now part of

Stantec

Oxfordshire Cotswolds Garden Village

EIA Scoping Report Appendices

On behalf of **Grosvenor Developments Ltd**

GROSVENOR

Project Ref: 39289 | Rev: DRAFT | Date: March 2019

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: 10 Queen Square, Bristol, BS1 4NT
T: +44 (0)117 332 7840 E: bristol@peterbrett.com

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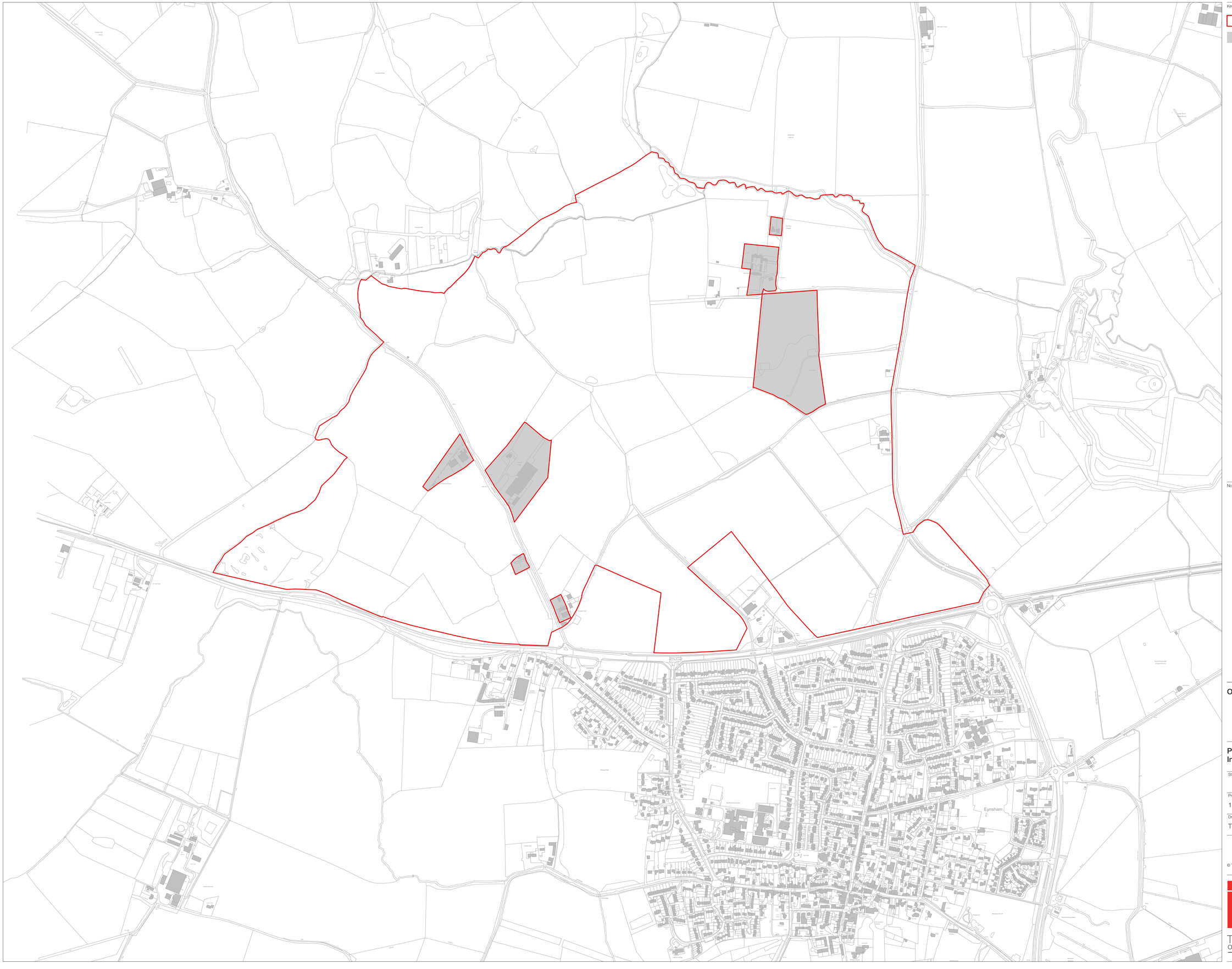
Appendix A Indicative Site Location Plan



Key

Indicative application boundary

Area excluded from future outline planning application

Notes/Revisions

OCGV

Planning Application
Indicative Red Line Boundary

Status:	Drawn by:	Checked by:
	SL	RB/JB

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LONDON
7 Heddon Street
London W1B 4BD

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

BIRMINGHAM
Enterprise House 115 Edmund Street
Birmingham B3 2HJ

TELEPHONE
020 3664 6755

www.torltd.co.uk

TERENCE O'ROURKE

Appendix B Extracts from the EIA Regulations

Regulation 18 extracted from the EIA Regulations, procedures on submission of environmental statements.

1. Subject to regulation 9, an EIA application must be accompanied by an environmental statement for the purposes of these Regulations.
2. A subsequent application is to be taken to be accompanied by an environmental statement for the purpose of paragraph (1) where the application for planning permission to which it relates was accompanied by a statement referred to by the applicant as an environmental statement for the purposes of these Regulations, but this is subject to regulation 9.
3. An environmental statement is a statement which includes at least—
   (a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development;
   (b) a description of the likely significant effects of the proposed development on the environment;
   (c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
   (d) a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
   (e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and
   (f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.
4. An environmental statement must—
   (a) where a scoping opinion or direction has been issued in accordance with regulation 15 or 16, be based on the most recent scoping opinion or direction issued (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion or direction);
   (b) include the information reasonably required for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment; and
   (c) be prepared, taking into account the results of any relevant UK environmental assessment, which are reasonably available to the person preparing the environmental statement, with a view to avoiding duplication of assessment.
5. In order to ensure the completeness and quality of the environmental statement—
   (a) the developer must ensure that the environmental statement is prepared by competent experts; and
   (b) the environmental statement must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts.

Schedule 4 extracted from the EIA Regulations, setting out the required information for inclusion in the ES.

1. A description of the development, including in particular:
   (a) a description of the location of the development;
   (b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;
   (c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;
   (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.
2. A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.
3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.
4. A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.
5. A description of the likely significant effects of the development on the environment resulting from, inter alia:
   (a) the construction and existence of the development, including, where relevant, demolition works;
   (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;
   (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;
   (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);
   (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;
   (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;
   (g) the technologies and the substances used.

   The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project, including in particular

those established under Council Directive 92/43/EEC(88) and Directive 2009/147/EC(89).

6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.
7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.
8. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(90) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(91) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.
9. A non-technical summary of the information provided under paragraphs 1 to 8.
10. A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.

Appendix C Committed Developments

Table 1. Developments Scoped In

PBA Reference	Application Reference and Local Authority	Name of Development	Description	Status (as of February 2019)	Scoped in or out?	Reason?
1	15/03148/OUT West Oxfordshire District Council (WODC)	Land West Of Thornbury Road Eynsham Oxfordshire	Residential development of up to 160 dwellings (means of access only).	Approved subject to Legal Agreement	✓	Large development 500m south west of the Site, therefore there is potential for cumulative effects
2	R3.0007/19 Oxfordshire County Council (OCC)	A40 Science Transit 2- Proposed Eynsham Park & Ride and bus lane scheme	Land west of the junction of Cuckoo Lane with the A40 (Park and Ride), land adjacent to A40 (bus lane) Request for Scoping Opinion for proposed new park and ride site at Eynsham and an approximately 6.5km long bus lane along the eastbound carriageway of the A40.	Scoping Opinion - Application Registered	✓	Large development which is adjacent to the Site boundary therefore there is potential for cumulative effects
3	N/A WODC	Land to the West of Eynsham	Land to the west of Eynsham is allocated in the draft West Oxfordshire Local Plan 2031 for a new urban extension of around 1,000 homes together with supporting services and facilities including a new primary school and western spine road.	SPD Issues Paper released July 2018	✓	Large development 500m south west of the Site therefore there is potential for cumulative effects
4	SG-08 WODC	Lower Road, Church Hanborough	Allocated in the 'Issues and Options' consultation for Part 2 of the Oxfordshire Minerals and Waste Local Plan as a 'Potential Mineral Working Site'.	N/A	✓ To be reviewed	This nominated mineral site borders the site to the north and to the east (on

PBA Reference	Application Reference and Local Authority	Name of Development	Description	Status (as of February 2019)	Scoped in or out?	Reason?
			Potential new quarry or extension to Cassington Quarry.			the opposite side of Lower Road)
5	SG-20 WODC	Land between Eynsham and Cassington	Allocated in the 'Issues and Options' consultation for Part 2 of the Oxfordshire Minerals and Waste Local Plan as a 'Potential Mineral Working Site'. Potential new quarry or extension to Cassington Quarry.	N/A	✓ To be reviewed	This nominated mineral site borders the site to the south-east (on the opposite side of Lower Road)
6	Residual areas of OCGV Strategic Location for Growth- Policy EW1 WODC	N/A	Unregistered land to the west of the site.	N/A	✓ To be reviewed	Allocated area within the wider OCGV allocation in the WODC Local Plan
7	Residual areas of OCGV strategic location for growth- Policy EW1 WODC	N/A	Land to the south of Cuckoo Wood Farm.	N/A	✓ To be reviewed	Allocated area within the wider OCGV allocation in the WODC Local Plan

Table 2. Developments Scoped Out

PBA Reference Number	Application Reference	Name of Development	Description	Status (as of February 2019)	Scoped in or out?	Reason?
8	15/01550/OUT WODC	Land North Of Cote Road Cote Road Aston Bampton Oxfordshire	Proposed residential development for up to 41 dwellings, landscaping, public open space and associated infrastructure with all matters reserved except for access. (Amended Description and Plans).	Approved	X	Development situated approximately 13km south west of the Site therefore significant cumulative effects are unlikely.
9	13/1494/P/OP WODC	Land East Of Saxel Close Aston Bampton Oxfordshire	Residential development comprising 38 dwellings, formation of vehicular & pedestrian accesses.	Approved subject to Legal Agreement	X	Development situated approximately 13km south west of the Site therefore significant cumulative effects are unlikely.
10	16/03415/OUT WODC	Land East Of Mount Owen Road Bampton Oxfordshire	Outline planning application for demolition of existing buildings and erection of up to 160 residential dwellings including up to 40% affordable housing, creation of new vehicular access off of Mount Owen Road and provision of public open space with associated infrastructure and earthworks. All matters reserved except for access.	Approved subject to Legal Agreement	X	Development situated approximately 13km south west of the Site therefore significant cumulative effects are unlikely.

11	13/1465/P/OP WODC	Street Record New Road Bampton Oxfordshire	Erection of residential development of up to 160 dwellings and creation of vehicular access from new road.	Granted, subject to conditions	X	Development situated approximately 13km south west of the Site therefore significant cumulative effects are unlikely.
12	14/0091/P/OP WODC	Land East Of Monahan Way Carterton Oxfordshire	Development comprising up to 700 houses, an employment area of 1.5 hectares (use classes B1 and B8, together with car showroom use which is sui generis), a local centre of 1 hectare (use classes A1 to A5, B1(a), C1, C2, C3, D1 and D2), a primary school with a site of 2.2 hectares, playing fields, allotments, informal open space, landscaping, drainage improvements and associated engineering works such as highways, cycleways and footways.	Approved subject to Legal Agreement	X	Development situated approximately 15km west of the Site therefore significant cumulative effects are unlikely.
13	13/1752/P/FP WODC	Land At Swinbrook Road Carterton	Demolition of Byfield, erection of 250 dwellings with associated access, public open space and landscaping including allotments, associated infrastructure adjacent to the Kilkenny Lane country park including the link road between Shilton Road and Elmhurst Way.	Granted, subject to conditions	X	Development situated approximately 15km south west of the Site therefore significant cumulative effects are unlikely.
14	13/0399/P/RM WODC	Northwood Crescent Upwood Drive Pitreavie Avenue Tangmere Avenue	Erection of two hundred dwellings with associated landscaping and play areas, (revision to 11/0490/p/rm).	Granted, subject to conditions	X	Development situated approximately 15km south west of the Site therefore significant

		Yatesbury Road, Carterton				cumulative effects are unlikely.
15	15/04061/OUT WODC	Land South Of Stanmore Crescent Carterton Oxfordshire	Demolition of existing no. 54 dwellings and outline consent sought for development of 135 residential dwellings (Class C3) with access via Stanmore Crescent/Upavon Way and Abingdon Road/Brize Norton Road. All matters reserved save access.	Approved subject to Legal Agreement	X	Development situated approximately 15km south west of the Site therefore significant cumulative effects are unlikely.
16	17/00831/OUT WODC	Linden House Kilkenny Lane Brize Norton Carterton Oxfordshire OX18 3NU	Residential development of up to 28 dwellings (means of access only), to include 4 affordable housing units.	Approved subject to Legal Agreement	X	Small development situated approximately 15km south west of the Site therefore significant cumulative effects are unlikely.
17	15/00567/FUL WODC	Land North Of Little Lees Charlbury Oxfordshire	Erection of twenty two dwellings and associated works (with access from Little Lees and Lees Heights).	Approved subject to Legal Agreement	X	Small development situated approximately 13km north west of the Site therefore significant cumulative effects are unlikely.
18	16/02306/FUL WODC	Land Rear Of 15 And 16 Woodstock Road Charlbury Oxfordshire	Demolition of 2 semi detached properties to facilitate a new vehicular site access, development of 9, no. two bedroom houses and 4 no. two bedroom bungalows with associated car parking and landscaping.	Approved subject to Legal Agreement	X	Small development situated approximately 13km north west of the Site therefore significant

						cumulative effects are unlikely.
19	15/03099/FUL WODC	Land South Of Forest Road Charlbury Oxfordshire	Residential development of 25 dwellings comprising self/custom build, market housing and affordable housing (use class C3) and a 12 bed supported living (sui generis) facility with associated access, parking and landscaping.	Awaiting decision	X	Small development situated approximately 13km north west of the Site therefore significant cumulative effects are unlikely.
20	14/01884/FUL WODC	Land South And East Of Walterbush Road Walterbush Road Chipping Norton Oxfordshire	Demolition of existing buildings and erection of 228 dwellings, a new clubhouse for Football Club, associated parking, landscaping, new vehicular accesses and servicing.	Approved subject to Legal Agreement	X	Large development however it is situated approximately 20km north west of the Site therefore significant cumulative effects are unlikely.
21	16/03416/OUT WODC	Land South Of Banbury Road Chipping Norton Oxfordshire	Outline planning application for demolition of existing buildings and erection of up to 100 residential dwellings including 40% affordable housing, creation of new vehicular access off of Banbury Road and provision of public open space with associated infrastructure and earthworks. All matters reserved except accessibility to the site, for vehicles in terms of the positioning and treatment of the access to the site.	Approved subject to Legal Agreement	X	Large development however is situated approximately 20km north west of the Site therefore significant cumulative effects are unlikely.

22	16/02657/FUL WODC	Land Off Well Lane Curbridge Witney Oxfordshire	Erection of fourteen dwellings and associated works.	Approved subject to Legal Agreement	X	Small development and is situated approximately 7km west of the Site therefore significant cumulative effects are unlikely.
23	16/00758/OUT WODC	Land North Of Standlake Road Ducklington Witney Oxfordshire	Residential development of up to 24 dwellings, of mixed size and tenure including 50% of the dwellings being affordable; together with a new access onto Standlake Road, public open space, landscaping and SUDS attenuation features (all matters reserved except means of access).	Approved subject to Legal Agreement	X	Small development and is situated approximately 7km west of the site therefore significant cumulative effects are unlikely.
24	17/02996/RES WODC	Land Between Wychwood House And Malvern Villas Witney Road Freeland Oxfordshire	Residential development comprising of 41 dwellings together with associated works.	Approved	X	Small development and is situated approximately 7km west of the Site therefore significant cumulative effects are unlikely.
25	14/1102/P/OP WODC	Land East Of Church Road Long Hanborough Oxfordshire	Erection of up to 50 dwellings, provision of play group facilities, provision of public open space and ancillary enabling works together with access from Church Road.	Approved subject to Legal Agreement	X	Development is situated approximately 6km north of the Site therefore significant cumulative effects are unlikely.

26	17/02749/RES WODC	Land South Of High Street Milton Under Wychwood Oxfordshire	Erection of 62 dwellings, landscaping including change of use, formation of footpath and creation of ecological enhancement area, and ancillary infrastructure and enabling works.	Approved	X	Development is situated approximately 7km north west of the Site therefore significant cumulative effects are unlikely.
27	17/01859/OUT WODC	Land West Of Minster Lovell South Of Burford Road Minster Lovell Oxfordshire	Residential development of up to 126 dwellings together with a new vehicular access onto Burford Road (B4047), footpath links, areas of public open space and landscaping.	Approved subject to Legal Agreement	X	Development is situated approximately 9km west of the Site therefore significant cumulative effects are unlikely.
28	17/02463/RES WODC	Land South Of New Yatt Road North Leigh Oxfordshire	Erection of 76 residential dwellings together with associated works (matters to be considered; appearance, landscaping, layout, and scale).	Approved	X	Development is situated approximately 10km north west of the Site therefore significant cumulative effects are unlikely.
29	16/04234/OUT WODC	Land North And West And East Of Belclose Cottage Witney Road North Leigh Oxfordshire	Erection of up to 50 dwellings including highway access arrangements from A4095 Witney Road, open space and associated physical infrastructure (means of access only). (Amended description).	Approved subject to Legal Agreement	X	Development is situated approximately 8km north west of the Site therefore significant cumulative effects are unlikely.
30	16/01902/OUT WODC	Land North Of New Yatt Road North Leigh Oxfordshire	Residential development comprising of up to 40 dwellings together with access, open space and associated works.	Approved subject to Legal Agreement	X	Development is situated approximately 10km north west of

						the Site therefore significant cumulative effects are unlikely.
31	15/00320/FUL WODC	Park Farm Standlake Road Northmoor Oxfordshire OX29 5AZ	Proposed residential development of fifteen dwellings, including garages and sewage treatment plant	Approved	X	Small development is situated approximately 6km east of the Site therefore significant cumulative effects are unlikely.
32	16/03761/OUT WODC	Land West Of Quarhill Close Quarhill Close Over Norton Oxfordshire	Erection of up to 18 dwellings and associated public open space (all matters except access reserved).	Approved subject to Legal Agreement	X	Small development and is situated approximately 20km north of the Site therefore significant cumulative effects are unlikely.
33	16/02851/OUT WODC	Land South Of Milton Road Shipton Under Wychwood Oxfordshire	Erection of up to 44 dwellings and a school car park with associated access and landscaping.	Approved subject to Legal Agreement	X	Development is situated approximately 16km north west of the Site therefore significant cumulative effects are unlikely.
34	16/01054/OUT WODC	Land At Former Stanton Harcourt Airfield Main Road Stanton Harcourt Oxfordshire	Re-development of former airfield for housing-led development comprising up to 50 dwellings and up to 450 sqm of office space, green infrastructure, public open space, access from Main Road and the demolition/retention of existing buildings in accordance with the	Approved subject to Legal Agreement	X	Development is situated approximately 4.5km south west of the Site however there is intervening development

			submitted Airfield Building Retention Strategy (amended description and details).			therefore significant cumulative effects are unlikely.
35	14/02130/OUT WODC	Charity Farm Woodstock Road Stonesfield Witney Oxfordshire OX29 8EJ	Outline planning permission for the erection of up to 37 dwellings with associated access and landscaping.	Approved subject to Legal Agreement	X	Development is situated approximately 7km north west of the Site therefore significant cumulative effects are unlikely.
36	15/04215/FUL WODC	Land East Of Farley Corner Farley Lane Stonesfield Oxfordshire	Erection of 13 dwellings, associated access and landscaping, and change of use of land to the north to form a burial ground.	Approved subject to Legal Agreement	X	Small development and is situated approximately 7km north west of the Site therefore significant cumulative effects are unlikely.
37	15/00561/OUT WODC	Street Farm 22 Nethercote Road Tackley Kidlington Oxfordshire OX5 3AW	Residential development, creation of a new vehicular access, landscaping and associated works.	Approved	X	Development is situated approximately 10km north east of the Site therefore significant cumulative effects are unlikely.
38	17/03338/RES WODC	Land North Of Burford Road Witney Oxfordshire	Construction of 260 dwellings (appearance, scale, landscaping and layout).	Approved	X	Development is situated approximately 8km west of the Site therefore significant

						cumulative effects are unlikely.
39	12/0084/P/OP WODC	Land At West Witney Downs Road Curbridge Witney Oxfordshire	Development comprising up to 1,000 dwellings; an employment area of 10 hectares (classes B1, B2 and B8) including provision for a possible energy centre; a local centre (classes A1- A5, B1(a), C2, C3, D1 and D2) C2 uses; a primary school; possible secondary education; playing fields and associated changing facilities; new access for vehicles, pedestrians and cyclists (including new junction at the A40/Downs Road) creation of general amenity areas and formal open space, including allotments; creation of landscaped areas; sustainable drainage measures; including storage ponds, creation of ecological habitat areas; and associated engineering and service operations; as amended by additional information received 16/11/12, diversion of bridleway.	Approved subject to Legal Agreement	X	Development is situated approximately 9km west of the Site therefore significant cumulative effects are unlikely.
40	16/01450/OUT WODC	Land At Downs Road Curbridge Witney Oxfordshire	Mixed use development comprising; an employment area of up to a maximum of 3,720 sq metres B1(a) offices; a hotel (up to 62 bed); up to a maximum of 257 homes together with public open spaces; landscaping, new access to Downs Road and other associated works.	Approved subject to Legal Agreement	X	Development is situated approximately 9km west of the Site therefore significant cumulative effects are unlikely.
41	15/00647/FUL WODC	Land At Thorney Leys Witney Oxfordshire	Erection of 25 residential units including associated parking new vehicular access landscaping and informal open space.	Approved subject to Legal Agreement	X	Development is situated approximately 8km west of the Site therefore significant

						cumulative effects are unlikely.
42	16/00602/FUL WODC	Land North Of Springfield Oval Witney Oxfordshire	Demolition of existing buildings and erection of 73 no.dwellings (1, 2 , 3 and 4 bed houses and flats) with associated access, parking, landscaping, and public open space (Amended plans).	Approved subject to Legal Agreement	X	Development is situated approximately 8km west of the Site therefore significant cumulative effects are unlikely.
43	16/01364/OUT WODC	Land East Of Woodstock Oxford Road Woodstock Oxfordshire	Outline planning application (all matters reserved except for means of access in respect of new junction arrangements) comprising up to a maximum of 300 residential dwellings, up to 1100sqm of A1/A2/B1/D1 floorspace; associated infrastructure, engineering and ancillary works; provision of public open space; formation of vehicular accesses; and Full Planning Application for the development of phase 1 comprising 46 residential dwellings (46 of the 300 described above) with associated infrastructure and engineering works.	Approved subject to Legal Agreement	X	Development is situated approximately 11km north of the Site therefore significant cumulative effects are unlikely.
44	17/02923/RES WODC	Land East Of Nethercote Road Tackley Oxfordshire	Reserved matters application for the demolition of existing agricultural buildings and residential development of 70 dwellings and associated works (amended plans).	Approved	X	Development is situated approximately 10km north east of the Site therefore significant cumulative effects are unlikely.

45	16/04230/FUL WODC	Land At London Road And Trinity Road Chipping Norton Oxfordshire	Erection of Assisted Living (Extra Care) and Retirement Living Accommodation, landscaping and car parking.	Approved subject to Legal Agreement	X	Development is situated approximately 20km north west of the Site therefore significant cumulative effects are unlikely.
46	17/00212/PN56 WODC	4 Witan Way Witney Oxfordshire OX28 6FF	Change of use of Office Building (Class B1a) to 15 residential units (Class C3)	Prior Approval Not Required	X	Small development situated approximately 6km west of the Site and does not require an EIA or prior approval therefore significant cumulative effects are unlikely.
47	17/00924/FUL WODC	Applegarth 2A Holloway Road Witney Oxfordshire OX28 6NF	Demolition of existing dwelling. Erection of 13 dwellings and associated infrastructure.	Approved subject to Legal Agreement	X	Small development situated approximately 7km west of the Site therefore significant cumulative effects are unlikely.
48	16/03533/FUL WODC	Churchill Farm Kingham Road Churchill Chipping Norton Oxfordshire OX7 6NE	Demolition of existing structures and erection of ten dwellings with associated garages, car parking and landscaping.	Approved subject to Legal Agreement	X	Small development situated approximately 20km north west of the Site therefore significant cumulative effects are unlikely.

49	16/02113/FUL WODC	Station Garage Station Road Kingham Chipping Norton Oxfordshire OX7 6UP	Removal of existing buildings. Erection of 10 dwellings with associated access and landscaping.	Approved subject to Legal Agreement	X	Small development is situated approximately 20km north west of the Site therefore significant cumulative effects are unlikely.
50	17/00609/FUL WODC	Manor Farm Eynsham Road Cassington Witney Oxfordshire OX29 4DL	Demolition of existing Dutch barns and erection of 10 dwellings together with associated works and formation of vehicular access.	Approved subject to Legal Agreement	X	Development is situated 3km away and 10 dwellings. Although this is a major development in EIA terms, it is unlikely that it will lead to significant cumulative effects.
51	16/02369/FUL WODC	Land On Stanton Harcourt Road Old Station Way Eynsham Oxfordshire	Extension to existing manufacturing building, erection of two storey manufacturing and office building, two storey research and development building and two storey office building. Creation of new vehicular access onto B4449 with associated gatehouse. Provision of 316 car parking spaces, creation of wild flower meadow and diversion of public footpath.	Approved subject to legal agreement	X	The development is approximately 1km south of the Site, however, it is well screened through existing views and is solely of employment use therefore it is unlikely that it will lead to significant cumulative effects.
52	18/02065/OUTFUL Oxford City Council	Oxford North (Northern Gateway) Land Adjacent To A44, A40, A34 And Wolvercote	Hybrid planning application comprising: (i) Outline application (with all matters reserved save for "access"), for the erection of up to 87,300 m2 (GIA) of employment space (Use Class B1), up to 550 m2 (GIA) of community space (Use Class D1), up to 2,500 m2 (GIA) of	Registered	X	Large development however it is situated approximately 5km east of the Site

		Roundabout Northern By-Pass Road Wolvercote Oxford Oxfordshire OX2 8JR	Use Classes A1, A2, A3, A4 and A5 floorspace, up to a 180 bedroom hotel (Use Class C1) and up to 480 residential units (Use Class C3), installation of an energy sharing loop, main vehicle access points from A40 and A44, link road between A40 and A44 through the site, pedestrian and cycle access points and routes, car and cycle parking, open space, landscaping and associated infrastructure works. Works to the A40 and A44 in the vicinity of the site. (ii) Full application for part of Phase 1A comprising 15,850 m2 (GIA) of employment space (Use Class B1), installation of an energy sharing loop, access junctions from the A40 and A44 (temporary junction design on A44), construction of a link road between the A40 and A44, open space, landscaping, temporary car parking (for limited period), installation of cycle parking (some temporary for limited period), foul and surface water drainage, pedestrian and cycle links (some temporary for limited period) along with associated infrastructure works. Works to the A40 and A44 in the vicinity of the site.			therefore significant cumulative effects are unlikely.
53	15/00166/OUT WODC	Land West Of Shilton Road Burford Oxfordshire	Outline application for the erection of up to 91 dwellings (50% affordable) and care/retirement complex (all matters reserved except means of access).	Refused	X	This planning application has been refused.
54	15/00761/FUL WODC	Eynsham Nursery And Plant Centre Old Witney Road Eynsham Witney Oxfordshire OX29 4PS	Erection of 77 dwellings (comprising a mix of 1 bedroom flats and 2, 3, 4 and 5 bedroom houses), open space, car parking and all associated landscaping and ancillary works. Formation of new vehicular access.	Refused	X	This planning application has been refused.

55	15/01184/FUL WODC	Land At Newland Street Eynsham Oxfordshire	Erection of 13 dwellings with associated access, parking and open space.	Refused	X	This planning application has been refused.
56	14/1046/P/FP WODC	Land South Of Church Street Kingham Oxfordshire	Erection of sixteen dwellings with associated garages and parking.	Refused	X	This planning application has been refused.
57	14/1234/P/OP WODC	Land South Of Witney Road Long Hanborough Oxfordshire	Erection of up to 169 dwellings, with new Doctors Surgery, to be up to 740 sq metres in size, with around 27 car parking spaces, with access from the Witney Road, plus open space, and associated works.	Refused	X	This planning application has been refused.
58	15/03797/OUT WODC	Land South East Of Pinsley Farm Main Road Long Hanborough Oxfordshire	Erection of up to 120 dwellings and provision of building for Class D1 use, together with associated works (means of access only).	Refused	X	This planning application has been refused.

Number	Application Reference	Site Name	Application Status
1.	15/03148/OUT	Land West of Thornbury Road, Eynsham, Oxfordshire	Approved
2.	N/A	A40 Science Transit 2 - Proposed Eynsham Park & Ride and Bus Lane Scheme	N/A
3.	N/A	West Eynsham	N/A
4.	N/A	Lower Road, Church Hanborough	N/A
5.	N/A	Land between Eynsham & Cassington	N/A
6.	N/A	Residual areas of OCGV Strategic Location for Growth- Policy EW1	N/A
7.	N/A	Residual areas of OCGV Strategic Location for Growth- Policy EW1	N/A

- Site Boundary
- Nominated Mineral Sites
- Committed Developments
- 1km Radius from Site
- 5km Radius from Site
- Bus Lane as Part of the Eynsham P&R Scheme

Oxfordshire Cotswolds Garden Village

0 2 km

pba peterborett now part of Stantec

Client: GROSVENOR

1:50,000 @ A3

18/03/19

Drawn: IB

Checked: NW

Committed Developments Plan

Figure 1 | Rev D

Document Path: Z:\Projects\39289\02_mxd\39289_CommittedDevelopments.mxd

Appendix D LVIA

Technical appendix G2: Methodology for the landscape and visual impact assessment

Introduction

G2.1 The following paragraphs set out the methodology that has been followed in the baseline study of the existing landscape, townscape and visual amenity and the subsequent assessment of the effects of the proposals.

LVIA guidelines

G2.2 The Landscape and Visual Impact Assessment (LVIA) has been carried out in accordance with the following best practice guidelines:

- The *Guidelines for Landscape and Visual Impact Assessment*, (GLVIA) 3rd Edition, Landscape Institute (LI) and Institute for Environmental Management and Assessment (IEMA) (2013)
- *An Approach to Landscape Character Assessment*, Natural England (October 2014)
- *SNH Visual Representation of Wind Farms guidance*, version 2.2 February 2017
- *Landscape Institute Advice Note 01/11, Photography and Photomontage in Landscape and Visual Assessments*

Role of the LVIA

G2.3 Paragraph 2.21 of the GLVIA states that there are two distinct components of the LVIA:

"Assessment of landscape effects: assessing effects on the landscape as a resource in its own right;

Assessment of visual effects: assessing the effects on specific views and on the general visual amenity experienced by people."

Definition of landscape

G2.4 In describing landscape, paragraph 2.19 of the GLVIA states that:

"Landscape results from the interplay of the physical, natural and cultural components of our surroundings. Different combinations of these elements and their spatial distribution create the distinctive character of landscapes in different places, allowing different landscapes to be mapped, analysed and described. Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of the landscape that make different places distinctive."

Definition of visual amenity

G2.5 The GLVIA glossary defines the meaning of visual amenity as:

"The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of

activities of the people living, working, recreating, visiting or travelling through an area."

G2.6 The methodology for assessing both the landscape and visual effects is outlined in paragraphs G2.34 to G2.67.

Assessment process

G2.7 The process of landscape and visual assessment (LVIA) includes the following stages:

- Project description – Describes the proposed development, identifying the main features of the proposals, and establishes parameters such as maximum extents of the development or sizes of the elements
- Baseline studies – Establishes the existing nature of the landscape and visual environment in the study area, including any relevant changes likely to occur independently of the development proposal. Includes information on the value attached to the different environmental resources
- Identification and description of effects – Systematically identifies and describes the effects that are likely to occur, including whether they are adverse or beneficial
- Assessing the significance of effects – Systematically and transparently assesses the likely significance of the effects identified
- Mitigation – Makes proposals for measures designed to avoid / prevent, reduce or offset (or compensate for) any significant negative (adverse) effects

Professional judgement

G2.8 Professional judgement is an important consideration in the determination of the overall landscape and visual effects and even with qualified and experienced professionals there can be differences in the judgements made.

G2.9 Paragraph 2.23 of the GLVIA states that:

"While there is some scope for quantitative measurement of some relatively objective matters, for example the number of trees lost to construction of a new mine, much of the assessment must rely on qualitative judgements, for example about what effect the introduction of a new development or land use change may have on visual amenity or about the significance of change in the character of the landscape and whether it is positive or negative."

G2.10 Paragraph 2.24 of the GLVIA states that:

"In all cases there is a need for the judgements that are made to be reasonable and based on clear and transparent methods so that the reasoning applied at different stages can be traced and examined by others."

Baseline assessment

G2.11 The landscape and visual baseline conditions were established by:

Landscape	Visual
Identify elements and features	Identify extent of possible visibility (ZTV)

Identify landscape character and key characteristics	Identify visual receptors (people) who may be affected
Consider value attached to landscape	Identify and select representative, illustrative and specific viewpoints
Identify landscape receptors	

Site familiarisation

G2.12 The site and surrounding area were visited in XXXXXX to obtain familiarity with the landscape. Field studies and desk studies of photographs, aerial photographs, map information, landscape character assessments and statutory and emerging planning policy documents have enabled the recording of landscape elements such as topography, drainage, land use, development, vegetation and other features.

Defining the study area

G2.13 The study area defines the scope of the assessment. The study area includes the site itself and the wider area around it, within which the proposed development may have a significant influence. The extent of the study area has been established using a zone of theoretical visibility (ZTV) of the proposed development in combination with observations made on site. During the assessment process the study area may change as a result of fieldwork studies or changes to the proposals.

G2.14 A 2.5 km study area was chosen, as the visibility beyond this distance will become limited and the proposed development is unlikely to have any significant adverse effects. The extent of the study area is a matter of professional judgement as indicated in paragraph 6.11 of the GLVIA and has been agreed with West Oxfordshire District Council.

Identifying landscape character, elements and features

G2.15 Published and adopted landscape character assessments (LCA) prepared by relevant authorities at varying levels, from national through to local assessments, have been referred to in order to identify the baseline landscape character, resources and associated value. These established assessments have been reviewed in terms of their status, scale and level of detail provided and therefore suitability for use within the LVIA. This review also took account of the date in which the assessments where carried out and how relevant the content is in relation to the current landscape characteristics.

G2.16 National and county level LCA generally give a broad scale assessment, which often provides an overview of the landscape context and setting but does not necessarily represent the local landscape characteristic of the site and surrounding area. Local LCA provide more detail on the types of landscape that occur in the study area. They are therefore considered appropriate as a basis for describing the key characteristics and are used to inform the description of the landscapes that may be affected by the proposals.

G2.17 Detailed fieldwork carried out within the site and immediate surroundings is used to check the applicability of the landscape character assessments throughout the study area, and where variations in the landscape are identified since the LCA was adopted, modifications are made or supplementary information is provided in the baseline assessment.

G2.18 ZTV analysis and field studies have been carried out to determine which landscape character areas will be physically or perceptually affected by the proposals.

Identifying possible extent of visibility (ZTV)

G2.19 Computer generated mapping has been used in combination with fieldwork, to assess the potential visibility of the proposals. The extent of visibility over which the proposed development may theoretically be seen, ZTV, is provided in figure 8.12.

G2.20 The ZTV has been derived from a Digital Surface Model. The DSM was based on a 2 m grid provided by Bluesky. This uses photogrammetrically derived information during summer that provides a highly detailed three-dimensional model of the landscape and townscape. Topographic features including landform, woodland, settlements, individual buildings, isolated trees, copses, hedgerows, embankments and other minor topographic features, out to a distance of 2.5 km from the application boundary, are all modelled. The accuracy of the DSM falls within acceptable limits; however, there are potential discrepancies between the DSM and the actual landform where there are minor topographic features that are too small to be picked up. The Bluesky data can pick up the majority of the woodland and buildings, although areas can be missed between the 2 m grid.

G2.21 For this project, the ZTV has been generated using the DSM and the following proposed building height parameters:

- Up to 2 storey residential: up to X m
- Up to 2.5 storey residential: up to X m
- Up to 3 storey residential: up to X m
- Up to 4 storey residential: up to X m
- Up to 3 storey employment: up to X m
- School: up to X m
- Community: up to X m
- Landmark: up to X m. (UPDATE ONCE WE HAVE FINAL BUILDING HEIGHTS)

G2.22 The height from which the proposed development would be seen was set at 1.6 m (mid way between the average heights for men and women given in the GLVIA). A professional judgement has been made for this assessment that approximately 2.5 km is the distance beyond which proposals of this scale, nature and context would not have a significant effect on either landscape / townscape character or views. The resulting ZTV, figure 8.12, illustrates the extent to which any part of the proposals (large or small) is potentially visible from the surrounding area.

G2.23 During fieldwork, any significant discrepancies in the ZTV are recorded and later amended. Fieldwork was confined to accessible parts of the site, public rights of way, transport routes and other publicly accessible areas.

Identifying visual receptors

G2.24 The baseline study will have determined the individuals and / or defined groups of people who have the potential to be affected by the proposals. These are referred to as visual receptors.

G2.25 Paragraph 6.13 of the GVLIA states that visual receptors may include:

> *"…people living in the area, people who work there, people passing through the landscape on road, rail or other forms of transport, people visiting promoted landscapes or attractions, and people engaged in recreation of different types".*

Identifying viewpoints

G2.26 Following analysis of the ZTV and fieldwork, a series of viewpoints from which the proposals will be seen by the individual or groups of visual receptors were identified. To illustrate all potential viewpoints from which the proposals will be seen by the different visual receptors within the study area is not practical and is unnecessary for the purposes of the EIA. Therefore, viewpoints selected for inclusion in the LVIA broadly fall into three groups:

- Representative viewpoints (represent the experience of different types of visual receptors). For example, certain points may be chosen to represent the views of users from a particular public right of way
- Specific viewpoints (a particular view from a key or promoted viewpoint). For example, viewpoints with a particular cultural landscape associations
- Illustrative viewpoints to demonstrate a particular effect / issue. For example, the restricted visibility at a certain location.

G2.27 Generally, viewpoints are selected from publicly accessible land and / or the transport routes. Private views from residential receptors have not been taken, however representative or specific viewpoints from adjacent areas can take into consideration that similar views may be afforded from receptors of residential properties.

Future baseline

G2.28 In describing potential effects, account must also be taken of ongoing changes to the area surrounding the site and the site itself should no development take place, which is described as future baseline. Those schemes that are under construction or have planning consent, which it can be reasonably assumed will be constructed, are to be included in the assessment's baseline. Understanding and describing how the proposals will be experienced in the immediate context of existing and future developments is important to reaching accurate and realistic conclusions on the overall effects.

G2.29 Chapter X of this ES describes the future baseline schemes. Those schemes that are not visible in the immediate context of the proposed development have not been considered as part of the future baseline. The baseline schemes that have been taken into consideration are described within this assessment under section 8.??.

Description of proposals

G2.30 The planning application drawings and design and access statement provide a description of the proposals. In this ES the proposals are described in chapter 2, while chapter 8 summarises the elements that are likely to give rise to landscape or visual effects. The effects on landform and on existing landscape features such as vegetation are also described. Proposals for landscape measures such as new planting are set out.

Mitigation measures

G2.31 The GLVIA describes three forms of mitigation measures. These are:

- *"Primary measures, developed through the iterative design process, which have become integrated or embedded into the project design;*
- *Standard construction and operational management practices for avoiding and reducing environmental effects;*
- *Secondary measures, designed to address any residual adverse effects remaining after primary measures and standard construction practices have been incorporated into the scheme."*

G2.32 The first two forms are referred to as primary mitigation, while the last is referred to as secondary mitigation. At all stages of the iterative design development, the purpose has been to prevent / avoid, reduce and where possible offset or remedy potential adverse effects by including primary mitigation measures and standard construction and operational management practices. The plans illustrated in the proposals chapter 2 figures incorporating these primary measures are used to assess predicted potential effects.

G2.33 Secondary mitigation measures are those that have not been designed into the proposals that form part of this application. Potential secondary mitigation measures are described and considered in the assessment. Where significant adverse effects remain after secondary mitigation, these are referred to as residual effects.

Landscape assessment

G2.34 The landscape assessment judges the potential effects of the proposals on the landscape receptors that have been identified. The significance of a landscape effect is determined by consideration of the sensitivity of the landscape receptors and the magnitude of the landscape effect as a result of the proposals. These are defined in the following paragraphs.

Criteria for assessing potential significance of landscape effects

Sensitivity of landscape receptor

G2.35 The sensitivity of the landscape is assessed by combining the considerations of two factors:

- Value
- Susceptibility to specific change

G2.36 The value of the landscape receptor is defined in the GLVIA (paragraph 5.19) as:

> *"The relative value that is attached to different landscapes by society, bearing in mind that a landscape may be valued by different stakeholders for a whole variety of reasons."*

G2.37 The value of the landscape receptor is established at the baseline stage and considers two key categories as highlighted in paragraph 5.44 of the GLVIA:

- *"The value of the landscape character types or areas based on review of any designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value;*
- *The value of individual contributors to landscape character, especially the key characteristics, which may include individual elements of the landscape, particular landscape features, notable aesthetic, perceptual or experiential qualities, and combinations of the contributors."*

G2.38 Landscape designations should not be over relied upon to signify the value of the landscape receptors. Other factors that can help in the identification of valued landscapes include:

- Landscape quality (condition)
- Scenic quality
- Rarity
- Representativeness
- Conservation interests
- Recreational value
- Perceptual aspects including wildness and / or tranquillity
- Associations.

G2.39 In the absence of a formal landscape designation or landscape character area, judgement on the value of a landscape is based on the criteria set out in the paragraph above (G2.38).

G2.40 The landscape receptors' susceptibility to specific change is defined in the GLVIA (paragraph 5.40) as follows:

> *"The ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and /or achievement of landscape planning policy and strategies."*

G2.41 Paragraph 5.42 of the GLVIA also states that:

> *"Since landscape effects in LVIA are particular to both the specific landscape in question and the specific nature of the proposed development, the assessment of susceptibility must be tailored to the project."*

G2.42 Factors for judging susceptibility to change include:

- Vulnerability or robustness of elements of the landscape
- The tolerance, i.e. the extent to which elements of the landscape can be replaced, restored or may be altered
- The level or role elements of the landscape have in defining the character of the landscape
- The landscape sensitivity to the specific type of development proposed.

G2.43 The guidance set out in figure 8.1 has been used in this assessment to arrive at an overall evaluation of landscape sensitivity. Both susceptibility to change and value are judged as high, medium, low or negligible based on the criteria shown. There may be circumstances where the weighting given to some criteria may be greater than others. The combination of susceptibility and value produces an overall evaluation of landscape sensitivity, which is ultimately a matter of professional judgement, and is defined in this assessment as high, medium, low or negligible.

Magnitude of landscape effect

G2.44 The magnitude of effect is assessed in terms of:

- Size / scale
- Geographical extent
- Duration
- Reversibility.

G2.45 The size or scale of an effect is assessed by determining the degree of change that would arise from the proposals. The effect of both loss and addition of new features is judged as major, partial, minor or very minor based on the criteria set out in figure 8.2. The judgements may take into account:

- The extent of existing landscape elements that will be lost (this may be quantified)
- The degree to which aesthetic or perceptual aspects of the landscape are altered through the loss of or addition of landscape resources / elements. For example, removal of hedges may change a small-scale intimate landscape into a large scale, open one
- Whether the effect changes any of the key characteristics which are distinctive to the landscape character.

G2.46 The geographical extent of effects is assessed by determining the area over which the landscape effects will be felt. The effect is considered across varying scales of wide, intermediate, localised or limited based on the criteria set out in figure 8.2. In general, the effects will vary according to the nature of the project and may not be relevant on every occasion.

G2.47 The duration of effects is assessed by the period of time over which the degree of change to the landscape would arise from the development. Duration is judged as long term, medium term or short term based on the criteria set out in figure 8.2.

G2.48 The reversibility of an effect assesses the prospects or practicality of the effect being reversed. The effect is judged as reversible, partially reversible or permanent as set out in figure 8.2.

G2.49 Duration and reversibility can be considered together so that a temporary or partially reversible effect is linked to definition of how long that effect may last.

G2.50 The guidance notes and criteria set out in figure 8.2 have been used to make a judgement on the magnitude of landscape effect for this assessment. The magnitude of landscape effect is determined by combining the judgements of the four individual factors of size / scale, geographical extent, duration and reversibility. There may be circumstances where the weighting given to some criteria may be greater than others. The combination of all four factors produces an overall evaluation of magnitude of landscape effect, which is ultimately a matter of professional judgement, and is defined in this assessment as large, medium, small or negligible.

Judging the overall significance of landscape effect

G2.51 The degree of the effects on the landscape resources is considered from a sequentially combined evaluation of the landscape sensitivity and the magnitude of effect. The matrix in figure 8.3 has been used to guide this judgement. The definitions used are included in that figure. They are applied to both potential effects, and to residual effects. If the degree of effect is moderate or above then the effect is considered to be significant.

G2.52 The GLVIA guidance also states that thought must be given to whether the likely significant landscape effects are judged to be positive (beneficial) or negative (adverse). The GLVIA (paragraph 5.37) suggests that when judging the effects to be adverse or beneficial the factors to be considered should include, but not be restricted to the following:

- *"The degree to which the proposal fits within the existing landscape character*
- *The contribution to the landscape that the development may make in its own right, usually by virtue of good design, even if it is in contrast to existing character."*

Visual assessment

G2.53 The visual assessment judges the potential effects of the proposals on the visual receptors that have been identified. The significance of a visual effect is determined by consideration of the sensitivity of the visual receptors and the magnitude of the effect on visual amenity. These are defined in the following paragraphs.

Criteria for assessing potential significance of visual effects

Sensitivity of visual receptors

G2.54 A visual receptor is a particular person or group of people who would be experiencing the view or are likely to be affected at a specific viewpoint.

G2.55 The sensitivity of the visual receptor is assessed by combining the judgements of two factors:

- Value attached to views
- Susceptibility of visual receptors to change.

G2.56 The GLVIA suggests that when judging the value attached to the views experienced (paragraph 6.37), account should be taken of:

- *"recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations;*
- *indicators of the value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment and references to them in literature or art."*

G2.57 The value attached to the views experienced is established at the baseline stage and considers these two key categories:

- The quality of the view / visual experience, i.e. attractive unspoilt landscape
- The associations that contribute to the visual experience, i.e. cultural / historical / ecological interests and planning designations.

G2.58 The visual receptors' susceptibility to change is defined in the GLVIA (paragraph 6.32) as follows:

- *"the occupation or activity of people experiencing the view at particular locations; and*
- *the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations."*

G2.59 The guidance set out in figure 8.4 has been used in this assessment to arrive at an overall evaluation of the sensitivity of the visual receptors. Both susceptibility to change and value are judged as high, medium, low or negligible based on the criteria shown. There may be circumstances where the weighting given to some criteria may be greater than others. The combination of susceptibility and value produces an overall evaluation of visual receptor sensitivity, which is ultimately a matter of professional judgement, and is defined in this assessment as high, medium, low or negligible.

Magnitude of visual effect

G2.60 The magnitude of visual effect is assessed in terms of:

- Size / scale
- Geographical extent
- Duration
- Reversibility.

G2.61 The size or scale of a visual effect is assessed by determining the degree of change that would arise from the proposals. The effect of loss, addition or change to the composition of the view through the introduction of development is judged as major, partial, minor or very minor based on the criteria set out in figure 8.5. The GLVIA (paragraph 6.39) suggests that when judging the visual effects the following should be taken account of:

- *"the scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the proposed development;*
- *the degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture;*
- *the nature of the view of the proposed development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses."*

G2.62 The geographical extent of visual effects is assessed by determining the area over which the visual effects will be seen. The visual effect is considered across varying scales of wide, intermediate, localised or limited based on the criteria set out in figure 8.5. The GLVIA (paragraph 6.40) suggests that extent is likely to reflect:

- *"the angle of view in relation to the main activity of the receptor;*
- *the distance of the viewpoint from the proposed development;*
- *the extent of the area over which the changes would be visible."*

G2.63 The duration of effects is assessed by the period of time over which the degree of change to the visual receptor would arise from the development. Duration is judged as long term, medium term or short term based on the criteria set out in figure 8.5.

G2.64 The reversibility of an effect assesses the prospects and the practicality of the effect being reversed. The effect is judged as reversible, partially reversible or permanent as set out in figure 8.5.

G2.65 The guidance notes and criteria set out in figure 8.5 have been used to make a judgement on the magnitude of visual effect for this assessment. The magnitude of visual effect is determined by combining the judgements of the four individual factors of size / scale, geographical extent, duration and reversibility. There may be circumstances where the weighting given to some criteria may be greater than others. The combination of all four factors produces an overall evaluation of magnitude of visual effect, which is ultimately a matter of professional judgement, and is defined in this assessment as large, medium, small or negligible.

Judging the overall significance of visual effects

G2.66 The degree of the effects on the visual receptor is considered from a sequentially combined evaluation of the visual receptor sensitivity and the magnitude of effect. The matrix in figure 8.6 has been used to guide this judgement. The definitions used are included in that figure. They are applied to both potential effects and to residual effects. If the degree of effect is moderate or above then the effect is considered to be significant.

G2.67 The GLVIA guidance also states that thought must be given to whether the likely significant visual effects are judged to be positive (beneficial) or negative (adverse). This is based on professional judgement as to whether the effects will affect the quality of the visual experience for those people who will see the proposed development, given the nature of the existing views. The GLVIA

(paragraph 6.44) suggests that when judging the effects to be adverse or beneficial the factors to be considered should include but not be restricted to the following:

- *"Effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant*
- *Effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant*
- *Large-scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features already present within the view."*

Taking account of effects throughout the life of the project

G2.68 The degree of landscape and visual effects can vary considerably during the life cycle of the project. Within the assessment a description of the development is provided at each stage in the life cycle of the project to assist in understanding the scheme and the predicted landscape and visual effects of the development. The description of effects considers the following project stages:

- During construction
- At completion (post-construction - year 0), including seasonal variation and night time. The assessment of night time effects will be informed by the findings of the lighting assessment, as set out in chapter X and technical appendix ?.
- Year 15 post construction.

Technical appendix G3: Photographic images methodology

Photographic survey

G3.1 The aim is to recreate as closely as possible what the human eye can see. 50 mm is a traditionally agreed focal length for matching a photograph to the actual view seen, but a range between 45 mm to 55 mm is often used.

G3.2 For this assessment, a Canon EOS 6D camera was used in conjunction with a 50 mm prime lens. The EOS 6D employs a sensor of similar size to a traditional SLR, therefore the 50 mm lens used results in a focal length of 50 mm as no modification factor is applied. This methodology is in accordance with the LI *Advice note 01/11, Photography and photomontage in landscape and visual impact assessment*.

G3.3 In this assessment, the photographs are taken at approximately 1.6 m above ground level using a tripod.

G3.4 GPS is used to provide a six-figure National Grid reference for the view. The accuracy of this device can vary (depending on factors such as satellite coverage, proximity of buildings, tree coverage etc.) so these figures are then checked on detailed OS survey plans to give a more accurate reference.

G3.5 For panoramic photographs an overlap of between 35% and 50% of each frame is used to allow the creation of a seamless panoramic, using Photoshop.

Photomontages

Baseline panorama

G3.6 All photographic representations are to be viewed at a comfortable arm's length. The baseline panorama shows the existing view and captures the overall landscape and visual context. The images are provided in cylindrical projection and should be viewed curved.

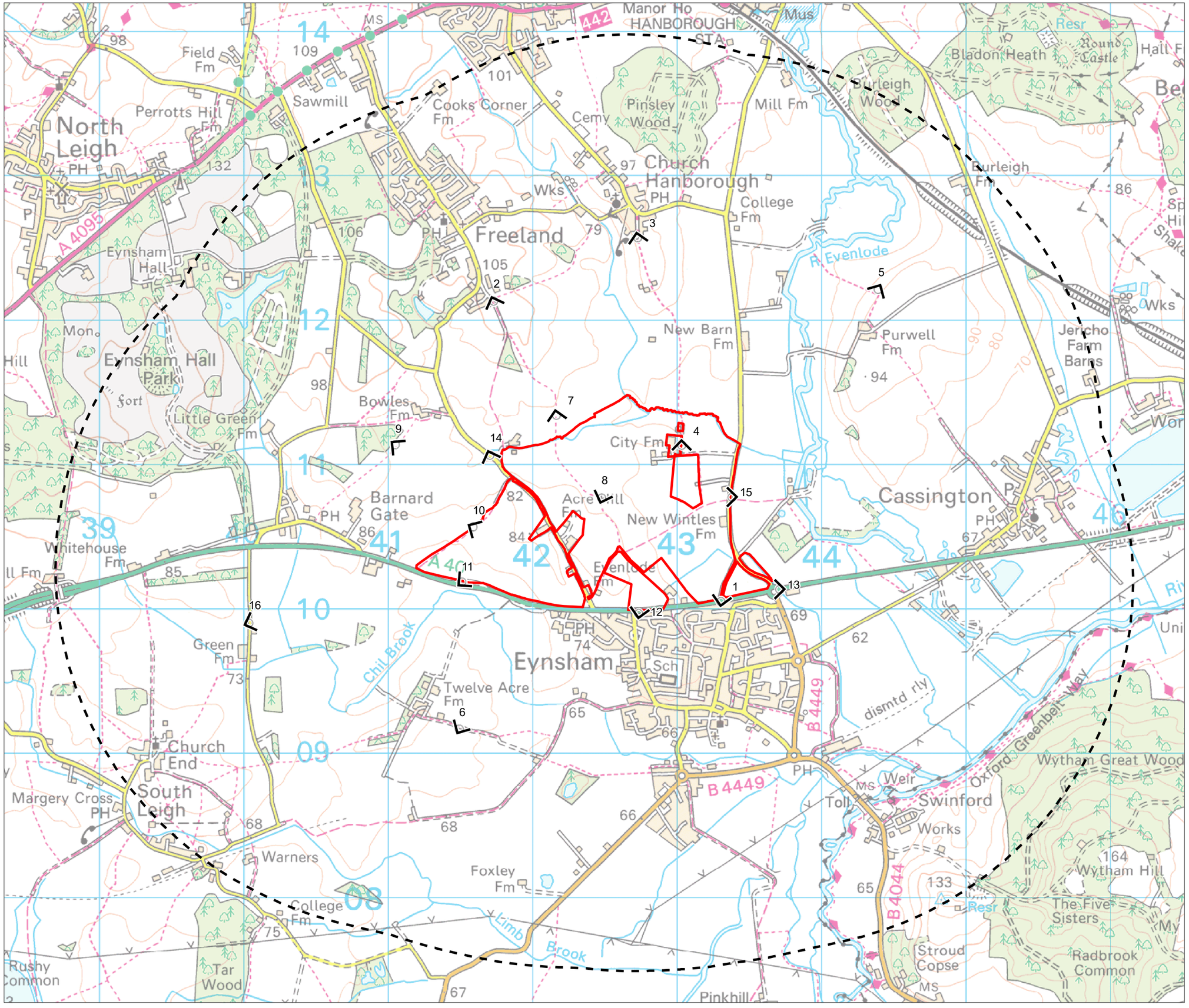
Proposed visualisations

G3.7 Photomontages are used to illustrate the likely view of a proposed development based on the outline parameter plans (figures XXXX), as it would be seen in a photograph. It is important to note that visualisations of the proposals in themselves can never provide the full understanding of potential impacts; they only inform the assessment process by which judgements are made. Photomontages can never be fully accurate and are used to give an illustrative impression of the proposals. The images are provided in planar projection and should be viewed flat at a comfortable arm's length.

G3.8 The photomontages contained in this study comply with the latest best practice guidelines and represent a wireframe outline of the proposals in the context of a site photograph. Paragraph 8.24 of the GLVIA states:

> *"Wireframes are computer-generated line drawings, based on a digital terrain model combined with information about the location and scale of components of the development, to give a relatively simple indication of how the proposals will appear from different viewpoints."*

G3.9 A 3D block model of the proposed development blocks based on AOD levels, has been used to generate a geometrically accurate wireframe illustrating the scale, mass and arrangement of the proposals based on the outline parameters. The extent of proposed structure planting has also been modelled to illustrate the parameter landscape proposals. The wireframe of the proposals has then been aligned and superimposed on to the selected viewpoint photographs. The photomontages have been constructed using surveyed photographs (surveyed with GRX-1 survey equipment which records the viewpoint's height above ground and OS grid coordinates) and aligned using surveyed control points taken within the surrounding area.



Site boundary

2.5km study area

Viewpoint locations

Oxfordshire Cotswold Garden Village
Grosvenor

0 625 m

N

Viewpoint locations plan

Dwg no/	Revision
Status	06 February 2019
Scale: 1:25,000 @A3	Drawn by: JC / Checked by: JD

LONDON
7 Heddon Street
London W1B 4BD

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

BIRMINGHAM
Enterprise House 115 Edmund Street
Birmingham B3 2HJ

TERENCE O'ROURKE

TELEPHONE
020 3664 6755

www.torltd.co.uk

Appendix E Phase 1 Ground Conditions Assessment

now part of

Oxfordshire Cotswold Garden Village, Eynsham

Phase 1 Ground Condition Assessment

[Ground Stability, Phase 1 Contaminated Land & Mineral (Sand and Gravel) Resources]

On behalf of **Grosvenor Developments Ltd**

Project Ref: 39289/001 | Rev: 00 | Date: January 2019

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
T: +44 (0)118 950 0761 E: reading@peterbrett.com

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Report Title: **Phase 1 Ground Condition Assessment**

Doc Ref: **39289/P038/P1GCA/PJ/RF/NH**

Date: **January 2019**

	Name	Position	Signature	Date
Prepared by:	Nick Hills	Geoenvironmental Engineer	N. Hills	31.01.19
Reviewed by:	Robert Foster	Principal Engineer	R. Foster	31.01.19
Approved by:	David Atherton	Director	D. Atherton	31.01.19
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved
00	Jan '19	Draft for comment	NH	RF	DA

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1 Introduction

1.1 Background

1.1.1 This Phase 1 Ground Condition Report has been prepared by Peter Brett Associates LLP (PBA) on behalf of Grosvenor Developments Ltd (the "Client") in relation to strategic development proposals at the site referred to as Oxfordshire Cotswold Garden Village.

1.1.2 As illustrated in **Figure 1**, the site is located to the north of Eynsham, Oxfordshire and covers an area of approximately 185 hectares consisting predominantly of farmland. Further details are given in **Figure 2a**.

1.1.3 The land is bordered by the A40 to the south, by Lower Road to the east, by farm tracks and field boundaries to the west and a tributary of the Hanborough Stream and Hanborough Stream itself to the north. The village of Eynsham lies south of the site (beyond the A40) and land use in the vicinity of the site is mainly agricultural farmland. Cuckoo Lane bisects the western area of the site and is aligned north-west to south-east with a junction on the A40 on the southern site boundary.

1.1.4 A masterplan for the site is being developed and this report is intended to inform that process by considering potential geotechnical, geoenvironmental and mineral related constraints and opportunities.

1.2 Objective

1.2.1 This Phase 1 Ground Condition Report has been prepared by PBA with the objective of identifying the existing ground conditions and environmental setting of the site using readily available published information and observations made during a site walkover. The aim is to identify how the ground conditions may influence the opportunities, and present constraints, to future development.

1.3 Proposed Development

1.3.1 The masterplan for the site is in the early stages of development but will include;

- the phased construction of a minimum to 2,200 homes,
- areas set aside for employment,
- community amenities, and
- the associated road network, parking and infrastructure to support the development.

1.4 Scope of Work/Terms of Reference

Assessment of Ground Conditions – Ground Stability

1.4.1 The preliminary ground stability assessment methodology adopted by PBA follows the guidance on preliminary land stability assessment given in the Planning Practice Guidance for Land Stability published by the Department for Communities and Local Government (DCLG 2014). The guidance at least requires a desk based study and a site inspection visit based on which the assessment is undertaken by an appropriately qualified person.

1.4.2 The desk based study comprises a review of existing readily available published sources of geological, geomorphological, hydrogeological and /or mining information on the site and its surroundings and a historical review including mapping and aerial imagery, if appropriate.

Ground Condition (Contamination) Assessment

1.4.3 The PBA methodology for ground contamination risk assessment is presented in **Appendix 1**.

1.4.4 In order to identify the current conditions and land use on the site and in the surrounding area, readily available information in the public domain has been obtained and reviewed, and a site reconnaissance walkover has been carried out. This report presents a review of the acquired information, together with the development of a Preliminary Conceptual Site Model (CSM) and an associated Phase 1 risk assessment.

Minerals (Sand and Gravel) Resource Desk Study

1.4.5 The British Geological Survey (BGS) provides guidance to planning practitioners on how to implement national policy with respect to the safeguarding and as appropriate prior extraction of mineral (BGS, 2011).

1.4.6 Available published geological information has been used in this assessment, together with data held in the BGS's online national onshore borehole record database and accessible through the web-hosted BGS mineral resource maps portal. No additional intrusive investigation has been undertaken by PBA.

1.4.7 Attention is drawn to the Guidance Note in Section 11 which provides advice for readers of this report.

1.5 Report Format

1.5.1 The description of the site, including on and off-site land-uses observed during a site walkover, is presented in **Section 2**. A summary of the historical land-uses of the site is presented in **Section 3**. The geological and hydrogeological setting of the site is described in **Section 4**, including a discussion of the potential geological hazards at the site. The environmental setting of the site, in terms of hydrology and ecology, is discussed in **Section 5**, with a discussion of potentially contaminative land-uses on and off site in **Section 6**.

1.5.2 **Sections 2** to **6** have been used to inform a Tier 1 contamination risk assessment and geotechnical assessment which are discussed in **Sections 7** and **8**, respectively.

1.5.3 A desk study review of minerals (sand and gravel) resources and waste management relating to the site and surrounding area is presented in **Section 9**.

1.5.4 A summary of the anticipated ground conditions and opportunities and constraints that the ground conditions present for the proposed development of the site are discussed in **Section 10**.

1.5.5 Essential guidance for report readers is presented in **Section 11**.

2 Site Description

2.1 Main Features

2.1.1 The general topography of the site and the surrounding area is shown on **Figure 2a**. The land within the site slopes gently in all directions from the summit of a hill (Acre Hill) at an elevation of approximately 85m above Ordnance Datum (m AOD) located in the centre-south of the site.

2.1.2 As shown on **Figure 2b**, for ease of description, the site area has been split into three sub-areas named “Parcel A”, “Parcel B” and “Parcel C”. The site will be described in terms of these sub-areas during this report.

2.1.3 The location of the features described in the text below are shown in **Figure 2a**.

Parcel A

2.1.4 Parcel A comprises a triangular parcel of land to the west of Cuckoo Lane and occupies an area of approximately 50 hectares. Parcel A is predominantly farmland split into numerous fields separated by hedgerows. The main feature within Parcel A is an off-road motorbike racing track located in the south-western corner.

2.1.5 Parcel A is bordered by the A40 to the south, by Cuckoo Lane to the east and by further agricultural farmland to the west. Parcel A does not include an adjacent depot and electricity transformer station, both of which front onto Cuckoo Lane on the eastern edge of this parcel but are not within the site boundary.

2.1.6 Generally, ground levels within Parcel A fall from approximately 85 m AOD in the vicinity of Cuckoo Lane on the eastern site boundary towards the southern and south-western areas of the parcel to a low of approximately 67 m AOD in the south-west corner of the parcel.

Parcel B

2.1.7 Parcel B comprises the majority of the remaining land within the site boundary, to the east of Cuckoo Lane and is the largest of the three parcels at an area of approximately 155 hectares. Parcel B is predominantly farmland split into numerous fields separated by hedgerows.

2.1.8 Parcel B is bordered to the north by further agricultural land and an unnamed watercourse (a tributary of the Hanborough Stream) and Hanborough Stream, to the east by Lower Road, to the south by the A40, small areas of agricultural land and soft landscaping associated with the Eynsham Express Service Station on the A40, and to the west by Cuckoo Lane.

2.1.9 The main development feature within Parcel B is New Wintles Farm, on the eastern boundary of this parcel, which comprises a farmhouse, barns and farmyard spaces. Parts of two other farms also extend into Parcel B namely Evenlode Farm in the south-west corner and Cuckoo Wood Farm in the north-west corner of the parcel. City Farm, a series of converted former farm buildings which now form private residences and their accompanying gardens, is located in the north-eastern area of this parcel but does not form part of the site. Similarly, an existing aggregate recycling facility to the south of City Farm, enclosed within the eastern area of the parcel, does not form part of the site.

2.1.10 Generally, ground levels within Parcel B fall from approximately 85 m AOD adjacent to Acre Hill Farm (located on the western edge of the parcel but not within the site boundary), towards the eastern parcel boundary on Lower Road at a level of approximately 64 m AOD.

Parcel C

2.1.11 Parcel C is located in the east central part of the site, enclosed on three sides (north, south and west) by Parcel B, and is the smallest of the three parcels with an area of approximately 12 hectares. Parcel C comprises three agricultural fields, two of which (the northern and southern fields) are recorded by the Environment Agency to be restored landfill sites and are discussed later in this report.

2.1.12 Parcel C is bordered to the east by an existing aggregate recycling facility, mentioned above.

2.1.13 Ground levels within Parcel C fall gently from the western boundary at approximately 70 m AOD to the eastern boundary at approximately 65 m AOD.

2.1.14 Parcel C is different from Parcels A and B due largely to the existence of the historical landfills.

2.2 Current Land Use

2.2.1 A walkover of the site was carried out by a geotechnical engineer from PBA on 4th December 2018. Selected photographs from the walkover are presented in **Appendix 2**.

2.2.2 The summary of the current land uses of the site is shown in **Table 2.1**, below. The locations of features of note described below are presented on **Figure 2c**.

Table 2.1 Summary of Current Land Uses

Parcel	Area	Description
A		**The vast majority of Parcel A is agricultural land, often grass with some crop. Exceptions to the above are described below.**
	Former Off-Road Motorbike Racing Track	Formerly accessed from the A40 (now blocked and gated) this area was used as an off-road motorbike racing track, with associated open spaces for parking and spectators. The area is now grassed and overgrown. A bund approximately 2m – 3m high runs along the southern boundary of this area and appears to have been formed from imported material (including brick, plastic and rope). The motorbike track is raised above the surrounding ground by between 1m and 3m and appears at least in part to have been formed from imported material. Several small ponds appear to have been excavated within the track area which contain established reeds. These are potentially old borrow pits that were excavated to supply material for track construction. Fly tipping was evident around the entrance to this area.
	Farmland	The remains of an old stone and brick structure were observed in the westernmost field. Potential asbestos containing materials were noted within the rubble. The farmland is crossed by overhead electricity cables carried on wooden poles. Drainage ditches between fields and on the parcel boundaries either dry or damp. Standing or flowing water was not noted.
B		**The vast majority of Parcel B is agricultural land, often grass with some crop. Exceptions to the above are described below.**

Parcel	Area	Description
	Farmland	An area of fly tipping was noted at a junction between four footpaths in the southern area. The material had been burned but appeared to contain potential asbestos containing materials. Drainage ditches between fields and on the boundaries were either dry or damp. Standing or flowing water was not noted.
	Cuckoo Wood Farm	This area was not accessed during the site walkover but recent aerial photography suggests the main farmhouse/cottage with an associated garden and outbuilding appear to lie within the parcel boundary.
	Evenlode Farm	Two farm buildings to the rear (east) and one building in the south lie within the parcel boundary. These appear to be storage sheds/barns.
	New Wintles Farm	A farmhouse with associated garden and outbuildings, a milking shed and a cattle shed, and an associated area of farm yard lie within the parcel.
C		**The majority of this parcel consists of grassed restored landfills.**
	Restored Landfill Sites	Three grassed fields (two fields are landfills restored to agricultural use) now in use as grazing and paddocks. Land is slightly mounded at the centre of each landfill field approximately 2 to 3m higher than the surrounding land, reducing to be level with the surrounding land at the edges. Multiple borehole installations present, marked by cones, probably gas and groundwater monitoring positions. A ditch is present on the northern edge, adjacent to the access track leading to/through City Farm. This ditch was observed to be damp, with no standing or flowing water. The ditch on the south-eastern side, adjacent to the public footpath was observed to be damp, with no standing or flowing water.
	Farmland	Drainage ditches between fields and on the boundaries were either dry or damp. Standing or flowing water was not noted.

2.3 Off-site Land Uses

2.3.1 **The predominant off-site land use surrounding the site is open agricultural land**. Other salient features that are present beyond the site boundary, or that are enclosed within the site boundary, but do not form part of the site, are discussed below.

2.3.2 **South** The main land use to the south of the Site, beyond the A40, is residential forming the northern fringe of Eynsham village. An area of land to the north of the A40, immediately beyond the southern site boundary, contains the Eynsham Express Service Station, a used car dealership and a vehicle servicing and repair garage. Visual and olfactory evidence of contamination was not noted within the accessible parts of these areas during the site walkover. However, an area of un-bunded oil drum storage was noted to the rear of the garage, from an adjacent footpath. An area of new woodland planted by the Woodland Trust in 2000, approximately 5.3 hectares in area, is present to the east of Evenlode Farm, north-east of the junction of Cuckoo Lane and the A40.

2.3.3 **Cuckoo Lane** Two farms, the Evenlode Farm and Acre Hill Farm, are located off Cuckoo Lane between Parcels A and B. Each of these farms comprises a farmhouse and associated barns and farm outbuildings within concrete-surfaced yards.

2.3.4 A Scottish and Southern Energy (SSE) substation, consisting of a single-storey brick building and several transformers, is also present on Cuckoo Lane between Parcels A and B. The ground cover at the substation is gravel. The depot of a vehicle recovery company is present on Cuckoo Lane and is enclosed to the west by Parcel A. This depot comprises three sheds and accompanying concrete-surfaced yards.

2.3.5 **Aggregate Recycling Facility & Restored Landfill** To the north and east of the restored landfills in Parcel C is an area that does not lie within the site boundary. During the site walkover, this area was observed to consist of two sections. The south-eastern quadrant was observed to be in use in part by a waste operator and understood from local authority planning records and the Oxfordshire Minerals and Waste Local Plan to be an aggregate recycling facility. This facility was surrounded by an approximately 10m high perimeter bund of imported materials. The remainder of this area, also a former landfill (a continuation of those within Parcel C) is mounded above the surrounding ground level by approximately 2m – 3m and contains numerous borehole installations.

3 Historical Land Use

3.1 Introduction

3.1.1 Landmark Information Group (LIG) have been commissioned to provide an Envirocheck Professional report, including historical Ordnance Survey (OS) maps, for the Site. Due to the large size of the site area, the historical maps have been split into several sections. These maps are presented in their entirety in **Appendix 3**. The maps and accompanying information from each section have been reviewed to determine the historical land-uses both on and off site.

3.1.2 In addition, PBA has consulted other sources of historical information for the Site gathered from sources including internet searches, West Oxfordshire District Council's (WODC) on-line planning portal and Freedom of Information (FOI) requests to WODC, Oxfordshire County Council (OCC) and the Environment Agency (EA).

3.2 Site History

3.2.1 The available historical OS map editions and aerial photographs supplied by LIG cover the period between 1876 and 2018.

3.2.2 The site area has been predominantly open agricultural land, separated into numerous fields, since the earliest available historical OS map editions from the late 19th Century. City Farm and associated buildings and cottages is labelled in the northern part of the site from the earliest available map editions with Cuckoo Lane shown through the western part of the site. The site appears to remain relatively unchanged through the early 20th Century, although there are few features of note on the aerial photograph from 1947.

3.2.3 On the 1974 map edition, signs of mineral extraction are shown in the eastern area of the Site, south of City Farm (Parcel C and at the neighbouring aggregate recycling facility), with two gravel pits labelled. These gravel pits are shown on map editions from the 1980s. On the 1990 map edition, there is no evidence of mineral extraction activities in Parcel C, but these areas are denoted as landfill on the 2006 map edition. Significant activity, presumably landfilling operations, are evident in the northern field in Parcel C on the 1999 aerial photography. A label "Pit (disused)" is shown in the area immediately to the north of the site boundary on the 1974 map edition.

3.2.4 On the 1974/75 map editions, Acre Hill Farm, Evenlode Farm, the "Engineering Maintenance Depot" and electricity sub-station are shown along Cuckoo Lane between Parcels A and B and a garage is labelled south of the site boundary along the recently constructed A40. A filling station is latterly shown to the south of the garage on the 1985 map edition (now the Eynsham Express Service Station). New Wintles Farm is shown on the eastern site boundary on the 1974 map edition onwards. The motorbike track in the south-western corner of Parcel A is shown on the aerial photograph from 1999. There are no significant changes on the latest 2018 map edition, albeit that the landfills are no longer shown.

4 Geology and Hydrogeology

4.1 Published Geological Information

4.1.1 The 1:50,000 scale geological map of England and Wales, Solid and Drift Edition Sheet 235 – Witney (BGS, 1982), Mineral Assessment Report 28 (IGS, 1977), the BGS's online database of historical borehole records (GeoIndex) and previous ground investigation reports accessible via West Oxfordshire District Council's (WODC) planning portal were consulted to inform the description of the geological setting of the site discussed below. Extracts of the published geological maps are presented as **Figures 3a** and **3b**.

4.1.2 There are numerous historical borehole records on and in the vicinity of the site, predominantly related to either ground investigation works for the prospective dualing of the A40 carriageway in the 1980s across the southern site area (north of the existing A40), or mineral prospecting boreholes (mainly for sand and gravel) in the area south and south-west of City Farm in the 1960s. Some of the historical mineral prospecting borehole records located on the site, between City Farm and New Wintles Farm, are confidential to ARC Aggregates Ltd (now Hanson UK) and copies of these records have not been obtained as part of this assessment. The record of an 80 m deep borehole located in the south-western area of the site has been used to provide information on the solid geology with depth. This borehole is named the Barnard Gate Borehole and was sunk in March/April 1979 for the purpose of coal exploration. Extracts of readily available relevant BGS borehole records are presented in **Appendix 4.**

Superficial Deposits

4.1.3 The distribution of Superficial Deposits on the Site as published on the 1:50,000 scale geological map is shown on **Figure 3a**. **In general, Superficial Deposits are absent over most of the site and solid geology is mapped at surface.**

4.1.4 Alluvium A thin ribbon of Alluvium is shown across the northern boundary of the site associated with the alignment of the watercourses in this location (the Hanborough Stream and its tributary). A more extensive area of Alluvium is present to the east of the site boundary associated with the River Evenlode floodplain, and part of this Alluvium protrudes into the eastern fringe of the site. Alluvium is also present in the south-western corner of the site associated with the alignment of Chil Brook which is located south of the A40 in this area. Alluvium is not recorded in many of the historical borehole records on-site but was identified in the south-western area as a brown, blue clay with some gravel to a depth of 1.5 m below ground level (bgl). The Alluvium in this area is generally described as humic silts and clays with an average thickness of 1.0 m (IGS, 1977).

4.1.5 River Terrace Deposits River Terrace Deposits are present on the eastern flank of the River Evenlode valley which includes Parcels B and C of the site. The distribution of these deposits varies according to ground elevation and age of deposition, as described below.

- A small lobe of the Fourth Terrace (Hanborough Gravel Member), the oldest Terrace Deposit present, is shown on the higher ground around Acre Hill in the south-western area of Parcel B. The Fourth Terrace usually comprises limestone pebbles with minor amounts of quartz and flint in a sandy matrix and has been identified as between 1.0 and 1.9 m thick in the wider area (IGS, 1977).

- The Third Terrace (Wolvercote Sand and Gravel Member) is not mapped on-site, although very minor remnants are recorded in areas to the north of the site boundary.

- The largest tract of River Terrace Deposits on the site extends as a north-south "finger" through the eastern area of the Site (Parcels B and C) and continues beyond the northern and southern site boundaries and comprises the Second Terrace (the upper and lower

facets of the Summertown-Radley Sand and Gravel Member). The Second Terrace is described as comprising limestone sand and gravel with minor amounts of quartz and flint in a sandy matrix, ranging in thickness locally from 0.6 m to 5.1 m with an average thickness of 2.6 m (IGS, 1977).

As discussed in the site history, part of the eastern area of the site (Parcel C) was worked for minerals in the 1970s (see **Section 4.1.11** below). These quarrying activities involved the extraction of sand and gravel from the Second Terrace. The mineral deposit is described as "ballast" on the historical mineral prospecting boreholes at City Farm dating from 1969, with a recorded thickness of between 0.0 m (i.e. absent) and 3.0 m, generally thickening towards the eastern boundary of the area investigated.

The mineral prospecting boreholes for the neighbouring areas at New Wintles Farm to the south and east are confidential. However, peripheral monitoring boreholes associated with the subsequent use of these quarries as landfills (see below) indicate that the thickness of the sand and gravel at the edges of these mineral workings was between approximately 0.6 and 3.5 m thick.

A ground investigation south of the site boundary in the area of Eynsham Express Service Station north of the A40 carried out in 2017 encountered between 1.6 and 3.7 m of the Second Terrace described as clayey sandy gravel and sandy gravelly clay.

- A separate deposit of First Terrace (Northmoor Sand and Gravel Member) is present on the eastern site boundary, north of New Wintles Farm, and is likely to extend beneath the Alluvium across the Evenlode floodplain to the east of the site boundary and extend down to the River Thames to the south-east forming an extensive deposit beyond the site boundary. The First Terrace is described as limestone pebbles with minor amounts of quartz and flint in a sandy matrix, ranging in thickness locally from 1.1 m to 6.6 m with an average thickness of 3.3 m (IGS, 1977). A water well at New Wintles Farm, close to the eastern site boundary, dating from 1957 encountered approximately 6.0 m of sandy clay and gravel (probably First Terrace) underlying topsoil.

Solid Geology

4.1.6 The solid geology beneath the site as published on the 1:50,000 scale geological map is shown on **Figure 3b**. In general, the solid geology in this area dips gently (3 to 5 degrees) to the south-east.

4.1.7 Oxford Clay Formation Most of the site is underlain by undifferentiated deposits of the Oxford Clay Formation and West Walton Formation described as stiff bluish grey clay with abundant shells and occasional siltstone and limestone beds. In the Barnard Gate Borehole, located in the south-western area of Parcel A, the Oxford Clay was 7.0 m thick and the base was encountered at a depth of 8.5 m bgl, corresponding to a reduced level of about 59.6 m AOD. From historical BGS borehole records located in the southern area of the site, around Cuckoo Lane, the Oxford Clay was generally in excess of 11 m thick, and at Eynsham Express Service Station, just beyond the southern site boundary, in excess of 7.6 m thick. The formation thins towards the south-east corner of the site where it was 0.7 m thick (as interpreted from historical borehole logs) with the base at 4.5 m bgl, corresponding to a reduced level of about 58.2 m AOD.

4.1.8 Kellaways Beds Across the northern and north-eastern site boundaries, the Oxford Clay is absent, and the underlying Kellaways Sand and Clay Members are exposed. The Kellaways Sand is described in the Barnard Gate Borehole as grey clayey sand and is approximately 1.0 m thick, and 2.5 m thick in a historical borehole record south-east of the site. The underlying Kellaways Clay is described as stiff dark blue grey clay and is approximately 5.0 m thick based on historical borehole records.

4.1.9 Cornbrash and Forest Marble Formations The Kellaways Beds are underlain sequentially by the Cornbrash and Forest Marble Formations. These formations are present at depth beneath the site and are not exposed at the surface. The Barnard Gate Borehole encountered approximately 4.0 m of Cornbrash Formation comprising brown rubbly limestone with clayey beds overlying 8.0 m of Forest Marble Formation comprising interbedded limestone and grey clay.

Faulting

4.1.10 The geological map does not indicate the presence of faults within the site area nor any faults in the vicinity of the site boundary.

Mineral Extraction / Landfill

4.1.11 As discussed above, the Second Terrace (Summertown-Radley Sand and Gravel Member) has been extracted historically south of City Farm and also north of the site boundary, and these areas have been identified as “Worked Ground” on the geological map. It is also understood that the area south-west of City Farm (now City Farm Landfill), although not denoted as “Worked Ground” on the geological map, was also subject to mineral extraction.

4.1.12 From the 1990s, the quarry voids were restored using waste materials deposited under waste management licenses to create City Farm and New Wintles Farm Landfills. Half of the New Wintles Farm landfill site (labelled as the “western field”) lies within Parcel C. The other half (labelled as the “northern field”) lies outside the site boundary. These former quarries are therefore the primary areas of Made Ground on the site. In-waste boreholes installed as part of the landfills monitoring regime indicate that the mineral deposits were completely worked out and the thickness of Made Ground in these landfills varies from between approximately 0.6 m to in excess of 3.0 m and includes silty organic clays and gravels of brick and concrete.

4.1.13 Further information on these landfills is provided in **Section 7** of the report.

4.2 Geological Hazards

4.2.1 An assessment of potential geological hazards that may provide a pathway for contaminant migration and also give rise to instability or adverse construction conditions, as supplied by the BGS from their National Geoscience Information Service (NGIS), are presented in the Envirocheck Report reproduced in **Appendix 5**. The generic assessment is generated automatically based on digital geological maps and the scope and the accuracy is limited by the methods used to create the dataset and is therefore only indicative for the search area.

4.2.2 The information contained in the Envirocheck Report has been reviewed and where considered necessary reassessed considering the specific information available for the site. The modified assessment of the likelihood of each geological hazard to be present on the site is summarised in Table 4.1 below.

Table 4.1 Summary of Envirocheck Report Land Stability Hazard Potential Assessment

Hazard	BGS-NGIS Assessed Hazard Potential	PBA Assessment
Collapsible Ground Stability Hazards	No Hazard to Very Low	Disagree. Whilst this assessment is true for the majority of the site, the areas of City Farm Landfill and New Wintles Landfill are considered to have a Moderate potential for collapsible ground stability hazards.

Hazard	BGS-NGIS Assessed Hazard Potential	PBA Assessment
Compressible Ground Stability Hazards	No Hazard to Moderate	Agree. The Moderate hazard potential should relate to the areas of historical landfill, other isolated areas of Made Ground and the areas underlain by Alluvium.
Dissolution Hazard	No Hazard	Agree. The underlying geology is not likely to be affected by dissolution hazards.
Landslide Ground Stability	Very Low	Agree. The slopes observed during the site walkover were all shallow.
Running Sand	Low	Disagree. Whilst this assessment is true for much of the site, within areas underlain by water bearing sands, potentially the Alluvium and undisturbed River Terrace Deposits, this should be raised to Moderate. The Kellaways Sand will also potentially have running sand.
Shrinking or Swelling Clay	Moderate	Agree. The Oxford Clay/West Walton Formation is likely to be of moderate to high volume change potential and therefore there is a potential for shrinking or swelling clay hazards. This potential is especially applicable in areas where existing trees or hedgerows are to be removed and where new trees are to be planted.

Natural Cavity Records

4.2.3 A search of the PBA Natural Cavities Database has indicated that there is one recorded natural cavity (a single solution pipe) located within 5km of the centre of the site, this is located near Hanborough Station in Long Hanborough, approximately 2.5km to the north of the site in a different geological setting present at the site. Given the anticipated ground conditions at the site, the presence of natural cavities would not be expected within the site boundary.

Mining Cavity Records

4.2.4 A search of the PBA non-coal Mining Database indicated that there are no recorded mining cavity locations within 5km of the centre of the site.

4.2.5 As discussed in Section 4.1, the purpose of the Barnard Gate Borehole was coal exploration and the borehole log records the presence of the Upper Coal Measures at a depth of approximately 220 m bgl. The Coal Authority's online interactive map indicates that:

- The site does not lie in a Development High Risk Area,
- There are no recorded mine entries on, or in the vicinity of the site, and the site does not lie in any mine entry potential zone of influence,
- There are no recorded fissures or breaklines within the site,
- There are no entries within the abandoned mines catalogue on, or in the vicinity of the site,
- The site does not lie within any recorded area of coal outcrops, surface mining (past and current), past probable shallow coal workings or probable shallow coal workings,

- The site does not lie in a Coal Mining Reporting Area

4.2.6 The Coal Authority's interactive map does indicate that the site lies in a Surface Coal Resource Area, an area where coal resources are capable of being extracted by surface mining methods i.e. "opencast". This designation has been applied to a large swathe of Oxfordshire, Berkshire and Warwickshire continuing north to Coventry and the Midlands and south to Newbury and Reading. However, at the site, this designation does not appear to be correct based on the known geology of the area and information from the Barnard Gate Borehole which indicates Coal Measures at considerable depth.

4.2.7 Overall, the risks relating to non-coal and coal mining cavities at the site are assessed to be Very Low.

4.3 Radon

4.3.1 The Envirocheck Report indicates that the Site is situated within a lower probability radon area where less than 1% of homes are estimated to be at or above the 200 bqm^{-3} Action Level and that no radon protection measures are required in the construction of new dwellings or extensions.

4.4 Hydrogeology & Groundwater Vulnerability

4.4.1 The aquifer designation maps within the Envirocheck Report provide the following aquifer classifications for the strata within the Site:

Table 4.2 Aquifer Designations

Stratum	Aquifer Designation
Alluvium	Secondary A Aquifer
River Terrace Deposits	Secondary A Aquifer
Oxford Clay Formation and West Walton Formation	Unproductive Strata
Kellaways Sand Member	Secondary A Aquifer
Kellaways Clay Member	Unproductive Strata

4.4.2 The hydrogeological properties of the Superficial Deposits will be dependent on their composition and thickness. If the Alluvium is predominantly clayey then it is considered less likely that it will be able to transmit or contain significant quantities of groundwater. The higher the proportion of gravels and the lower the proportion of clays within the River Terrace Deposits, the greater the amount of groundwater it will be able to transmit or contain.

4.4.3 Those strata defined as 'Unproductive Strata' are rock layers with low permeability that have negligible significance for water supply or river base flow.

4.4.4 Strata classified as Secondary (A) Aquifers by the Environment Agency are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases form an important source for base flow for rivers. PBA experience of Kellaways Sand is that it is not an aquifer, having a low permeability, hence the aquifer designation may not be correct.

4.4.5 On historical borehole records, groundwater levels have been recorded between approximately 1.0 and 3.0 m below ground level in the River Terrace Deposits. It is anticipated that

groundwater flow within the River Terrace Deposits will be generally towards the River Evenlode beyond the eastern boundary of the site.

4.4.6 Recent groundwater monitoring at the two landfills in Parcel C has indicated variable groundwater (leachate) flow directions. Groundwater (leachate) levels were recorded between approximately 68.0m AOD and 71.0m AOD (approximately 1.5 to 3.5 m bgl) at City Farm Landfill and around 66.0 to 67.0m AOD (approximately 3.0 to 3.5m bgl) in the "western field" of New Wintles Farm Landfill during monitoring in the winter of 2016/17. Neither landfill, as far as PBA understand, has been lined and it is common for landfills to have groundwater at different levels due to variations in infiltration, properties of the landfill material and the interconnectivity of permeable landfill materials.

4.4.7 The Second Terrace are indicated to have a High Leaching Potential (H3). These are coarse textured or moderately shallow soils which readily transmit non-absorbed pollutants and liquid discharges but which some ability to attenuate absorbed pollutants because of their large clay or organic matter content. The First Terrace are also indicated to have a High Leaching Potential (H1). These are soils that readily transmit discharges because that are either shallow, or susceptible to rapid by-pass flow directly to rock, gravel or groundwater.

4.4.8 The Alluvium is indicated to have a Low Leaching Potential. These are soils in which pollutants are unlikely to penetrate because water movement is largely horizontal, or they have a large ability to attenuate diffuse pollutants.

4.4.9 The Oxford Clay and West Walton Formations are designated as Non-aquifers (i.e. negligibly permeable).

4.5 Groundwater Abstraction

4.5.1 The Envirocheck Report (**Appendix 5**) indicates that the site is not located within any part of a groundwater Source Protection Zone (SPZ).

4.5.2 There are three active groundwater abstractions either within, or within 500m of the site boundary, as follows:

- Licence No. 28/39/12/0179, issued in July 1976 to Mr J C Watts, and located at City Farm for abstraction of groundwater for "*General Farming and Domestic*" purposes at a rate no greater than 14m^3 per day or 3973m^3 per year.
- Licence No. 28/39/12/0212, issued in November 1996 to McKenna Plant Hire, and located at New Wintles Farm for abstraction of groundwater for "*Dust Suppression*" at a rate no greater than 3m^3 per day or 270m^3 per year.
- Licence No. 28/39/12/0059, issued in January 1992 to Miss S O Solloway, located at New Wintles Farm for abstraction of groundwater for "*General Farming and Domestic*" purposes at a rate no greater than 5m^3 per day or 1818m^3 per year.

4.5.3 The source of the groundwater is not recorded in any of these three abstractions, but presumably they relate to groundwater abstraction from the River Terrace Deposits that are present beneath these areas.

5 Environmental Sensitivity

5.1 Introduction

5.1.1 This section discusses the environmental sensitivity of the site with relation to hydrology, environment and ecology. These issues are only considered in this report in enough detail to inform the Tier 1 Risk Assessment where such features give rise to consideration as receptors, pathways or sources. Site sensitivity maps supplied with the Envirocheck Report are presented in **Appendix 5**.

5.2 Hydrology

5.2.1 The primary watercourse on the site is the tributary of the Hanborough Stream that runs along and adjacent to the northern boundary of Parcel B. This watercourse discharges into the Hanborough Stream on the northern site boundary, north-west of City Farm, and the Hanborough Stream continues in an easterly direction beyond the eastern boundary of the site, discharging into the River Evenlode approximately 470 m to the east of the site boundary.

5.2.2 All field drains and ditches observed during the site walkover were, at most, damp, with no standing or flowing water recorded, although this is based on only one visit. A pond is indicated near the northern boundary of the site, adjacent to the Hanborough Stream tributary, in an area into which access was unavailable during the walkover. Small isolated ponds were present in the south-western corner of the site within the area of the motorbike racing track, possibly small borrow pits relating to track construction.

5.2.3 The River Isis (Thames) is located some 1.6km to the south of the site boundary, flowing broadly north-east near the village of Swinford.

Water Quality

5.2.4 The Envirocheck Report (**Appendix 5**) contains information on surface water quality in the Hanborough Stream. This data indicates that the water quality of the Hanborough Stream in the reach between Church Hanborough and the Evenlode was typically grade C (fairly good) according to the Environment Agency's former general quality assessment (GQA) scheme which was withdrawn in 2009.

Discharge Consents

5.2.5 The following active discharge consents are reported within the Envirocheck Report. These are either located within the site or within 500m of the site boundary.

- Reference CATM.2956 v2, located at City Farm. Issued in 2012 to Cherwell Homes Ltd. and allowing discharge of "*Final/Treated Effluent – Not Water Company*" to the River Terrace Deposits.
- Reference CAWM.0948, located at Evenlode Farm. Issued in November 2004 to Mr Malin, and allowing discharge of "*Final/Treated Effluent – Not Water Company*" to the Freeland Road (presumed to be Cuckoo Lane) Ditch.
- Reference CNTM.0084, located immediately adjacent to the north-western corner of the site, issued in February 1992 to Hudsons (Wantage) Ltd., and allowing discharge of "*Final/Treated Effluent – Not Water Company*" to the tributary of the Hanborough Stream which runs along/through the north-west of the site.

5.2.6 There are a further eight consents present within 500m of the site which have now been revoked, and previously allowed the discharge of surface water and treated sewage effluent to surface waters.

5.3 Pollution Incidents

5.3.1 The Envirocheck Report (**Appendix 5**) indicates that there have been no pollution incidents to controlled water recorded on the site. The nearest pollution incident (and the only such recorded incident within 500 m of the site boundary) is located approximately 470 m to the south of the south-eastern corner of the site, and relates to the discharge of unknown oils in 1993. This incident is reported as Category 2 (Minor) with relation to water impact.

5.4 Surface Water Abstractions

5.4.1 The Envirocheck Report (**Appendix 5**) indicates that there are no recorded surface water abstractions within 500 m of the site boundary.

5.5 Environment/Ecology

5.5.1 Terence O'Rourke are the appointed ecologists for the scheme and are undertaking a variety of surveys to establish the baseline for the site. At this stage, the Magic website has been reviewed, and this provides sufficient detail to inform an assessment of potential receptors for the Tier 1 contamination risk assessment.

5.5.2 The Magic website (magic.gov.uk) has been reviewed to identify any areas of environmental sensitivity on or within close proximity to the site. This review has not revealed the presence of any recorded Sites of Special Scientific Interest, Special Protection Areas, Special Areas of Conservation, Local Nature Reserves or National Nature Reserves within 2km of the site boundary.

5.5.3 There are small areas of Priority Habitat (lowland meadow and semi-improved grassland) present in the farmland to the north of the site boundary, and an area of woodland to the south of the site boundary is in the National Forest Inventory. Other potential local habitat resources including hedgerows, field margins and ponds are also present on-site.

5.5.4 For the purposes of this assessment, the potential significance of ecological receptors is considered to be Low, i.e. local habitat resources.

6 Contaminative Land Uses

6.1 Introduction

6.1.1 **The majority of the site (approximately 90%) is arable farmland** and the review of historical information highlights that these areas are broadly "greenfield" in nature having not been previously developed. A smaller proportion of the site (approximately 10%) can be considered as "brownfield", being occupied historically or currently by potentially contaminative land uses.

6.1.2 In the most part, these potentially contaminative land uses relate to the area of the restored landfills (discussed below), farms and the former off-road motorbike racing track present on-site.

6.1.3 The location of these potentially contaminative land uses are shown on the Opportunities and Constraints Plans (**Figures 4a and 4b**).

6.2 Farm Sites

6.2.1 The site walkover has identified potential sources of contamination at Evenlode Farm (partially within the site) and New Wintles Farm. These potential sources include above ground fuel storage tanks, dilapidated industrial and agricultural equipment, storage of agrichemicals and equipment maintenance areas. Other farms are present adjacent to the site, namely City Farm, Acre Hill Farm and Cuckoo Wood Farm

6.2.2 From PBA experience of working on farm sites, other potential sources of contamination associated with working farms, especially those which are long-established, can include infilled ponds, ash and general Made Ground, soil gas, various agricultural chemicals and asbestos. However, if present, these are likely to be relatively small scale features and are unlikely to represent a significant or widespread source of contamination.

6.3 Landfill Sites

6.3.1 The Envirocheck Report, alongside information received from the Local Authority and the Environment Agency, records two landfills within Parcel C; City Farm Landfill and New Wintles Farm Landfill, see **Figure 2c**

New Wintles Farm Landfill

6.3.2 The Envirocheck Report (**Appendix 5**) records that approximately half of the licenced area for New Wintles Farm Landfill occupies the "western field" of Parcel C. The combined area of the New Wintles Farm Landfill, comprising both the "western field" and "northern field" (located off-site is approximately 9.9 ha. The New Wintles Farm Landfill was licenced to McKenna Environmental Ltd in November 1992 under Waste Management Licence No. 86149 (latterly environment permit EPR/VP3199EC) and was of category "*Landfills Taking Other Wastes (Construction, Demolition, Dredgings)*" and also received *"Industrial Waste*". This Licence is recorded as Inactive.

6.3.3 Information on landfill gas and groundwater monitoring at the landfill is presented in the Landfill Permit Surrender section below. The date at which filling activities ceased is unknown.

6.3.4 A copy of Waste Disposal Licence No. OCC/113, dated November 1992 has been reviewed (**Appendix 6**) which indicates that New Wintles Farm Landfill was licenced for "*Infilling of old quarry workings with inert materials*". A plan of the licenced area has not been appended to this licence. This site was licenced to receive up to 1,500 tonnes per day of "*Category A Waste*" defined within the permit as "*Solid or granular material which either does not decompose or decomposes only very slowly and is virtually insoluble in water"* including either topsoil or

subsoil. Specific chemical criteria are not provided; however wastes were not permitted if "*they are mixed or contaminated with hazardous amounts of any noxious, poisonous or polluting substances*".

6.3.5 This landfill was prohibited from receiving sludges and liquids.

City Farm Landfill

6.3.6 The Envirocheck Report (**Appendix 5**) records that the licenced area for City Farm Landfill occupies the north-western field of Parcel C and occupies an area of approximately 7.1ha. However, it is apparent from borehole logs that the landfill itself only occupies the central and eastern area of this field and is absent from the western area (presumably due to the absence of mineral in this area). This site was licenced to McKenna Environmental Ltd in September 1996 under licence No. 86161 (latterly environment permit EPR/VP3699EY) and was of category "*Landfills Taking Other Wastes (Construction, Demolition, Dredgings)*".

6.3.7 Information on landfill gas and groundwater monitoring at the landfill is presented in the Landfill Permit Surrender section below. The date at which filling activities ceased is unknown.

6.3.8 A Copy of Waste Management Licence No. T/W/OCC165 dated September 1996, has been reviewed (**Appendix 7**), which indicates that City Farm Landfill occupied the easternmost three quarters of the north-western field of Parcel C. This site was licenced to receive up to 1,600 tonnes per day, and 250,000 tonnes per year, of "*Category A Waste*" defined within the permit as "*Solid or granular material which either does not decompose or decomposes only very slowly and is virtually insoluble in water"* including topsoil, subsoil, hardcore, brickwork, stone, concrete, clay, sand, well weathered excavated road metal, glass, pottery, china, enamels, ceramics, mica and abrasives. Chemical criteria are provided on pages 18 and 19 of **Appendix 7**, and it is noted that these criteria permit the waste received to contain up to 1% by volume (i.e. up to 10,000mg/kg) of "*Hydrocarbons or petroleum derivatives"* and 1% by volume of "*Mineral Oils*".

6.3.9 This landfill was prohibited from receiving *"Contaminated soil, liquid wastes, sludge wastes"* and wastes not otherwise specified.

Landfill Permit Surrender

6.3.10 Applications to surrender the environmental permits for both City Farm and New Wintles Farm Landfills were submitted to the Environment Agency (EA) in 2013 and 2016 but did not meet all the requirements of the EA's landfill surrender guidance.

6.3.11 Subsequent to the 2016 application, a permit surrender addendum report was produced by AAe Environmental Consultants (Ref: 133022, dated March 2017) to support the surrender application, which has been provided by the Environment Agency. The addendum report describes the characteristics of the on-site section ("western field") and off-site section ("northern field") at New Wintles Farm Landfill and City Farm Landfill and the following salient points have been noted from the addendum report:

- Emissions of hazardous ground gases, methane and carbon dioxide, have been recorded from in-waste boreholes and perimeter boreholes. Gas monitoring data included in the addendum report covers the period between July 2014 and February 2017. Maximum concentrations of methane and carbon dioxide recorded were 23.3% v/v and 10.7% v/v at New Wintles Farm (northern field), 26.0% v/v and 7.5% v/v at New Wintles Farm (western field), 39.1% v/v and 11.6% v/v at City Farm and 6.3% v/v and 9.5% v/v from perimeter boreholes. Gas flow rates were recorded up to a maximum of 23.8 l/hr.

- At City Farm Landfill, maximum methane and carbon dioxide concentrations of 16.6% v/v and 4.5% v/v, respectively, were recorded on the final monitoring round in February 2017. A maximum gas flow rate of 0.1 l/hr was recorded on this round which coincided with a

period of low atmospheric pressure (i.e. generally ideal conditions for soil gas emission). The maximum flow rate recorded from the in-waste boreholes at City Farm Landfill was 9.7 l/hr in January 2017, although generally gas flow rates were very low or negligible.

- At New Wintles Farm Landfill ("western field"), maximum methane and carbon dioxide concentrations of 17.0% v/v and 5.1% v/v, respectively, were recorded on the final monitoring round in January 2017. Gas flow rates from in-waste boreholes were generally very low or negligible.

- At New Wintles Farm Landfill ("northern field"), maximum methane and carbon dioxide concentrations of 4.4% v/v and 5.2% v/v, respectively, were recorded in January 2017. Gas flow rates from in-waste boreholes were generally very low or negligible, however a flow rate of 16.1 l/hr was recorded from one borehole on the final monitoring round.

- In the perimeter boreholes, concentrations of methane and carbon dioxide recorded were generally low or negligible in the last few monitoring rounds. It is noted that atmospheric pressure conditions were generally above 1000 mb during most monitoring rounds (i.e. not worst case). For monitoring rounds that coincided with low atmospheric pressure (January 2016) the maximum methane concentration of 6.3% v/v was recorded and gas flow rates were recorded up to 23.8 l/hr.

- When assessed against the methodology in BS8485 (2015) for characterising gassing sites, AAe have reported the characteristic situations for New Wintles Farm as CS2-3 (low/medium risk), for City Farm as CS2 (low risk) and the perimeter boreholes as CS1-2 (very low/low risk). AAe have concluded that the gases from the landfills pose a very low to negligible risk to **existing** receptors (i.e. not future receptors).

- Some testing of soil samples recovered from in-waste and perimeter boreholes was carried out. Concentrations of potential contaminants recorded were generally at low levels.

- Testing of samples of groundwater (leachate) recovered from in-waste boreholes and perimeter boreholes and surface water samples from neighbouring ditches was carried out. AAe concluded that concentrations of potential contaminants were not at a level to represent a risk to Controlled Waters.

- AAe considered that the landfills were in a stable state with respect to the existing restoration profile and the potential for future settlement.

- No landfilling activity has occurred within the area of the neighbouring aggregate recycling facility.

6.3.12 Further information provided by the Environment Agency indicates that the permits for New Wintles Farm Landfill and City Farm Landfill were surrendered on 26th April 2018.

6.3.13 The surrender indicates the Environment Agency are satisfied that the sites are no longer receiving waste, relevant closure procedures have been followed, an appropriate period of aftercare has passed to allow the waste to stabilise and to gather evidence to demonstrate that the pollution control measure are no longer necessary and that the deposits of waste are in satisfactory state that, **if left undisturbed**, will not cause pollution of the environment.

Eynsham A40 Landfill

6.3.14 The Envirocheck Report (**Appendix 5**) records that the licenced area of a separate landfill, labelled as the Eynsham A40 landfill, occupies a limited area of approximately 0.26 ha adjacent to the south-eastern corner of Parcel B. This site was licenced to Eynsham Consolidated Charities under licence reference OCC/20, dated January 1978. This Licence is recorded as "*lapsed/cancelled/defunct/not applicable/surrendered*".

6.4 Potentially Contaminative Land-uses

On-Site

6.4.1 Other than the farms and landfill sites discussed above, other potentially contaminative on-site land uses (as shown on **Figure 4a**) include;

- Potential imported materials used to construct both the bunds surrounding, and the track of the former motorbike racing track in the south-western corner of the site.
- Localised areas of fly-tipping.

Off-Site

6.4.2 Other than the farms and landfill sites discussed above, other potentially contaminative off-site land uses (as shown on **Figure 4a**) include;

- Former and current use of the depot site located between Parcels A and B on Cuckoo Lane.
- Eynsham Substation located between Parcels A and B on Cuckoo Lane.
- Use of the aggregate recycling facility at New Wintles Farm.
- The Eynsham Express Service Station adjacent to the southern boundary of the site. This site was subject to a ground investigation by WSP in 2017, the report of which has been obtained via information supplied by WODC, to support a planning application for refurbishment of the petrol station. Light non-aqueous phase liquid, i.e. floating hydrocarbon product, was identified in one of the boreholes in the southern area of the petrol station close to the A40. Subsequently, a remediation strategy was produced by WSP involving the removal of underground fuel tanks, replacement with new tanks and removal and remediation of the identified contaminated area of the site. This work was programmed for 2017, but there is no verification report on the planning portal.
- A vehicle servicing garage located adjacent to the southern boundary of the site, adjacent to the service station.

6.5 Pollution Incidents

6.5.1 The Envirocheck Report indicates that there are no recorded pollution incidents located within the site boundary. The nearest pollution incident, dated 1993 is located approximately 470m to the south of the site and is reported as Category 3 (Minor).

7 Tier 1 Preliminary Contamination Risk Assessment

7.1 Introduction

7.1.1 This Tier 1 Preliminary Risk Assessment includes the development of a CSM which identifies the types and locations of potential contaminants (sources), potential receptors and potential migration/transportation pathway(s). For a pollutant linkage to be identified a connection between all three elements (source-pathway-receptor) is required.

7.1.2 The methodology adopted by PBA and used in this assessment is defined in **Appendix 1**. This methodology is in general accordance with the EA's Contaminated Land Report CLR11 (EA, 2004).

7.1.3 The following assessment is based on the information set out in the previous sections and should not be read independently of the other sections of the report.

7.2 Hazard Identification

7.2.1 **The majority of the site area (approximately 90%) comprises undeveloped land, and potential sources of contamination are not anticipated in these areas.**

7.2.2 However, some on-site potential sources of contamination have been identified in localised parts of the site as a result of the review of the Envirocheck Report, historical plans and site walkover. Potential sources of contamination have been identified as follows:

On-Site

a. Former, now restored, New Wintles Landfill and City Farm Landfills;

b. Evenlode Farm and New Wintles Farm;

c. Localised areas of fly-tipping and derelict buildings

d. Made Ground of unknown source used in motorbike track area

e. Localised areas of Alluvium, primarily along the northern and eastern site boundaries

7.2.3 **Table 7.1** describes details of the kinds of contaminants that may arise as a result of the current and historical activities that have taken place at the site.

Table 7.1 Possible Contaminants Generated by On-site Activities

Land Use	Potential Contaminants Generated
Former landfill sites	Dependent on composition of fill materials and Made Ground. Landfill gas.
Farm areas	Hydrocarbons (i.e. fuels and oil associated with farm machinery maintenance and storage), agro-chemicals, ash, asbestos, soil gas.
Made Ground and fly tipped wastes	Unknown but potentially hydrocarbons, asbestos, and metals.

Land Use	Potential Contaminants Generated
Alluvium	Soil gas

7.3 Hazard Assessment

Potential Receptors

7.3.1 Five types of receptor (to potential contamination if present and if mobile), are considered relevant as part of the Hazard Assessment process as discussed below:

- Human health – existing residents and land users, construction workers and potential future residents and land users could potentially be at risk from the presence of contamination (if present and mobile)
- Controlled waters comprising:
  - Groundwater – Secondary Aquifers including the River Terrace Deposits and Kellaways Sand Secondary A Aquifers (though the Kellaways Sand may not be an aquifer based on our experience)
  - Surface water – Hanborough Stream and its tributaries, drainage ditches
- Building/services – structural receptors such as concrete foundations and plastic service pipes
- Property/crops, livestock etc.) – on-site and neighbouring farmland
- Ecological systems –adjacent areas of Priority Habitat, woodland and Green Belt

Potential Pathways

7.3.2 Potential environmental hazards need a pathway connecting the source (if present) to potential receptors in order to be able to impact upon the receptors. These pathways are capable of conveying the contaminants. Pathways may be anthropogenic (artificial) or natural.

7.3.3 Anthropogenic pathways are artificial routes capable of conveying contaminants and include such routes as surface water drains, land drains, permeable backfill materials, poorly consolidated Made Ground, foundations, and persons disturbing contamination sources in such a way as to liberate contaminants.

7.3.4 In the case of persons working with contaminated ground (e.g. to lay foundations or install services) direct contact with the source becomes possible, and pathways such as dermal contact, inhalation or ingestion require consideration.

7.3.5 The site is shown to be underlain predominantly by undifferentiated deposits of the Oxford Clay Formation and the West Walton Formation, as well as by the Kellaways Clay Member. The low permeability of these strata means that the downward and lateral migration of contaminants will be limited.

7.3.6 The Secondary Aquifers themselves are potential pathways for the lateral migration of contaminants if surface borne contaminants should reach them. However, the ability of these strata to transmit groundwater will be governed by the proportion of silts and clays within them.

7.3.7 Mobile contaminants (if present) may also be transmitted via surface water features including streams, tributaries of these streams and other on-site ditches.

Assessment of Plausible Pollutant Linkages and Risk Estimation

7.3.8 Ordinarily, the next stage of the hazard assessment is to consider how each individual identified contaminant source could potentially impact on each individual receptor via the available identified pathways. This constitutes an assessment of potential pollutant linkages.

7.3.9 Subsequently the significance of each pollutant linkage is estimated by considering the likelihood that a risk could manifest and the significance of the consequences if a risk were to manifest. This is termed the 'risk estimation process'.

7.3.10 A broad approach to risk estimation has been taken in order to classify the risks associated with large areas of the site. The results of this exercise are presented in **Section 7.4** and **Figures 4a and 4b**.

7.4 Risk Estimation

7.4.1 All individual areas of the site have been assigned a degree of risk according to the current and previous site uses and their potential to generate contamination. As a simple high level assessment of the whole site, individual areas have been assessed against one of five geoenvironmental risk categories: very low, low, moderate, high and very high.

7.4.2 Areas of the site which have not undergone significant development have been designated as **Very Low** risk areas. The absence of a significant source of contamination in these areas would indicate a negligible risk to potential receptors. **This very low risk area covers 90% of the site.**

7.4.3 Areas where there is only limited evidence of current or historical potentially contaminative activities (e.g. the former off-road motorbike racing track and farm sites) or where such activities are not considered likely to be highly contaminative have been designated as **Low** risk areas. Contaminants, if present, would not be expected to migrate far from the source area due to the natural properties of the underlying soils and therefore the risks to neighbouring land, aquifers etc. would be anticipated to be low. However, potential risks may exist to humans (construction workers), direct contact with buildings/services and possibly surface water (and associated ecology) via overland flow.

7.4.4 The areas of landfill within the site, on the basis of the documents reviewed (notably the permits and surrender documentation for these landfills) pose a risk from a gas generation standpoint and, to lesser extent, a soil/groundwater contamination standpoint. The surrender addendum report indicates that both landfills were generating significant landfill gas to the end of monitoring in 2017, and gas was also recorded in boreholes around the perimeter of the landfills. These areas are assessed as **High** risk with respect to landfill gas. Concentrations of contaminants in soil and groundwater were recorded at generally low levels in the surrender addendum report, and therefore the landfills are assessed as **Low/Moderate** risk with respect to soil/groundwater contamination.

7.4.5 Areas of the site which, on the basis of their historical use would be designated as Low or Very Low risk, but lie adjacent to landfill sites may be affected by the migration of landfill gas and leachate beyond the boundaries of the landfills. These areas are shown indicatively on **Figure 4b.** Typically, an arbitrary distance of 250m is used to define an area around a landfill beyond which it is considered unlikely that receptors could be affected by landfill emissions. The actual distance could vary from a few metres to a few hundred metres and would be subject to site specific ground conditions that would be determined by ground investigation and monitoring. The landfills are located in sand and gravel, so at this early stage we have assessed them as permeable to gas flows.

7.4.6 The landfills are thin (~3-3.5m), so there is a reasonable chance landfill gas will be significantly vented in a relatively short time. Gas monitoring may therefore reduce the risk from High and, in addition, reduce the extent of potentially affected areas around the landfills.

7.4.7 The description of the significance of each risk rating is discussed in **Table 7.2**.

Table 7.2 Significance of Risk Ranking Assigned to Individual Site Areas

Risk	Description of Significance
Very Low Risk	It is unlikely that harm will arise to a designated receptor and there is unlikely to be a liability/cost for the owner of the business/land.
Low Risk	It is possible that harm could arise to a designated receptor however, the consequences are likely to be limited and it is considered unlikely that the issue will represent a liability/cost for the owner of the business/land.
Moderate Risk	It is possible that harm could arise to a designated receptor but is unlikely that the harm will be significant or permanent. Remedial action may be necessary and therefore the issue could arise as a liability/cost for the owner/occupier whilst retained in the current use. Development/change of use will require further assessment and is likely to incur additional costs.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Investigation (if not undertaken already) is required and further consideration needs to be given to the masterplan and/or design of the buildings and infrastructure in and around the High Risk area.

8 Geotechnical Assessment

8.1 Introduction

8.1.1 A number of geotechnical factors and constraints will need to be considered in the design of foundations, earthworks, and infrastructure for the civil engineering and building work during any future development. Large areas of the site are “greenfield” and are unaffected by historical land uses. Such areas, if considered for development, have a reduced number of factors needing consideration and all issues are commonly occurring in the south of the UK. The following sections outline the geotechnical factors that should be taken into account during future development.

8.1.2 The geology of the area is dominated by the Oxford Clay Formation/West Walton Formation with smaller areas of Kellaways Sand and Kellaways Clay, typically in the northern and eastern fringes of the site. Superficial deposits comprise mainly River Terrace Deposits (sand and gravel) with smaller areas of Alluvium.

8.2 Foundation Conditions

Made Ground

8.2.1 Localised areas of Made Ground are likely to be present on the site associated with historical land-uses around the farm sites, infilled ponds and ditches and at the motorbike track in Parcel A.

8.2.2 Made Ground is inherently variable, with possible varying degrees of compressibility. Consequently, building structures and infrastructure on Made Ground may be at risk from high total and/or differential settlements. These areas may require deeper foundations or, if the area of Made Ground is particularly thick, special foundation solutions such as ground improvement or piled foundations. Suspended slabs are likely.

Landfill

8.2.3 Based on the available data, landfill gas is a major issue in and around the landfills. Contamination may also be an issue. Investigations, including gas monitoring, are required to further assess the risks and to assess any remediation and/or design requirements to overcome the problems. It is imperative to assess these issues further. General guidance is given below on the assumption that the issues will be resolved.

8.2.4 Currently, there is little available information to indicate the composition and relative density of the landfill material present and to assess the potential for ongoing settlement of these materials. It is common for landfill material to be only nominally compacted, and therefore any development on these areas of the site will be prone to unacceptably large magnitudes of total and differential settlements under applied loads. As such the use of conventional shallow strip foundations is not considered feasible in these areas of the site.

8.2.5 To avoid the risk of unacceptably high total and differential settlements, piled foundation bearing into the Oxford Clay, or deeper strata, may be considered for new buildings. Piles can be designed using conventional methods but will have to consider the potential for buried obstructions in the landfills, potential loss of concrete in the surrounding fill, chemical aggression of the infill material and potential downdrag force (negative friction) on the pile caused by the settling landfill material.

8.2.6 It is considered unlikely that the use of piles would create preferential pathways for the migration of contaminants from the landfills into the underlying strata, particularly as the underlying strata are generally cohesive. However, the Environment Agency will likely require a piling risk

assessment to demonstrate that this no significant risk to underlying aquifers. This is a common requirement on brownfield land undergoing development.

8.2.7 As an alternative to pile foundations, ground improvement techniques may also be considered. Viable ground improvement techniques will depend on the ground and groundwater conditions and will require discussion with specialist ground improvement contractors once this information is ascertained.

8.2.8 It is likely that any future development on these landfills, and possibly in the "landfill fringes", will require the inclusion of gas protection measures in the foundation and ground floor design. The level of gas protection required will depend on the gassing regime, the determined Characteristic Situation (CS) and the building type in accordance with BS 8485 (2015). For a private domestic property, the required gas protection measures may include active sub floor dispersal layers and a gas resistant membrane, the installation of which would need to be independently verified.

8.2.9 Further ground investigation and monitoring is recommended to confirm the CS for the landfill and "landfill fringe" areas. The monitoring period should be enough to cover "worst-case" atmospheric conditions i.e. falling/low atmospheric pressure.

Superficial Deposits

8.2.10 **Alluvium** The stratum is present only as **thin ribbons** of ground along watercourses and within limited areas in the south-western corner, and eastern boundary of the site, so its presence is **unlikely to be a major constraint**. In these ground conditions, conventional shallow foundations for low rise housing will need to be taken down into the 'solid' formation below. This may require deep strip footings, ground treatment or piling systems.

8.2.11 **River Terrace Deposits** The stratum is primarily located within Parcel B and has historically been extracted in the areas later used as landfill. Depending on the thickness of material present, shallow strip or pad footings may be adopted for low-rise structures. Groundwater may be high in some of the Terrace Deposits.

8.2.12 At the edges of these deposits it will be necessary to locally deepen or reinforce shallow foundations for proposed buildings such that the foundations do not span across the edge of the River Terrace Deposits which may lead to differential settlements across the building.

Bedrock Geology

8.2.13 Traditional shallow spread or strip foundations are likely to be suitable for low rise housing and some commercial developments on the solid geology at the site. Clay formations are susceptible to weathering and softening, particularly if left exposed, which could affect the allowable bearing pressure and, consequently the depth of weathering and foundation design parameters should be established on a site-specific basis. The Kellaways Sands are particularly prone to softening when exposed.

8.2.14 Notwithstanding the above, away from trees and significant shrubs, shallow foundations are likely for low rise residential housing.

8.2.15 Where any new structures are proposed, the potential for using ground bearing floor slabs at the site will be dependent on ground conditions, final development levels and the proximity of individual plots to existing and proposed boundary tree and hedgerow.

8.2.16 Current National House Building Council (NHBC) Standards require suspended forms of ground floor slab to be adopted where the depth of subfloor fill exceeds 600mm. In addition, where dwellings (or garages) are sited where heave can occur within the area bounded by the foundations a suspended form of ground floor slab construction is also required with provision

of a minimum (potentially 300mm) sub-floor void; which will necessitate use of precast concrete (or timber) forms of ground floor slab construction.

8.3 Shrinkage and Swelling of Clay Soils

8.3.1 The anticipated presence of deposits of the Oxford Clay/West Walton Formations and Kellaways Clay Member will classify the areas of the site underlain by these strata as 'Clay Soil' areas. All clay soils are to a varying degree susceptible to shrinkage and swelling due to both seasonal effects and due to the effect of trees and other vegetation. Standard geotechnical classification tests are likely to classify the Oxford Clay/West Walton Formation as a clay soil of medium or high volume change potential in accordance with the NHBC's published Technical Standards (NHBC, 2019).

8.3.2 The presence of mature trees and hedgerows around the site will give rise to a local high risk of potential ground movement associated with tree-root induced variations in moisture content on shrinkable/ swelling ground in these areas. Design and construction protocols to manage risk of shrinkage/ swelling movements on clay soil sites are well established and detailed (for instance) by the NHBC, together with published guidelines produced by the Building Research Establishment. Adherence to these published Technical Standards and other published guidelines, for example foundation and slab design, including guidelines on new proposed landscape plantings, should mitigate the potential increased risk to development as result of the clay soil classification of the site.

8.4 Roads

8.4.1 Roads constructed in areas where natural soft materials are present at formation level, may require capping layers, or alternatively stabilisation with lime or cement to minimise consumption of granular resources subject to environmental acceptability. Soft materials are likely in low lying areas or areas of Alluvium and, if practicable, these areas should be avoided. Roads over areas of Made Ground and landfills will require investigation prior to construction to determine the nature and thickness of the fill material and its properties, and mitigating measures designed accordingly. The landfills, in particular, may still be settling so any superimposed roads, drains or utilities will also settle unless the ground is stabilised.

8.5 Other Infrastructure

8.5.1 Car parks, drainage and utility infrastructure in deep and variable landfill materials may be at risk of damage from differential settlement or lateral ground movements as the ground is loaded or disturbed by construction activity. The landfill is fairly thin at around 3.0-3.5m so dynamic compaction or similar can be considered to reduce settlements. Alternatively, foul and surface water drainage could be routed to avoid areas of landfill wherever practicable. Where it is not practicable, car parks, sewers and utility infrastructure, in areas of landfill should be limited.

8.6 General Excavations

8.6.1 Excavations in natural ground, such as for services, should not present any significant problems specific to the site area. Within areas underlain at the surface by clay soils any groundwater inflows are likely to be slight and easily controlled. Excavations within the River Terrace Deposits may encounter groundwater inflows at a shallow depth and in this situation groundwater control measures (including screening to avoid the removal of fines) may be required, subject to further groundwater monitoring.

8.6.2 Excavations will require side support wherever entry is required and in soft or loose material side support should also be provided wherever there is a risk of collapse.

8.6.3 The gas and contamination risk needs further investigation and consideration for the landfills before excavation should be considered. Sub-surface obstructions may be present in the landfill areas and would require breaking out.

8.7 Aggressive Ground Conditions

8.7.1 The Oxford Clay is known to contain sulphate minerals which in the presence of groundwater and air can give rise to aggressive conditions for buried concrete i.e. the production of chemical agents that are destructive to buried concrete. This is normal in these materials and should be considered further in the ground investigation.

8.7.2 Contamination issues need further investigation and consideration in the Made Ground and landfills to assess sulphate issues.

8.8 Infiltration Drainage

8.8.1 The Oxford Clay/West Walton Formation and the Kellaways Clay Member are likely to be of very low permeability so there is likely to be minimal scope for the use of infiltration drainage for the attenuation of runoff from buildings and paved areas in areas underlain by these strata.

8.8.2 The permeability of the River Terrace Deposits will be controlled by the percentage of fine materials (silts and clays) within this stratum, and is likely to be moderate, providing some potential for infiltration drainage subject to site-specific investigation, testing and groundwater monitoring.

8.8.3 The Kellaways Sand is also unlikely to be used for infiltration subject to further testing and evaluation.

8.8.4 Surface water systems should be designed in accordance with the principles of sustainable drainage, SuDS.

8.9 Re-use of Materials

8.9.1 A sustainable approach to the design and construction of new developments is to re-use materials where practicable. This may include the use of materials that would normally be considered unsuitable or marginally suitable. The River Terrace Deposits are likely to be suitable for most applications although moisture conditioning may be required to achieve optimum conditions for some applications.

8.9.2 The reuse of the Oxford Clay is also possible subject to design considerations.

8.9.3 The reuse of Made Ground, landfill and Alluvium is unlikely.

9 Mineral (Sand and Gravel) Resources & Waste Management

9.1 Introduction

9.1.1 This section presents the findings of a desk study review of available information relating primarily to historical mineral activities and current mineral planning policy for the site and immediate surrounding areas.

9.2 Past Extraction in the Site Area

9.2.1 Review of the historical maps has identified that part of the site (most of Parcel C), and local areas neighbouring the site to the east and north, have been worked for sand and gravel in the past. Mineral extraction on and off site has been focussed on the Second Terrace of the River Terrace Deposits. From BGS geological mapping and mineral mapping presented in Mineral Assessment Report 28 (IGS, 1977), the Second Terrace forms a "finger", approximately 350 m wide, running broadly north-south through the eastern portion of the site and broadens out to the north and south of the site boundary.

9.2.2 The Second Terrace deposit on-site is bordered on both sides by the underlying Oxford Clay, and locally the Kellaways Beds, and it is evident from available historical mineral prospecting boreholes that the mineral deposit feathers out quickly towards the western edge, and probably the eastern edge as well although there are fewer available historical borehole records to confirm this in these areas. The maximum thickness of the mineral deposit is thought to be around 3.0 – 3.5 m based on information from historical borehole records and more recent landfill monitoring boreholes, with the mineral having been completely worked out to the top of the underlying Oxford Clay. The grading characteristics of the sand and gravel deposit in the Second Terrace presented in the Mineral Assessment Report indicates that the composition of the deposit is typically a "clayey gravel".

9.2.3 It does not appear from the historical maps that the Second Terrace has been worked to the north and south of Parcel C. City Farm, a well-established farmstead present since at least the earliest historical Ordnance Survey maps, is present to the north which probably precluded mineral extraction in this area. It is possible that the limited thickness and clayey nature of the deposit did not make mineral extraction viable to extend the quarry workings further south.

9.3 Oxfordshire County Council Minerals and Waste Local Plan

9.3.1 Oxfordshire County Council adopted their Minerals and Waste Plan (OMWLP) Part 1 - Core Strategy in September 2017. This plan contains policies relevant to the site and the surrounding area.

Minerals Safeguarding & Mineral Consultation

9.3.2 An extract of the OMWLP Policy Map is presented below showing the approximate site boundary as a red dotted line on the **Figure 9.1** overleaf. The eastern portion of the site lies in a mineral safeguarding area (brown hashed area) and mineral consultation area (brown line with triangles) for sand and gravel mineral deposits in the River Terrace Deposits (the dotted area).

9.3.3 A mineral safeguarding area is an area defined by the Mineral Planning Authority (Oxfordshire County Council) to identify areas of potential mineral resource (in this case sand and gravel) so that these resources are not sterilised by non-mineral development. However, the designation of a mineral safeguarding area does not presume that the resource will be worked. Mineral Consultation Areas are identified by the Mineral Planning Authority based on the mineral

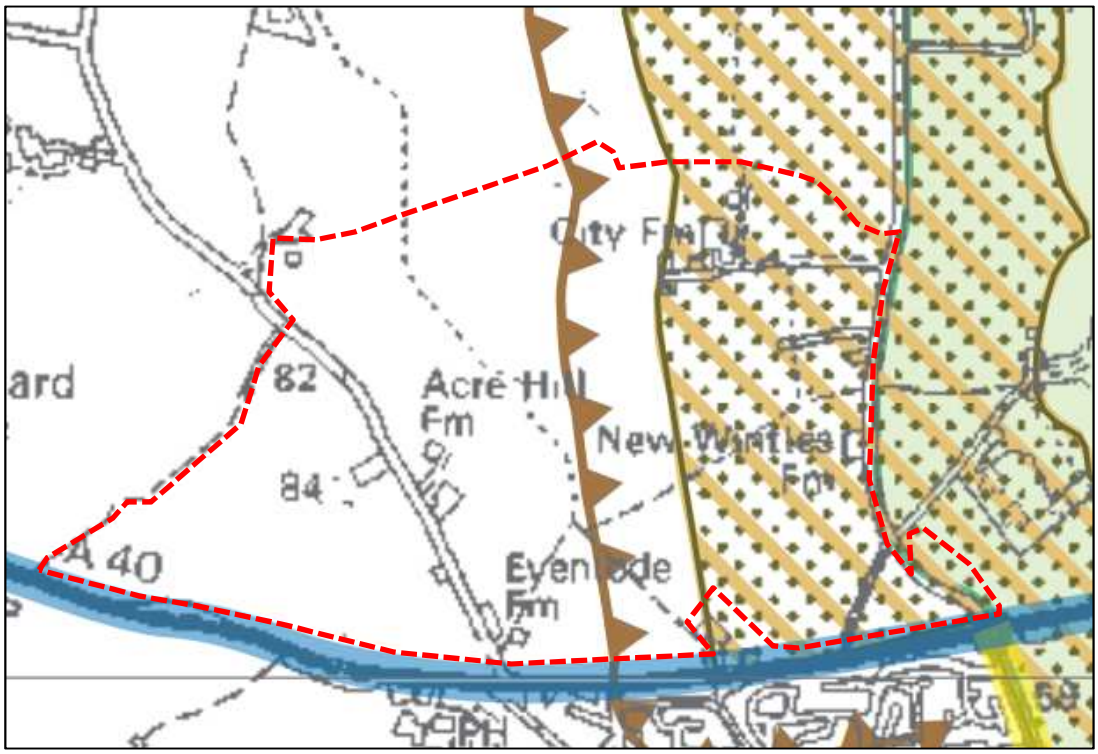
safeguarding area and include land within 250 m of the boundary of the mineral safeguarding area. The Mineral Planning Authority specifies the type of application for non-mineral related development on which the relevant district council (in this case WODC) must consult them within these areas.

9.3.4 The mineral safeguarding area that covers part of the site has been broadly defined by the Mineral Planning Authority according to the presence of sharp sand and gravel deposits in the main river valley, in this case the Evenlode Valley, and continues towards the river beyond the eastern site boundary, north of the site boundary to Church Hanborough and south-east of the site boundary, to the east of Eynsham, to the River Thames.

9.3.5 Policy M8 of the OMWLP requires that "*Mineral Resources in the Mineral Safeguarding Areas shown on the Policies Map are safeguarded for possible future use*". Within this policy "*Development that would prevent or otherwise hinder the possible future working of the mineral will not be permitted unless it can be shown that:*

- *The site has been allocated for development in an adopted local plan or neighbourhood plan; or*
- *The need for the development outweighs the economic and sustainability considerations relating to the mineral resource; or*
- *The mineral will be extracted prior to the development taking place.*

Figure 9.1 Mineral Policy Designations for the Site Area



9.3.6 Based on the available mineral prospecting boreholes from City Farm, an average thickness of mineral within the Second Terrace has been estimated as 1.6m. The total pre-extraction area of mineral deposit (Second Terrace) mapped within the site boundary (including those areas at New Wintles Farm) is approximately 40 ha. It is estimated that approximately 42 per cent of this mineral deposit (17 ha) has been extracted at City Farm and New Wintles Farm including peripheral margins. Thus, the remaining 58 per cent (approximately 23 ha) located within the site boundary north and south of these areas, has not currently been extracted. Therefore, the estimated mineral yield is approximately 0.65 million tonnes based on an assumed density of the mineral of 1.8 tonnes per cubic metre. This total does not allow for any buffer or exclusion zones around City Farm, the existing landfills and site boundaries.

Safeguarded Waste Management Sites

9.3.7 The aggregate recycling facility at New Wintles Farm, located outside the site boundary but enclosed by the site, is a safeguarded waste management site under Policy W11 of the OMWLP.

Mineral Site Allocations

9.3.8 Part 2 of the OMWLP, Site Allocations (Sites Plan), is currently in consultation and is not timetabled for adoption until November 2020. The main purpose of the Sites Plan is to allocate sites for minerals and waste development. Nominated sites, i.e. those sites that have been put forward for development by a mineral operator or landowner, were included in the Part 2 Site Allocations – Issues & Options Consultation document in August 2018. There are no nominated sites within the site boundary.

9.3.9 The 'Lower Road, Church Hanborough' site (reference SG-08) borders the site to the north and to the east (on the opposite side of Lower Road) and the 'Land between Eynsham & Cassington' site (reference SG-20) borders the site to the south-east (on the opposite side of Lower Road) (see **Figure 1**). These nominated sites will be assessed under the County Council's Site Assessment Methodology to select those sites preferred for development.

9.3.10 There is little available information on the mineral reserves at these neighbouring nominated sites. Mineral prospecting boreholes carried out as part of the Mineral Assessment Report (IGS, 1977), indicate that the thickness of mineral (Second Terrace) at New Barn, approximately 600 m north-east of the Site and located within the SG-08 boundary, is 1.1 m and is recorded as "very clayey gravel" overlying Cornbrash. In a more distant borehole, approximately 1.5 km north-east of the Site, also in the SG-08 boundary, the thickness of mineral (First Terrace) is reported as 3.0 m and recorded as "gravel". Another borehole located approximately 700 m east

of the site boundary, within the SG-20 boundary, records a mineral thickness (First Terrace) of 4.0 m and recorded as “gravel” (IGS, 1977).

9.3.11 In the site allocations consultation document, SG-08 is reported as having an estimated mineral yield of 2.5 million tonnes over a site area of 210 hectares (average 0.7 m thick) and SG-20 is reported as having an estimated mineral yield of 1.5 million tonnes (average 2.3m thick) over a site area of 37 hectares. Average thicknesses are given in parentheses based on an assumed density of the mineral of 1.8 tonnes per cubic metre.

9.4 West Oxfordshire District Council Local Plan

9.4.1 West Oxfordshire District Council adopted their Local Plan in September 2018. This plan sets out the overall planning framework for the District from 2011 to 2031.

9.4.2 Within this plan the site is allocated, under Policy EW1, for a residential led development of approximately 2,200 homes and is named Oxfordshire Cotswolds Garden Village Strategic Location for Growth.

9.4.3 Policy EW1 (q) indicates that the development of the site “..*will need to adopt appropriate measures to safeguard and take account of the operational requirements of the existing aggregate recycling facility and also safeguard sand and gravel deposits* ***where appropriate*** *having regard to the policies of the Minerals and Waste Local Plan.”*

9.5 Conclusion

9.5.1 The eastern section of the site lies within a mineral safeguarding area due to the designation of sand and gravel resources in the River Terrace Deposits present on-site. The allocation of the site for housing development in WODC’s Local Plan would meet criteria for non-mineral development within the mineral safeguarding area as per Policy M8 of the Oxfordshire Minerals and Waste Local Plan, although this is not mirrored in Local Plan Policy EW1 where it indicates that mineral safeguarding should be considered.

9.5.2 Notwithstanding the above, there are no nominated sites for mineral extraction located in the site boundary. Approximately 42% of the mineral area has already been worked out and the viability of mineral development of the remaining areas is considered to be low due to existing overlying development (City Farm) and the quality and thickness of the mineral reserve itself (generally described as “clayey”). It is evident from the neighbouring nominated sites, that nowadays mineral development is considered more viable in areas where there is a significant area underlain by a potential reserve (i.e. SG-08) and/or where the mineral thickness is significant (i.e. SG-20). Compared to these nominated sites, the remaining mineral reserve within the site is relatively small, disconnected, of variable thickness and of a low quality and does not have the lateral continuity to maintain any future expansion of mineral extraction activities, often a requirement for a mineral operator in order to invest in mineral extraction.

9.5.3 On the basis of the above, we consider that the remaining deposits do not represent a significant mineral resource and development should not be constrained by the mineral safeguarding designation on the site. Development may be constrained by the neighbouring nominated mineral sites and this is discussed further in **Section 10**.

9.5.4 It is recommended that discussions are held with Oxfordshire County Council to agree that the mineral resource on site is not significant at a County wide level and development at this location would be appropriate, subject to discussions on the implications of the neighbouring nominated sites.

10 Summary and Development Considerations

10.1 Summary of Ground Conditions

10.1.1 Overall, the geology is benign though the landfills in particular are an issue as well as the mineral safeguarding designation.

10.1.2 The site is situated primarily on undifferentiated clay deposits of the Oxford Clay Formation and the West Walton Formation. In the northern and eastern areas, the underlying Kellaways Sand and Kellaways Clay Members are present at surface or underlie Superficial Deposits. River Terrace Deposits (sand and gravel) are present in the eastern area of the site and Alluvium is mapped along the northern, eastern and part of the south-western site boundaries related to nearby watercourses.

10.1.3 The history of the site is predominantly agricultural with two farms located within the site boundary and further farms immediately adjacent. Former historical land-uses within the site include localised mineral extraction (sand and gravel) in the eastern area. These quarries have subsequently been restored by landfilling to agricultural use.

10.1.4 The site is situated in a relatively low sensitivity geoenvironmental setting for the following reasons:

- The majority of the site (approximately 90%) is agricultural land and has not been used historically.
- The solid geology underlying the site is mainly low permeability Oxford Clay Formation, West Walton Formation and Kellaways Clay Member – unproductive strata with respect to groundwater.
- There are no groundwater abstractions within the site boundary.
- There are no SPZs overlapping the site.
- The Secondary Aquifers present beneath the Site are likely to be of limited thickness, limited lateral extent, and have in part already been extracted.
- The site is not located within close proximity of designated environmental receptors such as Ramsar sites or Special Protection Areas (SPAs).

10.2 Geoenvironmental Conditions

Natural Geoenvironmental Conditions

10.2.1 The site is largely 'greenfield' land and these areas of the site are considered relatively low risk with respect to potentially significant geoenvironmental constraints. However, natural geoenvironmental hazards may be present which can place constraints on the development. Local soil gas may occur in the Alluvium in the northern strip adjacent to the tributary of the Hanborough Stream and Hanborough Stream itself.

Anthropogenic Geoenvironmental Conditions

10.2.2 Potential anthropogenic sources of contamination have been identified from uses of some areas of the site including farms, landfills and the motorbike racing track.

10.2.3 As a result of the preliminary Tier 1 Risk Assessment undertaken, the site has been divided into areas of Moderate/High, Low and Very Low geoenvironmental risk. **The majority of the site**

area comprises open greenfield land and is considered to be of Very Low geoenvironmental risk.

10.2.4 Selected areas of the site are considered **Low, Low/Moderate** and **High** risk as there is the potential for some soil contamination and/or the conditions for soil gas and landfill gas generation to be present at these locations. The degree to which any potential soil/gas contamination present becomes a development constraint will depend on the nature and extent of the contamination and the nature of the proposed development.

Geoenvironmental Opportunities

10.2.5 As part of the planning process for the future development of the site, potential sources of contamination lying within the site boundary will need to be investigated, risk assessed and, if necessary, remediated. This process will bring derelict land back into beneficial use and will lead to an improvement in geoenvironmental conditions and a reduction in the geoenvironmental risk for the site overall.

10.3 Geotechnical Conditions

10.3.1 **PBA's geotechnical appraisal has identified that the bedrock geology covering the vast majority of the site area will be suitable for use as a founding stratum.**

10.3.2 Where any cut is required to form suitable development platforms for buildings or infrastructure, these cut materials are likely to be suitable for an engineering reuse within the development area, except for the landfills, Made Ground and Alluvium.

10.3.3 The geotechnical appraisal has also identified the potential for the following issues at certain areas of the site;

- The localised presence of Made Ground with variable physical properties;
- The presence of landfill sites with possible unstable ground conditions, ongoing settlement issues, buried obstructions, potentially aggressive ground conditions with respect to buried concrete and landfill gas generation;
- The possible presence of naturally elevated sulphate in the Oxford Clay, which is likely to be within 'normal' levels for marine clays;
- The potential for soil heave associated with the felling of trees and removal of hedgerows in areas underlain by clay soils. This is also 'normal' for these types of clay.

10.4 Masterplanning and Development

10.4.1 Based on the available, limited, data, the landfills in Parcel C are of concern in terms primarily of landfill gas, and to a lesser extent contamination. Further investigation is required to assess the **actual** risk of these aspects to the proposed development. Landfill gases are likely to decline with distance from the landfill boundaries and with time as the landfills are relatively thin and hence there is a limited source/reservoir.

10.4.2 General guidance is given below for the development prior to the investigation taking place.

10.4.3 The geoenvironmental and geotechnical conditions discussed above may have implications on the site layout and land usage of a future development. The potential levels of remediation and engineering required for high sensitivity land-uses such as residential use with private gardens and schools on selected (brownfield) areas of the site (particularly the landfills) are likely to be greater than those required for less sensitive land-uses, such as commercial end uses or public open space. Therefore, to reduce development costs it would likely be beneficial to locate more

sensitive residential elements of the development on greenfield areas of the site and use the brownfield areas for less sensitive land uses such as commercial or open spaces.

10.4.4 Foundation solutions for buildings which will lie either wholly or partly on filled ground are likely to be more complex and therefore more expensive than those which lie on greenfield land parcels. As such, it may be more cost effective to locate structures particularly sensitive to settlement in the greenfield land parcels and those structures which are able to tolerate larger movements in the brownfield areas. It may be necessary to route infrastructure, such as main drainage or major highways, to avoid areas of deep compressible or contaminated infill, particularly the landfills.

10.4.5 The construction programme could be delayed when developing over brownfield areas if buried obstructions or unexpected hotspots of gross contamination are encountered. Foundation costs could be higher than anticipated where particularly weak ground is encountered or deep Made Ground (e.g. the landfills) with highly variable geotechnical properties.

10.4.6 Ground investigation work is required to inform the design response and to consider potential risk and cost implications whilst making best use of the available land.

10.4.7 The proximity of neighbouring nominated mineral sites may represent a constraint in terms of extending development right up to the adjacent boundaries within the site, should these nominated sites be allocated and come forward for mineral development. Areas to the east of the site will have Lower Road as a buffer to any adjoining mineral development and the location of Hanborough Stream along the northern site boundary will also necessitate a break in gravel extraction in this area anyway. From recent experience, the width of a potential buffer zone required during operation may be able to be negotiated with Oxfordshire County Council/mineral operator such that the buffer zone is divided between the development site and the neighbouring mineral site.

10.4.8 The neighbouring aggregate recycling facility is a safeguarded waste management site and therefore may be in operation long-term. Development (particularly residential) around this facility may not be desirable due to the potential for noise, dust and visual impacts and should also be considered in masterplanning.

10.5 Intrusive Investigation

10.5.1 As with any proposed development of this size, an intrusive investigation will be required in the future as part of the planning process. The timing of the investigation will depend upon the Client's overall development strategy and/or the opinion of the Local Authorities involved. The purpose of the investigation would be to clarify the anticipated ground conditions and refine the Conceptual Site Model for the site. This investigation should focus on areas of particularly uncertain ground conditions, i.e. landfill areas and farms, although baseline conditions within the 'greenfield' areas will also need to be determined.

10.5.2 We recommend that the landfills are investigated and monitored soon to further assess the landfill gas, contamination and content (bricks, concrete, soil etc.). Monitoring of landfill gas in particular should continue for at least 6 months to establish, inter alia, if the gas levels are decaying with time (ideally to below key threshold levels). The landfill fringes should also be investigated to determine the extent of landfill gas migration from the landfill area.

10.5.3 The primary objective of this work is to assess the **real risk** from the gas and contamination, any (likely) risk decrease with time and any remediation which may be required to improve the situation to enhance development opportunities and overall land values. A ground investigation strategy will be prepared under separate cover for agreement with the Client.

11 Essential Guidance for Report Readers

This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints they are described in the report text.

The opinions and recommendations expressed in this report are based on statute, guidance, and best practice current at the time of its publication. Peter Brett Associates LLP (PBA) does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and the report should be returned to us and reassessed if required for re-use after one year from date of publication. Following delivery of the report PBA has no obligation to advise the Client or any other party of such changes or their repercussions.

Some of the conclusions in this report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third party data used. Historical maps and aerial photographs provide a “snap shot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times.

The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.

This report has been written for the sole use of the Client stated at the front of the report in relation to a specific development or scheme. The conclusions and recommendations presented herein are only relevant to the scheme or the phase of project under consideration. This report shall not be relied upon or transferred to any other party without the express written authorisation of PBA. Any such party relies upon the report at its own risk.

The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc, unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.

Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as the Environment Agency, Natural England or Local Authority) have taken place only as part of this work where specifically stated.

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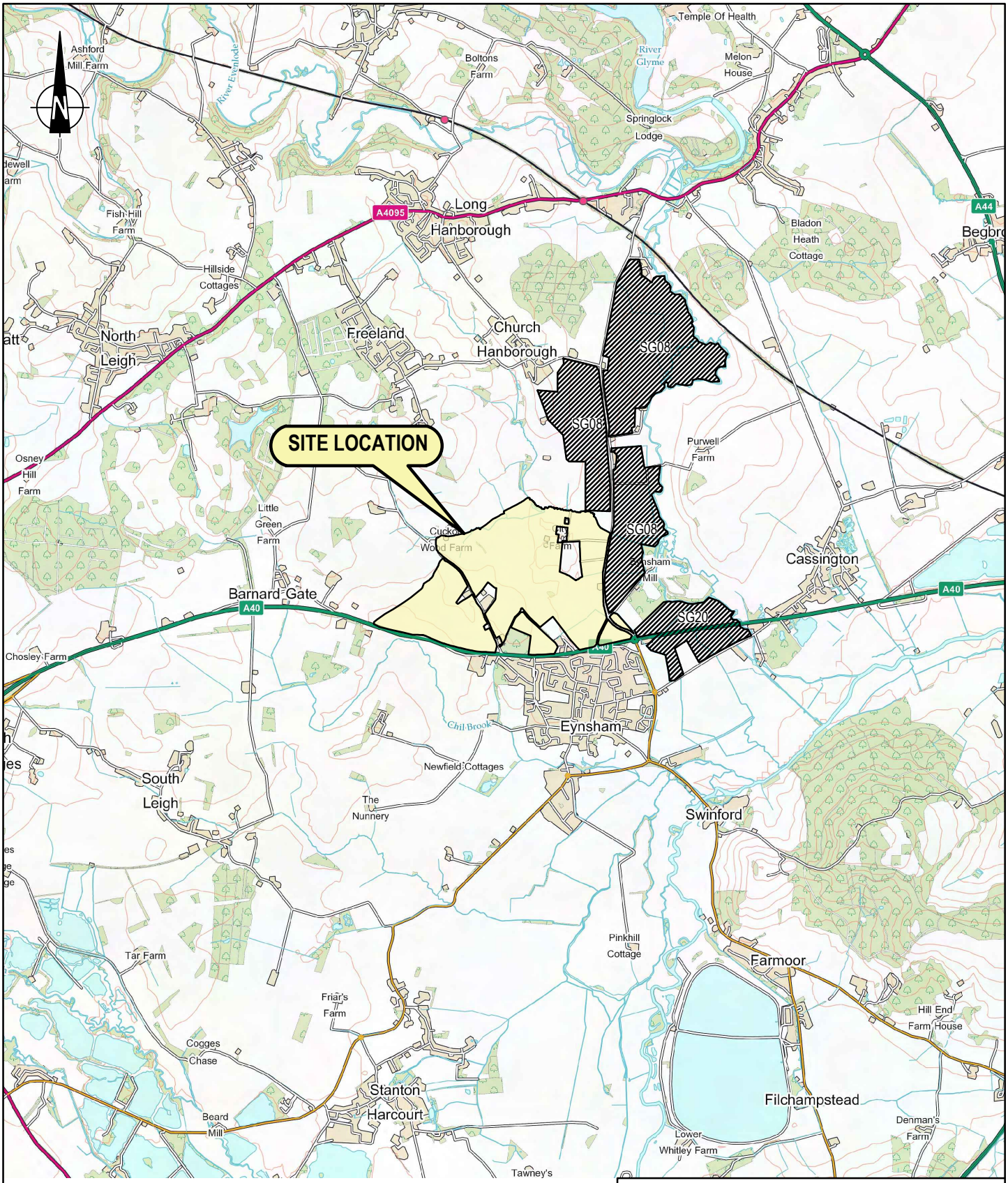
FIGURES



0 1000 2000
metres

Site Grid Ref: SP 427 108

Nominated Mineral Sites

OXFORDSHIRE COTSWOLD GARDEN VILLAGE

SITE LOCATION PLAN

Client
GROSVENOR DEVELOPMENTS LTD

Date of 1st Issue	Drawn by
03.01.2019	davco
A4 Scale	Checked by
1:50 000	NH
Figure Number	
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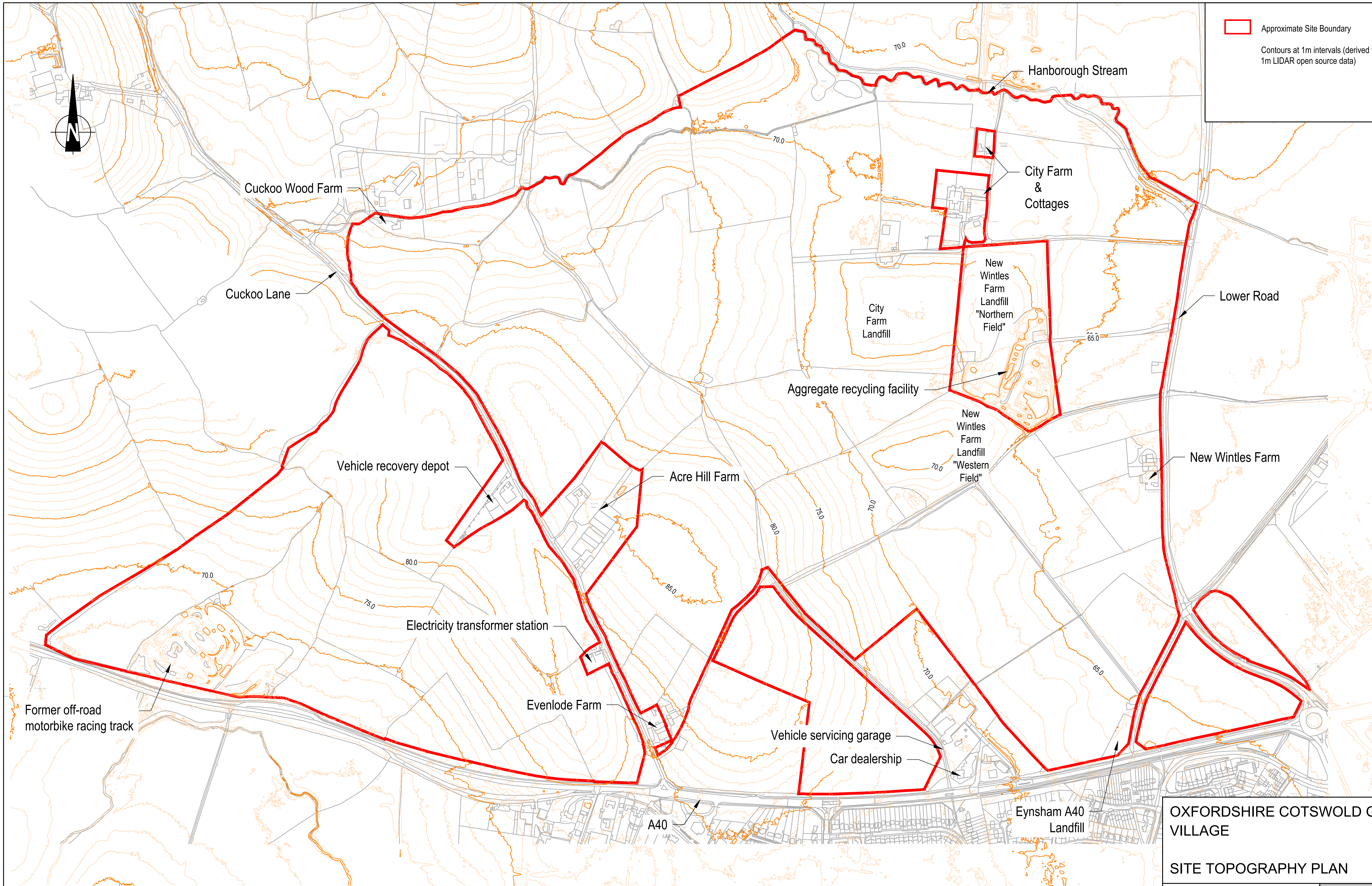

Hanborough Stream
Cuckoo Wood Farm
City Farm
&
Cottages
Cuckoo Lane
New
Wintles
Farm
Landfill
"Northern
Field"
City
Farm
Landfill
Lower Road
Aggregate recycling facility
New
Wintles
Farm
Landfill
"Western
Field"
New Wintles Farm
Vehicle recovery depot
Acre Hill Farm
Electricity transformer station
Evenlode Farm
Former off-road
motorbike racing track
Vehicle servicing garage
Car dealership
A40
Eynsham A40
Landfill
70.0
75.0
80.0
85.0
65.0

Approximate Site Boundary

Contours at 1m intervals (derived from 1m LIDAR open source data)

OXFORDSHIRE COTSWOLD GARDEN VILLAGE

SITE TOPOGRAPHY PLAN

Client

GROSVENOR DEVELOPMENTS LTD

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2a

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0 100 200
metres

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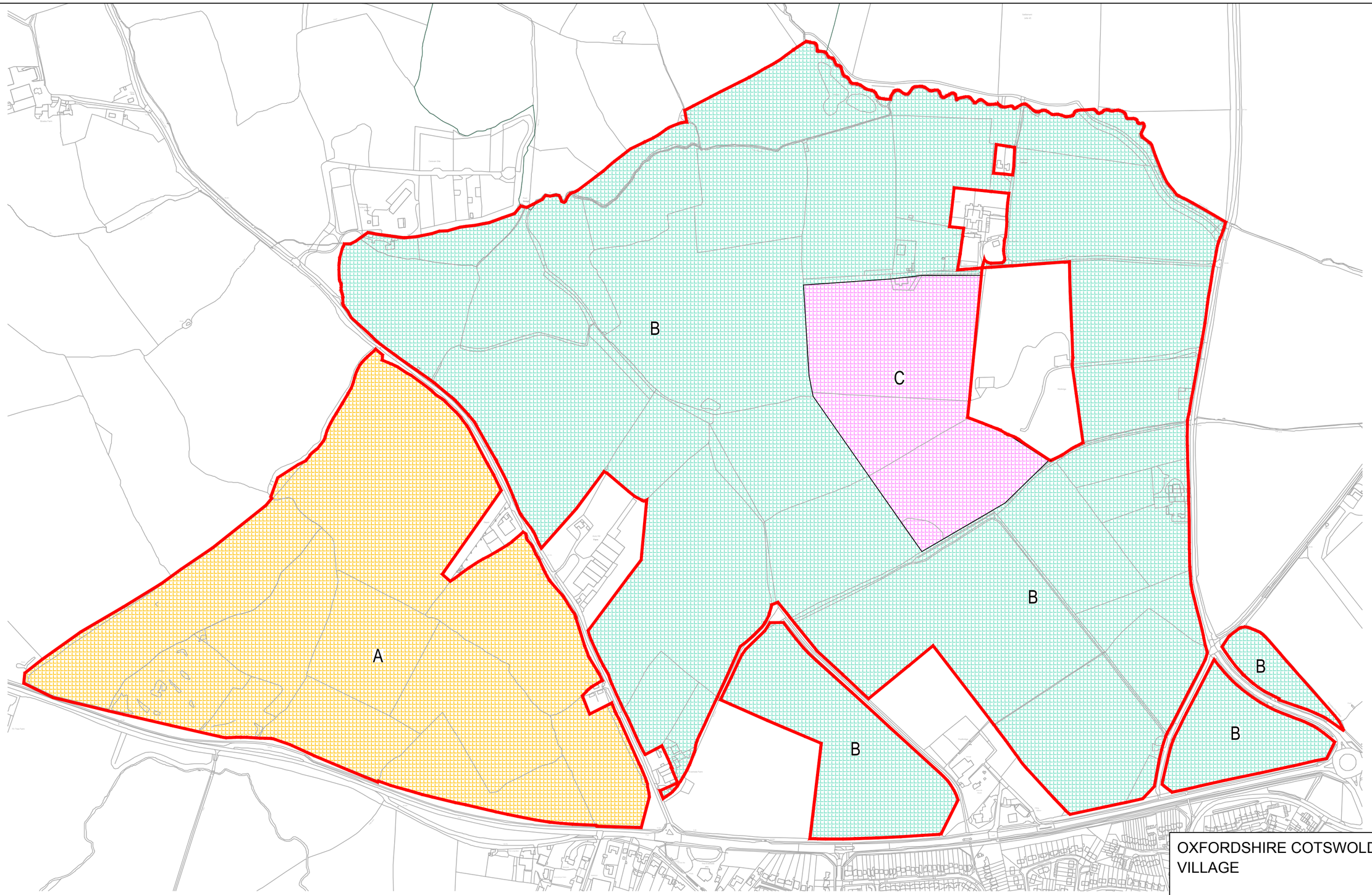

OXFORDSHIRE COTSWOLD GARDEN VILLAGE

SITE LAYOUT PLAN

Approximate Site Boundaries

Land Parcel A

Land Parcel B

Land Parcel C

0 100 200
metres

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Hanborough Stream

City Farm & Cottages

Cuckoo Wood Farm

Cuckoo Lane

New Wintles Farm Landfill "Northern Field"

City Farm Landfill

Lower Road

Aggregate recycling facility

New Wintles Farm Landfill "Western Field"

New Wintles Farm

Vehicle recovery depot

Acre Hill Farm

Fly-tipped material

Electricity transformer station

Evenlode Farm

Former off-road motorbike racing track

Vehicle servicing garage

Car dealership

Eynsham A40 Landfill

A40

Eynsham Express Service Station

Key

Approximate Site Boundary

Photograph Position

0 100 200 metres

OXFORDSHIRE COTSWOLD GARDEN VILLAGE

SITE WALKOVER PLAN

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Approximate Site Boundary

Superficial Deposits

ALV Alluvium

NO Northmoor Sand and Gravel Member (First Terrace)

SURAL Summertown-Radley Sand and Gravel Member (Second Terrace)

WV Wolvercote Sand and Gravel Member (Third Terrace)

HAN Hanborough Gravel Member (Fourth Terrace)

WV

ALV

ALV

SURAL

SURAL

SURAL

SURAL

City Farm Landfill

New Wintles Farm Landfill

New Wintles Farm Landfill

NO

ALV

ALV

SURAL

HAN

SURAL

SURAL

To River Evenlode

N

0 100 200

metres

OXFORDSHIRE COTSWOLD GARDEN VILLAGE

SUPERFICIAL GEOLOGY

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Approximate Site Boundary

Bedrock Geology

KLC Kellaways Clay Member

KLS Kellaways Sand Member

OXWW Oxford Clay Formation and West WaltonFormation

KLC

KLS

KLC

KLS

KLS

KLC

KLS

KLS

KLC

KLS

OXWW

City Farm Landfill

New Wintles Farm Landfill

New Wintles Farm Landfill

OXWW

OXWW

OXWW

OXWW

KLS

OXWW

OXFORDSHIRE COTSWOLD GARDEN VILLAGE

BEDROCK GEOLOGY

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0 100 200

metres

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N

Low/Moderate

Low/Moderate

Low/Moderate

Low/Moderate Risk Areas
On-Site landfills

Ground Conditions
There is the potential for contaminants to be present in localised areas the effects of which may be significant. Localised areas of thick made ground may be present. The possibility for buried obstructions exists.

Potential Development Implications
Investigations will be required in these areas to clarify risks and remedial measures may be required prior to development. Foundation requirements will be dependent on thicknesses of made ground and disturbed ground. Ground improvement measures may be required in some areas.

Low Risk Areas
Former off-road motorbike racing track, on-site farms

Ground Conditions
Investigations will be required in these areas to clarify risks and limited remedial measures may be required prior to development. Limited thicknesses of Made Ground may be present.

Potential Development Implications
The remediation of contamination is unlikely to be required. Traditional shallow foundation techniques and piles should be appropriate.

Very Low Risk Areas
Agricultural land, not previously developed

Ground Conditions
The significant presence of anthropogenic contamination is unlikely. Natural soils overlain by reworked agricultural plough soils

Potential Development Implications
The remediation of contamination is unlikely to be required. Traditional shallow foundation techniques and piles should be appropriate

Potential Off-Site Sources of Contamination

Approximate Site Boundary

0 100 200
metres

OXFORDSHIRE COTSWOLD GARDEN VILLAGE
SOIL AND GROUNDWATER OPPORTUNITIES AND CONSTRAINTS PLAN

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High Risk Areas
There is the potential for landfill gas to be present in this area, the effects of which may be significant. Investigation will be required to clarify the on-site risks. Gas protection measures are likely for new developments.

Low Risk Areas:
Former off-road motorbike track, on-site farms and areas of Alluvium; Investigations will be required in these areas to clarify gas risks and gas protection measures may be required for new developments.

Very Low Risk Areas:
The significant presence of soil gas is unlikely. Gas protection measures for new developments is unlikely.

Mapped extent of Second Terrace Deposits. Land which is generally within very low risk area, but which lie close to the recorded landfill sites. Such areas have not been used historically for landfilling themselves but could be influenced by landfill gas generated at the landfill sites and migration in the Terrace Deposits. Further investigation will be required in these areas to determine the degree of risk with distance from the landfill.

Potential migration of landfill gas beyond the boundaries of the landfill.

Off-Site Sources of Contamination

Approximate Site Boundary

0 100 200
metres

OXFORDSHIRE COTSWOLD GARDEN VILLAGE
SOIL GAS AND LANDFILL GAS OPPORTUNITIES AND CONSTRAINTS PLAN

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