been discounted due to their distance from the Site and the likely localised nature of any cumulative impacts of ground conditions.

Table 6.7 Cumulative Projects within 500m of the Site

Site Address	Application Reference	Description of development	Distance from Site (m)
Land East Of The A419.	S/19/0703	The construction of a new road, to link the A419 Commonhead Roundabout to the proposed New Eastern Villages (NEV) development.	Adjacent
Great Stall East - Land South Of The A420 South Marston Swindon	S/OUT/17/1990	Outline planning application for up to 1,550 homes; education provision including a 10 form entry secondary school and a 3 form entry primary school with attendant sports pitches; a sports hub and open space; a park and ride; a local centre up to 1,000sqm including classes A1, A2, A3, A4, A5 and D1 uses; public open space/green infrastructure; new informal and formal recreation spaces; and the formation of a new permanent access from the A420	100m

Site Address	Application Reference	Description of development	Distance from Site (m)
Land At Symmetry Park Shrivenham Road South Marston SN3 4RS	S/OUT/14/0253	40ha of employment development including B1b (research and development/light industrial), B1c (light industrial), B2 (general industrial) and B8 (warehouse and distribution), new landscaping and junction to A420.	180m
Redlands Eastern Villages Swindon Swindon	S/OUT/16/0021	Outline Planning Application for the erection of up to 370no. dwellings, a local convenience store/community facility, primary school, open space, landscaping, access points to and from Wanborough Road and northern site boundary and eastern boundaries and associated infrastructure.	400m
Land North Of A420 Eastern Villages Swindon (South Marston / Rowborough)	S/OUT/13/1555	Up to 2,380 dwellings together with a mixed use local centre and area (including A1 retail up to 1,500 sq.m metres, services (A2), restaurants, pubs and takeaways (A3, A4, A5), business uses (B1) up to 1,000 sq.m metres)	450m

6.4.9 Each of the cumulative developments identified in Table 6.7 have been included in the Ground Conditions cumulative assessment as they all could potentially have impacts on the local ground conditions.

6.4.10 It is anticipated that the Proposed Developments will have undertaken Phase 1 Desk Studies and Phase 2 Site Investigations and where required any remediation works will be undertaken to address risks posed by soil or groundwater contamination.

6.4.11 It is also anticipated that good working practices will be adopted during construction of these sites.

Construction Phase: short to medium term - Cumulative Impacts on Ground Conditions

6.4.12 In the context of this Environmental Impact Assessment (EIA) for the proposed construction works, it is assumed that best practices will be employed to ensure optimal environmental management. However, it is crucial to recognise that despite the implementation of such practices, there remains a risk of accidental fuel spillage and other unforeseen incidents that cannot be entirely ruled out.

Identified Impacts:

6.4.13 These include short-term impacts on:

- air quality associated with dust arising from site earthworks, movements of soils, and vehicles to and from the construction sites; and
- the environment, soils and controlled waters from the release of contaminants (including suspended solids from surface water-run off)..

Proposed Mitigation Measures:

6.4.14 To address and minimise the identified impacts, the implementation of comprehensive Construction Environmental Management Plans (CEMPs) and Site Management Plans

(SMPs). These plans will outline detailed strategies for managing the construction process and reducing environmental risks, ensuring that fuel and chemicals are stored in strict compliance with the Control of Pollution (Oil Storage) Regulations.

6.4.15 Furthermore, all construction activities will adhere to current legislation and standards, with specific reference to the Pollution Prevention Guidance (PPG) documents provided by the Environment Agency (EA).

Anticipated Cumulative Impacts and Significance:

6.4.16 Based on the implementation of the aforementioned measures, we anticipate that the cumulative impacts of the construction phase, including the identified avoidable impacts, will be Negligible and deemed Not Significant in terms of the EIA. This conclusion is drawn considering the comprehensive environmental management approach adopted during the construction works.

Occupation Phase: long term Cumulative Impacts on Ground Conditions

6.4.17 The completed developments will result in increased hardstanding coverage, including building foundations and drainage runs, across the cumulative sites. This will have an impact on drainage rates and groundwater recharge rates, which we have assessed as a Minor Significance with regard to ground conditions.

6.4.18 Additionally, the planning process is likely to implement beneficial cumulative impacts through the implementation of measures to enhance ground quality through the appropriate management and mitigation of any issues highlighted as part of their respective developments, Phase 1 and Phase 2 Desk Studies and Ground Investigations and the resultant mitigation measures to ensure that the sites are fit for purpose within the existing planning regime.

6.5 Assessment Summary

6.5.1 It is anticipated that appropriate mitigation measures will be put in place in line with the findings and recommendations of the ground investigation. As outlined in the Proposed Mitigation Measures section of this report, the proposed mitigation methods to manage unacceptable risks include:

- Excavating and relocating stockpiles from the Site to a suitable facility.
- Conducting supplementary ground investigations near TP136A and the southern farmyard, linked to Plot 1 of the NDA area. These investigations will concentrate on identifying the presence, extent, and concentration of asbestos contamination. Recommendations will vary based on whether contamination is confined to a localized 'hotspot' or is more widespread, potentially extending to the General Made Ground. Depending on findings, there might be a need to install a 600mm engineered cover system involving topsoil and subsoil over a bonded geogrid break layer (like TX160G) in General Made Ground areas. The mitigation strategy will also be dependent on the cut/fill in levels within this Plot.
- Additional assessment, demarcation, and possible removal of Made Ground around TP138A.
- Undertaking Asbestos Refurbishment/Demolition Surveys for all structures earmarked for retention or demolition. This step aims to mitigate asbestos-related risks during dismantling and removal activities.

- Devising a Remediation Strategy outlining the approach for addressing highlighted issues, which must be submitted to regulatory bodies for approval.

- Creating a Materials Management Plan, subject to approval by a Qualified Person, allowing the reuse of suitable materials at the Site.

6.5.2 Verification reports by a competent independent geo-environmental specialist will be required following completion of any remedial works.

6.5.3 Considering these actions, no residual impacts are anticipated on the long term Occupation Phase of the development.

7 Transportation

7.1 Introduction

7.1.1 This chapter has been prepared by Peter Evans Partnership (PEP) to provide an update on the likely environmental effects of the Proposed Development in transport terms. This chapter should be read in conjunction with the transport chapter (chapter 11) of the Original ES, the Transport Assessment provided as Appendix 11.1 and the Transport Assessment Addendum prepared at the time of the outline application by Peter Brett Associates.

7.1.2 This chapter considers the update of the baseline conditions, any changes to the Proposed Development that would affect the assessment and whether the previous conclusions on significance of effect have altered since the Original ES.

7.1.3 In terms of the baseline conditions, the main areas of difference from the Original ES are some alterations to the local road network, the existing road safety conditions and public transport services.

7.1.4 Other planned developments that have come forward in the intervening period have been considered through a cumulative assessment.

7.2 Assessment Criteria & Methodology

Previous Assessment

7.2.1 The study area for the Original ES is identified at paragraph 11.28 of that document as:

(i) Site access/Wanborough Road
(ii) Merlin Way
(iii) Kingfisher Drive
(iv) Covingham Drive
(v) A420
(vi) A419 (north of White Hart Junction)
(vii) A419 (south of White Hart Junction)
(viii) High Street
(ix) Callas Hill
(x) A4312 Oxford Road
(xi) Drakes Way
(xii) B4006 Dorcan Way
(xiii) A420 (between Gablecross Junction and White Hart Junction)
(xiv) A419

7.2.2 Baseline conditions were established from the standard of pedestrian and cycle facilities in the study area, pedestrian and cycle access to services and amenities, access to public transport, the standard of the strategic and local road network, traffic data from the highway authority's strategic traffic model and personal injury accident records.

7.2.3 The assessment of the proposal was then undertaken based on the guidance of the Guidelines for the Environmental Assessment of Road Traffic (IEMA 1993), the Design Manual for Roads and Bridges Vol 11, Section 2, Part 5 (Department for Transport) and Travel Plans, Transport Assessments and Statements in Decision Making (Department for Communities and Local Government, 2014). The magnitude of impact against the following criteria and the significance of those on the sensitivity of receptors were determined to establish the environmental effects of the Proposed Development:

- Severance – based on change in traffic flows;
- Driver delay – from the results of junction capacity testing;
- Pedestrian delay and amenity – based on change in traffic flow;
- Fear and intimidation – based on change in traffic flow;
- Accidents and safety – based on review of existing records and change in traffic characteristics that could affect road safety;
- Hazaradous loads – based on change in quantum of hazardous loads.

7.2.4 More detailed information on the criteria is provided in the Original ES.

7.2.5 The sensitive receptors within the study area agreed with the highway authority, as set out in Table 11.10 of the Original ES and are replicated in Table 7.1:

Table 7.1 – Sensitive Receptors

Link No.	Link	Description	Sensitivity/value of receptor
1	Wanborough Road	Single carriageway with a section footway on one side	Low
2	Merlin Way	Single carriageway with wide verges	Low
3	Kingsfisher Drive	Residential road with wide verges and footways. Presence of Covingham Kingfisher Primary School	High
4	Covingham Drive	Residential road with wide verges and footways	Low
5	A420 (east of Police Station Junction).	Single Carriageway, highly trafficked and no pedestrian access	Low
6	A419 (north of White Hart Junction)	Dual carriageway, highly trafficked and no pedestrian access	Low
7	A419 (south of White Hart Junction)	Dual carriageway, highly trafficked and no pedestrian access	Low
8	High Street	Single carriageway with a footway on one side	Low
9	Callas Hill	Single carriageway with no footways	Low
10	A4312 Oxford Road	Single carriageway with footways on either side, medium level of pedestrian activity	Low
11	Drakes Way	Highly trafficked route to town centre, segregated service road on which footway is provided on southern side	Low

12	B4006 Dorcan Way	Single carriageway with wide verges and footways. Presence of Covingham Park Primary School and Dorcan Academy	High
13	A420 (between Gablecross Junction and White Hart Junction)	Single carriageway, highly trafficked and with pedestrian access	Low

7.2.6 Both the construction and operational phases were assessed.

7.2.7 The Original ES identified that for the construction phase the construction traffic is anticipated to have:

- Negligible impact on driver delay;
- Negligible impact on pedestrian severance;
- Negligible impact on fear and intimidation and amenity;
- Negligible impact on road safety.

7.2.8 During the operational phase the potential effects of the completed development is anticipated to have:

- negligible impact on driver delay, following the implementation of the NEV mitigation package;
- negligible impact on pedestrian severance;
- negligible impact on fear and intimidation;
- negligible impact on accidents and safety;
- negligible impact on hazardous loads.

7.2.9 The assessment included the mitigation package of the NEV comprising:

- White Hart Junction improvements
- Great Stall Bridge
- A420 Highway Improvements
- West of A419 Highway Works
- Southern Connector Road (SCR)
- Express Bus Network (Rapid Transit)
- Park and Ride at the NEV
- Bus Service Provision
- Highway Links between development islands

- New link across the railway at footpath 5
- New Eastern Villages Travel Plan (Residential Element)

7.2.10 The Original ES reported that the cumulative assessment of the whole of the NEV had been assessed by Swindon Borough Council and was therefore not separately assessed in that document.

7.2.11 Secondary mitigation was proposed for both the construction and operational phases. These comprised a Construction Environmental Management Plan (CEMP) for the construction phase and the following for the operational phase.

- Wanborough Road footway improvements and traffic calming;
- Footway between the development and Wanborough Village; and
- Commitment to Travel Plans for the employment land uses and schools.

7.2.12 There were anticipated to be no residual effects of the development and negligible significance for all criteria during the construction and operational phases.

Legislative Context, Technical Guidance and Best Practice

Guidance and Best Practice

7.2.13 Since the preparation of the Original ES there have been updates to the guidance on undertaking Environmental Assessments. The most recent guidance is in the IEMA's guidance Environmental Assessment of Traffic Movement July 2023.

7.2.14 The criteria against which the environmental effect of the development is assessed have been reviewed against the updated IEMA guidance document, as follows.

Severance

7.2.15 The assessment criteria for severance is as set out in the Original ES.

Driver Delay

7.2.16 The assessment criteria for driver delay is as set out in the Original ES.

Pedestrian Delay

7.2.17 The IEMA guidance suggests that the application of definitive thresholds for the assessment of pedestrian delay is not wise. Instead judgement should be used to consider whether pedestrian delay is likely to constitute a significant effect. For the purposes of this assessment consideration has been given to whether the Proposed Development would increase traffic on the road links materially and therefore affect the ability to cross. The provision of controlled crossings has also been taken into consideration.

Pedestrian Amenity

7.2.18 The IEMA guidance references the doubling of traffic as a starting point for assessment but that local conditions should also be considered.

Fear and intimidation

7.2.19 IEMA guidance suggests consideration of the average hourly traffic over an 18 hour period, the total HGV traffic and the average vehicle speed to determine the existing level of hazard resulting from fear and intimidation, with the change in each category scored and summed to assess the effect from a development. The degree of change in the score with and without the development determines the magnitude of impact from the proposal.

7.2.20 Where there is a change in traffic flow of less than 600 vehicles per hour and no material change in HGVs or vehicle speeds no step change in fear and intimidation and therefore negligible impact from the development.

7.2.21 Where there is a small increase in traffic but which includes a higher proportion of HGVs, for example during the construction phase of a project, negligible impact is also anticipated.

Road Safety

7.2.22 The IEMA guidance suggests several approaches to assess road safety but recommends that the traffic and movement expert engages with the relevant authority to determine the best approach for determining road safety effects. In this case, the approach to the assessment of road safety was established through the Original ES and TA and the same approach is applied for the current purposes.

Hazardous Loads

7.2.23 The IEMA guidance states that some developments give rise to hazardous loads and the assessment needs to clearly outline the estimated number and composition of such loads. Reference is made to the types of load not associated with residential developments, eg toxic and nuclear waste.

7.2.24 In this case the hazardous loads are considered to be the HGV movements during construction and the effect of the increase in these during this period. Therefore no separate assessment of hazardous loads has been undertaken.

Baseline Data Collection

7.2.25 The updated baseline position has been established from a combination of a desktop exercise and a site visit to the area on 6th July 2023. The exercise was to ascertain whether the baseline data used for the Original ES had changed in the intervening period. Updated public transport data was obtained from public transport operators websites and the updated accident data was obtained from the website Crashmap as set out below.

7.2.26 The Original ES used traffic data from the Swindon Borough Council's traffic model, available at that time. As the Section 73 reflects no changes in the quantum of development or access arrangement the same model data has been used for the ES Addendum for consistency.

Assessment Methodology

7.2.27 The magnitude of the impact of the Proposed Development have been assessed against the criteria set out above taking into account the outcome of the previous assessment and any changes in baseline conditions or criteria since the Original ES.

7.2.28 Where no changes in baseline, criteria or effects of the Proposed development have been identified the magnitude of the impact is as previously reported for the specific criteria. As no change in sensitive receptors has been identified the significance of the effect from that criteria is also as reported in the Original ES.

7.2.29 Where there is a change in baseline conditions the magnitude of the impact of the Proposed Development has been considered against the relevant criteria as an update to the assessment. The significance of the effect has been determined from the sensitivity of receptors affected.

7.2.30 Where there is an update in the criteria since the Original ES the magnitude of the impact of the Proposed Development has been considered against the update and the significance from the sensitivity of the receptors.

7.2.31 Reference has been made to Table 11.7 of the Original ES to establish the significance of the effects from the impact magnitude and sensitivity of the receptor. For ease of reference this is set out below also.

Table 7.2 – Significance of Effect Matrix

	Magnitude of Impact			
Sensitivity/value of receptor	High	Medium	Low	Negligible
High	Major	Moderate	Moderate	Slight
Medium	Moderate	Moderate	Slight	Negligible
Low	Moderate	Slight	Negligible	Negligible

Geographical Scope

7.2.32 The geographical scope of the assessment is consistent with the study area agreed for the Original ES.

Temporal Scope

7.2.33 The assessment has been undertaken for the construction phase and operation phase of the Proposed Development, consistent with the Original ES.

7.3 Baseline Environment

Access for Pedestrians

7.3.1 Conditions for pedestrians are as stated within the Original ES with the exception of the footway provision around the White Hart roundabout and along the A420 to the east. The pedestrian route across the White Hart Roundabout is to the south of the junction only on the elevated path. A signalized crossing is provided on Oxford Road to provide access to Ermin Street to the north.

7.3.2 On the A420 towards Oxford a footway has been added to the south side of the road to beyond the access to Symmetry Park since the preparation of the Original ES and the path on the north side extended.

Pedestrian Access to Services and Amenities

7.3.3 The pedestrian access to services and amenities is as described in the Original ES. Pedestrians are also able to access the employment sites at Symmetry Park via the A420.

Access for Cyclists

7.3.4 The access for cyclists is as described in the Original ES.

Cycle Access to Services and Amenities

7.3.5 The cycle access to services and amenities is as described in the Original ES. Cyclists are also able to access the employment sites at Symmetry Park via the A420. Journeys could be undertaken in 20 to 25 minutes.

Access to Public Transport

7.3.6 The bus services have been revised since the Original ES. Currently, a network of bus services operates within the Swindon urban area and to surrounding villages. The bus stops nearest to the Site are at 'Wrenswood', on Merlin Way. These are around 1km to the north-west, which equates to a 13 minute walk.

7.3.7 Bus service 2 stops on Merlin Way and operates between Swindon town centre and Covingham. The service operates with a 20 minute frequency during the day Monday to Saturday, and every 30-60 minutes in the evening. On Sunday an hourly service operates during the day only. The journey time from the 'Wrenswood' stops to Swindon bus station is around 24 minutes.

7.3.8 A combined walking/bus trip to Swindon town centre from Wanborough Road could be undertaken within around 37 minutes.

Highway Network and Access

7.3.9 Some alterations to the road network have been undertaken since the preparation of the Original ES. These include works to the White Hart Roundabout to improve capacity. This has resulted in the loss of the footway on the northside of the junction, but an alternative access to this area is provided by the existing route to the south of the junction and a crossing on Oxford Road toward Ermin Street, as described above.

7.3.10 Access from Merlin Way onto the A419 junction has been replaced by the additional northbound on-slip on at the White Hart junction.

7.3.11 Construction of SCR from the Common head roundabout is underway and due for completion shortly.

7.3.12 Footway/cycleway improvements have been undertaken to the A420 beyond the police station to the access to Symmetry Park and into the employment area itself.

Baseline Traffic Within Study Area

7.3.13 Previous baseline traffic conditions were established from the strategic traffic model and the same model data is referenced for current baseline conditions.

Personal Injury Collisions

7.3.14 A review of the personal injury accident data for the latest five year period available for the study area previously agreed with the highway authority, using the online accident database Crashmap, has been undertaken. The accident data is that which is published by the Department for Transport (DfT) each year, which in turn is based on records provided by police forces. The review covers the period from January 2017 to December 2021 inclusive.

7.3.15 A summary of the collisions by year, type, and severity is set out below:

Table 7.3: Collision Data

Collision Type	Injury Severity	Year					Total
		2017	2018	2019	2020	2021	
All	Fatal	0	1	0	0	0	1
	Serious	10	6	6	6	4	32
	Slight	60	44	43	29	42	218
	Sub Total	70	51	49	35	46	251
Pedestrian	Fatal	0	0	0	0	0	0
	Serious	0	3	0	1	2	6
	Slight	1	4	1	0	2	8
	Sub Total	1	7	1	1	4	14
Cyclist	Fatal	0	0	0	0	0	0
	Serious	3	2	0	0	0	5
	Slight	7	3	5	2	7	24
	Sub Total	10	5	5	2	7	29

7.3.16 During the five year period from January 2017 to December 2021 inclusive, a total of 215 collisions have been reported, resulting in 1 fatal accident, 32 serious accidents and 218 slight accidents. This is in comparison with a total of 336 accidents recorded in the five year period assessed in the Original ES, of which there was 1 fatal and 33 serious collisions.

7.3.17 It is likely that the lower number of collisions recorded overall over the five year period between 2017 and 2021 is as a result of the covid 19 pandemic and fewer vehicles on the road in 2020 and part of 2021.

7.3.18 Over the five-year period, 43 of collisions involved a pedestrian or a cyclist, resulting in 32 slight injuries and 11 serious injuries. By comparison the review in 2019 recorded 48 collisions involving a pedestrian or cyclist.

7.3.19 Whilst there was an overall reduction in reported collisions for the most recent period reviewed, this is a result of a reduction in slight accidents, with a likely reduction in traffic flows during this time.

Sensitive Receptors

7.3.20 The sensitivity of receptors in the study area is listed in Table 7.1 above. The current sensitive receptors remain the same with the exception of the A420 east of Gablecross which now has pedestrian facilities and accesses, which have been constructed since the preparation of the Original ES. The sensitivity of this section of road remains low.

7.4 Updated Assessment of Impacts and Effects

7.4.1 The assessment based on the updated baseline and criteria to determine the environmental impacts of the Proposed Development and the significance of the effects taking into account the sensitivity of any receptors is set out below for both the construction and the operational phases of the Proposed Development.

Construction Impacts and Effects

7.4.2 The construction phase of the Proposed Development was considered in paragraphs 11.112 to 11.126 of the Original ES. This reports a total of 66 vehicle trips arriving and the same departing the Site per working day plus 8 HGVs per hour per working day with access from Wanborough Road. For the addendum the construction traffic is anticipated to use the Southern Connector Road rather than access via Wanborough Road.

7.4.3 The previous construction traffic routing assumptions was that traffic would arrive from the north, via the White Hart Roundabout and Merlin Way and Wanborough Road. With the proposed change to the construction access, now via the SCR traffic from the north would use the A419 between the White Hart Roundabout to the Commonhead roundabout and to/from the SCR. Therefore predicted HGVs on Wanborough Road could reduce compared to the Original ES.

7.4.4 The impact of the Proposed Development on severance and driver delay in the Original ES was determined to have negligible magnitude and of negligible significance. The minor change in traffic movement as a result of the construction access is not anticipated to affect these conclusions. The impact of each is anticipated to be negligible with negligible effect.

7.4.5 The low level change in the construction traffic assignment is not considered to give rise to an impact on pedestrian delay or pedestrian amenity and is anticipated to have negligible effect consistent with the Original ES.

7.4.6 The IEMA guidance on the assessment of the effect of development on fear and intimidation considers the average change in hourly traffic flow over an 18 hour period, the change in HGVs in total over the 18 hour period and the change in vehicle speeds.

7.4.7 From the construction traffic data provided at Table 11.12 in the Original ES, during the construction period the average hourly traffic generation over an 18 hour period is significantly less than the 600 vehicle threshold. The total HGV increase over the 18 hour period would not be significant. The average vehicle speed on each link is unlikely to change. Therefore during the construction period the impact of the Proposed Development on fear and intimidation would be negligible and the effect would be negligible.

7.4.8 The Original ES reported that the impact of the HGVs during the construction phase was considered negligible. The revised baseline on road safety collision records is broadly consistent with the conditions reported in the Original ES. The reassignment of construction traffic as a result of the change in access is not anticipated to materially increase in quantum of HGVS on any links and keeps the traffic on the strategic road network rather than using Wanborough Road. Therefore the Proposed Development would not give rise to any adverse change to the road safety assessment during the construction phase reported in the Original ES. The impact and effect on road safety would be negligible.

Occupation Impacts and Effects

7.4.9 The quantum of development within the Proposed Development has not changed since the Original ES. Therefore, the traffic generation and distribution remains as previously assessed. The change in traffic flows is as provided at Table 11.13 in the Original ES.

Severance

7.4.10 Severance is assessed based on the change in traffic flow compared to the baseline position. There is no change to the traffic flow since the Original ES and therefore the impact of the Proposed Development is expected to be the same, i.e. negligible and the effect is expected to be negligible.

Driver Delay

7.4.11 Driver delay is assessed based on the change in traffic flows compared to baseline and the performance of junctions. The flows remain as reported in the Original ES. The highway improvements which form part of the NEV transport mitigation package were assumed for the EIA. Some of these works have been implemented as noted in the update to the baseline conditions. As a result, no variation to the previous impact would be expected and the previously reported negligible impact on driver delay remains valid. The effect of the Proposed Development on driver delay is expected to be negligible.

Pedestrian Delay

7.4.12 The change in traffic flows on the links within the study cane be determined from Table 11.13 in the Original ES. The average hourly increase is between 2 vehicles and 188 vehicles. The links experiencing the greatest increase are the A420 west of the police station (70 vehicles/hour increase), the A419 north of the White Hart roundabout (96 vehicles/hour increase), and A420 between Gablecross and the White Hart Roundabout (188 vehicle/hour increase). On each of these links there is either a controlled crossing or no pedestrian activity.

7.4.13 The increase in traffic on Wanborough Road is on average 55 vehicles per hour, which is less than 1 per minute. This would not materially delay pedestrians.

7.4.14 Therefore, the impact of the Proposed Development on pedestrian delay is negligible. The environmental effect is negligible.

Pedestrian Amenity

7.4.15 The assessment undertaken in the Original ES for pedestrian amenity remains valid. The impact of the Proposed Development on pedestrian amenity is considered to be negligible. The environmental effect is negligible.

Fear and Intimidation

7.4.16 The traffic flows provided at Table 11.13 in the Original ES indicate that on average the hourly increase in traffic over the 18 hour period would be significantly less than 600 vehicles on the links in the study area. The nature of the Proposed Development suggests that the increase in HGVs would not be material over the 18 hour period and there is unlikely to be a change in vehicle speeds. Therefore the impact of the Proposed Development on fear and intimidation is negligible and the environmental effect is negligible.

Road Safety

7.4.17 The Original ES noted that the analysis showed a low accident rate in the area surrounding the Site and on balance the increase in traffic from the development would give rise to a negligible impact on accidents and safety. The updated road safety records show a reduction in injury collisions. This is for a period when traffic flows would have been lower as a result of the pandemic. However, there is no reason to suggest that the previous negligible impact of the Proposed Development would be affected. The environmental effect is negligible.

Mitigation

7.4.18 The primary mitigation comprises the NEV infrastructure as identified in the Original ES and taken into account for the assessment. Some of this has been constructed and is included in the baseline conditions.

7.4.19 The secondary mitigation measures identified at para 11.156 of the Original ES remain. For the construction phase a Construction Environmental Management Plan (CEMP) would be prepared and implemented.

7.4.20 For the operational phase the mitigation in place will be:

- Wanborough Road improvements;
- contribution towards the traffic calming;
- footway between the development and Wanborough Village; and
- commitment to Travel Plans for the employment land uses and schools.

Residual Effects

7.4.21 Table 11.14 of the Original ES noted the summary of effects at that time with and without mitigation. Overall for construction and operational phases the adverse environmental effects of the Proposed Development would be of negligible significance during the construction and operational phases. The updates to the Proposed Development makes no change to the effect of the development or the residual effect after mitigation is taken into consideration.

Cumulative Effects

7.4.22 Since the preparation of the Original ES development sites have come forward which would be considered for cumulative assessment purposes. Several of these relate to the NEV and were considered by Swindon Borough Council has part of the wider NEV assessment undertaken on their behalf, as noted in paragraph 11.153 in the Original ES. Four additional developments which do not comprise any part of the NEV are as follows:

- Land at Catbrain Farm, Highworth Road (ref S/OUT/19/0215)
- WH Smith headquarters, Stratton St Margaret (ref S/OUT/20/1390)
- Former Oakfield Campus, Marlowe Avenue (ref S/19/0192)
- Phase 3 Bradbury Park Land (ref S/OUT/18/1140)

7.4.23 PEP has undertaken an assessment of the likely effect on traffic flows within the study area as a result of these developments coming forward. The assessment has drawn on information submitted with each application. Two of the four applications are for the redevelopment of employment sites for residential use. The existing traffic generation would be greater than the predicted flows as a result of the redevelopment. The traffic from the employment uses are anticipated to be in the baseline flows from the traffic model. The other two applications are for residential developments which are not anticipated to generate significant traffic within the study area. The summation of the change in traffic flows from these applications is set out in Table 7.3. The PEP note setting out further information is provided at **Appendix 7.1**.

Table 7.4 Total Net Traffic Arising from Committed Sites

Link No.	Link	AM Peak	PM Peak	18 hr	24 hr
1	Wanborough Road	-9	-7	-111	-113
2	Merlin Way	-9	-7	-111	-113
3	Kingfisher Drive	-6	-6	-74	-76
4	Covingham Drive	-3	-1	-37	-38
5	A420 (east of site access)	-51	-27	-628	-643
6	A419 (north of White Hart Junction)	-101	-60	-1244	-1273
7	A419 (south of White Hart Junction)	-103	-62	-1269	-1298
8	High Street	0	0	0	0
9	Callas Hill	-9	-7	-111	-113
10	A4312 Oxford Road	2	3	25	25
11	Drakes Way	-5	-3	-62	-63
12	B4006 Dorcan Way	-56	-38	-690	-706
13	A420 (between Gablecross Junction and White Hart Junction)	-51	-27	-628	-643

7.4.24 The cumulative effect of these schemes in addition to the Proposed Development is to marginally reduce traffic on most links within the study area, marginally increase traffic on Oxford Road and to have no effect on High Street. The change in traffic is not anticipated to give rise to any change in the environmental effects identified above.

7.4.25 The cumulative assessment is also not anticipated to affect the mitigation measures.

7.5 Assessment Summary

7.5.1 The outcome of the assessment undertaken for the Proposed Development and the mitigation proposed do not differ from that for the Environmental Assessment. The table provided at paragraph 11.161 of that document remains valid and the significance of the effects considered above with and without mitigation is summarised below for ease of reference.

Table 7.5 Summary Table of Transport Impacts

Description of Likely Significant Effects	Significance (Major, Moderate, Slight, Negligible or Nil)	
	Without Mitigation	With Mitigation (Residual)
Construction Phase		
Severance	Negligible	Negligible
Driver Delay	Negligible	Negligible
Pedestrian Delay and Amenity	Negligible	Negligible
Fear and Intimidation	Negligible	Negligible
Accidents and Safety	Negligible	Negligible
Operational Phase		
Severance	Negligible	Negligible
Driver Delay	Negligible	Negligible
Pedestrian Delay and Amenity	Negligible	Negligible
Fear and Intimidation	Negligible	Negligible
Accidents and Safety	Negligible	Negligible

8 Ecology

8.1 Introduction

8.1.1 This chapter of the ES Addendum has been produced by FPCR Environment and Design Ltd on behalf of Countryside Sovereign Swindon LLP (CSS). This chapter provides a current baseline summary of the ecological and arboricultural features of the Site. This chapter also seeks to assess the likely impacts of the Proposed Development on wildlife designations, habitats of nature conservation interest, legally protected and notable species of plants and animals (terrestrial and aquatic), and trees of arboricultural value.

8.1.2 This addendum is not intended to be read as a standalone assessment, but it contains additional information in order to assess the effects that could arise following the modifications to the Proposed Development. Modifications are proposed following a technical review of the previously approved FRA Addendum, Parameters Plan, Illustrative Masterplan and associated technical evidence in which inconsistencies were identified. The modifications therefore seek to amended the Drainage Strategy and FRA Addendum to regularise its contents with the rest of the outline permission.

8.1.3 Reference should be made to the Original Environmental Statement (ES) Chapter[1] from 2019 and its associated figures and appendices, as well as the Ecological Mitigation and Management Framework (EMMF) from 2019 which was previously submitted following the Original ES prior to determination and was more up to date. The EMMF has also been updated to reflect the necessary changes. The EMMF addendum is found in **Appendix 8.7**.

8.2 Assessment Criteria & Methodology

Previous Assessment

8.2.1 Outline permission (ref. S/OUT/19/0582) was subject to an EIA and was granted consent in March 2021. The Original ES included a chapter prepared by Environmental Dimension Partnership Ltd (EDP); who provided ecology and arboricultural support for the outline application.

8.2.2 EDP provided a suite of ecological surveys (conducted in 2009, 2013 and 2017) and reporting as part of the outline application. Additionally, EDP prepared an arboricultural assessment of the Site, which comprised a survey (2014) and subsequent reporting. The findings of these original surveys are compiled as technical appendices to, and summarised within, Chapter 12 of the Original ES Chapter entitled “Ecology and Nature Conservation (Including Arboriculture)”.

8.2.3 The technical appendices of the Original ES Chapter are listed below and can be found with that document:

- Ecology Baseline Report (EDP, 2017)
- Update Phase 2 Survey Report (EDP, 2017)

1 Turley (2019). Environmental Statement Land at Lotmead Farm, Swindon. Accessed via: https://pa.swindon.gov.uk/publicaccess/ (Accessed 01.08.2023).

- Arboricultural Impact Assessment (EDP, 2019)
- Outline Landscape, Ecology and Arboricultural Management Plan (EDP, 2018)
- Ecology Consultee Correspondence (EDP, 2018)

8.2.4 EDP, based on the aforementioned technical information, included the following features of District value (or above) within the scope of the Original ES Chapter:

Habitats/Land-use

- River Cole LWS/River Cole and its tributaries (Liden Brook and Dorcan Stream);
- Hedgerows and associated mature trees;

Faunal Species Assemblages/Populations

- Freshwater bryozoan *L. crystallinus* population;
- Grass snake population;
- Serotine population;
- Great crested newt population; and
- Assemblages of fish and aquatic invertebrates (River Cole and its tributaries).

8.2.5 The Original ES chapter sought to identify the significance of residual effects, following the implementation of mitigation, for each of these features during both the Construction and Operation phases of the Proposed Development. In all cases the residual effects were assessed to be “Not Significant" and either “Neutral” or “Beneficial” following the application of mitigation – see Table 12.7: Summary of Residual Effect of Original ES Chapter.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

8.2.6 The Original ES Chapter set out the relevant legislation; however, for completeness there has since been an amendment to the Conservation of Habitats and Species Regulations (CHSR). The amended Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ensure that the habitat and species protection and standards derived from EU law as per “The Habitat Regulations” will continue to apply after Brexit. There would be no meaningful impact from a legislative perspective to the application of CHSR on the Proposed Development.

8.2.7 Additionally, the Environment Act 2021 came into force on 9th November 2021. Of relevance is the requirement for all developments subject to the Town and Country Planning Act to provide an at least 10% biodiversity net gain (BNG), as calculated using a Biodiversity Metric and a Biodiversity Gain Plan, with habitat used for net gain to be secured for a minimum of 30 years. Delivery of BNG may be on site, offsite or undertaken using statutory biodiversity credits. The requirement for BNG does not over-ride the need to apply the mitigation hierarchy (avoidance, mitigation and compensation) when considering biodiversity assets and their loss and does not change existing environmental and wildlife legal protection.

8.2.8 Whilst the Act mandates a 10% BNG delivery and for this to be a condition of planning permissions (Part 6 section 98 and Schedule 14 part 1), section 147 (3) states that this will only come into force once the secondary legislation is in place to support this requirement.

Therefore, there is a transition period (the length of which is not defined but anticipated as being around 2 years) until the mandated 10% is required under law.

8.2.9 At the time of writing the 10% is still not required by law but is due to be mandated from November 2023. Further, it is understood that mandatory BNG will only apply to sites that have submitted an application after the implementation of the Act, including Section 73 applications. Thus, the Proposed Development, having been submitted before the policy's enforcement is not considered bound by a mandatory 10%[2].

8.2.10 The requirement of a mandatory 10% BNG gain will therefore be considered no further within the present Chapter; however, it was agreed at outline through the EMMF that a net gain would be delivered and a now outdated metric was used to calculate net gain and had been included within the update EMMF (**Appendix 8.5**).

Guidance and Best Practice

8.2.11 The principal guidance and best practice as detailed within the Original ES Chapter for Ecological Impact Assessment (EcIA) remain current, these being the Chartered Institute of Ecology and Environmental Management's guidelines (CIEEM, 2018[3]).

8.2.12 All other relevant guidance cited within the Original ES Chapter also remains current.

Baseline Data Collection

8.2.13 The previous assessment has been updated to reflect changes to the Proposed Development resulting from the amended drainage strategy. A re-assessment of the sites baseline condition has been conducted to inform this. This has involved the following:

- A recent desktop study including a request for data to the Local biodiversity records centre (sent April 2022).
- Updated site-wide habitat assessment including full Defra Biodiversity Net Gain Condition Assessment including rivers (October 2021 & April 2022).
- Updated site-wide badger walkover (2022).
- Updated site-wide automated bat surveys (May, July, August, September, October 2022)
- Manual bat surveys on phases 1-4(May, July, August, September, October 2022).
- Updated site-wide breeding bird survey (scoping) (May, 2022).
- Updated site-wide Great Crested Newt (GCN) eDNA surveys (2022 & 2023).
- Updated site-wide hazel dormouse surveys (2022).

2 Local Government Association. Biodiversity Net Gain FAQs - Frequently Asked Questions. Last Updated 27.06.2023. Available at: Biodiversity Net Gain FAQs - Frequently Asked Questions | Local Government Association (Accessed 01.08.2023).

[3] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

- Updated reptile surveys at targeted locations (2022).
- Updated site-wide riparian mammal surveys (2022).

8.2.14 Methods, results and conclusions drawn for these updated works are presented within **Appendix 8.1 - Ecology Survey Results Report**.

8.2.15 It should be noted that surveys conducted in 2022/2023 were part of a detailed program for ongoing survey updates across the life of the scheme. The robust program spans 10 years and aims to provide a thorough program of updates to ensure up to date surveys are available as the phases come forward. The outline conditions have also influenced the survey schedule. This is why manual bat activity surveys do not cover the whole site (but automated surveys do) as they only targeted the early phases, and it is also why there are no update bats in buildings and trees surveys (except for Phase 1) as these have been programmed in accordance with condition 14. The robust nature of the updates has still, however, ensured that a thorough baseline update is available for this addendum. Further justification for the survey design is provided in **Appendix 8.1**.

8.2.16 An updated tree survey in accordance with BS5837(2012) "*Trees in Relation to Design, Demolition and Construction – Recommendations"* has also been conducted by FPCR in February 2022. The results of which are provided within **Appendix 8.2 – Tree Survey Plan** and **Appendix 8.3 – Tree Schedule**.

Assessment Methodology

8.2.17 The assessment methodologies for assessing the significance of ecological effects were outlined within the Original ES Chapter. In sum, the value of ecological features were defined within a geographical context from **International** to **Negligible**:

- **International**/European value (SACs, SPAs, Ramsar sites);
- **National** value (SSSIs and NNRs, within UK and/or England);
- **County** value (e.g. within Wiltshire): e.g. Local Nature Reserves, Local Wildlife Sites, Ancient woodlands;
- **District** value (e.g. Swindon Borough): e.g. watercourses, ponds, hedgerows, woodland – where species rich/extensive/atypical examples are present – moderate population sizes or species assemblages with moderate diversity of species;
- **Local** value (e.g. Covingham Parish): e.g. watercourses, ponds, hedgerows, woodland – common and widespread species with small populations;
- **Site**-level (e.g. Lotmead Farm Villages) and immediate environs: e.g. small areas of grassland and scrub – agricultural land – common and widespread species with small populations; and
- **Negligible** value; typically applied to areas of built development, active mineral extraction, or intensively farmed agricultural land.

8.2.18 Only those features deemed **District** value, or above were considered for further assessment.

8.2.19 Both onsite and off-site effects of the Proposed Development to ecological (and arboricultural) features were assessed. Consideration was given as to whether effects would be permanent or temporary, and direct or indirect. The significance of an effect was calculated to be a product

of the magnitude of the impact and the assessed value of the ecological feature affected. The effect may be either **adverse**, **beneficial**, or in some cases **negligible**.

8.2.20 For consistency, only those important ecological features of district level or above have been taken to assessment and justification is provided in paragraphs 12.76 to 12.80 of the Original ES Chapter. These paragraphs also detail how those features below this level were still considered and mitigated through the design of the scheme and proposed mitigation within the Technical Appendices. This has also been repeated here, and is supported by the detail provided in the updated EMMF (**Appendix 8.7**).

8.2.21 On this basis, the assessment of likely ecological effects within this Chapter uses the same terminology as summarised below:

- **significant** or **not significant**;

8.2.22 And a combination of the following:

- either **adverse** or **beneficial** or **negligible;**
- either **direct** or **indirect**;
- either **permanent** or **temporary**; and
- where relevant, either '**short**', '**medium**' or '**long-term**' (short – up to 1 year, medium – 1 to 10 years, or long-term – over 10 years) of effect.

Geographical Scope

8.2.23 The geographical scope of this chapter was outlined within the Original ES Chapter in paragraphs 12.37 – 12.38 and Figure 12.1. This scope has been carried through into the data presented within **Appendix 8.1**. No change to the assessed geographic scope from the Original ES Chapter is proposed.

Temporal Scope

8.2.24 The temporal scope remains the same as set out within the Original ES Chapter. As such, effects on ecological and arboricultural features have been assessed during both the Construction and Operation phases of the Proposed Development.

8.3 Baseline Environment

8.3.1 Baseline habitats have previously been assessed by EDP during their surveys in 2009, 2013 and 2017.

Habitats

8.3.2 An updated assessment of the ecological baseline of the Site is provided in **Appendix 8.1**. The Site remains under agricultural tenure. It was predominantly given over to improved grassland that was being actively managed for grazing cattle. There were relatively smaller areas of intensively managed arable land used by the pick your own farm. Other habitat, notably pockets of woodland, tall ruderal, marshy grassland and species-poor semi-improved grassland were present on Site. Bounding the field compartments were a network of largely native hedgerows many of which incorporated standard trees.

8.3.3 In the Original ES Chapter, the River Cole LWS/River Cole and its tributaries (Liden Brook and Dorcan Stream) and extensive hedgerows and associated mature trees, were identified as the

ecologically important habitat features on site (district level or above), and were the only features scoped into the assessment. The updated baseline assessment does not change this conclusion and again are the only features are scoped in.

Fauna

8.3.4 A suite of protected and notable species survey was conducted by EDP in 2009, 2013 and 2017. A number of surveys updates have been conducted by FPCR in 2022 and 2023 as highlighted earlier in this chapter and detailed within **Appendix 8.1**. Below summarises the baseline status of the taxa identified in the Original ES Chapter and following the 2022.23 updates:

- Breeding birds: assessed as **site** level at outline. No significant change in habitat nor assemblage was confirmed during the May 2022 update scoping survey.

- Navigating / foraging bats: assessed as **local** value at outline. At least nine species were recorded, including barbastelle (0.72% of total) which was recorded in low number during the 2017 surveys. The 2022 surveys recorded at least ten species in total, again including low numbers of barbastelle (0.59%). The additional species was lesser horseshoe which recorded as a single registration in September 2022 (0.001%). The results of the 2022 surveys do not show a significant change in baseline and the assessment remains **local** value.

- Bat roosts: at outline there were maternity roosts for serotine and (brown) long-eared bats present in Building B12, and small non-maternity roosts for common pipistrelle recorded in B16 and B21. Serotine were assessed as **district** value, and the long-eared bats and common pipistrelle as **local.** Buildings remain present and will be re-assessed through Condition 14.

- Dormouse: assessed as l**ocal** value at outline. Single dormouse recorded in north of the site in 2013, absent 2017 and 2022. Thought to be present locally in low numbers. Remian assessed as **local** value.

- Otter: assessed as **local** value at outline. In 2022 were present in River Cole and Dorcan Stream and absent from Liden brook. The evidence was similar that found in the surveys conducted in 2017, and the assessment remains **local** value.

- Water vole: assessed as **local** value at outline. 2022 showed a reduction with no water vole signs in Liden Brook and pond P1 compared to the 2017 surveys. Remain assessed as **local** value.

- Great crested newt: assessed as **district** value at outline with a medium-sized population in Ponds P3 and P4 onsite. The 2022 eDNA survey showed continued presence in P4 and an absence in pond P3. In 2023, P3 was resurveyed and again the result was negative. Remain assessed as **local** value.

- Grass snake: assessed as **district** value at outline, with a high population recorded on site. 2022 surveys indicate no significant change, and the assessment remains **local** value.

- A freshwater bryozoan (*Lophopus crystallinus*): known population in the River Cole system and assessed as **district** value at outline and for this addendum.

8.3.5 Across all taxa/species there were no significant differences between the findings of the original EDP surveys and FPCR's. It is therefore concluded that there has been no material baseline change in ecological condition on site between that presented as part of the Outline Planning application and present day. The baseline ecological value of the Site itself remains unchanged (see **Appendix 8.1** and section 8.3 below) since the Original ES Chapter.

8.3.6 Except for River Cole LWS, the majority of offsite Statutory and Non-Statutory Sites of Nature Conservation were scoped out of the assessment in the Original ES Chapter. One offsite Statutory Site, Tuckmill Meadows SSSI located 4 km NE, has now been assessed in the air quality chapter for this addendum (Chapter 11) as exceeding the threshold for Annual Average Daily Traffic. An impact assessment for this important ecological feature is now included here.

8.3.7 Through consideration of the geographic and temporal scope of the assessment, and confirmation that there has been no material change of the baseline ecological condition on Site, it is considered that the final scope of the present assessment should remain in line with that scoped into the Original ES Chapter with the addition of Tuckmill Meadows SSSI. The final scope is summarised below in Table 8.1.

Table 8.1 Final Scope of Ecological Assessment

Important Ecological Feature	Key Attributes	Value
Habitat/Land Use		
Tuckmiell Meadow SSSI (4km NE)	Designated for its calcareous fen, calcareous grassland and neutral grassland.	National
River Cole LWS/River Cole and its tributaries (Liden Brook and Dorcan Stream)	Landscape-scale wildlife corridor	County
Hedgerows and associated mature trees	Strong, species-rich, green network	District
Faunal Species Assemblages/Populations		
Freshwater bryozoan *L. crystallinus* population	Conservation notable (Red data List)	County
Grass snake population	High population present	District
Serotine population	Small maternity roost present	District
Great crested newt population	eDNA positive result for Pond 4 only. Pond 4 was previously assessed to have a medium sized meta-population in combination with Pond 3. GCN currently considered absent from Pond 3.	District
Assemblages of fish and aquatic invertebrates (River Cole and its tributaries)		District

8.4 Updated Assessment of Impacts and Effects

8.4.1 As discussed above, this Chapter has been prepared in order to assess the likely effects of the amended Drainage Strategy and FRA Addendum in order to regularise its contents with the approved Outline Application, based on the current understanding of the baseline value of the Site.

8.4.2 To this end, the amendments have been designed, based on the parameter plans which were approved at Outline. There are there no proposed changes to the approved parameters and

the scope of the Proposed Development remains the same as approved, in summary comprising:

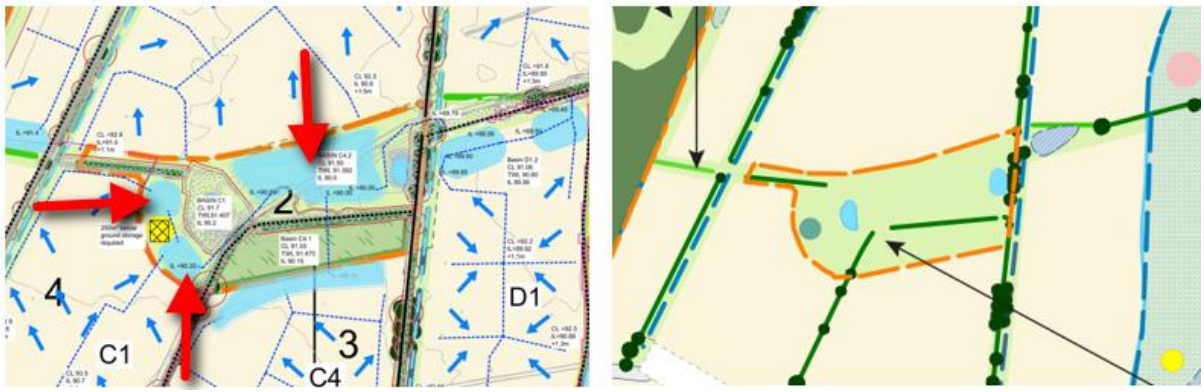
- up to 2,500 homes
- up to 1,780sqm of community/retail uses
- up to 2,500sqm of employment use
- sports hub
- playing pitches
- 2no. 2 form entry primary schools
- green infrastructure
- indicative primary access road corridors to A420
- improvements to Wanborough Road and associated works

8.4.3 The primary difference between the approved Drainage Strategy and FRA Addendum and the proposed amendments is the removal of the requirement for prioritisation of plot scale source control features and new above ground conveyancing features. This enables a predominantly piped drainage solution to tertiary basins in open space. Drained swales are proposed to run alongside strategic roads, with piped sewers to be used to convey surface water runoff to tertiary basins or ponds.

8.4.4 The location and extent of the majority of proposed drainage features match those shown on the approved Parameter Plan Green Infrastructure (**Appendix 8.4**). Most drainage features will sit within land previously shown as developable area or within land safeguarded for tertiary drainage features.

8.4.5 However, three additional drainage basins are proposed as part of the amended Drainage Strategy and FRA Addendum. These will sit within areas previously shown as Green Space within the central Biodiversity Zone (**Appendix 8.4**) close to Ponds 3 and 4. The location of additional drainage basins are indicated by red arrows in Figure 8.1.

Figure 8.1: Proposed changes to Drainage Strategy and FRA Addendum in area of central Biodiversity Zone. Left image shows snapshot of proposed changes (DWG. 22006-HYD-P0-XX-DR-C-2222 P03). Right image shows snapshot of approved parameter plan (DWG. DWG. PL1461.1-PLA-00-XXDR-U-0005 P04).



8.4.6 The Original ES Chapter provided a comprehensive breakdown of Permanent Habitat Losses to development both for Area Features (Table 12.6a of Original ES Chapter) and Linear Features (Table 12.6b of Original ES Chapter).

8.4.7 The revised Drainage Strategy and FRA Addendum will require a reduction of 0.68ha from what was originally proposed as Lowland Meadow within the central Biodiversity Zone. For context, total Green Space of the Proposed Development constitutes 62.29ha. This reduction will be mitigated via Primary Mitigation, inherent within the landscape proposals (and as explained within Appendix 8.7), in two ways:

8.4.8 Firstly, the basins in this area will experience periodical flooding, but otherwise the embankments and some of the base will be dry for much of the year. Whilst the topography of the basins will not be typical of floodplains/lowland meadows, the vegetation in these ephemeral (from a flood perspective) areas will function in much the same way as a lowland meadow with the right management prescriptions. The basins will therefore work in tandem with the two existing ponds (P3 and P4), providing a matrix of wet, marginal and grassland habitats. The area will remain functional as a Biodiversity Zone. Impacts on great crested newt, which were present in Pond 4, are discussed below.

8.4.9 Secondly, it is envisaged that the majority of the Green Space forming the northern boundary of the Site will be managed as a meadow with infrequent mowing and access provided in the most part by mown paths. In any case, it is considered that this area would function much better as a lowland meadow, than the aforementioned central Biodiversity Zone, due to its better connectivity to the wider landscape, proximity to the riparian corridor on the northern boundary and the other Biodiversity Zone/ Nature Reserve located in the north west of the Site.

8.4.10 It is considered that the management provisions, as discussed above, can be easily incorporated into a Landscape, Ecology and Arboricultural Management Plan (LEAMP) as per condition 11 as these areas are brought forward for Reserved Matters.

8.4.11 The central Biodiversity Zone will remain a valuable feature for ecology, based on the present proposals. Furthermore, the large areas of Green Space in the north of the Site, which will be well connected to the wider landscape and other relatively higher ecological value areas will be managed as lowland meadows. It is therefore concluded that the proposed changes within the central Biodiversity Zone will have a Negligible, Not Significant impact on the ecological value of the Proposed Development once operational.

8.4.12 Additionally, because the amended Drainage Strategy and FRA Addendum are in keeping with the approved parameter plans, the impacts to the wider habitat features of significance (namely Hedgerow Network and Trees) are predicted to be Negligible, Not Significant. This is based on a review of the Proposed Development from an arboricultural perspective – see **Appendices 8.5** and **8.6**.

8.4.13 Construction, Operation and Cumulative effects for ecological features scoped into the assessment are discussed in turn below. The assessments have been considered in the context of the outline conditions. These are summarised as follows:

Ecology:

- 11. Landscape and Ecological Management Plan (LEMP), informed by EMMF and updated survey updates.
- 12. Access from A420 Habitat Surveys Prior to the submission of any reserved matters application that includes access from the A420.

- 14. Bat Surveys of roost potential buildings and trees prior to partial or full removal.
- 35. Construction and Ecological Management Plan (CEMP) per Phase.
- 43. Environment Agency - River corridor survey where a phase of development is the first to propose an outfall into a main river (submitted with Phase 1).
- 44. Environment Agency - Ecological buffer zone. No development within any phase or sub phase of development that is within 10 metres of the River Cole and its tributaries shall take place until a scheme for the provision and management of at least a 10 metre wide ecological buffer zone alongside the River Cole and its tributaries has been submitted to, and approved in writing by, the local planning authority.

Arboriculture

- 15. Trees: Reserved matters applications shall accord with the details of trees and hedgerows contained within the Lotmead Farm Villages Arboricultural Impact Assessment
- 13. Access from A420 Arboricultural Survey Prior to the submission of any reserved matters application that includes access from the A420.

Construction Impacts and Effects

8.4.14 Predicted construction effects are detailed below and summarised in Table 8.3. In all cases the predicted residual effect arising from the construction phase remain the same as the Original ES Chapter.

Tuckmill Meadow SSSI (4km NE)

8.4.15 No construction impacts are predicted on this SSSI due to the distance of the SSSI from the Proposed Development.

River Cole LWS/River Cole and associated aquatic fauna

8.4.16 There has been no significant change in baseline ecological condition of the Site. The Proposed Development remains in accordance with the approved parameters. The assessment of effects remains as set out in the Original ES Chapter.

Hedgerow network and trees

8.4.17 There has been no significant change in baseline ecological condition of the Site. The Proposed Development remains in accordance with the approved parameters. The assessment of effects remains as set out in the Original ES Chapter.

Small serotine maternity roost

8.4.18 There has been no significant change in baseline ecological condition of the Site. The Proposed Development remains in accordance with the approved parameters. The assessment of effects remains as set out in the Original ES Chapter.

Medium population great crested newt

8.4.19 Previously a medium sized meta population of great crested newts (GCN) were described within the Original ES Chapter in Ponds 3 & 4.

8.4.20 eDNA surveys by FPCR for Pond 3 in both 2022 and 2023 provided negative results for GCN. At the time of writing GCN are considered absent from Pond 3. Pond 3 is not considered a constraint to the proposals from a GCN perspective.

8.4.21 Pond 4 has consistently had GCN positive results. Both from the Original ES Chapter and from the 2022 and 2023 eDNA surveys conducted by FPCR.

8.4.22 Two Natural England District Level Licences (DLL) are in preparation to ensure that the Proposed Development may proceed in a legally compliant manner with respect GCN. A DLL is currently in preparation for Phase 1 (and a small area of associated land) and a countersigned IACPC agreement from Natural England has been received. Further to this, a phased DLL is in preparation that will cover all remaining phases of the Proposed Development.

8.4.23 Compensation for GCN will therefore be provided for the entire Proposed Development as part of the DLL. GCN are therefore no longer considered a constraint to the Proposed Development.

8.4.24 However, it is proposed that GCN present on site will be protected from accidental harm during construction through Reasonable Avoidance Measures (RAMs) during clearance of sensitive areas of the Site, namely those close to Ponds 3 and 4. RAMs produced in accordance with best practice guidance[4] will ensure measures for sensitive clearance of vegetation and good working practices/site housekeeping to ensure that GCN do not stray onto the developable area during construction. These works will be conducted simultaneously with the grass snake measures (discussed below) and may therefore involve a degree of incidental (from a GCN perspective) exclusion measures from the development area during construction.

8.4.25 RAMs will be specified through the conditioned CEMP accompanying GCN sensitive areas of the site, as appropriate, when these areas are brought forward for Reserved Matters.

8.4.26 In absence of the aforementioned mitigation it would be predicted that the construction phase of the Proposed Development would have a significant adverse effect on the GCN population of the Site. However, following implementation of the DLL and RAMs it is deemed that the residual effect would be reduced. This is because the DLL will ensure that suitable habitat is created and maintained locally, whilst the RAMs will ensure that GCN identified on Site will protected as a precaution.

8.4.27 Accordingly, following the implementation of the DLL and RAMs it is concluded that the impacts of the construction remain **Not significant, Neutral** in accordance with the Original ES Chapter.

High population of grass snake

8.4.28 Previously a high population of grass snake were described within the Original ES Chapter.

8.4.29 FPCR conducted reptile surveys over a smaller geographic area of the Site than surveyed for the Original ES Chapter. These surveys were targeted at areas of most suitable habitat in 2022 as detailed in Appendix 8.1. FPCR recorded grass snake during 2022, though not in the number of individuals as described in the Original ES Chapter. However, there has been no material change in baseline habitat condition and therefore there is no reason to suggest that the Site

4 ARGUK (2019). Guidance for works carried out under great crested newt district level licensing. Available at: https://www.arguk.org/info-advice/gcn-licensing-reform/436-ne-gcn-dll-guidance-march19/file (Accessed 02.08.2023)

no longer supports a high population. The population and therefore scope of the assessment in the Original ES Chapter remain valid.

8.4.30 The Original ES Chapter detailed proposals for trapping, capture and exclusion measures delivered through the conditioned CEMP. The Proposed Development remains in accordance with the approved parameters. The assessment of effects remains as set out in the Original ES Chapter.

Occupation Impacts and Effects

8.4.31 Predicted occupation effects are detailed below and summarised in Table 8.3. In all cases the predicted residual effect arising from the occupation phase remain the same as the Original ES Chapter.

Tuckmill Meadow SSSI (4km NE)

8.4.32 The ESA air quality chapter (Chapter 11) predicts an Annual Average Daily Traffic (ADDT) increase on the A420 of 1,295, which runs within 200m of Tuckmill Meadows SSSI. The ADDT therefore exceeds the Design Manual for Road and Bridges[5] and Natural England (2018)[6] threshold and subsequently is considered at risk from air pollution due to atmospheric nitrogen deposition.

Figure 8.2 Tuckmill Meadow SSSI (red) and proximity to A420 (source: MAGIC Maps 2023)

8.4.33 The SSSI consists of a single unit with two habitat types: calcareous fen habitat and a complex of neutral and calcareous grassland. It was last condition assessed by Natural England in

[5] Design Manual for Roads and Bridges Volume 11 Environmental Assessment Section 3 Environmental Assessment Techniques Part 1 Air Quality

[6] Natural England (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations

November 2020[7] and has been put in "unfavourable declining" due to undermanagement resulting in both scrub encroachment and botanical evidence of increased nutrient levels. Management to reduce scrub including cutting and removal of vegetation to reduce nutrient is recommended by NE to improve condition. Atmospheric nitrogen is not mentioned by Natural England as a threat; however, calcareous fen and grassland is suspectable to increased nutrient loads, and given the proximately of the SSSI to the A420, further assessment is provided here.

8.4.34 The northern part of the Site is approximately 35m from the road. This section is screened from the road by mature woodland that lies between the SSSI boundary and the road, and it is considered unlikely deposition from the road would be able to reach the protected habitats in this location. The southern part of the site is approximately 170m from the road. There are two hedgerows between the road and the protected habitats which will provide some screening; however, more significantly, the distance from road to the SSSI is at the upper end of the 200m threshold and deposition is known on average to rapidly decrease with distance from the road[8].

8.4.35 Given these factors, and because atmospheric nitrogen is not identified as a threat to the SSSI, it is concluded that the SSSI is not sensitive to atmospheric nitrogen deposition. The potential impact of the Proposed Development on the SSSI is predicted to be **Not significant, neutral**.

River Cole LWS/River Cole and associated aquatic fauna

8.4.36 There has been no significant change in baseline ecological condition of the Site. The Proposed Development remains in accordance with the approved parameters. The assessment of effects remains as set out in the Original ES Chapter.

Hedgerow network and trees

8.4.37 There has been no significant change in baseline ecological condition of the Site. The Proposed Development remains in accordance with the approved parameters. The assessment of effects remains as set out in the Original ES Chapter.

Small serotine maternity roost

8.4.38 There has been no significant change in baseline ecological condition of the Site. The Proposed Development remains in accordance with the approved parameters. The assessment of effects remains as set out in the Original ES Chapter.

Medium population great crested newt

8.4.39 The DLL will ensure offsite habitat compensation in targeted areas to ensure the favourable conservation status of GCN in these offsite areas will remain. There is no requirement as part of DLL to mitigate/compensate for GCN on site.

8.4.40 Nevertheless, the previously discussed central Biodiversity Zone will provide good habitat for any GCN present on site in this area. Likewise, Green Space habitat provision, in accordance

[7] Natural England. Designated Sites View. Available at: https://designatedsites.naturalengland.org.uk/SiteFeatureCondition.aspx?SiteCode=S1000491&SiteName=Tuckmill%20Meadows%20SSSI (Accessed 23.08.2023).

[8] 0 BIGNAL, K., ASHMORE, M. & POWER, S. 2004. The ecological effects of diffuse air pollution from road transport. English Nature Research Report No. 580, Peterborough.

with the approved parameters will provide suitable good habitat for GCN and other amphibians present on Site.

8.4.41 There are no changes resulting from the amended Drainage Strategy and FRA Addendum that would alter the residual effect of the Proposed Development on GCN during operation. Consequently, the assessment of effects remains as set out in the Original ES Chapter.

High population of grass snake

8.4.42 There has been no significant change in baseline ecological condition of the Site, nor on the classification of the grass snake population present. The Proposed Development remains in accordance with the approved parameters, the main difference being the addition of three new attenuation basins near to Ponds 3 and 4.

8.4.43 Grass snake are a species which favours marginal and riparian habitats. The addition of the three attenuation basins in the central Biodiversity Zone close to Ponds 3 and 4 is therefore expected to provide an minor enhancement during the operation phase above that which was described in the Original ES Chapter. Consequently, the assessment of effects remains as set out in the Original ES Chapter.

Cumulative Effects

8.4.44 Of the important ecological features scoped in to this Chapter (Table 8.1), it is considered that the following may be cumulatively impacted by offsite proposals due to their connectivity to habitats outside of the Site.

- River Cole LWS/River Cole and its tributaries (Liden Brook and Dorcan Stream);
- Assemblages of fish and aquatic invertebrates (River Cole and its tributaries); and
- Hedgerows and associated mature trees network.

8.4.45 Tuckmill Meadow SSSI has been screened out of cumulative assessment because, as discussed above, the Proposed Development is not predicted to have a significant effect on this designated site. Therefore, the Proposed Development could not have a cumulative effect on the SSSI.

8.4.46 All other important ecological features, namely: Grass snake population; Serotine population; and GCN population have been screened out of future cumulative impacts. This is because these features are either: localised to the site and fully mitigated for within the proposals with no residual significant impact; or mobile and associated with the above screened in features and so are by default considered with them.

8.4.47 In the case of the GCN population it is also considered that the DLL will ensure that the district population is maintained and enhanced offsite, despite the provision of large areas of suitable habitat within Green Space on Site.

8.4.48 A full list of potential cumulative sites to be considered by each specialism within this ES Addendum has been provided in Table 3.2.

8.4.49 The following sites have been screened in for further assessment here:

- Land North Of A420 Eastern Villages Swindon (South Marston / Rowborough) (S/OUT/13/1555)
- Land At Symmetry Park Shrivenham Road South Marston SN3 4RS (S/OUT/14/0253)

- Great Stall East – Land South Of The A420 South Marston Swindon (S/OUT/17/1990)
- Land East Of The A419, Between Commonhead Roundabout And Land North Of Wanborough Road, Swindon Wilts (S/19/0703)
- Redlands Eastern Villages Swindon Swindon (S/OUT/16/0021)

8.4.50 Reference information for each of the above has been taken directly from the Local Authority planning portal, including, but not limited to: Environmental Statements; planning layouts and landscape proposals; and technical ecology reports.

8.4.51 The remainder of the cumulative sites have been screened out as they are too far from, or not directly linked with, the features being assessed.

8.4.52 The River Cole LWS/River Cole and its tributaries are either located within or bordering the boundaries of each of the above. Therefore, there is a degree of connectivity between these sites and the Site via this ecological feature.

8.4.53 Additionally, in the case of S/OUT/14/0253, S/OUT/17/1990 and S/19/0703 the Site shares boundaries and therefore links with hedgerows and associated mature trees network.

8.4.54 Table 8.2 below provides details and conclusions of the cumulative assessment based on the parameters discussed above.

Table 8.2 Cumulative assessment of Important Ecological Features

Site Address	Application Reference	Approx distance from site	Cumulative assessment
Land North Of A420 Eastern Villages Swindon(South Marston / Rowborough)	S/OUT/13/1555	450m	S/OUT/13/1555 proposed protection of riparian corridors as part of the construction mitigation, i.e. pollution controls. Additionally, watercourses are to be retained and buffered from proposals. Significant effects of S/OUT/13/1555 on riparian corridors were not predicted. Impacts from S/OUT/13/1555 on aquatic animals (e.g. otter, water vole, white claw crayfish) were not predicted. No cumulative, in combination effect on the River Cole LWS/River Cole and its tributaries and associated aquatic fauna is predicted between S/OUT/13/1555 and the Proposed Development. The effect is predicted to be **Not Significant.** Site is separated from the Proposed Development by the A420. There is no connection between hedgerows and trees. Hedgerows and trees are considered no further.

Land At Symmetry Park Shrivenham Road South Marston SN3 4RS	S/OUT/14/0253	180m	S/OUT/14/0253 proposed best practice mitigation measures to avoid impacts to offsite habitats, arising from pollution to the River Cole. Significant effects of S/OUT/14/0253 on River Cole were not predicted. No cumulative, in combination effect on the River Cole LWS/River Cole and its tributaries and associated aquatic fauna is predicted between S/OUT/14/0253 and the Proposed Development. The effect is predicted to be **Not Significant.** S/OUT/14/0253 borders close to the norther boundary of the Proposed Development along the River Cole corridor. The trees partially forming this corridor connect with the network of hedgerows and trees in the Proposed Development. The residual effect of S/OUT/14/0253 on habitats within the site (to include hedgerows and mature trees) are “certain beneficial, medium to long-term” on the basis of planting delivering a net-gain in tree and hedgerow cover. The same applies to the Proposed Development. No cumulative, in combination effect on the hedgerows and associated mature trees network is predicted. The effect is predicted to be **Not Significant**.
Great Stall East – Land South Of The A420 South Marston Swindon	S/OUT/17/1990	100m	S/OUT/17/1990 proposed protection of riparian corridors as part of the construction mitigation, i.e. pollution controls. Additionally, watercourses are to be retained and buffered from proposals. Finally, new SuDS features were proposed to further mitigate the impacts of the proposals. Significant effects of S/OUT/17/1990 on riparian corridors were not predicted. Impacts from S/OUT/17/1990 on aquatic animals (e.g. otter, water vole, white claw crayfish) were not predicted. No cumulative, in combination effect on the River Cole LWS/River Cole and its tributaries and associated aquatic fauna is predicted between

			S/OUT/17/1990 and the Proposed Development. The effect is predicted to be **Not Significant.** S/OUT/17/1990 borders close to the norther boundary of the Proposed Development along the River Cole corridor. The trees partially forming this corridor connect with the network of hedgerows and trees in the Proposed Development. The residual effect of S/OUT/17/1990 on habitats (Scattered Trees, TPOs, potentially veteran & Native species-rich Hedgerows) was considered non significant at both construction and operation phase. S/OUT/17/1990 predicted a net-gain in tree and hedgerow cover. The same applies to the Proposed Development. No cumulative, in combination effect on the hedgerows and associated mature trees network is predicted. The effect is predicted to be **Not Significant**.
Land East Of The A419, Between Commonhead Roundabout And Land North Of Wanborough Road, Swindon Wilts	S/19/0703	Adjacent	S/19/0703 proposed best practice mitigation measures to avoid impacts to offsite habitats, arising from pollution to the River Cole LWS. Significant effects of S/19/0703 on River Cole LWS were not predicted. Significant negative effects on otter were predicted as part of S/19/0703 resulting from habitat damage and loss in quality and increased noise and disturbance. All other impacts on otter were predicted to be not significant. The Proposed Development will mitigate for otter (and other aquatic fauna on Site). Cumulative effects on aquatic fauna are not predicted. No cumulative, in combination effect on the River Cole LWS/River Cole and its tributaries and associated aquatic fauna is predicted between S/19/0703 and the Proposed Development. The effect is predicted to be **Not Significant.** S/19/0703 borders close to the south eastern boundary of the Proposed Development along the Liden Brook (River Cole LWS)

			corridor. The trees partially forming this corridor connect with the network of hedgerows and trees in the Proposed Development. The residual effect of S/19/0703 on hedgerows and trees were predicted to be negative at the local level. S/19/0703 proposed the removal of 2 x veteran trees, which represented a predicted residual negative impact at the county level. Negative effects of S/19/0703 were to be compensated by new hedgerow and tree planting. The Proposed Development will retain and enhance the overall hedgerows and associated mature trees network. No cumulative, in combination effect on the hedgerows and associated mature trees network is predicted. The effect is predicted to be **Not Significant**.
Redlands Eastern Villages Swindon Swindon	S/OUT/16/0021	400m	S/OUT/16/0021 proposed best practice mitigation measures to avoid impacts to offsite habitats, arising from pollution to the River Cole LWS. Significant effects of S/OUT/16/0021 on River Cole LWS were not predicted. No cumulative, in combination effect on the River Cole LWS/River Cole and its tributaries and associated aquatic fauna is predicted between S/OUT/16/0021 and the Proposed Development. The effect is predicted to be **Not Significant.** Site is separated from the Proposed Development by existing field compartments. There is no direct connection between hedgerows and trees. Hedgerows and trees are considered no further.

8.5 Assessment Summary

8.5.1 Table 8.3 below provides a summary of residual effects based on the reassessment of the Proposed Development, following the amendments to the Drainage Strategy and FRA Addendum.

8.5.2 As discussed above, the proposed changes are in line with the parameters that were approved at Outline Planning. As there has been no material change in baseline condition of the site it is considered that the assessment of residual effects remain as presented within the Original ES Chapter.

8.5.3 The main change from an ecology perspective was the addition of three attenuation basins within the central Biodiversity Zone close to Ponds 3 and 4. Consideration was given to the effects of this change on significant features, GCN and grass snake, both of which were present in this area of the Site. However, when applying the effect of secondary and tertiary mitigation (summarised in Table 8.3) during both the construction and operation phases of the Proposed Development, it was concluded that the significance of residual effect remain as presented within the Original ES Chapter.

Table 8.3 Summary of Residual Effects

Feature	Stage	Significance of effects[1]	Main Secondary and Tertiary Mitigation	Significance of Residual Effect
River Cole LWS/River Cole and associated aquatic fauna	C	Significant, adverse	Buffering/pollution prevention measures delivered through CEMP	Not significant, Neutral
Hedgerow network and trees	C	Significant, adverse (worst case scenario only)	Temporary demarcation and buffering delivered through CEMP	Not significant, neutral
Small serotine maternity roost	C	Significant, adverse	Standard avoidance measures delivered through CEMP	Not significant, neutral
Medium population great crested newt	C	Significant, adverse	~~Trapping, capture and exclusion under Natural England derogation Licence~~ DLL and Reasonable Avoidance Measures and Exclusion	Not significant, neutral
High population of grass snake	C	Significant, adverse	Trapping, capture and exclusion delivered through CEMP	Not significant, neutral

Tuckmill Meadow SSSI	O	Not significant	None	Not significant, neutral.
River Cole LWS/River Cole and associated aquatic fauna	O	Significant, adverse	Design and operation of appropriate SUDS; partial-restoration of floodplain	Not significant, beneficial
Hedgerow network and trees	O	Significant, adverse (worst case scenario only)	Habitat enhancement and creation (2:1 planting of tree stock)	Not significant, beneficial
Small serotine maternity roost	O	Significant, adverse	Habitat enhancement and creation for roosting and foraging bats	Not significant, Beneficial
Medium population great crested newt	O	Significant, adverse	~~Creation and management of dedicated receptor site~~ Creation and management of habitat on site	Not significant, beneficial
High population of grass snake	O	Significant, adverse	Creation and management of dedicated receptor site	Not significant, beneficial

Table Notes: Construction - C; Operation – O; 1 includes Primary Mitigation (retention of and buffering from key habitats), A strikethrough indicates a change in status since from the previous assessment as per Original ES Chapter. Light blue text indicates the new status updated by FPCR in the ESA.

9 Landscape and Visual

9.1 Introduction

9.1.1 This chapter of the ES Addendum has been produced by Ben Stonyer CMLI, Senior Associate Landscape Architect at David Jarvis Associates Limited (DJA), landscape architects and town planners.

9.1.2 The assessment should be read in conjunction with the Original Landscape and Visual Impact Assessment (LVIA) prepared by The Urbanists and included in Chapter 13 of the Original ES dated April 2019.

9.1.3 This chapter has been produced to assess the landscape and visual effects arising as result of the updated Drainage Strategy and FRA and a review of the current baseline given the time that has passed since the Original ES.

9.2 Assessment Criteria & Methodology

Previous Assessment

9.2.1 The Original Landscape and Visual Chapter was prepared by the Urbanists and assessed the '*landscape and visual impact of the proposed development of land at Lotmead Farm Villages, off Wanborough Road, Swindon.'*

9.2.2 The Original ES chapter includes a description and analysis of baseline landscape and visual conditions.

9.2.3 Chapter 4 of the Original ES provides a detailed description of the construction activities from which the Original ES assessment was based. The main elements and features with potential to cause landscape and/or visual impacts are listed below:

- *'Erection of construction site and works compounds, temporary storage areas and temporary security fencing and associated vehicle movements;*
- *Earthworks, such as soil stripping, soil storage, cut/fill activities and main drainage infrastructure works and associated plant and vehicle movements;*
- *Primary vehicular access construction leading off the A420 and further vehicular access from Wanborough Road;*
- *Provision of site access roads, parking and other infrastructure;*
- *Construction of up to 2,448 residential units, 2 new primary schools, retail and business employment sites and new public open space.'*

9.2.4 Landscape and visual impacts were assessed to determine *'the capacity of the landscape to accommodate the likely changes of the proposed development without detriment'*, during construction, during operational year 0 and at Operational Year 10 to represent residual effects.

9.2.5 A thorough review was undertaken to ascertain the cumulative effects generated as a result of the proposed New Eastern Village (NEV) urban extension, as detailed in the Swindon Borough Council New Eastern Villages Green Infrastructure Supplementary Planning Document July 2017 (GI SPD). The likely cumulative residual effect on landscape was considered moderately adverse and significant. In terms of landscape character it was considered there would be a

moderately adverse and significant cumulative effect on the Vale Landscapes (which include LCA Vale of the White Horse, Midvale Ridge and Western Clay Vale as defined on Figure 9.6), this was principally due to the size of the NEV development. However it was considered there would be no residual effects on the Scarp and Downs Landscape (which include LCA Scarp, Down Plains and High Downs) owing to the separation distance and existing views of Swindon's residential, industrial and commercial urban edge.

9.2.6 Table 9.1 provides a summary of the Landscape and Visual affects concluded in the Original ES.

Table 9.1 Summary of Landscape and Visual conclusions from the Original ES

Potential Effects	Duration of Effect	Level of Effect at Year 0 and Significance	Level of Residual Effect at Year 10 and Significance
Loss of open Agricultural Land on Application Site	Permanent	Moderate adverse **Significant**	Minor Adverse **Not Significant**
Alterations to Site Topography on Application Site	Permanent	Minor/negligible adverse **Not Significant**	Negligible adverse **Not Significant**
Existing Application Site and Boundary Vegetation	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor beneficial **Not Significant**
Single Public Right of Way in westernmost part of Application Site – Route Diversion	Permanent	Moderate/minor beneficial **Not Significant**	Moderate beneficial **Significant**
Change in Local Landscape Character *(Vale of White Horse)*	Permanent	Moderate adverse **Significant**	Moderate/minor adverse **Not Significant**
Change in Local Landscape Character *(Scarp, Down Plains & High Downs)*	Permanent	**No Change**	**No Change**
Change in Local Landscape Character *(Midvale Ridge)*	Permanent	Minor/negligible adverse **Not Significant**	Minor/negligible adverse **Not Significant**
Change in Local Landscape Character *(Western Clay Vale)*	Permanent	Minor/negligible adverse **Not Significant**	Minor/negligible adverse **Not Significant**
Residential Receptors: Swindon	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Residential Receptors: Wanborough	Permanent	Moderate adverse **Significant**	Moderate adverse **Significant**
Residential Receptors: Hinton Parva	Permanent	Moderate adverse **Significant**	Moderate/minor adverse **Not Significant**
Residential Receptors: Individual Properties (Wanborough Road)	Permanent	Major/moderate adverse **Significant**	Moderate/minor adverse **Not Significant**
Roads: A420	Permanent	Moderate/minor adverse	Minor Adverse **Not Significant**

		Not Significant	
Roads: Wanborough Road	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Roads: Horpit minor road	Permanent	Moderate/minor adverse **Not Significant**	Negligible adverse **Not Significant**
Roads: North Wessex Downs edge	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**
Public Rights of Way: Wanborough-Horpit-Bourton	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**
Public Rights of Ways: Hinton Parva, Bishopstone, Ashbury	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Public Rights of Way: Ridgeway & Charlbury Hill	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Viewpoint 1	Permanent	Major/moderate adverse **Significant**	Major/moderate adverse **Significant**
Viewpoint 2	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**
Viewpoint 3	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Viewpoint 4	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Viewpoint 5	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Viewpoint 6	Permanent	Minor adverse **Not Significant**	Minor adverse **Not Significant**
Viewpoint 7	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Viewpoint 8	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**
Viewpoint 9	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**
Viewpoint 10	Permanent	Moderate adverse **Significant**	Moderate/minor adverse **Not Significant**
Viewpoint 11	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**
Viewpoint 12	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**

Legislative Context, Technical Guidance and Best Practice

Legislative Context

9.2.7 The Original Landscape and Visual chapter considered the legislative and policy framework relevant to the landscape appraisal. This included the National Planning Policy Framework (NPPF) Feb 2019, and the National Planning Policy Guidance (NPPG) on Design (Revision date March 2014). At a local level Policy EN5: Landscape Character and Historic Landscape of the Swindon Borough Council (SBC) Local Development Plan was considered, as well as the New Eastern Villages (NEV) Green Infrastructure Supplementary Planning Document (July 2017).

9.2.8 The NPPF was partially revised in July 2021 however the policies mentioned in the assessment are still included. In October 2019 the NPPG for Design was updated to be focussed on the design process and tools. As a result the following statement was omitted:

'Development should seek to promote character in townscape and landscape by responding to and reinforcing locally distinctive patterns of development, local man-made and natural heritage and culture, while not preventing or discouraging appropriate innovation.

The successful integration of all forms of new development with their surrounding context is an important design objective, irrespective of whether a site lies on the urban fringe or at the heart of a town centre.

When thinking about new development the site's land form should be taken into account. Natural features and local heritage resources can help give shape to a development and integrate it into the wider area, reinforce and sustain local distinctiveness, reduce its impact on nature and contribute to a sense of place. Views into and out of larger sites should also be carefully considered from the start of the design process.'

9.2.9 While the statement is not replicated, it's sentiment is echoed within the more recent National Design Guide 'Planning practice guidance for beautiful, enduring and successful places' published in January 2021, as demonstrated by the extracts below:

'Well-designed new development responds positively to the features of the site itself and the surrounding context beyond the site boundary. It enhances positive qualities and improves negative ones…'

'Well-designed new development is integrated into its wider surroundings, physically, socially and visually. It is carefully sited and designed, and is demonstrably based on an understanding of the existing situation'

9.2.10 Local policy EN5 and the (NEV) Green Infrastructure Supplementary Planning Document are still of relevance.

Guidance and Best Practice

9.2.11 The original assessment was based on the following documents:

- "Guidelines for Landscape and Visual Impact assessment" (3rd Edition, 2013), published by the Landscape Institute and the Institute of Environmental Assessment
- "Making Sense of Place – Landscape Character Assessment Guidance," (2002) published by the Countryside Agency and Scottish Natural Heritage.

- "Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity" (Scottish Natural Heritage and the Countryside Agency, 2004)

9.2.12 These documents are still of relevance.

9.2.13 Since the ES was submitted the Landscape Institute produced Technical Guidance Note (TGN) 06/19 'Visual Representation of Development Proposals' in September 2019. TGN 6/19 provides guidance on the appropriate techniques to capture site photography. All photography has been updated as part of this Addendum to accord with TGN 6/19 (see Appendix 9.1).

Baseline Data Collection

9.2.14 The landscape character baseline has been reviewed using the latest published landscape character assessments relevant to the study area and during a site visit conducted on the 18th July 2023. Landscape character mapping is included on Figures 9.3-9.7 and the sources are listed below:

- NCA 108: Upper Thames Clay Vales Profile, published by Natural England;
- NCA 109: Midvale Ridge Profile, published by Natural England;
- NCA 116: Berkshire & Marlborough Downs Profile, published by Natural England;
- The North Wessex Downs Area of Outstanding Natural Beauty Landscape Character Assessment (2002), published by the Countryside Agency;
- The Wiltshire Landscape Character Assessment (2005), published by Wiltshire County Council;
- The Oxfordshire Wildlife & Landscape Study (OWLS), incorporating the Oxfordshire Landscape Character Assessment (2004), published online only by Oxfordshire County Council;
- Landscape Character Areas Adopted Supplementary Planning Guidance, Swindon Borough Local Plan 2026 Revised Deposit Draft (2004), published by Swindon Borough Council;
- Vale of White Horse Landscape Character Assessment (2017), produced by HDA for the Vale of White Horse District Council.

9.2.15 Landscape designation mapping (see Figure 9.2) has been produced in GIS using datasets and mapping from the following sources:

- Natural England
- Historic England
- England's Community Forests
- Wilts and Berks Canal Trust

9.2.16 Public Rights of Way (PRoW) have been sourced from mapping at Swindon.gov.uk and are shown on Figure 9.8.

9.2.17 The visual baseline was updated during a survey of the Site and study area on the 18th July 2023. The updated viewpoint photos can be seen at **Appendix 9.1** and a comparison with the viewpoint photos included in the Original ES can be seen at **Appendix 9.2**.

Assessment Methodology

9.2.18 This addendum assesses changes to the Original Landscape and Visual Assessment as a result of the revised Drainage Strategy and FRA.

9.2.19 The principal change to the Drainage Strategy and FRA is the removal of the requirement for prioritisation of plot scale source control features and new above ground conveyancing features. This enables a predominantly piped drainage solution to tertiary basins in open space. Drained swales are proposed to run alongside strategic roads, with piped sewers to be used to convey surface water runoff to tertiary basins or ponds.

9.2.20 Tertiary basins or ponds have been positioned within open spaces so as not to impact the landscape mitigation framework agreed within the Landscape Parameter Plan. Key elements of the framework highlighted within the ES included:

- *'Create primary and secondary green corridors through the Application Site incorporating some of the retained existing landscape features;*
- *Strong structural boundary planting particularly along the southern and eastern margins to visually contain the development within the surrounding landscape and protect views from the AONB to the south;*
- *Localised landform manipulation to create well contoured screening banks at key locations;*
- *Planting to reflect the character of the area and help assimilate the development into its surroundings;*
- *Create a hierarchy of public and private open spaces within the green infrastructure network to increase accessibility and add to the sense of place;*
- *Utilise the visual and biodiversity opportunities of the sustainable drainage system;*
- *Increase publicly accessible links though footpaths and cycleways with the surrounding landscape.'*

9.2.21 The methodology for this addendum follows the consented methodology outlined within the Original ES.

9.2.22 Other than those items revised in this addendum the submitted LVIA chapter, including the baseline, is unaffected.

Geographical Scope

9.2.23 The consented Study Area was defined by the production of Zone of Theoretical Visibility (ZTV) studies.

9.2.24 Updated ZTV's have been produced to inform this addendum and can be seen on Figures 9.1 – 9.11.

9.2.25 The updated ZTV studies are based on a digital terrain model of the proposed development and the surrounding area derived from Ordnance Survey data using LSS software to determine the approximate extents and levels of visibility. Figure 9.10 represents a worse than worst case scenario as it does not take into account the screening effect of vegetation and individual or

groups of trees. Figure 9.11 includes the approximate extents of visibility when the screening effects of existing buildings (assumed at 8m high) and woodland (assumed at 16m high) are included. Both ZTV's test views at 1.7m above existing ground level. The building, woodland and eye height parameters match those tested within the Original ES.

9.2.26 The revised ZTV study results are broadly in accordance with those in the Original ES and as a result the Study Area is unchanged.

Temporal Scope

9.2.27 The temporal scope of this addendum is in line with the scope agreed as part of the Original ES and covers the following:

- During Construction
- During Operational Year 0
- Operational Year 10 (Residual effects)

9.3 Baseline Environment

Description of the Site and Surrounding Context

9.3.1 The Site's land use, topography, vegetation and boundaries are all unchanged since the Original ES.

9.3.2 A large Amazon warehouse at Symmetry Park, approximately 400m to the north of the Site, has been erected since the consented baseline was produced. Another notable change is the ongoing construction of the new Southern Connector Road from Pack Hill. Both of these features form part of the wider New Eastern Villages (NEV) urban extension.

9.3.3 Alterations to warehouse structures at South Marston Industrial Estate (former Honda site) are also evident in elevated long distance views. Due to the views being distant and the changes being in keeping with the land use assessed as part of the outline it is considered they have no bearing on the landscape or visual sensitivity within the Original ES.

Published Landscape Character

9.3.4 Published landscape character areas covering the site and surrounding landscape can be seen on Figures 9.3 – 9.7.

9.3.5 Published landscape character studies listed within the Original ES are unchanged. However, for completeness the landscape character areas included within the Vale of White Horse (VWH) Landscape Character Assessment produced by HDA in September 2017 are also shown on Figure 9.7. The assessment provides a district wide update to the VWH Landscape Strategy Planning Advisory Note referenced in the Original ES, building on the characterisation described in the Note. Due to the nature of the update, which does not cover the Site, and the relatively small area of the assessment covered by the study area, it is considered the 2017 VWH assessment update has no effect on the Original ES conclusions.

Landscape Designations

9.3.6 The baseline mapping for this addendum has been updated to include the latest landscape planning designations as shown on Figure 9.2.

9.3.7 The latest designations are broadly in accordance with those shown in the Original ES. One notable difference within the study area is Bourton Conservation Area which was not shown. This is however a heritage asset which would have been considered as part of Chapter 16 of the Original ES and is therefore eliminated from further consideration within this chapter of the Addendum.

Visual Baseline

9.3.8 As part of this Addendum all viewpoint photography was updated on the 18th and 28th July 2023. The updated views have been presented in accordance with TGN 6/19 as shown at Appendix 9.1. In addition, comparison sheets are provided at Appendix 9.2 to illustrate changes in the views since the Original ES.

9.3.9 The updated views were taken during the summer season, while vegetation was in leaf and providing additional screening. Despite this, it is considered that the updated photos in combination with those previously approved provide sufficient detail to update the visual baseline and assess any impacts as a result of the latest proposals.

9.3.10 The updated photos demonstrate the screening effect of in leaf vegetation has little effect on the sensitivity of the selected views. This is due to intervening distance and the majority of vegetation being well established when the Original ES was produced. The exception to this is Viewpoint 2, which has experienced an inherent change to its setting as a result of planting at Symmetry Park having matured, providing additional screening to views of the warehouse buildings and partial distance views to the AONB. In sensitivity terms, this change is considered neutral and therefore the Viewpoint remains moderately sensitive.

9.3.11 Visual baseline changes since the Original ES are detailed in Table 9.2

Table 9.2 Description of changes to visual baseline sensitivity

Viewpoint	Location	Description of changes since the Original ES and Viewpoint Sensitivity
1	Entrance to Lotmead Farm	No discernible change to the view ***Sensitivity: Very High (No change)***
2	View from entrance to the New Eastern Villages – including Application Site - from the A420	Planting at the entrance to Symmetry Park has matured partially screening longer distance views towards the Wessex Downs AONB, Charlbury Hill is still visible on the horizon. The Amazon warehouse is screened from view. ***Sensitivity: Medium (No change)***
3	Footpath north of Earlscourt Manor	No discernible change to the view ***Sensitivity – Medium (No change)***
4	Bridle path at the edge of Nightingale Wood	No discernible change to the view ***Sensitivity – Medium (No change)***
5	Footpath at its junction with Highworth Road	No discernible change to the view ***Sensitivity – Medium (No change)***
6	Railway bridge at Lower Bourton	No discernible change to the view ***Sensitivity – Low (No change)***
7	Footpath at its junction with Idstone Road	No discernible change to the view ***Sensitivity – Very High (No change)***
8	Local footpath through Home Farm, Hinton Parva	No discernible change to the view ***Sensitivity – Medium (No change)***
9	Wanborough Rd close to the junction at Callas Hill	No discernible change to the view ***Sensitivity – Very High (No change)***

10	Footpath through residential area in Wanborough	No discernible change to the view ***Sensitivity –High (No change)***
11	Charlbury Hill	No discernible change to the view ***Sensitivity – Very High (No change)***
12	B4192, at junction with Ridgeway and Aldbourne Circular Trail	No discernible change to the view ***Sensitivity – Very High (No change)***

9.4 Updated Assessment of Impacts and Effects

During Construction - Landscape Effects

9.4.1 The Original ES assumes all soft landscape works which form part of the Green Infrastructure would follow the construction phase. These soft landscape elements (listed at section 9.2.20) were considered to be part of the mitigation. This addendum makes the same assumption with mitigation assessed separately later in this chapter at Operational Year 10. The following During Construction and Operational Year 0 assessments therefore represent a 'worst case' scenario.

9.4.2 The Original LVIA listed the main elements of the proposed development that have potential to cause landscape and/or visual effects as follows:

- *'Erection of construction site and works compounds, temporary storage areas and temporary security fencing and associated vehicle movements;*
- *Earthworks, such as soil stripping, soil storage, cut/fill activities and main drainage infrastructure works and associated plant and vehicle movements;*
- *Primary vehicular access construction leading off the A420 and further vehicular access from Wanborough Road;*
- *Provision of site access roads, parking and other infrastructure;*
- *Construction of up to 2,448 residential units, 2 new primary schools, retail and business employment sites and new public open space.'*

9.4.3 The updated proposals would result in approximately 10 additional tertiary drainage features (drainage basins) within the scheme when compared with areas of Land Safeguarded for Tertiary Drainage Features on the consented Green Infrastructure Parameter Plan (GIPP). The additional tertiary drainage features are located within areas of Green Space and development as defined on the GIPP and would be of sizes in keeping with those consented at outline and the earthworks description in the above bullet points.

9.4.4 While the additional basins would result in added cut and fill, the work is considered to have a minor/negligible effect on topography in the context of the other construction activities. As a result the effect on topography would be no greater than that approved in the Original ES. Similarly the changes would have no greater impact on the baseline arable and agricultural land use due to the development extents remaining unchanged.

9.4.5 The updated drainage proposals have been designed to ensure vegetation and site boundaries shown as retained in the consented proposals are not impacted during construction.

9.4.6 The temporary Public Right of Way (PRoW) diversion highlighted within the Original ES would be unaffected during construction of the updated proposals and similarly other PRoW within the sites vicinity (see Figure 9.8) would not be impacted.

9.4.7 As highlighted in the Original ES *'during the construction phases, the Application Site will gradually change from open fields on the edge of an urban area to being land dominated by enabling infrastructure development and then to a construction site'*. The updated construction proposals would be contained within the approved development footprint, with no further loss of landscape features. As a result there would be no additional impact on the assessed landscape character areas.

During Construction - Visual Effects

9.4.8 In visual terms the updated drainage basins would be contained within the approved development envelope. They would be constructed at a low level in comparison to surrounding structures and retained vegetation. This combined with the adjacent construction works would result in the change being imperceptible with no further impacts on the viewpoints.

During Operational Year 0 – Landscape Effects

9.4.9 At Operational Year 0 the Application Site and updated drainage would have been built out. The updated drainage would result in no further impacts to land use due to the proposals being contained within the consented development footprint.

9.4.10 While the latest proposals would result in more basins, this change to topography is considered to be of negligible topographical effect given the size of the consented basins and other landform changes. As a result the effect on topography would be no greater than that approved in the Original ES.

9.4.11 The updated drainage proposals have been designed to accommodate the vegetation shown as retained in the consented proposals and would therefore have no further impact on these features.

9.4.12 The Original ES noted the consented proposals would have a major change to the landscape character and identity of the Application Site with effects also being likely on the immediate surroundings and potentially also the wider study area. At a local level these impacts would be as a result of a loss of some landscape features and the building of new housing and associated infrastructure which would result in major changes to the baseline situation. The updated drainage proposals would result in additional basins however these will be contained within the approved development footprint. Due to the contained nature of the latest proposals and their character being similar to features already approved they would have no further impact on landscape character.

9.4.13 Residential receptors including Swindon, Wanborough, Hinton Parva and individual properties local to the site were considered within the Original ES with effects ranging from minor to moderately adverse. Views from these receptors include glimpsed views of the development through and above intervening vegetation. Due to a combination of intervening vegetation and the low lying nature of the latest proposals it is considered they would have no further impact on these receptors.

9.4.14 The Original ES assessed the likely landscape impact on roads at Operational Year 0. Likely impacts were considered on road users views with the proposals considered to have no significant effects. Due to the low lying nature of the updated proposals in relation to roads it is assessed they would have no additional impact on these receptors.

9.4.15 In terms of rights of way and land accessible to the public, the updated proposals would have no further impact on existing Public Rights of Way (PRoW) and the internal and connecting footpaths and cycleways approved within the Parameter Plans would remain unchanged

During Operational Year 0 - Visual Effects

9.4.16 Once the Site is in operation the latest proposals would be at a low level in comparison to surrounding structures and retained vegetation. This combined with the adjacent housing would result in the change being imperceptible with no further impacts on the viewpoints.

Operational Year 10 – Landscape Effects

9.4.17 The Original ES considered landscape and visual effects which remain after the anticipated establishment period up to Operational Year 10 to be residual effects which will persist when taking into account the proposed mitigation measures mentioned in section 9.2.20.

9.4.18 The latest proposals have been designed to ensure there are no conflicts preventing the successful establishment of mitigation measures considered within the Original ES. As a result, by year 10, new planting will have matured softening the topographical effect of the new drainage basins. This would result in a negligible residual effect to topography that is no greater than the effect consented under the Original ES.

9.4.19 In terms of changes in land use, the proposals occupy areas defined for development in the consented proposals and which would already alter permanently from agricultural to residential. At Operational Year 10 the new drainage proposals will have established and form part of a strong green and blue infrastructure network throughout the site. The land use change will be consistent with the approved proposals and therefore the overall residual effect would remain minor adverse.

9.4.20 By Year 10 green infrastructure will have matured forming permanent and established habitats and public open spaces across the site. The proposed basins would positively contribute to this green infrastructure network providing additional areas of permanent water and ephemeral wetland. The Original ES judged the existing vegetation resources across the Site as medium sensitivity. The latest proposals are in keeping with the consented landscape typologies and therefore the magnitude of effect on existing site vegetation and boundaries is considered to be medium resulting in the same moderately beneficial residual effect consented under the Original ES.

9.4.21 The latest proposals do no directly affect existing Public Rights of Way (PRoW) or new footpath/cycle connections consented on the Parameter Plans. The proposed basins are designed around existing and proposed mitigation planting, and therefore as mentioned in the Original ES, would not impact the resultant visual and perceptual benefits this offers to PRoW users as it matures. As a result the latest proposals would result in no change to the high impact and moderately beneficial effect on Rights of Way and Land Accessible to the Public as consented in the Original ES.

9.4.22 In terms of landscape character the Original ES considered the retention of landscape features of value and their incorporation into an extensive landscape framework would contribute to the landscape Character of the Site and its immediate surroundings, helping to integrate the scale of the Proposed Development into the landscape. The proposals would not impact the deliverability of this landscape framework and therefore the impact on the landscape character types would remain as assessed in the Original ES.

Operational Year 10 – Visual Effects

9.4.23 The latest proposals have been designed around the structural mitigation planting. The basins would be at a low level and located within the visual development envelope approved under the Original ES. As a consequence, the changes would not be perceptible in comparison to the original proposals and therefore the impact and residual effects on visual receptors would remain as consented in the Original ES.

9.4.24 The residual landscape and visual effects are summarised in table 9.3 below.

Table 9.3 Summary of Landscape and Visual Residual Effects as a result of the Latest Proposals

Potential Effects	Duration of Effect	Level of Effect at Year 0 and Significance	Level of Residual Effect at Year 10 and Significance	Change since the Original ES
Loss of open Agricultural Land on Application Site	Permanent	Moderate adverse **Significant**	Minor Adverse **Not Significant**	**No Change**
Alterations to Site Topography on Application Site	Permanent	Minor/negligible adverse **Not Significant**	Negligible adverse **Not Significant**	**No Change**
Existing Application Site and Boundary Vegetation	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor beneficial **Not Significant**	**No Change**
Single Public Right of Way in westernmost part of Application Site – Route Diversion	Permanent	Moderate/minor beneficial **Not Significant**	Moderate beneficial **Significant**	**No Change**
Change in Local Landscape Character *(Vale of White Horse)*	Permanent	Moderate adverse **Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Change in Local Landscape Character *(Scarp, Down Plains & High Downs)*	Permanent	**No Change**	**No Change**	**No Change**
Change in Local Landscape Character *(Midvale Ridge)*		Minor/negligible adverse **Not Significant**	Minor/negligible adverse **Not Significant**	**No Change**
Change in Local Landscape Character *(Western Clay Vale)*	Permanent	Minor/negligible adverse **Not Significant**	Minor/negligible adverse **Not Significant**	**No Change**
Residential Receptors: Swindon	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Residential Receptors: Wanborough	Permanent	Moderate adverse **Significant**	Moderate adverse **Significant**	**No Change**

Residential Receptors: Hinton Parva	Permanent	Moderate adverse **Significant**	Moderate/minor adverse **Not Significant**	
Residential Receptors: Individual Properties (Wanborough Road)	Permanent	Major/moderate adverse **Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Roads: A420	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**	**No Change**
Roads: Wanborough Road	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Roads: Horpit minor road	Permanent	Moderate/minor adverse **Not Significant**	Negligible adverse **Not Significant**	**No Change**
Roads: North Wessex Downs edge	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**	**No Change**
Public Rights of Way: Wanborough-Horpit-Bourton	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**	**No Change**
Public Rights of Ways: Hinton Parva, Bishopstone, Ashbury	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Public Rights of Way: Ridgeway & Charlbury Hill	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Viewpoint 1	Permanent	Major/moderate adverse **Significant**	Major/moderate adverse **Significant**	**No Change**
Viewpoint 2	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**	**No Change**
Viewpoint 3	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Viewpoint 4	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Viewpoint 5	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Viewpoint 6	Permanent	Minor adverse **Not Significant**	Minor adverse **Not Significant**	**No Change**
Viewpoint 7	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Viewpoint 8	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**	**No Change**
Viewpoint 9	Permanent	Moderate/minor adverse **Not Significant**	Minor Adverse **Not Significant**	**No Change**

Viewpoint 10	Permanent	Moderate adverse **Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Viewpoint 11	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**
Viewpoint 12	Permanent	Moderate/minor adverse **Not Significant**	Moderate/minor adverse **Not Significant**	**No Change**

Cumulative Effects

9.4.25 In line with best practice as set out in GLVIA3, the Original LVIA considered the combined effects of different combinations of development.

9.4.26 Projects for assessment as part of this addendum are set out in Section 3 Table 3.2. The majority of the projects were either assessed as part of the Original LVIA, or fall outside the Study Area, and therefore do not need further consideration. However, the exception to this is Badbury Park Phase 3 at Commonhead (application ref. S/OUT/18/1140).

9.4.27 Badbury Park Phase 3 is an extension to a larger urban extension which is almost complete. The site sits approximately 4.4km west from Lotmead Farm, adjacent junction 15 of the M4. Due to the intervening distance and existing development within the context of phase 3 it is considered the development would not create any landscape or visual cumulative impacts.

9.5 Assessment Summary

9.5.1 This chapter has been produced to assess the landscape and visual effects arising as result of the updated drainage Strategy and FRA and to update the assessment against the updated/verified baseline given the time that has passed since the Original ES.

9.5.2 The Site's land use, topography, vegetation and boundaries are all unchanged since the approved ES. Changes to warehouse units are evident in the wider landscape however these either form part of the New Eastern Villages (NEV) urban extension or the South Marston Industrial Estate (former Honda site). Due to views being distant and the changes being in keeping with the land use assessed as part of the outline it is considered they have no bearing on the landscape or visual sensitivity within the Original ES.

9.5.3 Published landscape character studies and landscape designations listed within the Original ES are unchanged and the proposals would result in no changes of effect to these receptors.

9.5.4 The sensitivity of the 12 viewpoints assessed is unchanged since the Original ES and the proposals would have no visual effects beyond those approved.

10 Noise and Vibration

10.1 Introduction

10.1.1 This chapter of the ES Addendum has been produced by noise.co.uk Ltd and provides a review and, where applicable, update of the baseline conditions and assessment and in light of the revised Drainage Strategy and proposed changes set out within the Section 73 application to confirm whether there are any changes that materially affect the conclusions of the Original ES in relation to noise.

10.1.2 In the context of this assessment, noise is defined as unwanted or undesirable sound emitted by sources such as road or rail traffic and construction activities, which may disturb normal activities such as conversation, sleep or recreation. Vibration is defined as the transmission of energy that results in small movements of the transmitting medium, such as a building, which can give rise to adverse comment or in extreme examples cause building damage.

10.1.3 The assessment will establish both the potential noise and vibration impact the existing sources will have on the Proposed Development during the occupation and the impact the Proposed Development will have on existing receptors during the construction and occupation phases. The assessment is undertaken in-line with existing guidance and legislation based on baseline data obtained through surveys and 3D noise modelling. The assessment predicts the likely effect and propose appropriate mitigation, where applicable.

10.2 Assessment Criteria & Methodology

Previous Assessment

10.2.1 Outline Permission (ref. S/OUT/19/0582) was granted for the development of the Site in March 2021.

10.2.2 The Outline Permission was subject to Environmental Impact Assessment (EIA) which assessed the Proposed Development. The findings of the EIA were presented in an Environmental Statement (ES) (Turley. Environmental Statement. Lotmead Farm Villages. Ref: AINA3007, dated April 2019) that accompanied the outline application (the Original ES).

10.2.3 The noise and vibration chapter was based on the results of the objective sound pressure level survey and desk study information highlighting the potential noise and vibration impact the existing sources will have on the Proposed Development during the operational phase and the impact the Proposed Development will have on existing receptors during the construction and operational phase.

10.2.4 The chapter demonstrated potential risks that may occur during the construction/operational phase and concluded that mitigation measures are required to reduce the noise and vibration impact.

Legislative Context, Technical Guidance and Best Practice

National Policy Statement for England

10.2.5 The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to "promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".

10.2.6 This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

10.2.7 The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

National Planning Policy Framework

10.2.8 The National Planning Policy Framework (NPPF) was published on 19th June 2019 and sets out the Government's planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability".

10.2.9 The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:

- avoid noise giving rise to significant adverse impacts on health and the quality of life;
- mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.

10.2.10 Existing businesses near to proposed development 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.

National Planning Practice Guidance

10.2.11 The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was updated on the 22nd

July 2019 to reflect the changes made to the NPPF and make it more accessible.[1]It advises on how planning can manage potential noise impacts in new development. The guidance is regularly reviewed and updated and noise is listed as a specific category. A summary of the effects of noise exposure (in terms of health and quality of life) associated with both noise generating developments and noise sensitive developments is presented within the PPG and reproduced in Table 10.1.

10.2.12 There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.

10.2.13 It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

1 http://planningguidance.communities.gov.uk/

Table 10.1 Noise and vibration assessment hierarchy

Perception	Examples of outcomes	Effect level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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
Noticeable and very intrusive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Baseline Data Collection

10.2.14 A construction phasing plan[2] dated February 2022 and Construction Method Statement[3] has been provided since the Original ES. A desktop study has been carried out on the construction activity to establish the potential significant noise effect at residential receptors.

10.2.15 Since the Original ES, an environmental noise survey of the Site has been carried out to determine the baseline conditions at the Site between the 22 February 2022 and the 25 February 2022.

Assessment Methodology

Construction Noise and Vibration

10.2.16 BS 5228-1:2014[4] provides a method for predicting and assessing construction noise levels based on details of construction activities. The predictive method is based on the sound power level (L_w) of each item of plant to be used and the application of corrections for:

- Distance between the source and receptor locations;
- The percentage operating time of the plant; and,
- Any attenuation due to screening between source and receptor.

10.2.17 In order to assess the effect of demolition and construction noise at the nearby noise sensitive receptors, LOAELs and SOAELs have been considered. The LOAEL and SOAELs are based on the guidance threshold values outlined in Table E.1 of BS 5228-1:2014

Table 10.2 Demolition and Construction Noise Adverse Effect Levels

Day	Time (Hours)	Averaging Period, T	LOAEL (dB $L_{Aeq,T}$)	SOEAL (dB $L_{Aeq,T}$)
Monday to Friday	0700-1900	12 hours	65	75
Saturday	0800-1300	12 hours	65	75

10.2.18 The threshold of perception for vibration in residential environments is identified at an exposure level of 0.3mm/s peak particle velocity (PPV) in accordance with guidance in BS 5228: Part 2. Complaint is likely where levels occur above 1.0mm/s PPV at residential properties but this exposure can be tolerated if prior warning and explanation has been given to residents. Above a level of 10mm/s PPV the vibration is likely to be intolerable for any more than a very brief exposure to this level. The overall significance of the effect is assessed using professional judgement by considering not only the criteria above but also other factors.

10.2.19 In accordance with the guidance given in BS5228, 1 $mm.s^{-1}$ ppv has been selected as the target criteria to control the impact of construction vibration, with the criteria for assessing the

2 Phasing plan – overarching (0767-1004 E Phasing Plan-Overaching-A1L dated February 2022
3 Lotmead Farm Villages, New Eastern Villages, Swindon Countryside Sovereign Swindon LLP Framework Construction Metho Statement
4 British Standards Institution (2009); BS 5228-1:2009+A1:2014 and BS 5228 Part 2 Code of Practice for Noise and Vibration Control on Open Construction Sites

magnitude of vibration impacts according to the margin by which this target criterion is achieved or exceeded presented in Table 10.3.

Table 10.3 Construction Vibration Significance Criteria Vibration Level

Significance of Effect	**mm.s^{-1} PPV Title 3**
Major	s>1,0 (Exceeded Regularly)
Moderate	≈ 1.0
Minor	0.3 – 1.0
Neutral	<0.3
Notes : The above vibration limits relate to maximum PPV ground borne vibration occurring in any one of three mutually perpendicular axes (one of which may be vertical). Vibration is to be measured on the foundation or on an external façade no more than 1m from the ground, or failing this, solid ground as near to the building façade as possible	

Operational Road Traffic Noise Affecting Existing Noise Sensitive Receptors

10.2.20 The assessment of noise due to the proposed development on the existing sound climate in the surrounding areas is based on the change in sound levels at noise sensitive receptors due to a change in the volumes of road traffic generated by the proposed development.

10.2.21 The DMRB LA11[5] provides two magnitude scales of impact for the change in noise levels in the 'short-term' (opening year) and in the 'long-term' (future year). The 'long-term' future year assessment criteria have been used to assess the full and permanent effects of the Proposed Development. These are presented in Table 10.4 in terms of adverse effect levels.

Table 10.4 Summary table of noise impact evaluation criteria for changes in traffic noise

Adverse Effect Level	**Increase in $L_{A10,18hour}$ Noise Levels due to Operational Road Traffic (dB)**
SOAEL	10+
	5.9-9.9
LOAEL	3 – 4.9
	0.1 – 2.9
NOEL	0

Geographical Scope

10.2.22 In terms of construction noise the spatial extent of the assessment would be limited to areas where the calculated construction noise is expected to exceed the pre-construction ambient noise level by 5 dB or more subject to the following threshold value of 65dB(A) during the daytime periods defined as 07:00 to 19:00 on weekdays and 07:00 to 13:00 on Saturdays.

5 Highways England, Transport Scotland, Welsh Assembly, LA 111 (2019), Noise & Vibration

Temporal Scope

10.2.23 For construction impacts, the noise and vibration assessment will encompass:

- The baseline which is considered to be representative of the conditions prior to commencement of construction; and,
- The days and hours of construction activity.

10.3 Baseline Environment

Site description and Context

10.3.1 Table 14.6 of the Original ES established that the A419, A420 and Wanborough Road is the dominant source of environmental sound in the area. Other environmental sound was audible from the Great Western Main Line to the north of the Site.

10.3.2 Existing sensitive receptors include the residential dwellings located to the north, east, south and west of site including educational and commercial receptors south and north-west of the site. The locations of the noise sensitive receivers can be found in Table 14.1 and Figure 14.1 of the Original ES. The receptor locations remain applicable to the Site.

Baseline survey information

10.3.3 Baseline conditions at the Site were determined through an environmental noise survey between the 22nd February 2022 and the 25th February 2022. Full details are available in **Appendix 10.1** (noise.co.uk report 21801-1-R4 dated 9th June 2023) but the conclusions have been summarised below.

10.3.4 The monitoring positions for the survey are shown below in 0.

Figure 10.1 Noise monitoring locations

10.3.5 The survey attendee noted during the visits that the noise climate was dominated by transient road traffic noise from Wanborough Road and continuous road traffic noise from the A419 road.

10.3.6 A summary of the highest levels measured at monitoring positions 1-4 during the daytime (07:00-23:00) and night-time (23:00-07:00) period are summarised below in Table 10.5.

Table 10.5 Summary of the external sound pressure levels measured

Monitoring Location	Daytime dB LAeq,16hr	Night-time dB LAeq,8hr
1	79.1	73.3
2	76.0	66.9
3	63.0	59.2
4	59.8	57.0

10.3.7 Table 10.5 measurement results are considered to be representative of the current baseline conditions for the Site.

10.4 Updated Assessment of Impacts and Effects

Construction Phase

10.4.1 The details of the construction methodology for the development have not been established at this stage. The significance of noise and vibration effects have been assessed for the Site preparation and construction phases of the development only.

10.4.2 Construction plant chosen in the original ES has been re-assessed. The list of construction plant and assumed on-time for the has been reproduced in Table 10.6. These assumptions are considered a reasonable approximation of the likely construction activities.

Table 10.6 Construction Plant

Plant and Equipment	BS5228:2009 Reference	Assumed On-Time	Sound Pressure Level at 10 m (dB LAeq,T
Site Preparation			
Dozer	BS 5228-1:2009 Table C.2:1	30	75
Tracked excavator	BS 5228-1:2009 Table C.2:3	27.5	78
Tracked excavator (idling)	BS 5228-1:2009 Table C.2:4	12.5	52
Wheeled loader	BS 5228-1:2009 Table C.2:26	25	79
Dump truck (tipping fill)	BS 5228-1:2009 Table C.2:30	20	79
Dump truck	BS 5228-1:2009 Table C.2:31	20	87
Roller (rolling fill)	BS 5228-1:2009 Table C.2:37	20	79
Roller	BS 5228-1:2009 Table C.2:38	20	73
Grader	BS 5228-1:2009 Table C.6:31	15	86
Demolition, Foundation Works and Substructure			
Dozer	BS 5228-1:2009 Table C.2:10	60	80
Tracked excavator	BS 5228-1:2009 Table C.2:14	55	79
Tracked excavator (idling)	BS 5228-1:2009 Table C.2:20	25	68
Wheeled loader	BS 5228-1:2009 Table C.2:26	50	79
Cement mixer truck (discharging)	BS 5228-1:2009 Table C.4:18	20	75
Cement mixer truck (idling)	BS 5228-1:2009 Table C.4:19	40	71
Poker vibrator	BS 5228-1:2009 Table C.4:33	40	78
Dozer	BS 5228-1:2009 Table C.2:10	60	80
Tracked excavator	BS 5228-1:2009 Table C.2:14	55	79
Building Erection Works and Superstructure			
Dumper	BS 5228-1:2009 Table C.4:3	60	76
Large concrete mixer	BS 5228-1:2009 Table C.4:22	40	76
Wheeled mobile telescopic crane	BS 5228-1:2009 Table C.4:38	60	78
Lorry with lifting boom	BS 5228-1:2009 Table C.4:53	40	77
Tracked excavator	BS 5228-1:2009 Table C.4:63	20	77
Mini tracked excavator	BS 5228-1:2009 Table C.4:67	50	74
Circular bench saw (petrolcutting concrete blocks)	BS 5228-1:2009 Table C.4:71	30	85

Hand-held circular saw (petrol-cutting concrete blocks)	BS 5228-1:2009 Table C.4:72	60	79
Diesel generator	BS 5228-1:2009 Table C.4:76	90	61
Road Works			
Road planer	BS 5228-1:2009 Table C.5:7	15	82
Road planer (idling)	BS 5228-1:2009 Table C.5:8	15	62
Bulldozer	BS 5228-1:2009 Table C.5:14	25	86
Articulated dump truck	BS 5228-1:2009 Table C.5:16	25	81
Road roller	BS 5228-1:2009 Table C.5:19	37.5	80
Asphalt paver (+ tipper lorry)	BS 5228-1:2009 Table C.5:30	25	75
Vibratory roller	BS 5228-1:2009 Table C.5:21	25	80
Vibratory roller	BS 5228-1:2009 Table C.5:20	25	75
Grader	BS 5228-1:2009 Table C.6:31	15	86
Landscaping Works			
Lorry with lifting boom	BS 5228-1:2009 Table C.4:53	40	77
Tracked excavator	BS 5228-1:2009 Table C.4:63	20	77
Mini tracked excavator	BS 5228-1:2009 Table C.4:67	50	74

10.4.3 Acoustic modelling has been constructed using SoundPLAN™ in order to predict the propagation of sound across the site from source to receiver. The calculation procedure has been used from ISO96193-2:1996[6] to predict the propagation of sound.

10.4.4 Ordnance Survey data has been used to create te existing roads and buildings. Terrain data has been taken from The Department for Environment, Food and Rural Affairs.

10.4.5 The calculations were carried out based on the construction phase plan (worst-case scenarios) as follows:

- Situation 1: Site Preparation - Phase 1-4, Phase 5-7, Phase 6-8, Phase 7-9
- Situation 2: Demolition, Foundation Works and Substructure - Phase 1-4, Phase 5-7, Phase 6-8, Phase 7-9
- Situation 3: Building Erection Works and Superstructure - Phase 1-4, Phase 5-7, Phase 6-8, Phase 7-9
- Situation 4: Road Works - Phase 1-4, Phase 5-7, Phase 6-8, Phase 7-9
- Situation 5: Landscaping - Phase 1-4, Phase 5-7, Phase 6-8, Phase 7-9

10.4.6 As the specific details of proposed plant and working methodologies are yet to be determined, this assessment has been prepared in order to highlight potential locations where particular attention to noise control measures may be required to minimise potential adverse effects during the construction process.

6 ISO9613-2:1996 “Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation”

10.4.7 For the noise predictions, the noise sources are assumed to be distributed uniformly through the particular phase of development. This is considered to be a reasonable approach to the evaluation of the construction noise at this stage, taking into account periods when the construction activities are both close to and at distance from the existing receivers.

Construction Impacts and Effects

Table 10.7 Phase 1-4 construction and predicted noise levels

Receptor	Site Preparation Works dB $L_{Aeq,12hours}$	Demolition Foundation Works and Substructure	Building Erection Works and Superstructure	Road Works	Landscaping Works
R1	45.6	46.3	46.0	46.5	38.1
R2	45.9	46.6	46.3	46.8	38.4
R3	40.2	40.9	40.6	41.1	32.7
R4	38.6	39.3	39.0	39.5	31.1
R5	37.9	38.6	38.3	38.8	30.4
R6	33.2	33.9	33.6	34.1	25.7
R7	32.7	33.4	33.1	33.6	25.2
R8	33.9	34.6	34.3	34.8	26.4
R9	33.4	34.1	33.8	34.3	25.9
R10	32.9	33.6	33.3	33.8	25.4
R11	31.1	31.8	31.5	32.0	23.6
R12	33.5	34.2	33.9	34.4	26.0
R13	34.9	35.6	35.3	35.8	27.4
R14	37.6	38.3	38.0	38.5	30.1
R15	42.9	43.6	43.3	43.8	35.4

Table 10.8 Phase 5-7 construction and predicted noise levels

Receptor	Site Preparation Works dB $L_{Aeq,12hours}$	Demolition Foundation Works and Substructure	Building Erection Works and Superstructure	Road Works	Landscaping Works
R1	42.1	42.8	42.5	43.0	34.6
R2	42.4	43.1	42.8	43.3	34.9
R3	41.3	42.0	41.7	42.2	33.8
R4	41.1	41.8	41.5	42.0	33.6
R5	41.3	42.0	41.7	42.2	33.8
R6	39.7	40.4	40.1	40.6	32.2
R7	39.7	40.4	40.1	40.6	32.2
R8	42.7	43.4	43.1	43.6	35.2
R9	43.1	43.8	43.5	44.0	35.6
R10	43.5	44.2	43.9	44.4	36.0
R11	42.4	43.1	42.8	43.3	34.9
R12	50.1	50.8	50.5	51.0	42.6
R13	48.0	48.7	48.4	48.9	40.5
R14	41.3	42.0	41.7	42.2	33.8
R15	41.6	42.3	42.0	42.5	34.1

Table 10.9 Phase 6-8 construction and predicted noise levels

Receptor	Site Preparation Works dB $L_{Aeq,12hours}$	Demolition Foundation Works and Substructure	Building Erection Works and Superstructure	Road Works	Landscaping Works
R1	37.2	37.9	37.6	38.1	29.7
R2	37.1	37.8	37.5	38.0	29.6
R3	35.6	36.3	36.0	36.5	28.1
R4	35.1	35.8	35.5	36.0	27.6
R5	35.0	35.7	35.4	35.9	27.5
R6	33.7	34.4	34.1	34.6	26.2
R7	33.9	34.6	34.3	34.8	26.4
R8	36.9	37.6	37.3	37.8	29.4
R9	38.2	38.9	38.6	39.1	30.7
R10	40.0	40.7	40.4	40.9	32.5
R11	40.0	40.7	40.4	40.9	32.5
R12	49.4	50.1	49.8	50.3	41.9
R13	46.7	47.4	47.1	47.6	39.2
R14	37.9	38.6	38.3	38.8	30.4
R15	37.1	37.8	37.5	38.0	29.6

Table 10.10 Phase 7-9 construction and predicted noise levels

Receptor	Site Preparation Works dB $L_{Aeq,12hours}$	Demolition Foundation Works and Substructure	Building Erection Works and Superstructure	Road Works	Landscaping Works
R1	39.6	40.3	40.0	40.5	32.1
R2	39.7	40.4	40.1	40.6	32.2
R3	38.5	39.2	38.9	39.4	31.0
R4	38.2	38.9	38.6	39.1	30.7
R5	38.3	39.0	38.7	39.2	30.8
R6	37.4	38.1	37.8	38.3	29.9
R7	37.6	38.3	38.0	38.5	30.1
R8	41.0	41.7	41.4	41.9	33.5
R9	42.2	42.9	42.6	43.1	34.7
R10	43.6	44.3	44.0	44.5	36.1
R11	43.0	43.7	43.4	43.9	35.5
R12	50.2	50.9	50.6	51.1	42.7
R13	47.4	48.1	47.8	48.3	39.9
R14	39.4	40.1	39.8	40.3	31.9
R15	39.2	39.9	39.6	40.1	31.7

10.4.8 Graphical representations of the 3D noise model illustrating the results above can be found **Appendix 10.2**.

10.4.9 Based on the construction noise criteria in Table 10.2, the range of predicted potential construction noise levels at the nearby noise sensitive receptors is assessed to fall below the 65dB $L_{Aeq,T}$ threshold value for LOAEL and so the noise impact is expected to be 'not significant'.

Operational Transportation Noise

10.4.10 There has been no update to the traffic data provided in the Original ES.

10.4.11 The outcome of the assessment stated that

"The change in the dB $L_{A10,18hour}$ sound level is likely to be no greater than +1 dB at all receptors and is likely to fall below the proposed LOAEL. Therefore, it is considered that the effect from operational transportation noise affecting non-development receptors is likely to be of negligible significance"

10.4.12 Given there has been no updates to the traffic data the assessment outcome in the Original ES above remains.

Cumulative Effects

10.4.13 There are no known additional construction works going on in the surrounding area. Given this, it is not expected to have an effect on the outcome of the construction noise assessment.

10.4.14 Since the preparation of the Original ES development sites have come forward which would be considered for cumulative assessment purposes. PEP has undertaken an assessment of the likely effect on traffic flows within the study area as a result of these developments coming forward. The assessment has drawn on information submitted with each application. This is provided in **Appendix 7.1**.

10.4.15 The minor changes reported through this sensitivity testing is considered to be insignificant in terms of road traffic noise. As such the assessment outcome in the Original ES remains.

10.5 Assessment Summary

10.5.1 Considering the range of noise exposures, and the short duration of any intensive construction works closest to the boundary receptors, construction noise at the nearby noise sensitive receptors is assessed to fall below the LOAEL threshold and so the noise impact is expected to be 'not significant'.

10.5.2 Based on the assessment outcomes there is no requirement for additional mitigation. The phasing of construction works and implementation of measures in CEMP outlined in the mitigation and monitoring section under Demolition and Construction Noise and Vibrations of the Original ES should be adopted as a 'best practical means' approach to minimise noise and vibration through the construction phase of the site.

10.5.3 The Operational Transportation noise due to traffic data is likely to be of negligible significance given there has been no updates to the traffic data provided in the Original ES.

10.5.4 As traffic noise impacts would be negligible, no mitigation is required.

11 Air Quality

11.1 Introduction

11.1.1 This chapter of the ES Addendum has been produced by Stantec and provides a review and, where applicable, update of the baseline conditions and assessment in light of the revised Drainage Strategy and proposed changes set out within the Section 73 application to confirm whether there are any changes that materially affect the conclusions of the Original ES in relation to air quality.

11.2 Assessment Criteria & Methodology

Previous Assessment

11.2.1 Stantec UK Limited prepared an Air Quality Assessment in 2019, which was presented in Chapter 15 of the Environmental Statement (the Original ES), for the Proposed Development at Land at Lotmead Farm, Swindon. Outline planning permission has since been granted (ref. S/OUT/19/0582/PEEG).

11.2.2 The construction phase assessment included in Chapter 15 of the Original ES identified appropriate mitigation to employ against potential construction dust impacts. Construction phase effects were judged to be not significant when the identified mitigation measures are applied through the Construction Environmental Management Plan (CEMP) for the Site.

11.2.3 The Air Quality Assessment presented in Chapter 15 of the Original ES predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at nine worst-case locations representing existing properties adjacent to the local road network using 2022 emission factors and background air quality with 2031 traffic data. It was concluded that the Proposed Development would not have a significant effect in relation to air quality as predicted concentrations were below the National Air Quality Strategy Objectives (NAQOs) at existing residential locations, resulting in 'negligible' impacts.

11.2.4 In relation to air quality within the Site, the predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ were below the relevant NAQOs at proposed receptor locations which were representative of a worst-case location within the Site. Chapter 15 of the Original ES therefore concluded that air quality within the Site was acceptable for future residents without the need for additional mitigation.

Legislative Context, Technical Guidance and Best Practice

11.2.5 The following legislation and guidance have been introduced in relation to air quality since the Original ES, the implications of which have been considered within this addendum.

Legislative Context

Air Quality Regulations

11.2.6 Following the Transition Period after the UK's departure from the EU in January 2020, the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (and subsequent amendments for the devolved administrations) have amended the AQ Standards Regulations 2010 to reflect the fact that the UK has left the EU. The Environment (Miscellaneous

Amendments) (EU Exit) Regulations 2020 amended the $PM_{2.5}$ limit value in the AQSR to 20 µg/m^3.

11.2.7 The 2019 Clean Air Strategy[1] includes a commitment to set a "new, ambitious, long-term target to reduce people's exposure to $PM_{2.5}$" which the Environment Act 2021 commits the Secretary of State to setting. Two $PM_{2.5}$ targets were published via The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 and are set out below:

- an annual mean concentration target for $PM_{2.5}$ levels in England to be 10 µg/m^3 or below by 2040; and
- a population exposure reduction target for a reduction in $PM_{2.5}$ population exposure of 35% compared to 2019 to be achieved by 2040.

11.2.8 The Government has published an Environmental Improvement Plan 2023[2] which sets out the following interim $PM_{2.5}$ targets to be met by the end of January 2028:

- the highest annual mean concentration in the most recent full calendar year must not exceed 12 µg/m^3 of $PM_{2.5}$; and
- compared to 2018, the reduction in population exposure to $PM_{2.5}$ in the most recent full calendar year must be 22% or greater.

11.2.9 The Plan also details how these targets will be met including reducing emissions at home, driving effective local action through local authorities, maintaining and improving the regulatory framework for industrial emissions, supporting farmers to reduce their impact on ammonia emissions and reducing emissions from cars and other forms of transport.

National Planning Policy

11.2.10 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied[3]. The following paragraphs are considered relevant from an air quality perspective.

11.2.11 Paragraph 104 on promoting sustainable transport states:

"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: …

d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; …"

11.2.12 Paragraph 105 goes on to state:

[1] Department for Environment, Food and Rural Affairs (DEFRA) (2019) . 'Clean Air Strategy 2019'.
[2] Department for Environment, Food and Rural Affairs (DEFRA) (2023). 'Environmental Improvement Plan 2023'.
[3] Ministry of Housing, Communities & Local Government. (2021) 'National Planning Policy Framework'. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2#history

"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."

11.2.13 Paragraph 174 on conserving and enhancing the natural environment states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

e) 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 or land stability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans, and…"

11.2.14 Paragraph 185 within ground conditions and pollution 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."

11.2.15 Paragraph 186 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."

11.2.16 Paragraph 187 states that:

"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".

Guidance and Best Practice

11.2.17 DEFRA Local Air Quality Management Technical Guidance (LAQM.TG(22)[4]) was published for use by local authorities in their LAQM review and assessment work and is the updated version

[4] Department for Environment, Food and Rural Affairs (DEFRA)(2022). 'Local Air Quality Management Technical Guidance (TG22)'.

of TG16 used in the Original ES. The document provides key guidance on aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

11.2.18 The Institute of Air Quality Management (IAQM) has published guidance[5] on the assessment of construction dust impacts from demolition and construction which is an updated version of 2014 guidance used in the Original ES. The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.

11.2.19 The IAQM has published guidance on the assessment of air quality impacts on designated nature conservation sites[6] which adopts a similar procedure to that detailed in Natural England guidance on the assessment of road traffic emissions[7] and identifies that exhaust pipe emission of ammonia is an additional relevant pollutant when assessing nitrogen deposition to sensitive ecological features.

11.2.20 The Joint Nature Conservation Committee (JNCC) has published guidance[8] on the decision-making thresholds (DMTs) to help inform the assessment of the impacts of air quality on designated nature conservation sites. These DMTs are intended to be applied to individual sources to identify which are below a relevant threshold can properly be ignored on the basis that their combined effect will not undermine the achievement of the conservation objectives or make a meaningful contribution to a significant effect.

Updated Baseline Data Collection

11.2.21 Any exceedances of the limit values along roads within the study area have been identified using the 2020 NO_2 and PM Projections Data published by DEFRA[9]. Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by SBC and their Local Air Quality Management (LAQM) reports to identify potential Air Quality Management Areas (AQMAs). Background concentrations for the study area have been defined using the national pollution maps published by DEFRA which cover the whole country on a 1x1 km grid[10].

Assessment Methodology

11.2.22 The methodology includes presenting the updated baseline air quality conditions within the Site and surrounding area, changes in legislative context as well as a review of updated cumulative traffic data to consider if there are any material changes in relation to air quality which would alter the conclusions of the Original ES. A review of nearby ecological sites has also been

[5] Institute of Air Quality Management (2023). 'Assessment of Dust from Demolition and Construction', IAQM, London. Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf
[6] IAQM (2020) A guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites – version 1.1. London
[7] Natural England (2018). Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations. Version: June 2018.
[8] JNCC (2021). 'Technical Report: Decision Making Thresholds for Air Pollution'. JNCC Report No. 696,
[9] Department for Environment, Food and Rural Affairs (DEFRA) '2020 NO2 and PM Projections Data (2018 Reference Year)' [online] Available at: https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data
[10] Department for Environment, Food and Rural Affairs (DEFRA). '2018 Based Background Maps'.

undertaken to ascertain whether there is any exceedance of new guidance thresholds in relation to air quality that would require further assessment of air quality impacts on ecological sites.

Operational Impacts

11.2.23 The human health receptor locations used within the original assessment have been reviewed and assessed as appropriate worst-case receptors in terms of potential air quality impacts from road transport emissions. Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, high sensitivity receptors will generally be residential properties, schools, nursing homes, etc. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links. These are nine existing receptors and one proposed receptor assessed in the Original ES, primarily to the west of the site within Swindon, as shown in Table 11.2 below.

Table 11.2 Receptor Locations

Receptor	Location
R1	58 Lytchhett Way
R2	21 to 26 Kingfisher Drive
R3	8 The Drive
R4	6 Keble Close
R5	92 Weedon Road
R6	1 Oxford Road
R7	1 Lock Cottages, A420
R8	Nythe Farm
R9	3 Wanborough Road
PR1	Proposed Residential Receptor adjacent to South-western Site Access

11.2.24 The approach to establishing significance of effect for all receptors in respect to operational impacts due to road traffic remains the same as the Original ES.

Construction Impacts

11.2.25 The construction dust assessment has been undertaken using the revised dust emission magnitude thresholds[11] shown in Table 11.3 below, which are higher than those used in the Original ES. With appropriate mitigation in place, the residual impacts of construction dust impacts on air quality are assessed as not significant. The methodology for establishing significance of effect in respective to construction dust impacts remains the same as the Original ES.

[11] Institute of Air Quality Management (2023). 'Assessment of Dust from Demolition and Construction', IAQM, London. Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf

Table 11.3 Revised Dust Emission Magnitude Classification

Activity	Dust Emission Magnitude		
	Large	Medium	Small
Demolition	Total building volume of >75,000 m^3, potentially dusty construction material, on-site crushing and screening, demolition activities >12 m above ground	Total building volume of 12,000 – 75,000 m^3, potentially dusty construction material, demolition activities 6 – 12 m above ground level	Total building volume of <12,000 m^3, construction material with low potential for dust release, demolition activities <6 m above ground, demolition during wetter months
Earthworks	Total site area of >110,000 m^2, potentially dusty soil type, >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height	Total site area of 18,000 – 110,000 m^2, moderately dusty soil type, 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 3 - 6 m in height	Total site area of <18,000 m^2, soil type with large grain size, <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height
Construction	Total building volume >75,000 m^3, on-site concrete batching, sandblasting	Total building volume 12,000 - 75,000 m^3, potentially dusty construction material, on-site concrete batching	Total building volume <12,000 m^3, construction material with low potential for dust release
Trackout	>50 HDV outwards movements in any one day, potentially dusty surface material, unpaved road length >100 m	20 - 50 HDV outwards movements in any one day, moderately dusty surface material, unpaved road length 50 - 100 m	<20 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

11.2.26 At present, detailed information regarding the construction methodology for the development, specific activities and traffic movements is not available. However, an Air Quality and Dust Management Plan (AQDMP) will outline measures to control and minimise the risk of adverse effects from construction activities. The CEMP will be submitted to SBC for their approval. The CEMP will consider Heavy Goods Vehicles (HGV) and other construction traffic movements, including details of routing and times of day of movements. HGV access will be prevented or minimised, where possible, on traffic sensitive roads, residential streets, congested roads or unsuitable junctions.

11.2.27 Vehicle movements associated with access, demolition and construction will vary through the construction programme, with short periods of peak HGV movements associated with demolition and the delivery of materials during the construction phase. However, when the HGV movements are averaged over a full year period (Annual Average Daily Traffic - AADT), these will be significantly lower than peak movements. Together with the implementation of the CEMP, the construction vehicle movements impacts on human health receptors in the area are considered to be temporary and not significant, and have therefore been scoped out of this assessment. Moreover, vehicle movements associated with construction are typically significantly lower than the number of vehicle movements associated with operation of the development, which have been taken into account in this assessment.

Geographical Scope

11.2.28 This assessment considers the same geographical scope as the Original ES. This includes the Site, all roads (and adjacent properties) within 250 m of the Site boundary and all roads modelled within the Original ES.

Temporal Scope

11.2.29 The temporal scope of the assessment will cover the construction and occupation phases of the Proposed Development, which will be later than that assessed in the Original ES (anticipated to be up to 2043) with an assumption of commencement of development in 2024.

11.3 Baseline Environment

11.3.1 Swindon Borough Council (SBC) deploys diffusion tubes at several locations. Since the Original ES was prepared, SBC has deployed additional monitoring in close proximity to the Site: S31 on Wanborough Road, approximately 970 m from the Site and S42 on the A419, approximately 370 m from the Site. Data for the closest diffusion tube monitoring locations to the Site are provided in Table 11.4 and shown in Figure 11.1 below.

Figure 11.1 SBC Monitoring Locations

Table 11.4 Measured Annual Mean NO_2 Concentrations (2018-2022)

Site ID	Type	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
		2018	2019	2020	2021	2022
S17	Roadside	20.7	17.6	14.7	15.9	15.8
S26 (formerly S27)	Roadside	27.8	26.4	22.4	23.7	22.0
S31	Roadside	-	16.5	14.1	14.3	13.9
S42	Roadside	-	**52.3**	37.8	**42.3**	**43.3**
NAQO		**40**				

Exceedances of the national air quality objective are highlighted in bold.

11.3.2 An exceedance of the annual mean NO_2 NAQO was measured in 2019, 2021 and 2022 at monitoring location S42. This monitoring location was deployed in 2019 and therefore data was not included in the Original ES. However, a potential exceedance of the NAQO (47.8 µg/m^3 in 2017 and 45.1 µg/m^3 in 2022) was predicted at Nythe Farm (receptor R8) in Chapter 15 of the Original ES and therefore the measured concentrations at S42 are considered to be in a similar range to those predicted in the 2019 air quality assessment.

11.3.3 It should also be noted that there has been an apparent reduction in measured NO_2 concentrations over time (although due to Covid-19 lockdown restrictions in place during 2020 and 2021 measured concentrations during these years are likely to be lower than usual). This trend is consistent with national trends and the assumptions of DEFRA tools used in the air quality assessment, which assume a reduction in NO_2 concentrations overtime due to technological advances and improvement in vehicle fleet mix, despite an increase in vehicular traffic on the road network. Overall, it is therefore considered that the additional monitoring data available since the Original ES was prepared is not considered to materially affect the conclusions of Chapter 15 of the Original ES.

11.3.4 Since the Original ES was prepared, DEFRA has released more recent estimated background pollutant concentrations. A comparison between the most recent 2018-based background concentrations and the previous 2015-based background concentrations used in the Original ES is provided in Table 11.5 below. Table 11.4 shows that the most recent DEFRA estimated background concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) are generally lower than the previous DEFRA background concentrations used in the Original ES. Where more recent estimated background concentrations are higher than those used in the 2019 ES (i.e. NO2 concentrations for grid square 417500, 185500 and 418500, 186500) the difference is minor (<0.4 µg/m^3) and is not considered to have the potential to materially affect the baseline conditions shown in Chapter 15 of the Original ES.

Table 11.5 Comparison between 2015-based and 2018-based DEFRA Estimated Background Concentrations for 2021

Grid Reference	Annual Mean NO_2 (µg/m^3)		Annual Mean PM_{10} (ug/m^3)		Annual Mean $PM_{2.5}$ (ug/m^3)	
	2015-based[a]	2018-based[b]	2015-based[a]	2018-based[b]	2015-based[a]	2018-based[b]
417500, 185500	14.0	14.4	16.3	15.0	11.3	9.9
418500, 186500	15.4	15.5	16.8	16.6	11.6	10.6
419500, 186500	12.8	11.8	15.3	14.4	10.7	9.3
419500, 185500	12.7	12.7	16.0	15.4	11.1	9.9

[a] Data used in Original ES.
[b] Latest DEFRA estimated background data.

11.4 Updated Assessment of Impacts and Effects

Construction Impacts and Effects

11.4.1 There are no changes to the surrounding baseline which affect the area sensitivity to construction dust and PM_{10} impacts. Since the Original ES was published, new guidance[12] has

[12] Institute of Air Quality Management (2023). 'Assessment of Dust from Demolition and Construction', IAQM, London. Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf

changed the screening values as to which dust emission magnitude are measured. These definitions are higher for 'Large' magnitude than the guidance used in the Original ES, as shown in Table 11.3.

11.4.2 Whilst the development as a whole will remain within the 'Large' magnitude for all activities, the project is expected to be phased, with a delivery of 150 dwellings per annum (and 50 dwellings per annum for the first 200 dwellings). The development will be phased as per the Original ES. Alterations to the drainage strategy from the Original ES are likely to increase the dust emission potential for earthworks. Due to the timings when this will be implemented not coinciding with the occupation of the worst-case high sensitivity receptors within the site and the phasing over approximately 19 years, a medium risk of impact without mitigation remains appropriate.

11.4.3 Standard medium risk mitigation measures as set out in the Original ES therefore continue to be recommended. With mitigation in place, the effects of construction dust is assessed to be not significant on existing and proposed receptor locations.

11.4.4 Therefore, there are no material changes to air quality effects predicted as a result of the Proposed Development due to construction when compared to the Original ES.

Occupation Impacts and Effects

11.4.5 The Projects Transport Consultants, Peter Evans Partnership, have confirmed that the amendments to the Drainage Strategy alone would not affect the previously assessed traffic flows associated with the Proposed Development. Therefore, it is considered that no new significant effects would occur as a result of development traffic flows.

11.4.6 In addition, as the amendments to the Drainage Strategy are in accordance with the previously assessed parameters, the location of worst-case proposed receptor locations assessed in the Original ES remain unchanged.

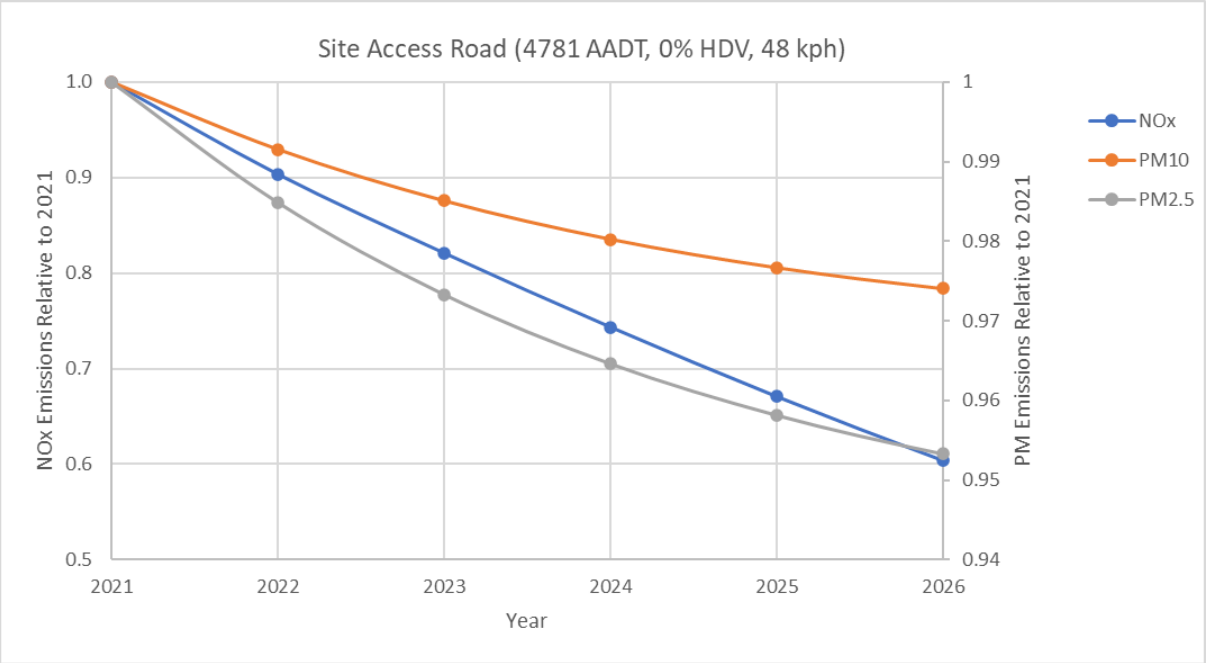
11.4.7 Mapped background concentrations and vehicle emission factors for the Proposed Development opening year in 2022 were used in the air quality assessment undertaken for the Original ES, alongside traffic data for 2036 (for the completed wider development). The first year of residential occupation of the Proposed Development is anticipated to now be 2025.

11.4.8 Since the Original ES, the $PM_{2.5}$ NAQO has decreased from 25 µg/m^3 to 20 µg/m^3. The highest predicted concentration was 13.8 µg/m^3 in the 'with development' scenario. Therefore, there are still no exceedances of the $PM_{2.5}$ NAQO.

11.4.9 Given the reduction in vehicle emissions forecast year on year in the latest version of the DEFRA EFT (v11[13]), as demonstrated in Figure 11.4, a later opening year of 2025 would correspond to lower predicted vehicle emissions than in 2022. In addition, as shown in Table 11.3, forecast background concentrations are also expected to reduce year on year. Therefore, using a later opening year of 2025 instead of 2022 would result in lower concentrations being predicted than those presented in the Original ES to support the planning application. As the impacts predicted in the Original ES were predicted to be 'negligible' at all modelled receptor locations, the air quality impacts associated with the Proposed Development are also be considered to remain 'negligible'.

[13] DEFRA (2020). 'Emission Factor Toolkit v11.0'. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/ . Last accessed 16th August 2023.

Figure 11.4 EFT v11 forecast emission rates for vehicles on Site Access Road 2021-2026



11.4.10 Due to changes in guidance thresholds for determining when detailed assessment of air quality impacts on ecological sites is required since the Original ES was undertaken, a review of nearby ecological sites adjacent to the road network has been undertaken. The Tuckmill Meadows Site of Special Scientific Interest (SSSI) is within 200 m of the A420 and has a potential AADT change due to the Proposed Development of 1,295 AADT. Further discussion regarding impacts on ecological sites is presented in Chapter 8, Ecology. No other ecological sites are considered to have the potential to experience significant impacts due to air quality from road traffic emissions resulting from the Proposed Development.

11.4.11 The effects of development traffic from the Development in relation to operational air quality are judged to be not significant. No additional traffic mitigation is therefore required to directly reduce the impacts of the development.

11.4.12 Nonetheless, a Travel Plan will be produced for the Development with the aim of reducing the number of vehicle trips made to and from the Site. In addition, the Proposed Development will include electric vehicle charging points in accordance with SBC standards for the New Eastern Villages (NEV).

Cumulative Effects

11.4.13 There are a number of committed developments in the vicinity of the Site which could be constructed over the same time period as the Development. Similar construction dust impacts could occur from any of the developments, however with similar mitigation measures applied. With mitigation in place, the cumulative effect of construction dust is considered to be not significant.

11.4.14 A sensitivity analysis relating to changes in cumulative road traffic since the Original ES was prepared has been undertaken by the Project Transport Consultant, Peter Evans Partnership. Since the Original ES was prepared, there has been a reduction of cumulative traffic arising from committed sites as shown in Table 11.6 below.

Table 11.6 Cumulative Net Traffic change to Original ES

Total Net Traffic Arising from Committed Sites	
Link	**24 Hour AADT Difference**
Wanborough Road	-113
Merlin Way	-113
Kingfisher Drive	-76
Covingham Drive	-38
A420 (east of site access)	-643
A419 (north of White Hart Junction)	-1,273
A419 (south of White Hart Junction)	-1,298
High Street	0
Callas Hill	-113
A4312 Oxford Road	25
Drakes Way	-63
B4006 Dorcan Way	-706
A420 (between Gablecross Junction and White Hart Junction)	-643

11.4.15 Based on this, and the conclusion drawn in paragraph 11.4.9 cumulative air quality effects therefore are considered to remain 'negligible' as per the Original ES.

11.5 Assessment Summary

11.5.1 Updates to baseline conditions and the revised Drainage Strategy have been reviewed for the consented development at Land at Lotmead Farm, Swindon.

11.5.2 Whilst minor changes to baseline conditions have occurred since the Original ES was prepared, these are not considered to have the potential to materially affect the conclusions of the Original ES in relation to air quality.

11.5.3 In addition, the amendments to the Drainage Strategy do not affect either the previously assessed receptor locations or development traffic flows and therefore are also not considered to have the potential to materially affect the conclusions of the Original ES in relation to air quality.

11.5.4 Potential air quality impacts on ecological sites have been reviewed in light of more recent guidance that has been published since the Original ES. Tuckmill Meadows SSSI is the only ecological site which has the potential for new impacts due to air quality from the Proposed Development. Further discussion on this can be seen in **Chapter 8 - Ecology**.

11.5.5 Potential construction dust impacts have been reviewed in light of more recent guidance being published since the Original ES and there are not considered to be any changes that will materially effect the conclusions of the original ES in terms of the mitigation measures relating to construction dust.

11.5.6 Therefore, no residual air quality effects differ or additional mitigation measures are required from those set out in the Original ES.

12 Archaeology & Cultural Heritage

12.1 Introduction

12.1.1 This chapter has been produced by RPS and considers the 'likely significant effects' upon both designated and non-designated heritage assets, including the potential for both direct and indirect effects as a result of the changes to the Drainage Strategy and FRA of the Proposed Development.

12.1.2 This chapter considers the conclusion of the Original ES Chapter and its baseline data along with new evidence gathered as a result of the archaeological mitigation strategy carried out across available areas of the Site, plus further assessments undertaken under condition (Condition 38 and 39) following from the granting of outline planning consent and in accordance with the Outline Mitigation Strategy (OMSWSI; EDP 2021).

12.1.3 All above reporting and fieldwork activities were carried out in agreement with the Archaeological Advisor of Wiltshire Council, and the Conservation Officer and the Inspector for Ancient Monument for Historic England.

12.1.4 The Updated Archaeological Desk Based Assessment (EDP 2019) which contained the full pre-determination geophysical survey, evaluation reports and built heritage assessments, along with the Heritage Setting Assessment (EDP 2017, updated 2019), are not re-appended to this ESA as the proposed changes do not materially affect the previous EIA conclusions and baseline. However, the results from a recent stage of archaeological mitigation along with further assessments, all associated with Phase 1 (Site 5) Lotmead, are appended to this report as part of its expanded baseline for the purpose of this ESA. The appendices are:

- Phase 1 (Site 5) Swindon Eastern Villages, Interim Fieldwork Summary (Cotswold Archaeology 2023; **Appendix 12.1**);
- Lotmead Farm Villages, Phase 1, Method Statement and Archaeological Management Plan (RPS 2023a; **Appendix 12.2**); and
- Lotmead Farm Villages, Phase 1, Heritage Statement (RPS 2023b; **Appendix 12.3**).

12.2 Assessment Criteria & Methodology

Previous Assessment

12.2.1 The Original ES Chapter in support of the Outline Planning Application for the Proposed Development (ref. S/OUT/19/0582) concluded that this would have a major beneficial effect on the Scheduled Monument of *Durocornovium* Roman Town (Figure 12.1), which will be preserved in situ within areas of green space. As part of the development proposal, in particular through improvements to its accessibly, condition and setting via the support of visual and landscape solutions, it was concluded that this will make a positive contribution to the significance of this national asset, especially within the Phase 1 location. These enhancements will allow the public to appreciate and connect with the historic environment not just in relation to the individual areas, as defined by Areas E and F, but to the monument as whole. The Heritage Statement prepared by RPS in 2023 and submitted as part of Phase 1 Reserved Matters Application reached similar conclusions (**Appendix 12.3**).

12.2.2 The Original ES Chapter also concluded that there was no mitigation required in respect of the Listed Buildings located in the wider area surrounding the Site as the Proposed Development forms no part of their setting and as such, their significance will not be affected by the construction or operation phases (Figure 12.1).

12.2.3 As per the non-listed buildings which included Lotmead Farm, adjacent farm offices and a series of cottages on Wanborough Road, located respectively centrally and on the southern edge of the Site (Figure 12.1), it was concluded that none will receive any physical effect from the Proposed Development. Their setting is limited to the immediate areas surrounding them which in respect of Lotmead Farm and adjacent offices any potential effects from the Proposed Development has been mitigated as part the design stage (inherent mitigation). The effect on the cottages on Wanborough Road was also considered to be negligible such that no mitigation was considered necessary.

12.2.4 As per the non-designated buried archaeological assets identified during multiple phase of geophysical survey and archaeological fieldwork (Figures 12.2 and 12.3), it was concluded that the Proposed Development could have a high adverse impact as this has the potential to destroy and remove any underlying archaeology that may be present within its footprint. However, where any groundworks for the construction of the housing or supporting infrastructure are proposed, there will be an agreed programme of archaeological work undertaken prior to the commencement of any development works in all areas that have proved to contain archaeological assets that could be negatively impacted. Such areas have been identified in the Outline Mitigation Strategy (OMSWSI, EDF in 2021) and are known as Sites 1 to 5 (Figure 12.4). The nature and scope of any archaeological works will be agreed with the Archaeological Advisor of Wiltshire Council in advance of this taking place and in line with the Outline Mitigation Strategy (OMSWSI, EDF 2021; Figure 12.4).

12.2.5 Furthermore a site specific Written Scheme of Investigation (WSI) will be prepared for each phase of development in order to satisfy Condition 38 of the Outline Planning Permission (ref. S/OUT/19/0582). In case of archaeological assets are required to be preservation in situ, a Method Statement and Management Plan will be carried out in accordance with Condition 39 of the same Outline Planning Permission.

12.2.6 Therefore, after archaeological mitigation has taken place, the residual impact on these assets by any proposed development work will be reduced to negligible or minor negative significance of effect.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

12.2.7 The following topic-specific policies and legislation are relevant to this assessment and have been taken into account in respect of this assessment.

12.2.8 National legislation regarding archaeology, including scheduled monuments, is contained in the Ancient Monuments and Archaeological Areas Act 1979, amended by the National Heritage Act 1983 and 2002, and updated in April 2014.

12.2.9 In March 2012, the government published the National Planning Policy Framework (NPPF), and it was last updated in July 2021. The NPPF is supported by the Planning Practice Guidance (PPG), which was published online 6th March 2014, with the guidance on Conserving and Enhancing the Historic Environment last updated 23 July 2019. (https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment).

12.2.10 The NPPF and PPG are additionally supported by three Good Practice Advice (GPA) documents published by Historic England: GPA 1: The Historic Environment in Local Plans; GPA 2: Managing Significance in Decision-Taking in the Historic Environment (both published March 2015). The second edition of GPA3: The Setting of Heritage Assets was published in December 2017.

National Planning Policy

12.2.11 Section 16 of the NPPF, entitled *Conserving and Enhancing the Historic Environment* provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 16 of the NPPF can be summarised as seeking the:

- Delivery of sustainable development;
- Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
- Conservation of England's heritage assets in a manner appropriate to their significance; and
- Recognition that heritage makes to our knowledge and understanding of the past.

12.2.12 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 194 states that planning decisions should be based on the significance of the heritage asset and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to review the potential impact of the proposal upon the significance of that asset.

12.2.13 *Heritage Assets* are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape positively identified as having a degree of significance meriting consideration in planning decisions. They include designated heritage assets (as defined in the NPPF) and assets identified by the local planning authority during the process of decision-making or through the plan-making process.

12.2.14 Annex 2 also defines *Archaeological Interest* as a heritage asset which holds or potentially could hold evidence of past human activity worthy of expert investigation at some point.

12.2.15 A *Nationally Important Designated Heritage Asset* comprises a: World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area.

12.2.16 *Significance* is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

12.2.17 *Setting* is defined as: The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

12.2.18 In short, government policy provides a framework which:

- Protects nationally important designated Heritage Assets;

- Protects the settings of such designations;
- In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions;
- Provides for the excavation and investigation of sites not significant enough to merit *in-situ* preservation.

12.2.19 The NPPG reiterates that the conservation of heritage assets in a manner appropriate to their significance is a core planning principle, requiring a flexible and thoughtful approach. Furthermore, it highlights that neglect and decay of heritage assets is best addressed through ensuring they remain in active use that is consistent with their conservation. Importantly, the guidance states that if complete, or partial loss of a heritage asset is justified, the aim should then be to capture and record the evidence of the asset's significance and make the interpretation publicly available. Key elements of the guidance relate to assessing harm. An important consideration should be whether the proposed works adversely affect a key element of the heritage asset's special architectural or historic interest. Additionally, it is the degree of harm, rather than the scale of development, that is to be assessed. The level of 'substantial harm' is considered to be a high bar that may not arise in many cases. Essentially, whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the NPPF. Importantly, harm may arise from works to the asset or from development within its setting. Setting is defined as the surroundings in which an asset is experienced and may be more extensive than the curtilage. A thorough assessment of the impact of proposals upon setting needs to take into account, and be proportionate to, the significance of the heritage asset and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it.

12.2.20 In considering any planning application for development, the planning authority will be mindful of the framework set by government policy, in this instance the NPPF, by current Development Plan Policy and by other material considerations.

Local Planning Policy

12.2.21 The Swindon Borough Local Plan 2026 was formally adopted by Swindon Borough Council (SBC) on 26 March 2015 and is the principal planning policy document for the Borough, providing the development strategy to deliver sustainable growth to the year 2026. Policy addressing the historic environment is contained in Policy EN10: Historic Environment and Historic Assets which states:

a. Swindon Borough's historic environment shall be sustained and enhanced. This includes all heritage assets including historic buildings, conservation areas, historic parks and gardens, landscape and archaeology.

b. Proposals for development affecting heritage assets shall conserve and, where appropriate, enhance their significance and setting. Any harm to the significance of a designated or non-designated heritage asset, or their loss, must be justified. Proposals will be weighed against the public benefits of the proposal, whether it has been demonstrated that all reasonable efforts have been made to sustain the existing use, find new uses, or mitigate the extent of the harm to the significance of the asset; and whether the works proposed are the minimum required to secure the long-term use of the asset.

c. Any alterations, extensions or changes of use to a listed building, or development in the vicinity of a listed building, shall not be permitted where there will be an adverse impact on those elements which contribute to their special architectural or historic significance, including their setting.

d. Scheduled monuments and other nationally important archaeological sites and their settings will be preserved in situ, and where not justifiable or feasible, provision to be made for excavation and recording. Development proposals affecting archaeological remains of less than national importance will be conserved in a manner appropriate to their significance. An appropriate assessment and evaluation should be submitted as part of any planning application in areas of known or potential archaeological interest.

e. Development within or which would affect the setting of the Borough's Conservation Areas will conserve those elements which contribute to their special character or appearance.

f. Features which form an integral part of a Park or Garden's historic interest and significance will be conserved and development will not detract from the enjoyment, layout, design, character, appearance or setting of them, including key views into and out from, or prejudice future restoration.

g. Any development proposal that would affect a locally important or non-designated heritage asset, including its setting, will be expected to conserve its significance, and any harm should be weighed against the public benefits of the proposal, including securing its optimum viable use."

12.2.22 The supporting text of this policy provides further clarification (contained within paragraphs 4.393-4.397) under the heading Scheduled Monuments and Archaeology:

"4.395 Development affecting the Borough's archaeological heritage must preserve in-situ archaeological remains and landscapes of acknowledged significance (as shown on the Policies Map) and protect their settings. Investigation via evaluation or other discovery may uncover additional sites to which this policy will apply.'

Guidance and Best Practice

12.2.23 No new guidance or Legislation has been introduced since the Original ES Chapter was prepared.

Baseline Data Collection

12.2.24 The designated and non-designated heritage assets that may be effected by the amendments to the Drainage Strategy and FRA are the same as those assessed in relation to the Proposed Development. As a result of this, the core baseline data considered in this ESA are the same as those included in the Original ES Chapter, plus further assessments undertaken under condition (Condition 38 and 39) following from the granting of planning consent and in accordance with the Outline Mitigation Strategy and Site-Specific Written Scheme of Investigations (OMSWSI, EDF 2021; Figure 4).

12.2.25 The baseline data of the Original ES Chapter was constituted of the Updated Archaeological Desk Based Assessment prepared by EDP in 2019. This provided an extensive analysis of the designated and non-designated heritage assets with the Site, and surrounding areas, that may be effected by the Proposed Development. This assessment did also draw together results from previous documents and reports, along with additional fieldwork activity, such as geophysical survey and trial trenching (Figures 12.2 and 12.3), that were undertaken at the Site specifically in support of the planning application (ref. S/OUT/19/0582). It also sought to establish the level of impacts to the setting and significance of the Listed Buildings and of the non-listed building located within and in proximity of the Site. Furthermore, the baseline data was expanded to include a Heritage Setting Assessment (EDP 2017, updated 2019) that was produced specifically to assess any potential impact on significance and setting of the Proposed development in respect of the Scheduled Monument of Durocornovium.

12.2.26 Since then, the Proposed Development has received Outline Planning Permission (ref. S/OUT/19/0582) and as a result of this, a programme of archaeological works was undertaken under condition (Condition 38) to mitigate any impacts on archaeological heritage assets that would arise from Phase 1 development. Phase 1 is located at the southern end of the Site, along Wanborough Road, and include parts of the Scheduled Monument of Durocornovium Roman Town (SM1004684), parcels E and F, which were not part of the mitigation strategy (Figure 5).

12.2.27 A draft report on the results of the archaeological excavation can be found in **Appendix 12.1**. This identified that the archaeological evidence observed on site were indicative of a Roman, rural landscape, outside the core settlement of *Durocornovium*, but clearly associated with its overall development. This included one or more phases of deforestation, possibly to obtain timber for construction and to provide land for agriculture; a system of ditches, pits, one enclosure and one large pond, along with evidence of Late Roman funerary activity which further confirms the “out of town” nature of the archaeological evidence.

12.2.28 Following from this, a Method Statement and Archaeological Management Plan was prepared by RPS in 2023 to discharge Condition 39 of the Outline Planning Permission (**Appendix 12.2**). This document detailed measures to be taken both at the construction and post-construction stages to safeguard areas of high archaeological significance at the Lotmead Site, Eastern Villages, Phase 1. These areas include parts of the Scheduled Monument of *Durocornovium* Roman Town (SM1004684), parcels E and F, and a buffer zone (Figure 5). The buffer covers an area of buried, non-designated archaeological assets associated with the Roman town, located between the Scheduled Monument to the south and the housing development to the north. Such areas are to be preserved *in situ* within proposed areas of green space and lie to the south of the Site, where it is bordered by the Wanborough Road.

12.2.29 A Heritage Management Plan was also prepared by RPS to assess the heritage impacts arising from a Reserved Matters Application in relation to the Proposed Development (**Appendix 12.3**). This application largely reflected the parameters set out in the Outline Planning Permission S/OUT/19/0582, with only minor changes to the alignment of the Southern Connect Road (SCR) and the reconfiguration of blocks structure. Therefore, it was concluded that The Phase 1 housing development and any associated infrastructure work and tree planting will have no direct (physical) impact on the Scheduled Monument Areas (E and F) and buffer zone, as these will be preserved in situ within areas of green space. Furthermore, in order to fulfil aims and objectives of the Heritage Management Plan (EDF 2020), landscape improvements are being proposed to enhance the public experience and improve accessibility through and across the Scheduled Monument Area with the creation of a path network which will streamline connection to and from its surroundings. This will make a positive contribution to the significance of this national asset within the Phase 1 location and will allow the public to appreciate the historic environment not just in relation to the individual areas, as defined by Areas E and F, but to the monument as whole.

12.2.30 A draft WSI for an Archaeological Excavation at Site 2 (Phase 2), Lotmead Swindon Eastern Villages, was also prepared by Cotswold Archaeology in 2023 under condition (Condition 38) to mitigate any impacts on archaeological heritage assets arising from Phase 2 development and proposed drainage work impacts. A plan showing the proposed mitigation strategy for this site can be found in Figure 12.7.

12.2.31 Before any work commence, discussion will be undertaken with the Archaeological Advisor Wiltshire Council to determine if any changes to the draft WSI are required.

Assessment Methodology

12.2.32 In accordance with the NPPF and Local Planning Policy, this ESA draws together the conclusion from the Original ES Chapter and associated appendices along with new evidence from recent phases of archaeological investigations in association with Phase 1 development of the Site (**Appendix 12.1**), plus further assessments and management plans undertaken under condition (Condition 39) and as part of Phase 1 Reserved Matters Application (**Appendix 12.2** and **Appendix 12.3**). These together form the baseline conditions in terms of the archaeological significance of the identified assets and the potential impact of the Proposed Development on their significance.

12.2.33 Tables 12.1, 12.2 and 12.3 have been employed in attributing 'sensitivity' to archaeological and cultural heritage assets, identifying the magnitude of likely impact upon them and assessing the significance of the resulting effects in EIA terms. These reflect the same criteria used in the Original ES Chapter.

12.2.34 The significance of effect has been assessed with reference to the sensitivity of the receptors (heritage assets) affected and the magnitude of impact. The sensitivity of heritage asset receptors was defined using the criteria in Table 12.1, which is based on those established by the Highways Agency in its Design Manual for Roads and Bridges (HA 2007). This is an industry standard assessment methodology, and the only one adopted by a Government agency.

12.2.35 The classification of the magnitude of impact on heritage assets is rigorous and based on consistent criteria. This takes account of factors such as the physical scale and type of disturbance to them and whether features or evidence would be lost that are fundamental to their historic character, integrity and therefore significance. Both physical and non-physical (e.g. visual) changes to heritage assets were considered. The magnitude of impact is assessed using the criteria in Table 12.2.

Table 12.1 Sensitivity of Receptors

Sensitivity	Importance	Definition/Example of Archaeological Receptor
High	National	Scheduled Monuments Areas of Archaeological Importance Registered Battlefields Conservation Areas Protected Wreck Sites Registered Parks and Gardens (all grades) Non-designated assets, including landscapes, of demonstrable national importance
Medium	Regional	Non-designated assets, including landscapes, of demonstrable Regional or County Importance
Low	Local	Locally important asset with cultural or educational value Assets with significance to Local Heritage value or interest
Negligible	Local	Assets with significance to Local Heritage value or interest

Table 12.2 Magnitude of impacts

High/Major	Medium/Moderate	Minor/Low	Negligible	No Impact
Change to a heritage asset so that it is completely altered, (Beneficial or Adverse) or destroyed (Adverse)	Partial loss or alteration of the significance of an archaeological asset. (Beneficial or Adverse)	Slight loss of the significance of an heritage asset.	A very slight change to the significance of an archaeological asset	No change to the significance of an archaeological asset

Table 12.3 The Significant of Effect Assessment Matrix

	Sensitivity of Receptors				
Magnitude of Impacts		**High**	**Medium**	**Low**	**Neglegible**
	High	Major	Major or Moderate	Major or Minor	Minor
	Medium	Major or Moderate	Moderate	Minor	Minor or Negligible
	Low	Moderate or Minor	Minor	Minor or Negligible	Minor or Negligible
	Negligible	Minor	Minor or Negligible	Minor or Negligible	Negligible
	No impact	Neutral	Neutral	Neutral	Neutral

12.2.36 Only those effects defined as 'Major' or 'Moderate' are considered to be significant in terms of the EIA Regulations. All other effects are deemed to be 'not significant'.

12.2.37 The five Grade II Listed Buildings (Figure 12.1), which are located outside the Site, had already been scoped out as part of the Original ES Chapter on the basis that the details presented within the appendices identified that such assets will clearly not be affected by the Proposed Development, in terms of either direct or indirect effects on their significance. In addition to which, other assets, such as the modern cottages Wanborough Road had also been scoped out on the basis of their very limited heritage significance (Figure 12.1).

12.2.38 In terms of heritage assets that were to be effected by the Proposed Development, the Original ES Chapter had identified two forms of mitigations. A 'Primary Mitigation (Inherent Mitigation)' whereby the mitigation of heritage effects is carried out as part of the design process such as the setting back of development or the restriction of heights of structures where these are adjacent to the Scheduled Monument of *Durocornovium*. A "Secondary Mitigation" (additional Mitigation) which will comprise additional works or protections, known as preservation *in situ*

that may be attached as planning conditions to any consent to ensure the appropriate treatment of archaeological deposits within the Site or indeed the preservation of any areas in situ via positive management. This work would normally be set out in a Written Scheme of Investigation (WSI) or Archaeological Management Plan (AMP) to be agreed with the LPA in advance of construction.

12.2.39 A successful example of "Secondary Mitigation" can be seen in relation to Site 5 and the Scheduled Monument of Durocornovium as shown in **Appendices 12.1; 12.2 and 12.3**. A draft plan of further potential mitigation for Site 2 can be seen in Figure 12.7.

12.2.40 Similarly, the proposed amendments to the Drainage Strategy and FRA will be carried out within the set parameters of the approved Outline Planning Permission and therefore, will have a negligible impact on the setting and significance of any designated heritage assets within the site, mostly due to the below ground nature of the amended drainage infrastructure (Figure 6).

12.2.41 As for the high adverse impact of such works on non-designated buried archaeological assets, there will be an agreed programme of archaeological investigation undertaken prior to commencement of any development works in all those Sites (1 to 5) that have proved to contain archaeological assets of high to medium significance. Such works will be preceded Written Scheme of Investigation (WSI) or Archaeological Management Plan (AMP) to be agreed with the LPA in advance of construction in accordance with the approved Outline Mitigation Strategy (OMSWSI, EDF 2021; Figure 12.4).

Geographical Scope

12.2.42 The Geography scope of this addendum is the same as the Original ES and has not changed.

12.2.43 This includes all designated and non-designated archaeological assets within a 500m radius of the Site boundary. This includes both the Site in its entirety and also the surrounding wider context.

12.2.44 The extent of the Study Area is proportionate to the scale and nature of the Proposed Development. It has also been determined to be proportionate, recognising the high density of archaeological assets within the Site and its immediate surroundings.

12.2.45 Extensive consultation and engagement with the Archaeological Advisor to Wiltshire Council, the Conservation Officer and Historic England has taken place throughout the project, since 2016.

Temporal Scope

12.2.46 Timescales for the Proposed Development are not fixed at this time however it is assumed that construction will begin in 2024.

12.2.47 As per the Original ES Chapter it is anticipated that the development will progress at an average delivery rate of 150 dwellings per annum. Based on the development of 2,500 dwellings, assuming the first 200 dwellings will be constructed at a slower rate of 50 dwellings per annum, the completion of development can be expected in circa 2043 (c. 19 years).

12.2.48 The below statements are based on an estimate of the typical timescales for a development of this type to come forwards and are provided as a guideline to inform the EIA, against which professional judgement has been used in the subsequent technical assessments.

12.2.49 Construction and operation of the proposed road and buildings could occur in tandem for some periods, and the timescales for this cannot be guaranteed. It is likely that the Proposed Development will be phased and different parts of the development may be brought forwards

by different parties. As a result, it is possible that construction could take place alongside occupation/operation of completed parts of the Proposed Development.

12.2.50 As the Outline elements of the scheme will be subject to future Reserved Matters applications, the timings for construction and subsequent operation could vary, but construction is currently assumed to commence in 2024.

12.3 Baseline Environment

12.3.1 The Original ES Chapter has drawn on the information from a number of reports and assessments (see Paragraphs 12.2.24 to 12.2.31) to describe the baseline conditions in terms of significance of the identified designated and non-designated heritage assets and the potential impacts from the Proposed Development (EDP 2017, updated 2019; EDP 2019). The baseline conditions have not changed and are still relevant, plus additional information on the nature of some of those assets, their significance and potential impacts has been further established in this ESA following from more fieldwork activity and further assessments carried out at the site under Outline Planning Permission (Condition 38 and 39) and in association with Phase 1 Development (Appendices 12.1 to 12.2).

12.3.2 On this basis, the heritage assets that may be effected by the amendments to the Drainage Strategy and FRA, which are considered in this ESA, are the same as those assessed in relation to the Proposed Development as part of the Original ES chapter and as such, the significance of those "receptors", both designated and non-designated has not changed.

12.3.3 The **designated heritage assets** include:

- **The Scheduled Monument of *Durocornovium*** which is the only designated archaeological assets within the Site (Figure 12.1);

- **Five Grade II Listed Buildings** (Figure 12.1) located in proximity of the Site (Lower Earlscourt Farmhouse, LB1023277; Marston Farmhouse, LB 299721; The outhouse to the north of Nythe Farmhouse, LB1023430; Longleaze Farm House, LB1299729; Lock Keepers Cottage; LB1355939; Earlscourt Manor (LB1023276);

12.3.4 The **non-designated heritage assets** include:

- The below ground archaeological assets observed across the whole perimeter of the Site, especially within areas of proposed future archaeological investigations, Site 1 to 5 as per the Outline Mitigation Strategy (OMSWSI, EDF 2021; Figure 4) agreed with Archaeological Advisor of Wiltshire Council, Melanie Pomeroy-Kellinger. Such archaeological assets include evidence of Mid-Late Prehistoric and Roman settlement occupation. There is little evidence of Medieval and Post Medieval activity within the areas of archaeological trial trenching.

  The excavation undertaken at Site 5 in association with Phase 1 development revealed a rural landscape activity associated with the development of *Durocornovium* (**Appendix 12.1** and **Appendix 12.2**). Very little Prehistoric background activity was observed.

- **Other non-designated heritage** assets include the Lotmead Farm complex located at the south-western portion of the Site and a series of residential cottages located its south-west edge, adjacent to Wanborough Road (Figure 1).

Designated Heritage Assets

12.3.5 In summary the Scheduled Monument of Durocornovium (formally designated as 'Site of Roman town, West of Wanborough House') (SM No. 1004684), is an asset of **National Importance or High sensitivity** (Table 16.1) that covers an area of *circa.*25ha adjacent to Wanborough Road, of which circa 8.4ha lies within the south/south-west part of the Site (Figure 12.1).

12.3.6 As also established in the Original ES Chapter, this settlement was known to antiquarians of the 17th century and was 'surveyed' in the 19th century. The site was identified as Durocornovium in the 20th century, after which time it was subject to a series of modern investigations.

12.3.7 The earliest formal investigations were undertaken in the 1920s when a series of test pits were excavated at diverse locations to establish the extent of settlement activity. From the 1950s to 1970s, the expansion of Swindon and upgrading of the local roads and infrastructure led to several programmes of extensive archaeological investigations. The most substantial phase of which began in 1966 and continued for 10 years, mainly concentrating on the line of Ermin Street and the adjacent Roman settlement to either side (EDP 2019).

12.3.8 These investigations established that the Roman settlement of Durocornovium originated in the decade after the conquest of AD43, possibly with a military connection. There is some evidence that industrial activity was associated with the settlement's earliest phases. Intensive building appears to have taken place during the 2nd and 3rd centuries, although the majority of the evidence for settlement appears to relate to the late 3rd and 4th centuries. By this time, the settlement is understood to have covered a wide area (estimated at *circa* 25-30ha), with the main concentration of buildings fronting onto Ermin Street, and an expanse of buildings built on a formal system of side roads extending towards the *mansio* site (EDP 2019), which lies within the Site. The western limits of the settlement area are suggested by the discovery of cremation and inhumation burials (cemeteries) to the south of Ermin Street, while, broadly speaking, the limits of the town are understood to be defined by a spread of dark soil associated with Roman occupation debris. However, recent investigations have suggested that the settlement now extends further to the north-west and south-east (see below).

12.3.9 Since 2004 further investigations have been undertaken within the area of known Roman settlement which, among other features, recorded archaeologically significant deposits of dark earth adjacent to the line of Ermin Street which are likely to date to the late Romano-British period.

12.3.10 The geophysical survey undertaken to inform the Lotmead Farm development in 2013, focussed on the location of the Scheduled Monument (EDP 2019). Whilst there has never been any intention to develop the area of the monument, the survey was undertaken to understand its extent and significance and in terms of its future management. The survey revealed evidence of several phases of archaeological activity within the scheduled area, with a large number of positive anomalies that relate to ditches associated with enclosures, boundaries and roads or tracks within the town. However, away from the core of the Roman settlement, fewer geophysical responses were visible suggesting the scheduled boundary where it is located within the Site encompasses the majority of the Roman remains.

12.3.11 This was followed by a phase of pre-determination trenching evaluation, undertaken to investigate geophysical anomalies of possible archaeological nature, that had been identified north of the Scheduled Monument, within areas that were going to be impacted by the Proposed Development. This trenching exercise revealed very limited evidence of archaeological remains to the north of Area E, contrarily, a series of archaeological remains, including ditches, pits and

a burial of Romano-British date were observed north of Area F of the Scheduled Monument (EDP 2019).

12.3.12 Since then and, after the preparation of the original ES Chapter, the Proposed Development has received Outline Planning Permission (ref. S/OUT/19/0582) and as a result of this, a programme of archaeological works was undertaken under condition (Condition 38) to mitigate any impacts on archaeological heritage assets that would arise from Phase 1 development. This is located at the southern end of the Site, along Wanborough Road, and include parts of the Scheduled Monument of Durocornovium Roman Town (SM1004684), parcels E and (Figure 12.5) which will be preserved *in situ* and not be impacted by any development works.

12.3.13 A draft report on the results of the archaeological excavation can be found in Appendix 12.1. This identified that the archaeological evidence observed on site were indicative of a Roman, rural landscape, outside the core settlement of *Durocornovium*, but clearly associated with its overall development. This included one or more phases of deforestation, possibly to obtain timber for construction and to provide land for agriculture; a system of ditches, pits, one enclosure and one large pond, along with evidence of Late Roman funerary activity which further confirms the “out of town” nature of the archaeological evidence.

12.3.14 This phase of archaeological excavation in relation to Phase 1 development also proved that such archaeological remains extended southwards within the buffer zone, located immediately north of the Area F of the Scheduled Monument. Therefore, owing to this connection, such remains are now considered to be of **High sensitivity** and will be *preserved in situ* alongside the Scheduled Monument within the proposed areas of green space.

12.3.15 There are no Listed buildings within the Site, although there are five Grade II Listed buildings located in the vicinity. These are considered to be as of **High sensitivity** and include: Lower Earlscourt Farmhouse, LB1023277; Marston Farmhouse, LB 299721; The outhouse to the north of Nythe Farmhouse, LB1023430; Longleaze Farmhouse, LB1299729; Lock Keepers Cottage; LB1355939; Earlscourt Manor (LB1023276). A full assessment of those buildings can be found in EDP 2019, Appendix 7.

12.3.16 The Original ES Chapter also established that none of these buildings has a relationship with the land that forms the Site. The elements of their settings, which contribute to their heritage significance, are focused on their immediate farmstead complexes and street scenes with which they are associated. Therefore, as the Site forms no part of their setting, it was concluded that the residential development within it will have no effect on the significance of such buildings. Therefore, these listed buildings do not represent a constraint to the form of development proposed and no mitigation was required. As a results of this, any amendments to the Drainage Strategy and FRA will also have no impact on the setting and significance of the Listed buildings and no mitigation will be required.

Non-Designated Heritage Assets

12.3.17 The non-designated archaeological assets identified within the Site have been assessed as of **Regional to Local importance, Medium to Low sensitivity** (Table 16.1). Results of the recent geophysical surveys identified three areas of previously unknown archaeological activity (EDP 2019; Sites 1-3 Figure 12.2). The activity, located across the land to the north-east, centre and west of the Site, appears to represent discrete concentrations of Mid-Late Prehistoric settlements, comprising areas of ring ditches and enclosures, located in proximity of the braided river channels of the River Cole and the Dorcan Stream. The presence of such evidence was later confirmed by a phase of archaeological evaluation undertaken at the Site in support of the planning application (ref. S/OUT/19/0582) as shown on Figure 12.3 (EDP 2019).

12.3.18 Evidence of Roman activity was also picked-up during the geophysical survey and pre-determination archaeological evaluation (EDP 2019; Sites 1-3 Figure 12.2), to the south of the Site, in particular to the north of Area F of the Scheduled Monument, as detailed above in Paragraphs 12.3.10 and 12.3.11. Such evidence was further confirmed by a programme of archaeological works undertaken under condition (Condition 38) to mitigate any impacts on buried archaeological assets that would arise from Phase 1 of the Proposed Development (Figure 12.5; Appendix 12.1). These works were carried out in accordance with the Outline Mitigation Strategy (OMSWSI, EDF in 2021), a programme of archaeological mitigation prepared for the whole Site in agreement with the Archaeological Advisor of Wiltshire Council, where Sites 1 to 5, (Figure 12.4) had been identified as areas that would require further archaeological investigations prior to development. A Site specific Written Scheme of Investigation (WSI was prepared in advance of Site 5 (Phase 1) excavation works.

12.3.19 A draft Written Scheme of Investigation (WSI) for an Archaeological Excavation at Site 2 (Phase 2) of the Proposed Development has also been recently prepared by Cotswold Archaeology under condition (Condition 38) to mitigate any impacts on Mid-Late Prehistoric buried archaeological assets arising from Phase 2 development and associated drainage works. It may be possible that the WSI will need reviewing following from the proposed new Drainage Strategy and FRA proposals included in this ESA. However, a plan showing a draft of the proposed mitigation strategy for Site 2 can be found in Figure 12.7

12.3.20 As per the Medieval and Post Medieval periods, very little evidence was exposed during any phase of archaeological investigation undertaken at the site. Remains of these periods are mainly associated with findspots, evidence of agricultural activity and the known upstanding buildings, which are mostly of Post Medieval-Modern date, located within and outside the Site (EDP 2019).

12.3.21 All non-designated built heritage assets located within the perimeter of the Site (Figure 12.1) are considered mostly of **Low-Medium (Local- Regional)** heritage importance. The bulk of such buildings at the Site is focused on the Lotmead Farm complex located in the centre-southern portion of the site. The earliest buildings within the farm complex comprise the main farmhouse and outbuilding and the associated courtyard complex to the north-east. The assessment carried on those buildings concluded that an 18th to 19th century date seems likely for these structures but that the farmhouse may have had earlier origins. However, later alterations have diminished its significance and as such, the building is of no more than low importance (EDP 2019).

12.3.22 The substantial alteration to the fabric of the buildings within the courtyard is a result of their conversion to offices. This and the widespread prevalence of this type of 19th century courtyard complex means that these buildings are considered to form a heritage asset of no more than local importance.

12.3.23 The remaining buildings within the Site comprise a series of residential dwellings located to its southern end, along Wanborough Road. They comprise a semi-detached pair of 19th century brick cottages off the main access road to Lotmead Farm, a semi-detached pair of early 20th century brick cottages and a further semi-detached pair of late 20th century residential properties.

12.3.24 While the late 20th century properties are clearly of no heritage importance, the 19th century and early 20th century buildings presumably represent worker's cottages associated with the dairy farm to the north-east. However, they exhibit little architectural interest and have experienced significant alteration to their external openings and roof coverings such that they are considered to be of negligible heritage importance.

12.3.25 The elements of the setting of these buildings which contribute to their limited significance is defined by their immediate residential grounds, and their locations, on the main road, deliberately peripheral to the associated Lotmead Farm complex to the north-east and as such makes a very limited contribution to their heritage significance.

12.4 Updated Assessment of Impacts and Effects

12.4.1 Following from a review of the amendments to the Drainage Strategy and FRA against the ESA baseline environment, it has been established that the conclusions of the Original ES Chapter are still valid and so are the mitigation measures that are recommended (Original ES Chapter; 16.12).

Designated Heritage Assets

12.4.2 The Scheduled Monument of Durocornovium (formally designated as 'Site of Roman town, West of Wanborough House') (SM No. 1004684), is an asset of **National Importance or High** sensitivity (Table 16.1) whereby its significance could be directly or indirectly affected by amendments to the Drainage Strategy and FRA of Proposed Development, or through changes within parts of its setting that contribute to that significance. However, the Original ES chapter concluded that the Proposed Development (ref. S/OUT/19/0582) would have a major beneficial effect on the Scheduled Monument of *Durocornovium* Roman Town, which will be preserved *in situ* within areas of green space, plus providing improvements to its accessibly and enhancements on the way the public appreciate and connect with the historic environment, not just in relation to the individual area, as defined by Areas E and F, but to the monument as whole. The Heritage Statement prepared by RPS in 2023 and submitted as part of Phase 1 Reserved Matters Application reached similar conclusions (**Appendix 12.3**). Furthermore, a Method Statement and a Heritage Management Plan (**Appendix 12.2**) has also been prepared and sets out measures to be taken both at the construction and post-construction stages to safeguard areas of the Scheduled Monument (SM1004684), Parcels E and F, and a buffer zone, located immediately to north of SAM (Figure 5). This buffer covers an area of buried, non-designated archaeological assets which contains archaeological remains associated with the development of the Roman town (**Appendix 12.1**). Owing to this connection, such remains are now considered to be of High sensitivity and will be preserved in situ alongside the Scheduled Monument within the proposed areas of green space.

12.4.3 Therefore, it concluded that any amendments to the Drainage Strategy and FRA, that are included in this ESA, will have a negligible impact on the setting and significance on this designated heritage assets as such works will mostly be at ground/below ground level and within the agreed parameters, which are the results of "Primary Mitigation" (see Paragraph 12.2.38) of the approved Proposed Development (Figure 12.6).

12.4.4 The Listed buildings surrounding the Site were assessed in the Original ES chapter as of **High sensitivity**, but it was established that none of these has a relationship with the land that forms the Site. The elements of their settings, which contribute to their heritage significance, are focused on their immediate farmstead complexes and street scenes with which they are associated. Therefore, as the Site forms no part of their setting, it was concluded that the residential development within it will have no effect on the significance of such buildings. Therefore, these listed buildings do not represent a constraint to the form of development proposed and no mitigation was required. As a results of this, any amendments to the Drainage Strategy and FRA will also have no impact on the setting of the Listed buildings and no mitigation will be required.

Non Designated Heritage Assets

12.4.5 The non-designated archaeological assets identified within the Site by the Original ES Chapter have been assessed as of **Regional to Local importance, Medium to Low sensitivity** (Table 16.1). Therefore, it was concluded that the Proposed Development will have the potential to destroy and remove any underlying archaeology that may be present within its footprint and that a programme of archaeological works ("Secondary Mitigation", see Paragraph 12.2.38) will need to be undertaken to ensure that all potential archaeological assets of significance are properly excavated and/or assessed prior to any development work taking place. As such, an Outline Mitigation Strategy (OMSWSI, EDF in 2021) for a programme of archaeological mitigation was prepared in agreement with the Archaeological Advisor of Wiltshire Council, and five Sites, 1 to 5, (Figure 12.4) had been identified as areas that will require further archaeological works prior to development. Such works will be undertaken under planning condition and in accordance with a site- specific WSI.

12.4.6 The Original ES Chapter did also establish that in case of archaeological remains of High sensitivity, these would be preserved *in situ* and a Method Statement and Heritage Management Plan would be produced to set out a series of safe-guarding measures to ensure that those assets are not impacted by any construction and post construction activity. As discussed above (Paragraph 12.3.5), a Method Statement and Heritage Management Plan was prepared to safeguard parts of the Scheduled Monument of *Durocornovium* Roman Town (SM1004684), parcels E and F, but also an area of buffer zone, located immediately to the north of parcel F, that contained non-designated archaeological assets associated with the development of the Roman town and therefore, now regarded as of High sensitivity. For this reason, such remains will now be preserved *in situ*, alongside with the Scheduled Monument, within the proposed areas of green space (**Appendix 12.2**; Figure 5).

12.4.7 Therefore, it is concluded that any amendments to the Drainage Strategy and FRA, as also established by the Original ES with regards to the Proposed Development, could have a high adverse impacts on any non-designated archaeological assets as these have the potential to destroy and remove any archaeological assets within their footprint. Therefore, an agreed programme of archaeological work and/or preservation *in situ,* where required, - "Secondary Mitigation"- will need to be undertaken under condition, but prior to the commencement of development works, within those areas of the Site (Sites1 to 5; Figure 12.4) that have been identified in the Outline Mitigation Strategy (OMSWSI, EDF in 2021) and that are **yet** to be mitigated.

12.4.8 No further mitigation will be required within Site 5 as part of Phase 1 development, because all areas of known archaeological potential as per Outline Mitigation Strategy (OMSWSI, EDF in 2021; Figure 4) have already been subject to archaeological excavation (Figure 6) and therefore, won't be adversely impacted by any works associated with the amendments to the Drainage Strategy and FRA. A draft mitigation proposal for Site 2 can be found in Figure 12.7.

12.4.9 Finally, the non-designated built heritage assets at the Site include the Lotmead Farm complex located at the centre-southern portion of the Site and a series of residential cottages located its south-west edge, adjacent to Wanborough Road. The Original ES Chapter concluded that these are of **Low to Medium heritage** importance and that those dated to the 19th century have undergone such alterations to their original structures, that they are now considered to be of negligible heritage importance. Therefore, the Proposed Development, as the amendments to the Drainage Strategy and FRA, are considered to have a negligible impact such that no mitigation is considered necessary.

12.4.10 After mitigation has taken place, where required, the residual impact on these assets by any proposed development work will be reduced to negligible or minor negative significance of effect.

Construction Impacts and Effects

12.4.11 There is only one designated heritage asset within the Site. This is the Scheduled Monument of Durocornovium formally designated as 'Site of Roman town, West of Wanborough House' (SM1004684) which is considered of high sensitivity/national importance.

12.4.12 Due to modern landscape interventions, such asset is currently divided into separate land parcels, labelled A to H (Figure 12.1), with Areas E and F falling within the southern end of the Site. However, as results of "Primary Mitigation" implemented at the design stage for the Proposed Development, it was agreed that such areas, along with a buffer zone to north, will be preserved *in situ* within areas of green space. For this reason, there will be no physical impact on this designated heritage asset during any phase of the Proposed Development, including any proposed amendments to the Drainage Strategy and FRA.

12.4.13 The integrity of this monument of Nation Importance will be guaranteed by a series of safeguarding measures to be implemented during any stage of the construction phase as set out in the Method Statement and a Heritage Plan prepared by RPS in 2023 (**Appendix 12.3**), as a response to Condition 39 of the Outline Planning Permission (ref. S/OUT/19/0582) in relation to Phase 1 Development.

12.4.14 Therefore, given that no physical or direct impacts are expected on this high sensitivity assets during construction of the proposed amendments to the Drainage Strategy and FRA, the overall effect is concluded to be neutral/not significant, with no mitigation required.

12.4.15 The Listed Buildings are located in the wider landscape, outside the perimeter of the Site. Owing to their physical distance from the Site, none will receive a physical or direct impact from the proposed amendments to the Drainage Strategy and FRA and the Proposed development. Therefore, on the basis of this, the overall effect on this designated assets is concluded to be neutral/not significant. No mitigation is required.

12.4.16 The non-designated archaeological assets identified within the Site by the original ES Chapter have been assessed as of Regional to Local importance, Medium to Low sensitivity (Table 12.1). Therefore, it was concluded that groundwork activity associated with the Proposed Development, including any proposed amendments to the Drainage Strategy and FRA, would comprise a high magnitude of change, and (worst case) has the potential to destroy all of the archaeological deposits present within its footprint. Therefore, due to the high adverse impacts that are anticipated, the overall effect on this heritage assets is assessed to be moderate, as also concluded in the Original ES Chapter.

12.4.17 The presence of areas of green space as part of the Proposed Development will allow the preservation of non-designated archaeological assets *in situ* in some areas. In other areas, however, where loss of identified archaeological assets is anticipated from the construction phase of any proposed amendments to the Drainage Strategy and FRA and Proposed Development, specific mitigation measures will take place in advance of construction activity, as set out in the Outline Mitigation Strategy (OMSWSI, EDF 2021) and in accordance with a Site Specific WSI. This may comprise further evaluation work to verify and augment the results of the previous work on the site and/or where presence of archaeological assets has already been established through evaluation, a programme of archaeological excavation will be undertaken which will also include analysis and publication.

12.4.18 An example of such mitigation strategy can be found in **Appendix 12.1**, where a programme of archaeological excavation was undertaken within Site 5 in advance of Phase 1 Development. Figure 12.7 works shows a draft mitigation proposal for Site 2.

12.4.19 The scope and extent of the archaeological mitigation strategy within any of the areas of proposed mitigation (Sites 1 to 4, Figure 12.6) will be agreed in advance with the Archaeological Advisor of Wiltshire Council, and monitored by them throughout the phases of fieldwork and reporting. Such work will be undertaken post-consent and under Condition 38 of the Outline Planning Permission (ref. S/OUT/19/0582).

12.4.20 All non-designated built heritage assets located within the perimeter of the Site (Figure 12.1) are considered mostly of Low -Medium (Local- Regional) heritage importance. Only those structures that were considered of no heritage value will be demolished as part of the Proposed Development. Lotmead Farmhouse and the associated courtyard complex to the north, as well as the modern house to the east will be retained in their current form, as are the cottages along Wanborough Road. Therefore, there will be *negligible to no effects* from the construction phase (i.e. direct effects) as these buildings will not be impacted by the proposed amendments to the Drainage Strategy and FRA of the Proposed Development. On this basis, the overall effect on this designated assets is concluded to be neutral/not significant. No mitigation is required.

Occupation Impacts and Effects

12.4.21 There is only one designated heritage asset within the Site, the Scheduled Monument of Durocornovium (SM No. 1004684).

12.4.22 For the operational phase, only indirect effects are considered in terms of the potential effects on the significance of the monument through changes within its setting. The proposed amendments to the Drainage Strategy and FRA will follow the same parameters applied to the Proposed Development whereby no housing or other development is proposed near Areas E and D of the Scheduled Monument and a set-back of over 50m has been applied to any development proposed in proximity to Area F. As such, the Scheduled Monument, which is of high sensitivity, will receive a low magnitude of change, resulting in minor/no significant effects by virtue of the “Primary Mitigation” inherent to the design of the approved Proposed Development.

12.4.23 In relation to the Listed buildings located outside the perimeter of the Site, which is are of High sensitivity, none of these has a functional relationship with the Site and the elements of their settings which contribute to their heritage significance are focused on their immediate farmstead complexes. As such, the operation phase of proposed Drainage Strategy and FRA, as the Proposed Development, will have a neutral effect and therefore, not significant (see Paragraph 12.2.37).

12.4.24 In relation to the non-designated archaeological assets, no mitigation measures will be required for the operational phase of works, as any archaeological remains identified within Sites 1 to 5 (Figures 12.4 and 12.5) will have been mitigated prior to the construction phase. Therefore, neutral effects are anticipated as a result of the operational phase. As such, these are considered not significant.

12.4.25 However, in case of any assets preserved *in situ* there will be a series of safe-guarding measure to be followed to ensure the integrity of such assets during the operational phase. Therefore, given that no physical or direct impacts are expected on this high sensitivity assets during the operational phase of the Drainage Strategy and FRA, the overall effect is concluded to be neutral/not significant, with no further mitigation required.

12.4.26 All non-designated built heritage assets located within the perimeter of the Site (Figure 12.1) are considered mostly of Low-Medium (Local- Regional) heritage importance. The Original ES Chapter concludes that such assets will receive a low magnitude of change from the operational phase of the Proposed Development, resulting in minor/negligible significant effects by virtue of the Written Scheme of Investigation (WSI) inherent to the design of the Proposed Development. The same conclusion can be applied to the amended Drainage Strategy and FRA. As such, no further mitigation is proposed in terms of Lotmead Farmhouse (see Paragraph 12.2.37).

Cumulative Effects

12.4.27 Cumulative effects are the combined effects of several development schemes (in conjunction with the Proposed Development) which may, on an individual basis be insignificant but, cumulatively, have a significant effect.

12.4.28 The ESA has taken into consideration the 'cumulative effects' from a number of schemes in proximity of the Site (see Chapter 3) and reached similar conclusions to those set out in the Original ES Chapter.

12.4.29 The Scheduled Monument of Durocornovium (SM No. 1004684) is the only designated heritage assets within the Site with the potential to receive an effect from the Proposed Development and amendments to its Drainage and FRA. With regard to the potential for cumulative effects, the SM does not extend into any of the sites listed in Chapter 3 of this ES as it is too distant and indeed too well screened for these sites to form any part of their setting. Furthermore, the design stage of the Proposed Development had already addressed any adverse effects on the SM through "Primary Mitigation", and due to the provision of a Heritage Management Plan, a beneficial effect in the long term has been identified in respect of the Scheduled Monument. As such, there will be no adverse cumulative effects form the developments listed above (see Chapter 3), plus residents of these sites will benefit from the positive management of the Scheduled Monument as this will include space for visitors to experience this National asset and understand its interpretation within the wider landscape (**Appendix 12.3**).

12.4.30 As for the amendments to the Drainage and FRA of the Proposed Development, these will have no effect on the Listed Buildings (Figure 12.1) identified in wider area surrounding the Site and there can be no cumulative effects in respect of the development sites listed above, mostly because elements of their settings, which contribute to their heritage significance, are focused on their immediate farmstead complexes and street scenes with which they are associated.

12.4.31 With regard to the identified non-designated heritage assets within archaeological areas (Sites 1 to 4, Figure 12.6), there are discrete areas of archaeological activity located within the Site, mostly dating to the Mid-Late Prehistoric and the Roman period. These archaeological assets are not expected to extend beyond the Proposed Development boundaries. However, in case archaeological assets do transcend site boundaries a holistic approach to archaeological reporting at a wider landscape level will be employed to better understand the collective value of such sites. As a result of this, the cumulatively information from such works will provide a better understanding of the nature and settlement pattern of this area of Wiltshire during the Prehistoric and Roman time.

12.4.32 The non-listed buildings, Lotmead Farm the adjacent farm offices and the cottage on Wanborough Road are located centrally and on the southern edge of the Site. Their setting is limited to the immediate areas surrounding them which, in respect to Drainage and FRA, any mitigation required has already taken place as part of the "Primary Mitigation" of the Proposed Development. With regard to the potential for cumulative effects, the proposed schemes listed

above are too distant and too well screened to form any part of the settings of these buildings, such that there can be no cumulative effects.

12.4.33 All in all, we can conclude that each new development coming forward (see Chapter 3) will be required by the Local Planning Authority to assess and mitigate, where required, their own individual impacts on surrounding heritage assets, including those within the Site, as such there can't be no cumulative impacts.

12.5 Assessment Summary

12.5.1 This ESA Chapter has been produced by RPS and considers the 'likely significant effects' upon both designated and non-designated heritage assets, including the potential for both direct and indirect effects as a result of the changes to the Drainage Strategy and FRA of the Proposed Development.

12.5.2 This chapter considers the conclusion of the Original ES Chapter and its baseline data along with new evidence gathered as a results the archaeological mitigation strategy carried out across available areas of the site, plus further assessments undertaken under condition (**Appendix 12.1, 12.2 and 12.3**) following from the granting of outline planning consent and in accordance with the Outline Mitigation Strategy (OMSWSI; EDP 2021).

12.5.3 As a result of this and following from a review of the amendments to the Drainage Strategy and FRA against the ESA baseline environment, it has been established that the conclusions of the original ES Chapter are still valid and so are the mitigation measures that are recommended, known as "Primary and Secondary Mitigation" (see Paragraph 12.3.28; ES Chapter; 16.12), along with the residual effects in relation to the designated and not designated heritage present at the Site.

12.5.4 None of the proposed amendments to Drainage Strategy and FRA, for the Proposed Development, will directly or indirectly impact on the remains, setting or significance of the Scheduled Monument (SM1004684), Listed Buildings and non-listed buildings within and outside the site (Figure 1). The design of such amendments will fall within the agreed parameters of the approved development outline, and therefore, any potential adverse impacts on those assets has already been addressed through design as part of the "Primary Mitigation" of the Outline Planning Application (see Paragraph 12.2.38; ES Chapter; 16.12 and 16.15 pp).

12.5.5 As a results of the implementation of such mitigations, no further mitigation is required for any of those assets. In particular in case of the Scheduled Monument, the archaeological works completed to date, especially those in association with Phase 1 development (**Appendix 12.1**), along with the preparation of a revised Heritage Statement **(Appendix 12.3**), have already produced a major beneficial effect and will continue to do so under the provisions of the Method Statement and Heritage Management Plan that will safeguard the designated assets during construction and post construction works (**Appendix 12.2**).Therefore, when assessed in terms of the high importance of the Scheduled Monument, the residual effect of both the construction and operational phases of the Proposed Development on this asset, including any amendment to the Drainage Strategy and FRA, will still be considered **major beneficial.**

12.5.6 In relation to the non-designated archaeological assets, any amendments to Drainage Strategy and FRA, as any other below groundwork associated with the Proposed Development, have the potential to completely remove any identified archaeological assets (Sites 1 to 5) within their footprint, and as such, a high adverse impact will result in a moderate effect on the significance of these non-designated heritage assets. However, the excavation and recording recommended by way of archaeological excavation in advance of construction will preserve these features by record, or in some instances, where archaeological assets can be preserved

in situ under areas of green space, a Method Statement and Heritage Management Plan will be prepared to safeguard these during construction and post construction works ("Secondary Mitigation ", see Paragraph 12.2.38). Any mitigation strategy will be carried out in agreement with the Archaeological Advisor of Wiltshire Council and will be undertaken under condition (38 and 39) of the Outline Planning Permission (ref. S/OUT/19/0582).

12.5.7 With the implementation of the mitigation, the residual impact will be reduced to **minor significance of effect.**

13 Conclusion

13.1.1 A review of the Original ES has been undertaken to confirm the validity of the conclusions and mitigation measures presented in respect of the revised Drainage Strategy and FRA Addendum submitted as part of the Section 73 application.

13.1.2 In summary, the Original ES identified significant effects in respect of the following (when assessing the whole of the outline development):

- Land Use and Agriculture (adverse)
- Socio Economics and Human Health (beneficial)
- Water Resources (beneficial)
- Ground Conditions (beneficial)
- Landscape and Visual (beneficial and adverse)
- Archaeology and Cultural Heritage (beneficial)

13.1.3 With the implementation of appropriate mitigation, the Original ES (summarised in Chapter 17 of the Original ES) stated that significant residual (post-mitigation) adverse effects remain in respect of landscape change and visual effects and the loss of agricultural land and farm holding associated with the existing dairy farm.

13.1.4 Following a review of the baseline conditions and updated assessment work in light of the revised FRA and Drainage Strategy, this ESA has confirmed/identified significant effects in respect of the following topics:

- Land Use and Agriculture (adverse)
- Socio Economics and Human Health (beneficial)
- Archaeology and Cultural Heritage (beneficial)
- Water Resources (beneficial)
- Landscape and Visual (beneficial and adverse)

13.1.5 This is in line with the Original ES, with the exception of ground conditions, where further baseline work has been undertaken since the Original ES. Following a review of the ground conditions assessment in the context of the update baseline information, additional impacts and effects were identified (as set out in Chapter 6), however, it is concluded that within the implementation of the proposed mitigation measures there would be no significant residual impacts in relation to ground conditions (this represent a change from the Moderate beneficial residual effects reported in the Original ES).

13.1.6 No new residual significant adverse effects have been identified within the ESA.

13.1.7 Given the impacts and effects identified within this ESA are broadly in line with the Original ES, the mitigation measures set out within the Original ES also remain applicable and appropriate, with the exception of ecology where mitigation for the great crested newts has been updated to

reflect the District Level Licences (DLL) which are in preparation. Full details of the mitigation requirements are set out within the technical chapters of the ESA and the Original ES.

13.1.8 As presented in this ESA, the review demonstrates that changes to the FRA and drainage strategy comply with the previously assessed parameters and the relevant strategies relating to the EIA. This ESA should be read in conjunction with the Original ES.