WEST CAMBRIDGE

OUTLINE PLANNING APPLICATION

ENVIRONMENTAL STATEMENT _ VOLUME 3

TECHNICAL APPENDICES

UNIVERSITY OF CAMBRIDGE

JUNE 2016

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Document History

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EIA Quality Mark

This Environmental Statement and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development have been undertaken in line with our commitments as members of the EIA Quality Mark.

The EIA Quality Mark is a voluntary scheme operated by the Institute of Environmental Management and Assessment (IEMA) through our EIA activities are independently reviewed, on an annual basis, to ensure we continue to deliver excellence in the following areas:

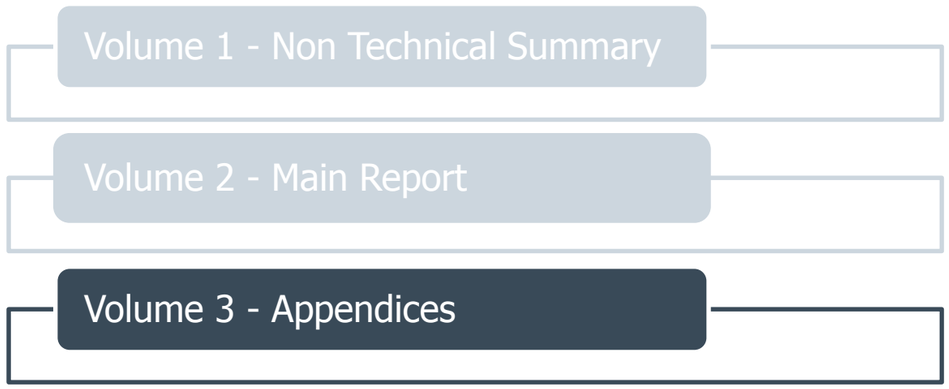
EIA Management
EIA Team Capabilities
EIA Regulatory Compliance
EIA Context & Influence
EIA Content
EIA Presentation
Improving EIA practice

To find out more about the EIA Quality Mark and our registration to it please visit: www.iema.net/qmark

Contents

Introduction

These appendices are the third volume of the Environmental Statement that is submitted as part of the outline planning application for the West Cambridge Masterplan. The information in these appendices is designed to accompany the Non Technical Summary and Main Report in Volumes 1 and 2 respectively and is not intended to be read in isolation.



Appendix 5.1 Scoping Opinion

Enquiries to:
John Evans
Senior Planner (New Neighbourhoods)
t: 01223 457293
e: john.evans@cambridge.gov.uk

CAMBRIDGE CITY COUNCIL

New Neighbourhoods

Ben Peirson
AECOM Design + Planning
MidCity Place
71 High Holborn
London
WC1V 6QS

6 May 2015

Our Ref: 15/5150/PREEIA

Dear Ben,

Scoping Opinion of the Local Planning Authority, Town and Country Planning Environmental Impact Assessment (England and Wales) Regulations 2011

West Cambridge Masterplan Review, West Cambridge Campus, Madingley Road, Cambridge, CB3 0ES

Thank you for your Scoping Report submitted on **2 April 2015**.

Your letter requested a scoping opinion on the proposed new masterplan and outline planning application for West Cambridge, Cambridge, under Regulation 13 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

We would ask you to accept this letter and its appendices as the formal response of Cambridge City Council.

In preparing this scoping response we have consulted:

Statutory and External Consultees

Environment Agency
Highway Agency
Natural England
Heritage England
Wildlife Trust

East of England Local Government Association

Sport England
Anglian Water Services
Cambridge Past, Present and Future
Cambridgeshire Constabulary

Local Authorities

Cambridgeshire County Council – Highways, Transport/New Communities, Archaeology
South Cambridgeshire District Council

Internal Consultees

Environmental Health
Urban Design and Landscape
Sustainable Construction
Nature Conservation

The Scoping Report identifies the majority of the potential environmental impacts of the development and sets out assessment criteria which are broadly acceptable.

Appendix 1 sets out the key scoping issues and other matters to be covered in the Environmental Statement.

Appendix 2 contains the full consultation responses received.

A copy of this Scoping Opinion will be placed on Part 1 of the Planning Register.

If you have any queries please contact me,

Yours sincerely,

John Evans
Senior Planner
New Neighbourhoods

Attached:

Appendix 1 – Scoping Opinion
Appendix 2 – Consultee responses

Appendix 1

Town and Country Planning (Environmental Impact Assessment (England and Wales) Regulations 2011 Regulation 13(1)

Scoping Opinion of the Local Planning Authority

Proposal: West Cambridge Masterplan Review

Details of Developer: University of Cambridge

EIA Project Manager: Ben Peirson, Aecom Design and Planning

Date of Scoping Opinion: 1 May 2015

1.0 Introduction

1.1 This Scoping Opinion is in response to the Scoping Report dated **1 April 2015**, which relates to a new masterplan for the Site, increasing the amount of development to approximately 423,000 m sq in floorspace.

1.2 The proposed land uses are:

- Academic
- Commercial
- Mixed use including existing residential and nursery uses
- Services and parking
- Sports and community

1.3 Indicative floorspace for each use is not specified in the Scoping Report. Some of the older existing buildings including the Department of Veterinary Medicine buildings, Cavendish Laboratories, and the Whittle Laboratory will be demolished.

1.4 A series of open spaces and corridors will cross the site, providing a variety of uses including informal recreation and outdoor entertainment; landscaping; surface water balancing and other water features; sustainable drainage systems; nature conservation; woodland; and pedestrian and cycle routes.

1.5 Junction improvements are proposed on the A1303 Madingley Road. Car parking will be concentrated in multi-storey structures along the edge of the site and semi-basements.

Scoping Opinion

1.6 It is noted the University of Cambridge intends to submit an Environmental Statement (ES) to support the outline planning application. This is because the development exceeds Schedule 2 threshold for urban developments, 10 (a), under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011. The Council agrees that an ES is required.

1.7 The submitted Scoping Report is sufficient for the Council to issue its Scoping Opinion which is set out below.

Consultation

1.8 During the scoping process, formal consultation was carried out with relevant statutory agencies and authorities and other relevant parties. A list of the consultees contacted and a summary of the responses to the EIA Scoping Report are contained in the covering letter and Appendix 2.

1.9 In adopting this Scoping Opinion, the Council has taken into account its consultation responses and has considered the specific characteristics of the proposal, the type of development, and the environmental features likely to be affected by the development. The summary cannot be considered exhaustive and only highlights the main points. We would therefore refer you to the responses contained in Appendix 2 (Consultee Responses Spreadsheet) which contains more detail about each relevant aspect.

1.10 Although this Scoping Opinion seeks to ensure that any future ES includes such information that is considered reasonably required, please note that further information may still be required once the planning application and ES has been submitted.

Assessment

1.11 From the responses received, your initial report addresses the majority of the potential impacts of this development. Below is a summary of the main points.

The Proposed Development

Purpose of Document

1.12 The purpose of the document is clear and the extent of the application site is understood.

Report Structure

1.13 The report structure is acceptable.

Description of development

1.14 The description of development is very general in the Scoping Report, with an intended floorspace of 423,000 m sq. The ES will need to clearly set out the development scenario being tested.

Background to the Development

1.15 The background to the development is clear.

Policy Context

1.16 The Scoping Report does not describe the policy context. The ES needs to refer to relevant policies in the Cambridge Local Plan 2006. It will also be appropriate to add a section regarding The Draft Cambridge Local Plan 2014.

Buildings

1.17 Paragraph – 3.5.1. The development should clearly specify which buildings are to be demolished and those to be retained. Those buildings to be demolished should be appraised for their historic value, for example Merton Hall Farmhouse.

Ecology

1.18 The Council is in agreement with the likely ecology impact of the development described in 5.3.1 of the Scoping report. The assessment criteria set out within The Chartered Institute of Ecology and Environmental Management (CIEEM) is considered appropriate to assess the impact of the development.

1.19 The following Protected Species surveys are recommended to inform the baseline:

- Great crested newt presence / absence surveys for the water bodies on Site;
- Water vole surveys of the water bodies known to have previously accommodated the species;
- Breeding bird survey; and
- Bat roost surveys of buildings and trees and bat transect surveys.
- The current extent and population of the scarce vascular plants associated with the Coton Hedgerow County Wildlife Site.
- It is noted that further surveys for invasive plants, bats, birds, great crested newts and water voles will be undertaken and the information considered as part of the baseline for the ES.

1.20 The ES should demonstrate wildlife habitat enhancement through enlargement or management of existing habitats and creation of new habitats. In addition, all phases of development should be assessed for impact on protected species.

1.21 The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 *Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System*. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.

1.22 Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, ‘are capable of being a material consideration…in the

making of planning decisions'. We advise that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES.

1.23 The ES should thoroughly assess the potential to affect designated sites, namely the Site of Special Scientific Interest (SSSI) Madingley Wood, located 1.8km to the west. In addition, impacts on regional and local wildlife and geological sites should be fully assessed. Appropriate mitigation measures may be needed in order to avoid, minimise or reduce any adverse significant effects.

1.24 The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 109), which should be demonstrated through the ES.

Historic Environment

1.25 There is broad agreement with the scope of impact set out within section 6.2 of the Scoping Report. However, whilst the Council confirms there are no statutory protected buildings on the site there is contemporary architecture which may be considered for inclusion on either the national or local list. The impact of the development on the setting of the Schlumberger Research Building by Michael Hopkins needs to be considered in the ES and supported by appropriate visuals. I note the setting of Schlumberger has been previously acknowledged as an issue in pre application discussions.

1.26 All building demolitions need to be clearly specified in the ES, and an appraisal of any historic interest. In particular Merton Hall Farmhouse which is over 100 years old and scheduled for demolition.

1.27 The ES should analyse the impact of the development on the setting of the historic core of Cambridge.

Archaeology

1.28 The report submitted by Atkins in support of the request for a scoping opinion makes certain assumptions regarding the significance of archaeological assets likely to survive (Section 6.2.5). We would advise that we do not currently have sufficient information to assess the extent and significance of archaeology likely to be affected and cannot therefore make recommendations regarding the specific requirements for mitigation.

1.29 We would recommend that the site should be subject to a programme of archaeological evaluation, to determine the extent, quality and significance of

any archaeological assets present and provide sufficient information to inform appropriate strategies to mitigate the impact of the development. This may include excavation, recording and publication of the results, or preservation in situ where this is appropriate to the significance of identified archaeology. The evaluation should be undertaken to inform the EIA, which should also include proposals to mitigate the development impact.

Landscape and Visual

1.30 The ES should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.

1.31 We are supportive of the general approach to be taken in the production of the ES with regard to landscape and visual matters. However, we would recommend that the visual assessment is carried out as soon as possible in the ES process along with the production of the photomontages in order to use the assessment as a working tool as opposed to merely a confirmation of impact, i.e. to modify the masterplan in light of the findings of the impact assessment.

1.32 We would recommend that the consultant also consider the *Cambridge Green Belt Study*, Landscape Design Associates, September 2002 as well as the Cambridgeshire Landscape Guidelines 1991 and the Guidance for the Cambridge Skyline. Although the Cambridge Green Belt Study was published 13 years ago, it contains some very useful observations on the subtle Cambridge landscape, particularly where the abrupt urban edge meets the agricultural fields that surround the city.

1.33 It is recognised in the report that for the visual assessment the viewpoints will need to be agreed and that they will need to be located on an OS map accompanied by a definitive map showing the Public Rights of Way. The visual receptor locations shown in the report are not exhaustive. Further views are recommended. (OS plan views contained in appendix 2: landscape comments).

1.34 The ES should consider potential impacts on access land, public open land and rights of way in the vicinity of the development. Appropriate mitigation measures should be incorporated for any adverse impacts.

Socio economics

1.35 It is recommended that health and wellbeing impacts are covered in the ES. This should include cumulative impacts of construction and operation on

existing and new residents and employees, including noise and vibration, dust, daylight and sunlight impacts, and air quality impacts, which might combine to cause significant stress or health and wellbeing impacts. These should be briefly summarised from other chapters in the ES and brought together when considering the overall cumulative impacts on health and wellbeing from the scheme alone, and in combination with other developments.

1.36 Assessments of impacts relating to crime and fear of crime should be completed according to the key points set out in Secured by Design.

Traffic and Transport

1.37 The County Council are in agreement with the likely effects and scope of assessment to inform the ES. The ES should also cover/clarify the following issues:

1.38 The new masterplan should be complementary to the Transport Strategy for Cambridge and South Cambridgeshire (TSCSC). City Deal is the funding process, TSCSC is the overarching strategy.

1.39 It should be noted for the ES methodology that cycle trips in Cambridge are made over longer distances than the 5km average.

1.40 The assessment criteria set out in paragraph 9.3.14 states that the study area will be based on an assessment using the highway network CSRM model. However further discussions will be required with the County Highways Authority to agree this methodology.

1.41 The study area for the Transport Assessment (TA) may well be more extensive as the use of a 30% threshold is not considered refined enough for the assessment of operational traffic and transport implications.

1.42 Paragraph 9.3.13 outlines the proposed assessment criteria and refers to Department of Transport (DFT) guidance, footnoting DfT's 2007 Guidance on Transport Assessments. It should be noted that this document is currently 'archived' and, while still of value and its use welcomed in this process, is not technically DfT current guidance.

1.43 The list of criteria in the same paragraph should include the DfT circular 02/2013 'The strategic road network and the delivery of sustainable development', this being current DfT policy.

General Environmental Impacts

1.44 The EIA Scoping Opinion Request gives consideration to the following potential environmental impacts, relevant to the Environment and Refuse Service.

- Air quality

- Noise (construction and operational)
- Contaminated Land

1.45 Throughout the Scoping Request, the applicant states that Cambridge City Council (CCC) and South Cambridgeshire District Council (SCDC) will be contacted to discuss the scope and content of the relevant environmental assessments. This is welcomed.

1.46 Additionally, three further potential impacts, not covered with the Scoping Request have been identified and are also discussed below. These are:

- Artificial Lighting (for impact on amenity)
- Odour
- Waste and Recycling

Air Quality

Air Quality

1.47 It is noted that in terms of construction & operational air quality impacts, reference is made to the use of the guidance in Environmental Protection UK, 2010, (Development Control: Planning for Air Quality). There are certain drawbacks with this guidance. Indeed, an updated joint EPUK /IAQM guidance will be issued very soon. Therefore, it is recommended that the applicant also makes reference to this in terms of magnitude / significance of impacts. The draft document can be found at:

http://www.environmental-protection.org.uk/committees/air-quality/air-pollution-and-planning/

1.48 Combined Heat and Power is proposed. The potential air quality impacts of this will also need to be modelled alongside any potential traffic/travel impacts. Therefore, expected flue heights, exit velocities, temperatures and throughputs will need to be determined ready for the ES.

1.49 It is noted that a separate traffic and transport assessment is to be carried out. It is assumed that this data will feed into the air quality assessment.

Noise and Vibration

1.50 Reference is made to the most up-to-date and appropriate guidance (British Standards. BS4142:2014 is likely to be most relevant of these documents given the proposed end-uses. As residential uses exist on the site, and if further residential uses are proposed, we would also expect use of BS8233:2014 to assess performance of the building fabric by day and by night. We also expect an assessment of the noise levels within external amenity spaces.

1.51 Where residential dwellings cannot achieve the standards set out in BS8233:2014 with windows open, we would expect to see proposals for an

alternative form of ventilation provided within the assessment. However, these details can be obtained through condition as and when required.

1.52 Careful consideration should be given to the possible reflective nature of larger commercial units, reflecting noise back towards existing residential premises.

1.53 Potential impacts from construction noise should be assessed using BS5228:2009, to include forecast noise levels at the site (or construction phase) boundary along with detailed proposals for mitigation and noise management.

Water Environment

1.54 The scope of the construction effects and the method of assessment is considered appropriate.

1.55 The recognition of the potential contamination of surface water runoff during the construction is welcomed. We recommend baseline data related to the ecological status of the Wash Pit Brook and Coton Brook be collected to help inform the surface water drainage strategy. It is noted that ecological status is included in the Assessment Criteria table 12.1, but it would also be helpful to include reference to current status of the brooks in the section on establishing the baseline.

1.56 The proposed method of assessment does not make any reference to the impact of climate change. This should form part of the analysis within the ES.

1.57 The Flood Risk Assessment included within the ES will need to demonstrate that the proposed development will not increase the flood risk to others.

1.58 Because the site sits on a Groundwater Vulnerability Zone we would expect the ES to include detailed analysis of the local and wider area hydrogeology.

Ground Conditions

1.59 Contaminated land is addressed within the Scoping Report. It is noted that various detailed investigations have already taken place.

1.60 The Scoping Request states that ground investigations will be undertaken in areas not previously subject to investigation. The applicant should contact CCC to discuss the protocol for the further sampling and analysis and the methodology to be used in risk characterisation and assessment.

1.61 Additionally, it is likely that we will require the submission of a Soil Management Strategy.

Cumulative Effects

1.62 The likely effects and approach to the method of assessment is considered appropriate. It is recommended that health and wellbeing issues which are related to cumulative impact are assessed in greater are assessed in greater detail. For example Socio-Economic Impacts, Noise and Vibration, and Air Quality, should be linked to potential effects on health and wellbeing of existing and new residents and workers (for example, noise/stress, air quality/respiratory disease and isolation and loneliness of existing residents on campus).

1.63 The development in combination with other current applications; approved but uncompleted projects; projects which are reasonably foreseen; and other ongoing activities, should be included in the ES.

Summary

1.64 Subject to the above matters, the submitted Scoping Report addresses the majority of the impacts arising from the development. Detailed comments from relevant consultees are included in appendix 2.

Appendix 2

Consultation Responses

Statutory and External Consultees
Environment Agency
Highways England
Historic England
Natural England
Wildlife Trust
East of England Local Government Association
Sport England (No comments)
Anglia Water Services
Cambridge Past, Present and Future
Cambridgeshire Constabulary (No comments)
Local Authorities
Cambridgeshire County Council
Archaeology
South Cambridgeshire District Council
Internal Consultees
Environmental Health
Urban Design and Landscape
Planning Policy Team: Sustainability
Ecology Officer

Mark Parsons
Cambridge City Council
The Guildhall
Cambridge
Cambridgeshire
CB2 3QJ

Our ref: AC/2015/122783/01-L01
Your ref: 15/5150

Date: 17 April 2015

Dear Sir

WEST CAMBRIDGE MASTERPLAN EIA - ENVIRONMENTAL IMPACT ASSESSMENT – SCOPING OPINION REQUEST. WEST CAMBRIDGE SITE, MADINGLEY ROAD, CAMBRIDGE, CAMBRIDGESHIRE.

Thank you for your consultation received 13 April 2015.

An electronic copy of your response to the applicant would be appreciated.

Environment Agency position.
The Environment Agency finds the submitted document to be generally acceptable and offers further guidance and informatives which should be considered by the applicant, and addressed in any subsequent EIA and formal planning application.

I also attach for the applicant's assistance a copy of the Environment Agencys *Planning Application Guidance* document.

Development & Floodrisk.
A site specific Flood Risk Assessment (FRA) will need to be submitted to support this application. This should be based on the most up to date information available, see following link. https://www.gov.uk/flood-risk-assessment-in-flood-zone-1-and-critical-drainage-areas

The conclusions of the FRA should be included within the EIA. The FRA will need to demonstrate that the proposed development will not increase the flood risk to others.

Under the Flood Water Management Act 2010, since the 6th April 2012, Cambridgeshire County Council has been responsible for Ordinary Watercourses Regulation in this area as the Lead Local Flood Authority (LLFA). ***Any works*** to an ordinary watercourse, including culverting, or discharge, may require prior written consent from the County. Please contact them at: FloodAndWater@Cambridgeshire.gov.uk (Tel: 01223 699155).

Foul Water Drainage & Trade Effluent Disposal.
All foul sewage or trade effluent, including cooling water containing chemical additives, or vehicle washing water, including steam cleaning effluent shall be discharged to the foul sewer.

Anglian Water Services Ltd. should be consulted by the Local Planning Authority and be requested to demonstrate that the sewerage and sewage disposal systems serving the development have sufficient capacity to accommodate the additional flows, generated as a result of the development, without causing pollution or flooding. If there is not capacity in either of the sewers, the Agency must be reconsulted with alternative methods of disposal.

Groundwater & Contaminated Land.
As the site sits on Groundwater Vulnerability Zones we would expect the EIA to include a detailed analysis of the local and wider area hydrogeology. This would include groundwater levels, and ideally groundwater flow direction. The EIA would also assess the risks posed by contamination to controlled waters following the requirements of the National Planning Policy Framework and the Environment Agency Guiding Principles for Land Contamination.

Environmental Management - Waste.
Advice to applicant. Excavated material arising from site remediation or land development works can sometimes be classified as waste. For further guidance on how waste is classified, and best practice for its handling, transport, treatment and disposal please see our waste pages at http://www.environment-agency.gov.uk/business/topics/waste/default.aspx

If any waste is to be used onsite, the applicant will be required to obtain the appropriate waste exemption or permit from us. We are unable to specify what exactly would be required if anything, due to the limited amount of information provided. The applicant is advised to refer to guidance on our website http://www.environment-agency.gov.uk/subjects/waste The Environmental Protection (Duty of Care) Regulations 1991 for dealing with waste materials are applicable for any off-site movements of wastes. The developer as waste producer therefore has a duty of care to ensure all materials removed go to an appropriate permitted facility and all relevant documentation is completed and kept in line with regulations. The developer must apply the waste hierarchy in a priority order of prevention, re-use, recycling before considering other recovery or disposal options. Government Guidance on the waste hierarchy in England is at: http://www.defra.gov.uk/publications/files/pb13530-waste-hierarchy-guidance.pdf If any controlled waste is to be removed off site, then the site operator must ensure a registered waste carrier is used to convey the waste material off site to a suitably permitted facility. The applicant is advised to refer to guidance on our website http://www.environment-agency.gov.uk/subjects/waste.

Conservation.
Opportunities should be provided for wildlife habitat enhancement through enlargement and/or appropriate management of existing habitats and through creation of new habitats. Subsequent proposals must demonstrate enhancement.

Environmental Permitting.
The applicant may need an Environmental Permit if the proposed development manages or produces waste or emissions that pollute the air, water or land.
The Environmental Permitting Regulations (England and Wales) 2010 cover water discharges, groundwater activities, radioactive substances, waste, mining waste and installations. They also include provision for a number of Directives including batteries.

Please visit our website for further information on Environmental Permitting.

The Applicant should also investigate any of the above mentioned issues, on and off site, which may impact upon the proposed development.

Please be advised that the comments contained within this correspondence represent the informal opinion of an officer of the Environment Agency. These comments are not intended to be exhaustive and are made without prejudice to any subsequent response to the local planning authority to a formal planning consultation. We reserve the right to change our position in relation to any such application.

Yours faithfully

Mr. T.G. Waddams
Planning Liaison Officer

Direct e-mail planning_liaison.anglian_central@environment-agency.gov.uk

Enc: EA Guidance

Cambridgeshire & Bedfordshire Area, Environment Agency, Bromholme Lane, Brampton, Huntingdon, Cambs. PE28 4NE

www.gov.uk/environment-agency

Awarded to Cambridgeshire and Bedfordshire Area

Highways England

Our interest, as you would no doubt expect, will largely be in the transport aspects of the EIA. The transport section of the scoping report states that a separate transport assessment (TA) is to be produced, which is no surprise and would be expected. As such this scoping note is broadly acceptable to us.

I only had two minor comments to make, which may well be picked up anyway by the TA. Firstly, paragraph 9.3.13 outlines the proposed assessment criteria and refers to DfT guidance, footnoting DfT's 2007 Guidance on TAs. It should be noted that this document is currently 'archived' and, while still of value and its use welcomed in this process, is not technically DfT current guidance. Secondly, the list of criteria in the same paragraph should include the DfT circular 02/2013 "The strategic road network and the delivery of sustainable development" this being current DfT policy on planning in regard to the SRN.

David Abbott, Asset Manager: Area 8
Highways England

Historic England

EAST OF ENGLAND OFFICE

Mr Mark Parsons
Cambridge City Council
The Guildhall
Cambridge
Cambridgeshire
CB2 3QJ

Direct Dial: 01223 582717

Our ref: PA00372420
Your ref: 15/5150/PREEIA

28 April 2015

Dear Mr Parsons

WEST CAMBRIDGE SITE, MADINGLEY ROAD, CAMBRIDGE
EIA Scoping Opinion for West Cambridge Masterplan
LPA Ref: 15/5150/PREEIA

Thank you for your invitation to respond to the EIA Scoping Report for the West Cambridge Masterplan. Historic England is primarily concerned with the impact of new development on the historic environment and my comments will therefore focus on those aspects of the report.

Section 6 of the report deals with the historic environment, both built heritage and archaeology. I note that in paragraph 6.1.4 the report states that there are no buildings within the site of special interest. While there are no statutorily protected buildings, there are some interesting pieces of contemporary architecture. In particular the site includes the Schlumberger Cambridge Research Building by Michael Hopkins and Partners (1985, 1992). This building received a Civic Trust Award in 1988 and an RIBA Award in 1993. At some point in the near future this building may be considered for inclusion on either the national or local list.

Paragraph 6.3.1 states that the setting of all heritage assets within the zone of visual influence, established by the landscape and visual assessment, will be included in the assessment. In addition to the impact on the setting of nearby designate heritage assets, Historic England would wish to see the potential impact of the development on the setting of the historic core of Cambridge, in views looking in towards the city from the Green Belt, included within the scope of the EIA. I doubt that the viewpoints included in the map on page 19 will be sufficient for the purpose, and one or two carefully selected and agreed additional viewpoints may be required.

Finally, I note that the Conduit Head Conservation Area is missing from the map on page 4 of the Scoping Report.

Historic England

EAST OF ENGLAND OFFICE

Yours sincerely

David Grech
Historic Places Adviser
E-mail: david.grech@HistoricEngland.org.uk

Date: 22 April 2015
Our ref: 150928
Your ref: 15/5150/PREEIA

Mr Mark Parsons
Principal Planner (New Neighbourhoods)
Planning Services
Cambridge City Council

Customer Services
Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

T 0300 060 3900

BY EMAIL ONLY

Dear Mr Parsons

Environmental Impact Assessment Scoping consultation (Regulation 15 (3) (i) of the EIA Regulations 2011): Scoping Report for the Environmental Impact Assessment (EIA) of the West Cambridge Masterplan (increasing the floorspace beyond that approved under 97/0961/OP) submitted under Regulation 13 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2011, to request a formal Scoping Opinion on the information to be supplied in the Environmental Statement.
Location: West Cambridge Site, Madingley Road, Cambridge

Thank you for seeking our advice on the scope of the Environmental Statement (ES) in your consultation dated 10 April 2015.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

Case law[1] and guidance[2] has stressed the need for a full set of environmental information to be available for consideration prior to a decision being taken on whether or not to grant planning permission.

We note that the site is located on the western edge of Cambridge, bounded to the west by the M11 Motorway, to the north by the A1303 Madingley Road, to the east by Clerk Maxwell Road, and to the south by open countryside. The Site is 66ha in area and comprises a mix of land uses including academic, commercial, sports, and residential. The majority of the site is open land comprising a mixture of roads and footpaths, car parks, unmanaged plots awaiting development, formal landscaped public realm areas, and large paddocks associated with the veterinary school.

Annex A to this letter provides Natural England's advice on the scope of the Environmental Impact Assessment (EIA) for this development, taking into consideration the information provided in the Scoping Opinion Request report prepared by Atkins (April 2015).

Should the proposal be amended in a way which significantly affects its impact on the natural environment then, in accordance with Section 4 of the Natural Environment and Rural Communities

[1] Harrison, J in *R. v. Cornwall County Council ex parte Hardy* (2001)
[2] *Note on Environmental Impact Assessment Directive for Local Planning* Authorities Office of the Deputy Prime Minister (April 2004) available from http://webarchive.nationalarchives.gov.uk/+/http://www.communities.gov.uk/planningandbuilding/planning/sustainabilityenvironmental/environmentalimpactassessment/noteenvironmental/

Act 2006, Natural England should be consulted again.

We would be happy to comment further should the need arise but if in the meantime you have any queries please do not hesitate to contact us. For any queries relating to the specific advice in this letter only please contact Janet Nuttall on 0300 060 1239. For any new consultations, or to provide further information on this consultation please send your correspondences to consultations@naturalengland.org.uk.

Yours sincerely

Janet Nuttall
Sustainable Land Use Adviser

Annex A – Advice related to EIA Scoping Requirements

1. General Principles

Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2011, sets out the necessary information to assess impacts on the natural environment to be included in an ES, specifically:

- A description of the development – including physical characteristics and the full land use requirements of the site during construction and operational phases.
- Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.
- An assessment of alternatives and clear reasoning as to why the preferred option has been chosen.
- A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors.
- A description of the likely significant effects of the development on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects. Effects should relate to the existence of the development, the use of natural resources and the emissions from pollutants. This should also include a description of the forecasting methods to predict the likely effects on the environment.
- A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.
- A non-technical summary of the information.
- An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.

It will be important for any assessment to consider the potential cumulative effects of this proposal, including all supporting infrastructure, with other similar proposals and a thorough assessment of the 'in combination' effects of the proposed development with any existing developments and current applications. A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.

2. Biodiversity and Geology

2.1 Ecological Aspects of an Environmental Statement

We welcome the proposed approach to assessing impacts on ecology presented in the Scoping Opinion report. Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters.

EcIA is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EcIA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal.

The National Planning Policy Framework sets out guidance in S.118 on how to take account of biodiversity interests in planning decisions and the framework that local authorities should provide to assist developers.

2.2 Internationally and Nationally Designated Sites

The ES should thoroughly assess the potential for the proposal to affect designated sites. European sites (eg designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2010. In addition paragraph 118 of the National Planning Policy Framework requires that potential Special Protection

Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites.

Under Regulation 61 of the Conservation of Habitats and Species Regulations 2010 an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site.

Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process.

Sites of Special Scientific Interest (SSSIs) and sites of European or international importance (Special Areas of Conservation, Special Protection Areas and Ramsar sites)
The development site is located in close proximity to the following designated conservation sites:

- Madingley Wood SSSI is located approximately 1.8km to the west.

Traveller's Rest Pit SSSI is a geological site located within 600m of the proposed development site. The ES should assess the potential effect of development on this site, however, we believe the notified geological interests of this site are unlikely to be adversely affected.

- Further information on the SSSI and its special interest features can be found at www.magic.gov . The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within the SSSIs and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects.

2.3 Regionally and Locally Important Sites
The EIA will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geoconservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The Environmental Statement should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. We understand that the site includes two County Wildlife Sites (CWSs). A number of other CWSs are located nearby. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures. Contact the Cambridgeshire Wildlife Trust and geoconservation group for further information.

2.4 Protected Species - Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2010
We welcome proposals to undertake detailed assessment of impacts on ecology, informed by up to date surveys and based on best practice Chartered Institute of Ecology and Environmental Management *Guidelines for Ecological Impact Assessment in the United Kingdom (*2006). The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). We note that records of protected species have been sought from the Cambridgeshire and Peterborough Environmental Records Centre. Consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment.

The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 *Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System*. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey

results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.

In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. Natural England has adopted standing advice for protected species which includes links to guidance on survey and mitigation.

2.5 Habitats and Species of Principal Importance

The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available in the Defra publication 'Guidance for Local Authorities on Implementing the Biodiversity Duty'.

Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, 'are capable of being a material consideration...in the making of planning decisions'. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP.

We welcome proposals for detailed ecological survey and assessment. Natural England recommends that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of:

- Any historical data for the site affected by the proposal (eg from previous surveys);
- Additional surveys carried out as part of this proposal;
- The habitats and species present;
- The status of these habitats and species (eg whether priority species or habitat);
- The direct and indirect effects of the development upon those habitats and species;
- Full details of any mitigation or compensation that might be required.

The development should seek if possible to avoid adverse impact on sensitive areas for wildlife within the site, and if possible provide opportunities for overall wildlife gain.

2.6 Contacts for Local Records

Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the appropriate bodies (CPERC, Cambridgeshire Wildlife Trust and the local geoconservation group or other recording society and a local landscape characterisation document).

3. Designated Landscapes and Landscape Character

Landscape and visual impacts

Natural England supports proposals to undertake landscape and visual impact assessment in accordance with *Guidelines for Landscape and Visual Impact Assessment*, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition) and *An Approach to Landscape Character Assessment*, Natural England (2014).

Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding

area and landscape together with any physical effects of the development, such as changes in topography. The European Landscape Convention places a duty on Local Planning Authorities to consider the impacts of landscape when exercising their functions.

The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.

In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, Natural England encourages all new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.

The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application.

The assessment should refer to the relevant National Character Areas which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page.

Heritage Landscapes
You should consider whether there is land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding scenic, scientific or historic interest. An up-to-date list may be obtained at www.hmrc.gov.uk/heritage/lbsearch.htm and further information can be found on Natural England's landscape pages here.

4. Access and Recreation

Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.

Rights of Way and National Trails
The EIA should consider potential impacts on access land, public open land and rights of way in the vicinity of the development. Appropriate mitigation measures should be incorporated for any adverse impacts. We also recommend reference to the relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.

5. Soil and Agricultural Land Quality

We are not aware, based on the information provided in the Scoping Opinion report, that the proposed development site includes any agricultural land.

6. Air Quality

Natural England supports proposals for an air quality chapter in the ES to assess the impacts of development through the construction and operational phases, including impacts on Madingley Wood SSSI.

Air quality in the UK has improved over recent decades but air pollution remains a significant issue; for example over 97% of sensitive habitat area in England is predicted to exceed the critical loads for ecosystem protection from atmospheric nitrogen deposition (England Biodiversity Strategy, Defra 2011). A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The assessment should take account of the risks of air pollution and how these can be managed or reduced. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk). Further information on air pollution modelling and assessment can be found on the Environment Agency website.

7. Climate Change Adaptation

The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 109), which should be demonstrated through the ES.

8. Contribution to local environmental initiatives and priorities

The proposal should aim to provide significant multi-functional green infrastructure enhancements, including contribution to the objectives and targets of the Cambridgeshire Biodiversity Action Plan and Cambridgeshire Green Infrastructure Strategy (2011). Consideration should be given to opportunities for enhancements within the site and to the creation of green / wildlife corridors providing linkages to the wider environment.

9. Cumulative and in-combination effects

A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.

The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information):

a. existing completed projects;
b. approved but uncompleted projects;
c. ongoing activities;
d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and

e. plans and projects which are reasonably foreseeable, ie projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.

John Evans

From: Sian Williams <Sian.Williams@wildlifebcn.org>
Sent: 17 April 2015 09:36
To: Mark Parsons
Subject: scoping opinion ref 15/5150/PREEIA

Dear Mr. Parsons,
Thank you for consulting the Wildlife Trust regarding the EIA Scoping Report for the proposed expansion of the West Cambridge Development site.
The scoping document has identified the key potential ecological receptors in terms of sites (both statutory and non-statutory) and species, and the proposed outline of the Environmental Statement looks suitable, therefore we have no comments to add at this stage.
However, we would be pleased to provide input into the assessments, mitigation proposals, etc., particularly with regard to the City and County Wildlife Sites, so please keep us informed of the progress of this application.

Yours sincerely,

Siân Williams, MCIEEM

Sian Williams
Conservation Officer

Direct line: 01954 713509
Office: 01954 713500

Follow us:
www: wildlifebcn.org
Facebook: /wildlifebcn
Twitter: @wildlifebcn

Wildlife Trust for Bedfordshire, Cambridgeshire & Northamptonshire
The Manor House
Broad Street
Great Cambourne
Cambridge
CB23 6DH
United Kingdom

John Evans

From: Bull Sue <sBull@anglianwater.co.uk>
Sent: 20 April 2015 15:10
To: Mark Parsons
Subject: FW: 15/5150/PREEIA Consultation on request for a Scoping Report EIA of the West Cambridge Masterplan

Thank you for the opportunity to comment on this application.

Section 3.10 Utilities
In addition to any private assets that may be located on the site, there are public assets, owned and maintained by Anglian Water . There is a 300mm diameter surface water sewer crossing through the site that requires a 3 metre easement either side of the centreline of the pipe.

If it is not possible to avoid this sewer and easement then the sewer may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). We have a duty to divert our sewerage infrastructure if requested to do so although this would be at the developers expense who would need to make a formal application for consideration of a diversion.

Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that the your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

Maps detailing the location of our sewers are available from www.digdat.co.uk.

For connection to the foul sewerage there are potential points in Madingley Road and Wilberforce Road.

Section 3.7 Surface Water Drainage
The document suggests use of Sustainable drainage and there is a pond/lake on the site. A connection to the public system and a discharge rate would only be considered once evidence has been provided that all other methods of sustainable drainage has been considered and would be utilised as far as possible .

Regards

Sue Bull
Planning Liaison Manager

Office: 01733 414690 Mobile: 07885 135312 Thorpe Wood House, Thorpe Wood, Peterborough, PE3 6WT

Cambridge Past, Present & Future
Wandlebury Ring, Gog Magog Hills
Babraham, Cambridge CB22 3AE
www.cambridgeppf.org
Phone 01223 243830

CAMBRIDGE PAST, PRESENT & FUTURE
Formerly Cambridge Preservation Society

Cambridge City Council
Mr Mark Parsons
Planning Department
Guildhall
Cambridge
CB2 3OJ

30 April 2015

Dear Mr Parsons

Ref: Consultation Response to Planning Application 15/5150/PREEIA Scoping Report for the Environmental Impact Assessment (EIA) of the West Cambridge Masterplan- *(increasing the floorspace beyond that approved under 97/0961/OP) submitted under Regulation 13 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2011, to request a formal Scoping Opinion on the information to be supplied in the Environmental Statement.*

Summary:
Cambridge Past, Present & Future is **unable to support** the current application in its current form and request the following issues be considered. CambridgePPF has assessed the Masterplan document and believe it is inadequate and does not sufficiently acknowledge the full extent of the site, immediate area and wider zone of influence thereby missing key opportunities for enhancement.

Comments on application Ref 15/5150/PREEIA:
It is encouraging and appreciated that the Charity has been included and considered an important stakeholder and non-statutory consultee.

It is acknowledged that this is a scoping opinion application and as such is preliminary in nature. A scoping report should include all of the issues to be considered and assess the likely significant environmental effects of the development. In addition, the document should include proposals for mitigation of any impact arising from the proposal. Finally, it is appreciated the current application relates to a previous Masterplan in 1999, reviewed in 2004 (although it is unclear why these previous plans were insufficient in estimates of need by over 170,000m^2).

CambridgePPF seeks further clarification on items referenced in the Masterplan document:

- Environmental –
    - West Cambridge is adjacent to the Green Belt and is one of the main arteries into the City. This section of the Green Belt has the highest score in the City/SCDC Review of the Inner Boundary of the Green Belt. The views from the high ground at Coton and Madingley of the cityscape are one of the best vistas of Cambridge. Development, therefore, has to be sensitive to this Green Belt landscape.

    - In addition, drainage issues, such as impact on adjacent brooks, do not seem to have been considered, as well as noise and air pollution from the M11. The proposal should include

mitigations for these items. Has any methodology or approach for energy production and sustainability been explored?

- The document refers to ecology and biodiversity information gaps, and indicates further work is proposed. When in the process is this to take place and will it be before the OAP?

- Heritage –
  - The site is adjacent to or abuts numerous designate and non-designated heritage assets, including the following short list (not all inclusive):
    - abuts the West Cambridge Conservation Area
    - Conduit Head Road Conservation Area
    - adjacent listed buildings, protected open space
    - building of local interest/positive unlisted buildings
    - important trees and tree groups
    - scheduled ancient monument that is located within the site (ref 1233793, early medieval inhumation, two Saxon pots found in 1900 and 1903
    - Madingley Wood SSSI
    - Histon Road SSSI
    - Traveller's Rest Pit SSSI
    - Coton Countryside Reserve- which was not mentioned or included in the asset map Figure 2.2 (a farmed recreational site of 120ha plus befitting people and wildlife)
    - City country and wildlife site located within the site (ref Figure 3.5 Cambridge Skyline Guidance)

  - It is stated that the site itself does not contain any buildings of architectural interest or significance, however, the City consider the Schlumberger Building to be a landmark building (ref Figure 3.6 Cambridge Skyline Guidance)

  - Merton Hall Farmhouse – the building and farmstead can be seen on the 1898 OS map, indicating it is over 100yrs old therefore warranting a more detailed assessment of its significance, since it is scheduled for demolition

  - Section 6.2.6 states that 'long term effects on the setting of heritage assets could arise due to the presence of new build form'. No apparent mitigation has been suggested and yet this harm has been dismissed and the summary states there is 'potential' harm. A more thorough assessment of this impact should be carried out that outlines the potential harm and offers wider benefits to help mitigate and balance it out

Recommendations for further consideration in the wider context of the proposal:

- Consultation – the site is on the boundary with South Cambridgeshire District Council and through views could have an impact on the setting and character of the area. It is highly recommended that the planning (including landscape, ecology and conservation) team be included in this and future consultations.

- Transport – how has linking this development (and that proposed in NW Cambridge) to the city centre, railway station, Addenbrookes and other major sites within the Cambridge been included? This includes bus lanes, cycle routes, etc. as the A1303 has already become a challenge at peak times. Both Cambridgeshire County Council and the University should look at transport alternatives for all development. One option for consideration could be a new Guided Busway starting at St

Neots, through Cambourne and Bourne Airfield, Hardwick, Coton, then NW Cambridge, through West Cambridge, and into the city along the Barton Road.

- Detail and design principles - Buildings along the western edge of the site should be no more than four storey internally and three along the outer boundary of the site. Principles such as scale, form, massing, design, materials and context are key to a successful development and it is not clear from the pre-application information if this has been substantially considered.

- Opportunities for enhancement – any planning related funds or contributions, including a Section 106 agreement, should be considered and contribute towards the wider context of the site. Funds could be allocated to ensure an improved quality of environment for local residents, including the Coton Countryside Reserve.

- Existing planting and vegetation – along the north and west boundaries of the site the Masterplan states there is sufficient screening via existing dense planting. However, in planning terms existing plants, trees and vegetation cannot be relied upon for their permanence.

- Relocation/Phasing – there are several buildings proposed for demolition that are currently in use. Where will the existing occupants go? How is the proposal to be phased?

- Information gaps – there are numerous indications throughout the document that state further work 'will be undertaken' as part of the baseline for the EIA, however, it is unclear when this work will take place. The next stage of the process is said to be the OPA, however, how is that part of the baseline? For example, traffic survey, protected species survey, air quality, etc.

- Contamination – the ground around the School of Veterinary Medicine may be contaminated and mitigations need to be in place to address this, including containing the matter and preventing it from seeping into the wider area during construction.

Final comments:
The EIA Masterplan should be a means by which the impact of further development be assessed and the document in its current form does not adequately address the issues raised above. If the Council can provide reassurance over these issues, then CambridgePPF may be willing to support this proposal.

The Masterplan states it precedes the submission of an Outline Planning Application. Outline applications tend to lack sufficient detail and information in order to properly assess the impact, harm and benefit of the proposed scheme. As a result, CambridgePPF encourage the applicant consider a full planning application in order to enable a more constructive debate with an adequate level of information.

Relevant policies:
- NPPF
- Cambridge Local Plan 2006
- Cambridge Skyline Guidance
- Cambridge City Council relevant Conservation Area Appraisals

If you have any queries regarding this letter please do not hesitate to contact me.

Kind regards

Stacey Weiser, IHBC
Head of Planning and Conservation

Cambridge Past, Present & Future: a local charity working to keep Cambridge and its surroundings special by positively influencing planning developments, delivering environmental education and managing the green spaces and historic buildings in its care - **for the benefit of all.**

Cambridgeshire County Council

Date: 1st May 2015

Contact: Judit Carballo
Direct dial: 01223 706574
E Mail: Judit.carballo@cambridgeshire.gov.uk

Economy, Transport & Environment
Executive Director Graham Hughes

Growth and Economy
Box No. SH1315
Shire Hall
Castle Hill
Cambridge
CB3 0AP

Dear Mark,

Consultation on request for a formal Scoping Opinion under the EIA Regulations at Cambridge West Site

Please find enclosed, as an appendix to this letter, Cambridgeshire County Council formal response to the West Cambridge Masterplan EIA Scoping Opinion.

The County Council would like note that it is vital that Highways Agency (now Highways England) are consulted on this as the strategic highway authority.

Note that the County Council has not comments to make from the following services: Children, Families and Adults; Libraries and Lifelong Learning; Sports, Arts and Culture; Floods and Water while Education and Health services have not provided comments

If you have any questions or require clarification please contact me.

Yours sincerely,
Judit Carballo

1.0 MINERALS AND WASTE

1.1 The West Cambridge Masterplan EIA outlines the scope of the proposed development. It is clear that the objective behind the proposal is a densification of existing / planned development from 250,000 square metres to 423,000 square metres.

1.2 The densification will be achieved through the demolition of some existing buildings, the modernisation of others, and new building at a high density. It is evident that on this strategic site there will be activity which will give rise to waste, both demolition and construction over a period of time.

1.3 In the light of this the EIA, or other supporting documentation, should address Policy CS28 of the adopted Cambridgeshire and Peterborough Minerals and Waste Core Strategy and include a waste audit and strategy which addresses:

- anticipated nature and volumes of waste arising;
- the steps that will be taken to minimise the amount of waste arising;
- the steps that will be taken to ensure segregation of waste at source; and its sorting, storage, recovery and recycling;
- steps taken to ensure the re-use of waste arising in the development e.g. soils and recycled aggregate;
- any other steps taken to manage the waste that cannot be incorporated within the development or that arises once the development is complete.

1.4 Alternatively, if this is not possible at this stage and as the proposed development will occur in phases over a significant time period, when the outline planning application is determined (and if approved) each phase should be required to submit a waste management and minimisation strategy, and a Construction Environment Management Plan

1.5 A completed RECAP Toolkit with supporting material for the proposed development is also required by the adopted Cambridgeshire and Peterborough Minerals and Waste Core Strategy Core Strategy Policy CS28, and the adopted RECAP Waste Management Guide. It is important that the RECAP guidance is considered as early on as possible in the planning process in order to ensure that waste provision as part of the overall development (including the occupation stage) is adequate. The RECAP toolkit will also enable contributions to Household Recycling Centre provision and bring sites to be determined.

1.6 The above matters could be achieved through the following suggested planning conditions.

Planning Conditions

1.7 ***Construction Environment Management Plan***

Prior to the commencement of development or any reserved matters approval, a site wide Construction Environmental Management Plan (CEMP), shall be submitted to and approved in writing by the local planning authority. The CEMP shall accord with and give effect to the waste management principles set out in the adopted Cambridgeshire & Peterborough Minerals and Waste Core Strategy (2011) and Waste Hierarchy when completed. The CEMP shall include the consideration of the following aspects of construction:

a) Site wide construction and phasing programme
b) Contractors' access arrangements for vehicles, plant and personnel including the location of construction traffic routes to, from and within the site, details of their signing, monitoring and enforcement measures, along with location of parking for contractors and construction workers
c) Construction hours
d) Delivery times for construction purposes
e) Soil Management Strategy including a method statement for the stripping of top soil for re-use; the raising of land levels (if required); and arrangements (including height and location of stockpiles) for temporary topsoil and subsoil storage to BS3883:2007
f) Noise monitoring method including location, duration, frequency and reporting of results to the LPA in accordance with the provisions of BS 5228 (1997)
g) Maximum noise mitigation levels for construction equipment, plant and vehicles
h) Vibration monitoring method including location, duration, frequency and reporting of results to the LPA in accordance with the provisions of BS 5228 (1997)
i) Setting maximum vibration levels at sensitive receptors
j) Dust management and wheel washing measures to prevent the deposition of debris on the highway
k) Site lighting
l) Drainage control measures including the use of settling tanks, oil interceptors and bunds
m) Screening and hoarding details
n) Access and protection arrangements around the site for pedestrians, cyclists and other road users
o) Procedures for interference with public highways, (including public rights of way), permanent and temporary realignment, diversions and road closures.
p) External safety and information signing and notices
q) Liaison, consultation and publicity arrangements including dedicated points of contact
r) Consideration of sensitive receptors
s) Prior notice and agreement procedures for works outside agreed limits
t) Complaints procedures, including complaints response procedures
Membership of the Considerate Contractors Scheme
u) Location of Contractors compound and method of moving materials, plant and equipment around the site
The Construction Environmental Management Plan shall be implemented in

accordance with the agreed details, unless otherwise agreed in writing by the Local Planning Authority.

Reason: To ensure the environmental impact of the construction of the development is adequately mitigated and in the interests of the amenity of nearby residents/occupiers (District Council to insert policy references); and to comply with Guidance for Local Planning Authorities on Implementing Planning Requirements of the European Union Waste Framework Directive (2008/98/EC), Department for Communities and Local Government, December 2012.

1.8 ***Detailed Waste Management and Minimisation Plan***

Prior to the commencement of development or any reserved matters approval, a Detailed Waste Management and Minimisation Plan (DWMMP) shall be submitted to and approved in writing by the local planning authority. The DWMMP shall include details of:

a) Construction waste infrastructure including if appropriate a construction material recycling facility to be in place during all phases of construction
b) anticipated nature and volumes of waste and measures to ensure the maximisation of the reuse of waste.
c) measures and protocols to ensure effective segregation of waste at source including waste sorting, storage, recovery and recycling facilities to ensure the maximisation of waste materials both for use within and outside the site.
d) any other steps to ensure the minimisation of waste during construction
e) the location and timing of provision of facilities pursuant to criteria a/b/c/d.
f) proposed monitoring and timing of submission of monitoring reports.
g) the proposed timing of submission of a Waste Management Closure Report to demonstrate the effective implementation, management and monitoring of construction waste during the construction lifetime of the development.
h) a RECAP Waste Management Guide toolkit shall be completed, with supporting reference material
i) proposals for the management of municipal waste generated during the occupation phase of the development, to include the design and provision of permanent facilities e.g. internal and external segregation and storage of recyclables, non-recyclables and compostable material; access to storage and collection points by users and waste collection vehicles.

The Detailed Waste Management and Minimisation Plan shall be implemented in accordance with the agreed details, unless otherwise agreed in writing by the Local Planning Authority.

Reason: In the interests of maximising waste re-use and recycling opportunities; and to comply with policy CS28 of the Cambridgeshire and Peterborough Minerals and Waste Core Strategy (2011) and the Recycling in Cambridgeshire and Peterborough (RECAP) Waste Design Guide 2012; and to comply with Guidance for Local Planning Authorities on Implementing Planning Requirements of the European Union Waste Framework Directive

(2008/98/EC), Department for Communities and Local Government, December 2012.

2.0 TRANSPORT

2.1 Para 3.8.3 first sentence suggest amend to say 'The public transport provision will be developed to be complementary with the aspirations set out in the Transport Strategy for Cambridge and South Cambridgeshire, some of which will be delivered via the ongoing City Deal process.' (City Deal is the funding process but TSCSC is the strategy).

Add 'and County Council' after City Council.

Change 'will' to 'could' as measures will need to be developed through the TA process so may not be as set out here.

2.2 Para 3.8.4: in Cambs cycle trips are made over longer distances than the typically assumed 5km national average. Para should be amended to reflect this.

2.3 Para 3.8.7: last bullet 'smaller concentrations of cycle parking at a range of locations...'

2.4 Para 3.11.2: last sentence add '...for agreement with the local authorities'.

2.5 Para 9.1.5: suggest amend to 'Highways Agency (now Highways England)...'

2.6 Append '...subject to further discussions with Cambridgeshire County Council and Highways England' to the end of the last sentence.

2.7 Para 9.3.7 suggest amend first sentence to say 'The details of the assessment are still to be agreed with the highway authorities but are likley to make use of a purpose-built etc...'

2.8 Para 9.3.9: At end of para please add 'The study area for the Transport Assessment (TA) may well be more extensive as the use of a 30% threshold is not considered refined enough for the assessment of operational traffic and transport implications.'

2.9 Para 9.3.12 at end of para please note 'there may be a need for intermediate years to be considered in the TA so that the impacts of phasing can be better understood'

2.10 Para 9.3.14. Suggest saying 'This is likely to use the CSRM but further discussions with the highway authorities is needed'.

2.11 Para 9.3.18 suggest adding the following to the end of this para 'It should be noted that these criteria relate to ES thresholds but it is recognised that in

operational highway terms much lower thresholds can be important and will be considered via the TA process'.

2.12 Para 9.3.20: are these thresholds relevant / applicable to LOCAL highways?

2.13 Para 9.3.2: these thresholds sound too coarse for detailed assessment of pedestrian delays in a TA context

3.0 ARCHAELOGY

3.1 The historic environment records indicate that the site is located in a landscape of high archaeological potential. Previous archaeological investigations within the eastern part of the development area has previously identified a high status Roman settlement (HER ECB1015), with evidence for earlier Roman settlement to the south (HER ECB3234). An additional high status Roman settlement is known to survive to the north west of the area (HER 19118) and extensive evidence for prehistoric and Roman activity has been recorded in excavations undertaken in advance of the University's North West development (CAU work in progress). It is likely that significant archaeological remains will survive in the area and that these would be severely damaged or destroyed by the proposed development.

3.2 The report submitted by Atkins in support of the request for a scoping opinion makes certain assumptions regarding the significance of archaeological assets likely to survive (Section 6.2.5). The County Council would advise that we do not currently have sufficient information to assess the extent and significance of archaeology likely to be affected and cannot therefore make recommendations regarding the specific requirements for mitigation.

3.3 The County Council recommends that the site is subject to a programme of archaeological evaluation, to determine the extent, quality and significance of any archaeological assets present and provide sufficient information to inform appropriate strategies to mitigate the impact of the development. This may include excavation, recording and publication of the results, or preservation in situ where this is appropriate to the significance of identified archaeology. The evaluation should be undertaken to inform the EIA, which should also include proposals to mitigate the development impact.

John Evans

From: Thomas Andy <Andy.Thomas@cambridgeshire.gov.uk>
Sent: 30 April 2015 17:04
To: John Evans
Subject: 15/5150/PREEIA, West Cambridge Scoping Opinion - archaeology

Dear John

Thank you for your consultation regarding the historic environment issues with the above EIA Scoping.

Our records indicate that the site is located in a landscape of high archaeological potential. Previous archaeological investigations within the eastern part of the development area has previously identified a high status Roman settlement (HER ECB1015), with evidence for earlier Roman settlement to the south (HER ECB3234). An additional high status Roman settlement is known to survive to the north west of the area (HER 19118) and extensive evidence for prehistoric and Roman activity has been recorded in excavations undertaken in advance of the University's North West development (CAU work in progress). It is likely that significant archaeological remains will survive in the area and that these would be severely damaged or destroyed by the proposed development.

The report submitted by Atkins in support of the request for a scoping opinion makes certain assumptions regarding the significance of archaeological assets likely to survive (Section 6.2.5). We would advise that we do not currently have sufficient information to assess the extent and significance of archaeology likely to be affected and cannot therefore make recommendations regarding the specific requirements for mitigation.

We would recommend that the site should be subject to a programme of archaeological evaluation, to determine the extent, quality and significance of any archaeological assets present and provide sufficient information to inform appropriate strategies to mitigate the impact of the development. This may include excavation, recording and publication of the results, or preservation in situ where this is appropriate to the significance of identified archaeology. The evaluation should be undertaken to inform the EIA, which should also include proposals to mitigate the development impact.

Please let me know if you need any additional information.

Regards

Andy

Andy Thomas
Senior Archaeologist
Historic Environment Team
Cambridgeshire County Council

Direct Dial 01223 728566

Dear John,

Thank-you for consulting SCDC on the above EIA Scoping requesting. In the time given to comment I have not been able to consult our internal consultees therefore our comments are limited. At this time we do not have any specific comments to make in relation to South Cambridgeshire. We would expect the Environmental Statement to take account of any cumulative impacts of development in the vicinity.

As there are potential environmental impacts that affect South Cambridgeshire (landscape and visual impacts are perhaps the most obvious) I encourage continued dialogue about this site between the two authorities – would it be possible for you to notify me of the response from the City Council on this scoping request, and through our ongoing discussions please keep me informed of progress on this site.

Kind Regards
Paul

Paul Mumford | Team Leader, New Communities

South Cambridgeshire Hall | Cambourne Business Park | Cambourne | Cambridge | CB23 6EA
t: 01954 713237 | m: 07706617982 e: paul.mumford@scambs.gov.uk
www.scambs.gov.uk | facebook.com/south-cambridgeshire | twitter.com/SouthCambs

CAMBRIDGE CITY COUNCIL MEMO

To:	Mark Parsons John Evans	**Dept:**	Planning
Building:	The Guildhall	**Room:**	
From:	Adam Finch	**Dept:**	Refuse and Environment Service
Phone:	01223 457886	**Room:**	Mandela House
Date:	30th April 2015		
Subject:	**West Cambridge Site, Madingley Road, Cambridge** **West Cambridge Masterplan (increasing the floorspace beyond that approved under 97/0961/OP) submitted under Regulation 13 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2011, to request a formal Scoping Opinion on the information to be supplied in the Environmental Statement.** **Environmental Impact Assessment – Scoping Opinion**		

My Ref: WK/201516196

Your Ref: 15/5150/PREEIA

Thank you for consulting Refuse and Environment regarding the above Scoping Opinion for an EIA.

Recommendations

An EIA will be required for the proposed development. The proposed development will exceed the Schedule 2 threshold for urban developments as defined within 10a of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

The scope of the relevant environmental assessments to be included in the EIA should be discussed and agreed with Cambridge City Council and South Cambridgeshire District Council prior to being carried out.

The commentary below sets out the areas of assessment we would expect to see within an EIA.

Comments

The EIA Scoping Opinion Request gives consideration to the following potential environmental impacts, relevant to the Environment and Refuse Service

- Air quality

- Noise (construction and operational)
- Contaminated Land

Throughout the Scoping Request, the applicant states that Cambridge City Council (CCC) and South Cambridgeshire District Council (SCDC) will be contacted to discuss the scope and content of the relevant environmental assessments. This is welcomed.

Additionally, three further potential impacts, not covered with the Scoping Request have been identified and are also discussed below. These are:

- Artificial Lighting (for impact on amenity)
- Odour
- Waste and Recycling

Air Quality

The EIA Scoping Opinion Request recognises that air quality will be a consideration.

Section 10.3 "Method of Assessment" states that both Councils will be contacted in order to discuss the proposed scope and assessment methodology.

It is noted that in terms of construction & operational air quality impacts, reference is made to the use of the guidance in Environmental Protection UK, 2010, (Development Control: Planning for Air Quality). There are certain drawbacks with this guidance. Indeed, an updated joint EPUK /IAQM guidance will be issued very soon. Therefore, it is recommended that the applicant also makes reference to this in terms of magnitude / significance of impacts. The draft document can be found at:

http://www.environmental-protection.org.uk/committees/air-quality/air-pollution-and-planning/

A CHP is proposed on the plant. The potential air quality impacts of this will also need to be modelled alongside any potential traffic/travel impacts. Therefore, expected flue heights, exit velocities, temperatures and throughputs will need to be determined ready for the EIA.

It is noted that a separate traffic and transport assessment is to be carried out. It is assumed that this data will feed into the air quality assessment.

Noise

Reference is made to the most up-to-date and appropriate guidance (British Standards. BS4142:2014 is likely to be most relevant of these documents given the proposed end-uses. If any residential uses are proposed on the site, we would also expect use of BS8233:2014 to assess performance of the building fabric by day and by night. We also expect an assessment of the noise levels within external amenity spaces.

Where residential dwellings cannot achieve the standards set out in BS8233:2014 with windows open, we would expect to see proposals for an alternative form of ventilation provided within the assessment. However, these details can be obtained through condition as and when required.

Careful consideration should be given to the possible reflective nature of larger commercial units, reflecting noise back towards existing residential premises.

Potential impacts from construction noise should be assessed using BS5228:2009, to include forecast noise levels at the site (or construction phase) boundary along with detailed proposals for mitigation and noise management.

Contaminated Land

Contaminated land is addressed within the Scoping Request document. It is noted that various detailed investigations have already taken place. Further investigations will be required in order to fill in the gaps.

The Scoping Request states that ground investigations will be undertaken in areas not previously subject to investigation. The applicant should contact CCC and SCDC to discuss the protocol for the further sampling and analysis and the methodology to be used in risk characterisation and assessment.

Additionally, it is likely that we will require the submission of a Soil Management Strategy, also to be discussed and agreed with CCC and SCDC.

Artificial Lighting

Artificial lighting is a consideration that we will need to see included within the EIA. Specifically, this is in relation in relation to the potential impact on residences (existing and proposed new, if any).

The lighting assessment is required in order to minimise impacts from glare, obtrusiveness and intrusion and spill. The assessment will need to be carried out in accordance with Institute of Lighting Professionals guidance document 'PLG04 GUIDANCE ON UNDERTAKING ENVIRONMENTAL LIGHTING IMPACT ASSESSMENTS', which is available to download at:

https://www.theilp.org.uk/resources/ilp-technical-reports/plg04/

and relevant PPG documents.

The proposed area of development is significantly darker than the central area of Cambridge and as such, we anticipate that the impact may be moderate to high. The applicant will be required to consider mitigation.

Further detailed assessment of lighting is likely to be conditioned.

Odour

The potential for sources of odour may be explored within the EIA. Impacts may arise as a result of a new café, commercial kitchen, fume extract or a particular process. It is acknowledged that the fine detail is not yet available. However, the applicant should be made aware that this will be an additional consideration.

Details of odour extract and mitigation measures can be dealt with through conditions.

Waste

The applicant will be required to design waste and recycling facilities and services in line with the RECAP (2012) design guide requirements. This is usually dealt with by our Waste and Recycling Team. Conditions are available for this aspect of the development.

Regards,

Mr Adam Finch
Senior Technical Officer
Environmental Quality & Growth Team

CAMBRIDGE CITY COUNCIL

LANDSCAPE AND URBAN DESIGN COMMENTS

Application Ref:

Site/Location: West Cambridge, Madingley Road, Cambridge

Description: Proposed Masterplan Review

Received Date:

Case Officer: Mark Parsons

Response Date: 24 March 2015

Responding Officers: Dinah Foley-Norman

West Cambridge Scoping Opinion

The University of Cambridge intends to submit an Environmental Statement to support an outline planning application for the West Cambridge site as it will exceed the Schedule 2 threshold for urban developments (10.(a)) under The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (the Regulations). Under Section 13 of the Regulations, the applicant is requesting a Scoping Opinion from Cambridge City Council.

In response to the Scoping Opinion Request, we have the following comments related to visual and landscape issues:

General
We are supportive of the general approach to be taken in the production of the Environmental Statement with regard to landscape and visual matters. However, we would recommend that the visual assessment is carried out as soon as possible in the ES process along with the production of the photomontages in order to use the assessment as a working tool as opposed to merely a confirmation of impact, i.e. to modify the masterplan in light of the findings of the impact assessment.

Assessment of Impact on landscape character areas
We would recommend that the consultant also consider the *Cambridge Green Belt Study*, Landscape Design Associates, September 2002 as well as the Cambridgeshire Landscape Guidelines 1991 and the Guidance for the Cambridge Skyline. Although the Cambridge Green Belt Study was published 13 years ago, it contains some very useful observations on the subtle Cambridge landscape, particularly where the abrupt urban edge meets the agricultural fields that surround the city.

We note that the assessment criteria shown at Tables 7.1 to 7.5 (significance of effects on landscape character areas) are generic and would point out that the assessor must bear in mind the Cambridge context and that the land around the city is Green Belt and therefore sensitive. The thresholds as shown value landscape diversity highly and may judge the flat

arable fields surrounding Cambridge as 'ordinary' or perhaps 'good'. The Cambridge context should include the setting of the historic city whereby the collegiate historic core is set behind an abrupt, vegetated urban edge is, in turn, set behind an agricultural foreground. This is particularly so of the western edge of Cambridge where there are clear and near views of Kings' College chapel, the University Library, St. John's College chapel etc.

Table 7.5 Significance of Effect
We will assume that Table 7.5 will have a lot more explanation on how it is used including what are the professional judgements elements and what are facts, exactly how the magnitude of change is arrived at, and why a particular Cambridge landscape is sensitive to change.

Visual assessment and impact
It is recognised in the report that for the visual assessment the viewpoints will need to be agreed and that they will need to be located on an OS map accompanied by a definitive map showing the Public Rights of Way. The visual receptor locations shown in the report are not exhaustive and we include an OS with some further viewpoints to be checked/assessed. We know some have very clear view of the site and also include photographs from these locations.

Please note that recent removal of vegetation along the A1303 (Madingley Road) has open up views of the West Cambridge site from the road.


WEST CAMBRIDGE
SUGGESTED VIEWPOINTS
to be checked/assessed

Consultee Comments for Planning Application 15/5150/PREEIA

Application Summary

Application Number: 15/5150/PREEIA
Address: West Cambridge Site Madingley Road Cambridge Cambridgeshire
Proposal: Scoping Report for the Environmental Impact Assessment (EIA) of the West Cambridge Masterplan (increasing the floorspace beyond that approved under 97/0961/OP) submitted under Regulation 13 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2011, to request a formal Scoping Opinion on the information to be supplied in the Environmental Statement.
Case Officer: Mr Mark Parsons

Consultee Details

Name: Mrs Emma Davies
Address: The Guildhall Market Hill, Cambridge, Cambridgeshire CB2 3QJ
Email: emma.davies@cambridge.gov.uk
On Behalf Of: Policy Section

Comments

The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 defines the development projects that should be considered for Environmental Impact Assessments (EIA). Given that the West Cambridge Masterplan will exceed the Schedule 2 threshold for urban developments, the above application seeks a Scoping Opinion from the Council as to the information that will be deemed necessary to determine the application.

On the whole, the level of information included in order to enable the assessment of the effects of the proposed development on the environment is supported. The only addition that I would suggest relates to the baseline information that will be collected in relation to the water environment. The recognition of the potential contamination of surface water runoff during the construction phase and the potential this has to enter surface water bodies downstream is welcomed, as are the proposals to utilise sustainable drainage systems to enhance the quality of runoff before it enters these water bodies. What I would recommend is that if possible, baseline data related to the ecological status of the Wash Pit Brook and Coton Brook be collected to help inform the surface water drainage strategy, or make it clearer if this data has already been collected. It is noted that ecological status is included in the Assessment Criteria table 12.1, but it would also be helpful to include reference to current status of the brooks in the section on establishing the baseline.

Emma Davies

Senior Sustainability Officer (Design and Construction).

Ecology Officer

I support the proposed Protected Species surveys to provide a baseline:

- Great crested newt presence / absence surveys for the water bodies on Site;
- Water vole surveys of the waterbodies known to have previously accommodated the species;
- Breeding bird survey; and
- Bat roost surveys of buildings and trees and bat transect surveys.

The current extent and population of the scarce vascular plants associated with the Coton Hedgerow County Wildlife Site should also be examined.

Appendix 5.2 Responses to Scoping Opinion

1.1.1 Table A5.2.1 below summarises the main issues raised in the Scoping Opinion and details the applicant's response. For some issues further discussions have been required with the Cambridge City Council and / or other consultees and these discussions are also recorded here.

Table A5.2.1 Main issues identified in Appendix 1 of the Scoping Opinion

Scoping Opinion		**Applicant response**
Paragraph	**Issue**	
General		
1.14	The description of development is very general in the Scoping Report, with an intended floorspace of 423,000 m sq. The ES will need to clearly set out the development scenario being tested.	The project description in the Scoping Report was deliberately general as the parameter plans had not yet been finalised. The project description in the ES contains the appropriate detail to undertake the impact assessments, acknowledging that the EIA is an assessment of the parameter plans but not the illustrative masterplan.
1.16	The ES needs to refer to relevant policies in the Cambridge Local Plan 2006. It will also be appropriate to add a section regarding The Draft Cambridge Local Plan 2014	Relevant local planning policies are covered under the specific chapters (chapters 6-14). Section 1.2 provides context for the Local Plan.
1.17	The development should clearly specify which buildings are to be demolished and those to be retained. Those buildings to be demolished should be appraised for their historic value, for example Merton Hall Farmhouse.	The Project Description chapter of the ES contains a plan showing which buildings are to be demolished as part of the outline planning application. Any buildings proposed for demolition which are of historical interest have been fully appraised in the Historic Environment chapter 7.
Ecology		
1.18	The Council is in agreement with the likely ecology impact of the development described in 5.3.1 of the Scoping report. The assessment criteria set out within The Chartered Institute of Ecology and Environmental Management (CIEEM) is considered appropriate to assess the impact of the development.	Chapter 6 has undertaken the ecological assessment in accordance with the Scoping report.
1.19	The following Protected Species surveys are recommended to inform the baseline: • Great crested newt presence / absence surveys for the water bodies on Site; • Water vole surveys of the water bodies known to have previously accommodated the species; • Breeding bird survey; and • Bat roost surveys of buildings and trees and bat transect surveys. • The current extent and population of the scarce vascular plants associated with the Coton Hedgerow County Wildlife Site. • It is No response required that further surveys for invasive plants, bats, birds, great crested newts and water voles will be undertaken and the information considered as part of the baseline for the ES.	Great crested newt, breeding birds, and bat roost surveys have all been undertaken. Whilst undertaking the great crested newt HSI surveys it was established that although historic records for water vole exist on site, there is currently no suitable habitat for water vole. Further discussions have been held with Natural England and Cambridge City Council's ecologist to revise the scope of the survey works. Water voles have not been surveyed as there is no suitable habitat on the Site.
1.20	The ES should demonstrate wildlife habitat enhancement through enlargement or management of existing habitats and creation of new habitats. In addition, all phases of development should be assessed for impact on protected species.	This has been included in Chapter 6.
1.21	The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.	All ecological surveys have been undertaken by appropriately qualified ecologists (i.e. hold the correct licences for the various species being surveyed) in the correct survey seasons.
1.22	Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, 'are capable of being a material consideration…in the making of planning decisions'. We advise that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES.	Effects to BAP species and habitats have been assessed and reported in Chapter 6.

Scoping Opinion		Applicant response
Paragraph	**Issue**	
1.23	The ES should thoroughly assess the potential to affect designated sites, namely the Site of Special Scientific Interest (SSSI) Madingley Wood, located 1.8km to the west. In addition, impacts on regional and local wildlife and geological sites should be fully assessed. Appropriate mitigation measures may be needed in order to avoid, minimise or reduce any adverse significant effects.	Effects to ecologically designated sites have been assessed and reported in Chapter 6.
1.24	The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 109), which should be demonstrated through the ES.	The ecology assessment and proposed mitigation have taken into account adaptation requirements for predicted future climate change.
Historic environment		
1.25	There is broad agreement with the scope of impact set out within section 6.2 of the Scoping Report. However, whilst the Council confirms there are no statutory protected buildings on the site there is contemporary architecture which may be considered for inclusion on either the national or local list. The impact of the development on the setting of the Schlumberger Research Building by Michael Hopkins needs to be considered in the ES and supported by appropriate visuals. I note the setting of Schlumberger has been previously acknowledged as an issue in pre application discussions.	Effects on the setting of the Schlumberger Research Building by Michael Hopkins has been assessed in the historic environment chapter of the ES and considered as a heritage asset.
1.26	All building demolitions need to be clearly specified in the ES, and an appraisal of any historic interest. In particular Merton Hall Farmhouse which is over 100 years old and scheduled for demolition.	All buildings proposed for demolition will be clearly identified in the project description chapter of the ES. Merton Hall Farmhouse has been assumed to require demolition, but consent has already been granted for this through the extant planning permission as the previous masterplan required this building to be demolished. As such the ES has assumed that the Proposed Scheme could not cause further harm to this low value heritage asset.
1.27	The ES should analyse the impact of the development on the setting of the historic core of Cambridge.	The Zone of Theoretical Visibility (ZTV) has been modelled using GIS and 2m digital surface data, and this has established the study area for both the landscape and visual and historic environment assessments. The model shows that the city historic core is not within the ZTV. Nevertheless the Castle Mound has been selected as a sensitive visual receptor following subsequent discussions with Cambridge City Council and a photomontage produced for this key viewpoint.
1.28	The report submitted by Atkins in support of the request for a scoping opinion makes certain assumptions regarding the significance of archaeological assets likely to survive (Section 6.2.5). We would advise that we do not currently have sufficient information to assess the extent and significance of archaeology likely to be affected and cannot therefore make recommendations regarding the specific requirements for mitigation.	Geo-physical surveys and trial trenching have been undertaken in agreement with the County Archaeologist. The results of these surveys have been included in the historic environment assessment and used to inform the archaeology baseline. A standalone report has also been produced which details the results of the surveys and is available in Appendix A7.1 of the ES. Appropriate measures have been proposed to suitably mitigate the archaeological assets found on the Site.
1.29	We would recommend that the site should be subject to a programme of archaeological evaluation, to determine the extent, quality and significance of any archaeological assets present and provide sufficient information to inform appropriate strategies to mitigate the impact of the development. This may include excavation, recording and publication of the results, or preservation in situ where this is appropriate to the significance of identified archaeology. The evaluation should be undertaken to inform the EIA, which should also include proposals to mitigate the development impact.	
Landscape and visual		
1.30	The ES should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.	The landscape and visual impact assessment has been undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment 3rd Edition, published by the Landscape Institute and the Institute for Environmental Management and Assessment. The assessment has included appraised the effects of the Proposed Scheme on the relevant landscape character areas.

Scoping Opinion		Applicant response
Paragraph	**Issue**	
1.31	We are supportive of the general approach to be taken in the production of the ES with regard to landscape and visual matters. However, we would recommend that the visual assessment is carried out as soon as possible in the ES process along with the production of the photomontages in order to use the assessment as a working tool as opposed to merely a confirmation of impact, i.e. to modify the masterplan in light of the findings of the impact assessment.	The EIA process has been used to refine the parameter plans where appropriate.
1.32	We would recommend that the consultant also consider the Cambridge Green Belt Study, Landscape Design Associates, September 2002 as well as the Cambridgeshire Landscape Guidelines 1991 and the Guidance for the Cambridge Skyline. Although the Cambridge Green Belt Study was published 13 years ago, it contains some very useful observations on the subtle Cambridge landscape, particularly where the abrupt urban edge meets the agricultural fields that surround the city.	The Cambridge Green Belt Study has been used to define the sensitivity of the landscape to change and has been used to help define the landscape baseline.
1.33	It is recognised in the report that for the visual assessment the viewpoints will need to be agreed and that they will need to be located on an OS map accompanied by a definitive map showing the Public Rights of Way. The visual receptor locations shown in the report are not exhaustive. Further views are recommended. (OS plan views contained in appendix 2: landscape comments).	The visual receptors assessed in the ES have been agreed with the relevant officers at Cambridge City Council through subsequent correspondence.
1.34	The ES should consider potential impacts on access land, public open land and rights of way in the vicinity of the development. Appropriate mitigation measures should be incorporated for any adverse impacts.	
Landscape comments from subsequent letter dated 18th May 2015		
N/A	I note that the assessment criteria have been amended to include the mention of the Cambridge Green Belt Study. We trust that the subtleties of the Cambridge landscape and how it interacts with the historic city of Cambridge will be the basis for the assessment. This may result in further refinement of Table 7.1 Landscape Quality.	The Cambridge Green Belt Study has been used to define the sensitivity of the landscape to change and has been used to help define the landscape baseline.
N/A	There remains a concern that there is not enough explanation of the assessment process together with the criteria and their use. It should be borne in mind that this will be a public document and a more thorough explanation would be useful and wise.	A full description of the method of assessment has been included in the ES
N/A	Table 7.5 Significance of Effect shows the relationship between Sensitivity and Magnitude of Change. The table is very course and over-simplified and results in the judgement that high quality is automatically highly sensitive and that poor quality is always of low sensitivity. This is not necessarily the case. There is also limited explanation of the Magnitude of Change. The words ‘large’ and ‘major’ seemed to be interchanged from the explanation in para. 7.3.9 and the table.	A full description of the method of assessment has been included in the ES. The assessment matrix is intended to provide consistency and clarity to the assessment process but in all cases professional judgement will be exercised to ensure the assessment findings are appropriate.
N/A	The revised plan of the viewpoints is No response required and supported. However Views 19 and 20 may be better located from the footpath immediately to the north of the location shown on the plan.	The visual receptors assessed in the ES have been agreed with the relevant officers at Cambridge City Council through subsequent correspondence.
N/A	Para. 7.3.4 Topography – It would be appreciated if the description of the landform includes the fact that the land falls away to the exceptionally flat land to the south. Therefore the site appears elevated from the south making the development more prominent. I would also disagree that the visual envelope is restricted to short and medium distance views.	The visual envelope has been established by GIS modelling using surface DSM data. The description of the landform describes the Site as being slightly elevated to land to the south.
N/A	Vegetation structure – The southern boundary is not strongly defined by dense belts of woodland and hedgerow along its entire length. Parts of it are very open to views from and to the south.	The landscape baseline acknowledges that belts of screening vegetation and hedgerow to the south have gaps which allow views from the south through to the Site. The ZTV shows the surrounding areas of land where there is a direct line of sight.
N/A	Within the application area there is an additional field to the south of the main site that remains in the Green Belt. Will this field accommodate spoil? If so, will the spoil have a landscape and visual impact?	It is not yet certain if or how much spoil will be placed in this part of the Site. This has been included in the LVIA assessment.
Landscape comments from subsequent emails dated 1st July 2015 and 6th July 2015		

Scoping Opinion		Applicant response
Paragraph	**Issue**	
Email received 01/07/2015	Before we agree the proposed viewpoints to inform the EIA, could we please have a photo of the vista from each visual receptor location, to inform the final decision? Receptor location 8 may not add much value to the analysis, but we can judge this when we have seen an image from each location. There has been a slight error in the position of point number 20. The footpath immediately to the north of point 19 would offer better views for modelling. (Revised location attached). We recommend one new visual receptor location within the City from Castle Mound, which would address comments raised by Historic England to your Scoping Report.	Photographs of all viewpoints have subsequently been submitted for consideration by Cambridge City Council as to the suitability of visual receptor locations for photomontages.
Email received 06/07/2015	To update, we have considered the viewpoint images and would make the following comments: All viewpoints chosen must have the photographs retaken on a clear, bright day because the ones provided here are not of sufficient quality or clarity. Please note that the clearest shots are taken early in the morning at this time of year, before any haze lowers the clarity. Our preferences would be: Number 1 from Coton Reserve to show elevated public view. Number 6 from Wilberforce Road with the playing field in the foreground to show view from housing. Number 7 from Gough Way to show view from rear of housing. Number 12 to show clear view into site from Madingley Road. Number 16 to show at-grade, middle distance view from public road. Number 21 Chapel Hill Haslingfield to show distance elevated view. Number 23 (additional) from footpath west of Grantchester (north of 19). Also need to see additional view from Castle Mound taken on a clear day.	Panoramic photographs of the viewpoints suggested by Cambridge City Council have subsequently taken using a high quality camera on a clear day early in the morning to minimise distortion from haze.
Socio-economics		
1.35	It is recommended that health and wellbeing impacts are covered in the ES. This should include cumulative impacts of construction and operation on existing and new residents and employees, including noise and vibration, dust, daylight and sunlight impacts, and air quality impacts, which might combine to cause significant stress or health and wellbeing impacts. These should be briefly summarised from other chapters in the ES and brought together when considering the overall cumulative impacts on health and wellbeing from the scheme alone, and in combination with other developments.	It will not be possible to consider daylight/ sunlight effects as modelling cannot be carried out on the parameter plans. Effects on wellbeing from air quality and noise effects have been considered in the cumulative effects chapter.
1.36	Assessments of impacts relating to crime and fear of crime should be completed according to the key points set out in Secured by Design.	The scope of the socio-economic assessment has been expanded to include this issue.
Traffic and transport		
1.37	The County Council are in agreement with the likely effects and scope of assessment to inform the ES. The ES should also cover/clarify the following issues.	No response required
1.38	The new masterplan should be complementary to the Transport Strategy for Cambridge and South Cambridgeshire (TSCSC). City Deal is the funding process, TSCSC is the overarching strategy.	
1.39	It should be No response required for the ES methodology that cycle trips in Cambridge are made over longer distances than the 5km average.	
1.40	The assessment criteria set out in paragraph 9.3.14 states that the study area will be based on an assessment using the highway network CSRM model. However further discussions will be required with the County Highways Authority to agree this methodology.	No response required – Discussion with the local highway authority are already underway.

Scoping Opinion		Applicant response
Paragraph	**Issue**	
1.41	The study area for the Transport Assessment (TA) may well be more extensive as the use of a 30% threshold is not considered refined enough for the assessment of operational traffic and transport implications.	Discussions with the local highway authority are underway and include the traffic study area which will be agreed prior to undertaking the traffic assessments.
1.42	Paragraph 9.3.13 outlines the proposed assessment criteria and refers to Department of Transport (DFT) guidance, footnoting DfT's 2007 Guidance on Transport Assessments. It should be No response required that this document is currently 'archived' and, while still of value and its use welcomed in this process, is not technically DfT current guidance.	No response required =
1.43	The list of criteria in the same paragraph should include the DfT circular 02/2013 'The strategic road network and the delivery of sustainable development', this being current DfT policy.	
1.44	The EIA Scoping Opinion Request gives consideration to the following potential environmental impacts, relevant to the Environment and Refuse Service. • Air quality • Noise (construction and operational) • Contaminated Land	
1.45	Throughout the Scoping Request, the applicant states that Cambridge City Council (CCC) and South Cambridgeshire District Council (SCDC) will be contacted to discuss the scope and content of the relevant environmental assessments. This is welcomed.	
1.46	Additionally, three further potential impacts, not covered with the Scoping Request have been identified and are also discussed below. These are: • Artificial Lighting (for impact on amenity) • Odour • Waste and Recycling	Artificial lighting will be considered in general terms in the landscape and visual assessments. It is not possible to assess the effects to amenity from artificial lighting at individual receptors as the design is not at a sufficient detailed stage. This should be considered at the reserved matters stage when appropriate design details are available. There are no odour sources that could result in significant environmental effects proposed on the Site. It is No response required in the detailed consultee response in Appendix 2 of the Scoping Opinion that the Refuse and Environment Service suggest that impacts may arise as a result of new cafes, commercial kitchens, and fume extractions. It is acknowledged that these sources may result in minor and very localised odour issues that can be dealt with at the reserved matters stage but they would not result in significant environmental effects that should be dealt with in the EIA. Waste and recycling will be dealt with in a separate Site Waste Management Plan which will be submitted as part of the outline planning application.
Air quality		
1.47	It is No response required that in terms of construction & operational air quality impacts, reference is made to the use of the guidance in Environmental Protection UK, 2010, (Development Control: Planning for Air Quality). There are certain drawbacks with this guidance. Indeed, an updated joint EPUK /IAQM guidance will be issued very soon. Therefore, it is recommended that the applicant also makes reference to this in terms of magnitude / significance of impacts. The draft document can be found at: http://www.environmental-protection.org.uk/committees/air-quality/air-pollution-and-planning/	The most appropriate guidance will be referenced in the ES.
1.48	Combined Heat and Power is proposed. The potential air quality impacts of this will also need to be modelled alongside any potential traffic/travel impacts. Therefore, expected flue heights, exit velocities, temperatures and throughputs will need to be determined ready for the ES.	Assumptions about the CHP design have been stated in the project description. The air quality assessment has included modelling of the emissions plume from both of the CHP location options.
1.49	It is No response required that a separate traffic and transport assessment is to be carried out. It is assumed that this data will feed into the air quality assessment.	The air quality chapter has included an assessment on predicted traffic emissions based on data produced by traffic modelling.
Noise		

Scoping Opinion		Applicant response
Paragraph	**Issue**	
1.50	Reference is made to the most up-to-date and appropriate guidance (British Standards. BS4142:2014 is likely to be most relevant of these documents given the proposed end-uses. As residential uses exist on the site, and if further residential uses are proposed, we would also expect use of BS8233:2014 to assess performance of the building fabric by day and by night. We also expect an assessment of the noise levels within external amenity spaces.	For the operational phase, the noise assessment has considered noise effects from the CHP and from traffic. The most appropriate guidance has been used to determine effect significance. It should be No response required that no new residential dwellings are proposed.
1.51	Where residential dwellings cannot achieve the standards set out in BS8233:2014 with windows open, we would expect to see proposals for an alternative form of ventilation provided within the assessment. However, these details can be obtained through condition as and when required.	
1.52	Careful consideration should be given to the possible reflective nature of larger commercial units, reflecting noise back towards existing residential premises.	
1.53	Potential impacts from construction noise should be assessed using BS5228:2009, to include forecast noise levels at the site (or construction phase) boundary along with detailed proposals for mitigation and noise management.	Reasonable assumptions about the likely construction activities will be made and a noise assessment undertaken at an appropriate level using the approach set out in BS5228:2009.
Water environment		
1.54	The scope of the construction effects and the method of assessment is considered appropriate.	No response required
1.55	The recognition of the potential contamination of surface water runoff during the construction is welcomed. We recommend baseline data related to the ecological status of the Wash Pit Brook and Coton Brook be collected to help inform the surface water drainage strategy. It is No response required that ecological status is included in the Assessment Criteria table 12.1, but it would also be helpful to include reference to current status of the brooks in the section on establishing the baseline.	The exact scope of the water quality assessment has been agreed through subsequent communication with the Senior Sustainability Officer at Cambridge City Council.
1.56	The proposed method of assessment does not make any reference to the impact of climate change. This should form part of the analysis within the ES.	Climate change impacts have been considered in the flood risk assessment.
1.57	The Flood Risk Assessment included within the ES will need to demonstrate that the proposed development will not increase the flood risk to others.	The flood risk assessment has demonstrated that no downstream flooding would arise as a result of the Proposed Development.
1.58	Because the site sits on a Groundwater Vulnerability Zone we would expect the ES to include detailed analysis of the local and wider area hydrogeology.	The hydrogeology study area is sufficient to assess the effects to the Groundwater Vulnerability Zone.
Ground conditions		
1.59	Contaminated land is addressed within the Scoping Report. It is No response required that various detailed investigations have already taken place.	No response required
1.60	The Scoping Request states that ground investigations will be undertaken in areas not previously subject to investigation. The applicant should contact CCC to discuss the protocol for the further sampling and analysis and the methodology to be used in risk characterisation and assessment.	Further ground investigation in conjunction with the archaeology trial trenching has been undertaken, where samples were taken from material excavated from the trial trenches.
1.61	Additionally, it is likely that we will require the submission of a Soil Management Strategy.	A soil management strategy will be produced as part of the Construction Environment Management Plan (CEMP) and will be submitted to the council for approval as part of any reserved matters applications.
1.62	The likely effects and approach to the method of assessment is considered appropriate. It is recommended that health and wellbeing issues which are related to cumulative impact are assessed in greater are assessed in greater detail. For example Socio-Economic Impacts, Noise and Vibration, and Air Quality, should be linked to potential effects on health and wellbeing of existing and new residents and workers (for example, noise/stress, air quality/respiratory disease and isolation and loneliness of existing residents on campus).	Effects on wellbeing from air quality and noise effects have been considered in the cumulative effects chapter.
Cumulative effects		
1.63	The development in combination with other current applications; approved but uncompleted projects; projects which are reasonably foreseen; and other ongoing activities, should be included in the ES.	No response required – the list of proposed projects to include in the cumulative effects assessment has been discussed and agreed in previous consultation.

Scoping Opinion – Appendix 2

1.1.2 Appendix 2 of the Scoping Opinion includes the formal responses from the consultees. The following consultees responded:

- Environment Agency
- Highways England
- Historic England
- Natural England
- Wildlife Trust
- Anglia Water Services
- Cambridge Past, Present and Future
- Cambridgeshire County Council
- Archaeology
- South Cambridgeshire District Council
- Cambridge City Council
  - Environmental Health
  - Urban Design and Landscape
  - Planning Policy Team: Sustainability
  - Ecology Officer

1.1.3 Most of the issues raised by the consultees are covered in Appendix 1 and responded to accordingly in Table A5.2.1 above. Some issues raised by the consultees are more detailed than Appendix 1 and require further response. These are summarised in Table A5.2.2 below.

Table A5.2.2 Detailed consultee responses in Appendix 2 of the Scoping Opinion

Scoping Opinion		**Applicant response**
Consultee	**Issue**	
Environment Agency	All issues raised covered in Appendix 1	No response required
Highways England		
Historic England	One or two carefully selected and agreed additional viewpoints may be required to assess the impact of the Proposed Development on the historic city core.	An additional viewpoint from the Castle Mound has been agreed with Cambridge City Council.
Natural England	Habitat surveys equivalent to Phase 2 are recommended	Habitat surveys have been carried out to Phase 1 equivalent. This is considered sufficient to identify any habitats suitable for protected species or of value in their own right which should be considered in the ES. On the basis of the Phase 1 surveys, further protected species surveys have been undertaken, but no habitats of particular ecological note have been identified that would warrant a Phase 2 survey. This has been agreed with Natural England through subsequent communications.
	Botanical surveys are recommended	Surveys for invasive plant species has been carried out at the optimum time of year. A specific survey for to check for the extent of the scarce vascular plant species present in the Coton Path Hedgerow have also been undertaken. Further botanical surveys are not considered necessary. This has been agreed with Natural England through subsequent communications.
	Invertebrate surveys are recommended	The Phase 1 survey did not identify any habitats on site which are of particular value to invertebrates. It is extremely unlikely that any invertebrates of sufficient interest or rarity exist on site that would warrant separate invertebrate surveys. This has been agreed with Natural England through subsequent communications.
Wildlife Trust	All issues raised covered in Appendix 1	No response required
Anglian Water Services	A 300mm surface water sewer crosses the site which requires a 3m easement on either side of the centreline of the pipe. If it is not possible to avoid the pipe and easement, diversion may be required.	This will be considered at the reserved matters stage.
Cambridge Past, Present and Future	Views from the high ground at Coton and Madingley of the cityscape are one of the best vistas of Cambridge. Development therefore has to be sensitive to the Green Belt landscape.	Effects of the development to landscape character and key viewpoints will be assessed in the landscape and visual chapter of the ES. The assessment has included a viewpoint looking east across the Site towards Cambridge from the high ground in Coton.
	Drainage issues, such as impacts on adjacent brooks do not seem to have been considered as well as noise and air pollution from the M11. The proposal should include mitigation for these items.	Effects of the development on surface water bodies have been considered in the water environment chapter of the ES. Increases in traffic volumes to the local road network including the M11 have been modelled and a study area established based on which road links will receive a significant change in traffic volumes. The air quality and noise assessments have used the traffic model data to assess changes in noise and air quality. Mitigation has only be proposed if the assessments determine that significant effects are likely to arise.

Scoping Opinion		**Applicant response**
Consultee	**Issue**	
	The site is adjacent to or abuts numerous designated and non-designated heritage assets.	The ES has assessed the effects to all designated and non-designated heritage assets within the study area. The Coton Countryside Reserve has been assessed as a landscape character area in the landscape and visual chapter.
Cambridgeshire County Council	All issues raised covered in Appendix 1	No response required
Archaeology		
South Cambridgeshire District Council		
Cambridge City Council		

Appendix 6.1 Ecology legislation

Legislation relevant to the ecology assessment is summarised in Table A6.1.1.

Table A6.1.1 Legislation relevant to the ecology assessment

Species	Legislation	Offences	Licensing procedures and guidance
Bats European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately1 capture, injure or kill a bat; deliberate disturbance2 of bats; or damage or destroy a breeding site or resting place used by a bat. [The protection of bat roosts is considered to apply regardless of whether bats are present.]	A Natural England (NE) licence in respect of development is required. Guidance documents: NE Standing Advice for protected species 2013 European Protected Species: Mitigation Licensing- How to get a licence (NE 2013) Bat Mitigation Guidelines (English Nature 2004) Bat Workers Manual (JNCC 2004)
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb3 a bat in such a place.	Licence from NE is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site.
Badger	Protection of Badgers Act 1992 (as amended)	Wilfully kill, injure or take a badger; or intentionally or recklessly damage, destroy or obstruct access to a badger sett or disturb a badger in its sett. [It is not illegal to carry out disturbance activities in the vicinity of setts that are not occupied.]	Where required, licences for development activities involving disturbance or sett interference or closure are issued by Natural England (NE). Licences for activities involving watercourse maintenance, drainage works or flood defences are issued under a separate process. Licences are normally not granted from December to June inclusive because cubs may be present within setts. Guidance documents: NE Standing Advice for protected species 2013 Badgers & Development (NE 2007)
Water vole	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally kill, injure or take water voles; intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection or disturb a water vole in such a place.	No licence is required for survey in England, unless you are likely to commit an action that is otherwise illegal. There are currently no licensing purposes that explicitly cover development activities or activities associated with the improvement or maintenance of waterways. However when a proposed lawful activity has no opportunity to retain water voles within a development site and their translocation would result in a conservation benefit then a licence from Natural England may be obtained. Guidance documents: NE Standing Advice for protected species 2013 The Water Vole Conservation Handbook (R. Strachan & T. Moorhouse, Wildlife Conservation Research Unit, 2nd Edition 2006) Water voles and development licensing policy - NE Technical Information Note TIN042 2008
Birds	Wildlife and Countryside Act 1981 (as amended) S.1	Intentionally kill, injure or take any wild bird; intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built; intentionally take or destroy the nest or eggs of any wild bird. Intentionally or recklessly disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young; intentionally or recklessly disturb dependent young of such a species [e.g. most birds of prey, kingfisher, barn owl, black redstart, little ringed plover].	No licences are available to disturb any birds in regard to development. Licences are available in certain circumstances to damage or destroy nests, but these only apply to the list of licensable activities in the Act and do not cover development. General licences are available in respect of 'pest species' but only for certain very specific purposes e.g. public health, public safety, air safety. Guidance documents: NE Standing Advice for protected species 2013
Great crested newt European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately1 capture, injure or kill a great crested newt; deliberate disturbance2 of a great crested newt; deliberately take or destroy its eggs; or damage or destroy a breeding site or resting place used by a great crested newt.	Licences issued for development by Natural England. Guidance documents: NE Standing Advice for protected species 2013 European Protected Species: Mitigation Licensing- How to get a licence (NE 2013) Great Crested Newt Mitigation Guidelines (English Nature 2001)

Species	Legislation	Offences	Licensing procedures and guidance
	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb3 a great crested newt in such a place.	Licences issued for science (survey), education and conservation by Natural England.
Rabbits, foxes and other wild mammals	Wild Mammals (Protection) Act 1996	Intentionally inflict unnecessary suffering to any wild mammal.	Natural England provides guidance in relation to rabbits, foxes (which are also protected under the Wildlife and Countryside Act 1981 from live baits and decoys) and other wild mammals, on their website. Lawful and humane pest control of these species is permitted.
Plants European protected species	Conservation of Habitats and Species Regulations 2010 (as amended); Reg.45	Deliberately pick, collect, cut, uproot or destroy a wild plant of a European protected species (Schedule 5).	Licences can be issued for science, education and conservation and also in respect of a development if it is of over-riding public interest. Guidance documents: NE Standing Advice for protected species 2013 European Protected Species: Mitigation Licensing- How to get a licence (NE 2013) Guidance on sampling rare aquatic plants, NE 2009
Plants Nationally protected species	Wildlife and Countryside Act 1981 S.13 (Schedule 8)	Intentionally pick, uproot or destroy any wild plant on Schedule 8	Licences can be issued by Natural England for specific purposes only, such as science and education or conservation purposes. There is no provision for licensing the above actions for development operations under the Wildlife & Countryside Act 1981 (as amended). No licence is required for survey in England. Guidance on survey techniques is available from Natural England. Guidance documents: NE Standing Advice for protected species 2013
Plants All plants	Wildlife and Countryside Act 1981 S.13	To uproot any wild plant without authorisation.	No licence is required. The land owner's permission is required.
Invasive plant species	Wildlife and Countryside Act 1981 S.14	It is illegal to plant or otherwise cause these species to grow in the wild.	Any contaminated soil or plant material is classified as controlled waste and should be disposed of in a suitably licensed landfill site, accompanied by appropriate Waste Transfer documentation, and must comply with section 34 of the Environmental Protection Act 1990. Guidance documents: The Knotweed Code of Practice (Environment Agency, 2013 version 3) Managing Invasive Non-native Plants (Environment Agency 2010) Guidance on Section 14 of the Wildlife and Countryside Act, 1981 (Defra 2010)

[1]Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing

[2]Deliberate disturbance of animals includes in particular any disturbance which is likely a) to impair their ability (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to affect significantly the local distribution or abundance of the species to which they belong.

[3]Lower levels of disturbance not covered by the Conservation of Habitats and Species Regulations 2010 remain an offence under the Wildlife and Countryside Act 1981 although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided.

Appendix 6.2 Ecology survey methods

Desk study

The Multi-Agency Geographic Information for the Countryside (MAGIC) website[1] was reviewed for information on all designated sites of nature conservation importance (statutory sites only) within 2km of the Site. This search also included internationally designated sites; these being Special Protection Areas (SPAs), Wetlands of International Importance (Ramsar sites) and Special Areas of Conservation (SACs).

The England Biodiversity List and Cambridgeshire and Peterborough Biodiversity Action Plan (BAP)[2] were reviewed to assist in determining which Habitats and Species of Principal Importance may be present within or adjacent to the Site.

Ordnance Survey maps and the Where's the Path website[3] were used to initially identify the presence of water bodies within 500m of the Site boundary, in order to establish if the land within and immediately surrounding the Site could be used as terrestrial habitat for great crested newts. This species typically uses suitable terrestrial habitat up to 500m from a breeding pond. However, there is a notable decrease in great crested newt abundance beyond a distance of 250m from a breeding pond[4].

The Cambridgeshire and Peterborough Environmental records Centre (CPERC) provided information relating to non-statutory designated sites and legally protected and notable species records within 1km of the Site in February 2015.

Extended phase 1 survey

An extended Phase 1 habitat survey of the Site was undertaken on 16th February 2015. Ponds identified during the desk study within the Site were visited during the extended Phase 1 habitat survey.

The extended Phase 1 habitat survey of the Site followed Joint Nature Conservation Committee guidance[5], which include mapping habitats within the Site and undertaking a search for evidence of notable and protected species, and an assessment of each habitats potential to support such species, as recommended by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2013)[6]

With respect to the broad habitats known to be present within the survey area from the desk study, the following ecological features and resources were searched for, where access allowed:

- An assessment of trees and buildings within the Site for their potential to provide bat roost habitat (following good practice guidelines for bat surveys7);
- Searching for signs of badger activity including setts, tracks, snuffle holes and latrines within and up to 50m outside the Site (where access was possible);
- Searching for signs of bird nests and identifying any suitable nesting habitats within the Site;
- Searching for suitable habitat for water voles, otters and white-clawed crayfish within and adjacent to the Site;
- Assessment of habitat suitability for dormice;
- A Habitat Suitability Index (HSI)[8] assessment of water bodies, with connectivity to the Site, up to 500m from the Site for their potential to support great crested newts;
- An assessment of land within and adjacent to the Site for its potential to be used by reptiles;
- An assessment of habitat potential for invertebrates; and
- The extended Phase 1 habitat survey checked for the presence of Japanese knotweed, giant knotweed, hybrid knotweed, giant hogweed, Himalayan balsam, rhododendron and cotoneaster species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and subject to strict legal control. The list of invasive plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) is extensive and these plants are found in a range of different habitats, including aquatic habitats.

Invasive plant species

The initial survey for invasive plants was undertaken during the Phase 1 survey in February, which is outside of the optimal survey period. An additional walkover survey was carried out during the optimal season for vegetation surveys (1st April to 31st August) to validate the survey undertaken in February and determine the presence and abundance of Japanese knotweed, giant knotweed, hybrid knotweed, giant hogweed, Himalayan balsam, rhododendron and cotoneaster species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) within the Site.

Protected species surveys

Great crested newts

Habitat suitability index (HSI) assessment for great crested newts

The Habitat Suitability Index Assessment is a means of evaluating habitat quality and quantity for great crested newts. An HSI is a numerical index, between 0 and 1. Values close to 0 indicate unsuitable habitat, 1 represents optimal habitat. The HSI for the great crested newt incorporates ten suitability indices, all of which are factors known to affect this species, these are:

- Geographical location
- Pond area
- Pond permanence
- Water quality
- Percentage shade 1m from shore

[1] Magic.gov.uk
[2] http://www.cpbiodiversity.org.uk/biodiversity-action-plans
[3] http://wtp2.appspot.com/wheresthepath.htm
[4] Cresswell, W. & Whitworth, R. (2004). *An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt (Triturus cristatus)*. English Nature Research Report 576
[5] Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey – a technique for environment audit.
[6] Chartered Institute if Ecology and Environmental Management (2013). Guidelines for Preliminary Ecological Appraisal.
[7] Hundt L (2012), Bat Surveys: Good Practice Guidelines, 2nd edition, Bat Conservation Trust
[8] Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus) Herpetological Journal 10 (4), 143-155. (2000) Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M.). The great crested newt Habitat Suitability Index (HSI) is a quantitative measure of aquatic habitat quality for great crested newt. The HSI is a number between 0 and 1, derived from an assessment of ten habitat variables known to influence the presence of newts.

- Presence of waterfowl
- Presence of fish
- Pond count within 1km
- Quality of terrestrial habitat
- Percentage cover of macrophytes

The HSI is a geometric mean of ten suitability indices (HSI = (SI1 x SI2 x SI3 x SI4 x SI5 x SI6 x SI7 x SI8 x SI9 x SI10)1/10)

The calculated HSI score is then used to define pond suitability for great crested newts on a categorical scale as shown in Table A6.2.1:

Table A6.2.1 Interpretation of HSI Scores

HSI	Pond Suitability
<0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

Great crested newt presence/likely absence surveys

Great crested newt presence and likely absence surveys were undertaken for all waterbodies on Site and within 500m that were given a score of 0.6 or above (average, good, or excellent suitability) within the HSI assessment as recommended by the guidelines[9]. A number of techniques were used to survey these water bodies including torching, bottle trapping, netting and egg search methods. A minimum of three techniques were used on each pond determined by the condition of the waterbody:

- Torching: This involves an ecologist walking the circumference of the pond and shining a high powered torch (one million candlepower) into the water. All great crested newts, smooth newts, palmate newts or other amphibians are recorded and any other fauna of interest were noted.
- Bottle trapping: This survey technique involves placing a number of specifically made traps around the margins of the ponds, particularly in areas where vegetation is denser. The great crested newt mitigation guidelines recommend traps are placed approximately every 2m around the pond perimeter. The traps are set prior to sunset and then retrieved carefully early the following morning and any newts or other amphibians trapped will be identified to species and sex and then released.
- Netting: This survey technique involves using a pond net to sample the areas around the pond edge which are accessible. This was carried out for approximately 15 minutes per 50m of accessible bank.
- Egg searching: Vegetation within the margins of the pond was inspected for great crested newt eggs, which are generally folded within, or laid on the underside of, submerged or floating leaves.

[9] English Nature (2001). *Great Crested Newt Mitigation Guidelines*

Presence/absence surveys of nine waterbodies were completed between 21st April and 26th May 2015. Details of the survey dates and methods used are shown in Table A6.2.2. The waterbody locations are shown in Figure 6.1 in the ecology chapter (Chapter 6) of Volume 2 of the ES. All surveys were undertaken in suitable weather conditions with temperatures above 5°C and either no or light precipitation.

Table A6.2.2 Survey dates and methods used for great crested newt presence and absence surveys

Waterbody ID	Date	Survey method			
		Torch	Bottle trap	Netting	Egg search
L1	21/04/2015	✓		✓	✓
	27/04/2015	✓		✓	✓
	05/05/2015	✓		✓	✓
	11/05/2015	✓		✓	✓
P1/P2/P3/P4/P5	21/04/2015	✓	✓		✓
	27/04/2015	✓	✓		✓
	05/05/2015	✓	✓		✓
	11/05/2015	✓	✓		✓
P6/P7	23/04/2015	✓	✓		✓
	29/04/2015	✓	✓		✓
	06/05/2015	✓	✓		✓
	13/05/2015	✓	✓		✓
P8	23/04/2015	✓	✓		✓
	29/04/2015	✓	✓		✓
	06/05/2015	✓	✓		✓
	13/05/2015	✓	✓		✓
	19/05/2015	✓	✓		✓
	26/05/2015	✓	✓		✓

Bats

Assessment of potential value of buildings and trees for roosting sites for bats

Surveys were undertaken to either confirm the presence of bats in buildings and trees or identify if the buildings and trees had features considered to have the potential to support roosting bats. The potential of the buildings and trees has been categorised as negligible, low, moderate or high in accordance with the Bat Survey Guidelines[7]. Categories used in the assessment are defined in Table A6.2.3.

Table A6.2.3 Definitions of categories used for features in buildings and trees

Potential to support roosting bats	Equivalent tree categories[7]	Description
Negligible Potential	Category 3	Buildings or trees with no features capable of supporting roosting bats. Often buildings are of a 'sound' well-sealed nature, or have a single skin and no roof void. They tend to have high interior light-levels, and little or no insulation. Buildings without any roofs may also fall into this category.
Low Potential	Category 2	Buildings or trees with limited features for roosting bats (e.g. A feature where the use of bats cannot be ruled out but is considered unlikely based on size, depth, vulnerability to the elements). No evidence of bats found (e.g. droppings/staining). Buildings or trees may be surrounded by poor or sub-optimal bat foraging habitat. No evidence of bats found. Trees may also have low potential when no features with obvious potential are seen but the tree is of a size and age that elevated (Tree climb) surveys may result in cracks or crevices being found.
Moderate Potential	Category 1	Buildings or trees with some features suitable for roosting bats. Buildings usually of brick or stone construction with a small number of features of potential value to roosting bats e.g. loose roof/ridge tiles, gaps in brickwork, gaps under fascia boards, and/or warm sealed roof-spaces with under-felt. These buildings may be used as occasional or transient roosts in the summer, but are unsuitable for large colonies. No evidence of bats found. Trees with definite bat potential, supporting fewer suitable features than Category 1* trees or with potential for use by single bats
High Potential	Category 1*	Buildings or trees with a large number of features or extensive areas of obvious potential for roosting bats. Generally they have sheltered locations, with a stable temperature regime and suitable bat-access points. Could be suitable for a maternity roost. No evidence of bats found. Potential feeding remains, urine staining or scratch marks (in the absence of droppings) within or around the feature are likely to indicate the presence of bat occupation and therefore suggest high potential that a roost is present. In the absence of such signs, assigning a feature high potential will also be informed by the surveyor's knowledge of bat ecology and preferred roost types (relative to the feature being assessed). Trees with multiple, highly suitable features capable of supporting larger roosts
Confirmed Roost	Known or Confirmed Roost	Bats discovered roosting within the building or tree, or recorded emerging/entering the building or tree at dusk/dawn. Building or tree found to contain conclusive evidence of occupation by bats, such as bat droppings. A confirmed record (as supplied by an established source such as the local bat group) would also apply to this category.

All trees identified as requiring removal or cutting back as part of the Proposed Development were assessed for their potential to support roosting bats. Trees were assessed from the ground using a ladder, high powered torches and binoculars in an assessment known as a Ground Level Tree Assessment (GLTA) on the 11th May 2015. .

All buildings due for demolition (identified as the Cavendish Laboratories, the Department of Veterinary Medicine buildings, W017, W030 and W041&W042) underwent a full external and internal inspection. Inspection methods included searching for evidence of bats (i.e. presence of droppings or staining on access points) using high powered torches and binoculars. Internal inspections involved entering loft spaces or voids where access was possible. Building inspections were undertaken between 27th April 2015 and 1st May 2015.

Emergence and re-entry and backtracking surveys

The initial surveys of the buildings identified a total of forty four features with potential for roosting bats. Due to the large number of features and the complexity of the buildings within the veterinary school and Cavendish laboratories it was decided that further surveys would be undertaken using both back tracking and building emergence/re-entry survey methods.

Dusk emergence and pre-dawn re-entry surveys involved the surveyor watching the building, paying particular attention to the feature identified as having potential to support roosting bats, to see whether bats emerge or re-enter the feature. Dusk surveys began fifteen minutes before sunset and finished two hours after sunset. Dawn surveys began between one and a half and two hours before sunrise and finished at sunrise. This was undertaken to establish whether features were being used by bats and to identify the number of bats and species using the features.

Survey effort was based on guidance in the Bat Surveys Good Practice Guidelines as indicated in Table A6.2.4.

Table A6.2.4 Minimum number of surveys required for presence/absence surveys in trees[10]

High Roost Potential	Low to Moderate Roost Potential	Low Roost Potential
Three dusk emergence and/or pre-dawn re-entry surveys during May to September Optimum period May - August	Two dusk emergence and/or pre-dawn re-entry surveys during May to September Optimum period May - August	One dusk emergence and/or pre-dawn re-entry surveys during May to September Optimum period May - August
Note: Two surveys carried out within the same 24 hour period constitute a single survey		

Backtracking surveys are used to find roosts by observing bats and tracking them to the roost. The technique is based on four principles:

1. The earlier a bat is seen after sunset or the later it is seen before sunrise, the closer it is likely to be to its roost.
2. Bats fly away from their roost at sunset, so surveyors should move in the opposite direction as the bats at this time to locate the roost.

[10] Table taken from Chapter 8, pg63 of: Hundt, L.,, 2012, Bat Surveys Good Practices Guidelines, 2nd Edition, Bat Conservation Trust

3. Bats fly toward their roost at sunrise, so surveyors should move in the same direction as the bats at this time to locate the roost.
4. At sunrise, some bat species swarm (interact socially while in flight) at roost entrances for between ten and ninety minutes before entering.

Evening surveys began half an hour before sunset and the time and direction of flight of each bat seen was noted onto a plan. At two hours before sunset surveyors returned to the potential flight routes identified in the evening survey and moved in the same direction as any bats seen and noted any concentration in flight activity or swarming behaviour.

Buildings W030, W017 and W041 & W042 are stand-alone structures outside of the Department fo Veterinary Medicine and Cavendish Laboratory buildings and were subject to emergence and re-entry surveys. In addition this method was used on buildings W027, W028 (within the Department of Veterinary Medicine complex) and buildings W010 and W011 (within the Cavendish Laboratories complex) as these were considered to have the highest potential to support roosting bats and require targeted surveys. Details of survey dates and times are presented in Table A6.2.5.

Table A6.2.5 Dates and times of emergence and re-entry surveys

Building number	Date	Sunrise time[11]	Sunset time[9]	Weather conditions					Survey type	Start time	Finish time
				Air temp °c	Humidity (%)	Wind speed[12]	Cloud cover[13]	Rain			
W030	14th July 2015	04:55	21:15	17	87	2	8	None	Dawn	03:30	05:00
	03rd August 2015	05:23	20:47	20	64	3	3	None	Dusk	20:35	22:20
W017	02nd July 2015	04:43	21:23	20	60	1	2	None	Dawn	03:15	04:45
	03rd August 2015	05:23	20:47	20	64	3	3	None	Dusk	20:40	22:15
W041 & W042	22nd July 2015	05:05	21:06	16	87	0	3	None	Dusk	20:50	22:40
	25th August 2015	05:59	20:04	13	98	0	0	None	Dawn	04:30	06:00
W010 and W011	13th July 2015	04:54	21:16	19	85	2	8	None	Dusk	21:00	22:45
	04th August	05:25	20:46	14	84	2	0	None	Dawn	03:55	05:25
W027	10th July 2015	04:50	21:19	21	62	4	7	None	Dawn	02:45	04:50
	12th August 2015	05:37	20:31	19	68	3	7	None	Dusk	20:15	22:30
W028	07th August 2015	05:29	20:40	15	77	0	0	None	Dawn	03:30	05:30
	08th July 2015	04:48	21:20	15	82	0	2	None	Dusk	21:05	23:15

Backtracking methods were used on all other buildings within the Department of Veterinary Medicine and Cavendish Laboratory buildings that were considered to have lower potential to support roosting bats. Dates and times for backtracking surveys are presented in Table A6.2.6.

[11] Time given is sunrise and sunset times for Cambridge
[12] Measurement of wind speeds using qualitative scale available at www.metoffice.gov.uk
[13] Measurement of cloud cover from 1 (clear sky) to 8 (complete cloud cover)

Table A6.2.6 Dates and times of backtracking surveys

Building complex	Date	Sunrise time[9]	Sunset time[9]	Weather conditions					Survey type	Start time	Finish time
				Air temp °c	Humidity (%)	Wind speed	Cloud cover	Rain			
Cavendish Laboratories	01st July 2015	04:52	21:24	26	73	1	2	0	Dusk	21:10	23:25
	14th July 2015	04:55	21:15	19	85	1	8	0	Dawn	03:25	04:55
	12th August 2015	05:37	20:30	16	67	2	7	0	Dusk	22:15	22:00
Department of Veterinary Medicine buildings	15th July 2015	04:56	21:14	20	60	2	7	0	Dusk	20:45	23:15
	16th July 2015	04:57	21:13	15	84	2	7	0	Dawn	02:30	05:00
	22nd July 2015	05:05	21:06	15	76	0	1	0	Dawn	02:30	05:05
	09th August 2015	05:32	20:36	23	78	0	1	0	Dusk	20:20	22:45
	11th August 2015	05:36	20:33	12	87	0	0	0	Dawn	03:30	05:35
	12th August 2015	05:37	20:31	16	82	2	7	0	Dawn	03:35	05:40
	17th August 2015	05:44	20:23	12	82	0	0	0	Dawn	03:30	05:45

Tree climb surveys

Three trees located to the rear of Cavendish laboratories that were identified as category 1*, 1 or 2 (as described in Table A6.3) were climbed by suitably qualified tree climbers who hold the relevant Natural England WML-CL18 – (Level 2) licences.

Features that were identified during the GLTA to have potential to support roosting bats were further inspected using an endoscope to identify the roosting potential for bats or confirm presence of bats. Any new features seen whilst climbing the tree which couldn't be seen from the ground were also assessed. The features identified during the GLTA were re-classified following the tree climb and roosting potential down or up graded where necessary. The tree climb was undertaken on 1st July 2015.

Bat activity surveys

Walking transects were undertaken across the Site to establish the level of bat activity and species using the Site for foraging and commuting purposes. Transect surveys were undertaken in accordance with the Bat Survey Guidelines and involved two surveyors, with bat detectors, walking a pre-determined route, stopping at "listening points" for 3 minute intervals. The survey route took approximately 2 hours to complete and timing of the surveys were as follows:

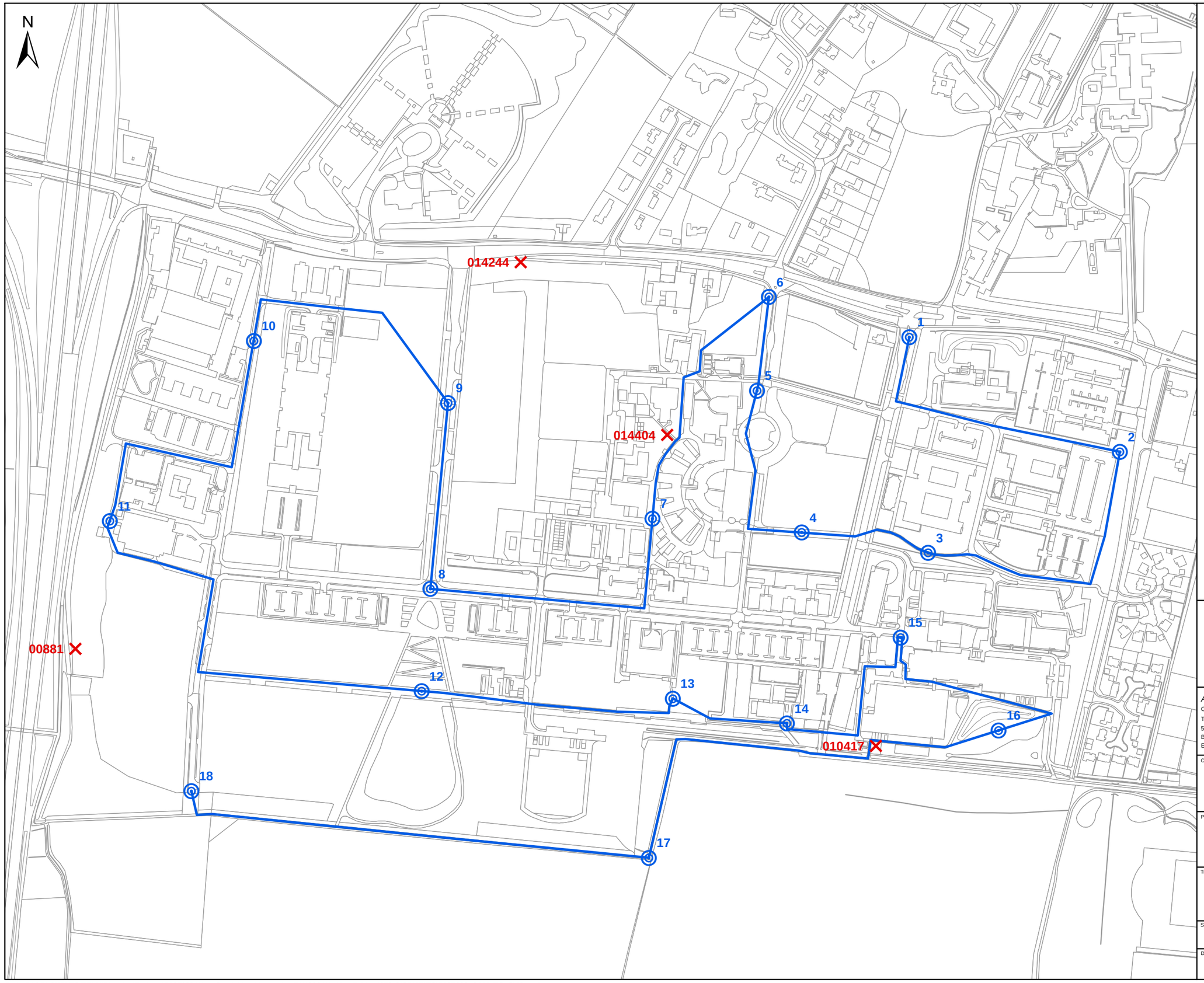
- Dusk survey (21:20 to 23:20) on 23/6/2015
- Dusk survey (21:05 to 23:45) on 06/07/2015 followed by Dawn survey (02:50 to 04:47) on 07/07/2015; and
- Dusk survey (19:45 to 22:00) on 24/08/2015

In addition to the walking transect, wild life acoustics song meters (automatic static detectors known as SM2s) were placed out at four locations around the Site. The locations were considered to be the area's most likely to have main bat activity based on landscape features present such as linear tree lines or hedgerows, buildings with potential to support roosting bats and waterbodies. Overall the habitats on Site were considered to be of low quality for bats as the Site is predominantly built up, brightly lit and comprising of semi improved heavily grazed paddocks or amenity grassland areas. The development area is considered to be a large site, proposed for major infrastructure developments. For a site of this size with low habitat quality, the bat survey guidance recommends 1 static location to be set up to collect data over four consecutive nights within each season (spring, summer and autumn). Using the guidance as a reference the static detectors were left out for a week during the summer season between 23rd and 30th June 2015. Deviations from the guidance method were two fold, the spring season was missed due to equipment failures and the deadlines for the project meant surveys couldn't be carried out within the autumn season. It was also considered necessary to locate the SM2's in four locations, rather than the guidance recommendation of one, as suitable habitat features were spread widely across the Site. It was felt that one location would not therefore represent a true reflection of activity across the Site.

The transect route and locations of the SM2s are shown on Figure A6.2.1.

Data analysis

Bat calls were recorded during emergence and re-entry surveys, backtracking and activity surveys. All recordings, where not confidently identified in the field, were analysed in either Pettersson Elektronic Bat Sound 4.2 or Analook software by experienced ecologists.



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- Static Detectors (SM2s)
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Tel: +44(0)1454 662000
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Project
West Cambridge Masterplan EIA

Title
Ecology
Bat Activity Transect Route
and SM2 Locations

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:4,000	SS Date 02/10/15	HW Date 02/10/15	DP Date 02/10/15

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Breeding birds and barn owls

Breeding bird surveys

The survey covered all areas within the Site shown on Figure A6.2. The survey visits were undertaken between April and July 2015 details of which are presented in Table A6.2.7.

Table A6.2.7 Breeding bird survey dates, times and weather conditions

Survey number	Date	Time	Sunrise [14]	Weather Conditions			
				Cloud – Okta[13]	Temperature at start – degrees Celsius	Wind – Beaufort Scale[12]	Rain
1	16/04/15	06.00 – 08.00	06.01	0/8	8°C	1-2	None
2	27/05/15	06.00 – 07.40	04.50	4/8	10°C	2-3	None
3	15/07/15	06.00 – 07.30	04.56	8/8	16°C	2-3	Occasional light drizzle

With the exception of wind farm developments, there is currently no published bird survey guidance to follow when assessing the impacts of a development on breeding birds. Therefore, in order to achieve the purpose of the survey, the principles of the Common Birds Census (CBC) mapping method developed by the British Trust for Ornithology (BTO) were followed.

The CBC, which began in 1962 and was designed as a long-term population monitoring scheme, allows the recording of bird territories through conspicuous singing and displaying during the breeding season. The CBC adopted ten survey visits as the standard approach, although to detect the presence of any one species all ten visits were rarely needed. The BTO have since recognised weaknesses of the CBC as a long-term population monitoring scheme largely due to the time-consuming nature of the fieldwork dictated by the ten survey visits and it has now been superseded by the Breeding Bird Survey (BBS). However, the CBC mapping method remains the most accurate and practical way to determine the numbers and local distribution of breeding birds within a particular survey area.

Habitats within the Site did not suggest a rich bird assemblage is likely to be present, and so three breeding bird survey visits, using the CBC mapping technique were considered appropriate to meet the purpose of the surveys. This level of survey effort was considered suitable to determine the approximate abundance of breeding bird species on Site, and to minimise the risk of overlooking scarce and/or species of conservation concern.

Two surveyors walked a route through the Site ensuring all areas were viewed to within 50m. The surveyors recorded species seen or heard up to 50m from the Site boundary, although the detectability of birds at any given place is variable, being dependent upon the habitats present and the species.

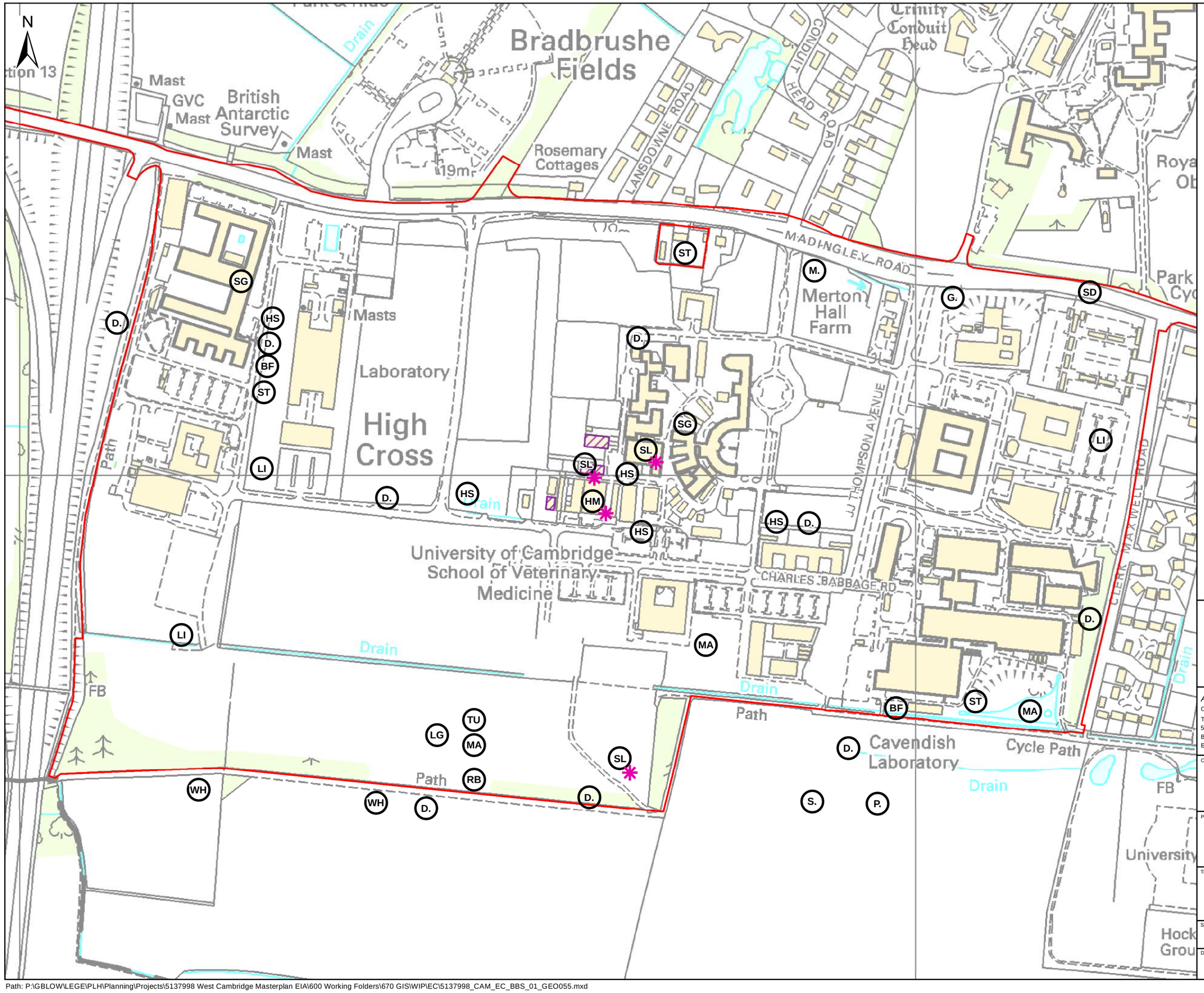
Surveys commenced within one and a half hours of sunrise and lasted approximately one and a half to two hours. The direction surveyors walked through the Site was varied between visits to optimise detection and minimise recording bias. The bird surveys were undertaken in fair weather conditions (i.e. not in heavy rain, poor visibility or wind greater than Beaufort 4). The surveys were conducted by experienced ornithologists, each with over eight years of professional bird survey and assessment experience.

The surveyors, with the aid of binoculars, recorded all contacts with birds by either sight or sound by walking through the Site at a slow and steady pace. The positions of the recorded birds were plotted as accurately as possible (to the nearest 10-20m) on a suitably scaled base map, i.e. a 'visit map'. Standard BTO codes and symbols were used for mapping species (including sex and age, e.g. juvenile, immature or adult) and bird activity (including singing, alarm-calling, nest-building and location, carrying food or faecal sacs, territorial disputes and copulation). Direction of birds overflying the survey area was also noted.

Barn owl inspection

A number of buildings within the Site were identified during initial ecological surveys in February 2015 as having potential to support breeding barn owl. These were associated with the Department of Veterinary Medicine buildings towards the centre of the Site. During a Site visit on the 16th April 2015, these buildings were inspected by two bird surveyors, both of whom hold survey licences for barn owl. Surveyors looked for evidence of barn owl within and around the buildings including, owl pellets, splashing, feathers, and nest sites.

[14] Time given is sunrise time for Cambridge



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- Site boundary
- Building inspected for barn owl
- Nest identified
- Approximate location of notable species territories

Two-letter species codes:

BF	Bullfinch
D.	Dunnock
G.	Green woodpecker
HM	House martin
HS	House sparrow
LG	Little grebe
LI	Linnet
M.	Mistle thrush
MA	Mallard
P.	Grey partridge
RB	Reed bunting
S.	Skylark
SD	Stock dove
SG	Starling
SL	Swallow
ST	Song thrush
TU	Tufted duck
WH	Common whitethroat

0 50 100 Metres

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The Hub
500 Park Ave,
Bristol, South Glos.,
England, BS32 4RZ
Tel: +44(0)1454 662000
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Project: West Cambridge Masterplan EIA

Title: Ecology
Breeding Bird Survey 2015
Figure 5.2

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:4,000	SJD Date 01/06/16	IEW Date 01/06/16	DM Date 01/06/16

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Badger survey

A badger survey was undertaken within the footprint of the Site in conjunction with the phase 1 habitat survey in February 2015. The survey area was inspected for evidence of badger activity including setts, latrines, paw prints, snuffle holes (created when foraging), track-ways, hairs (caught on fencing) and scratching posts.

Setts were classified as follows:

- Main Sett - normally only one per territory. It will generally be the largest sett, usually with several entrances. It will be permanently occupied throughout the year and used as the breeding sett;
- Annex Sett - of intermediate size and located close to the main sett. These are occupied for long periods and can be used for breeding when there are more than one breeding sow in the clan;
- Subsidiary Sett - of intermediate size, similar to an annex sett, however located further away from the main sett and not connected to it by clearly defined paths; and,
- Outlying Sett - the smallest setts, usually with only one or two entrances. They are occupied less frequently and there can be any number within a territory.

Appendix 6.3 Species list of all plants found in the Coton Path Hedgerow County Wildlife Site (CWS)

Species list of plants recorded during phase 2 survey of the Coton footpath hedgerow CWS are detailed in Table A6.3.1.

Table A6.3.1 Species list for Coton Path Hedgerow CWS

Latin name	Common Name	Dominance (DAFOR)
Acer campestre	Field Maple	O
Cornus sanguinea	Dogwood	R
Corylus avellna	Hazel	R
Crataegus monoguna	Hawthorn	D
Fraxinus Ecelsior	Ash	R
Prunus spinosa	Blackthorn	F
Quercus robur	Oak	R
Rosa canina agg	Dog Rose	O
Rubus fruticosus	Bramble	O
Sambucus nigra	Elder	O
Ulmus minor	Elm	D
Agrostis stolonifera	Creeping bent	F
Anisantha sterilis	Barren brome	F
Arrhenatherum elatius	False oat-grass	A
Bromus hordeaceus	Soft brome	F
Dactylis glomerata	Cock's-foot	A
Elytriga repens	Couch grass	F
Festuca arundinacea	Tall fescue	F
Festuca rubra	Red fescue	A
Holcus lanatus	Yorkshire fog	A
Poa annua	Annual meadow-grass	F
Poa pratensis	Smooth meadow grass	O
Poa trivialis	Rough meadow grass	F
Achillea millefolium	Yarrow	O
Alliara petiolata	Garlic mustard	R
Anagallis arvensis	Scarlett pimpernel	O
Anthriscus sylvestris	Cow parsley	F
Arctium lappa	Greater burdock	O
Bellis perennis	Daisy	F
Bollota nigra	Black horehound	O
Bryonia dioica	White bryony	F
Centaurea nigra	Common Knapweed	O
Cerastium fontanum	Common mouse-ear	O
Cirisium arvense	Creeping thistle	F
Cirsium vulgare	Spear thistle	F
Conium maculatum	Hemlock	R
Convolvulus arvensis	Field bindweed	F
Dipsacaceae sp	Teasels	F
Epilobium hirsutum	Greater willow herb	O
Galium aparine	Cleavers	O
Galium mollugo	Hedge bedstraw	O
Galium verum	Lady's bedstraw	R
Geranium dissectum	Cut-leaved crane's-bill	F
Geranium robertianum	Herb Robert	O
Geum urbanum	Wood avens	R
Glechoma hederacea	Ground ivy	F
Heracleum sphondylium	Hogweed	O
Hypericum perforatum	Perforate St John's-wort	O
Lactuca serriola	Prickly lettuce	F
Lamium album	White dead-nettle	F
Lapsana communis	Nipplewort	O
Leucanthemum vulgare	Oxeye daisy	A
Malva sylvestris	Common Mallow	A
Medicago lupilina	Black medick	F
Myosotis arvensis	Field forget-me-not	O
Pentaglottis sempervirens	Green alkanet	R
Picris echioides	Bristly ox-tongue	A
Plantago lanceolata	Ribwort plantain	A
Plantago major	Greater plantation	O
Potentilla reptans	Creeping cinquefoil	F

Latin name	Common Name	Dominance (DAFOR)
Prunella vulgaris	Selfheal	F
Ranunculus repens	Creeping buttercup	A
Rumex crispus	Curled dock	F
Rumex obtusifolius	Broad-leaved dock	F
Rumex sanguineus	Wood dock	O
Senecio jacobaea	Ragwort	O
Senecio sp.	Ragwort species	R
Silene dioica	Red Campion	O
Silene latifolia	White Campion	F
Sinapis arvensis	Charlock	R
Sison amomum	Stone parsley	R
Solanum dulcamara	Woody nightshade	R
Sonchus sp	Sow thistle sp	O
Stachys sylvatica	Hedge woundwort	O
Taraxacrum officinale	Dandelion	F
Trifolium repens	White clover	A
Tussilago farfara	Colt's-foot	O
Urtica dioca	Nettles	F
Veronica chamaedrys	Germander speedwell	F
Veronica filiformis	Slender speedwell	O
Veronica persica	Common field speedwell	F
Vicia tetrasperma	Smooth tare	R

Appendix 6.4 Phase 1 habitat map target notes

Phase 1 mapping is shown on Figure 6.1 in the ecology chapter (Chapter 6) of Volume 2 of the ES. Target notes related to the mapping are shown in Table A6.4.1.

Table A6.4.1 Phase I habitat map target notes

Target Note Number	Description	Photograph
TN1	Laboratory building with low potential to support roosting bats	
TN2	Artificial Badger sett which has been expanded. Signs of activity around the sett including dung pits, footprints and hair on fencing	

Target Note Number	Description	Photograph
TN3	Line of mature oak trees	
TN4	Wet ditch with low potential to support water vole	 
TN5	Cavendish laboratory buildings with potential to support bats and nesting birds	 
TN6	Complex of modern buildings bisected by access roads, amenity grassland verges and public footpaths	No photo
TN7, TN9 and TN10	Paddocks associated with the veterinary school. Used to hold grazing animals including cows, horses and sheep. Species poor semi improved grassland comprising of perennial rye grass (*Lolium perenne*), cock's foot (*Dactylis glomerata),* white clover (*Trifolium repens*), daises (*Bellis perenis*), meadow grass (*Poa sp*.), knotgrass (*Polygonum aviculare*), thistles (*Cirsium spp*.), buttercups (*Ranunculus spp.),* ribwort plantain (*Plantago lanceolate*), Hawk's beard (*Crepis spp.*), cranesbill (*Geranium spp*.) and common sorrel (*Rumex acetosa*).	   
TN11	Coton Path hedgerow CWS running parallel to cycleway.	No photo

Appendix 6.5 Great crested newt presence / absence survey results

The great crested newt survey results are shown in Table A6.5.1.

Table A6.5.1 Great crested newt presence / absence survey results

Waterbody reference	HSI survey date	HSI score	Presence absence survey dates[15]	Presence absence survey method[16][17]	Presence absence survey Results[18][19][20]	Other amphibian species recorded	Great crested newt peak count	Population size class assessment
L1	16/02/2015	0.66	21/04/2015 to 11/05/2015	T/N/ES	T: great crested newts Not Present N: great crested newts Not Present ES: No GCN eggs recorded.	3 female smooth newts 1 male smooth newt	0	N/A
P1	16/02/2015	0.69	21/04/2015 to 11/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded	1 male smooth newt	0	N/A
P2	16/02/2015	0.69	21/04/2015 to 11/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded		0	N/A
P3	16/02/1015	0.77	21/04/2015 to 11/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded	1 male smooth newt	0	N/A
P4	16/02/2015	0.68	21/04/2015 to 11/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded		0	N/A
P5	07/04/2015	0.72	21/04/2015 to 11/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded	1 common frog	0	N/A
P6	07/04/2015	0.87	23/04/2015 to 13/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded	5 female smooth newts 6 male smooth newts 1 smooth newt sex unknown	0	N/A
P7	07/04/2015	0.75	23/04/2015 to 13/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded	22 female smooth newts 9 males smooth newts 1 smooth newt sex unknown	0	N/A

[15] Dates include population assessment surveys undertaken on waterbodies found to support great crested newts
[16] T = torching; BT = bottle trapping; ES = egg search; RS = refuge search; N = netting
[17] Methodology applies to population assessment surveys undertaken on waterbodies found to support great crested newts
[18] T = torching; BT = bottle trapping; ES = egg search; RS = refuge search; N = netting
[19] GCN = great crested newt; (m) – male great crested newt; (f) = female great crested newt; (j) = juvenile great crested newt
[20] The peak count from the surveys is provided for each method used

Waterbody reference	HSI survey date	HSI score	Presence absence survey dates[15]	Presence absence survey method[1617]	Presence absence survey Results[181920]	Other amphibian species recorded	Great crested newt peak count	Population size class assessment
P8a	23/04/2015		23/04/2015 to 26/05/2015	T/BT/ES	T: 4 female great crested newts Present BT: 6 female and 6 male great crested newts Present ES: GCN eggs recorded	19 female smooth newts 13 males smooth newts 2 smooth newt sex unknown	10	Small
P8b	23/04/2015		23/04/2015 to 26/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded		0	N/A
P8c	23/04/2015		23/04/2015 to 26/05/2015	T/BT/ES	T: great crested newts Not Present BT: great crested newts Not Present ES: No GCN eggs recorded	4 female smooth newts	0	N/A

Appendix 6.6 Bat survey results

Building inspections both external and internal were undertaken between 27th April and 21st May 2015. Results from these surveys and further emergence and re-entry surveys are shown in Table A6.6.1. .

Table A6.6.1 Bat Survey Results for Buildings

Building Reference	Bat Roost Category[21]	Survey Results (Survey 1)[22]	Survey Results (Survey 2)	Survey Results (Survey 3)	Roost Type[23]
W028	Moderate/High	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W027	Moderate/High	No bats seen emerging or re-entering building	1 CP re-entry into brick air vents on east facing building façade located left of long windows.	N/A	Transitional roost for 1 x common species of bat
W017	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W033	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W030	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W037	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W067	Low	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W022	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W041 and W042	Low	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W012	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W059	Low	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W034	Low	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W025	Low	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W016 and W045	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W010	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W011	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W013	Moderate	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	None
W014	Negligible	N/A	N/A	N/A	N/A
W036	Negligible	N/A	N/A	N/A	N/A
W023	Negligible	N/A	N/A	N/A	N/A
W020	Negligible	N/A	N/A	N/A	N/A
W086	Negligible	N/A	N/A	N/A	N/A
W087	Negligible	N/A	N/A	N/A	N/A
W044	Negligible	N/A	N/A	N/A	N/A
W038	Negligible	Anecdotal evidence of one bat landing on building. Behaviour described indicated swarming behaviour. Species not known. No re-entry seen	No bats seen emerging or re-entering building	No bats seen emerging or re-entering building	Possible transitional roost for single bat but not confirmed through surveys.
W055	Negligible	N/A	N/A	N/A	N/A
W029	Negligible	N/A	N/A	N/A	N/A
W075	Negligible	N/A	N/A	N/A	N/A
W019 (North)	Negligible	N/A	N/A	N/A	N/A

[21]See Appendix 6.2 for descriptions of Roost Category
[22]BLE=brown long-eared, SP=soprano pipistrelle
[23]Roost type is based on the species concerned, number of bats and location of the roost

Building Reference	Bat Roost Category[21]	Survey Results (Survey 1)[22]	Survey Results (Survey 2)	Survey Results (Survey 3)	Roost Type[23]
W019 (South)	Negligible	N/A	N/A	N/A	N/A
W069	Negligible	N/A	N/A	N/A	N/A
W040	Negligible	N/A	N/A	N/A	N/A
W068	Negligible	N/A	N/A	N/A	N/A
New building north of building W027	Negligible	N/A	N/A	N/A	N/A
W039	Negligible	N/A	N/A	N/A	N/A
W077	Negligible	N/A	N/A	N/A	N/A

Ground level tree assessments (GLTA) were undertaken on 11th May 2015, the results for those trees that were found to have low, moderate or high features, during the GLTA, and so required further surveys are shown in Table A6.6.2

Table A6.6.2 Further Bat Survey Results for Trees

Tree Reference	Bat Roost Category[24]	Survey Results (Survey 1) [25]	Survey Results (Survey 2)	Survey Results (Survey 3)	Roost Type[26]
BT88	High	0	N/a	N/a	No roost
BT89	Moderate	0	N/a	N/a	No roost
BT90 (feature 1)	Negligible	0	N/a	N/a	0
BT90 (feature 2)	Negligible	0	N/a	N/a	0
BT91 (feature 1)	High	0	N/a	N/a	0
BT91 (feature 2)	Moderate	0	N/a	N/a	0
BT91 (feature 3)	Negligible	0	N/a	N/a	0
BT92	Low	0	N/a	N/a	0
BT93	Negligible	0	N/a	N/a	0
BT94	Negligible	0	N/a	N/a	0
BT95	Negligible	0	N/a	N/a	0
BT96	Negligible	0	N/a	N/a	0
BT091	Low	0	N/a	N/a	0

Four Wild life acoustics song meters (automatic static detectors known as SM2s) were placed out for a period of one week between the 23rd and 20th June 2015. Peak counts of species recorded by the SM2s are presented in Tables A6.6.3 to A6.6.5.

Table A6.6.3 Species recorded by SM2 014404 located within Amenity Grassland area in center of Veterinary School at OS Grid Reference TL 42750 59106

Date	Count of Species					Total Count
	Common Pipistrelle	Soprano Pipistrelle	Noctule	Nyctalus Spp.	Myotis spp.	
23/06/2015	0	0	0	0	0	0
24/06/2015	7	0	0	0	0	7
25/06/2015	10	5	0	0	0	15
26/06/2015	5	3	1	0	0	9
27/06/2015	5	2	0	0	0	7
28/06/2015	23	0	1	0	0	24
29/06/2015	4	0	0	0	0	4

Table A6.6.4 Species recorded by SM2 014244 located on fence line to the North of the site along boundary with Madingley Road at OS Grid Reference TL 42560 59271

Date	Count of Species					Total Count
	Common Pipistrelle	Soprano Pipistrelle	Noctule	Nyctalus Spp.	Myotis spp.	
23/06/2015	5	4	0	0	0	9
24/06/2015	7	4	0	0	0	11
25/06/2015	15	5	0	0	0	20
26/06/2015	32	6		1	0	39
27/06/2015	38	3	0	0	0	41
28/06/2015	23	20	0	0	0	43
29/06/2015	8	2	0	0	0	10

[24]See Appendix 6.2 for descriptions of Roost Category
[25]BLE=brown long-eared, SP=soprano pipistrelle
[26]Roost type is based on the species concerned, number of bats and location of the roost

Table A6.6.5 Species recorded by SM2 008881 located on fence line to the west of site opposite M11 scrub CWS at OS Grid Reference TL 42108 58851

Date	Count of Species					Total Count
	Common Pipistrelle	Soprano Pipistrelle	Noctule	Barbastelle	Myotis spp.	
23/06/2015	23	11	0	0	0	34
24/06/2015	28	5	0	0	0	33
25/06/2015	6	8	1	0	1	16
26/06/2015	13	8	0	0	0	21
27/06/2015	8	5	0	0	0	13
28/06/2015	11	3	0	1	1	16
29/06/2015	0	1	0	0	0	1

Table A6.6.6 Species recorded by SM2 010417 located along ditch running between Cavendish Laboratories and Coton Hedgerow footpath at OS Grid Reference TL42970 58738

Date	Count of Species					Total Count
	Common Pipistrelle	Soprano Pipistrelle	Pipistrelle Spp.	Noctule	Myotis spp.	
23/06/2015	17	45	2	0	0	64
24/06/2015	43	70	2	0	1	116
25/06/2015	53	71	6	1	3	134
26/06/2015	83	109	6	2	2	202
27/06/2015	51	51	0	0	5	107
28/06/2015	70	83	3	1	3	160
29/06/2015	40	11	0	1	1	53

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Bat Species

- B. Barb
- M. Daub
- Myotis sp.
- N Noc
- Nyctalus sp
- P. pip
- P. pyg

0 50 100
Metres

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Client
University of Cambridge

Project
West Cambridge Masterplan EIA

Title
Ecology
Bat Species Identified During Activity Survey

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:4,000	SS Date 02/10/15	HW Date 02/10/15	DP Date 02/10/15

Drawing Number: 5137998_CAM_EC_BAT
Rev: 00

Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\EC\5137998_CAM_EC_BAT.mxd

Appendix 6.7 Badger survey results

The badger survey results are summarised in Table A6.7.1.

Table A6.7.1 Badger survey results

Sett reference	Location	Number of sett entrances	Evidence of activity	Sett classification
Sett 1	Earth mound dominated by tall ruderal at southern end of scrub and broadleaved woodland block to west of masterplan site TL 42087 58833	5	Dung pits, Hairs, pathway, bedding and footprints	Main sett

Appendix 6.8 Breeding bird survey results

Survey dates and times for the breeding bird surveys undertaken in 2015 are shown in Table A6.8.1.

Table A6.8.1 Breeding bird survey dates, times and weather conditions

Survey number	Date	Time	Sunrise [27]	Weather conditions			
				Cloud – Okta[28]	Temperature at start – degrees Celsius	Wind – Beaufort scale[29]	Rain
1	16/04/15	06.00 – 08.00	06.01	0/8	8°C	1-2	None
2	27/05/15	06.00 – 07.40	04.50	4/8	10°C	2-3	None
3	15/07/15	06.00 – 07.30	04.56	8/8	16°C	2-3	Occasional light drizzle

A list of all the species recorded along with their legal protection and conservation status is set out in Table A6.8.2. Twenty of these are considered to be notable due to their legal protection or conservation status. The Breeding Bird Survey 2015 figure in Appendix 6.2 shows the approximate location of notable bird species territories identified during the surveys.

Table A6.8.2 Bird species recorded during breeding bird surveys in 2015

BTO code	Species		Notable Status	Breeding Status
B.	*Turdus merula*	Blackbird		Breeding
BC	*Sylvia atricapilla*	Blackcap		Breeding
BF	*Pyrrhula pyrrhula*	Bullfinch	Amber List BoCC, SPI, UK BAP priority species	Probable breeding
BH	*Larus ridibundus*	Black-headed gull	Amber List BoCC	Non-breeding
BT	*Parus caeruleus*	Blue tit		Probable breeding
C.	*Corvus corone corone*	Carrion crow		Probable breeding
CC	*Phylloscopus collybita*	Chiffchaff		Probable breeding
CG	*Branta canadensis*	Canada goose		Non-breeding
CH	*Fringilla coelebs*	Chaffinch		Breeding
CO	*Fulica atra*	Coot		Breeding
CT	*Parus ater*	Coal tit		Probable breeding
D.	*Prunella modularis*	Dunnock	Amber List BoCC, SPI, UK BAP priority species	Breeding
G.	*Picus viridis*	Green woodpecker	Amber List BoCC	Possible breeding
GO	*Carduelis carduelis*	Goldfinch		Breeding
GR	*Carduelis chloris*	Greenfinch		Breeding
GT	*Parus major*	Great tit		Probable breeding
H.	*Ardea cinerea*	Grey heron		Non-breeding
HM	*Delichon urbica*	House martin	Amber List BoCC	Breeding30
HS	*Passer domesticus*	House sparrow	Red List BoCC, SPI, UK BAP priority species	Breeding
JD	*Corvus monedula*	Jackdaw		Probable breeding
LG	*Tachybaptus ruficollis*	Little grebe	Amber List BoCC	Breeding
LI	*Carduelis cannabina*	Linnet	Red List BoCC, SPI, UK BAP priority species	Breeding
LT	*Aegithalos caudatus*	Long-tailed tit		Probable breeding
M.	*Turdus viscivorus*	Mistle thrush	Amber List BoCC	Probable breeding
MA	*Anas platyrhynchos*	Mallard	Amber List BoCC	Breeding
MG	*Pica pica*	Magpie		Breeding
MH	*Gallinula chloropus*	Moorhen		Breeding
MP	*Anthus pratensis*	Meadow pipit	Amber List BoCC	Non-breeding
MS	*Cygnus olor*	Mute swan		Possible breeding
P.	*Perdix perdix*	Grey partridge	Red List BoCC, SPI, UK BAP priority species	Possible breeding adjacent site
PH	*Phasianus colchicus*	Pheasant		Possible breeding adjacent site
PW	*Motacilla alba*	Pied wagtail		Breeding
R.	*Erithacus rubecula*	Robin		Breeding
RL	*Alectoris rufa*	Red-legged partridge		Possible breeding adjacent site
RW	*Acrocephalus scirpaceus*	Reed warbler		Possible breeding
S.	*Alauda arvensis*	Skylark	Red List BoCC, SPI, UK BAP priority species	Breeding adjacent site
SD	*Columba oenas*	Stock dove	Amber List BoCC	Breeding adjacent site

[27] Time given is sunrise time for Cambridge
[28] Measurement of cloud cover from 1 (clear sky) to 8 (complete cloud cover)
[29] Measurement of wind speeds using qualitative scale available at www.metoffice.gov.uk
[30] A colony of approximately 20 house martin nests were present around one of the buildings within School of Veterinary Medicine.

BTO code	Species		Notable Status	Breeding Status
SG	*Sturnus vulgaris*	Starling	Red List BoCC, SPI, UK BAP priority species	Breeding
SH	*Accipiter nisus*	Sparrowhawk		Possible breeding
SL	*Hirundo rustica*	Swallow	Amber List BoCC	Breeding31
ST	*Turdus philomelos*	Song thrush	Red List BoCC, SPI, UK BAP priority species	Breeding
TU	*Aythya fuligula*	Tufted duck	Amber List BoCC	Probable breeding
WH	*Sylvia communis*	Common whitethroat	Amber List BoCC	Breeding
WP	*Columba palumbus*	Wood pigeon		Breeding
WR	*Troglodytes troglodytes*	Wren		Breeding
WW	*Phylloscopus trochilus*	Willow warbler	Amber List BoCC	Possible breeding

In addition to those species identified during the surveys, anecdotal records of barn owl foraging at the southern area of the site were received during discussions with grounds management team. Three modern open fronted barns were inspected for evidence of barn owl. No evidence of barn owl (pellets, feathers, splashing) was identified within these structures, and no suitable ledges or owl boxes were present.

[31] Approximately 3 swallow nests were present within buildings associated with School of Veterinary Medicine.

Appendix 7.1 Archaeological evaluation

West Cambridge Archaeology

Department of Veterinary Medicine Paddocks

An Archaeological Evaluation

Marcus Brittain and Christopher Evans

CAMBRIDGE ARCHAEOLOGICAL UNIT

UNIVERSITY OF CAMBRIDGE

WEST CAMBRIDGE ARCHAEOLOGY

Department of Veterinary Medicine Paddocks: An Archaeological Evaluation

Marcus Brittain and Christopher Evans

With contributions by
Grahame Appleby, Emma Beadsmoore, Val Fryer, Rob Law,
Francesca Mazzilli and Vida Rajkovača

University of Cambridge
June 2015/Report No. 1292
ECB 4458

CONTENTS

Summary

A programme of archaeological trenching covering an area of 2240.4sqm revealed a previously unidentified geological variation of a ridge of diamict gravel over Gault Clay upon which an Early to Middle Iron Age settlement was identified. This comprised of at least two circular gully-defined dwellings with associated pits over a distribution clearly demarcated by a broken line of bounding ditches. A third structure was identified 25m away from the core settlement upon the Gault Clay landfall. An additional Iron Age site represented by a ditch and posthole was also identified, and a ditch-defined trackway may also be attributed to this phase. An extensive Romano-British fieldsystem overlay the settlement area and other considerable parts of the proposed development area.

INTRODUCTION

An archaeological trenching evaluation was undertaken by the Cambridge Archaeological Unit (CAU) on behalf of the University of Cambridge between 18th May and 1st June 2015. This comprised of thirty-seven excavated trenches totalling 1211.05m (2240.4sqm). Overall, a record of moderate archaeological coverage was documented covering prehistoric to post-Medieval eras with a denser archaeological return towards the centre of the proposed development area (PDA). This notably entailed a small Iron Age settlement or farmstead, an extensive ditched field pattern of probable Roman date, a Medieval or post-Medieval agricultural furrow system covering the majority of the PDA, and other localised evidence for historic-era land use.

To enable spatial reference the PDA has been divided east to west into three 'fields' (Table 1; Figure 1).

Field	Description	Trenches
1	Beside the Schlumberger Gould Research Centre	1-5, 35-36
2	Paddocks west of the Department of Veterinary Medicine	6-14, 28-33, 37
3	Paddocks east of the Department of Veterinary Medicine	15-27

Table 1: Investigation 'Fields' and their corresponding trenches

The green-field/open-land component of the PDA covers *c*. 9.8ha centred at TL 4240 5900 (i.e. area available for fieldwork). At present the land is used by the Department of Veterinary Medicine for stock-grazing. The site is bounded to the west by The Schlumberger Gould Research Centre, to the north by Madingley Road, by Charles Babbage Road to the south and by J.J. Thompson Avenue to the east, with the main buildings and adjoining paddocks of the Department of Veterinary Science bounding the east, north and west fields. The BGS Survey (map sheet No.188) indicates the solid geology as being of Gault Clay; however, the trenching revealed a mix of sandy gravels and clay that comprise a ridge of diamict deposits (Boreham 2002) that derive from material weathered off the lower chalk and Boulder clay ridge at Coton to the west. At its highest point the ridge lies slightly elevated at *c*. 21m OD, with the land dropping to *c*. 18.4m OD to the northwest and southeast, and to below 17.2m OD in the northeast (this falls to 15.50m OD at the High Cross site in the southwest). Trenches 5, 6, 12, 13, 15 and 16, positioned along the north edge of the PDA, showed that here the landfall coincides with a geological transition to Gault Clay between 18.4m and 19.0m OD (Figure 2).

Archaeological and Historical Background

The only archaeological monitoring to have previously been carried out within the current PDA is observations recorded during the opening of six geo-technical test-pits in Field 2 in 1998 (Dickens 1999). Three of the test-pits contained possible archaeological features, but no finds were recovered and the conditions of the investigation were too limiting for meaningful archaeological statements.

The immediate area's archaeological potential was fully appraised in a desktop assessment (Alexander 1996), although the southern and eastern portions of the overall West Cambridge Development area have since been subject to archaeological evaluation of varying scales of sampling intensity (Dickens 1999; Whittaker & Evans

1999; Lucas 2000, 2001; Armour 2001; Whittaker 2001; Timberlake & Patten 2006; Hutton 2009, 2010; Slater 2011, 2012). The sites identified during these phases of evaluation have been formally investigated principally by two major excavations at Vicar's Farm to the east and High Cross to the south. Summarised in detail below, these illustrate sporadic and fairly low density earlier prehistoric visitation to the West Cambridge landscape with greater intensity of land use emerging during the Early Iron Age (*c*. 800 BC) in the southwest with Middle to Late Iron Age activity also represented to the east. Here, to the east, Romano-British settlement developed over three distinct phases, with the southwest later serving as part of a broad enclosed fieldsystem.

Vicar's Farm (TL 4309 5905) – Excavations carried out by the CAU at Vicar's Farm in 1999 and 2000 (Lucas & Whittaker 2001; Lucas 2002), and at the neighbouring Whittle Laboratory in 2011 (Slater 2011), revealed evidence of activity from the Mesolithic to Romano-British periods, with a substantial three-phased Romano-British settlement covering the entire excavated area.

Mesolithic to Bronze Age activity was largely confined to an assemblage of (residual context) worked flint, indicating sporadic visitation. In the Iron Age, there is evidence for more sustained use of the landscape and a number of features containing Iron Age pottery were excavated, although only two features were themselves Iron Age in date. Finds included a brooch dated to the 4th century BC and a late 1st century BC/early 1st century AD coin. Pottery from a ditch exposed in trenches opened in advance of works relating to the construction of the Nano Fabrication Building to the immediate south of the Vicar's Farm site confirmed it's Middle to Late Iron Age date, which further suggests earlier origins of the subsequent Romano-British site's layout whilst also defining its southern limit (Amour 2001).

Romano-British activity commenced with the construction of a ditched system enclosing the central portion of the site. Phase I (AD 80-180) then saw the establishment of the core settlement together with many internal features that included a probable timber shrine, an aisled building and a cemetery containing eight cremations and two inhumed burials of neonates. In the second, middle phase of activity (AD 180-270) the site underwent major expansion to the south and a system of ditched field enclosure was initiated away from the settlement. In the settlement's core the aisled building and cemetery passed out of use as new features were established on the eastern side. The site transformed radically in Phase III (AD 270-410+) as a third area was added to the south, linking the main settlement with the southern fieldsystem. A cemetery was identified on the boundary of this fieldsystem that grew to 29 graves, containing the inhumed remains of at least 30 individuals. Features in the eastern half of the site's core developed into a new centre of activity, possibly as a location for marketing livestock. Backfilling of the site's eastern boundary opened the whole of the core to the east (beyond the limit of excavation). The settlement as a whole appears to have been abandoned in the early decades of the 5th century AD, turning to agricultural land until the end of the 20th century.

High Cross (TL 4240 5900) – Over the winter of 2009 and 2010 the CAU excavated an area of 2.2ha (Timberlake 2010), later supplemented by additional trenching (Slater 2012). Evidence for pre-Iron Age activity was limited to an early Neolithic pit and a length of ditch associated with a Middle Bronze Age pit-well. Early Iron Age occupation was located upon a thin spread of gravels, sands and silts overlying Gault Clay, and consisted of a half dozen distinct groups of pits, amongst which also lay pits dated to the Middle Iron Age. Two of the earlier pit groups had formed clusters dug on either side of the valley floor, between which passed a substantial Early Iron Age ditch. This may distinguish the presence of a former route, intimated by traces of an east-facing break or in-turned entrance in the course of the ditch; alternatively, the segments of the ditch may have been cut for the drainage of the water-filled pits that may originally have been quarried for material or dug as waterholes, perhaps for retting, finally to be filled by rubbish. Coverage of the southern pit cluster by a 'dark earth-type' deposit of silt following the Middle Iron Age, along with other environmental evidence, suggests that the area became increasingly damp. There is only ambiguous evidence to connect settlement to these features, with scarce pottery and post-hole settings; however, the presence of saddle-quern fragments associated with small assemblages of burnt stone within the pits suggests the presence at least of hearths and the possibility of nearby dwellings. The site may therefore represent either a short-lived or failed/abandoned Iron Age colonisation of the valley.

Figure 1. Site location (showing Fields 1-3) and previous investigations

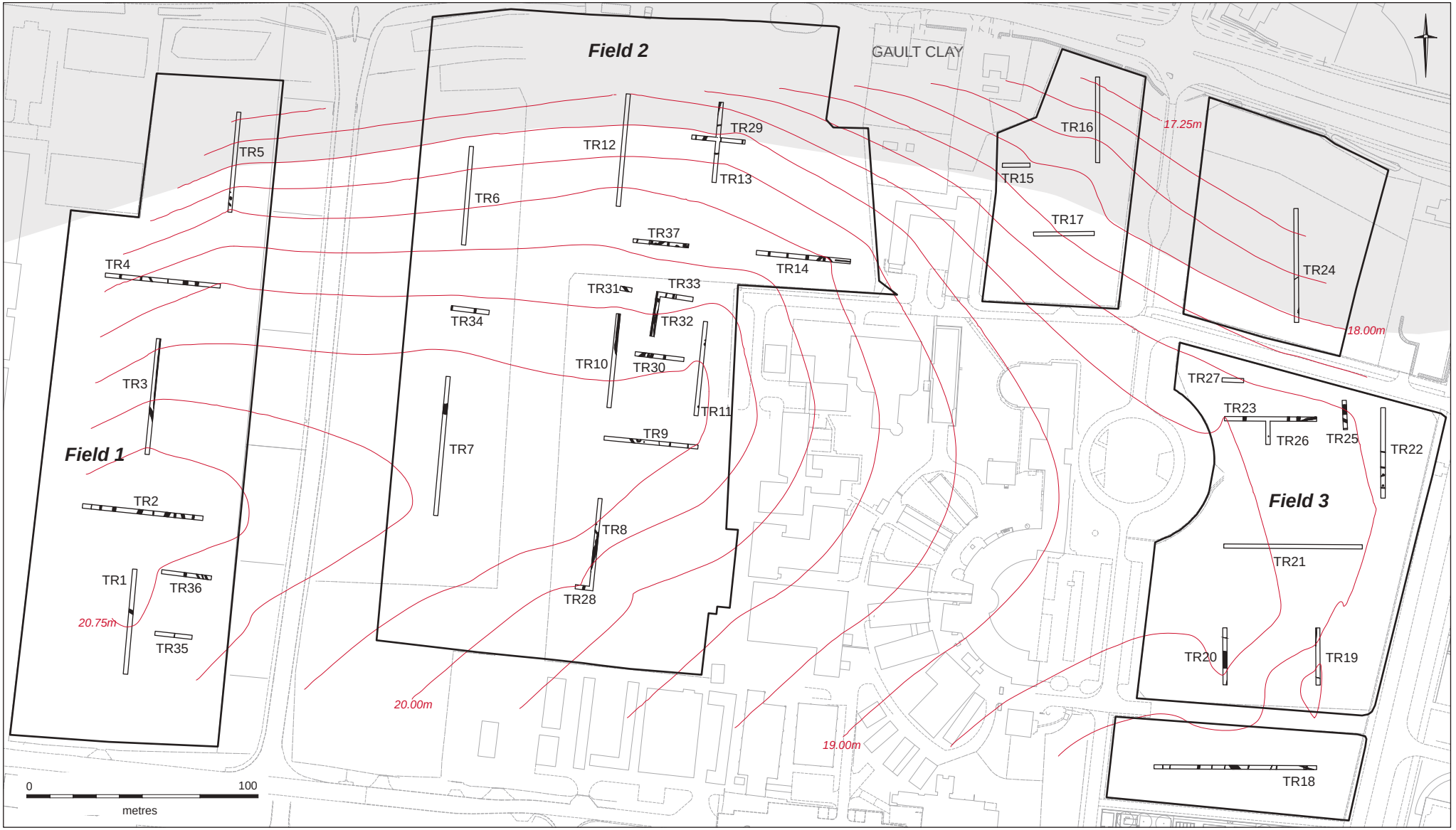

Figure 2. Site topography and solid geology

The Romano-British phase of occupation was limited to a ditched fieldsystem established upon the south-facing slope. Three fields each covered *c.* 0.6 ha and a small amount of Early Roman fineware pottery was recovered from their slight ditches as well as from a small enclosure close to the south-western limits of the excavation and which possibly attests to the fringes of a west-lying settlement. To the east, a somewhat larger ditch crossed the valley, marking perhaps a similar boundary to that already defined in the Iron Age.

On the south side of the valley floor was a trackway that has been equated with the Medieval 'Coton' or 'Sheepcote Way'. Traces of adjoining field boundaries, plus abutting plough-furrow, were also noted, and the south-facing slopes were covered by medieval or post-Medieval agricultural ridge and furrow.

The Medieval landscape of the PDA was encompassed by strips of land known as the West Fields of Cambridge (Hall & Ravensdale 1976), and aerial photography has identified additional traces of ridge and furrow cultivation in Fields 1 and 2 of the current investigation. This illustrates furlongs evenly distributed upon a broadly north-south axis (Alexander 1996: 3). Here the course of Madingley Road marked one of three major divisions of the West Fields.

The Enclosure Map of 1805 shows the fields of the PDA to belong to Merton College of the University of Oxford, and Baker's Map of 1830 continues to depict the PDA as strips of land unencumbered by buildings. Ordnance Survey (OS) maps of the 1880s positon buildings of Merton Hall Farm erected on the south side of Madingley Road west of today's J.J. Thompson Avenue. Additional buildings probably connected with the farm emerge in the 1903 OS map in the northwest corner of Field 2, and south of Merton Hall Farm in the 1920s OS maps, and vestiges of these buildings remain today. Planning for a Veterinary School on the site was begun in 1947 with building works ensuing in 1950. Merton Hall Farm was appropriated by the School in 1951 and adapted for the purposes of animal health, with the main buildings and hospital of the School being completed in 1955 (Figure 3). By the 1970s considerable southward expansion of the buildings of Merton Hall farm was established; these were demolished by 2002, but the foundations extend into the east side of Field 3 of the current investigations.

Methodology

In advance of this project a geophysical survey was carried out in March 2015 by Bartlett-Clark Consultancy. There were limited geophysical anomalies within the survey results. Marked on Figure 4 in red, these included a possible circular ditched gully and related linears. Strong geophysical responses (indicated by mixed black and white linear or stippled anomalies) were aligned with known features of modern origin, namely underground services, fencing and ferrous – probably agricultural – objects likely deriving from the ploughsoil.

In total, thirty-seven trenches (Figure 7) were excavated using a 360° rubber-tracked excavator with a 1.85m wide toothless ditching bucket under the supervision of an experienced archaeologist. Trenches were excavated to a level where archaeological features were visible; these were planned and hand excavated. Data sheets were

completed for all of the trenches to record section profiles and geological variances and were accompanied by plans at a scale of 1:50 of all archaeological features and the recording of excavated features with sections drawn at a scale of 1:10, complimented by digital photography. The CAU-modified version of the Museum of London recording system was employed throughout with all excavated stratigraphic events assigned feature numbers (F.#) and all contexts assigned individual numbers ([context #]). The PDA was fixed to the Ordnance Survey (OS) grid and a contour survey undertaken with a Global Positioning System (GPS). All trenches were reinstated upon completion of the excavation programme.

Information detailing the character of the trenches (e.g. data sheets, digital photography and survey record) has been catalogued together within an archive following procedures outlined in MoRPHE (English Heritage 2006). This is being stored with the processed material record at the CAU offices, under the site code VET15.

Acknowledgements

The project was undertaken on behalf of the University's Estates Management and we are grateful to Heather Topel for her co-operation throughout. Andy Thomas of the Historic Environment Team at the Cambridgeshire County Council oversaw and monitored the development control of the investigation. At the Cambridge Archaeological Unit, Christopher Evans was the Project Manager, and the fieldwork was carried out by Marcus Brittain with the assistance of Giuseppina Mutri, David Matzliach, Sabrina Salmon and Martin Toresson; machine earthmoving was administered by Lattenbury Services. The site was surveyed by Donald Horne, Tim Lewis, Jane Matthews and Jon Moller, and the report graphics were produced by Vicki Herring. We are grateful in particular to Sam Stevens of the Department of Veterinary Medicine for her help throughout the fieldwork.

Figure 3. Aerial photograph, looking northeast, of Vetenery School on it’s opening, 1955

Figure 4. Trench plan with geophysical survey results

Figure 5. Trench plan with excavated features and phasing projections

RESULTS

Archaeological features, totalling 56, were identified in all but nine trenches (Tr. 6-7, 12, 15-17, 19, 27, 35). These are quantified in Tables 2 and 3. Fields 1-3 varied in their relative density of identifiable archaeological features and deposits (Table 4); these are outlined by period below.

Number of:	Archaeological Feature
Features Recorded	56
Excavated Features	40
Excavated Contexts	96

Table 2: Feature totals

Feature category	Total	%
Linear	31	55.5
Pit	14	25.0
Furrow	4	7.0
Posthole	2	3.6
Wall foundation	2	3.6
Drain	1	1.8
Natural hollow	1	1.8
Tree throw	1	1.8
Total	*56*	*100*

Table 3: Feature frequency

Field	No. of Trenches	No. of Recorded Features	% of Total Recorded Features	Prehistoric	Roman	Med/post-Med
1	7	16	28.6	8	2	5
2	17	27	48.2	19	6	2
3	13	13	23.2	3	2	8
Total	*37*	*56*	*100*	*30*	*10*	*15*

Table 4: Total number of trenches and features by area

A total of 401 (4537g) artefacts were recovered from cut features (Table 5). The detail of these features is outlined below by order of feature category; a complete overview of each trench is provided in the Appendix.

Material	Quantity	Weight (g)
Animal Bone	224	860
Brick/Tile	3	79
Burnt Stone	15	2669
Glass	1	23
Metalwork	1	2
Pottery	136	761
Shell	7	18
Tobacco Pipe	1	2
Worked Flint	13	123
Total	*401*	*4537*

Table 5: Total number of finds by category

Prehistoric

Earliest prehistoric activity was evinced by a small amount of worked flint (see Beadsmoore, below) found either as residual intrusions within later features or, in the case of **F.5** in TR18, from subsoil deposits caught within hollows over the solid geology (a similar hollow was identified in Tr.7 & Tr.20). In the absence of diagnostic specimens, a broad timeline of the Neolithic and Bronze Age is likely for these items.

Three sites of Early to Middle Iron Age date were recorded. These produced 664g of pottery that represents 87.3% of the total recovery (by weight) for the PDA. Of this total, 87% derived from Trench 30. Pottery dating to the Iron Age was also recovered from a single linear feature in Site 3 (Field 1), although the security of this finding as evidence for an Iron Age date for this and related linears in Field 1 is not deemed as reliable.

Site 1 - Located in Field 3, Site 1 comprised a single ditch (**F.2**) and a posthole. The ditch (F.2) was observed as passing through Trenches 23 and 25 and just south of an east-west alignment, and appeared to terminate somewhere before Trench 26. Two slots were excavated, each confirming the ditch's width of 1.0m and a depth of between 0.53m and 0.68m. Silting of the ditch was represented by a lower fill of yellowish-brown sandy-clay silt – [3] and [23] – sealed by dark grey clayey silt speckled with charcoal flecks and containing 8g of pottery: [4] and [22]. The posthole (**F.30**) was situated in direct alignment with F.2 to the west of its terminus. Circular in plan with a diameter of 0.35m and sharp concave sides to a near flat base at 0.1m depth, the posthole contained a single dark silt fill [69] with occasional charcoal flecks.

Site 2 - A series of linear and curvilinear ditches with associated pits and postholes were investigated in Field 2 at the centre of the PDA (Figure 6) over a north-south distribution across Trenches 8-11, 13 and 28-33 (Table 6) covering upwards of 1.48ha (14800sqm). The core of Site 2 was investigated by Trenches 9-11 and 30-33, in which shallow, tightly set and curving linears (**F.17**, **F.22**, **F.27**, **F.29**, **F.31** & **F.37**) illustrate a dense hub of activity of at least two phases. None of the linears exceeded depths of 0.35m, each displaying a profile of sharp sloping sides towards a near flat base filled with a single deposit mainly of mid greyish brown silt. An exception here was F.27 that contained a very dark, nearly black deposit of charcoal rich silt from which 439g of pottery was recovered, with 422g of animal (cow and sheep/goat) bone and at least two possible stone 'rubbers'. By comparison, the finds retrieval from the remaining 'core' features was of moderately low density. It is difficult to posit a clear picture of the nature of the linears within this 'core' and their relation to one another, but it is nevertheless possible to suggest a layout composed of two or three gully-defined structures bounded by a line of ditched enclosure (Figure 6). A two-phase sequence may be determined from the relationship of features either in section or in plan. This was most clearly illustrated by the cutting of an oval pit (F.28) by the curve of linear F.27. In essence the pit was a thin slot of 0.25m by 1.45m that produced no finds, and yet was excavated to a depth of 0.4m. This too contained a fill of mid greyish brown silt. To the north of this, in Trench 32, F.27 again appeared to cut the curving linear F.29 (this was clearly observed in plan rather than an excavated section), and in Trench 10 linear F.22 was either enlarged along its north arm or was cut afresh by a pit (F.23), either way displaying a two-stage sequence of events.

Additional small pits filled with near black, charcoal-infused silt were identified across the east and south of the Site 2 core in Trenches 8-9 and 11: **F.17**, **F.38-40** and **F.42-43**. One of these was investigated (F.17), issuing an oval plan, 0.3m by 0.5m, and a shallow depth of 0.1m Although no finds were forthcoming they are most likely contemporary with the Iron Age phase of activity here. Similar features were identified in two trenches opened to evaluate the archaeological potential of the New Stable Block in the southeast corner of what is now identified as Site 2 (Lucas 2000). No signs of Iron Age activity were noted during this stage of investigation, and the pits, postholes and related linears were pronounced as Medieval in date. It is possible now to perhaps view these as part of a broader spread of features connected with the Iron Age phase of activity, thus extending the site's southeast distribution.

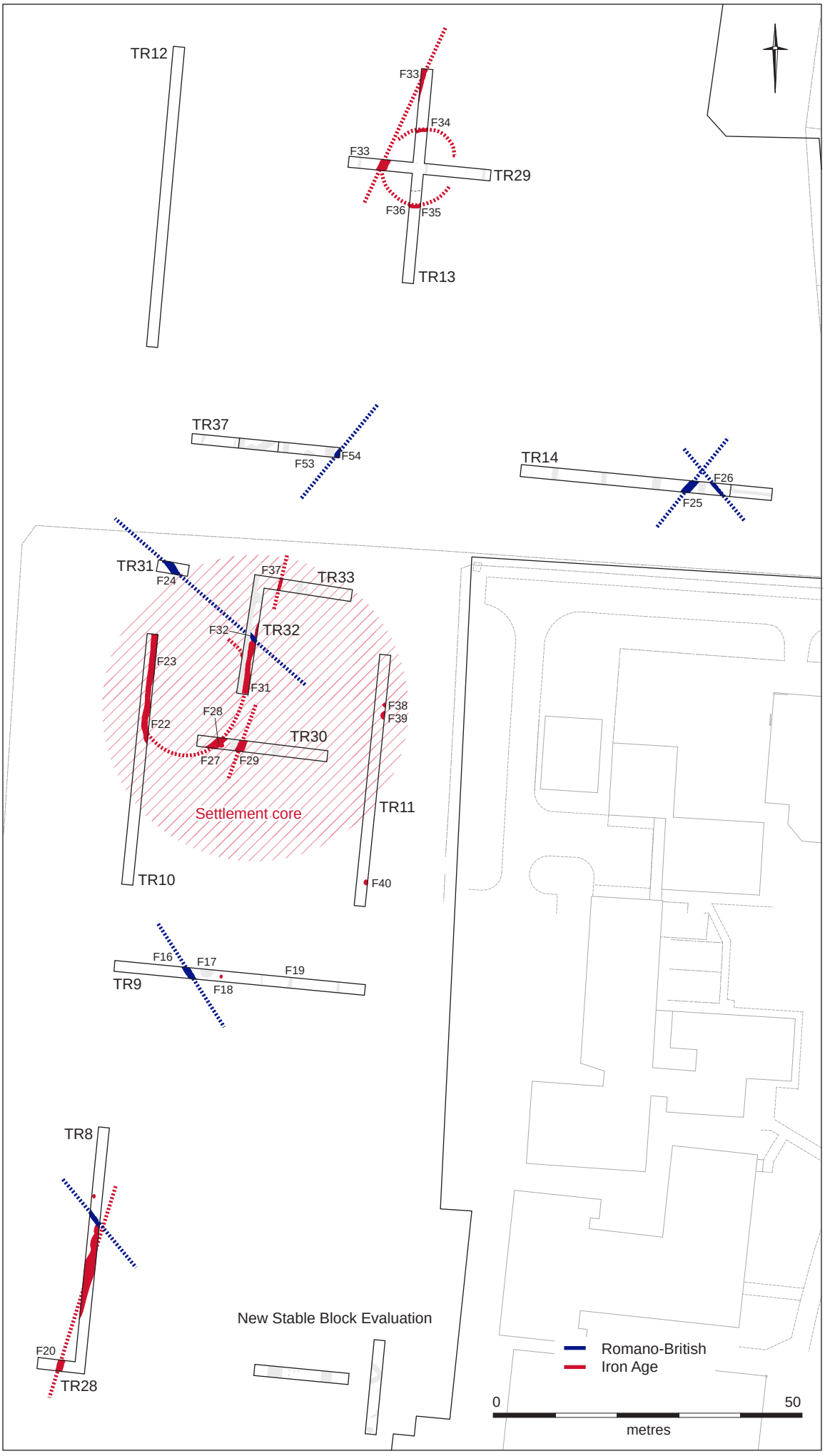

Figure 6. Early to Middle Iron Age settlement in Field 2 (Site 2)

The southern extent of Site 2 was defined in Trenches 8 and 28 by a linear (**F.20**) oriented north-northeast to south-southwest. This was more substantial than the curvilinears of the Site 2 core to the north, with the excavated slot displaying a depth of 0.56m at a width of 1.1m that looked to increase in plan as it stretched northward and where it appears to terminate beyond Trench 8. The linear was filled primarily by moderately firm light brownish grey silty clay with occasional small sub-angular stones [53] that overlay a basal fill, approximately 0.1m thick, of soft grey silty clay with frequent gravel inclusions [54]. Finds included bone of both sheep and cow, and the base of the linear had struck the watertable. A similar linear (**F.33**) was investigated in Trenches 13 and 29, set upon the same alignment as F.20. This was 1.27m wide and cut to a depth of 0.4m containing two fills from which a small assemblage of sheep bone and Iron Age pottery was collected. The upper fill [75] consisted of moderately stiff dark grey silty clay infused with occasional flecks of charcoal and small sub-angular stones; this capped a deposit of stiff mid to dark yellowish brown gritted sandy clay [93]. Together, to the north and south of Site 2, F.33 and F.20 marked the western limit of the Iron Age feature distribution, and they each traversed a slight landfall from the Site 2 core. Of particular note is that F.33 crossed both the diamict till and Gault Clay geological boundaries. Here, also positioned upon this geological boundary horizon, two linears were noted as curving slightly towards one another in Trench 13. These were initially thought to be a part of a single curvilinear gully, perhaps delineating a small circular structure, but this was problematized by a lack of return through the Trench 29 cross-trench. Even if these are separate features, they may nonetheless be structurally related. The southern linear (**F.35**), stretched east-west across the trench, and curved northwards. This was cut to 0.3m depth and contained a single fill of moderately firm mid grey silt [79] with no finds. Eight metres north of F.35 was **F.34**, also running east-west from each side of the trench and with a south oriented curve. The dimensions of this linear were near to identical with those of F.35 (0.44m wide and 0.2m deep) and contained slightly darker and firmer (but equivalent) grey silt [77], again with a lack of finds; however, this was cut by either a linear terminus or a pit (**F.36**), 0.63m wide by 0.4m deep. This contained two fills: a clayey band of silting [94] overlain by moderately firm mid greyish brown clayey silt with charcoal flecks [81], Iron Age pottery and a fragment of sheep/goat bone.

Feature no.	Trench	Shape/ Orientation	Length/ Width (m)	Depth (m)	Finds
17	9	Small oval pit	0.5/0.3	0.1	-
20	8,28	Linear oriented NE-SW	1.1	0.56	BN
22	10	N-S Linear, curving east. Cut by F.23	0.68	0.12	-
23	10	N-S Linear or pit cutting F.22	0.56	0.45	PT,BN,FL
27	30	Linear oriented NE-SW, curving west. Cuts F.28	1.35	0.27	PT,BN,FL,BS
28	30	Oval pit cut oriented E-W. Cut by F.27	1.45/0.25	0.4	-
29	30,32	Linear oriented NE-SW	1.05	0.35	PT,BN
31	32	Linear oriented NNE-SSW. Cut by F.32 (Roman ditch)	0.95	0.25	PT,BN
33	13,29	Linear oriented NE-SW	1.27	0.4	PT,BN,BS
34	13	E-W Linear; possible ring gully. Cut by F.36	0.44	0.2	BN
35	13	E-W Linear; possible ring gully.	0.46	0.3	-
36	13	E-W Linear; possible ring gully.	0.63	0.4	PT,BN

37	33	Linear oriented N-S. ?as F.31.	0.4	0.15	-
38	11	Unexcavated pit	-	-	-
39	11	Unexcavated pit	-	-	-
40	11	Unexcavated pit	-	-	-
42	8	Unexcavated pit	-	-	-
43	8	Unexcavated pit	-	-	-

Table 6: Summary of Site 2 Iron Age features

It is clear that the core of Site 2 represents a settlement of Iron Age date comprising of habitational structures, pit storage and/or disposal, and clearly defined boundary lines at least on its west aspect. It is at present less clear as to the role of the possible structural features identified in Trenches 13 and 29 to the north of the core settlement. This does appear to stand apart from the main area of activity, perhaps separated by some 25.0m and on the cusp of the downward slope to the Gault Clay; as indicated by Law below, this cluster would though seem to be of somewhat earlier date (Late Bronze/earliest Iron Age) than the main site.

Site 3 - Identified in Field 1 (Figure 7), two separate parallel lines of shallow ditching (Table 7) amounting to a total of five linears and crossing Trenches 3-5 and 36 were originally assumed to belong to the Romano-British fieldsystem. Two factors argue in favour of these instead being of earlier attribution. The first is their misalignment to the Romano-British fieldsystem that was set upon a northwest-southeast axis; by contrast the five linears were positioned on a north-northwest to south-southeast axis. The second factor raising doubt in a Romano-British date is the recovery of a single rim sherd (broken into three pieces) of Early to Middle Iron Age pottery from F.11 in Trench 12. What these instead appear to represent are two lines of a trackway spaced *c.* 11m apart, the origin and destination of which are not certain. The north arm of the trackway consisted of an unexcavated linear **F.56**, 0.6m wide, with the south arm distinguished by two or three tightly set parallel linears, **F.11/12/50** (forming a single ditch length), **F.44/45/51** (also forming a single ditch length) and **F.52**, where F.11/12/50 was shown to cut F.44/45/51. All linears contained a single fill of moderately firm mid yellowish brown silty clay with occasional small sub-angular stones, and each was comparable in their dimensions, with widths of between 0.55m and 0.75m, and depths of 0.11m to 0.15m. The intercutting nature of these linears is suggestive of maintenance of the south arm of the trackway.

Field	Trench	Feature no.	Orientation	Width (m)	Depth (m)	Finds	Notes
1	2,3,36	11/12/50	NW-SE	0.68-0.75	0.13-0.15	PT	-
1	2,3,36	44/45/51	NW-SE	0.55-0.7	0.11-0.14	-	-
1	36	52	NW-SE	-	-	-	Unexcavated
1	4	56	NW-SE	0.6	-	-	Unexcavated

Table 7: Summary of Site 3 possible Iron Age features

Romano-British

Nine features have been assigned to the Romano-British phase of activity (Table 8) on account of a small pottery assemblage and the results from previous stages of investigation at High Cross and Vicar's Farm. All of these features are linears that form ditched field boundaries mainly across Fields 1 and 2 (Figures 6 & 7), with a single linear in Field 3 possibly connected to this phase. For ease of presentation the fields are discussed here separately, although it is important to note that the linears observed in Field 1 encompass Site 3.

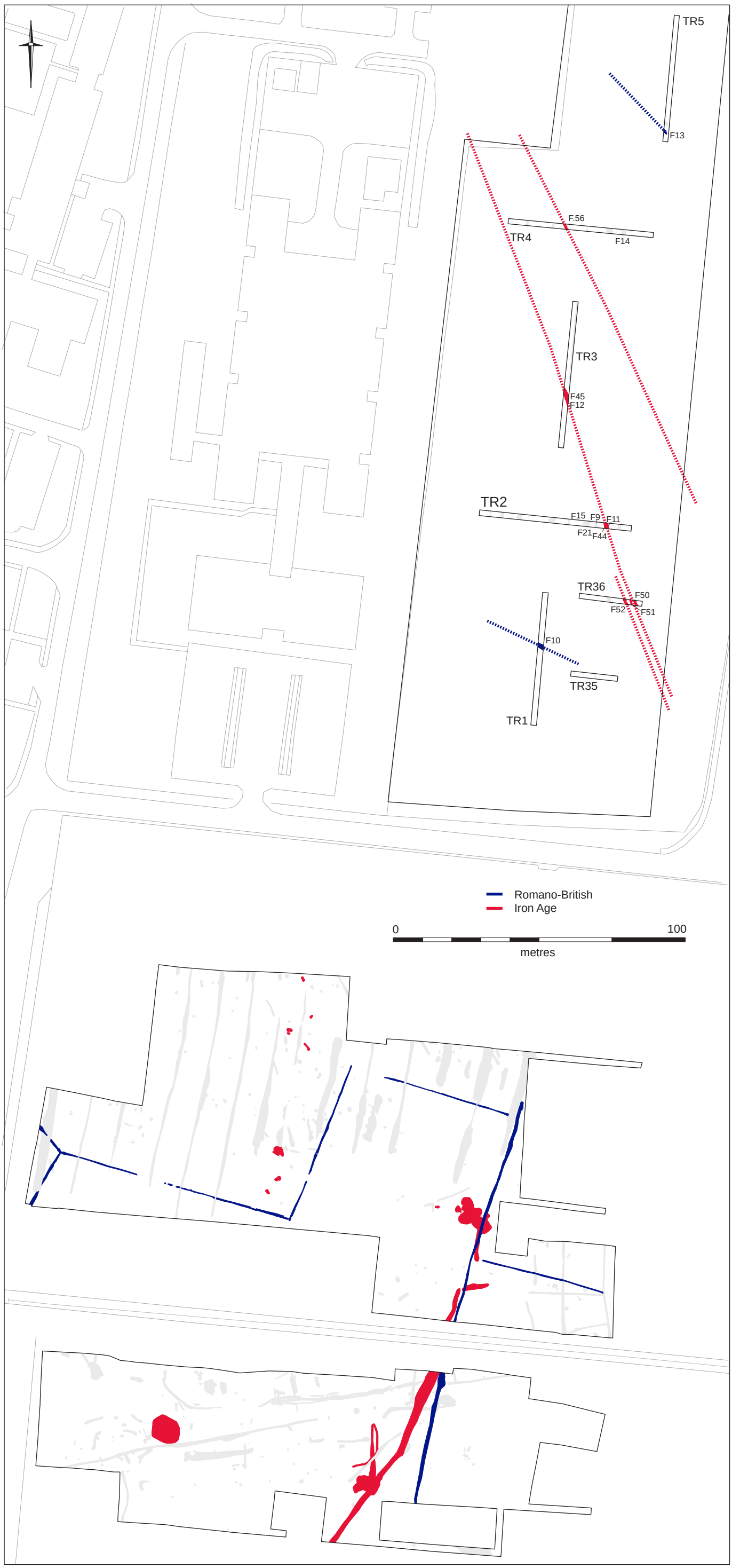

Figure 7. Detail of early field system (Site 3) and the High Cross site

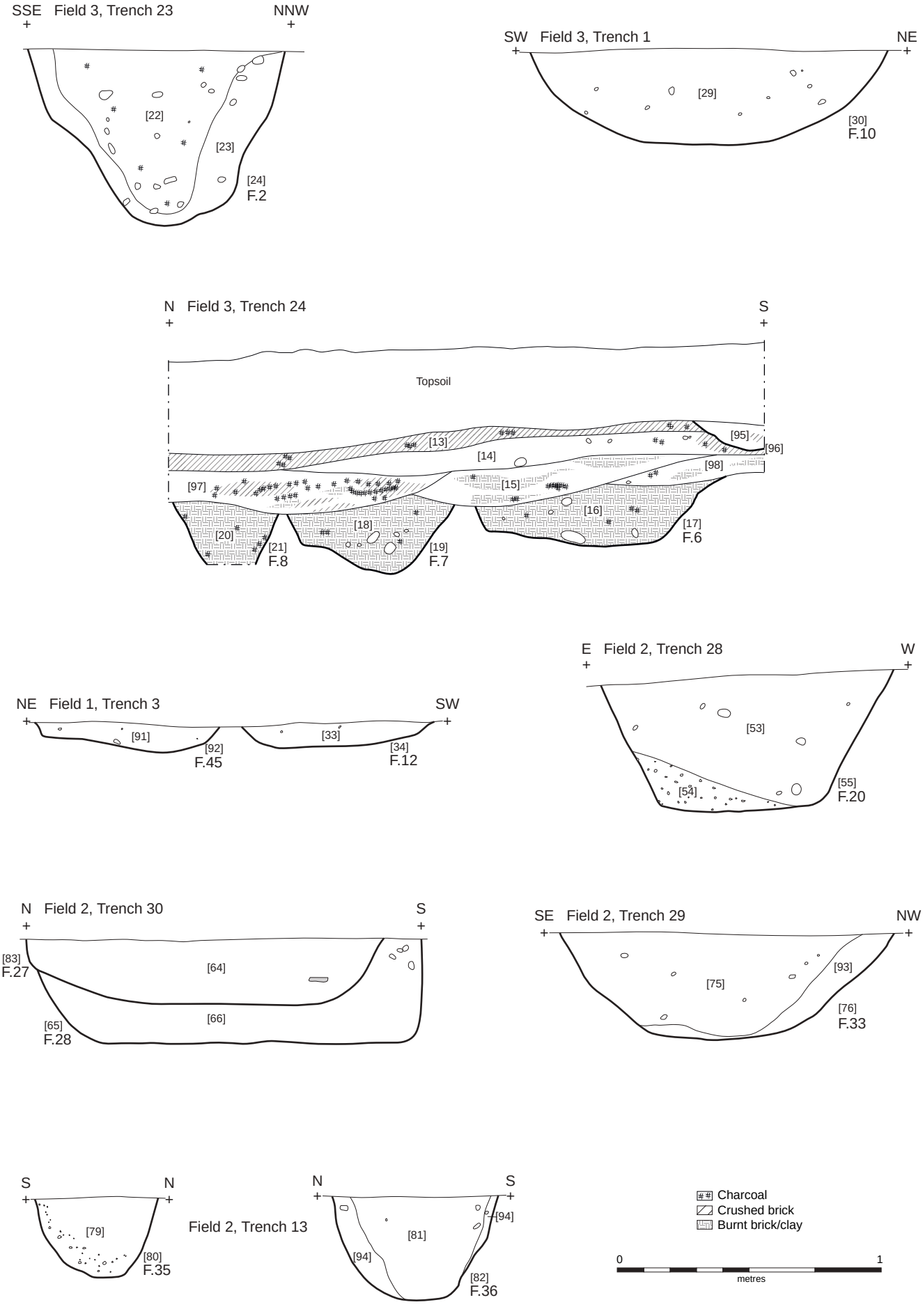

Figure 8. Selected sections

Field	Trench	Feature no.	Orientation	Width (m)	Depth (m)	Finds	Notes
1	1	10	NW-SE	1.36	0.36	FL,BS	-
1	5	13	NW-SE	0.58	0.17	-	Terminus
2	9	16	NW-SE	0.6	0.16	-	-
2	14	25	NE-SW	1	0.2	-	-
2	14	26	NW-SE	0.44	0.13	-	-
2	31,32	24/31	NW-SE	0.7-1.2	0.2-0.25	PT,FL	-
2	32	41	NW-SE	-	-	-	Unexcavated
2	37	54	NE-SW	-	-	-	Unexcavated
3	18	3	NW-SE	0.32-0.52	0.11-0.21	FL	-

Table 8: Summary of Romano-British linears

Field 1 (Site 3)

Consisting of two linears, F.10 and F.13, the character of the Romano-British ditched fieldsystem here is an extension of that first identified in the High Cross site to the southwest, namely on a northwest-southeast orientation. This was dated to the Early Roman (1st–2nd centuries AD) period. **F.10**, located in Trench 1 to the south of Field 1, was cut to a width of 1.36m with a sharp profile of concave sides and slightly rounded base at a depth of 0.36m. This was filled with a single deposit of moderately firm mid orangey brown clayey sandy-silt with rare charcoal flecks [29] and a single fragment of heat-affected stone. Trench 35 was opened in order to ascertain the southeast continuation of F.10, but it appears unfortunately to have been cut short of its projection, which was therefore not determined. **F.13** was the rounded terminus of a linear that ran along the north edge of the diamict geology immediately before its break on the landfall to Gault Clay. Smaller than F.10, this was 0.58m in width and 0.17m in depth.

Field 2 (Site 2)

Six linears (**F.16**, **F.24-26**, **F.41** & **F.54**) oriented at right angles on a northwest-southeast axis were identified in five trenches in Field 2: Numbers 9, 14, 31-32 and 37. These each contained a single fill of firm mid to light orangey brown gravelly clay, and were cut to a width of between 0.4m and 1.2m at a depth of 0.13-0.25m. Four sherds of Early Roman (1st–2nd centuries AD) pottery from three different vessels were recovered from one of these – F.24 – which was also found to cut one of the Iron Age ditches (F.32) in Trench 32. No additional relationships could be ascertained.

Field 3

A single linear (**F.3**) was observed in Trench 18 oriented northwest-southeast in the southeast corner of Field 3. Two slots were excavated to reveal a sharp concave cut of between 0.32m and 0.52m width varying to a depth of 0.11m to 0.21m. This contained a single fill of firm mid brown clayey silt and occasional gravel with no finds.

Medieval and Post-Medieval

Sixteen features of Medieval or post-Medieval date were recorded, although finds only of post-Medieval date were identified.

Across each of Fields 1-3 was a north-south swathe of agricultural furrows, regularly spaced between *c*. 6-8m, of which four were excavated: **F.9**, **F.14-15** and **F.19**. These ranged between 0.4m and 1.33m in width and 0.07m to 0.15m in depth, the variation reflecting the variation in furrow survival across the PDA. Finds from these features were predominantly mid-19th century in date, although a spread of 18th century pottery was also observed (though not collected) in the topsoil over the west half of Trench 2 in Field 1. Ceramic drains were broadly found to lie on a similar alignment, although most were filled with sediment and were evidently non-functional. A single cut containing a ceramic drain was formally tested and recorded as **F.21** in Trench 2; this, however, may have been connected with foundations (**F.47** and **F.48**) for farm buildings constructed in the 1970s and demolished in the early 2000s. A number of other modern services and features related to these foundations were recorded: **F.1** and **F.46-48**.

The north paddocks of Field 3 were unusual in that the present land surface was shown in Trenches 15-17 and 24 to be largely artificially built-up ground with layers of imported clay and rubble overlying the original ground surface to a thickness of up to 0.6m in the north half of Trench 16 (a similar, though shallower, profile was observed by Hutton [2010] during trenching prior to the construction of student accommodation south of Tr.17). Material recovered from the rubble layers was modern, thereby confirming landscaping as a feature of the construction of the Veterinary School in the 1950s. These did, however, conceal the horizons below, although the only features uncovered were three sub-square or rectangular pits in Trench 24: **F.6-8**. These were up to 0.3m deep and approximately 0.5m to 0.9m wide and were filled with a compact deposit of burnt and degraded red brick. Baker's Map of the area for 1830 depicts a 'Brick Kiln' between the north side of Madingley Road and Gravel Hill Farm, and it is likely that these three pits relate to similar production activities.

Figure 9. Selected photographs: F.27 and F.28 (top left), F.34 and F.36 (top right), F.29 (bottom right), and Trench 32 (bottom left)

FINDS AND ENVIRONMENTAL EVIDENCE

Environmental Assessment - Val Fryer

Six samples were collected for the evaluation of the content and preservation of the plant macrofossil assemblages from fills within five ditches (four Iron Age, one Romano-British).

The samples were bulk floated by the CAU and the flots were collected in a 300 micron mesh sieve. The dry flots were scanned under a binocular microscope at magnifications up to x16 and the plant macrofossils and other remains noted are listed in Table 9. Nomenclature within the table follows Stace (2010) for the plant remains and Kerney and Cameron (1979) for the mollusc shells. All plant macrofossils were charred. Modern roots, seeds and arthropod remains were also recorded.

Results

Plant macrofossils are generally scarce, although sample 5 (ditch F.27) does contain a moderate density of charcoal/charred wood fragments. Other macrofossils include occasional wheat (*Triticum* sp.) grains, seeds of brome (*Bromus* sp.) and indeterminate small grasses (Poaceae) and a spike-rush (*Eleocharis* sp.) nutlet. Most are quite poorly preserved. Other remains are also scarce but include fragments of black porous and tarry material, small pieces of coal and small mammal/amphibian bones, all of which are likely to be intrusive within the features' fills.

Although specific sieving for molluscan remains was not undertaken, shells of terrestrial and marsh/freshwater slum snails are present within all but sample 1. However, as most retain excellent colouration as well as delicate surface structuring, it is considered most likely that all are intrusive within the features from which the samples were taken.

The recovered assemblages are very small and sparse, and it would appear that many of the excavated features have suffered some degree of post-depositional disturbance/bioturbation. The few remains which are recorded are almost certainly derived from scattered detritus of either domestic or agricultural origin. However, the paucity of material probably suggests that the ditches were entirely peripheral to any main focus of activity.

On the basis of the current assemblages, it is difficult to make recommendations for a future sampling strategy should further interventions be planned. However, as the area does include a known Iron Age settlement as well as some evidence for later activities, it is suggested that any future work should include the taking of additional samples (preferably of 40-60 litres in volume) from any archaeological features which are both dated and well-sealed. Analysis of such samples could help to pinpoint specific settlement foci as well as identify which particular activities were occurring on or near the site during the Iron Age and Roman periods.

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**
Context No.	[3]		[81]	[61]	[64]	[68]
Feature No.	**F.2**		**F.36**	**F.24**	**F.27**	**F.29**
Date	Iron Age		Iron Age	Romano-British	Iron Age	Iron Age
Plant macrofossils						
Triticum sp. (grains)					x	
Cereal indet. (grains)					xfg	
Bromus sp.					x	
Fabaceae indet.				x		
Small Poaceae indet.			x		x	x
Eleocharis sp.					x	
Charcoal <2mm	x	x	x		xxx	x
Charcoal >2mm			x	x	xx	
Charcoal >5mm			x		x	
Charcoal >10mm					x	
Charred root/stem			x		x	
Indet. seeds			x			x
Other remains						
Black porous 'cokey' material	x		x	x	x	x
Black tarry material		x	x			
Bone					x	
Small coal frags.	x		x	x		
Small mammal/amphibian bones					x	
Mollusc shells						
Woodland/shade loving species						
Acanthinula aculeata						x
Aegopinella sp.						x
Carychium sp.					x	x
Clausilia sp.					xcf	xcf
Oxychlius sp.						x
Trichia striolata					x	
Vitrea sp.						x
Zonitidae indet.					x	
Open country species						
Pupilla muscorum						x
Vallonia sp.		x		x	x	x
V. excentrica			xcf			
V. pulchella				xcf		
Vertigo pygmaea				x	x	x
Catholic species						
Cochlicopa sp.					x	x
Trichia hispida group			x	x	x	x
Marsh/freshwater slum species						
Anisus leucostoma						x
Lymnaea sp.			x		x	
Sample volume (litres)	**10**	**10**	**15**	**15**	**16**	**15**
Volume of flot (litres)	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
% flot sorted	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 9. Summary of Environmental data. (Key: x = 1 – 10 specimens, xx = 11 – 50 specimens, xxx = 51 – 100 specimens, fg = fragment, cf = compare, IA = Iron Age, Rom = Romano-British).

Animal Bone - Vida Rajkovača

A small faunal assemblage was recovered totalling 224 (860g) bone fragments. 144 fragments (645g) were recovered by hand and the remainder (80 fragments/ 215g) collected from heavy residues of the processed environmental bulk soil samples.

Following the zooarchaeological assessment, 49 assessable specimens were recorded from the hand-excavated slots, with just under half being assigned to species (23 specimens, *c*. 47%). A further 27 specimens were recorded from the heavy residues, only four of which were possible to identify to species.

The assemblage was recovered from a small number of contexts assigned to linear features or ditches. A number of these were Iron Age in date, although most are undated. Overall, the bone was very fragmented and the preservation was moderate to quite poor.

The zooarchaeological investigation followed the system implemented by Bournemouth University with all identifiable elements recorded (NISP: Number of Identifiable Specimens) and diagnostic zoning (amended from Dobney & Reilly 1988) used to calculate MNE (Minimum Number of Elements) from which MNI (Minimum Number of Individuals) was derived. Identification of the assemblage was undertaken with the aid of Schmid (1972) and Hillson (1999) along with reference material from the Cambridge Archaeological Unit. Where possible, unidentifiable fragments were assigned to general size categories (this information is presented in order to provide a complete fragment count), and butchery, pathology and gnawing were noted. Ageing of the assemblage employed both mandibular tooth wear and fusion of proximal and distal epiphyses. The ageing data of Silver (1969) was used to assess epiphyseal fusion of the post-cranial elements. The analyses of tooth eruption and mandibular toothwear stages were recorded following Payne (1973) for ovicapra and Grant (1982) for cattle and pigs.

Representation of Species

The only two identified species were cow and sheep/ goat, recorded in similar numbers (Table 10). This relatively even representation was reflected in size-category NISP counts. Skeletal element count showed a slight prevalence of mandibular elements and teeth, though a cow radius and ulna demonstrated that remains of joints of higher meat value were also represented. Results from the three identified sites may be summarised in the following way:

Site 1: A single cow ulna fragment from F.2.
Site 2: This generated more than half of the assemblage.
Site 3: Only four fragments of bone, with one being identified as sheep/ goat.

Bone from Heavy Residues

Material came from three samples, recovered from the area of dense archaeological occupation in the Field 2/ Site 2. Cow was the only species positively identified, represented by loose tooth, calcaneus and metapodial fragment (Table 11).

Site	**3**		**2**							**1**	
Trench	Tr.3	Tr.2	Tr.28	Tr.10		Tr.30	Tr.30	Tr.32	Tr. 13,29	Tr. 13	Tr. 23	
Feature	**F.12**	**F.15**	**F.20**	**F.23**		**F.27**	**F.29**	**F.31**	**F.33**	**F.36**	**F.2**	*Total*
Context	[33]	[39]	[53]	[58]	[59]	[64]	[68]	[72]	[76]	[81]	[22]	
Date	nd	nd	nd	nd	nd	Iron Age				nd	Iron Age	
Taxon												
Cow	-	-	1	-	3	3	3	1	-	-	1	*12*
Sheep/ goat	-	1	1	-	1	5	-	-	2	1	-	*11*
Sub-total to species	**-**	**1**	**2**	**-**	**4**	**8**	**3**	**1**	**2**	**1**	**1**	***23***
Cattle-sized	-	-	-	-	-	4	5	1	-	-	-	*10*
Sheep-sized	-	2	5	1	-	2	-	-	2	3	-	*15*
Mammal n.f.i.	1	-	-	-	-	-	-	-	-	-	-	*1*
Total	***1***	***3***	***7***	***1***	***4***	***14***	***8***	***2***	***4***	***4***	***1***	***49***

Table 10. Number of identified faunal species from all features (the abbreviation n.f.i. denotes the specimen that could not be further identified).

Trench	**30**	**30**	**13**
Feature	**F.27**	**F.29**	**F.36**
Context	[64]	[68]	[81]
Date	Iron Age		nd
Taxon			
Cow	4	-	-
Sub-total to species	**4**	**-**	**-**
Cattle-sized	3	-	-
Sheep-sized	8	5	1
Mammal n.f.i.	3	-	3
Total	***18***	***5***	***4***

Table 11. Number of identified faunal species from heavy residues (the abbreviation n.f.i. denotes the specimen that could not be further identified).

An assemblage of this size only allows for quantification and characterisation of species identification; further meaningful assessment is not possible, although it is clear that the potential for the retrieval of a fuller assemblage is likely in the event of further investigations, particularly within Site 2. The presence of domesticates in ditches, most likely of Iron Age date, is in keeping with expected local and period-specific patterns of economy that are heavily reliant on domestic sources of food.

Prehistoric Pottery - Rob Law

A total of 123 later prehistoric pottery sherds with a combined weight of 684g was recovered from twelve evaluation trenches. The material has been assigned to one of three categories according to fabric type (see below): Later Bronze Age to Earliest Iron Age (*c*. 1000 - 600 BC); Early to Middle Iron Age (*c*. 600 - 50 BC) and Later Iron Age / Early Roman (*c*. 50 - AD 50). Small sherds dominate the assemblage with 108 (88%) being classified as small (4cm and under) and 15 (12%) as medium-sized (measuring >4cm and <8cm). The mean sherd weight (MSW) is 5.6g. Most of the sherds show relatively fresh breaks indicating they entered the ground shortly after being broken. A small number of sherds show slight signs of abrasion. All of the sherds, with the possible exception of two from Trench 30 (F.27 [64]) derive from handmade vessels. Amongst the 123 sherds, 18 are diagnostic: 14 rims and 4 base sherds. A small number of these are refitting sherds.

Date				LBA-EIA		EIA-MIA		LIA-E.Rom		Total	
Trench	Feature	Context	Sample	No. Sherds	Wt (g)	No. Sherds	Wt (g)	No. Sherds	Wt (g)	No. Sherds	Wt (g)
2	11	31	-	-	-	3	24	-	-	3	24
10	23	58	-	3	7	-	-	-	-	3	27
10	23	59	-	-	-	1	1	-	-	1	1
13	36	81	-	2	7	-	-	-	-	2	7
23	2	22	-	-	-	3	8	-	-	3	8
25	-	Subsoil	-	-	-	3	9	-	-	3	9
29	33	76	-	6	17	-	-	-	-	6	17
30	27	64	-	19	59	26	353	2	27	47	439
30	29	68	-	-	-	17	39	-	-	17	39
32	31	72	-	2	18	-	-	-	-	2	18
30	27	64	5	3	34	28	72	-	-	31	106
30	29	68	6	5	9	-	-	-	-	5	9
Total				*40*	*151*	*81*	*506*	*2*	*27*	*123*	*684*

Table 12. Quantification of pottery from evaluation trenches.

Fabrics types:
1: Sand and straw / grasses
2: Sand and finely crushed quartz. Small, frequent and well distributed
3: Finely crushed shell and sand. Small, frequent and well distributed
4: Finely crushed shell. Small, frequent and well distributed
5: Sand

Fabric	Description	No. sherds	Period
1	Sand and straw / grasses	39	Later Bronze Age to Earliest Iron Age
2	Sand and finely crushed quartz. Small, frequent and well distributed	1	Later Bronze Age to Earliest Iron Age
3	Finely crushed shell and sand. Small, frequent and well distributed	49	Early to Middle Bronze Age
4	Finely crushed shell. Small, frequent and well distributed	15	Early to Middle Bronze Age
5	Sand	19	Early to Middle Iron Age (inc. Later Iron Age/ Early Roman)

Later Bronze Age/Earliest Iron Age (*c*. 1000- 600 BC)

There are 40 sherds likely to date from between the Later Bronze Age (LBA) to the Earliest Iron Age (Earliest IA). Of these, 39 are tempered with sand and straw (Fabric 1), while a single sherd contains sand and finely crushed quartz (Fabric 2). Two small rim sherds, in a hard black sandy fabric with remnants of straw or grass, are the only diagnostic sherds within this fabric group. Both are crudely formed: one rounded and expanded externally, the other flat and rounded externally. The later carries a single nail impression on the flattened rim. Both originate from small vessels.

Early to Middle Iron Age (*c*. 600 - 50 BC)

There are 81 sherds likely to date from the Early to Middle Iron Age (EIA - MIA): 49 in Fabric 3, 15 in Fabric 4 and 17 in Fabric 5. Amongst them are 10 rim sherds (one from Tr.2 and nine from Tr.30) and four base sherds (all from Tr.30). The rim sherd from Trench 2 is flattened and in Fabric 5. One of the rim sherds from Trench 30, also in Fabric 5, has a round rim, short upright neck and a high rounded shoulder, similar to Brudenell's F3 (2012, Figure 4.1). There are a further seven rounded rim sherds which are slightly expanded externally and all in Fabric 3. Four of these refit to form part of a vessel with a short uptight neck and rounded shoulder. While the edges of these sherds appear relatively fresh, their exterior surface is rather worn. Despite this, some decoration is still visible on each of the sherds and includes diagonal and horizontal scoring along with impressed tools marks- the later forming the outline of a triangle. Four body sherds and two base sherds, in an identical fabric, refit to form the lower section of what appears to be a bowl-like vessel. If these sherds are from the same vessel as the refitting rim sherds, then the vessel is likely to have been a round bodied bowl, similar Brudenell's K3 (*ibid*.). The remaining rim sherd has a crudely flattened rim, rounded externally, which carries diagonal nail impressions. It is in an hard blackened sandy fabric (F.5) The two remaining base sherds, both in Fabric 5, come from a thick-walled urn-like vessel.

Later Iron Age / Early Roman period (*c*. 50 -AD 50)

There a two rim sherds, both in Fabric 5 and from Trench 30 (F.27, [64]), that may belong to a wheel thrown (or wheel finished) vessel and thus more likely to date from the Later Iron Age (Later IA) or possibly the Early Roman period (ER). They have everted tapered lips and concave collars and may belong to the same vessel.

Trench 30 produced the greatest quantity of pottery: 100 sherds weighing 593g or 81% of the total assemblage and 87% of the total weight. The pottery dates from the LBA through to the Later IA/ER period. Of the 100 sherds, 27 (102g) can be assigned to the LBA-Earliest IA; 71 (464g) to the EIA-MIA and 2 (27g) to the Later IA/ER period. In contrast, Trenches 13, 29 and 32 produced only LBA-Earliest IA pottery, while Trenches 2 and 23 (plus the subsoil from Trench 25) only EIA-MIA.

Romano-British Pottery - Francesca Mazzilli

Four small sherds of early Romano-British pottery, *c*. 1st–2nd century AD, representing three vessel types were recorded from a single feature, ditch F.24 [61], in Trench 31 (cat. nos. <40> & <45>). The combined weight of these sherds totalled 10g.

Post-Medieval Pottery - Marcus Brittain

Nine sherds of post-Medieval pottery were collected from Fields 1 to 3 (88g). These are all of mid- to late 19th century date and derive from agricultural furrows, the fill of a service trench and as residual to earlier features. Overall these are consistent with the historical use of the PDA for agriculture.

<6> F.15 [39], Tr.2: Five sherds of 19th century ceramic and stoneware pottery, weight 50g. Includes two rim sherds of white china cups and a white china mug handle, with two sherds of mid reddish brown glazed stoneware.

<22> Service trench, Tr.22, weight 2g. A single sherd of mid-19th century blue and white printed white ware ceramic.

<24> F.1 [1], Tr.22, weight 9g. A single sherd of mid reddish brown glazed stoneware.

<41> F.31 [72], Tr.32, weight 19g. A single sherd of mid-19th century blue and white printed white ware ceramic.

Furrow, Tr.14, weight 78g. A near complete pedestal base of a vase or container with blue and white printed floral design along the footing and a 'MILKMAID' stamp on the base. This belongs to a popular mid-19th century design of a country scene in which the main feature is a cow and milkmaid (Coysh & Henrywood 1989: 136).

Worked Flint - Emma Beadsmoore

A total of six (85g) flints were recovered from three features. The material comprised working waste. Feature 2 yielded a secondary flake comparable to the later Neolithic products of discoidal cores. A chronologically non-diagnostic secondary flake was recovered from F.5. Whilst F.10 yielded three secondary flakes and a chunk, all of which were chronologically non-diagnostic.

Worked & Burnt Stone - Marcus Brittain

Stone collected from linear features in Field 1 and Field 2 (Site 2) were submitted for analysis (2669g), of which 838g were heat affected. Three (one burnt and two unburnt) show signs of possible modification, with two having potentially been used as rubbers or polishing implements, and the other perhaps originally serving as part of a quern. There are no stones of an obviously non-local source.

<2> F.10 [29], Tr.1. Unworked small heat affected stone with slightly reddened exterior surface, weight 91g.

<28> F.2 [22], Tr.23. Five non-refitting small heat affected stones with slightly reddened exterior surface, weight 465g.

<34> F.33 [76], Tr.29. One unburnt and unworked stone with two medium heat shattered stones, one with slightly reddened surface, and the other with a polished 'skin' of reddening on the exterior surface and black charring of the interior structure; possible quern fragment.

<37> F.27 [64], Tr.30. Three stones (not heat affected), of which two display a slightly concave or hollowed and polished short surface, perhaps resulting from modification through rubbing/polishing. Weight 1548g. Source of the stones may be of boulder clay as observed at the High Cross site to the south west (Timberlake 2010).

DISCUSSION

The paddocks of the Department of Veterinary Medicine represent an important and previously unexplored gap in the extensive archaeological landscape of the West and North West Cambridge hinterland. The intensity of prehistoric and Romano-British activity upon the gravels overlooking the lower and generally wetter plains composed of Gault Clay has become well established in the picture emerging from detailed and targeted investigation. Whilst it had long been assumed that claylands were a *terra nullius* unattractive to early agricultural communities, this view has since been eroded against a growing body of data returned from now extensive excavation within these contexts across Cambridgeshire and the Midlands more broadly. The expectation prior to the current project, and in part based upon the mapping of the British Geological Survey for the area, was that the paddocks were located upon Gault Clay.

Ambiguities regarding the prehistoric archaeology at the High Cross Site to the southwest of the PDA have been of a particular concern. Here Early to Middle Iron Age (and some Bronze Age) activity provided evidence for colonisation of damp and potentially marginal land that was short-lived and a seemingly failed venture. The degree to which this land could be described as 'marginal' was difficult to estimate in light of the character of the archaeology: a part-enclosure or boundary ditch with large pits and possible wells. The status of the activity was equally difficult to define, either as a settlement, a peripheral activity area or otherwise. Vicar's Farm, to the east, revealed just a single Early Iron Age pit and residual pottery over an area of 3.6ha (Lucas 2001), with but one Middle to later Iron Age ditch in the Nano Fabrication Centre evaluation (Amour 2001). A contrast to this, on gravels raised upon a ridge at the North West Cambridge Site, the so-called Traveller's Rest Sub-site was a small enclosed Middle Iron Age settlement evident in longer-term use (Evans 2015b), with associated Early to Middle Iron Age pits, wells and other activity areas established elsewhere along the ridge (Site V; Brittain 2014). There activities in the lower lying Gault Clay lands were really only intensified in the Late Iron Age (Site VI; Timberlake 2014), which has only presented a further challenge to explaining the dynamics of the locational-context of the High Cross settlement. This may partially be resolved by recourse to Site 2's situation upon a slightly raised, more gravelly till-like ridge running almost directly between High Cross and Vicar's Farm. This appears to consist of a small and partially enclosed settlement, with its northwest and southwest edge defined by at least two broken lines of ditch transecting the ridge from both its north and south landfalls. At its core, a minimum of two circular, gully-defined dwellings and associated pits and other postholes pertain to domestic habitation, with key intersecting features illustrative of an extended duration (and perhaps modification) of occupation. A possible third gully-defined structure was noted on the edge of the Gault Clay, 25m north of the core. As discussed by Law above, this northern cluster would actually seem to be of earlier date (Late Bronze/earliest Iron Age) than the main Middle Iron Age settlement core there; that said, there are also indications of Early Iron Age activity within the southern area.

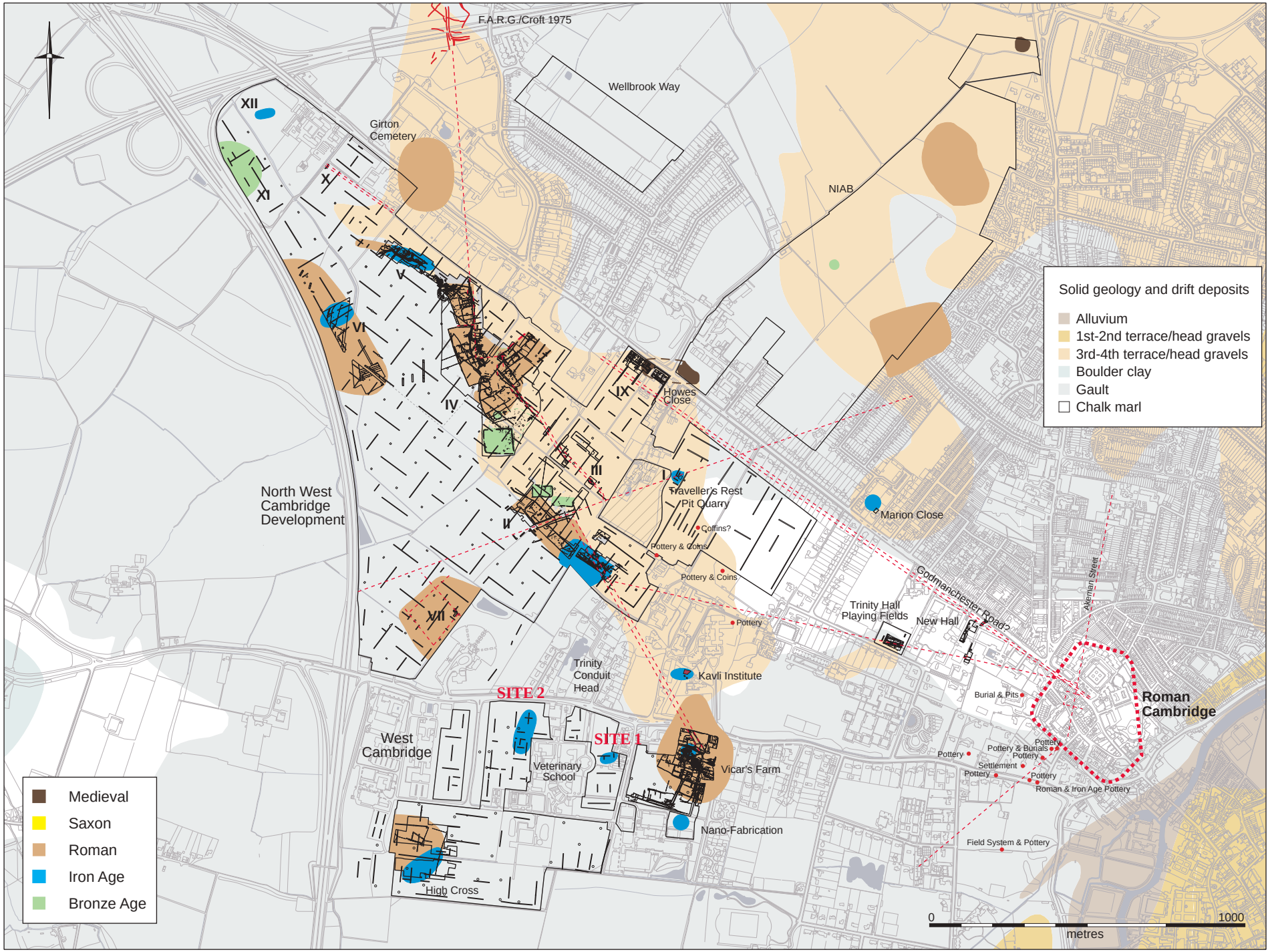

Figure 10. Site distributions

There is a comparative distinction between the Iron Age features of Site 2 and those recorded at High Cross. At the latter there was a complete absence for clear evidence of dwelling structures as such, in spite of a fragment of quern having been recovered from one of the pits. The pits themselves were of moderate size, but evidence for storage was typically scant with any prior use having been subsumed by later refuse discard. Quarrying and well-sinking were also posed as alternative prior usage. Ultimately, non-permanent settlement or seasonal encampment was reasonably suggested to account for these residues (Timberlake 2014: 50-1). Current evidence from Site 2 seems to portray a marked contrast. Here large pits and pit clusters are absent, with smaller discrete pits and possible posthole groupings more readily apparent. The clearer evidence for dwelling structures is also an obvious contrast to High Cross. Common to both, perhaps, are the 'broken' or interrupted ditches marking the limits of activity and running against the break of slope, along the east edge of the High Cross site and along the west edge of Site 2. With these demarcating boundaries effectively defining a threshold to each site, and the possibility of different activities taking place within them, there is scope to consider a complimentary relationship between the two topographically distinct sites.

Any further detailing of the area's later prehistory must await the eventual excavation of Site 2. What does, though, warrant notice is the very recovery of two further Middle Iron Age settlements in the West/North West Cambridge environs. As mentioned, only one settlement proper of the period was found upon the latter's gravel ridge (Traveller's Rest Sub-site; Evans 2015b), with none there found on the low-lying clays. This is in contrast to the number of the area's Late Iron Age settlements; with there also being a high density of Bronze/Early Iron Age settlements, this led to speculation that during the Middle Iron Age there may have been a location shift onto the lighter and obviously highly fertile Kimmeridge Clays to the north of the area, such as found at Longstanton or the southern end of the A14 investigations (Evans, *et al*. 2008; Evans & Standring 2012). The mixed till-like qualities of the West Cambridge's diamict ridge would seem directly comparable to Kimmeridge deposits and this could well explain the occurrence of Sites 1 and 2 settlements here.

Regardless of whether the trackway that appears to run across the length of Field 1 is actually of later prehistoric date, the scale of what seems to be the Romano-British fieldsystem within Fields 1 and 2 is impressive. No evidence of contemporary settlement as such was found in the PDA and it is difficult to know which of the wider area's previously identified settlements it might have related to: High Cross to the south or North West Cambridge's Site VII just north of Madingley Road. Given that the latter was clearly of a high status and possibly even a villa (Evans & Newman 2010), it seems the most likely candidate and that, once again, most of its accompanying arable lands probably lay on the till-like diamict-bed lands rather than the Gault Clays below it (though see Timberlake 2014 for the low-ground Romano-British planting beds recovered to the north at Site VI).

In conclusion, while the fieldwork programme essentially amounts to an 'infilling' exercise of the area's evaluation cover, the recognition of the diamict ridge and the attraction it obviously had for later prehistoric and Romano-British land-use has contributed a crucial element to the understanding of the Cambridge's western hinterlands.

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Appendix: Trench Descriptions

Trench 1		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.28	Features (n=1): F.10. A single linear of possible Roman date.
Avg. Subsoil Thickness (m)	0.13	
Max Depth (m)	0.44	
Trench Length (m)	45.3	
Solid Geology – Gravelly Clay		

Trench 2		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=9): F.9, F.11, F.15, F.21, F.44 Eight Medieval or post-Medieval linears of an agricultural furrow system and possible trackway, with one linear of possible Roman date. West half of trench contained 18th and 19th century ceramic in topsoil.
Avg. Subsoil Thickness (m)	0.15	
Max Depth (m)	0.44	
Trench Length (m)	52.0	
Solid Geology – Gravelly Clay		

Trench 3		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.29	Features (n=2): F.12, F.45 Two linears of possible Roman date.
Avg. Subsoil Thickness (m)	0.16	
Max Depth (m)	0.47	
Trench Length (m)	50.0	
Solid Geology – Gravelly Clay		

Trench 4		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.28	Features (n=5): F.14 Four Medieval or post-Medieval linears of an agricultural furrow system with one linear of possible Roman date.
Avg. Subsoil Thickness (m)	0.18	
Max Depth (m)	0.48	
Trench Length (m)	49.6	
Solid Geology – Gravelly Clay		

Trench 5		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.27	Features (n=1): F.13 Terminus of a linear within a possible Roman fieldsystem; corresponds with landfall and break in geology from gravels to Gault Clay.
Avg. Subsoil Thickness (m)	0.15-.29	
Colluvium (m)	0.24	
Max Depth (m)	0.83	
Trench Length (m)	43.3	
Solid Geology – Gravelly Clay to Gault Clay		

Trench 6		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.24	Features (n=0) No archaeology. Break in geology on landfall from gravels to Gault Clay.
Avg. Subsoil Thickness (m)	0.03	
Max Depth (m)	0.28	
Trench Length (m)	42.5	
Solid Geology – Gravelly Clay and Gault Clay		

Trench 7		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.22	Features (n=0): Agricultural headland observed along with recent built-up topsoil to south of trench.
Avg. Subsoil Thickness (m)	0.19	
Headland Max Thickness (m)	0.48	
Max Depth (m)	1.24	
Trench Length (m)	60.0	
Solid Geology – Gravelly Clay		

Trench 8		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.29	Features (n=4): F.20, F.42, F.43 Single modern linear cutting Early to Middle Iron Age linear with two small pits or postholes of possible prehistoric date.
Avg. Subsoil Thickness (m)	0.2	
Max Depth (m)	0.55	
Trench Length (m)	39.8	
Solid Geology – Gravelly Clay		

Trench 9		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=7): F.16, F.17, F.18, F.19 A linear of possible Roman date alongside a small pit or posthole and tree-throw of possible prehistoric date, with two Medieval or post-Medieval agricultural furrows and two ceramic field drains.
Avg. Subsoil Thickness (m)	0.30	
Max Depth (m)	0.55	
Trench Length (m)	40.6	
Solid Geology – Gravelly Clay		

Trench 10		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=2): F.22, F.23 An Iron Age linear with a re-cut.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.44	
Trench Length (m)	40.5	
Solid Geology – Gravelly Clay		

Trench 11		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=3): F.38, F.39, F.40 Three probable Iron Age pits.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.44	
Trench Length (m)	40.7	
Solid Geology – Gravelly Clay		

Trench 12		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=0) No. archaeology. Geological change on landfall to Gault Clay
Avg. Subsoil Thickness (m)	0.20	
Max Depth (m)	0.50	
Trench Length (m)	48.5	
Solid Geology – Gravelly Clay and Gault Clay		

Trench 13		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.31	Features (n=5): F.33, F.34, F.35, F.36, F.49 Early to Middle Iron Age linear with two gullies possible relating to a structure, along with a modern posthole and a geological change in the north of the trench from gravel to Gault Clay.
Avg. Subsoil Thickness (m)	0.20	
Max Depth (m)	0.43	
Trench Length (m)	34.8	
Solid Geology – Gravelly Clay and Gault Clay		

Trench 14		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.29	Features (n=7): F.25, F.26 Four Medieval or post-Medieval agricultural furrows and a modern service trench, overlying two linears of possible Roman or earlier date.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.48	
Trench Length (m)	40.7	
Solid Geology – Gravelly Clay		

Trench 15		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.34	Features (n=0) No archaeology.
Avg. Subsoil Thickness (m)	0.16	
Max Depth (m)	0.50	
Trench Length (m)	12.2	
Solid Geology – Gravelly Clay		

Trench 16		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.12	Features (n=0) Two ceramic drains. Built-up ground probably relating to construction of Veterinary Science buildings.
Clay Import (max-min m)	0.14-.45	
Buried Topsoil (Avg. m)	0.3	
Buried Subsoil (Avg. m)	0.16	
Max Depth (m)	1.07	
Trench Length (m)	37.0	
Solid Geology – Gault Clay		

Trench 17		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.22	Features (n=0) Two ceramic drains. Built-up ground probably relating to construction of Veterinary Science buildings.
Clay Import (max-min m)	0.06-.12	
Buried Topsoil (Avg. m)	0.25	
Buried Subsoil (Avg. m)	0.12	
Max Depth (m)	0.67	
Trench Length (m)	26.8	
Solid Geology – Gault Clay		

Trench 18		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=13): F.3, F.5 Six Medieval or post-Medieval agricultural furrows with seven ceramic drains, a natural hollow filled with subsoil and containing a single knapped flint, along with a linear of possible Roman date.
Avg. Subsoil Thickness (m)	0.26	
Max Depth (m)	0.54	
Trench Length (m)	70.0	
Solid Geology – Gravelly Clay		

Trench 19		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.31	Features (n=0) Two ceramic field drains.
Avg. Subsoil Thickness (m)	0.22	
Max Depth (m)	0.6	
Trench Length (m)	24.6	
Solid Geology – Gravelly Clay		

Trench 20		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.21	Features (n=1) A single Medieval or post-Medieval agricultural furrow with a ceramic field drain and a natural hollow filled with subsoil to a depth of 0.75m (from modern ground surface).
Avg. Subsoil Thickness (m)	0.20	
Max Depth (m)	0.41	
Trench Length (m)	24.5	
Solid Geology – Gravelly Clay		

Trench 21		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=9) A modern posthole and two inactive modern services overlay four medieval or post-Medieval agricultural furrows and five ceramic field drains.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.61	
Trench Length (m)	59.5	
Solid Geology – Gravelly Clay		

Trench 22		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.26	Features (n=6): F.1, F.4, F.46, F.47, F.48 Two modern wall foundations and two service trenches with two small sub-rectangular pits containing animal (sheep) bone in a greasy black deposit with a layer of crumbly white substance (unexcavated). Considerable demolition material within the topsoil and subsoil.
Avg. Subsoil Thickness (m)	0.18	
Max Depth (m)	0.46	
Trench Length (m)	39.0	
Solid Geology – Gravelly Clay		

Trench 23		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.30	Features (n=3): F.2 Two Medieval or post-Medieval agricultural furrows with a ceramic field drain and a linear of possible Iron Age date.
Avg. Subsoil Thickness (m)	0.15	
Max Depth (m)	0.50	
Trench Length (m)	39.6	
Solid Geology – Gravelly Clay		

Trench 24		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.28	Features (n=4): F.6, F.7, F.8, F.55 Considerable built-up ground with demolition material at upper south end of trench and imported clay and topsoil northwards from mid-way along trench. This is probably associated with the construction of the Veterinary Science buildings. At south end the demolition layers conceal at least three square or sub-rectangular pits containing fired clay and burnt hand-made brick, probably post-Medieval.
Avg. Subsoil Thickness (m)	0.27	
Clay Import (max-min m)	0.03-.14	
Buried Topsoil (Avg. m)	0.22	
Buried Subsoil (Avg. m)	0.19	
Max Depth (m)	1.05	
Trench Length (m)	49.0	
Solid Geology – Gravelly Clay		

Trench 25		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.38	Features (n=1): F.2 Eastward continuation of linear F.2 of possible Iron Age date. South half of trench shows modern disturbance of solid geology.
Avg. Subsoil Thickness (m)	0.23	
Max Depth (m)	0.61	
Trench Length (m)	12.7	
Solid Geology – Gravelly Clay		

Trench 26		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.29	Features (n=1): F.30 Single posthole in line with course of linear F.2; Possibly of Iron Age date.
Avg. Subsoil Thickness (m)	0.15	
Max Depth (m)	0.44	
Trench Length (m)	10.0	
Solid Geology – Gravelly Clay		

Trench 27		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.29	Features (n=0) No archaeology.
Avg. Subsoil Thickness (m)	0.15	
Max Depth (m)	0.44	
Trench Length (m)	10.0	
Solid Geology – Gravelly Clay		

Trench 28		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.32	Features (n=1): F.20 Linear of probable Early to Middle Iron Age date.
Avg. Subsoil Thickness (m)	0.23	
Max Depth (m)	0.55	
Trench Length (m)	7.65	
Solid Geology – Gravelly Clay		

Trench 29		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.31	Features (n=1): F.33 Linear of probable Early to Middle Iron Age date, with three ceramic field drains possibly connected to agricultural furrow system.
Avg. Subsoil Thickness (m)	0.20	
Max Depth (m)	0.43	
Trench Length (m)	23.0	
Solid Geology – Gravelly Clay		

Trench 30		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=5): F.27, F.28, F.29 Two Medieval or post-Medieval agricultural furrows with two linears of Early to Middle Iron Age date, one cutting an earlier pit.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.44	
Trench Length (m)	21.0	
Solid Geology – Gravelly Clay		

Trench 31		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=1): F.24 Linear of probable Roman date.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.44	
Trench Length (m)	5.00	
Solid Geology – Gravelly Clay		

Trench 32		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=5): F.31, F.41 At least five features of Iron Age, Roman and Medieval or Post-medieval date, all linears, densely packed.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.44	
Trench Length (m)	19.3	
Solid Geology – Gravelly Clay		

Trench 33		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=2): F.37 A possible Iron Age linear with a Medieval or Post-medieval agricultural furrow.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.44	
Trench Length (m)	14.0	
Solid Geology – Gravelly Clay		

Trench 34		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.27	Features (n=2) Two medieval or post-Medieval agricultural furrows.
Avg. Subsoil Thickness (m)	0.15	
Max Depth (m)	0.48	
Trench Length (m)	16.4	
Solid Geology – Gravelly Clay		

Trench 35		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.25	Features (n=0) One ceramic field drain, but no continuation of F.10 from Trench 1.
Avg. Subsoil Thickness (m)	0.18	
Max Depth (m)	0.46	
Trench Length (m)	16.0	
Solid Geology – Gravelly Clay		

Trench 36		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.30	Features (n=4): F.50, F.51, F.52 Three probable Roman linears possibly curving to the south (and towards F.10). Also a single Medieval or post-medieval agricultural furrow.
Avg. Subsoil Thickness (m)	0.20	
Max Depth (m)	0.52	
Trench Length (m)	21.5	
Solid Geology – Gravelly Clay		

Trench 37		
Trench Stratigraphy		***Summary Description***
Avg. Topsoil Thickness (m)	0.29	Features (n=7): F.53, F.54 A modern service trench traverses the centre of the trench. Three Medieval or post-medieval agricultural furrows and a drain overly a single linear of possible Roman date and a sub-square pit or terminus.
Avg. Subsoil Thickness (m)	0.19	
Max Depth (m)	0.48	
Trench Length (m)	24.0	
Solid Geology – Gravelly Clay		

OASIS DATA COLLECTION FORM: England

OASIS ID: cambridg3-216574

Project details

Project name	West Cambridge Archaeology Department of Veterinary Medicine Paddocks: An Archaeological Evaluation
Short description of the project	A programme of archaeological trenching covering an area of 2240.4m2 revealed a previously unidentified geological variation of a ridge of diamict gravel over Gault clay upon which an Early to Middle Iron Age settlement was identified. This comprised of at least two circular gulley-defined dwellings with associated pits over a distribution clearly demarcated by a broken line of bounding ditches. A third structure was identified 25m away from the core settlement upon the Gault clay landfall. An additional Iron Age site represented by a ditch and posthole was also identified, and a ditch-defined trackway may also possibly be attributed to this phase. An extensive Romano-British field system overlay the settlement area and other considerable parts of the proposed development area.
Project dates	Start: 18-05-2015 End: 01-06-2015
Previous/future work	Yes / Not known
Any associated project reference codes	ECB4458 - HER event no.
Type of project	Field evaluation
Site status	None
Monument type	DITCH Iron Age
Monument type	POSTHOLE Iron Age
Monument type	TRACK Iron Age
Monument type	ROUNDHOUSE Iron Age
Monument type	FIELDSYSTEM Roman
Significant Finds	POTTERY Iron Age
Significant Finds	POTTERY Roman
Significant Finds	POTTERY Post Medieval
Significant Finds	FLINT Late Prehistoric
Significant Finds	ANIMAL BONE Late Prehistoric
Significant Finds	ANIMAL BONE Roman
Significant Finds	WORKED STONE Late Prehistoric
Methods & techniques	''Environmental Sampling'',''Geophysical Survey'',''Measured Survey'',''Metal Detectors'',''Targeted Trenches''
Development type	Large/ medium scale extensions to existing structures (e.g. church, school, hospitals, law courts, etc.)
Prompt	Planning condition
Position in the planning process	Not known / Not recorded

Project location

Country	England
Site location	CAMBRIDGESHIRE CAMBRIDGE CAMBRIDGE West Cambridge Archaeology Department of Veterinary Medicine Paddocks: An Archaeological Evaluation
Postcode	CB3 0HB
Study area	2240.40 Square metres
Site coordinates	TL 4240 5900 52.210370503 0.0843729829652 52 12 37 N 000 05 03 E Point
Height OD / Depth	Min: 15.50m Max: 21.00m

Project creators

Name of Organisation	Cambridge Archaeological Unit
Project brief originator	Consultant
Project design originator	Christopher Evans
Project director/manager	Christopher Evans
Project supervisor	Marcus Brittain
Type of sponsor/funding body	Developer
Name of sponsor/funding body	University of Cambridge

Project archives

Physical Archive recipient	Cambridge Archaeological Unit
Physical Archive ID	VET15
Physical Contents	''Animal Bones'',''Ceramics'',''Environmental'',''Worked stone/lithics'',''other''
Digital Archive recipient	Cambridge Archaeological Unit
Digital Archive ID	VET15
Digital Contents	''Animal Bones'',''Ceramics'',''Environmental'',''Stratigraphic'',''Survey'',''Worked stone/lithics'',''other''
Digital Media available	''Database'',''Geophysics'',''Spreadsheets'',''Text''
Paper Archive recipient	Cambridge Archaeological Unit
Paper Archive ID	VET15
Paper Contents	''Animal Bones'',''Ceramics'',''Environmental'',''Stratigraphic'',''Survey'',''Worked stone/lithics'',''other''
Paper Media available	''Context sheet'',''Map'',''Plan'',''Section'',''Survey ''

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)

Title	West Cambridge Archaeology Department of Veterinary Medicine Paddocks: An Archaeological Evaluation
Author(s)/Editor(s)	Brittain, M., Evans, C.
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Description	PDF format
Entered by	G. Appleby (gaa21@cam.ac.uk)
Entered on	3 July 2015

Appendix 7.2 Full historic environment impact assessment

Table A7.2.1 Full historic environment impact assessment for the construction phase

Baseline		**Impact assessment**				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Archaeology						
Site 1 (Iron Age)	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	Through the 2015 field evaluation, a written record of the asset has already been produced. No further mitigation is required to preserve the site's heritage significance.	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset has been preserved through a written record produced during the field evaluation	Negligible **Not significant**
Site 2 (Iron Age)	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	In addition to the written record produced during the 2015 field evaluation, a full open area excavation will be undertaken prior to construction works commencing. This will be agreed with CHET in advance.	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a written record from a full open area excavation.	Negligible Not significant
Site 3 (Iron Age/Roman)	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	Mitigation for Site 2 will further expose the field system which will be recorded. Additional trenching will be undertaken to establish the system's basic layout	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a written record from mitigation undertaken for site 2 combined with additional trenching if required.	Negligible **Not significant**
Vicar's Farm	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	Preservation by record will occur by adhering to a suitable Written Scheme of Investigation to be agreed with CHET.	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a Written Scheme Investigation to be agreed with CHET.	Negligible **Not significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Nano Fabrication Building Site	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	Preservation by record will occur by adhering to a suitable Written Scheme of Investigation to be agreed with CHET.	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a Written Scheme Investigation to be agreed with CHET.	Negligible **Not significant**
Built heritage						
Central Cambridge Conservation area and designated assets therein. The central conservation area covers the historic core of the city, open spaces including the college backs, Jesus Green, Midsummer Common and the Botanic Garden. The conservation area appraisal states that this 'interplay of grand college buildings and verdant landscape is perhaps the most enduring image of central Cambridge.' The central conservation area also includes some fine examples of 19th century domestic development, particularly surrounding the railway station.	High	Cambridge is located on flat, low lying land. This coupled with the tight urban grain ensures that there are relatively limited outward views from the majority of the central core, particularly at street level. Views from the principal open spaces within the urban core, such as the college quadrangles, the 'Backs' and Parker's Piece, for example, are similarly highly constrained, and will therefore not feature views of the construction. Some views westward from the upper levels or roof tops of certain buildings, such as from the St Johns and King's College Chapels, for example, may feature the tops of cranes and any other tall plant associated with the construction process in some views. However the majority of the construction process will be concealed by intervening buildings and vegetation, as well as the landform.	No mitigation is proposed	Minor	Medium distance views of construction plant and activities from some limited areas of the conservation area would have a temporary adverse effect on the setting of the conservation area	Slight **Not Significant**
Willow House (1331936). Grade II* listed. Two storey house built by George Checkley in 1932 with a later single storey extension. There are five tall symmetrically arranged windows on the first floor and window bands on the ground floor.	High	Willow house is located within densely landscaped grounds on Conduit Head Road, which is itself thickly planted with coniferous trees and shrubs. Outward views are highly constrained by this planting and the landscaping associated with Salix and the White House to the south. The construction will therefore not feature in the setting of the house.	No mitigation is proposed	Neutral	There will be no residual effect to the setting of Willow House	Neutral **Not Significant**
Shawms (1268363) Grade II* listed. Two storey house in the Modern Movement style with a single storey roof conservatory. The entrance has a projecting porch hood supported on two steel posts.	High	Shawms features extensive glazing to its south front, which faces over landscaped grounds to the Site. Views to the south are slightly filtered by mature planting and intervening buildings, however some visual intrusion, particularly from the presence of cranes and other tall plant, is likely.	No mitigation is proposed	Minor adverse	Glimpsed views of construction plant and activity will result in a temporary adverse effect to the setting of the building.	Slight Adverse **Not significant**
48 Storeys Way (1126090) Grade II* listed Two storey house built in 1913 by Ballie Scott. The building features an attic under a dramatic roofscape from which rise two tall chimney stacks with water tabling and narrow projecting caps.	High	Views in the direction of the Site are screened by the presence of Churchill College and the Moller Centre. The construction will not feature in the setting of the listed building.	No mitigation is proposed.	Neutral	There will be no residual effect to the setting of 48 Storeys Way	Neutral **Not Significant**
White House (1126037) Grade II listed. Two storey house with a third storey set back at the centre of the roof terrace built in 1930 by George Checkley in the International Modern style. The house has a rectangular plan with central entrance hall The facades are white painted brick and the roof is flat concrete.	Medium	The house is located within landscaped grounds adjacent to Madingley Road, immediately to the north of the Site. Views to the Site are somewhat filtered by dense boundary planting, however the presence of the plant and the construction process will constitute a change to the currently relatively tranquil setting of the asset.	No mitigation is proposed	Moderate adverse	Close views of construction plant and activity will result in a temporary adverse effect to the setting of the building.	Moderate Adverse **Significant Effect**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Salix (1227614) Grade II listed. 1 and 2 storey house built in 1934 and extended in1936 by George Checkley. Low long single storey wing of 5 windows and flat roof canopy on roof terrace. Original metal frame windows. The facades are white painted rendered brick and the roof is flat and bitumenised.	Medium	Salix is located within densely landscaped grounds on Conduit Head Road, which is itself thickly planted with coniferous trees and shrubs. Outward views are highly constrained by this planting and the landscaping associated with White House to the south. The construction will therefore not feature in the setting of the house.	No mitigation is proposed	Neutral	There will be no residual effect to the setting of Salix.	Neutral **Not Significant**
Spring House (1380900) Grade II listed The house was built in 1965-7 by Colin St John Wilson and his assistant M J Long. The construction is of pale cavity brick walls, with internal columns and partitions of timber and features a cut-away corner terrace and verandah above. The building has Concrete Roman tile monopitched roofs, with open timberwork beneath. L-shaped plan with corner angle cut away to form the terrace.	Medium	The house is located at the north end of Conduit Head Road. Views outwards are highly constrained by dense planting and intervening domestic development lining Conduit Head Road to the south. The construction will therefore not feature in the building's setting.	No mitigation is proposed	Neutral	There will be no residual effect to the setting of Spring House	Neutral **Not Significant**
The Observatory (1126156) Grade II listed Construction of the Observatory commenced in 1822.by the architect John Clement Mead. The building has two storeys, and is built from ashlar with slate and lead roofs in a Neo- Greek style. Built on a half H shaped plan with wings extending towards the North and projecting central tetrastyle portico of Doric Order to the south and front entrance. A small movable dome is located on the centre of the building.	Medium	The Observatory buildings are located at the end of an avenue of trees leading from Madingley Road, to the north of the Site. In addition to the avenue of trees the boundaries of the observatory compound are sparsely planted. There are relatively clear views to the south towards Madingley Road. The construction phases, particularly the presence of tall plant such as cranes, hoardings and increased vehicle movement will feature in oblique views from the observatory group of assets, particularly in views down the entrance avenue. These will be somewhat filtered by intervening vegetation, particularly that to the boundaries of the Site and the observatory land.	No mitigation is proposed	Minor adverse	Oblique, glimpsed views of the construction plant and activities will result in a temporary adverse effect to the setting of the Observatory.	Slight adverse **Not Significant**
Northumberland Dome at the Observatory (1126157) Grade II listed. The building was constructed around 1838 of white brick and a movable copper dome and is located in the grounds of the Observatory. The dome has since been reconstructed.	Medium				Oblique, glimpsed views of the construction plant and activities will result in a temporary adverse effects to the setting of the copper Dome at the Observatory.	Slight adverse **Not significant**
Chapel, Churchill College (1331925) Grade II Listed. The college chapel was built in 1961-68 by Sheppard Robson and Partners. The building is constructed of brown brick, concrete, and has a copper roof. The building has a square plan with 'inscribed cross' and has simple, brick slab walls, separated by slit windows. The chapel was built against the wishes of the founding college fellows, particularly Francis Crick, hence its isolated position away from the main college buildings.	Medium	The chapel is located in an open expanse of lawn, and is somewhat removed from the rest of the college buildings, adjacent to the observatory complex. Elements of construction plant and activities may feature in some oblique views from the college. However these views will be substantially filtered by the presence of intervening boundary planting.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the chapel.	Neutral **Not Significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Research Flats, Churchill College (1331924) Grade II Listed. Two storey block of flats for researchers constructed in 1959-60 by Sheppard Robson and Partners. The buildings are constructed in a compact swastika layout from brown brick with flat roofs and have timber windows. Each flat has an outdoor terrace, secluded by storey-height walls, which continue to form the walls of the flats themselves.	Medium	Elements of construction plant and activities, particularly tall plant such as cranes, may feature in some oblique views from the building. However these views will be substantially filtered by the presence of intervening boundary planting and would not impact the building setting.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the flats.	Neutral **Not Significant**
Residential Courts at Churchill College (1227711) Grade II listed Two to three storey student residences constructed in 1961-68 by Sheppard, Robson and Partners. The building is constructed from brown brick and concrete and has varnished timber windows. The flat roofs are covered in copper. The facades are irregular with projecting brick bay windows at intervals,	Medium	The residential courts are located to the north of the Churchill college campus set in an open lawn with some scattered tree planting, and the other college buildings to the south and east. The landscape dips slightly to the north of the campus, which somewhat constrains outward views. Elements of the construction, particularly tall plant such as cranes, may feature in some oblique views from the residences. However these views will be substantially filtered by the presence of intervening boundary planting and landscaping and the gentle slope of the site and would not impact the building setting.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the residences.	Neutral **Not Significant**
Wolfson Hall, Bracken Library and Bevin Rooms (1126008) Grade II listed. Two storey library with reading rooms and hall built in 1961-68 by Sheppard Robson and Partners. The building is constructed from brown brick and concrete. There is an external door of sculpted metal by Geoffrey Clarke.	Medium	The building is located within an irregular courtyard created by the southern residential courts (qv, 1126007) with no outward views to the surrounding landscape.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the library.	Neutral **Not Significant**
Central Buildings Churchill College (1227706) Grade II listed. Two storey college building containing dining room and kitchens, common rooms, boiler house, college offices and main entrance built in 1961- 68 by Sheppard Robson and Partners. The building is constructed in an irregular 'H' plan from brown brick and concrete, both pre-cast and board-marked. The dining hall forms the link between the two parallel ranges.	Medium	The building is located to the north of the campus. Outward views are highly constrained by the campus buildings to the south (the residentially courts and the Wolfson Hall and Library, qv) there are limited outward views to the surrounding landscape.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the college building.	Neutral **Not Significant**
Residential Courts at Churchill College (1126007) Grade II listed. Four linked residential courts of two to three storeys located due south-west of the Central Buildings of Churchill College GV II Student residences built in 1961-68 by Sheppard, Robson and Partners. The building is constructed from brown brick and concrete, and has varnished timber windows. The building has flat roofs covered in copper.		The residential courts are located to the south of the Churchill campus, immediately to the north of Madingley Road. The buildings are low lying and outward views in the direction of the Site are highly constrained by boundary landscaping and planting within the college campus. The campus site is bound by a high grassy bund and scattered tree planting, and the dense boundary planting within the Site. Tall plant, such as cranes, might be discernable above the tree line in some oblique views but this would not impact on the setting of the building.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the residential courts.	Neutral **Not Significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
31 Madingley Road (1268371) Grade II listed. Early Modern Movement style house of two storeys rising to three storeys at the west end.	Medium	The house is set in densely landscaped grounds. Views to the Site are screened by the intervening development along Wilberforce Road and Bulstrode Gardens.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the house.	Neutral **Not Significant**
House and Brock Brothers Studio (1331872) Grade II listed. A house dating from the late 18th century with later 19th and 20th century additions, including a purpose-built artist's studio dating from 1908, designed by the Brock brothers for their own use. The principal elevation (north) is of three storeys and four bays. It has two flat-roofed polygonal bays to the ground and first floor with cornice detail, and contains twelve-pane vertical sash windows. The main entrance contains a late 18th century Roman Doric doorcase with fluted pilasters and pediment, and classical door with fielded panels and mouldings.	Medium	The house is located to the south of Madingley Road. Some filtered views to the Site may be possible from upper rear windows, however these will largely be constrained by intervening buildings and planting and would not impact the setting of the building.	No mitigation	Negligible	There will be no residual effect to the setting of the house.	Neutral **Not Significant**
9 Wilberforce Road (1268352) Grade II listed. Two storey Modern Movement house built in 1937 by D. Cosens. The building is constructed from whitewashed brick laid in Flemish bond with a bituminous felt roof. Rectangular plan with a recessed corner section at south-east corner.	Medium	The house is located opposite the Emmanuel College Sports Pitches, with the existing buildings on the Site visible beyond the trees lining Clerk Maxwell Road. The construction plant and activities will likely be visible from the listed building; however this will be partly screened by the intervening tree planting and the currently constructed elements of the existing masterplan.	No mitigation is proposed	Minor Adverse	Some medium range views of construction plant and activities would result in temporary adverse effects to the setting of the house.	Slight Adverse **Not Significant**
Emmanuel College Sports Pavilion, including grounds man's house and stables (1422595) Grade II listed. Sports pavilion with attached Groundsman's House and separate stable, built for Emmanuel College in 1910. Complex roofscape of steep, sweeping pitches and hipped roof surmounted by a decorative copper cupola which has a polygonal base and a weathervane.	Medium	The constructed elements of the masterplan are visible in views across the sports pitches, though they are somewhat screened by the presence of tree screening and intervening housing. The some construction activities and plant such as cranes will likely be visible from the listed building; however this will be partly screened by the intervening tree planting and the currently constructed elements of the existing masterplan.	No mitigation is proposed	Minor Adverse	Some medium range views of construction plant and activities would result in temporary adverse effects to the setting of the pavilion and house.	Slight Adverse **Not Significant**
Garden at 48 Storeys Way (1422759) Grade II Registered Park and Garden. Suburban Arts and Crafts garden laid out in 1913 to the designs of M. H. Baillie Scott. The garden forms a series of six outdoor 'apartments', as Baillie Scott called them, which change in character. They are laid out on a system of cross axes which provide vistas along the length and width of the garden.	Medium	Intervening buildings, particularly the Moller Centre and Churchill College, and the topography of the landform ensures that there are no views of the Site which could result in impacts to the setting of the garden.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the garden.	Neutral **Not Significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Conduit Head Road Conservation Area The conservation area comprises 20th century residential development, built in a piecemeal fashion from approximately 1914. A number of modernist houses built in the 1930s and 1960s, are of particular note. These buildings provide a high quality and progressive architectural character to the area.	Medium	The conservation area boundary extends out into Madigley Road and includes two properties that face onto Madingley Road and the Site. Construction works and plant will be highly visible from the southern extent of the conservation area though it will be heavily screened by tree planting from the more northerly portion of the conservation area. This will be a substantial change to the currently relatively tranquil setting of the conservation area.	No mitigation is proposed	Moderate Adverse	Direct close views of construction activities and plant from the southern end of the conservation area will result in temporary adverse effects to the setting of the conservation area.	Moderate Adverse **Significant effect**
West Cambridge Conservation Area The conservation area is notable for its spacious residential streets lined with large mainly detached 19th and 20th century houses. A variety of college and university buildings are included in the conservation area. Despite the differences in the form, scale and materials between the residential and collegiate buildings the very high quality of nearly all the structures ensures that the area retains spatial cohesion. Green open spaces, including agricultural land and the college playing fields and tennis courts also contribute to the conservation area's significance.	Medium	The conservation area extends in an arc around the north east corner of the Site. The construction activities and plant will feature prominently in views to and from the west and north west of the conservation area, substantially eroding its relatively tranquil setting. The conservation area draws part of its significance from the interface between the suburban and rural at its western edge; the construction process will challenge this. However the construction will not be appreciable from many of the key areas within the conservation area, including Grange Road and the area surrounding the University Library, due to the presence of intervening buildings, mature tree planting and the low lying topography.	No Mitigation is proposed	Moderate Adverse	Direct close views of construction activities and plant from within the conservation area will result in temporary adverse effects to the setting of the conservation area.	Moderate Adverse **Significant Effect**
Storey's Way Conservation Area The special character of Storey's Way is derived from the fine detached family houses with their spacious gardens, interspersed with the collegiate grounds of Fitzwilliam and Churchill Colleges.	Medium	Some construction activities and plant may be visible from the upper read windows of some of the houses on the south side of the conservation area, these views are largely constrained by the Churchill college buildings, the adjacent Moller Centre and dense planting. The construction activities and plant will not be visible from Storey's Way in the central space of the conservation area.	No mitigation is proposed	Negligible	Some glimpsed views from limited locations within the conservation area would not result in significant effects to the setting of the conservation area.	Neutral **Not Significant**
Schlumberger Building Commercial research centre and office designed by Michael Hopkins and completed in 1985. The building is a tented structure suspended between a 'cats cradle' arrangement of struts and supports. The building is both technically innovative, and a highly sculptural treatment for a late 20th century commercial building.	Medium	The significance of the Schlumberger building lies in its position as an early and highly articulate example of a High-Tech building, by one of that style's leading British proponents. The technical innovation embodied in its design also contributes to the building's significance. Setting makes a limited contribution to the significance of the building. The construction will envelope the building on all sides, altering its currently relatively tranquil, semi-rural setting. This will hamper the appreciation of the building The architectural significance of the building will remain unaffected.	No mitigation is proposed	Minor Adverse	Construction activities would reduce the appreciation of the building by limiting existing views resulting in a temporary adverse effect.	Slight Adverse **Not Significant**
Merton Hall Farmhouse Two storey farmhouse built from gault brick with a slate roof and two end stacks. Three bay, central door to ground floor with a 20th century porch. Regular fenestration, windows all four pane sashs with flat arch brick	Low	The building would be demolished during construction. Demolition of the farmhouse has already been approved as part of the existing masterplan and extant planning permission and would occur irrespective of the Proposed Development.	No mitigation is proposed	No change	Demolition of the farmhouse has already been consented as part of the existing masterplan and extant planning permission and would occur irrespective of the Proposed Development.	Neutral **Not Significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Whittle Laboratory Academic building by Robert Mathew Johnson Marshall and Partners, completed in 1973. The building is constructed from brown brick with vertical strip windows	Negliigible	The building would be demolished	No mitigation is proposed	Major adverse	Demolition of the building during construction would result in the building's loss. This would be a permanent adverse effect.	Slight Adverse **Not Significant**
Cavendish Laboratory Complex of interconnected laboratories and other university buildings, largely two to three storeys, with horizontal windows. Completed in 1974 to designs by Robert Mathew Johnson Marshal and Partners utilsiing the CLASP method of prefabricated concrete panels.	Negliigible	The building would be demolished	No mitigation is proposed	Major adverse	Demolition of the building during construction would result in the building's loss. This would be a permanent adverse effect.	Slight Adverse **Not Significant**
Department of Veterinary Medicine. Complex of buildings by Ian Forbes, from 1953 onwards. Largely restrained neo-Georgian, with some neo-baroque details to the end pavilions. Intended to form part of a symmetrical run of buildings through the centre of the Site: as the only constructed elements of this, they appear stranded and unrelated to their context.	Negliigible	The building would be demolished	No mitigation is proposed	Major adverse	Demolition of the building during construction would result in the building's loss. This would be a permanent adverse effect.	Slight Adverse **Not Significant**

Table A7.2.2 Full historic environment assess,emt for the operational phase

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Central Cambridge Conservation area and designated assets within the conservation area boundary. The central conservation area covers the historic core of the city, open spaces including the college backs, Jesus Green, Midsummer Common and the Botanic Garden. The conservation area appraisal states that this 'interplay of grand college buildings and verdant landscape is perhaps the most enduring image of central Cambridge.' The central conservation area also includes some fine examples of 19th century domestic development, particularly surrounding the railway station.	High	The Proposed Development will be largely invisible from the majority of the conservation area, which due to the nature of its topography and tight urban grain has constrained outward views. It will not feature in views from the Backs, for example, or from any of the college quads, which are highly significant open spaces within the conservation area. However some taller elements of the Proposed Development, such as the energy centre stack, will appear in some outward views from limited elevated points within the conservation area, particularly from Castle Hill. In these views it will appear as a distant element and will not fundamentally challenge the dominance of the man-made tall elements, such as the Kings College, Great St Mary's and university library towers, in these views. The Tall Buildings Study identifies some key views of Cambridge from the south, particularly from the Gog MaGog hills. The stack will feature obliquely far to the west of the city centre in some of these views, but will not fundamentally challenge the dominance of the man-made tall elements, such as the Kings College, Great St Mary's and university library towers, in these views.	No mitigation is proposed.	Minor Adverse	Some glimpsed views of tall elements of the Proposed Development would be visible from limited elevated points within the conservation area. Distant views of the historic city core from the south and west would feature tall elements of the Proposed Development but would not obscure or detract from the views of the historic skyline. This would result in a permanent adverse effect.	Slight Adverse **Not Significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Willow House (1331936). Grade II* listed. Two storey house built by George Checkley in 1932 with a later single storey extension. There are five tall symmetrically arranged windows on the first floor and window bands on the ground floor.	High	Willow house is located within densely landscaped grounds on Conduit Head Road, which is itself thickly planted with coniferous trees and shrubs. Outward views are highly constrained by this planting and the landscaping associated with Salix and the White House to the south. The Proposed Development will therefore not be an appreciable element in the setting of the house.	No mitigation is proposed	Neutral	There will be no residual effect to the setting of Willow House	Neutral **Not Significant**
Shawms (1268363) Grade II* listed. Two storey house in the Modern Movement style with a single storey roof conservatory. The entrance has a projecting porch hood supported on two steel posts.	High	Shawms features extensive glazing to its south front, which faces over landscaped grounds to the Site. Views to the south are slightly filtered by mature planting and intervening buildings. However the Proposed Development will feature in views to the south. This will alter the setting of the asset, by adding large contemporary structures somewhat at odds to its currently domestic peri-urban context.	No mitigation is proposed	Minor Adverse	Glimpsed views of the Proposed Development will result in a permanent adverse effect to the setting of the building.	Slight Adverse **Not Significant**
48 Storeys Way (1126090) Grade II* listed Two storey house built in 1913 by Ballie Scott. The building features an attic under a dramatic roofscape from which rise two tall chimney stacks with water tabling and narrow projecting caps.	High	Views in the direction of the Site are screened by the presence of the Churchill College and the Moller Centre. The Proposed Development will not feature in the setting of the building.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of 48 Storeys Way	Neutral **Not Significant**
White House (1126037) Grade II listed. Two storey house with a third storey set back at the centre of the roof terrace built in 1930 by George Checkley in the International Modern style. The house has a rectangular plan with central entrance hall The facades are white painted brick and the roof is flat concrete.	Medium	The house is located within landscaped grounds adjacent to Madingley Road, immediately to the north of the Site. Views to the Site are somewhat filtered by boundary planting, however the Proposed Development will feature prominently in the setting of the asset, fundamentally altering its setting by the addition of large contemporary structures to its currently suburban and semi-rural context.	No mitigation is proposed.	Moderate Adverse	Close views of the Proposed Development will result in a permanent adverse effect to the setting of the building.	Moderate Adverse **Significant Effect**
Salix (1227614) Grade II listed. 1 and 2 storey house built in 1934 and extended in1936 by George Checkley. Low long single storey wing of 5 windows and flat roof canopy on roof terrace. Original metal frame windows. The facades are white painted rendered brick and the roof is flat and bitumenised.	Medium	Salix is located within densely landscaped grounds on Conduit Head Road, which is itself thickly planted with coniferous trees and shrubs. Outward views are highly constrained by this planting and the landscaping associated with White House to the south. The Proposed Development will therefore not feature in the setting of the house.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of Salix.	Neutral **Not Significant**
Spring House (1380900) Grade II listed The house was built in 1965-7 by Colin St John Wilson and his assistant M J Long. The construction is of pale cavity brick walls, with internal columns and partitions of timber and features a cut-away corner terrace and verandah above. The building has Concrete Roman tile monopitched roofs, with open timberwork beneath. L-shaped plan with corner angle cut away to form the terrace.	Medium	The house is located at the north end of Conduit Head Road. Views outwards are highly constrained by dense planting and intervening domestic development lining Conduit Head Road to the south. The Proposed Development will therefore not feature in the building's setting.	No mitigation is proposed	Neutral	There will be no residual effect to the setting of Spring House	Neutral Not Significant

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
The Observatory (1126156) Grade II listed Construction of the Observatory commenced in 1822.by the architect John Clement Mead. The building has two storeys, and is built from ashlar with slate and lead roofs in a Neo- Greek style. Built on a half H shaped plan with wings extending towards the North and projecting central tetrastyle portico of Doric Order to the south and front entrance. A small movable dome is located on the centre of the building.	Medium	The Observatory buildings are located at the end of an avenue of trees leading from Madingley Road, to the north of the Site. In addition to the avenue of trees the boundaries of the observatory compound are sparsely planted. There are relatively clear views to the south towards the Madingley road. The Proposed Development will be an appreciable element in the setting of the observatory complex, with the large modern buildings visible in oblique views to the south west. The presence of the Site will be somewhat filtered by boundary planting.	No mitigation is proposed	Minor adverse	Oblique, glimpsed views of the Proposed Development will result in a permanent adverse effect to the setting of the Observatory.	Slight adverse Not Significant
Northumberland Dome at the Observatory (1126157) Grade II listed. The building was constructed around 1838 of white brick and a movable copper dome and is located in the grounds of the Observatory. The dome has since been reconstructed.	Medium				Oblique, glimpsed views of the Proposed Development will result in a permanent adverse effects to the setting of the copper Dome at the Observatory.	Slight adverse Not Significant
Chapel, Churchill College (1331925) Grade II Listed. The college chapel was built in 1961-68 by Sheppard Robson and Partners. The building is constructed of brown brick, concrete, and has a copper roof. The building has a square plan with 'inscribed cross' and has simple, brick slab walls, separated by slit windows. The chapel was built against the wishes of the founding college fellows, particularly Francis Crick, hence its isolated position away from the main college buildings.	Medium	The chapel is located in an open expanse of lawn, and is somewhat removed from the rest of the college buildings, adjacent to the observatory complex. Elements of the Proposed Development, particularly rooftop structures and plant, may feature in some oblique views from the college. However these views will be substantially filtered by the presence of intervening boundary planting.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the chapel.	Neutral Not significant
Research Flats, Churchill College (1331924) Grade II Listed. Two storey block of flats for researchers constructed in 1959-60 by Sheppard Robson and Partners. The buildings are constructed in a compact swastika layout from brown brick with flat roofs and have timber windows. Each flat has an outdoor terrace, secluded by storey-height walls, which continue to form the walls of the flats themselves.	Medium	Elements of the completed scheme, particularly rooftop plant and chimneys, may feature in some oblique views from the college. However these views will be substantially filtered by the presence of intervening boundary planting.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the flats.	Negligible **Not significant**
Residential Courts at Churchill College (11227711) Grade II listed Two to three storey student residences constructed in 1961-68 by Sheppard, Robson and Partners. The building is constructed from brown brick and concrete and has varnished timber windows. The flat roofs are covered in copper. The facades are irregular with projecting brick bay windows at intervals,	Medium	The residential courts are located to the north of the Churchill college campus set in an open lawn with some scattered tree planting, and the other college buildings to the south and east. The landscape dips slightly to the north of the campus, which somewhat constrains outward views. Glimpsed views of the roofscape of the Proposed Development may be possible from some upper floors of the college building.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the residences.	Neutral **Not significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Wolfson Hall, Bracken Library and Bevin Rooms (1126008) Grade II listed. Two storey library with reading rooms and hall built in 1961-68 by Sheppard Robson and Partners. The building is constructed from brown brick and concrete. There is an external door of sculpted metal by Geoffrey Clarke.	Medium	The building is located within an irregular courtyard created by the southern residential courts (qv, 1126007) with no outward views to the surrounding landscape.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the library.	Neutral **Not significant**
Central Buildings Churchill College (1227706) Grade II listed. Two storey college building containing dining room and kitchens, common rooms, boiler house, college offices and main entrance built in 1961- 68 by Sheppard Robson and Partners. The building is constructed in an irregular 'H' plan from brown brick and concrete, both pre-cast and board-marked. The dining hall forms the link between the two parallel ranges.	Medium	The building is located to the north of the campus. Outward views are highly constrained by the campus buildings to the south (the residentially courts and the Wolfson Hall and Library, qv) there are therefore limited outward views to the surrounding landscape.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the college building.	Neutral **Not Significant**
Residential Courts at Churchill College (1126007) Grade II listed. Four linked residential courts of two to three storeys located due south-west of the Central Buildings of Churchill College GV II Student residences built in 1961-68 by Sheppard, Robson and Partners. The building is constructed from brown brick and concrete, and has varnished timber windows. The building has flat roofs covered in copper.	Medium	The residential courts are located to the south of the Churchill campus, immediately to the north of Madingley Road. The buildings are low lying, and outward views in the direction of the Site are highly constrained by boundary landscaping and planting to the college campus. The campus site is bound by a high grassy bund and scattered tree planting, and the dense boundary planting to the Site. Rooftop plant and the energy centre stack, might be discernable above the tree line in some oblique views but this would not impact on the setting of the building.	No mitigation is proposed	Negligible	There will be no residual effect to the setting of the residential courts.	Neutral **Not significant**
31 Madingley Road (1268371) Grade II listed. Early Modern Movement style house of two storeys rising to three storeys at the west end.	Medium	The house is set in densely landscaped grounds. Views to the Site are screened by the intervening development along Wilberforce Road and Bulstrode Gardens.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the house.	Neutral **Not Significant**
House and Brock Brothers Studio (1331872) Grade II listed. A house dating from the late 18th century with later 19th and 20th century additions, including a purpose-built artist's studio dating from 1908, designed by the Brock brothers for their own use. The principal elevation (north) is of three storeys and four bays. It has two flat-roofed polygonal bays to the ground and first floor with cornice detail, and contains twelve-pane vertical sash windows. The main entrance contains a late 18th century Roman Doric doorcase with fluted pilasters and pediment, and classical door with fielded panels and mouldings.	Medium	The house is located to the south of Madingley Road. Some filtered views of the Proposed Development may be possible from upper rear windows, however these will largely be filtered by intervening buildings and planting and would not impact the setting of the building.	No mitigation	Negligible	There will be no residual effect to the setting of the house.	Neutral **Not significant**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
9 Wilberforce Road (1268352) Grade II listed. Two storey Modern Movement house built in 1937 by D. Cosens. The building is constructed from whitewashed brick laid in Flemish bond with a bituminous felt roof. Rectangular plan with a recessed corner section at south-east corner.	Medium	The house is located opposite the Emmanuel College Sports Pitches, with the existing buildings on the Site visible beyond the trees lining Clerk Maxwell Road. The rooftops and taller elements of the Proposed Development will be visible in distant views over the Emmanuel College sports pitches, resulting in a densification of modern large buildings in the setting of the listed building and altering key views from the asset.	No mitigation is proposed	Minor Adverse	Some medium range views of the Proposed Development would result in permanent adverse effects to the setting of the house.	Slight Adverse **Not Significant**
Emmanuel College Sports Pavilion, including grounds man's house and stables (1422595) Grade II listed. Sports pavilion with attached Groundsman's House and separate stable, built for Emmanuel College in 1910. Complex roofscape of steep, sweeping pitches and hipped roof surmounted by a decorative copper cupola which has a polygonal base and a weathervane.	Medium	The constructed elements of the masterplan are visible in views across the sports pitches, though they are somewhat screened by the presence of tree screening and intervening housing. The rooftops and taller elements of the Proposed Development will be visible in distant views over the Emmanuel College sports pitches, resulting in a densification of modern large buildings in the setting of the listed building and altering key views from the asset.	No mitigation is proposed	Minor Adverse	Some medium range views of rooftops, rooftop plant and the energy centre stack would result in permanent adverse effects to the setting of the pavilion and house.	Slight Adverse **Not Significant**
Garden at 48 Storeys Way (1422759) Grade II Registered Park and Garden. Suburban Arts and Crafts garden laid out in 1913 to the designs of M. H. Baillie Scott. The garden forms a series of six outdoor 'apartments', as Baillie Scott called them, which change in character. They are laid out on a system of cross axes which provide vistas along the length and width of the garden.	Medium	Intervening buildings, particularly the Moller Centre and Churchill College, and the topography of the landform ensures that there are no views of the Site which could result in impacts to the setting of the garden.	No Mitigation is proposed	Neutral	There will be no residual effect to the setting of the garden.	Neutral **Not Significant**
Conduit Head Road Conservation Area The conservation area comprises 20th century residential development, built in a piecemeal fashion from approximately 1914. A number of modernist houses built in the 1930s and 1960s, are of particular note. These buildings provide a high quality and progressive architectural character to the area.	Medium	The Proposed Development will consist of a number of large contemporary buildings immediately to the south of the conservation area boundary, and will be highly visible from the southern extent of the conservation area, particularly the portion of the conservation area on Madingley Road and the southernmost part of Conduit Head Road. This will be a substantial change to the immediate setting of the conservation area. The dense tree planting and shrubbery will screen the development from the northern part of the conservation area.	No mitigation is proposed	Moderate Adverse	Direct close views of the Proposed Development from the southern end of the conservation area will result in permanent adverse effects to the setting of the conservation area.	Moderate Adverse **Significant Effect**
West Cambridge Conservation Area The conservation area is notable for its spacious residential streets lined with large mainly detached 19th and 20th century houses. A variety of college and university buildings are included in the conservation area. Despite the differences in the form, scale and materials between the residential and collegiate buildings the very high quality of nearly all the structures ensures that the area retains spatial cohesion. Green open spaces, including agricultural land and the college playing fields and tennis courts also contribute to the conservation area's significance.	Medium	The conservation area extends in an arc around the north east corner of the Site. The Proposed Development will feature prominently in the west and north west of the conservation area, as a dense collection of large modern buildings. This will substantially erode the conservation area's relatively tranquil setting. The conservation area draws part of its significance from the interface between the suburban and rural at its western edge; the Proposed Development process will fundamentally alter this relationship. However the Proposed Development will not be appreciable from many of the key areas within the conservation area, including Grange Road and the area surrounding the University Library, due to the presence of intervening buildings, mature tree planting and the low lying topography.	No Mitigation is proposed	Moderate Adverse	Direct close views of the Proposed Development from within the conservation area will result in permanent adverse effects to the setting of the conservation area.	Moderate Adverse **Significant Effect**

Baseline		Impact assessment				
Receptor	**Value**	**Impact**	**Mitigation measure**	**Impact magnitude**	**Residual effect**	**Significance of effect**
Storey's Way Conservation Area The special character of Storey's Way is derived from the fine detached family houses with their spacious gardens, interspersed with the collegiate grounds of Fitzwilliam and Churchill Colleges.	Medium	Some elements of the Proposed Development, particularly tall roof top plant and the energy centre stack, may be visible from the upper rear windows of some of the houses on the south side of the conservation area. These views are largely constrained by the Churchill college buildings, the adjacent Moller Centre and dense planting. The Proposed Development will not be visible from Storey's Way in the central space of the conservation area.	No mitigation is proposed	Negligible	Some glimpsed views from limited locations within the conservation area would not result in significant effects to the setting of the conservation area.	Neutral Not significant
Schlumberger Building Commercial research centre and office designed by Michael Hopkins and completed in 1985. The building is a tented structure suspended between a 'cats cradle' arrangement of struts and supports. The building is both technically innovative, and a highly sculptural treatment for a late 20th century commercial building.	Medium	The Proposed Development will result in an alteration of the current semi-rural setting of the Schlumberger building. Setting makes a limited contribution to the significance of the building and it was always intended that the area surrounding the building be developed in this manner. The architectural significances of the building will remain unaltered by the development in its setting.	No mitigation is proposed	Neutral	The appreciation of the Schlumberger building will not be affected by the Proposed Development. There would be no residual effects to the appreciation of the building.	Neutral Not significant

Appendix 8.1 Arboriculture Impact Assessment

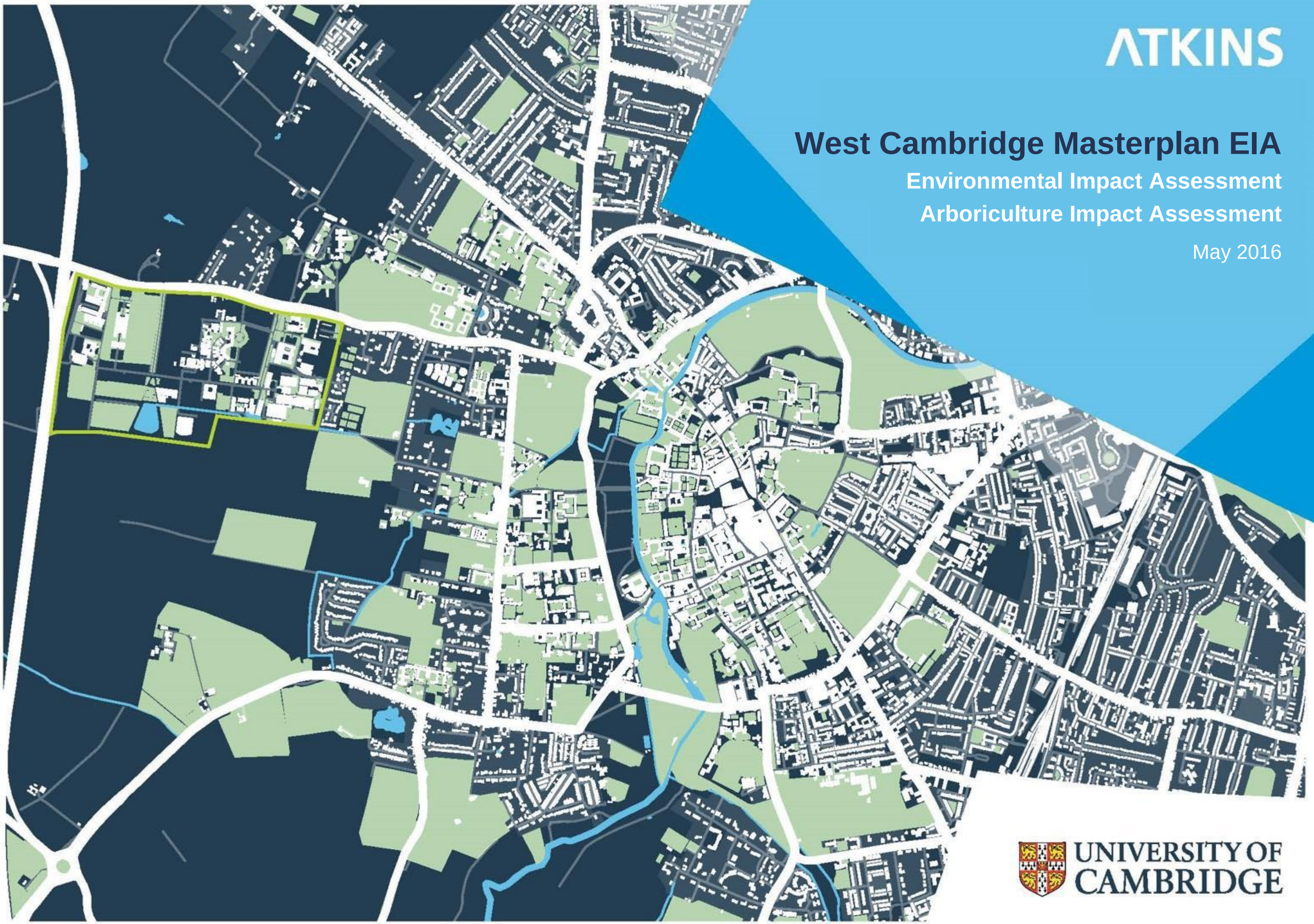
ATKINS

West Cambridge Masterplan EIA

Environmental Impact Assessment

Arboriculture Impact Assessment

May 2016



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Document History

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Rev 1.0	Draft	TD	JH	DP	PW	25/02/15
Rev 2.0	Planning submission	TD	JH	DP	PW	17/05/16

EIA Quality Mark

This Environmental Statement and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development have been undertaken in line with our commitments as members of the EIA Quality Mark.

The EIA Quality Mark is a voluntary scheme operated by the Institute of Environmental Management and Assessment (IEMA) through our EIA activities are independently reviewed, on an annual basis, to ensure we continue to deliver excellence in the following areas:

EIA Management
EIA Team Capabilities
EIA Regulatory Compliance
EIA Context & Influence
EIA Content
EIA Presentation
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Contents

1. Introduction

1.1 Terms of reference

1.1.1 Atkins Limited (Atkins) has been commissioned by the University of Cambridge to undertake a tree survey in accordance with BS5837:2012 Trees in relation to design, demolition and construction – Recommendations, in support of an outline planning application (OPA) for the development of the West Cambridge site.

1.1.2 An existing masterplan for the site was approved in 1999 and reviewed in 2004 and currently forms the basis of the development on site. Accordingly, the academic and residential components have been delivered to the anticipated levels, but the commercial research and shared facilities components are below the envisaged 1999 masterplan. Policy 18 of the Draft Submission Local Plan supports the densification of the development through a revised masterplan subject to a number of conditions. It is within this context that the University of Cambridge is producing a new masterplan for the West Cambridge site which significantly increases the amount of development to approximately 423,000m^2.

1.1.3 The survey extents included all the trees within the West Cambridge Site as illustrated on the supplied topographical drawings produced by Greenhatch Group for Peter Brett Associates.

1.2 The application site

1.2.1 The West Cambridge site is located approximately 2km to the north-west of the centre of Cambridge in Cambridgeshire on the urban fringe of the city. The site is bound by Madingley Road to the north and by residential properties to the east. The M11 forms the western boundary to the site, beyond which lies agricultural land. Agricultural land bounds the site to the south.

1.2.2 The West Cambridge site is 66ha in area and comprises a mix of land uses including academic, commercial, sports, and residential. The site has undergone extensive development with completed buildings and areas under construction. These are supported by a network of roads and footpaths, car parks, formal landscaped public realm areas, and large paddocks associated with the veterinary school.

1.3 Proposed works

1.3.1 The masterplan approved in 1999 (planning application reference C/97/0961/OP) and reviewed in 2004 envisaged just under 250,000m^2 of development together with the pre-existing development on the site. The University of Cambridge is proposing densification of the development through a revised masterplan to increase the amount of development on site to approximately 423,000m^2. This is to be achieved through demolishing older existing buildings such as the Department of Veterinary Medicine Buildings and the Whittle Laboratory, and through developing areas of open space.

1.3.2 This impact assessment has been produced using the latest version (dated 19th August 2015) of the produced parameter plans. These parameter plans have been overlaid onto the tree survey drawings to produce a set of tree protection plans.

1.4 Scope of works

1.4.1 This report presents Arboricultural information captured on 16th to 18th February 2015 by Atkins Senior Arboriculturist Tom Dale M.Arbor.A Cert Arb L6 (ABC), accompanied by Senior Landscape Architect Jonathan Hesketh on 17th to 18th February. The scope of works includes the survey of trees within the site boundary and the production of an Arboricultural Impact Assessment with accompanying tree protection plans.

2. Methodology

2.1 General

2.1.1 This Arboricultural Impact Assessment has been undertaken in accordance with BS5837:2012 Trees in relation to design, demolition and construction – Recommendations. The standard gives recommendations and guidance on the relationship between trees and design, demolition and construction process, setting out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures.

2.2 Spatial Scope

2.2.1 The survey works spanned three days and concentrated on all the trees illustrated on the supplied topographical drawing produced by Greenhatch Group, drawing number 21144.

2.3 Data Gathering

2.3.1 Data was collected in accordance with BS5837:2012, as outlined in Appendix A of this report. The purpose of the tree categorisation method applied by the Arboriculturist, being to identity the quality and value (in a non-fiscal sense) of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained if development is to occur.

2.3.2 For a tree to qualify under any given category, it should fall within the scope of that category's definition as defined in Figure A2 in Appendix A (category's U, A, B, C) and, for trees in categories A to C, it should qualify under one or more of the three subcategories (1, 2, 3). Subcategories 1, 2 and 3 are intended to reflect arboricultural and landscape qualities, and cultural values, respectively.

2.3.3 Trees were recorded as individual specimens and as groups. Where trees were recorded as groups measurements were taken from the largest tree within the group for the purposes of establishing data for the tree survey drawings. This level of survey meets the requirements of BS5837:2012, which states that *'trees growing as groups or woodland should be identified and assessed as such'*. The BS defines the term group as *'trees that form cohesive arboricultural features either aerodynamically (e.g. trees that provide companion shelter), visually (e.g. avenues or screens) or culturally including for biodiversity (e.g. parkland or wood pasture).'*

2.3.4 Crown spreads of the surveyed trees were given as an average measurement or to the relevant cardinal points with regards to the site. The average measurement was taken from the cardinal point relevant to the direction of the site or any proposals. This level of survey is deemed sufficient by the Arboriculturist in order to establish the extent of the crown spread in the direction of any future proposals. All crown spread measurements should be taken from the tree survey schedules

2.3.5 The trees were assessed in line with the Visual Tree Assessment (VTA) method as developed by Mattheck and Breloer (1994). This method is based on the axiom of uniform stress, whereby a tree will grow in response to environmental stimuli to produce a structure that bears forces evenly across its surface. As such an internal defect, such as decay, would initiate a noticeable change in the stem's shape to accommodate the physical change.

2.4 Survey

2.4.1 The locations of all the individual trees and the outlines of groups were taken from the supplied topographical data.

2.4.2 It is to be noted that trees were primarily recorded as groups based on their value being achieved through their collective landscape functions as avenues or screens, rather than trees of high arboricultural significance. Significant trees were also recorded as individual specimens. Significant trees in the context of this survey were trees of clearly identifiable cultural importance, mature specimens or dominant trees in groups.

2.4.3 The majority of trees onsite have been planted within the last ten years meaning they are still small in scale and replaceable. The survey primarily identified these trees as groups or identified significant trees within these groups where they require specific works.

2.4.4 The trees on site have been subjected to past surveys with numbered aluminium tags on the majority of trees. The ones missing likely to be a result of tree growth, as such the Arboriculturist has adopted their own number system commencing from 001 for individual trees and G001 for groups of trees. Where individual trees were recorded their tree tags were also captured in the tree survey schedules, where they were still attached. For tree groups the Arboriculturist recorded the tag number of the largest tree in the group where it was still attached.

2.5 Limitations to Survey

2.5.1 Trees were identified and inspected from ground level only and were not climbed. No invasive examination techniques (such as increment boring, or internal decay detection) were carried out and as such no assessment of the internal condition of the wood of these trees can be given. The tree survey undertaken is not intended to be a tree risk management survey targeting safety related issues. However, where specific hazards have been identified these have been recorded and management recommendations provided.

2.5.2 Where access permitted a Forest Ace Laser Hypsometer was used to measure tree heights and crown spreads of the tree stock.

2.5.3 BS5837: 2012 does not include arguments for or against development, or for the removal or retention of trees. Where development is to occur the standard provides guidance on how to decide which trees are appropriate for retention.

2.5.4 Validity, accuracy and findings of the tree locations will directly relate to the accuracy of information provided at the time of the survey, i.e. the supplied topographical drawing. Where tree groups have been illustrated as an outline this covers the extents of the tree group. It does not always illustrate individual trees within the groups. Where significant trees were identified in these groups they were plotted separately.

2.5.5 The report does not comment on possible effects of trees on neighbouring properties, including in relation to subsidence or heave, or with regard to possible hazards presented by trees surveyed. Neighbouring owners of trees that are identified as posing a possible risk to the property/site in question should seek their own advice as to possible effects of the recommendations given within this report.

2.5.6 Damage to, or possibility of damage to, any other structure that is not referred to within the report is not considered unless otherwise specified. This includes both neighbouring structures and any other structure on the property.

2.5.7 Trees are living organisms subject to changes outside human control. Trees and their environment alter with the seasons and it is as well to inspect trees whilst in full leaf and when out of leaf. Following harsh or unexpected weather conditions, or heavy storms it is also prudent to inspect trees. Changes to ground water conditions will affect the root growth of a tree. Such changes are not always the result of human influence and other factors may be involved.

3. Existing Site Conditions

3.1 Existing Land Use

3.1.1 The site is 66ha in area comprising a range of land uses including built infrastructure for academic, commercial and residential use divided by internal access roads, pedestrian routes and water features. There are expanses of open grassland located around the site as part of new informal and formal landscape features, as well as grazing pasture and areas of land left redundant for future development.

3.1.2 There are three main roads crossing the site in a north-south direction; JJ Thompson Avenue, High Cross Road and No Name Road. JJ Thompson Avenue and High Cross Site Road both provide access to the West Cambridge site from the A1303 Madingley Road.

3.2 Existing Tree Stock

3.2.1 The trees within the site are predominantly newly planted or young specimens planted within the past ten years as part of the developments undertaken on site. These form distinct avenues or formal lines of trees located in areas of public usage or denoting formal access routes. The repetition of species selection and planting structure is indicative of formal planting schemes with distinct lines or avenues being created. The species selection for these formal planting areas is typical for avenue features with Lime and London Plane being the species primarily used. The limited age of these trees reduces their arboricultural value at present. However, over time this will increase with their maturity.

3.2.2 The site also accommodates concentrations of newly planted or young trees within informal planting schemes located around wildlife features, (e.g. water features), and as part of reinforcing screening to views into the site from all cardinal points. These vegetative screens comprise woodland planting plots with trees and shrubs or groups of individual closely planted trees. The species selection is varied however Common Ash, Lime and English Oak dominate the climax tree species composition.

3.2.3 There are individual and groups of more mature trees located within the site, again forming distinct lines of trees or prominent standard specimens in formal and informal areas. The trees of note are the mature English Oaks forming remnants of old field boundaries in the north and south aspects of the site (tree refs 024, 037-039 & 063-068; the mature Silver Maples (tree refs 043 & G069) growing around the veterinary school; the prominent avenue of semi to early mature Lime trees (tree refs G57) leading to these facilities; the veteran Horse Chestnut within one of the north east car parks (tree ref 014); and the mature Willow specimens located sporadically around the pond area to the south of the site (tree refs 001, 013 & G37) . These trees are prominent specimens given their age, size and maturity. Their vitality and structural conditions were varied. However, the majority were in good vitality.

3.2.4 The northern and western boundaries sustain linear belts of more mature trees and shrubs that provide full or partial screening to views into the site from these locations. The tree stock again is varied in these locations including Ash and Sycamore. However, self-sown Elm trees are prevalent throughout. There are some more mature Elms that have been able to withstand Dutch Elm Disease to the east of JJ Thompson Avenue, but the majority are limited to young trees that have established from old tree stumps cut back in the past due to poor structural condition.

3.3 Site Topography

3.3.1 The site is set at grade with no significant level changes recorded throughout the site, except for localised planted earth mounds.

3.4 Soil Assessment

3.4.1 No soil assessment was carried out on site by the Arboriculturist although base line data from the British Geological Survey[1] states the site supports an area of mudstone bedrock with no superficial deposits recorded.

[1] http://www.bgs.ac.uk

4. Summary of Tree Condition

4.1 Number of Trees Recorded

4.1.1 The survey captured 76 no. individual trees, 110 no. groups and 4 no. woodlands on site as part of formal and informal groups located throughout the site.

4.2 General Condition Details

4.2.1 The survey sheets in Appendix B provide more detail on all the trees surveyed on site. In general the trees on site were showing signs of fair to good vitality with average bud formation and coverage for the tree species and locality. The trees varied in age structure with the majority being young trees.

4.2.2 The criteria for establishing tree BS Categories is detailed within the cascade chart in Appendix A of the report. This chart is taken from BS5837:2012.

4.2.3 In general BS Category A trees are high quality trees with an estimated 40+ years useful remaining life expectancy. These trees are often dominant trees in groups or ancient veteran specimens that offer high landscape amenity value or are of significant arboricultural or cultural value. The survey captured 13no. BS Category A trees as individual trees or groups.

4.2.4 In general BS Category B trees are those of moderate quality with an estimated 20+ year's useful remaining life expectancy. The trees are often downgraded due to remedial defects such as storm damage, over extended limbs, asymmetrical crowns or limited past management intervention. The survey captured 63no. BS Category B trees as individual trees or groups.

4.2.5 In general BS Category C trees are of low quality due to their young age or due to poor condition with an estimated 10+ year's useful remaining life expectancy. Whilst by definition such trees are of low quality as defined by their BS Category ratings they can still offer landscape amenity value as part of larger groups. The survey captured 108no. BS Category C trees as individual trees or groups. The majority of trees obtained a BS Category rating given their young age.

4.2.6 In general BS Category U trees are trees with serious structural defects or trees in poor physiological condition that reduces their remaining useful life expectancies below 10years. Where U trees have been recorded they may require remedial works to reduce the risk of harm to people or property that could be reasonably foreseen as coming into contact with the trees. These works should form part of tree risk management operations for the site. The survey captured 3no. BS Category U trees.

4.2.7 Preliminary management recommendations have been recorded for certain of trees surveyed on site. These works have been identified as part of managing the risk of failure or damage to people or property within proximity of the particular tree. These works should form part of the tree risk management strategy for the site and be undertaken independent of the proposals.

5. Arboricultural Impacts

5.1 General

5.1.1 This survey takes into account the tree stock deemed likely to be affected by the proposed scheme and identifies their condition and suitability for retention. The tree protection plans illustrate the extents of the survey area, the root protection area (RPA) for each tree or trees and the current parameter plans for developing the site.

5.1.2 The British Standard relies heavily on the creation of a protected zone referred to as the RPA around each tree. This is the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. This area should be protected from disturbance "in order to avoid unacceptable damage to the tree as a result of severance or asphyxiation of the root system." The recommended minimum area (m^2) for each tree to avoid potentially harmful disturbance has been calculated for all of the trees on site and entered into the tree schedule and is illustrated on the tree survey drawings.

5.1.3 The RPA(s) for each tree or group of trees is illustrated as a circle or an offset from the centre of the tree group or stem. This area does not take into account pre-existing site conditions or other factors that can influence or modify the shape and disposition of tree roots. Accordingly, the Arboriculturist can make modifications or judgements on the likely extents of RPAs, where through professional judgement it is deemed likely that the root zones have been restricted in a certain direction because of limiting factors such as; topography, drainage or the presence of existing built infrastructure.

5.2 Scheme details

5.2.1 The proposals are covered in detail within the ES and the planning drawings. It must be noted that the incorporated parameters plans do not include any detailed designs, they merely cover the development plots. As such the Arboriculturist has had to adopt a worst case scenario to fulfil this impact assessment meaning all trees within the development plots have currently been shown for removal on the tree protection plans. However, designers should use this impact assessment and accompanying tree protection plans to create sympathetic designs to enable the retention of trees where feasible on site, especially mature trees or groups that offer high landscape amenity value.

5.2.2 As no construction methodologies are not readily known and the detailed designs are to still to be completed the location of any specific mitigation measures to facilitate the proposals, including the location of protective barriers, ground protection and facilitation pruning, will have to be defined within an Arboricultural Method Statement (AMS) and there locations illustrated on updated TPPs, where required.

5.3 Arboricultural Impacts

5.3.1 The table below outlines the impacts of the proposals on the tree stock on site and likely mitigation measures required to facilitate the works.

Table 5.1 Tree stock and works

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
001(0626)	Crack Willow	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G001(0625)	Limex4	C2	X-4	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G002	Elmx14, Sycamorex1, Hawthorn, Elder	B2	N/A	N/A	Trees outside of development areas.
G003	Elm, Elder, Hawthorn	C2	N/A	N/A	Trees outside of development areas.
G003A	Common Ash, Norway Maple, Sycamore,	B2	N/A	N/A	Trees outside of development areas.
G004(0571)	Lime	B2	N/A	N/A	Trees outside of development areas.
G005(0619)	Lime	B2	N/A	N/A	Trees outside of development areas.
G006(0629)	Common Ash	C2	X-11	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G007	Hazel, Blackthorn	C2	X-13	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G008(0866)	Common Ash	C2	X-13	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G009(0857)	Common Ash	C2	N/A	N/A	Trees outside of development areas.
002	Silver Birch	C1	N/A	N/A	Tree outside of development areas.
G010(0851)	English Oak "fastigata"	C2	X-5	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
003(0822)	Turkey Oak	B2	N/A	N/A	Tree outside of development areas.
004(0821)	Turkey Oak	B2	N/A	N/A	Tree outside of development areas.
005(0820)	Turkey Oak	B2	N/A	N/A	Tree outside of development areas.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
G011(0702)	Common Alder	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G012(0694)	Cherry	B2	X-18	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
G013	Liquid Amber x5	C2	X-5	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G014	Common Ash, Field Maple	B2	X-704m^2	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
G015(1760)	Callery Pear	C2	X-50	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G016	Common Ash, Lime, English Oak, Cherry, Hazel	C2	X-4997m^2	N/A	Sections of tree group located within development areas. Trees of low quality as defined by BS Category.
006	Leyland Cypress	B2	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
007	Lombardy Poplar	C2	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G017	Field Maplex3	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G018 (008-011)	Common Ash, Norway Maple	B2	N/A	N/A	Trees outside of development areas.
G019(1686)	English Oak, Beech, Lime, Horse Chestnut	B2, U	N/A	X-1	Trees outside of development areas. Fell 1691- horse chestnut in decline due to Bleeding canker and honey fungus on surface roots & on stems.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
012(1704)	Common Ash	B1/2	N/A	N/A	Tree outside of development areas.
G020(1703)	English Oak, Beech, Lime	C2	N/A	N/A	Trees outside of development areas.
G021(1706)	English Oak, Chery, Horse Chestnut Beech, Lime	C2	N/A	N/A	Trees outside of development areas.
013(1718)	Weeping Willow	B1/2	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
014	Horse Chestnut	B3	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
G022A	Grey Poplarx4	B2	N/A	N/A	Trees outside of development areas.
G022	Field Maple, Common Ash, Cherry, Hazel	C2	N/A	N/A	Trees outside of development areas.
015	Sycamore	B2	N/A	N/A	Tree outside of development areas.
016	Sycamore	B2	N/A	N/A	Tree outside of development areas.
017	Hawthorn	C2	N/A	N/A	Tree outside of development areas.
G023(0661)	Common Ash	C2	X-22	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G024	Grey Poplar, Common Ash, Cherry, Silver Birch, Hawthorn, Lime, English Oak	B2	X-75m^2	N/A	Part of tree group located within a development area. Trees of moderate quality as defined by BS Category.
G025(0719)	Lime	C2	X-13	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G026(0725)	Cherry	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
018(0728)	Himalayan birch	C2	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G027	Common Ash	C2	X-9	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
019(0807)	Horse Chestnut	C2	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G028	Flowering Cherry, Cockspur thorn	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G029	Himalayan birch	C2	X-16	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G030(0803)	Weeping Ashx3	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G031	Not Identified	C2	N/A	N/A	Tree outside of development areas.
G032(0796)	White beamx3	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
020(0800)	Whitebeam	B1	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
G033(0784)	Whitebeam, Crab Apple	C2	N/A	N/A	Trees outside of development areas.
G034(0776)	Silver Birch	B2	N/A	N/A	Trees outside of development areas.
021	Flowering Cherry	B1/3	N/A	N/A	Tree outside of development areas.
G035(0760)	Alderx3	B2	N/A	N/A	Trees outside of development areas.
G036(0759)	Willow leaved Pearx4	B2	N/A	N/A	Trees outside of development areas.
G037(0756)	Weeping Willowx8	B2	N/A	N/A	Trees outside of development areas. Trees must be retained as defined within the West Cambridge Design Guidelines.
022(0753)	Field Maple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G038(0740)	Horse Chestnut	B2	N/A	N/A	Trees outside of development areas. Trees must be retained as defined within the West Cambridge Design Guidelines.
G039(0747)	Alderx3	C2	N/A	N/A	Trees outside of development areas.
023(0744)	White Willow	C2	N/A	N/A	Tree outside of development areas.
G040	Cherry, English Oak, Lime	C2	N/A	N/A	Trees outside of development areas.
G041	Field Maple, Elm, Alder, Hazel, Hawthorn,	C2	N/A	N/A	Trees outside of development areas.
024(1562)	English Oak	A1/2/3	N/A	N/A	Tree outside of development areas. Tree must be retained as defined within the West Cambridge Design Guidelines.
G042	Weeping Willow	C2	N/A	N/A	Trees outside of development areas.
G043	Crack Willow	C3	N/A	N/A	Trees outside of development areas.
G044	Cherry	U	N/A	X-1	Trees outside of development areas. Fell west tree due to poor structural form.
G045	Crab Apple	C2	X-4	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
025(0787)	Silver Maple	B1	N/A	N/A	Tree outside of development areas.
G046(0789)	Silver Maple	C2	X-6	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G047(0895)	London Plane	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
G048(1030)	Hornbeam	C2	X-90	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G049(1565)	Golden Ash	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
026	Liquid Amber	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
027(1564)	Tulip Tree	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G050	Apple, Silver Birch, Willow	C2	X-29	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G051(1397)	Norway Maple	B2	X-4	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
G052	Snowy mespilus, Pear	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G053	Snowy mespilus, Pear	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G054	London Plane	B2	N/A	N/A	Trees within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
G055(1547)	Lime	B2	X-2	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
G056(1541)	Lime	B2	X-9	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
028(1493)	Norway Maple	B1*	N/A	N/A	Tree outside of development areas. Tree must be retained as defined within the West Cambridge Design Guidelines.
029(1532)	Apple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
030(1530)	Lawson Cypress	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G057(1529)	Lime	A2	N/A	N/A	Trees outside of development areas. Trees must be retained as defined within the West Cambridge Design Guidelines.
G058(1519)	Lime	C2	X-9	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
031(1854)	Luscomb Oak	A1	X	N/A	Tree located within a development area. Tree of high quality as defined by BS Category.
032	Common Ash	B2	N/A	N/A	Tree outside of development areas.
033	Sycamore	B2	N/A	N/A	Tree outside of development areas. Tree must be retained as defined within the West Cambridge Design Guidelines.
034(1897)	Field Maple	B2	N/A	N/A	Tree outside of development areas. Tree must be retained as defined within the West Cambridge Design Guidelines.
035(1896)	Field Maple	C1	N/A	N/A	Tree outside of development areas.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
036(1895)	English Oak	A1	N/A	N/A	Tree outside of development areas. Tree must be retained as defined within the West Cambridge Design Guidelines.
G059(1508)	Common Beech	A2	N/A	N/A	Trees outside of development areas. Trees must be retained as defined within the West Cambridge Design Guidelines.
037	English Oak	A1	N/A	N/A	Tree outside of development areas. Tree must be retained as defined within the West Cambridge Design Guidelines.
038(1892)	English Oak	A1	X	N/A	Tree located within a development area. Tree of high quality as defined by BS Category.
039(1891)	English Oak	A1	N/A	N/A	Tree outside of development areas. Tree must be retained as defined within the West Cambridge Design Guidelines.
G060	Cherry, Elder, Hazel, Sycamore, Lawson Cypress, Common Ash	C2	X-1	N/A	1xTree located within a development area. Tree of low quality as defined by BS Category.
040	Hybrid Black Poplar	C1/2	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
041(1494)	English Oak	B1/2	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
042	Blue Atlantic Cedar	B2	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
043(1497)	Silver Maple	B2	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
044(1398)	Norway Maple	B2	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
G061(1448)	Silver Birch	C2	X-19	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G062(1445)	Norway Maple	B2	X-2	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
045(1440)	Cappadocian Maple	C2	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G063	Leyland cypress	C2	X-200m^2	N/A	Tree group located within a development area. Trees of low quality as defined by BS Category.
046(1426)	Cappadocian Maple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G064(1423)	Flowering Cherry	B2	N/A	N/A	Trees within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
047	Elder	C1	N/A	N/A	Tree outside of development areas.
048(1420)	Black Mulberry	B1	N/A	N/A	Tree outside of development areas.
049(1419)	Flowering Cherry	B1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G065(1470)	Cherry	C2	X-2	N/A	2xTrees located within a development area. Trees of low quality as defined by BS Category.
G066(1461)	Silver Birch	B2	N/A	N/A	Trees within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
G067(1474)	Lime	B2	N/A	N/A	Trees within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
050(1475)	Sweet Gum	C1	N/A	N/A	Tree outside of development areas.
051(1476)	Norway Maple	C1	N/A	N/A	Tree outside of development areas.
G068(1456)	Norway Maple	B2	N/A	N/A	Trees within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
G069(1452)	Silver Maple	B2	N/A	N/A	Trees within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
G070(1450)	Crab Apple	B2	N/A	N/A	Trees within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
052(1449)	Crab Apple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G071(1409)	Whitebeam	B2	X-5	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
053	Elder	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G072(1401)	Norway Maple	U, C2	X-6	N/A	Trees located within a development area. Trees of low or poor quality as defined by BS Category.
054	Silver Birch	U	X	X	Tree located within a development area. Tree also recommended for removal due to its poor condition.
G073(1392)	Hornbeam	C2	X-28	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
055(1477)	Hornbeam "fastigata'	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G074	Silver Birch	B2	X-2	N/A	Trees located within a development area. Tree of moderate quality as defined by BS Category.
056	Sycamore	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G075	Elder, Silver Birch, Alder,	C2	X-10	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
057	Silver Birch	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
058(1490)	Silver Maple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
059	Crab Apple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G076	London Plane	B2	N/A	N/A	Trees outside of development areas.
G077(1370)	Lime	B2	X-4	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
060	Horse Chestnut	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
061	Field Maple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
G078	Field Maple, Black thorn	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G079	Hornbeam	C2	X-31	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G080	London Plane	C2	N/A	N/A	Trees outside of development areas.
G081	London Plane	C2	N/A	N/A	Trees outside of development areas.
G082	Hornbeam	C2	X-23	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
062(1084)	Apple	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G083	Sorbus spp	C2	X-12	N/A	Part of group located within a development area. Trees of low quality as defined by BS Category.
G084	London Plane	C2	N/A	N/A	Trees outside of development areas.
G085	Hornbeam	C2	X-85	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G086	Various	C2	N/A	N/A	Trees outside of development areas.
W1	Ash, Field Maple, English Oak, Hawthorn, Hazel	C2	N/A	N/A	Trees outside of development areas.
W2	Ash, Field Maple, English Oak, Hawthorn, Hazel	C2	N/A	N/A	Trees outside of development areas.
063	English Oak	A1/2/3	N/A	N/A	Tree within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
064	English Oak	A1/2/3	N/A	N/A	Tree within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
065	English Oak	A1/2/3	N/A	N/A	Tree within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
066(1839)	English Oak	A1/2/3	N/A	N/A	Tree within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
067(1829)	English Oak	A1/2/3	N/A	N/A	Tree within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
068(1826)	English Oak	B1/2/3	N/A	N/A	Tree within a development area. However, trees must be retained as defined within the West Cambridge Design Guidelines.
G087	English Oakx2	B1/2/3	N/A	N/A	Trees outside of development areas. Trees must be retained as defined within the West Cambridge Design Guidelines
G088(1820)	Common Ash	C2	X-4	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
W3	Field Maple, Common Ash, Elder, Blackthorn, English Oak, Scots Pine	B2	N/A	N/A	Trees outside of development areas.
W4	Field Maple, Common Ash, Elder, Blackthorn, Sycamore	B2	X	N/A	Part of group falls within a development area.
G089	Beechx2	C2	X-2	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G090	Crab Apple, Hawthorn, Elder	C2	X-4 222m^2	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
069	Common Ash	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
G091	Hornbeam, Hawthorn	C2	X-9	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
070(1579)	Service tree	B2/3	N/A	N/A	Tree outside of development areas.
G092(1170)	Sorbus sp	C2	X-4	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G093(1169)	Hornbeam 'fastigata'	B2	X-1	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
071	Honey locust	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G094(1151)	Silver Birch x2	C2	X-2	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G095(1153)	Hornbeamx3, Silver Birchx1, Alder x3	C2	X-7	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
072(1156)	Alder	B1	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
G096	Mixed	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G097(1185)	Mixed	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
073(1184)	Honey locust	C1	N/A	N/A	Tree outside of development areas.
G098(1181)	Weeping birchx6	C2	N/A	N/A	Trees outside of development areas.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
074	Blue Atlantic Cedar	B1	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
G099(0216)	Scots Pine, Whitebeam Silver Birch, Cherry, Elder, Alder, Lawson's Cypress, Goat Willow, Field Maple,	C2	X-37	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
075	Alder	B1	X	N/A	Tree located within a development area. Tree of moderate quality as defined by BS Category.
G100	Pearx4	C2	X-4	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
076	Lawson's cypress	C1	X	N/A	Tree located within a development area. Tree of low quality as defined by BS Category.
G101(1234)	Silver Birch	B2	X-6	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
G102(1250)	Norway Maple	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G103	Silver Birchx3	C2	X-4	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G104(1223)	Norway Maple x3, Scots Pine x1	C2	X-3	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G105	Silver Birch, Hawthorn Scots Pine, Lime, Whitebeam.	B2	N/A	N/A	Tree outside of development areas.

Group/ Tree No.	Species	Cat	Removal due to		Details of how proposed build affects trees
			Cons	Cond	
G106(1341)	Horse chestnutx2, Limex1	C2	N/A	N/A	Tree outside of development areas.
G107(1346)	Cherry	B2	X-6	N/A	Trees located within a development area. Trees of moderate quality as defined by BS Category.
G108	Common Ash, Whitebeam	C2	X-34	N/A	Trees located within a development area. Trees of low quality as defined by BS Category.
G109(1358)	Cherry, Lime	C2	N/A	N/A	Trees outside of development areas.
G110	Various	C2	N/A	N/A	Trees outside of development areas.

5.3.2 The impacts of the proposals have been quantified as accurately as possible given the information available at this time. The proposed development will require the removal of trees through direct impact by trees being located within the proposed development footprints. As previously noted this impact assessment is based on a worst case scenario with the following trees currently requiring removal to facilitate developments onsite:

5.3.3 **941no**. individual trees and **3113m²** of group areas.

5.3.4 When assessing the tree removal it is clear that a considerable number of trees will have to be removed to facilitate the development of the site. However, this does not take into account the potential to retain trees within the different development plots. The designers should consider a sympathetic approach to the layout of any development to incorporate the retention of trees, especially those trees that have been assigned BS Categories of B and A as these are highly desirable for retention. In terms of tree removal justification for any proposals BS Category C trees should generally not hinder development given their low quality either as young trees or trees with limited useful remaining life expectancy. Certain trees have also been shown as 'must be retained' within the West Cambridge Design Guidelines, this details has been reflected in the table. The guidelines also identify trees that should be retained and the designers should use these guidelines to retain as many trees as possible.

5.3.5 This report and accompanying plans should be utilised by the designers to inform the layout of the detailed proposals to retain trees where appropriate. Once the finalised layout of the proposals has been determine the impacts on the trees will need to be quantified by an Arboriculturist. In order to provide details on the trees to be removed and any requirements for facilitation pruning and mitigation measures.

5.3.6 Designers should take into account that trees will tolerate a degree of root zone infringement depending on the works proposed and if they require any excavations, similarly, other factors to consider are species tolerance and the remaining un-surfaced RPA that can be retained. The BS5837 makes reference to 20% as a general rule in determining the amount of RPA infringement that could be achievable.

5.4 Preliminary Management Recommendations

5.4.1 Preliminary management recommendations have been recorded for some of the trees surveyed on site. These works have been identified as part of managing the risk of failure or to benefit the long term potential of the tree group to maximise their wildlife and screening potential.

5.5 Preliminary Mitigation Measures

5.5.1 At present no reference has been made to protective barriers. Once the designs in the different development plots has been finalised the location of mitigation measures shall have to be determined by an Arboriculturist. Protective barriers will be required to create construction exclusion zones (CEZ's) in order to protect the remaining RPA's of trees affected by the proposed works. The CEZ's will be defined as all the areas behind the fencing. Site operations not permitted in the CEZ without consultation with an Arboriculturist include storage of plant, equipment or materials, vehicular or plant access, washing down of vehicles or machinery, handling, discharge or spillage of any substances, including cement washings, actions likely to cause localised water-logging, no mechanical digging, scraping or excavation shall be permitted in the CEZ and no earthworks or changes in the finished ground levels other than those agreed by an Arboriculturist.

5.5.2 The locations of protective barriers will have to be determined at detailed design phase and once construction methodologies are readily known and should be detailed within an Arboricultural Method Statement (AMS). The protective barriers will need to be installed prior to any works commencing. The barriers are to be erected to exclude construction activity in the RPAs of retained trees and are to conform to figure 3b of BS5837:2012 (page 21), a heras type fencing.

5.5.3 The AMS would also identity any further mitigation measures to protect retained trees including the provision of ground protection or hand excavations to reduce the potential of damaging tree root zones.

6. Arboricultural Method Statement

6.1 Heads of Terms

6.1.1 A site specific Arboricultural Method Statement (AMS) will address some or all of the following:

- Removal of existing structures and hard surfacing;
- Installation of temporary ground protection;
- Excavations;
- Installation of new hard surfacing – materials, design constraints and implications for levels;
- Tree works schedule;
- Tree protective barriers;
- A schedule of specific events requiring input or arboricultural supervision.

Appendix A. Key & BS5837:2012 survey table

Tree No: Sequential reference number given to the tree or group of trees as shown on the tree survey drawings.

Species: This is the common name given to the tree. The botanical name is sometimes given.

Height (Ht): tree height from the base of the tree to its heights stem, measured in metres (m). Measurements are taken to the nearest half metre.

Stem diameter (mm): measured in accordance with figure A1 below. Measurements rounded to the nearest 10mm.

Branch spread (m): measurement of crown spread to the four cardinal points, if the crown is balanced a single measurement is given. Crown spread plotted on the tree survey drawings. Measurements are taken to the nearest half metre.

1st significant branch and direction of growth (m): measurement of the height of the first significant branch above ground level, given in metres and direction of growth e.g. 2.4-N

Canopy height (m): height of the canopy above ground level. Measurements are taken to the nearest half metre.

Life stage: The following abbreviations are used:

Y = Young trees <1/5 life expectancy.

SM = Semi-Mature trees 1/5 – 2/5 life expectancy.

EM = Early Mature trees 2/5 – 3/5 life expectancy.

M = Mature trees 3/5 – 4/5 life expectancy

OM= Over-Mature trees >4/5 life expectancy

General observations, particularly of structural and/or physiological condition: e.g. observations of the any decay and physical defect.

Preliminary management recommendations: any identified preliminary management to rectify defects recorded in general observations. These may include the need for further detailed inspection, or works to address immediate hazard to life or property.

Estimated remaining contribution, in years:

<10

10+

20+

40+

Category grading: As per BS5837:2012 chart in accordance with figure A2 below.

A – Illustrated as light green (RGB code 000-255-000)

B – Illustrated as Mid blue (RGB code 000-000-255)

C – Illustrated as Grey (RGB code 091-091-091)

U – Illustrated as Dark red (RGB code 127-000-000)

Root Protection Area (m^2): plotted around each of the category A, B and C trees on relevant drawings, and illustrates the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability , and where the protection of the roots and soil structure is treated as paramount.

(Note: Red hash tag '#' will denote that a measurement is estimated)

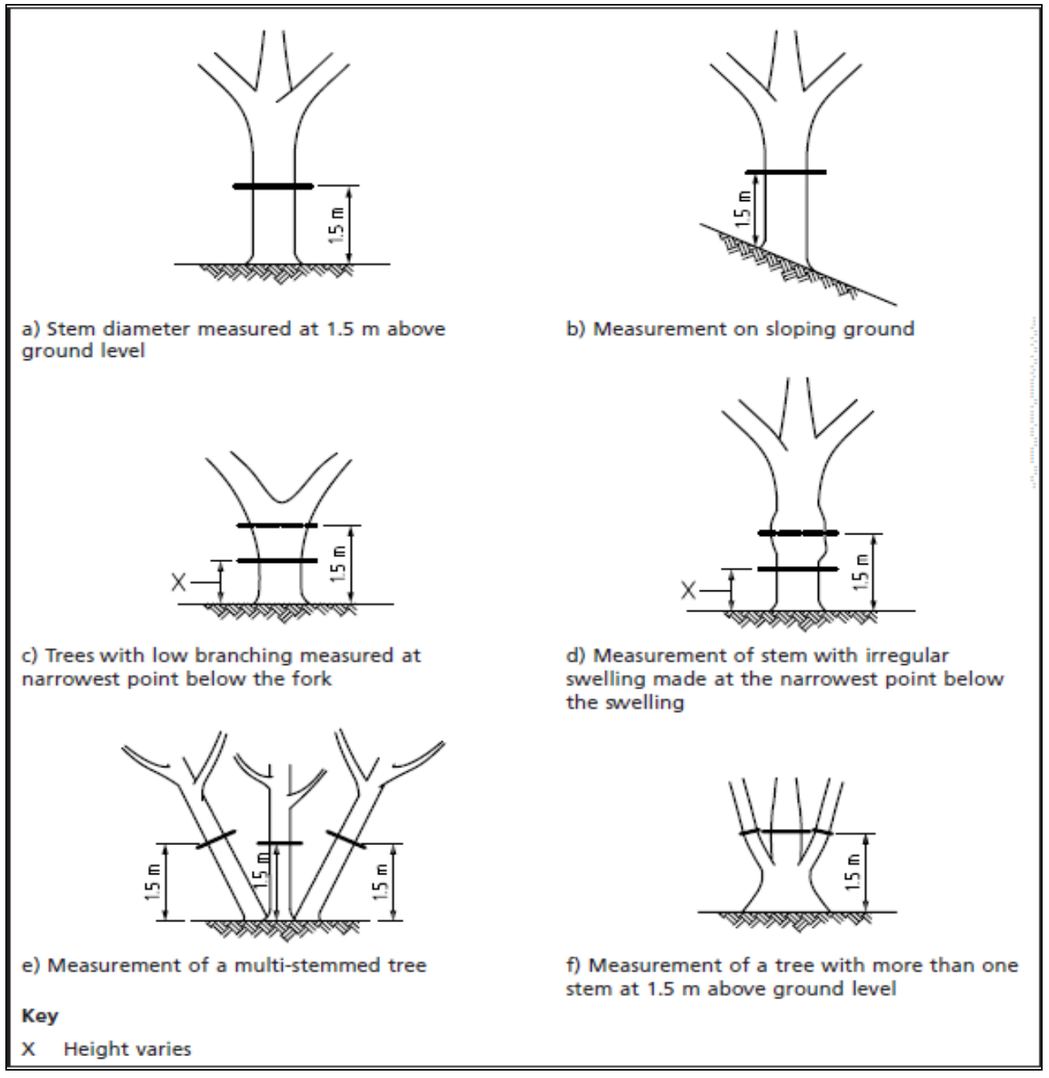


Figure A.1 Measurement of tree stems dependant on tree form

Table A.1 Cascade chart for tree quality assessment from BS5837:2012

Category and definition	Criteria (including subcategories where appropriate)		
Trees unsuitable for retention (see Note)			
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.*		
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**
Trees to be considered for retention			
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value

Appendix B. Tree survey schedules

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
001(0626)	Crack Willow	10	1250	6	3-SW	1.8	OM	Fair vitality. Crown topped at 7m. Rapid regenerated stems at pruning wounds. Onset of decay visible at pruning points with deadwood and Un-occluded wounds.	Manage as reduced tree	10+	C1	15.0
G001(0625)	Limex4	To 7	220	To 3.5	n/a	1.8	Y	Line of 4 trees. Good vitality throughout. Some tight forks in canopies. Not significant at present. No apparent significant structural defects recorded	No works presently required	40+	C2	2.6
G002	Elmx14, Sycamorex1, Hawthorn, Elder	To 20	250-700	To S-8	n/a	GL	Y-M	Small informal group. Occasional elder & hawthorn. Predominantly elm. Ivy clad stems, including dead ivy. Mutual crown suppression. Drawn forms on younger trees. Some failed stems at ground level. Small diameter deadwood in crowns. No visible signs of Dutch elm disease. Fair to good vitality throughout.	Sever regenerated ivy.	20+	B2	8.4
G003	Elm, Elder, Hawthorn	To 6	To 250	To N-4	n/a	GL	Y-EM	Informal linear group of predominantly self-sown elm, forming old field boundary hedgerow in places. Stumps of dead elms in sporadically located throughout group. Dead elm management evident with felled stems. Remaining live tree previously cut to 1m. Hawthorn & elder within group as well. Heavy ivy encroachment on stems, suppression of crowns - small diameter deadwood present. Fair vitality.	Sever ivy on stems, fell dead elms. Cut back over extended branches towards footpath.	10+	C2	3.0
G003A	Common Ash, Norway Maple, Sycamore,	To 16	To 300x2	To S-8	n/a	GL	SM-EM	Part of boundary vegetation. Intermittent trees. Single & multi stem forms suggesting past coppice management or self-sown. Heavy ivy encroachment on stems & dead ivy in places where it has been severed. Fair vitality throughout, deadwood in crowns and sections of dieback from ivy shading and competition for light. Leans and drawn stems	Sever ivy, remove deadwood overhanging footpath	20+	B2	5.1
G004(0571)	Lime	To 7	To 290	To 4	n/a	1.8	Y	Linear planting forming an avenue. Pruning wounds in crowns from crown lifting. Good vitality throughout. Some tight forks in crowns, synonymous of species and not significant at present.	No works presently required	40+	B2	3.5

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G005(0619)	Lime	To 7	To 230	To 4	n/a	1.8	Y	Linear planting forming an avenue. Pruning wounds in crowns from crown lifting. Mistletoe in crown tree-0599, not significant. Good vitality throughout. Some tight forks in crowns, synonymous of species and not significant at present.	No works presently required	40+	B2	2.8
G006(0629)	Common Ash	To 7	To 190	To 3.5	n/a	1.8	Y	Linear planting forming an avenue feature. Good vitality throughout. No signs of ash dieback. Rabbit wire on main stems of northern line. Potential to restrict main stem growth. No apparent significant structural defects recorded	Remove or loosen rabbit wire	20+	C2	2.3
G007	Hazel, Blackthorn	To 4	To 100	To 2	n/a	GL	Y	Linear plot of shrubs. Good vitality. Screening function. No apparent significant structural defects recorded	No works presently required	20+	C2	1.2
G008(0866)	Common Ash	To 7	To 110	To 2	n/a	1.8	Y	Line of trees set within a beech hedgerow. Good vitality. No apparent significant structural defects recorded	Remove ivy from stems	20+	C2	1.3
G009(0857)	Common Ash	To 8	To 180	To 3	n/a	1.8	Y	Line of trees growing in grassed surface. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	C2	2.2
002	Silver Birch	5	110	2	0.8-E	0.2	Y	Single tree. Good vitality. Crown will obstruct camera over time. Ivy at base	No works presently required	20+	C1	1.3
G010(0851)	English Oak "fastigata"	To 8	To 170	To 1.5	n/a	0.1	Y	Linear planting forming an avenue. Fastigate form. Good vitality throughout. Southern line within building site, bases not inspected.	No works presently required	20+	C2	2.0
003(0822)	Turkey Oak	12	420	S-6.5, 6	2-S	2	SM	Growing on top of slopped grass bank. Good vitality. Crown break at 1.9m. Merged limbs in southern crown extents. Not significant at present. Bird or mammal nest in upper canopy.	No works presently required	40+	B2	5.0
004(0821)	Turkey Oak	12	380	6, E-4	2-S	1	SM	Growing on top of slopped grass bank. Single stem to 8m, co-dominant stems from 8m. Fair to good vitality, small diameter deadwood in crown - considered to be due to competition for light.	No works presently required	40+	B2	4.6
005(0820)	Turkey Oak	12	340	W-2, 6	2-S	1.4	SM	Growing on top of slopped grass bank. Good vitality. Crown break at 2m. Single stem to 5m. No apparent significant structural defects recorded	No works presently required	40+	B2	4.1

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G011(0702)	Common Alder	To 10	To 175	N-4, S-3, E&W-3	n/a	1.8	Y	Line of 3xtrees. Planting pits covered by metal tree grilles. Good vitality. No surface root activity recorded.	No works presently required	40+	C2	2.1
G012(0694)	Cherry	To 8	To 230	To 5.5	n/a	1.8	SM	Formal group planting. Mix of planting environments including pea gravel and part of planted plots with shrubs. Good vitality throughout. Occasional sap bleeds at old branch wounds, not significant at present.	No works presently required	40+	B2	2.8
G013	Liquid Amber x5	To 6.5	To 130	To 2	n/a	1.6	Y	Formal planting. Planting pits covered in decorative gravel. Fair vitality throughout, sparse crowns in places, loss of apical dominance on central southern tree.	No works presently required	20+	C2	1.6
G014	Common Ash, Field Maple	To 10	To 220	To 4	n/a	GL	Y-SM	Linear plot of trees & shrubs. Good vitality throughout. Drawn stems on Field Maples. No apparent significant structural defects recorded. Landscape merit	No works presently required	40+	B2	2.6
G015(1760)	Callery Pear'	To 4.5	To 120	To 2	n/a	1.8	Y	Formal planting set in hard surfaces. Tree pits protect by metal grilles. Surface roots displacing grilles in places. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	1.4
G016	Common Ash, Lime, English Oak, Cherry, Hazel	To 10	To 200	To 2.5	n/a	GL	Y	Boundary screen planted plots, mix of trees & shrubs. Good vitality throughout, small diameter deadwood in crowns from competition for light. No apparent significant structural defects recorded.	Selective thinning to promote establishment of English Oak	40+	C2	2.4
006	Leyland Cypress	22	1000	To 4.5	n/a	0.2	EM	Prominent boundary tree. Good vitality. Pronounced buttress roots. No evidence of root plate movement. Dense crown. Structural defects potentially obscured.	No works presently required	20+	B2	12.0
007	Lombardy Poplar	14	300x2	4	0.5-S	GL	SM	Boundary tree. Co-dominant stems at 0.3m. Good vitality. Surface roots displacing block paving to south east.	No works presently required	10+	C2	5.1
G017	Field Maplex3	To 7	To 200	To 3.5	n/a	GL	Y	Trees growing on top of slopped grass bank. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	2.4

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G018 (008-011)	Common Ash, Norway Maple	To 16	011-300x2, 500	To S-9.5	n/a	3-S	SM-M	Part of boundary vegetation. Fair to good vitality throughout. 008-Common Ash, co-dominant stems at 3m, union not visible. Ivy encroachment on stems to 8m. 009-Norway Maple, co-dominant stems at 0.5m, tight union with included bark junction. Not significant at present. Ivy encroachment on stems. 010-Sycamore, co dominant stems at 2m, not visible. Ivy encroachment on stems. 011-Common Ash, 3xstems from 1m. Open crown. dead ivy in canopy	Sever ivy throughout group to facilitate ongoing condition related inspections	20+	B2	6.0
G019(1686)	English Oak, Beech, Lime, Horse Chestnut	To 7	To 290	To 3.5	n/a	1.8	Y	Informal planted plot, grass at bases. Good vitality throughout. No apparent significant structural defects recorded	Fell 1691- horse chestnut in decline due to Bleeding canker and honey fungus on surface roots & on stems.	40+	B2, 1691-U	3.5
012(1704)	Common Ash	16	540, 500	9	2-W	2	M	Boundary tree. Growing in grassed sunken area. Co dominant stems at 1m, union not included. Stems split into further co dominant unions at 2m. East stem included bark junction at split, abrupt angles on limbs beyond 3m. Suggests past crown reductions. Not significant at present.	No works presently required	20+	B1/2	8.8
G020(1703)	English Oak, Beech, Lime	To 7	To 250	To 3.5	n/a	2	Y	Informal planted plot growing on top of slopped grass bank. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	3.0
G021(1706)	English Oak, Chery, Horse Chestnut Beech, Lime	To 8	To 250	To 3.5	n/a	2	Y-SM	Informal planted plot growing on top of slopped grass bank. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	3.0
013(1718)	Weeping Willow	14	900	6	1.8-N	2	M	Growing on boundary in sunken grass area. Old pollard. Cavities and areas of decay visible at old pruning wounds. Rapid regenerated stems at points. Main stem multi stem form at 2m. Ground lights installed in root zone	Maintain as reduced tree.	40+	B1/2	10.8
014	Horse Chestnut	6	1250	3	n/a	1	OM	Bespoke engineered solution around root zone to mitigate for change in ground levels. Metal grid system. Tree topped at 6m. Epicormic growth on main stem & branches-limited. Crown break at 3m into 6xstems. Veteran tree.	No works presently required	10+	B3	15.0

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G022A	Grey Poplarx4	To 18	To 550	To W-10	n/a	3	EM	Line of 4 trees. Growing on east boundary adjacent to footpath. Good vitality throughout. Leans on trees, southern tree on 30degree lean-no root plate movement recorded. Surface roots displacing asphalt footpath to west.	No works presently required	20+	B2	6.6
G022	Field Maple, Common Ash, Cherry, Hazel	To 10	To 200	To W-4	n/a	GL	Y-SM	Linear belt of trees & shrubs. Drawn stems throughout. Fair vitality given competition for light & ivy encroachment on stems shading canopies.	Selective coppice	20+	C2	2.4
015	Sycamore	15	500@200	W-7	1-W	2	EM	Growing adjacent to footpath. Tree splits into 4xstems at 1m. Unions appear sound. Small diameter deadwood in crown. Fair vitality.	Remove deadwood overhanging footpath	20+	B2	6.0
016	Sycamore	15	350, 370	W-5	3-N	3	EM	Growing adjacent to footpath. 2xstems from ground level. Slight lean on stems to north. Fair vitality with small diameter deadwood in crown.	Remove deadwood overhanging footpath	20+	B2	6.1
017	Hawthorn	5	300@200	W-4	0.5-W	2	EM	Growing adjacent to footpath. Multi stem form at 0.5m. Crown suppressed to north. Fair vitality with small diameter deadwood in crown.	No works presently required	20+	C2	3.6
G023(0661)	Common Ash	To 7	To 200	To 3	n/a	1.8	Y	Formal planting. Trees in car park. Good vitality throughout, no apparent significant structural defects recorded	No works presently required	20+	C2	2.4
G024	Grey Poplar, Common Ash, Cherry, Silver Birch, Hawthorn, Lime, English Oak	To 10	To 200	To W-4	n/a	GL	Y-SM	Planted earth mound. Screening function. Good vitality throughout. Mutual crown suppression. No apparent significant structural defects recorded	Selective thinning	40+	B2	2.4
G025(0719)	Lime	5	To 150	To 2	n/a	1.8	Y	Formal linear planting. Beech hedgerow underneath. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	C2	1.8
G026(0725)	Cherry	4	To 160	To 2	n/a	1.8	Y	3xcherry. Set in grassed area. Good vitality. Crowns toped at 4m.	No works presently required	20+	C2	1.9
018(0728)	Himalayan birch	5	120	2	1.8-N	1.8	Y	Growing in grassed area. Good vitality. No apparent significant structural defects recorded	No works presently required	20+	C2	1.4
G027	Common Ash	6	To 145	To 2	n/a	1.8	Y	Linear planting, shrubs underneath. Good vitality throughout, no apparent significant structural defects recorded	No works presently required	20+	C2	1.7

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
019(0807)	Horse Chestnut	6	300	5	1.8-N	2	SM	Growing in grassed area. Footpath to north. Good vitality. Crown break at 1.8. No apparent significant structural defects recorded	No works presently required	20+	C2	3.6
G028	Flowering Cherry, Cockspur thorn	4	To 140	To 2	n/a	1	Y	3xtrees growing in grassed area. Good vitality throughout. Graft point for cherry at base. No apparent significant structural defects recorded	No works presently required	20+	C2	1.7
G029	Himalayan birch	To 5	To 80	1.5	n/a	1.5	Y	Group planting, shrubs underneath. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	C2	1.0
G030(0803)	Weeping Ashx3	To 5.5	To 250	To 4.5	n/a	1.8	Y	Growing in grassed area. Weeping habits, crown breaks at 1.8m. Small diameter deadwood in crowns. Fair vitality throughout	No works presently required	20+	C2	3.0
G031	Not identified	To 3	To 90	To2.5	n/a	GL	Y	3xshrubs. Corner planted plot. Fair vitality throughout	No works presently required	10+	C2	1.1
G032(0796)	White beamx3	To 4.5	To 180	To 3	n/a	1.7	Y	Growing in grassed area. Good vitality throughout. Suckering growth on central tree. Decay entry points on stems at old branch wounds, not significant at present	Remove suckering growth	10+	C2	2.2
020(0800)	Whitebeam	8	To 240	3	2-E	1.8	SM	Growing in courtyard area. Crown break at 2m into 3xstems. Birds nest in crown. Ground compaction at base.	No works presently required	20+	B1	2.9
G033(0784)	Whitebeam, Crab Apple	To 8	To 250	To 3.3	n/a	1	Y	Growing in grassed area. Decay entry points on mains, at old branch wounds. Fair to good vitality throughout. Small diameter deadwood in crowns.	0785-elongated cavity on south side of main st. No works presently required	20+	C2	3.0
G034(0776)	Silver Birch	To 12	To 270	To 4.5	n/a	1.8	SM	Growing on grassed mound. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	B2	3.2
021	Flowering Cherry	4	190	1	n/a	1	SM	Good vitality. Graft point at ground level.	No works presently required	20+	B1/3	2.3
G035(0760)	Alderx3	To 12	To 400	To N-5	n/a	1.8	Y-SM	Growing on banks of pond. Single stems & co-dominant leaders. Good vitality throughout. Abrupt angles on branches and minor crown suppression. No apparent significant structural defects recorded	No works presently required	20+	B2	4.8
G036(0759)	Weeping Silver Pearx4	To 3.5	To 230	To 3	n/a	1.5	SM	Growing on banks of pond. Crowns lifted to 1.8m. Congested crowns, typical of species. Good vitality throughout	No works presently required	20+	B2	2.8

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G037(0756)	Weeping Willowx8	To 17	To 700	To N, W-9	n/a	1.5	EM	Group of 8 trees. Fair to good vitality throughout. Deadwood in crowns, competition for light & crown shading. Past crown reductions visible on 2xtrees with multi stem regenerated stems at pruning wounds. Remaining trees unmanaged. Kinked stem, slight leans. Hazard beams in crowns due to weighted tips on branches leading to horizontal cracks.	Crown reductions by 5m on trees not currently under a reduction programme.	20+	B2/3	8.4
022(0753)	Field Maple	10	200	N-5, S-2	1.8-N	1.5	SM	Growing in grassed area. Crown suppression to south. Small diameter deadwood in crown. Fair vitality	No works presently required	10+	C1	2.4
G038(0740)	Horse Chestnut	To 10	490	To 5.5	n/a	1.8	SM	Trees growing on earth mound. Mutual crown suppression. Small diameter deadwood in crowns given competition for light. Fair to good vitality. No apparent significant structural defects recorded	No works presently required	20+	B2	5.9
G039(0747)	Alderx3	16	280	To 4	n/a	1	SM	Trees growing on pond. Good vitality. Self-sown. Leans on stems. No apparent significant structural defects recorded	No works presently required	20+	C2	3.4
023(0744)	White Willow	14	480	4	2-S	1.8	SM	Tree growing on top of slopped grass bank. Good vitality throughout. Crown break at 2m. Upright habit.	No works presently required	20+	C2	5.8
G040	Cherry, English Oak, Lime	6	To 150	3	n/a	1.8	Y	Line of trees. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	C2	1.8
G041	Field Maple, Elm, Alder, Hazel, Hawthorn,	To 10	To 200	To 3	n/a	GL	Y-SM	Boundary hedgerow & occasional trees. Predominantly self-set elm. Southside cut back for cycle way clearance. Fair vitality, deadwood in crowns. Gaps in line.	No works presently required	20+	C2	2.4
024(1562)	English Oak	19	1000	9.5	4-N	4	M	Trees growing on southern boundary. Prominent tree given size and scale. Good vitality. Minor ivy encroachment. Ditch directly north, restricts root zone in this direction.	No works presently required	40+	A1/2/3	12.0
G042	Weeping Willow	To 16	To 650*	To 8*	n/a	GL	EM	Trees growing on southern bank of pond. Crowns collapsed in places, tear outs at old branch wounds. No targets beneath trees, leave as deadwood habitat	No works presently required	20+	C2/3	7.8

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM /EM/ M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20 +/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G043	Crack Willow	To 14	700	4	n/a	2	EM	Trees topped at 8m. Onset of decay at pruning wounds and multi stem regeneration at pruning wounds. Elongated cavities extending down from topping points with wood decay fungi and extensive heartwood decay evident. Bat boxes in crowns & ivy clad stems.	Maintain as reduced trees given weakened structural condition.	10+	C3	8.4
G044	Cherry	To 8	To 350	To 4	n/a	0.5	Y-SM	Growing on top of earth mound. West tree large split in main stem below crown break. No long term potential. East tree sap bleeds on stems and suppressed crown, not significant.	Fell west tree	<10	U	4.2
G045	Crab Apple	To 5.5	150	To 3	n/a	1.8	NP-Y	Good vitality. Tree stakes on 2xtrees. No apparent significant structural defects recorded	No works presently required	20+	C2	1.8
025(0787)	Silver Maple	14	650*	8, W-3	3-E	2	M	Ivy at base hindering full assessment. Crown break at 2m. Ivy encroachment on stem to 3m. Root zone restricted to north by existing hard surfaces.	No works presently required	20+	B1	7.8
G046(0789)	Silver Maple	12	320	To 4.5	n/a	2	Y-SM	Trees growing in island plots. Fair vitality, small diameter deadwood in crowns. Ivy encroachment on stems. Decay entry points at old branch wounds.	No works presently required	10+	C2	3.8
G047(0895)	London Plane	To 7	To 100	To 2	n/a	2	Y	Linear planting forming an avenue. Tree pits protected by grilles. Fair to good vitality.	No works presently required	40+	C2	1.2
G048(1030)	Hornbeam	To 5.5	To 140	To 2	n/a	2	Y	Car park planting. Good vitality throughout. Some clipped into square crowns. No apparent significant structural defects recorded	No works presently required	40+	C2	1.7
G049(1565)	Golden Ash	To 5.5	To 100	To 2	n/a	2	Y	Trees growing in courtyard, breathing gravel at base. Good vitality	No works presently required	40+	C2	1.2
026	Liquid Amber	7	130	3	2-S	2	Y	Growing in border. Fair vitality, relatively sparse crown	No works presently required	10+	C1	1.6
027(1564)	Tulip Tree	8	160	3	n/a	2	Y	Growing in breathing gravel. good vitality, no apparent significant structural defects recorded	No works presently required	40+	C1	1.9
G050	Apple, Silver Birch, Willow	To 4	To 75	To 2	n/a	2	NP	Various newly planted trees. Good vitality throughout.	No works presently required	40+	C2	0.9

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G051(1397)	Norway Maple	To 8	To 330	To 5	n/a	2	SM	Trees growing in grassed area. Good vitality throughout. Ground levels appear raised at bases, no buttress roots visible. Crown breaks at 2m. Pruning wounds in crowns. Tight forks.	clear soil from bases	20+	B2	4.0
G052	Snowy mespilus, Pear	To 8	To 180	To 4	n/a	GL	Y	Trees growing in grassed courtyard. Good vitality	No works presently required	40+	C2	2.2
G053	Snowy mespilus, Pear	To 8	To 180	To 4	n/a	GL	Y	Trees growing in grassed courtyard. Good vitality	No works presently required	40+	C2	2.2
G054	London Plane	To 9	To 200	To 4	n/a	1.8	Y	Linear planting. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	B2	2.4
G055(1547)	Lime	To 9	To 350	To 4.5	n/a	1.8	SM	Line of trees. Good vitality throughout. Grassed area at base, car park to west. Surface root damage in places from mower activity. Crowns lifted and reduced. Stubs of deadwood in crowns.	No works presently required	40+	B2	4.2
G056(1541)	Lime	To 7	To 250	To 3.5	n/a	1.8	Y	Crescent planting. Grassed area at bases. Good vitality throughout, no apparent significant structural defects recorded	No works presently required	40+	B2	3.0
028(1493)	Norway Maple	12	620	7	2-E	2	M	Prominent tree. Grass area at base. Fair vitality, small diameter deadwood in crown. Crown break at 2m into multi stems, dieback on central leader. Seams of reaction wood extending down from union, potential reaction wood to internal crack.	PiCUS sonic tomograph to determine internal condition of main stem beneath multi-stem union.	20+	B1*	7.4
029(1532)	Apple	5	160	3	1-S	1.5	Y	Growing in grassed area. Mower damage base. Crown break at 1m, good vitality	No works presently required	10+	C1	1.9
030(1530)	Lawson Cypress	9	260	3	n/a	0.5	SM	Growing in grassed area. Crown suppressed to west. Fair vitality	No works presently required	10+	C1	3.1
G057(1529)	Lime	To 14	To 400	To 6	n/a	2	EM	Avenue feature. Good vitality throughout. Occasional tight forks in canopies, not significant at present. Crowns lifted to 2m. No apparent significant structural defects recorded	No works presently required	40+	A2	4.8
G058(1519)	Lime	To 7	To 130	2	n/a	1.5	Y	Line of trees. Grass at bases, fair vitality throughout. Snapped branches in crowns, remaining wounds frayed.	Formative prune	20+	C2	1.6
031(1854)	Luscomb Oak	16	750	9	2.5-E	2	EM	Growing in grassed area. Good vitality. Crown break at 2.5m. Balanced form. No apparent significant structural defects recorded	No works presently required	40+	A1	9.0

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
032	Common Ash	18	500, 650	S-9.5	5-E	3	M	Growing on bank of ditch on northern boundary. Heavy ivy encroachment on stems to 16m, obscuring full assessment. Dead branches on ground and hung-up in canopy. Fair vitality	Sever ivy at base, remove deadwood overhanging footpath	20+	B2	9.8
033	Sycamore	18	700x3*	S-9	6-S	2	M	Growing on bank of ditch on northern boundary of site. Fair vitality, heavy ivy encroachment on stems obscuring full assessment of crown condition. 3xstems at base. Garden debris piled at base, not accessible.	Sever ivy at base, remove deadwood overhanging footpath. Remove garden debris at base to facilitate ongoing tree condition assessments.	20+	B2	14.9
034(1897)	Field Maple	14	500	8, N-4	3-E	3	EM	Good vitality. Crown suppressed to north. Bat box in crown. No apparent significant structural defects recorded. Animal grazing at base	No works presently required	40+	B2	6.0
035(1896)	Field Maple	14	330	N&W-1.5, 6,	2-W	2	SM	Fair vitality. Crown suppressed to north & west. Bark removed in places on main stem from grazing cattle. Small diameter deadwood in crown	No works presently required	10+	C1	4.0
036(1895)	English Oak	18	860	S-9, W-8, E-6, N-5	2-S	1	M	Good vitality. Crown break at 2m. Rubbing branches in crown. Minor suppression to north & west. No apparent significant structural defects recorded	No works presently required	40+	A1	10.3
G059(1508)	Common Beech	To 18	530	To 7.5	n/a	2	SM-EM	Positioned at end of lime avenue. Good vitality. Single stems to 5-9m before co-dominant leaders. No apparent significant structural defects recorded	No works presently required	40+	A2	6.4
037	English Oak	14	1100	13, W-7	1-S	1	EM	Growing in grassed area. Low crown height, crown break at 1m. Squat form. Large diameter deadwood in crown to west. Drainage channel to west. Loss of apical dominant leader. Fair to good vitality	No works presently required	40+	A1	13.2
038(1892)	English Oak	20	990	13	2-W	1.5	M	Growing in grassed area. Good vitality. Central leader splits into multi stem form at 7m. Prominent tree.	No works presently required	40+	A1	11.9
039(1891)	English Oak	17	890	11, N-8	2-E	2	EM	Growing in grassed area. Good vitality. Small diameter deadwood in crown. Crown break at 2m. No apparent significant structural defects recorded	No works presently required	40+	A1	10.7

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G060	Cherry, Elder, Hazel, Sycamore, Lawson Cypress, Common Ash		280	To 5	n/a	GL	Y-EM	Corner plot. Informal group of self-sown & planted trees growing around cottage. Heavy ivy encroachment on stems in places, heavy clematis growth on some conifers. Drawn stems. Fair vitality. deadwood in crowns. Limited targets around trees.	No works presently required	20+	C2	3.4
040	Hybrid Black Poplar	20	910	8	3-S	2	M	Growing within G060. Ivy encroachment on main stem to 5m. Open crown form. Seams of reaction wood on main stem indicative of adaptive wood to compensate for an internal cracks. Not significant at present	No works presently required	20+	C1/2	10.9
041(1494)	English Oak	15	460	7, N-4	2-S	2	SM	Part of avenue, suppression to north. Good vitality. Co-dominant leaders at 5m, union appears sound. No apparent significant structural defects recorded	No works presently required	40+	B1/2	5.5
042	Blue Atlantic Cedar	10	330	5	1-S	1.5	SM	Growing in grassed area. Good vitality. No apparent significant structural defects recorded	No works presently required	40+	B2	4.0
043(1497)	Silver Maple	16	910	17, N-9.5, S-11	2-S	2	M	Growing in grassed area. Crown break at 2m. Open crown form. Pronounced buttress roots to east & west. Crown tip pruned. Good vitality.	No works presently required	20+	B2	10.9
044(1398)	Norway Maple	5	540	8	2-S	1.8	EM	Growing in grassed area. Good vitality. Crown break at 2m. No apparent significant structural defects recorded	No works presently required	20+	B2	6.5
G061(1448)	Silver Birch	To 13	To 330	To 7	n/a	2	Y-SM	Growing in grassed area & field boundary. Line of trees. Fair to good vitality throughout, with small diameter deadwood in crowns. Cavities on main stems at old branch wounds or animal grazing damage. Leans on stems. Dieback on branches. 1436-elongated cavity on south side of main stem.	No works presently required	20+	C2	4.0
G062(1445)	Norway Maple	13	To 390	To 6	n/a	2	SM	Growing in grassed area. Good vitality throughout. Mutual crown suppression. No apparent significant structural defects recorded	No works presently required	20+	B2	4.7
045(1440)	Cappadocian Maple	12	440	S-3, 8	2-S	2	SM	Part of line of trees. Dense suckering growth at base. Elongated cavity on westside of main stem from animal grazing. White rot present. Good vitality	No works presently required	20+	C2	5.3
G063	Leyland cypress	10	To 450	To 4	n/a	0.5	SM-EM	Hedgerow planting. Topped at 5m. Fair to good vitality throughout.	No works presently required	10+	C2	5.4

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
046(1426)	Cappadocian Maple	6	350	4.5, E-4	2-N	2	SM	Growing in grassed area, aggregate in root zone to east. Good vitality. Suckering growth cut down. No apparent significant structural defects recorded	No works presently required	20+	C1	4.2
G064(1423)	Flowering Cherry	To 4.5	To 350	To 4.5	n/a	1.6	SM-EM	Informal group growing in grassed area. Grafted trees, graft points at bases. Good vitality throughout. occluding pruning wounds in crowns,	No works presently required	20+	B2	4.2
047	Elder	4	80x5	W-3	n/a	GL	SM	Self-sown tree, growing immediately adjacent to building. Fair vitality. No long term potential	No works presently required	<10	C1	2.1
048(1420)	Black Mulberry	5	360	N-7, 5	1.6-N	1.8	SM	Growing in grassed area. Good vitality. Crown break at 1.6m into 5xstems. Crown reduced to south & east for building clearance.	No works presently required	20+	B1	4.3
049(1419)	Flowering Cherry	7	360	5.5	2-NE	2	EM	Growing in grassed area. Services to south. Grafted tree. Good vitality. Co-dominant leaders at 2m. No apparent significant structural defects recorded	No works presently required	20+	B1	4.3
G065(1470)	Cherry	To 7	To 355	To E-5.5	n/a	2	SM-EM	Growing in line in grassed area. Mutual crown suppression. Fair to good vitality with small diameter deadwood in crowns. Crown breaks at 1.6m. 1470-elongated cavities on south & west stems from unions with main stem to 400mm. Heartwood decay evident, reaction wood on periphery of wounds. Not significant at present	1470-cavity extends to full branch extents. Reduce to 1m.	10+	C2	4.3
G066(1461)	Silver Birch	To 14	To 390	To 7	n/a	2	SM-EM	Line of trees, grassed area at bases. Mutual crown suppression throughout. Localised dieback of shaded limbs. Stubs of small diameter deadwood. Decay entry points at old branch wounds. Not significant at present.	No works presently required	20+	B2	4.7
G067(1474)	Lime	To 14	To 360	To 5.5	n/a	2	SM-EM	3xtrees. Grassed area at bases. Crown breaks at 2m. Crossing & rubbing branches throughout. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	B2	4.3
050(1475)	Sweet Gum	4.5	160	2	n/a	2	Y	Good vitality, no apparent significant structural defects recorded	No works presently required	20+	C1	1.9
051(1476)	Norway Maple	4	150	2	n/a	2	Y	Good vitality, no apparent significant structural defects recorded	No works presently required	20+	C1	1.8

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G068(1456)	Norway Maple	To 14	To 545	To 6.5	n/a	2	SM-EM	Informal group, growing in grassed area. Good vitality throughout, mutual crown suppression. Small diameter deadwood in crowns through shading. Crown breaks at 1.5m into multi stem forms. Crossing & rubbing branches in crowns , not significant at present	No works presently required	20+	B2	6.5
G069(1452)	Silver Maple	To 16	To 740	To 14	n/a	2	EM-M	Informal group growing in grassed area. Good vitality throughout. Crown breaks at 2m into multi stem forms. Large broad open crowns. Branches tip pruned in the past away from built infrastructure. Exposed surface roots, scalped in places by mower activity.	No works presently required	20+	B2	8.9
G070(1450)	Crab Apple	To 7	370	To 7	n/a	1.8	EM	Growing in grassed area. Fair to good vitality. Small diameter deadwood in crowns. 1450-leans to east, no root heave visible, not significant at present	No works presently required	20+	B2	4.4
052(1449)	Crab Apple	2.5	180	2.5	1.5-W	1.5	Y	Grafted tree. Good vitality. Dense canopy at 1.5m.	No works presently required	20+	C1	2.2
G071(1409)	Whitebeam	To 10	To 450	To 6	n/a	1.8	EM	Line of trees. Crown breaks at 2m into multi stem forms. Small diameter deadwood in crowns, slight leans on stems. Crowns directionally pruned away from built infrastructure.	1413-Ganoderma fungal brackets at base-fell	20+	B2	5.4
053	Elder	6	230	3.5, S-0	n/a	0.5	SM	Tree growing immediately adjacent to building. Fair vitality.	No works presently required	10+	C1	2.8
G072(1401)	Norway Maple	To 11	To 340	To 4.5	n/a	2	SM	Line of trees growing in grassed area. Fair vitality. Deadwood in crowns-small & large diameter. 1405, 1406-extensive dieback in crowns, within falling distance of target areas.	Remove deadwood in crowns. Fell 1405 &1406	<10	U, C2	4.1
054	Silver Birch	7	240	4	n/a	1	SM	Sparse crown. Loss of apical dominant leader. Cavities on main stem, deadwood at base.	fell on the grounds of safety & sound arboricultural management	<10	U	2.9
G073(1392)	Hornbeam	To 5.5	To 140	To 2	n/a	2	Y	Car park planting. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	1.7
055(1477)	Hornbeam "fastigata'	6	280	4	n/a	1.5	Y	Good vitality. Growing in grassed area. No apparent significant structural defects recorded	No works presently required	40+	C1	3.4

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G074	Silver Birch	To 14	To 330	To 5.5	n/a	1.5	SM-EM	Growing in garden area. Good vitality throughout. Mutual crown suppression. No apparent significant structural defects recorded	No works presently required	20+	B2	4.0
056	Sycamore	9	80<10	To 4.5	n/a	0.5	SM	Multi stem form, past coppice management. Good vitality, drawn stems	No works presently required	10+	C1	3.0
G075	Elder, Silver Birch, Alder,	To 6	To 180	To 3.5	n/a	0.5	NP-Y	Part of garden border. Mix of trees and shrubs. Good vitality, no apparent significant structural defects recorded	No works presently required	40+	C2	2.2
057	Silver Birch	9	330	5	2-S	2	SM	Fair vitality, small diameter deadwood in crown. Mechanical disturbance in root zone from levelling and grass seeding. No surface roots visible. Minor ivy encroachment on stem.	No works presently required	10+	C1	4.0
058(1490)	Silver Maple	7	250	3	2-S	2	Y	Growing in grassed area in car park. Good vitality, slight lean to east.	No works presently required	20+	C1	3.0
059	Crab Apple	4	120	2	n/a	1.8	Y	Growing in nursery area, good vitality	No works presently required	20+	C1	1.4
G076	London Plane	To 8	To 160	To 3	n/a	1.8	Y	Avenue feature. Metal grilles at bases. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	B2	1.9
G077(1370)	Lime	To 10	To 450	To 6	n/a	1.8	Y-SM	Line of trees. Grassed area at bases. 2xyoung & 2xsemi-mature. Good vitality throughout. Girdling roots snapped. Small diameter deadwood in crowns. Crowns lifted for car park clearance.	No works presently required	40+	B2	5.4
060	Horse Chestnut	6	210*	4, W-0	1-S	0.5	Y	Tree not accessible, within building site. Good vitality. Mechanical disturbance in root plate	No works presently required	10+	C1	2.5
061	Field Maple	8	500	5, E-3	1-S	0.5	SM	Tree not accessible, within building site. Good vitality. Mechanical disturbance in root plate	No works presently required	10+	C1	6.0
G078	Field Maple, Black thorn	To 7	To 400	To 4.5	n/a	GL	SM-EM	Old field boundary hedgerow. Limited trees remaining. Multi stem forms, suggesting past topping. Building welfare facilities to north. Fair vitality	No works presently required	10+	C2	4.8
G079	Hornbeam	To 5.5	To 140	To 2	n/a	2	Y	Car park planting. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	1.7
G080	London Plane	To 6	To 100	To 2.5	n/a	2	Y	Avenue feature. Good vitality throughout. Metal grilles at bases.	No works presently required	40+	C2	1.2

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G081	London Plane	To 6	To 100	To 2.5	n/a	2	Y	Avenue feature. Good vitality throughout. Metal grilles at bases.	No works presently required	40+	C2	1.2
G082	Hornbeam	To 5.5	To 140	To 2	n/a	2	Y	Car park planting. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	1.7
062(1084)	Apple	6	160	3	n/a	1.8	Y	Good vitality. Growing in raised border. Snapped branch in crown	Formative prune	20+	C1	1.9
G083	Sorbus spp	To 6	To 100	To 2.5	n/a	1.8	Y	Good vitality, no apparent significant structural defects recorded	No works presently required	40+	C2	1.2
G084	London Plane	To 6	To 100	To 2.5	n/a	2	Y	Avenue feature. Good vitality throughout. Metal grilles at bases.	No works presently required	40+	C2	1.2
G085	Hornbeam	To 5.5	To 140	To 2	n/a	2	Y	Car park planting. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	40+	C2	1.7
G086	Various	To 6	To 100	To 2.5	n/a	2	Y	Avenue feature. Good vitality throughout. Metal grilles at bases.	No works presently required	40+	C2	1.2
W1	Ash, Field Maple, English Oak, Hawthorn, Hazel	To 6	To 200	To 3	n/a	GL	Y-SM	Screen planting on earth mound. 3m centre spacing. Fair to good vitality throughout. New planting to front. No apparent significant structural defects recorded	No works presently required	40+	C2	2.4
W2	Ash, Field Maple, English Oak, Hawthorn, Hazel	To 6	To 200	To 3	n/a	GL	Y-SM	Screen planting on earth mound. 3m centres spacing. Fair to good vitality throughout. New planting to front. No apparent significant structural defects recorded	No works presently required	40+	C2	2.4
063	English Oak	16	1100	9	3-E	1	M	Prominent tree. Old field boundary tree. Dead ivy throughout crown. Co-dominant leaders at 3m. Good vitality. Ditch to north. No apparent significant structural defects recorded	No works presently required	40+	A1/2/3	13.2
064	English Oak	16	1050	7, N&S-9	3-W	3	M	Prominent tree. Old field boundary tree. Crown break at 3m into multi stem form, suggesting old pollard. Good vitality. Ditch to north. No apparent significant structural defects recorded	No works presently required	40+	A1/2/3	12.6
065	English Oak	18	1000	7, N&S-10	5-N	1.5	M	Prominent tree growing on ditch. Old field boundary tree. Crown break at 5m. Good vitality, small & moderate size deadwood in crown. Good habitat value.	No works presently required	40+	A1/2/3	12.0

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
066(1839)	English Oak	18	1200	8	2-E	1	M	Prominent tree growing close to water feature. Old field boundary tree. Dead ivy throughout crown. Good vitality small diameter deadwood in crown. No apparent significant structural defects recorded	No works presently required	40+	A1/2/3	14.4
067(1829)	English Oak	14	900	7.5	3-S	1	M	Prominent tree growing immediately adjacent to water feature. Old field boundary tree. Crown break at 4m into 3xstems. Slight lean on stems, correcting at 6m. Good vitality. No apparent significant structural defects recorded	No works presently required	40+	A1/2/3	10.8
068(1826)	English Oak	14	520, 460	7	2-S	1	M	Old field boundary tree. Co-dominant leaders at 1m. Old branch wound at base to south east, decay at wound-not significant at present. Kinked main stems. Relatively sparse crown, small diameter deadwood in crown.	Apply liquid fertiliser to base to improve vitality.	40+	B1/2/3	8.3
G087	English Oakx2	To 14	To 580	To 6.5	n/a	2	SM	Part of old field boundary. Good vitality. 2xtrees. Co-dominant leaders and multi stem forms from 2m. Small diameter deadwood in crowns.	No works presently required	40+	B1/2/3	7.0
G088(1820)	Common Ash	To 12	To 410	To 6	n/a	GL	SM	Line of trees. Ground disturbance at bases. Fair vitality throughout, deadwood in crowns. Bark wounds on stems. Basal limbs. Frayed branch wounds.	Crown clean	20+	C2	4.9
W3	Field Maple, Common Ash, Elder, Blackthorn, English Oak, Scots Pine	To 16	To 300	To 6	n/a	GL	SM	Woodland block. Diagonal rows, 3m centres. Screening function. No active management visible. Woodland edge to west. Fair to good vitality throughout.	Selective thinning	40+	B2	3.6
W4	Field Maple, Common Ash, Elder, Blackthorn, Sycamore	To 10	To 300	To 6	n/a	GL	SM	Woodland block. Screening to M11, 3m centres. Screening function. No active management visible. Fair to good vitality throughout.	Selective thinning	40+	B2	3.6
G089	Beechx2	To 5	To 180	To 3	n/a	GL	Y	Growing on corner of field. Good vitality throughout, no apparent significant structural defects recorded	No works presently required	20+	C2	2.2
G090	Crab Apple, Hawthorn, Elder	To 8	To 400	To 4	n/a	GL	SM	Old field boundary hedgerow. 5xindividual crab apple trees-crown lifted to 3m. Hedgerow topped at 2m. Decay entry points, old branch wounds. Fair to good vitality. Western extents not topped. Gaps in places. Ivy clad stems.	No works presently required	20+	C2	4.8

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
069	Common Ash	8	260	5	2-NE	2	Y	Fair vitality. Bark stripped at buttress roots. Rabbit damage. Ground disturbance at base	No works presently required	10+	C1	3.1
G091	Hornbeam, Hawthorn	To 7	To 300	To 6	n/a	GL	SM	Old field boundary hedgerow. Gaps in places. No recent management. Multi stem forms at ground level or at 2m. Past coppice or topping. Fair to good vitality throughout	No works presently required	20+	C2	3.6
070(1579)	Service tree	14	750	8	4-S	3	M	Growing on west boundary. Adjacent to footpath. Small to moderate deadwood in crown. Frayed old branch wounds. Dieback in upper canopy. Fair vitality	Remove deadwood in crown overhanging footpath	20+	B2/3	9.0
G092(1170)	Sorbus spp	To 6	To 150	To 2.5	n/a	2	Y	Good vitality. No apparent significant structural defects recorded	No works presently required	20+	C2	1.8
G093(1169)	Hornbeam 'fastigata'	To 14	To 470	To 5	n/a	1	SM-EM	Intermittent trees in car park area. Good vitality. Upright growth habit. No apparent significant structural defects recorded	Crowns lifted for car park clearance No works presently required	20+	B2	5.6
071	Honey locust	9	550	5, E&W-3	1.5-SE	2	SM	Growing in planted border. Fair vitality, crown thinned. Small diameter deadwood in crown. Relatively sparse crown.	Clear shrubs to 1m radius around tree to improve vitality, remove deadwood in crown overhanging car park	10+	C1	6.6
G094(1151)	Silver Birch x2	To 10	To 280	To 4	n/a	1.5	Y-SM	Growing in car park. Good vitality. Mutual crown suppression. No apparent significant structural defects recorded	No works presently required	20+	C2	3.4
G095(1153)	Hornbeamx3, Silver Birchx1, Alder x3	To 9	To 260	To 3.5	n/a	1.5	Y-SM	Growing in car park. Good vitality. No apparent significant structural defects recorded. Crowns lifted for car park clearance	No works presently required	20+	C2	3.1
072(1156)	Alder	14	360	5	3-W	1.5	SM	Growing in car park. Slight lean on main stem. Good vitality. No apparent significant structural defects recorded. Crown lifted for car park clearance.	No works presently required	20+	B1	4.3
G096	Mixed	To 3.5	To 120	To 2	n/a	1.5	Y	Mixed trees growing in car park area. Fair to good vitality throughout	No works presently required	20+	C2	1.4
G097(1185)	Mixed	To 7	To 220	To 3.5	n/a	1.5	Y	Growing in grassed area. Good vitality throughout. Small diameter deadwood in crowns. No apparent significant structural defects recorded. Fair vitality. Dieback in crowns	No works presently required	20+	C2	2.6
073(1184)	Honey locust	8	360, 470	S-6, 4.5	2-N	2	SM	Growing in planted border. Co-dominant leaders at base. Crown thinned. Pruning wounds present. Stubs of small diameter deadwood in crown and localised dieback.	Remove deadwood in crown overhanging target areas.	10+	C1	7.1

Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G098(1181)	Weeping birchx6	5	To 220	To 4.5	n/a	1.5	Y-SM	Informal group growing in grassed area. Pendulous habit from 2-3m. Fair vitality throughout. Contorted stems & small diameter deadwood in crowns.	No works presently required	20+	C2	2.6
074	Blue Atlantic Cedar	12	450	6	1-SE	1	SM	Good vitality. Growing in grassed area. Crown break at 1.8m. No apparent significant structural defects recorded	No works presently required	20+	B1	5.4
G099(0216)	Scots Pine, White Beam, Silver Birch, Cherry, Elder, Alder, Lawson's Cypress, Goat Willow, Field Maple,	To 7	To 250	To 3.5	n/a	0.5	Y-SM	Part of car park planting. Fair to good vitality throughout. Multi stem & single stems. No apparent significant structural defects recorded	No works presently required	20+	C2	3.0
075	Alder	10	300	N-4	2-N	0.5	SM	Part of car park area. Lean on main stem to north. Correcting at 2m. Good vitality, single leader.	No works presently required	20+	B1	3.6
G100	Callery Pearx4	To 6	To 200	To 2.5	n/a	1.5	SM	Part of garden area. Good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	C2	2.4
076	Lawson's cypress	2.5	190	1.5	n/a	0.5	Y	Tree topped at 2M. Part if car park area. Fair vitality	No works presently required	10+	C1	2.3
G101(1234)	Silver Birch	To 14	To 340	To 5	n/a	3	Y-SM	Informal group of trees. Grassed area at bases. Crowns lifted to 3m, un-occluded pruning wounds on stems. Mutual crown suppression, small diameter deadwood in crowns. Fair to good vitality throughout.	No works presently required	20+	B2	4.1
G102(1250)	Norway Maple	To 10	To 350	To 6	n/a	4	Y-SM	Line of trees in car park area. Crowns lifted for car park clearance. Un-occluded pruning wounds on stems. Fair vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	C2	4.2
G103	Silver Birchx3	5	80	2	n/a	1	Y	Good vitality. Growing in grassed planted border	No works presently required	20+	C2	1.0
G104(1223)	Norway Maple x3, Scots Pine x1	To 10	To 160	To 4	n/a	1	Y	Good vitality. Growing in grassed planted border	No works presently required	20+	C2	1.9
G105	Silver Birch, Hawthorn Scots Pine, Lime, Whitebeam.	To 14	To 360	To 5	n/a	1	Y-SM	Boundary tree planting. Excavation works to north. Mutual crown suppression throughout. Drawn stems. Fair to good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	B2	4.3

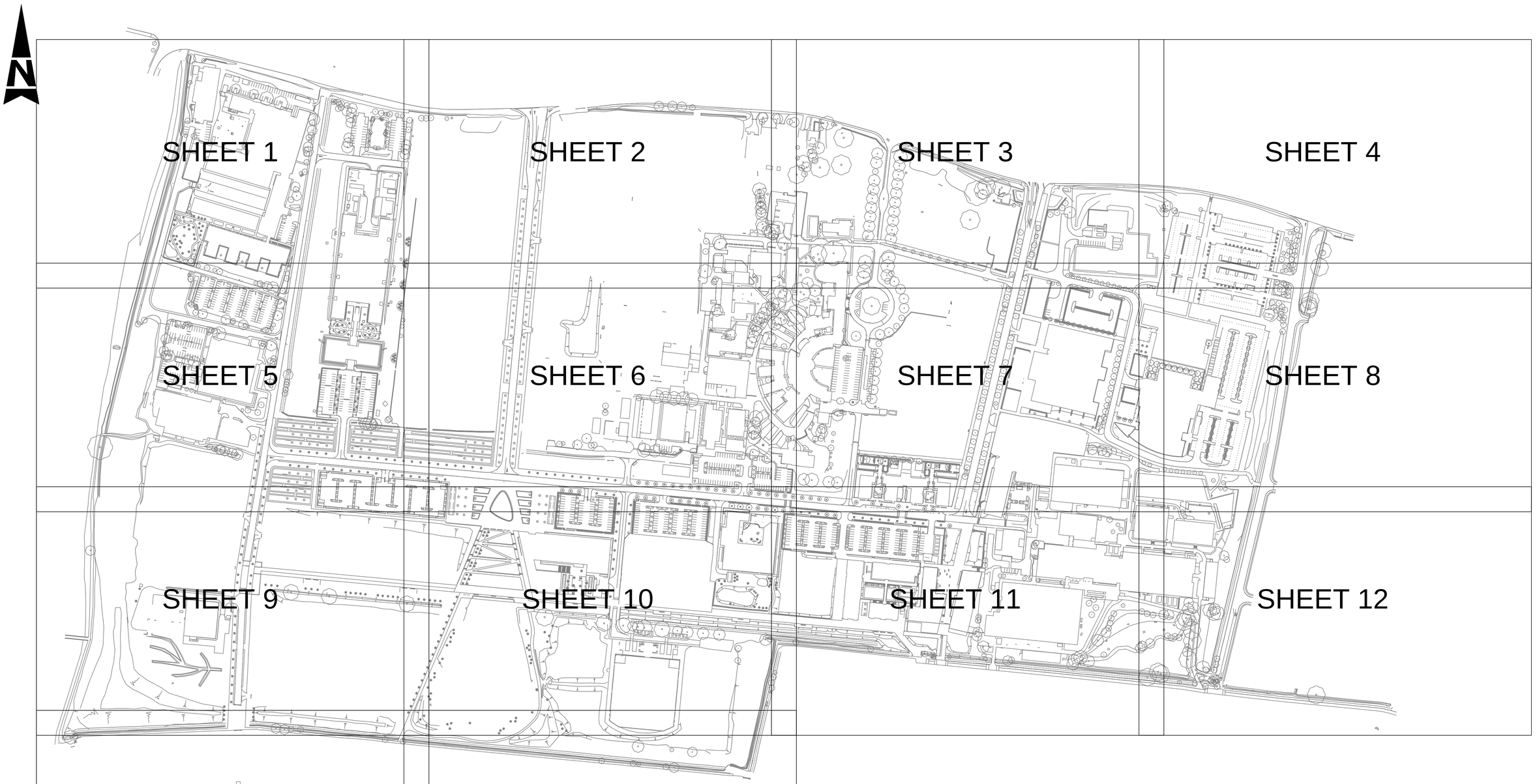
Tree no.	Species in group	Ht (m)	Stem diameter (mm)	Branch spread (m) N/E/S/W	1st major branch height (m) & direction N/E/S/W	Canopy height (m)	Life stage Y/SM/EM/M/OM	General observations structural and/or physiological condition	Preliminary management recommendations	Estimated Remaining contribution (years) <10/10+/20+/40+	Category grading A/B/C/U 1/2/3	Root Protection Area Radius (m)
G106(1341)	Horse chestnutx2, Limex1	To 7	To 200	To 4	n/a	1	Y	Growing in grassed area on northern boundary. Good vitality throughout, no apparent significant structural defects recorded	No works presently required	20+	C2	2.4
G107(1346)	Cherry	To 7	To 260	To 4.5	n/a	2	SM	Line of trees. Crowns lifted to 2m. Good vitality throughout, sap bleeds on stems, not significant. No apparent significant structural defects recorded	No works presently required	20+	B2	3.1
G108	Common Ash, Whitebeam	To 8	To 230, 140	To 5	n/a	1.5	Y	Existing & planted trees around pond. Drawn stems. Fair vitality throughout. Poor structural condition on Whitebeams, limited long-term potential. Stripped bark and extensive wounds on stems.	No works presently required given limited access to trees.	20+	C2	3.2
G109(1358)	Cherry, Lime	To 8	To 260	To 6	n/a	1.5	Y	Lines of trees on boundary & extending south into site. Excavation works to north of boundary trees. Fair to good vitality throughout. No apparent significant structural defects recorded	No works presently required	20+	C2	3.1
G110	Various	T05	To 150	To 2	n/a	1.5	NP	Various newly planted trees within landscape areas and along highway infrastructure. Good vitality throughout	No works presently required	40+	C2	1.8

Appendix C. Glossary of terms

Term	Description
Access Facilitation Pruning	One-off tree pruning operation, the nature and effects of which are without significant adverse impact on tree physiology or amenity value, which is directly necessary to provide access for operations on site.
Adaptive Growth	The process whereby wood formation is influenced both in quantity and in quality by the action of gravitational force and mechanical stresses on the cambial zone
Amenity Value	The environmental and landscape benefits of trees as opposed to their commercial value for timber
Ancient Woodland	Sites which have been wooded since at least 1600, as defined by English Nature and recognised as being of high nature conservation value, whether managed or not. They may be semi-natural or replanted.
Arboricultural Method Statement	Methodology for the implementation of any aspect of development that is within the root protection area, or has the potential to result in loss of or damage to a tree to be retained.
Arboriculture	The study and care of trees and other woody vegetation
Arboriculturist	A person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction.
Cavity	An open wound, characterised by the presence of decay and resulting in a hollow
Co-dominant stems	Where a trees main stem splits into two leaders, can also be called twin-stemmed.
Competent person	A person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached.
Construction	Site-based operations with the potential to affect existing trees.
Construction Exclusion Zone	The area based on the root protection area from which access is prohibited for the duration of a project.
Coppice	A traditional method of woodland management in which young tree stems are repeatedly cut down to near ground level. In subsequent growth years, many new shoots will emerge, and, after a number of years the coppiced tree, or *stool*, is ready to be harvested, and the cycle begins again
Crown clearance	This is the removal of all dead, dying and diseased branches; in addition branches that are cleared away from a specific hazard e.g. live railway line.
Crown lifting	The removal of lower branches to provide a desired amount of clearance above ground level. This can be achieved either by the complete removal of a branch or only parts of which extend below the desired height
Crown reduction	The overall reduction of both the height and spread of the crown.
Decay	Process of degradation of woody tissues by fungi and bacteria through decomposition of cellulose and lignin.
Deadwood	Deadwood is often present within the crown or on the stems of trees. In some instances is may be an indication of ill health, however, it may also indicate natural growth processes. If a target is present beneath the tree, deadwood may fall and cause injury or damage and should be removed, otherwise deadwood can remain intact for conservation purposes (insects, fungi, birds etc.).
Epicormic growth	A secondary growth from dormant adventitious buds on the stem or main braches.
Failure	In connection with tree hazards, apartail or total fracture within woody tissue or loss of cohesion between roots and soil.
Hazard beam	An branch that has over extended in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).
Hung-up limb	Dead or fallen branch from within the crown or from another tree's crown that has failed and been caught up by, and resting on, branches of a tree
Included Bark Junction	Pattern of development at branch junctions where bark is turned inward rather than pushed out. Potential weakness due to a lack of a woody union.
Ivy Growth	Ivy growth may ascend into the tree's crown, increasing wind resistance, concealing potential defects and reducing the tree's photosynthetic capacity. Ivy growth is often acceptable in woodland areas as a conservation benefit.
Monolith	A large bulk of standing dead wood. Usually the truck of the tree or the truck with the base of the branch frame work. These should be retained for wildlife habitat when the risk is appropriate for the location.
Pollarding	This involves the removal of whole branches to leave only the main trunk. In species such as willows and poplars such as significant pruning is acceptable with new branches developing from the pollard heads. Secondary pruning of the new wood can help form a new canopy to the tree several years after the initial pollard
Reaction Wood	Specialised secondary xylem, which develops in response to a lean or similar mechanical stress, attempting to restore the stem to the vertical.
Root Protection Area (RPA)	The layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.
Service	Any above or below ground structure or apparatus required for utility provision.
Stem	The principal above-ground structural component(s) of a tree that supports its branches.
Structure	A manufactured object, such as a building, carriageway, path, wall, service run, and built or excavated earthwork.
Structural Defect	Internal or external points of weakness, which reduce the stability of the tree
Sub-dominant stem	A branch within the crown that is not the dominant leader
Suppressed	Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.

Term	Description
TPO	A Tree Preservation Order is an order made by Local Planning Authority which in general makes it an offence to cut down, lop, top, uproot, wilfully damage or wilfully destroy a tree without first getting permission from us. Tree Preservation Orders are usually made to protect trees that make a significant contribution to the amenity of an area. They may particularly be made when it is felt that a tree may be under threat.
Tree Constraints Plan	Abbreviated to TCP. Plans showing specific tree constraints including Root Protection Areas and Crown spread.
Tree Protection Plan	Abbreviated to TPP. Scaled drawing, informed by descriptive text where necessary, based upon the finalised proposals, showing trees for retention and illustrating the tree and landscape protection measures.
Veteran Tree	A tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem.
Visual Tree Assessment	A non-invasive method of examining the health and structural condition of trees. Developed by Claus Mattheck and David Breloer 1994
Wound	Any injury, which induces a compartmentalisation response
Wound Wood	Wood with atypical anatomical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound as opposed to the ambiguous term "callus."

Appendix D. Drawings



Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Landscape Architecture,
The Octagon,
27 Middleborough,
Colchester, Essex, England
CO1 1TG

Tel: (01206) 732000
Fax: (01206) 732020
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Client: UNIVERSITY OF CAMBRIDGE

Project: WEST CAMBRIDGE MASTERPLAN (EIA)

Title: TREE PROTECTION PLAN KEY

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:2000	BC Date 12/04/16	TD Date 12/04/16	TD Date 12/04/16

Status	Drawing Number	Rev
P	5137998_COL_ARB_00	A

TREE PROTECTION KEY

- 000 CATEGORY A TREE + TREE REF.
- 000 CATEGORY B TREE + TREE REF.
- 000 CATEGORY C TREE + TREE REF.
- 000 CATEGORY U TREE + TREE REF.
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- ROOT PROTECTION AREA
- REFER TO GROUP G110
- PROPOSED BUILDING FOOTPRINTS
- TREE TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS
- TREE GROUP TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
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–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Landscape Architecture,
The Octagon,
27 Middleborough,
Colchester, Essex, England
CO1 1TG

Tel: (01206) 732000
Fax: (01206) 732020
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Project: WEST CAMBRIDGE MASTERPLAN (EIA)

Title: TREE PROTECTION PLAN SHEET 1

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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Drawing Number: 5137998_COL_ARB_01

Rev: A

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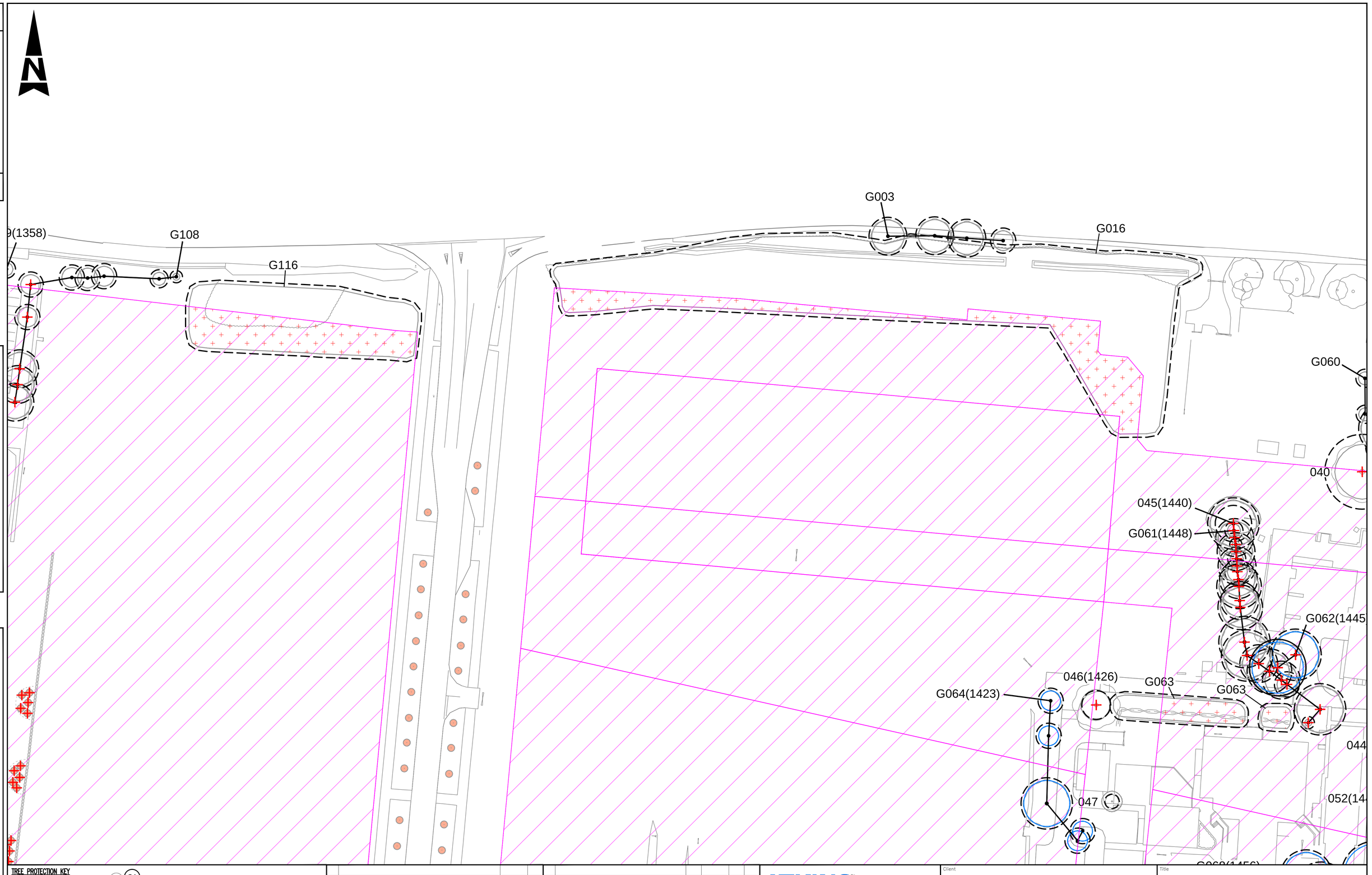

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P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Landscape Architecture,
The Octagon,
27 Middleborough,
Colchester, Essex, England
CO1 1TG

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Fax: (01206) 732020
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Title: TREE PROTECTION PLAN SHEET 2

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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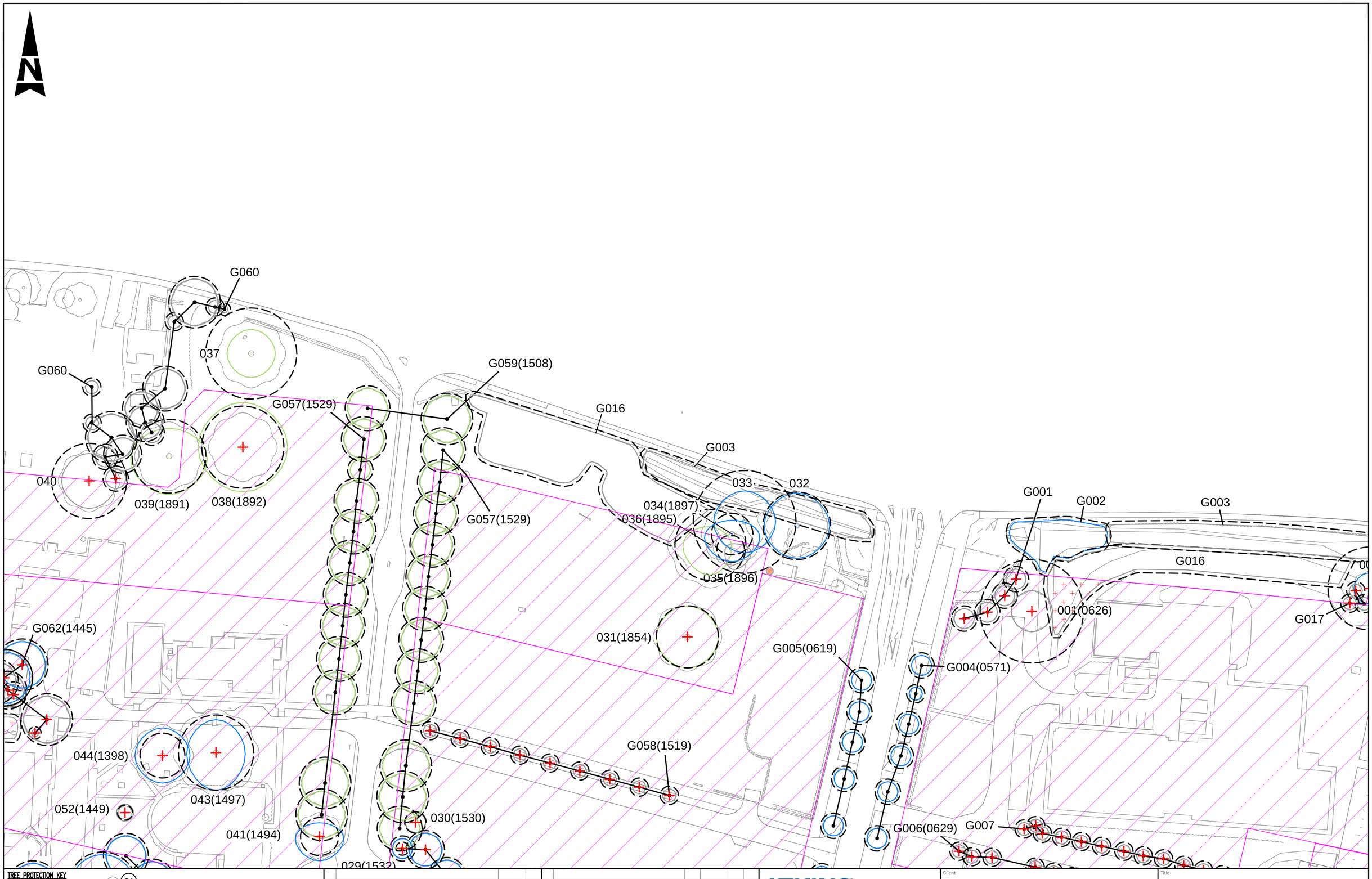

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Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Landscape Architecture,
The Octagon,
27 Middleborough,
Colchester, Essex, England
CO1 1TG

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Fax: (01206) 732020
www.atkinsglobal.com

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Title: TREE PROTECTION PLAN SHEET 3

Project: WEST CAMBRIDGE MASTERPLAN (EIA)

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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Status: P

Drawing Number: 5137998_COL_ARB_03

Rev: A

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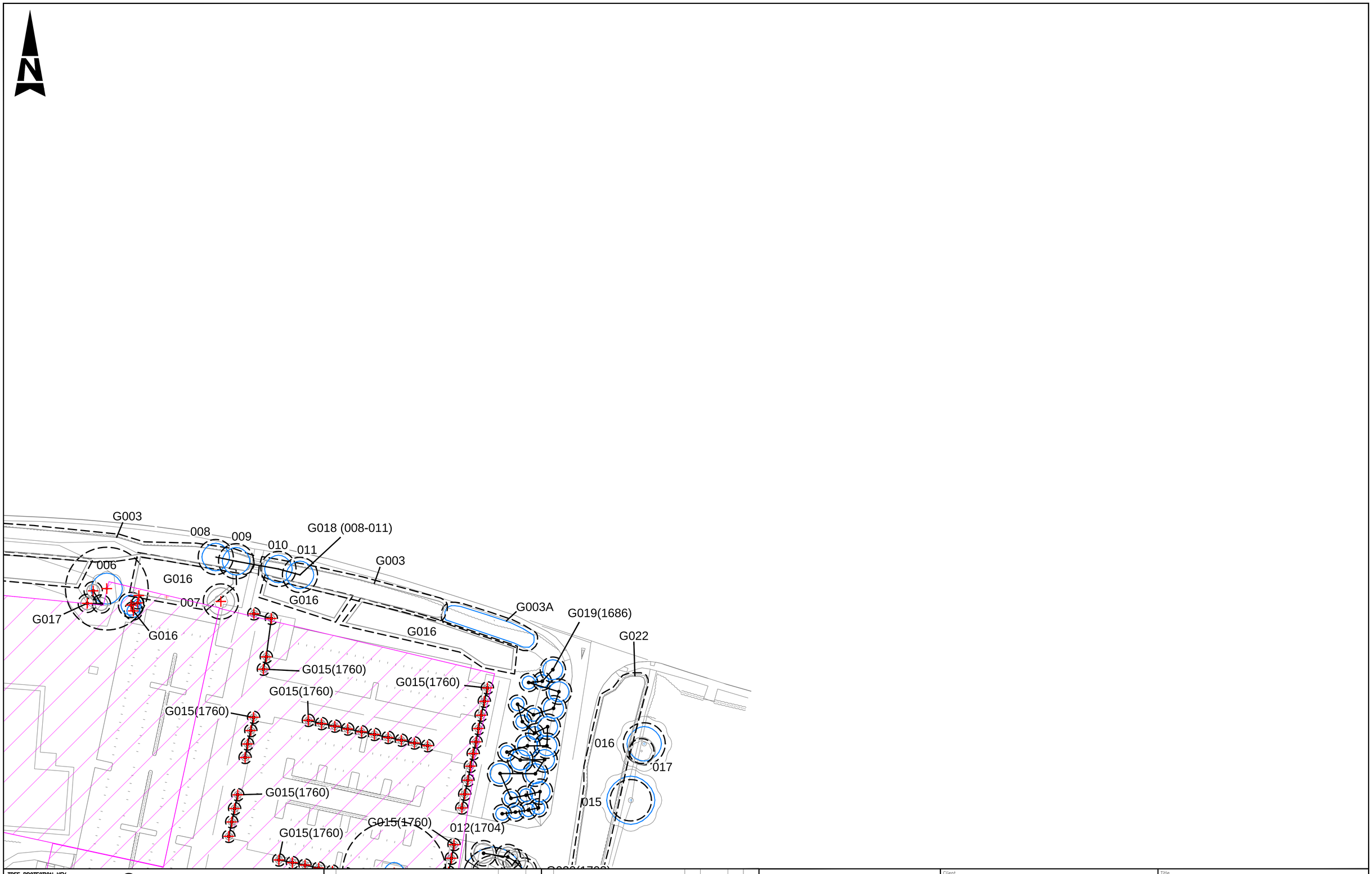

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ROOT PROTECTION AREA

REFER TO GROUP G110

PROPOSED BUILDING FOOTPRINTS

TREE TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

TREE GROUP TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Landscape Architecture,
The Octagon,
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Colchester, Essex, England
CO1 1TG

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Fax: (01206) 732020
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Drawing Number: 5137998_COL_ARB_04

Rev: A

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TREE PROTECTION KEY

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Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Colchester, Essex, England
CO1 1TG

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Title: TREE PROTECTION PLAN SHEET 5

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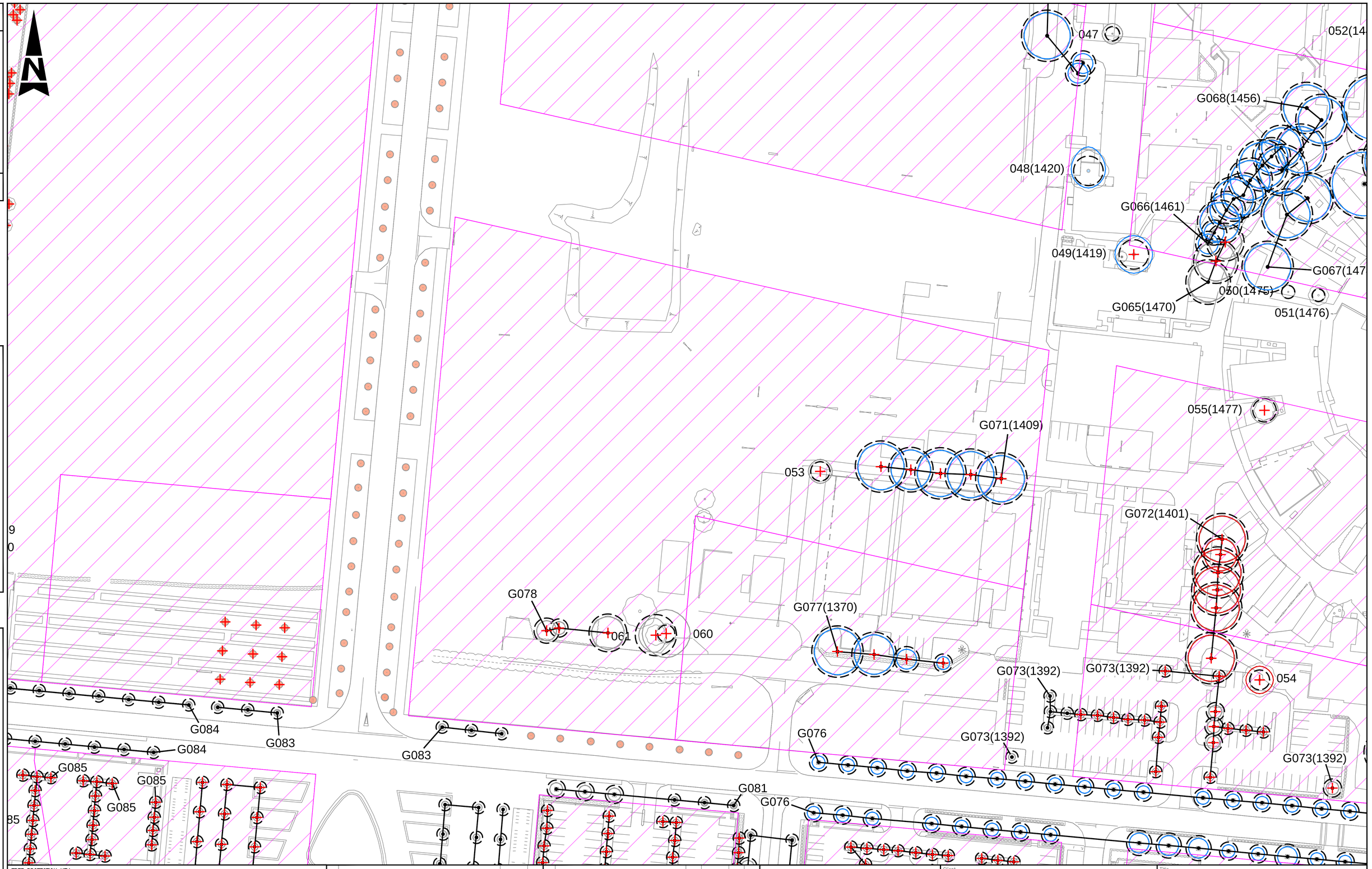

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P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Title: TREE PROTECTION PLAN SHEET 6

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Status: P

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Rev: A

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Drawing Number

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TREE PROTECTION KEY

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ROOT PROTECTION AREA

REFER TO GROUP G110

PROPOSED BUILDING FOOTPRINTS

TREE TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

TREE GROUP TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Landscape Architecture,
The Octagon,
27 Middleborough,
Colchester, Essex, England
CO1 1TG

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Project: WEST CAMBRIDGE MASTERPLAN (EIA)

Title: TREE PROTECTION PLAN SHEET 07

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:500	BC Date 12/04/16	TD Date 12/04/16	TD Date 12/04/16

Status	Drawing Number	Rev
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Date: May 17, 2016 – 9:44am
Plotted by: CLEM1389

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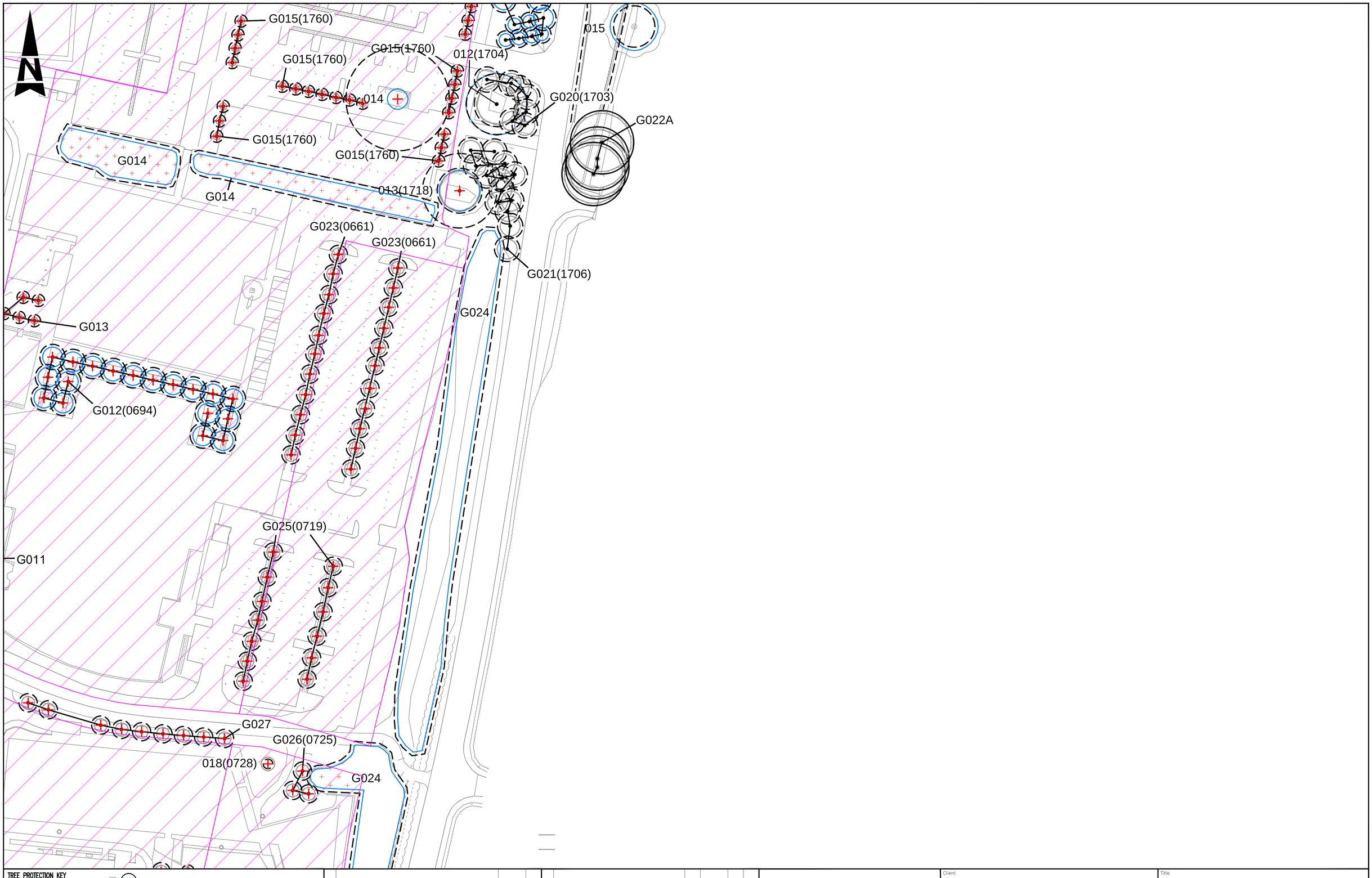

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Date: May 17, 2016 - 9:44am Plotted by: CLEM1389

TREE PROTECTION KEY

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Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
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27 Middleborough,
Colchester, Essex, England
CO1 1TG

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Fax: (01206) 732020
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Client: UNIVERSITY OF CAMBRIDGE

Title: TREE PROTECTION PLAN SHEET 8

Project: WEST CAMBRIDGE MASTERPLAN (EIA)

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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Drawing Number

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File: 5137998_Tree Protection Plan_PLANNING – .dwg

Date: May 17, 2016 - 9:44am Plotted by: CLEM1389

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W4

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W2

TREE PROTECTION KEY

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TREE GROUP TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

Stat	Purpose of Issue	Date	Auth
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Rev	Description	By	Date	Chk'd	Auth
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Landscape Architecture,
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27 Middleborough,
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CO1 1TG

Tel: (01206) 732000
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Project: WEST CAMBRIDGE MASTERPLAN (EIA)

Title: TREE PROTECTION PLAN SHEET 9

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:500	BC Date 12/04/16	TD Date 12/04/16	TD Date 12/04/16

Status: P

Drawing Number: 5137998_COL_ARB_09

Rev: A

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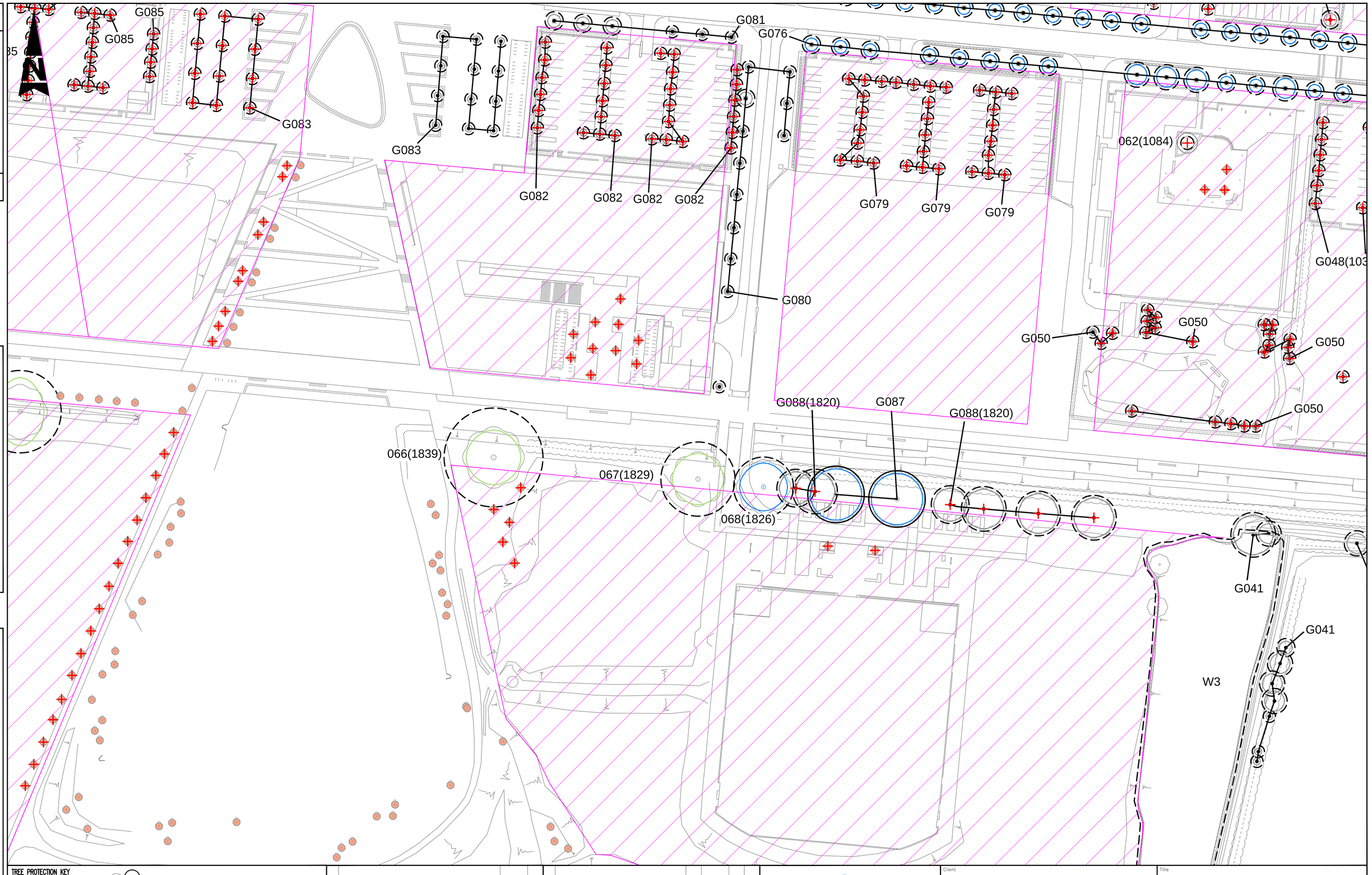

TREE PROTECTION KEY

- CATEGORY A TREE + TREE REF.
- CATEGORY B TREE + TREE REF.
- CATEGORY C TREE + TREE REF.
- CATEGORY U TREE + TREE REF.
- G1 — TREE GROUP REFERENCE (COLOUR RELATES TO BS CATEGORIES AS FOR INDIVIDUAL TREES AS SHOWN ABOVE)
- W1 — WOODLAND GROUP REFERENCE (COLOUR RELATES TO BS CATEGORIES AS FOR INDIVIDUAL TREES AS SHOWN ABOVE)
- ROOT PROTECTION AREA
- REFER TO GROUP G110
- PROPOSED BUILDING FOOTPRINTS
- TREE TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS
- TREE GROUP TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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File: 5137998_Tree Protection Plan_PLANNING – .dwg
Date: May 17, 2016 - 9:44am Plotted by: CLEM1389

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Title: TREE PROTECTION PLAN SHEET 10

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
A1	1:500	BC Date 12/04/16	TD Date 12/04/16	TD Date 12/04/16

Status	Drawing Number	Rev
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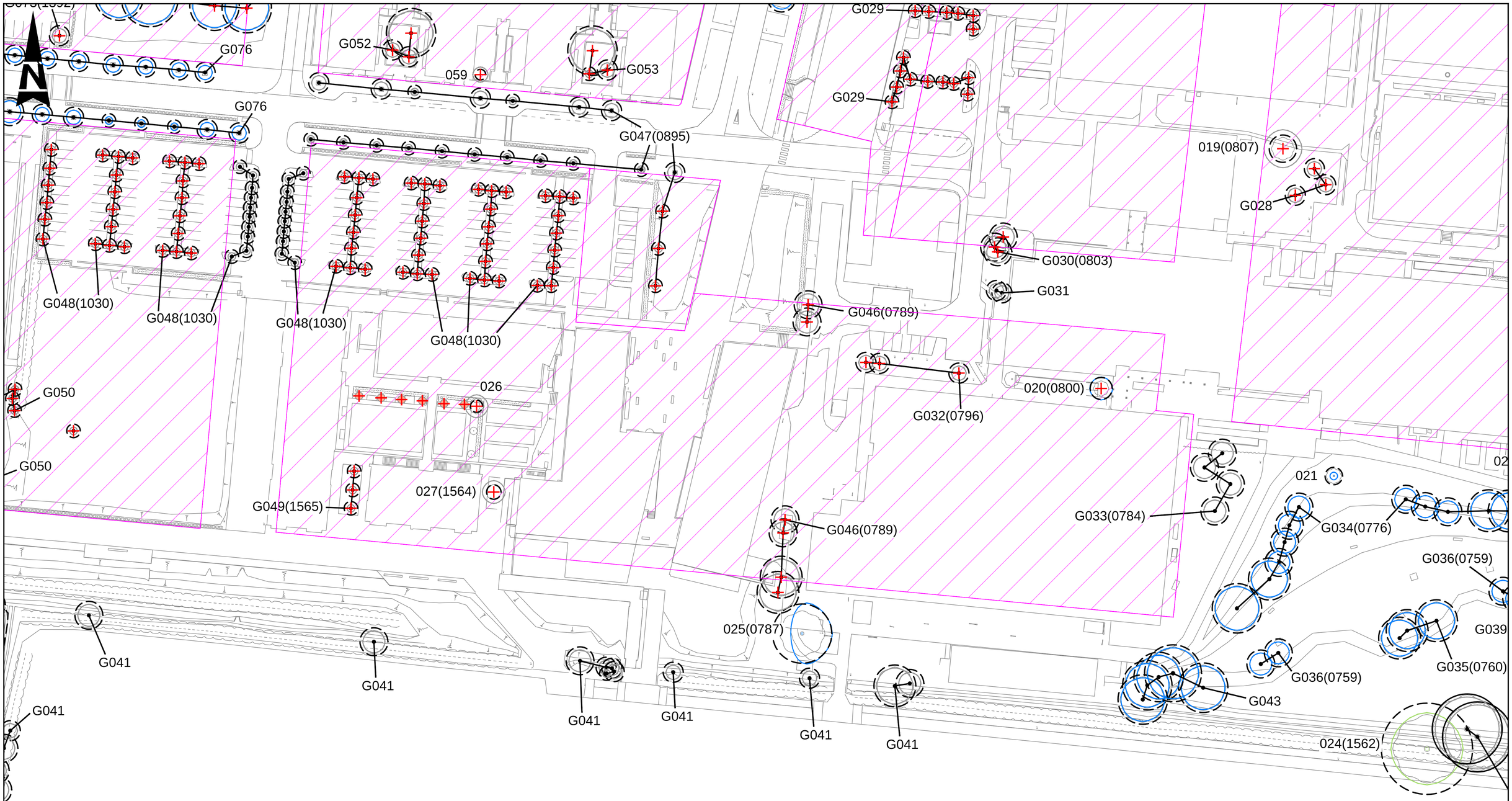

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Rev | Drawing Number | Status

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Date: May 17, 2016 - 9:44am Plotted by: CLEM1389

TREE PROTECTION KEY

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- 000 CATEGORY B TREE + TREE REF.
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- G1 TREE GROUP REFERENCE (COLOUR RELATES TO BS CATEGORIES AS FOR INDIVIDUAL TREES AS SHOWN ABOVE)
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- ROOT PROTECTION AREA
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- TREE TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS
- TREE GROUP TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
–	ORIGINAL PLANNING ISSUE	BC	12/04/16	TD	TD

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Title: TREE PROTECTION PLAN SHEET 11

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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Rev

Drawing Number

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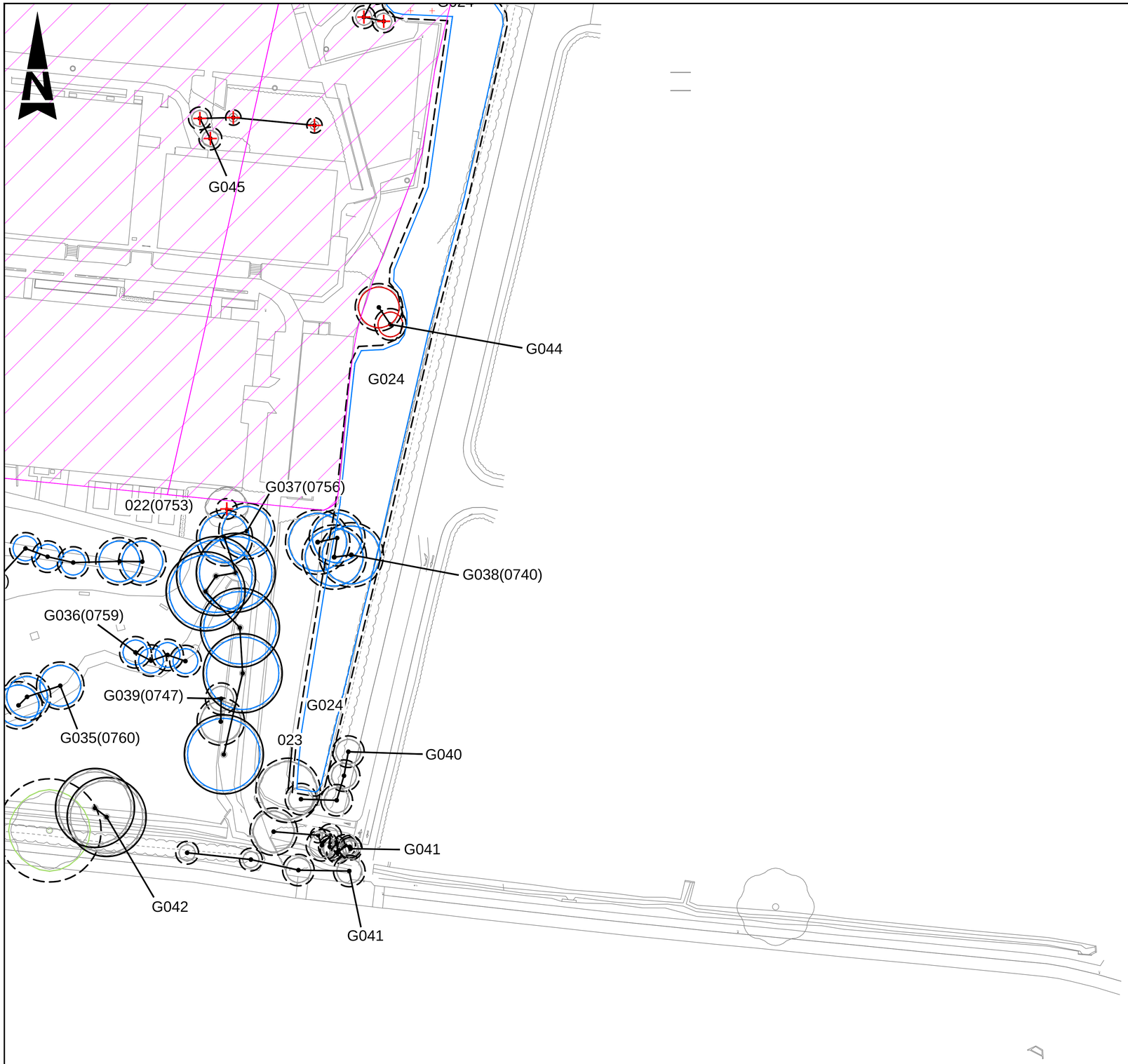

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Date: May 17, 2016 - 9:44am Plotted by: CLEM1389

TREE PROTECTION KEY

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- 000 CATEGORY B TREE + TREE REF.
- 000 CATEGORY C TREE + TREE REF.
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- TREE GROUP TO BE REMOVED OR TRANSLOCATED AS PART OF WORKS

Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
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Title: TREE PROTECTION PLAN SHEET 12

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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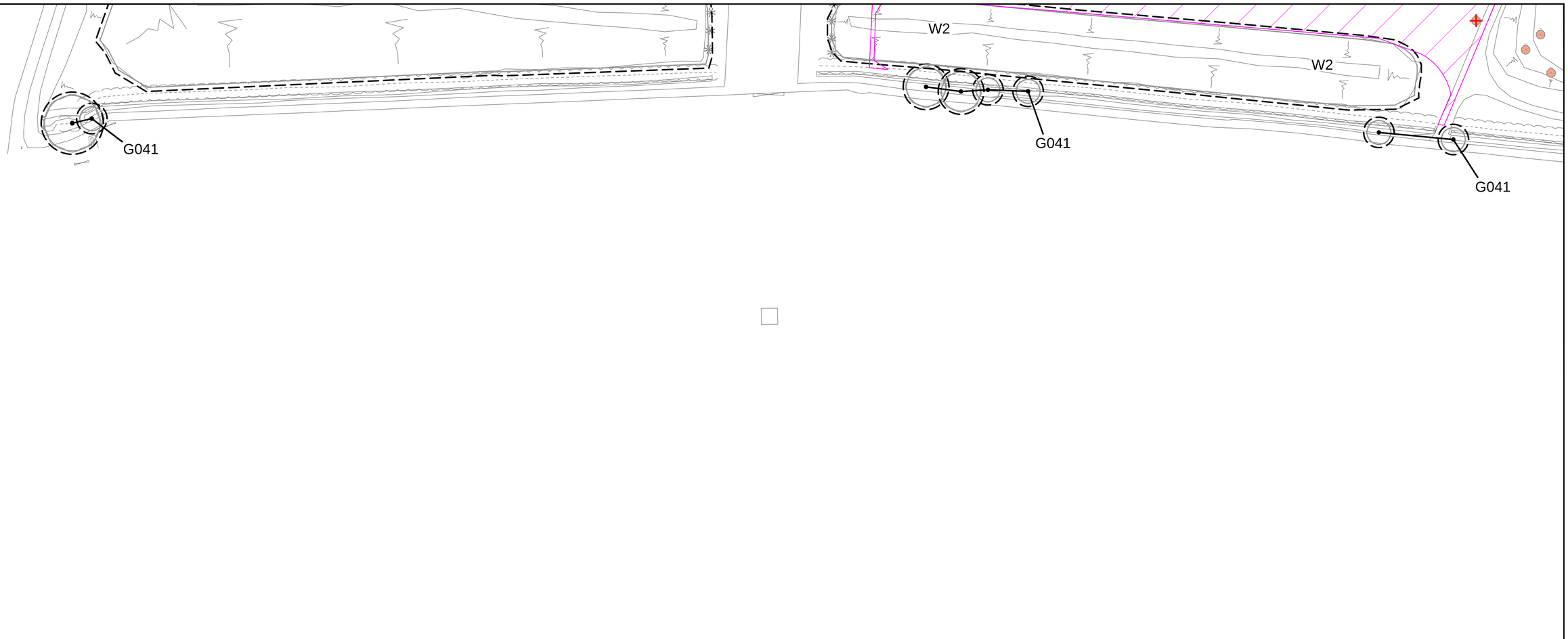

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TREE PROTECTION KEY

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Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
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Title: TREE PROTECTION PLAN SHEET 13

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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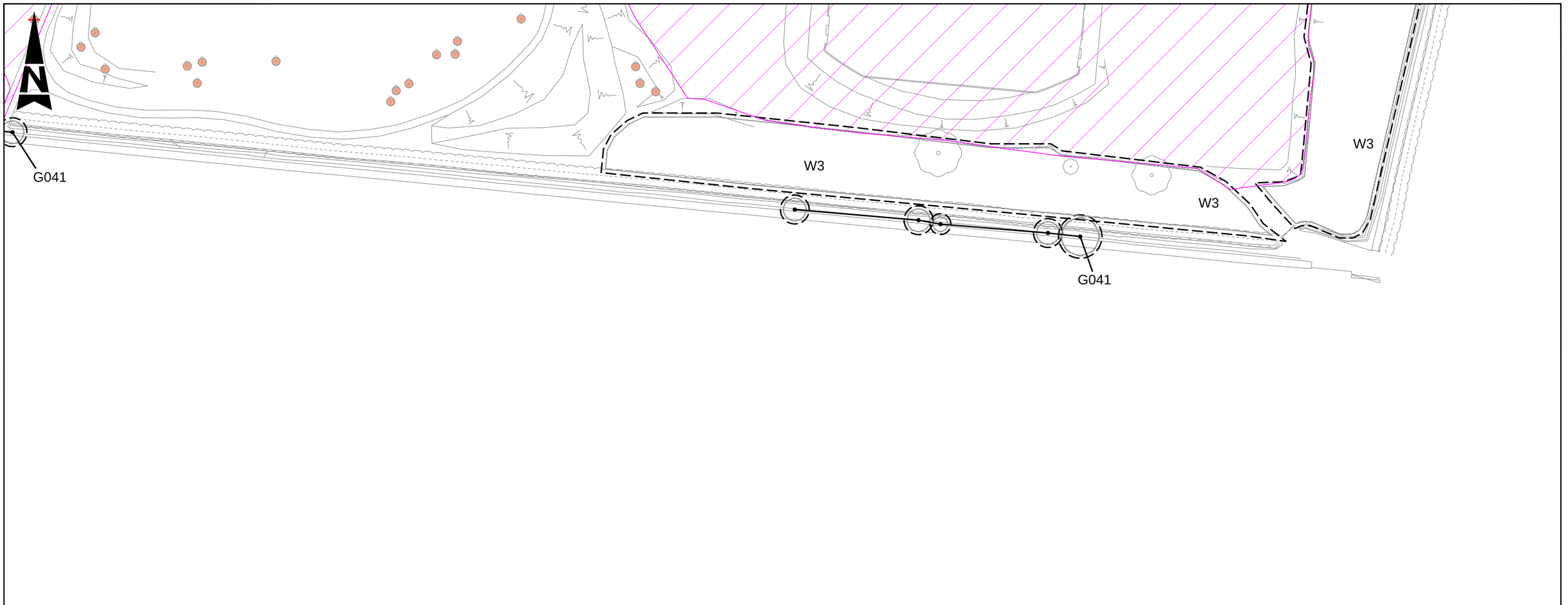

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Drawing Number

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TREE PROTECTION KEY

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Stat	Purpose of Issue	Date	Auth
P	PLANNING	12/04/16	TD

Rev	Description	By	Date	Chk'd	Auth
A	RETENTION OF TREE GROUP G064	BC	17/05/16	TD	TD
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Title: TREE PROTECTION PLAN SHEET 14

Sheet Size	Original Scale	Designed/Drawn	Checked	Authorised
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Daniel Parsons

Euston Tower
286 Euston Road
London
England
NW1 3AT

Tel: +44 207 121 2191
Fax: +44 207121 2806

Email: daniel.parsons@atknsglobal.com

Appendix 8.2 Visual receptor photosheets

1. Public viewpoint within the Coton Countryside Reserve

2. Public Right of Way alongside the western boundary 3930

3. Harcamlow Way 3931a

4. Wimpole Way 3931a

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Title
Landscape
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Page 1 of 6

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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Rev
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5. Clerk Maxwell Road

6. Wilberforce Road

7. Dane Drive

8. Conduit Head Road

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Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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9. -

10. Public Right of Way to the south of Harcamlow Way 559

11. Madingley Road (West)

12. Madingley Road (East)

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Page 3 of 6

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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Drawing Number
5137998_CAM_LV_PHO

Rev
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13. M11 Motorway

14. Public Right of Way to the west of Laundry Farm 556

15. Grantchester Road

16. Barton Road

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Page 4 of 6

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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17. Cambridge Rugby Football Club

18. Coton Road

19. Public Right of Way south west of Grantchester 1066

20. Public Right of Way west of Grantchester 1065

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Page 5 of 6

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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Drawing Number
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21. Public Right of Way along the top of Chapel Hill 11715

22. Chapel Hill

23. Castle Mound

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Title
Landscape
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Page 6 of 6

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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Appendix 8.3 Visualisations

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
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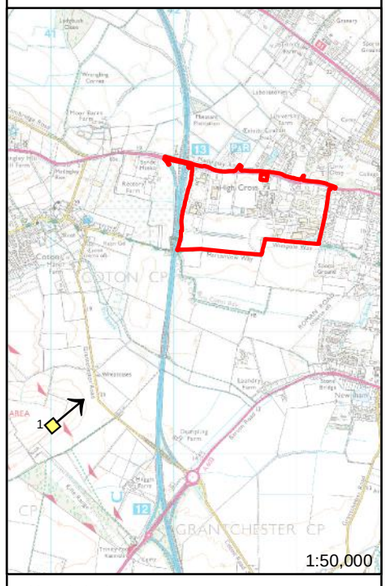
Photomontage location:



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Project
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Title
Landscape
Photomontage Views
Viewpoint 1 - Summer, Existing
Sheet 1 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number
5137998_CAM_LV_PM1SE

Rev
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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

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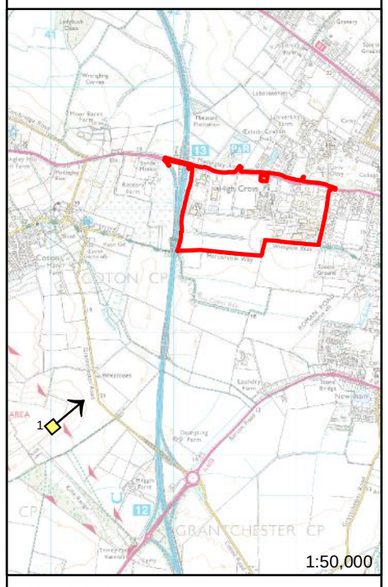

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Title
Landscape
Photomontage Views
Viewpoint 1 - Summer, Proposed
Sheet 3 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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Notes:

Camera information:
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Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

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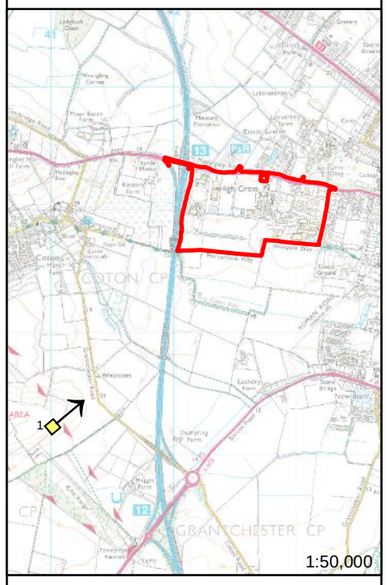

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Title
Landscape
Photomontage Views
Viewpoint 1 - Winter, Existing
Sheet 2 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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Drawing Number
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Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

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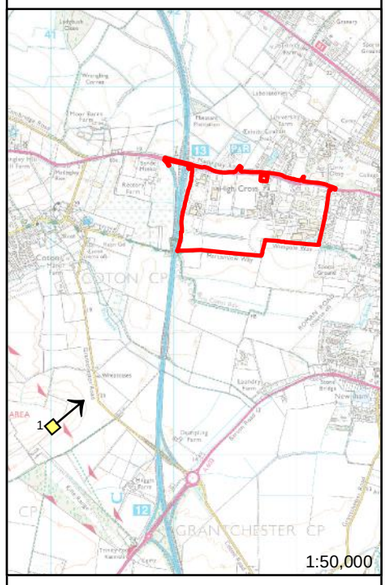

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Title
Landscape
Photomontage Views
Viewpoint 1 - Winter, Proposed
Sheet 4 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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Drawing Number
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Rev
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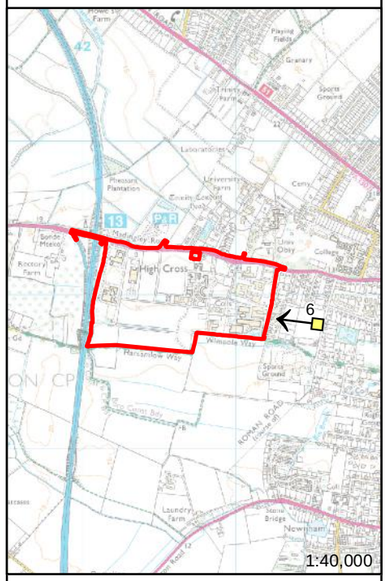

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Client
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Title
Landscape
Photomontage Views
Viewpoint 6 - Summer, Existing
Sheet 5 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number: 5137998_CAM_LV_PM6SE
Rev: 00

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

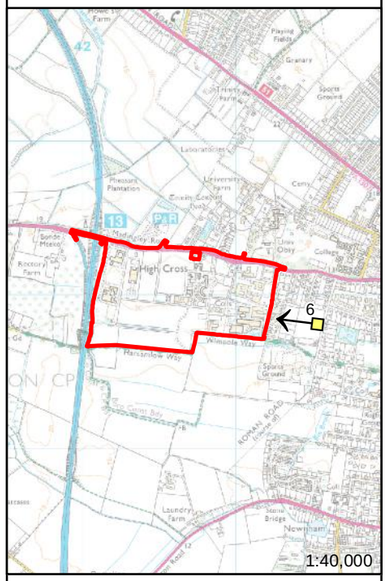
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 6 - Summer, Proposed
Sheet 7 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number: 5137998_CAM_LV_PM6SP
Rev: 00

Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM6SP_00_GEO067.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
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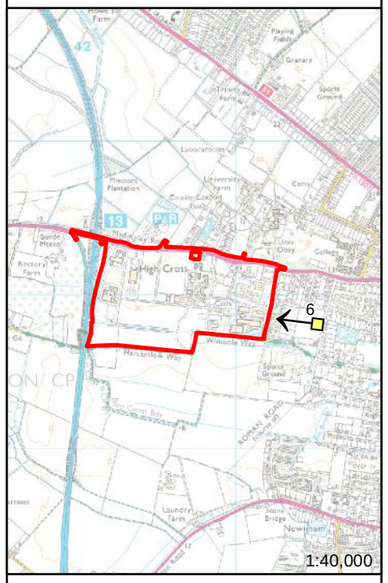
Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 6 - Winter, Existing
Sheet 6 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number
5137998_CAM_LV_PM6WE

Rev
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Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM6WE_00_GEO066.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

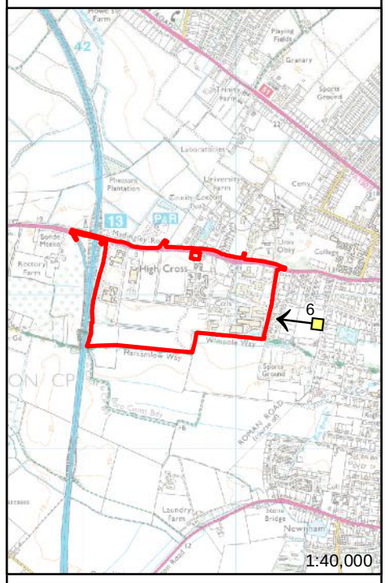
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 6 - Winter, Proposed
Sheet 8 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number
5137998_CAM_LV_PM6WP

Rev
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Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM6WP_00_GEO068.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

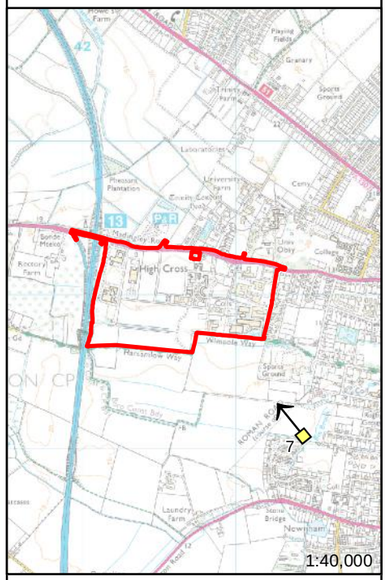
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 7 - Summer, Existing
Sheet 9 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number: 5137998_CAM_LV_PM7SE
Rev: 00

Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM7SE_00_GEO069.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

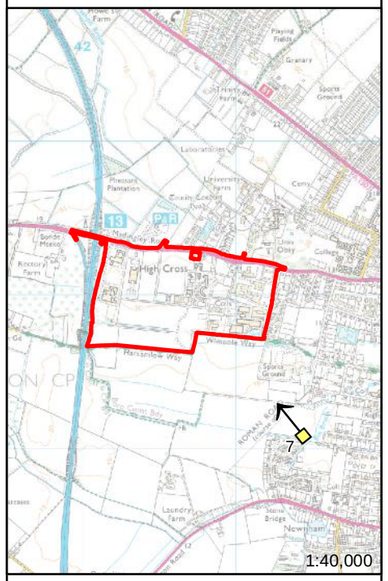
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 7 - Summer, Proposed
Sheet 11 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number: 5137998_CAM_LV_PM7SP
Rev: 00

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

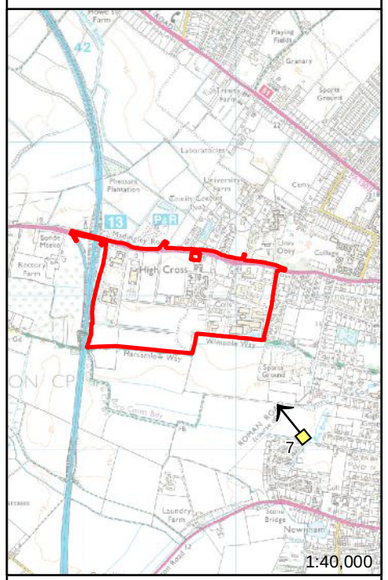
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 7 - Winter, Existing
Sheet 10 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 10/06/16	JW Date 10/06/16	DP Date 10/06/16

Drawing Number
5137998_CAM_LV_PM7WE

Rev
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Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM7WE_00_GEO070.mxd

Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

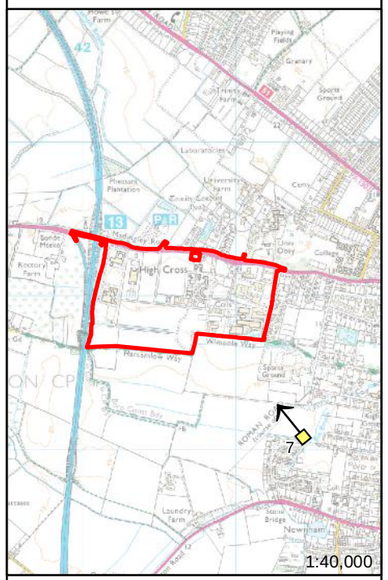
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 7 - Winter, Proposed
Sheet 12 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 03/06/16	JW Date 03/06/16	DP Date 03/06/16

Drawing Number
5137998_CAM_LV_PM7WP

Rev
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Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM7WP_00_GEO072.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

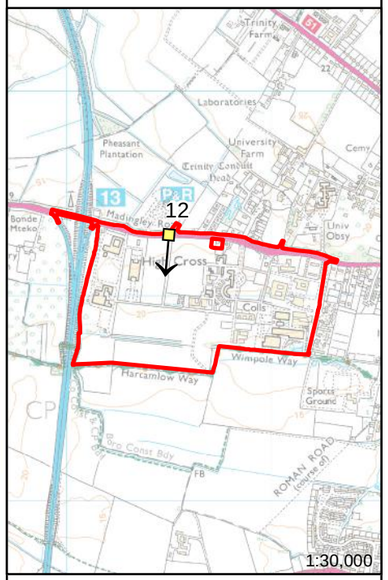
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 12 - Summer, Existing
Sheet 13 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 13/06/16	JW Date 13/06/16	DP Date 13/06/16

Drawing Number: 5137998_CAM_LV_PM12SE
Rev: 00

Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM12SE_00_GEO073.mxd

Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
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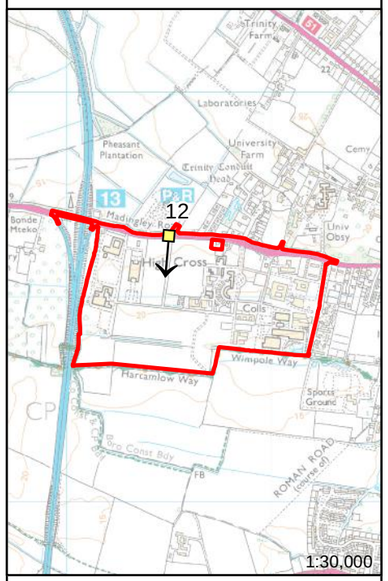
Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 12 - Summer, Proposed
Sheet 15 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 13/06/16	JW Date 13/06/16	DP Date 13/06/16

Drawing Number: 5137998_CAM_LV_PM12SP
Rev: 00

Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM12SP_00_GEO075.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
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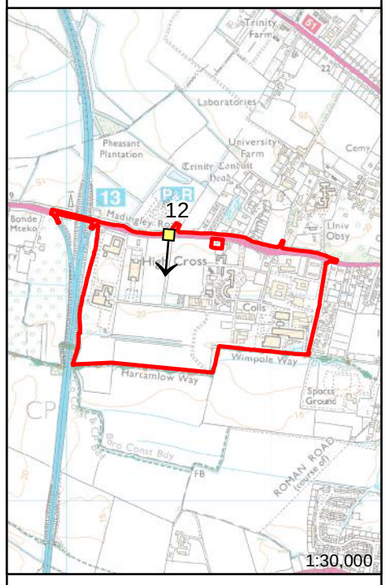
Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 12 - Winter, Existing
Sheet 14 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 13/06/16	JW Date 13/06/16	DP Date 13/06/16

Drawing Number
5137998_CAM_LV_PM12WE

Rev
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Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM12WE_00_GEO074.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
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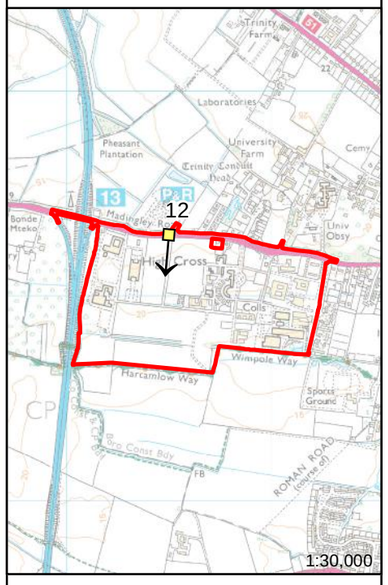
Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 12 - Winter, Proposed
Sheet 16 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 13/06/16	JW Date 13/06/16	DP Date 13/06/16

Drawing Number: 5137998_CAM_LV_PM12WP
Rev: 00

Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM12WP_00_GEO076.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

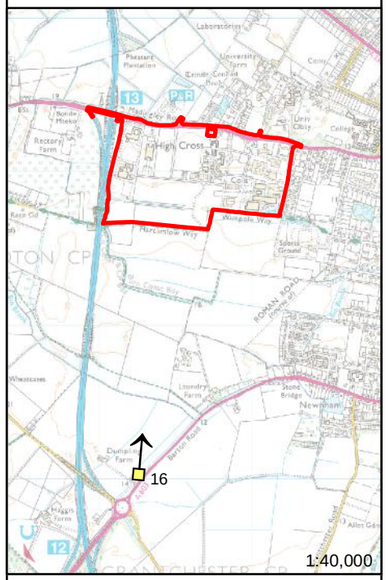
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 16 - Summer, Existing
Sheet 17 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 13/06/16	JW Date 13/06/16	DP Date 13/06/16

Drawing Number
5137998_CAM_LV_PM16SE

Rev
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Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM16SE_00_GEO077.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

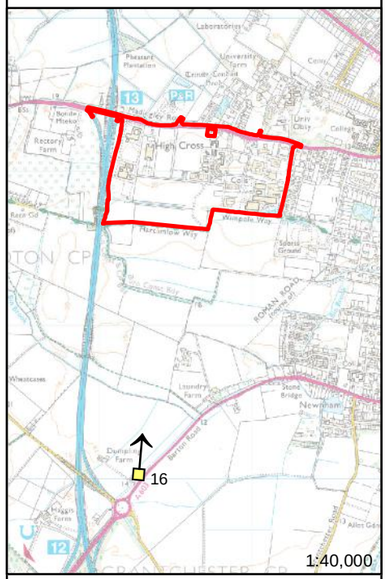
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 16 - Summer, Proposed
Sheet 19 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD Date 14/06/16	JW Date 14/06/16	DP Date 14/06/16

Drawing Number
5137998_CAM_LV_PM16SP

Rev
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Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM16SP_00_GEO079.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
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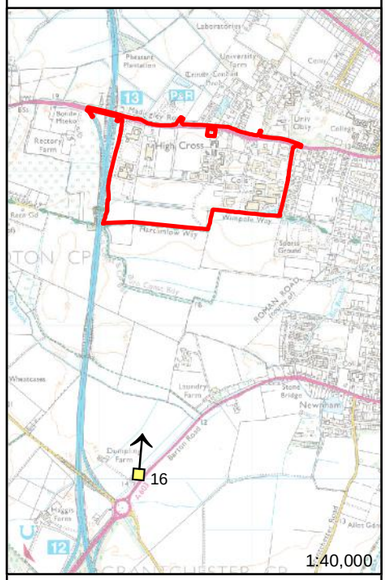
Photomontage location:



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Title
Landscape
Photomontage Views
Viewpoint 16 - Winter, Existing
Sheet 18 of 32

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	N/A	SJD	JW	DP
		Date 13/06/16	Date 13/06/16	Date 13/06/16

Drawing Number
5137998_CAM_LV_PM16WE

Rev
00

Path: P:\GBLOW\LEGE\PLH\Planning\Projects\5137998 West Cambridge Masterplan EIA\600 Working Folders\670 GIS\WIP\LV\5137998_CAM_LV_PM16WE_00_GEO078.mxd

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Notes:

Camera information:
Canon EOS 5D MkII, EF 50mm f/1.2L USM (fixed), 50mm, 40 degrees

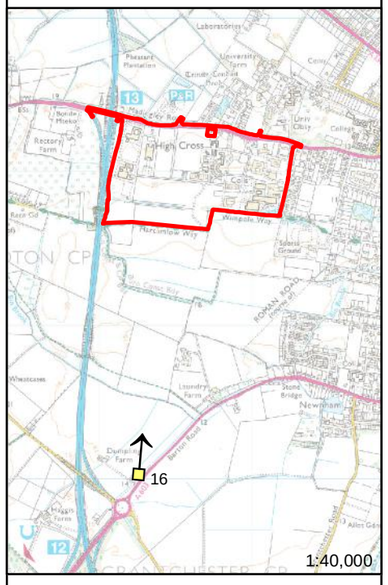
Date, time and weather information:
2016-02-25, weather as per photographs, direction as per photolocation plan

Viewpoint height:
c.1.65m above ground level

Correct viewing distance from viewer to photomontage:
450mm

Size photomontage should be printed to accurately represent scale of development:
A3

Photomontage location:



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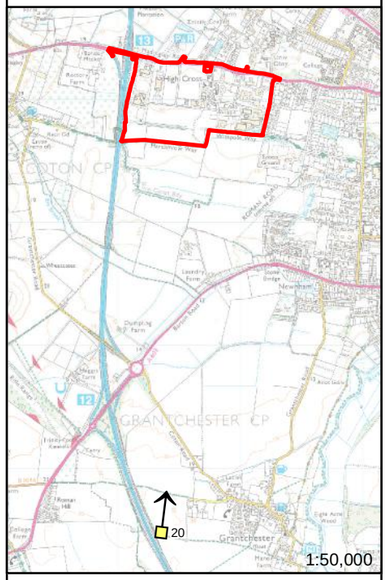

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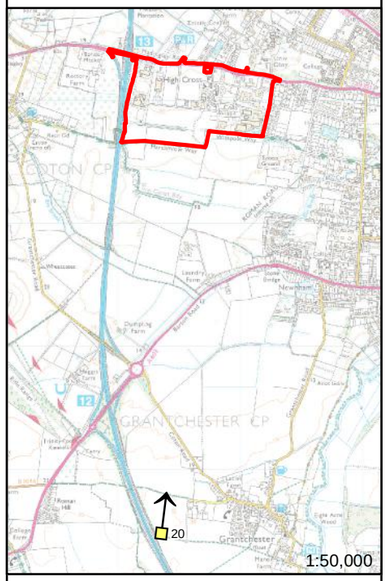

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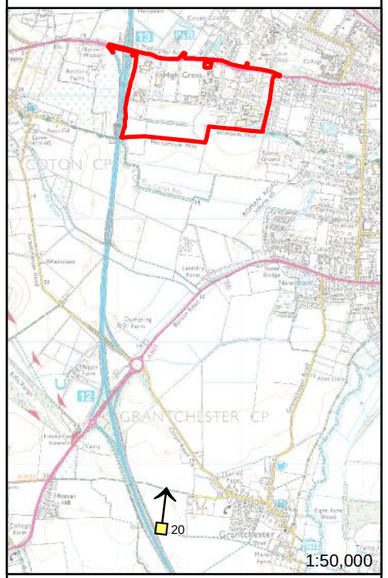

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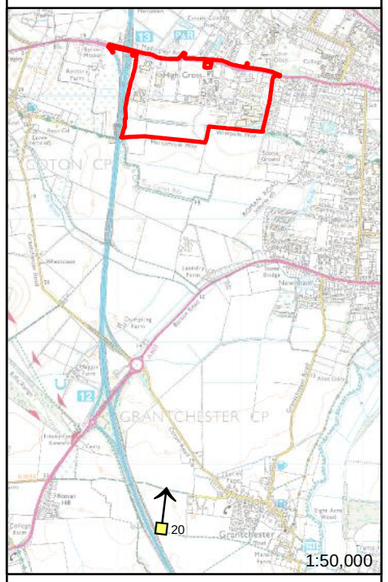

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Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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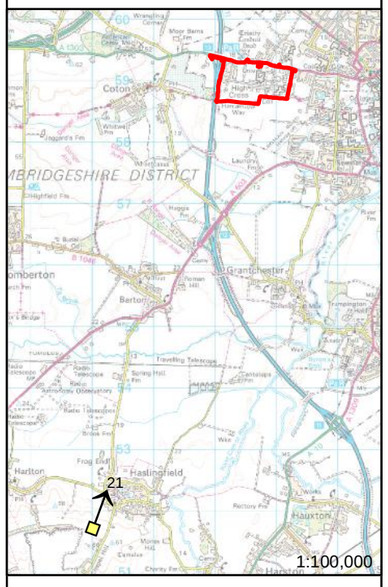

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Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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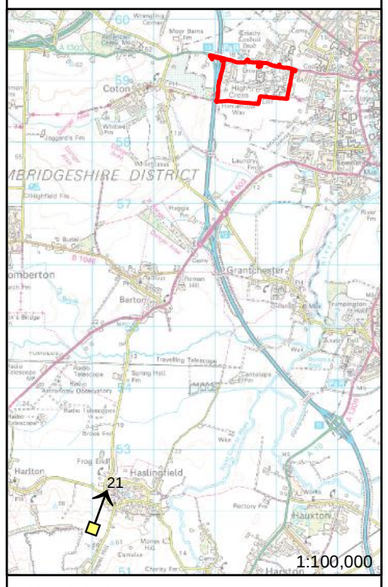

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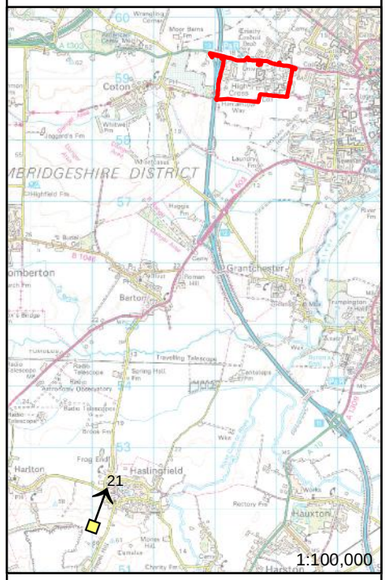

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Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
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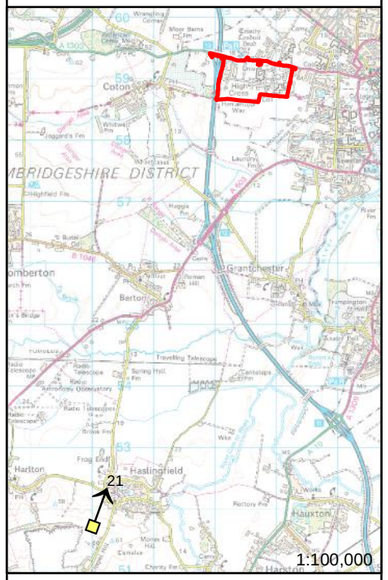

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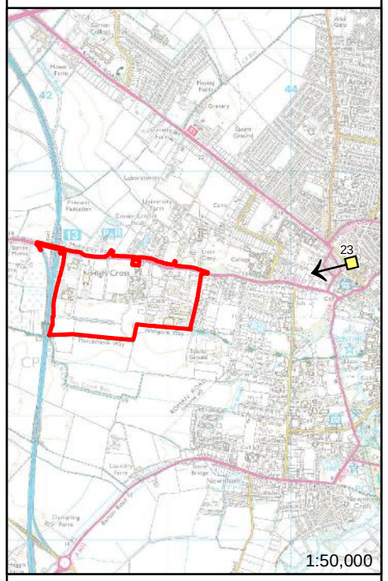

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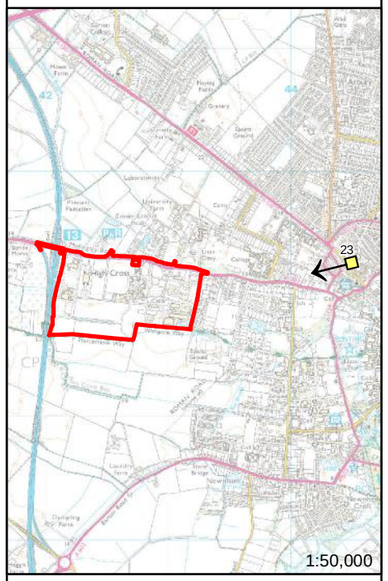

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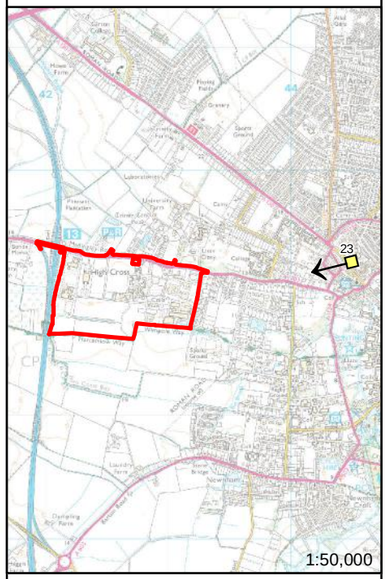

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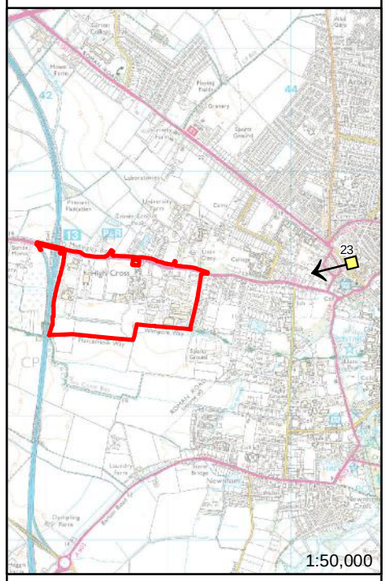

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Appendix 9.1 Employment calculations

Maximum employment calculations

Construction phase employment

Construction cost of the Proposed Development has been estimated at £1.8 billion. Using an average construction turnover per employee of £225,000 (based on a sample of 30 major UK construction companies), the Proposed Development creates 8,000 construction person year jobs, an equivalent of 800 FTE construction jobs over the Development's 15 year construction period.

Assuming a moderate composite multiplier of 1.25 at the local level and 1.50 at the regional level (as recommended by the HCA Additionality Guide 2014), the construction of the Proposed Development could indirectly support a further 200 jobs locally and 400 jobs regionally.

Operational phase jobs on Site

The total number of jobs on Site after completion of the Proposed Development in 2031 was calculated using total proposed floorspace figures provided by AECOM, average employment densities from the Employment Densities Guide 2nd Edition (HCA) and guidance from AECOM and Creative Places (see Table A9.1.1). All jobs referred to in this report are Full Time Equivalent (FTE) jobs. The total number of FTE jobs on Site is calculated to be 13,994.

This must be considered alongside the estimated 4,350 FTE jobs at the adjacent North West Cambridge scheme upon completion in 2026 (source: NWC EIA, Table 5.14, page 5-17).

The total employment floorspace of the West Cambridge Site when the Proposed Development is complete (existing + proposed net additional floorspace) will be 500,280m^2, comprising: 210,386 m^2 commercial, 257,909 m^2 academic, 1,000 m^2 retail/food drink, 3,150 m^2 nursery, 10,160 m^2 assembly and leisure, 7,675 m^2 ancillary and 10,000 m^2 residential.

To calculate commercial, retail and academic employment, it was first assumed that the floorspace figures given were Gross External Area (GEA) and that this represents 120% of Net Internal Area (NIA) i.e. the area supporting employment. The NIA for commercial floorspace is therefore 175,322 m^2, for retail/food & drink 833 m^2 and for academic 214,924 m^2.

It was assumed that 99% of the commercial NIA (173,568 m^2) will be office, dry lab and workshop uses with respective employment densities of 17 m^2, 25 m^2 and 35 m^2 per FTE (based upon AECOM and Creative Places guidance). The floorspace was assumed to be split between the uses as follows: 80% office (138,855 m^2), 10% dry lab and 10% workshop (17,357 m^2 each). The three uses together support 9,358 jobs. It should be noted that this assumption represents the maximum expected office use class floorspace. It may be the case that a higher proportion of the commercial floorspace is dry lab/workshop use. If so, the level of employment will be lower.

It is assumed that 98% of the academic NIA (210,626m^2) will be used for academic purposes. Based on AECOM guidance regarding the University of Cambridge's employment densities for academic floorspace, an employment density of 50 m^2 per FTE was used for the academic floorspace NIA of 210,626m^2. Academic jobs on Site will therefore number 4,213.

For retail/food & drink employment, the remaining 1% of the commercial NIA (1,753m^2) and 2% of the academic NIA (4,298m^2) was assumed to be retail/food & drink shared facilities within academic and commercial space. In addition to the 833 m^2 specified retail/food & drink floorspace, this brings total retail/food & drink NIA to 6,885 m^2. Employment density of 18 m^2 per FTE was used, based upon Employment Densities Guide 2nd Edition densities for high street (19), food superstores (17), and restaurants & cafes (18). This supports 383 jobs.

Following discussion with AECOM, provisional figures of 20 nursery and 20 assembly and leisure jobs have been used rather than calculating based upon floorspace. Ancillary floorspace is expected to be used for an energy centre with negligible employment creation, thus assumed to be zero. These figures are to be refined at a later stage. The existing residential floorspace (10,000 m^2 GEA, 8,333 m^2 NIA) on site is not expected to generate employment opportunities.

Operational phase net additional employment benefits

The net additional job creation of the Proposed Development is estimated to be 6,600 FTE jobs at the local level and 8,100 FTE jobs at the regional level.

The total number of jobs to be created on site by the Proposed Development excluding deadweight was calculated at 6,367 office-based, 541 dry lab, 387 workshop, 308 retail, and 2,526 academic, using the proposed (rather than existing) floorspace figures and above assumptions regarding floorspace uses and employment density. The 20 assembly and leisure jobs are eliminated as deadweight, whilst the 20 nursery jobs were excluded from calculations because their numbers are too low to have any significant leakage, displacement or economic multiplier effects.

The net employment benefits at the local and regional levels were calculated by incorporating leakage, displacement, and economic multiplier effects. The HCA ready-reckoners (HCA Additionality Guide 2014) were used to quantify these effects, with assessment of Cambridge's economic characteristics and baseline informing the selection of each ready-reckoner, as follows.

Leakage

Leakage is estimated as the number or proportion of outputs that will benefit those outside the Proposed Development's target area.

For office, dry lab and workshop jobs, the high quality of jobs is usually likely to lead to higher levels of leakage as it provides incentive for people from outside the local area to commute to access employment opportunities. Evidence suggests that this is indeed the case in the Cambridge area. However, given the high level of qualification of residents of Cambridge and South Cambridgeshire - far exceeding the regional average - and resultant significant pool of suitable potential employees, it is assumed that a significant number of jobs created will be taken up by those residing within the two local authorities, mitigating some of the leakage effects. This employment leakage is therefore expected to be moderate (25% by the HCA ready-reckoners).

The leakage for office, dry lab and workshop jobs on the regional level is likely to be low (10% by the HCA ready-reckoners), since commuting from beyond the region is not expected to be very prevalent.

For retail, leakages are expected to be low on the local level (10%) and negligible (0%) on the regional level. This is because of the low value nature of these jobs which make long commutes highly unlikely.

For academic jobs, leakages on the local and regional levels are expected to be very low (10% and 5% respectively), because the vast majority will be taken up by those based locally at the University of Cambridge.

Displacement

Displacement would arise if businesses located in the Proposed Development were to employ people currently employed by firms elsewhere in the area. It follows that these jobs would not be additional jobs but rather displaced from elsewhere in the area.

For office jobs the displacement effect is assumed to be low (25% on the local level and 30% on the regional level) because a large proportion of businesses located on the Proposed Development are to be start-ups and new firms rather than firms previously based elsewhere in the local or regional area. Whilst local businesses experience a significant level of competition within the cluster which would ordinarily result in displacement, the particularly large and growing pool of skilled labour associated with the University is likely to go a considerable way towards eliminating this effect.

For retail, the expected local, convenience nature of the businesses established make it unlikely that significant numbers of other jobs will be displaced. The displacement is therefore assumed to be low – 25% at both the local and regional levels.

For academic jobs, the majority of floorspace is to be used to rehouse pre-existing academic departments. A high level of displacement is assumed – 65% for the local and regional levels.

Economic multiplier

Economic multiplier effects refer to knock-on effects within the local economy by which the economic impact of a development is multiplied. In accordance with the HCA Additionality Guide 2014, composite multipliers are assumed to be 1.29 at a local level and 1.44 at a regional level for office development. The same assumption was used for academic jobs, because of the supply chain linkages required for scientific research.

For retail jobs, the HCA recommends lower multipliers, of 1.21 at the local level and 1.38 at the regional level.

Following these assumptions, the leakages and displacement were deducted from the total number of jobs supported by the proposed floorspace, and this figure was put through the multiplier. The total employment figures have been rounded to the nearest 100 FTEs. The process and results are shown in Table A9.1.2 – Table A9.1.4.

Table A9.1.1 Operational phase jobs on Site

	Commercial - Office	Commercial - Dry lab	Commercial - Workshop	Retail/food & drink	Academic	Nursery	Assembly and leisure	Ancillary	Residential
Proposed floorspace (m2)	210,386	210,386	210,386	1,000	257,909	N/A	N/A	N/A	10,000
NIA conversion (m2)	175,321	175,321	175,321	833	214,924	N/A	N/A	N/A	8,333
NIA adjusted for use (m2)	138,855 1	17,3572	17,3572	6,8853	210,626 4	N/A	N/A	N/A	c.8,333
Employment density (m2 per FTE)	17	25	35	18	50	N/A	N/A	N/A	N/A
Total jobs (FTE)	**8,168**	**694**	**496**	**383**	**4,213**	**20**	**20**	**0**	**0**

1 – 80% of the 99% of total commercial NIA, with remaining 1% designated as ancillary retail/food & drink
2 – 10% of the 99% of total commercial NIA, with remaining 1% designated as ancillary retail/food & drink
3 – Includes 1% of commercial NIA and 2% academic NIA as shared facilities ancillary to main use
4 – 98% of total academic NIA, with remaining 2% designated as ancillary retail/food & drink

Table A9.1.2 Net additional office, dry lab and workshop jobs

Office, dry lab and workshop FTE jobs	Local	Regional
Gross direct jobs	7,294	7,294
Leakage level	25%	10%
Leakage quantity	1,824	729
Jobs after leakage	5,471	6,565
Displacement level	25%	30%
Displacement quantity	1,368	1,969
Jobs after displacement	4,103	4,595
Economic multiplier	1.29	1.44
Net additional jobs	5,293	6,617
Net additional jobs (rounded)	5,300	6,600

Table A9.1.3 Net additional retail jobs

Retail FTE jobs	Local	Regional
Gross direct jobs	308	308
Leakage level	10%	0%
Leakage quantity	31	0
Jobs after leakage	278	308
Displacement level	25%	25%
Displacement quantity	69	77
Jobs after displacement	208	231
Economic multiplier	1.21	1.38
Net additional jobs	252	319
Net additional jobs (rounded)	300	300

Table A9.1.4 Net additional academic jobs

Academic FTE jobs	Local	Regional
Gross direct jobs	2,526	2,526
Leakage level	10%	5%
Leakage quantity	253	126
Jobs after leakage	2,274	2,400
Displacement level	65%	65%
Displacement quantity	1,478	1,560
Jobs after displacement	796	840
Economic multiplier	1.29	1.44
Net additional jobs	1,027	1,210
Net additional jobs (rounded)	1,000	1,200

Minimum employment calculations

Operational phase jobs on Site

The minimum total number of jobs on Site after completion of the Proposed Development in 2031 was calculated using total proposed floorspace figures which replace all proposed commercial floorspace with academic floorspace (retaining existing commercial floorspace), average employment densities from the Employment Densities Guide 2nd Edition (HCA) and guidance from AECOM and Creative Places (see Table A9.1.5). The minimum total number of FTE jobs on Site is calculated to be 9,453. All jobs referred to in this appendix are Full Time Equivalent (FTE) jobs.

Table A9.1.5 Minimum operational phase jobs on Site

	Commercial - Office	Commercial - Dry lab	Commercial - Workshop	Retail/food & drink	Academic	Nursery	Assembly and leisure	Ancillary	Residential
Proposed floorspace adjusted for use (m2)	36,7491	4,5942	4,5942	9,9023	413,457 4	N/A	N/A	N/A	10,000
NIA conversion (m2)	30,624	3,828	3,8282	8,2523	344,548	N/A	N/A	N/A	c.8,333
Employment density (m2 per FTE)	17	25	35	18	50	N/A	N/A	N/A	N/A
Total jobs (FTE)	1,800	200	100	500	6,900	20	20	0	0

1 – 80% of the 99% of total commercial floorspace, with remaining 1% designated as ancillary retail/food & drink

2 – 10% of the 99% of total commercial floorspace, with remaining 1% designated as ancillary retail/food & drink

3 – Includes 1,000sq.m proposed retail floorspace plus 1% of commercial floorspace and 2% academic floorspace as shared facilities ancillary to main use

4 – 98% of total academic NIA, with remaining 2% designated as ancillary retail/food & drink

This must be considered alongside the estimated 4,350 FTE jobs at the adjacent North West Cambridge scheme upon completion in 2026 (source: NWC EIA, Table 5.14, page 5-17).

The total employment floorspace of the West Cambridge Site when the Proposed Development is complete (existing + proposed net additional floorspace) will comprise: 46,400 m^2 commercial, 421,895 m^2 academic, 1,000 m^2 retail/food drink, 3,150 m^2 nursery, 10,160 m^2 assembly and leisure, 7,675 m^2 ancillary and 10,000 m^2 residential.

It was assumed that 99% of the existing commercial floorspace (45,936 m^2) is split between uses as follows: 80% office (36,749 m^2), 10% dry lab and 10% workshop (4,594 m^2 each). It is assumed that 98% of the total proposed academic floorspace (413,457 m^2) will be used for academic purposes.

The remaining 1% of the commercial floorspace and 2% of the academic floorspace was assumed to be retail/food & drink shared facilities within academic and commercial space. In addition to the 1,000 m^2 specified retail/food & drink floorspace, this brings total retail/food & drink floorspace to 9,902 m^2.

To calculate commercial, retail and academic employment, it was assumed that the floorspace figures given were Gross External Area (GEA) and that this represents 120% of Net Internal Area (NIA) i.e. the area supporting employment. The NIA for commercial floorspace is therefore 38,280 m^2: 30,624 m^2 office and 3,828 m^2 each for dry lab and workshop. The office, dry lab and workshop uses - with respective employment densities of 17 m^2, 25 m^2 and 35 m^2 per FTE (based upon AECOM and Creative Places guidance) - together support 2,064 jobs.

Based on AECOM guidance regarding the University of Cambridge's employment densities for academic floorspace, an employment density of 50 m^2 per FTE was used for the academic NIA of 344,548 m^2. Academic jobs on Site will therefore number 6,891.

For retail employment, an employment density of 18 m^2 per FTE was used, based upon Employment Densities Guide 2nd Edition densities for high street (19), food superstores (17), and restaurants & cafes (18). The total of 8,252 m^2 NIA supports 458 jobs.

Following discussion with AECOM, provisional figures of 20 nursery and 20 assembly and leisure jobs have been used rather than calculating based upon floorspace. Ancillary floorspace is expected to be used for an energy centre with negligible employment creation, thus assumed to be zero. These figures are to be refined at a later stage. The existing residential floorspace (10,000 m^2 GEA, 8,333 m^2 NIA) on site is not expected to generate employment opportunities.

Operational phase net additional employment benefits

The net additional job creation of the Proposed Development is estimated to be 2,400 FTE jobs at the local level and 2,900 FTE jobs at the regional level.

The total number of jobs to be created on site by the Proposed Development excluding deadweight was calculated at 384 retail and 5,205 academic, using the proposed (rather than existing) floorspace figures and above assumptions regarding floorspace uses and employment density. The 20 assembly and leisure jobs are eliminated as deadweight, whilst the 20 nursery jobs were excluded from calculations because their numbers are too low to have any significant leakage, displacement or economic multiplier effects.

The net employment benefits at the local and regional levels were calculated by incorporating leakage, displacement, and economic multiplier effects. The HCA ready-reckoners (HCA Additionality Guide 2014) were used to quantify these effects, with assessment of Cambridge's economic characteristics and baseline informing the selection of each ready-reckoner, as follows.

Leakage

Leakage is estimated as the number or proportion of outputs that will benefit those outside the Proposed Development's target area.

For retail, leakages are expected to be low on the local level (10%) and negligible (0%) on the regional level. This is because of the low value nature of these jobs which make long commutes highly unlikely.

For academic jobs, leakages on the local and regional levels are expected to be very low (10% and 5% respectively), because the vast majority will be taken up by those based locally at the University of Cambridge.

Displacement

Displacement would arise if businesses located in the Proposed Development were to employ people currently employed by firms elsewhere in the area. It follows that these jobs would not be additional jobs but rather displaced from elsewhere in the area.

For retail, the expected local, convenience nature of the businesses established make it unlikely that significant numbers of other jobs will be displaced. The displacement is therefore assumed to be low – 25% at both the local and regional levels.

For academic jobs, the majority of floorspace is to be used to rehouse pre-existing academic departments. A high level of displacement is assumed – 65% for the local and regional levels.

Economic multiplier

Economic multiplier effects refer to knock-on effects within the local economy by which the economic impact of a development is multiplied. In accordance with the HCA Additionality Guide 2014, composite multipliers are assumed to be 1.29 at a local level and 1.44 at a regional level for academic jobs, because of the supply chain linkages required for scientific research.

For retail jobs, the HCA recommends lower multipliers, of 1.21 at the local level and 1.38 at the regional level.

Following these assumptions, the leakages and displacement were deducted from the total number of jobs supported by the proposed floorspace, and this figure was put through the multiplier. The total employment figures have been rounded to the nearest 100 FTEs. The process and results are shown in Table A9.1.6 – Table A9.1.7.

Table A9.1.6 Net additional retail jobs

Retail FTE jobs	Local	Regional
Gross direct jobs	384	384
Leakage level	10%	0%
Leakage quantity	38	0
Jobs after leakage	346	384
Displacement level	25%	25%
Displacement quantity	86	96
Jobs after displacement	259	288
Economic multiplier	1.21	1.38
Net additional jobs	314	398
Net additional jobs (rounded)	300	400

Table A9.1.7 Net additional academic jobs

Academic FTE jobs	Local	Regional
Gross direct jobs	5,205	5,205
Leakage level	10%	5%
Leakage quantity	520	260
Jobs after leakage	4,684	4,944
Displacement level	65%	65%
Displacement quantity	3,045	3,214
Jobs after displacement	1,639	1,731
Economic multiplier	1.29	1.44
Net additional jobs	2,115	2,492
Net additional jobs (rounded)	2,100	2,500

Appendix 10.1 Traffic flows

Table A10.1.1 2015 Base year traffic flows

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
1.0	M11 - J12 - J13 - Nbd	41,896	41,825	6,578	6,496
1.0	M11 - J12 - J13 - Sbd	37,350	37,287	5,864	5,791
1.1	M11 J13 -J14 - Nbd	31,315	31,262	4,917	4,855
1.1	M11 J13 -J14 - Sbd	30,815	30,763	4,838	4,778
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Nbd	21,958	21,921	3,448	3,404
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Sbd	22,403	22,365	3,517	3,473
1.3	M11 J13 off-slip - Nbd	10,564	10,547	1,659	1,638
1.3	M11 J13 on-slip - Sbd	6,882	6,871	1,081	1,067
2.0	A14 West of J30 (Bar Hill) - Ebd	38,738	35,645	7,258	6,532
2.0	A14 West of J30 (Bar Hill) - Wbd	40,267	37,053	7,545	6,790
2.1	A14 North West of M11 J14 - Ebd	39,011	35,897	7,310	6,578
2.1	A14 North West M11 J14 - Wbd	38,883	35,779	7,286	6,557
2.2	A14 West of J32 Interchange - Ebd	34,604	31,842	6,484	5,835
2.2	A14 West of J32 Interchange - Wbd	32,334	29,753	6,058	5,452
2.3	A428 -West of M11 J14 - Ebd	12,705	11,691	2,381	2,142
2.3	A428 - West of M11 J14 - Wbd	10,879	10,011	2,038	1,835
3.0	A1303 East of Madingley Mulch Rbt Ebd	6,558	6,327	376	346
3.0	A1303 East of Madingley Mulch Rbt Wbd	11,659	11,248	668	616
3.1	Madingley Rd - East of Cambridge Rd Crossroads Wbd	11,436	11,034	655	604
3.1	Madingley Rd - East of Cambridge Rd Crossroads Ebd	6,433	6,207	369	340
3.2	Madingley Rd on Over Bridge M11 Ebd	13,657	13,177	783	721
3.2	Madingley Rd on Over Bridge M11 Wbd	5,933	5,725	340	313
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd	10,016	9,622	367	327
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd	9,800	9,415	360	320
3.4	Madingley Rd - West of P&R Access Wbd	9,800	9,415	360	320
3.4	Madingley Rd - West of P&R Access Ebd	10,016	9,622	367	327
3.5	Madingley Rd - East of P&R Access Wbd	9,715	9,333	356	317
3.5	Madingley Rd - East of P&R Access Ebd	9,501	9,127	349	310

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
3.6	Madingley Rd - East of Proposed High Cross Access Ebd	8,228	7,905	302	269
3.6	Madingley Rd - East of Proposed High Cross Access Wbd	8,532	8,196	313	279
3.7	Madingley Rd - East of JJ Thomson Ave Ebd	9,366	8,998	344	306
3.7	Madingley Rd - East of JJ Thomson Ave Wbd	9,431	9,061	346	308
3.8	Madingley Rd - East of Clerk Maxwell Rd Ebd	9,129	8,770	335	298
3.8	Madingley Rd - East of Clerk Maxwell Rd Wbd	9,470	9,098	347	309
3.9	Madingley Rd - East of Storey's Way Ebd	7,839	7,531	288	256
3.9	Madingley Rd - East of Storey's Way Wbd	7,693	7,390	282	251
3.10	Madingley Rd - East of Grange Road Ebd	7,839	7,531	288	256
3.10	Madingley Rd - East of Grange Road Wbd	7,693	7,390	282	251
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Ebd	8,651	8,311	317	282
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Wbd	8,118	7,799	298	265
3.12	Northampton St - West of Pound Hill Ebd	6,988	6,713	256	228
3.12	Northampton St - West of Pound Hill Wbd	7,096	6,817	260	232
4.0	Huntingdon Rd - West of Proposed NWC HRW Access NWbd	6,353	6,104	233	207
4.0	Huntingdon Rd - West of Proposed NWC HRW Access SEbd	4,583	4,402	168	150
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College NWbd	6,353	6,104	233	207
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College SEbd	4,583	4,402	168	150
4.2	Huntingdon Rd - East of NWC HRW Access NWbd	8,346	8,018	306	273
4.2	Huntingdon Rd - East of NWC HRW Access SEbd	7,020	6,744	258	229
4.3	Huntingdon Rd - East of NIAB Access NWbd	9,006	8,652	330	294
4.3	Huntingdon Rd - East of NIAB Access SEbd	9,152	8,793	336	299
4.4	Huntingdon Rd - East of Storey's Way NWbd	8,467	8,134	311	276
4.4	Huntingdon Rd - East of Storey's Way SEbd	8,397	8,067	308	274
5.0	Barton Rd - West of Grantchester Rd Ebd	10,009	9,616	367	327

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
5.0	Barton Rd - West of Grantchester Rd Wbd	7,910	7,599	290	258
5.1	Barton Rd - East of Grantchester Rd Ebd	6,614	6,354	243	216
5.1	Barton Rd - East of Grantchester Rd Wbd	7,566	7,268	278	247
6.0	Queen's Rd - North of West Rd Nbd	7,001	6,726	257	229
6.0	Queen's Rd - North of West Rd Sbd	8,340	8,012	306	272
7.0	Histon Road - South of A14 Nbd	16,071	15,439	590	525
7.0	Histon Road - South of A14 Sbd	19,066	18,317	700	623
8.0	Grange Rd - South of Madingley Rd Nbd	2,036	1,933	99	86
8.0	Grange Rd - South of Madingley Rd Sbd	2,427	2,304	118	102
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Ebd	1,760	1,671	86	74
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Wbd	1,583	1,503	77	67
10.0	Girton Rd - North of Huntingdon Rd Nbd	2,422	2,299	118	102
10.0	Girton Rd - North of Huntingdon Rd Sbd	2,797	2,655	136	117

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Nbd	0	0	0	0
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Sbd	0	0	0	0
11.1	Proposed Madingley Rd West Access to NWC Nbd	0	0	0	0
11.1	Proposed Madingley Rd West Access to NWC Sbd	0	0	0	0
11.2	Proposed Huntingdon Rd West Access to NWC Nbd	0	0	0	0
11.2	Proposed Huntingdon Rd West Access to NWC Sbd	0	0	0	0
11.3	Proposed Huntingdon Rd East Access to NWC Sbd	0	0	0	0
11.3	Proposed Huntingdon Rd East Access to NWC Nbd	0	0	0	0
12.0	Western Access to Madingley Rd Nbd	0	0	0	0
12.0	Western Access to Madingley Rd Sbd	0	0	0	0
12.1	High Cross Access to Madingley Rd Nbd	1,391	1,072	92	67

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
12.1	High Cross Access to Madingley Rd Sbd	1,457	1,123	97	70
12.2	JJ Thomson Ave Access to Madingley Rd Nbd	1,653	1,274	110	80
12.2	JJ Thomson Ave Access to Madingley Rd Sbd	1,452	1,119	96	70
12.3	Clerk Maxwell Rd Nbd	453	349	30	22
12.3	Clerk Maxwell Rd Sbd	395	305	26	19

Table A10.1.2 2021 Do minimum traffic flows

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5tFlows
1.0	M11 - J12 - J13 - Nbd	44,651	44,576	7,011	6,923
1.0	M11 - J12 - J13 - Sbd	40,353	40,285	6,336	6,256
1.1	M11 J13 -J14 - Nbd	32,705	32,650	5,135	5,071
1.1	M11 J13 -J14 - Sbd	32,268	32,214	5,066	5,003
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Nbd	23,075	23,037	3,623	3,578
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Sbd	23,514	23,474	3,692	3,646
1.3	M11 J13 off-slip - Nbd	11,929	11,909	1,873	1,850
1.3	M11 J13 on-slip - Sbd	8,412	8,398	1,321	1,304
2.0	A14 West of J30 (Bar Hill) - Ebd	39,542	36,385	7,409	6,668
2.0	A14 West of J30 (Bar Hill) - Wbd	41,134	37,850	7,707	6,936
2.1	A14 North West of M11 J14 - Ebd	40,613	37,371	7,610	6,849
2.1	A14 North West M11 J14 - Wbd	40,508	37,275	7,590	6,831
2.2	A14 West of J32 Interchange - Ebd	36,206	33,316	6,784	6,105
2.2	A14 West of J32 Interchange - Wbd	33,959	31,248	6,363	5,726
2.3	A428 -West of M11 J14 - Ebd	13,115	12,069	2,457	2,212
2.3	A428 - West of M11 J14 - Wbd	11,250	10,352	2,108	1,897
3.0	A1303 East of Madingley Mulch Rbt Ebd	7,384	7,124	423	390
3.0	A1303 East of Madingley Mulch Rbt Wbd	12,450	12,012	713	658
3.1	Madingley Rd - East of Cambridge Rd Crossroads Wbd	11,659	11,248	668	616
3.1	Madingley Rd - East of Cambridge Rd Crossroads Ebd	7,023	6,776	402	371
3.2	Madingley Rd on Over Bridge M11 Ebd	15,420	14,877	884	815
3.2	Madingley Rd on Over Bridge M11 Wbd	5,822	5,618	334	308
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd	11,279	10,835	414	368

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5tFlows
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd	10,898	10,470	400	356
3.4	Madingley Rd - West of P&R Access Wbd	10,898	10,470	400	356
3.4	Madingley Rd - West of P&R Access Ebd	11,279	10,835	414	368
3.5	Madingley Rd - East of P&R Access Wbd	10,813	10,388	397	353
3.5	Madingley Rd - East of P&R Access Ebd	10,764	10,341	395	351
3.6	Madingley Rd - East of Proposed High Cross Access Ebd	9,066	8,710	333	296
3.6	Madingley Rd - East of Proposed High Cross Access Wbd	9,446	9,074	347	308
3.7	Madingley Rd - East of JJ Thomson Ave Ebd	10,369	9,962	380	339
3.7	Madingley Rd - East of JJ Thomson Ave Wbd	10,231	9,829	375	334
3.8	Madingley Rd - East of Clerk Maxwell Rd Ebd	10,132	9,734	372	331
3.8	Madingley Rd - East of Clerk Maxwell Rd Wbd	10,269	9,866	377	335
3.9	Madingley Rd - East of Storey's Way Ebd	8,873	8,524	326	290
3.9	Madingley Rd - East of Storey's Way Wbd	8,772	8,427	322	286

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5tFlows
3.10	Madingley Rd - East of Grange Road Ebd	8,810	8,463	323	288
3.10	Madingley Rd - East of Grange Road Wbd	8,721	8,378	320	285
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Ebd	9,641	9,262	354	315
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Wbd	9,190	8,829	337	300
3.12	Northampton St - West of Pound Hill Ebd	7,724	7,421	283	252
3.12	Northampton St - West of Pound Hill Wbd	8,111	7,793	298	265
4.0	Huntingdon Rd - West of Proposed NWC HRW Access NWbd	8,232	7,909	302	269
4.0	Huntingdon Rd - West of Proposed NWC HRW Access SEbd	6,093	5,854	224	199
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College NWbd	7,090	6,811	260	231
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College SEbd	5,020	4,823	184	164
4.2	Huntingdon Rd - East of NWC HRW Access NWbd	10,917	10,488	401	356

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5tFlows
4.2	Huntingdon Rd - East of NWC HRW Access SEbd	9,977	9,585	366	326
4.3	Huntingdon Rd - East of NIAB Access NWbd	11,545	11,091	424	377
4.3	Huntingdon Rd - East of NIAB Access SEbd	12,205	11,726	448	399
4.4	Huntingdon Rd - East of Storey's Way NWbd	10,898	10,470	400	356
4.4	Huntingdon Rd - East of Storey's Way SEbd	11,583	11,128	425	378
5.0	Barton Rd - West of Grantchester Rd Ebd	10,193	9,793	374	333
5.0	Barton Rd - West of Grantchester Rd Wbd	8,037	7,721	295	262
5.1	Barton Rd - East of Grantchester Rd Ebd	6,798	6,530	249	222
5.1	Barton Rd - East of Grantchester Rd Wbd	7,693	7,390	282	251
6.0	Queen's Rd - North of West Rd Nbd	7,432	7,140	273	243
6.0	Queen's Rd - North of West Rd Sbd	8,822	8,476	324	288
7.0	Histon Road - South of A14 Nbd	17,651	16,957	648	576
7.0	Histon Road - South of A14 Sbd	20,450	19,646	750	668
8.0	Grange Rd - South of Madingley Rd Nbd	2,114	2,007	103	89

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5tFlows
8.0	Grange Rd - South of Madingley Rd Sbd	2,521	2,393	122	106
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Ebd	1,448	1,374	70	61
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Wbd	1,474	1,399	72	62
10.0	Girton Rd - North of Huntingdon Rd Nbd	2,625	2,492	127	110
10.0	Girton Rd - North of Huntingdon Rd Sbd	3,005	2,853	146	126
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Nbd	451	348	30	22
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Sbd	550	424	36	27
11.1	Proposed Madingley Rd West Access to NWC Nbd	2,354	1,814	156	114
11.1	Proposed Madingley Rd West Access to NWC Sbd	2,382	1,836	158	115
11.2	Proposed Huntingdon Rd West Access to NWC Nbd	841	648	56	41
11.2	Proposed Huntingdon Rd West Access to NWC Sbd	794	612	53	38

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5tFlows
11.3	Proposed Huntingdon Rd East Access to NWC Sbd	1,884	1,452	125	91
11.3	Proposed Huntingdon Rd East Access to NWC Nbd	2,387	1,840	158	115
12.0	Western Access to Madingley Rd Nbd	0	0	0	0
12.0	Western Access to Madingley Rd Sbd	0	0	0	0
12.1	High Cross Access to Madingley Rd Nbd	1,391	1,072	92	67
12.1	High Cross Access to Madingley Rd Sbd	1,678	1,293	111	81
12.2	JJ Thomson Ave Access to Madingley Rd Nbd	1,644	1,267	109	79
12.2	JJ Thomson Ave Access to Madingley Rd Sbd	1,236	953	82	60
12.3	Clerk Maxwell Rd Nbd	453	349	30	22
12.3	Clerk Maxwell Rd Sbd	395	305	26	19

Table A10.1.3 2021 Do Something traffic flows

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
1.0	M11 - J12 - J13 - Nbd	45,184	45,109	7,470	7,005
1.0	M11 - J12 - J13 - Sbd	40,918	40,849	6,876	6,344
1.1	M11 J13 -J14 - Nbd	32,692	32,638	5,286	5,069
1.1	M11 J13 -J14 - Sbd	32,262	32,208	5,258	5,002
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Nbd	23,075	23,037	3,762	3,578
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Sbd	23,514	23,474	3,857	3,646
1.3	M11 J13 off-slip - Nbd	13,104	13,082	2,182	2,032
1.3	M11 J13 on-slip - Sbd	8,990	8,975	1,671	1,394
2.0	A14 West of J30 (Bar Hill) - Ebd	39,861	36,679	7,687	6,722
2.0	A14 West of J30 (Bar Hill) - Wbd	41,436	38,128	7,962	6,987
2.1	A14 North West of M11 J14 - Ebd	40,608	37,366	7,867	6,848
2.1	A14 North West M11 J14 - Wbd	40,503	37,270	7,834	6,830
2.2	A14 West of J32 Interchange - Ebd	36,200	33,311	7,042	6,104
2.2	A14 West of J32 Interchange - Wbd	33,953	31,243	6,607	5,725
2.3	A428 -West of M11 J14 - Ebd	13,115	12,069	2,573	2,212
2.3	A428 - West of M11 J14 - Wbd	11,244	10,346	2,219	1,896
3.0	A1303 East of Madingley Mulch Rbt Ebd	7,654	7,385	511	404
3.0	A1303 East of Madingley Mulch Rbt Wbd	12,720	12,273	794	672

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
3.1	Madingley Rd - East of Cambridge Rd Crossroads Wbd	11,950	11,530	752	631
3.1	Madingley Rd - East of Cambridge Rd Crossroads Ebd	7,328	7,070	495	387
3.2	Madingley Rd on Over Bridge M11 Ebd	16,315	15,741	1,082	862
3.2	Madingley Rd on Over Bridge M11 Wbd	6,121	5,905	401	323
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd	12,097	11,622	517	395
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd	11,736	11,274	508	383
3.4	Madingley Rd - West of P&R Access Wbd	11,736	11,274	609	383
3.4	Madingley Rd - West of P&R Access Ebd	12,097	11,622	535	395
3.5	Madingley Rd - East of P&R Access Wbd	11,651	11,193	606	380
3.5	Madingley Rd - East of P&R Access Ebd	11,583	11,127	516	378
3.6	Madingley Rd - East of Proposed High Cross Access Ebd	10,037	9,643	455	328
3.6	Madingley Rd - East of Proposed High Cross Access Wbd	10,791	10,367	505	352
3.7	Madingley Rd - East of JJ Thomson Ave Ebd	11,778	11,315	547	385
3.7	Madingley Rd - East of JJ Thomson Ave Wbd	11,970	11,500	577	391
3.8	Madingley Rd - East of Clerk Maxwell Rd Ebd	11,541	11,087	539	377
3.8	Madingley Rd - East of Clerk Maxwell Rd Wbd	12,009	11,537	579	392
3.9	Madingley Rd - East of Storey's Way Ebd	10,263	9,860	490	335
3.9	Madingley Rd - East of Storey's Way Wbd	10,492	10,079	522	343
3.10	Madingley Rd - East of Grange Road Ebd	10,162	9,762	485	332
3.10	Madingley Rd - East of Grange Road Wbd	10,403	9,994	518	340
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Ebd	10,365	9,957	445	338
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Wbd	10,028	9,634	440	327
3.12	Northampton St - West of Pound Hill Ebd	8,245	7,921	359	269
3.12	Northampton St - West of Pound Hill Wbd	8,537	8,201	362	279
4.0	Huntingdon Rd - West of Proposed NWC HRW Access NWbd	8,645	8,305	370	282

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
4.0	Huntingdon Rd - West of Proposed NWC HRW Access SEbd	6,544	6,287	298	214
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College NWbd	7,083	6,805	282	231
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College SEbd	5,014	4,817	207	164
4.2	Huntingdon Rd - East of NWC HRW Access NWbd	11,012	10,579	443	360
4.2	Huntingdon Rd - East of NWC HRW Access SEbd	10,041	9,646	411	328
4.3	Huntingdon Rd - East of NIAB Access NWbd	11,564	11,110	454	378
4.3	Huntingdon Rd - East of NIAB Access SEbd	12,218	11,738	487	399
4.4	Huntingdon Rd - East of Storey's Way NWbd	10,898	10,470	427	356
4.4	Huntingdon Rd - East of Storey's Way SEbd	11,583	11,128	461	378
5.0	Barton Rd - West of Grantchester Rd Ebd	10,225	9,823	381	334
5.0	Barton Rd - West of Grantchester Rd Wbd	8,037	7,721	298	262
5.1	Barton Rd - East of Grantchester Rd Ebd	6,829	6,561	257	223
5.1	Barton Rd - East of Grantchester Rd Wbd	7,693	7,390	285	251

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
6.0	Queen's Rd - North of West Rd Nbd	7,807	7,500	323	255
6.0	Queen's Rd - North of West Rd Sbd	9,000	8,646	352	294
7.0	Histon Road - South of A14 Nbd	18,152	17,439	728	593
7.0	Histon Road - South of A14 Sbd	21,021	20,195	837	686
8.0	Grange Rd - South of Madingley Rd Nbd	2,140	2,032	107	90
8.0	Grange Rd - South of Madingley Rd Sbd	2,547	2,418	127	107
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Ebd	1,453	1,379	71	61
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Wbd	1,484	1,409	72	62
10.0	Girton Rd - North of Huntingdon Rd Nbd	2,677	2,541	137	112
10.0	Girton Rd - North of Huntingdon Rd Sbd	3,073	2,917	157	129
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Nbd	484	373	69	23
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Sbd	597	460	84	29

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
11.1	Proposed Madingley Rd West Access to NWC Nbd	2,913	2,245	285	140
11.1	Proposed Madingley Rd West Access to NWC Sbd	3,012	2,321	307	145
11.2	Proposed Huntingdon Rd West Access to NWC Nbd	1,156	891	119	56
11.2	Proposed Huntingdon Rd West Access to NWC Sbd	1,128	869	122	54
11.3	Proposed Huntingdon Rd East Access to NWC Sbd	2,007	1,546	181	97
11.3	Proposed Huntingdon Rd East Access to NWC Nbd	2,476	1,908	213	119
12.0	Western Access to Madingley Rd Nbd	0	0	231	0
12.0	Western Access to Madingley Rd Sbd	0	0	344	0
12.1	High Cross Access to Madingley Rd Nbd	2,510	1,934	167	121
12.1	High Cross Access to Madingley Rd Sbd	2,712	2,090	180	131
12.2	JJ Thomson Ave Access to Madingley Rd Nbd	1,310	1,009	87	63
12.2	JJ Thomson Ave Access to Madingley Rd Sbd	1,349	1,040	90	65
12.3	Clerk Maxwell Rd Nbd	1,806	1,392	120	87
12.3	Clerk Maxwell Rd Sbd	1,800	1,387	119	87

Table A10.1.4 2031 Do Minimum traffic flows

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
1.0	M11 - J12 - J13 - Nbd	46,308	46,230	7,271	7,180
1.0	M11 - J12 - J13 - Sbd	42,486	42,415	6,671	6,587
1.1	M11 J13 -J14 - Nbd	33,695	33,639	5,290	5,224
1.1	M11 J13 -J14 - Sbd	33,519	33,463	5,263	5,197
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Nbd	23,983	23,943	3,766	3,718
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Sbd	24,587	24,546	3,860	3,812
1.3	M11 J13 off-slip - Nbd	12,583	12,562	1,976	1,951
1.3	M11 J13 on-slip - Sbd	9,295	9,279	1,459	1,441
2.0	A14 West of J30 (Bar Hill) - Ebd	40,203	36,994	7,533	6,779
2.0	A14 West of J30 (Bar Hill) - Wbd	41,795	38,459	7,831	7,048
2.1	A14 North West of M11 J14 - Ebd	42,028	38,673	7,875	7,087
2.1	A14 North West M11 J14 - Wbd	41,843	38,503	7,840	7,056
2.2	A14 West of J32 Interchange - Ebd	37,620	34,617	7,049	6,344

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
2.2	A14 West of J32 Interchange - Wbd	35,293	32,476	6,613	5,951
2.3	A428 -West of M11 J14 - Ebd	13,737	12,640	2,574	2,316
2.3	A428 - West of M11 J14 - Wbd	11,848	10,903	2,220	1,998
3.0	A1303 East of Madingley Mulch Rbt Ebd	8,251	7,961	473	436
3.0	A1303 East of Madingley Mulch Rbt Wbd	13,268	12,802	760	701
3.1	Madingley Rd - East of Cambridge Rd Crossroads Wbd	12,477	12,039	715	659
3.1	Madingley Rd - East of Cambridge Rd Crossroads Ebd	7,897	7,620	452	417
3.2	Madingley Rd on Over Bridge M11 Ebd	16,711	16,123	957	883
3.2	Madingley Rd on Over Bridge M11 Wbd	6,343	6,120	363	335
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd	12,104	11,628	444	395
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd	11,894	11,427	436	388
3.4	Madingley Rd - West of P&R Access Wbd	11,894	11,427	436	388
3.4	Madingley Rd - West of P&R Access Ebd	12,104	11,628	444	395
3.5	Madingley Rd - East of P&R Access Wbd	11,810	11,346	433	386
3.5	Madingley Rd - East of P&R Access Ebd	11,589	11,133	425	378
3.6	Madingley Rd - East of Proposed High Cross Access Ebd	9,739	9,356	357	318
3.6	Madingley Rd - East of Proposed High Cross Access Wbd	10,258	9,855	376	335
3.7	Madingley Rd - East of JJ Thomson Ave Ebd	11,055	10,620	406	361
3.7	Madingley Rd - East of JJ Thomson Ave Wbd	10,840	10,414	398	354
3.8	Madingley Rd - East of Clerk Maxwell Rd Ebd	10,817	10,392	397	353
3.8	Madingley Rd - East of Clerk Maxwell Rd Wbd	10,879	10,451	399	355
3.9	Madingley Rd - East of Storey's Way Ebd	9,533	9,159	350	311
3.9	Madingley Rd - East of Storey's Way Wbd	9,375	9,006	344	306
3.10	Madingley Rd - East of Grange Road Ebd	9,457	9,085	347	309
3.10	Madingley Rd - East of Grange Road Wbd	9,317	8,951	342	304
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Ebd	10,098	9,701	370	330

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Wbd	9,622	9,244	353	314
3.12	Northampton St - West of Pound Hill Ebd	8,194	7,872	301	268
3.12	Northampton St - West of Pound Hill Wbd	8,619	8,281	316	281
4.0	Huntingdon Rd - West of Proposed NWC HRW Access NWbd	9,032	8,677	331	295
4.0	Huntingdon Rd - West of Proposed NWC HRW Access SEbd	6,893	6,622	253	225
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College NWbd	7,750	7,445	284	253
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College SEbd	5,725	5,500	210	187
4.2	Huntingdon Rd - East of NWC HRW Access NWbd	11,901	11,433	437	389
4.2	Huntingdon Rd - East of NWC HRW Access SEbd	11,152	10,713	409	364
4.3	Huntingdon Rd - East of NIAB Access NWbd	12,491	12,000	458	408
4.3	Huntingdon Rd - East of NIAB Access SEbd	13,500	12,970	495	441
4.4	Huntingdon Rd - East of Storey's Way NWbd	11,818	11,354	434	386
4.4	Huntingdon Rd - East of Storey's Way SEbd	12,840	12,335	471	419
5.0	Barton Rd - West of Grantchester Rd Ebd	10,301	9,896	378	336
5.0	Barton Rd - West of Grantchester Rd Wbd	8,132	7,812	298	266
5.1	Barton Rd - East of Grantchester Rd Ebd	6,906	6,634	253	225
5.1	Barton Rd - East of Grantchester Rd Wbd	7,788	7,482	286	254
6.0	Queen's Rd - North of West Rd Nbd	7,794	7,488	286	254
6.0	Queen's Rd - North of West Rd Sbd	9,210	8,848	338	301
7.0	Histon Road - South of A14 Nbd	18,578	17,848	682	607
7.0	Histon Road - South of A14 Sbd	21,275	20,439	781	695
8.0	Grange Rd - South of Madingley Rd Nbd	2,161	2,052	105	91
8.0	Grange Rd - South of Madingley Rd Sbd	2,573	2,442	125	108
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Ebd	1,458	1,384	71	61
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Wbd	1,489	1,414	72	63

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
10.0	Girton Rd - North of Huntingdon Rd Nbd	2,672	2,536	130	112
10.0	Girton Rd - North of Huntingdon Rd Sbd	3,052	2,897	148	128
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Nbd	954	735	63	46
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Sbd	1,161	894	77	56
11.1	Proposed Madingley Rd West Access to NWC Nbd	2,909	2,242	193	140
11.1	Proposed Madingley Rd West Access to NWC Sbd	2,970	2,289	197	143
11.2	Proposed Huntingdon Rd West Access to NWC Nbd	954	735	63	46
11.2	Proposed Huntingdon Rd West Access to NWC Sbd	874	674	58	42
11.3	Proposed Huntingdon Rd East Access to NWC Sbd	2,406	1,854	160	116
11.3	Proposed Huntingdon Rd East Access to NWC Nbd	3,031	2,336	201	146
12.0	Western Access to Madingley Rd Nbd	0	0	0	0
12.0	Western Access to Madingley Rd Sbd	0	0	0	0
12.1	High Cross Access to Madingley Rd Nbd	1,391	1,072	92	67
12.1	High Cross Access to Madingley Rd Sbd	1,678	1,293	111	81
12.2	JJ Thomson Ave Access to Madingley Rd Nbd	1,644	1,267	109	79
12.2	JJ Thomson Ave Access to Madingley Rd Sbd	1,236	953	82	60
12.3	Clerk Maxwell Rd Nbd	453	349	30	22
12.3	Clerk Maxwell Rd Sbd	395	305	26	19

Table A10.1.5 2031 Do Something traffic flows

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
1.0	M11 - J12 - J13 - Nbd	47,578	47,498	7,470	7,376
1.0	M11 - J12 - J13 - Sbd	43,794	43,721	6,876	6,790
1.1	M11 J13 -J14 - Nbd	33,664	33,607	5,286	5,219
1.1	M11 J13 -J14 - Sbd	33,487	33,431	5,258	5,192
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Nbd	23,958	23,918	3,762	3,714
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Sbd	24,568	24,527	3,857	3,809
1.3	M11 J13 off-slip - Nbd	13,897	13,874	2,182	2,155

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
1.3	M11 J13 on-slip - Sbd	10,641	10,623	1,671	1,650
2.0	A14 West of J30 (Bar Hill) - Ebd	41,024	37,750	7,687	6,918
2.0	A14 West of J30 (Bar Hill) - Wbd	42,491	39,099	7,962	7,165
2.1	A14 North West of M11 J14 - Ebd	41,988	38,636	7,867	7,080
2.1	A14 North West M11 J14 - Wbd	41,809	38,471	7,834	7,050
2.2	A14 West of J32 Interchange - Ebd	37,580	34,581	7,042	6,337
2.2	A14 West of J32 Interchange - Wbd	35,259	32,445	6,607	5,946
2.3	A428 -West of M11 J14 - Ebd	13,731	12,635	2,573	2,315
2.3	A428 - West of M11 J14 - Wbd	11,843	10,897	2,219	1,997
3.0	A1303 East of Madingley Mulch Rbt Ebd	8,910	8,597	511	471
3.0	A1303 East of Madingley Mulch Rbt Wbd	13,851	13,364	794	732
3.1	Madingley Rd - East of Cambridge Rd Crossroads Wbd	13,116	12,655	752	693
3.1	Madingley Rd - East of Cambridge Rd Crossroads Ebd	8,633	8,329	495	456
3.2	Madingley Rd on Over Bridge M11 Ebd	18,883	18,219	1,082	997
3.2	Madingley Rd on Over Bridge M11 Wbd	6,995	6,749	401	370

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd	14,097	13,543	517	460
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd	13,843	13,299	508	452
3.4	Madingley Rd - West of P&R Access Wbd	16,610	15,957	609	542
3.4	Madingley Rd - West of P&R Access Ebd	14,573	14,000	535	476
3.5	Madingley Rd - East of P&R Access Wbd	16,525	15,876	606	540
3.5	Madingley Rd - East of P&R Access Ebd	14,058	13,505	516	459
3.6	Madingley Rd - East of Proposed High Cross Access Ebd	12,398	11,911	455	405
3.6	Madingley Rd - East of Proposed High Cross Access Wbd	13,768	13,227	505	450
3.7	Madingley Rd - East of JJ Thomson Ave Ebd	14,920	14,334	547	487
3.7	Madingley Rd - East of JJ Thomson Ave Wbd	15,734	15,116	577	514
3.8	Madingley Rd - East of Clerk Maxwell Rd Ebd	14,682	14,105	539	479
3.8	Madingley Rd - East of Clerk Maxwell Rd Wbd	15,772	15,153	579	515

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
3.9	Madingley Rd - East of Storey's Way Ebd	13,360	12,835	490	436
3.9	Madingley Rd - East of Storey's Way Wbd	14,224	13,665	522	464
3.10	Madingley Rd - East of Grange Road Ebd	13,227	12,707	485	432
3.10	Madingley Rd - East of Grange Road Wbd	14,109	13,555	518	461
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Ebd	12,142	11,665	445	396
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Wbd	11,989	11,518	440	391
3.12	Northampton St - West of Pound Hill Ebd	9,781	9,396	359	319
3.12	Northampton St - West of Pound Hill Wbd	9,870	9,482	362	322
4.0	Huntingdon Rd - West of Proposed NWC HRW Access NWbd	10,098	9,701	370	330
4.0	Huntingdon Rd - West of Proposed NWC HRW Access SEbd	8,131	7,811	298	265
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College NWbd	7,680	7,378	282	251
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College SEbd	5,655	5,433	207	185
4.2	Huntingdon Rd - East of NWC HRW Access NWbd	12,085	11,610	443	395
4.2	Huntingdon Rd - East of NWC HRW Access SEbd	11,215	10,774	411	366
4.3	Huntingdon Rd - East of NIAB Access NWbd	12,364	11,878	454	404
4.3	Huntingdon Rd - East of NIAB Access SEbd	13,272	12,750	487	433
4.4	Huntingdon Rd - East of Storey's Way NWbd	11,634	11,177	427	380
4.4	Huntingdon Rd - East of Storey's Way SEbd	12,567	12,073	461	410
5.0	Barton Rd - West of Grantchester Rd Ebd	10,390	9,982	381	339
5.0	Barton Rd - West of Grantchester Rd Wbd	8,126	7,806	298	265
5.1	Barton Rd - East of Grantchester Rd Ebd	6,994	6,720	257	228
5.1	Barton Rd - East of Grantchester Rd Wbd	7,781	7,476	285	254
6.0	Queen's Rd - North of West Rd Nbd	8,797	8,451	323	287
6.0	Queen's Rd - North of West Rd Sbd	9,584	9,207	352	313
7.0	Histon Road - South of A14 Nbd	19,841	19,061	728	648
7.0	Histon Road - South of A14 Sbd	22,817	21,921	837	745

Link Ref	Link Description	Estimated 18hr Base 5-Day Flows (vehicles)	Estimated 24hr Base 7-Day Flows (vehicles)	Estimated 18hr > 3.5t Flows	Estimated 24hr > 3.5t Flows
8.0	Grange Rd - South of Madingley Rd Nbd	2,203	2,091	107	93
8.0	Grange Rd - South of Madingley Rd Sbd	2,614	2,482	127	110
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Ebd	1,458	1,384	71	61
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Wbd	1,489	1,414	72	63
10.0	Girton Rd - North of Huntingdon Rd Nbd	2,812	2,670	137	118
10.0	Girton Rd - North of Huntingdon Rd Sbd	3,234	3,070	157	136
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Nbd	1,034	797	69	50
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Sbd	1,259	970	84	61
11.1	Proposed Madingley Rd West Access to NWC Nbd	4,300	3,313	285	207
11.1	Proposed Madingley Rd West Access to NWC Sbd	4,629	3,567	307	223
11.2	Proposed Huntingdon Rd West Access to NWC Nbd	1,790	1,380	119	86
11.2	Proposed Huntingdon Rd West Access to NWC Sbd	1,833	1,412	122	88
11.3	Proposed Huntingdon Rd East Access to NWC Sbd	2,721	2,097	181	131
11.3	Proposed Huntingdon Rd East Access to NWC Nbd	3,210	2,473	213	155
12.0	Western Access to Madingley Rd Nbd	3,487	2,687	231	168
12.0	Western Access to Madingley Rd Sbd	5,188	3,998	344	250
12.1	High Cross Access to Madingley Rd Nbd	2,383	1,836	158	115
12.1	High Cross Access to Madingley Rd Sbd	1,537	1,184	102	74
12.2	JJ Thomson Ave Access to Madingley Rd Nbd	1,789	1,379	119	86
12.2	JJ Thomson Ave Access to Madingley Rd Sbd	1,983	1,528	132	96
12.3	Clerk Maxwell Rd Nbd	1,806	1,392	120	87
12.3	Clerk Maxwell Rd Sbd	1,800	1,387	119	87

Appendix 10.2 Existing severance, fear and intimidation

Table A10.2.1 Existing severance, fear and intimidation

Link Ref	Link Description	Severance based on 24 hour Flows	Fear and Intimidation			
			a) Average hourly Flows Over 18 hour day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	d) Weighted Assessmentof a) – c)
1.0	M11 - J12 - J13 - Nbd	41,825	2,328	6,578	70	High
1.0	M11 - J12 - J13 - Sbd	37,287	2,075	5,864	70	High
1.1	M11 J13 -J14 - Nbd	31,262	1,740	4,917	70	High
1.1	M11 J13 -J14 - Sbd	30,763	1,712	4,838	70	High
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Nbd	21,921	1,220	3,448	70	High
1.2	M11 between A14 Ebd on-slip / Huntingdon Rd on slip - Sbd	22,365	1,245	3,517	70	High
1.3	M11 J13 off-slip - Nbd	10,547	587	1,659	70	Medium
1.3	M11 J13 on-slip - Sbd	6,871	382	1,081	70	Medium
2.0	A14 West of J30 (Bar Hill) - Ebd	35,645	2,152	7,258	70	High
2.0	A14 West of J30 (Bar Hill) - Wbd	37,053	2,237	7,545	70	High
2.1	A14 North West of M11 J14 - Ebd	35,897	2,167	7,310	70	High
2.1	A14 North West M11 J14 - Wbd	35,779	2,160	7,286	70	High
2.2	A14 West of J32 Interchange - Ebd	31,842	1,922	6,484	70	High
2.2	A14 West of J32 Interchange - Wbd	29,753	1,796	6,058	70	High
2.3	A428 -West of M11 J14 - Ebd	11,691	706	2,381	70	High
2.3	A428 - West of M11 J14 - Wbd	10,011	604	2,038	70	High
3.0	A1303 East of Madingley Mulch Rbt Ebd	6,327	364	376	50	Medium
3.0	A1303 East of Madingley Mulch Rbt Wbd	11,248	648	668	50	Medium
3.1	Madingley Rd - East of Cambridge Rd Crossroads Wbd	11,034	635	655	40	Medium
3.1	Madingley Rd - East of Cambridge Rd Crossroads Ebd	6,207	357	369	40	Medium
3.2	Madingley Rd on Over Bridge M11 Ebd	13,177	759	783	40	Medium
3.2	Madingley Rd on Over Bridge M11 Wbd	5,725	330	340	40	Medium
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd	9,622	556	367	40	Medium
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd	9,415	544	360	40	Medium
3.4	Madingley Rd - West of P&R Access Wbd	9,415	544	360	40	Medium
3.4	Madingley Rd - West of P&R Access Ebd	9,622	556	367	40	Medium
3.5	Madingley Rd - East of P&R Access Wbd	9,333	540	356	40	Medium
3.5	Madingley Rd - East of P&R Access Ebd	9,127	528	349	40	Medium
3.6	Madingley Rd - East of Proposed High Cross Access Ebd	7,905	457	302	40	Medium

Link Ref	Link Description	Severance based on 24 hour Flows	Fear and Intimidation			
			a) Average hourly Flows Over 18 hour day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	d) Weighted Assessmentof a) – c)
3.6	Madingley Rd - East of Proposed High Cross Access Wbd	8,196	474	313	40	Medium
3.7	Madingley Rd - East of JJ Thomson Ave Ebd	8,998	520	344	30	Medium
3.7	Madingley Rd - East of JJ Thomson Ave Wbd	9,061	524	346	30	Medium
3.8	Madingley Rd - East of Clerk Maxwell Rd Ebd	8,770	507	335	30	Medium
3.8	Madingley Rd - East of Clerk Maxwell Rd Wbd	9,098	526	347	30	Medium
3.9	Madingley Rd - East of Storey's Way Ebd	7,531	435	288	30	Low
3.9	Madingley Rd - East of Storey's Way Wbd	7,390	427	282	30	Low
3.10	Madingley Rd - East of Grange Road Ebd	7,531	435	288	30	Low
3.10	Madingley Rd - East of Grange Road Wbd	7,390	427	282	30	Low
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Ebd	8,311	481	317	30	Low
3.11	Madingley Rd - West of Queen's Rd / Northampton St Rbt Wbd	7,799	451	298	30	Low
3.12	Northampton St - West of Pound Hill Ebd	6,713	388	256	30	Low
3.12	Northampton St - West of Pound Hill Wbd	6,817	394	260	30	Low
4.0	Huntingdon Rd - West of Proposed NWC HRW Access NWbd	6,104	353	233	60	Low
4.0	Huntingdon Rd - West of Proposed NWC HRW Access SEbd	4,402	255	168	60	Low
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College NWbd	6,104	353	233	30	Low
4.1	Huntingdon Rd - South East of Grange Drive opposite Girton College SEbd	4,402	255	168	30	Low
4.2	Huntingdon Rd - East of NWC HRE Access NWbd	8,018	464	306	30	Low
4.2	Huntingdon Rd - East of NWC HRE Access SEbd	6,744	390	258	30	Low
4.3	Huntingdon Rd - East of NIAB Access NWbd	8,652	500	330	30	Low
4.3	Huntingdon Rd - East of NIAB Access SEbd	8,793	508	336	30	Low
4.4	Huntingdon Rd - East of Storey's Way NWbd	8,134	470	311	30	Low
4.4	Huntingdon Rd - East of Storey's Way SEbd	8,067	467	308	30	Low
5.0	Barton Rd - West of Grantchester Rd Ebd	9,616	556	367	30	Low
5.0	Barton Rd - West of Grantchester Rd Wbd	7,599	439	290	30	Low
5.1	Barton Rd - East of Grantchester Rd Ebd	6,354	367	243	30	Low
5.1	Barton Rd - East of Grantchester Rd Wbd	7,268	420	278	30	Low
6.0	Queen's Rd - North of West Rd Nbd	6,726	389	257	30	Low
6.0	Queen's Rd - North of West Rd Sbd	8,012	463	306	30	Low
7.0	Histon Road - South of A14 Nbd	15,439	893	590	40	Medium
7.0	Histon Road - South of A14 Sbd	18,317	1,059	700	40	Medium
8.0	Grange Rd - South of Madingley Rd Nbd	1,933	113	99	30	Negligible

Link Ref	Link Description	Severance based on 24 hour Flows	Fear and Intimidation			
			a) Average hourly Flows Over 18 hour day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	d) Weighted Assessmentof a) – c)
8.0	Grange Rd - South of Madingley Rd Sbd	2,304	135	118	30	Negligible
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Ebd	1,671	98	86	20	Negligible
9.0	Storey's Way - between Madingley Rd and Huntingdon Rd Wbd	1,503	88	77	20	Negligible
10.0	Girton Rd - North of Huntingdon Rd Nbd	2,299	135	118	30	Negligible
10.0	Girton Rd - North of Huntingdon Rd Sbd	2,655	155	136	30	Negligible
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Nbd	Minimal	0	0	20	n/a
11.0	Proposed NIAB Access - between Huntingdon Rd and Histon Rd Sbd	Minimal	0	0	20	n/a
11.1	Proposed Madingley Rd West Access to NWC Nbd	Not Open	Not Open	Not Open	20	n/a
11.1	Proposed Madingley Rd West Access to NWC Sbd	Not Open	Not Open	Not Open	20	n/a
11.2	Proposed Huntingdon Rd West Access to NWC Nbd	Not Open	Not Open	Not Open	20	n/a
11.2	Proposed Huntingdon Rd West Access to NWC Sbd	Not Open	Not Open	Not Open	20	n/a
11.3	Proposed Huntingdon Rd East Access to NWC Sbd	Not Open	Not Open	Not Open	20	n/a
11.3	Proposed Huntingdon Rd East Access to NWC Nbd	Not Open	Not Open	Not Open	20	n/a
12.0	Western Access to Madingley Rd Nbd	Not Open	Not Open	Not Open	20	n/a
12.0	Western Access to Madingley Rd Sbd	Not Open	Not Open	Not Open	20	n/a
12.1	High Cross Access to Madingley Rd Nbd	1,072	77	92	25	Negligible
12.1	High Cross Access to Madingley Rd Sbd	1,123	81	97	25	Negligible
12.2	JJ Thomson Ave Access to Madingley Rd Nbd	1,274	92	110	25	Negligible
12.2	JJ Thomson Ave Access to Madingley Rd Sbd	1,119	81	96	25	Negligible
12.3	Clerk Maxwell Rd Nbd	349	25	30	30	Negligible
12.3	Clerk Maxwell Rd Sbd	305	22	26	30	Negligible

Level	**Impact**
High	> 90% change
Medium	60% - 90% change
Low	30% - 60% change
< 30% change	Negligible

Appendix 10.3 Construction traffic assessment

Table A10.3.1 Construction traffic assessment

Link No	Link	Base 2015 Daily Flow (24 hour, 7 day 1-way flows)		Estimated Daily Construction Traffic (1 way)			Increase	
		All Vehs	Heavy Vehs	Light Vehs	Heavy Vehs	All Vehs	All Vehs	Heavy Vehs
1.0	M11 - J12 - J13 - Nbd	41,825	6,496	3	124	127	0.3%	1.9%
1.0	M11 - J12 - J13 - Sbd	37,287	5,791	3	124	127	0.3%	2.1%
1.1	M11 J13 -J14 - Nbd	31,262	4,855	0	88	88	0.3%	1.8%
1.1	M11 J13 -J14 - Sbd	30,763	4,778	0	88	88	0.3%	1.8%
1.3	M11 J13 off-slip - Nbd	10,547	1,638	3	124	127	1.2%	7.6%
1.3	M11 J13 on-slip - Sbd	6,871	1,067	3	124	127	1.8%	11.6%
2.0	A14 West of J30 (Bar Hill) - Ebd	35,645	6,532	8	51	59	0.2%	0.8%
2.0	A14 West of J30 (Bar Hill) - Wbd	37,053	6,790	8	51	59	0.2%	0.8%
2.1	A14 North West of M11 J14 - Ebd	35,897	6,578	8	51	59	0.2%	0.8%
2.1	A14 North West M11 J14 - Wbd	35,779	6,557	8	51	59	0.2%	0.8%
2.2	A14 West of J32 Interchange - Ebd	31,842	5,835	8	37	44	0.1%	0.6%
2.2	A14 West of J32 Interchange - Wbd	29,753	5,452	8	37	44	0.1%	0.7%
3.0	A1303 East of Madingley Mulch Rbt Ebd	6,327	346	3	22	25	0.4%	6.3%
3.0	A1303 East of Madingley Mulch Rbt Wbd	11,248	616	3	22	25	0.2%	3.6%
3.1	Madingley Rd - East of Cambridge Rd Crossroads Wbd	11,034	604	3	22	25	0.2%	3.6%
3.1	Madingley Rd - East of Cambridge Rd Crossroads Ebd	6,207	340	3	22	25	0.4%	6.4%
3.2	Madingley Rd on Over Bridge M11 Ebd	13,177	721	6	146	152	1.2%	20.2%
3.2	Madingley Rd on Over Bridge M11 Wbd	5,725	313	3	22	25	0.4%	7.0%
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd	9,622	327	6	146	152	1.6%	44.6%
3.3	Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd	9,415	320	6	146	152	1.6%	45.6%
3.4	Madingley Rd - West of P&R Access Wbd	9,415	320	6	146	152	1.6%	45.6%
3.4	Madingley Rd - West of P&R Access Ebd	9,622	327	6	146	152	1.6%	44.6%
3.5	Madingley Rd - East of P&R Access Wbd	9,333	317	6	146	152	1.6%	46.0%
3.5	Madingley Rd - East of P&R Access Ebd	9,127	310	6	146	152	1.7%	47.1%
3.6	Madingley Rd - East of Proposed High Cross Access Ebd	7,905	269	6	146	152	1.9%	54.3%
3.6	Madingley Rd - East of Proposed High Cross Access Wbd	8,196	279	6	146	152	1.9%	52.4%
3.7	Madingley Rd - East of JJ Thomson Ave Ebd	8,998	306	24	0	24	0.3%	0.0%
3.7	Madingley Rd - East of JJ Thomson Ave Wbd	9,061	308	24	0	24	0.3%	0.0%
3.8	Madingley Rd - East of Clerk Maxwell Rd Ebd	8,770	298	24	0	24	0.3%	0.0%

Link No	Link	Base 2015 Daily Flow (24 hour, 7 day 1-way flows)		Estimated Daily Construction Traffic (1 way)			Increase	
		All Vehs	Heavy Vehs	Light Vehs	Heavy Vehs	All Vehs	All Vehs	Heavy Vehs
3.8	Madingley Rd - East of Clerk Maxwell Rd Wbd	9,098	309	24	0	24	0.3%	0.0%

Appendix 11.1 Human health receptors

Table A11.1.1 Human health receptors considered in the air quality assessment

Receptor	Location	Model Height (m)
R1	1 Rhodegund Cottages, A14 Huntingdon Rd	1.5
R2	Hacker's Fruit Farm	1.5
R3	1 Huntingdon Road A14	1.5
R4	3-4 Elm Grange, A14 Huntingdon Rd	1.5
R5	118 Girton Road	4.5
R6	102 Girton Road	1.5
R7	91 Girton Road	1.5
R8	84 Girton Road	1.5
R9	2 Girton Road	1.5
R10	1 Huntingdon Road A14	1.5
R11	Nurseries, Huntington Road	1.5
R12	71- 81 Huntingdon Road	1.5
R13	141 Huntingdon Road	1.5
R14	139 Huntingdon Road	1.5
R15	1 to 81 Victoria Road	4.5
R16	38 Northampton Street	1.5
R17	9 Madingley Road	1.5
R18	11 Madingley Road	1.5
R19	19 to 39 Benians Ct	1.5
R20	23 Madingley Road	1.5
R21	53 Madingley Road	1.5
R22	14 Conduit Head Road	1.5
R23	Whitehouse, Conduit Head Road	1.5
R24	2 Merton Hall, Madingley Road	1.5
R25	36 Madingley Road	1.5
R26	2 Lansdowne Road	1.5
R27	2 Rosemary Cottages, Madingley Road	1.5
R28	1 to 10 Refectory Farm Chalets	1.5
R29	77 The Footpath	1.5
R30	3 St Neods Road	1.5
R31	Mill Farm, St Neods Rd	1.5

Appendix 11.2 Air quality model verification

Nitrogen Dioxide

Most nitrogen dioxide is produce in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emission of nitrogen oxides (NOx = NO + NO2). The model has been run to predict the 2014 annual mean road-NO_x contribution at ten roadside and kerbside monitoring locations (both automatic and diffusion tubes) in close proximity to the proposed development and within the two closest declared AQMAs (described in Table 10.11). Table 10.2.1 below describes the heights at which the monitoring locations were modelled.

Table A11.2.1 Modelled heights of monitoring locations

ID	Site Type	Within AQMA	Model Height (m)
Automatic Sites (SCDC)			
Girton	Roadside	N	1.5
Impington (A14)	Roadside	Y	2.5
Diffusion Tubes (SCDC)			
1A Weavers Field	Urban Background	Y	2
1 Catchall Farm Cottages	Roadside	Y	1.5
Hackers Fruit Farm	Roadside	Y	1.5
Rhadegund Farm	Roadside	Y	2
Diffusion Tubes (CCC)			
Madingley Road	Kerbside	N	1
Histon Road 1 NEW	Kerbside	N	1.5
Huntingdon Road 1	Roadside	N	1
Huntingdon Road 2	Roadside	N	1

The model output of road-NO_x has been compared with the 'measured' road-NO_x, which was calculated from the measured NO_2 concentrations and the adjusted background NO_2 concentrations within the NO_x from NO_2 calculator published by Defra.

A primary adjustment factor was determined as the slope of the best fit line between the 'measured' road contribution and the model derived road contribution, forced through zero (Figure 11.2.1). This factor was then applied to the modelled road-NO_x concentration for each monitoring Site to provide adjusted modelled road-NO_x concentrations. The total NO_2 concentrations were then determined by combining the adjusted modelled road-NO_x concentrations with the predicted background NO_2 concentration within the NO_x from NO_2 calculator. A secondary adjustment factor was finally calculated as the slope of the best fit line applied to the adjusted data and forced through zero (Figure 10.2.2).

The following primary and secondary adjustment factors have been applied to all modelled NO_2 data:

- Primary adjustment factor: 1.3394
- Secondary adjustment factor: 0.9919

The results imply that the model was under-predicting the road-NO_x contribution. This is a common experience with this and most other models. The final NO_2 adjustment is minor.

Figure 11.2.3 compares final adjusted modelled total NO_2 at each of the monitoring sites, to measured total NO_2, and shows the 1:1 relationship, as well as ±10% and ±25% of the 1:1 line. The majority of the points lie within the ±25% line with the exception of monitoring location Madingley Road, which measured 40.2 µg/m^3 in 2014. This monitoring point was left within the verification as it provided a slightly higher verification factor that otherwise would have been obtained without the monitoring point. The reasons for the under-prediction at this point could not be ascertained.

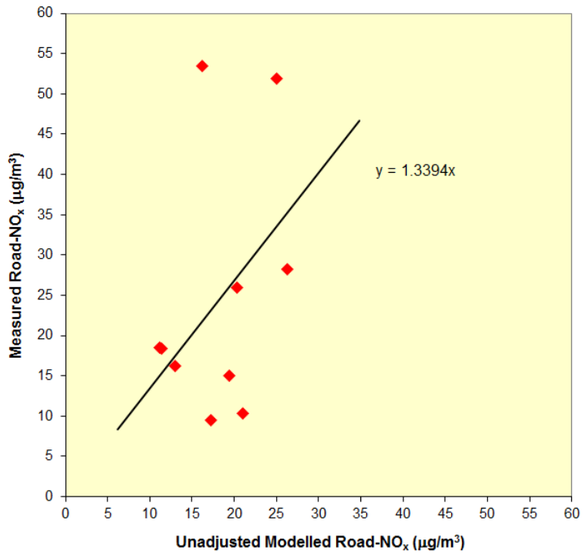

Figure A11.2.1 Comparison of Measured Road-NO_x with Unadjusted Modelled Road-NO_x Concentrations

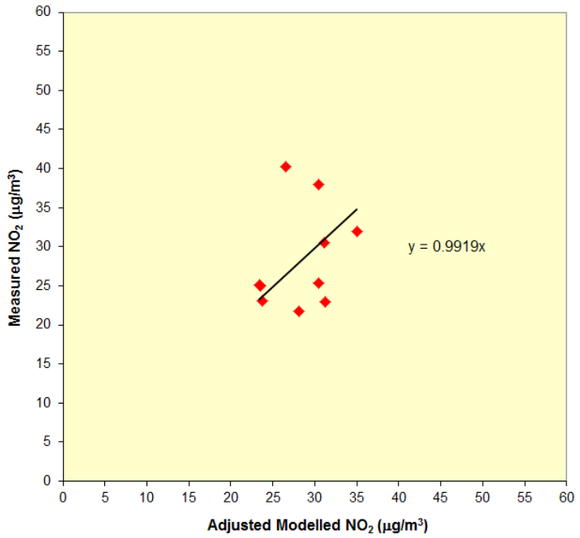

Figure A11.2.2 Comparison of Measured NO_2 with Adjusted Modelled NO_2 Concentrations

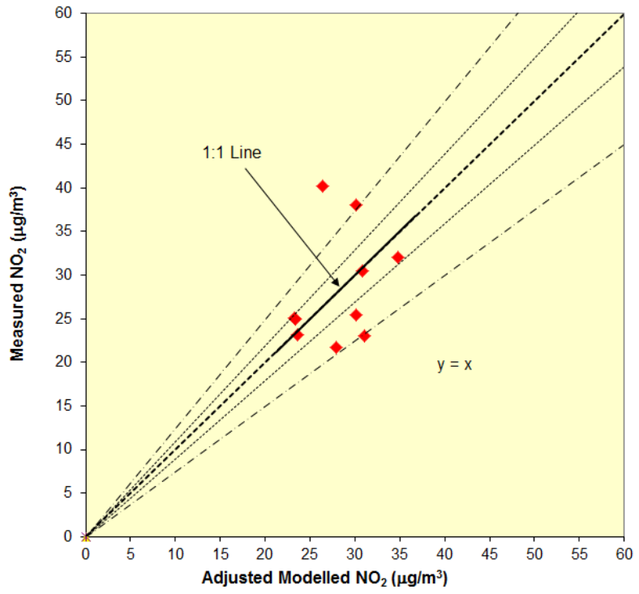

Figure A11.2.3 Comparison of Measured NO_2 with Fully Adjusted Modelled NO_2 Concentrations

PM_{10} and $PM_{2.5}$

Automatic monitors Girton and Impington (A14) undertake PM_{10} monitoring. However, due to low data capture in 2014 it was considered conservative to use the primary adjustment factor calculated for NO_2 concentrations to the modelled-road PM_{10} concentrations. Similarly, the Girton monitor undertakes $PM_{2.5}$ monitoring, but the measured data was below the estimated background concentrations. It was therefore decided to use the primary adjustment factor calculated for NO_2 concentrations to the modelled-road $PM_{2.5}$ concentrations.

Appendix 11.3 Traffic data used for the air quality assessment

Table A11.3.1 Traffic data used for the air quality assessment

Road Link	Description	2014 Baseline		2021 Without Development		2021 With Development (Phase I)		2031 Baseline with Phase I		2031 With Full Development	
		AADT	%HDV	AADT	%HDV	AADT	%HDV	AADT	%HDV	AADT	%HDV
1.0	M11 – J12 – J13	78,220	15.53	84,862	15.53	85,958	15.53	88,645	15.53	91,219	15.53
1.1	M11 – J13 – J14	61,325	15.53	64,865	15.53	64,846	15.53	67,102	15.53	67,039	15.53
1.2	M11 between A14 Ebd on-slip / Huntington Road on slip	43,787	15.53	46,511	15.53	46,511	15.53	48,489	15.53	48,444	15.53
1.3	M11 J13 off-slip	17,220	15.53	20,307	15.53	22,057	15.53	21,841	15.53	24,497	15.53
2.0	A14 West of J30 (Bar Hill)	71,824	18.33	74,236	18.33	74,807	18.33	75,4153	18.33	76,849	18.33
2.1	A14 North West of M11 J154	70,815	18.33	74,646	18.33	74,636	18.33	77,176	18.33	77,107	18.33
2.2	A14 West of J32 Interchange	60,855	18.33	64,564	18.33	64,554	18.33	67,093	18.33	67,025	18.33
2.3	A428 – West of M11 J14	21,367	18.33	22,420	18.33	22,415	18.33	23,543	18.33	23,533	18.33
3.0	A1303 East of Madingley Mulch Roundabout	17,350	5.47	19,136	5.47	19,658	5.47	20,763	5.47	21,961	5.47
3.1	Madingley Rd – East of Cambrirdge Rd Crossroads	17,020	5.47	18,024	5.47	18,600	5.47	19,658	5.47	20,984	5.47
3.2	Madingley Rd on Over Bridge M11	18,661	5.47	20,495	5.47	21,647	5.47	22,243	5.47	24,968	5.47
3.3	Madingley Rd between M11 Sbd On Slip – Proposed Madingley Road West Access	18,794	3.4	21,305	3.4	22,896	3.4	23,055	3.4	26,842	3.4
3.4	Madingley Rd – West of P&R Access	18,794	3.4	21,305	3.4	22,896	3.4	23,055	3.4	29,957	3.4
3.5	Madingley Rd – East of P&R Access	18,226	3.4	20,729	3.4	22,321	3.4	22,479	3.4	29,381	3.4
3.6	Madingley Rd – East of Proposed High Cross Access	15,896	3.4	17,784	3.4	20,010	3.4	19,211	3.4	25,138	3.4
3.7	Madingley Rd – East of JJ Thomson Ave	17,829	3.4	19,791	3.4	22,815	3.4	21,035	3.4	29,449	3.4
3.8	Madingley Rd – East of Clerk Maxwell Rd	17,640	3.4	19,599	3.4	22,624	3.4	20,843	3.4	29,258	3.4
3.9	Madingely Rd – East of Storey's Way	14,731	3.4	16,951	3.4	19,939	3.4	18,165	3.4	26,500	3.4
3.10	Madingley Rd – East of Grange Road	14,731	3.4	16,841	3.4	19,756	3.4	18,037	3.4	26,262	3.4
3.11	Madingley Rd – West of Queen's Rd / Northampton Road Roundabout	15,905	3.4	18,091	3.4	19,591	3.4	18,945	3.4	23,183	3.4
3.12	Northampton Rd – West of Pound Hill	13,358	3.4	15,213	3.4	16,122	3.4	16,152	3.4	18,878	3.4
4.0	Huntingdon Rd- West of Proposed NWC HRW Access	10,372	3.4	13,762	3.4	14,591	3.4	15,299	3.4	17,512	3.4
4.1	Huntingdon Rd – South East of Grange Drive opposite Girton College	10,372	3.4	11,634	3.4	11,622	3.4	12,945	3.4	12,811	3.4
4.2	Huntingdon Rd – East of NWC HRW Access	14,574	3.4	20,073	3.4	20,226	3.4	22,146	3.4	22,384	3.4
4.3	Huntingdon Rd – East of NIAB Access	17,223	3.4	22,817	3.4	22,848	3.4	24,970	3.4	24,628	3.4
4.4	Huntingdon Rd – East of Storey's Way	15,995	3.4	21,598	3.4	21,598	3.4	23,689	3.4	23,250	3.4
6.0	Queen's Rd – North of West Road	14,540	3.4	15,616	3.4	16,146	3.4	16,335	3.4	17,659	3.4
7.0	Histon Road – South of A14	33,326	3.4	36,604	3.4	37,634	3.4	38,287	3.4	40,982	3.4
8.0	Grange Road – South of Madingley Road	4,180	4.43	4,400	4.43	4,450	4.43	4,494	4.43	4,573	4.43

Road Link	Description	2014 Baseline		2021 Without Development		2021 With Development (Phase I)		2031 Baseline with Phase I		2031 With Full Development	
		AADT	%HDV	AADT	%HDV	AADT	%HDV	AADT	%HDV	AADT	%HDV
9.0	Storey's Way – between Madingley Rd and Huntingdon Road	3,132	4.43	2,774	4.43	2,788	4.43	2,798	4.43	2,798	4.43
10.0	Girton Road – North of Huntingdon Road	4,887	4.43	5,345	4.43	5,458	4.43	5,434	4.43	5,740	4.43
11.0	Proposed NIAB Access – between Huntingdon Rd and Histon Rd	0	0	771	6.26	833	6.26	1,630	6.26	1,767	6.26
11.1	Proposed Madingley Rd West Access to NWC	0	0	3,650	6.26	4,566	6.26	4,530	6.26	6,880	6.26
11.2	Proposed Huntingdon Rd West Access to NWC	0	0	1,260	6.26	1,760	6.26	1,409	6.26	2,792	6.26
11.3	Proposed Huntingdon Rd East Access to NWC	0	0	3,292	6.260	3,455	6.26	4,190	6.26	4,570	6.26
12.0	Western Access to Madingley Rd	0	0	0	0	0	0	0	0	6,685	6.26
12.1	High Cross Access to Madingley Rd	2,165	6.26	2,365	6.26	4,918	6.26	2,365	6.26	3,879	6.26
12.2	JJ Thomson Ave Access to Madingley Rd	2,361	6.26	2,219	6.26	3,244	6.26	2,213	6.26	4,102	6.26
12.3	Clerk Maxwell Rd	645	6.26	653	6.26	653	6.26	653	6.26	653	6.26

Appendix 11.4 Energy centre modelling inputs

The following tables summaries the stack parameters used in the assessment.

Table A11.4.1 Summary of the Stack Parameters

Parameters	Stack Diameter (m)	Exhaust Gas Flow Rate	Exhaust Temperature (℃)	NO_x Emission Rate (g/s)
CHP	0.6	4.52	120	0.726
10 MW Boiler	0.7	5.77	180	0.35
5 MW Boiler	0.535	3.37	180	0.20

Table A11.4.2 Stacks Heights

Grid Reference	Stack Height (m)
542166_258940 to 542169_258139	26 (46mAOD)

Table A11.4.3 Building Dimensions

Building 1	Grid reference	Height (m)	Length (m)	Width (m)	Angle (°)
1	542191_259131.7	18	133	371	96
2	542161.1_258847.7	19	133	200	96
3	542393.4_259147.9	18	172	259	95
4	542378.6_258979.1	22	172	80	95
5	542721.5_259037.8	22	455	314	103
6	542761.8_259220.2	18	461	59	103

Appendix 11.5 Predicted concentrations of air quality emissions at baseline scenarios

Predicted Concentrations of NO_2, PM_{10} and $PM_{2.5}$ at Receptors in 2014, 2021 and 2031

Table A11.5.1 Human Health Receptors

Receptor	Annual Mean (µg/m³)								
	2014 Baseline			2021 Without Development			2031 Without Full Development		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	31.5	22.1	14.2	22.9	21.1	13.2	16.4	20.4	12.5
R2	28.5	21.3	13.4	20.8	20.4	12.5	14.8	19.7	11.8
R3	29.4	22.9	14.1	21.6	22.0	13.2	15.4	21.3	12.6
R4	29.6	21.8	14.0	23.2	21.0	13.2	16.9	20.3	12.5
R5	27.5	21.0	13.7	20.9	20.2	12.9	15.4	19.5	12.2
R6	27.2	21.0	13.7	20.8	20.1	12.9	15.4	19.5	12.2
R7	22.3	20.4	13.2	17.8	19.6	12.5	13.7	18.9	11.9
R8	22.1	20.3	13.2	17.6	19.6	12.5	13.6	18.9	11.9
R9	20.3	19.4	12.5	16.8	18.7	11.9	13.1	18.1	11.3
R10	22.6	19.7	12.7	18.6	19.0	12.0	14.3	18.4	11.4
R11	18.6	19.3	12.4	15.8	18.7	11.8	12.6	18.1	11.3
R12	20.6	18.5	12.2	18.3	18.0	11.7	14.3	17.4	11.1
R13	19.2	18.5	12.2	16.5	17.9	11.6	13.4	17.3	11.1
R14	19.4	18.5	12.2	16.5	17.9	11.6	13.4	17.3	11.1
R15	26.6	19.1	12.9	23.5	18.5	12.3	18.9	17.8	11.6
R16	22.8	18.1	12.3	19.9	17.3	11.6	16.9	16.7	11.0
R17	23.1	18.6	12.6	20.1	17.9	12.0	16.8	17.3	11.3
R18	22.0	18.5	12.6	19.3	17.8	11.9	16.3	17.1	11.3
R19	19.0	18.5	12.2	16.2	17.8	11.6	13.2	17.2	11.0
R20	19.6	18.5	12.3	16.6	17.9	11.6	13.5	17.2	11.0
R21	18.2	18.3	12.1	15.5	17.7	11.5	12.8	17.0	10.9
R22	19.7	19.8	12.9	16.3	19.1	12.2	12.8	18.4	11.6
R23	19.5	19.7	12.8	16.1	19.0	12.2	12.7	18.4	11.6
R24	18.6	19.6	12.7	15.4	18.9	12.1	12.2	18.2	11.5
R25	20.5	19.9	13.0	16.8	19.2	12.3	13.1	18.6	11.7
R26	20.5	19.9	13.0	16.8	19.2	12.3	13.1	18.6	11.7
R27	20.0	19.8	12.9	16.6	19.1	12.2	13.0	18.5	11.6
R28	16.0	18.0	11.8	13.0	17.3	11.2	10.3	16.7	10.6
R29	16.2	19.0	12.2	13.3	18.3	11.6	10.7	17.7	11.0
R30	18.3	18.4	12.0	14.7	17.7	11.4	11.4	17.1	10.8
R31	17.6	18.4	11.9	14.3	17.7	11.3	11.2	17.1	10.7
Objectives	**40**	**40**	**25**	**40**	**40**	**25**	**40**	**40**	**25**

Table A11.5.2 Ecological Receptors (2014)

Receptor and Distance in Habitat	Distance from kerb (m)	Total NO_x (µg/m³)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)
Madingley Wood SSSI				
T1- 0m	0	**41.4**	**31.4**	**2.24**
T1- 5m	5	**32.3**	**30.1**	**2.15**
T1- 10m	10	28.2	**29.5**	**2.11**
T1- 15m	15	26.0	**29.2**	**2.08**
T1- 20m	20	24.6	**29.0**	**2.07**
T1- 30m	30	22.9	**28.7**	**2.05**
T1- 40m	40	22.0	**28.6**	**2.04**
T1- 50m	50	21.4	**28.5**	**2.03**
T1- 75m	75	20.5	**28.3**	**2.02**
T1- 100m	100	20.0	**28.3**	**2.02**
T1- 125m	125	19.7	**28.2**	**2.02**
T1- 150m	150	19.5	**28.2**	**2.01**
T1- 175m	175	19.4	**28.2**	**2.01**
T1- 200m	200	19.2	**28.2**	**2.01**
CRITICAL LEVEL / LOAD		**30**	**15 - 20**	**0.214 – 1.860**
Exceedences of the Critical Level / Load in bold				

Table A11.5.3 Ecological Receptors (2021)

Receptor and Distance in Habitat	Distance from kerb (m)	Total NO_x ($\mu g/m^3$)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)
Madingley Wood SSSI				
T1- 0m	0	**31.9**	**30.4**	**2.17**
T1- 5m	5	25.3	**29.5**	**2.11**
T1- 10m	10	22.4	**29.1**	**2.08**
T1- 15m	15	20.8	**28.8**	**2.06**
T1- 20m	20	19.8	**28.7**	**2.05**
T1- 30m	30	18.6	**28.5**	**2.04**
T1- 40m	40	18.0	**28.4**	**2.03**
T1- 50m	50	17.5	**28.3**	**2.02**
T1- 75m	75	16.9	**28.2**	**2.02**
T1- 100m	100	16.5	**28.2**	**2.01**
T1- 125m	125	16.3	**28.2**	**2.01**
T1- 150m	150	16.2	**28.1**	**2.01**
T1- 175m	175	16.0	**28.1**	**2.01**
T1- 200m	200	16.0	**28.1**	**2.01**
CRITICAL LEVEL / LOAD		**30**	**15 - 20**	**0.214 – 1.860**
Exceedences of the Critical Level / Load in bold				

Table A11.5.4 Ecological receptors (2031)

Receptor and Distance in Habitat	Distance from kerb (m)	Total NO_x ($\mu g/m^3$)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)
Madingley Wood SSSI				
T1- 0m	0	23.1	**29.5**	**2.11**
T1- 5m	5	19.0	**28.9**	**2.07**
T1- 10m	10	17.1	**28.7**	**2.05**
T1- 15m	15	16.1	**28.5**	**2.04**
T1- 20m	20	15.5	**28.4**	**2.03**
T1- 30m	30	14.7	**28.3**	**2.02**
T1- 40m	40	14.3	**28.2**	**2.02**
T1- 50m	50	14.0	**28.2**	**2.01**
T1- 75m	75	13.6	**28.1**	**2.01**
T1- 100m	100	13.4	**28.1**	**2.01**
T1- 125m	125	13.3	**28.1**	**2.01**
T1- 150m	150	13.2	**28.1**	**2.01**
T1- 175m	175	13.1	**28.1**	**2.00**
T1- 200m	200	13.1	**28.1**	**2.00**
CRITICAL LEVEL / LOAD		**30**	**15 - 20**	**0.214 – 1.860**
Exceedences of the Critical Level / Load in bold				

Appendix 11.6 Predicted future concentrations of air quality emissions for impact scenarios (human health receptors)

Table 11.6.1 Predicted Concentrations of NO_2, PM_{10} and $PM_{2.5}$ at Existing Receptors in 2021

Receptor	Annual Mean (µg/m³)					
	2021 Without Development			2021 With Development (Interim Scenario)		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	22.9	21.1	13.2	22.9	21.1	13.2
R2	20.8	20.4	12.5	20.8	20.4	12.5
R3	21.6	22.0	13.2	21.6	22.0	13.2
R4	23.2	21.0	13.2	23.3	21.0	13.2
R5	20.9	20.2	12.9	20.9	20.2	12.9
R6	20.8	20.1	12.9	20.8	20.1	12.9
R7	17.8	19.6	12.5	17.8	19.6	12.5
R8	17.6	19.6	12.5	17.7	19.6	12.5
R9	16.8	18.7	11.9	16.8	18.7	11.9
R10	18.6	19.0	12.0	18.6	19.0	12.0
R11	15.8	18.7	11.8	15.8	18.7	11.8
R12	18.3	18.0	11.7	18.3	18.0	11.7
R13	16.5	17.9	11.6	16.5	17.9	11.6
R14	16.5	17.9	11.6	16.5	17.9	11.6
R15	23.5	18.5	12.3	23.6	18.5	12.3
R16	19.9	17.3	11.6	20.2	17.4	11.7
R17	20.1	17.9	12.0	20.5	18.0	12.0
R18	19.3	17.8	11.9	19.6	17.8	11.9
R19	16.2	17.8	11.6	16.5	17.9	11.6
R20	16.6	17.9	11.6	17.1	17.9	11.7
R21	15.5	17.7	11.5	15.8	17.7	11.5
R22	16.3	19.1	12.2	16.5	19.1	12.3
R23	16.1	19.0	12.2	16.3	19.1	12.2
R24	15.4	18.9	12.1	15.6	18.9	12.1
R25	16.8	19.2	12.3	17.2	19.3	12.3
R26	16.8	19.2	12.3	17.2	19.3	12.3
R27	16.6	19.1	12.2	16.9	19.1	12.3
R28	13.0	17.3	11.2	13.1	17.3	11.2
R29	13.3	18.3	11.6	13.4	18.3	11.6
R30	14.7	17.7	11.4	14.8	17.7	11.4
R31	14.3	17.7	11.3	14.4	17.7	11.3
Objectives	**40**	**40**	**25**	**40**	**40**	**25**

Table 11.6.2 Change in Predicted Concentrations brought about by the Development in 2021

Receptor	Annual Mean (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
R1	0.1	0.0	0.0
R2	0.0	0.0	0.0
R3	0.0	0.0	0.0
R4	0.2	0.0	0.0
R5	0.0	0.0	0.0
R6	0.0	0.0	0.0
R7	0.0	0.0	0.0
R8	0.0	0.0	0.0
R9	0.0	0.0	0.0
R10	0.0	0.0	0.0
R11	0.0	0.0	0.0
R12	0.1	0.0	0.0
R13	0.0	0.0	0.0
R14	0.0	0.0	0.0
R15	0.1	0.0	0.0
R16	0.2	0.0	0.0
R17	0.4	0.1	0.0
R18	0.3	0.1	0.0
R19	0.3	0.1	0.0
R20	0.4	0.1	0.0
R21	0.2	0.0	0.0
R22	0.3	0.1	0.0

Receptor	Annual Mean (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
R23	0.3	0.1	0.0
R24	0.2	0.0	0.0
R25	0.3	0.1	0.0
R26	0.3	0.1	0.0
R27	0.3	0.1	0.0
R28	0.0	0.0	0.0
R29	0.0	0.0	0.0
R30	0.1	0.0	0.0
R31	0.1	0.0	0.0
Based on unrounded numbers			

Table 11.6.3 Predicted Concentrations of NO_2, PM_{10} and $PM_{2.5}$ at Existing Receptors in 2031

Receptor	Annual Mean (µg/m³)					
	2031 Without Development			2031 With Full Development		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	16.4	20.4	12.5	16.5	20.4	12.5
R2	14.8	19.7	11.8	14.8	19.7	11.8
R3	15.4	21.3	12.6	15.5	21.3	12.6
R4	16.9	20.3	12.5	17.2	20.4	12.5
R5	15.4	19.5	12.2	15.5	19.5	12.2
R6	15.4	19.5	12.2	15.4	19.5	12.2
R7	13.7	18.9	11.9	13.8	19.0	11.9
R8	13.6	18.9	11.9	13.7	18.9	11.9
R9	13.1	18.1	11.3	13.2	18.1	11.3
R10	14.3	18.4	11.4	14.4	18.4	11.5
R11	12.6	18.1	11.3	12.7	18.1	11.3
R12	14.3	17.4	11.1	14.4	17.4	11.1
R13	13.4	17.3	11.1	13.4	17.3	11.1
R14	13.4	17.3	11.1	13.4	17.3	11.1
R15	18.9	17.8	11.6	19.0	17.9	11.7
R16	16.9	16.7	11.0	17.3	16.8	11.1
R17	16.8	17.3	11.3	17.5	17.5	11.4
R18	16.3	17.1	11.3	16.8	17.3	11.3
R19	13.2	17.2	11.0	13.7	17.4	11.1
R20	13.5	17.2	11.0	14.1	17.4	11.1
R21	12.8	17.0	10.9	13.2	17.2	11.0
R22	12.8	18.4	11.6	13.2	18.6	11.7
R23	12.7	18.4	11.6	13.1	18.6	11.7
R24	12.2	18.2	11.5	12.5	18.3	11.6
R25	13.1	18.6	11.7	13.6	18.8	11.8
R26	13.1	18.6	11.7	13.7	18.8	11.8
R27	13.0	18.5	11.6	13.5	18.6	11.7
R28	10.3	16.7	10.6	10.4	16.7	10.6
R29	10.7	17.7	11.0	10.8	17.7	11.0
R30	11.4	17.1	10.8	11.6	17.1	10.8
R31	11.2	17.1	10.7	11.3	17.1	10.8
Objectives	**40**	**40**	**25**	**40**	**40**	**25**

Table 11.6.4 Change in Predicted Concentrations brought about by the Development in 2031

Receptor	Annual Mean (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
R1	0.1	0.0	0.0
R2	0.0	0.0	0.0
R3	0.0	0.0	0.0
R4	0.3	0.1	0.0
R5	0.0	0.0	0.0
R6	0.0	0.0	0.0
R7	0.0	0.0	0.0
R8	0.1	0.0	0.0
R9	0.0	0.0	0.0
R10	0.0	0.0	0.0
R11	0.0	0.0	0.0
R12	0.1	0.0	0.0
R13	0.0	0.0	0.0
R14	0.0	0.0	0.0
R15	0.1	0.0	0.0
R16	0.4	0.1	0.1

Receptor	Annual Mean (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
R17	0.7	0.2	0.1
R18	0.5	0.1	0.1
R19	0.5	0.2	0.1
R20	0.6	0.2	0.1
R21	0.4	0.1	0.1
R22	0.4	0.2	0.1
R23	0.4	0.2	0.1
R24	0.3	0.1	0.1
R25	0.5	0.2	0.1
R26	0.5	0.2	0.1
R27	0.5	0.2	0.1
R28	0.1	0.0	0.0
R29	0.0	0.0	0.0
R30	0.1	0.0	0.0
R31	0.1	0.0	0.0
Based on unrounded numbers			

Appendix 11.7 Predicted future concentrations of air quality emissions for impact scenarios (ecological receptors)

Table A11.7.1 Predicted concentrations at ecological receptors in 2021 without and with the Proposed Development

Receptor and Distance in Habitat	Distance from kerb (m)	2021 Without Development			2021 With Development (Interim Scenario)		
		Total NO_x ($\mu g/m^3$)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)	Total NO_x ($\mu g/m^3$)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)
Madingley Wood SSSI							
T1- 0m	0	**31.9**	**30.4**	**2.17**	**32.3**	**30.5**	**2.18**
T1- 5m	5	25.3	**29.5**	**2.11**	25.6	**29.5**	**2.11**
T1- 10m	10	22.4	**29.1**	**2.08**	22.6	**29.1**	**2.08**
T1- 15m	15	20.8	**28.8**	**2.06**	21.0	**28.9**	**2.06**
T1- 20m	20	19.8	**28.7**	**2.05**	19.9	**28.7**	**2.05**
T1- 30m	30	18.6	**28.5**	**2.04**	18.7	**28.5**	**2.04**
T1- 40m	40	18.0	**28.4**	**2.03**	18.0	**28.4**	**2.03**
T1- 50m	50	17.5	**28.3**	**2.02**	17.5	**28.3**	**2.02**
T1- 75m	75	16.9	**28.2**	**2.02**	16.9	**28.2**	**2.02**
T1- 100m	100	16.5	**28.2**	**2.01**	16.6	**28.2**	**2.01**
T1- 125m	125	16.3	**28.2**	**2.01**	16.3	**28.2**	**2.01**
T1- 150m	150	16.2	**28.1**	**2.01**	16.2	**28.1**	**2.01**
T1- 175m	175	16.0	**28.1**	**2.01**	16.1	**28.1**	**2.01**
T1- 200m	200	16.0	**28.1**	**2.01**	16.0	**28.1**	**2.01**
CRITICAL LEVEL / LOAD		**30**	**15 - 20**	**0.214 – 1.860**	**30**	**15 - 20**	**0.214 – 1.860**
Exceedences of the Critical Level / Load in bold Exceedences of the objectives in bold. For acid deposition, the existence of an exceedance has been determined using the Critical Load Function Tool available on the APIS website							

Table A11.7.2 Predicted Scheme Contribution in 2021

Receptor and Distance in Habitat	Distance from kerb (m)	2021 Scheme Contribution					
		Total NO_x (µg/m^3)		Nitrogen Deposition (kgN/ha/yr)		Acid Deposition (keqN/ha/yr)	
		NO_x	%	N Deposition	%	Acid Deposition	%
Madingley Wood SSSI							
T1- 0m	0	0.4	**1.4**	0.10	0.7	0.01	0.4
T1- 5m	5	0.3	0.8	0.06	0.4	0.00	0.2
T1- 10m	10	0.2	0.6	0.05	0.3	0.00	0.2
T1- 15m	15	0.1	0.5	0.04	0.2	0.00	0.1
T1- 20m	20	0.1	0.4	0.03	0.2	0.00	0.1
T1- 30m	30	0.1	0.3	0.02	0.1	0.00	0.1
T1- 40m	40	0.1	0.2	0.02	0.1	0.00	0.1
T1- 50m	50	0.1	0.2	0.01	0.1	0.00	0.1
T1- 75m	75	0.0	0.1	0.01	0.1	0.00	0.0
T1- 100m	100	0.0	0.1	0.01	0.1	0.00	0.0
T1- 125m	125	0.0	0.1	0.01	0.0	0.00	0.0
T1- 150m	150	0.0	0.1	0.01	0.0	0.00	0.0
T1- 175m	175	0.0	0.1	0.01	0.0	0.00	0.0
T1- 200m	200	0.0	0.1	0.01	0.0	0.00	0.0
Exceedences of 1% of the critical level/ load highlighted in bold							

Table A11.7.3 Predicted Concentrations at Ecological Receptors in 2031 without and with the Proposed Development in Place

Receptor and Distance in Habitat	Distance from kerb (m)	2031 Without Development			2031 With Full Development		
		Total NO_x (µg/m^3)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)	Total NO_x (µg/m^3)	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keqN/ha/yr)
Madingley Wood SSSI							
T1- 0m	0	23.1	**29.5**	**2.11**	23.7	**29.6**	**2.11**
T1- 5m	5	19.0	**28.9**	**2.07**	19.3	**29.0**	**2.07**
T1- 10m	10	17.1	**28.7**	**2.05**	17.4	**28.7**	**2.05**
T1- 15m	15	16.1	**28.5**	**2.04**	16.3	**28.5**	**2.04**
T1- 20m	20	15.5	**28.4**	**2.03**	15.7	**28.4**	**2.03**
T1- 30m	30	14.7	**28.3**	**2.02**	14.9	**28.3**	**2.02**
T1- 40m	40	14.3	**28.2**	**2.02**	14.4	**28.3**	**2.02**
T1- 50m	50	14.0	**28.2**	**2.01**	14.1	**28.2**	**2.02**
T1- 75m	75	13.6	**28.1**	**2.01**	13.7	**28.2**	**2.01**
T1- 100m	100	13.4	**28.1**	**2.01**	13.5	**28.1**	**2.01**
T1- 125m	125	13.3	**28.1**	**2.01**	13.3	**28.1**	**2.01**
T1- 150m	150	13.2	**28.1**	**2.01**	13.2	**28.1**	**2.01**
T1- 175m	175	13.1	**28.1**	**2.00**	13.1	**28.1**	**2.00**
T1- 200m	200	13.1	**28.1**	**2.00**	13.1	**28.1**	**2.00**
CRITICAL LEVEL / LOAD		**30**	**15 - 20**	**0.214 – 1.860**	**30**	**15 - 20**	**0.214 – 1.860**
Exceedences of the Critical Level / Load in bold Exceedences of the objectives in bold. For acid deposition, the existence of an exceedance has been determined using the Critical Load Function Tool available on the APIS website							

Table A11.7.4 Predicted Scheme Contribution in 2031

Receptor and Distance in Habitat	Distance from kerb (m)	2021 Scheme Contribution					
		Total NO_x (µg/m^3)		Nitrogen Deposition (kgN/ha/yr)		Acid Deposition (keqN/ha/yr)	
		NO_x	%	N Deposition	%	Acid Deposition	%
Madingley Wood SSSI							
T1- 0m	0	0.6	1.9	0.08	0.6	0.01	0.3
T1- 5m	5	0.4	1.2	0.05	0.3	0.00	0.2
T1- 10m	10	0.3	0.8	0.04	0.2	0.00	0.1
T1- 15m	15	0.2	0.7	0.03	0.2	0.00	0.1
T1- 20m	20	0.2	0.5	0.02	0.2	0.00	0.1
T1- 30m	30	0.1	0.4	0.02	0.1	0.00	0.1
T1- 40m	40	0.1	0.3	0.01	0.1	0.00	0.1
T1- 50m	50	0.1	0.3	0.01	0.1	0.00	0.0
T1- 75m	75	0.1	0.2	0.01	0.1	0.00	0.0
T1- 100m	100	0.0	0.2	0.01	0.1	0.00	0.0
T1- 125m	125	0.0	0.1	0.01	0.0	0.00	0.0
T1- 150m	150	0.0	0.1	0.01	0.0	0.00	0.0
T1- 175m	175	0.0	0.1	0.00	0.0	0.00	0.0
T1- 200m	200	0.0	0.1	0.00	0.0	0.00	0.0

Appendix 11.8 Predicted energy centre emission concentrations

The maximum predicted Process Contribution (PC) at worst-case human health receptors

Table A11.8.1 Maximum Process Contribution (PC) at Human Health Receptors

Pollutant	Averaging	Units	PC	EAL	%EAL
NO_2	Annual	µg/m^3	0.7	40	1.8
	Hourly		44.8	200	22.4

The maximum predicted PC is potentially significant but below the assessment level. The maximum predicted total concentrations are shown in the following Tables 10.8.5 and 10.8.6 for 2021 and 2031 respectively.

Table A11.8.2 Total Process Contribution in 2021

Pollutant	Averaging	Background (µg/m^3)	PEC	EAL	%EAL
NO_2	Annual	16.9	17.6	40	44.0
	Hourly	31.2	76.0	200	38.0

Table A11.8.3 Total Process Contribution in 2031

Pollutant	Averaging	Background (µg/m^3)	PEC	EAL	%EAL
NO_2	Annual	13.5	14.2	40	35.5
	Hourly	25	69.8	200	34.9

The maximum predicted environmental concentrations are well below the assessments levels. The combined effect of emissions from road traffic and the Energy Centre will not lead to a breach of national air quality strategy objecitives.

Appendix 12.1 Acoustic terminology

Acoustic Terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near (LAeq,T).
Daytime	The period 07:00-23:00 hours.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), LAx	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
LAeq,T	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
Lmax,T	A noise level index defined as the maximum noise level recorded during a noise event with a period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. LA10,18h is the A –weighted arithmetic average of the 18 hourly LA10,1h values from 06:00-24:00.
$L_{90,T}$ or Background Noise Level	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
LOAEL	Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.
Night-time	The period 23:00-07:00 hours.
NOEL	No Observed Effect Level - the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; and
SOAEL	Significant Observed Adverse Effect Level - The level above which significant adverse effects on health and quality of life occur.
The vibratory motion of a surface can be described by either: (a) displacement (m), (b) velocity (m/s), or (c) acceleration (m/s^2).	
peak to peak	This value gives the total excursion of the oscillation about the zero datum. The unit is often used where the vibratory displacement of a component is critical for maximum stress or mechanical clearance calculations.
Peak	This value gives the maximum excursion of the oscillation above or below the zero datum. This value is useful for indicating the level of short duration shocks.
r.m.s	This value gives the root mean square of the time history over a specific time interval (time constant). This value is useful for indicating the energy content of the vibration.
dB (vibration)	Decibel quantities are often encountered. A reference level of 10-6 m/s2 r.m.s is typically used for acceleration
Vibration Dose Value (V.D.V) (m/s1.75)	This value assesses both the magnitude of vibration and its duration. Where possible the vibration dose value should be determined over the full exposure to vibration. It is often estimated from the frequency weighted r.m.s value of the acceleration and its duration and is then referred to as e.V.D.V.