Gavray Drive West, Bicester

Environmental Statement Addendum

May 2018

Coordinated by
David Lock Associates
On behalf of Gallagher Estates Ltd
Charles Brown and
Simon Digby

CONTENTS

1 INTRODUCTION

1.1 Gallagher Estates, Charles Brown and Simon Digby (the "Applicants" and "Appellants") submitted an Outline Planning Application (OPA) for residential development (the "Proposed Development") on land north of Gavray Dive, Bicester (the "Application Site" or "Site") in April 2015. This site is known as Gavray Drive West, comprising land west of Langford Brook. The Site lies within the administrative boundary of Cherwell District Council (CDC).

1.2 The planning application was refused by Cherwell District Council on 22 June 2017. Gallagher Estates, Charles Brown and Simon Digby subsequently appealed this decision which was validated on 28 December 2017.

1.3 The original OPA was submitted with an Environmental Statement dated April 2015 ("2015 ES"). This Environmental Statement addendum report ("ES addendum") updates the 2015 ES to the extent necessary to take account of any material change in circumstances.

1.4 The ES addendum has been prepared in accordance with Regulation 22 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 ('*further information and evidence respecting environmental statements'*. In accordance with the Regulations, this addendum together with the 2015 ES provide an assessment of the *"likely significant effects of the proposed development on the environment".*

1.5 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 came into effect on 16th May 2017. However as the outline planning application was submitted under the previous Regulations these remain valid for the submission of the further information.

Purpose of the Environmental Statement addendum

1.6 The ES submitted in 2015 reports the findings of an Environmental Impact Assessment (EIA) of the Proposed Development. EIA is a process whereby the likely significant environmental effects of a proposed development are rigorously assessed. It enables potentially "significant" environmental effects to be identified and appropriate mitigation measures to be proposed, removing or minimising potential adverse effects.

1.7 This ES addendum report outlines the following:

- Further environmental information that has been considered necessary to update that previously submitted;
- How each Environmental Statement (ES) chapter has changed and;
- Conclusions setting out any key changes to the overall mitigation measures proposed and residual impacts.

1.8 In addition, the appendices include addendum chapters or fully revised environmental chapters as follows:

- Appendix A: Addendum to ES Chapter 5 Transport and Access
- Appendix B: Addendum to ES Chapter 6 Air Quality
- Appendix C: Addendum to ES Chapter 7 Noise and Vibration
- Appendix D: Addendum to ES Chapter 9 Ecology and Biodiversity
- Appendix E: JBA Technical Note

Advertising and Consultation

1.9 The ES Addendum has been advertised in accordance with Regulations 22(3), 22(4) and 22(8) of the 2011 EIA Regulations. The 2011 EIA Regulations specify that publication/consultation is the responsibility of the recipient of such information. However, the appellants have undertaken the publicity/consultation requirements on behalf of Cherwell District Council.

1.10 The further information has been advertised in the Bicester Advertiser newspaper circulated in the locality. A list of those to whom the further information has been sent has been provided to the Planning Inspectorate.

1.11 The ES addendum can be inspected at Cherwell District Council offices, along with the ES submitted in 2015. The 2015 ES is available to view on the Planning section of the CDC website (www.cherwell.gov.uk).

1.12 Any representations should be sent for the attention of the Environmental Services Team at the following address;

The Planning Inspectorate
3D, Temple Quay House
Temple Quay
Bristol
BS1 6PN

environmentalservices@pins.gsi.gov.uk

1.13 Copies of the addendum in digital format can be obtained for free on CD from David Lock Associates at the address below:

Becky Bonnett
Principal Planner
David Lock Associates
50 North Thirteenth Street
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Application Site and Development Proposals – Changes made through application process

1.14 Following submission of the planning application in 2015, the formal description of development altered from that stated at paragraph 2.3.4 of the 2015 ES with the addition of the words "of up to 180 dwellings". The change was requested by CDC at the point of submission. The change has no significant impact on the 2015 ES or this addendum as both assessed a "residential component comprising up to 180 new dwellings" as stated at paragraph 2.3.1 of the 2015 ES. The formal description of development subject of the appeal, and as stated on CDC's decision notice, is as follows:

"Residential development of up to 180 dwellings to include affordable housing, public open space, localised ground remodelling, compensatory flood storage and structural planting".

1.15 In response to a request from CDC during their consideration of the OPA, the indicative location of the play area was moved from the public open space, adjacent to Langford Brook, to a position within the residential area. This is the only change to the Parameter Plan from that included in the 2015 ES (figure 2.2 of the 2015 ES figures). The impact of this change is considered to be insignificant in terms of its environmental impacts.

1.16 For the avoidance of doubt, no other changes have been made to the appeal scheme since the application was refused by Cherwell District Council in June 2017.

Construction Stage

1.17 The 2015 ES assumed construction would be complete in the three years following consent of reserved matters and discharge of conditions approvals. This was envisaged to be 2016/17 at the time of writing. Should the appeal be allowed, it is estimated that construction could commence in 2019/20.

Consideration of Alternatives

1.18 Consideration of alternative sites to the Proposed Development was informed by the evidence base that informed the evolution of the Cherwell Local Plan. This Plan considered all reasonable alternatives to the Application Site. This process concluded with the adoption of the Cherwell Local Plan in July 2015 and subsequent "re-adoption" with Policy Bicester 13 on 19 December 2016. Both included the Gavray Drive site. Given that the development plan process eliminated reasonable alternatives to the Application Site it is considered unnecessary to consider potential alternative sites around Bicester in the addendum.

1.19 In terms of alternative designs of the Proposed Development, these evolved through the ES process. Following submission of the application, one minor change was made to the Parameters Plan with the relocation of the indicative play area, as detailed above.

Planning Policy

1.20 The 2015 ES considered the proposal against the policy context at that time. This comprised the following:

- National Planning Policy Framework (March 2012)
- Cherwell District Local Plan (1996)
- Non-Statutory Cherwell District Local Plan (2011)
- Cherwell Local Plan 2031: Submission Document (2014)

1.21 Following submission of the planning application, the Cherwell Local Plan 2011-2031 – Part 1 was formally adopted by CDC in July 2015. Gavray Drive is one of several Strategic Development Sites in Bicester identified in the adopted Local Plan. The most pertinent policies relevant to this appeal are Policy Bicester 13 (re-adopted), ESD10 and ESD11.

1.22 There are no material changes to the policies relevant to this proposal between those included in the submission draft version of the Local Plan and those adopted in 2015. As such, the policies contained within the adopted Local Plan do not significantly change the assessment of impacts, their scale and magnitude from those identified in the 2015 ES.

1.23 The position is the same for the NPPF. No material changes have been to the NPPF in the intervening period between submission of the application and the appeal which alters the assessment of impacts.

Re-adopted Policy Bicester 13:

1.24 The current Development Plan policy context is now straightforward. However, it is relevant to briefly explain the reason for the re-adoption of Policy Bicester 13. In September 2015, an application was made to the High Court by JJ Gallagher Ltd; London and Metropolitan Developments Ltd and the Norman Trustees to challenge the decision of the CDC to adopt the Cherwell Local Plan 2011-2031. The claim succeeded and a Court Order was issued. The Order was subject to an appeal which was dismissed in full. The third bullet point of Policy Bicester 13, as adopted in July 2015, was altered to read as follows.

~~*That part of the site within the Conservation Target Area should be kept free from built development. Development*~~ ***(the deleted words).*** *Development must avoid adversely impacting on the Conservation Target Area and comply with the requirements of Policy ESD11 to secure a net biodiversity gain.*

1.25 CDC complied with the Court Order. CDC re-adopted Policy 13 of the Cherwell Local Plan in accordance with that Order and an associated addendum to the Local Plan Inspector's Report at the Council meeting on 19th December 2016. The Local Plan policy controlling development of the appeal site is clearly up-to-date.

1.26 The new rail chord to the north is now open and operating. This has allowed a more detailed assessment of noise and vibration assessment. There are no other significant changes to the sites immediate location.

Reason for Amended Chapters

1.27 The focus of the addendum is on ecology, transport, noise and air quality. As concerns around ecology form the primary underlying reason for refusal, the provision of further ecological information seeks to update the information previously submitted.

1.28 For transport, an amended chapter is provided to reflect a different approach to predicting the future year traffic flows. This has arisen as a result of the Highway Authority now having a strategic transport model of Bicester available, which they are using as the basis for assessment of all major development in Bicester.

1.29 For noise, CDC's Environmental Protection Manager requested an update to the noise baseline reported in the ES as the Bicester Chord railway line is now operational. The Environmental Protection Manager requested that consideration be given to the impact of additional train movements on the line when Phase 2 of the EWR development, upgrading the line to Milton Keynes and Cambridge, becomes operational. Furthermore, industrial units north of the line were requested to be included.

1.30 With amendments to the traffic flows it was considered prudent to update the air quality chapter as these impacts are closely related to the transport impacts.

1.31 The remaining chapters have not been updated as the Local Plan policy and National Planning Policy Framework context has not materially altered since 2015, and there are no changes in either the description of development or the physical environment in and around the site that would warrant different conclusions to those set out in the 2015 ES.

1.32 The following section summarises the impacts of the the proposed development, making clear where new surveys or work have been undertaken. The overall conclusion is that impacts have not significantly altered from those identified in the 2015 ES.

2 CONCLUSION AND CUMULATIVE IMPACTS

2.1 The EIA found that the Proposed Development would have few residual effects of more than minor significance, whether adverse or beneficial. This chapter summarises the findings of the 2015 ES, examining the effects identified in each chapter, identifying where additional work has been undertaken in the intervening period and sets out the required mitigation measures and residual impacts remaining. Cumulative impacts are set out.

Socio-Economic Effects

2.2 There is no change to impacts identified in the 2015 ES.

Effects

2.3 During construction the likely significant direct and indirect effects of the construction works upon job creation and expenditure would be **temporary**, of **local scale** and of **moderate beneficial** significance. As the effects are temporary this assessment is not considered to be significant in the overall context of the EIA.

2.4 The effect of the population increase, is considered to be **permanent**, of **local to regional scale** (but primarily local) and of **major beneficial** significance. There will be more residents within Bicester as a result of the development who will contribute to the labour market, and help generate growth of and provide support to the local and national economies, which is a significant factor as part of the EIA.

2.5 Both the direct and indirect effects of the Proposed Development on the local and regional housing market will be **permanent**, of **local** and to some extent **regional** scale and of **moderate beneficial significance** for the long term development of the area. As the development will meet local demand from households for dwellings the significance from an EIA perspective is significant to a small extent.

2.6 The effects of the Proposed Development on the local labour market are therefore assessed as being **permanent**, of **local** scale, and of **moderate beneficial** significance. No jobs are being created on site but the development will generate a substantial labour market which is significant for the EIA.

The impact of the Proposed Development on education will be addressed as part of the Section 106 agreement. Overall it is expected that the new development will have **permanent** effects, of **local** scale and of **moderate beneficial** significance. Given the number of potential

pupils generated from the development and the lack of on-site provision this significance in terms of the EIA is not significant.

2.7 The effects of the Development upon health are expected to be **permanent**, of **local** scale and of **minor beneficial** significance. The population increase does not warrant new services to be provided on-site or elsewhere, therefore the significance in terms of the EIA is not significant.

2.8 Although the Proposed Development results in an overall loss of on-site open space, the quality of the public open space to be provided will be much greater than what currently exists and will be made available to the public which is not currently the case. The public open space to be provided is considered to be a **permanent** effect of **local** scale and **moderate beneficial** significance to existing and future residents, users and visitors. Given the ecological sensitivity of the area and the importance of providing open space on-site this effect is considered significant in the context of the EIA.

2.9 No on-site community facilities are proposed as part of this application, however the nearest community facilities are located at Langford Village, approximately 975m on foot using local footpaths or 1.5km driving. It is unlikely that other community facilities across Bicester will be used, or at the very least used by pedestrians from the Site. Overall, the effects of the Proposed Development on community facilities are expected to be **permanent**, of **local scale** and of **neutral** significance.

2.10 The effects of on the existing local centres, superstores, Bicester town centre and Bicester Shopping Village are likely to arise from additional money being spent at these locations, therefore the effects can be considered to be **permanent** and of **moderate benefit**, and of a **local scale**. The new dwellings will contribute towards maintaining the viability of the retail provision in Bicester as the Site is well-served. However the significance of this is minimal in terms of the overall EIA.

2.11 During the construction of the Proposed Development there might be the need for security fencing or other measures to provide the required safety while the development is not yet advanced enough to provide a sufficient level of indirect surveillance. In terms of crime and public safety, the Proposed Development would have beneficial effects upon the surrounding areas as the level of activity will be increased and with it indirect surveillance and perceived safety. This could indirectly affect both the local housing market and local economy by attracting new interest and investment. It is considered that the Proposed Development would have **permanent**, **local** to the development and of **minor beneficial** effects on crime and public safety both for the development and its surroundings.

Mitigation Measures

2.12 As shown in the previous section, the socio-economic effects of the Proposed Development will be beneficial during both the construction phase, as well as after completion. Conditions on any planning permission may set delivery thresholds that will form part of the Section 106 legal agreement, to ensure that any harm caused by the development will be appropriately mitigated.

Residual Effects

2.13 All effects of the Proposed Development will be predominantly beneficial. Consequently, the residual effects during construction and following completion of the Proposed Development would remain identical to those described within the assessment of the likely significant effects.

Cumulative Effects

2.14 All effects of the Proposed Development will be predominantly beneficial. Consequently, the residual effects during construction and following completion of the Proposed Development would remain identical to those described within the assessment of the likely significant effects. The same will be true for its cumulative effects (i.e when this scheme is considered in combination with other schemes in the area).

Transport

2.15 The original chapter described the assessment methodology, baseline conditions at the site and surroundings, the likely significant environmental effects, the mitigation measures required to prevent, reduce or offset any significant adverse effects and the likely residual effects after these measures have been employed. Rather than repeat this in its entirety, the addendum focuses on the areas that have changed from the original ES. The majority of the assessment methodology remains the same, with the main change resulting from applying a different approach to predicting the future year traffic flows. This has arisen as a result of the Highway Authority now having a strategic transport model of Bicester available, which they are using as the basis for assessment of all major development in Bicester.

2.16 An addendum transport ES chapter is included in Appendix A. An updated Transport Assessment has also been produced.

Air Quality

2.17 An updated chapter is provided in Appendix B. All impacts are considered to be negligible.

Noise

2.18 An updated chapter is provided in Appendix C. The measured results are better than predicted in the 2015 ES. The addition of the EWR Phase 2 trains results in a minimal increase in noise levels and does not affect the outcome of the assessment.

Landscape

2.19 There is no change to impacts identified in the 2015 ES.

Effects

2.20 The direct effects of the proposed development on the Site would be adverse through the establishment of a new land use at the site; these effects are adverse and significant in EIA terms. This is inevitable given the utilisation of a greenfield site for a new residential development with built form and ancillary features. These effects should not be seen as an obstacle to development as the mature landscape setting of the site contains effects so as to reduce, offset and mitigate otherwise adverse indirect effects from extending across the immediate and surrounding landscape to the Site. The protection, retention and enhancement of the site's native tree and hedgerow boundaries would afford inherent mitigation. Whilst the landscape mitigation proposed as part of the proposed development would retain and enhance the landscape character surrounding the site and give opportunity for new characterful planting within the Site. However, it is considered that the proposed development would not significantly alter the character of the wider surrounding landscape, which is classified as urban edge/fringe, due to the discrete geographical area over which effects will be experienced.

2.21 The most adverse visual effects are likely to be experienced along public footpath (PRoW 129/3) which is situated within the Site area. This level of effect diminishes from major-moderate, adverse (construction phase) to moderate – minor, adverse (Year 1 – Year 15) which is inevitable given the change of land use from greenfield / agriculture to residential with ancillary development.

2.22 The visual effects predicted to arise as a result of the introduction of the proposed development follow a similar pattern to effects upon landscape character, in that generally

significant effects are likely to occur only within and in very close proximity to the proposed development; the magnitude of change to views decreases rapidly with distance from the development site.

Mitigation Measures

2.23 Mitigation during construction includes adoption of an approved Construction Environmental Management Plan and Arboricultural Method Statement. Post-completion, the proposed masterplan has been developed iteratively through the development of a Landscape Visual Impact Assessment. This approach has been key to ensure the proposed development succinctly integrates with its setting and landscape character area. The masterplan has incorporated existing landscape features for inherent mitigation, as well as facilitating additional mitigation measures as detailed below

2.24 The landscape elements specific to the detailed design of the proposed development would be the retention and enhancement of existing features as well as the establishment of new measures that would provide:

- Retention and continuity of typical landscape features to reinforce landscape character and provide a distinctive sense of place;
- Visual screening of the proposed development;
- Creation of new public and private amenity; and
- Contribution to green networks and enhancement of habitat connectivity and ecological value.

Residual Effects

2.25 What indirect impacts are experienced diminish over the time of the proposed development through the maturity of the site setting and the effectiveness of mitigation measures. Effects by Year 15 would significantly reduce and would remain insignificant in EIA terms over the lifetime of the proposed scheme.

2.26 A mitigation strategy has been identified to offset or reduce these impacts through pro-active management (during the construction stage), the application of best national practice, the utility of inherent mitigation and the introduction of new mitigation measures. Overall, these effects present a residual situation which is insignificant and also not significantly adverse in EIA terms.

Cumulative Effects

2.27 It is considered that the proposed development would be experienced as an "infill" to the existing urban area of Bicester and would not be experienced simultaneously with other proposed residential schemes (which being much larger would be perceived as urban extensions rather than "infills"). Inherent mitigation would screen and contain interversibility through the Site's mature landscape setting, railway embankment and also existing residential built form. These existing physical characteristics would offset, reduce and mitigate any cumulative effect to a negligible level not significant in EIA terms).

2.28 There would inevitably be cumulative effect with the development of the adjacent Gavray Drive East site however, adverse landscape effects would be moderate but would be contained within each of the site's well defined boundaries. The anticipated cumulative effect would diminish from construction stage to an adverse minor effect due to the expedient establishment of "embedded mitigation measures". In both cases each of these schemes would be experienced as "infilling" to the existing urban area due to the extent of surrounding residential development (particularly south of Gavray Drive) and the robust physical elements which contain the sites i.e. adjacent railway embankment and A4421 Charbridge Road.

Ecology

2.29 The update chapter is included in Appendix D. It provides an assessment of the significance and consequences of potential ecological effects upon identified Important Ecological Features (IEFs), formerly known as Valued Ecological Receptors (VERs), arising from the Proposed Development. The summary and conclusions of the original chapter, as detailed below, have been reconfirmed during the update of the chapter during 2018.

2.30 The assessment included a review of the current conditions found within the Site and identifies measures to avoid, mitigate and/or compensate where appropriate for significant effects that may arise.

2.31 The habitats within the Site are limited in extent and value comprising predominantly intensively farmed arable with a thin band of broadleaved woodland planting along the southern boundary and a single species-poor hedgerow located within the western extent of the Site. These habitats are considered of negligible (low) ecological value in their own right, although have some, albeit limited, potential to support protected species including bats and birds. Some habitats of moderately higher value were identified including Langford Brook and associated trees, along the eastern boundary of the Site which were considered IEFs. In addition, Gavray Drive Meadows LWS was identified as a IEF included within the EcIA owing to its proximity to the Site. Populations of bats, birds, harvest mouse and white-letter

hairstreak butterfly occurring within the Site, as identified through baseline ecological surveys, were also included as IEFs within the assessment.

2.32 In the absence of further mitigation measures, predicted effects on local sites, habitats and species have been considered for the periods up to and during demolition/construction, and during the lifetime of the completed development. The assessment concludes that all the predicted effects, in the absence of mitigation, are at the site level only and are not considered to constitute a "significant effect" for the purposes of Ecological Impact Assessment. However, in accordance with both legislation and planning policies, measures are identified to mitigate these effects and/or compensate for effects which cannot be fully mitigated.

2.33 The strategy to mitigate adverse effects during construction includes specific measures to protect features of ecological value which are to be retained within undeveloped open spaces in the Site, but which are at risk of damage or disturbance. In addition, measures are identified to avoid harming species which may be present within habitats that will be cleared during the construction process, through sensitive timings and working methods.

2.34 The long-term strategy to mitigate adverse effects during the lifetime of the completed development includes for the creation and management of new habitats of ecological value including trees, hedgerows and rough, tussocky grassland thereby creating new opportunities for protected species, to compensate for effects during construction and provide net gains for biodiversity.

2.35 Overall, through sensitive design and additional mitigation measures proposed, no significant adverse effects on the ecology of the area are anticipated, and there are opportunities for ecological benefits to be delivered as part of the Proposed Development. In particular, the Landscaping Scheme applied to the Proposed Development will allow for the creation of wildflower grassland meadow within the POS provision in the eastern extent of the Site. In respect of the habitat targets for the Ray Conservation Target Area (CTA), the habitat creation measures within the POS provision, which lies within the CTA, will (subject to detailed design and implementation) provide a contribution towards the target of creating 5ha of Lowland Meadow[i]. It is concluded that the Proposed Development will result in a positive gain for biodiversity, in accordance with national and local planning policy.

Arboriculture

2.36 Impacts have not changed from those identified in the 2015 ES.

Effects

2.37 Possible construction impacts can be avoided and mitigated through construction techniques. Following completion of all construction activities retained arboricultural receptors are considered less prone to future effects than other more sensitive receptors such as ecological assets.

2.38 The proposed outline development for the site requires the removal of one internal hedgerow (H4). The remaining individuals and groups of trees can be appropriately retained and with suitable protection can contribute greatly to the visual amenity of the area. With the implementation of landscape proposals this loss will be suitably mitigated and indeed increase the local tree cover in the immediate area of the development.

Mitigation Measures

2.39 Loss of existing trees and hedgerows as a result of the development overall is considered negligible in terms of landscape and visual amenity. The protection of Root Protection Areas (RPA) using suitable protective barriers conforming to the Standard, will protect against damage to trees and hedgerows selected for retention.

2.40 Significant new planting of both trees and hedgerows, specific details relating to species, specification and planting locations are to be submitted as part of the Reserved Matters application. The depicted mitigation for the loss of the one internal hedgerow proposes a like for like replacement due west of its current location, thereby reinforcing the site's western boundary.

Residual Effects

2.41 Following the implementation of the mitigation measures, residual effects with respect to the arboricultural resource are limited to neutral and negligible significance.

Cumulative Effects

2.42 There are no cumulative effects arising. Following the implementation of the mitigation strategies within the construction stage of the Proposed Development as highlighted, the potential impacts associated with trees and development can be suitably reduced to an acceptable level, such that there are no significant effects identified.

Historic Environment

2.43 There is no change to impacts identified in the 2015 ES.

Effects

2.44 The Site does not form part of the setting of, or contribute to the significance of, any of the designated heritage assets in the study area. Therefore, the construction stage will not affect any designated heritage assets directly or indirectly.

2.45 The construction of the Proposed Development will likely remove any archaeological deposits present within its footprint, therefore the undated gullies will be subject to a permanent, large, direct and negative impact of **moderate/minor adverse significance**. The Iron Age pit will also be subject to a permanent, large, direct and negative impact of **moderate/minor adverse significance**. Neither of these effects are considered to be significant in terms of the EIA.

2.46 The historic landscape character of the Site is identified as being of negligible sensitivity. Therefore, the temporary, large, direct and negative impact, resulting from the complete land use and character change from agricultural land to construction site, will be of **minor adverse significance**. This is a non-significant effect in terms of the EIA.

2.47 All impacts on undesignated heritage assets will occur during the construction phase. As such, there will be no impacts on these during the post-completion stage.

Mitigation Measures

2.48 As there are no impacts identified upon designated heritage assets, there is no requirement for mitigation measures.

2.49 A mitigation strategy; to record both the identified and unidentified undesignated archaeological features within the Site; has been agreed with Richard Oram, archaeological advisor to Cherwell District Council.

Residual Effects

2.50 As there are no impacts identified upon designated assets, there are no residual effects. As the undesignated heritage assets will be removed through the mitigation and construction processes described above, there will be no residual effects. As there are no measures available to mitigate the impact upon the historic landscape character of the Site, the impact will remain temporary, large, direct and negative, resulting in a **minor adverse effect** which is not significant for the purposes of environmental impact assessment. There are no impacts identified upon designated assets, and therefore there will be no residual effects.

2.51 All impacts will have occurred during the construction phase and there will therefore be no residual impacts during the post-completion stage.

Cumulative Impacts

2.52 Residential development sites within a 1km radius study area were considered within this cumulative effects assessment. This was considered to be a proportionately sized study area in light of the extent of the Proposed Development and the relatively enclosed position of the Site, in terms of wider views. There are no impacts identified upon designated or undesignated assets, and therefore there will be no cumulative effects in that respect.

2.53 The Gavray Drive East site has more surviving historic landscape features, including hedgerows, some of which are depicted on 17th century maps, and ridge and furrow earthworks. The Site, on the other hand, has a negligible value due to its lack of ridge and furrow earthworks and historic hedgerows. Therefore, in combination with Gavray Drive East, it will lead to the land use change of historic farmland to residential development, with the cumulative effect considered to be **adverse**, although not significant for the purposes of environmental impact assessment.

Agriculture and Soil Resources

2.54 An updated chapter is provided in Appendix C. The measured results are better than predicted in the 2015 ES. The addition of the EWR Phase 2 trains results in a minimal increase in noise levels and does not affect the outcome of the assessment.

2.55 There is no change to the impacts identified in the 2015 ES.

Effects

2.56 The Proposed Development includes the development of approximately 6 ha of agricultural land of Subgrade 3b 'moderate' quality plus a further circa 0.7 ha currently in use as a temporary construction compound which has also been identified as Subgrade 3b. The impact is of a small magnitude on a receptor of high sensitivity with a Moderate to Minor Adverse effect. As 6.7 ha of Subgrade 3b is at the lower end of the Low magnitude parameters, it is considered that the effect would be of Minor Adverse significance.

2.57 The loss of land may lead to some adjustments to the farm business, but any changes necessary will be of a very minor nature. The small magnitude of impact upon a full-time agricultural business, a receptor of low sensitivity, will lead to a Minor Adverse effect.

2.58 Once in operation, the non-agricultural use of land can lead to trespass onto neighbouring agricultural land. The spread of such trespass can prohibit the full agricultural exploitation of adjacent land. The small magnitude of the effect of trespass on farm businesses, themselves receptors of low sensitivity, would result in an effect of Minor Adverse significance.

Mitigation Measures

2.59 There are very few measures which can be put in place to mitigate the long term effects on agricultural businesses. Given the **Minor Adverse** effect on one farm business, however, mitigation measures are not considered to be required.

2.60 The effects of trespass as a result of development can limit the full exploitation of adjacent agricultural land. The design for the Proposed Development includes an area of public open space between the two sites which will help mitigate the spread of trespass from one area to the other.

Residual Effects

2.61 The development of agricultural land for residential purposes is permanent. The loss of agricultural land at the Site will therefore remain **Minor Adverse** and the effect on one farm business will remain **Minor Adverse**.

2.62 The design of the Proposed Development will help mitigate any effects from trespass onto adjacent agricultural land. The significance of trespass is considered to be **Negligible**.

Cumulative Effects

2.63 A worst case scenario has been considered in terms of cumulative effects, given that it is not known the extent of the Best and Most Versatile Agricultural Land on all development sites, nor the extent of the proposed loss of agriculture in each case. As a result, if all the land within each committed site comprises BMV then there will be a minor to moderate adverse impact.

Flood Risk and Drainage

2.64 The fluvial impacts identified in the 2015 ES remain unchanged. The surface water drainage strategy will be updated to comply with national standards in order to meet the impacts set out in the 2015 ES.

2.65 Since the issue of the Environment Statement in February 2015, the Environment Agency has released new guidance on climate change allowances (ref: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)

2.66 Additional hydraulic modelling work was undertaken with the new climate change allowances to ensure the proposed residential scheme at Gavray Drive is safe to its future occupants and does not increase fluvial flood risk across third party land. Hydraulic model results can be found in JBA's Technical Note dated April 2018 (Appendix E).

2.67 Having utilised the new climate change allowances mandated by the latest EA guidance, JBA's technical work demonstrates that on-site flood mitigation measures are capable of keeping the site safe from flooding and off-setting in its entirety the impact of the proposed development.

Surface Water Drainage

2.68 The nature and principle of this surface water drainage strategy has previously been reviewed by the LLFA and includes the following key features:

- A crushed-stone blanket
- A surface water attenuation basin

2.69 The current strategy proposes on-site attenuation storage of runoff during all storm events up to and including the 1 in 100-year + 30% with flows from the site restricted to the 1 in 2-year Greenfield rate.

2.70 Changes to the national and regional guidance on surface water drainage have been made since the original surface water drainage strategy was prepared and approved by the LLFA. The new guidance on surface water drainage requirements include the following:

- CIRIA 753 'The SuDS Manual'
- The Environment Agency (EA) guidance on Climate Change (released February 2016)
- Cherwell Level 1 Strategic Flood Risk Assessment May 2017 Update

2.71 The key implication of these changes to the proposal relates to the surface water runoff storage volumes to accommodate on-site. Prior to February 2016, the impact of climate change within a surface water drainage context was accounted for as 30% increase in rainfall intensity. Following the release of the EA's guidance in February 2016, the climate change allowance has been raised to 40%.

2.72 The surface water drainage strategy agreed with the LLFA provides on-site storage for events up to and including the 1 in 100-year +30% climate change event. Given the change in guidance, it is acknowledged that additional on-site storage will need to be accommodated to comply with the above guidance.

2.73 Considering the level of flexibility in relation to the on-site storage provision, this additional storage volume can be provided by adjusting the extent of the crushed-stone blanket and/ or in combination with other storage facilities.

2.74 Consequently, a surface water drainage scheme complying with the current policies can be incorporated on-site without impacting on the extent of the proposed development plateau and floodplain compensatory storage area.

Ground Conditions

2.75 There is no change to the impacts identified in the 2015 ES.

Effects

2.76 Potential Effects of the Proposed Development on ground conditions during construction include:

2.77 Removal or incorporation of trees and shrubs into the development could have an impact on the condition of the weathered clay material. This may result in swelling or shrinkage of the ground dependent upon the hydrological conditions at the site. In addition, large areas of hardstanding are likely to reduce the amount of water ingress into the soils and potentially affect the ground conditions;

2.78 Fuel and oil based hydrocarbon contamination associated with plant and machinery activity on site;

2.79 It is possible that contamination of the ground may occur due to activities relating to the developments. This could include spillage of oils and fuel from plant working at the site, chemical spillages and other contaminants, and potential for construction waste such as broken brick, tiles, waste concrete and cement, to become incorporated into the surface of the ground;

2.80 Removal of topsoil materials and tracking of plant across uncovered cohesive bedrock material may cause additional weathering and disturbance to the shallow ground conditions and could result in softening and rutting of the surface; and

2.81 Removal of topsoil materials is likely to increase surface run-off.

2.82 Excluding unforeseen activities/alterations undertaken within the individual housing plots, the effects of the post-completion ground conditions are deemed to be the same as those in the construction stage. Following development of the Site the ground will be affected by activities undertaken within the individual housing plots. This could include spillages of oils, fuels or other chemicals associated with vehicle and household activities. Similarly the roads serving the development provide further potential for contamination of the ground.

Mitigation Measures

2.83 In terms of minimising the impact of the Proposed Development on the ground conditions, there would be a requirement during the development/construction phase for the contractor to follow the best practice guidance contained within the Environment Agency's Pollution Prevention Guidelines to ensure that materials and chemicals used during the construction do not impact the ground adversely.

2.84 Construction activities may also require material management plans to be prepared and implemented to audit waste materials and minimise potential adverse impacts to the ground. Mitigation will be achieved through application of a Construction Environmental Management Plan (CEMP).

2.85 There are few measures that can be put in place to minimise the impact that individuals occupying the Proposed Development may have on the ground conditions. However, the predominately clayey nature of both the existing made ground and underlying weathered clay strata would help to contain any spillage or contamination within any isolated location and impede transmission.

Residual Effects

2.86 It is considered that the existing ground conditions at the Site provide minimal impact upon the Proposed Development of the Site. The assessments reported above do not identify any significant adverse residual effects.

Cumulative Effects

2.87 The risks due to ground conditions will be similar for all of the planned development. However, only effects to groundwater and surface water (particularly from Gavray Drive East) are considered to be cumulative. During construction of all sites, it is assumed suitable mitigation measures and, if required, remediation measures will be in place to prevent contamination of groundwater and surface water. Therefore the cumulative effect of contamination during construction is considered to be insignificant. Spillages or other sources of contamination within individual housing plots may have a cumulative impact during the Post-completion stage. However, the magnitude of this is considered to be negligible and therefore the cumulative effect is deemed to be insignificant.

Waste and Utilities

2.88 There is no change to the impacts identified in the 2015 ES.

Effects

2.89 Construction operations will generate waste materials as a result of general handling losses and surpluses. Up to approximately 4534m3 construction waste is anticipated to be generated as a result of the Proposed Development. It is likely that a significant proportion of this could be recycled or re-used resulting in an insignificant effect.

2.90 There is potential for construction works to give rise to significant environmental effects if appropriate mitigation measures are not employed during the installation works to provide new utility service; e.g. fuel spillages and increased noise emissions from plant and machinery.

2.91 During construction, there is the potential for plant, on site, to strike existing services (for example cables and pipes) if they are not on record drawings or are not located prior to commencement of excavation. This could cause temporary loss of the aforementioned services to the general population in the local area temporarily.

2.92 The users of the completed development will produce wastes which will require disposal and which by virtue of the volumes which will arise are likely to give rise in the long term to a more significant impact.

2.93 The users of the completed development will require the provisions of the utilities (potable water, electricity, gas, telecommunications and foul drainage) and therefore the development is likely to give rise in the long term to a more significant impact.

Mitigation Measures

2.94 The volume of waste generated during the construction works will be minimised through adherence by the Site contractor to the Code of Practice on Site Waste Management Plans (SWMP).

2.95 The installation works to provide new utility services will be subject to appropriate construction management plans and pollution prevention guidance to ensure any environmental impacts during the temporary construction phase will be negligible.

2.96 The production of waste materials from the completed development can be mitigated by encouraging waste minimisation and commercial recycling schemes.

2.97 To minimise water use, sustainable water fittings will be specified for all water outlets throughout the development. The introduction of energy efficiency measures in accordance with the anticipated Building Regulations revisions during the detailed design stage will reduce the overall energy demand consumption. If reinforcement of the existing gas network needs to take place in order to supply the development, the newly proposed lines will follow the same route as the existing and as such, environmental impact will be minimal. No mitigation measures will need to be put in place with regards to

telecommunications. All drainage will be kept as shallow as possible to minimise the excavations required and subsequent impact

Residual Effects

2.98 There will be a small adverse impact on the availability of landfill capacity, as a result of the disposal of non-recyclable wastes from the development. This impact will include a reduction in the total landfill space available for other wastes. Waste materials from the development are likely to be disposed of to landfills in the local area with any residual hazardous materials taken further afield to adjoining counties. The impact is therefore likely to have an effect at local or district scale rather than a regional level. As a result of the mitigation measures which will be applied, the impacts on local landfill availability are likely to be relatively minor overall.

2.99 The use of landfill capacity for non-recyclable wastes from the development is not reversible and therefore will have a long-term impact on the overall availability of landfill capacity in the area. With the current facilities in place it is anticipated that the impact of the Proposed Development on the County's ability to handle the recyclable and recoverable wastes generated by the Proposed Development will be negligible.

2.100 With an increase in housing within the area, there will be an increase in demand for all the utilities investigated within this report. However due to the current infrastructure available and potential for supply, it is anticipated that there will be an insignificant impact following mitigation measures implemented to existing networks to serve the development.

Cumulative Effects

2.101 The risks due to utilities and waste will be similar for all of the planned development in the Local Plan. If all the proposed developments are constructed, residual waste materials which cannot be re-used, recycled or recovered, from all construction activity is likely to be disposed of to landfill, within the Minerals and Waste Local Plan area.

2.102 If all proposed developments are constructed in a short time period, the cumulative additional demand may affect power and gas supplies to the local area where insufficient lead in time for network reinforcement exists. This could lead to a potential risk that of the infrastructure not meeting demand, creating power outages and gas shortages. Infrastructure reinforcement is assessed at the planning stage however in consultation with the utility providers and therefore provides a mechanism in which power and gas provision can be planned into the future to cater for increased demand.

2.103 If all the proposed developments are constructed, the cumulative additional demand would put additional strain on the existing water supply network. There is then the risk that, not enough water could be supplied to meet the demand, creating a water shortage, especially during prolonged periods of hot dry weather. Infrastructure reinforcement is assessed at the planning stage however in consultation with the utility providers and therefore provides a mechanism under the five year Asset Management Plan process to ensure provision for increased demand.

2.104 There are not expected to be any significant cumulative effects from the increase in telecommunications traffic.

Appendix A: Addendum to ES Chapter 5 Transport and Access

CONTENTS

5.1 INTRODUCTION

5.1.1 This chapter of the ES Addendum provides an update of the assessment of the likely significant effects of the proposed development in terms of Transport and Access and has been produced by Markides Associates (MA).

5.1.2 The original chapter described the assessment methodology, baseline conditions at the site and surroundings, the likely significant environmental effects, the mitigation measures required to prevent, reduce or offset any significant adverse effects and the likely residual effects after these measures have been employed. Rather than repeat this in its entirety, this Addendum focuses on the areas that have changed from the original ES. The majority of the assessment methodology remains the same, with the main change resulting from applying a different approach to predicting the future year traffic flows. This has arisen as a result of the Highway Authority now having a strategic transport model of Bicester available, which they are using as the basis for assessment of all major development in Bicester.

5.2 ASSESSMENT METHODOLOGY

Scope

5.2.1 The scope of the assessment is unchanged from the original ES.

Data sources

5.2.2 The following data sources were used in the the compilation of the original assessment and remain relevant to this one:

- Junction turning count traffic surveys, undertaken 14th May 2014;
- Link flow automatic traffic count (ATC) surveys for each of the junction approach arms, undertaken 10th – 16th May 2014;
- Personal Injury Accident data, sourced from OCC; and
- Public transport timetable information, publicly available.

5.2.3 Development related trip generation calculations were made using the industry standard TRICS[1] database, with distribution profile and mode splits informed by 2011 Census data

5.2.4 Growth rates from the TEMPRO database and publicly available transport related documents associated with committed development are no longer relied upon. Instead data has been provided by OCC from their SATURN model of Bicester which incorporates traffic growth, committed developments and committed highway infrastructure improvements.

Consultees

5.2.5 OCC have been consulted on the approach to forecasting future year traffic flows and the use of their own SATURN model data was agreed to be appropriate.

Assessment approach

5.2.6 The scale and extent of the assessment is the same as that included within the original ES.

5.2.7 Anticipated traffic flows for the years 2021 and 2026 have been provided by OCC for weekday peak periods at Gavray Drive, the A4421, London Road and the A41. The SATURN model baseline scenarios include traffic associated with committed developments (i.e. those with planning consent) and development identified within the adopted Local Plan. As the site on Gavray Drive forms part of a larger allocation for 300 residential units within the Local Plan, the baseline SATURN model for 2021 and 2026 already include traffic assumptions for development traffic associated with development on the site. These therefore provide traffic flows for a full cumulative development scenario that includes all of the Gavray Drive allocation of 300 units being built out.

5.2.8 The SATURN model also includes infrastructure associated with other committed and allocated development sites in the area. This includes the assumption that by 2026 a new link road between the Gavray Drive / A4421 roundabout and the A41 east of Bicester is in place.

5.2.9 The peak hour traffic flows from the SATURN model have been converted to daily flows by applying factors derived from the ATC surveys undertaken in 2014 on the same roads.

5.2.10 To obtain 2021 and 2026 traffic flows without any additional residential development on Gavray Drive and with the proposed 180 residential units in place, it is necessary to subtract the traffic associated with the development proposals from the SATURN flows provided by OCC. The traffic generation of the proposals remains the same as assumed for the previous assessment and is summarised in Table 5.1.

Table 5.1: Anticipated Vehicle Trip Generation

Unit Numbers	AM Peak			PM Peak			Daily		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
180 residential units	50	69	119	71	60	131	493	520	1013
300 residential units	83	115	198	118	100	218	822	866	1688

5.2.11 This traffic is assigned to the road network using distribution data for the site extracted from the OCC SATURN model. The resultant development flows were then subtracted from the SATURN model flows to provide flows without any additional development at Gavray and with the provision of 180 residential units.

Significance criteria

5.2.12 As with the original ES, the significance level attributed to each effect has been assessed based on the magnitude of change resulting from the development, and the sensitivity of the affected receptor to change. There has been no change in the estimates of construction traffic as a result of the proposals and no update on this element of the assessment is therefore required. This addendum therefore focuses on the operational phase of the development.

5.2.13 Effects, which are beneficial or adverse, have been identified as either:

- Major effect: where the development could be expected to have a very significant, long term effect on the highway and public transport networks;

- Moderate effect: where the development could be expected to have a noticeable long term effect on the highway and public transport networks;
- Minor effect: where the development could be expected to result in a small, barely noticeable, localised and short term effect on the highway and public transport networks; and
- Negligible: where no discernible effect is expected as a result of the development on the highway and public transport networks.

5.2.14 The thresholds that have therefore been adopted to determine the magnitude of change as a result of the development are as in the original ES and are set out in Table 5.2.

Table 5.2: Assessment Criteria for Magnitude of Effect

Receptor	Negligible	Minor	Moderate	Major
Change in average HGV two way daily link flows during construction	Less than 10%	10-20%	20-30%	Greater than 30%
Change in average daily link flows during operation	Less than 10%	10-20%	20-30%	Greater than 30%
Change in AM peak hour public bus patronage (one-way) during operation	Less than 10% of total capacity	10-20% of total capacity	20-30% of total capacity	Greater than 30% of total capacity
Change in pedestrian amenity, safety and severance	An imperceptible change to amenity and safety	A small change to amenity and safety	A large change to amenity and safety	A very large change to amenity and safety

5.2.15 In terms of sensitivity of receptors, these are unchanged from the original assessment.

5.2.16 When the magnitude of change and sensitivity of a receptor is considered together, the following significance matrix detailed in Table 5.3 is applicable.

Table 5.3: Significance Matrix

Sensitivity of Receptor	Magnitude of Effect		
	Major	Moderate	Minor
Major	Major	Major/ Moderate	Moderate
Moderate	Major/ Moderate	Moderate	Moderate/ Minor
Low	Moderate	Moderate/ Minor	Minor

5.2.17 Using this table therefore, a significant effect can be defined as one that would have a Moderate or Major/Moderate or Major effect.

Uncertainties and limitations

5.2.18 The forecast flows are based on a strategic transport model that is only available for weekday peak periods. There is an element of uncertainty associated with any forecasting methodology, including SATURN modelling, which should be born in mind. This assessment supplements the original assessment that was submitted with the application that relies on a different forecasting methodology, if both indicate similar outcomes this would increase the confidence in the conclusions drawn.

5.3 RELEVANT POLICY

5.3.1 The National Planning Policy Framework (NPPF) and Planning Practice Guidance (2014) remain the relevant policy documents at a National Level. No further update on these is required.

Oxfordshire County Council Planning Policy Guidance
Local Transport Plan 4

5.3.2 Oxfordshire County Council's (OCC) Local Transport Plan 3 (LTP3) was replaced by LTP4 in 2015, which was updated in 2016.

5.3.3 Specifically with regards to development, Policy 17 of LTP4 states that *'Oxfordshire County Council will seek to ensure through cooperation with the districts and city councils, that the location of development makes the best use of existing and planned infrastructure, provides new or improved infrastructure and reduces the need to travel and supports walking , cycling and public transport.'* This has been reflected in the adoption of Gavray Drive as a location suitable for the development of 300 residential units.

5.3.4 In Policy 34 of LTP4 OCC *'will require the layout and design of new developments to proactively encourage walking and cycling, especially for local trips, and allow development to be served by frequent, reliable and efficient public transport. To do this, we will:*

- *secure transport improvements to mitigation the cumulative adverse transport impacts from new developments in the locality and /or wider area, through effective Travel Plans, financial contributions from developers or direct works carried out by developers;*
- *Identify the requirement for passenger transport services to serve the development and negotiate the provision of these passenger transport services with the developer;*
- *Ensure that developers promote and enable cycling and walking for journeys associated with the new development, including through the provision of effective travel plans;*
- *Require that all infrastructure associated with the developments is provided to appropriate design standards and to appropriate timescales;*
- *Agree local routeing agreements where appropriate to protect environmentally sensitive location from traffic generated by new developments;*
- *Seek support towards the long term operation and maintenance of facilities, services and selected highway infrastructure from appropriate developments, normally through the payment of commuted sums;*

- *Secure works to achieve suitable access to and mitigate against the impact of new developments in the immediate area, generally through direct works carried out by the developer.*'

5.3.5 In addition to the specific policies regarding development, the LTP4 includes a specific Area Strategy for Bicester, which seeks to provide the infrastructure necessary to support the aspirations set out in the Cherwell Local Plan and the overall goals and policies of Connecting Oxfordshire as set out in Volume 1 of the Local Transport Plan.

5.3.6 This identifies a series of improvements to increase the overall capacity of transport networks and systems within the locality, enabling them to accommodate the additional trips generated by development; to adapt to the cumulative impact of proposed development and to mitigate the local environmental impact of increased travel.

5.3.7 Of particular relevance to the Site in terms of proximity and improving accessibility are references within BIC1 relating to delivering peripheral routes around the town. They are seeking a package of phased improvements to be agreed alongside the introduction of sustainable transport measures, including:

- *Eastern peripheral corridor : upgrade to dual carriageway on the A4421 between the Buckingham Road and Gavray Drive to complement the transport solution at the railway level crossing at Charbridge Lane and facilitate development in the area. This scheme will improve the operation of this section of the eastern perimeter road and enhance the integration of the North East Bicester Business Park site with the rest of the town. This will include improvements to the Buckingham Road / A4421 junction to provide the necessary capacity for the additional trips generated from nearby employment and residential development, as well as support the heritage tourism development of the neighbouring Former RAF Bicester site.*
- *Southern peripheral corridor : provide a South East Perimeter Road to support the significant housing and employment growth in Bicester. In the longer term, link capacity issues along Boundary Way are assessed as being a major transport issues for the town. Land is safeguarded at Graven Hill for the section of road to the south of this site, joining the A41 at the Pioneer Road junction – this prevents development on the land that would be required, but does not remove the need for full assessment, justification and planning processes to be undertaken. This will need extending westwards to join the A41 north of the M40 Junction 9. The preferred aligment for this extension has been approved as a connection from the Little Chesterton junction across to Graven Hill. The solution will also include a new link through the South East Bicester development site*

from the A14 Pioneer Road junction up to Wretchwick Way, providing connectivity through the site, in particular for buses.

Adopted Cherwell District Local Plan 2011- 2013

5.3.8 The adopted Cherwell Local Plan 2011-2031 Part 1 incorporating the re-adopted Policy Bicester 13 forms the current local planning policy document.

5.3.9 The Local Plan sets out the vision and spatial strategy for Cherwell District. The strategy can be summarised as:

- Focusing the bulk of the proposed growth in and around Bicester and Banbury.
- Limiting growth in rural areas and directing it towards larger and more sustainable villages.
- Aiming to strictly control development in open countryside.

5.3.10 Bicester Policy 13 covers the site of this development. It identifies a number of Key Site Specific Design and Place Shaping Principles, which with regards to transport and access, are:

- Retention of Public Rights of Way and a layout that affords good access to the countryside;
- New footpaths and cycleways should be provided that link with existing networks, the wider urban area and schools and community facilities. Access should be provided over the railway to the town centre;
- A linked network of footways which cross the central open space, and connect Langford Village, Stream Walk and Bicester Distribution Park;
- A layout that maximises the potential for walkable neighbourhoods and enables a high degree of integration and connectivity between new and existing communities;
- A legible hierarchy of routes to encourage sustainable modes of travelGood accessibility to public transport services with local bus stops provided. Provision of a transport assessment and Travel Plan;
- Additional bus stops on the A4421 Charbridge Labe will be provided, with connecting footpaths from the development. The developers will contribute to the cost of improving local bus services.

5.3.11 Whilst there are no transport and development specific policies within the document, Strategic Objective 13 states that CDCs will promote sustainable development *'to reduce the dependency on the private car as a mode of travel, increase the attraction of and opportunities for travelling by public transport, cycle and on foot, and to ensure high standards of accessibility for people with impaired mobility.'*

5.3.12 Furthermore, Policy SLE4 details CDC's aspiration to support modal shift and more sustainable locations for employment and housing growth. It is also identified that, *'All development where reasonable to do so, should facilitate the use of sustainable modes of transport to make the fullest possible use of public transport, walking and cycling. Encouragement will be given to solutions which support reductions in greenhouse gas emissions and reduce congestion. Development which is not suitable for the roads that serve the development and which have a severe traffic impact will not be supported.'*

5.3.13 The document identifies that in the Infrastructure Delivery Plan the following projects, which are of particular significance to the Wider Site accessibility, will be implemented:

- A4421 Charbridge Lane Crossing – conversion of the current level crossing into a grade separated over bridge;
- Ensuring delivery of high quality public transport from all strategic sites to Bicester Town Centre and Rail Stations;
- Highway capacity improvements to peripheral routes; and
- Improved pedestrian and cycle links from East Bicester to the town centre, via Bicester Village Station.

5.4 BASELINE CONDITIONS

5.4.3 Many of the baseline conditions are unchanged from the original ES Chapter and this Addendum only identifies areas where changes have occurred.

Rail

5.4.4 Bicester benefits from having two national railway stations, Bicester North and Bicester Village.

5.4.5 At the time of production of the previous ES Chapter, Bicester Village Station was known as Bicester Town, and acted as the terminating station on the Oxford to Bicester Line, operated by Chiltern Railways. However, as part of Chiltern Railways Evergreen 3 project, improvements have been undertaken to the Station. It has been renamed as Bicester Village and a new passenger service between Oxford and London Marylebone via Bicester and High Wycombe, through the introduction of a new link between Bicester Village and the existing Chiltern mainline. There are 3 to 4 services during peak hours between Oxford and London Marylebone servicing Bicester Village in each direction. Journey times to London are 70 – 80 minutes.

Bus

5.4.6 Bicester Circular bus services 22 and 23are no longer in operation. It is understood that Chiltern Railways no longer advertise (or operate) the Taxibus service from Bicester North Station.

PIA Data

5.4.7 The accident data for the following junctions has been sourced for the period between 01/01/2011-30/09/2017.

- Gavray Drive / A4421 Wretchwick Way roundabout
- Peregrine Way / Wretchwick Way priority junction
- Peregrine Way / Wretchwick Way /Neunkirchen Way roundabout
- A41 / London Road / A4421 Seelscheid Way / Gravenhill Road roundabout.

5.4.8 Both the Gavray Drive and Peregrine Way roundabout junctions with the A4421 experienced a limited number of accidents over the period, all of which were classified as slight.

5.4.9 The Peregrine Way / A4421 priority junction experienced a total of 5 personal injury accidents, one of which resulted in serious injury. This involved a motorcycle and a car, with the car driver failing to give way.

5.4.10 The accident data analysis for the last Junction (A41 / London Road / A4421 Seelscheid Way / Gravenhill Road roundabout) shows a much higher number of accidents for the same period (13 in total), which is unsurprising given the higher number of vehicle movements through this junction. These incidents included two classified as 'Serious' and one 'Fatal' incident.

5.4.11 The fatality occurred under normal weather and road conditions when a medium-sized vehicle (Class C1), coming from A41 west turning left into A4421, collided with a pedal cycle crossing the road, with the cyclist sustaining fatal injuries. The cause of the accident was attributed to the cyclist failing to judge the other person's path or speed and entering the road at a point with no crossing provision from the footway.

5.5 LIKELY SIGNIFICANT EFFECTS

Post-completion stage

5.5.1 The post-completion stage of the proposed development will see the occupation of up to 180 residential units, accessed from Gavray Drive.

Potential Effect – Change in average daily two way link flows during operation

5.5.2 Tables 5.4 and 5.5 details the change in average daily two way link flows as a result of the development during operation. and the flows have been derived as explained in Section 5.2, with 2021 and 2026 taken as the assessment years, when the development would be fully occupied. .

Table 5.4: Change in Average Daily Link Flows During Operation-2021

Count location	Receptor Sensitivity	2021 Future Baseline Traffic Flows	Anticipated Development Traffic Flows	Total Traffic Flows	Percentage Change %	Magnitude of Change	Significance
A4421 Charbridge Lane	Low	14938	427	15365	3%	Negligible	Minor
Gavray Drive	Low	1138	667	1805	59%	Major	Moderate
A4421 Wretchwick Way	Low	13304	241	13545	2%	Negligible	Minor
A4421 Neunkirchen Way	Low	14899	189	15088	1%	Negligible	Minor
A41 South	Low	27760	253	28013	1%	Negligible	Minor
A41 North	Low	32708	153	32861	0%	Negligible	Minor
London Road	Low	8416	219	8635	3%	Negligible	Minor

Table 5.5: Change in Average Daily Link Flows During Operation-2026

Count location	Receptor Sensitivity	2026 Future Baseline Traffic Flows	Anticipated Development Traffic Flows	Total Traffic Flows	Percentage Change %	Magnitude of Change	Significance
A4421 Charbridge Lane	Low	24057	442	24499	2%	Negligible	Minor
Gavray Drive	Low	2444	627	3071	25%	Moderate	Moderate/Minor
A4421 Wretchwick Way	Low	10877	184	11061	2%	Negligible	Minor
A4421 Neunkirchen Way	Low	12278	138	12416	1%	Negligible	Minor
A41 South	Low	23334	282	23616	1%	Negligible	Minor
A41 North	Low	37213	0	37213	0%	Negligible	Minor
London Road	Low	6180	136	6316	2%	Negligible	Minor

5.5.3 The additional traffic during operation will result in a moderate long term adverse effect on Gavray Drive which is considered significant, but with all other receptors having a minor adverse effect which is not considered significant.

5.5.4 This impact can, however, be attributed to the fact that Gavray Drive currently serves a limited number of residential units, with a two way baseline flow of only 1856 vehicle movements.

Potential Effect – Change in AM peak hour public bus patronage.

5.5.5 There have been no changes to the number of bus trips estimated to be generated by the proposals. However, there has been a reduction in the number of services available. As the peak departures from the site by bus equate to a total of 6 additional passengers, some of who are likely to walk to the town centre bus stops, the result remains as a minor long term adverse effect.

Potential Effect – Change in pedestrian amenity, safety and severance.

5.5.6 The development benefits from being located adjacent to an established pedestrian network, with direct routes to the town centre and local facilities to the south, including Bicester Village station.

5.5.7 The scale of development will not result in any perceptible change to pedestrian or cycle journey times, safety or amenity and nor is it believed that the additional number of vehicle movements will have any perceptible change to pedestrian severance. The effect is therefore considered to be, at worse, minor adverse.

5.6 MITIGATION MEASURES

Post-completion stage

5.6.1 Notwithstanding the significance of effect on receptors that has been calculated, which in terms of daily traffic impact is minor for all links other than Gavray Drive, which is moderate, a residential TP will be implemented to ensure there is no increase in the number of vehicle movements to/from the Site as well as encouraging modal shift. In particular, single occupancy vehicle trips will be discouraged in favour of promoting more sustainable modes of travel.

5.6.2 TP measures will include:

- All new residents will be provided with a 'Sustainable Travel Information Pack', which will include various mapping, timetable and contact information to encourage sustainable travel;
- Personalised Travel Planning;

- Formation of a Walking Bus to local schools;
- Formation of Bicycle User Group; and
- The implementation of a car sharing database;

5.7 RESIDUAL EFFECTS

Post-completion stage

5.7.2 The residual effect during operation of the Proposed Development will be minor to moderate adverse and so for some effects will remain significant,

Summary of effects

5.7.3 The effects identified are summarised in Table 5.6 below and are unchanged from the previous assessment work carried out:

Table 5.6: Summary of effects

Potential effect	Significance (pre-mitigation)	Mitigation measure	Significance of residual effect
Construction stage			
Change in HGV Proportions During Construction – Gavray Drive	Moderate Adverse	Construction Environmental Management Plan will be implemented with measures including agreeing a vehicle route, consolidating deliveries as much as possible and scheduling deliveries.	Moderate Adverse The specific effect relates to the increase in proportion of daily flows. Existing daily HGV proportions are low on Gavray Drive, therefore any additional HGV movements will result in the adverse effect. The mitigation will ensure there is not a concentrated impact, but it will not remove the effect.
Change in HGV Proportions During Construction – rest of highway network study area	Minor Adverse	Construction Environmental Management Plan will be implemented with measures including agreeing a vehicle route, consolidating deliveries as much as possible and scheduling deliveries.	Minor Adverse The mitigation will ensure there is not a concentrated impact, but it will not remove the effect a.
Reduction in amenity and safety for pedestrian and cyclists	Minor Adverse	There will be strict monitoring and control of any potential pedestrian/construction vehicle point of conflict	Minor Adverse
Post-completion stage			

Change in average daily link flows during operation on Gavray Drive	Moderate adverse	A Travel Plan will be implemented to ensure that the anticipated number of vehicle movements are maintained.	Moderate Adverse
Change in average daily link flows during operation on remainder of highway network	Minor Adverse	A Travel Plan will be implemented to ensure that the anticipated number of vehicle movements are maintained.	Minor Adverse
Change in AM peak hour public bus patronage	Minor adverse	A Travel Plan will be implemented to ensure that residents are aware of all travel options to access the site.	Minor Adverse
Reduction in amenity and safety for pedestrian and cyclists	Minor adverse	The development proposal is not anticipated to have any perceptible change to pedestrian or cyclist amenity.	Minor Adverse

5.8 CUMULATIVE EFFECTS

5.8.1 Committed developments are included within the data provided by OCC from the SATURN model and no further assessment for other sites is needed. However, the assessment has, so far, only considered 180 units at Gavray Drive. It is therefore necessary to assess a cumulative scenario including the other 120 units allocated for the site.

5.8.2 Tables 5.7 and 5.8 below then details the change in traffic flows with the introduction of 300 residential units on the site/.

Table 5.7: Change in Average Daily Link Flows Cumulative Assessment - 2021

Count location	Receptor Sensitivity	2021 Future Baseline Traffic Flows	Cumulative Development Traffic Flows	Total Traffic Flows	Percentage Change %	Magnitude of Change	Significance
A4421 Charbridge Lane	Low	14938	713	15651	5%	Negligible	Minor
Gavray Drive	Low	1138	1115	2253	98%	Major	Moderate
A4421 Wretchwick Way	Low	13304	402	13706	3%	Negligible	Minor
A4421 Neunkirchen Way	Low	14899	316	15215	2%	Negligible	Minor
A41 South	Low	27760	423	28183	2%	Negligible	Minor
A41 North	Low	32708	256	32964	1%	Negligible	Minor
London Road	Low	8416	363	8779	4%	Negligible	Minor

Table 5.8: Change in Average Daily Link Flows Cumulative Assessment - 2026

Count location	Receptor Sensitivity	2026 Future Baseline Traffic Flows	Cumulative Development Traffic Flows	Total Traffic Flows	Percentage Change %	Magnitude of Change	Significance
A4421 Charbridge Lane	Low	24057	739	24796	3%	Negligible	Minor
Gavray Drive	Low	2444	1046	3490	43%	Major	Moderate
A4421 Wretchwick Way	Low	10877	306	11183	3%	Negligible	Minor
A4421 Neunkirchen Way	Low	12278	229	12507	2%	Negligible	Minor
A41 South	Low	23334	470	23804	2%	Negligible	Minor
A41 North	Low	37213	0	37213	0%	Negligible	Minor
London Road	Low	6180	225	6405	4%	Negligible	Minor

5.5.8 Using the Significance Matrix in Table 5.3, it can be seen that, whilst there is a major magnitude of change, the additional traffic during the cumulative scenario will result in a moderate long term adverse effect on Gavray Drive, with all other receptors continuing to have a minor adverse effect.

5.8.1 Again however, this impact can be attributed to the fact that Gavray Drive currently serves a limited number of residential units.

GLOSSARY

1. TRICS – (Trip Rate Information Computer System) is a database of trip generation information used for development planning

2. TEMPRO – (Trip end Model Presentation Program) is used to estimate traffic growth across an assessment period and location

Appendix B: Addendum to ES Chapter 6 Air Quality

CONTENTS

6.1 INTRODUCTION

6.1.1 Ove Arup & Partners Limited (Arup) has been commissioned by Gallagher Developments to update the air quality assessment for the proposed residential development at Gavray Drive in Bicester, Oxfordshire.

6.1.2 Air quality studies are concerned with the presence of airborne pollutants in the atmosphere. This chapter outlines relevant air quality management policy and legislation, describes the existing air quality conditions in the vicinity of the Application Site and outlines the nature of the development and the likely significant air quality effects as a result of its construction and operation. Mitigation measures are also proposed, where necessary, which would be implemented to reduce the effects of the proposed development on air quality as far as practicable.

6.1.3 The current use of the Site is green space and it is located on the outskirts of Bicester town, within Cherwell District Council (CDC). The Site is bounded by two railway lines, the Birmingham to Marylebone rail line (Chiltern Line) to the north and the Oxford to Bletchley rail line to the west. Gavray Drive runs to the south-west of the Site and green space occupies the area to the east.

6.2 ASSESSMENT METHODOLOGY

Scope

6.2.1 This study assesses the likely significant air quality effects from the construction and operation of the proposed development, focusing on emissions of nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$) and dust. Emissions of these pollutants are associated with construction activities on the Site, as well as emissions generated by additional traffic travelling to and from the development.

6.2.2 The Study Area for assessment of dust impacts during construction extends approximately 350m from the Site boundary and 50m from the traffic access routes based on the recommendations of the Institute of Air Quality Management (IAQM) guidance document.

6.2.3 For the assessment of traffic emissions, sensitive receptors have been selected at worst case locations along the local road network as seen in Figure 6.2.

Data sources

6.2.4 The following data sources have been used throughout this air quality assessment:

- CDC scoping response;
- CDC review and assessment reports and local air quality monitoring data[1];
- Traffic data provided by the transport consultants;
- The UK-Air Information Resource website[2]; and
- The Environment Agency (EA) website[3].

Assessment approach

6.2.5 The overall approach to the air quality assessment comprises:

- A review of the existing air quality conditions at, and in the vicinity of the proposed Site;
- An assessment of the likely significant effect of changes in air quality arising from the construction and operation of the proposed development; and
- Formulation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

[1] CDC, https://www.cherwell.gov.uk/download/downloads/id/3478/air-quality-annual-status-report-2017.pdf, Accessed February 2018
[2] Defra, http://uk-air.Defra.gov.uk, Accessed February 2018
[3] Environment Agency, https://www.gov.uk/government/organisations/environment-agency, Accessed February 2018

Baseline Assessment Methodology

6.2.6 Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment – these are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

6.2.7 A desk-based review of the data sources has been undertaken to determine baseline conditions of air quality in this assessment.

Construction Assessment Methodology

6.2.8 The construction effects have been assessed using the qualitative approach described in the latest IAQM guidance[4] in relation to dust emissions.

Road traffic emissions

6.2.9 The area where road traffic emissions have been assessed has been determined using the criteria detailed in the Environmental Protection UK (EPUK) and IAQM guidance[5]. The criteria consider light duty vehicles (LDVs, i.e. cars and small vans <3.5t gross vehicle weight) and heavy duty vehicles (HDVs, i.e. goods vehicles and buses >3.5t gross vehicle weight). The criteria are a change in LDV flows of more than 100 annual average daily traffic (AADT) within or adjacent to an air quality management area (AQMA) or 500 AADT elsewhere; a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or 100 AADT elsewhere.

6.2.10 Information provided by the transport consultants for the project, indicates that there will be an additional 30 HDVs on the road network in 2018 as part of the construction works. The Site is not located within or adjacent to an AQMA. Therefore, since the additional HDV flows during construction are less than the 100 HDV movements stated in the EPUK/IAQM guidance document, emissions from construction road vehicle traffic are considered to be of negligible significance and have been scoped out of this assessment.

Dust emissions

6.2.11 The IAQM guidance applies to the assessment of dust from construction/demolition activities. An 'impact' is described as a change in pollutants concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main impacts that may arise during construction of the proposed development are:

- Dust deposition, resulting in the soiling of surfaces;

[4] IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction (v1.1)
[5] EPUK & IAQM (2017) Land-use & Development Control: Planning for Air Quality (v1.2)

- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on site; and
- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from non-road mobile machinery (NRMM) and vehicles accessing the site.

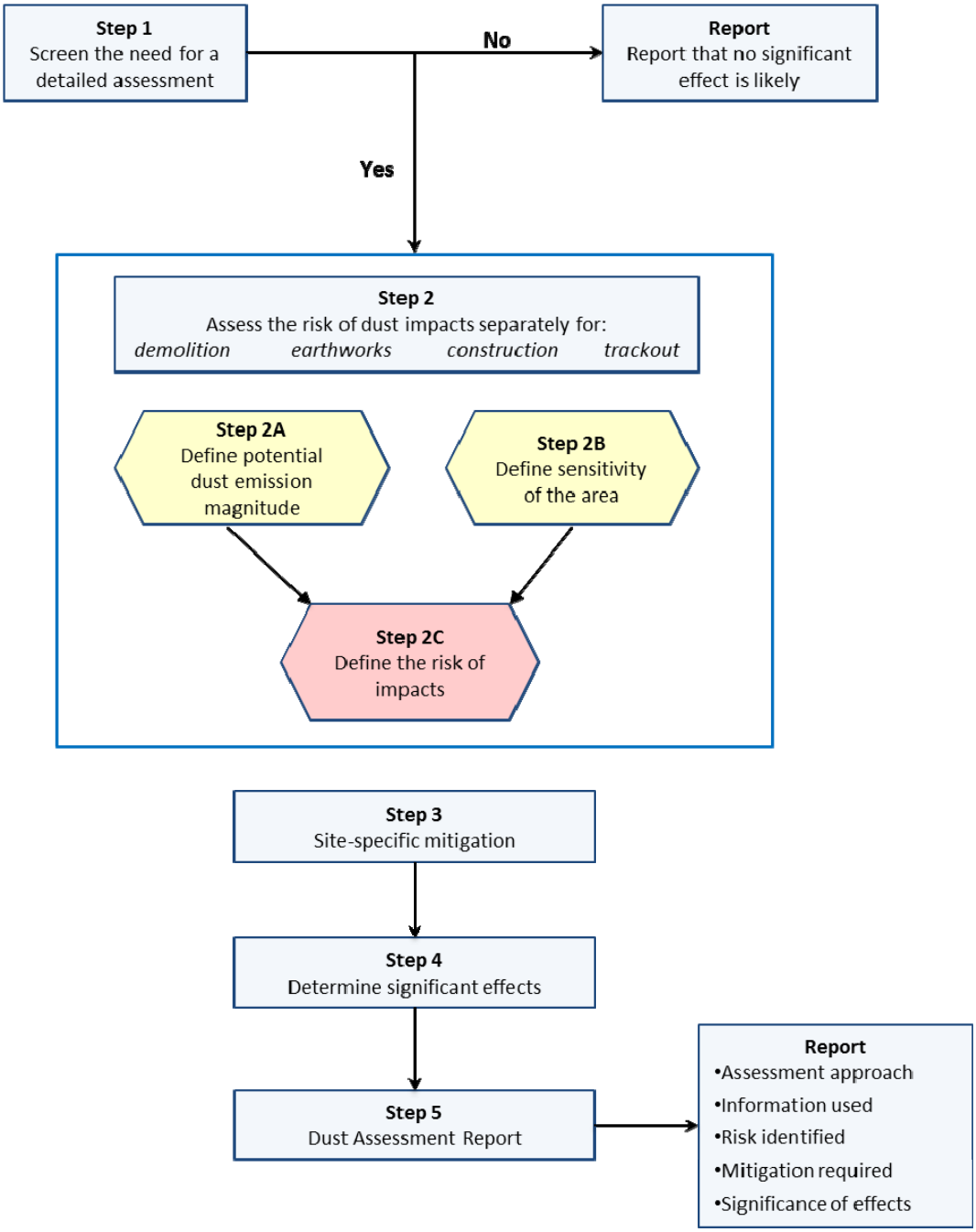
6.2.12 The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the Site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the Site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on Site and then transfer dust and dirt onto the road network. Certain assumptions have been made regarding construction activities and these are outlined in the Construction Assessment section.

6.2.13 For each of the dust-generating activities, the guidance considers three separate effects: annoyance due to dust soiling; harm to ecological receptors; and the risk of health effects due to a significant increase in PM_{10} exposure. The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure; these are identified in the Construction Assessment section.

6.2.14 The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of the site.

6.2.15 There are five steps in the assessment process described in the IAQM guidance. These are summarised in Figure 6.1 and a further description is provided in the following sections.

Figure 6.1 IAQM dust assessment methodology



Step 1: Need for assessment

6.2.16 The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the site boundary (for ecological receptors that is 50m) and/or within 50m of the route(s) used by the construction vehicles on the public highway up to 500m from the site entrance(s).

Step 2: Assess risk of dust impacts

6.2.17 This step is split into three sections as follows:

2A. Define the potential dust emission magnitude;

2B. Define the sensitivity of the area; and

2C. Define the risk of impacts.

6.2.18 Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria shown in Table A6.1 (Appendix 6.1).

6.2.19 The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. Table A6.2 to Table A6.4 (Appendix 6.1) show the criteria for defining the sensitivity of the area to different dust effects.

6.2.20 The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (Table A6.5, Appendix 6.1) and an overall risk for the site derived.

Step 3: Determine the site-specific mitigation

6.2.21 Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

Step 4: Determine any significant residual effects

6.2.22 Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. Experience indicates that once mitigation measures are applied, in most cases the dust effects will be reduced to negligible levels.

Step 5: Prepare a dust assessment report

6.2.23 The last step of the assessment is the preparation of a Dust Assessment Report which is covered within this report.

Operational Assessment Methodology

Road Traffic Emissions

6.2.24 Operational air quality impacts from the proposed development arise principally as a result of traffic changes along the local road network. Effects of traffic generated by

the development have been assessed using the ADMS-Roads atmospheric dispersion model.

6.2.25 Pollutant concentrations are forecast at locations that are in close proximity to the proposed development and the surrounding road network affected by the development. The model calculates one-hour average concentrations with results processed to calculate the annual mean concentration for comparison with the air quality standards. The following sections detail the inputs and processes used in this assessment.

Assessment Scenarios

6.2.26 The assessment scenarios are summarised as follows:

- 2017 baseline scenario;
- 2021 and 2026 opening year Do-Minimum (DM) scenarios;
- 2021 and 2026 opening year Do-Something (DS) scenarios; and,
- 2021 and 2026 cumulative scenarios.

6.2.27 The 2021 and 2026 DM scenarios represent the future year scenarios with committed developments in the area without the proposed development, while the 2021 and 2026 DS scenarios represent the future year scenarios with committed developments and the proposed development in place. The 2021 and 2026 cumulative scenarios represent the future year scenarios with committed developments, the proposed development and the Gavray Drive East development in place. Further information on these scenarios and the committed developments can be found in Chapter 5: Transport.

Sensitive Receptors

6.2.28 Pollutant concentrations have been forecast at selected human receptors within the Study Area where exposure to traffic emissions from vehicles travelling to/from the site is potentially the greatest, i.e. properties, schools and hospitals in close proximity to roads/junctions with the greatest predicted changes in traffic flows. No nationally or internationally designated ecological sites are located within 200m of the local road network and therefore no assessment of ecological receptors has been undertaken.

6.2.29 Details of the assessed receptors are given in Table 6.1 and their location shown in Figure 6.2. Assessed receptors include future residential receptors that are to be constructed as part of the proposed development, as well as residential properties across the local road network.

6.2.30 Table 6.1 Receptor Locations

ID	Receptor	Type	X	Y
1	London Road north	Residential	458839	221513
2	London Road centre	Residential	458980	221418
3	London Road/Neunkirchen Way	Residential	459172	221277
4	Neunkirchen Way	Residential	459265	221274
5	Neunkirchen Way roundabout	Residential	459445	221360
6	Wretchwick Way	Residential	459580	221449
7	Wretchwick Way roundabout	Residential	459974	221845
8	Charbidge Lane south	Residential	459881	221942
9	Charbidge Lane north	Residential	459671	222141
10	Gavray Drive/Mallards Way	Residential	459356	222357
11	Wretchwick Way north	Residential	459853	221710
12	Proposed residential north	Residential	459251	222499
13	Proposed residential centre	Residential	459333	222440
14	Proposed residential south	Residential	459467	222331
15	4 Kestrel Way	Residential	459368	221341
16	Wretchwick Way Farm	Residential	459679	221385
17	Avocet Way	Residential	459764	221717
18	The Bramblings	Residential	459309	222378

Traffic Data

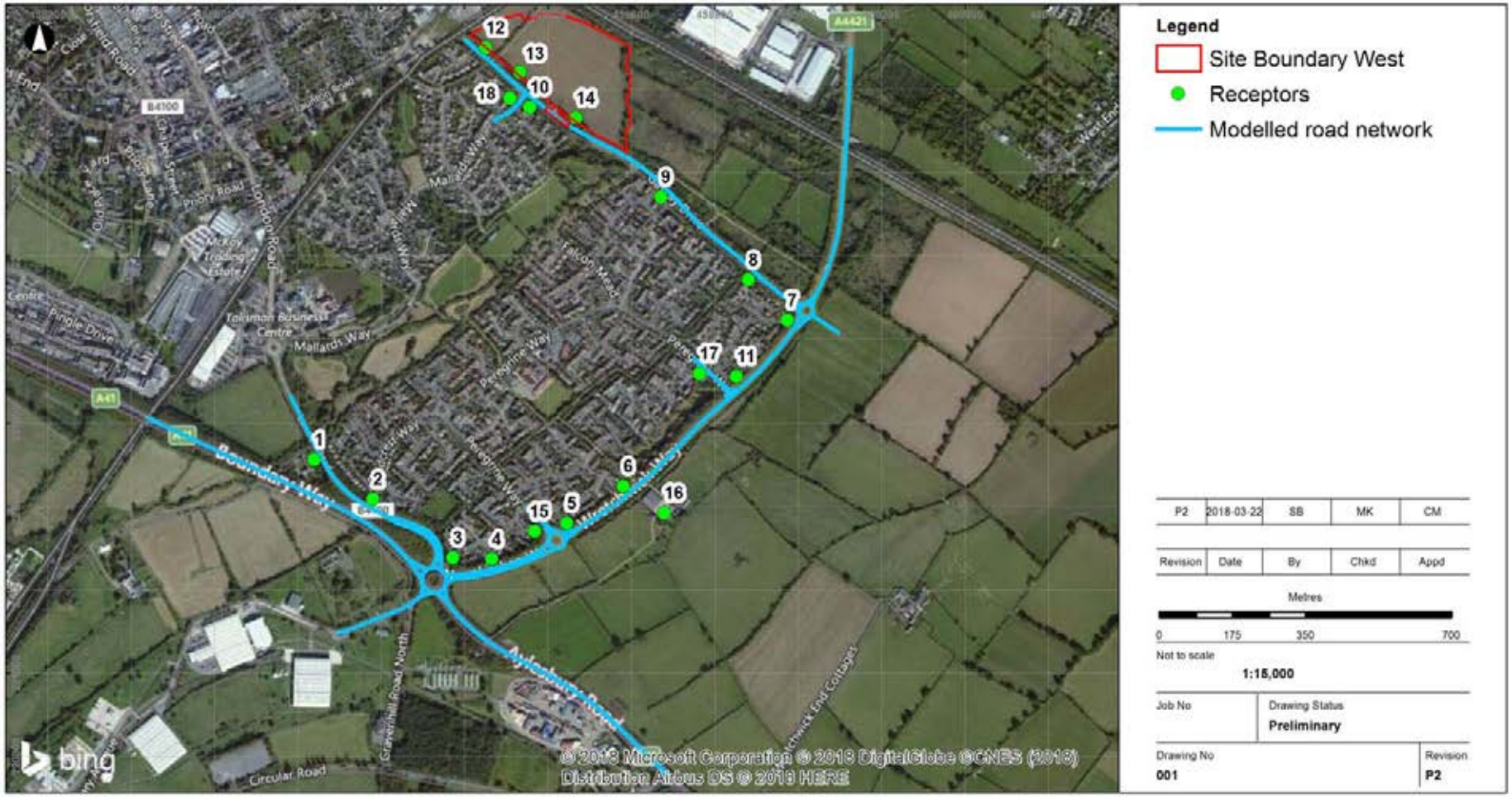
6.2.31 Traffic data for all scenarios was provided by Odyssey Markides, the Transport Consultants for the project. The data consisted of 24-hour Annual Average Daily Traffic (AADT) flows, percentage of HDVs and daily average speeds (Appendix 6.2). Where speeds were not available, these were taken from the ITO website[6].

6.2.32 The traffic data included two sets of future DS scenarios; one representing the operation of the proposed development (Gavray Drive West) and another one representing the operation of both the proposed development and the Gavray Drive East development adjacent to Site as a sensitivity test.

6.2.33 Pollutant emission rates for all road sources were calculated using the UK Defra Emissions Factor Toolkit (EFT) v8.0.1[7]. Emission rates for 2017 were used in the baseline scenario and emission rates for 2021 and 2026 for the remaining scenarios. Speeds were reduced to 20kph close to junctions following the Defra LAQM.TG(16) guidance[8].Traffic data for the model road network is given in Appendix 6.2 and the location of these roads shown in Figure 6.2.

[6] ITO Speeds, http://product.itoworld.com/map/124, Accessed April 2018
[7] Defra (2017) Emissions Factors Toolkit (EFT)
[8] Defra (2016) Local Air Quality Management Technical Guidance TG(16)

Figure 6.2 Modelled road network and sensitive receptors



Model version set up

6.2.34 Dispersion modelling of NOx, PM_{10} and $PM_{2.5}$ emissions was undertaken using ADMS-Roads (version 4.1.1.0) model from Cambridge Environmental Research Consultants (CERC).

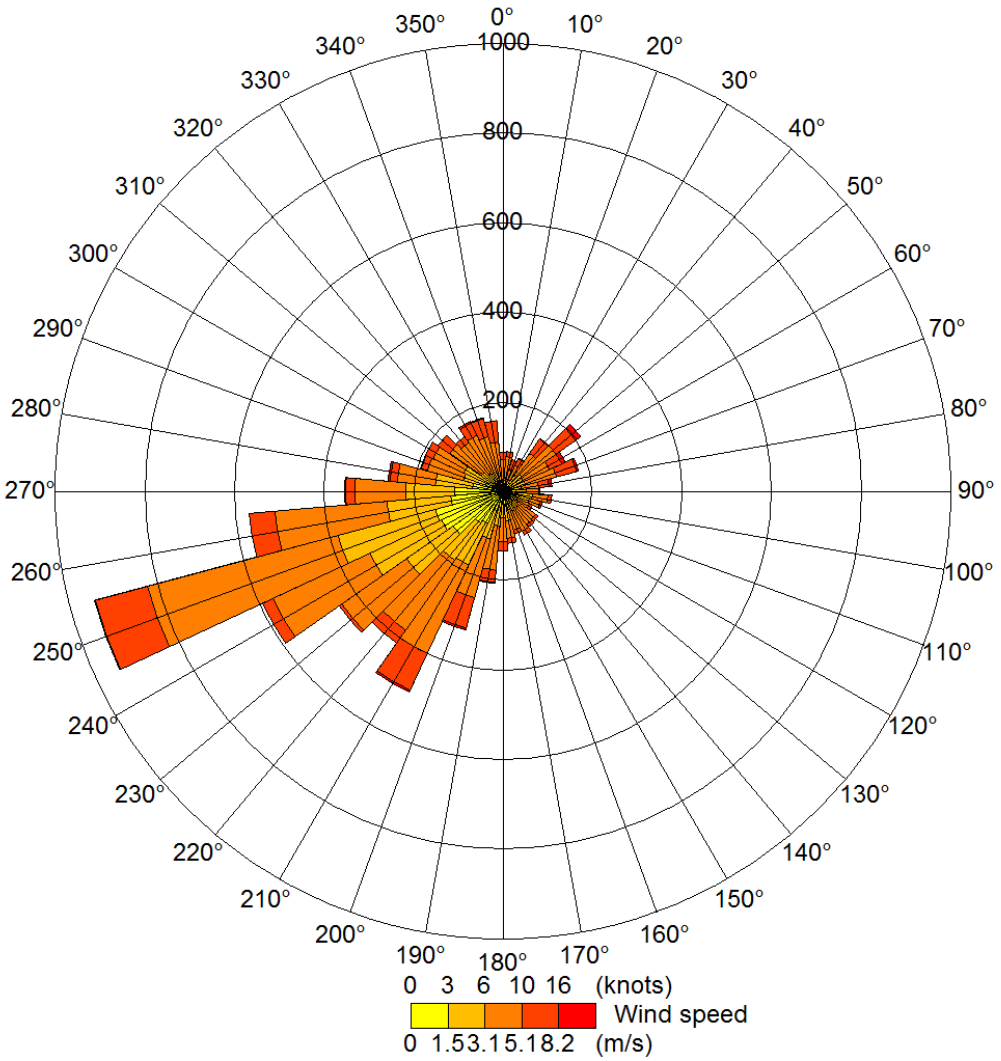
Meteorological data

6.2.35 Hourly sequential observation data for 2017 was used in the assessment from the meteorological station at Brize Norton meteorological station. Figure 6.3 shows the relevant windrose derived from this data, where it can be observed that prevailing winds for the area are predominantly south-westerly.

6.2.36 Defra's LAQM.TG(16) guidance recommends that the meteorological data file is tested within a dispersion model and the relevant output log file checked to confirm the number of missing hours and calm hours that cannot be used by the dispersion model. This is important when considering predictions of high percentiles and the number of exceedances. The guidance recommends that meteorological data should only be used if the percentage of usable hours is greater than 75% and preferably 90%.

6.2.37 The 2017 meteorological data from Brize Norton meteorological station include 8,738 lines of usable hourly data of the total 8,760 for the year. These correspond to 99.7% of usable data, which is above the 90% threshold advised by the Defra guidance.

Figure 6.3 Windrose for 2017 for Brize Norton meteorological station



Other model parameters

6.2.38 The extent of mechanical turbulence (and hence, mixing) in the atmosphere is affected by the surface/ground over which the air is passing. Typical surface roughness values range from 1.5m (for cities, forests and industrial areas) to 0.0001m (for water or sandy deserts). In this assessment, the general land use in the local study area can be described as “parkland, open suburbia” with a corresponding surface roughness of 0.5m.

6.2.39 Another model parameter is the minimum Monin-Obukhov length, which describes the minimum level of turbulence in the atmosphere. Typical values range from 2m to 20m for rural areas. In urban areas though, where traffic and buildings cause the generation of more heat, these values are higher. For this model, a length of 10m was used, representing ‘small towns <50,000’.

Model verification

6.2.40 Model verification refers to the comparison of modelled pollutant concentrations with measured concentrations at the same points to determine the performance of the model. There are number of uncertainties in both air quality monitoring and modelling therefore the process of verification is undertaken to ensure modelled results are robust and reflect reality. Should the model results for NO_2 be largely within ±25% of the measured values and there is no systematic over or under-prediction of concentrations, then no adjustment is necessary according to Defra's LAQM.TG(16) guidance. If this is not the case, then the modelled values are adjusted based on the observed relationship between modelling and measured NOx, PM_{10} and $PM_{2.5}$ concentrations to provide a better agreement.

6.2.41 There is one diffusion tube monitoring site located along the modelled road network (Aylesbury Road), however this site is at a kerbside location and not representative of public exposure. Other diffusion tube sites are located in Bicester town centre (London Road, Market Square and Causeway), as outlined in Section 6.4. As such, model verification was not possible; however, a comparison between modelled and monitored results from comparable areas has been made.

6.2.42 Monitored results at the Aylesbury Road site in 2017 were 28.8µg/m^3. Monitored results at the three sites in Bicester town centre in 2017 were 26.3µg/m^3 at London Road, 24.7µg/m^3 at Market Square and 18.3µg/m^3 at Causeway. The London Road monitor is located at the junction with Station Approach, which provides access to Bicester Village train station car parks and, therefore, slightly elevated NO_2 concentrations are expected due to the traffic volumes going to and from these car parks and the slow moving traffic at the junction. The Market Square monitor is located in the town centre car park and as such, slightly elevated pollution concentrations are to be expected due to slow moving traffic. The Causeway monitor is also at a relatively central location, however, this location is more comparable to the geographical context of the sensitive receptors in the study area.

6.2.43 As outlined in Section 6.5, receptor results for the base year 2017 range from 17.6µg/m^3 to 33.2µg/m^3. These are similar to the measured concentrations in the area. Therefore, the model is considered to give a reasonable representation of real-world conditions.

NO_x to NO_2 conversion

6.2.44 The model predicts total NO_x concentrations, which comprises principally a mixture of nitric oxide (NO) and NO_2. Since only NO_2 has been associated with effects on human health, the air quality standards for the protection of human health are based

on NO_2 rather than NO_x or NO. Thus, a suitable NO_x to NO_2 conversion rate needs to be applied to the modelled NO_x concentrations.

6.2.45 Defra's LAQM.TG(16) guidance details an approach for calculating the roadside conversion of NO_x to NO_2, which takes into account the difference between ambient NO_x concentrations with and without the development, the concentration of ozone and the different proportions of primary NO_2 emissions in different years. This approach is available as a spreadsheet calculator, with the most up to date version (v6.1)[9] having been used in this assessment.

Background concentrations

6.2.46 Background concentrations refer to the existing levels of pollution in the atmosphere, produced by a variety of sources, such as roads and industrial processes. Defra has produced estimated background air pollution data for each 1x1km OS grid square for each local authority area[10]. Background maps are available for 2015 and projected through to 2030. Background concentrations are reported and discussed in the baseline section of this report.

Significance criteria for traffic emissions

6.2.47 The 2017 EPUK/IAQM guidance note 'Land-Use Planning & Development Control' provides an approach to determining the air quality impacts resulting from a proposed development and the overall significance of local air quality effects arising from a proposed development.

6.2.48 Firstly, impact descriptors are determined based on the magnitude of incremental change as a proportion of the relevant assessment level, in this instance the annual mean NO_2, PM_{10}, and $PM_{2.5}$ objectives. The change is then examined in relation to the predicted total pollutant concentrations in the assessment year and its relationship with the annual mean NO_2, PM_{10}, and $PM_{2.5}$ objectives.

6.2.49 The assessment framework for determining impact descriptors at each of the assessed receptors is shown in Table 6.2.

[9] Defra (2017) NOx to NO_2 conversion spreadsheet
[10] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015

Table 6.2 Impact descriptors

Annual average concentrations at receptor in the assessment year	**% Change in concentrations relative to annual mean NO_2 and PM_{10} objectives**			
	1	**2-5**	**6-10**	**>10**
75% or less of objective	Negligible	Negligible	Slight	Moderate
76-94% of objective	Negligible	Slight	Moderate	Moderate
95-102% of objective	Slight	Moderate	Moderate	Substantial
103-109% of objective	Moderate	Moderate	Substantial	Substantial

Note: Changes in pollutant concentrations of less than 0% i.e. <0.5% would be described as negligible

6.2.50 The impact descriptors at each of the assessed receptors can then be used as a starting point to making a judgement on the overall significance of effect of a proposed development, however other influences would also need to be taken into account, such as:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

6.2.51 Professional judgement should be used to determine the overall significance of effect of the proposed development, however in circumstances where the proposed development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not result in a significant effect.

Uncertainties and limitations

6.2.52 Limitations are described throughout the document where applicable.

6.3 RELEVANT POLICY

National Planning Policy Framework (March 2012)

6.3.1 The National Planning Policy Framework (NPPF)[11] was published in March 2012 with the purpose of using planning to achieve sustainable development. Paragraph 124 of the NPPF on air quality states that:

> *"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."*

National Planning Policy Guidance

6.3.2 The land use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality consideration that relates to land use and its development can be a material planning consideration in the determination of planning applications, dependent upon the details of the proposed development.

Local Air Quality Management Policy Guidance (2016)

6.3.3 Policy guidance note LAQM.PG(16)[12] provides additional guidance on the links between transport and air quality. LAQM.PG(16) describes how road transport contributes to local air pollution and how transport measures may bring improvements in air quality. Key transport related Government initiatives are set out, including regulatory measures and standards to reduce vehicle emissions and improve fuels, tax-based measures and the development of an integrated transport strategy.

6.3.4 LAQM.PG(16) also provides guidance on the links between air quality and the land use planning system. The guidance advises that air quality considerations should be integrated within the planning process at the earliest stage and is intended to aid local authorities in developing action plans to deal with specific air quality problems and create strategies to improve air quality. It summarises the main ways in which the land use planning system can help deliver compliance with the air quality objectives.

[11] Department for communities and local government (2012) National Planning Policy Framework
[12] Defra (2016) Local Air Quality Management Policy Guidance PG(16)

The Cherwell Local Plan

6.3.5 A Local Plan for Cherwell District was first adopted in November 1996. Since then, the Local Plan has been revised. However, saved policy ENV1 on air quality has been retained:

> *"ENV1 Development which is likely to cause materially detrimental levels of noise, vibration, smell, smoke, fumes or other type of environmental pollution will not normally be permitted."*

6.3.6 The currently adopted Local Plan is the Cherwell Local Plan 2011-2031 (adopted in 2015). There are two policies in relation to air quality that are relevant to this assessment. These policies have been considered throughout the assessment.

> *"Policy ESD 3 Sustainable Construction – Reducing waste and pollution and making adequate provision for the recycling of waste."*

> *"Policy ESD 10 Protection and Enhancement of Biodiversity and the Natural Environment – Air quality assessments will also be required for development proposals that would be likely to have a significantly adverse impact on biodiversity by generating an increase in air pollution."*

6.4 BASELINE CONDITIONS

6.4.1 The following section outlines the baseline air quality conditions within the Study Area.

Sources of air pollution

Industrial processes

6.4.2 Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, regulated through the Pollution Prevention Control (PPC) system[13,14]. Part A processes have the potential to release prescribed substances to air, land and water. Part B processes are smaller in scale and have the potential for release of prescribed substances to air only and are managed by CDC.

6.4.3 There is one Part A process within 2km of the Application Site. The Thames Water Sewage Treatment works is located 1.9km south-west of the site boundary and is only recorded to have CO_2 emissions to air. Due to this distance and the nature of the process, this facility is not considered to have a significant effect on local air quality in the vicinity of the Site.

Road and rail traffic

6.4.4 In recent decades, transport atmospheric emissions on a national basis have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. Vehicle emissions, from both the road and railway lines, are likely to be the dominant source of air pollutants in the vicinity of the Site. The main pollutants associated with traffic and considered in this assessment are NO_2 and PM_{10}. The Site is bounded by two railway lines, the Birmingham to Marylebone rail line (Chiltern Line) to the north and the Oxford to Bletchley rail line to the west. These two railway lines are not listed in LAQM.TG(16) guidance as lines with "Heavy Traffic of Diesel Passenger Trains" and therefore are not at risk of causing exceedances of the air quality standards. Gavray Drive runs to the south-west of the development and green space occupies the area to the east of the Site. Charbridge Lane is located to the

[13] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
[14] The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

east of the greenspace and had an AADT of 11,643 in 2013 with a HGV % of 9%[15]. The location of the DfT traffic count is shown in Figure 6.4.

[15] Department for Transport (2014), Traffic Counts: http://www.dft.gov.uk/traffic-counts/; Accessed: October 2014

Figure 6.4 DfT traffic count location

Local air quality

6.4.5 As discussed above, the Environment Act 1995 requires local authorities to review and assess air quality with respect to the objectives for the pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an Annual Status Report (ASR) of their area each year. If the ASR identifies potential hotspot areas likely to exceed air quality objectives, the local authorities must declare the area as an AQMA and produce an Air Quality Action Plan (AQAP), which includes measures to improve air quality within this AQMA.

6.4.6 The closest AQMA to the Development Site is the Cherwell District Council Air Quality Management Area no. 4 which is located in the Bicester town centre, approximately 900m to the north-west of the Site. The AQMA was declared in 2015 for exceedances to annual mean NO_2 concentrations and incorporates sections of Kings End, Queens Avenue, Field Street and St Johns Street.

6.4.7 According to the most recent LAQM report[16], CDC does not currently operate an automatic monitor in their area of jurisdiction.

6.4.8 The council carries out monitoring of NO_2 concentrations within Bicester using diffusion tubes. There are nine diffusion tube sites within 1.5km of the Application Site. Details and monitoring data for these are presented in Table 6.4 and their location shown in Figure 6.5. Exceedances of the air quality objective (40µg/m^3) are displayed in **bold**.

6.4.9 It can be observed that monitored NO_2 concentrations have been below the air quality objective from 2015 to 2017, with the exception of Kings End South. Exceedances of the air quality standard have been recorded at sites within the AQMA over the past five years.

Table 6.3 NO_2 concentrations (µg/m^3) from local monitoring sites

ID	Site	Location type	Distance (m)	Direction	In AQMA?
1	Causeway	Kerbside	818	W	
2	Kings End South	Roadside	1,213	W	Y
3	St Johns 2014	Kerbside	923	W	Y
4	Field Street	Kerbside	1,045	W	Y
5	North Street	Kerbside	1,023	W	Y
6	Queens Avenue (x3)	Kerbside	1,186	W	Y
7	Market Square 2014	Roadside	690	W	
8	Aylesbury Rd 2014	Roadside	1,164	S	
9	London Road 2016	Roadside	643	W	

[16] Cherwell District Council, Air Quality Status Report, 2016

Table 6.4 NO_2 concentrations (µg/m^3) from local monitoring sites

ID	Site	Location type	2013	2014	2015	2016	2017
1	Causeway	Kerbside	23.2	20.2	20.0	22.5	18.3
2	Kings End South	Roadside	**48.5**	**46.9**	**46.0**	**46.0**	**41.7**
3	St Johns 2014	Kerbside	-	36.3	38.3	36.2	37.8
4	Field Street	Kerbside	**40.3**	36.2	36.5	34.3	33.5
5	North Street	Kerbside	**44.7**	**41.9**	39.8	37.9	36.5
6	Queens Avenue (x3)	Kerbside	**41.0**	**40.3**	38.7	38.7	39.5
7	Market Square 2014	Roadside	-	23.5	23.7	25.4	24.7
8	Aylesbury Rd 2014	Roadside	-	32.7	30.5	30.0	28.8
9	London Road 2016	Roadside	-	-	-	29.1	26.3
Note: 2017 results have been provided by CDC.							

Figure 6.5 Monitoring sites

Background concentrations

6.4.10 Background concentrations for use in the baseline scenario 2017 have been taken from the Defra background mapping website for the relevant grid squares within the study area. (Table 6.5). It can be observed that background concentrations are well below the air quality objectives in the study area. The development site itself is located in grid square 459500, 222500 (highlighted in **bold** in Table 6.5).

Table 6.5 Background concentrations (µg/m^3) for the baseline year 2017

OS grid reference	NO_2	PM_{10}	$PM_{2.5}$
458500, 221500	10.6	13.9	9.1
459500, 221500	10.3	13.7	9.2
458500, 222500	11.2	14.8	10.2
459500, 222500	11.6	13.8	9.4

6.4.11 There are two urban background diffusion tubes in Bicester; Villiers Road and Tamarisk Gardens. They are located over 1.5km away from the development site, however it is worth noting that in 2017 the monitors recorded NO_2 concentrations of 17.9µg/m^3 and 16.3µg/m^3 respectively. These are higher than the Defra backgrounds maps for 2017. Therefore, an average of the two local urban background sites (i.e. 17.1µg/m^3) has been used as the background NO_2 concentration for processing the base year model results in the study area.

6.4.12 Background PM_{10} and $PM_{2.5}$ concentrations for the base year were taken from the Defra background maps.

The projected future baseline

6.4.13 Air quality is predicted to improve in future years, mainly due to improvements in vehicle technologies. Background concentrations for the future year scenario 2021 and 2026 from the Defra background maps are shown in Table 6.6. It can be observed that the concentrations are very low compared to the monitored background concentrations in the base year 2017. Therefore, for the future assessment years, background NO_2 concentrations were assumed to be 14.1µg/m^3 in 2021 and 11.9µg/m^3 in 2026. These were calculated using the predicted rate of reduction in background concentrations from the Defra background maps, applied to the monitoring background concentrations of 17.1µg/m^3 in 2017.

6.4.14 Background PM_{10} and $PM_{2.5}$ concentrations for the future years were taken from the Defra background maps.

Table 6.6 Background concentrations (µg/m^3) for 2021 and 2026

OS grid reference	NO_2	PM_{10}	$PM_{2.5}$
2021			
458500, 221500	8.6	13.5	8.8
459500, 221500	8.5	13.3	8.8
458500, 222500	9.3	14.4	9.9
459500, 222500	9.6	13.4	9.0
2026			
458500, 221500	7.1	13.3	8.6
459500, 221500	7.0	13.2	8.6
458500, 222500	7.9	14.2	9.7
459500, 222500	8.4	13.2	8.8

6.5 LIKELY SIGNIFICANT EFFECTS

Construction stage

6.5.1 As discussed in the Methodology Section, road traffic emissions during the construction stage have been scoped out of this assessment. Therefore, this section focusses on dust emissions during construction.

6.5.2 The site of the proposed development covers an area of approximately 6.92 hectares. The site currently comprises green space and as such there will be no demolition works required. It should be noted that a section of the green space will remain untouched. An area of approximately 4.62 hectares will be developed for residential use. The effects of demolition and construction works are considered in the following section.

Need for Assessment

6.5.3 Sensitive receptors are defined as those properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction and operation of the proposed development. There are sensitive receptors located within 350m of proposed buildings to be constructed (Figure 6.6); these are mainly residential dwellings. As such, their sensitivity to dust soiling and PM_{10} exposure has been classified as *high* according to the IAQM guidance.

6.5.4 There is also one designated ecological site, the Gavray Drive Local Wildlife Site (LWS), within 50m of the site, which has been included in the assessment of construction dust emissions. Due to its local designation, the sensitivity of the ecological receptor to dust deposition has been classified as *low* following the IAQM guidance. Further details on this site are presented in Chapter 9: Ecology and Biodiversity.

Figure 6.6 Construction dust buffer of 350m

Dust Emission Magnitude

6.5.5 Following the methodology outlined in Section 6.2 and the criteria presented in Table A6.2 (Appendix 6.1), each dust-generating activity has been assigned a dust emission magnitude as shown in Table 6.7. For earthworks, it has been assumed that these will occur in the proposed building areas. For trackout, it has been assumed that construction vehicles will use Gavray Drive from the east and north and Wretchwick Way from the south.

Table 6.7 Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Earthworks	Large	Estimated total site area > 10,000m^2
Construction	Large	Estimated total building volume > 100,000m^3 Potentially dusty construction material
Trackout	Medium	Estimated number of daily HDV trips between 10 and 50 Surface material with low potential for dust release

Sensitivity of the Area

6.5.6 The sensitivity of the area to dust soiling has been assigned as *medium*, due to the presence of sensitive receptors within 50m from any dust generating activity.

6.5.7 The sensitivity of the area to human health impacts has been assigned as *low* due to the presence of sensitive receptors within 50m from any dust generating activity and the low PM_{10} background concentrations in the area (13.8µg/m^3 from the Defra background maps).

6.5.8 The sensitivity of the area to ecological impacts has been assigned as *low* due to the presence of the Gavray Drive LWS within 50m of the site.

Risk of Impacts

6.5.9 Using the criteria set out in the risk of dust impacts table in the appendix, the impacts on the area without mitigation are defined. Taking into consideration the dust emission magnitude and the sensitivity of the area, the site has been classified as *medium risk* for all activities at worst (

Table 6.8), corresponding to moderate significant effects.

6.5.10 It should be noted that, assuming the relevant mitigation measures outlined in Section 6.6 are implemented, the residual significance of potential impacts from all dust generating activities is *negligible* as outlined in the IAQM guidance.

Table 6.8 Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health	Ecological
Earthworks	Medium	Low	Low
Construction	Medium	Low	Low
Trackout	Low	Low	Low

Post-completion stage

Road Traffic Emissions

6.5.11 Dispersion modelling was undertaken with the inputs described in Section 6.2, for the following assessment scenarios:

- 2017 baseline scenario;
- 2021 and 2026 DM scenarios without the proposed development including traffic growth and committed developments; and
- 2021 and 2026 DS scenarios including traffic growth, committed developments and the proposed development.

6.5.12 The change in concentrations between the DM and DS scenarios has been calculated in order to assess the impact of the proposed development to local air quality.

Predicted NO_2 Concentrations

6.5.13 Table 6.9 and Table 6.12 present the forecast NO_2 concentrations for the assessed receptors for each assessment scenario for 2021 and 2026 respectively. It can be observed that annual mean NO_2 concentrations are predicted to be well below the air quality objective at all sensitive receptors. The highest concentration has been predicted at receptor 3 at the junction of London Road and Neunkirchen Way with 26.4µg/m^3 in 2021 and 19.1µg/m^3 in 2026.

6.5.14 The largest change in NO_2 concentrations in 2021 was 0.1µg/m^3 which has been forecast at most receptors in the study area. The largest change in concentrations in 2026 has been forecast at receptors 3, 7, 8 and 9 with an increase of 0.1µg/m^3.

6.5.15 It is predicted that all receptors will experience *negligible* impacts due to the operation of the proposed development.

Predicted PM_{10} concentrations

6.5.16 Table 6.10 and Table 6.13 present the forecast PM_{10} concentrations for the assessed receptors for each assessment scenario for 2021 and 2026 respectively. It can be observed that annual mean PM_{10} concentrations are predicted to be well below the air quality objective at all sensitive receptors. The highest concentration has been

predicted at receptor 3 at the junction of London Road and Neunkirchen Way with 15.6µg/m^3 in 2021 and 15.3µg/m^3 in 2026.

6.5.17 Changes in PM_{10} concentrations have been predicted to be less than 0.1µg/m^3 in both 2021 and 2026.

6.5.18 It is predicted that all receptors will experience *negligible* impacts due to the operation of the proposed development.

Predicted $PM_{2.5}$ concentrations

6.5.19 Table 6.11 and Table 6.14 present the forecast $PM_{2.5}$ concentrations for the assessed receptors for each assessment scenario for 2021 and 2026 respectively. It can be observed that annual mean $PM_{2.5}$ concentrations are predicted to be well below the air quality objective at all sensitive receptors. The highest concentration has been predicted at receptor 3 at the junction of London Road and Neunkirchen Way with 10.1µg/m^3 in 2021 and 9.8µg/m^3 in 2026.

6.5.20 No changes in $PM_{2.5}$ concentrations have been predicted in 2021 and 2026.

6.5.21 It is predicted that all receptors will experience *negligible* impacts due to the operation of the proposed development.

Table 6.9 Predicted NO_2 concentrations (µg/m^3) and impact descriptors (2021)

ID	Receptor	Base 2017	DM 2021	DS 2021	Change	Impact descriptor
1	London Road north	24.0	19.2	19.3	0.1	Negligible
2	London Road centre	27.8	22.2	22.2	< 0.1	Negligible
3	London Road/Neunkirchen Way	33.2	26.3	26.4	0.1	Negligible
4	Neunkirchen Way	27.6	22.0	22.1	0.1	Negligible
5	Neunkirchen Way roundabout	29.4	23.4	23.5	0.1	Negligible
6	Wretchwick Way	23.2	18.7	18.7	< 0.1	Negligible
7	Wretchwick Way roundabout	22.8	18.1	18.2	0.1	Negligible
8	Charbidge Lane south	18.8	15.4	15.5	0.1	Negligible
9	Charbidge Lane north	18.0	14.8	14.9	0.1	Negligible
10	Gavray Drive/Mallards Way	17.7	14.9	15.0	0.1	Negligible
11	Wretchwick Way north	22.5	18.1	18.2	0.1	Negligible
12	Proposed residential north	18.0	14.9	14.9	0.0	Negligible
13	Proposed residential centre	17.9	14.9	14.9	0.0	Negligible
14	Proposed residential south	18.0	14.9	15.0	0.1	Negligible
15	4 Kestrel Way	24.3	19.5	19.6	< 0.1	Negligible
16	Wretchwick Way Farm	20.3	16.5	16.5	0.0	Negligible
17	Avocet Way	19.8	16.2	16.2	0.0	Negligible
18	The Bramblings	17.6	14.7	14.8	0.1	Negligible

Table 6.10 Predicted PM_{10} concentrations ($\mu g/m^3$) and impact descriptors (2021)

ID	Receptor	Base 2017	DM 2021	DS 2021	Change	Impact descriptor
1	London Road north	15.2	14.8	14.8	0.0	Negligible
2	London Road centre	15.9	15.5	15.5	0.0	Negligible
3	London Road/Neunkirchen Way	16.0	15.6	15.6	0.0	Negligible
4	Neunkirchen Way	15.4	15.0	15.0	0.0	Negligible
5	Neunkirchen Way roundabout	15.5	15.1	15.2	< 0.1	Negligible
6	Wretchwick Way	14.8	14.4	14.4	0.0	Negligible
7	Wretchwick Way roundabout	14.6	14.2	14.2	0.0	Negligible
8	Charbidge Lane south	14.0	13.6	13.6	0.0	Negligible
9	Charbidge Lane north	14.0	13.6	13.6	0.0	Negligible
10	Gavray Drive/Mallards Way	13.9	13.6	13.6	0.0	Negligible
11	Wretchwick Way north	14.7	14.3	14.3	0.0	Negligible
12	Proposed residential north	14.0	13.6	13.6	0.0	Negligible
13	Proposed residential centre	14.0	13.6	13.6	0.0	Negligible
14	Proposed residential south	14.0	13.6	13.6	0.0	Negligible
15	4 Kestrel Way	14.8	14.4	14.5	< 0.1	Negligible
16	Wretchwick Way Farm	14.2	13.9	13.9	0.0	Negligible
17	Avocet Way	14.2	13.8	13.8	0.0	Negligible
18	The Bramblings	13.9	13.5	13.6	< 0.1	Negligible

Table 6.11 Predicted $PM_{2.5}$ concentrations ($\mu g/m^3$) and impact descriptors (2021)

ID	Receptor	Base 2017	DM 2021	DS 2021	Change	Impact descriptor
1	London Road north	9.9	9.5	9.5	0.0	Negligible
2	London Road centre	10.3	9.9	9.9	0.0	Negligible
3	London Road/Neunkirchen Way	10.5	10.1	10.1	0.0	Negligible
4	Neunkirchen Way	10.1	9.7	9.8	< 0.1	Negligible
5	Neunkirchen Way roundabout	10.2	9.8	9.8	0.0	Negligible
6	Wretchwick Way	9.8	9.4	9.4	0.0	Negligible
7	Wretchwick Way roundabout	9.7	9.3	9.3	0.0	Negligible
8	Charbidge Lane south	9.3	9.0	9.0	0.0	Negligible
9	Charbidge Lane north	9.5	9.1	9.1	0.0	Negligible
10	Gavray Drive/Mallards Way	9.4	9.1	9.1	0.0	Negligible
11	Wretchwick Way north	9.7	9.3	9.3	0.0	Negligible
12	Proposed residential north	9.4	9.1	9.1	0.0	Negligible
13	Proposed residential centre	9.4	9.1	9.1	0.0	Negligible
14	Proposed residential south	9.5	9.1	9.1	0.0	Negligible
15	4 Kestrel Way	9.8	9.4	9.4	0.0	Negligible
16	Wretchwick Way Farm	9.5	9.1	9.1	0.0	Negligible
17	Avocet Way	9.4	9.1	9.1	0.0	Negligible
18	The Bramblings	9.4	9.0	9.0	0.0	Negligible

Table 6.12 Predicted NO_2 concentrations (µg/m^3) and impact descriptors (2026)

ID	Receptor	DM 2026	DS 2026	Change	Impact descriptor
1	London Road north	15.1	15.1	0.0	Negligible
2	London Road centre	16.8	16.8	0.0	Negligible
3	London Road/Neunkirchen Way	19.0	19.1	0.1	Negligible
4	Neunkirchen Way	16.2	16.3	< 0.1	Negligible
5	Neunkirchen Way roundabout	16.9	16.9	0.0	Negligible
6	Wretchwick Way	14.2	14.2	0.0	Negligible
7	Wretchwick Way roundabout	14.4	14.5	0.1	Negligible
8	Charbidge Lane south	12.8	12.9	0.1	Negligible
9	Charbidge Lane north	12.5	12.5	< 0.1	Negligible
10	Gavray Drive/Mallards Way	12.5	12.5	< 0.1	Negligible
11	Wretchwick Way north	14.1	14.2	< 0.1	Negligible
12	Proposed residential north	12.6	12.6	0.0	Negligible
13	Proposed residential centre	12.6	12.6	0.0	Negligible
14	Proposed residential south	12.5	12.5	0.0	Negligible
15	4 Kestrel Way	14.9	14.9	0.0	Negligible
16	Wretchwick Way Farm	13.1	13.1	0.0	Negligible
17	Avocet Way	13.1	13.1	0.0	Negligible
18	The Bramblings	12.4	12.4	0.0	Negligible

Table 6.13 Predicted PM_{10} concentrations ($\mu g/m^3$) and impact descriptors (2026)

ID	Receptor	DM 2026	DS 2026	Change	Impact descriptor
1	London Road north	14.6	14.6	0.0	Negligible
2	London Road centre	15.3	15.3	0.0	Negligible
3	London Road/Neunkirchen Way	15.3	15.3	0.0	Negligible
4	Neunkirchen Way	14.6	14.6	0.0	Negligible
5	Neunkirchen Way roundabout	14.7	14.7	0.0	Negligible
6	Wretchwick Way	14.0	14.0	0.0	Negligible
7	Wretchwick Way roundabout	14.0	14.0	0.0	Negligible
8	Charbidge Lane south	13.5	13.5	0.0	Negligible
9	Charbidge Lane north	13.4	13.5	< 0.1	Negligible
10	Gavray Drive/Mallards Way	13.4	13.5	< 0.1	Negligible
11	Wretchwick Way north	14.0	14.0	0.0	Negligible
12	Proposed residential north	13.5	13.5	0.0	Negligible
13	Proposed residential centre	13.5	13.5	0.0	Negligible
14	Proposed residential south	13.4	13.5	< 0.1	Negligible
15	4 Kestrel Way	14.1	14.1	0.0	Negligible
16	Wretchwick Way Farm	13.6	13.6	0.0	Negligible
17	Avocet Way	13.6	13.6	0.0	Negligible
18	The Bramblings	13.4	13.4	0.0	Negligible

Table 6.14 Predicted $PM_{2.5}$ concentrations (µg/m^3) and impact descriptors (2026)

ID	Receptor	DM 2026	DS 2026	Change	Impact descriptor
1	London Road north	9.3	9.3	0.0	Negligible
2	London Road centre	9.7	9.7	0.0	Negligible
3	London Road/Neunkirchen Way	9.8	9.8	0.0	Negligible
4	Neunkirchen Way	9.4	9.4	0.0	Negligible
5	Neunkirchen Way roundabout	9.5	9.5	0.0	Negligible
6	Wretchwick Way	9.1	9.1	0.0	Negligible
7	Wretchwick Way roundabout	9.1	9.1	0.0	Negligible
8	Charbidge Lane south	8.8	8.8	0.0	Negligible
9	Charbidge Lane north	8.9	8.9	0.0	Negligible
10	Gavray Drive/Mallards Way	8.9	8.9	0.0	Negligible
11	Wretchwick Way north	9.1	9.1	0.0	Negligible
12	Proposed residential north	8.9	8.9	0.0	Negligible
13	Proposed residential centre	8.9	8.9	0.0	Negligible
14	Proposed residential south	8.9	8.9	0.0	Negligible
15	4 Kestrel Way	9.2	9.2	0.0	Negligible
16	Wretchwick Way Farm	8.9	8.9	0.0	Negligible
17	Avocet Way	8.9	8.9	0.0	Negligible
18	The Bramblings	8.9	8.9	0.0	Negligible

Railway Emissions

6.5.22 The proposed site is bounded by two railway lines, the Birmingham to Marylebone rail line (Chiltern Line) to the north and the Oxford to Bletchley rail line to the west. Stationary diesel locomotives can give rise to high levels of SO_2 close to the point of emission. Recent evidence suggests that moving diesel locomotives, in sufficient numbers, can also give rise to high NO_2 concentrations close to the track. Defra guidance LAQM.TG(16) provides a staged assessment methodology for determining potential air quality impacts associated with locomotive emissions. This has been considered separately for stationary and moving trains.

Stationary Locomotives

6.5.23 Defra guidance LAQM.TG(16) identifies any receptor within 15m of a location where locomotives are regularly stationary for 15-minute periods or longer as being at risk of exposure to exceedances of the air quality limit values for SO_2. Review of the rail track in the vicinity of the development indicated that the Bicester North station is located approximately 900m north-west of the development site. This is a distance of over 15m and as such, in accordance with the guidance presented within LAQM.TG(16) , any stationary locomotives present on the track closest to the site are not considered likely to cause exceedances of the air quality objective at this location. Potential air quality impacts associated with stationary trains at the development site are therefore predicted to be not significant.

Moving Locomotives

6.5.24 Defra has provided a list of rail routes with heavy traffic of diesel passenger trains which may result in elevated NO_2 concentrations in the vicinity of the line. Review of this information indicated that the Chiltern Line and Oxford to Bletchley rail lines have not been identified as requiring further consideration. As such, potential air quality impacts associated with moving locomotives near the Site are not predicted to be significant.

Assessment of significance

6.5.25 The impact descriptors for annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations as a result of the development are predicted to be negligible at all sensitive receptors in all assessment scenarios. Therefore, no significant effects to local air quality would be anticipated from the operation of the development.

6.6 MITIGATION MEASURES

Construction stage

6.6.1 The dust emitting activities assessed in section 6.5 can be greatly reduced or eliminated by applying the site specific mitigation measures for medium risk sites according to the IAQM guidance. The following measures from the guidance are relevant and should be included in the Construction Environmental Management Plan (CEMP) for the site. With effective mitigation implemented as part of the CEMP, effects associated with the construction phase are likely to be insignificant.

General

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan, which will include measures to control other emissions, approved by the local authority.

Site management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results and make an inspection log available to the local authority, when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Site maintenance

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.

- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on un-surfaced haul roads and work areas.
- Implement a Travel Plan than supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use the fine water sprays on such equipment wherever appropriate.
- Avoid scabbling (roughening of concrete surfaces) if possible.

Waste management

- Avoid bonfires and burning of waste materials.

Post-completion stage

6.6.2 As the proposed development does not result in any significant effects for local air quality no mitigation for the operational phase is required.

6.7 RESIDUAL EFFECTS

Construction stage

6.7.1 As indicated in section 6.5 the receiving environment is considered to be of medium sensitivity to potential dust impacts. Assuming the relevant mitigation measures outlined in section 6.6 are implemented, the residual significance of potential impacts from all dust generating activities is not significant at receptor locations.

Post-completion stage

6.7.2 The residual effects on air quality from the completed development are negligible and not significant.

Summary of effects

6.7.3 The effects identified in relation to local air quality are summarised in Table 6.15.

Table 6.15 Summary of effects

Potential effect	Significance (pre-mitigation)	Mitigation measure	Significance of residual effect
Construction stage			
Fugitive dust emissions from demolition, earthworks, and construction.	**Moderate adverse** *(based on a site with medium risk to dust impacts)*	Site specific mitigation measures for high risk sites according to the IAQM guidance as outlined in section 6.6	**Negligible**
Post-completion stage			
Effects on air quality from completed Development traffic	**Negligible**	None required	**Negligible**
Effects on air quality from railway emissions	**Negligible**	None required	**Negligible**

6.8 CUMULATIVE EFFECTS

Construction stage

6.8.1 Should the construction phase programmes of other committed developments in the vicinity of the proposed development overlap then there is the potential for increases in dust impacts at sensitive locations. However, it is not anticipated these will be significant and the implementation of suitable mitigation options, as outlined within this chapter, should control impacts to an acceptable level.

Post-completion stage

6.8.2 Dispersion modelling was undertaken with the inputs described in Section 6.2. The assessment scenarios for the cumulative assessment are the following:

- 2021 and 2026 DM scenarios without the proposed development, including traffic growth, committed and cumulative developments; and
- 2021 and 2026 DS scenarios including traffic growth, committed and cumulative developments, the proposed development and Gavray Drive East.

6.8.3 The change in concentrations between the DM and DS scenarios has been calculated in order to assess the cumulative impact of the proposed development to local air quality.

Predicted NO_2 concentrations

6.5.26 Table 6.16 and Table 6.19 present the forecast NO_2 concentrations for the assessed receptors for each assessment scenario for 2021 and 2026 respectively. It can be observed that annual mean NO_2 concentrations are predicted to be well below the air quality objective at all sensitive receptors. The highest concentration has been predicted at receptor 3 at the junction of London Road and Neunkirchen Way with 26.5µg/m^3 in 2021 and 19.1µg/m^3 in 2026.

6.5.27 The largest change in NO_2 concentrations in 2021 was 0.2µg/m^3 which has been forecast at six receptors across the study area. The largest change in NO_2 concentrations in 2026 was 0.1µg/m^3 which has been forecast at five receptors across the study area.

6.5.28 It is anticipated that all receptors will experience *negligible* impacts as a result of the operation of the proposed development and Gavray Drive East.

Predicted PM_{10} concentrations

6.5.29 Table 6.17 and Table 6.20 present the forecast PM_{10} concentrations for the assessed receptors for each assessment scenario for 2021 and 2026 respectively. It can be observed that annual mean PM_{10} concentrations are predicted to be well below the

air quality objective at all sensitive receptors. The highest concentration has been predicted at receptor 3 at the junction of London Road and Neunkirchen Way with 15.7µg/m^3 in 2021 and 15.3µg/m^3 in 2026.

6.5.30 Changes in PM_{10} concentrations have been predicted to be less than 0.1µg/m^3 in both 2021 and 2026.

6.5.31 It is anticipated that all receptors will experience *negligible* impacts as a result of the operation of the proposed development and Gavray Drive East.

Predicted $PM_{2.5}$ concentrations

6.5.32 Table 6.18 and Table 6.21 present the forecast $PM_{2.5}$ concentrations for the assessed receptors for each assessment scenario for 2021 and 2026 respectively. It can be observed that annual mean $PM_{2.5}$ concentrations are predicted to be well below the air quality objective at all sensitive receptors. The highest concentration has been predicted at receptor 3 at the junction of London Road and Neunkirchen Way with 10.1µg/m^3 in 2021 and with 9.8µg/m^3 in 2026.

6.5.33 Changes in $PM_{2.5}$ concentrations have been predicted to be less than 0.1µg/m^3 in 2021. No changes in $PM_{2.5}$ concentrations have been predicted in 2026.

6.5.34 It is anticipated that all receptors will experience *negligible* impacts as a result of the operation of the proposed development and Gavray Drive East.

Table 6.16 Predicted NO_2 concentrations (µg/m^3) and impact descriptors for cumulative assessment (2021)

ID	Receptor	DM 2021	DS 2021	Change	Impact descriptor
1	London Road north	19.2	19.3	0.1	Negligible
2	London Road centre	22.2	22.3	< 0.2	Negligible
3	London Road/Neunkirchen Way	26.3	26.5	0.2	Negligible
4	Neunkirchen Way	22.0	22.1	0.1	Negligible
5	Neunkirchen Way roundabout	23.4	23.6	0.2	Negligible
6	Wretchwick Way	18.7	18.8	0.1	Negligible
7	Wretchwick Way roundabout	18.1	18.3	0.2	Negligible
8	Charbidge Lane south	15.4	15.5	< 0.2	Negligible
9	Charbidge Lane north	14.8	15.0	0.2	Negligible
10	Gavray Drive/Mallards Way	14.9	15.1	0.2	Negligible
11	Wretchwick Way north	18.1	18.2	0.1	Negligible
12	Proposed residential north	14.9	14.9	0.0	Negligible
13	Proposed residential centre	14.9	14.9	< 0.1	Negligible
14	Proposed residential south	14.9	15.1	0.2	Negligible
15	4 Kestrel Way	19.5	19.6	0.1	Negligible
16	Wretchwick Way Farm	16.5	16.5	< 0.1	Negligible
17	Avocet Way	16.2	16.2	0.0	Negligible
18	The Bramblings	14.7	14.9	< 0.2	Negligible

Table 6.17 Predicted PM_{10} concentrations ($\mu g/m^3$) and impact descriptors for cumulative assessment (2021)

ID	Receptor	DM 2021	DS 2021	Change	Impact descriptor
1	London Road north	14.8	14.8	0.0	Negligible
2	London Road centre	15.5	15.6	< 0.1	Negligible
3	London Road/Neunkirchen Way	15.6	15.7	< 0.1	Negligible
4	Neunkirchen Way	15.0	15.1	< 0.1	Negligible
5	Neunkirchen Way roundabout	15.1	15.2	< 0.1	Negligible
6	Wretchwick Way	14.4	14.4	0.0	Negligible
7	Wretchwick Way roundabout	14.2	14.2	0.0	Negligible
8	Charbidge Lane south	13.6	13.7	< 0.1	Negligible
9	Charbidge Lane north	13.6	13.6	0.0	Negligible
10	Gavray Drive/Mallards Way	13.6	13.6	0.0	Negligible
11	Wretchwick Way north	14.3	14.3	0.0	Negligible
12	Proposed residential north	13.6	13.6	0.0	Negligible
13	Proposed residential centre	13.6	13.6	0.0	Negligible
14	Proposed residential south	13.6	13.6	0.0	Negligible
15	4 Kestrel Way	14.4	14.5	< 0.1	Negligible
16	Wretchwick Way Farm	13.9	13.9	0.0	Negligible
17	Avocet Way	13.8	13.8	0.0	Negligible
18	The Bramblings	13.5	13.6	< 0.1	Negligible

Table 6.18 Predicted $PM_{2.5}$ concentrations ($\mu g/m^3$) and impact descriptors for cumulative assessment (2021)

ID	Receptor	DM 2021	DS 2021	Change	Impact descriptor
1	London Road north	9.5	9.5	0.0	Negligible
2	London Road centre	9.9	9.9	0.0	Negligible
3	London Road/Neunkirchen Way	10.1	10.1	0.0	Negligible
4	Neunkirchen Way	9.7	9.8	< 0.1	Negligible
5	Neunkirchen Way roundabout	9.8	9.8	0.0	Negligible
6	Wretchwick Way	9.4	9.4	0.0	Negligible
7	Wretchwick Way roundabout	9.3	9.3	0.0	Negligible
8	Charbidge Lane south	9.0	9.0	0.0	Negligible
9	Charbidge Lane north	9.1	9.1	0.0	Negligible
10	Gavray Drive/Mallards Way	9.1	9.1	0.0	Negligible
11	Wretchwick Way north	9.3	9.3	0.0	Negligible
12	Proposed residential north	9.1	9.1	0.0	Negligible
13	Proposed residential centre	9.1	9.1	0.0	Negligible
14	Proposed residential south	9.1	9.1	0.0	Negligible
15	4 Kestrel Way	9.4	9.4	0.0	Negligible
16	Wretchwick Way Farm	9.1	9.1	0.0	Negligible
17	Avocet Way	9.1	9.1	0.0	Negligible
18	The Bramblings	9.0	9.1	< 0.1	Negligible

Table 6.19 Predicted NO_2 concentrations (µg/m^3) and impact descriptors for cumulative assessment (2026)

ID	Receptor	DM 2026	DS 2026	Change	Impact descriptor
1	London Road north	15.1	15.1	0.0	Negligible
2	London Road centre	16.8	16.8	0.0	Negligible
3	London Road/Neunkirchen Way	19.0	19.1	0.1	Negligible
4	Neunkirchen Way	16.2	16.3	0.1	Negligible
5	Neunkirchen Way roundabout	16.9	16.9	< 0.1	Negligible
6	Wretchwick Way	14.2	14.2	< 0.1	Negligible
7	Wretchwick Way roundabout	14.4	14.5	0.1	Negligible
8	Charbidge Lane south	12.8	12.9	0.1	Negligible
9	Charbidge Lane north	12.5	12.5	< 0.1	Negligible
10	Gavray Drive/Mallards Way	12.5	12.6	0.1	Negligible
11	Wretchwick Way north	14.1	14.2	< 0.1	Negligible
12	Proposed residential north	12.6	12.6	0.0	Negligible
13	Proposed residential centre	12.6	12.6	0.0	Negligible
14	Proposed residential south	12.5	12.5	< 0.1	Negligible
15	4 Kestrel Way	14.9	14.9	0.0	Negligible
16	Wretchwick Way Farm	13.1	13.2	< 0.1	Negligible
17	Avocet Way	13.1	13.1	0.0	Negligible
18	The Bramblings	12.4	12.4	< 0.1	Negligible

Table 6.20 Predicted PM_{10} concentrations (µg/m^3) and impact descriptors for cumulative assessment (2026)

ID	Receptor	DM 2026	DS 2026	Change	Impact descriptor
1	London Road north	14.6	14.6	0.0	Negligible
2	London Road centre	15.3	15.3	0.0	Negligible
3	London Road/Neunkirchen Way	15.3	15.3	0.0	Negligible
4	Neunkirchen Way	14.6	14.7	< 0.1	Negligible
5	Neunkirchen Way roundabout	14.7	14.7	0.0	Negligible
6	Wretchwick Way	14.0	14.0	0.0	Negligible
7	Wretchwick Way roundabout	14.0	14.0	0.0	Negligible
8	Charbidge Lane south	13.5	13.5	0.0	Negligible
9	Charbidge Lane north	13.4	13.5	< 0.1	Negligible
10	Gavray Drive/Mallards Way	13.4	13.5	< 0.1	Negligible
11	Wretchwick Way north	14.0	14.0	0.0	Negligible
12	Proposed residential north	13.5	13.5	0.0	Negligible
13	Proposed residential centre	13.5	13.5	0.0	Negligible
14	Proposed residential south	13.4	13.5	< 0.1	Negligible
15	4 Kestrel Way	14.1	14.1	0.0	Negligible
16	Wretchwick Way Farm	13.6	13.6	0.0	Negligible
17	Avocet Way	13.6	13.6	0.0	Negligible
18	The Bramblings	13.4	13.4	0.0	Negligible

Table 6.21 Predicted $PM_{2.5}$ concentrations ($\mu g/m^3$) and impact descriptors for cumulative assessment (2026)

ID	Receptor	DM 2026	DS 2026	Change	Impact descriptor
1	London Road north	9.3	9.3	0.0	Negligible
2	London Road centre	9.7	9.7	0.0	Negligible
3	London Road/Neunkirchen Way	9.8	9.8	0.0	Negligible
4	Neunkirchen Way	9.4	9.4	0.0	Negligible
5	Neunkirchen Way roundabout	9.5	9.5	0.0	Negligible
6	Wretchwick Way	9.1	9.1	0.0	Negligible
7	Wretchwick Way roundabout	9.1	9.1	0.0	Negligible
8	Charbidge Lane south	8.8	8.8	0.0	Negligible
9	Charbidge Lane north	8.9	8.9	0.0	Negligible
10	Gavray Drive/Mallards Way	8.9	8.9	0.0	Negligible
11	Wretchwick Way north	9.1	9.1	0.0	Negligible
12	Proposed residential north	8.9	8.9	0.0	Negligible
13	Proposed residential centre	8.9	8.9	0.0	Negligible
14	Proposed residential south	8.9	8.9	0.0	Negligible
15	4 Kestrel Way	9.2	9.2	0.0	Negligible
16	Wretchwick Way Farm	8.9	8.9	0.0	Negligible
17	Avocet Way	8.9	8.9	0.0	Negligible
18	The Bramblings	8.9	8.9	0.0	Negligible

APPENIDX 6.1 CONSTRUCTION ASSESSMENT METHODOLOGY

Table A6.1 Categorisation of dust emission magnitude

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
• total building volume <20,000m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <10m above ground • demolition during wetter months	• total building volume 20,000 - 50,000m^3 • potentially dusty construction material • demolition activities 10 - 20m above ground level	• total building volume >50,000m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >20m above ground level
Earthworks		
• total site area <2,500m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <4m in height • total material moved <10,000 tonnes • earthworks during wetter months	• total site area 2,500m^2 - 10,000m^2 • moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • formation of bunds 4 - 8m in height • total material moved 20,000 - 100,000 tonnes	• total site area >10,000m^2 • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • formation of bunds >8m in height • total material moved >100,000 tonnes
Construction		
• total building volume <25,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)	• total building volume 25,000 - 100,000m^3 • potentially dusty construction material (e.g. concrete) • on-site concrete batching	• total building volume >100,000m^3 • on-site concrete batching • sandblasting
Trackout		
• <10 HDV (>3.5t) outward movements in any one day • surface material with low potential for dust release • unpaved road length <50m	• 10 – 50 HDV (>3.5t) outward movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50 – 100m;	• >50 HDV (>3.5t) outward movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m

Table A6.2 Sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	**< 50**	**< 100**	**< 350**
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table A6.3 Sensitivity of the area to human health impacts

Background PM_{10} concentrations (annual mean)	Number of receptors	Distance from the source (m)				
		< 20	< 50	< 100	< 200	< 350
High receptor sensitivity						
> 32µg/m^3	> 100	High	High	High	Medium	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
28 – 32µg/m^3	> 100	High	High	Medium	Low	Low
	10 – 100		Medium	Low		
	< 10					
24 – 28µg/m^3	> 100	High	Medium	Low	Low	Low
	10 – 100					
	< 10	Medium	Low			
< 24µg/m^3	> 100	Medium	Low	Low	Low	Low
	10 – 100	Low				
	< 10					
Medium receptor sensitivity						
–	> 10	High	Medium	Low	Low	Low
	< 10	Medium	Low			
Low receptor sensitivity						
–	> 1	Low	Low	Low	Low	Low

Table A6.4 Sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	< 20	< 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table A6.5 Risk of dust impacts

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible

Sensitivity of area	Dust emission magnitude		
	Large	**Medium**	**Small**
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible

APPENDIX 6.2 TRAFFIC DATA

Table A6.6 Baseline 2017 traffic data

Road		Direction	AADT	%HGV	Speed (kph)
1	Gavray Drive East of Mallards Way	N'bound	-	-	49
		S'bound	-	-	49
		TOTAL	-	-	49
2	Mallards Way	N'bound	-	-	32
		S'bound	-	-	32
		TOTAL	-	-	32
3	Gavray Drive West of Mallards Way	N'bound	-	-	49
		S'bound	-	-	49
		TOTAL	-	-	49
4	Gavray Drive west of A4421	N'bound	562	6%	49
		S'bound	480	5%	49
		TOTAL	1,042	6%	49
5	A4421 North of Gavray Drive	N'bound	7,535	10%	63
		S'bound	6,143	10%	63
		TOTAL	13,678	10%	63
6	Wretchwick Avenue	N'bound	-	-	48
		S'bound	-	-	48
		TOTAL	-	-	48
7	A4421 South of Gavray Drive	N'bound	6,625	10%	80
		S'bound	5,557	13%	80
		TOTAL	12,182	12%	80
8	A4421 North of Peregrine Way (N)	N'bound	6,628	8%	80
		S'bound	5,740	9%	80
		TOTAL	12,368	9%	80

Road		Direction	AADT	%HGV	Speed (kph)
9	A4421 South of Peregrine Way (N)	N'bound	6,511	8%	78
		S'bound	4,958	9%	78
		TOTAL	11,469	9%	78
10	Peregrine Way (N)	N'bound	1,602	1%	48
		S'bound	2,365	0%	48
		TOTAL	3,966	1%	48
11	A4421 North of Peregrine Way (S)	N'bound	6,509	8%	76
		S'bound	4,966	9%	76
		TOTAL	11,475	9%	76
12	A4421 South of Peregrine Way (S)	N'bound	7,275	8%	61
		S'bound	6,473	9%	61
		TOTAL	13,748	9%	61
13	Peregrine Way (S)	N'bound	3,273	0%	48
		S'bound	4,100	0%	48
		TOTAL	7,373	0%	48
14	London Road (N)	N'bound	3,679	5%	61
		S'bound	4,028	6%	62
		TOTAL	7,707	6%	61
15	A4421 E	E'bound	7,887	8%	59
		W'bound	5,755	9%	61
		TOTAL	13,642	9%	61
16	A41 South	N'bound	12,296	7%	97
		S'bound	13,123	6%	97
		TOTAL	25,419	7%	97
17	Gravenhill Road	E'bound	5,019	-	32
		W'bound	3,418	-	32
		TOTAL	8,437	-	32

Road		Direction	AADT	%HGV	Speed (kph)
18	A41 North	N'bound	15,113	8%	66
		S'bound	14,837	9%	69
		TOTAL	29,949	9%	66

Table A6.7 Traffic data for DM and DS scenarios

Road		Direction	DM 2021		DS 2021		DM 2026		DS 2026	
			AADT	% HGV	AADT	% HGV	AADT	% HGV	AADT	% HGV
1	Gavray Drive East of Mallards Way	N'bound	622	0%	772	0%	752	0%	886	0%
		S'bound	786	0%	981	0%	944	0%	1,094	0%
		TOTAL	1,408	0%	1,753	0%	1,697	0%	1,981	0%
2	Mallards Way	N'bound	576	0%	726	0%	739	0%	840	0%
		S'bound	749	0%	944	0%	1,078	0%	1,057	0%
		TOTAL	1,325	0%	1,670	0%	1,817	0%	1,898	0%
3	Gavray Drive West of Mallards Way	N'bound	862	0%	862	0%	1,464	0%	862	0%
		S'bound	836	0%	836	0%	1,288	0%	836	0%
		TOTAL	1,698	0%	1,698	0%	2,751	0%	1,698	0%
4	Gavray Drive west of A4421	N'bound	614	6%	939	6%	1,330	6%	1,128	6%
		S'bound	524	5%	866	5%	1,114	5%	1,125	5%
		TOTAL	1,138	6%	1,805	6%	2,444	6%	2,253	6%
5	A4421 North of Gavray Drive	N'bound	8,229	10%	8,437	10%	11,892	10%	8,559	10%
		S'bound	6,709	10%	6,927	10%	12,165	10%	7,092	10%
		TOTAL	14,938	10%	15,365	10%	24,057	10%	15,651	10%
6	Wretchwick Avenue	N'bound	1,348	3%	1,348	3%	9,344	1%	1,348	3%
		S'bound	1,386	2%	1,386	2%	7,436	2%	1,386	2%
		TOTAL	2,734	2%	2,734	2%	16,780	2%	2,734	2%
7	A4421 South of Gavray Drive	N'bound	7,235	10%	7,359	10%	5,952	10%	7,453	10%
		S'bound	6,069	13%	6,185	13%	4,925	13%	6,253	13%

Road		Direction	DM 2021		DS 2021		DM 2026		DS 2026	
			AADT	% HGV	AADT	% HGV	AADT	% HGV	AADT	% HGV
		TOTAL	13,304	12%	13,545	12%	10,877	12%	13,706	12%
8	A4421 North of Peregrine Way (N)	N'bound	7,239	8%	7,363	8%	5,955	8%	7,457	8%
		S'bound	6,268	9%	6,385	9%	5,044	9%	6,452	9%
		TOTAL	13,507	9%	13,748	9%	11,000	9%	13,909	9%
9	A4421 South of Peregrine Way (N)	N'bound	7,111	8%	7,221	8%	5,740	8%	7,305	8%
		S'bound	5,414	9%	5,512	9%	3,970	9%	5,569	9%
		TOTAL	12,525	9%	12,733	9%	9,710	9%	12,873	9%
10	Peregrine Way (N)	N'bound	1,749	1%	1,777	1%	1,822	1%	1,749	1%
		S'bound	2,583	0%	2,601	0%	2,844	0%	2,612	0%
		TOTAL	4,332	0%	4,378	0%	4,666	0%	4,361	0%
11	A4421 North of Peregrine Way (S)	N'bound	7,108	8%	7,219	8%	5,738	8%	7,302	8%
		S'bound	5,423	9%	5,515	9%	3,970	9%	5,568	9%
		TOTAL	12,532	9%	12,734	9%	9,708	9%	12,871	9%
12	A4421 South of Peregrine Way (S)	N'bound	7,946	8%	8,051	8%	6,531	8%	8,130	8%
		S'bound	7,069	9%	7,160	9%	5,773	9%	7,214	9%
		TOTAL	15,014	9%	15,211	9%	12,304	9%	15,344	9%
13	Peregrine Way (S)	N'bound	3,574	0%	3,584	0%	3,496	0%	3,592	0%
		S'bound	4,478	0%	4,478	0%	4,654	0%	4,478	0%
		TOTAL	8,052	0%	8,063	0%	8,150	0%	8,070	0%
14	London Road (N)	N'bound	4,018	5%	4,118	5%	2,708	5%	4,194	5%
		S'bound	4,399	6%	4,517	6%	3,472	6%	4,586	6%
		TOTAL	8,416	6%	8,635	6%	6,180	6%	8,779	6%
15	A4421 E	E'bound	8,614	8%	8,711	8%	7,096	8%	8,785	8%
		W'bound	6,285	9%	6,376	9%	5,182	9%	6,430	9%
		TOTAL	14,899	9%	15,088	9%	12,278	9%	15,215	9%
1	A41 South	N'bound	13,428	7%	13,555	7%	12,534	7%	13,651	7%

Road		Direction	DM 2021		DS 2021		DM 2026		DS 2026	
			AADT	% HGV	AADT	% HGV	AADT	% HGV	AADT	% HGV
6		S'bound	14,332	6%	14,458	6%	10,801	6%	14,532	6%
		TOTAL	27,760	7%	28,013	7%	23,334	7%	28,183	7%
17	Gravenhill Road	E'bound	5,481	5%	5,491	5%	5,447	5%	5,499	5%
		W'bound	3,733	3%	3,746	3%	6,716	3%	3,753	3%
		TOTAL	9,214	4%	9,237	4%	12,163	4%	9,252	4%
18	A41 North	N'bound	16,505	8%	16,582	8%	19,199	8%	16,627	8%
		S'bound	16,203	9%	16,279	9%	18,014	9%	16,337	9%
		TOTAL	32,708	9%	32,861	9%	37,213	9%	32,964	9%

Table A6.8 Traffic data for DS cumulative scenarios

Road		Direction	DS 2021		DS 2026	
			AADT	% HGV	AADT	% HGV
1	Gavray Drive East of Mallards Way	N'bound	839	0%	904	0%
		S'bound	1,051	0%	1,113	0%
		TOTAL	1,890	0%	2,017	0%
2	Mallards Way	N'bound	826	0%	891	0%
		S'bound	1,185	0%	1,247	0%
		TOTAL	2,011	0%	2,138	0%
3	Gavray Drive West of Mallards Way	N'bound	1,464	0%	1,464	0%
		S'bound	1,288	0%	1,288	0%
		TOTAL	2,751	0%	2,751	0%
4	Gavray Drive west of A4421	N'bound	1,641	6%	1,822	6%
		S'bound	1,429	5%	1,667	5%
		TOTAL	3,071	6%	3,490	6%
5	A4421 North of Gavray Drive	N'bound	12,106	10%	12,230	10%
		S'bound	12,393	10%	12,566	10%

Road		Direction	DS 2021		DS 2026	
			AADT	% HGV	AADT	% HGV
		TOTAL	24,499	10%	24,796	10%
6	Wretchwick Avenue	N'bound	9,436	1%	9,446	1%
		S'bound	7,537	2%	7,596	2%
		TOTAL	16,973	2%	17,042	2%
7	A4421 South of Gavray Drive	N'bound	6,038	10%	6,103	10%
		S'bound	5,023	13%	5,080	13%
		TOTAL	11,061	12%	11,183	12%
8	A4421 North of Peregrine Way (N)	N'bound	6,042	8%	6,107	8%
		S'bound	5,142	9%	5,199	9%
		TOTAL	11,184	9%	11,306	9%
9	A4421 South of Peregrine Way (N)	N'bound	5,829	8%	5,892	8%
		S'bound	4,052	9%	4,100	9%
		TOTAL	9,881	9%	9,992	9%
10	Peregrine Way (N)	N'bound	1,822	1%	1,822	1%
		S'bound	2,859	0%	2,868	0%
		TOTAL	4,666	0%	4,690	0%
11	A4421 North of Peregrine Way (S)	N'bound	5,824	8%	5,889	8%
		S'bound	4,053	9%	4,101	9%
		TOTAL	9,876	9%	9,990	9%
12	A4421 South of Peregrine Way (S)	N'bound	6,612	8%	6,673	8%
		S'bound	5,856	9%	5,903	9%
		TOTAL	12,467	9%	12,577	9%
13	Peregrine Way (S)	N'bound	3,506	0%	3,513	0%
		S'bound	4,654	0%	4,654	0%
		TOTAL	8,160	0%	8,167	0%
14	London Road (N)	N'bound	2,770	5%	2,817	5%

Road		Direction	DS 2021		DS 2026	
			AADT	% HGV	AADT	% HGV
		S'bound	3,546	6%	3,589	6%
		TOTAL	6,316	6%	6,405	6%
15	A4421 E	E'bound	7,157	8%	7,204	8%
		W'bound	5,259	9%	5,303	9%
		TOTAL	12,416	9%	12,507	9%
16	A41 South	N'bound	12,674	7%	12,780	7%
		S'bound	10,942	6%	11,024	6%
		TOTAL	23,616	7%	23,804	7%
17	Gravenhill Road	E'bound	5,457	5%	5,465	5%
		W'bound	6,735	3%	6,746	3%
		TOTAL	12,192	4%	12,210	4%
18	A41 North	N'bound	19,199	8%	19,199	8%
		S'bound	18,014	9%	18,014	9%
		TOTAL	37,213	9%	37,213	9%

Appendix C: Addendum to ES Chapter 7 Noise and Vibration

CONTENTS

5.1 INTRODUCTION

5.1.1 Ove Arup & Partners Limited (Arup) were commissioned by Gallagher Estates Limited to undertake the original Environmental Impact Assessment (EIA) of the likely significant effects on the environment from the noise arising from construction and operation of the proposed residential development at Gavray Drive (West site), Bicester. This assessment accompanied the outline planning application for the proposed residential development at Gavray Drive West in Bicester, Oxfordshire, submitted in 2015. Planning consent was subsequently refused in 2017, and Gallagher Estates have lodged an appeal against the refusal of planning permission. Given the timescales between the preparation of the original application and the current appeal, Arup have been commissioned to provide an Addendum to the Environmental Impact Assessment to update the original assessment where necessary.

5.1.2 This chapter therefore outlines the changes to the noise assessment that was presented in the original Environmental Statement (ES) that was submitted with the planning application in 2015. Aspects of the assessment that have not changed since the issue of the original planning application are not discussed in this Addendum. For details of aspects of the assessment not referred to in this Addendum, reference should be made to the original ES.

5.2 ASSESSMENT METHODOLOGY

5.2.1 The assessment methodology adopted for this Addendum is the same as that outlined in the original ES.

Consultation

5.2.2 Mr Trevor Dixon, Environmental Protection Manager at Cherwell District Council, was consulted in February 2018 with regard to any updates required to the noise baseline reported in the ES. The following advice was provided:

'Now that the Bicester Chord is in place and operational a further noise survey will be required as part of the update to the noise assessment in order to measure and confirm the current baseline noise levels at the site. The assessment will also need to consider the impact of additional train movements on the line when Phase 2 of the EWR development, upgrading the line to Milton Keynes and Cambridge, becomes operational.

There are also industrial units on the other side of the line that will need to be considered in the assessment.'

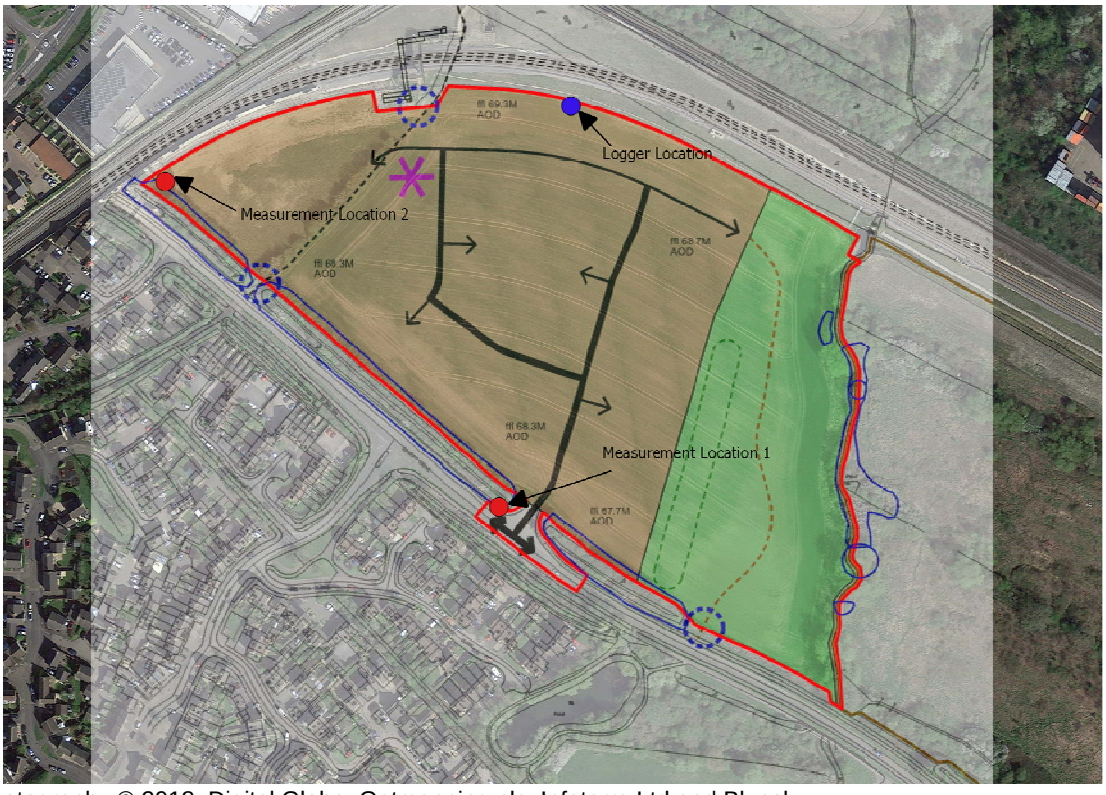
5.2.3 The updated assessment presented assessment has therefore been produced with consideration of the above consultation.

5.3 RELEVANT POLICY

5.3.1 The relevant policy and guidance documents referenced in the original ES remain current.

5.4 BASELINE CONDITIONS

5.4.1 In order to update the baseline information, as requested by Cherwell District Council, a baseline noise survey was carried out at the proposed development site on the 5th and 6th March 2018. Attended measurements were taken at two locations along the south west site boundary (adjacent to Gavray Drive) during representative periods of both the day and night. In addition, unattended measurements were taken using a logging sound level meter at a location along the north site boundary (adjacent to the new railway line) over a period of 20 hours. The measurement locations are indicated in Figure 1 below.



Aerial photography © 2018, Digital Globe, Getmapping plc, Infoterra Ltd and Bluesky

Figure 1: Monitoring Locations (attended locations shown in red, unattended location shown in blue)

All measurements were taken with Class 1 noise monitoring equipment. The monitoring equipment was calibrated on-site at the start and end of the survey period using an acoustic calibrator, with no significant (> 0.5 dB) change in calibration observed. The noise monitoring equipment and acoustic calibrator had current laboratory calibrations for the survey period, and calibration certificates for the equipment used are available on request.

All monitoring equipment was fitted with a manufacturer supplied windshield for the duration of measurements. The attended monitoring results were obtained with a sound level meter mounted on a tripod at a height of approximately 1.5 m above local ground level. The unattended measurements were obtained with a logging sound level meter in an environmental enclosure. The microphone was mounted on a pole attached to the palisade fence adjacent to the railway line, at a height of approximately 2 m above the railway line.

Weather conditions during the survey were generally dry, however there was a period of light rain which started around 15:40 and finished at around 16:40 on the 5th March. Attended measurement were suspended during this period and logger measurements during this period were removed from the analysis to avoid the possibility of rainfall affecting the measured noise levels. Wind speeds during the survey period were low (typically less than 2 m/s) and of variable direction. Weather conditions are therefore not considered to have adversely affected the results of the noise survey.

Sources of noise that were audible during the survey included rail movements on the Bicester Chord and the other rail lines that run adjacent to the site, noise from road traffic on Gavray Drive and other more distant parts of the road network and noise from the industrial and retail units to both the north west and north east of the proposed development site.

The results of the baseline survey are summarised in the following tables:

Date / Time	**Measurement Location**	**$L_{Aeq,\ 15\ min}$ (dB)**	**$L_{A,max,\ 15\ min}$ (dB)**	**$L_{A90,\ 15\ min}$ (dB)**
15:07 05/03/2018	1	62	78	45
00:39 06/03/2019	1	39	61	34
01:19 06/03/2018	1	43	63	33

Date / Time	Measurement Location	$L_{Aeq, 15\ min}$ (dB)	$L_{A,max, 15\ min}$ (dB)	$L_{A90, 15\ min}$ (dB)
09:54 06/03/2018	1	61	78	40
10:33 06/03/2018	1	61	79	42
15:29 05/03/2018	2	50	63	46
00:19 06/03/2018	2	42	61	35
00:58 06/03/2018	2	48	68	34
01:39 06/03/2018	2	37	49	33
10:13 06/03/2018	2	53	68	40
10:53 06/03/2018	2	48	68	41

Table 1: Summary of Attended Measurements

Period	Descriptor	Maximum (dB(A))	Average[1] (dB(A))	Minimum (dB(A))
Day (07:00 - 23:00)	$L_{A,max}$	94	78	47
	L_{Aeq}	70	59	43
	L_{A90}	49	45	39
Night (23:00 - 07:00)	$L_{A,max}$	88	73	42
	L_{Aeq}	70	55	36
	L_{A90}	48	38	34

Table 2: Summary of unattended measurement results

The baseline measurements indicate that daytime noise levels at the boundary of the proposed development site are typically of the order of 60 dB L_{Aeq}, with typical night-time noise levels of up to 55 dB L_{Aeq}.

[1] Logarithmic average for L_{Aeq} and $L_{A,max}$, arithmetic average for L_{A90}

The measured daytime noise levels are consistent with the baseline noise levels that were estimated previously. The measured night-time noise levels are significantly lower than those estimated in the previous assessment (by approximately 8 to 11 dB), but are typically slightly higher than the baseline noise measurements referenced in the original ES assessment. This is as expected, with the presence of the new rail line. It should also be noted that the original ES assessment was based on the ERM predicted noise levels produced for the assessment of the Bicester Chord, which assumed the maximum rail movements for the Bicester Chord and for the EWR Phase 2B proposals. These rail movements are similar to those which were discussed in the East West Rail Western Section Phase 2 Draft Environmental Statement (June 2017). Based on the information currently available, there is therefore not likely to be any substantial change (i.e. more than 1 dB) in noise impacts from those identified in the original ES due to additional rail movements on the nearby rail lines.

As such, the conclusions of the assessment of the suitability of the site for residential development remain unchanged, specifically that the site is suitable for residential development, given the mitigation measures outlined in Appendix 5.3 of the original ES chapter.

5.5 POTENTIAL EFFECTS

Construction stage

5.5.1 No changes to the assessment methodology or assumptions described in the original ES have been made have been made with regard to the construction noise assessment, therefore the conclusion of the original ES, that construction noise impacts are **neutral / negligible** remain the same.

Post-completion stage – Road Traffic Noise

5.5.2 An assessment of the likely noise effects has been conducted by considering the difference between the ‘do something’ (DS) and ‘do minimum’ (DM) scenarios.

5.5.3 Two scenarios are considered for the assessment of operational road traffic noise:

- Proposed Development, the Gavray Drive development (west land parcel only)
- Sensitivity Development (both west and east land parcels)

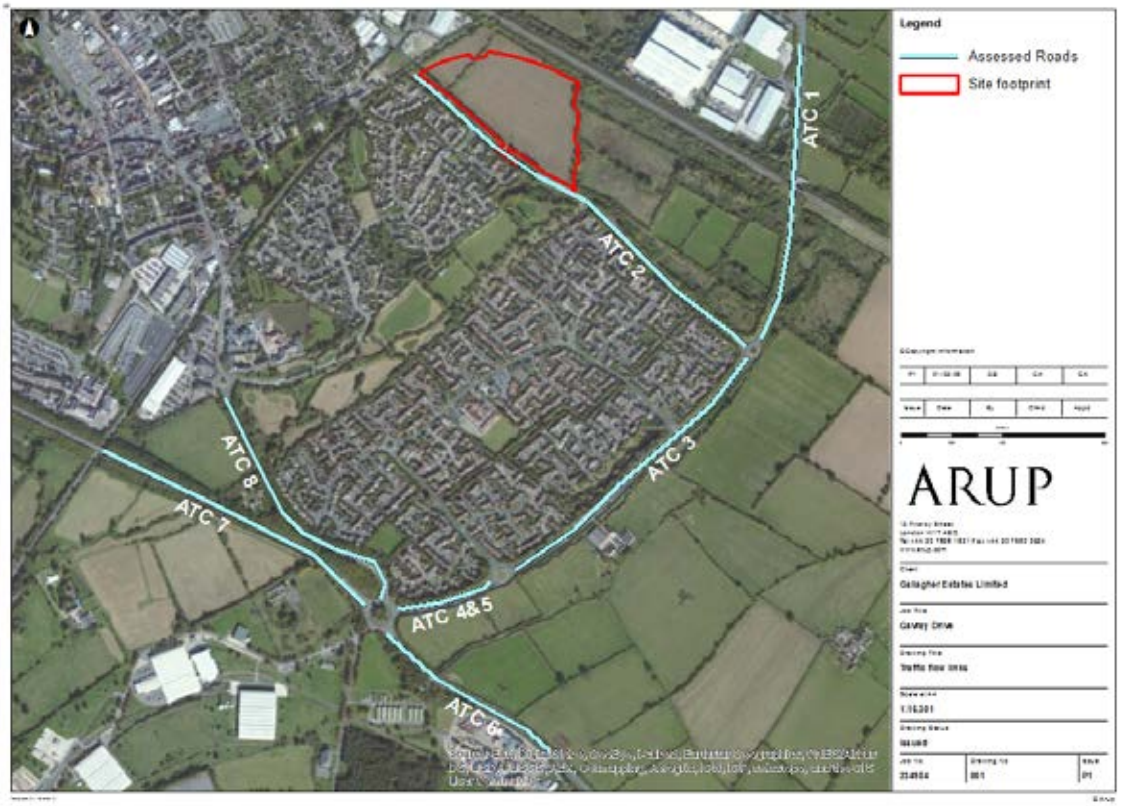


Figure 2: Summary of assessed roads for road traffic noise (BNL) predictions

5.5.4 Table 3 and Table 4 show the predicted basic noise level (BNL) relating to road traffic flows for the baseline 2018 (B) conditions as well as predicted 'do-minimum' 2021 (DM) and 'do something' (DS) scenarios. For each considered scenario.

Road link	Basic noise level $dBL_{A10,18h}$			
	B	DM	DS	DS - DM
ATC 1 Chabridge Ln	72.3	72.7	72.8	0.1
ATC 2 Gavray Drive	58.9	59.3	61.1	1.8
ATC 3 Wretchwrack Way	73.0	73.3	73.4	0.1
ATC 4&5 Neunkirchen Way	71.4	71.6	71.8	0.2
ATC 6 A41 (South)	73.8	74.2	74.3	0.0
ATC 7 A41 (North)	75.5	75.9	75.9	0.0
ATC 8 London Road	68.4	68.8	68.9	0.1

Table 3: **Summary of predicted road traffic noise impacts for Proposed Development**

Road link	Basic noise level $dBL_{A10,18h}$			
	B	DM	DS	DS - DM
ATC 1 Chabridge Ln	72.3	72.7	72.9	0.2
ATC 2 Gavray Drive	58.9	59.3	62.0	2.7
ATC 3 Wretchwrack Way	73.0	73.3	73.5	0.1

Road link	Basic noise level $dBL_{A10,18h}$			
	B	DM	DS	DS - DM
ATC 4&5 Neunkirchen Way	71.4	71.6	71.9	0.2
ATC 6 A41 (South)	73.8	74.2	74.3	0.1
ATC 7 A41 (North)	75.5	75.9	75.9	0.0
ATC 8 London Road	68.4	68.8	69.0	0.2

Table 4: Summary of predicted road traffic noise impacts for Sensitivity Development

5.5.5 For the future assessment year (2021) the majority of the nearby road network experiences a **neutral/negligible** noise increase (i.e. an increase of less than 1dB) as a result of the proposed development in all scenarios. The only exception is ATC 2 Gavray Drive, which experiences a **minor adverse** increase in noise of between 1.8dB and 2.7dB, as shown in Table 1 and Table 2 for the Proposed Development, and Sensitivity Development respectively. As such, there is no change from the noise impacts identified in the original ES.

5.6 MITIGATION MEASURES

5.6.1 Since none of the identified effects have changed from the original ES assessment, there are no proposed changes to mitigation proposals from than those set out in the ES.

5.7 RESIDUAL EFFECTS

5.6.2 Since none of the identified effects have changed from the original ES assessment, there are no changes to residual impacts from than those set out in the ES.

Summary of effects

5.7.3 The effects identified are summarised in Table 5 below:

Potential effect	Significance (pre-mitigation)	Mitigation measure	Significance of residual effect
Construction stage			
Noise from construction activity	Neutral/ Negligible	Use Best Practicable Means. Enforcement of noise control measures way of a CEMP. Hoarding use when close to sensitive receptors	Neutral/ Negligible
Post-completion stage			
Road traffic noise on wider road network	Neutral/ Negligible	None proposed	Neutral/ Negligible

Table 5 Summary of effects

5.8 CUMULATIVE EFFECTS

5.8.1 Since none of the identified effects have changed from the original ES assessment, there are no changes to predicted cumulative effects from than those set out in the ES.

Appendix D: Addendum to ES Chapter 9 Ecology and Biodiversity

9.1 INTRODUCTION

9.1.1 This chapter of the ES assesses the likely significant effects of the Proposed Development at Gavray Drive West, hereafter referred to as the 'Site', on important ecological features (designated sites, habitats and/or species populations). The original chapter was prepared in 2015 and has been updated during April 2018 to reflect any material changes in legislation, planning policy, methodology or ecological baseline for the Site in the intervening period.

9.1.2 The assessment includes a summary of the current ecological conditions found within and around the Site and identifies measures to avoid, minimise, mitigate and/or compensate, where appropriate, for significant effects that may arise as part of the Proposed Development. This chapter of the Environmental Statement has been produced by the Environmental Dimension Partnership Ltd (EDP).

9.1.3 The original chapter was prepared with reference to The Chartered Institute of Ecology and Environmental Management's (CIEEM) Ecological Impact Assessment Guidelines published in 2006. This updated chapter has been revised with reference to the second edition of the Guidelines published by CIEEM in January 2016. This chapter should be read in conjunction with the detailed Ecological Baseline prepared for the original chapter which is included as **Appendix 9.1**, and with the updates provided to that baseline as part of work carried out in 2018 (as documented in subsequent sections of this updated chapter)

9.2 ASSESSMENT METHODOLOGY

Scope

9.2.1 The scope of the original ecological impact assessment (EcIA) was determined by previous ecological investigations of the Site, as outlined in full within **Appendix 9.1**, and through pre-application consultation.

Extent of the Study Area

9.2.2 The original chapter was informed by detailed studies undertaken on the Site and on land to the immediate east (i.e. east of Langford Brook) (hereafter referred to as the wider 'Study Area' for the purposes of this Chapter), as illustrated on **Figure 9.1**. However, for some potential ecological features, desk studies, field surveys and the assessment of effects have extended beyond this Study Area to a wider potential zone of influence in accordance with the CIEEM Guidelines. The zone of influence has been determined through a review of the baseline ecological conditions and relative areas and resources that may be affected by the Proposed Development.

Data sources

9.2.2 The scope of consultation undertaken to date has included a formal EIA Scoping Report submitted to CDC in September 2014. The Scoping Report has been informed by a significant amount of consultation with respect to the Site since 2002. This process informed the identification of important ecological features pertinent to the Proposed Development, and the likely scope of potential effects on these features. Furthermore, consultation has informed the masterplan in terms of iterative design to accommodate avoidance, mitigation, compensation and enhancement measures.

Assessment approach

9.2.3 The ecology baseline collated during 2013 and 2014 was completed in line with the Scope of Works outlined within EDP's Scoping report and those matters arising from consultee responses including those received from Cherwell District Council, Natural England and Berkshire, Buckingham and Berkshire Wildlife Trust (BBOWT). The scope of works is summarised below and has been further supplemented by pertinent update work completed during 2018. The detailed methodologies employed to collate the ecology baseline which informed the original chapter are discussed in full in **Appendix 9.1** and are further supplemented by relevant update work completed during 2018.

Updated Desk Study

9.2.4 To inform the original chapter, an update ecological desk study was undertaken in June 2013. A search of the Multi-Agency Government Information Centre (MAGIC) website was undertaken to identify statutory designated sites of international value within 5km of the Study Area, and of national value within 2km. Sites of local importance and records of protected and notable species/habitat records were also requested from Thames Valley Environmental Records Centre (TVERC) within 2km, in addition to records for Annex II bat species records within 4km of the Study Area.

9.2.5 In addition to the above, butterfly records were also requested during 2013 from Butterfly Conservation (accessing both national and local (Thames Valley Branch) databases), for within 2km of the Study Area; records specific to Marsh Fritillary butterfly were requested for within a 15km radius of the Study Area.

9.2.6 A further update of the desk study was initiated during February 2018 to identify any additional records submitted to TVERC or Butterfly Conservation during the interim period. As of today's date, no additional records had been received from Butterfly Conservation. The methodology for the update desk study was identical to that completed during 2013, with exception to an increase in the search radius from 4km to 6km specific to Annex II bat species during the 2018 update desk study.

9.2.7 The search areas employed in completion of the desk study reflect the sensitivity and value of important ecological features associated with the Study Area. The search areas are considered sufficient to cover the potential zone of influence of the Proposed Development upon such features whilst providing contextual information to assist with determining and evaluating the ecological baseline.

Field Surveys

9.2.8 The ecological baseline for the original chapter was informed by a suite of 'Phase 2' ecological surveys completed across the Study Area, as detailed in full in **Appendix 9.1**. Those considered pertinent to the assessment of effects in respect of the Proposed Development of the Site, by virtue of their coverage and results, are listed below:

- Updated Extended Phase 1 Survey completed in June 2013;
- Updated bat activity surveys, including manual transect surveys undertaken between June to August 2013;

- Tree assessments for actual/potential bat roosting and barn owl nesting in June 2013;
- Wintering bird surveys undertaken monthly throughout October 2013 to March 2014;
- Breeding bird surveys comprising three visits completed during spring 2013;
- Updated badger survey completed in June 2013;
- Updated water vole and otter survey of Langford Brook undertaken in June 2013;
- Harvest mouse survey of suitable habitat to search for the presence of harvest mouse nests undertaken during November 2013;
- Updated great crested newt survey undertaken between mid-May to mid-June 2013;
- Updated reptile surveys undertaken between June and September 2013 (with an additional survey visit completed on 01 October 2013); and
- White-letter hairstreak surveys comprising eggs searches (November 2011; updated in February 2013), elm tree habitat suitability assessment (2011; updated in May 2013) and adult searches (late June 2013 and mid-end July 2013).

9.2.9 In addition, a full BS5837:2012 tree survey and arboricultural impact assessment was also undertaken by EDP. The methodology employed and the results are set out in detail in **Chapter 10 - Arboriculture** of the Environmental Statement.

9.2.10 The baseline collated for the original chapter was used to identify pertinent Valued Ecological Receptors (VERs; now termed Important Ecological Features (IEFs) for reasons detailed below) which were then subject to impact assessment. The update work completed during 2018 considered whether there were any likely material changes to these IEFs between the preparation of the original assessment and 2018. This consideration was made on the basis of an update desk study initiated during February 2018 and an update extended Phase 1 survey of the proposed development completed in March 2018.

9.2.11 The update extended Phase 1 survey was completed on the 07 March 2018 by an experienced ecologist with reference to the methodology for the survey completed in 2013 (as documented in **Appendix 9.1**). The weather conditions during the survey were dry but overcast.

Evaluation Methodology

9.2.12 The original chapter was prepared with reference to the Guidance published by CIEEM during 2006. In the intervening period, CIEEM published a second edition of the Guidance in January 2016. Therefore, where pertinent, this chapter has been updated during 2018 with reference to this updated guidance.

9.2.13 The evaluation of VERs in the original chapter reflected the CIEEM Guidelines published during February 2006, VERs has been termed IEFs in the updated guidance. Evaluation of the IEFs (formally VERs) have therefore been reconsidered with reference to the updated Guidance.

9.2.14 The Guidelines propose an approach to valuing features that involves professional judgement based on available guidance and information, together with advice from experts who know the locality of the Site and/or the distribution and status of the species or features that are being considered.

9.2.15 In consideration of the likely significant effects on IEFs (formerly VERs) as a result of the Proposed Development in relation to the need to comply with national planning policy, Chapter 11 of the National Planning Policy Framework (NPPF) 'Conserving and Enhancing the Natural Environment' and attached ODPM Circular 'Biodiversity and Geological Conservation' has been consulted.

9.2.16 In addition, the following best practice guidance in relation to survey techniques and mitigation measures have been taken into account:

- Joint Nature Conservation Committee, 1993. Handbook for Phase 1 habitat survey: A Technique for Environmental Audit;
- English Nature, 2004. Bat Mitigation Guidelines;
- Bat Conservation Trust, 2012. Bat Surveys: Good Practice Guidelines (2nd edition). Bat Conservation Trust, London (superseded in 2016 by the publication of the 3rd edition);
- Joint Nature Conservation Committee, 1999. Bat Workers Manual;
- Marchant, J. H. (1983). *Common Birds Census Instructions.* BTO, Tring. 12pp.;
- Marchant, J. H., Hudson, R., Carter, S. P. & Whittington, P. A. (1990) *Population Trends in British Breeding Birds.* BTO, Tring;
- Gilbert, G., Gibbons, D. W. & Evans, J. (1998) *Bird Monitoring Methods.* RSPB, Sandy, Bedfordshire;
- Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. 2000. Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus). Herpetological Journal 10 (4), 143-155;
- Harris, S., Cresswell, P., and Jeffries, D.J. 1989. Surveying Badgers, Mammal Society, London;

- Froglife. 1999. Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10, Froglife, Halesworth;
- Gent, T., Gibson, S. 1999. Herpetofauna Workers Manual. JNCC;
- English Nature, 2004. Reptiles: Guidelines for Developers; and
- English Nature, 2001. Great crested newt mitigation guidelines.

Geographical Context

9.2.17 The updated Guidelines recommend that the importance of an ecological resource or feature be determined within a defined geographical context, utilising the following frame of reference where appropriate or adapted to suit local circumstances:

- International and European importance;
- National importance;
- Regional importance;
- Metropolitan, County, Vice-county or other local authority-wide area;
- Local importance.

Valuing Designated Sites

9.2.18 Within the UK, certain valued habitats have been assigned a level of nature conservation value through designation; the updated CIEEM Guidelines recommend that the reasons for their designation need to be taken into account in the assessment. Such designations include:

- Internationally important Sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar Sites;

- Nationally important Sites such as Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs); and

- Regional/County important Sites, which are referred to as Local Wildlife Sites (LWSs) and Local Nature Reserves (LNRs)[1].

9.2.19 Where a site has multiple designations then the overriding value is that of the highest level. However, under such circumstances, the impacts of the development upon each

[1] LNRs are nationally designated but typically of only local importance.

of the qualifying features should be considered; carefully distinguishing between them in accordance with the respective legislation and policy.

Valuing Biodiversity

9.2.20 The Guidelines state that there are various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity; furthermore, that consultation, especially with local specialists, can be crucial for identifying less obvious important resources and features. The Cherwell Biodiversity Action Plans[2] were important references that were used to inform the local context of the original assessment.

Valuing Habitats

9.2.21 The Guidelines recommend that the value assigned to habitat and plant communities should be measured against published selection criteria where available. Where habitat or plant communities do not meet the necessary criteria for designation at a specific level, the Guidelines recommend that the ecologist may consider the local context if appropriate.

Valuing Species

9.2.22 Species should be assessed according to their biodiversity value rather than according to their legal status; although some species will fit into both categories. Where protected species are present however, and there is a potential for a breach of the legislation, then such species should be considered. In assigning value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. The evaluation of populations should make use of any relevant published evaluation criteria.

Characterising Significant Effects

9.2.23 The Guidelines state that the assessment of effects should be undertaken in relation to the baseline conditions within the zone of influence that are expected to occur if the Proposed Development were not to take place. Having identified the activities likely to cause significant effects, it is then necessary to describe the resultant changes and to assess the effect on valued ecological resources.

[2] http://www.cherwell.gov.uk/index.cfm?articleid=3210&articleaction=form&formid=28. Accessed 04/11/14

9.2.24 The Guidelines recommend that the process of identifying effects should make explicit reference to aspects of ecological structure and function on which the feature depends. Effects must be assessed in the context of the baseline conditions within the zone of influence during the lifetime of the Proposed Development.

9.2.25 The Guidelines further state that it is important to consider the likelihood that a change/activity will occur as predicted and also the degree of confidence in the assessment of the effect on ecological structure and function. The limitations to certainty should be described and the consequences for confidence in predictions must be stated clearly.

9.2.26 When describing ecological impacts reference should be made to the following characteristics:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

9.2.27 To characterise the likely ecological change and effect, it is necessary to take into account all the above factors.

9.2.28 The Guidelines consider that positive and negative effects should be determined according to whether the change is in accordance with nature conservation objectives and policy.

9.2.29 A significant effect is defined by the Guidance as an "…*effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*". Effects can be considered significant at a wide range of geographical scales.

9.2.30 Ecological effects are therefore identified as being "significant" or "not significant" and "positive" or "negative" with reference to geographical scale. The Guidelines do not define a scale or matrix of significance.

9.2.31 Within this update chapter, ecological features identified as IEFs are carried forward to the assessment of likely significant effects stage.

9.2.32 Although certain species and habitats may not constitute IEFs based upon their nature conservation value, or likely absence from the Site, they may still warrant consideration during the design of the Proposed Development on the basis of their legal protection, their implications for policies and plans, or other issues, such as animal welfare or opportunities to deliver new opportunities for these species and habitats.

Significance criteria

9.2.33 The significance of the effects upon IEFs has been assessed both before and after consideration of additional measures (*e.g.* mitigation). The latter represents the assessment of the residual effects of the Proposed Development. Finally, an assessment of cumulative effects upon IEFs arising from the Proposed Development in combination with proposed, consented or planned development within the zone of influence of the Site is undertaken.

9.3 RELEVANT POLICY & LEGISLATION

9.3.1 The following legislation of primary relevance has been referred to whilst compiling this update chapter:

- The Conservation of Habitats and Species Regulations 2017 (known as the Habitat Regulations); which consolidates the 2010 Regulations with amendments and which transposes into UK law the European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('Habitats Directive') and European Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive');
- The Wildlife and Countryside Act 1981 (as amended);
- The Natural Environment and Rural Communities (NERC) Act 2006; and
- The Protection of Badgers Act 1992.

National Planning Policy Framework (March 2012)

9.3.2 Chapter 11 of the NPPF 'Conserving and Enhancing the Natural Environment' contains policies which afford protection to statutory and non-statutory designated sites, wildlife habitats and protected species. The ODPM Circular 06/05 'Biodiversity and Geological Conservation' attached to the NPPF contains further guidance in respect of biodiversity conservation and its impact within the planning system. This document covers areas including internationally and nationally designated sites, habitats and species outside of designated sites, and protected species.

9.3.3 The Government has since published a revised draft of the NPPF for consultation during March 2018.

Adopted Cherwell Local Plan 2011 – 2013

9.3.4 Following the preparation of the original chapter, Cherwell District Council adopted its Local Plan 2011 – 2013 which superseded all other local planning policy.

9.3.5 The Proposed Development is part of the development allocated by Policy Bicester 13 and is subject to the provisions of that Policy.

9.3.6 In addition, other relevant policies include: Policy ESD10 which aims to protect and enhance biodiversity and the natural environment; Policy ESD11 which relates to

Conservation Target Areas (CTAs); and Policy ESD17 relating to the maintenance and enhancement of the District's Green Infrastructure.

9.4 BASELINE CONDITIONS

Overview

9.4.1 This section sets out the baseline context of the Proposed Development and should be read in conjunction with **Appendix 9.1**, where full methodologies and results of the ecological investigations are set out. The baseline context for the Proposed Development has been updated during 2018 to determine any material changes arising since the original baseline was collated.

Designated Sites

Statutory Designations

9.4.2 Consistent with the baseline for the original chapter, the Site and Study Area are not covered by any statutory designated sites, nor do any statutory designations of European or national importance exist within 5km and 2km of the site, respectively.

9.4.3 However, the following two nationally important designations have previously been identified by Natural England as IEFs, with the potential, in their opinion, to be detrimentally and indirectly affected by adverse changes in water quality/water quantity within the downstream section of the Langford Brook between the Site and the designations:

1. Wendlebury Meads and Mansmoor Closes SSSI – located 5.5 km southwest of the Site ('as the crow flies'); and

2. Otmoor SSSI – located 7.4 km southwest of the Site ('as the crow flies')

9.4.4 Both SSSIs support grassland and important plant communities. However with reference to freely-available, web-based information sources, and based upon professional judgement and experience, EDP considers that likely significant effects (if at all) upon these two SSSIs from water quality/quantity changes associated with the Proposed Development are likely to be negligible, on the basis that:

- Otmoor SSSI is not connected to Langford Brook and is situated some way south of the River Ray;
- Given the distances of the SSSIs away from the proposed development site any likely significant effects are likely to be largely attenuated over that distance;

- The main source of hydrological inputs to both SSSIs is believed to be from the River Ray when it floods. As such the water quality/quantity inputs to the River Ray are believed to be more pertinent to the condition and management of the vegetation communities on the SSSIs than Langford Brook. Any water quality/quantity changes (if at all) are likely to be minor and not significant in the context of existing sources of water quality/quantity issues in the broader river basin catchment and between the proposed development site and the SSSIs (e.g. diffuse rural, Bicester Town, the M40);

- At the time when the original chapter was prepared, Otmoor SSSI was in a predominantly (73.72%) unfavourable 'recovering' condition. Based on a condition report generated during April 2018, the condition of the SSSI has significantly improved with 56% of the SSSI now in favourable condition, with the remainder (44%) still in unfavourable 'recovering', condition; and

- Similarly, at the time of the original chapter was prepared, Wendlebury SSSI was in favourable (100%) condition and this remains the case as of April 2018.

9.4.5 It is therefore considered that both SSSIs can be scoped out of detailed consideration as part of the EcIA and not considered IEFs because it can be reasonably determined, as demonstrated by the coarse ('high') level screening above, that the likely significant effects (if at all) upon these two SSSIs from water quality/quantity effects associated with the Proposed Development are likely to be negligible. This approach is consistent with Natural England's Scoping Opinion[3] supplied to David Lock Associates which states that the proposal "…*does not appear, from the information provided, to affect any nationally designated geological or ecological sites (Ramsar, SPA, SAC, SSSI, NNR)…".*

Non-Statutory Designations

9.4.6 The Study Area lies within the Ray Conservation Target Area (CTA). Part of the Site falls within the CTA (see **Figure 9.3** which shows that the eastern extent of the site falls within the CTA). CTAs in Oxfordshire were identified as the areas in which Biodiversity Action Plan (BAP) habitat targets are to be delivered. At a landscape scale CTAs aim to link areas of BAP habitat, restore biodiversity and allow wildlife to adapt to climate change through the creation and restoration of ecological corridors. The Ray CTA covers an area of 1,192 ha situated within the alluvial floodplain of the River Ray and extends to include areas of Buckinghamshire as well as Oxfordshire. The primary biodiversity interests supported within the Ray CTA include lowland meadow, wet

[3] Cherwell District Council. *Scoping Opinion West Nov 2014*. Reference Number RH/14/00009/SCOP

grassland/floodplain grazing marsh, hedgerows, ponds and true fox sedge. The CTA covers a wide range of land uses including extensive areas of intensive agricultural land considered of negligible ecological interest. CTAs are therefore not considered to warrant inclusion within the EcIA as an IEF given the nature of the current arable use of the Site. AS such, the Ray CTA has been scoped out accordingly. The potential for the Proposed Development to contribute, or otherwise, towards the targets specified for the Ray CTA through proposed habitat creation/enhancement measures is however considered within the mitigation section of the EcIA.

9.4.7 Gavray Drive Meadows LWS (see **Figure 9.3** for designation) lies within the centre of the Study Area. However, no part of the LWS falls within the Site. Based on the LWS citation, it is notable for the following:

- Supports lowland meadow which is a habitat of Principal Importance;
- Supports reed bunting (*Emberiza schoeniclus*), song thrush (*Turdus philomelos*), bullfinch (*Pyrrhula pyrrhula*), linnet (*Carduelis cannabina*) and great crested newts (*Triturus cristatus*) which are species Principal Importance;
- Supports the nationally scarce ground beetle (*Bembidion gilvipes)*; and
- Supports Birds of Conservation Concern, namely: bullfinch, reed bunting, song thrush, yellow hammer (*Emberiza citrinella*), linnet, dunnock (*Prunella modularis*) and willow warbler (*Phylloscopus trochilus*).

9.4.8 Three other LWSs lie within 2km of the Site, namely:

- Graven Hill – which lies approximately 2km to the south west of the Site, is notable for its woodland habitat and the species that it supports, namely grasshopper warbler (*Locustella naevia*) and willow warbler (*Phylloscopus trochilus*), and a number of ancient woodland indicator species;
- Bicester Airfield – which lies approximately 1.6km to the north of the Site and is designated due to areas of species-rich grassland; and
- Meadows NW of Blackthorn Hill – which lies approximately 1.5km to the south east of the Site and is designated due to meadow habitat.

9.4.9 In addition to the above, the south-east corner of Bure Park LNR lies approximately 2km to the north-west of the Site, and is designated for its grass meadow, young broadleaved woodland, hedgerows and scrub habitats.

9.4.10 The following 'Proposed Local Wildlife Sites and Extensions' are also located within 2km of the Site:

- Bicester Airfield Proposed Extension – a proposed extension to the aforementioned Bicester Airfield.

9.4.11 Gavray Drive Meadows LWS is situated immediately beyond the eastern boundary of the Site and, owing to its proximity, requires consideration within an EcIA as an IEF of County value. The remaining non-statutory designations discussed above are not considered to be affected by the Proposed Development however and have been scoped out of the EcIA as an IEF owing to their spatial separation and/or lack of ecological connections with the Site. This conclusion remains consistent with that made within the original chapter in 2015 and therefore there are no material changes in IEFs (previously known as VERs) between the original and updated chapter in relation to non-statutory designations.

Habitats

9.4.12 A full description of the habitats present within the Study Area is set out in **Appendix 9.1**. Those habitats found and described within the Site within the original chapter include the following:

- Arable;
- Broadleaved woodland belt;
- A single hedgerow;
- Scattered scrub;
- Tall ruderal vegetation;
- Langford Brook; and
- Trees.

9.4.13 An update Extended Phase 1 survey was completed during March 2018 reconfirming the presence of the above habitat features within the Study Area. Material changes which had occurred since the original chapter was prepared are as follows:

i. The length of the single hedgerow had been reduced significantly (approximately by half) as a result of railway chord development; and

ii. The parcel of arable land in the western end of the proposed development site had been used as a work compound (now restored to arable) in the intervening period.

9.4.14 The approximate distribution of habitats within the Site as of March 2018 is illustrated at **Figure 9.4**.

9.4.15 Those habitats present within the Site which are considered of sufficient ecological value to warrant inclusion as IEFs within the EcIA are limited to Langford Brook and trees. This was reconfirmed during the updated work completed during 2018.

9.4.16 Langford Brook is a wet stream flowing north to south through the western centre of the Study Area, located along the eastern boundary of the Site. The Brook supports steep sided banks with associated scrub, tall, coarse grasses and tall ruderal vegetation. The eastern boundary of the Brook supports mature to semi-mature trees comprising predominantly oak and willow. The Brook is considered of local value.

9.4.17 In addition to the above, Langford Brook is adjoined by a number of semi-mature to over-mature trees, some of which are subject to Tree Preservation Orders (TPOs), as detailed in full in the Arboricultural Assessment (Chapter 10). Many of these trees associated with the Brook are located outside of the Site but are considered in this Chapter due to the potential for effects arising from the Proposed Development. The trees comprise historical pollarded crack willow and ash trees, which are considered of intrinsic value, and are of potential value to roosting bats and nesting birds. Trees are collectively considered of local value.

9.4.18 All other habitats present onsite are considered to be limited in extent, species-poor in composition and considered to be of value at the site level or lower and thus are not considered IEFs in their own right. Impacts upon such features will require further consideration however in the context of biodiversity loss/gain, to ensure the Proposed Development remains compliant with national planning policy.

9.4.19 The value of those notable habitats above (Langford Brook and trees), together with other habitats within the Site which do not constitute IEFs, to protected species is discussed within the species sub-sections below.

Protected and /or Notable Species

9.4.20 Information on protected and/or notable species associated with the Study Area was collected through a desk study and further detailed ‘Phase 2’ surveys. The findings of these investigations are set out in full in **Appendix 9.1** and are summarised below.

Bats

9.4.21 The 2013 updated desk study returned few records of bats within 2km of the Study Area. Records included a single record of common pipistrelle (*Pipistrellus pipistrellus*) and brown long-eared bat (*Plecotus auritus*), and three records of *pipistrelle* sp., none of which were from within the Site. Although a number of bat records were received during the update desk study completed during 2018 (added or recorded since 2013), none relate to the Site or the wider Study Area (as detailed within **Appendix 9.1** of this update chapter).

Bat Roosting in Trees

9.4.22 The day-time assessment of trees identified five trees with potential to support roosting bats located within or immediately adjacent to the Site, including one medium potential tree and four low potential trees located immediately to the east of Langford Brook with crown spread into the Site. These trees required further consideration within the EcIA owing to the potential for the Proposed Development to result in adverse effects to bats potentially roosting within these trees. No conclusive evidence of roosting bats was encountered in any of the trees during the ground level assessments. Full results are provided within **Appendix 9.1**. This remains the case during 2018 and given that none of the trees are due to be affected by the Proposed Development no additional update work was completed during 2018.

Bat Foraging/Commuting Activity

9.4.23 Information on bat foraging/ commuting activity within the Study Area was collected through the course of manual transect surveys undertaken between June to August 2013, as discussed in full in **Appendix 9.1**.

9.4.24 Within the Site low levels of foraging/commuting activity by the following species was recorded: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), and *myotis sp*. Foraging/commuting habitats within the Site are limited to the thin band of broadleaved woodland along the southern boundary and the tree lined Langford Brook at the eastern boundary. The species assemblage and significantly low activity levels recorded is considered typical of an urban edge site subject to high levels of artificial light illumination of habitats. This remains the case during 2018 and given that both key features are retained and, in the case of Langford Brook in particular, buffered by the proposed development, no additional update work was completed during 2018.

9.4.25 In summary, the overall bat assemblage is considered to be of no more than local value. It is considered that, due to no material changes to the key habitats that this conclusion remains valid in 2018.

Birds

9.4.26 During the 2013 update desk study, relatively few records of birds were returned by TVERC during the course of the desk study. Records of the following species were returned from within the Study Area including the Red Listed common songthrush and Amber Listed kestrel, green woodpecker, dunnock, common whitethroat and kingfisher. In addition to those records directly from the Study Area, records of Red List species pertinent to those habitats supported by the Study Area include the Red Listed grasshopper warbler, and Amber Listed willow warbler and common bullfinch.

9.4.27 During the 2018 desk study, few additional records were received for the Site. However some additional records were received for the wider Study Area covered by the report included as **Appendix 9.1** and the wider area covered by the desk study. The records which, from available grid references, relate to the Site or its immediate environs included records of little egret, kestrel, green sandpiper, swift, swallow, dunnock, song thrush, bullfinch and yellowhammer made between 2013 and 2016. Although these additional records provide useful context, it is not considered they materially affect the conclusions of the baseline for the purposes of completing the EcIA.

9.4.28 The ornithological interest across the Study Area was assessed through a full breeding bird survey (comprising three survey visits) undertaken in spring 2013 and a further 6 wintering bird surveys undertaken monthly between October 2013 and March 2014. Given that no material changes to those habitats onsite were identified during the update survey in 2018, with the majority of the site in arable use, the findings of the previous surveys are considered to remain vaild.

Wintering Birds

9.4.29 During the course of wintering bird surveys undertaken throughout the Study Area, a total of 42 species of bird were recorded, as discussed in full in **Appendix 9.1**.

9.4.30 However, with regards to those species of note within the Site, the arable field which largely comprises the entirety of the Site supported foraging flocks of redwing, black headed gull and pied wagtail.

9.4.31 Overall, the winter bird assemblage is considered to be relatively typical of an urban edge locality in lowland England being biased towards common generalist resident species and common winter migrants. None of the species recorded are considered to be of significant ecological value at more than a site to local level. For the reasons detailed above, it is considered that this conclusion remains valid during 2018.

Breeding Birds

9.4.32 A total of 37 species of bird were recorded within the Study Area during the three breeding bird survey visits, of which only 25 species were recorded in the Site. Of those 25 species, 13 (i.e. 52%) were confirmed as breeding or possibly breeding, based on the behaviour that they exhibited during the survey visits, with the other species only using the Site as a foraging resource.

9.4.33 The assemblage of birds consisted predominantly of common resident passerines such as wren (*Troglodytes troglodytes*), robin (*Erithacus rubecula*) and blackbird (*Turdus merula*) alongside three summer migrants: common whitethroat (*Sylvia communis*), black cap *(Sylvia communis*), black cap (*Sylvia atricapilla*) and chiff-chaff (*Phylloscopus collybita*).

9.4.34 Only five species of conservation concern, in terms of being listed as UK BAP Priority Species or Red/Amber Listed Species of Conservation Concern, were recorded in the Site including the following Amber listed species: dunnock (*Prunella modularis*), common whitethroat and stock dove (*Columba oenas*), and the following Red listed species: starling (*Sturnus* vulgaris) and house sparrow (*Passer domesticus*). The following three species were all recorded foraging on the Site on just one occasion throughout the survey visits: stock dove, starling and house sparrow. One pair of dunnock and common whitethroat were confirmed breeding on Site.

9.4.35 In terms of habitats of value to breeding birds within the Site (excluding wintering birds which are discussed above) these are limited to the thin band of broadleaved woodland along the southern boundary of the Site, the single hedgerow (reduced in extent by 2018 -H2) running north to south running the western extent of the Site and the tree-lined Langford Brook.

The Overall Bird Assemblage

9.4.36 The assemblage of bird species recorded within the Site is considered to be typical for the range and quality of habitats present, and for its geographic and topographic location. The wintering bird assemblage recorded within the Site is not considered to be of any greater value than at the site level. However, the overall bird assemblage is

considered to be of local value. It is considered that any avoidance, mitigation or compensation measures applied to birds will provide ecological protection and enhancement to breeding birds and wintering birds. As such, birds are collectively considered as a IEF of local value within the EcIA. This conclusion remains valid in 2018 for the reasons detailed above.

Great Crested Newt

9.4.37 The 2013 desk study returned 9 records from 2003 of great crested newt from a location at pond P9 (see **Figure 9.2**). The records include observations of up to 29 females and 69 males, indicating a medium population present within this pond. Additional records of great crested newt were received during the 2018 update survey, with the meta population(s) of great crested newt well recorded for the locally and across the wider landscape.

9.4.38 Detailed great crested newt surveys have been undertaken of ponds within, and surrounding, the Study Area during 2002, 2004, 2010, 2012 and 2013. The surveys have confirmed the presence of great crested newt within the Study Area during each year surveyed. Most recently (spring 2013) a peak count of 105 individuals was recorded across the ponds within the Study Area, representing a large population present. Full details of great crested newt surveys undertaken in the Study Area are provided within **Appendix 9.1**.

9.4.39 However, the Site itself supports no aquatic habitats suitable of supporting great crested newt, whilst terrestrial habitats are sub-optimal and limited to arable and periphery trees and scattered scrub. The Site is situated beyond 250m of any confirmed breeding pond located to the east of Langford Brook and therefore lies outside of the range of core terrestrial habitat surrounding those ponds. This remains the case in 2018.

9.4.40 The Site is partially separated from terrestrial habitat beyond the eastern boundary by Langford Brook, although it is accepted that the brook does not present a significant physical barrier to dispersal. Terrestrial habitat beyond the southern and eastern boundary of the Study Area is separated from the Site by Gavray Drive Road and the A441 Charbridge Lane. However, it is expected that great crested newt could transverse these roads and reside within the area of land to the east of Langford Brook where breeding ponds have been confirmed.

9.4.41 In view of the above, it is considered highly unlikely that a notable population of great crested newts would migrate/reside within the Site, and the species has been scoped out as a IEF from the EcIA. This remains the case in 2018.

9.4.42 However, given the future land use and management of the Site as a result of the Proposed Development, its future suitability for great crested newt during the construction period cannot be entirely ruled out. Further consideration, in respect of the legislation pertaining to the protection of great crested newts and their habitats, is therefore required for the construction period along with suitable and reasonable precautionary avoidance and mitigation measures as necessary.

Reptiles

9.4.43 No records of reptiles were returned by TVERC during the 2013 desk study. During the 2018 desk study a number of common lizard and a few grass snake records were returned; however, none of these related to the Site or the wider Study Area encompassed by the report included as **Appendix 9.1**.

9.4.44 Reptile surveys undertaken throughout the Study Area (east of Langford Brook) confirmed the presence of common lizard (*Zootoca vivipara*) and grass snake (*Natrix natrix*) as discussed in full in **Appendix 9.1**.

9.4.45 The Site itself however is not considered to support habitats suitable for widespread reptile species owing to the dominance of intensive arable and it is therefore considered that reptiles are not likely present and would be scoped out as a IEFs from the EcIA. Given that there has been no material change to reptile habitat during the interim period, it is considered that the above conclusion remains valid. However, as discussed previously in relation to great crested newt, the future suitability of the Site for reptiles as a result of the Proposed Development cannot be guaranteed and, in respect of the population recorded immediately beyond the eastern boundary of the Site, reptiles warrant further consideration including the provision of suitable precautionary avoidance and mitigation measures to ensure no infringement of relevant legislation.

Badger

9.4.46 The updated desk study returned two records of badgers within 2km of the Study Area, including one record of a dead badger just to the south of Gavray Drive, which adjoins the Site along its southern boundary.

9.4.47 The Study Area supports moderately good foraging opportunities for badgers within the semi-improved grassland fields, dense hedgerows and woodlands, although conditions for badger sett building are limited.

9.4.48 Opportunities for badger foraging and sett building are negligible within the Site however, owing to the lack of suitable habitats, and no evidence of badger activity (including badger setts) has been recorded during numerous visits to the Study Area over a period of ten years, including during the badger walkover survey undertaken on 11 June 2013 and the update walkover survey completed during March 2018. As such, it is considered that badgers are not present on the Site, and is therefore scoped out as an IEF from the EcIA.

Water Vole and Otter

9.4.49 The 2013 desk study returned four records of water vole within 2km of the Study Area, the nearest record, dated 2000, being immediately north of the Site. No additional records were received during the update desk study completed during 2018.

9.4.50 The water vole and otter walkover survey of Langford Brook undertaken in June 2013 recorded no evidence of water vole or otter activity.

9.4.51 In respect of water vole, the Brook is considered unsuitable to support a breeding population owing to the lack of permanent (year-round) water and sufficient depth. Furthermore, the banks lack sufficient vegetation cover as a result of heavy shading in areas, thereby reducing the potential of the Brook to support water vole. The Brook was considered to offer some suitable foraging opportunities for otter, with opportunities available for this species to 'lie up' during the day present within areas of scrub, woodland and rough grassland located outside of the Site (to the east of the Brook). It is considered that these conclusions remain pertinent in 2018.

9.4.52 Owing to the lack of any direct evidence of water vole and otter, these species have been scoped out as IEFs from the EcIA.

Harvest Mouse

9.4.53 No records of harvest mouse were returned by TVERC during the 2013 updated desk study.

9.4.54 The Study Area supports a large area of suitable foraging and nest-building habitat for harvest mouse within tall, unmanaged, rough grassland with a significant scrub interface. During the detailed hand search of the Study Area a total of four harvest mouse nests were found.

9.4.55 Of these, only one nest was found within the Site itself, in the south-east corner. Owing to the paucity of suitable habitats within the Site, which is dominated by intensive arable with little rough grassland and scrub, it is considered that nesting and foraging opportunities for harvest mice are significantly limited.

9.4.56 On a precautionary basis, the population of this species supported by the Site is considered to be of local value and therefore regarded as an IEF requiring further consideration within the EcIA. This remains the case during 2018 and it is not considered that there would have been any significant change in the distribution of the species in the intervening period given that the habitats within the Site have not changed significantly as they relate to this species.

White-letter Hairstreak

9.4.57 Surveys for white-letter hairstreak within the Study Area comprised: eggs searches undertaken during November 2011 and updated in February 2013; an elm tree habitat suitability assessment in 2011, updated in May 2013; and adult searches completed in late June 2013 and mid-end July 2013.

9.4.58 The 2011 egg search recorded 25 white-letter hairstreak eggs within the Study Area. 8 eggs were also recorded within the Study Area in 2013. Of those eggs recorded, none are located within the Site.

9.4.59 Within the Site, elm trees are restricted to the hedgerow running north-south through the western extent of the Site (hedgerow H2); 16 elms were identified in this area, all of which were considered of moderate suitability during the 2013 elm tree assessment.

9.4.60 During the 2013 adult searches within the Site, one adult was recorded within hedgerow H2 on the eastern boundary of field F14. Since 2013, the extent of H2 has been reduced significantly due to the rail chord infrastructure works. As such, the extent of available habitat for this species has reduced significantly between 2013 and 2018.

9.4.61 Full details of the survey methodologies and results as discussed above are provided in full in **Appendix 9.1**. In summary, only a single adult white-letter hairstreak sighting has been made, and no eggs recorded, within the Site, although 16 elm trees have been identified which are considered of moderate suitability to support the species. With regards to the above, it is considered that Site supports a population of value at no greater than at the Local level. Given the significant reduction in H2, it is considered that the value of the site for this species by 2018 has been reduced.

Summary of Valued Ecological Receptors

9.4.62 Based on the baseline ecological information described above (and presented in full in **Appendix 9.1**), a number of IEFs requiring full consideration within the detailed Ecological Impact Assessment have been identified, as summarised in **Table 9.4**. These have been reconfirmed during the update work completed during 2018.

Table 9.4: Summary of IEFs requiring consideration within the detailed assessment

Type	Receptor	Value	Distance from Application Site
Non-statutory designations	Gavray Drive Meadows LWS	County	Immediately adjacent to the eastern boundary but outside of the Site.
Habitats	Langford Brook	Local	The Brook forms the eastern boundary of the Site.
	Trees	Local	Located along the eastern boundary of the Site in proximity to Langford Brook, including some trees located immediately off-Site with canopy spread into the Site.
Species	Bats	Local	Onsite.
	Breeding birds	Local	Onsite.
	Harvest mouse	Local	Single nest located within rough grassland/tall ruderal and scrub in south east corner of the Site.
	White-letter hairstreak	Local	Single adult recorded in hedgerow H2 on the eastern boundary of field F14 within the Site and presence of 16 elms of moderate habitat suitability.

9.4.63 A number of additional ecological receptors, namely great crested newt and common reptile species are considered likely to remain absent from the Site although this cannot be guaranteed in the future. Therefore, these species require further consideration in relation to potential infringement of wildlife legislation and/or planning

policies relating to biodiversity impacts. These are considered further later in this Chapter in respect of the mitigation strategy.

The Projected Future Baseline

9.4.64 It is anticipated that if the Proposed Development did not proceed, the Site would remain under arable land use offering little opportunities for biodiversity. The limited extent of habitats available would unlikely change, and no biodiversity enhancements are considered likely to arise in absence of funded development of the Site.

9.5 LIKELY SIGNIFICANT EFFECTS

Introduction

9.5.1 An assessment of likely significant effects of the Proposed Development on those IEFs identified above has been undertaken based on the Parameter Plans, which incorporate 'inherent' mitigation included as a result of an iterative assessment and design process. The likely effects are assessed with the inherent mitigation included, but in the absence of the additional mitigation measures required to address potentially significant effects. The Parameters Plan remains unchanged in 2018 to that considered within the original chapter.

9.5.2 Anticipated effects during the construction and post-completion stage of the Proposed Development are discussed in turn below and these have been reconfirmed as being pertinent in 2018, with no material changes to the impacts/effects and their significance between the original chapter and the update chapter prepared during 2018.

Construction Stage

9.5.3 Generalised effects which could arise as a result of the construction of the Proposed Development in absence of mitigation include the following:

- Effects of direct habitat loss, damage and degradation due to land take upon habitats and species;
- Impacts of noise, light and human disturbance to species; and
- Pollution of groundwater and surface water flows, as further identified and evaluated in **Chapter 13 - Water Resources**.

Non-statutory Designations

9.5.4 Likely significant air quality effects arising from the construction of the Proposed Development on Gavray Drive Meadows LWS include construction dust emissions, which could if present in significant quantities/volumes have a detrimental effect on flora and fauna associated with the LWS. The Air Quality chapter of this EIA (see **Chapter 6**) has addressed the potential for adverse air quality effects during the construction period and concluded that, subject to the adoption of mitigation measures outlined in **Chapter 6**, that the residual significance of potential effects from all dust generating activities is not significant.

9.5.5 No significant effects on Gavray Drive Meadows LWS are therefore expected to arise during the construction period of the Proposed Development.

Habitats

Langford Brook

9.5.6 The Proposed Development may result in potential adverse hydrological effects pertaining to silt laden run-off/pollutants entering Langford Brook via changes to the quality and quantity of surface water run-off entering the watercourse. Such effects are considered to be inherently mitigated through the provision of a development buffer via the Public Open Space (POS) proposed along the eastern boundary of the Site. In the absence of further mitigation, potential hydrological effects are considered indirect minor adverse (temporary) and reversible (site level), and not significant.

Trees

9.5.7 The Proposed Development has been designed to retain all of the trees within the Site and no direct losses are predicted as a result. Furthermore, the installation of BS5837 Compliant Protective Barrier around the Root Protection Area (RPA) of those retained trees, as recommended within the Arboricultural Assessment, to ensure appropriate protection is afforded to tree roots, is considered sufficient inherent mitigation to ensure that no significant adverse effects will arise to trees during the construction stage of the Proposed Development.

Species

Bats

Bat Roosting – Trees

9.5.8 A total of four trees, including a single medium potential tree and four low potential trees, are located immediately to the east of Langford Brook. Following review of the Parameters Plan, and based on the proposed layout, it is anticipated that the Proposed Development will result in no direct loss to these trees, and as such no significant effect on bats potentially roosting in these trees will arise.

9.5.9 In addition, bats potentially roosting in trees along the eastern boundary of the Site are considered to be at potential risk of adverse effects from increased disturbance due to the increased use of artificial lighting during the construction period. Given that the majority of the construction works will be undertaken during daylight hours, the usage of artificial lighting will likely be limited to the early morning and early evening hours, with greater use occurring during the winter months. In the absence of mitigation,

negative effects of lighting on potentially roosting bats are considered an indirect minor adverse (temporary), reversible (site level) effect and not significant.

Bat Foraging/Commuting

9.5.10 Areas of the Site supporting foraging/commuting habitats for bats, namely the tree-lined Langford Brook along the eastern boundary and the thin band of broadleaved woodland along the southern boundary as discussed previously, are to be unaffected by the Proposed Development. The Proposed Development will result in no direct loss to these valued foraging/commuting habitats.

9.5.11 Potentially negative effects arising from increased use of artificial lighting during the construction phase, as discussed previously in relation to potentially roosting bats, are considered to apply equally to foraging and commuting bats. The Proposed Development includes for the provision of POS within the eastern extent of the Site which partially inherently mitigates for potential adverse effects on foraging/commuting bats within this area. Furthermore, the buffering of the southern boundary tree line within the Root Protection Area (RPA) of trees is considered to provide a degree of inherent mitigation. In view of the above, the effect of increased use of artificial lighting on foraging and commuting bats is considered likely to result in an indirect minor adverse (temporary), reversible (site level) impact which is not significant for EcIA purposes.

Birds

9.5.12 In view of the inherent mitigation measures reflected in the retention of notable habitat features within the design layout, including the thin band of broadleaved woodland along the southern boundary and Langford Brook along the eastern boundary, the loss, damage and degradation of potential bird nesting and foraging habitats during construction will be restricted to arable land and small losses of hedgerow habitat, as is evident from the Parameters Plan. These effects are considered to be of low magnitude and would constitute a minor adverse (temporary to permanent) effect (site level) which is not significant for EcIA purposes.

9.5.13 Disturbance to nesting and foraging habitat for breeding birds through light spill, noise, visual and human disturbance during construction is likely to have an effect at the site level only, owing to the limited availability of suitable habitats within the Site. The effects are considered temporary and minor adverse (site level) and thus not significant for EcIA purposes.

9.5.14 The legal protection afforded to birds at the nest (their eggs and young) is considered inherent mitigation to ensure no effects relating to direct harm arise in respect of the breeding bird assemblage (including woodland birds).

Harvest Mouse

9.5.15 Evidence of harvest mouse has been recorded within the wider Study Area and within the south east corner of the Site, with the presence of nesting confirmed. It is anticipated that the construction of the Proposed Development could result in the direct harm to this species if construction activities are carried out within areas of rough grassland, tall ruderal vegetation and scrub identified within the south east corner of the Site. Similarly, construction with these areas could result in the loss, damage and degradation to harvest mouse nesting and foraging habitats. The potential harm to harvest mouse individuals and the loss, damage and degradation of their habitats is considered a direct, minor (permanent) adverse effect at the site level and not considered significant for EcIA purposes.

White-letter Hairstreak

9.5.16 Only a single adult white-letter hairstreak sighting has been made (within hedgerow H2; see **Figure 9.2**), and no eggs recorded, within the Site. The Parameters Plan indicates that this hedgerow H2 will be lost, resulting in the loss of habitat confirmed to support white-letter hairstreak. Habitat loss is considered a minor adverse (permanent) effect at the site level, and thus not significant for EcIA purposes. Furthermore, it is noted that the extent of H2 and therefore available habitat for this species has significantly reduced since the original assessment, with predicted minor adverse (permanent) effects considered a worst case scenario.

Post-development Stage

9.5.17 Generalised effects which could arise as a result of the operation of the Proposed Development, in the absence of mitigation, include the following:

- Increased recreational pressures;
- Effects of light and noise/visual/human disturbance to habitats and species;
- Increased risk of collision to species arising from increased traffic movements;
- Increased levels of airborne pollutants due to emissions of nitrogen dioxide (NO_2), particulate matter (PM_{10}) and dust (see **Chapter 6 – Air Quality**) and
- Alteration of surface water and groundwater flow quality and quantity.

Non-statutory Designations

9.5.18 It is considered that following completion of the Proposed Development Gavray Drive Meadows LWS is at risk of potential adverse effects as a result of increased recreational pressure arising from increased housing provision. Increased recreational pressure has the potential to damage and degrade valuable ground flora and trees through trampling and littering, and disturb associated fauna occurring within the LWS including birds, great crested newt and reptiles. The effects of increased recreational pressure as discussed above are considered to have been partially inherently mitigated through the open space provision shown on the submitted Parameter Plan. The resulting effect is considered to be minor adverse (permanent) and of significance at the local level.

9.5.19 Likely significant air quality effects arising during the post-completion stage of the Proposed Development on Gavray Drive Meadows LWS include emissions of nitrogen dioxide (NO_2), particulate matter (PM_{10}) and dust emissions generated by additional traffic travelling to and from the proposed development, which could if present in significant quantities/volumes have a detrimental effect on flora and fauna associated with the LWS. The Air Quality chapter of this EIA (see **Chapter 6**) has addressed the potential for adverse air quality effects during the post-completion stage of the Proposed Development and concluded that, subject to the adoption of mitigation measures outlined in **Chapter 6**, that the residual significance of potential air quality effects is not significant.

Habitats

9.5.20 Following completion of the Proposed Development, retained habitats are at risk of damage, disturbance or deterioration as a result of the increased residential population, potentially resulting in inappropriate recreational use and inappropriate management of habitats. Such effects are applicable only to those habitats retained, which is limited to the broadleaved woodland along the southern boundary, Langford Brook and associated trees. The effects are considered to be indirect, minor adverse (temporary to permanent) (site level) and so not significant in terms of EcIA purposes.

9.5.21 Additionally, Langford Brook is at risk of potential adverse effects resulting from hydrological impacts arising from changes in water quality due to surface run-off/pollutants entering the watercourse. The Parameter Plans include a degree of inherent mitigation through the siting of POS within the eastern extent of the Site, adjacent to Langford Brook.

9.5.22 Post-development impacts of the Proposed Development upon Langford Brook are thus considered to be indirect, minor adverse (temporary), reversible effect (site level), and not significant for EcIA purposes.

Species

Bats

9.5.23 Effects of increased collision risk, light spill and disturbance upon sensitive habitats used for foraging, commuting and roosting during the operational stage of the Proposed Development, in the absence of mitigation, will have adverse (permanent) effects. Such effects are considered of low magnitude owing to the limited extent of suitable habitat available to bats within the Site. Furthermore, these effects have been minimised through inherent buffering afforded to the commuting and foraging habitats present including the broadleaved woodland along the southern boundary and the tree lined Langford Brook. Consequently, these effects are considered to constitute minor adverse (permanent) effects (site level) and thus not significant for EIA purposes.

Birds

9.5.24 Retained habitats supporting breeding and foraging birds are potentially at risk of disturbance and damage during the operational phase of the Proposed Development, and an increase in domestic cats and dogs in the vicinity would increase the risk of predation and disturbance of birds. These effects are considered to constitute minor adverse (permanent) effects (site level) and thus not significant for the purposes of the EcIA.

Harvest Mouse

9.5.25 As discussed previously in relation to likely significant effects on breeding birds, an increase in domestic cats and dogs as a result of the Proposed Development could increase the risk of predation and disturbance to harvest mouse. This effect is considered to constitute a minor adverse (permanent) effect (site level) and thus not considered to be significant for the purposes of the EcIA.

White-letter Hairstreak

9.5.26 No significant effects on white-letter hairstreak are anticipated during the operational phase of the Proposed Development.

9.6 MITIGATION MEASURES

9.6.1 The measures set out for the original chapter, as detailed below, have been reconfirmed as pertinent in 2018.

9.6.2 Owing to the limited ecological value of the Site, the IEFs identified and the proposed layout and inherent mitigation incorporated into the Illustrative Masterplan, adverse effects have been avoided or are not considered significant, such that further mitigation would not be required for the purposes of Ecological Impact Assessment.

9.6.3 However, in order to ensure compliance with relevant nature conservation legislation and relevant planning policy, both national and local, further mitigation is required to avoid or reduce in severity potential adverse effects, not all of which can be achieved through inherent mitigation alone. This section therefore describes those measures to avoid, mitigate or compensate for adverse effects on IEFs, which are capable of being delivered at the detailed design stages.

9.6.4 In addition, habitat creation/enhancement measures are detailed within the mitigation section which are considered to contribute towards the targets for the Ray Conservation Target Area (CTA).

Construction stage

9.6.5 The findings of the detailed surveys completed for the Site and wider Study Area to date are considered to remain valid at the time of submission; however where relevant and depending on development timescales and phasing, certain detailed species surveys may require updating prior to commencement of the relevant phase of development. The findings will be used to inform the measures set out below.

9.6.6 Detailed measures to protect habitats and species during the construction phase will be set out in an Ecological Construction Method Statement (ECMS), anticipated to be secured through an appropriately worded pre-commencement condition attached to any forthcoming planning consent. The ECMS will cross reference the Arboricultural Method Statement (AMS), also prepared at the post-outline consent stages. The ECMS will incorporate details provided within the Arboricultural Assessment prepared along with this outline planning application (see **Chapter 10 - Arboriculture**).

9.6.7 An Environmental Clerk of Works (ECW) will be identified by the Developer to implement the ECMS prior to and during the construction phase.

Habitats

9.6.8 The ECMS will contain measures to ensure that valued habitats retained within the Site which includes the broadleaved woodland along the southern boundary, Langford Brook and any associated trees, are fully protected during construction activities.

9.6.9 Measures will include the establishment of Ecological Protection Zones (EPZs) within the Proposed Development layout, protected by fencing and signage to prevent activities such as the incursion by vehicles or personnel, fires and stockpiling of materials.

9.6.10 Indirect hydrological effects on Langford Brook will be further addressed through the adhering to Environment Agency Pollution Prevention Guidelines (PPGs), namely PPG1 'General guide to the prevention of pollution', PPG5 'Works and maintenance in or near water', PPG6 'Pollution prevention guidance for working at construction and demolition sites'[i] and PPG21 'Pollution incident response planning' to ensure that detrimental effects on the watercourse as a result of surface run-off, spillage and pollution arising throughout the construction phases are avoided[4]. Implementation of best practice will also be incorporated into the detailed design stage so as to ensure that any discharge of surface water into the natural environment is of acceptable levels and quality as detailed further in **Chapter 13 – Water Resources**.

9.6.11 The measures above will address construction effects on retained habitats, ensuring that they are reduced to insignificant levels; however, habitat losses will be addressed through new habitat creation during and after construction. This is discussed further under the Completed Development mitigation section further below.

Species

9.6.12 Protection of species during construction will be ensured through the provisions of the ECMS. As a general measure aimed at protecting species, "tool box talks" will be provided by a suitably qualified ecologist to the principal contractor appointed by the Developer, for distribution to all employees involved in any enabling works/vegetation clearance, to ensure that identification and protection of the relevant species, their habitats is understood.

[4] These Guidance documents have now been archived but remain relevant and have not been superceeded.

9.6.13 In addition to the habitat protection measures described above, which will deliver much of the necessary species protection, further measures to be included in the ECMS for each species group are summarised below. Species IEFs include bats, birds and harvest mouse, the mitigation measures for which are discussed further below. In addition, protective measures are required in relation to non-IEF species including great crested newt and common reptiles, owing to their presence within the wider Study Area, to avoid potential infringement of legislation relating to these legally protected species.

Bats

- Retained trees with bat roost potential, or confirmed bat roosts, will be included within EPZs;

- Construction activities will be restricted to daylight hours as far as possible to mitigate effects of increased visual and noise disturbance, with the use of temporary, artificial lighting avoided during the hours between dusk and dawn, with directional and low-level lighting used away from sensitive habitat corridors to mitigate effects relating to increased use of artificial lighting;

- Update survey of trees with bat roost potential prior to felling or pruning of trees or demolition of buildings, will be undertaken if required, and, if bat roosts are confirmed present, works will cease until an appropriate strategy is devised and agreed;

- Works may require a Natural England (NE) EPS licence to derogate from the legal protection afforded to bats. In order to obtain a licence NE will need to be satisfied that there will be no detriment to the maintenance of the favourable conservation status of the local bat population; and

- Other retained trees and/or proposed new buildings will provide ample opportunity to provide replacement roosting habitat to mitigate any losses.

Birds

- Retained nesting habitats will be included within EPZs; and

- Removal of potential nesting habitat will be undertaken outside the bird breeding season (namely March-August) unless a detailed survey by a suitably experienced ecologist has confirmed that no nests are present in the affected area immediately prior to works commencing.

Harvest Mouse

- Retained habitats suitable for nesting and foraging harvest mice, namely the small area of rough grassland, tall ruderal and scrub habitat located within the south-east corner of the Site, will be included within EPZs; and

- Where removal of vegetation considered suitable for harvest mouse nesting and/or foraging is required, this should be undertaken in mid-late Autumn to avoid the harvest mouse breeding season or during late winter/early spring period when populations are at their lowest. Vegetation clearance should be undertaken under supervision from an ECoW and should allow for the phased clearance of vegetation working away from the construction area.

Great Crested Newt

- Owing to the presence of great crested newt within the wider Study Area, reasonable, precautionary measures to avoid harm should be adopted during any vegetation clearance required within the Site;

- Vegetation clearance should be undertaken in phases, allowing vegetation to be gradually reduced in height to approximately 150mm above ground, with all cut material removed from site. Thereafter, fingertip searches for great crested newt by an ECoW will be undertaken, before commencing further clearance down to approximately 50mm above ground level with all cuttings removed from the Site;

- Follow vegetation clearance the sward within the Site should be maintained at a height of approximately 50-100mm to discourage the future dispersal of great crested newt into the Site;

- All vegetation clearance should be completed under supervision from an ECoW;

- As a precaution to prevent dispersal of great crested newt into the Site from the wider Study Area (east of Langford Brook), exclusion fencing should be installed along the eastern boundary of the Site;

- The exclusion fencing should follow the installation guidelines provided within the English Nature (Natural England) great crested newt mitigation guidelines and should be installed by a suitably experienced ecological contractor under supervision by an ECoW; and

- Such procedures will be set out within the ECMS.

Reptiles

- Owing to the presence of a large population of common lizard and a small population of grass snake within the wider Study Area (east of Langford Brook) vegetation clearance should include precautionary measures to avoid potential harm to mobile reptiles;

- Vegetation clearance should be completed through a phased clearance operation under supervision from an ECoW as previously discussed above in relation to great crested newt;

- Following vegetation clearance, the sward within the Site should be maintained at a height of approximately 50-100mm to discourage the future dispersal of reptiles into the Site;

- To further minimize the potential dispersal of common reptiles into the Site from the wider Study Area (east of Langford Brook) exclusion fencing should be installed along the eastern boundary of the Site, as previously discussed above in relation to great crested newt, with fencing of a design suitable for the exclusion of both species groups; and

- Such procedures will be set out within the ECMS.

Post-development Stage

9.6.14 A Landscape, Ecology and Arboricultural Management Plan (LEAMP) will be developed to ensure the long-term conservation of retained and new valued environmental resources, including habitats and species of ecological value.

9.6.15 It will be necessary for the LEAMP to be developed in detail prior to the initiation of the construction phase. It will also be necessary, prior to the construction phase, to identify the implementation responsibilities of the management plan.

9.6.16 The LEAMP will include detailed measures covering the establishment phase up to 5-years after commencement of the Proposed Development, with objectives and principles set out covering the long-term management, for review at 5 yearly intervals thereafter. Monitoring of the effects of the implemented measures will form the basis for any revision of the scheme after five years. The Developer will provide a financial contribution for the long-term implementation of the LEAMP secured via a legal agreement.

9.6.17 The LEAMP will incorporate adoption of an approved Arboricultural Method Statement (AMS) incorporating best practice guidance set out in British Standard 5837: 2012 Trees in Relation to Design, Demolition and Construction which will ensure retained trees and other vegetation are not adversely affected during the construction process.

Non-statutory Designations

9.6.18 The severity of the potential effect of increased recreational pressure on Gavray Drive Meadows LWS is partially reduced owing to inherent mitigation through open space provision incorporated into the Proposed Development, as shown on the Illustrative Masterplan. However, such effects will be reduced further at the detailed design stage of the Proposed Development through the appropriate management and detailed design of areas of informal and formal open space. Such measures are to be delivered through the LEAMP to ensure such spaces are multifunctional, so as to attract recreational usage itself without being detrimental to potentially sensitive habitat and species enhanced or created adjacent.

Habitats

9.6.19 Owing to the limited extent of valued habitats within the Site, the LEAMP will focus on the establishment and maintenance of new habitats of long-term ecological value within the Proposed Development's open space provision, to provide net gains to biodiversity. These measures are summarised below.

Trees

- The ongoing viability and safety of the tree stock on-site will be maintained through arboricultural inspections undertaken on an annual cycle in

accordance with industry best practice, as specified within the 'Arboricultural Assessment' included within Chapter 10 – Arboriculture.

Hedgerows

- New native species-rich hedgerow will be planted within the Proposed Development's open spaces;
- Hedgerows will include a high proportion of elm specimens to provide future habitat opportunities for white-letter hairstreak butterflies; and
- Once established new hedgerows will to be trimmed on rotation to maximise flowering and fruiting necessary to enhance the wildlife value of the hedgerow.

Ponds

- The creation of swales/attenuation features within the Proposed Development's open space is proposed to provide aquatic habitat suitable for a range of species including bats, birds, great crested newt, aquatic invertebrates, dragonflies, damselflies and flying insects.

Grassland

- Creation of rough, tussocky grassland within open space provision will encourage great crested newt dispersal into the Site whilst linking existing breeding ponds east of Langford Brook to new SuDS provision, and to provide basking, foraging and sheltering opportunities for reptiles;
- Rough, tussocky grassland will be managed to allow the establishment of tall grasses with a dense litter layer to provide nesting opportunities for harvest mouse; and
- New species-rich grassland will be sown within open spaces and surrounding attenuation features, managed to benefit bats, reptiles, amphibians and invertebrates.

9.6.20 Potential adverse hydrological effects on Langford Brook will be addressed through the incorporation of a Sustainable Drainage Systems (SuDs) within the POS provision as illustrated on the Parameters Plan. This will include an attenuation feature(s) which will not only ensure the rate of surface water run-off from the Proposed Development

matches current levels, but will also intercept pollutants before otherwise being discharged into Langford Brook. The Landscaping Scheme for the Proposed Development, to be included within the LEAMP, will detail suitable planting and management for the attenuation feature(s), which will enhance their ecological value and effectiveness at intercepting surface run-off.

Species

9.6.21 As described above, the LEAMP for the Proposed Development will include measures to create and enhance habitats of ecological value. These measures will also benefit valued species occurring within the wider Study Area (east of Langford Brook) through the provision of enhanced opportunities for breeding, refuge, foraging and/or dispersal. In general terms these habitats will be sympathetically managed according to protected species interests as detailed within the LEAMP. Human related disturbance effects will be reduced through the appropriate positioning and clear demarcation of PRoW in addition to the use of strategic structural planting.

9.6.22 Additional species-specific measures to minimise operational effects and provide enhanced opportunities for species breeding and refuge will be included within the LEAMP as detailed below.

Bats

- Bat roosting features (e.g. bricks and access tiles) will be incorporated into selected new buildings along the eastern boundary of the Site;

- Bat boxes will be installed within mature trees located along the eastern boundary of the Site (along Langford Brook) to provide further new roosting opportunities; and

- Detailed lighting proposals for the Site to be submitted at the reserved matters stage, as required by a suitably worded lighting condition attached to the grant of outline planning permission, will be incorporated to ensure that the southern boundary woodland/tree line and retained and new habitats along the eastern boundary are not illuminated to a level where bat activity is deterred.

Birds

- Durable bird boxes, comprising a range of designs to suit different species recorded on the Site, will be erected on retained mature trees; and

- Bird nesting features (e.g. swallow/swift ledges and sparrow terraces) will be incorporated into selected new and/or renovated buildings within the Site.

White-letter Hairstreak

- A new native species-rich hedgerow planted within the Site's open spaces (as discussed previously) will include a high density of elm trees to provide a foodplant for the species; and

- Scattered elm trees will be planted within POS provision to provide additional foodplants.

9.6.23 In addition to the above mitigation measures to be delivered via the LEAMP for those IEFs included within the assessment, there is significant scope for the Proposed Development to deliver net gains to non-IEF species including great crested newt and common reptiles, to be implemented through the provisions outlined below. Such measures would be deliverable via the detailed Soft Landscaping proposals and LEAMP for the Site.

Great Crested Newt

- The provision of new aquatic habitats via SuDs within open space in the eastern extent of the site, subject to appropriate detailed design, planting and management; and

- An increase in terrestrial habitat resource quality and features for shelter, refuge and hibernation within areas of open space via creation of great crested newt hibernacula and log piles and suitable management of grassland habitats.

Reptiles

- The enhancement of terrestrial habitats to provide increased foraging, sheltering and hibernating resources via creation and management of habitat mosaics to maximise habitat structure and provision of suitable deadwood habitat and hibernacula as discussed above in relation to great crested newts

9.7 RESIDUAL EFFECTS

9.7.1 The residual effects, as detailed below for the original chapter, have been reconfirmed as pertinent during 2018.

Construction Stage

9.7.2 Subject to the mitigation measures outlined above, residual effects anticipated upon IEFs during the construction phase have been reduced to levels that are not considered to be significant.

Post-development Stage

9.7.3 In light of the mitigation proposed, all potential effects upon those IEFs identified within the assessment are not considered to be significant. Furthermore, mitigation measures to be delivered via the Soft Landscape proposals and LEAMP will result in a minor beneficial (site level) effect owing to habitat creation, restoration and management over the long-term.

Summary of Effects

9.7.4 A summary of the residual effects during construction and after completion is provided in **Table 9.7**.

Table 9.7: Summary of Effects (Updated 2018)

IEF	Geographical Value	Potential Effect	Nature of Effect	Significance Pre-mitigation (Major/ moderate/ minor) (Beneficial/ adverse/ negligible) (Geographic scale)	Mitigation/ Enhancement Measures	Significance of Residual Effect (Major/ moderate/ minor) (Beneficial/ adverse/ negligible) (Geographic scale)
Construction Stage						
Habitats						
Langford Brook	Local	Indirect hydrological effects on quality/quantity of surface water run-off.	Temporary	Minor adverse (Site)	Indirect scheme design – development buffer via POS provision along eastern boundary.	Negligible
Trees	Local	Damage and degradation caused by incursion of construction vehicles, plant and machinery within RPAs.	Temporary to permanent	Minor adverse (Site)	ECMS – protection of retained habitat through establishment of EPZs. LEAMP - ongoing maintenance of tree stock viability.	Negligible
Species						
Bats	Local	Damage and degradation of roosting habitats in trees with confirmed bat roosts, or potential to support roosting bats, caused by incursion of construction vehicles, plant and machinery within RPAs.	Permanent	Negligible (owing to legal compliance)	ECMS and AMS – protection of retained trees. EPS licence if required – protection of bats during habitat losses and provision of replacement roosting habitat.	Negligible

		Disturbance of trees with potentially roosting bats via increased levels of artificial lighting.	Temporary	Minor adverse (Site)	ECMS – sensitive working hours, construction methods and restricted access and lighting.	Negligible
Breeding Birds	Local	Loss, damage and degradation of arable and hedgerow foraging/nesting habitat.	Temporary to permanent	Minor adverse (Site)	ECMS – protection of retained habitat; LEAMP and Landscaping Scheme – new habitat creation and long-term management.	Negligible
		Increased light spill, noise, visual and human disturbance of foraging/nesting habitat.	Temporary	Minor adverse (Site)	ECMS – sensitive working hours, construction methods and restricted access and lighting.	Negligible
		Direct harm.	Permanent	Negligible (subject to legal compliance)	ECMS – sensitive timing and methods of habitat clearance.	Negligible
Harvest Mouse	Local	Direct harm, loss, damage and degradation of suitable foraging/nesting habitats.	Permanent	Minor adverse (Site)	ECMS – protection of retained habitat; LEAMP and Landscaping Scheme – new habitat creation and long-term management.	Minor beneficial (Site)
White-letter Hairstreak	Site	Direct loss of hedgerow habitat confirmed to support white-letter hairstreak.	Permanent	Minor adverse (Site)	ECMS – protection of retained habitat; LEAMP and Landscaping Scheme – new habitat creation and long-term management.	Negligible
Post-development Stage						
Non-statutory Designations						

Gavray Drive LWS	County	Potential for proportional increase in formal/informal recreational use of the Local Wildlife Site resulting in impact to habitat present.	Permanent	Minor adverse (Site)	Inherent Scheme design – open space provision, and LEAMP – management of informal and formal open space.	Negligible
Habitats		Potential for proportional increase in formal/informal recreational use of the Local Wildlife Site resulting in impact to habitat present.	Permanent	Minor adverse (Site)	LEAMP & Landscaping Scheme – enhancement of habitats to increase resilience to disturbance effects, and establishment and maintenance of new habitats of ecological value within green open space provision.	Negligible
		Hydrological effects including changes in water quality due to surface run-off/ pollutants entering Langford Brook.	Temporary	Minor adverse (Site)	SuDS provision within Public Open Space, and LEAMP/ Landscape Scheme to ensure suitable planting and management of receptors to control surface water run-off and intercept pollutants.	Negligible
Species						
Bats	Local	Increased collision risk, light spill and disturbance on foraging, commuting and roosting habitats.	Permanent	Minor adverse (Site)	LEAMP & detailed design – to incorporate appropriate buffers along retained habitats, new habitat creation. Detailed Lighting Scheme – avoid illumination of key habitats.	Negligible
Breeding Birds	Local	Disturbance/damage of nesting and foraging habitats, and increased predation, caused by	Permanent	Minor adverse (Site)	LEAMP and Landscaping Scheme – new habitat creation and long-term management of	Negligible

		increased residential and domestic pet population.			retained and new breeding habitats.	
Great Crested Newt	District (within Study Area)	Nil	N/A	N/A	LEAMP and Landscaping Scheme – new terrestrial and aquatic habitat creation and habitat restoration/ enhancement.	Minor beneficial (Site)
Reptiles	District (within Study Area)	Nil	N/A	N/A	LEAMP and Landscaping Scheme – new terrestrial habitat creation and habitat restoration/ enhancement.	Minor beneficial (Site)

9.8 CUMULATIVE EFFECTS

9.8.1 The schemes to be considered in the cumulative assessment include the Proposed Development along with other committed developments (i.e. operational, those that have already begun construction, those that have not been commenced but have a valid planning permission and those schemes which are in the planning process). The assessment of cumulative effects repeats the assessment process set out above, but considers the potential change caused by all schemes identified for cumulative assessment. Those developments which have been considered for cumulative purposes are set out in Chapter 2. 'Land at Gavray Drive East' requires consideration in respect of ecology.

9.8.2 The cumulative effects, as detailed in the original chapter and set out below, have been reconsidered and reconfirmed as pertinent during 2018.

Designated Sites

9.8.3 In terms of Gavray Drive Meadows LWS increased housing provision as a result of the residential development of Gavray Drive East may give rise to an increase in recreational pressure on the LWS. In the absence of mitigation, the cumulative effect of increased recreational pressure has potential to result in adverse effects on the ground flora and fauna within the LWS. Subject to the provision of suitable Public Rights of Way (PRoW) and informal and formal Public Open Space (POS) within the Proposed Development to facilitate the increased residential population it is considered unlikely that any significant adverse cumulative effects would arise on the LWS.

Habitats

9.8.4 The potential cumulative effect of habitat loss, degradation and damage to valuable tree stock located along the eastern boundary of the Site and the western boundary of the proposed development at Gavray Drive East is considered not to be significant provided that an appropriate buffer to this habitat (free from development, and protected accordingly by fencing and signage) is provided by both of the developments.

9.8.5 Potential adverse hydrological cumulative effects on Langford Brook as a result of changes to surface water run-off quality and quantity caused by the proposed development of Gavray Drive East are considered not significant provided that an

appropriate development buffer is afforded to the Brook together with the creation of SuDS to attenuate surface water run-off.

Species

9.8.6 The proposed residential development on Land at Gavray Drive East has a potential adverse effect on foraging/commuting bats through habitat loss, degradation, fragmentation and disturbance (including visual, noise and light spill) which is anticipated, in the absence of mitigation, to constitute a minor adverse cumulative effect (local) level. Provided that the effect is mitigated for through appropriate green infrastructure provision within the layout of the proposed scheme, which maintains and enhances existing habitat linkages, and that sensitive timing and construction methods which minimize disturbance are employed, the potential effect is considered not to be significant.

9.8.7 In addition, a potential adverse cumulative effect on breeding birds through habitat loss, fragmentation and degradation is also anticipated from the proposed residential development on Land at Gavray Drive East. The effect could potentially be significant at the local level. However, it is considered that provided the retention of notable nesting habitats within Ecological Protection Zones (EPZs) and the provision of new habitats through the erection of bird boxes and bird nesting features within retained/new buildings or mature trees is adopted by the proposals, the cumulative effect will not be significant to the overall breeding bird assemblage identified as a IEF within the Site.

9.8.8 In relation to harvest mouse it is considered that the proposed residential development of Gavray Drive East is likely to result in an adverse cumulative effect through habitat loss, degradation and damage, and disturbance from increased numbers of domestic pets. Retention, restoration and creation of tall, unmanaged tussocky grassland interspersed with scrub patches within the proposals for Gavray Drive East would mitigate the potential effect to ensure that the cumulative effect will not be significant upon the overall harvest mouse population present.

9.8.9 The proposed development on Land at Gavray Drive East will need to accommodate the retention and planting of elm trees within the development layout to mitigate the potential adverse cumulative effect of habitat loss, damage and degradation to elm trees resulting in negative effects to the white-letter hairstreak butterfly population present within the site. Subject to detailed design and implementation of a suitable Landscaping Scheme to maintain and plant elm trees within open space provision within the proposed layout the potential adverse cumulative effect is considered not to be significant.

Cumulative Summary

9.8.10 The cumulative proposal evaluated will also need to be designed to accommodate and mitigate ecological interests to fulfil planning policy requirements and thereby inherently protect ecological interests across the wider landscape from cumulative development effects. Owing to the absence of significant residual effects predicted, cumulative effects of the Proposed Development are considered to be extremely unlikely to arise in combination with the proposed residential development at Gavray Drive East.

9.9 SUMMARY AND CONCLUSIONS

9.9.1 This update chapter provides an assessment of the significance and consequences of potential ecological effects upon identified Important Ecological Features (IEFs), formerly known as Valued Ecological Receptors (VERs), arising from the Proposed Development. The summary and conclusions of the original chapter, as detailed below, have been reconfirmed during the update of the chapter during 2018.

9.9.2 The assessment included a review of the current conditions found within the Site and identifies measures to avoid, mitigate and/or compensate where appropriate for significant effects that may arise. It has been prepared by EDP Ltd as part of an Environmental Statement (ES) that accompanies an outline planning application for the Site with all matters reserved except access.

9.9.3 The habitats within the Site are limited in extent and value comprising predominantly intensively farmed arable with a thin band of broadleaved woodland planting along the southern boundary and a single species-poor hedgerow located within the western extent of the Site. These habitats are considered of negligible (low) ecological value in their own right, although have some, albeit limited, potential to support protected species including bats and birds. Some habitats of moderately higher value were identified including Langford Brook and associated trees, along the eastern boundary of the Site which were considered IEFs. In addition, Gavray Drive Meadows LWS was identified as a IEF included within the EcIA owing to its proximity to the Site. Populations of bats, birds, harvest mouse and white-letter hairstreak butterfly occurring within the Site, as identified through baseline ecological surveys, were also included as IEFs within the assessment.

9.9.4 In the absence of further mitigation measures, predicted effects on local sites, habitats and species have been considered for the periods up to and during demolition/construction, and during the lifetime of the completed development. The assessment concludes that all the predicted effects, in the absence of mitigation, have an site level effect only and are not considered to have a significant effect for the purposes of Ecological Impact Assessment. However, in accordance with both legislation and planning policies, measures are identified to mitigate these effects and/or compensate for effects which cannot be fully mitigated.

9.9.5 The strategy to mitigate adverse effects during construction includes specific measures to protect features of ecological value which are to be retained within undeveloped open spaces in the Site, but which are at risk of damage or disturbance.

In addition, measures are identified to avoid harming species which may be present within habitats that will be cleared during the construction process, through sensitive timings and working methods.

9.9.6 The long-term strategy to mitigate adverse effects during the lifetime of the completed development includes for the creation and management of new habitats of ecological value including trees, hedgerows and rough, tussocky grassland thereby creating new opportunities for protected species, to compensate for effects during construction and provide net gains for biodiversity.

9.9.7 Overall, through sensitive design and additional mitigation measures proposed, no significant adverse effects on the ecology of the area are anticipated, and there are opportunities for ecological benefits to be delivered as part of the Proposed Development. In particular, the Landscaping Scheme applied to the Proposed Development will allow for the creation of wildflower grassland meadow within the POS provision in the eastern extent of the Site. In respect of the habitat targets for the Ray Conservation Target Area (CTA), the habitat creation measures within the POS provision, which lies within the CTA, will (subject to detailed design and implementation) provide a contribution towards the target of 5ha creation of Lowland Meadow[ii]. It is concluded that the Proposed Development will result in a positive gain for biodiversity, in accordance with national and local planning policy.

FIGURES

Figure 9.1 Study Area and Site (EDP124_105a 10 March 2015)
Figure 9.2 Extended Phase 1 Survey (EDP124_56c 27 October 2014)
Figure 9.3 TVERC Designated Sites Map (EDP124_109 17 November 2014)
Figure 9.4 Extended Phase 1 Survey (2018) (EDP124_d125 17 April 2018)

[i] Environment Agency (2012) Pollution Prevention Guidelines: PPG6 Working and construction and demolition sites. 2nd Edition.
[ii] Wild Oxfordshire. *Ray CTA (Conservation Target Area)*. Available at http://www.wildoxfordshire.org.uk/biodiversity/conservation-target-areas/. Accessed 04.11.14.
SUGGESTIONS FOR GUIDANCE AND LEGISLATION note some duplicate what has been set out in 9.2.11 above but consideration should be given as to what may be relevant and if there are other pieces of guidance that should be listed

Bat Conservation Trust (2010) *Bats and Lighting in the UK*

Bat Conservation Trust (2012) *Bat Surveys – Good Practice Guidelines.* Second Edition.

Bat Conservation Trust (2016) *Bat Surveys – Good Practice Guidelines.* Third Edition

Bibby, C.J., Burgess, N.D., Hill, D.A., & Mustoe, S.H. (2000) *Bird Census Techniques*. 2nd edition. Academic Press, London.

British Standard (2012) *BS 5837: Trees in Relation to design, demolition and construction – Recommendations.*

Cresswell P., Harris S., Jefferies D. J. (1990) *The history, distribution, status and habitat requirements of the badger in Britain*. Nature Conservancy Council.

Department of Communities and Local Government (DCLG) (2012) *National Planning Policy Framework*. DCLG London.

DMRB (2007) Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3, Part 1 - HA207/07 Air Quality (May 2007).

Eaton et al., (2009) *Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*. British Birds 102, pp 296-341.

English Nature (2001) *Great Crested Newt Mitigation Guidelines*

English Nature (2002) *Badgers and Development.* English Nature, Peterborough.

European Commission, (1992), *European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora*: "Habitats Directive".

Environment Agency (2011) H1 Environmental Risk Assessment Framework: Annex F – Air Emissions (v2.2 December 2011).

European Commission (2009) *Birds Directive Council Directive 79/409/EEC on the Conservation of Wild Birds*: "Birds Directive".

Froglife (1999) *Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.

Fuller, R.J. (1980) A method for assessing the ornithological importance of sites for nature conservation. Biological Conservation 17, pp 229-239.

Gent, T. and Gibson, S. (Eds.) (2003) *Herpetofauna Worker's Manual*. Joint Nature Conservation Committee, Peterborough.

Gibbs, C. (editor) (2008) Guidance for the Selection of Sites of Nature Conservation Importance (SNCIs) in Surrey.

Gilbert, G., Gibbons, D.W. and Evans, J. (1998) Bird Monitoring Methods: *A manual of techniques for key species.* RSPB/BTO/JNCC/WWT/ITE/The Seabird Group. RSPB/BTO, Sandy, Beds.

Government Office for the South East (2009) *The South East Plan: Regional Spatial Strategy for the South East of England*.

Gregory R. D. at al. (2002) The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. British Birds 95, pp. 410-450.

~~HGBI (1998) *Advisory Notes for Amphibians and Reptiles Groups.*~~

Highways Agency (2012) *Design Manual for Roads and Bridges.* London Highways Agency.

HMSO (1981) *The Wildlife and Countryside Act (as amended).*

HMSO (1995) *Biodiversity: The UK Steering Group Report Volume 1: Meeting the Rio Challenge.*

HMSO (2000) *The Countryside and Rights of Way Act*.

HMSO (2010) *The Conservation of Habitats and Species Regulations*.

Holden, P. & Cleaves, T. (2002) *RSPB Handbook of British Birds*. Chris Helm, London.

Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom*.

Institute of Environmental Assessment (1997) *Guidelines for Baseline Ecological Assessment*.

Joint Nature Conservation Committee (2010) *Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit*.

Kruuk, H. (1979) *Foraging and spatial organisation of the European Badger*, Meles meles. Taken from: Kruuk, Hans (1989), *The Social Badger.* Oxford University Press.

MAGIC, (2014), Ordnance survey map and designated site information - accessed March 2014 from [www.magic.gov.uk]

Merchant, J.H. (1983) *BTO Common Birds Census Instructions*. BTO, Tring.

Natural England (2007) *Badgers and Development: A Guide to Best Practice and Licensing* Interim Guidance Document. Natural England, Peterborough.

OPSI (1992) *Protection of Badgers Act*.

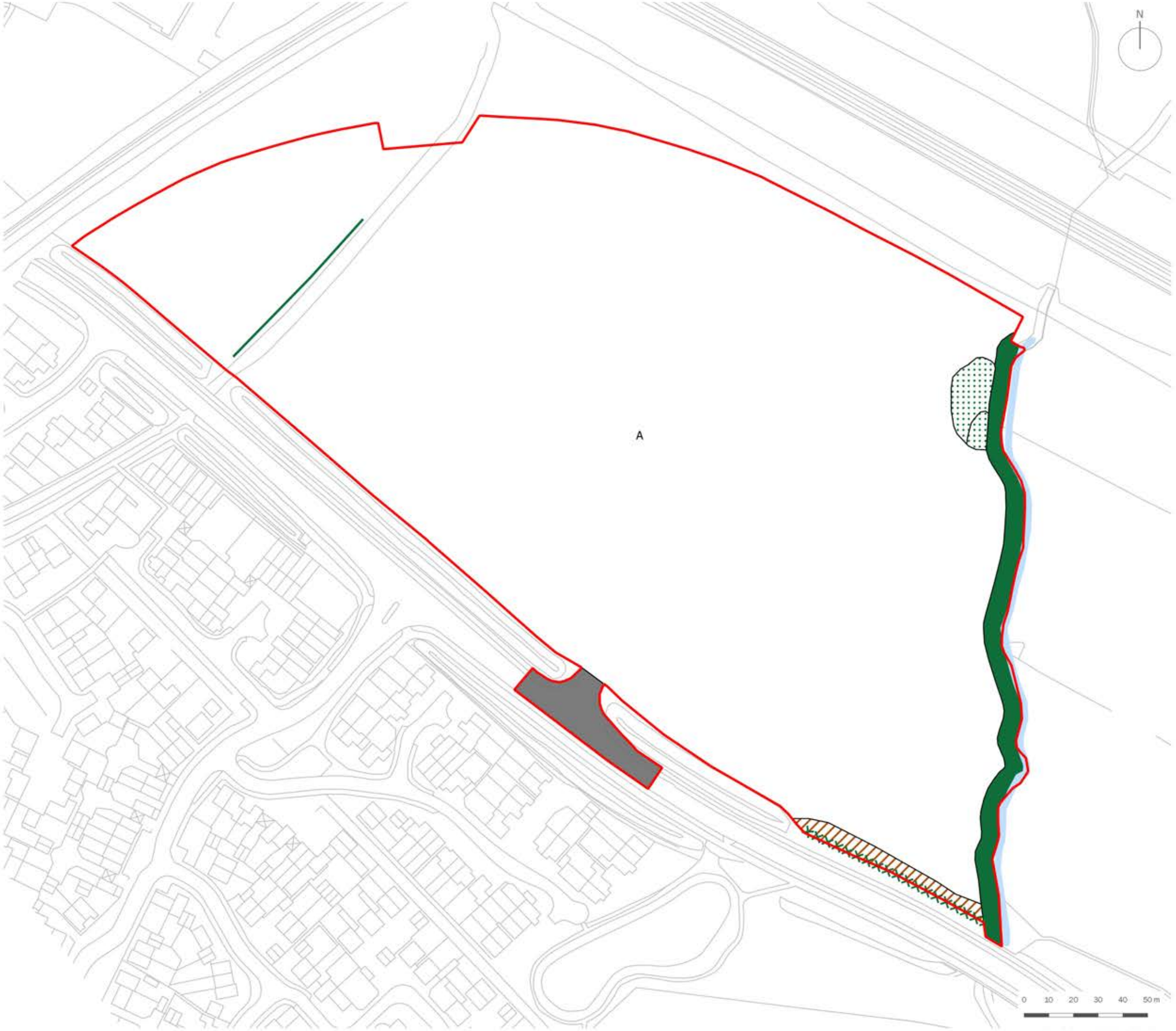
OPSI (1996) *Wild Mammals (Protection) Act*.

OPSI (2006) *Natural Environment and Rural Communities Act*.

Stace, C. (2010) *New Flora of the British Isles*. 3rd Edition. Cambridge University Press

Strachan et al. (2011) *Water Vole Conservation Handbook*. 3rd Ed. Wildlife Conservation Research Unit, Tubney.

Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. & Taylor, I. (2014) A Vascular Plant Red List for England. Botanical Society of Britain and Ireland, Bristol.



Site Boundary

Linear Habitats

XXXXX Linear Scrub

Species-poor Hedgerow

Stream

BIA Habitat

A Arable

Broad-leaved Woodland

Hardstanding

Scattered Scrub

Tall Ruderal Vegetation

client

Gallagher Estates Ltd

project title

Gavray Drive West

drawing title

Extended Phase 1 Survey (2018)

date	17 APRIL 2018	**drawn by**	CR
drawing number	edp0124_d125	**checked**	RR
scale	1:1,500 @ A3	**QA**	PD

the environmental dimension partnership

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Appendix E: JBA Technical Note

TECHNICAL NOTE

JBA Project Code	2013s7196
Contract	FRA at Gavray Drive Bicester
Client	Gallagher Estates
Day, Date and Time	23 April 2018
Author	Olivier Saillofest
Subject	FRA at Gavray Drive Bicester

1 Introduction

1.1 Terms of Reference

JBA was appointed to re-model the impact of a residential development site at Gavray Drive, Bicester.

1.2 Context

A proposal including a floodplain compensatory storage area and a development plateau (with Finished Floor Levels set between 67.8m AOD to the north and 67.7m AOD to the south) was initially designed between 2013 and 2015. In line with National Guidance, the impact of the proposal was quantified for the 100-year (1% Annual Exceedance Probability of AEP) with climate change flood event. At that time, climate change was estimated as a 20% increase in peak flows within the river channel.

Since this impact analysis was made, National Guidance on Climate Change was updated in February 2016. According to the new guidance, climate change allowances for the Langford Brook (which is located within the River Thames basin) should now be represented as:

- +35% increase in peak flows for the 100-year (1% AEP) with 'higher central' climate change allowance. This scenario, which is commonly referred as the 'design' flood event, is used to assess the impact of the proposal and combined to a freeboard value in order to set the minimum Finished Floor Levels (min FFL).
- +70% increase in peak flows for the 100-year (1% AEP) with 'upper end' climate change allowance. This scenario is modelled to confirm that the min FFL described above remains above flood levels.

1.3 Approach

The hydraulic model representing the post-development conditions of the site. In line with national guidance, the impact of the proposal on flood depths and peak flows was re-assessed for the 100-year (1% AEP) with climate change 'design' flood event, using the February 2016 (higher central) climate change allowance (i.e. +35% increase in peak flow).

To confirm that the proposed FFL are adequately raised, peak water levels for the 100-year (1% AEP) with 'upper end' climate change (i.e. +70% increase in peak flow) flood event were also generated and mapped.

2 Hydraulic Modelling Results

2.1 100-year (1% AEP) with 'higher central' climate change fluvial flood event

The peak water levels generated during the 100-year (1% AEP) with (+35%) climate change fluvial flood event are represented in Figure 2-1.

Figure 2-1: 100-year (1% AEP) with (+35%) climate change peak water levels

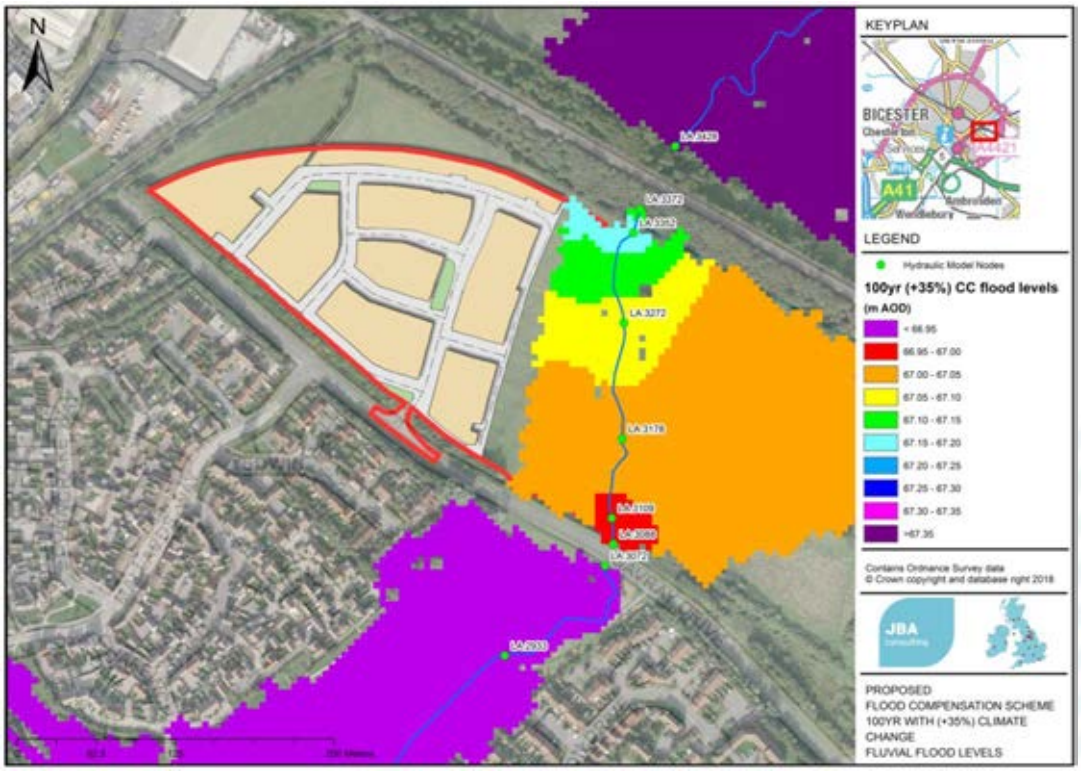
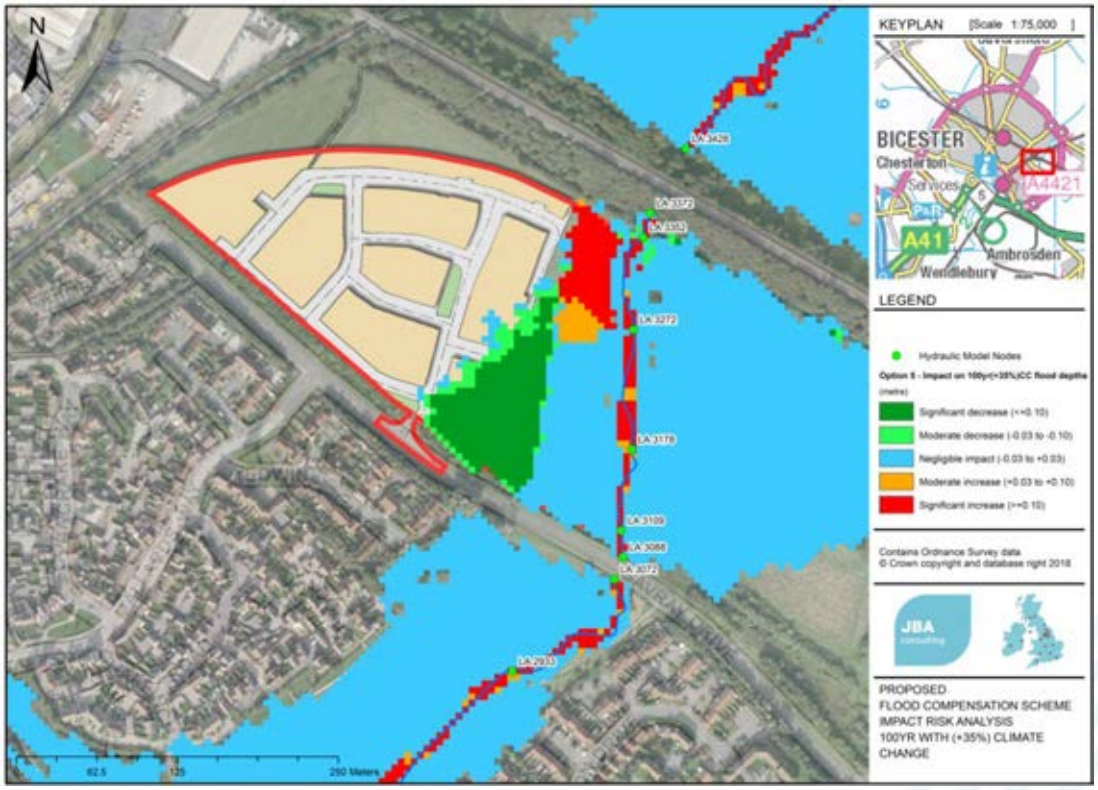


Figure 2-1 shows that the peak water levels along the development site boundary vary between 67.20m AOD to the north/upstream end and 67.05m AOD to the south/downstream end of the development plateau.

These levels are between 1.50m and 0.65m below the proposed FFL for the development plateau.

The impact on the 100-year (1% AEP) with (+35%) climate change flood depths generated by the proposal was quantified by subtracting the peak depth grid generated during the pre-development scenario from the one from the post-development scenario. The resulting 'impact on flood depth' grid is represented in Figure 2-2.

Figure 2-2: Impact on 100-year (1% AEP) with (+35%) climate change flood depths



Notwithstanding the graphical limitations of this approach (which appear to show an increase in flood depths along the river channel), Figure 2-1 shows that the proposal will not increase flood risk across third-party land during the 100-year (1% AEP) with (+35%) climate change fluvial flood scenario. To ensure flood risk along the channel does not increase, a review of the 'flow vs. time' hydrographs (see Figure 2-3) at the downstream end of the site was undertaken

Figure 2-3: Flow vs. time at Gavray Drive culvert

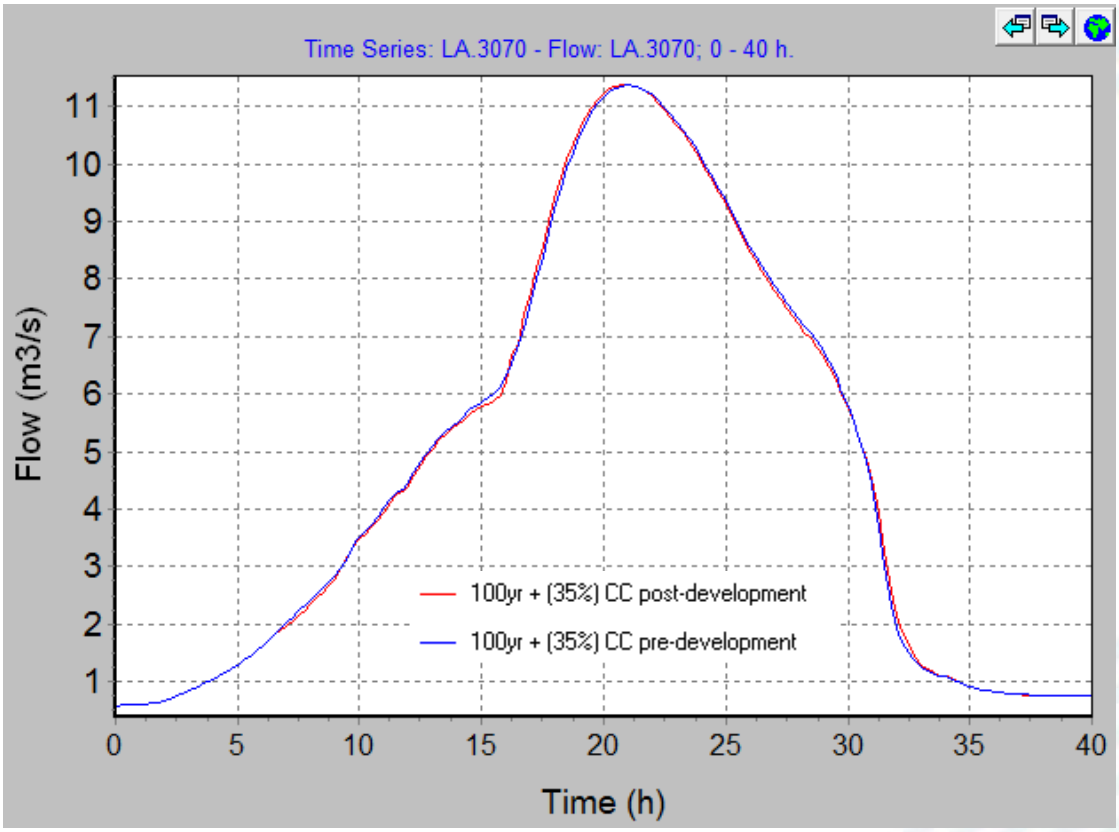


Figure 2-3 shows that the proposal will have a negligible impact on flows leaving the site. Consequently, the proposal will have a negligible impact on flood risk along the river channel and downstream of the site.

2.2 100-year (1% AEP) with 'upper end' climate change fluvial flood event

The peak water levels generated during the 100-year (1% AEP) with (+70%) climate change fluvial flood event are represented in Figure 2-4.

Figure 2-4: 100-year (1% AEP) with (+70%) climate change peak water levels

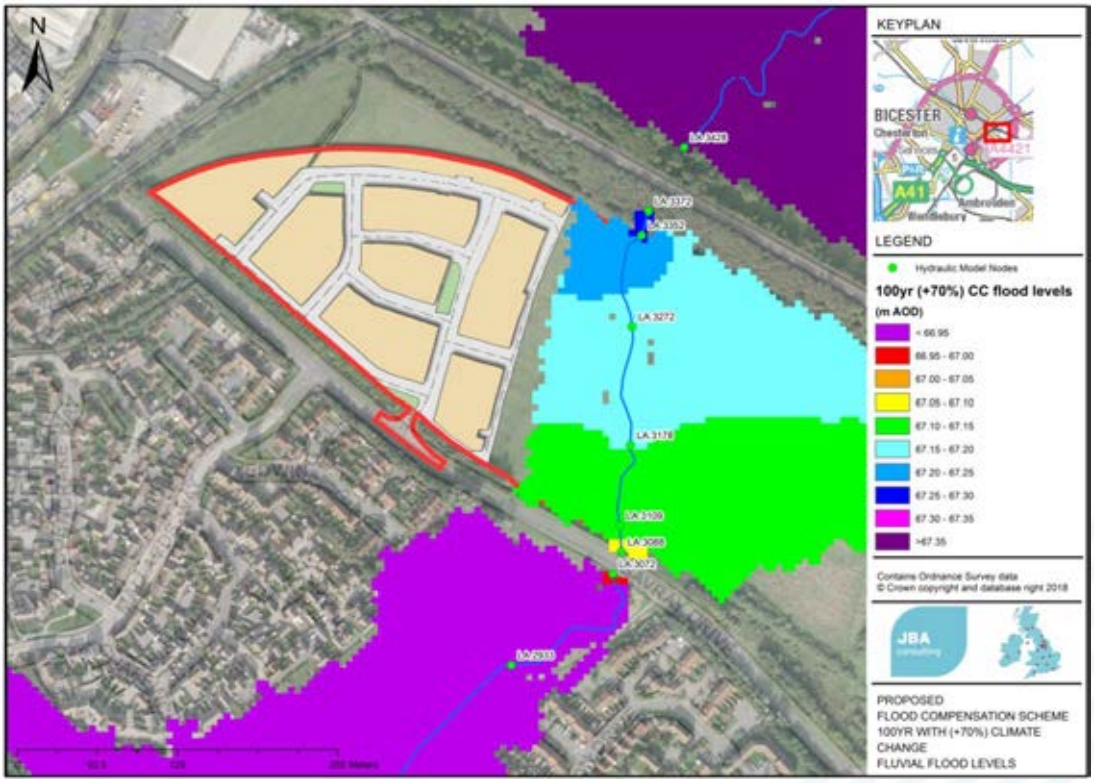


Figure 2-4 shows that the peak water levels along the development site boundary vary between 67.25 to the north/upstream end and 67.15 to the south/downstream end of the development plateau. These levels are between 1.45m and 0.55m below the proposed FFL for the development plateau.

The impact on the 100-year (1% AEP) with (+70%) climate change flood depths generated by the proposal was quantified by subtracting the peak depth grid generated during the pre-development scenario from the one from the post-development scenario. The resulting 'impact on flood depth' grid is represented in Figure 2-5.

Figure 2-5: Impact on 100-year (1% AEP) with (+70%) climate change flood depths

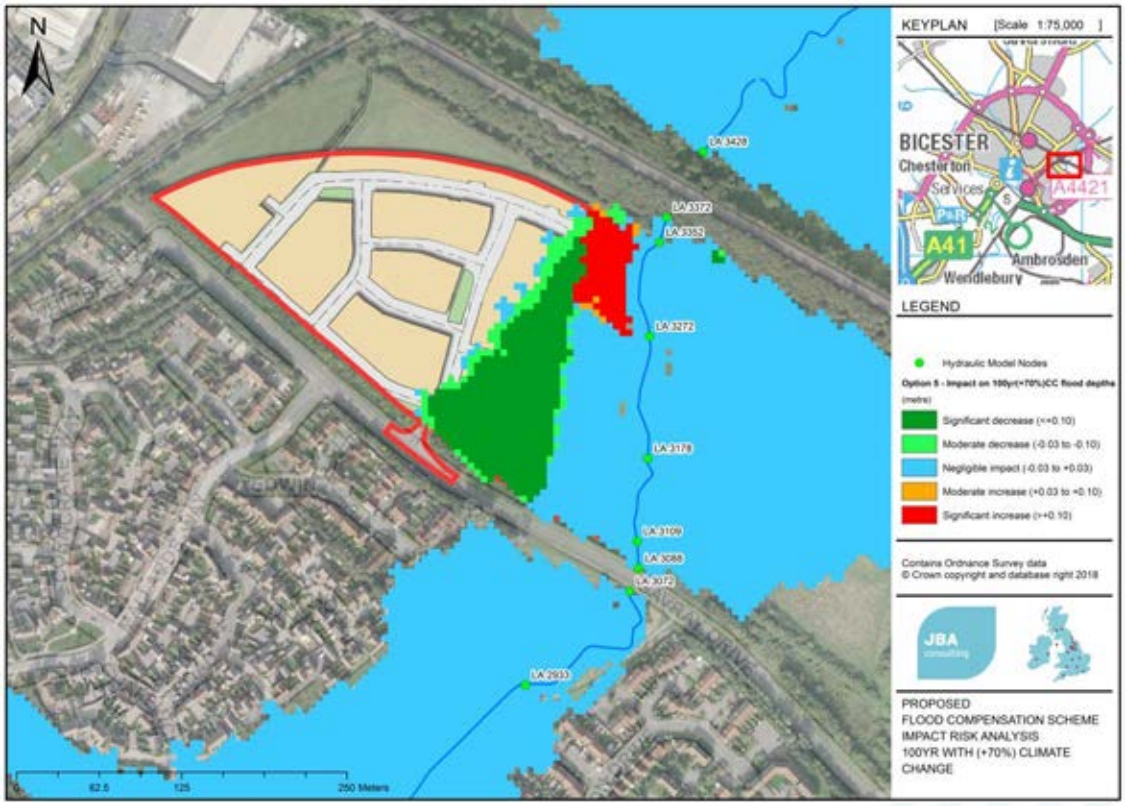


Figure 2-5 shows that the proposal will not increase flood risk across third-party land during the 100-year (1%AEP) with (+35%) climate change fluvial flood scenario.

3 Conclusion

The impact of the proposed residential development (including flood mitigation measures) at Gravray Drive, Bicester was re-modelled using the latest guidance on climate change.

Model results (still) indicate that:

- The proposal will generate no detrimental impact across third-party land during the 100-year (1%AEP) with (+35%) climate change and the 100-year (1%AEP) with (+70%) climate change fluvial flood events.
- The peak water levels will vary between 67.05 and 67.20m AOD along development plateau during the 100-year (1%AEP) with (+35%) climate change fluvial flood event. These levels are between 1.50m and 0.65m below the proposed FFL for the development plateau.
- The peak water levels will vary between 67.15 and 67.25m AOD along development plateau during the 100-year (1%AEP) with (+70%) climate change fluvial flood event. These levels are between 1.45m and 0.55m below the proposed FFL for the development plateau.