NYMNPA

04/09/2019

Forge Valley, Scarborough

Construction Method Statement

D/I/D/128858/04 Issue 1
September 2019

FAIRHURST

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CONTROL SHEET

CLIENT: **Scarborough Borough Council**

PROJECT TITLE: **Forge Valley, Scarborough**

REPORT TITLE: **Construction Method Statement**

PROJECT REFERENCE: **128858**

DOCUMENT NUMBER: **D-I-D/128858/04**

ISSUE 1 DRAFT	Name	Signature	Date
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Revision Record	Rev.	Date	Status	Description	Signature	
	1	04/09/19	Final	Updated due to Natural England and NYMNP Woodland Officer comments through planning process.	By	
					Checked	
					Approved	

This document has been prepared in accordance with procedure OP/P02 of the *Fairhurst Quality and Environmental Management System*

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FAIRHURST

1.0 INTRODUCTION

Aim of the project

1.1 The aim of the project is to safeguard the current walkway and to improve accessibility in the Forge Valley Nature Reserve by:

- Restoring and protecting the natural environment;
- Providing a year round accessible route for wheelchair users, walkers and runners;
- Creating a new footbridge at the southern end of the boardwalk to connect with Public Rights of Way (PRoW) on the East Ayton side of the River Derwent;
- Improving parking provision with two spaces specifically for disabled persons and two mini bus parking bays; and
- Providing a more robust and lower maintenance boardwalk.

1.2 Ecological considerations and protecting/ restoring the natural, sensitive environment in which these works take place is at the forefront of this project. To that end ecological recommendations form the various ecology/ tree surveys have been embedded into this report and also form appendices to this document (Appendix 1 to 5).

1.3 Before any works commence on site there are pre-commencement requirements relating to an Ecological Clerk of Works, as included within the tender requirements. Works relating to this role are also further detailed within report.

Rationale for the project

1.4 An accessible route through the Forge Valley Nature Reserve that creates a recreational, educational and tourist destination, meanwhile protecting and restoring the natural environment.

Accessibility and use

1.5 Improved access to the nature reserve is likely to be popular with locals and visitors of all ages and ability. The proposed boardwalk will be built at a suitable gradient to

ensure suitability for those with accessibility needs. Where possible the existing boardwalk will be redesigned to improve gradient/ alignment, and include better passing places to accommodate buggies, wheelchairs and mobility scooters.

2.0 DESIGN AND CONSTRUCTION

Tree felling

2.1 Where trees will need to be felled to accommodate the works, this will be carried out using the appropriate equipment, techniques and qualified personnel. This will be done outside the bird breeding season to avoid disturbance. Removal of Trees with Bat Roost Potential have been avoided through the design and assessment process. Tree works will be carried out in accordance with the BS5837 Tree Survey (Appendix 3) and the Arboricultural Impact Assessment (AIA) (Appendix 4).

Materials

2.2 Imported quarried aggregate will be required for the construction of both the car park and footpaths. Aggregates are to be sourced from local quarries to minimise delivery distance and suitable ‘as dug’ material is to be utilised wherever possible to alleviate the amount and cost of imported aggregate materials. Recycled plastic will be used for the footbridge and boardwalk.

2.3 All aggregates and cementitious materials must be stored away from water courses and covered when necessary to reduce sediment run-off. COSHH statements will be available for all hazardous materials. As far as possible, materials when not required for site should be stored in a secured compound. Generally, materials are to be stored safely to ensure no injury occurs from falling items. Any materials considered hazardous are to be stored in a locked container within the Contractor’s compound.

Bridge Crossing

2.4 A 1.5m wide footbridge with a 12m span is to be installed across the River Derwent. No vehicular access will be permitted to the bridge and it is to be designed to

accommodate the load of a powered wheelchair. The footbridge is to be comprised of structural steelwork with a recycled plastic finish and will be designed, manufactured and installed by a specialist sub-contractor. Reinforced concrete pad foundations are likely to be utilised to support both ends of the bridge, subject to confirmation of ground conditions and subsequent detailed design. The concrete foundations will be contained by a permanent waterproof formwork, such as a GRP liner, in order to prevent contamination of the adjacent water course.

2.5 The concrete founds will be set back approximately 5m from the main watercourse channel to prevent impacts on the aquatic environment both during construction and operational stages.

2.6 No bridge construction work will be undertaken at night to avoid disturbance to nocturnal species.

2.7 Appropriate measures to prevent sediment release surrounding bridge foundation excavations will be in place and may include sediment fencing or similar.

2.8 It is anticipated that the bridge is to be prefabricated, transported to site and installed via a crane located within the new constructed car park. As such, the proposed car park construction is to be designed to sufficiently support HGV access in line with the AIA (Appendix 4) recommendations.

Car Parking

2.9 The proposed car park will be constructed using a reinforced gravel grid designed to facilitate occasional HGV access, due to the requirement for crane installation of the timber footbridge. A well compacted Type 3 sub-base is to be used in conjunction with a geotextile layer to provide a sufficient base below the gravel grid whilst also maintaining permeability and free drainage, providing appropriate SuDS attenuation and levels of treatment.

Path Construction

2.10 Proposed pedestrian footpaths are to be approximately 1.5m wide and will be graded and rolled in order to provide an even surface with a sufficient crossfall to shed surface water away from the footpath. The top layer is to consist of a layer of 6-10mm sized gravel and is to be supported by a well compacted Type 1 sub-base. As part of the pedestrian footpaths, new boardwalks are also to be installed which will be designed, manufactured and installed by a specialist sub-contractor.

2.11 For the construction of gravel footpaths within Root Protection Areas, the following methodology will be applied:

1. A toolbox talk will be provided by a Suitably Qualified Ecologist (SQE) to all site personnel (including clearance, construction and sub-contractors) to raise awareness of wildlife potentially present and legislative requirements.
2. Remove vegetation in stages. Reduce ground vegetation to 10cm in height initially, then remove all vegetation in order to reduce the possibility of impacting reptiles. Limit the use of mechanical plant where practical.
3. Undertake pruning works if required.
4. Existing surface and topsoil is to be retained. No excavations or trenching for the installation of services in footpath area.
5. Any voids or depressions within the ground surface are to be filled with sharp sand (not builders' sand) to maintain levels.
6. Install geotextile separation filtration layer over area for footways.
7. Install cellular confinement mats over the area. Expand the Cellweb panels to the full length. Trim to desired width. Pin the Cellweb panels with staking pins to anchor open the cells and staple adjacent panels together to create a continuous mattress.
8. Install treated timber boarding of approximately 150mm height for lateral support secured by robust stakes for both sides.
9. Infill the Cellweb with a no fines angular granular fill of size 40-20mm within each open cell.
10. Install second layer of geotextile separation filtration layer.
11. Apply finished surface of gravel.

2.12 For further information, refer to AIA (Appendix 4).

Ground Conditions

2.13 Based on a review of the British Geological Survey (BGS) Online Viewer, historic BGS borehole records and Magic Map viewer for environmental data, the following ground conditions are considered to be present beneath the proposed car park and footbridge development:

Superficial Geology

2.14 Information provided by the British Geological Survey (BGS) online Viewer (Ref. 01) indicates that superficial geology is locally absent along the length of the Forge Valley footpath, likely to be attributable to the erosional force of the River Derwent.

Bedrock Geology

2.15 Information provided by the BGS Online Viewer (Ref. 01) indicates the site to be underlain by bedrock geology of the Lower Calcareous grit Formation, comprising sandstone and Yedmandale Member comprising limestone and calcareous sandstone.

2.16 The nearest BGS historic borehole (SE98NE12), is located approximately 300m south east of the proposed car park and bridge location.

BGS Borehole Information

2.17 The nearest BGS historic borehole (SE98NE12), is located approximately 300m south east of the proposed car park and bridge location. The ground conditions encountered within this borehole are as follows;

- Clayey sandy gravel to a depth of 3.80mbgl;
- Sandy limestone, some shells to a depth of 8.60mbgl;
- Soft silty clay with limestone fragments, to a depth of 9.80mbgl;
- Sandy limestone to a depth of 11.20mbgl;
- Calcareous fine sandstone with silty clay & limestone fragments to a depth of 13.90mbgl;
- Clay & calcareous sandstone to a depth of 19.0mbgl; and
- Alternating sandstone and limestone to a maximum borehole depth of 35.00mbgl.

2.18 Based on the information provided above, and localized absence of superficial geology within the vicinity of the site as reported within the BGS viewer (Ref 01) it is

considered that the site will be underlain by weathered mudstone and sandstone bedrock underlain by competent interbedded rock at shallow depth.

Hydrogeology

2.19 Information provided within the Magic Map online viewer (Ref. 02) indicates the bedrock geology underlying the site, is classified as a Principle Aquifer. Principle aquifers are defined as geology that exhibit high permeability and/or provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. Based on the resource potential of the bedrock aquifer it is classified as a Zone 1 – Inner source protection zone. Groundwater levels underlying the proposed car park and bridge crossing are anticipated to be encountered at shallow depth and in hydraulic continuity with the River Derwent.

Hydrology

2.20 The nearest surface water feature to the development is the River Derwent located adjacent to the west of the proposed car park, and flows north to south past the site. The Magic Map online viewer (Ref. 02) indicates that the River Derwent valley (Forge Valley) is located within a Drinking Water Protection Area (surface water) and a Drinking Water Safeguard Zone (Surface Water).

3.0 SITE DESIGNATIONS/ ENVIRONMENTAL PROTECTION

3.1 The site is designated a Site of Special Scientific Importance (SSSI) and a National Nature Reserve (NNR). Full environmental protection measures are to be in place prior to any works taking place, including a Bespoke EA Permit, protected species licences and supporting method statements.

3.2 Consent of Natural England for works to the boardwalk is required and should be in place prior to any works commencing. (Natural England have confirmed that any works that have planning permission do not require a separate SSSI consent).

3.3 The construction works will be carried out under the methods stated in the Biosecurity document (Appendix 5).

3.4 Works will be carried out under a method statement in order to protect the SSSI from construction impacts. This is outlined below. For further information refer to Extended Phase 1 Habitat Survey (Appendix 1).

Outline Sediment Pollution method statement

- Chemicals should not be used during the construction work.
- Ensure sediment/pollution prevention control methods are in place:
    - Straw bales used where hydrological connections to water bodies are identified.
    - No refuelling within 10m of any watercourse/ waterbody.
    - Spill kits available at all times.
    - Plant nappies for all plant used on site.
    - Sediment barriers will be installed surrounding extensive excavation of tree clearance areas.

Site Clearance

- A toolbox talk will be provided by a Suitably Qualified Ecologist (SQE) to all site personnel (including clearance, construction and sub-contractors) to raise awareness of wildlife potentially present and legislative requirements.

- Removal of vegetation in stages. Reduce ground vegetation to 10cm in height initially, then remove all vegetation in order to reduce the possibility of impacting wildlife.

Outline Felling method statement

- Felling of trees/shrubs, clearance of dense vegetation should be avoided during the bird nesting season (March to August inclusive).
- A toolbox talk will be provided to all site personnel (including clearance, construction and sub-contractors) by a SQE prior to work commencing on site.
- All trees/shrubs, clearance of dense vegetation should be avoided during the bird nesting season (March to August inclusive).
- Works will be subject to an inspection for breeding birds immediately prior to works by a SQE.
- Should active bird nests be found in trees that are to be cleared, removal of the relevant tree(s) will not be undertaken until a SQE has confirmed that the nest is no longer active.
- All trees with low BRP will be soft felled in sections.
- All felling will be directional and avoid damage to adjacent trees.

4.0 CONSTRUCTION METHOD

- All trees and vegetation to be felled/cleared as necessary by qualified personnel prior to construction work;
- The existing raised boardwalk is to be cleared as necessary by qualified personnel prior to construction work in a phased manner;
- Surfacing to car park areas to be laid;
- Surfacing to new path network to be laid;
- Footbridge foundations to be constructed;
- Prefabricated footbridge to be installed via crane located within new car park;
- New boardwalk to be installed;
- New trees to be planted;

- All street furniture such as bins and cycle stands to be installed; and
- Site to be tidied and all excess or waste materials to be removed from site (if not being reused within the site).

5.0 PRELIMINARY AND TEMPORARY SITE MEASURES

Site Induction

5.1 The Principal Contractor will carry out a site induction specific to the site, with specific reference to the SSSI and NNR context. Information will be provided to staff on any hazards of the site and will be told the site rules. Inductees will be informed of the requirement to observe specific site elements appropriate to their own work activities and/or site wide hazards. These might include:

- Working near/ over water, Vehicle movements, Traffic Management Systems;
- Ensure that inductees are made aware of specific requirements for the production of risk assessments and method statements where specific hazards are identified; and
- Ensure inductees are made aware of restricted areas and the reasons for the control measures in place.

Site Briefings

5.2 The Site Supervisor/ Principle Contractor will be required to conduct site briefings on a daily basis as a means of sharing health and safety problems; fostering a good health and safety culture on site and encouraging staff to report potential health and safety issues. The process should cover the following:

- Remind staff to consider the SLAM technique i.e. Stop the task and think. Look at each step; Look before, during and after completion of the task to identify potential hazards; Assess. Are workers equipped to perform the task safely check they have the correct knowledge, skills, training, and tools; Manage. Managers should take appropriate action to eliminate or minimise any hazards on site.
- Any staff/site changeovers;
- Check risk assessments and method statements are still relevant;

- Weather conditions;
- Ground conditions;
- Excavations;
- Existing buried or overhead services;
- Public safety;
- Traffic on and off site;
- Machinery;
- Site Health and Safety performance;
- Any feedback/suggestions form staff;
- Capture any information on near misses or dangerous occurrences; and
- Deliveries, visitors, arrival of specialist equipment, sub-contractors.

Toolbox Talks

5.3 Toolbox talks will cover specific issues that have been identified from walking around the site, issues raised during site briefings or those which cause near misses on site. The issues can include, but are not limited to:

- Manual handling;
- Slips and trips; and
- Noise
- Environmental / ecological risks, and protection.

6.0 POLLUTION CONTROL PLAN

6.1 The works will be carried out to suit weather conditions and should heavy rainfall be an issue, methods will be taken to reduce run-off pollution in the water course.

6.2 The following general good working practices will be adopted:

- All tools are to be washed off-site. On no account are they to be washed in the watercourse; and
- Appropriately qualified supervisors will oversee the project.

Pollution Prevention

6.3 Work carried out near any water course is regarded as high risk with the potential to cause pollution, silting and erosion. No muddy surface waters or discoloured ground water is to be admitted to the watercourse. Works will be scheduled to avoid excavation and exposure of soils during periods of heavy rainfall, in line with the Bespoke EA Permit and any other statutory requirements.

The Control of Fuel and Lubricating Fluids

6.4 Fuel for plant is to be secured in secure (lockable) steel bunded containers held within the designated compound sites; and all refuelling is to be carried out at suitable locations away from water courses.

Emergency Equipment

6.5 Contingency procedures are to be available for use in the event of a spillage. Spill kits, complete with absorbent material are to be provided and instruction of use known to Contractors. Any spilled material is to be contained and reported to the Environment Agency (EA).

Site Precautions

6.6 All vehicles and equipment shall be strictly maintained and operated in accordance with authorised guidelines and instructions. It shall be in a good working condition and fully serviced before accessing the site.

6.7 The site working area shall be signposted, taped off and warning notices posted to warn the public that the PRoW will be temporarily ‘stopped up’ and alternative routes identified for the duration of the works.

7.0 TIMING/ SCHEDULE OF WORKS

7.1 Timing will be dependent on funding; however the construction period is expected to start early 2020. All work is expected to be completed by August 2021.

8.0 HOURS OF OPERATION

8.1 Work will be carried out during any day of the week, unless specifically specified, during daylight hours, as a guide, 0800hrs to 1800hrs. No 'lone working' will be permitted at any time.

9.0 INSURANCES

9.1 The Contractor shall display or make available, his Insurance Cover as appropriate to the works

10.0 COMPOUNDS

10.1 There will be no compounds in the immediate vicinity of individual trees, under tree canopies or within woodland areas as set out within the AIA.

11.0 SITE DEMOBILISATION

11.1 All Contractor equipment and any traces of work will be removed from the site within one week of the works finishing. Waste will be disposed of through the Contractor's business refuse disposal or via a local licenced landfill site. All ground vegetation and surface wear and tear will be repaired to its former state using the appropriate reinstatement technique. This repair work will be immediately carried out by the Contractor once the site infrastructure has been vacated.

12.0 FUTURE MAINTENANCE

12.1 The site will be primarily managed by the Raincliffe Woods Community Enterprise, who have a 30 year lease from Scarborough Borough Council (as of April 2015) to manage Forge Valley. The management of the site beyond this time will be decided by Scarborough Borough Council, who are the owners of the woodland, but have a long standing working relationship with the community, North York Moors National Park Authority, the EA, Natural England and other interested parties which would inform the longer term strategy.

APPENDICES

Appendix 1:

Eco North ECN18 218

Extended Phase 1 Habitat Survey

Extended Phase 1 Habitat Survey

Forge Valley, Scarborough

June 2019

Final Report

Report Prepared For:

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Document Control

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
Draft V01	13/06/19	Draft to client	Not Confidential	SH	JM	MM
Final V02	17/06/19	Amendment	Not Confidential	-	-	-

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Contents

Summary

EcoNorth Ltd. was commissioned by Fairhurst to undertake an extended Phase 1 habitat survey of land at Forge Valley, near East Ayton in Scarborough. The survey was undertaken by EcoNorth Ecologist Sarah Hawes MSc BSc (Hons) GradCIEEM and David Beaver TechArborA Arboricultural Consultant on 13th May 2019. Habitat maps were produced in accordance with the methodology described in the Handbook for Phase 1 Habitat Survey (JNCC, 2010), with the survey 'extended' to determine the potential suitability of the site for protected species. The client proposes to replace an 18-year-old 2.3km wooden boardwalk at site A, construct a new footbridge across the River Derwent onto the boardwalk at site B and to expand the car park including disabled parking at site C.

Site A is within Raincliffe & Forge Valley Woods SSSI and NNR, and Site B and C lie partially within the SSSI/NNR. The survey was designed to map the habitats and determine the potential suitability of the site for protected species, to inform the funding application and assesses the potential impacts upon the ecological interests of the site.

The desk study completed prior to the field visit highlighted the presence of 10 statutory and 5 non-statutory sites within 2km of the site boundary, and also identified the presence of badger within the site, and several species of bat, including common pipistrelle, soprano pipistrelle, noctule, brown long-eared and *Myotis* sp. within 2km of the site boundary.

The following table highlights the key ecological features/species identified on site and those which have the potential to be present, based on the information available to date. Requirements for further surveys are highlighted, while necessary mitigation measures are provided in Section 7; further measures will be agreed as necessary following on from the completion of the additional surveys outlined below.

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
Habitats	Site A Consists of a car park and boardwalk parallel to the river connected via a bridge across the River Derwent. Small section of woodland and tall ruderal vegetation on steeply sloped riverbank. Site B Consists of a small car park of hard standing and semi-improved grassland. On the western side of the site between the road and the river there is a strip of woodland with marginal habitat along both sides of the river. Site C Consists of hard standing and semi-improved grassland with deciduous woodland alongside the River Derwent.	High – National	No	Considerate development plan that retains key habitat features e.g. trees. Refer to section 7 for further details.
Invasive Plant Species	No Schedule 9 invasive species were recorded during the survey. However, Himalyan balsalm has been recorded within Forge Valley previously.	N/A	No	Watching brief during any works and method statement implemented to prevent the spread of invasive plants
Bats	High value foraging habitat within the woodland, along the woodland edge and along the river, as well as roosting opportunities within trees on site.	Moderate	Yes – Bat activity surveys will be needed for trees of moderate to high suitability for bats between May and	Any removal of trees with low to high bat roosting potential will require further surveys. Low trees will require soft felling under a method statement written by a suitably qualified ecologist and moderate or high

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
			September, with one of these surveys undertaken between May and August inclusive. Inspections prior to felling trees of low potential.	trees will require two or three bat activity surveys respectively. Connectivity in vegetation cover to be retained, primarily along the woodland edge and watercourse. Appropriate lighting scheme to be implemented, including maintaining a dark corridor/buffer along the watercourse.
Great Crested Newt (GCN)	The River Derwent is fast moving and unsuitable for GCN. The streams feeding the river near site A are fast flowing and therefore unsuitable. One water body (445m to the south of site C) assessed using HSI (Habitat Suitability Index) was below average and GCN are considered unlikely to be present on site.	Low	No	Due to the nature of the works proposed and the remaining habitat present any GCN that may be in the area can be avoided by working under a method statement. Works should be carried out under a precautionary Method Statement written by a suitably qualified ecologist (SQE).
Otter	No signs of otters were recorded on site however, suitable habitat present on all three sites	Moderate	Yes surveys required prior to works undertaken, which can be carried out at any time of the year	Due to the possibility of otters being present and disturbed during works e.g. habitat removal, otter surveys will be required.
Freshwater Pearl	No signs but the river is potentially suitable for freshwater pearl mussel and the River Derwent is	Moderate	No	Pollution prevention method statement should be followed when working on

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
Mussel	within the species range.			banksides and crossings
Reptiles	The habitats present consist of sub-optimal habitat for reptiles.	Low	No	Works should be carried out under a precautionary method statement written by a suitably qualified ecologist.
White-clawed Crayfish	No signs recorded but the habitat is potentially suitable for white-clawed crayfish and the River Derwent is within the species distribution range.	Moderate	No	Pollution prevention method statement should be followed when working on banksides and crossings
Water Vole	No signs of water voles were recorded on site however, the habitat present on all three sites is near a river and has suitable habitat present.	Moderate	Yes Surveys required and to be carried out between mid-April to September.	Due to the possibility of water voles being present and the disturbance and removal of habitat as a result of the development further water vole surveys will be required.
Red Squirrel	No signs of red squirrels were recorded during the survey. The woodland has potential to support the species but being deciduous reduces the likelihood that red squirrels are present on the sites.	Low	No, if works avoid the breeding season (February to September, inclusive).	Pre-work checks for active dreys should be carried out prior to the works commencing
Badger	Recent records for badger from local area, and no evidence of badger activity or badger setts were identified on any of the sites, however there is suitable habitat present in all three areas, especially site C.	Low	Yes Pre-construction checks should be carried out within one month prior to the works commencing.	Due to the possibility of badger being present, works should be avoided within 30m of any badger sett.
Birds	Suitable habitat for nesting birds was present within all sites.	Moderate	No, if works avoid the breeding bird season (March to August,	Refer to Section 7. If any works are undertaken within the breeding season, then checking surveys by an SQE are

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
			inclusive).	required.
Migratory Fish	The river is suitable for migratory fish.	Moderate	No	Pollution prevention method statement should be followed when working on banksides and crossings

1. Introduction

1.1 Background

EcoNorth Ltd. was commissioned by Fairhurst (henceforth referred to as the client) to undertake an extended Phase 1 habitat survey of three sites within Forge Valley, near East Ayton in Scarborough (central grid reference Site A: SE 98480 87099, Site B: SE 98749 85874, Site C: SE 98916 85657). The client proposes to replace an 18-year-old 2.3 km wooden boardwalk at site A, construct a new footbridge across the river Derwent on to the boardwalk at site B, and to expand the car park including disabled parking at site C. All three sites are located within Raincliffe & Forge Valley Woods Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). The survey was designed to map the habitats and determine the potential suitability of the site for protected species, to inform the funding application.

This report:

- Sets out the results of the survey
- Analyses the site's value for nature conservation
- Identifies additional survey requirements in order to fully determine the baseline ecological conditions on the site
- Identifies key avoidance, mitigation and/or compensation measures required to ensure the proposals do not have an adverse impact upon biodiversity

1.2 Site Context

Figure 1 identifies the location and extent of the development site.

Figure 1: Survey Areas (Boundary outlined in red)

The three sites surveyed are within Forge Valley, north of East Ayton, near Scarborough, North Yorkshire. The River Derwent runs parallel to Seavegate Road and through the Forge Valley woodland. Almost the entirety of Forge Valley lies within North York Moors National Park. To the south of the sites is the village of east Ayton and to the north, east and west lies agricultural fields bordered by hedgerow and areas of woodland.

1.3 Nature of the Proposals

The client proposes to extend the carpark northwards from the original car park at site A. At site B a new bridge is proposed as well as the felling of trees and clearance of vegetation in order to incorporate a new car park on the western side of the road. Site C will have a new path created retaining the majority of the trees on site.

Site A is within the Raincliffe & Forge Valley Woods SSSI however, only a small section of sites B and C are within the SSSI area boundary. The survey was designed to map the habitats and determine the potential suitability of the site for protected species, to inform the funding application.

Figures 2,3 and 4 show the sites to be developed.

Figure 2: Site A

Figure 3: Site B

Figure 4: Site C

2. Planning Policy and Legislation

2.1 Planning Policy and Guidance

A series of national and local planning policies are in place which are designed to ensure that development works do not have an adverse impact upon biodiversity, at a site or wider level. Such policies ensure that both developers and public bodies must give due consideration to the potential effects of development works upon both ecological receptors (in line with existing wildlife legislation) and biodiversity.

2.1.1 National Planning Policy Framework (NPPF) (2019)

The NPPF outlines the Government's policies through the planning process, acting as guidance for local planning authorities and decision-makers. The document places a duty on local authorities to consider the principles included when assessing planning applications and preparing Local Plans and Regional Spatial Strategies. Chapter 15 relates to the conservation and enhancement of the natural environment, in line with existing wildlife legislation. Further details are provided on the gov.uk website.

2.1.2 Biodiversity Action Plans (BAPs)

The UK BAP was published in 1994 to guide national strategies for the conservation of biodiversity. BAPs were designed to ensure the conservation and re-establishment of natural habitats, and that measures were implemented to aid the conservation and enhancement of habitats and species of local importance, the latter through the development of Local BAPs. The UK BAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in 2012 however, the lists of species and habitats of conservation importance are still considered to remain a valuable tool for identifying features of local and national conservation concern. As such, the potential presence of both Local and UK BAP habitats and species were considered throughout the surveys and assessment.

2.2 Legislation

A range of legislation is in place to ensure that habitats and species of conservation importance are protected from both direct and indirect harm. Key legislation includes:

- The Conservation of Habitats and Species Regulations 2017 (The Habitat Regulations)
- The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (The Bern Convention)
- The Wildlife and Countryside Act 1981 (as amended)
- The Natural Environment and Rural Communities (NERC) Act 2006

- The Countryside and Rights of Way (CRoW) Act 2000
- The Wild Mammals (Protection) Act 1996
- The Protection of Badgers Act 1992
- The Hedgerow Regulations 1997

SSSIs are protected in England under the Wildlife and Countryside Act 1981 (as amended). An overview of the above legislation is provided in Appendix A.

The potential presence, on or near the site, of species afforded protection under the above legislation was considered throughout the surveys and assessment. Species considered include:

- Bats
- Great crested newt *Triturus cristatus*
- Otter *Lutra lutra*
- Freshwater pearl mussel *Margaritifera margaritifera*
- Reptiles
- White-clawed crayfish *Austropotamobius pallipes*
- Water vole *Arvicola amphibius*
- Red squirrel *Sciurus vulgaris*
- Badger *Meles meles*
- Birds
- Migratory fish

An overview of the legislation and level of protection relating to such species is provided in Appendix A.

3. Methodology

3.1 Desk Study

Contextual information was gathered as part of a desk study undertaken prior to the start of field surveys. Such information can identify protected or notable species which may occur on the proposed development site or in the local area, as well as identifying statutory and non-statutory ecological sites which may have the potential to be affected by the proposals. Species records and the location of statutory and non-statutory nature conservation sites within 2km of the survey site were requested from North & East Yorkshire Ecological Data Centre (NEYEDC) and from the Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk).

Additionally, 1:10,000 Ordnance Survey maps were consulted to help identify waterbodies or watercourses within 500m of the site. This search reflects the potential for great crested newt (GCN) to utilise terrestrial habitat up to 500m from their breeding ponds and also helps determine the potential for other riparian or semi-aquatic species which will move away from a watercourse to be present (e.g. otter).

It should be noted that an absence of records is likely to reflect an absence of survey data and cannot be taken as confirmation that a particular species is not present in the site or surrounding area.

3.2 Field Survey

3.2.1 Habitats

Mapping of the habitats within the site followed the Phase 1 survey methodology outlined in the 2010 edition of the 'Handbook for Phase 1 habitat survey' by the Joint Nature Conservation Committee (JNCC). This follows a standardised system which can be easily interpreted, with habitats and boundary features correlating to one of around ninety set definitions. Target notes were used to record further information regarding features of interest, or specific habitats or features identified during the survey which do not closely match any of the Phase 1 criteria.

Plant species were identified in accordance with Rose (2006) and Stace (2010). A search was also conducted for presence of Schedule 9 invasive non-native plant species such as Japanese knotweed *Fallopia japonica* and Himalayan balsam *Impatiens glandulifera*.

The results of the Phase 1 habitat survey are shown in Appendix B, with Target Notes provided in Appendix C and site photographs in Appendix D.

An assessment of the potential suitability of the habitats within the site and surrounding area for bats was undertaken on 13/05/2019, as part of the survey. This included an

assessment using the criteria set out in the Bat Conservation Trust Survey Guidelines, as shown in Table 1, below.

Table 1: BCT Guidelines for Assessing the Value of Habitats for Bats.

Feature	Value
Evidence indicating that a structure/feature is used by bats, such as: • Bats seen roosting or emerging/entering a structure/ feature; • Field signs such as droppings, feeding remains or carcasses found; and/or • Bats heard calling or 'chattering' within a roost Bats recorded/observed using an area for foraging or commuting	Confirmed Roost
• Site is close to known roosts • Site is connected with the wider landscape by strong linear features that would be used by commuting bats e.g. river/stream valleys or hedgerows • Habitat of high quality for foraging bats e.g. broadleaved woodland, tree-lined watercourses, parkland • Buildings, trees or other structures e.g. mines, caves, tunnels, ice houses and cellars, with features of particular significance for roosting bats • Site is connected with the wider landscape by linear features that could be used by commuting bats e.g. lines of trees and scrub or linked back gardens • Habitat could be used by foraging bats e.g. trees, scrub, grassland or water • Several potential roosts in the buildings, trees or other structures • Isolated site not connected by prominent linear features (but if suitable foraging habitat is adjacent it may be valuable if it is all that is available • Isolated habitat that could be used by foraging bats e.g. a lone tree or patch of scrub, but not parkland • Small number of potential roosts generally of lower conservation importance e.g. probably not maternity roosts or hibernacula	High Value Habitat ↓

Feature	Value
• No features that could be used by roosting bats for foraging, roosting or commuting	Low Value Habitat

The above criteria were used to provide a guide as to the potential suitability of the site for bats. It is important to note that an absence of potential commuting routes or 'good quality' foraging areas around a site cannot be used to confirm the absence of bats from a site. Bats are highly mobile animals which will use different habitats at different times of the year, therefore an appropriate level of additional survey work must be carried out in order to determine if and how bats utilise a particular site.

3.2.2 Protected and Notable Species

Throughout the field survey, searches were made for field signs indicating the presence of protected and notable species, including but not being limited to those species listed in Section 3.2. Any field signs recorded (including sightings of the animals themselves) were mapped; any such signs are illustrated in Appendix B and listed as Target Notes in Appendix C. An assessment was also made of the potential for the site and adjacent areas to support protected and notable species, to identify where the proposals may impact upon such species and identify any requirements for further (species-specific) surveys.

3.2.3 Habitat Suitability Index (HSI) Survey for Great Crested Newt

Where access permitted, ponds and areas of water within 500m were checked for their suitability to support breeding GCN following methodology described by Amphibian and Reptile Groups of the UK (2010) and Oldham et al. (2000). Each pond/waterway was scored using ten criteria. These scores were then used to calculate the suitability of that pond/waterway for supporting breeding GCN. The HSI score is used to inform the need for specific GCN surveys in the breeding season.

3.2.4 Survey Conditions and Personnel

The extended Phase 1 habitat survey was completed on 13th May 2019 by EcoNorth Ecologist Sarah Hawes MSc BSc (Hons) GradCIEEM and David Beaver TechArborA Arboricultural Consultant.

Table 2 shows the conditions during the survey.

Table 2: Survey Conditions

Date	Precipitation	Temperature (°C)	Cloud Cover (Octas)	Wind (Beaufort Scale)
13/05/19	Scattered showers	7 - 10 ªC	6/8	4

Any constraints or limitations to the survey are discussed in Section 6.1.

3.3 Assessment

The botanical value of the habitats on site and the value of the site for protected species, as determined through the extended phase 1 survey, were based on the criteria published by the Chartered the Institute of Ecology and Environmental Management (CIEEM) in 2018 (http://www.cieem.net/ecia-guidelines-terrestrial-). Each feature was classified as being as one of the following levels of value:

- International
- National
- Regional/County
- City/District/Borough
- Local
- Low

Examples of different ecological features meeting each of these criteria are outlined in Appendix E.

4. Baseline Conditions

4.1 Desk Study

4.1.1 Designated Sites

Table 3 shows those designated sites identified through the desk study as lying within 2km of the site boundary.

Table 3: Designated Sites within 2km

Designated Site	Site location	Reasons for Designation
Raincliffe & Forge Valley Woods SSSI	SE984864; SE991877	Forge Valley Woods flank the steep east and west facing slopes of the Derwent valley and extend along a northwest facing spur into Raincliffe Woods. They comprise one of the best examples known of mixed deciduous woodland in north-east England. There is a sequence of woodland types occupying different levels of the valley sides. In the wet valley bottom alder *Alnus glutinosa* and willow *Salix* sp., predominate with a ground flora of opposite-leaved and alternate-leaved golden saxifrage *Chrysosplenium oppositifolium* and *C. alternifolium*, yellow flag Iris *pseudacorus* and pendulous sedge *Carex pendula*. The middle slopes support a mixed canopy in which ash *Fraxinus excelsior* and wych elm *Ulmus glabra* are largely dominant with sycamore *Acer pseudoplatanus* locally prevalent, and an understorey of hazel *Corylus avellana*, field maple *Acer campestre*, holly *Ilex aquifolium*, bird cherry *Prunus padus* and spurge laurel *Daphne laureola*. The base-rich soils here support a diverse field layer dominated by dogs mercury *Mercurialis perennis*, ramsons *Allium ursinum* and bramble *Rubus fruticosus* with other herbs such as sanicle *Sanicula europaea*, wood anemone *Anemone nemorosa*, toothwort *Lathraea squamaria*, and ferns including soft shield fern *Polystichum setiferum* and harts tongue *Phyllitis scolopendrium*. Several species of orchid occur, including early purple-orchid *Orchis mascula*, broad-leaved helleborine *Epipactis helleborine* and birds-nest orchid *Neottia nidus-avis*. At the top of the slope more acidic soils support pedunculate oak *Quercus robur* with rowan *Sorbus aucuparia* and holly. The field layer contains bilberry

Designated Site	Site location	Reasons for Designation
		Vaccinium myrtillus, great woodrush *Luzula sylvatica*, heather *Calluna vulgaris* and wavy hair-grass *Deschampsia flexuosa*. In the Raincliffe sector chickweed wintergreen *Trientalis europaea* is recorded. Small areas of calcareous grassland are associated with limestone outcrops at the southeast end of the valley and here rock-rose *Helianthemum nummularium*, carline thistle *Carlina vulgaris* and thyme *Thymus praecox* occur. There are also several well-developed tufa springs. The woodland supports a rich population of breeding birds including nuthatch *Sitta europaea*, treecreeper *Certhia familiaris*, garden warbler *Sylvia borin*, wood warbler *Phylloscopus sibilatrix*, redstart *Phoenicurus phoenicurus* and black-cap *Sylvia atricapilla*.
Cockrah Wood SSSI	SE969881	The site was formerly on oakwood Quercus sp. situated on a steep slope with acid soils. It has been largely replanted with conifers but there remain populations of scarce plants, notably the may lily *Maianthemum bifolium*, hay scented buckler fern *Dryopteris aemula*, chickweed wintergreen *Trientalis europaea* and the club moss *Lycopodium clavatum*. The ground flora comprises acidic species such as wood sage *Teucrium scorodonia*, bracken *Pteridium aquilinum*, wood sorrel *Oxalis acetosella* and abundant ferns including soft shield-fern *Polystichum setiferum* and narrow buckler *fern Dryopteris carthusiana*. The site is noted for the presence of several colonies of the may lily the habitat of which is being carefully managed with the co-operation of the owners in an attempt to provide optimum conditions for its growth.
Spiker's Hill Quarry SSSI	SE980861	Newhurst Quarry is the only British site where pre-existing hypogene mineralisation, originating from ascending mineral-rich fluids in pre - Triassic times, has been notified by weathering and resedimentation during Triassic times, some 225 million years ago. No other locality in Britain shows such effects, and Newhurst Quarry is the only British occurrence of the minerals Coulsonite (a vanadium-rich variety of magnetite) and Vesignieite (a complex hydrated copper-barium-vanadium mineral).
Betton Farm Quarries SSSI	TA001855	The best Coral Rag sections in the Scarborough area are to be seen at Betton Farm Quarries. A series of Thamnasteria patch reefs rest upon Malton Oolite,

Designated Site	Site location	Reasons for Designation
		surrounded by calcareous muds and reef detritus. The best example of coral patch reefs in the Yorkshire Corallian outcrop here, with a rich associated molluscan fossil fauna, notably gastropods which occur both in and around the reefs. This is an important palaeoecological locality in the classic Coral Rag of Yorkshire.

Table 4: SINC Sites within 2km

Site	Site location
Raincliffe & Forge Valley Woods SSSI	SE984864; SE991877
Cockrah Wood SSSI	SE969881
Spiker's Hill Quarry SSSI	SE980861
Betton Farm Quarries SSSI	TA001855
North York Moors National Park	All of search area north of A170
Racecourse Road Plantation SINC (TA08-17)	TA008861
Sikes Plantation SINC (TA08-10)	TA001844
Irton SINC (TA08-25)	TA005856
Betton Farm Road Verges SINC (TA08-37)	SE005857
Black Rigg and Long Plantation SINC (TA08-31)	TA002865

4.1.2 Protected and Notable Species

A range of protected and notable species were identified through the desk study as having been recorded within 2km of the site boundary within the last 10 years. This includes badger, bats (including *Myotis* sp., common pipistrelle *Pipistrlleus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus,* noctule *Nyctalus noctula*, and brown long-eared *Plecotus auritus*) within 2km of the site boundary.

Further information is provided in Appendix F.

4.2 Field Survey

Habitats

Overall the habitats within the three sites were found to be dominated by deciduous woodland, with semi-improved grassland, tall ruderal vegetation, marginal habitats as well

as fence lines, hard standing and running water. Such habitats are described in the following sub-sections. The results of the Phase 1 habitat survey are shown in Appendix B, with Target Notes provided in Appendix C and site photographs in Appendix D.

4.2.1 Site A

Site A is predominantly hard standing consisting of a car park located in the south-east of the site and a boardwalk parallel to the river in the north-west of the site. The car park and board walk are connected via a bridge across the River Derwent. A small section of woodland is also included within the survey site as well as a small area of tall ruderal vegetation directly to the north of the car park. There is a steep slope of woodland to the west of the board walk running along the river as well as a steep riverbank immediately to the east of the board walk.

Woodland

Woodland habitat is present to the south, north and north east of the car park as well as along a steep bank to the west of the boardwalk. Sycamore *Acer pseudoplatanus*, common ash *Fraxinus excelsior*, and wych elm *Ulmus glabra* is present within the woodland and the understorey is dominated by common nettle *Urtica dioica*, with frequent ivy *Hedera helix*, wood forget-me-not *Myosotis sylvatica*, common hogweed *Heracleum sphondylium*, wild garlic *Allium ursinum* and cleavers *Galium aparine*.

Tall Ruderal

Tall ruderal vegetation is located to the north of the car park, cleavers is dominant with abundant creeping buttercup *Ranunculus repens*, broad-leaved dock *Rumex obtusifolius, common dandelion Taraxacum officinale, occasional hogweed,* wild garlic and wood forget-me-not.

Semi-improved Grassland

Small areas of semi-improved grassland are present along the western margin of the road. Cock's-foot *Dactylus glomerata* is dominant, broad-leaved dock and common dandelion is abundant, cow parsley *Anthriscus sylvestris* and lesser celandine *Ficaria verna* is frequent, occasional wild garlic, ground ivy, creeping buttercup and common nettles are also present.

4.2.2 Site B

There is a small car park to the east consisting of hard standing and semi-improved grassland. On the western side of the site between the road and the river there is a strip of woodland with marginal habitat along both sides of the river.

Woodland

Woodland is present between the river and the road. Willow sp., *Salix*, common alder *Alnus glutinosa*, and wych elm trees are present. The understorey habitat is dominated by wild garlic with abundant dog's mercury *Mercurialis perennis,* cleavers and wood anemone *Anemone nemorosa*, as well as frequent wavy bitter-cress *Cardamine flexuosa,* creeping buttercup, cleavers, occasional large bitter-cress *Cardamine amara*, lesser burdock *Arctium minus*, herb Robert *Geranium robertianum,* ground ivy *Glechoma hederacea*, bramble *Rubus fruticosus*, common nettle, and rarer woodland speedwell *Veronica montana,* red campion *Silene dioica,* pignut *Carya glabra,* and bluebell *Hyacinthoides non-scripta.*

Semi-Improved Grassland

Semi-improved grassland is present to the east of the road within the car park. Cock's-foot is dominant, broad-leaved dock and common dandelion is abundant, cow parsley and lesser celandine is frequent, occasional wild garlic, ground ivy, creeping buttercup and common nettle are also present.

Marginal Habitat

Marginal habitat is present along the river to the west of the site. Marsh marigold *Caltha palustris* is dominant and lesser celandine is also present.

4.2.3 Site C

The current car park area on the eastern side of Site C consists of hard standing and semi-improved grassland. The car park is bordered to the north and south by a wooden fence and large log on the eastern boundary (Target Note 19). The western side opens to the road. The western section of site C consists of deciduous woodland with a wild garlic dominant ground layer, hard standing and tall ruderal. The River Derwent runs parallel north to south near to the western border meeting the site boundary along the north-western edge.

Woodland

The woodland is located to the north-west and north-east of the road. Horse chestnut *Aesculus hippocastanum,* common beech *Fagus sylvatica*, common lime *Tilia x europaea* and sycamore are present. Wild garlic is dominant species in the understorey, common hogweed, cleavers, and cow parsley are abundant, common dandelion is occasional and red campion, wood speedwell and common dog violet *Viola riviniana* are rare.

Semi-improved Grassland

Areas if semi-improved grassland are present within the car park. Semi-improved grassland is also present along the western margin of the road. Cock's-foot is dominant, broad-leaved dock and common dandelion is abundant, cow parsley and lesser celandine is

frequent, occasional wild garlic, ground ivy, creeping buttercup and common nettle are also present.

Tall Ruderal

Tall ruderal vegetation is present in the clearing between the two areas of woodland. Common nettle is dominant, cleavers and creeping buttercup are abundant, hogweed, broad-leaved dock, bramble and willow herb sp., *Epilobium* are frequent, wild garlic and crosswort *Cruciata laevipes* are occasional and red campion, ground ivy, wood forget-me-not and cock's foot are rare.

4.2.4 Schedule 9 Plant Species

No schedule 9 plant species were recorded at the time of the survey at any of the three sites.

4.2.5 Protected and Notable Species

Bats

There is high value foraging habitat within the woodland, along the woodland edge and along the river, as well as low to high suitability for roosting opportunities within trees on site. The surrounding landscape provides optimal habitat as the woodland edge habitat and river provide excellent foraging opportunities for bats. All three sites are connected via the river and woodland as well as being connected to the wider landscape from the hedgerow bordering the surrounding agricultural fields.

Site A

The trees within the woodland areas at site A are mature enough to have bat roosting potential.

Site B

The majority of the trees at site B are densely packed and are of negligible to low potential for roosting bats. There is one very large tree directly to the south of the site which has high potential due to its size and should be retained.

Site C

The trees at site C, are less densely packed than sites A and B therefore, individual trees could be identified and assessed for bat roosting potential. Trees with low to high bat roosting potential have been target notes and identified within the Phase 1 habitat map. The site has a mixture of low to high trees with bat roosting suitability.

Great Crested Newt

The data search returned no records for great crested newt and the River Derwent is fast moving and considered to be unsuitable for supporting the species. One water body (445m to the south of site C) was were identified within 500m of the three sites. The HSI (Habitat Suitability Index) was below average and is considered unlikely to support great crested newt. The streams entering the river near site A are fast flowing and are also considered unsuitable to support great crested newt.

Otter

No signs of otters were recorded on site, and no signs returned from the data search however the riverine habitat is highly suitable for foraging otter with the potential for couch sites as well along the riverbanks.

Freshwater Pearl Mussel

The river habitat is considered potentially suitable for freshwater peal mussel and is within its distribution range. No signs were recorded.

Reptiles

No signs of reptiles were recorded, or records returned from the data search and the habitats present are considered to be sub-optimal for supporting reptiles.

White-clawed Crayfish

The river habitat is considered potentially suitable for white-clawed crayfish and is within its distribution range, with records for the species further upstream. No signs were recorded.

Water Vole

No signs of water voles were recorded on site, and no records returned from the data search however the habitat present on all three sites is suitable for water vole.

Red Squirrel

No signs of red squirrels were recorded during the survey and no records were returned form the data search. As the woodland is mostly deciduous it reduces the likelihood that red squirrel are present on the sites.

Badger

No evidence of badgers was recorded during the survey, and no setts are located within or close to the three sites, however, the semi-improved grassland, tall ruderal vegetation and woodland habitat provide suitable foraging habitat for badgers and they have been recorded within 2km of the site in the last ten years.

Birds

The woodland, grassland, riverine and marginal habitats are likely to support a range of breeding bird species and Goldcrest *Regulus regulus* was recorded at site A. Kingfisher *Alcedo atthis* a Schedule 1 breeding species (Wildlife and Countryside Act 1981, as amended) was noted on a display board at the site as being present.

Migratory Fish

The river is considered to support suitable habitat for migratory fish.

BAP and Other Species

The site is suitable for hedgehog *Erinaceus europaeus* which are a UK BAP species.

5. Interpretation and Discussion

5.1 Survey Constraints and Further Survey Requirements

There were no major survey constraints and all three areas were accessible for the purpose of the habitat survey.

However, before a robust assessment of the value of the site and potential impacts of the proposals can be made, the following additional surveys are required:

- Otter surveys at each site prior to works, (which can be undertaken throughout the year).
- Any trees to be removed from site A need to be identified and a ground level tree assessment for bat root potential carried out.
- Any trees to be removed within site B should be subject to an inspection by a suitably qualified ecologist prior to felling under a method statement.
- Any trees which require felling within site C will require further surveys for roosting bat potential. See Target Notes in Appendix C for further details.
- Water vole survey at each site which can be undertaken between mid-April and September.
- Badger checks carried out within one month of the works commencing at each site (best undertaken in early spring or autumn).

5.2 Assessment of Value

Based on the results of the desk study and field work completed to date, the ecological interests of the site are valued as shown in Table 5, below, using the criteria outlined in Section 4.3 and Appendix E.

Table 5: Value of Ecological Features Recorded on Site

Ecological Feature	Ecological Value	Justification
Mixed deciduous woodland	High – National	The woodland at Site A is within and at Site B and C partially within a SSSI/NNR.
Semi-improved grassland	Low	Supports a small range of locally common species typical of such habitats.
Tall ruderal	Low	
Marginal	Low	

Ecological Feature	Ecological Value	Justification
habitat		
Waterbody	High	The River Derwent provides habitat for a number of protected species eg white-clawed crayfish, kingfisher
Hard standing	N/A	N/A
Fence line		
Invasive Plant Species	N/A	Himalayan Balsalm has been recorded on the three sites in the past therefore, preventative measures should be carried out including a tool box talk by a suitably qualified ecologist (SQE) prior to the works commencing.
Bats	Moderate	Potential destruction of bat roosts as some trees will be removed. Bat roosts are protected under the Habitats Regulation 2017 and Wildlife and Countryside Act 1981 (as amended).
Great Crested Newt	Low	Great crested newts are unlikely to be present within the sites and the scale of the works is unlikely to impact the local population. However, a method statement for site clearance works will reduce the risk further. GCN are protected under the Habitats Regulation 2017 and Wildlife and Countryside Act 1981 (as amended).
Otter	Moderate	Damage and disturbance to otters and their holts/places of shelter e.g. couches on the riverbanks. Otters are protected under the Habitats Regulation 2017 and Wildlife and Countryside Act 1981 (as amended).
Freshwater Pearl Mussel	Moderate	The proposed bridge at site B will not directly impact the species as it is designed to avoid any structure in the watercourse and will have a buffer zone either side. Pollution e.g. spills from the works could affect the water quality of the river so Pollution measures to be followed.
Reptiles	Moderate	If reptiles are present, there is a risk of individual killing or injury during the proposed works. The scale of the works is unlikely to impact the local population. However, a method statement for site clearance works will reduce the risk further. Reptiles are protected under the Wildlife and Countryside Act 1981 (as amended).
White-clawed Crayfish	Moderate	The proposed bridge at site B will not directly impact the species as it is designed to avoid any structure in the watercourse and will have a buffer zone either side. Pollution e.g. spills from the works could indirectly affect the water quality of the river so pollution prevention measures to be followed.

Ecological Feature	Ecological Value	Justification
		White-clawed crayfish are protected under the Salmon and Freshwater Fisheries Act 1975, the Habitats regulation 2017 and the Wildlife and Countryside Act 2017 (as amended).
Water Vole	Moderate	Potential destruction and disturbance to water voles and their burrows during works on banks, vegetation clearance. Water voles are protected under the Wildlife and Countryside Act 1981 (as amended).
Red Squirrel	Low	Potential risk of destroying active squirrel drey if present in tree to be felled.
Badger	Moderate	Moderate risk of disturbing a badger sett if present on or near site, if within 30m of works areas.
Birds	High	Potential disturbance and loss of bird nests due to clearance if the works are carried out within the nesting bird season (March to August inclusive). Including Schedule 1 species kingfisher *Alcedo atthis* Active bird nests are protected under the Habitats regulation 2017 and the Wildlife and Countryside Act 2017 (as amended).
Migratory Fish	Moderate	The proposed bridge at site B will not directly impact the species as it is designed to avoid any structure in the watercourse and will have a buffer zone either side. Pollution e.g. spills from the works could indirectly affect the water quality of the river so pollution prevention measures to be followed. Fish are protected under the Salmon and Freshwater Fisheries Act 1975

5.3 Input into the Design Process

In order to minimise the potential impacts of the proposals upon the key ecological interests of the site, namely the river and deciduous woodland, the proposals will ensure that the river will be unaffected by the development works and that minimal impact (ie tree removal) on will be carried out on the deciduous woodland.

5.4 Impact Assessment

Based on the current proposed development plans shown in Figures 2, 3 and 4, the development will potentially have the following impacts upon the ecological interests of the site:

- Felling of trees may result in loss of bat roosts and therefore have a High impact.

- The works could have a Moderate impact on otters and badgers due to the disturbance cause by the works.
- The works could have a Moderate impact on water vole due to the disturbance cause by the works.
- The works could have a Moderate impact on nesting birds due if the works are carried out within the nesting bird season (March to August, inclusive).
- Loss of deciduous woodland habitat would be Low due to the possibly impact areas being small and the retention of connectivity within the woodland.
- Loss of foraging habitat for bats would be Low due to the retention of the remaining woodland.

6. Mitigation and Compensation Strategy

The following measures will be implemented in order to minimise the ecological impacts of the proposals, including the risk of protected species being adversely affected:

- It is recommended where possible that any veteran trees or trees with bat roost potential are retained.
- Bat boxes placed on younger trees along the woodland edge which currently have no bat roosting features. The bat boxes should be long lasting trees with a lifespan over 20 years, be placed within the tree between 4 to 6 metres and on a south or south-western aspect. An example of suitable bat boxes includes 2F Schwegler Bat Box.
- The natural vegetation on either side of the river must be retained where possible.
- Restrict bank management to small areas and work on one bank at a time.
- No additional lighting should be included in the development proposal. During the works, any additional lighting should be restricted to 30 minutes after sunrise to 30 minutes prior to sunrise.
- The bridge design should consider the use of the river by foraging and commuting bats. An external bat box could be installed onto the bridge in order to provide roosting opportunities for bats.
- Any brash / timber piles created will be situated in the retained areas of habitat for use as shelter by hedgehogs or other mammals. If brash / timber piles are left or are present on site, these will be checked by hand in order to determine that no hedgehogs or other mammals are sheltering within before mechanical movement.
- Works will be carried out under a method statement to avoid pollution of aquatic habitats, see Appendix H.
- No works will be undertaken until a species-specific pre-construction badger, water vole and otter inspection is undertaken within the month prior to the start of works, in order to prevent disturbance or destruction to an active sett that may be built in the intervening period before works take place.
- It is advised that the works avoid the bird nesting season, however if the works will be undertaken between March and August, then a nesting bird pre-construction check must be carried out prior to the works commencing.
- If the works will be undertaken between February and September, then a red squirrel drey pre-construction check must be carried out within one month prior to the works commencing.

- Where any trenches / excavations greater than 0.5m deep are created these will be closed overnight where possible. Alternatively, one side will be cut at no more than a 45º angle, or a plank large enough for a person to walk up will be installed overnight to provide any wildlife which may fall in with an escape route. All such excavations will be checked for wildlife prior to the recommencement of works each morning.

- Bird boxes could be included within the woodland. The boxes would ideally be placed over 2m high on a tree between north and east with a clear flight path to the nest box entrance. An example of a suitable nest box would be the Woodcrete by Schwegler 32mm nestbox.

- The proposed works would require permission from Natural England. David Clayton is responsible for Raincliffe & Forge Valley Woods SSSI NNR (Unit ID: 102682).

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Appendix A – Key Legislation

Table A1: Overview of Key Legislation

Legislation	Key Features
The Conservation of Habitats and Species Regulations 2017 (The Habitats Regulations)	The Habitat Regulations transpose *Council Directive 79/409/EEC on the Protection of Wild Birds* (the EC Birds Directive 1979) and *Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna* (the EC Habitats Directive 1992) into UK law. The Birds Directive was amended in 2009, becoming Directive 2009/147/EC. The Habitat Regulations make it an offence (with certain exceptions) to deliberately capture, disturb, kill or trade in those animal species listed in Schedule 2, or to pick, cut, uproot, collect, destroy or trade in those plant species listed in Schedule 4. The EC Birds Directive requires member states to establish and monitor Special Protection Areas (SPAs) for all rare or vulnerable species included in Annex I, as well as for all regularly occurring migratory species, with key focus on wetlands of international importance. Annex I and II of the Habitats Directive respectively list those habitats and species for which a similar network of sites – Special Areas of Conservation (SACs) – must be established and monitored. Collectively, SPAs and SACs form a network of pan-European protected areas which are referred to as 'Natura 2000' sites.
The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (Bern Convention)	The Bern Convention was adopted in 1979 and ratified by the UK Government in 1982. The principal aims of the Convention are to ensure the conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species). Members of the European Community meet their obligations via the Birds Directive and the Habitats Directive. These are transposed into UK law by the Wildlife and Countryside Act 1981 (as amended), Nature Conservation (Scotland) Act 2004 (as amended), Wildlife (Northern Ireland) Order 1985, and the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985.

Legislation	Key Features
The Wildlife and Countryside Act 1981 (as amended)	The Wildlife and Countryside Act consolidates and amends existing national legislation to implement the requirements of the Bern Convention and the Birds Directive throughout Great Britain. The Act is the primary UK mechanism for the designation of statutory ecological sites - Sites of Special Scientific Interest (SSSIs) - and the protection of individual species listed under Schedules 1, 2, 5, 6 and 8 of the Act, each of which is subject to varying levels of protection. Schedule 9 of the Act also lists those plant species which it is an offence to plant or otherwise cause to grow in the wild, while Schedule 14 prevents the release into the wild or sale of certain plant and animal species which may cause ecological, environmental or socio-economic harm.
Natural Environment and Rural Communities Act 2006	The NERC Act places a duty on public bodies to consider and conserve biodiversity through the exercise of their functions and includes a range of measures to strengthen the protection of both habitats and wildlife. The Act makes provision in respect of biodiversity, pesticides harmful to wildlife, protection of birds and invasive non-native species.
The Countryside and Rights of Way (CRoW) Act 2000	The CRoW Act, which applies to England and Wales only, strengthens the provisions of the Wildlife and Countryside Act 1981 (as amended), both in respect of protected species and statutory ecological sites, the latter primarily relating to the management and protection of SSSIs. It also provides for better management of Areas of Outstanding Natural Beauty (AONBs). The Act places a statutory obligation on public bodies to further the conservation of biodiversity through the exercise of their functions, thereby providing a statutory basis to the Biodiversity Action Plan (BAP) process. Section 74 of the Act lists those habitats and species of principal importance in England.
The Wild Mammals (Protection) Act 1996	This Act provides protection for wild mammals from acts of cruelty. An offence is committed if any person mutilates, kicks, beats, nails, or otherwise impales, stabs, burns, stones, crushes, drowns, drags or asphyxiates any wild mammal with intent to inflict unnecessary suffering.
The Protection of Badgers Act 1992	This consolidates the existing legislation relating to the protection of badgers, and makes it an office in England and Wales to wilfully kill, injure or take a badger (or attempt to do so) and affords protection to both the animals themselves and their setts.

Legislation	Key Features
Hedgerow Regulations 1997	The Hedgerow Regulations are intended to protect important countryside hedgerows from destruction or damage in England and Wales.

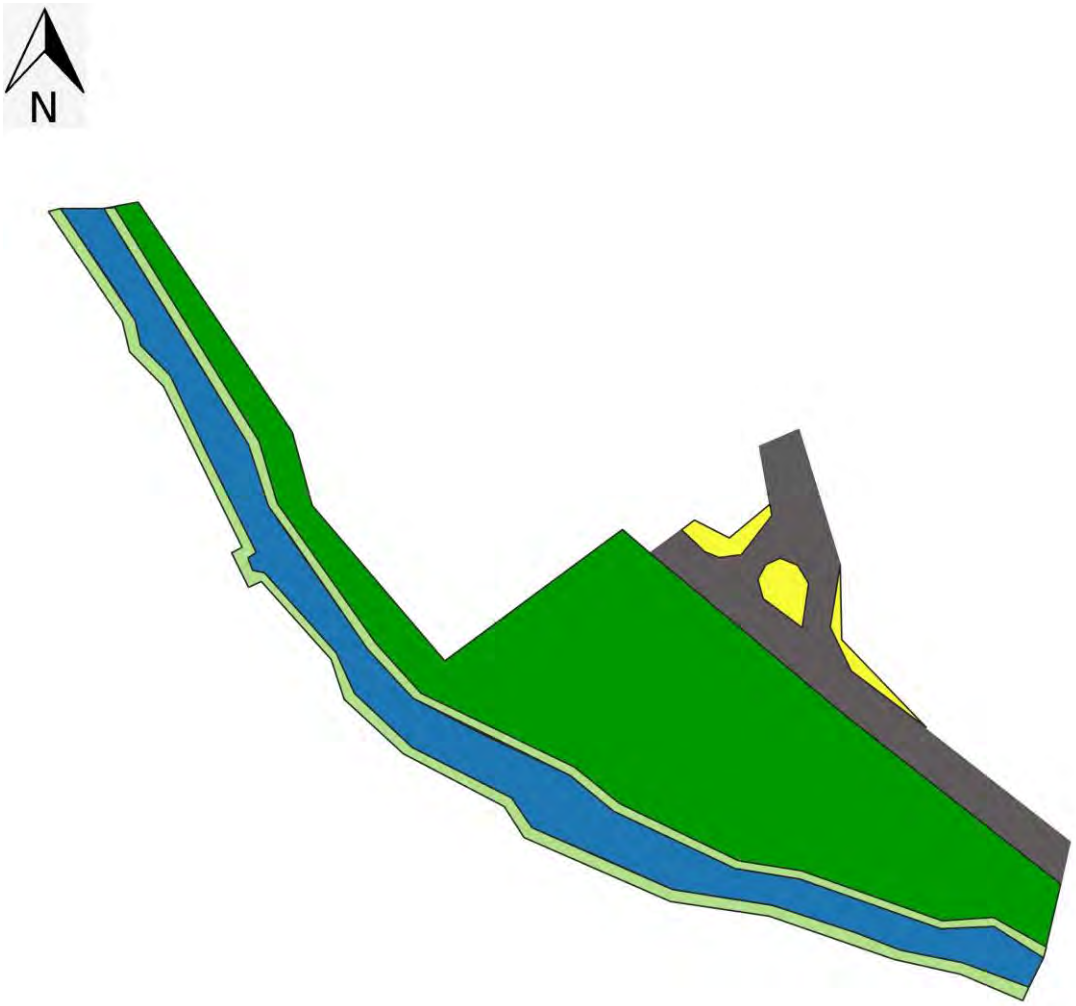
Table A2: Overview of Key Protected Species Legislation and Protection

Species	Key Legislation and Protection
Bats	All European bat species are protected in Britain under the Habitat Regulations 2017. All British bat species are included on Schedules 5 and 6 of the Wildlife and Countryside Act 1981 (as amended) and the whole of Section 9 applies to European bat species. The above collectively prohibits the following: • Deliberately or recklessly capturing, injuring, taking or killing of a bat • Deliberately or recklessly harassing a bat • Intentionally or recklessly disturbing of a bat in its place of rest (roost), or which is used for protection or rearing young • Deliberately or recklessly damaging, destroying or obstructing access to any resting place or breeding area used by bats • Deliberately or recklessly disturbing a bat in any way which is likely to significantly affect the local populations of the species, either through affecting their distribution or abundance, or affect any individuals' ability to survive, reproduce or rear young • Possession or advertisement/sale/exchange of a bat (dead or alive) or any part of a bat Bats are also protected by the Wild Mammals (Protection) Act 1996. Licenses are issued by Natural England for any works which may compromise the protection of European protected species, including bats. This license is required irrespective of whether the works require planning permission. Selected species are also listed in the UK BAP.
Great Crested Newt	Great crested newts receive the same levels of protection under British and European law as is afforded to bats (see above). Great crested newts are included on the UK BAP.
Otter	Otter are protected under British and European law, receiving the same level of protection as bats (see above). Otter are also listed as a priority species in Appendix II of the Bern Convention. Otter are included on the UK BAP.
Freshwater Pearl Mussel	Freshwater pearl mussels are protected under Schedule 5 of The Wildlife and Countryside Act 1981 (as amended), which make it an offence to:

Species	Key Legislation and Protection
	• Intentionally kill, injure or take the species • Intentionally or recklessly damage, destroy, or obstruct access to any place used by the species for shelter or protection, or to disturb the species while they are using such a place The species is also included in Appendix III of the Bern Convention and is listed on the UK BAP.
Reptiles	Common reptiles (grass snake, adder, common lizard and slow-worm) receive partial protection under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to: • Intentionally or recklessly kill or injure these species • Sell, offer or advertise for sale, possess or transport for the purposes of sale these animals, whether alive or dead, or any part thereof In addition, smooth snake and sand lizard are also protected under the Habitat Regulations 2017, which makes it an offence to: • Intentionally or recklessly kill, injure, capture, disturb or handle these species; • Intentionally or recklessly damage or destroy any place used by these species for shelter, protection, resting or breeding; and • Intentionally or recklessly obstruct access to any place used for shelter, protection, resting or breeding by these species. All 6 species of native reptile are listed on the UK BAP.
White-clawed Crayfish	White-clawed crayfish are partially protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to: • Take white-clawed crayfish • Sell, possess or transport white-clawed crayfish for the purpose of sale • Advertise the buying or selling of white-clawed crayfish The species is also protected under the Habitats Directive, being listed under Annex II and V, and is included on the UK BAP.
Water Vole	Water voles are protected under Schedules 5 and 6 of the WCA 1981 (as amended). This makes it an offence to: • Intentionally kill, injure or take water voles • Possess or control the species • Damage or destroy any place used by water vole for shelter or protection • Disturb water vole while they occupy such places of shelter • Sell, possess or transport water vole for the purpose of sale • Advertise the buying or selling of water vole

Species	Key Legislation and Protection
	The species is also protected under the Wild Mammals (Protection) Act 1996 and is listed on the UK BAP.
Red Squirrel	Red squirrels are protected under Schedules 5 and 6 of the WCA 1981, receiving the same level of protection as water vole. The species is also protected under the Wild Mammals (Protection) Act 1996 and listed on the UK BAP.
Badger	Badger are protected under the Protection of Badgers Act 1992, which makes it an offence to: • Knowingly kill, capture, injure or disturb any individual • Intentionally damage or destroy a badger sett, or any part thereof • Obstruct access to an area which is used for breeding, resting or shelter • Disturb a badger while it is using any place used for breeding, resting or shelter The species is also protected by the Wild Mammals (Protection) Act 1996 and receives partial protection through inclusion on Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).
Birds	With the exception of some species listed on Schedule 2, the majority of bird species are protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to intentionally or recklessly: • Kill, injure or take any wild bird • Take, damage or destroy any nest which is in use or being built • Take, damage or destroy the eggs of any such bird Additional protection against disturbance at the nest is also afforded to any bird species listed on Schedule 1 of the Act. Selected bird species are also listed on the UK BAP.
Migratory Fish	Atlantic salmon and sea trout are protected under the Salmon and Freshwater Fisheries Act 1975, supplemented by the Salmon Act 1986. Both species also listed under the EC Habitats Directive 1992, Annexes IIa and V. All three species of lamprey receive a degree of legal protection, being listed under Annexes Iia and Va of the Habitats Directive. The conservation of species listed under Annex II of the Habitats Directive requires the designation of Special Areas of Conservation. Species listed under Annex V of the Directive are also considered to be of community interest and their taking in the wild and exploitation may be subject to management measures. River and sea lampreys, Atlantic salmon, European eel and brown/sea trout are listed on the UK BAP.

Appendix B – Phase 1 Habitat Map Sites A, B & C



Key

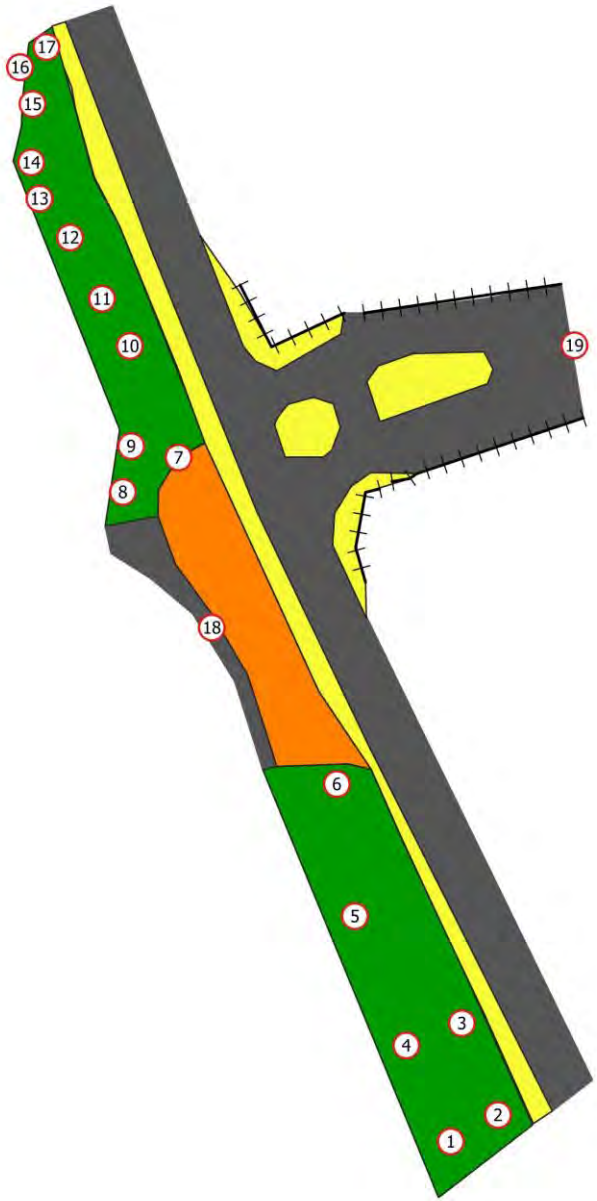
- Marginal Habitat
- Waterbody
- Woodland
- Semi-Improved Grassland
- Hard Standing

eco NORTH
Ecological Consultants

Client	Fairhurst
Project	ECN18 218 Forge Valley
Title	Figure 6: Phase 1 Habitat Map of Site B

Drawing No	Date	Drawn	Chkd
1	31/05/19	SHG	JT

EcoNorth
11 Enterprise Court,
Cramlington, Northumberland, NE23 1LZ



Key

- Target Point
- Fenceline
- Semi-Improved Grassland
- Tall Ruderal
- Woodland
- Hard Standing

eco NORTH
Ecological Consultants

Client

Fairhurst

Project

ECN18 218 Forge Valley

Title

Figure 7: Phase 1 Habitat Map of Site C

Drawing No	Date	Drawn	Chkd
1	31/05/19	SHG	JT

EcoNorth
11 Enterprise Court,
Cramlington, Northumberland, NE23 1LZ

Appendix C – Target Notes

Table C1: Target Notes Relating to Phase 1 Habitat Map C (see Appendix B)

Number	Description
1	Low bat potential horse chestnut tree.
2	Low bat potential horse chestnut tree.
3	Low bat potential horse chestnut tree.
4	Moderate bat potential horse chestnut tree.
5	Low bat potential horse chestnut tree.
6	Low bat potential horse chestnut tree.
7	Low bat potential horse chestnut tree.
8	Low bat potential horse chestnut tree.
9	Maple tree of negligible bat potential.
10	Low bat potential horse chestnut tree.
11	Moderate bat potential tree.
12	Moderate bat potential tree.
13	Negligible bat potential tree.
14	Moderate bat potential tree.
15	Low bat potential tree.
16	Low bat potential tree.
17	Low bat potential tree.
18	Deadwood log.
19	Deadwood log.

Appendix D – Site Photographs

Photo 1: Tall ruderal vegetation	Photo 2: Target Note 18
	
Photo 3: Mixed deciduous woodland	**Photo 4: River Derwent**
	
Photo 5: Target Note 19	**Photo 6: Site C car park**
	

Appendix E – Value of Ecological Receptors

Table E1: Examples of Ecological Receptors of Differing Value

Value	Examples
International	• An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, pSAC, Ramsar site) or an area which meets the designation criteria for such sites. • Internationally significant and viable areas of a habitat type listed in Annexe 1 of the Habitats Directive, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole. • Any regularly occurring, globally threatened species. • A regularly occurring population of an internationally important species, which is threatened or rare in the UK, of uncertain conservation status. • A regularly occurring, nationally significant population/number of any internationally important species.
National	• A nationally designated site (e.g. SSSI, NNR) or a discrete area which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified. • A viable area of a UK BAP priority habitat, or smaller areas of such habitat which are essential to maintain the viability of a larger whole. • A regularly occurring significant number/population of a nationally important species e.g. listed on the Wildlife and Countryside Act 1981 (as amended). • A regularly occurring population of a nationally important species that is threatened or rare in the county or region. • A feature identified as being of critical importance in the UK BAP.
Regional/County	• Viable areas of key habitat identified in the Regional or County BAP or smaller areas of such a habitat, which are essential to maintain the viability of the larger whole. • Regional/county significant and viable areas of key habitat identified as being of regional value in the appropriate English Nature (now Natural England) Natural Area. • A regularly occurring significant population/number of any important species important at a regional/county level. • Any regularly occurring, locally significant population of a species which is listed in a Regional/County Red Data Book

Value	Examples
	or BAP on account of its regional rarity or localisation. • Sites of conservation importance that exceed the district selection criteria but that fall short of SSSI selection guidelines.
City/District/Borough	• Areas of habitat identified in a District/City/Borough BAP or in the relevant Natural Area profile. • Sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on District/City/Borough ecological criteria. • Sites/features that are scarce within the District/City/Borough or which appreciably enrich the District/City/Borough habitat resource. • A diverse and/or ecologically valuable hedgerow network. • A population of a species that is listed in a District/City/Borough BAP because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation. • A regularly occurring, locally significant number of a District/City/Borough important species during key phases of its life cycle.
Local	• Areas identified in a Local BAP or the relevant natural area profile. • Sites/features which area scarce in the locality or which are considered to appreciably enrich the habitat resource within the local context, e.g. species-rich hedgerows. • Local Nature Reserves selected on Parish/Local ecological criteria. • Significant numbers/population of a locally important species e.g. one which is listed on the Local BAP. • Any species, populations or habitats of local importance.
Low	• Habitats of moderate to low diversity which support a range of locally and nationally common species, the loss of which can be easily mitigated.

Appendix F – Protected and Notable Species Identified by the Desk Study

Table F1: Protected Species Records within 2km

Species	Number of Records	Most Recent Record	Within Forge Valley?	Level of Protection		
				HR 2017	WCA 1981	NERC /UK BAP
Eurasian Badger	1	2018	Yes	☐	☒	☐
Myotis sp.	1	2017	No	☒	☒	☒
Noctule	4	2017	No	☒	☒	☐
Common pipistrelle	4	2017	No	☒	☒	☐
Soprano pipistrelle	3	2017	No	☒	☒	☒
Brown long-eared	1	2017	No	☒	☒	☒

Key

HR 2017 – The Conservation of Habitats and Species Regulations 2017

WCA 1981 – The Wildlife and Countryside Act 1981 (as amended) (Bird species listed relate solely to those included on Schedule 1)

NERC – The Natural Environment and Rural Communities Act 2006

UK BAP – UK Biodiversity Action Plan

Appendix G – HSI Results

Waterbody	Waterbody 1
Grid Reference	SE 98909 85072
Location	1
Area of Open Water (m^2)	1
Permanence (years/10 it dries out)	0.1
Water Quality	0.33
Shade (%)	1
No. of Wild/Water-fowl	0.67
Fish	1
Ponds within 1km	0.1
Terrestrial Habitat within 0.5km (ha)	0.67
Macrophyte Cover (%)	0.9
HSI Score	0.516
Quality	Below Average

Appendix H – Method Statement

Outline Sediment Pollution method statement
• Chemicals should not be used during the construction work. • Ensure sediment/pollution prevention control methods are in place: o Straw bales used where hydrological connections to water bodies off site are identified. o No refuelling within 10 m of any watercourse / waterbody. o Spill kits available at all times. o Plant nappies for all plant used on site. o Sediment barriers will be installed surrounding extensive excavation or tree clearance areas.

Site Clearance
• A toolbox talk will be provided by a Suitably Qualified Ecologist (SQE) to all site personnel (including clearance, construction and sub-contractors) to raise awareness of wildlife potentially present and legislative requirements. • Removal of vegetation in stages. Reduce ground vegetation to 10cm in height initially, then remove all vegetation in order to reduce the possibility of impacting wildlife.

Outline Felling method statement
• Felling of trees/shrubs, clearance of dense vegetation should be avoided during the bird nesting season (March to August inclusive). • A toolbox talk will be provided to all site personnel (including clearance, construction and sub-contractors) by a SQE prior to work commencing on site.

- All trees with Bat roosting Potential (BRP) will be subject to updated inspections for roosting bats immediately prior to soft-felling (subject to results of tree inspection).
- Works will be subject to an inspection for breeding birds immediately prior to works by a SQE.
- Should active bird nests be found in trees that are to be cleared, removal of the relevant tree(s) will not be undertaken until a SQE has confirmed that the nest is no longer active.
- All trees with BRP will be soft felled in sections.
- All felling will be directional and avoid damage to adjacent trees.

Appendix 2:

Eco North ECN18 218

Protected Species Survey

Protected Species Survey

Forge Valley, Scarborough

July 2019

Final Report

Report Prepared For:

Fairhurst
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Project Ref:	ECN18 218
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Date:	17/07/19

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Ecological Consultants

Document Control

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
Draft V01	12/07/19	Draft to client	Not Confidential	SH	CS	JT
Final V01	17/07/19	Final to client	Not Confidential	-	-	-

Field Investigations and Data

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by EcoNorth Ltd. for inaccuracies in the data supplied by any other party.

Declaration of Compliance

"The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed within this document are our true and professional bona fide opinions."

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Contents

Summary

EcoNorth Ltd. was commissioned by Fairhurst (henceforth referred to as 'the client') to undertake protected species surveys of three sites within Forge Valley, near East Ayton in Scarborough, following a Phase 1 habitat survey carried out in June 2019. The surveys were undertaken by Ecologist Sarah Hawes GradCIEEM, Assistant Ecologist Laura Parsons and Intern Ecologist Tom Wilson on 26th to 27th June 2019. The client proposes to replace an 18-year-old 2.3km wooden boardwalk at Site A, construct a new footbridge across the River Derwent onto the boardwalk at Site B and to expand the car park, including disabled parking at Site C.

Site A is within Raincliffe & Forge Valley Woods SSSI and NNR, and Sites B and C lie partially within the SSSI/NNR. The survey was designed to determine the potential suitability of the site for protected species (specifically roosting bats, otter and water vole), to assess the potential impacts upon the ecological interests of the site.

The desk study completed prior to the field visit highlighted the presence of 10 statutory and 5 non-statutory sites within 2km of the site boundary, and also identified the presence of badger within the site, and several species of bat, including common pipistrelle, soprano pipistrelle, noctule, brown long-eared and *Myotis* sp. within 2km of the site boundary.

The following table summarises the results of the protected species surveys. Necessary mitigation measures are provided in Section 7. The client is happy to commit to the implementation of the measures detailed within this report and is aware that these are likely to be made a condition of any planning consent which may be granted.

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
Trees assessed for bat roosting potential at Site B	Good quality foraging habitat for bats within the woodland, along the woodland edge and the river. Value limited by the small area to be affected Bird nesting opportunities within trees.	Low to local	No	If any changes occur to the plan which will impact any trees not currently identified for removal, then those trees will require further assessment. Clearance works will not commence during the bird nesting period (March – August inclusive) unless checking surveys have confirmed no active nests are present within the 5 days prior
Otter	The only sign recorded was a potential otter slide. There is suitable foraging habitat present on all three sites.	Low to local	No	Pre-work check to be carried out within a month prior to the works commencing. Works to be undertaken under a Method Statement.

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
Water Vole	One water vole burrow was recorded along the bank of Site B. There is suitable foraging and habitat for burrow creation present on all three sites.	Low to local	No	Pre-work check to be carried out within a month prior to the works commencing. Works to be undertaken under a Method Statement.

1. Introduction

1.1 Background

EcoNorth Ltd. was commissioned by Fairhurst (henceforth referred to as the client) to undertake a protected species survey of three sites within Forge Valley, near East Ayton in Scarborough, following the Phase 1 habitat survey carried out in June 2019 (central grid reference Site A: SE 98480 87099, Site B: SE 98749 85874, Site C: SE 98916 85657). The sites are referred to as plans A, B and C in Figure 1 below. The client proposes to replace an 18-year-old 2.3 km wooden boardwalk at Site A, construct a new footbridge across the River Derwent on to the boardwalk at Site B, and to expand the car park including disabled parking at Site C. All three sites are located within Raincliffe & Forge Valley Woods Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). The survey was designed to determine the presence/absence of the site for protected species.

This report:

- Sets out the results of the survey
- Analyses all three Site's value for otter and water vole
- Assesses trees identified for removal within Site B for bat roosting potential
- Identifies key avoidance, mitigation and/or compensation measures required to ensure the proposals do not have an adverse impact upon biodiversity

1.2 Site Context

The three sites surveyed are within Forge Valley, north of East Ayton, near Scarborough, North Yorkshire. The River Derwent runs parallel to Seavegate Road and through the Forge Valley woodland. Almost the entirety of Forge Valley lies within North York Moors National Park. To the south of the sites is the village of East Ayton and to the north, east and west lie agricultural fields bordered by hedgerow and areas of woodland.

Figure 1 identifies the location and extent of the development sites.

Figure 1: Survey Areas (Boundary outlined in red)

1.3 Nature of the Proposals

The client proposes to extend the car park northwards from the original car park at Site A. At Site B, a new bridge is proposed as well as the felling of trees and clearance of

vegetation in order to incorporate a new car park on the western side of the road. Site C will have a new path created, retaining the trees on site.

Further details can be found in Forge Valley PEA Report (EcoNorth, 2019a).

Figures 2, 3 and 4 show the proposals for the three sites.

Figure 2: Proposals for Site A

Figure 3: Proposals for Site B

Figure 4: Proposals for Site C

2. Planning Policy and Legislation

2.1 Planning Policy and Guidance

A series of national and local planning policies are in place which are designed to ensure that development works do not have an adverse impact upon biodiversity, at a site or wider level. Such policies ensure that both developers and public bodies must give due consideration to the potential effects of development works upon both ecological receptors (in line with existing wildlife legislation) and biodiversity.

2.1.1 National Planning Policy Framework (NPPF) (2019)

The NPPF outlines the Government's policies through the planning process, acting as guidance for local planning authorities and decision-makers. The document places a duty on local authorities to consider the principles included when assessing planning applications and preparing Local Plans and Regional Spatial Strategies. Chapter 15 relates to the conservation and enhancement of the natural environment, in line with existing wildlife legislation. Further details are provided on the gov.uk website.

2.1.2 Biodiversity Action Plans (BAPs)

The UK BAP was published in 1994 to guide national strategies for the conservation of biodiversity. BAPs were designed to ensure the conservation and re-establishment of natural habitats, and that measures were implemented to aid the conservation and enhancement of habitats and species of local importance, the latter through the development of Local BAPs. The UK BAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in 2012 however, the lists of species and habitats of conservation importance are still considered to remain a valuable tool for identifying features of local and national conservation concern. As such, the potential presence of both Local and UK BAP habitats and species were considered throughout the surveys and assessment.

2.2 Legislation

2.2.1 Protected Species and Sites

A range of legislation is in place to ensure that habitats and species of conservation importance are protected from both direct and indirect harm. Key legislation includes:

- The Conservation of Habitats and Species Regulations 2017 (The Habitat Regulations)
- The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (The Bern Convention)
- The Wildlife and Countryside Act 1981 (as amended)

- The Natural Environment and Rural Communities (NERC) Act 2006
- The Countryside and Rights of Way (CRoW) Act 2000
- The Wild Mammals (Protection) Act 1996

An overview of the above legislation is provided in Appendix A.

SSSIs are protected in England under the Wildlife and Countryside Act 1981 (as amended).

The potential presence, on or near the site, of species afforded protection under the above legislation was considered throughout the surveys and assessment. Species considered include:

- Bats
- Otter *Lutra lutra*
- Water vole *Arvicola amphibius*

An overview of the legislation and level of protection relating to such species is provided in Appendix A.

3. Methodology

3.1 Desk Study

Contextual information was gathered as part of a desk study undertaken prior to the start of field surveys. Such information can identify protected or notable species which may occur on the proposed development site or in the local area, as well as identifying statutory and non-statutory ecological sites which may have the potential to be affected by the proposals. Species records and the location of statutory and non-statutory nature conservation sites within 2km of the survey site were requested from North & East Yorkshire Ecological Data Centre (NEYEDC) and from the Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk). Details of designated sites are presented in the Phase 1 Habitat Survey for the Forge Valley sites (EcoNorth, 2019a).

It should be noted that an absence of records is likely to reflect an absence of survey data and cannot be taken as confirmation that a particular species is not present in the site or surrounding area.

3.2 Field Survey

3.2.1 Otters

A species-specific otter survey was undertaken on 27th June 2019, in order to determine the presence/absence of the species within the sites. The survey included searches for spraint, jelly, paths, footprints, feeding remains, couches/lying-up sites and holts, as well as sightings of otters. The length of the watercourses were walked in order to search for such field signs and checks were made of any areas of standing water which may also be suitable for use by the species. The otter survey methodology is based on Chanin 2003a and 2003b.

3.2.2 Water Voles

The watercourse identified through the phase 1 survey as having the potential to support water vole were subject to a species-specific survey on 27th June 2019. This survey was designed to provide further detail on the suitability of such features for water vole and to determine the presence or absence of the species within the site or adjacent areas. Field signs searched for included droppings, latrines, feeding stations/remains, lawns, nests, footprints, runways, burrows and sightings of the animals themselves. A characteristic 'plop' noise is often typically heard when water voles enter the water, which can also be used as an indication of the presence of the species at a site. The water vole survey methodology is based on Strachan and Moorhouse 2006.

3.2.3 Preliminary Bat Roost Assessment / Field Sign Survey

An assessment was made of the suitability of the trees within the site to support roosting bats on 26th June 2019. Each tree was inspected, and notes made of the species, approximate height, diameter at breast height (DBH) and any features which provide potential bat roost sites e.g. holes, splits in the trunk or limbs, flaking bark, areas covered by ivy. Each tree was inspected from the ground using binoculars and a high-powered torch (Clulite CB2) with higher areas accessed by climbing. The survey was undertaken in accordance with BCT guidelines (Collins, 2016).

Where any field signs indicating the presence of bats, or bats themselves were recorded, a note was made of the location of the roost. Where roosts were not confirmed, each tree was classed as negligible, low, moderate or high suitability, based on the potential for such features to be present.

The layout of trees within the site is shown in Appendix B, with site photographs provided in Appendix D.

3.2.4 Survey Conditions and Personnel

The bat roost assessment of the trees was carried out on 26th June 2019 by Ecologist Sarah Hawes BSc (Hons) MSc GradCIEEM and Thomas Wilson BSc (Hons) MSc. The water vole and otter surveys were carried out on the 27th June 2019 by Sarah Hawes BSc (Hons) MSc GradCIEEM and Laura Parsons BSc (Hons) MSc GradCIEEM. Details of the team's experience are available at https://www.econorth.co.uk/who-we-are/team/

Table 2 shows the conditions during the survey.

Table 2: Survey Conditions

Date	Precipitation	Temperature (°C)	Cloud Cover (Octas)	Wind (Beaufort Scale)
26/6/19	Brief scattered showers	11.0	6/8	1
27/6/19	None	16.0	0/8	1

Any constraints or limitations to the survey are discussed in Section 6.1.

4. Results

4.1 Desk Study

4.1.1 Designated Sites

Designated sites were outlined within the previous ecological report (EcoNorth, 2019a). No sites within 2km of the three development areas were specifically designated for the purpose of protecting bats, otters or water voles.

4.1.2 Protected and Notable Species

Bats were identified through the desk study as having been recorded within 2km of the three survey boundaries within the last 10 years. This includes *Myotis* sp., common pipistrelle *Pipistrelleus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus,* noctule *Nyctalus noctula*, and brown long-eared bat *Plecotus auritus*.

No water voles or otters were recorded within 2km of the sites within the last 10 years, within data held by the local records center.

Further information for these species is provided in Appendix E.

For all protected and notable species records, refer to previous ecological report, EcoNorth 2019a.

4.2 Field Survey

4.2.1 Bat Roost Assessment of Trees at Site B

The trees at Site B identified for removal have negligible potential to support roosting bats. There is one large mature tree directly to the south of the site which has high roost potential due to its size, which will be retained through the proposals (see figure in Appendix B).

Further information of the tree assessments is provided in Appendix F.

4.2.2 Habitat

Along the Derwent riverbank there was disturbance from a public footpath to the west of the river, as well as dog walkers and fishing activities.

The river current was fast with a bank profile which varied from steep (>45º) to shallow (<45º). The width of the river varied between 2-10m and depth between <0.5 to 2m. Within some areas along the river the vegetation had grown to such an extent that access and view of the bank was prevented. The river is relatively fast flowing. Most of the habitat bordering the river was grassland, marginal habitat and broad-leaved woodland.

4.2.3 Otters

One potential otter slide was recorded (see Figure in Appendix B) on the bank adjacent to the works area at Site B. The habitat along the river is considered suitable for otters, providing potential foraging areas and sheltered rest sites.

No evidence of otter activity was recorded during the initial extended phase 1 survey, or during the subsequent species-specific survey at Sites A and C.

4.2.4 Water Voles

One water vole burrow was recorded on the bank of Site B however, no further signs indicating the presence of the species (runs, latrines, feeding remains etc) were recorded. Although the habitat along the river is considered suitable for water vole, the lack of additional field signs indicates that the burrow may no longer be active.

No evidence of water vole activity was recorded during the initial extended phase 1 survey, or during the subsequent species-specific survey at Sites A and C.

5. Interpretation and Discussion

5.1 Survey Constraints and Further Survey Requirements

Due to the time of year, the vegetation height made it difficult to view potential features along sections of the river banks. In spite of this, evidence of protected species was noted and it is considered that if any significant features e.g. otter holts were present, these would have been identified through the surveys. The assessment has been based on a reasonable worst-case scenario and professional judgement, in line with the habitats and field signs recorded. No further surveys are therefore considered to be necessary prior to the submission of the planning application.

5.2 Assessment of Value

Based on the results of the desk study and field surveys, the habitats within and immediately adjacent to the sites are considered to be of Low-Local value to otter, providing foraging habitat and potential commuting routes and rest sites for the local population.

The sites are also considered to be of Low-Local value to water vole, with a single burrow identified, but with no other field signs recorded.

The trees identified at Site B for removal are considered to be of negligible roosting value to bats. The area has highpotential to be used by foraging and or commuting bats however, the small size of the area to be affected / limited number of trees to be removed is considered to limit the potential value of the works area to the local bat population; the area to be affected is therefore considered to be of low value to foraging and commuting bats, given the abundance of habitats of a similar or higher quality in the local area.

5.3 Input into the Design Process

In order to minimise the potential impacts of the proposals upon the key ecological interests of the site, namely otter and water vole, the proposals will ensure that marginal habitat and riverbanks are retained through the proposed works.

5.4 Impact Assessment

Based on the current proposed development plans shown in Figures 2, 3 and 4, the development will potentially have the following impacts upon the ecological interests of the site in the absence of mitigation:

- The loss and / or disturbance of habitats of low to local value to otter, water vole and bats during the development phase

- A low risk of the harm or temporary disturbance of otter, water vole or bats during the development phase

6. Mitigation and Compensation Strategy

The following measures will be implemented in order to minimise the ecological impacts of the proposals, including the risk of protected species being adversely affected:

- Works will proceed to a Method Statement to minimise the risk of protected species being affected by the proposals.
- No works will be undertaken until a pre-construction protected species inspection is undertaken within the month prior to the start of works, in order to prevent disturbance or destruction to an active rest site that may be built in the intervening period before works take place. In the event any protected features e.g. an otter couch, are identified at this time, works will not commence until a licence has been granted by Natural England
- No fires will be lit as part of the proposals.
- Any chemicals required during the construction works will be stored in appropriate locked containers located at least 30m from the nearest waterbody/watercourse when not in use. Spill kits will be available on site at all times, with contractors having been given the relevant training on their use prior to the start of works.
- Works will be carried out under a Method Statement to avoid pollution of aquatic habitats, see (EcoNorth, 2019a).
- No night-time works will be undertaken.
- All trenches will be closed overnight to help avoid trapping any wildlife which may fall in. If closure is not possible, either one side will be cut to a 45º angle or planks large enough for a person to walk up will be installed to provide animals with a potential exit route. Any trenches not closed overnight will be checked for protected and notable species each morning, prior to the recommencement of works, to ensure no such species have become trapped inside in the interim. In the unlikely event such species are recorded, works will cease and the project ecologist will be contacted immediately for advice on how to proceed
- Contractors will receive a tool box talk detailing the SSSI designation, potential for and identification of relevant protected species prior to works commencing

- In the unlikely event that protected species are found within the works area during the development phase, works will cease immediately and the project ecologist will be contacted for advice on how to proceed.
- Vegetation (including ground clearance) works will not be undertaken during the bird nesting period (March – August inclusive) unless a checking survey by the project ecologist has shown active nests to be absent within the five days prior. Where active nests are identified, the project ecologist will implement an appropriate buffer zone into which no works will progress until they have confirmed that the nest is no longer active
- No additional lighting will be included in the development proposal or used during the construction works. If lighting is considered necessary at any time, this will not be implemented until an appropriate lighting scheme has been agreed with the project ecologist in order to minimise the risk of disturbing nocturnal wildlife
- Any brash / timber piles created will be situated in the retained areas of habitat for use as shelter by hedgehogs or other mammals. If brash / timber piles are left or are present on site, these will be checked by hand in order to determine that no hedgehogs or other mammals are sheltering within before mechanical movement.
- Works will not commence until permission (SSSI consent) has been granted by Natural England in line worth the requirements of the Wildlife and Countryside Act. David Clayton is responsible for Raincliffe & Forge Valley Woods SSSI and NNR (Unit ID: 102682).
- Bat boxes placed on younger trees along the woodland edge which currently have no bat roosting features. The bat boxes should be long lasting with a lifespan over 10 years, be installed on the tree between 4 to 6 metres and on a south or south-western aspect.
- The natural vegetation on either side of the river will be retained through the works.
- Bank management will be restricted to small areas, with works proceeding on one bank at a time.
- The bridge design will consider the use of the river by foraging and commuting bats. A bat box could be installed onto the new bridge or adjacent trees in order to provide roosting opportunities for bats.
- Bird boxes could be included within the woodland. The boxes would ideally be placed over 2m high on a tree between north and east, with a clear flight path to the nest box entrance.

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Appendix A – Key Legislation

Table A1: Overview of Key Legislation

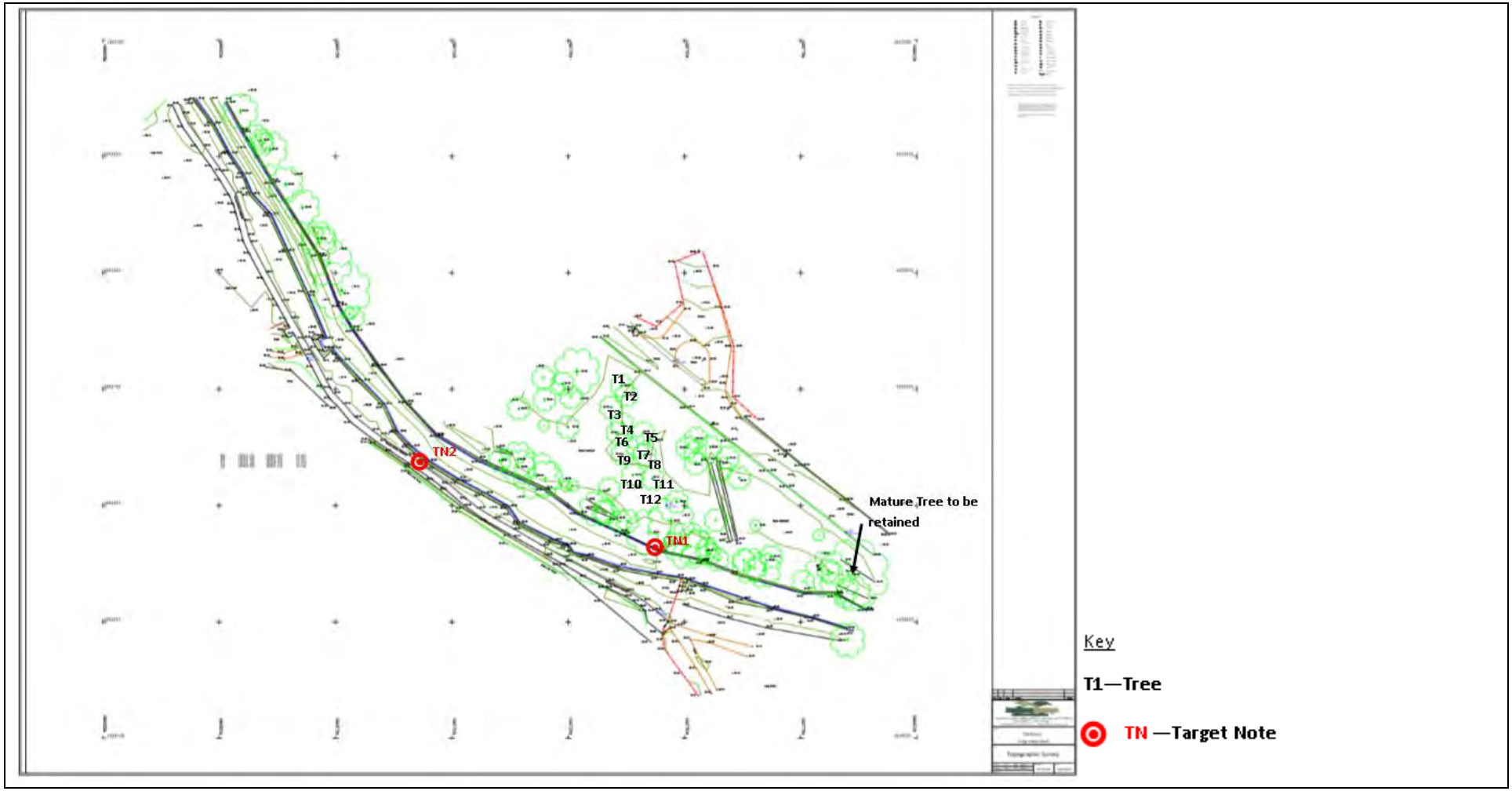
Legislation	Key Features
The Conservation of Habitats and Species Regulations 2017 (The Habitats Regulations)	The Habitat Regulations transpose *Council Directive 79/409/EEC on the Protection of Wild Birds* (the EC Birds Directive 1979) and *Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna* (the EC Habitats Directive 1992) into UK law. The Birds Directive was amended in 2009, becoming Directive 2009/147/EC. The Habitat Regulations make it an offence (with certain exceptions) to deliberately capture, disturb, kill or trade in those animal species listed in Schedule 2, or to pick, cut, uproot, collect, destroy or trade in those plant species listed in Schedule 4. The EC Birds Directive requires member states to establish and monitor Special Protection Areas (SPAs) for all rare or vulnerable species included in Annex I, as well as for all regularly occurring migratory species, with key focus on wetlands of international importance. Annex I and II of the Habitats Directive respectively list those habitats and species for which a similar network of sites – Special Areas of Conservation (SACs) – must be established and monitored. Collectively, SPAs and SACs form a network of pan-European protected areas which are referred to as 'Natura 2000' sites.
The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (Bern Convention)	The Bern Convention was adopted in 1979 and ratified by the UK Government in 1982. The principal aims of the Convention are to ensure the conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species). Members of the European Community meet their obligations via the Birds Directive and the Habitats Directive. These are transposed into UK law by the Wildlife and Countryside Act 1981 (as amended), Nature Conservation (Scotland) Act 2004 (as amended), Wildlife (Northern Ireland) Order 1985, and the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985.
The Wildlife and Countryside Act	The Wildlife and Countryside Act consolidates and amends existing national legislation to implement the requirements of the Bern

Legislation	Key Features
1981 (as amended)	Convention and the Birds Directive throughout Great Britain. The Act is the primary UK mechanism for the designation of statutory ecological sites - Sites of Special Scientific Interest (SSSIs) - and the protection of individual species listed under Schedules 1, 2, 5, 6 and 8 of the Act, each of which is subject to varying levels of protection. Schedule 9 of the Act also lists those plant species which it is an offence to plant or otherwise cause to grow in the wild, while Schedule 14 prevents the release into the wild or sale of certain plant and animal species which may cause ecological, environmental or socio-economic harm.
Natural Environment and Rural Communities Act 2006	The NERC Act places a duty on public bodies to consider and conserve biodiversity through the exercise of their functions and includes a range of measures to strengthen the protection of both habitats and wildlife. The Act makes provision in respect of biodiversity, pesticides harmful to wildlife, protection of birds and invasive non-native species.
The Countryside and Rights of Way (CRoW) Act 2000	The CRoW Act, which applies to England and Wales only, strengthens the provisions of the Wildlife and Countryside Act 1981 (as amended), both in respect of protected species and statutory ecological sites, the latter primarily relating to the management and protection of SSSIs. It also provides for better management of Areas of Outstanding Natural Beauty (AONBs). The Act places a statutory obligation on public bodies to further the conservation of biodiversity through the exercise of their functions, thereby providing a statutory basis to the Biodiversity Action Plan (BAP) process. Section 74 of the Act lists those habitats and species of principal importance in England.
The Wild Mammals (Protection) Act 1996	This Act provides protection for wild mammals from acts of cruelty. An offence is committed if any person mutilates, kicks, beats, nails, or otherwise impales, stabs, burns, stones, crushes, drowns, drags or asphyxiates any wild mammal with intent to inflict unnecessary suffering.

Table A2: Overview of Key Protected Species Legislation and Protection

Species	Key Legislation and Protection
Bats	All European bat species are protected in Britain under the Habitat Regulations 2017. All British bat species are included on Schedules 5 and 6 of the Wildlife and Countryside Act 1981 (as amended) and the whole of Section 9 applies to European bat species. The above collectively prohibits the following: • Deliberately or recklessly capturing, injuring, taking or killing of a bat • Deliberately or recklessly harassing a bat • Intentionally or recklessly disturbing of a bat in its place of rest (roost), or which is used for protection or rearing young • Deliberately or recklessly damaging, destroying or obstructing access to any resting place or breeding area used by bats • Deliberately or recklessly disturbing a bat in any way which is likely to significantly affect the local populations of the species, either through affecting their distribution or abundance, or affect any individuals' ability to survive, reproduce or rear young • Possession or advertisement/sale/exchange of a bat (dead or alive) or any part of a bat Bats are also protected by the Wild Mammals (Protection) Act 1996. Licenses are issued by Natural England for any works which may compromise the protection of European protected species, including bats. This license is required irrespective of whether the works require planning permission. Selected species are also listed in the UK BAP.
Otter	Otter are protected under British and European law, receiving the same level of protection as bats (see above). Otter are also listed as a priority species in Appendix II of the Bern Convention. Otter are included on the UK BAP.
Water Vole	Water voles are protected under Schedules 5 and 6 of the WCA 1981 (as amended). This makes it an offence to: • Intentionally kill, injure or take water voles • Possess or control the species • Damage or destroy any place used by water vole for shelter or protection • Disturb water vole while they occupy such places of shelter • Sell, possess or transport water vole for the purpose of sale • Advertise the buying or selling of water vole The species is also protected under the Wild Mammals (Protection) Act 1996 and is listed on the UK BAP.

Appendix B – Protected Species Map



Appendix C – Target Notes

Table C1: Target Notes Relating Protected Species Map (see Appendix B)

Number	Description
1	Water vole burrow at Site B.
2	Possible otter slide at site B.

Appendix D – Site Photographs

Photo 1: River Derwent at Site B	Photo 2: Water Vole Burrow at Site B
	
Photo 3: River Derwent along Site C	**Photo 4: Tree 2**
	

Photo 5: Tree 3	Photo 6: Tree 4
	
Photo 7: Tree 5	Photo 8: Tree 6
	

Photo 9: Tree 7	Photo 10: Tree 8
	
Photo 11: Tree 9	Photo 12: Tree 10
	

Photo 13: Tree 11	Photo 14: Tree 12
	
Photo 13: Mature Tree to be retained	Photo 14: Photo taken from western side of river at Site C
	

Appendix E – Protected Species Identified by the Desk Study

Table E1: Relevant Protected Species Records within 2km

Species	Number of Records	Most Recent Record	Within Forge Valley?	Level of Protection		
				HR 2017	WCA 1981	NERC /UK BAP
Myotis sp.	1	2017	No	☒	☒	☒
Noctule	4	2017	No	☒	☒	☐
Common pipistrelle	4	2017	No	☒	☒	☐
Soprano pipistrelle	3	2017	No	☒	☒	☒
Brown long-eared	1	2017	No	☒	☒	☒

Key

HR 2017 – The Conservation of Habitats and Species Regulations 2017

WCA 1981 – The Wildlife and Countryside Act 1981 (as amended) (Bird species listed relate solely to those included on Schedule 1)

NERC – The Natural Environment and Rural Communities Act 2006

UK BAP – UK Biodiversity Action Plan

Appendix F – Tree Assessments (see Appendix B)

Tree Number	Species	Height (m)	DBH (mm)	Features	Bat Roost Risk
T1	Common Alder *Alnus glutinosa*	Approx. 10m	300mm	Ivy present on trunk insufficient to create potential roosting feature (PRF). Young tree in good condition with no PRF.	Negligible
T2	Common Ash *Fraxinus excelsior*	Approx. 8m	250mm	Young tree in good condition with no PRF.	Negligible
T3	Common Alder *Alnus glutinosa*	Approx. 10m	350mm	Young tree in good condition with no PRF.	Negligible
T4	Common Alder *Alnus glutinosa*	Approx. 11m	300mm	Young tree in good condition with no PRF.	Negligible
T5	Oak sp. *Quercus* sp.	Approx. 10m	350mm	Some snapped branches providing features that from the ground looked like PRF however, under aerial inspection the snapped branches had no gaps or holes.	Negligible
T6	Dead tree	Approx. 6m	Avg. 150mm (1250mm overall)	Dead multi-stemmed trunk. With some lifted bark. Under inspection using a torch and endoscope the lifted bark was assessed as being superficial (gaps too	Negligible

				narrow/small) and did not provide any PRF.	
T7	Oak sp. *Quercus* sp.	Approx. 12m	450mm	Multi-stemmed trunk with narrow branches.	Negligible
T8	Common Ash *Fraxinus excelsior*	Approx. 11m	150mm	Young tree in good condition with no PRF.	Negligible
T9	Common Hazel *Corylus avellana*	Approx. 10m	250mm	Young tree in good condition with no PRF.	Negligible
T10	Common Ash *Fraxinus excelsior*	Approx. 10m	120mm	Young tree in good condition with no PRF.	Negligible
T11	Common Ash *Fraxinus excelsior*	Approx. 11m	150mm	Young tree in good condition with no PRF.	Negligible
T12	Elm sp. *Ulmus* sp.	Approx. 10m	200mm	Young tree in good condition with no PRF.	Negligible

Appendix 3:

Eco North ECN18 218

BS5837 Tree Survey Report

BS5837 Tree Survey

Forge Valley, Scarborough

September 2019

Final Report

Report Prepared For:	Project Ref: ECN18 218
Fairhurst 1 Arngrove Court, Barrack Road, Newcastle upon Tyne, NE4 6DB	Prepared By: David Beaver BA, HNC, (TechArborA)
	Non-technical Review By: Sarah Hawes
	Approved By: Jamie Macleod
	Date: 4th September 2019

eco NORTH
Ecological Consultants

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
Draft V01	12.06.19	Initial to client	Not confidential	DB	SH	JM
Final V02	04./09.19	Amendments	Not confidential	DB	SH	-

Field Investigations and Data

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by EcoNorth Ltd. for inaccuracies in the data supplied by any other party.

Declaration of Compliance

"The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed within this document are our true and professional bona fide opinions."

Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by EcoNorth Ltd. at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. No other warranty, expressed or implied is made as to the professional advice included in this report.

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Contents

Non-Technical Summary

EcoNorth Ltd was commissioned by Fairhurst (henceforth referred to as 'the client') to supply a BS5837 Tree Survey for an area of Forge Valley, Scarborough, North Yorkshire.

Based on the findings of this survey, it is concluded that no significant impacts to the current established trees are predicted. Furthermore, any impacts will be within acceptable limits when the mitigation measures proposed in this report are applied.

The three sites have been surveyed in accordance with BS5837:2012 'Trees in Relation to Construction – Recommendations' to provide detailed, independent, arboricultural advice on the trees present, in the context of potential development.

The tree survey consists of 33 trees and 10 groups. 1 tree is retention category 'A', 33 trees or groups are category 'B', 7 trees or groups are category 'C', 1tree is category 'U' and 1 tree is dead and not recorded as in a retention category. All are detailed in Appendix C.

Category 'A' trees are high quality, high amenity trees which should be retained if at all possible. Category 'B' trees should be retained where possible, and protected throughout any new development. Category 'C' trees could be retained. Replacement planting is recommended for any category 'B' or 'C' trees that cannot be retained.

A number of separate appendices have been issued with this report but are not included within this document; these detail specific management practises to be undertaken in relation to each individual tree or group. These are titled as follows:

- ECN18 218 Arboricultural Report – Appendix C Tree Data – BS5837 (PDF file)
- ECN18 218 Arboricultural Report – Appendix E Tree Constraints Plan (DXF file)

1. Introduction

1.1 Background

EcoNorth Ltd was commissioned by Fairhurst (henceforth referred to as 'the client') to supply a BS5837 Tree Survey at three sites of the proposed development of Forge Valley, (central grid reference: SE 98912 85680).

This report uses the plan showing tree locations and crown spread in Appendix D.

The report is required in accordance with BS5837:2012 ('Trees in Relation to Design, Demolition and Construction – Recommendations') to provide detailed, independent, arboricultural advice on the trees present in the context of potential development.

This report represents a BS5837 Tree Survey and should not be accepted as a detailed tree safety inspection report.

1.2 Survey Details

The survey took place on the 7th May 2019. Survey conditions are detailed in Appendix A.

The trees were surveyed visually from the ground in accordance with the guiding principles of BS5837:2012 (explanatory details regarding the survey methodology are included within Appendix A).

A full explanation of the tree data can be found in Appendix B. Full details of all the trees surveyed are found in Appendix C. For tree locations please refer to Appendix D, Figure 2 and the Tree Constraints Plan in Appendix E.

2. The Site

2.1 Location

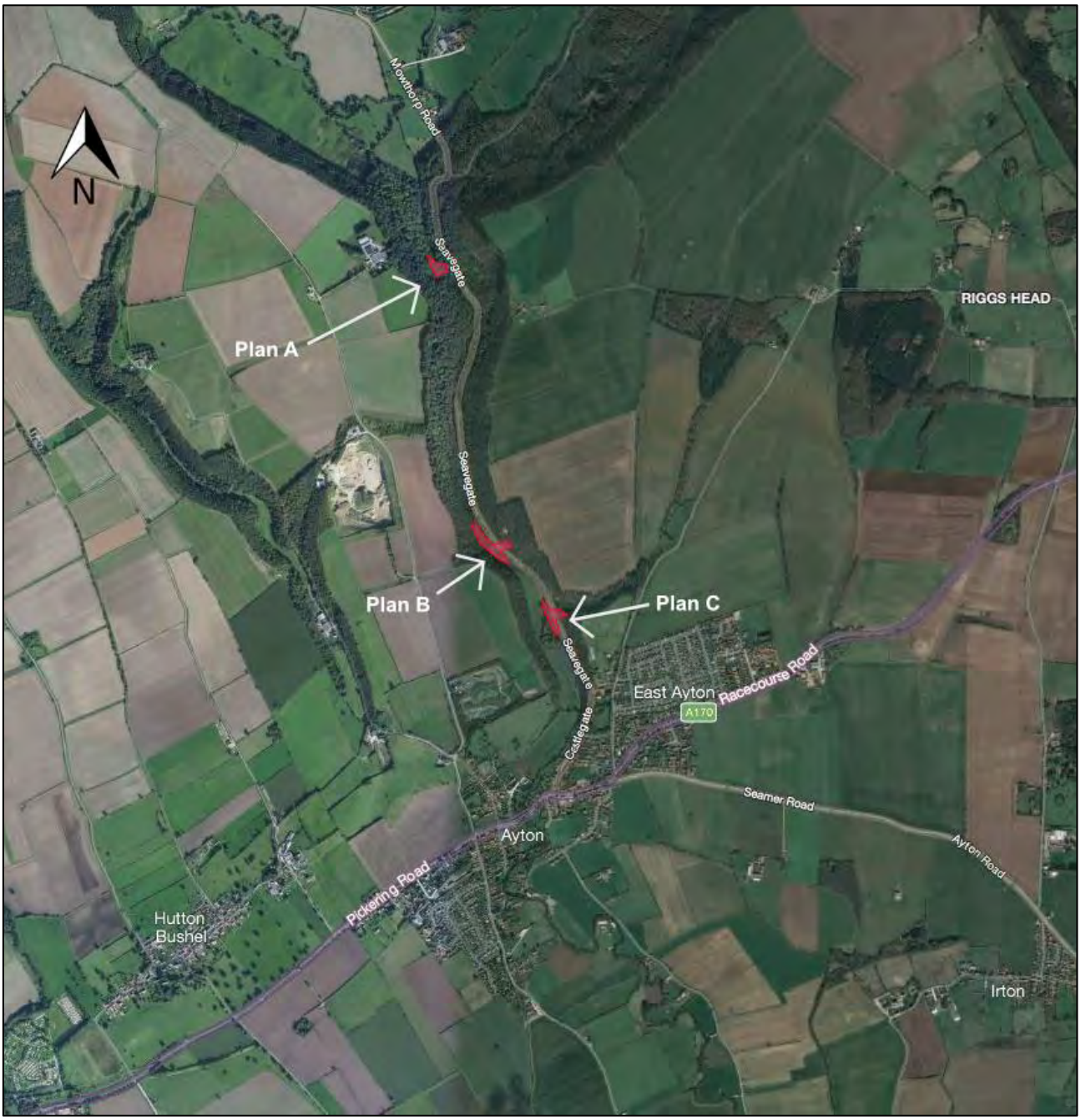
The area surveyed is located in Forge Valley, north of East Ayton, near Scarborough, North Yorkshire. It is accessible from Seavegate Road. Almost the entirety of Forge Valley lies within North York Moors National Park. The site is a Site of Special Scientific Interest.

The sites chosen for the proposed development are adjacent or opposite current parking spaces as indicated in Figure 1. The tree cover is predominantly native broadleaf trees. No coniferous trees are present in the surveyed areas.

The trees surveyed are in mostly fair condition and the area showed evidence of previous management. The trees surveyed are highly suitable for the woodland location in terms of species and form.

The tree survey is limited to the site boundaries shown in Figure 1. Trees just beyond the red line boundary are measured only when they are considered to have potential impacts on the proposed development.

Figure 1: Survey Areas (boundaries highlighted in red)



3. Trees

3.1 Legal

Due to the large penalties for carrying out work to protected trees illegally, a check should be made with the Local Planning Authority to see if the trees are covered by a Tree Preservation Order (TPO), or if they are within a Conservation Area before any tree works are authorised. If any of the above applies, statutory permission is required before any works can take place.

When appointing a tree surgeon, only properly qualified and experienced contractors that have adequate Public Liability and Employer's Liability Insurance should be used. All tree work should be carried out according to BS3998: 2010 Tree Work - Recommendations.

3.2 Summary of Results

The tree survey consists of 33 trees and 10 groups. Smaller trees of less than 75mm diameter, or less than 150mm if within a group, are not included and neither are any ornamental shrubs or native shrubs which grew adjacent to and within some groups around the larger trees.

The overall quality of trees is fair and with a diverse range of ages. Some trees have been pruned as evidenced by the pruning wounds and branch stubs to raise the crowns where they could obstruct pedestrians and vehicles.

As the trees within the groups in Plan B are observed predominantly as a collective, and the structure/form is similar throughout, with very few noteworthy individuals, the individual importance of trees is reduced. Therefore, the removal of a small proportion of the trees is considered acceptable, as this would not impact significantly on the wider group.

A small number of poor quality trees are noted which should be removed in the current context if in close proximity to the proposed developments, or where tree thinning is desirable as part of normal woodland management.

Of the surveyed vegetation, 1 tree is retention category 'A', 33 trees or groups are category 'B', 7 trees or groups are category 'C', 1 tree is category 'U' and 1 tree is dead and not recorded as in a retention category. All are detailed in Appendix C.

Category 'A' trees are high quality, high amenity trees which should be retained if at all possible. Significant amendments to the development should be considered before removing these trees.

Category 'B' trees should be retained where possible, and protected throughout any new development.

Category 'C' trees could be retained. If this is not possible or desirable, then replacement planting is recommended for any category 'B' or 'C' trees.

Category 'U' trees are 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 and should be removed.

Some trees alongside paths have been subject to preventative pruning works, where branches may obstruct pedestrian access.

The following trees could be removed: T010 and T011. These trees are dead or dying and covered in prolific ivy which does offer wildlife habitat value. Other works are listed in the survey data in Appendix C.

3.3 Outline Arboricultural Impacts

The category 'A' tree should be retained. Category 'B' trees should be retained where practicable and incorporated within the design brief. Protection of these trees should be easily managed throughout proposed works. Where these trees cause constraints, a crown lift is recommended to allow access for pedestrians or vehicles. However, some removal and thinning is recommended, especially within groups G027 and G034. Any works in this area will have some impact and replacement planting is recommended within the development site. Several category 'C' groups could be removed to facilitate development or to ensure user safety, otherwise, as the location is a Site of Special Scientific Interest it is desirable to leave these trees to decline naturally to enhance the ecological value of the site and retain a woodland feel.

The Site A boardwalk area has limited scope for changes to the course due to the steep bank to the west and the drop to the river to the east. However, there is room in places to widen the boardwalk and where a change to the course is necessary, it should be achievable with the removal of some ground cover and smaller shrubs. Where larger trees are encountered and particularly close to the large Sycamore (*Acer pseudoplatanus*), the boardwalk should be adjusted to save the tree.

Recommendations for any specific pre-construction management have been made for each individual tree or the group and are detailed in Appendix C.

3.4 Protection of the Retained Trees

The retained trees may require protection by fencing in accordance with BS5837:2012, during the development phase. An associated Arboricultural Method Statement is provided in Appendix B of the accompanying Arboricultural Implications Assessment.

The statements made in this report do not take account of extremes of climate, vandalism or accident, whether physical, chemical or fire. EcoNorth Ltd cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this report ceases at any stated time limit within it, or if none stated after two years from the date of the survey or when any site conditions change, or pruning or other works unspecified in the Report are carried out to, or affecting, the Subject Tree(s), whichever is sooner.

4. References

EcoNorth Ltd., (2019). Arboricultural Implications Assessment, Forge Valley, Yorkshire, Unpublished

BSI (2012). *Trees in Relation to Design, Demolition and Construction-Recommendations (BS5837:2012)*. British Standards Institute, London.

Appendix A – Survey Methodology and Limitations

The survey was undertaken in accordance with British Standard 5837 (2012): Trees in Relation to Design, Demolition and Construction – Recommendations. The trees are assessed with reference to the proposed site layout.

The trees are surveyed from the ground using 'Visual Tree Assessment' (VTA) methodology. VTA is appropriate and is endorsed by industry guidance. It is used by arboriculturalists to evaluate the structural integrity of a tree, relying on observation of trees biomechanical and physiological features. Measurements are obtained using a diameter tape, clinometer and GPS. GPS accuracy was compromised due to the valley's topography and the dense tree cover and was around 2 metres in open ground and 3.5 m under the tree canopy, therefore some corrections were made later where possible.

Some tree stems were inaccessible due to dense epicormic growth or hazardous locations e.g. on a steep bank or too close to the river bank and therefore an estimated diameter is given in the data and indicated with a # symbol.

Shrubs and insignificant trees of less than 75mm diameter have been omitted from the survey and trees within groups whose diameter was less than 150mm were also omittied from the survey as recommended by BS5837. Where the trees are growing so close that crowns overlapped they are grouped with any significant trees within surveyed separately.

Crown spread in the 4 cardinal points is not always recorded, or an estimate is given, as recommended in BS5837 section 4.4.2.5 Note 1" *It is not always practical or necessary to record branch spread for every tree within a group or woodland*."

Survey date(s)	7/05/19
Times	11:50 – 16:40
Temperature	7 – 10ªC
Wind	Beaufort force 4
Cloud/visibility	Scattered showers. Good visibility.

This report represents a BS5837 Tree Survey and should not be accepted as a detailed tree safety inspection report; however, tree related hazards are recorded and commented upon where observed, yet no guarantee can be given as to the absolute safety or otherwise of any individual tree. All recommended tree work must be to BS3998:2010 - 'Tree Work: Recommendations'.

The findings and recommendations contained within this report are valid for a period of twelve months from the date of the survey. The author shall not be responsible for events which happen after this time due to factors which are not apparent at the time, and the acceptance of this report constitutes an agreement with these guidelines and terms.

Appendix B – Explanation of Tree Descriptions

HEIGHT of the tree is measured from the stem base in metres. Where the ground has a significant slope the higher ground is selected.

STEM DIAMETER is measured at 1.5 metres above (higher) ground level. Where the tree is multi-stemmed at this point; the diameter is measured close to ground level or else a combined stem diameter is calculated.

CROWN SPREAD is measured from the centre of the stem base to the tips of the branches in all four cardinal points.

AGE CLASS of the tree is described as young, semi-mature, early-mature, mature, or over-mature.

PHYSIOLOGICAL CONDITION is classed as good, fair, poor, or dead. This is an indication of the health of the tree and takes into account vigour, presence of disease, and dieback.

STRUCTURAL CONDITION is classed as good, fair, or poor. This is an indication of the structural integrity of the tree and takes into account significant wounds, decay and quality of branch junctions.

LIFE EXPECTANCY is classed as; <10 years, 10-20 years, 20-40 years, or > 40 years. This is an indication of the number of years before removal of the tree is likely to be required.

Retention Categories

A (marked green on Figure 2) = retention most desirable. These trees are of very high quality and value with a good life expectancy.

B (marked in blue on Figure 2) = retention desirable. These trees are of good quality and value with a significant life expectancy.

C (marked in grey on Figure 2) = trees which could be retained. These trees are of low or average quality and value, and are in adequate condition to remain until new planting could be established.

U (marked in red on Figure 2) = trees for removal. These trees are in such a condition that any existing value would be lost within 10 years.

Appendix C – Tree Data

symbol indicates estimated figures where it was unsafe or impractical to use measuring devices.

The crown spread is not recorded within some groups, or where it is impractical or unnecessary to do so, as described in Appendix A

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
G015	Group, mixed species	Group 5 stems	Height (m): 18# 5 stems, avg.(mm): 400# Branch Spread(m): 5#(N), 3#(S), 6#(E), 4#(W) Height of Crown Clearance (m): 4 Age Class: Mature	N:5# S:3# E:6# W:4#	Low branches (3m) obstruct pedestrian access. Hawthorn and Alder. One dead alder with prolific ivy.	B2	Area: 54.29 sq m.	Overall Condition: Fair	Management Recommendations: Remove dead tree if a public safety issue. During construction: Protect trees with protective barriers - as shown on plans.
G016	Group, mixed species	Group 4 stems	Height (m): 17 4 stems, avg.(mm): 600# Branch Spread(m): 3(N), 6(S), 7(E), 4(W) Height of Crown Clearance (m): 4 Age Class: Mature	N:3 S:6 E:7 W:4	Sycamore and alder. Prolific ivy	B2	Area: 53.91 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
G019	Group, mixed species	Group	Height (m): 19 Stem Diam (mm): 300# Branch Spread(m): 2#(N), 2#(S), 2#(E), 2#(W) Height of Crown Clearance (m): 3 Age Class: Mature	N:2# S:2# E:2# W:2#	Mixed sycamore and elm. Some branches overhang the car park.	B2	Area: 590.87 sq m.	Overall Condition: Fair	During construction: Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
G026	Alder, Common(Alnus glutinosa)	Group	Height (m): 15#Stem Diam (mm): 200Branch Spread(m):2#(N), 3#(S), 3#(E), 4#(W)Height of Crown Clearance (m): 3Age Class: Early Mature	N:2#S:3#E:3#W:4#		B2	Area: 76.4 sq m.	Overall Condition: Fair	During construction:Protect trees with protective barriers - as shown on plans.
G027	Group, mixed species	Group	Height (m): 17# Stem Diam (mm): 200# Branch Spread(m): 3#(N), 3#(S), 3#(E), 3#(W) Height of Crown Clearance (m): 5	N:3# S:3# E:3# W:3#	Mostly Alder and Elm	B2	Area: 270.04 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
G029	Group, mixed species	Group	Height (m): 17 Stem Diam (mm): 300# Branch Spread(m): 3#(N), 3#(S), 4#(E), 4#(W) Height of Crown Clearance (m): 5	N:3# S:3# E:4# W:4#	Sycamore, Alder, Rowan	B2	Area: 110.97 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
G032	Alder (Alnus sp.)	Group 6 stems	Height (m): 16# 6 stems, avg.(mm): 200# Height of Crown Clearance (m): 3 Age Class: Mature		Multi-stemmed (coppiced) alders.	B2	Area: 225.67 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
G034	Group, mixed species	Group	Height (m): 15 Stem Diam (mm): 180# Height of Crown Clearance (m): 4 Age Class: Early Mature		Mixed, planted British Native species: Elm, Hazel, Alder, Ash, Birch, Rowan and Maples. Some naturally seeded sycamore . Tree guards still present on many trees. Some causing constrictions or littering the floor.	B2	Area: 421.52 sq m.	Overall Condition: Fair	Management Recommendations: Remove guards and poorer specimens if they are a safety issue. During construction: Protect trees with protective barriers - as shown on plans.
G035	Group, mixed species	Group	Height (m): 9#Stem Diam (mm): 180#Branch Spread(m):1(N), 4(S), 2(E), 2(W)Height of Crown Clearance (m): 3Age Class: Mature	N:1S:4E:2W:2	Elder and Ash. Prolific ivy. Leaning.	C2	Area: 37.35 sq m.	Overall Condition: Poor	During construction: Protect trees with protective barriers - as shown on plans.
G043	Ash, Common (Fraxinus excelsior)	Group 7 stems	Height (m): 20# 7 stems, avg.(mm): 300# Branch Spread(m): 3#(N), 3#(S), 3#(E), 3#(W) Height of Crown Clearance (m): 4# Age Class: Early Mature	N:3# S:3# E:3# W:3#	Prolific ivy on some.	B2	Area: 106.61 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T001	Chestnut, Horse (Aesculus hippocastanum)	Tree	Height (m): 24# Stem Diam (mm): 670 Height of Crown Clearance (m): 4 Age Class: Mature			B2	Radius: 8.0m. Area: 201 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
T002	Beech, Common (Fagus sylvatica)	Tree	Height (m): 25 Stem Diam (mm): 800 Branch Spread(m): 7(N), 8(S), 9(E), 5#(W) Height of Crown Clearance (m): 2 Age Class: Mature	N:7 S:8 E:9 W:5#		B2	Radius: 9.6m. Area: 290 sq m.	Overall Condition: Fair	Management Recommendations: Crown lift to 5.2 metres for vehicle access. During construction: Protect trees with protective barriers - as shown on plans.
T003	Chestnut, Horse (Aesculus hippocastanum)	Tree	Height (m): 25 Stem Diam (mm): 560 Branch Spread(m): 5(N), 7(S), 6(E), 6#(W) Height of Crown Clearance (m): 3 Age Class: Mature	N:5 S:7 E:6 W:6#		B2	Radius: 6.7m. Area: 141 sq m.	Overall Condition: Fair	Management Recommendations: No action required. Crown lift to 5.2 metres for vehicle access. During construction: Protect trees with protective barriers - as shown on plans.
T004	Chestnut, Horse(Aesculus hippocastanum)	Tree	Height (m): 25Stem Diam (mm): 600Branch Spread(m):5(N), 7(S), 8(E), 6#(W)Height of Crown Clearance (m): 3Age Class: Mature	N:5S:7E:8W:6#		B2	Radius: 7.2m.Area: 163 sq m.	Overall Condition: Fair	Management Recommendations:Crown lift to 5.2 metres for vehicle access.During construction:Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
T005	Chestnut, Horse (Aesculus hippocastanum)	Tree	Height (m): 18 Stem Diam (mm): 670 Branch Spread(m): 5#(N), 7#(S), 4#(E), 6#(W) Height of Crown Clearance (m): 3 Age Class: Mature	N:5# S:7# E:4# W:6#	Limb decay. Fractured limbs - storm damage	B2	Radius: 8.0m. Area: 201 sq m.	Overall Condition: Fair	Management Recommendations: Crown lift to 5.2 metres for vehicle access. During construction: Protect trees with protective barriers - as shown on plans.
T006	Chestnut, Horse (Aesculus hippocastanum)	Tree	Height (m): 16# Stem Diam (mm): 500 Branch Spread(m): 5#(N), 7#(S), 4#(E), 6#(W) Height of Crown Clearance (m): 2 Age Class: Early Mature	N:5# S:7# E:4# W:6#		B2	Radius: 6.0m. Area: 113 sq m.	Overall Condition: Fair	Management Recommendations: Crown lift to 5.2 metres for vehicle access. During construction: Protect trees with protective barriers - as shown on plans.
T007	Lime, Common (Tilia x vulgaris)	Tree	Height (m): 34 Stem Diam (mm): 1180 Branch Spread(m): 5(N), 7(S), 8(E), 8(W) Height of Crown Clearance (m): 8 Age Class: Mature	N:5 S:7 E:8 W:8	Epicormic growth typical of species. Occluded pruning scars. Burrs at base of stem.	A2	Radius: 14.2m. Area: 633 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T008	Chestnut, Horse(Aesculus hippocastanum)	Tree	Height (m): 18Stem Diam (mm): 580Branch Spread(m):6(N), 6(S), 4(E), 4(W)Height of Crown Clearance (m): 2Age Class: Early Mature	N:6S:6E:4W:4		B2	Radius: 7.0m.Area: 154 sq m.	Overall Condition: Fair	Management Recommendations:Crown lift to 5.2 metres for vehicle access. During construction:Protect trees with protective

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
									barriers - as shown on plans.
T009	Sycamore (Acer pseudoplatanus)	Tree	Height (m): 17 Stem Diam (mm): 380 Branch Spread(m): 4(N), 2(S), 5(E), 4(W) Height of Crown Clearance (m): 4 Age Class: Early Mature	N:4 S:2 E:5 W:4	Leaning stem	B2	Radius: 4.6m. Area: 66 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T010	Not identified	Tree	Height (m): 9 Stem Diam (mm): 160 Age Class: Mature		Dieback - poor foliage. Dead wood. Prolific ivy	NotRecorded	none - no Retention Category specified.	Overall Condition: Dead	Remove tree only if it is a safety issue.
T011	Not identified	Tree	Height (m): 13 Stem Diam (mm): 340 Age Class: Mature		Dieback - poor foliage. Dead wood. Prolific ivy	U	none - due to Retention Category of U.	Overall Condition: Poor	Remove tree only if it is a safety issue.
T012	Chestnut, Horse (Aesculus hippocastanum)	Tree	Height (m): 17 Stem Diam (mm): 450 Branch Spread(m): 4(N), 4(S), 5(E), 4(W) Height of Crown Clearance (m): 2 Age Class: Mature	N:4 S:4 E:5 W:4		B2	Radius: 5.4m. Area: 92 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T013	Poplar, Black (Populus nigra)	Tree	Height (m): 18 Stem Diam (mm): 640 Branch Spread(m): 1(N), 8(S), 7(E), 3(W) Height of Crown Clearance (m): 6 Age Class: Over Mature	N:1 S:8 E:7 W:3	Prolific ivy. Severe lean.	C2	Radius: 7.7m. Area: 186 sq m.	Overall Condition: Poor	During construction: Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
T014	Poplar, Black(Populus nigra)	Coppiced	Height (m): 18Stem Diam (mm): 650#Branch Spread(m):3(N), 8(S), 7(E), 3(W)Height of Crown Clearance (m): 6Age Class: Over Mature	N:3S:8E:7W:3	Prolific ivy. Severe lean.	C2	Radius: 7.8m.Area: 191 sq m.	Overall Condition: Poor	During construction: Protect trees with protective barriers - as shown on plans.
T017	Alder, Common (Alnus glutinosa)	Tree	Height (m): 17 Stem Diam (mm): 400# Branch Spread(m): 1(N), 4(S), 4(E), 4(W) Height of Crown Clearance (m): 8 Age Class: Mature	N:1 S:4 E:4 W:4	Prolific ivy	C2	Radius: 4.8m. Area: 72 sq m.	Overall Condition: Poor	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T018	Alder, Common (Alnus glutinosa)	Tree	Height (m): 18 Stem Diam (mm): 380 Branch Spread(m): 2(N), 4(S), 4(E), 4(W) Height of Crown Clearance (m): 8 Age Class: Mature	N:2 S:4 E:4 W:4		B2	Radius: 4.6m. Area: 66 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T020	Willow (Salix sp.)	Tree	Height (m): 32 Stem Diam (mm): 1150 Branch Spread(m): 5(N), 7(S), 8(E), 8(W) Age Class: Over Mature	N:5 S:7 E:8 W:8	Prolific ivy	B2	Radius: 13.8m. Area: 598 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
T021	Alder, Common (Alnus glutinosa)	Coppiced 10 stems	Height (m): 19# 10 stems, avg.(mm): 200# Branch Spread(m): 2(N), 4(S), 2(E), 7(W) Height of Crown Clearance (m): 3 Age Class: Mature	N:2 S:4 E:2 W:7		C2	Radius: 7.6m. Area: 181 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T022	Alder, Common(Alnus glutinosa)	Tree4 stems	Height (m): 14#4 stems, avg.(mm): 200#Branch Spread(m):2(N), 4(S), 2(E), 7(W)Height of Crown Clearance (m): 3Age Class: Early Mature	N:2S:4E:2W:7		C2	Radius: 4.8m.Area: 72 sq m.	Overall Condition: Fair	Management Recommendations:No action required. During construction:Protect trees with protective barriers - as shown on plans.
T023	Alder, Common (Alnus glutinosa)	Tree 8 stems	Height (m): 14# 8 stems, avg.(mm): 200# Branch Spread(m): 2(N), 4(S), 2(E), 7(W) Height of Crown Clearance (m): 3 Age Class: Early Mature	N:2 S:4 E:2 W:7		B2	Radius: 6.8m. Area: 145 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T024	Alder, Common (Alnus glutinosa)	Tree 15 stems	Height (m): 14# 15 stems, avg.(mm): 150# Branch Spread(m): 2(N), 2(S), 2(E), 2(W) Height of Crown Clearance (m): 3 Age Class: Early Mature	N:2 S:2 E:2 W:2		B2	Radius: 7.0m. Area: 154 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
T025	Elm, wych (Ulmus glabra)	Tree 10 stems	Height (m): 10 10 stems, avg.(mm): 150# Branch Spread(m): 2(N), 2(S), 2(E), 2(W) Height of Crown Clearance (m): 3 Age Class: Early Mature	N:2 S:2 E:2 W:2		B2	Radius: 5.7m. Area: 102 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T028	Elm, wych (Ulmus glabra)	Tree	Height (m): 8 Stem Diam (mm): 210 Branch Spread(m): 3(N), 3(S), 4(E), 3(W) Age Class: Semi Mature	N:3 S:3 E:4 W:3		B2	Radius: 2.5m. Area: 20 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T030	Alder, Common(Alnus glutinosa)	Tree	Height (m): 14#Stem Diam (mm): 350Branch Spread(m):3#(N), 3#(S), 4#(E), 4#(W)Age Class: Early Mature	N:3#S:3#E:4#W:4#		B2	Radius: 4.2m.Area: 55 sq m.	Overall Condition: Fair	Management Recommendations:No action required. During construction:Protect trees with protective barriers - as shown on plans.
T031	Willow (Salix sp.)	Tree	Height (m): 25# Stem Diam (mm): 780 Branch Spread(m): 4#(N), 4#(S), 4#(E), 4#(W) Height of Crown Clearance (m): 6 Age Class: Mature	N:4# S:4# E:4# W:4#		B2	Radius: 9.4m. Area: 278 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
T033	Lime (Tilia sp.)	Tree	Height (m): 18 Stem Diam (mm): 490 Branch Spread(m): 5(N), 6(S), 7(E), 4(W) Height of Crown Clearance (m): 1 Age Class: Mature	N:5 S:6 E:7 W:4		B2	Radius: 5.9m. Area: 109 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T036	Sycamore (Acer pseudoplatanus)	Tree	Height (m): 19# Stem Diam (mm): 510 Branch Spread(m): 6#(N), 5#(S), 5#(E), 5#(W) Height of Crown Clearance (m): 9 Age Class: Mature	N:6# S:5# E:5# W:5#		B2	Radius: 6.1m. Area: 117 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T037	Sycamore (Acer pseudoplatanus)	Tree 2 stems	Height (m): 23# 2 stems, diam(mm): 550, 450, Branch Spread(m): 6#(N), 5#(S), 5#(E), 5#(W) Height of Crown Clearance (m): 9 Age Class: Mature	N:6# S:5# E:5# W:5#		B2	Radius: 8.5m. Area: 227 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T038	Ash, Common(Fraxinus excelsior)	Tree	Height (m): 25#Stem Diam (mm): 530#Branch Spread(m):6#(N), 4#(S), 4#(E), 4#(W)Height of Crown Clearance (m): 12Age Class: Mature	N:6#S:4#E:4#W:4#		B2	Radius: 6.4m.Area: 129 sq m.	Overall Condition: Good	Management Recommendations:No action required. During construction:Protect trees with protective barriers - as shown on plans.

Ref	Species	Full Structure	Measurements	Spread	Comments	BS5837 Category	RPA	Measurements 2	Recommendations
T039	Elm, wych (Ulmus glabra)	Tree	Height (m): 15# Stem Diam (mm): 300# Branch Spread(m): 3#(N), 3#(S), 5#(E), 1#(W) Height of Crown Clearance (m): 3 Age Class: Early Mature	N:3# S:3# E:5# W:1#	Twin leader.	C2	Radius: 3.6m. Area: 41 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T040	Ash, Common (Fraxinus excelsior)	Tree	Height (m): 20# Stem Diam (mm): 320# Branch Spread(m): 3#(N), 3#(S), 5#(E), 1#(W) Height of Crown Clearance (m): 3 Age Class: Early Mature	N:3# S:3# E:5# W:1#		B2	Radius: 3.8m. Area: 45 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T041	Sycamore (Acer pseudoplatanus)	Tree	Height (m): 20# Stem Diam (mm): 380 Branch Spread(m): 4#(N), 4#(S), 4#(E), 4#(W) Height of Crown Clearance (m): 3 Age Class: Mature	N:4# S:4# E:4# W:4#		B2	Radius: 4.6m. Area: 66 sq m.	Overall Condition: Fair	Management Recommendations: No action required. During construction: Protect trees with protective barriers - as shown on plans.
T042	Sycamore (Acer pseudoplatanus)	Tree	Height (m): 20# Stem Diam (mm): 500# Branch Spread(m): 4#(N), 4#(S), 4#(E), 9(W) Height of Crown Clearance (m): 3 Age Class: Mature	N:4# S:4# E:4# W:9	Epicormic growth at base.	B2	Radius: 6.0m. Area: 113 sq m.	Overall Condition: Fair	Management Recommendations: Crown lift to 5.2 metres for vehicle access. During construction: Protect trees with protective barriers - as shown on plans.

Appendix D – Tree Locations

Figures 2, 3 and 4 below shows the location of surveyed trees in relation to the site boundaries, with individual trees at actual crown size with radii averaged.

Figure 2: Plan A Location of Surveyed Trees. Photographs (B1- B9) along the boardwalk are shown in Appendix F

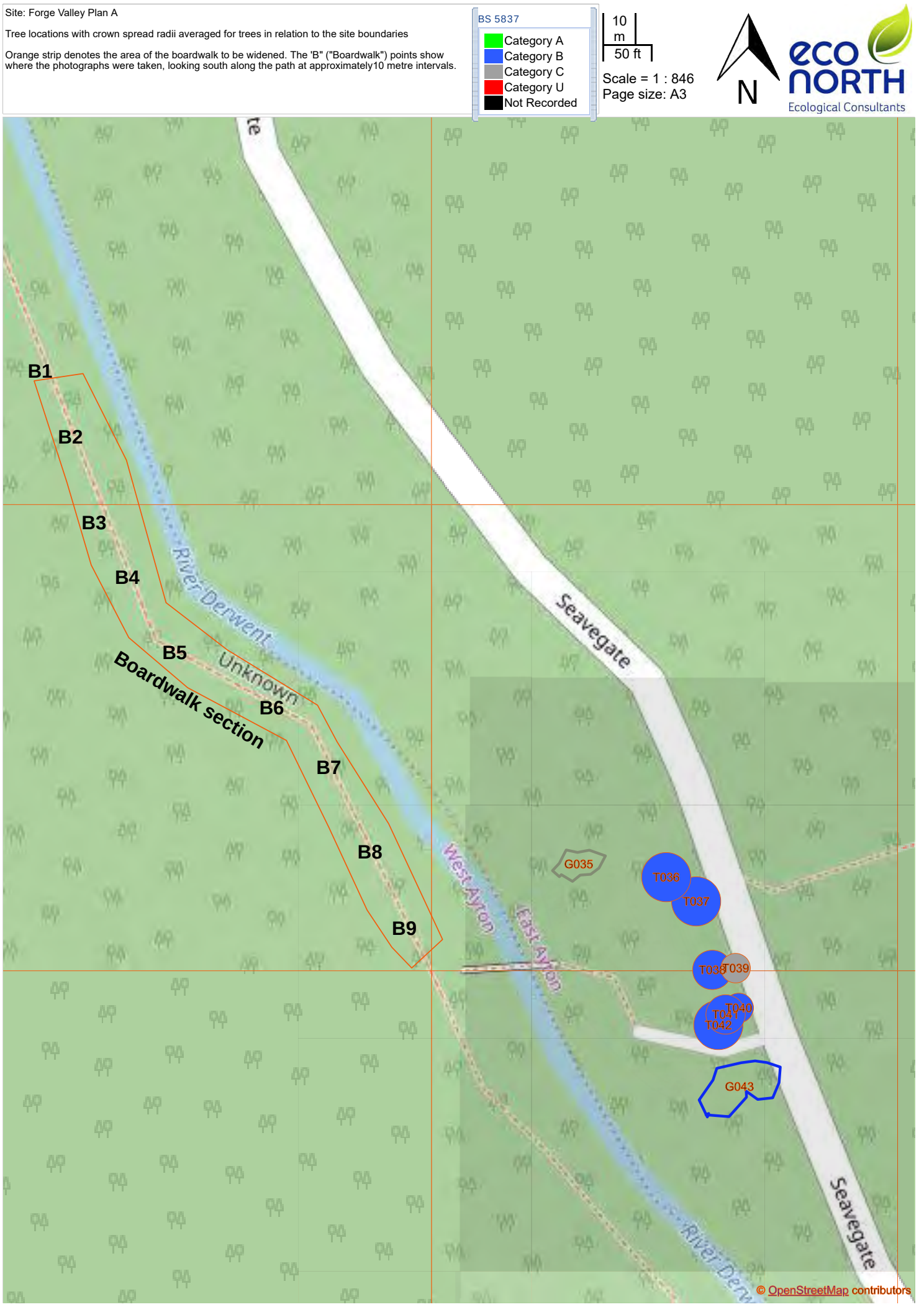


Figure 3: Plan B Location of Surveyed Trees

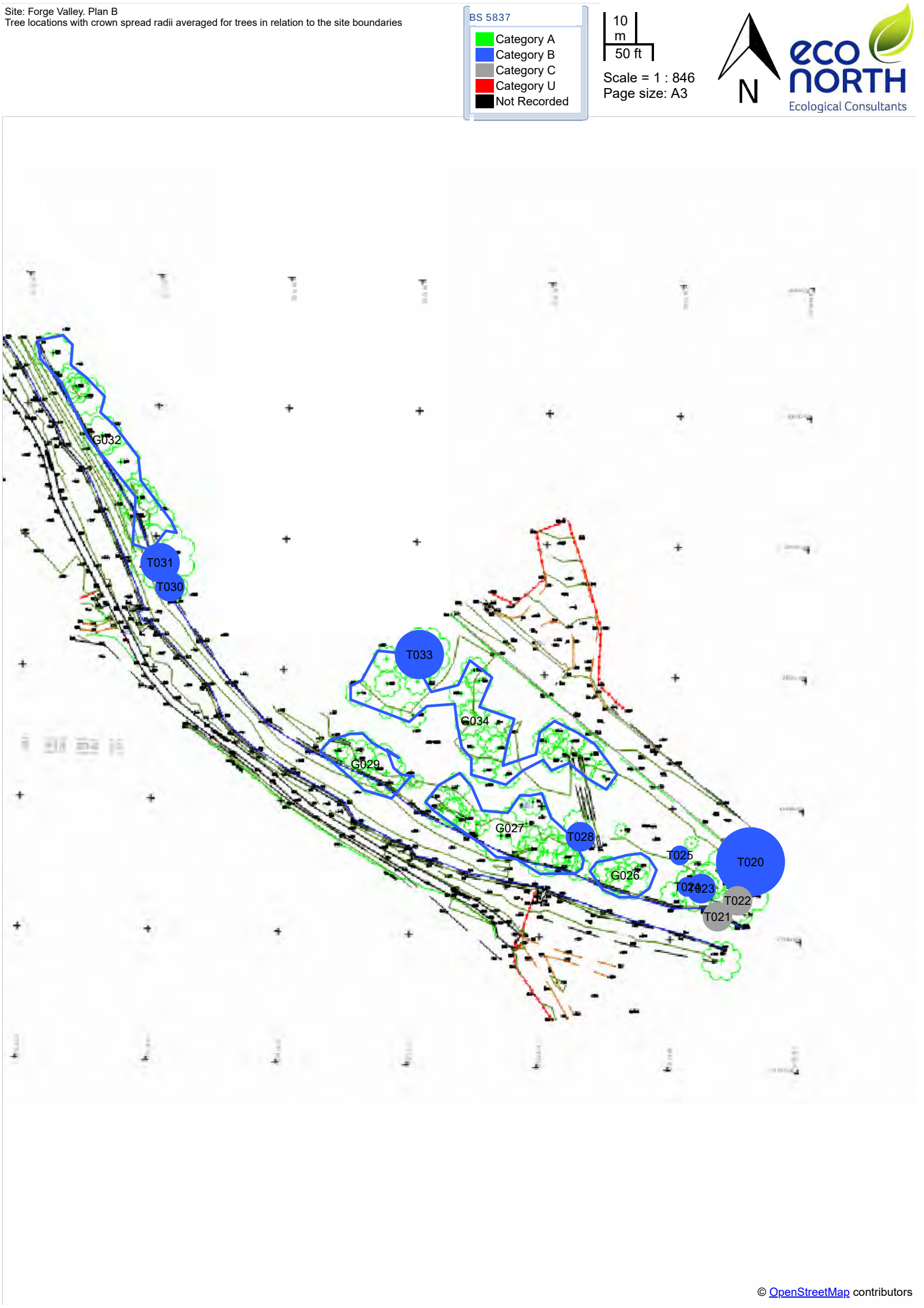
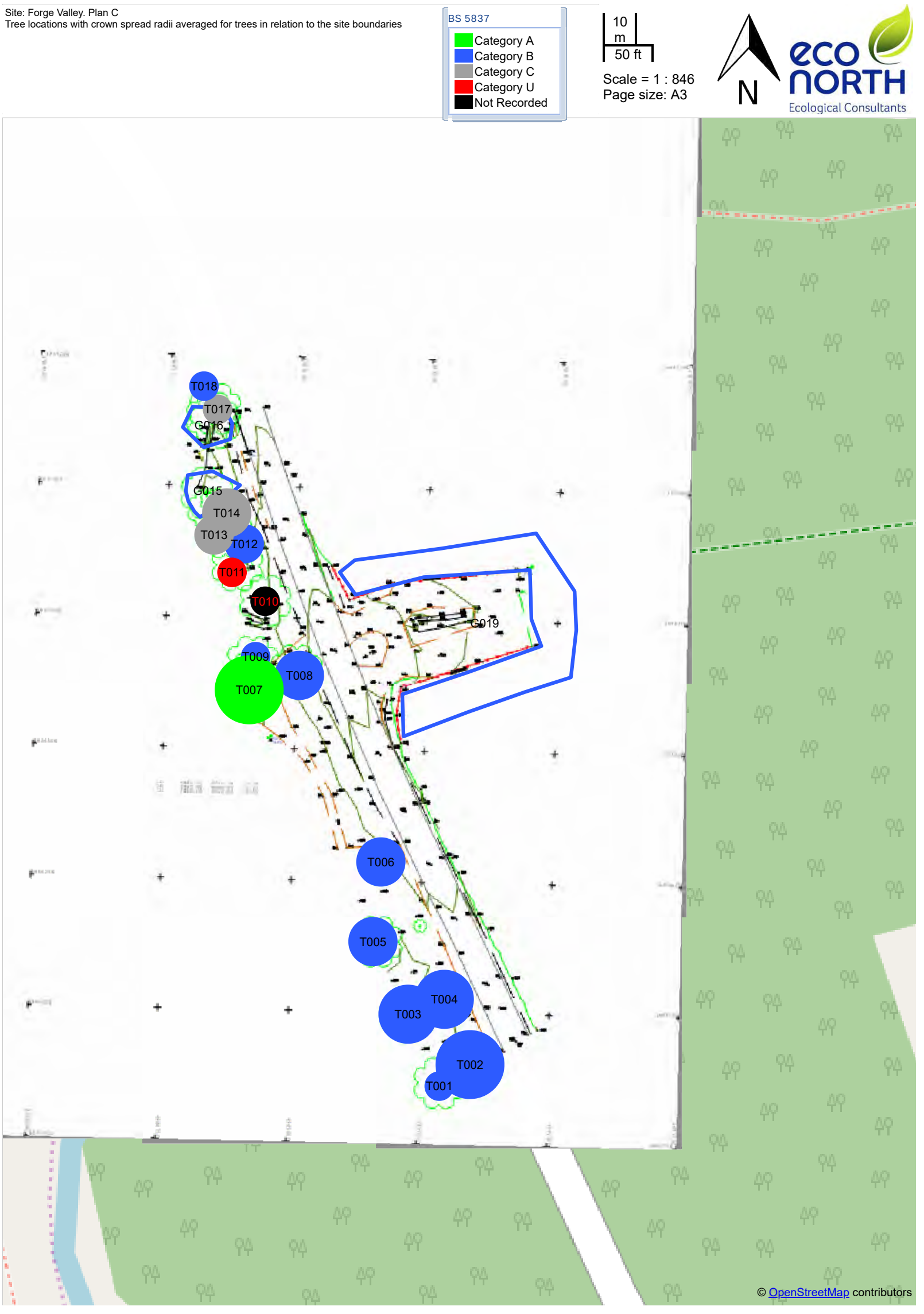


Figure 4: Plan C Location of Surveyed Trees



Appendix E: Tree Constraints Plans

A separate DXF file includes the following data:

Site Plan Layer: This layer contains the image of the site plan or map that was loaded into the software. The image is not stored inside the DXF file – it is stored in a separate image file in the same folder.

Tree Locations Layer: This layer contains the small circles that represent the tree trunk. The colour corresponds to the BS5837 retention category. The line thickness and visibility for all the trees can be changed using the layer's properties.

Tree Crown Spread Layer: This layer contains a distorted circle to represent crown spread using the N, S, E, W measurements. The colour corresponds to the BS5837 retention category. For tree groups and hedges, the polygon is drawn. The line thickness, font and height can be changed using the text style's properties. The text can be removed by hiding the layer.

Tree RPA Layer: This layer contains a shaded circle representing the calculated Root Protection Area. For tree groups and hedges, the polygon is drawn. The colour and visibility for all the trees can be changed using the layer's properties.

Tree RPA2 Layer: This layer contains a 12 sided polygon representing the calculated RPA. For tree groups and hedges, the polygon is drawn. Your can adjust the polygon to show the desired root protection fencing. The line colour, thickness and visibility for all the trees can be changed using the layer's properties and visibility for all the trees can be changed using the layer's properties.

Tree Reference Layer: This layer contains each tree's reference number and BS5837 retention category, which is plotted beside the tree using the Tree Text text style. The colour corresponds to the BS5837 retention category. The text font and height can be changed using the text style's properties. The text can be removed by hiding the layer.

Tree Species Layer: This layer contains each tree's species name, which is plotted beside the tree using the Tree Text text style. The colour corresponds to the BS5837 retention category.

Tree Shadow Layer: This layer contains a shaded arc representing the typical shadow pattern – it is an arc from NW to E using the tree height as radius. For tree groups and hedges, the polygon is drawn. The colour and visibility for all the trees can be changed using the layer's properties.

Tree Text Style: This text style is used for both the reference and species text. The text font and height can be changed using this text style's properties. In some CAD applications, you may need to re-apply the text style to the text items to make the change – please consult your application's reference manuals.

Figures 5, 6 and 7 below shows the trees RPAs and constraints plans. A separate DXF file shows additional detail if required.

Figure 5: Plan A Tree RPA and Constraints Plan

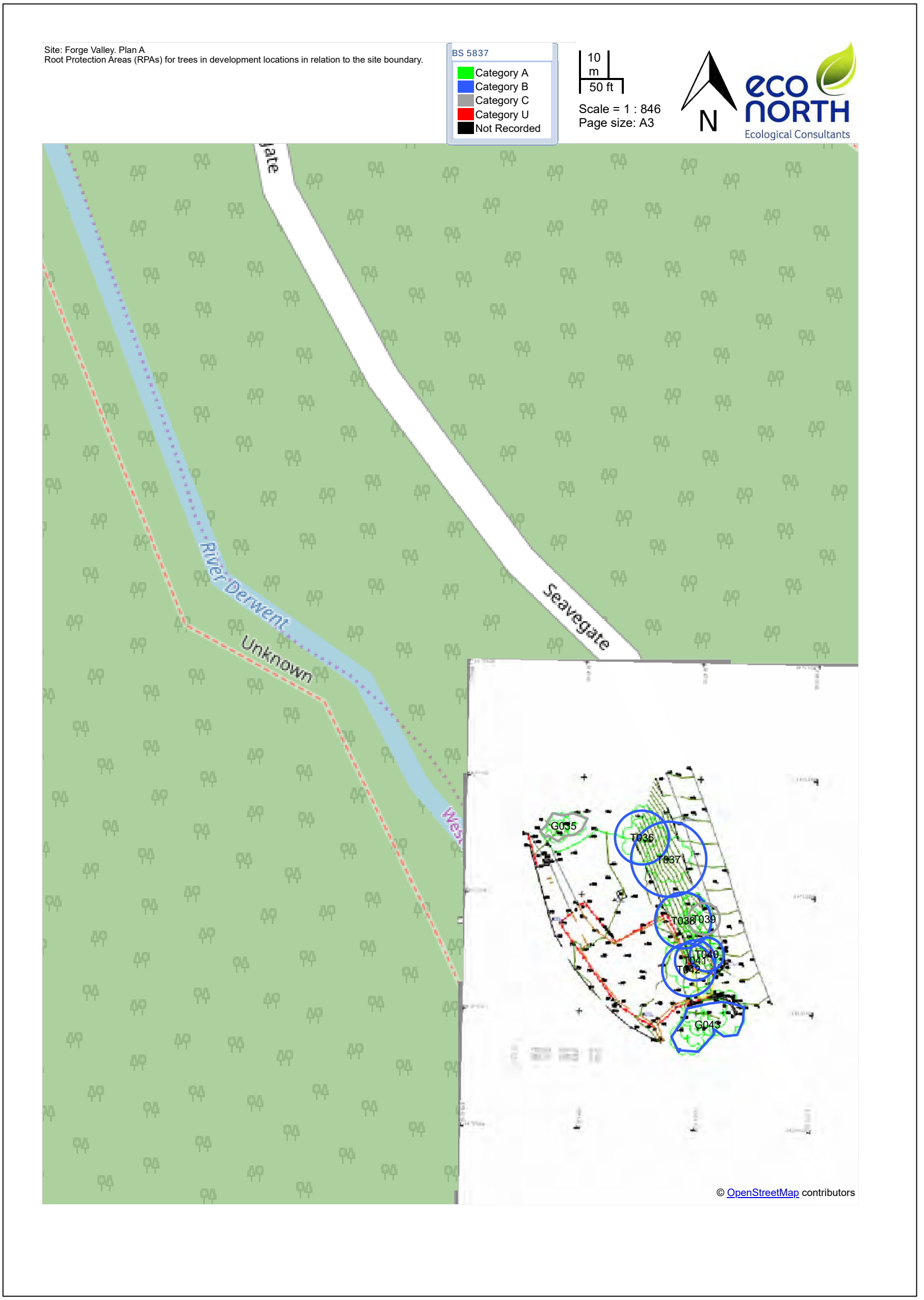
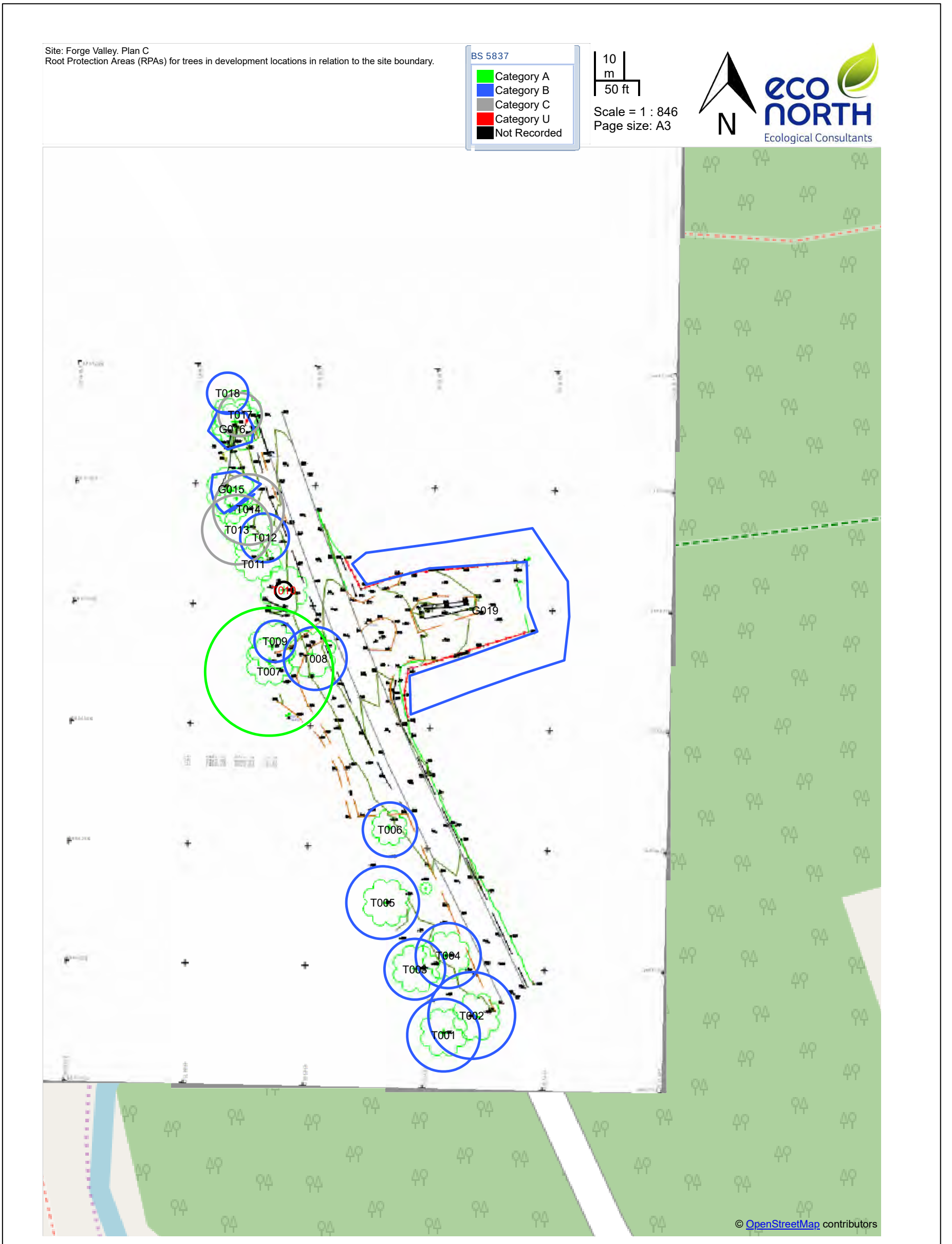


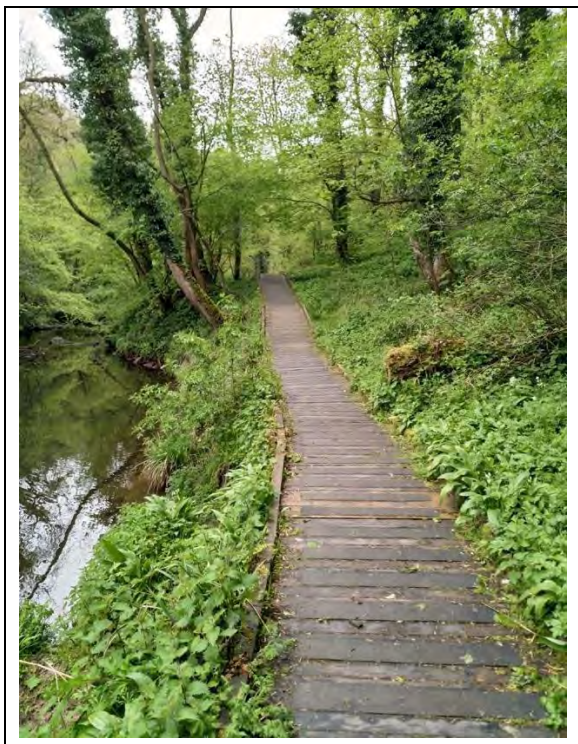
Figure 6: Plan B Tree RPA and Constraints Plan

Figure 7: Plan C Tree RPA and Constraints Plan

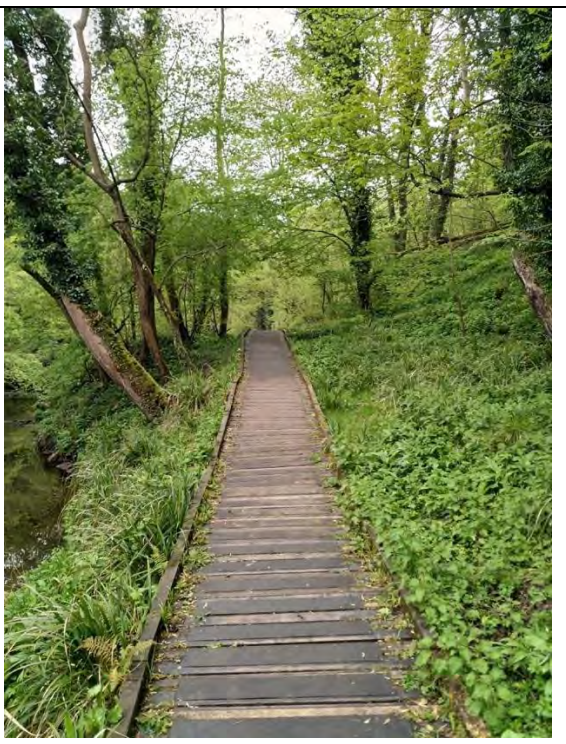


Appendix F: Photographs of Boardwalk area.

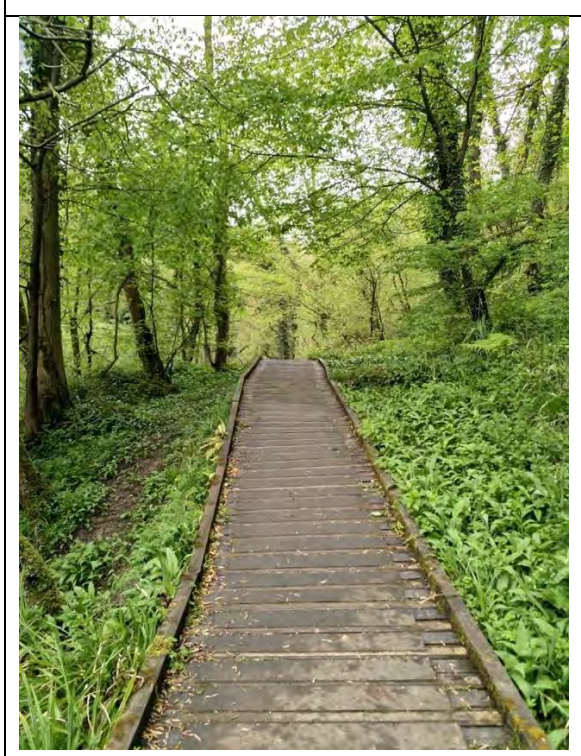
Photographs were taken from the most northerly point on the orange area at 10 metre intervals, moving south towards the bridge crossing at the car park in Plan A.



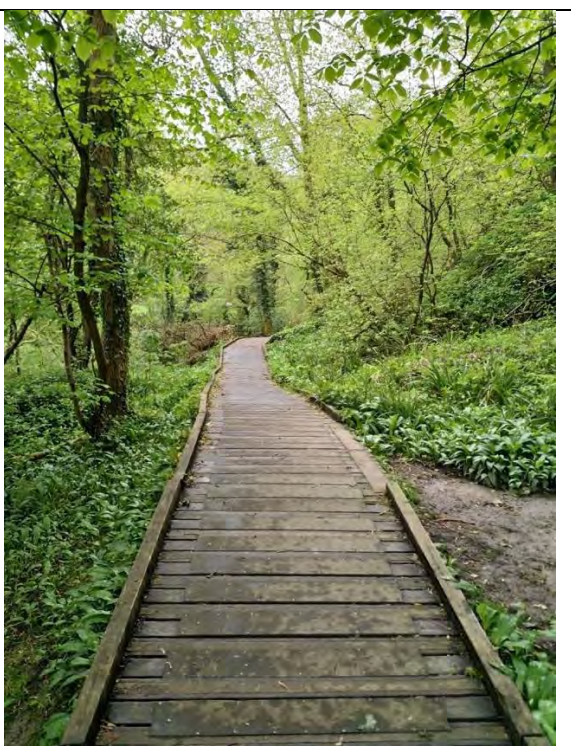
Location B1



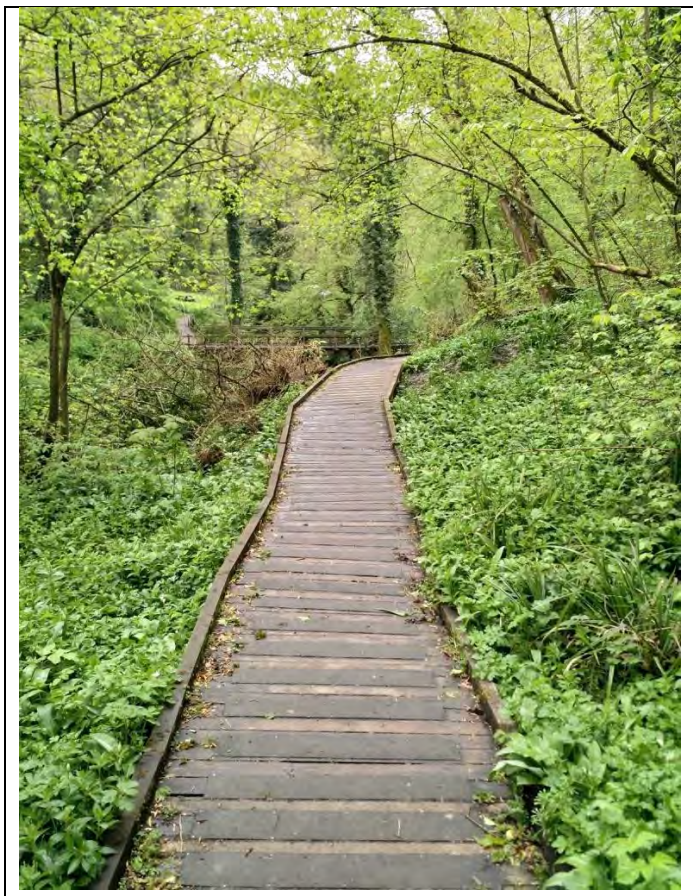
Location B2



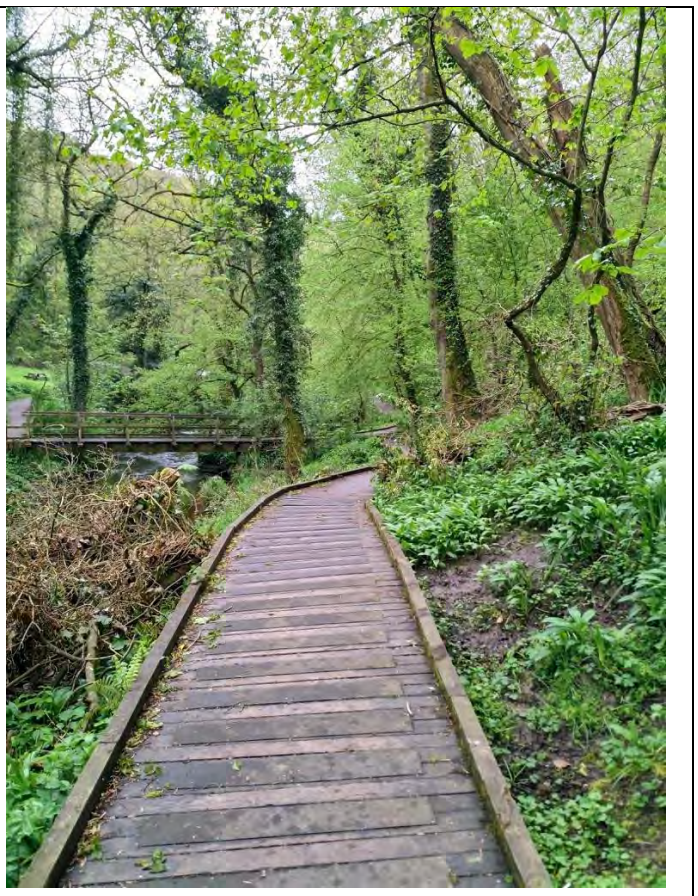
Location B3



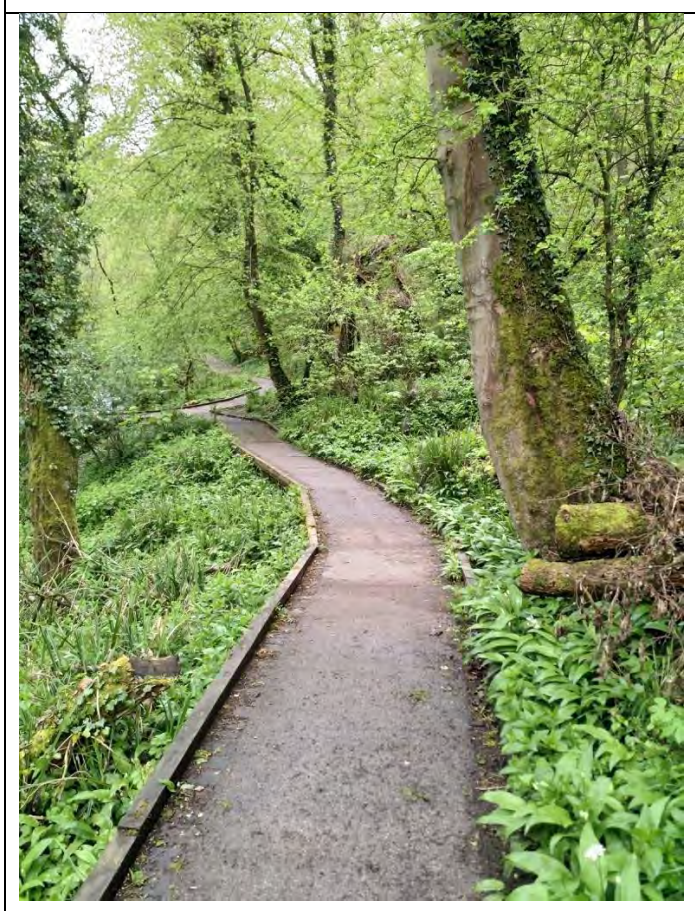
Location B4



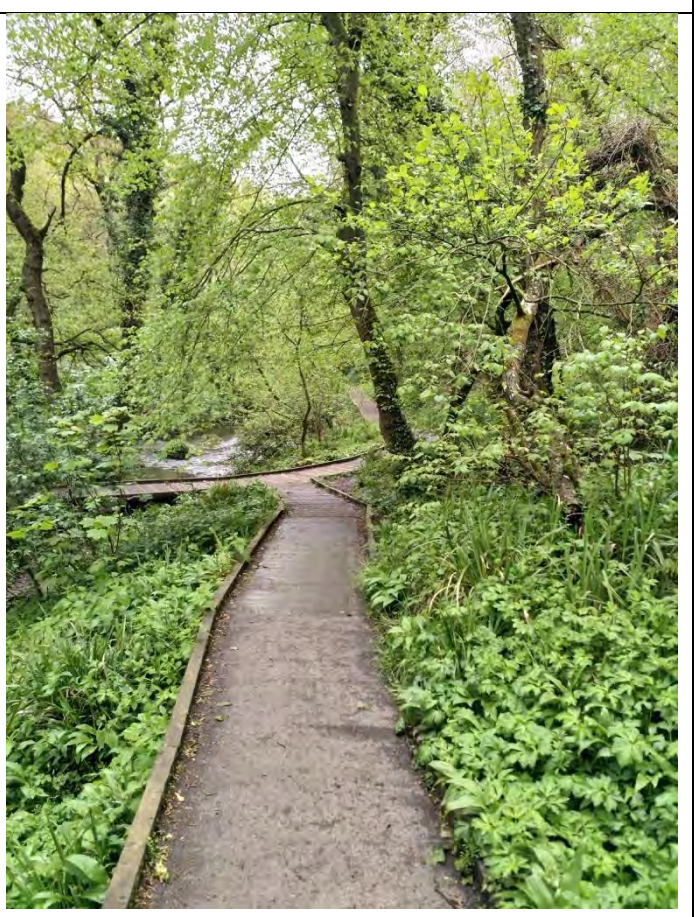
Location B5



Location B6



Location B7. Note the large, mature Sycamore restricting any widening of the path at that point.



Location B8.

Location B9

Appendix 4:

Eco North ECN18 218

Arboricultural Impact Assessment

Arboricultural Impact Assessment

Forge Valley, Yorkshire

September 2019

Final Report

Report Prepared For:	Project Ref: ECN18 218
Fairhurst 1 Arngrove Court, Barrack Road, Newcastle upon Tyne, NE4 6DB	Prepared By: David Beaver BA, HNC, (TechArborA)
	Non-technical Review By: Sarah Hawes
	Approved By: Jamie Macleod
	Date: 4th Sep 2019

eco NORTH
Ecological Consultants

Document Control

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
Draft V01	12/06/19	Initial to client	Not confidential	DB	SH	JM
Final V02	17/06/19	Amendment	Not confidential	DB	SH	-
Final V03	04/09/19	Amendment	Not confidential	DB	SH	-

Field Investigations and Data

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by EcoNorth Ltd. for inaccuracies in the data supplied by any other party.

Declaration of Compliance

"The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed within this document are our true and professional bona fide opinions."

Third Party Disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by EcoNorth Ltd. at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. No other warranty, expressed or implied is made as to the professional advice included in this report.

Contents

Non-Technical Summary

EcoNorth Ltd was commissioned by Fairhurst (henceforth referred to as 'the client') to supply a BS5837 Tree Survey for an area of Forge Valley, North Yorkshire.

The three sites have been surveyed in accordance with BS5837:2012 'Trees in Relation to Construction – Recommendations' to provide detailed, independent, arboricultural advice on the trees present, in the context of potential development.

Based on the findings of this survey, it is concluded that no significant impacts to the current established trees are predicted. Furthermore, any impacts will be within acceptable limits when the mitigation measures proposed in this report are applied.

The tree protection measures given in this report should be implemented to ensure tree health and safety. It is strongly recommended that the arboricultural protection measures are clearly communicated to the entire construction team prior to commencement – this process should involve the Local Planning Authority (LPA) so as to ensure any planning conditions are not breached. This is most effectively managed by monitoring the development on a regular basis, checking tree protection measures in relation to the Tree Protection Plan & Arboricultural Method Statement(s) and reporting to the LPA on a monthly basis.

The tree survey consists of 33 trees and 10 groups. 1 tree is retention category 'A', 33 trees or groups are category 'B', 7 trees or groups are category 'C', 1tree is category 'U' and 1 tree is dead and not recorded as in a retention category. All are detailed in Appendix C of the BS5837 Survey Report.

Category 'A' trees are high quality, high amenity trees which should be retained if at all possible. Category 'B' trees should be retained where possible, and protected throughout any new development. Category 'C' trees could be retained. Replacement planting is recommended for any category 'B' or 'C' trees that cannot be retained. Category 'U' trees should be removed.

Any changes to the constituents of a group of trees can lead to remaining trees being downgraded after removal.

The construction works may impact on some of the surveyed trees and require the removal of a small number of trees shown in the tree survey. The loss of these trees will have little negative impact on the overall amenity value of this site. The remaining trees surveyed should not cause any nuisance or hinder the development process if routine tree works are carried out on them.

1. Introduction

1.1 Background

EcoNorth Ltd was commissioned by Fairhurst (henceforth referred to as 'the client') to supply a BS5837 Tree Survey at the three sites of the proposed development of Forge Valley, North Yorkshire, (central grid reference: SE 98912 85680).

This report assesses the value of trees on the proposed development site and provides information of relevant protection measures during construction.

Specifically, this report:

- Provides an Arboricultural Impact Assessment (AIA) with regards to the proposal for the development
- Recommends measures that will suitably protect retained trees during the development process
- Recommends an appropriate level of mitigation and/or compensation where necessary

The report is based on the following document:

ECN18 218 Forge Valley, North Yorkshire, BS 5837 Tree Survey V01 (EcoNorth, 2019)

1.2 Site Context

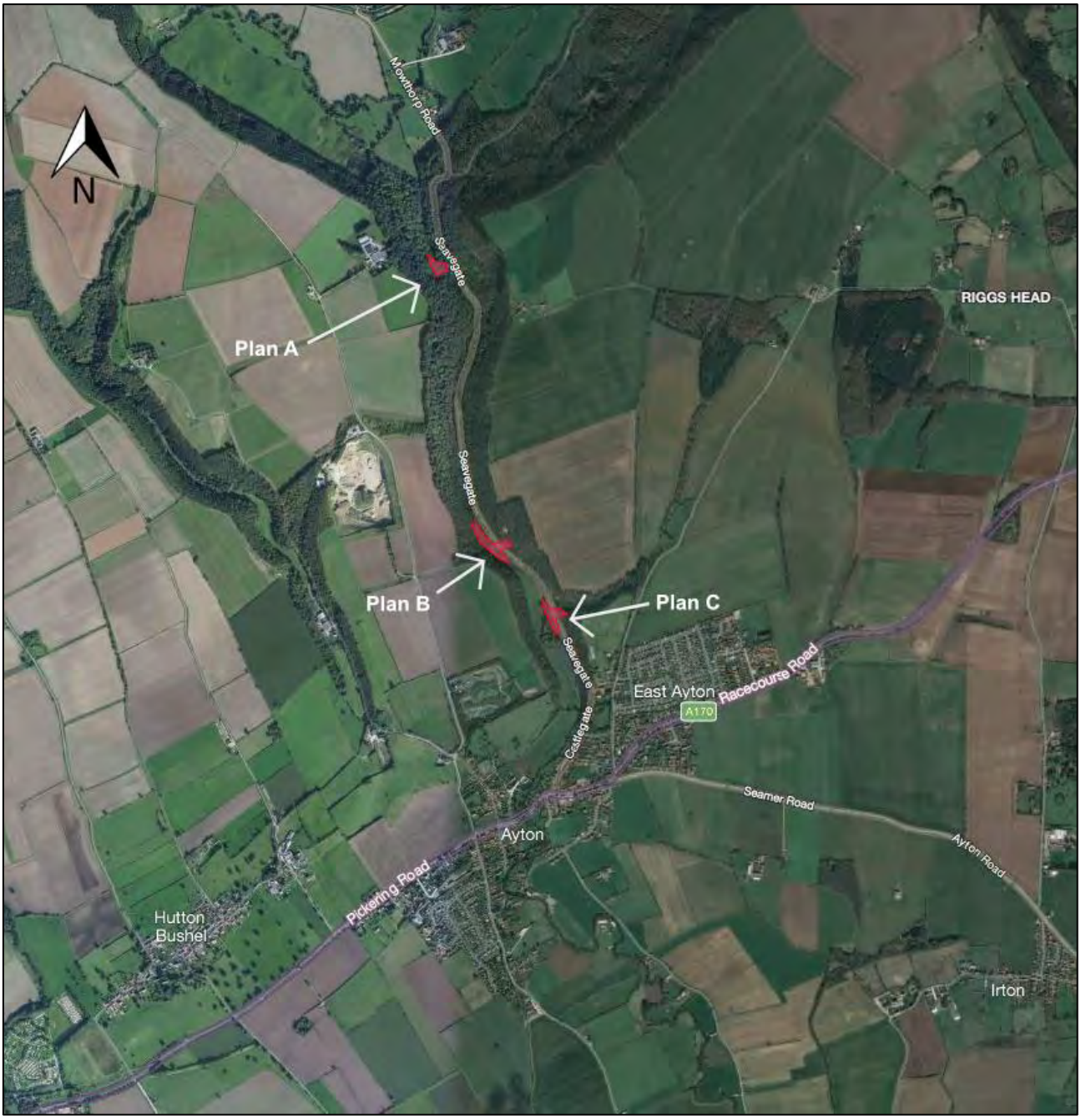
The three sites surveyed are located in Forge Valley, north of East Ayton, near Scarborough, North Yorkshire. It is accessible from Seavegate Road. Almost the entirety of Forge Valley lies within North York Moors National Park. The site is a Site of Special Scientific Interest.

The sites chosen for the proposed development are adjacent or opposite to current parking spaces as indicated in Figure 1. The tree cover is predominantly native broadleaf trees. No coniferous trees are present in the surveyed areas.

The trees surveyed are in mostly fair condition and the area showed evidence of previous management. The trees surveyed are highly suitable for the woodland location in terms of species and form.

The tree survey is limited to the site boundaries shown in Figure 1. Trees just beyond the red line boundary are measured only when they are considered to have potential impacts on the proposed development

Figure 1: Survey Areas of the Proposed Development (site boundaries outlined in red)



2. Limitations / Methodology

The original tree survey which forms the basis of this AIA was carried out by EcoNorth in May 2019 (BS5837 Tree Survey, EcoNorth 2019). The trees on site have been surveyed and classified in accordance with British Standard 5837:2012 'Trees in Relation to Construction – Recommendations'.

Trees are large dynamic organisms whose health and condition can change rapidly, therefore due to the changing nature of trees and other site considerations, this report and

any recommendations made are only valid for the 12-month period following the last site visit on 7th May 2019.

2.1 Third Party Liability

The limit of EcoNorth Ltd indemnity over any matter arising out of this report extends only to the instructing the Client. EcoNorth Ltd. cannot be held liable for any third-party claim that arises following this report. The content and format of this report are for the exclusive use of the Client. It may not be sold, lent, hired out or divulged to any third party not directly involved in the subject matter without the written permission of EcoNorth Ltd.

2.2 Subsidence Risk

This report is primarily concerned with the condition of existing trees and the application of current guidance for their retention. Any discussion of soil characteristics is only presented where this may have a direct effect on tree growth. This report does not seek to address the specific area of subsidence risk assessment.

2.3 Terminology

This report considers the arboricultural Impacts and Implications of the proposed development. Discussion and comment of Impact relates to the general nature/level of development, whereas Implications refer to specific issues relating to layout and individual trees/groups.

When describing impacts on arboricultural features, reference is made to the following parameters:

a) Positive or negative

b) National Joint Utilities Group (NJUG): Refers to "Planning, Installation and Maintenance of Utility Services in Proximity to Trees No. 4 (2007) Guidelines" describing advisable excavations around trees divided into protection zones

c) Magnitude: Refers to the 'size' or 'amount' of an impact, determined on a quantitative basis where possible

d) Root Protection Area (RPA): An area calculated in square metres by an arboriculturalist to provide sufficient protection of the tree root system. This will be indicated and provided on a plan

e) Construction Exclusion Zone (CEZ): Area designated to protect above and below ground tree parts in which no construction or excavation works can take place without express permission of the Arboricultural Officer. This will be indicated and provided on a plan. Fencing of 2.5m height of 'Heras' or similar type will surround this area until all works are completed

f) Extent: The area over which the impact occurs (magnitude and extent may be synonymous)

g) Duration: The time for which the impact is expected to last prior to recovery or replacement of the resource of feature. Defined in relation to the feature rather than human timeframes. The duration of an activity may differ from the duration of the resulting impact caused by the activity. For example, if short term construction activities cause soil compaction around mature trees, there may be longer term implications for tree health

h) Tree retentions and BS5837 categories:

- Category 'A' trees: These are high quality, high amenity trees which should be retained if at all possible. Significant amendments to the development should be considered before removing these trees
- Category 'B' trees: These are reasonably high-quality trees whose retention is desirable. Minor amendments to the development should be considered before removing these trees
- Category 'C' trees: These are lower quality trees, the removal of some of these should be considered acceptable, if required to facilitate the development'
- Category 'U' trees: 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

i) Reversibility: An irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible (temporary) impact is one from which spontaneous recovery is possible or for which effective mitigation is both possible and an enforceable commitment has been made

j) Timing and frequency: Some changes may only cause an impact if they happen to coincide with the critical life stages or seasons (for example, the bird nesting season). This may be avoided by careful scheduling of the relevant activities

k) Compensation: Measures taken to make up for the loss of, or permanent damage to, arboricultural resources through the provision of replacements

l) Enhancement: A new benefit unrelated to any negative impact

m) Impact: The way in which an arboricultural resource is affected by the project

n) Mitigation: Measures taken to avoid or reduce negative impacts

3. Site Description

The sites chosen are level and consists of wooded areas, riversides, hard-standing parking areas and informal parking areas. The overall feel is of a native broadleaf woodland offering good habitat and wildlife opportunities. The mature trees reach great height, but limited spread due to the valley location and the dense tree cover. The road and the river restrict the footprint of any development of the sites.

Almost the entirety of Forge Valley lies within North York Moors National Park. The site is a Site of Special Scientific Interest and therefore any development needs to be carried out with sensitivity and with minimal disruption to the natural flora and tree population, whilst balancing the need to manage the trees for safety and amenity value.

The surveys undertaken, and this report are limited to trees on the site plus any trees whose estimated RPA could fall within the proposed development area within the red boundaries marked in Figure 1.

4. Baseline Factors

The baseline survey data describes the conditions that would pertain in the absence of the proposed project at the time that the project would be constructed.

4.1 Presence of Tree Preservation Orders or Conservation Areas

Due to the large penalties for carrying out work to protected trees illegally, before authorising any tree works, a check by the tree owners (the Local Authority in this instance) should be made to see if the trees are covered by a Tree Preservation Order (TPO) or if they are within a Conservation Area.

4.2 Wildlife

It is a criminal offence to disturb or destroy – whether intentionally or recklessly – the nesting sites of wild birds or the roost sites of bats, under the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and the Habitats Regulations 2017.

Therefore, development works should avoid carrying out significant tree works during the bird nesting season (March to August, inclusive) and ensure that trees are surveyed for signs of bat roosts and/or bat activity before starting any tree work.

4.3 Existing Trees on Site

The volume of existing tree cover is large and densely growing, or planted in the case of the Plan B area.

The species mix is good, with mostly British native broadleaf species surveyed. Due to the growth pattern of the species and the close planting, there is some lower canopy close to and within the site boundaries. The current plan may create some conflicts with tree canopies and therefore some pruning and crown lifting would be needed to avoid removing trees unnecessarily.

The trees are diverse species, with a healthy mixture of ages, but as the trees are observed more predominantly as a collective, with very few noteworthy individuals, the individual importance of trees is lessened. Therefore, a small proportion of tree removals is considered acceptable as this would not impact significantly on the wider group.

A continuous crown cover for the site should be maintained for visual amenity value and to enhance and improve wildlife habitats.

The removal of any lower quality trees and pruning for access and safety of some of the better-quality trees should be acceptable providing that future management is maintained for health and safety. As part of this future management, supplementary tree planting to replace any lost category 'B' trees should integrate within the site for species selection and biodiversity.

The individual better quality, or mature trees, with good form should be retained and protected, where possible, for their future contribution to the area.

Notable arboricultural features and issues on or near to the site are as follows:

- A large, tall Lime (T007) (*Tilia* sp.) offers exceptional amenity and ecological value to the Plan C site. There are some growth peculiarities which are typical of this species but are not of major concern at this stage.
- A large Willow (T020) (*Salix sp.*) is heavily covered in ivy and makes a striking visual impact on Plan B.
- There are several coppiced and some single stem Alder trees (*Alnus glutinosa*) growing along the river bank. This is an ideal location for this species, where they are thriving and offering bankside integrity and stability and must be retained.
- Poor quality trees and dead trees e.g. T010 and T011(unable to identify the species in those two instances) would normally be removed on a development site, but it is recommended that within this SSSI and other natural woodlands that they are retained and allowed to decline naturally. They should only be removed if they will create a hazard to people, or if they conflict with the development and alternatives to the design are not practicable.
- Mixed, planted British Native species: Elm, Hazel, Alder, Ash, Birch, Rowan and Maples. Some naturally seeded sycamore and approximately 9 early mature or young, mainly category 'B' or 'C' trees within G034, would be removed to facilitate the construction of a new parking area. Tree guards still present on many of these trees. Some of these are causing stem growth constrictions or littering the floor. Removal or thinning within this group would be beneficial to the long-term viability of this area.

4.4 Root Protection Areas (RPAs)

The Root Protection Areas (RPAs) have been calculated in accordance with BS5837, and are detailed on the Tree Survey Plan (see Appendix E of the Tree Survey Report). Although the trees' RPAs are plotted as circles, due to the proximity of the trees to each other it is

recommended that the whole boundary areas be treated as an RPA, i.e. all site works are to be undertaken in a manner which is sensitive to tree roots, retain the existing ground levels, provide ground protection for access etc. Roots will be encountered beneath any of the chosen areas for new surfacing, fencing or pile construction and so the working process should take account of this.

Consideration for the retained trees' rooting areas should avoid significant ground works in the site area in order to ensure the protection of existing conditions. Specific attention must be paid to access, storage and tree protection measures.

It is sometimes possible to undertake construction activities within the rooting areas of retained trees which will require greater attention to the tree protection measures, phasing of works and construction processes etc. If it is proposed to undertake works within these areas, more specific advice should be sought from the accompanying method statement.

Table 1: Modified RPAs

Tree / Group Ref. No.	Reasons for Modifying RPA
Trees bordering the river or tarmac road surfaces.	These trees will have fewer water seeking roots where they could be submerged constantly or under impermeable road materials.
T038, T041, T042	A small percentage (> 15%) of the tree's RPA may be affected by the need for construction work or surface works under tarmac. Few of the water seeking roots will be in this area as it isn't a good area for the growth of tree roots. The ground level should remain the same according to the latest development plan, but surface materials may be changed/replaced. It is advisable that mechanical excavation is kept to a minimum and any exposed roots are avoided and protected. Materials and spoil should not be stored in this area. Work should aim to minimise root damage.
T002, T004, T007 and T020	Tree roots will be less extensive next to the road surface. Work is expected to take place in the zones where their roots will have compensated. It is advisable that mechanical excavation is kept to a minimum and any exposed roots are avoided and protected. Materials and spoil should not be stored in this area. Work should aim to minimise root damage. A surface should be laid that avoids digging and prevents soil compaction along new pathways. See method statement.

5. Implications Assessment

5.1 Above Ground Constraints

Effects of Repairs and Construction on Amenity Value on or Near the Site

Some of the existing trees located within the marked footprint of the ride and driveways may be removed to accommodate the design, but the design aims to integrate the better-quality trees into the construction where possible. Collectively, they screen the site offering good amenity value. It is desirable that replacement planting take place on the site to mitigate any loss.

Pruning and Felling Works to Facilitate Development

The poorer-quality trees can be removed as part of the site's safety measures in conjunction with site preparations and tree pruning works. However, in areas of ancient woodland it is important to retain fallen deadwood and trees showing signs of decline where they are not a threat to public safety. This also includes the removal of scrubby self-seeded saplings and ground cover in order to facilitate the proposals. It is important to note that the ground cover and self-seeded trees form an integral part of the site's character and future growth. Only the areas agreed for construction should be cleared and self-seeded trees could be utilised as part of the site's tree planting.

Developers should be aware of trees reaching their full growth potential. It is always prudent to provide adequate clearance from a tree's current crown for future growth, i.e. to allow a tree adequate space to reach maturity without conflicts with people and vehicles.

These removals should be acceptable providing that new landscaping is well demonstrated, aims to complement the existing and retained tree cover and demonstrates a commitment to the long-term enhancement of tree cover.

In conjunction with the tree removals indicated on the existing plan, any design revisions to accommodate more moderate quality trees should be approved in a final tree removal plan to easily identify the trees to be removed. On a site of this type, with closely growing trees this is best done by physically marking the trees for removing by spraying a cross on their stems to ease identification within the footprint and so protect the better quality retained trees. Failure to do this could lead to confusion and the unnecessary loss of better-quality trees that should be retained if possible.

The proposed works will entail the removal and protection of some trees as indicated in the survey recommendations. A protective surface to prevent soil and root compaction should be installed on the RPAs of retained trees if the use of plant, pedestrian zones or placement of heavy equipment is necessary in those areas; this should be installed as soon as practicable and before the commencement of any works.

Some trees within groups G027 and G034 could be removed for the development to proceed if it is not possible to integrate them within the design or are a safety risk. Most of the trees within those groups are recently planted and would normally be thinned out to improve growth of the remaining specimens. There was no evidence that this had taken place since planting. Some other smaller trees and shrubs that didn't meet the size requirement to be surveyed may need to be removed to facilitate access and as part of the development. Any category 'B' trees removed for construction will need to be replaced and a plan created demonstrating how any loss will be mitigated.

Where removal is to take place, suitable fencing as described in the method statement should be installed to protect remaining trees and to mark the areas to be left.

As per the tree survey recommendations, the pruning of some remaining trees' branches may be necessary as they will encroach below the clearance height for pedestrians in some instances.

Any remaining trees marked in the survey that are recommended for 'pruning', 'dead wood removal' or 'investigation' that are not within the construction zone should only require arboricultural work as part of normal tree management on the site.

Proximity of Trees to Structures

There are no built structures – apart from bankside bridge supports - in the sites surveyed.

5.2 Below Ground Constraints

Proximity of Trees to Structures

Below ground services were not available on the plan to determine if there will be conflict with RPAs. This could change closer to the construction date. These would have to be considered before construction takes place, though are unlikely to be affected by the trees at present.

Works Required within the RPA

Some construction work will occur within the RPA of trees as shown on the survey tree constraints plan (Figures A1, A2 and A3 in Appendix A). The removal of some surveyed trees is necessary for the construction to proceed. The remaining trees should not require removal or major works as long as tree root protection is in place. If work is unavoidable in these zones, then the Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (NJUG, 2007) should be followed to prevent damage to a large proportion of the tree roots of affected trees.

It is advisable that mechanical excavation within the RPA is kept to a minimum and any exposed roots are avoided and protected. Materials and spoil should not be stored in this area. Work should minimise root damage.

Ground Level Changes

Ground level changes should not be significant enough to impact on retained trees. Any ground level changes not indicated on the plan should occur outside the RPAs.

6. Construction Process of the Proposed Development

Development processes that lead to soil compaction in tree rooting zones and physical damage to trees can adversely affect long-term tree health. This can lead to unnecessary tree loss if not controlled properly on site during the building and the construction phases.

Due to the woodland nature and high volume of tree cover, there are limitations placed on access and site movements on the northern edge of the site and the removal of additional trees may be necessary where they are shown between access tracks and the proposed development. Where this is the case, suitable tree planting should concentrate on the areas which will enhance the future tree cover.

6.1 Tree Protection

No access to the RPA of any retained tree will be permitted before or during construction activity, unless detailed in an Arboricultural Method Statement or otherwise agreed in advance with the LPA following advice from the appointed specialist.

The processes of construction are unlikely to have a detrimental effect upon the health of the retained trees. This is assuming recommendations made in this report are adhered to at all times by the contractors e.g. the positioning of a stout fence between the retained trees and construction activities is placed prior to commencement of works and remains intact and in position throughout the duration of the construction activities.

BS5837 recommends that retained trees (and areas suitable for new planting) are incorporated into Construction Exclusion Zones (CEZ's) and suitably protected throughout the development process. The CEZ's are clearly marked on the Tree Protection Plan, modified by EcoNorth Ltd, which accompanies this report (see Appendix A).

The development will be carried out in the following order:

1. Remedial tree works undertaken
2. Tree protection fence installed
3. Development of site
4. Removal of tree protection fence

7. Infrastructure Requirements – Highway Visibility, Lighting, CCTV, Services

The installation of services within the rooting zones of trees can have a large detrimental impact on the long-term survival of retained trees leading to their unnecessary loss or root failure in high winds. No services are to be installed within any remaining tree's RPA at present.

Undisclosed locating of above ground services, CCTV cameras, electrical sub-stations, refuse stores, lighting and other infrastructure requirements can lead to unnecessary pruning of tree crowns or root loss during or post development. It is not known whether such developments are planned to take place adjacent or within the RPA of any retained trees outside the surveyed area.

Underground services near to trees will need to be installed in accordance with the guidance given in BS5837 together with the Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (NJUG, 2007).

8. Mitigating Tree Loss / New Planting

Should any trees be lost due to the development these will be replaced with similar on this site therefore a landscape plan should be drawn up if this is considered necessary. This plan should incorporate management of the existing vegetation and new planting of trees sympathetic to the environment and to the benefit of the new development and the surrounding landscape. This planting should specifically be designed to help compensate for some tree loss. Spatial constraints for areas in which trees are to be planted should be considered within the species selection process.

Where new tree planting is planned, it is imperative that consideration is given to future management and maintenance.

9. Impact Assessment

The proposed works will have little arboricultural effects on the surrounding site as a whole, but the developers are acutely aware of the site's sensitivities and have endeavoured to minimise loss and aim to replace any losses. In the context of sustainability, the development plan shows that the impact on significant trees that conflict with the design have been highlighted and carefully considered. Any long-term effects could be easily mitigated with future new planting and renewal.

The arboricultural aspects of the development to be measured/assessed is in line with Department for Communities and Local Government (DCLG) Planning Policy, for example:

PPS 1 **–** Protection and Enhancement of the Environment **-** *"Planning should seek to maintain and improve the local environment and help to mitigate the effects of declining environmental quality" and "to protect and enhance the quality, character and amenity value of the countryside and urban areas as a whole."*

PPS 9 **–** Key Principles **-** *"Development should take a strategic approach to the conservation, enhancement and restoration of biodiversity and geology, and recognise the contributions that sites, areas and features, both individually and in combination, make to conserving these resources."*

PPS 3 **–** When Assessing Design Quality **-** *"The extent to which the proposed development...provides for the retention or re-establishment of the biodiversity within residential environments."*

The retained trees may require some minor pruning over the 10-20 years following completion of the development, but the level of pruning is likely to be minor with a low impact on the trees' health and amenity value.

10. Post Development Pressure

The level of tree management required should be low and similar to that required as part of the normal management of the spaces regardless of the proposed development. In consideration of these matters, there will be no appreciable post development pressure,

and none that would oblige the Local Planning Authority to give consent to inappropriate tree works.

11. Conclusions

The plan should be adapted to the requirements of the proposed work by protecting most existing trees and planting suitable replacement species where possible.

The work may entail the removal of a small number of trees and surrounding shrubs to enable construction of the parking areas and the bridge supports on the banks. The loss of this vegetation can be mitigated with new planting and/or management of the existing vegetation.

The courses of new footpaths are very respectful of the tree roots of existing trees to be retained, with only minor intrusion into their RPAs which could be protected with sensitive installation of new surfacing. This should remain unchanged throughout the construction process. Any changes to the design during construction should not proceed until the arboriculturalist has been consulted.

The proposals are acceptable, provided correct methods are employed and especially if replacement measures and protective measures are carried out when practicable.

12. Recommendations

It is strongly recommended that the arboricultural protection measures are clearly communicated to the entire construction team prior to commencement – this process should involve the LPA so as to ensure any planning conditions are not breached. This is most effectively managed by monitoring the development on a regular basis, checking tree protection measures in relation to the Tree Protection Plan & Arboricultural Method Statement(s) and reporting to the LPA on a monthly basis.

All tree work should be undertaken by trained and competent personnel to current industry standards and guidance.

Please note: The statements made in this report do not take account of extremes of climate, vandalism or accident, whether physical, chemical, or fire. EcoNorth Ltd. cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this report ceases at any stated time limit within it, or if none stated after two years from the date of the survey or when any site conditions change or pruning or other works unspecified in the report are carried out to, or affecting, the subject tree(s), whichever is sooner.

13. References

BSI (2012). *Trees in Relation to Design, Demolition and Construction-Recommendations (BS5837:2012)*. British Standards Institute, London.

National Joint Utilities Group *NJUG Volume 4 - Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees'* (NJUG, 2007).

EcoNorth Ltd., (2019). ECN18 218 Forge Valley, Yorkshire BS5837 Tree Survey, Unpublished.

Appendix A – Tree Protection Plans

Figure A1: Tree Protection Plan A (Construction Exclusion Zones (CEZs) marked by orange dashed line). Yellow zones indicate areas where temporary access will be required to the CEZ.

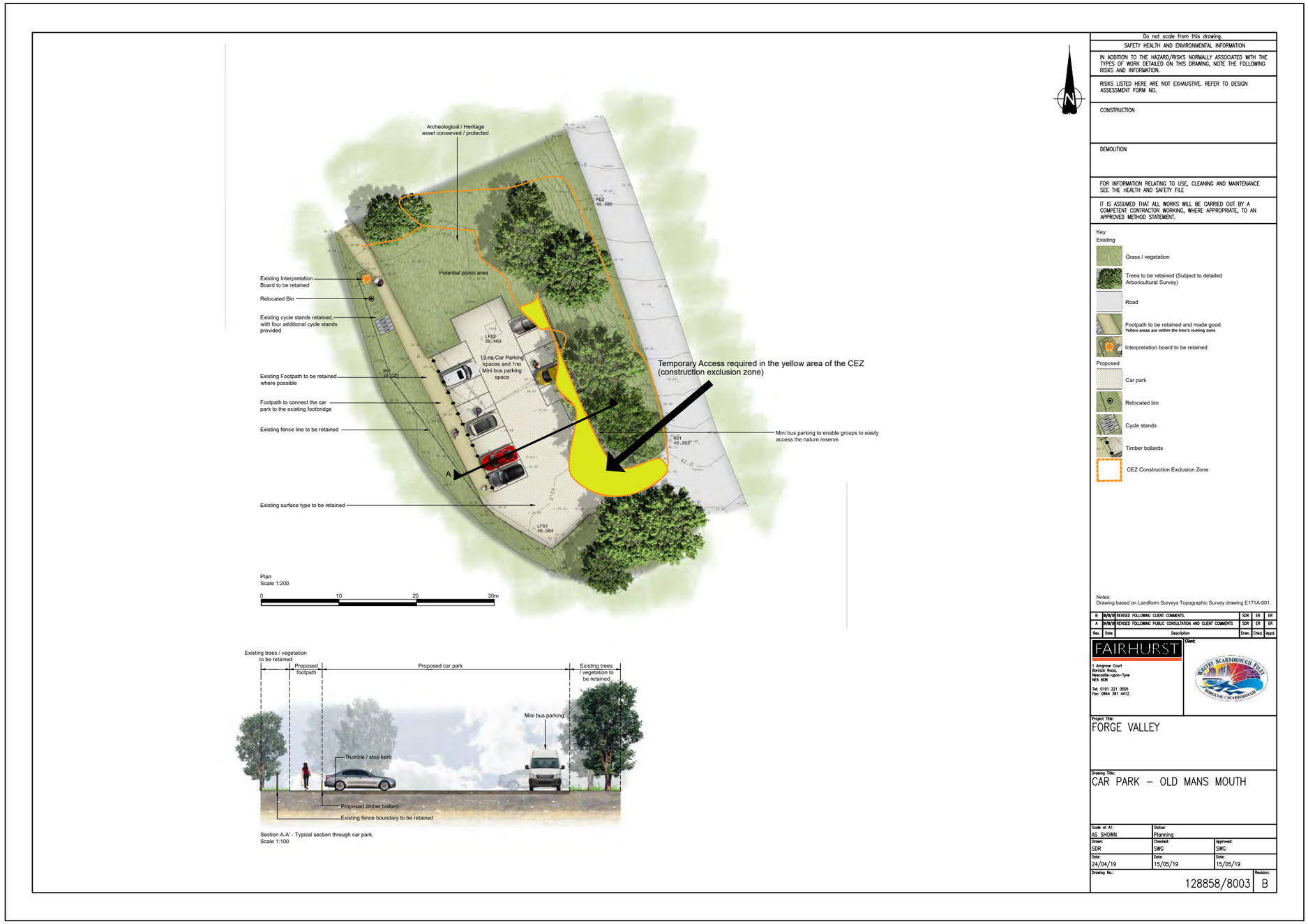
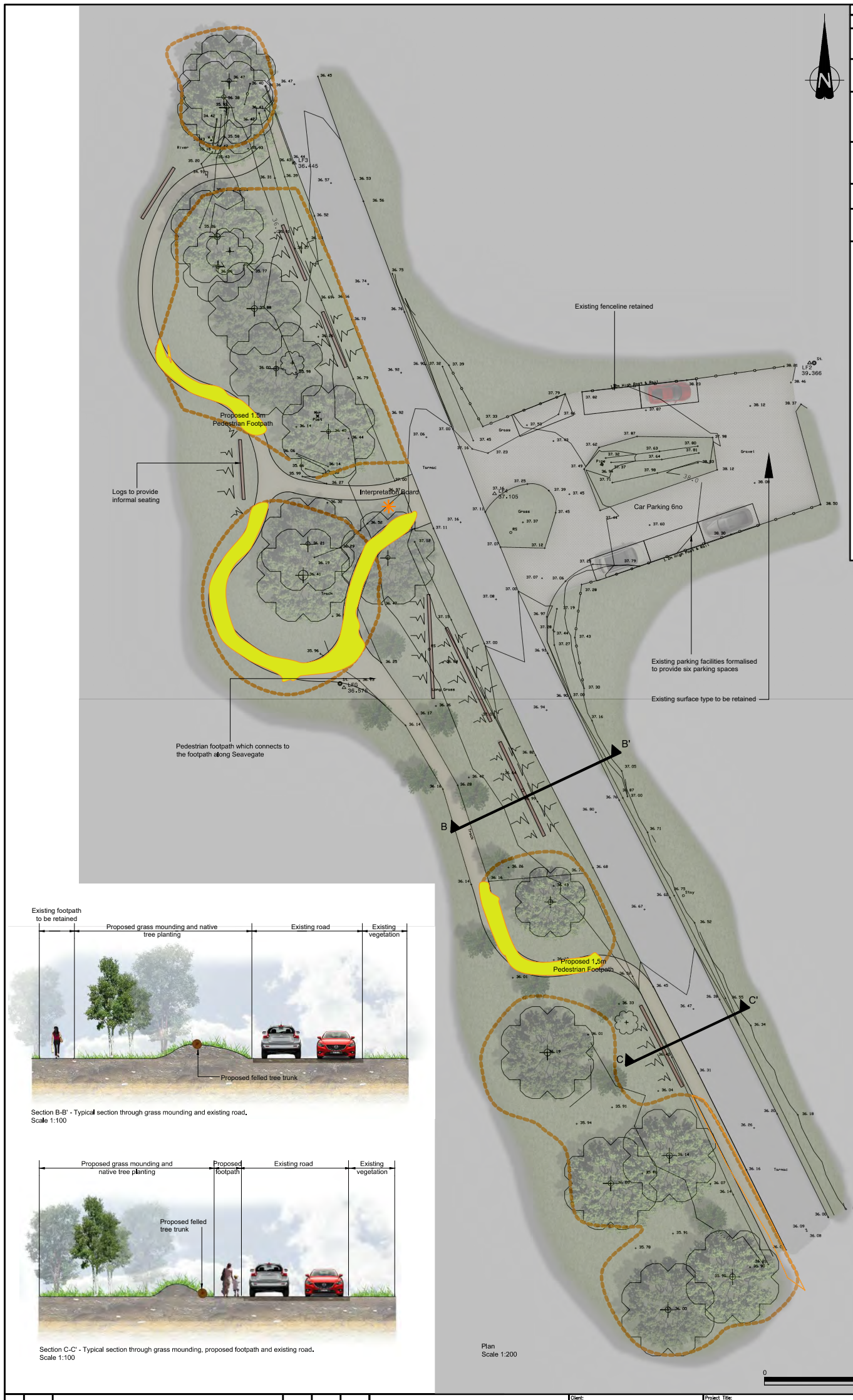


Figure A2: Tree Protection Plan B

Figure A3: Tree Protection Plan C



Appendix B – Site Specific Method Statement

Method Statement for Tree Protection Throughout the Development & Construction Period

The following Arboricultural Method Statement (AMS) refers to the Tree Protection Plan (TPP) above prepared by EcoNorth Ltd. to identify:

- Trees to be retained
- Construction Exclusion Zones (CEZ)
- Measurements to identify CEZ in relation to centres of trees

Summary

There are several woodland trees which will need to be removed before construction can take place and the remaining trees will require protection throughout. Due to the close planting of the trees and the construction technique to be used, the whole area is to be treated as vulnerable to soil compaction to varying degrees. Undeveloped areas are to be protected by Construction Exclusion Zones (CEZ's) as recommended in BS5837: 2012 and as shown on the Trees Protection Plan (TPP). Trees to be removed should take place pre-construction after being physically marked to protect retained trees. The work should be in accordance with instructions from a consultant arboriculturalist. Once tree removal has taken place fencing should be installed, followed by ground protection measures where practicable. This fencing and ground protection should be removed at the end of final construction.

Construction Exclusion Zone

The Construction Exclusion Zone (CEZ) required by the current edition (2012) BS5837 Trees in Relation to Construction relates to the stem diameter of each tree when measured at a height of 1.5m from ground level, adjusted where necessary to account for actual rooting patterns on site. In some instances, such as this one, where there is an overriding justification for construction within the RPAs, the location of protective barriers to be erected has been adjusted to form a CEZ that affords sufficient tree protection yet allows for the development to take place. The CEZs are to be afforded protection at all times and will be protected by robust fencing. No works should be undertaken within any CEZ that causes unnecessary compaction to the soil or severance of tree roots.

There are construction operations planned within the RPAs, but these should aim to be as non-destructive as practicable as described in 6.2 'Works required within the RPA.'

The zones have been created to protect significant groups of trees – including category 'A' trees which are within the construction zones for the development. Where some category 'B' trees to be retained have root protection areas which encroach into the development area, the CEZ has been modified slightly to allow for some non-destructive work to take place.

Root Protection Areas

Based on the tree survey data, Root Protection Areas (RPA's) have been determined for every retained and surveyed tree. The RPA's are designed to protect at least a functional minimum of tree root mass in order to ensure that the trees survive the construction process.

It is the responsibility of everyone engaged in the construction process to respect the tree protection measures and observe the necessary precautions within and adjacent to them.

Inside the exclusion area of the Protective Fencing, the following shall apply:

- No mechanical excavation
- No excavation by any other means without arboricultural site supervision.
- No hand digging without a written method statement having first been approved by the developers arboriculturalist.
- No ground level changes whatsoever.
- No storage of plant or materials.
- No storage or handling of any chemicals.
- No vehicular access.

Protective Fences

A protective fence will be erected prior to the commencement of any site works (e.g. before any materials or machinery are brought on site), development or the stripping of soil commences. The barrier will have signs attached to it stating that this is a Construction Exclusion Zone and that NO WORKS are permitted within the barrier. The barrier may only be removed following completion of all construction works.

The fence is required to be sited in accordance with the Tree Protection Plan enclosed with this method statement as Appendix A. The fence must ideally be constructed as per Figure A1 in BS 5837:2012 and be fit for the purpose of excluding any construction activity (see Appendix 1.2 of British Standard). Barriers should be fit for the purpose of excluding construction activity, and appropriate to the degree and proximity of work taking place around the retained trees. On all sites, special attention should be paid to ensuring that barriers remain rigid and complete.

Should any alternative method of barrier construction be proposed, consultation with the developers arboriculturalist will be obtained to clarify the efficacy of the revised design prior to informing the local planning authority and obtaining their consent.

Once the exclusion zone has been protected by barriers and/or ground protection, construction can commence. All weather notices should be fixed to the barriers with the words: 'Construction exclusion zone – Keep out' or similar.

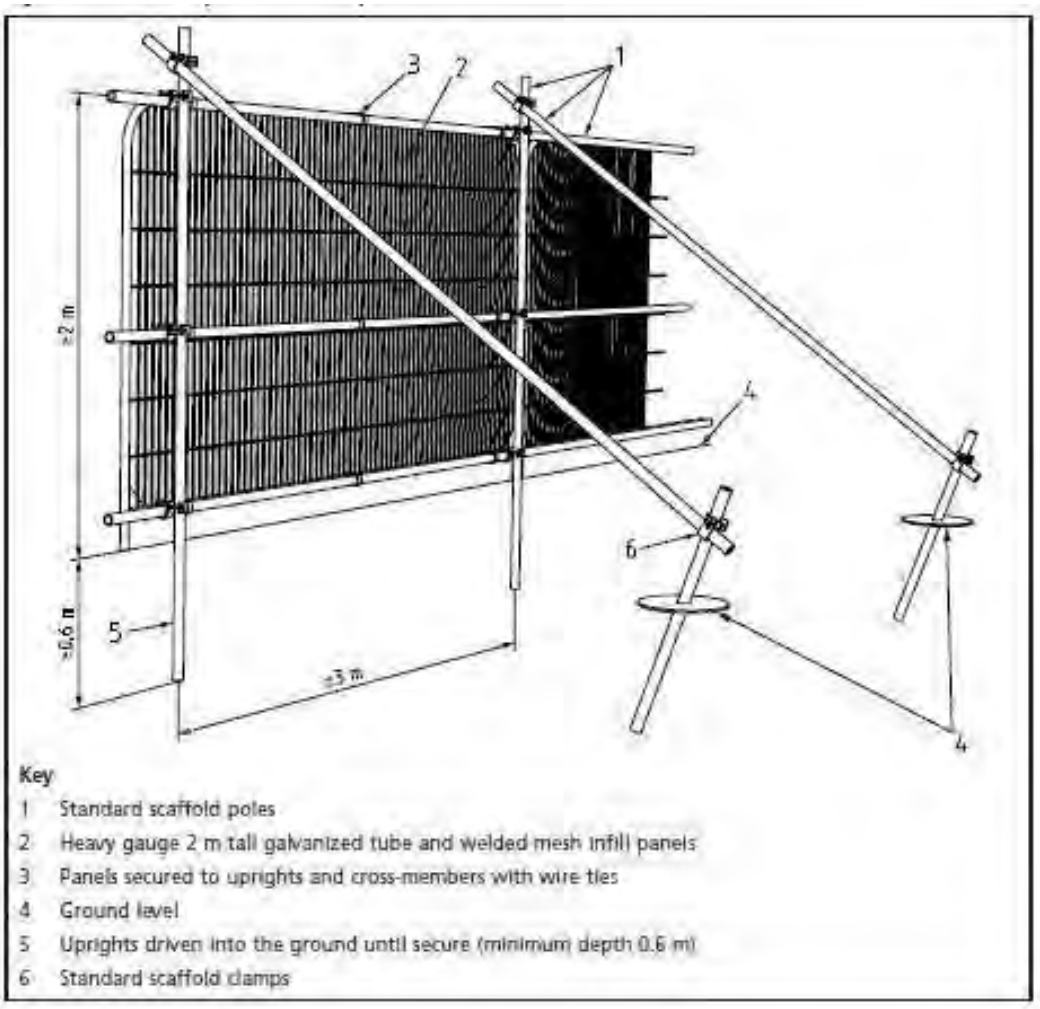
There are no new accessible areas of planting to be protected during the construction phase. The level of construction on site would be suitably excluded from the CEZ with any

barrier type construction, coupled with the designated site manager to formally brief any construction personnel with regard to the contents of this method statement.

No access to the sites from any other part of the property than the existing entrances will be permitted for construction traffic or delivery of supplies.

Figure B1 - Example Specification Tree Protection Fence

See Tree Protection Plan



Precautions in Respect of Temporary Works

If temporary access is required to a CEZ then access may only be gained after consultation with the Local Planning Authority and following placement of materials such as concrete slabs or geo-textile fabrics that will spread the weight of any vehicular load and prevent compaction to the soil. For pedestrian movements within any CEZ then a single thickness scaffold board on top of a compressible layer laid onto a geotextile fabric may be acceptable.

According to the current proposal, access into the RPAs of the following trees and groups may be required: T001 – T009, many of the trees within Plan B - especially within G034 and within parts of Plan A, although the exact design proposal had not been created at the

time of this report. Access to these areas should be kept to a minimum (see Tree Constraints Plan).

Access Details

It would be suitable to consider the current driveway as the sole vehicle access onto the site section, the parking area as the storage section and the remainder of the site as an area requiring temporary ground protection measures for pedestrian access

Contractors Car Parking

Within the existing hard standing area.

Storage Space

The storage space will be allocated within the development's compound area.

Additional Precautions

There are no services planned to be installed within the CEZs at present.

No storage of materials, lighting of fires will take place within the CEZ. No mixing or storage of materials will take place up a slope where they may leak into a CEZ.

No fires will be lit within 20 metres of any tree stem and will take into account fire size and wind direction, so that no flames come within 5m of any foliage.

If there is a requirement to use cranes or high sided vehicles during the construction process, then a method statement will be supplied, and approved by the LPA, to ensure that there is no damage to the retained trees.

No notice boards, cables or other services will be attached to any tree.

Materials which may contaminate the soil will not be discharged within 10m of any tree stem. When undertaking the mixing of materials, it is essential that any slope of the ground does not allow contaminates to run towards a tree root area.

Site Gradients

No alterations of soil levels will take place to trees near to the site.

Demolition

No demolition work should take place, only removal of vegetation, fencing and kerbing.

If at a later date some demolition is required then this should be carried out by hand where possible or using plant which is supported on material that spreads the weight of the vehicle (see Precautions in Respect of Temporary Works above). Also, it is important that all the removal takes place in the smallest area practicable within the root protection area (RPA) to prevent soil compaction. All waste material should be removed from the RPA within the CEZ as soon as possible and the removal process should avoid those areas in the RPA which will not be landscaped to prevent accidental damage to the trees' stems.

No reduction in levels of the underlying soil surface will occur.

The underlying soil may be levelled by the addition of up to 100mm of good quality top soil to BS 3882: 1984. Hand tools only will be used for any levelling works; this work will not disturb the underlying soil.

Should any roots over 25mm diameter, have grown above the final soil level and be a hindrance to the final surface installation, their removal will only be carried out under arboricultural supervision and with the approval of the Local Planning Authority.

If the area around the retained trees is to be left following the removal of the existing hard surface, before a new hard surface is laid or soft landscaping implemented, then the line of protective fencing must be correctly re-established immediately after the hard surface removal work has been completed.

If, for whatever reason there is a delay before the area is left exposed prior to awaiting a new surface, then a temporary surface must be implemented, or the area fenced off.

Some construction with regards to the footpaths may be required within the RPA of the trees. This will be carried out employing the no dig method and the construction will be Cellweb based with resin bonded gravel top surface.

The construction of new surfacing around the trees should take place as soon as possible to prevent damage to any exposed roots.

Any accidental damage or noticeable changes to the trees should be reported to the site foreman and the Arboriculturalist as soon as possible to assess any risks to personnel on the site and to the wider public.

Hard Surfaces

Some hard surfaces may be constructed within the CEZ, but guidance should be followed to minimise damage as described in Appendix D.

Gravel could be used and retains its porosity unless excessively consolidated and is particularly useful where changes of level occur, or an irregular shape is needed around the stem of a tree. Gravel is easily renewed or topped up. Although weeds may become established, they can be controlled by chemical or mechanical means. However, gravel is rarely suitable for use where there is vehicle or pedestrian traffic.

Materials with a high fines content, such as binding gravels or hoggin, should not be used due to their almost impermeable texture when consolidated. Therefore, a resin bound gravel should only be used if a porous type is used as these surfaces can consist of porous or impermeable material. As the interstices in unsealed tar paving will eventually become blocked by fines, it is advisable for such surfaces to be laid following the same principles as those for impermeable surfaces, therefore its use within the RPA also needs to be restricted in heavily used areas where loose gravel is not practical.

Paving slabs and block pavers are available with built-in infiltration spaces between the slabs or blocks. These are ideal, though they should be laid dry-jointed on a sharp sand foundation to allow air and moisture to penetrate to the rooting area.

The excavation needed for the placement of kerbs, edgings and their associated foundations and haunchings can damage tree roots. Within the RPA, this should be avoided either by the use of alternative methods of edge support or by not using supports at all. For example, where kerbing is required for light structures, such as footpaths, peg and board edging may be acceptable and offered as an alternative within the RPA of the design. Where it is necessary to pin kerbing in place, the pins should, where practical, be located clear of any major tree roots visible on the surface.

Soft Landscaping

Soft landscaping should be carried out in parts of the site and where this is being proposed, tree protection fencing has been omitted on the presumption that no heavy plant or vehicular access will be required in the root protection areas of the trees in these zones. It is recommended that replacement planting take place upon completion of all construction work. If this is adopted, then details will be supplied to and agreed by the LPA prior to the commencement of works.

Use of Herbicides

Herbicide use should not be required on this site and should be avoided where possible, especially close to retained vegetation.

On Site Monitoring Regime

The tree protection measures shall be monitored by the site foreman.

The contractor / site manager shall contact the appointed specialist if any changes occur to the proposed boundary which may affect trees on the. The appointed specialist shall recommend an action plan to incorporate mitigation measures where necessary.

Use of Subcontractors

The main contractor will be responsible for ensuring sub-contractors do not carry out any process or operation that is likely to adversely impact upon any tree on site.

Contingency Plan

Water is readily available on site and will be used to flush spilt materials through the soil and avoid contamination to tree roots. At the time of any spillage the main contractor will contact an arboriculturalist for advice.

Remedial Tree Works

Tree works (see schedule in Table C1 of Appendix C - Tree Work Schedule) will be undertaken prior to the commencement of works. All tree works are to be carried out in accordance with BS3998 (British Standard Recommendations for Tree Works 2010).

Responsibilities

It will be the responsibility of the main contractor to ensure that the planning conditions attached to planning consent are adhered to at all times and that a monitoring regime in regard to tree protection is adopted on site.

The main contractor will be responsible for contacting the Local Planning Authority at any time issues are raised related to the trees on site.

If at any time pruning works are required, permission must be sought from the Local Planning Authority first and then carried out in accordance with BS3998 Recommendations for Tree Works 2010.

The main contractor will ensure the build sequence is appropriate to ensure that no damage occurs to the trees during the construction processes. Protective fences will remain in position until completion of all construction works on the site.

The fencing and signs must be maintained in position at all times and checked on a regular basis by an on-site person designated that responsibility.

Ground Protection

Any new gravel tracks and access routes should aim to provide as great a clearance from tree stems as is possible. However, as the whole site area is to be considered as a potential rooting area, for the ground works construction methods (hard surfacing, walls etc.) the construction process should aim to retain the existing ground levels, work sensitively and using a no-dig design where practicable.

Any ground protection to be installed in locations shown on the TPP must be strong enough to support any predicted load and resist compaction and soil damage.

The primary method of protecting the ground when erecting scaffolding within RPA's is by installing geotextile fabric and side butting scaffolding boards on a compressible layer such as bark chippings on a geotextile membrane.

The scaffolding may be erected first with the uprights placed on spreader boards and the ground protection installed around the uprights.

The boarding will be left in place until the building works are finished.

A single thickness of boarding laid on the soil surface will provide sufficient protection for pedestrian loads. However, for wheeled or tracked construction traffic movements within the RPA, ground protection should be designed by the project engineer to accommodate the likely loading and may involve the use of proprietary systems such as three-dimensional cellular confinement systems and approved for use by the developers arboriculturalist and local authority before any works start.

The ground beneath any protection boarding will be left undisturbed and will be protected with a porous geotextile fabric. If necessary, sand should be laid on the fabric to level the ground.

Avoiding Crown and Stem Damage

Great care must be exercised when working close to retained trees. Plant and machinery with booms, jibs and counterweights and the passage of tall or wide loads etc., should be controlled by a banksman to maintain adequate clearance.

Access facilitation pruning shall be kept to the barest minimum necessary to facilitate development and shall be carried out in strict accordance with the tree surgery guidance. Under no circumstance shall construction personnel undertake any tree pruning operations.

The design and layout of the site is to incorporate the components of any retained trees (crown and rooting area) and provide a suitable level of clearance to allow for their long-term safe retention, i.e. exclude standard construction techniques and new compacted surfaces from RPAs, use ground protection and provide crown clearance (including new tree planting).

The canopies of some trees surveyed do not always provide a suitable level of clearance to allow for construction without impact on the upper live crown growth. Some lifting and pruning of the crown may be needed to enable access for plant and machinery. It is far better to prune lower branches correctly to BS3998 than to rectify damage from high vehicles or plant conflicting with the crown. The removal of deadwood and dead branches (back to tree stems) is also anticipated which will have no impact on the trees or their amenity.

Installation of Underground Services

Every effort should have been made to ensure the routing of services does not encroach into RPA's, if for whatever reason installation within RPA's is required, the developer's arboriculturalist and local authority must be notified prior to any tree protection barrier removal and the following details adhered to.

Trenching for the installation of underground services severs any roots present and may change the local soil hydrology in a way that adversely affected the health of the tree. For this reason, particular care will be taken in the routeing and methods of excavation used. At all times where services are to pass within the Root Protection Area, detailed plans showing the proposed routeing will be drawn up in conjunction with an arboriculturalist. Such plans will also show the levels and access space needed for installing the services.

The preferable method for trenching within RPA's to avoid damage is via excavation using 'airspade' or similar. This tool utilises compressed air to remove soil from around tree roots causing minimal damage. This approach should be utilised whenever possible.

Trenchless technology, such as thrust boring can be used in some instances and is particularly effective as it can pass directly under the tree, at a depth which is likely to avoid almost all impact on roots of the subject tree. As no access/thrust pits will be located within the RPA's of the subject trees, the need for arboricultural supervision is limited.

Reference can be made to National Joint Utilities Group Volume 4, Issue 2 for guidance, but any approach must be approved by the developers arboriculturalist and brought to the attention of the local authority tree officer.

Development notes.

BS5837: 2012 states:

In order to avoid disturbances to the physical protection forming the construction exclusion zone once it is installed, it is essential to consider, make allowances for and plan all construction operations which will be undertaken in the vicinity of the trees, in particular:

- Site construction access
- The intensity and nature of the construction activity
- Contractor's car parking
- Phasing of construction works
- The space needed for all foundation excavations and construction works
- The availability of special construction techniques
- The location and space needed for all service runs including foul and surface water drains, land drains, soakaways, gas, oil, water, electricity, telephone, television or other communication cables
- All changes in ground level, including the location of retaining walls, steps and making adequate allowance for foundations of such walls and back fillings;
- Spaces for cranes, plant, scaffolding and access during works
- Space for site huts, temporary latrines (including their drainage) and other temporary structures
- The type and extent of landscape works which will be needed within the protected areas and the effects these will have on the root system
- Space for storing (whether temporary or long-term) materials, spoil and fuel and the mixing of cement and concrete
- The effects of slope on the movement of potentially harmful liquid spillages towards or into protected areas

Types of hard surfaces and their suitability in proximity to trees

General

If a hard surface is proposed above the granular material, a permeable and gas-porous finished surface (wearing course) should be installed.

In some situations, consideration should be given to constructing the final surface prior to the main building works, so as to provide protection for the roots at subsequent stages. However, it may be desirable to protect the final surface from drainage with a temporary covering.

Washed gravel

Washed gravel retains its porosity unless excessively consolidated and is particularly useful where changes of level occurs or an irregular shape is needed around the stem of a tree. Gravel is easily renewed or topped up. Although weeds may become established, they can be controlled by chemical or mechanical means. However, gravel is rarely suitable for use where there is vehicle or pedestrian traffic for example, in residential areas. Materials with a high fines content, such as binding gravels or hoggin, should not be used due to their almost impermeable texture when consolidated.

Paving slabs and block pavers

Paving slabs and block pavers are available with built in infiltration spaces between the slabs or blocks. These are ideal, though they should be laid dry-jointed on a sharp sand foundation to allow air and moisture to penetrate to the rooting area.

In situ concrete

As in situ concrete forms an impermeable surface, falls and openings should be provided for water and air to enter the soil. This can be achieved by forming 50mm diameter holes in the construction of a slab at regular spacing's of 300-600mm (as determined by an engineer) and back-filling the resulting holes with no-fines gravel or aggregate. A high standard of material and workmanship is needed if frost damaged and excessive wear are to be avoided.

Bitumen paving

Bitumen paving can consist of porous or impermeable material. As the interstices in unsealed tar paving will eventually become blocked by silt, all such paving should be laid following the same principles as those for impermeable surfaces. Its use within the RPA should, therefore, be restricted to the following parameters: new impermeable surfacing within the RPA should be restricted to a maximum width of 3m and situated tangentially to one side of a tree only, or confined to an area no greater than 20% of the RPA whichever is smaller.

Edge supports

The excavation needed for the placement of kerbs, edgings and their associated foundations and haunchings can damage tree roots. Within the RPA, this should be avoided either by the use of alternative methods of edge support or by not using supports at all. For example, where kerbing is required for light structures, such as footpaths, peg and board edging may be acceptable. For more substantial structures, such as estate roads, railway sleepers may be acceptable, retained in place with track pins or road pins. In some situations, for example where the roadway needs to traverse a lateral slope, gabions could be used to provide a kerbing solution (in this example, the gabions are installed on the down-hill side of the road). Gabions can be inter-linked, or pinned in place. Where it is necessary to pin kerbing in place, the pins should, where practical, be located clear of any major tree roots visible on the surface.

Appendix C – Tree Work Schedule

Sequence of Events

The following sequences are governed by operational constraints and subject to change. The developers arboriculturalist must be noted of any changes to this schedule:

Pre-development Stage

- Pre-commencement site meeting between Local Planning Authority, client and developer's architect. This meeting must take place before any development activity begins to confirm the timing and implementation of the agreed Tree Works and installation of tree protection measures
- Clearly mark trees to be removed. This is to avoid confusion as the trees are closely grown, especially in G027 and G034 and it will be very difficult to identify which tree is included in the removal schedule.
- Removal of trees directly/indirectly impacted by development
- Pruning of trees directly/indirectly impacted by development. Remove branch cover back to the stem of any retained trees around the tree houses, pods and parking areas after the site footprint has been marked out
- Tree protection fencing erected
- Site to be inspected by developer's arboriculturalist

Development Stage

- This stage is subject to site monitoring visits by the developer's arboriculturalist at intervals as agreed at the pre-commencement site meeting. These visits are to ensure that the agreed protection measures are functional and correctly achieving their purpose
- For any site preparations, including the vegetation strip etc., the removal of existing built structures or site features, tracks, walls, kerbs or hard surface sections, to be undertaken with great care, i.e. within the potential rooting areas of trees. Works of this nature should be undertaken by hand with hand operated non-mechanical tools and maintain the existing soil levels
- Site made accessible to construction traffic
- Any removal of existing gravel tracks and unmade paths as well as the installation of new gravel track and unmade path sections are to be undertaken sensitively. If

  undertaken by the use of machinery, tree root damage is anticipated, however, due to the small-scale nature of the works, manual operations are expected. As these techniques are being used throughout the Holiday Village without a negative impact on existing trees, the previous installation methods are considered acceptable
- Removal of Protective Fencing as agreed by the developers arboriculturalist

- Hard and soft landscaping implemented

Supervision will require the arboriculturalist to be present throughout some tasks, to ensure the arboricultural objectives are met.

If the task is to take a long period of time, provided the arboriculturalist is satisfied, the supervision may be reduced to telephone or email contact between the site Project Manager and the arboriculturalist.

The local authority arboriculturalist will have free access to the site and pass any recommendations direct to the developer's arboriculturalist.

Any alterations to the Protective Fencing should be approved by the developer's arboriculturalist and Local Authority arboriculturalist.

The following tree works are required to allow construction to commence and to address safety concerns (Table C1). This should take place after tree protection fencing has been put in place throughout the site. The order of works may be modified depending on the method statement for the redevelopment works:

Table C1: Required Tree Works

Tree No.	Works
All trees	Install protective fencing around the CEZ as shown in the Tree Protection Plan in Appendix A, figure1
Any small trees within the survey areas not shown in the survey and shrubs	Remove trees and shrubs required for development
T010 and T011	Remove trees– if within the development footprint. Leave for wildlife purposes if not.
Marked trees within Groups G027 and G034	Remove marked trees only where required or where an individual within the groups would fall within category 'U'.
Any trees with crown clearances under 3m for pedestrians and 5m if likely to conflict with vehicles	Crown lift for pedestrians and vehicles where necessary.

Control measures:

- All tree removals and pruning to be approved by LPA if TPO/CA constraints apply.
- All tree removals to take place following approval for a felling licence. Unlikely due to the volume of timber to be removed.
- All tree works to be in accordance with the British Standard for Recommendations for Tree Works, BS3998: 2010 and the European Tree Pruning Guide (ISA).

- Although no evidence of the presence of Ramorum disease *(Phytophthora ramorum)* on the site, tree contractors should still take precautionary measures (use of disinfectants on felling and pruning tools).
- The general tree protection measures shall apply to the tree surgery teams.
- All contractor vehicles to be parked and stored outside the CEZ.
- No re-fuelling of machinery to take place within the CEZ and not within 10m of the CEZ or uphill of it.
- The general tree protection measures shall apply to the tree surgery teams.

Appendix D – Arboricultural Method Statement – Installation of Hard Landscaping at the Edge of the RPAs and Protection of Retained Trees

Care will need to be taken to avoid damage to the roots of trees whose RPAs encroaches on the development site due to compaction, storage of materials and possible root destruction. The major contribution to soil compaction from vehicle movements comes from the first passes of vehicles over the ground. Therefore, it is essential that ground protection is specified and installed from day one of construction projects.

The method statement sets out the principles of tree protection that need to be followed. This is an outline to demonstrate that the proposal is possible without causing unnecessary damage to the tree. Installation should follow these but can be adapted if necessary as long as the protection of the trees is maintained. If there is any doubt during the actual installation, then the Arboriculturalist should be consulted. To protect the existing tree roots the installation should be as follows:

- Tree protection fencing of the rigid and non-rigid (depending on the terrain) type should be installed as shown on the tree protection plan along CEZ boundaries provided in Appendix A
- The tree protective fencing will be erected prior to any works commencing on site
- The line of the final cut for the hard surface will be marked on the ground
- Excavation should be minimized in the RPA
- The ground will be excavated with a digger located outside the CEZ
- Any exposed roots present in the excavation will be pruned using hand tools when possible e.g. sharp pruning saw or secateurs leaving as small a diameter cut as possible
- A geotextile membrane should be placed to maintain a separation of layers and on top of this, open a cellular panel

- Into this panel pour angular stone, without fine stones and soil to retain gaps for water and air movement
- The stones are filled to overflowing and compacted into it
- Another geotextile membrane prevents sand above from dropping into the voids between the stones
- Surfacing of tarmac, paviours or gravel can be added above the sand-binding layer as a wearing course
- The operation will be supervised by the appointed specialist

Arboricultural Method Statement – Installation of Footways Within RPA

Footways may be proposed within the root protection areas. The following methodology is to be applied if they are required:

1) Remove existing vegetation from the surface, taking care to limit the use of mechanical plant where practical.
2) Undertake pruning works if required
3) Existing surface and topsoil is to be retained. No excavations or trenching for the installation of services in footpath area
4) Any voids or depressions within the ground surface are to be filled with sharp sand (not builders' sand) to maintain levels
5) Install geotextile separation filtration layer over area for footways
6) Install cellular confinement mats over the area. Expand the Cellweb panels to the full length. Trim to desired width. Pin the Cellweb panels with staking pins to anchor open the cells and staple adjacent panels together to create a continuous mattress
7) Install treated timber boarding of approximately 150mm height for lateral support secured by robust stakes for both sides
8) Infill the Cellweb with a no fines angular granular fill of size 40-20mm within each open cell
9) Install second layer of geotextile separation filtration layer
10) Apply finished surface of gravel

FAIRHURST

Appendix 5:

Eco North ECN18 218

Biosecurity Document

Protected Species Survey

Forge Valley, Scarborough

July 2019

Final Report

Report Prepared For:

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Project Ref:	ECN18 218
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eco NORTH
Ecological Consultants

Document Control

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
Draft V01	12/07/19	Draft to client	Not Confidential	SH	CS	JT
Final V01	17/07/19	Final to client	Not Confidential	-	-	-

Field Investigations and Data

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by EcoNorth Ltd. for inaccuracies in the data supplied by any other party.

Declaration of Compliance

"The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed within this document are our true and professional bona fide opinions."

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Contents

Summary

EcoNorth Ltd. was commissioned by Fairhurst (henceforth referred to as 'the client') to undertake protected species surveys of three sites within Forge Valley, near East Ayton in Scarborough, following a Phase 1 habitat survey carried out in June 2019. The surveys were undertaken by Ecologist Sarah Hawes GradCIEEM, Assistant Ecologist Laura Parsons and Intern Ecologist Tom Wilson on 26th to 27th June 2019. The client proposes to replace an 18-year-old 2.3km wooden boardwalk at Site A, construct a new footbridge across the River Derwent onto the boardwalk at Site B and to expand the car park, including disabled parking at Site C.

Site A is within Raincliffe & Forge Valley Woods SSSI and NNR, and Sites B and C lie partially within the SSSI/NNR. The survey was designed to determine the potential suitability of the site for protected species (specifically roosting bats, otter and water vole), to assess the potential impacts upon the ecological interests of the site.

The desk study completed prior to the field visit highlighted the presence of 10 statutory and 5 non-statutory sites within 2km of the site boundary, and also identified the presence of badger within the site, and several species of bat, including common pipistrelle, soprano pipistrelle, noctule, brown long-eared and *Myotis* sp. within 2km of the site boundary.

The following table summarises the results of the protected species surveys. Necessary mitigation measures are provided in Section 7. The client is happy to commit to the implementation of the measures detailed within this report and is aware that these are likely to be made a condition of any planning consent which may be granted.

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
Trees assessed for bat roosting potential at Site B	Good quality foraging habitat for bats within the woodland, along the woodland edge and the river. Value limited by the small area to be affected Bird nesting opportunities within trees.	Low to local	No	If any changes occur to the plan which will impact any trees not currently identified for removal, then those trees will require further assessment. Clearance works will not commence during the bird nesting period (March – August inclusive) unless checking surveys have confirmed no active nests are present within the 5 days prior
Otter	The only sign recorded was a potential otter slide. There is suitable foraging habitat present on all three sites.	Low to local	No	Pre-work check to be carried out within a month prior to the works commencing. Works to be undertaken under a Method Statement.

Ecological Feature	Presence on Site	Ecological Value	Further Surveys Required?	Key Mitigation
Water Vole	One water vole burrow was recorded along the bank of Site B. There is suitable foraging and habitat for burrow creation present on all three sites.	Low to local	No	Pre-work check to be carried out within a month prior to the works commencing. Works to be undertaken under a Method Statement.

1. Introduction

1.1 Background

EcoNorth Ltd. was commissioned by Fairhurst (henceforth referred to as the client) to undertake a protected species survey of three sites within Forge Valley, near East Ayton in Scarborough, following the Phase 1 habitat survey carried out in June 2019 (central grid reference Site A: SE 98480 87099, Site B: SE 98749 85874, Site C: SE 98916 85657). The sites are referred to as plans A, B and C in Figure 1 below. The client proposes to replace an 18-year-old 2.3 km wooden boardwalk at Site A, construct a new footbridge across the River Derwent on to the boardwalk at Site B, and to expand the car park including disabled parking at Site C. All three sites are located within Raincliffe & Forge Valley Woods Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). The survey was designed to determine the presence/absence of the site for protected species.

This report:

- Sets out the results of the survey
- Analyses all three Site's value for otter and water vole
- Assesses trees identified for removal within Site B for bat roosting potential
- Identifies key avoidance, mitigation and/or compensation measures required to ensure the proposals do not have an adverse impact upon biodiversity

1.2 Site Context

The three sites surveyed are within Forge Valley, north of East Ayton, near Scarborough, North Yorkshire. The River Derwent runs parallel to Seavegate Road and through the Forge Valley woodland. Almost the entirety of Forge Valley lies within North York Moors National Park. To the south of the sites is the village of East Ayton and to the north, east and west lie agricultural fields bordered by hedgerow and areas of woodland.

Figure 1 identifies the location and extent of the development sites.

Figure 1: Survey Areas (Boundary outlined in red)

1.3 Nature of the Proposals

The client proposes to extend the car park northwards from the original car park at Site A. At Site B, a new bridge is proposed as well as the felling of trees and clearance of

vegetation in order to incorporate a new car park on the western side of the road. Site C will have a new path created, retaining the trees on site.

Further details can be found in Forge Valley PEA Report (EcoNorth, 2019a).

Figures 2, 3 and 4 show the proposals for the three sites.

Figure 2: Proposals for Site A

Figure 3: Proposals for Site B

Figure 4: Proposals for Site C

2. Planning Policy and Legislation

2.1 Planning Policy and Guidance

A series of national and local planning policies are in place which are designed to ensure that development works do not have an adverse impact upon biodiversity, at a site or wider level. Such policies ensure that both developers and public bodies must give due consideration to the potential effects of development works upon both ecological receptors (in line with existing wildlife legislation) and biodiversity.

2.1.1 National Planning Policy Framework (NPPF) (2019)

The NPPF outlines the Government's policies through the planning process, acting as guidance for local planning authorities and decision-makers. The document places a duty on local authorities to consider the principles included when assessing planning applications and preparing Local Plans and Regional Spatial Strategies. Chapter 15 relates to the conservation and enhancement of the natural environment, in line with existing wildlife legislation. Further details are provided on the gov.uk website.

2.1.2 Biodiversity Action Plans (BAPs)

The UK BAP was published in 1994 to guide national strategies for the conservation of biodiversity. BAPs were designed to ensure the conservation and re-establishment of natural habitats, and that measures were implemented to aid the conservation and enhancement of habitats and species of local importance, the latter through the development of Local BAPs. The UK BAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in 2012 however, the lists of species and habitats of conservation importance are still considered to remain a valuable tool for identifying features of local and national conservation concern. As such, the potential presence of both Local and UK BAP habitats and species were considered throughout the surveys and assessment.

2.2 Legislation

2.2.1 Protected Species and Sites

A range of legislation is in place to ensure that habitats and species of conservation importance are protected from both direct and indirect harm. Key legislation includes:

- The Conservation of Habitats and Species Regulations 2017 (The Habitat Regulations)
- The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (The Bern Convention)
- The Wildlife and Countryside Act 1981 (as amended)

- The Natural Environment and Rural Communities (NERC) Act 2006
- The Countryside and Rights of Way (CRoW) Act 2000
- The Wild Mammals (Protection) Act 1996

An overview of the above legislation is provided in Appendix A.

SSSIs are protected in England under the Wildlife and Countryside Act 1981 (as amended).

The potential presence, on or near the site, of species afforded protection under the above legislation was considered throughout the surveys and assessment. Species considered include:

- Bats
- Otter *Lutra lutra*
- Water vole *Arvicola amphibius*

An overview of the legislation and level of protection relating to such species is provided in Appendix A.

3. Methodology

3.1 Desk Study

Contextual information was gathered as part of a desk study undertaken prior to the start of field surveys. Such information can identify protected or notable species which may occur on the proposed development site or in the local area, as well as identifying statutory and non-statutory ecological sites which may have the potential to be affected by the proposals. Species records and the location of statutory and non-statutory nature conservation sites within 2km of the survey site were requested from North & East Yorkshire Ecological Data Centre (NEYEDC) and from the Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk). Details of designated sites are presented in the Phase 1 Habitat Survey for the Forge Valley sites (EcoNorth, 2019a).

It should be noted that an absence of records is likely to reflect an absence of survey data and cannot be taken as confirmation that a particular species is not present in the site or surrounding area.

3.2 Field Survey

3.2.1 Otters

A species-specific otter survey was undertaken on 27th June 2019, in order to determine the presence/absence of the species within the sites. The survey included searches for spraint, jelly, paths, footprints, feeding remains, couches/lying-up sites and holts, as well as sightings of otters. The length of the watercourses were walked in order to search for such field signs and checks were made of any areas of standing water which may also be suitable for use by the species. The otter survey methodology is based on Chanin 2003a and 2003b.

3.2.2 Water Voles

The watercourse identified through the phase 1 survey as having the potential to support water vole were subject to a species-specific survey on 27th June 2019. This survey was designed to provide further detail on the suitability of such features for water vole and to determine the presence or absence of the species within the site or adjacent areas. Field signs searched for included droppings, latrines, feeding stations/remains, lawns, nests, footprints, runways, burrows and sightings of the animals themselves. A characteristic 'plop' noise is often typically heard when water voles enter the water, which can also be used as an indication of the presence of the species at a site. The water vole survey methodology is based on Strachan and Moorhouse 2006.

3.2.3 Preliminary Bat Roost Assessment / Field Sign Survey

An assessment was made of the suitability of the trees within the site to support roosting bats on 26th June 2019. Each tree was inspected, and notes made of the species, approximate height, diameter at breast height (DBH) and any features which provide potential bat roost sites e.g. holes, splits in the trunk or limbs, flaking bark, areas covered by ivy. Each tree was inspected from the ground using binoculars and a high-powered torch (Clulite CB2) with higher areas accessed by climbing. The survey was undertaken in accordance with BCT guidelines (Collins, 2016).

Where any field signs indicating the presence of bats, or bats themselves were recorded, a note was made of the location of the roost. Where roosts were not confirmed, each tree was classed as negligible, low, moderate or high suitability, based on the potential for such features to be present.

The layout of trees within the site is shown in Appendix B, with site photographs provided in Appendix D.

3.2.4 Survey Conditions and Personnel

The bat roost assessment of the trees was carried out on 26th June 2019 by Ecologist Sarah Hawes BSc (Hons) MSc GradCIEEM and Thomas Wilson BSc (Hons) MSc. The water vole and otter surveys were carried out on the 27th June 2019 by Sarah Hawes BSc (Hons) MSc GradCIEEM and Laura Parsons BSc (Hons) MSc GradCIEEM. Details of the team's experience are available at https://www.econorth.co.uk/who-we-are/team/

Table 2 shows the conditions during the survey.

Table 2: Survey Conditions

Date	Precipitation	Temperature (°C)	Cloud Cover (Octas)	Wind (Beaufort Scale)
26/6/19	Brief scattered showers	11.0	6/8	1
27/6/19	None	16.0	0/8	1

Any constraints or limitations to the survey are discussed in Section 6.1.

4. Results

4.1 Desk Study

4.1.1 Designated Sites

Designated sites were outlined within the previous ecological report (EcoNorth, 2019a). No sites within 2km of the three development areas were specifically designated for the purpose of protecting bats, otters or water voles.

4.1.2 Protected and Notable Species

Bats were identified through the desk study as having been recorded within 2km of the three survey boundaries within the last 10 years. This includes *Myotis* sp., common pipistrelle *Pipistrelleus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus,* noctule *Nyctalus noctula*, and brown long-eared bat *Plecotus auritus*.

No water voles or otters were recorded within 2km of the sites within the last 10 years, within data held by the local records center.

Further information for these species is provided in Appendix E.

For all protected and notable species records, refer to previous ecological report, EcoNorth 2019a.

4.2 Field Survey

4.2.1 Bat Roost Assessment of Trees at Site B

The trees at Site B identified for removal have negligible potential to support roosting bats. There is one large mature tree directly to the south of the site which has high roost potential due to its size, which will be retained through the proposals (see figure in Appendix B).

Further information of the tree assessments is provided in Appendix F.

4.2.2 Habitat

Along the Derwent riverbank there was disturbance from a public footpath to the west of the river, as well as dog walkers and fishing activities.

The river current was fast with a bank profile which varied from steep (>45º) to shallow (<45º). The width of the river varied between 2-10m and depth between <0.5 to 2m. Within some areas along the river the vegetation had grown to such an extent that access and view of the bank was prevented. The river is relatively fast flowing. Most of the habitat bordering the river was grassland, marginal habitat and broad-leaved woodland.

4.2.3 Otters

One potential otter slide was recorded (see Figure in Appendix B) on the bank adjacent to the works area at Site B. The habitat along the river is considered suitable for otters, providing potential foraging areas and sheltered rest sites.

No evidence of otter activity was recorded during the initial extended phase 1 survey, or during the subsequent species-specific survey at Sites A and C.

4.2.4 Water Voles

One water vole burrow was recorded on the bank of Site B however, no further signs indicating the presence of the species (runs, latrines, feeding remains etc) were recorded. Although the habitat along the river is considered suitable for water vole, the lack of additional field signs indicates that the burrow may no longer be active.

No evidence of water vole activity was recorded during the initial extended phase 1 survey, or during the subsequent species-specific survey at Sites A and C.

5. Interpretation and Discussion

5.1 Survey Constraints and Further Survey Requirements

Due to the time of year, the vegetation height made it difficult to view potential features along sections of the river banks. In spite of this, evidence of protected species was noted and it is considered that if any significant features e.g. otter holts were present, these would have been identified through the surveys. The assessment has been based on a reasonable worst-case scenario and professional judgement, in line with the habitats and field signs recorded. No further surveys are therefore considered to be necessary prior to the submission of the planning application.

5.2 Assessment of Value

Based on the results of the desk study and field surveys, the habitats within and immediately adjacent to the sites are considered to be of Low-Local value to otter, providing foraging habitat and potential commuting routes and rest sites for the local population.

The sites are also considered to be of Low-Local value to water vole, with a single burrow identified, but with no other field signs recorded.

The trees identified at Site B for removal are considered to be of negligible roosting value to bats. The area has highpotential to be used by foraging and or commuting bats however, the small size of the area to be affected / limited number of trees to be removed is considered to limit the potential value of the works area to the local bat population; the area to be affected is therefore considered to be of low value to foraging and commuting bats, given the abundance of habitats of a similar or higher quality in the local area.

5.3 Input into the Design Process

In order to minimise the potential impacts of the proposals upon the key ecological interests of the site, namely otter and water vole, the proposals will ensure that marginal habitat and riverbanks are retained through the proposed works.

5.4 Impact Assessment

Based on the current proposed development plans shown in Figures 2, 3 and 4, the development will potentially have the following impacts upon the ecological interests of the site in the absence of mitigation:

- The loss and / or disturbance of habitats of low to local value to otter, water vole and bats during the development phase

- A low risk of the harm or temporary disturbance of otter, water vole or bats during the development phase

6. Mitigation and Compensation Strategy

The following measures will be implemented in order to minimise the ecological impacts of the proposals, including the risk of protected species being adversely affected:

- Works will proceed to a Method Statement to minimise the risk of protected species being affected by the proposals.
- No works will be undertaken until a pre-construction protected species inspection is undertaken within the month prior to the start of works, in order to prevent disturbance or destruction to an active rest site that may be built in the intervening period before works take place. In the event any protected features e.g. an otter couch, are identified at this time, works will not commence until a licence has been granted by Natural England
- No fires will be lit as part of the proposals.
- Any chemicals required during the construction works will be stored in appropriate locked containers located at least 30m from the nearest waterbody/watercourse when not in use. Spill kits will be available on site at all times, with contractors having been given the relevant training on their use prior to the start of works.
- Works will be carried out under a Method Statement to avoid pollution of aquatic habitats, see (EcoNorth, 2019a).
- No night-time works will be undertaken.
- All trenches will be closed overnight to help avoid trapping any wildlife which may fall in. If closure is not possible, either one side will be cut to a 45º angle or planks large enough for a person to walk up will be installed to provide animals with a potential exit route. Any trenches not closed overnight will be checked for protected and notable species each morning, prior to the recommencement of works, to ensure no such species have become trapped inside in the interim. In the unlikely event such species are recorded, works will cease and the project ecologist will be contacted immediately for advice on how to proceed
- Contractors will receive a tool box talk detailing the SSSI designation, potential for and identification of relevant protected species prior to works commencing

- In the unlikely event that protected species are found within the works area during the development phase, works will cease immediately and the project ecologist will be contacted for advice on how to proceed.
- Vegetation (including ground clearance) works will not be undertaken during the bird nesting period (March – August inclusive) unless a checking survey by the project ecologist has shown active nests to be absent within the five days prior. Where active nests are identified, the project ecologist will implement an appropriate buffer zone into which no works will progress until they have confirmed that the nest is no longer active
- No additional lighting will be included in the development proposal or used during the construction works. If lighting is considered necessary at any time, this will not be implemented until an appropriate lighting scheme has been agreed with the project ecologist in order to minimise the risk of disturbing nocturnal wildlife
- Any brash / timber piles created will be situated in the retained areas of habitat for use as shelter by hedgehogs or other mammals. If brash / timber piles are left or are present on site, these will be checked by hand in order to determine that no hedgehogs or other mammals are sheltering within before mechanical movement.
- Works will not commence until permission (SSSI consent) has been granted by Natural England in line worth the requirements of the Wildlife and Countryside Act. David Clayton is responsible for Raincliffe & Forge Valley Woods SSSI and NNR (Unit ID: 102682).
- Bat boxes placed on younger trees along the woodland edge which currently have no bat roosting features. The bat boxes should be long lasting with a lifespan over 10 years, be installed on the tree between 4 to 6 metres and on a south or south-western aspect.
- The natural vegetation on either side of the river will be retained through the works.
- Bank management will be restricted to small areas, with works proceeding on one bank at a time.
- The bridge design will consider the use of the river by foraging and commuting bats. A bat box could be installed onto the new bridge or adjacent trees in order to provide roosting opportunities for bats.
- Bird boxes could be included within the woodland. The boxes would ideally be placed over 2m high on a tree between north and east, with a clear flight path to the nest box entrance.

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Appendix A – Key Legislation

Table A1: Overview of Key Legislation

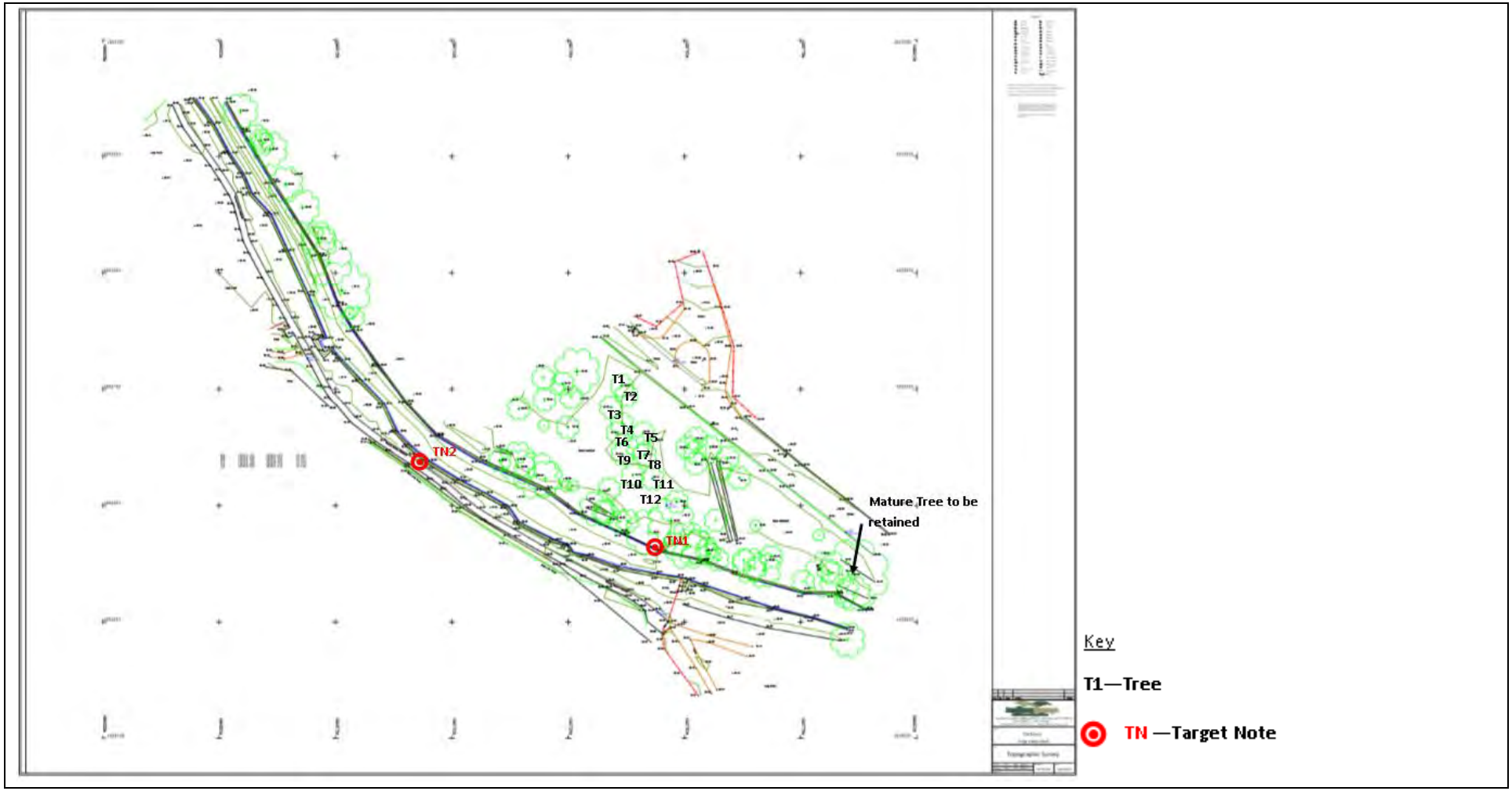
Legislation	Key Features
The Conservation of Habitats and Species Regulations 2017 (The Habitats Regulations)	The Habitat Regulations transpose *Council Directive 79/409/EEC on the Protection of Wild Birds* (the EC Birds Directive 1979) and *Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna* (the EC Habitats Directive 1992) into UK law. The Birds Directive was amended in 2009, becoming Directive 2009/147/EC. The Habitat Regulations make it an offence (with certain exceptions) to deliberately capture, disturb, kill or trade in those animal species listed in Schedule 2, or to pick, cut, uproot, collect, destroy or trade in those plant species listed in Schedule 4. The EC Birds Directive requires member states to establish and monitor Special Protection Areas (SPAs) for all rare or vulnerable species included in Annex I, as well as for all regularly occurring migratory species, with key focus on wetlands of international importance. Annex I and II of the Habitats Directive respectively list those habitats and species for which a similar network of sites – Special Areas of Conservation (SACs) – must be established and monitored. Collectively, SPAs and SACs form a network of pan-European protected areas which are referred to as 'Natura 2000' sites.
The Convention on the Conservation of European Wildlife and Natural Habitats 1979 (Bern Convention)	The Bern Convention was adopted in 1979 and ratified by the UK Government in 1982. The principal aims of the Convention are to ensure the conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species). Members of the European Community meet their obligations via the Birds Directive and the Habitats Directive. These are transposed into UK law by the Wildlife and Countryside Act 1981 (as amended), Nature Conservation (Scotland) Act 2004 (as amended), Wildlife (Northern Ireland) Order 1985, and the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985.
The Wildlife and Countryside Act	The Wildlife and Countryside Act consolidates and amends existing national legislation to implement the requirements of the Bern

Legislation	Key Features
1981 (as amended)	Convention and the Birds Directive throughout Great Britain. The Act is the primary UK mechanism for the designation of statutory ecological sites - Sites of Special Scientific Interest (SSSIs) - and the protection of individual species listed under Schedules 1, 2, 5, 6 and 8 of the Act, each of which is subject to varying levels of protection. Schedule 9 of the Act also lists those plant species which it is an offence to plant or otherwise cause to grow in the wild, while Schedule 14 prevents the release into the wild or sale of certain plant and animal species which may cause ecological, environmental or socio-economic harm.
Natural Environment and Rural Communities Act 2006	The NERC Act places a duty on public bodies to consider and conserve biodiversity through the exercise of their functions and includes a range of measures to strengthen the protection of both habitats and wildlife. The Act makes provision in respect of biodiversity, pesticides harmful to wildlife, protection of birds and invasive non-native species.
The Countryside and Rights of Way (CRoW) Act 2000	The CRoW Act, which applies to England and Wales only, strengthens the provisions of the Wildlife and Countryside Act 1981 (as amended), both in respect of protected species and statutory ecological sites, the latter primarily relating to the management and protection of SSSIs. It also provides for better management of Areas of Outstanding Natural Beauty (AONBs). The Act places a statutory obligation on public bodies to further the conservation of biodiversity through the exercise of their functions, thereby providing a statutory basis to the Biodiversity Action Plan (BAP) process. Section 74 of the Act lists those habitats and species of principal importance in England.
The Wild Mammals (Protection) Act 1996	This Act provides protection for wild mammals from acts of cruelty. An offence is committed if any person mutilates, kicks, beats, nails, or otherwise impales, stabs, burns, stones, crushes, drowns, drags or asphyxiates any wild mammal with intent to inflict unnecessary suffering.

Table A2: Overview of Key Protected Species Legislation and Protection

Species	Key Legislation and Protection
Bats	All European bat species are protected in Britain under the Habitat Regulations 2017. All British bat species are included on Schedules 5 and 6 of the Wildlife and Countryside Act 1981 (as amended) and the whole of Section 9 applies to European bat species. The above collectively prohibits the following: • Deliberately or recklessly capturing, injuring, taking or killing of a bat • Deliberately or recklessly harassing a bat • Intentionally or recklessly disturbing of a bat in its place of rest (roost), or which is used for protection or rearing young • Deliberately or recklessly damaging, destroying or obstructing access to any resting place or breeding area used by bats • Deliberately or recklessly disturbing a bat in any way which is likely to significantly affect the local populations of the species, either through affecting their distribution or abundance, or affect any individuals' ability to survive, reproduce or rear young • Possession or advertisement/sale/exchange of a bat (dead or alive) or any part of a bat Bats are also protected by the Wild Mammals (Protection) Act 1996. Licenses are issued by Natural England for any works which may compromise the protection of European protected species, including bats. This license is required irrespective of whether the works require planning permission. Selected species are also listed in the UK BAP.
Otter	Otter are protected under British and European law, receiving the same level of protection as bats (see above). Otter are also listed as a priority species in Appendix II of the Bern Convention. Otter are included on the UK BAP.
Water Vole	Water voles are protected under Schedules 5 and 6 of the WCA 1981 (as amended). This makes it an offence to: • Intentionally kill, injure or take water voles • Possess or control the species • Damage or destroy any place used by water vole for shelter or protection • Disturb water vole while they occupy such places of shelter • Sell, possess or transport water vole for the purpose of sale • Advertise the buying or selling of water vole The species is also protected under the Wild Mammals (Protection) Act 1996 and is listed on the UK BAP.

Appendix B – Protected Species Map



Appendix C – Target Notes

Table C1: Target Notes Relating Protected Species Map (see Appendix B)

Number	Description
1	Water vole burrow at Site B.
2	Possible otter slide at site B.

Appendix D – Site Photographs

Photo 1: River Derwent at Site B	Photo 2: Water Vole Burrow at Site B
	
Photo 3: River Derwent along Site C	**Photo 4: Tree 2**
	

Photo 5: Tree 3	Photo 6: Tree 4
	
Photo 7: Tree 5	Photo 8: Tree 6
	

Photo 9: Tree 7	Photo 10: Tree 8
	
Photo 11: Tree 9	Photo 12: Tree 10
	

Photo 13: Tree 11	Photo 14: Tree 12
	
Photo 13: Mature Tree to be retained	Photo 14: Photo taken from western side of river at Site C
	

Appendix E – Protected Species Identified by the Desk Study

Table E1: Relevant Protected Species Records within 2km

Species	Number of Records	Most Recent Record	Within Forge Valley?	Level of Protection		
				HR 2017	WCA 1981	NERC /UK BAP
Myotis sp.	1	2017	No	☒	☒	☒
Noctule	4	2017	No	☒	☒	☐
Common pipistrelle	4	2017	No	☒	☒	☐
Soprano pipistrelle	3	2017	No	☒	☒	☒
Brown long-eared	1	2017	No	☒	☒	☒

Key

HR 2017 – The Conservation of Habitats and Species Regulations 2017

WCA 1981 – The Wildlife and Countryside Act 1981 (as amended) (Bird species listed relate solely to those included on Schedule 1)

NERC – The Natural Environment and Rural Communities Act 2006

UK BAP – UK Biodiversity Action Plan

Appendix F – Tree Assessments (see Appendix B)

Tree Number	Species	Height (m)	DBH (mm)	Features	Bat Roost Risk
T1	Common Alder *Alnus glutinosa*	Approx. 10m	300mm	Ivy present on trunk insufficient to create potential roosting feature (PRF). Young tree in good condition with no PRF.	Negligible
T2	Common Ash *Fraxinus excelsior*	Approx. 8m	250mm	Young tree in good condition with no PRF.	Negligible
T3	Common Alder *Alnus glutinosa*	Approx. 10m	350mm	Young tree in good condition with no PRF.	Negligible
T4	Common Alder *Alnus glutinosa*	Approx. 11m	300mm	Young tree in good condition with no PRF.	Negligible
T5	Oak sp. *Quercus* sp.	Approx. 10m	350mm	Some snapped branches providing features that from the ground looked like PRF however, under aerial inspection the snapped branches had no gaps or holes.	Negligible
T6	Dead tree	Approx. 6m	Avg. 150mm (1250mm overall)	Dead multi-stemmed trunk. With some lifted bark. Under inspection using a torch and endoscope the lifted bark was assessed as being superficial (gaps too	Negligible

				narrow/small) and did not provide any PRF.	
T7	Oak sp. *Quercus* sp.	Approx. 12m	450mm	Multi-stemmed trunk with narrow branches.	Negligible
T8	Common Ash *Fraxinus excelsior*	Approx. 11m	150mm	Young tree in good condition with no PRF.	Negligible
T9	Common Hazel *Corylus avellana*	Approx. 10m	250mm	Young tree in good condition with no PRF.	Negligible
T10	Common Ash *Fraxinus excelsior*	Approx. 10m	120mm	Young tree in good condition with no PRF.	Negligible
T11	Common Ash *Fraxinus excelsior*	Approx. 11m	150mm	Young tree in good condition with no PRF.	Negligible
T12	Elm sp. *Ulmus* sp.	Approx. 10m	200mm	Young tree in good condition with no PRF.	Negligible

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