NYMNPA

04/09/2019

From:
To: Jill Bastow; Planning
Cc:
Subject: 128858 - NYM/2019/0444/FL Forge Valley Committee
Date: 04 September 2019 12:12:21
Attachments:

Good afternoon,

In response to the consultations, please find attached the following reports to be assigned to planning application NYM/2019/0444/FL - Forge Valley:

- Amended Arboricultural Implications Assessment (AIA) (September 2019)
- Amended Tree Survey Report (September 2019)
- Biosecurity Protocol (September 2019)

Kind Regards,

Josh

Josh Murphy
Graduate Planner

FAIRHURST

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Arboricultural Impact Assessment

Forge Valley, Yorkshire

September 2019

Final Report

Report Prepared For:

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Project Ref: ECN18 218

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Ecological Consultants

Document Control

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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

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Contents

Contents 1

Non-Technical Summary 3

1. Introduction 4

1.1 Background 4

1.2 Site Context 4

2. Limitations / Methodology 5

2.1 Third Party Liability 6

2.2 Subsidence Risk 6

2.3 Terminology 6

3. Site Description 8

4. Baseline Factors 8

4.1 Presence of Tree Preservation Orders or Conservation Areas 8

4.2 Wildlife 8

4.3 Existing Trees on Site 8

4.4 Root Protection Areas (RPAs) 9

5. Implications Assessment 10

5.1 Above Ground Constraints 10

5.2 Below Ground Constraints 12

6. Construction Process of the Proposed Development 12

6.1 Tree Protection 13

7. Infrastructure Requirements – Highway Visibility, Lighting, CCTV, Services 13

8. Mitigating Tree Loss / New Planting 14

9. Impact Assessment 14

10. Post Development Pressure 14

11. Conclusions 15

12. Recommendations 15

13. References 15

Appendix A – Tree Protection Plans 17

Appendix B – Site Specific Method Statement 20

Appendix C – Tree Work Schedule 30

Appendix D – Arboricultural Method Statement – Installation of Hard Landscaping at the Edge of the RPAs and Protection of Retained Trees 32

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

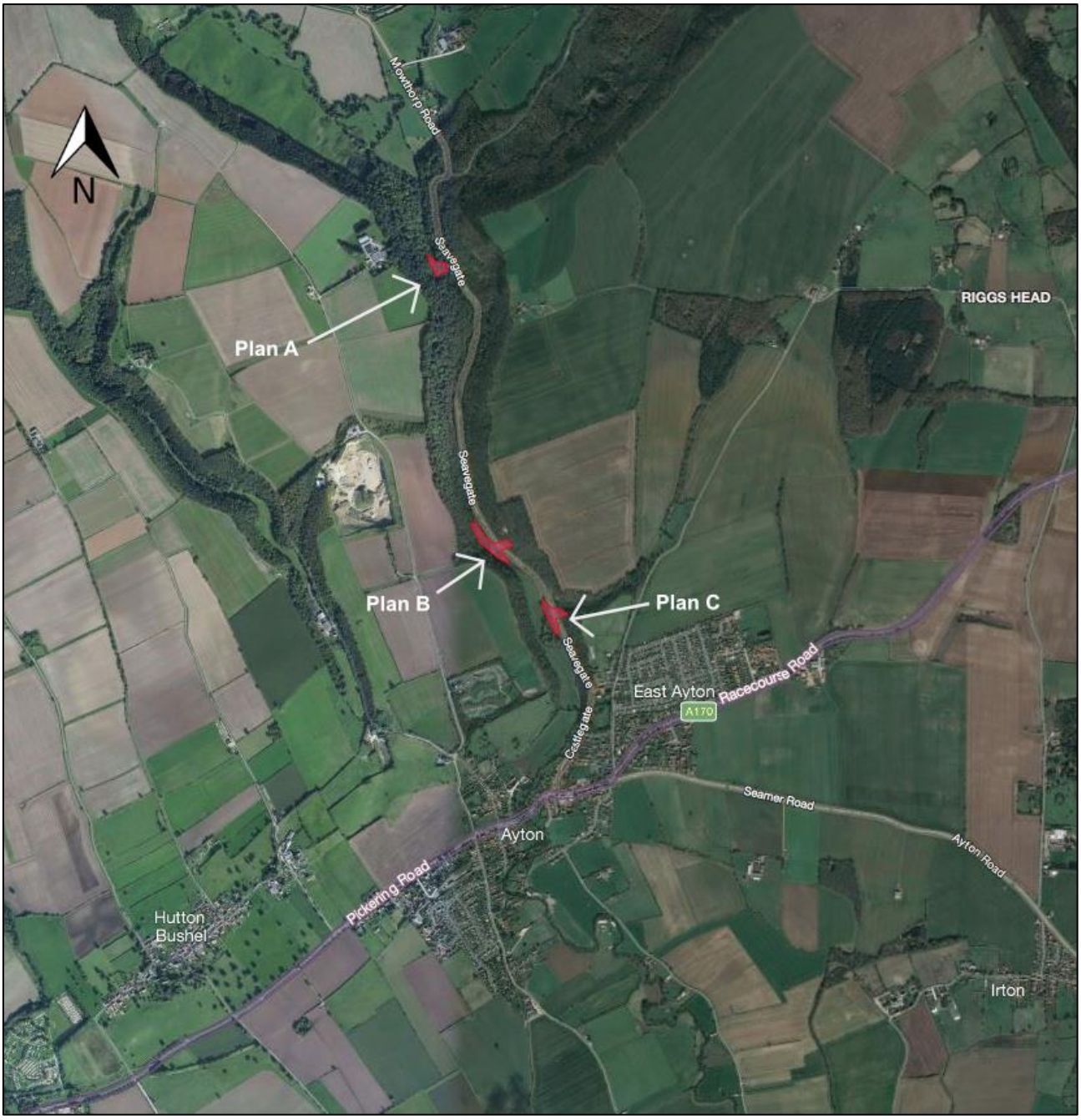
The three sites surveyed are located in Forge Valley, north of East Ayton, near Scarborough, North Yorkshire. It is accessible from Seavegate Road. Almost the entirety of Forge Valley lies within North York Moors National Park. The site is a Site of Special Scientific Interest.

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.

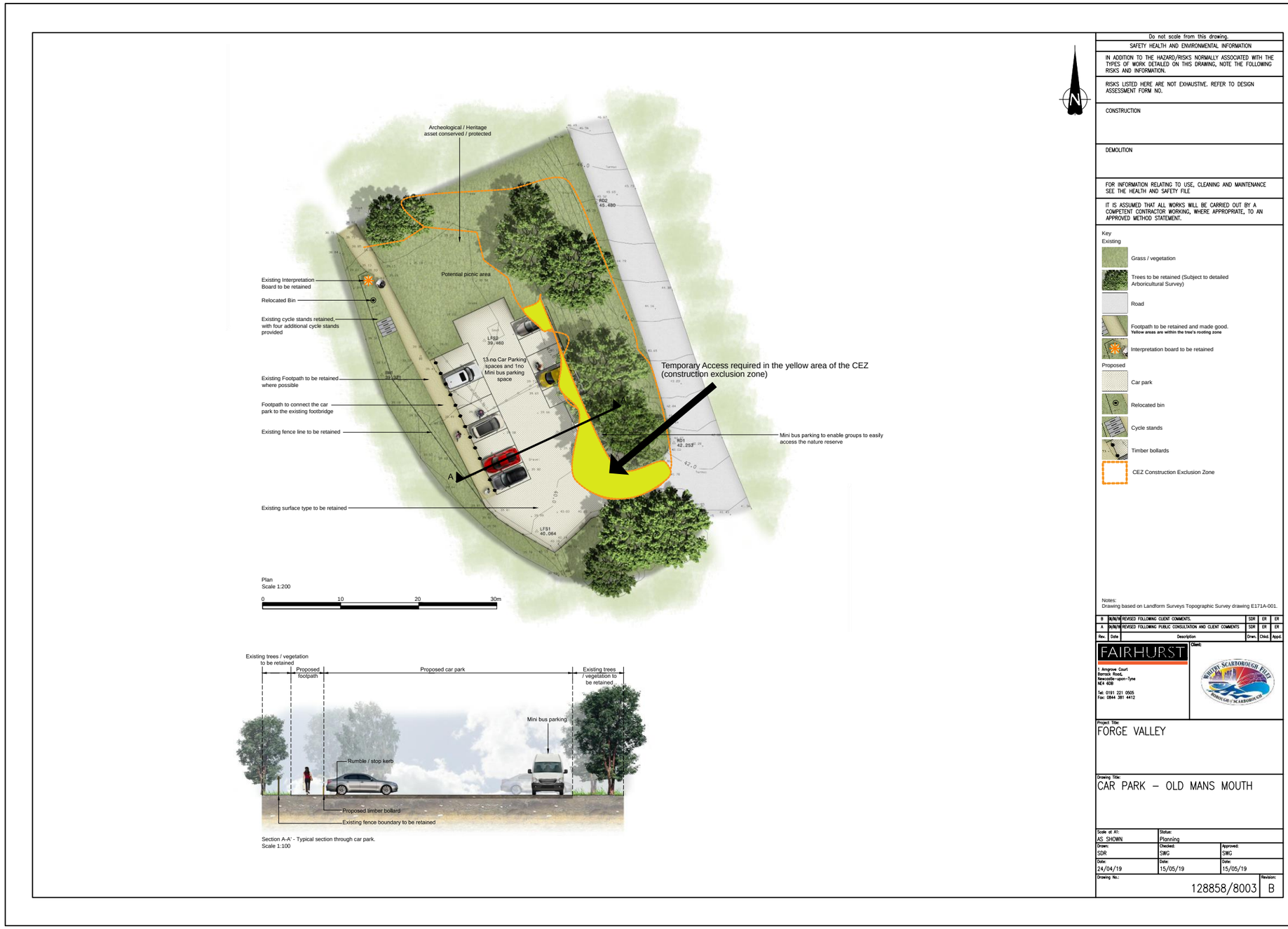


Figure A2: Tree Protection Plan B

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.

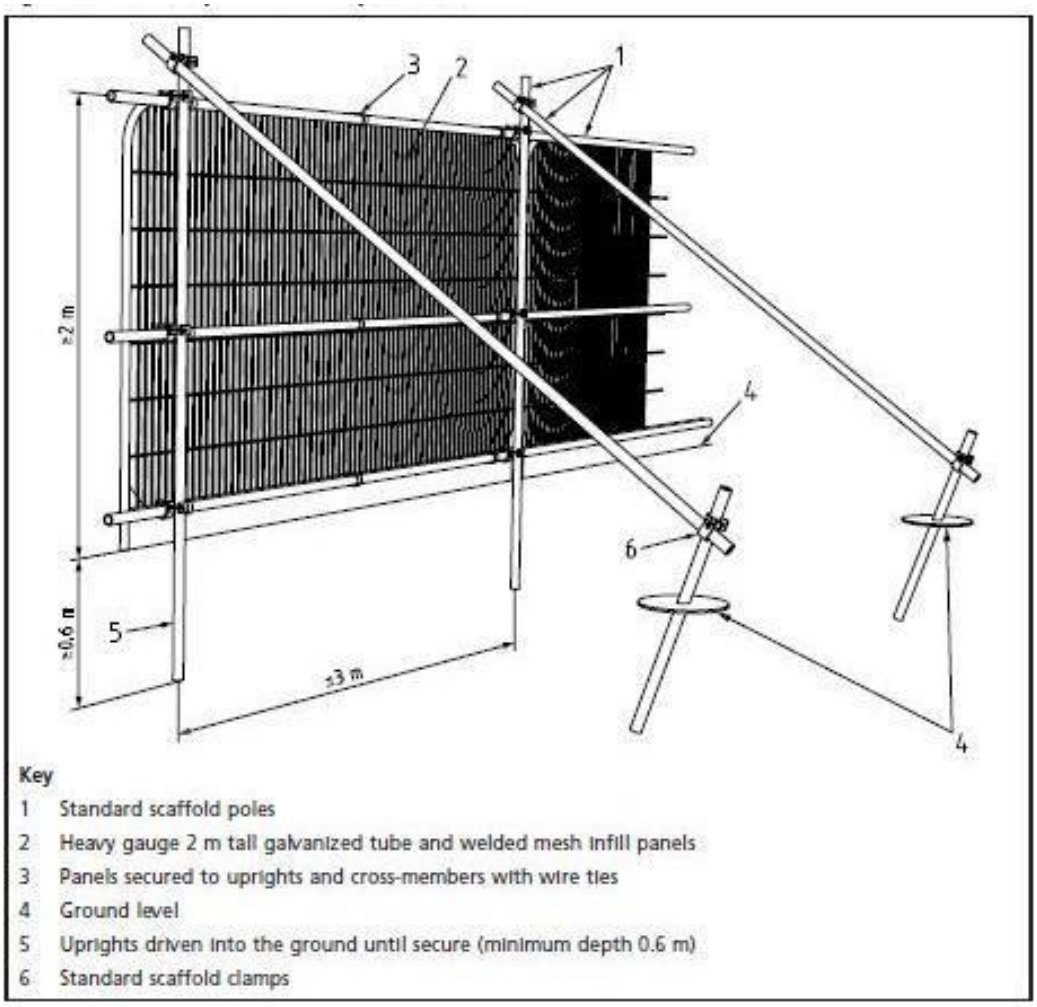
There are no new accessible areas of planting to be protected during the construction phase. The level of construction on site would be suitably excluded from the CEZ with any

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

NYMNPA

04/09/2019

Biosecurity Protocol

Forge Valley, Scarborough

September 2019

Final Document

Report Prepared For:	**Project Ref:** ECN18 218
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Document Control

Version	Date	Changes	Confidentiality	Prep	Rev	Auth
Draft V01	04/09/19	Draft to client	Not Confidential	SH	-	JT
Final V02	04/09/19	Final to client	Not Confidential	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

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Contents

Contents 1

1. Site Background Information 2

2. Biosecurity Risk 3

2.1 Aquatic fauna 4

2.2 Invasive plant species 4

2.3 Tree diseases 5

3. Biosecurity Methodology 7

3.1 Information for Personnel 7

3.2 Facilities 7

3.3 Signage 8

3.4 Procedure 8

3.5 Further Measures 9

3.6 Vegetation clearance 9

References 9

Appendix A – Invasive Species Identification 10

1. Site Background Information

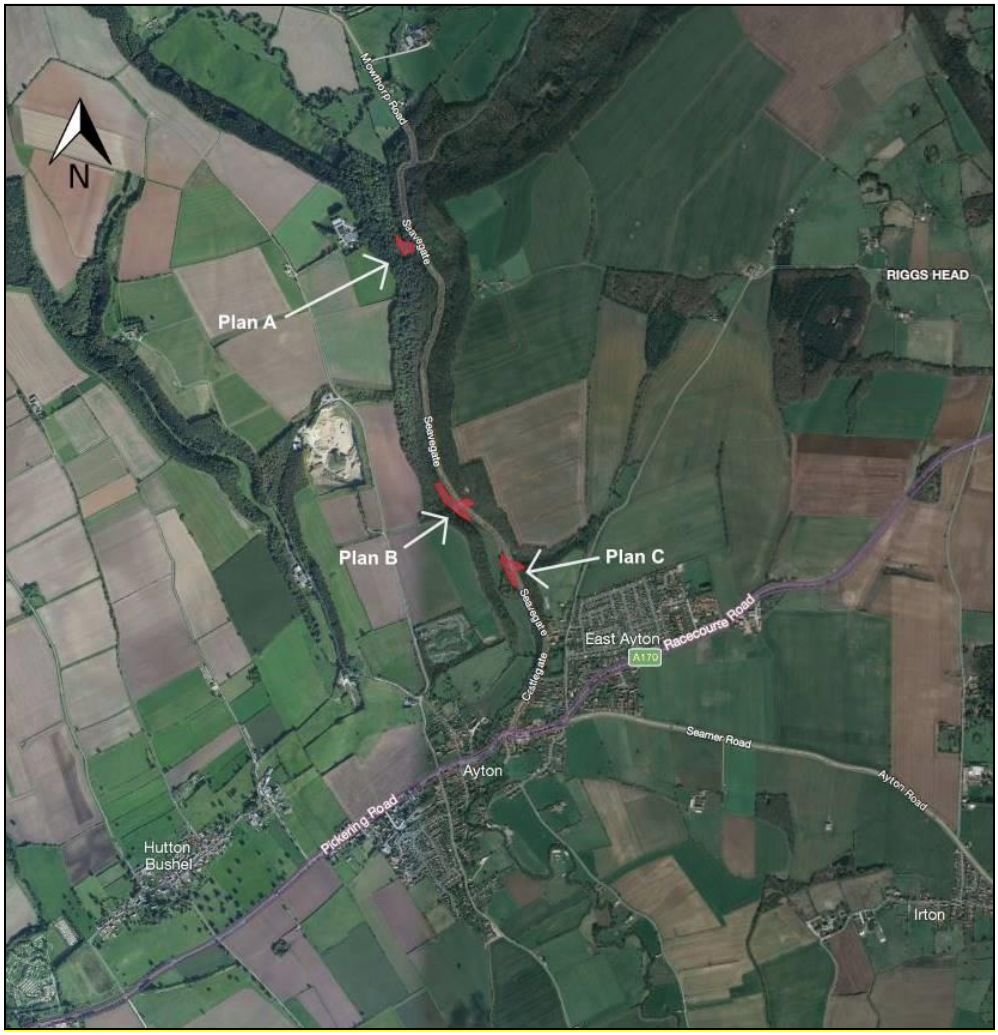
EcoNorth Ltd. was commissioned by Fairhurst (henceforth referred to as 'the client') to develop a biosecurity risk assessment and protocolfor three discrete sites within Forge Valley, near East Ayton in Scarborough. The client proposes to replace an 18-year-old 2.3km wooden boardwalk at Site A, construct a new footbridge across the River Derwent onto the boardwalk and new car park at Site B and to expand the car park, including disabled parking at Site C.

Site A is within Raincliffe & Forge Valley Woods Site of Special Scientific Interest SSSI and National Nature Reserve NNR, and Sites B and C lie partially within the SSSI/NNR.

The requirement for a biosecurity Risk Assesment and protocol was identified through consultation with Natural England as part of the planning application and application for the content of Natural England to undertake work within the SSSI.

This document outlines the relevant biosecurity risks and sets out protocol which will be adopted for proposed construction works to be carried out on site at Forge Valley.

Figure 1: Site Areas (Boundary outlined in red)



2. Biosecurity Risk

Biosecurity is a set of procedures which aim to protect against biological or biochemical substances which are considered harmful to populations and/or habitats.

Non-native species and associated diseases as well as plant disease can present a significant risk to native flora and fauna through mechanisms such as competition, spread of disease and shading out native flora.

Given the works associated with this project are scheduled to be undertaken within a Site of Special Scientific Interest designated as it is one of the best examples known of mixed deciduous woodland in north-east England. Natural England have highlighted the importance of and requirement for a Biosecurity Protocol for construction works.

2.1 Aquatic fauna

Without proper measures in place the movement of people and plant to and from site can present a risk of moving non-native aquatic species of any life stage and / or any associated diseases between watercourses or even River catchments.

While no specific survey effort for white clawed crayfish, non-native crayfish or fish species has been undertaken as part of this project it is possible that movement of plant and people form other construction projects could introduce non-native crayfish and associated diseases.

Non-native crayfish species such as the signal crayfish are prone to out competing white clawed crayfish and are often associated with the spread of crayfish plague which typically has devastating effects on whole populations of white clawed crayfish. Non-native crayfish species can also have a detrimental effect on native spawning fish.

Given that the status of crayfish of all species is unknown at this time within the watercourse the risk of movement between watercourses is relevant to both people and plant arriving in and leaving Forge Valley. Risk to address movement on and / or offsite are required.

2.2 Invasive plant species

A number of problematic invasive non-native plant species the spread of which is controlled by law through inclusion on schedule 9 of the Wildlife and Countryside Act (1981) have the potential to be present on site or be introduced to site via movement of plant, people and materials.

The primary species of concern due to their association with watercourses are outlined in Table 1 below. A description of the problematic characteristics of these species is also included. From a biodiversity perspective all of the species noted are notably competitive and invasive plant species and have the potential to dominate the local flora and prevent growth of native plants.

Table 1: High risk invasive non-native plant species

Species	Notes / Description
Himalayan balsam *Impatiens glandulifera*	Himalayan balsam has been identified within forge valley previously though was note reported within habitat surveys undertaken for this project. Therefore, there is a risk that this invasive species may be on site. Himalayan balsalm spreads quickly along waterways dominating the habitat as it is able to spread up to 800 seeds per plant. Seeds can travel up to 7m from the plant, this distance is increased as often the seeds land in waterways such as a stream which will enable the seed to travel and colonise further

Species	Notes / Description
	downstream (Inland waterways association, accessed 2019).
Giant hogweed *Heracleum mantegazzianum*	Giant hogweed a non-native species which can often be found colonising riverbanks, its huge growth form can dominate large areas smothering native flora. Giant hogweed sap can cause burns as it causes the skin to suffer from phytotoxity where the skin becomes extremely sensitive to sunlight. As such this species represents a safety risk as well as a biosecurity risk.
Japanese knotweed *Fallopia japonica*	Japanese knotweed is a non-native invasive plant whose natural habitat is on volcanic lava fields of Japan. It is commonly found near waterways. The plant has very vigorous growth and is known to cause structural problems with road and or footpath infrastructure. There is a risk of the plant being spread by the transport of fragments of the root either by being washed downstream or within mud on vehicles and boots.

2.3 Tree diseases

A number of tree diseases occur within the UK. Notable relevant examples are included in Figure 1 below along with relevant symptoms and timing of those symptoms. Some of the diseases can have sever implications for whole populations of tree species in a given area. Movement of plant materials and people between sites presents a risk of disease spread and therefore measures to prevent spread of tree disease are considered within the protocol.

Observatree
monitoring tree health

Disease signs and symptoms calendar

If you see any of these symptoms, report your concerns via Tree Alert: **www.forestry.gov.uk/treealert**

DISEASES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Acute Oak Decline	Bleed stains/ 'D' shaped exit holes	Bleed stains/ 'D' shaped exit holes	Fresh bleeds/ 'D' shaped exit holes	Fresh bleeds/ 'D' shaped exit holes	Fresh bleeds/ 'D' shaped exit holes	Bleed stains/ 'D' shaped exit holes	Bleed stains/ 'D' shaped exit holes	Bleed stains/ 'D' shaped exit holes	Fresh bleeds/ 'D' shaped exit holes	Fresh bleeds/ 'D' shaped exit holes	Bleed stains/ 'D' shaped exit holes	Bleed stains/ 'D' shaped exit holes
Chalara Dieback of Ash	Bark lesions	Bark lesions	Bark lesions	Bark lesions	Leaf infections/ fruiting bodies on stalks in litter	Leaf infections/ fruiting bodies on stalks in litter	Leaf infections/ fruiting bodies on stalks in litter	Leaf infections/ fruiting bodies on stalks in litter	Leaf infections/ fruiting bodies on stalks in litter	Leaf infections/ fruiting bodies on stalks in litter	Bark lesions	Bark lesions
Chestnut Blight	Bark lesions	Bark lesions	Bark lesions	Leaf collapse/ retained, dead leaves	Leaf collapse/ retained, dead leaves	Leaf collapse/ retained, dead leaves	Leaf collapse/ retained, dead leaves	Leaf collapse/ retained, dead leaves	Leaf collapse/ retained, dead leaves	Bark lesions	Bark lesions	Bark lesions
Dothistroma Needle Blight						Needle symptoms/ banding	Needle symptoms/ banding	Needle symptoms/ banding				
European Mountain Ringspot Virus				Yellow ringspots/ speckling/ leaf discoloration	Yellow ringspots/ speckling/ leaf discoloration	Yellow ringspots/ speckling/ leaf discoloration	Yellow ringspots/ speckling/ leaf discoloration	Yellow ringspots/ speckling/ leaf discoloration	Yellow ringspots/ speckling/ leaf discoloration			
Phytophthora lateralis/ Phytophthora austrocedri	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death	Bark lesions/ foliage death
Plane Wilt	Bark lesions	Bark lesions	Bark lesions	Wilting/ yellow leaves/early leaf fall	Wilting/ yellow leaves/early leaf fall	Wilting/ yellow leaves/early leaf fall	Wilting/ yellow leaves/early leaf fall	Wilting/ yellow leaves/early leaf fall	Wilting/ yellow leaves/early leaf fall	Bark lesions	Bark lesions	Bark lesions
Sirococcus tsugae	Fruiting bodies on bark/shoot cankers	Fruiting bodies on bark/shoot cankers	Fruiting bodies on bark/shoot cankers	Fruiting bodies on bark/shoot cankers	Pink needles	Pink needles	Pink needles	Pink needles	Pink needles	Fruiting bodies on bark/shoot cankers	Fruiting bodies on bark/shoot cankers	Fruiting bodies on bark/shoot cankers

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Sirococcus tsugae

©Forestry Commission /Ana Perez-Sierra

Pest and disease information provided by Suzy Sancisi-Frey, Forest Research

For more information and resources on our pests and diseases visit **www.observatree.org.uk**

Chalara Dieback of Ash

©Forestry Commission

3. Biosecurity Methodology

3.1 Information for Personnel

A toolbox talk outlining biosecurity risks by a suitably qualified ecologist must be delivered to all personnel on site prior to commencing work. This would include:

- Site designations;
- The effects of the spread of the invasive signal crayfish and crayfish plague;
- Identification of invasive non-native plant species;
- Legislation;
- The use of biosecurity techniques; and
- The importance of reporting

An identification guide of non-native plant species which may be encountered is appended to this document.

3.2 Facilities

Suitable facilities must be available on site to clean footwear and equipment. They must be situated off site away from drains or watercourses. These facilities must be used by any new personnel or when arriving or leaving the site.

For Boots and Equipment this must include access to:

- Boot brush, hoof pick or boot dip
- Supply of water
- Basin
- Disinfectant spray (Cleankill)
- Water to rinse off disinfectant
- Pressure spray for vehicles off site
- Facility to immerse equipment in disinfectant
- Sanitising hand gel

For vehicles this must include access to:

- Supply of water

- Disinfectant spray (Cleankill)
- 5 litre pressure spray for vehicles
- Brush
- Sanitising hand gel

3.3 Signage

Information about the security measures being implemented on site should be included at all relevant points on site.

3.4 Procedure

The cleaning of boots and site vehicles which are capable of driving off site must be undertaken at a safe distance from any watercourses. Safety glasses and gloves must be worn to protect against disinfectant.

Clean Boots:-

- Remove all soil etc. from boots using brush, hoof pick and supply of water
- Spray boots with disinfectant (Cleankill)
- Rinse off disinfectant with clean water
- Disinfect brush
- Clean hands with sanitising gel

Clean Vehicle

- Remove all soil etc. from vehicle using soft brush and 5 litre pressure spray of clean water focussing on tyres and wheel arches.
- Spray tyres and wheel arches with disinfectant (Cleankill)
- Rinse off disinfectant with clean water
- Disinfect brush
- Clean hands with sanitising gel

Avoidance

The construction avoids in water structures and there is therefore no or limited requirement to access the watercourse during the construction period. Avoiding access to the water will be encouraged for biosecurity as well as health and safety reasons.

Should any water be required on site for dust suppression or other requirements this will be obtained form a potable water source rather than a waterbody or watercourse to avoid potential contamination.

3.5 Further Measures

Prior to off loading at site the contractor will ensure that plant hire providers have documented evidence of as a minimum a check – clean – dry procedure having been undertaken prior to delivering operating machines to site.

Verification and a visual inspection of plant and machinery having been sufficiently cleaned must be received before the vehicle is allowed on site.

Checks should be carried out when appropriate in order to ensure this methodology is being implemented

Where possible keep vehicles off site to reduce contamination risk. Keep to established routes and park vehicles on hard standing designated areas.

Vehicle tyres will be cleaned between undertaking any off-road activities at sites A, B or C.

3.6 Vegetation clearance

To minimise any risk associated with moving materials off site, the small number of immature trees felled as part of the proposal will be retained on site close to where it was felled to provide a source of deadwood, or chipped on site and retained in a suitable location.

References

- Inland waterways association (Accessed September 2019) https://www.waterways.org.uk/news_campaigns/campaigns/himalayan_balsam/himalayan_balsam_fact_sheet
- NNSS (Non-Native Species Secretariat) (Accessed September 2019) http://www.nonnativespecies.org/checkcleandry/biosecurity-for-everyone.cfm

Appendix A – Invasive Species Identification

Giant Hogweed

Stem: Starts growing March/April reaching up to 5 metres tall. Stems are green with dark purple spots or blotches, furrowed or ribbed with sparse spiky hairs. Stems are hollow, up to 100mm across

Leaves: Emerge dark green in a rosette in the spring, with lower leaves up to 2.5metres long in summer. Leaf lobes are deeply cut and spiked at the ends.

Page **2** of **3**

Flowers: White, appearing June to September, up to 500mm across forming one large umbrella like flower Head

Note : Sap is an irritant which can cause sever burns on skin

Himalayan Balsam

Stems: These are a reddish colour, and can reach up to 3 metres tall. Stems are hollow and jointed, sappy and brittle

Leaves: Spear shaped with jagged edges. These are shiny and dark green with a dark red midrib and can be up to 150mm long. Generally, they are arranged opposite on stems or in whorls of three.

Flowers: Large purplish pink to pale pinks, slipper shaped on long stalks. Usually appear June-October. The plant has explosive seed pods that can throw seeds over 6 metres away from the plant

Japanese knotweed

Stem: Early signs of growth seen mid-March. Distinctive red and purple shoots, often accompanied by rolled back leaves and can grow to 2-3 metres. In summer the stem resembles bamboo with green with red/purple speckles. Forms dense clumps. The plant dies back in winter, but stems persist as upright brown hollow stalks

Leaves: Alternate, green heart shaped leaves, usually 120mm long

Flowers: Delicate creamy sprays August to October

AMENDED

NYMNPA

04/09/2019

BS5837 Tree Survey

Forge Valley, Scarborough

September 2019

Final Report

Report Prepared For:

Fairhurst
1 Arngrove Court,
Barrack Road,
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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

Contents 1

Non-Technical Summary 2

1. Introduction 3

1.1 Background 3

1.2 Survey Details 3

2. The Site 3

2.1 Location 3

3. Trees 5

3.1 Legal 5

3.2 Summary of Results 5

3.3 Outline Arboricultural Impacts 6

3.4 Protection of the Retained Trees 6

4. References 7

Appendix A – Survey Methodology and Limitations 8

Appendix B – Explanation of Tree Descriptions 9

Appendix C – Tree Data 10

Appendix D – Tree Locations 21

Appendix E: Tree Constraints Plans 24

Appendix F: Photographs of Boardwalk area. 28

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

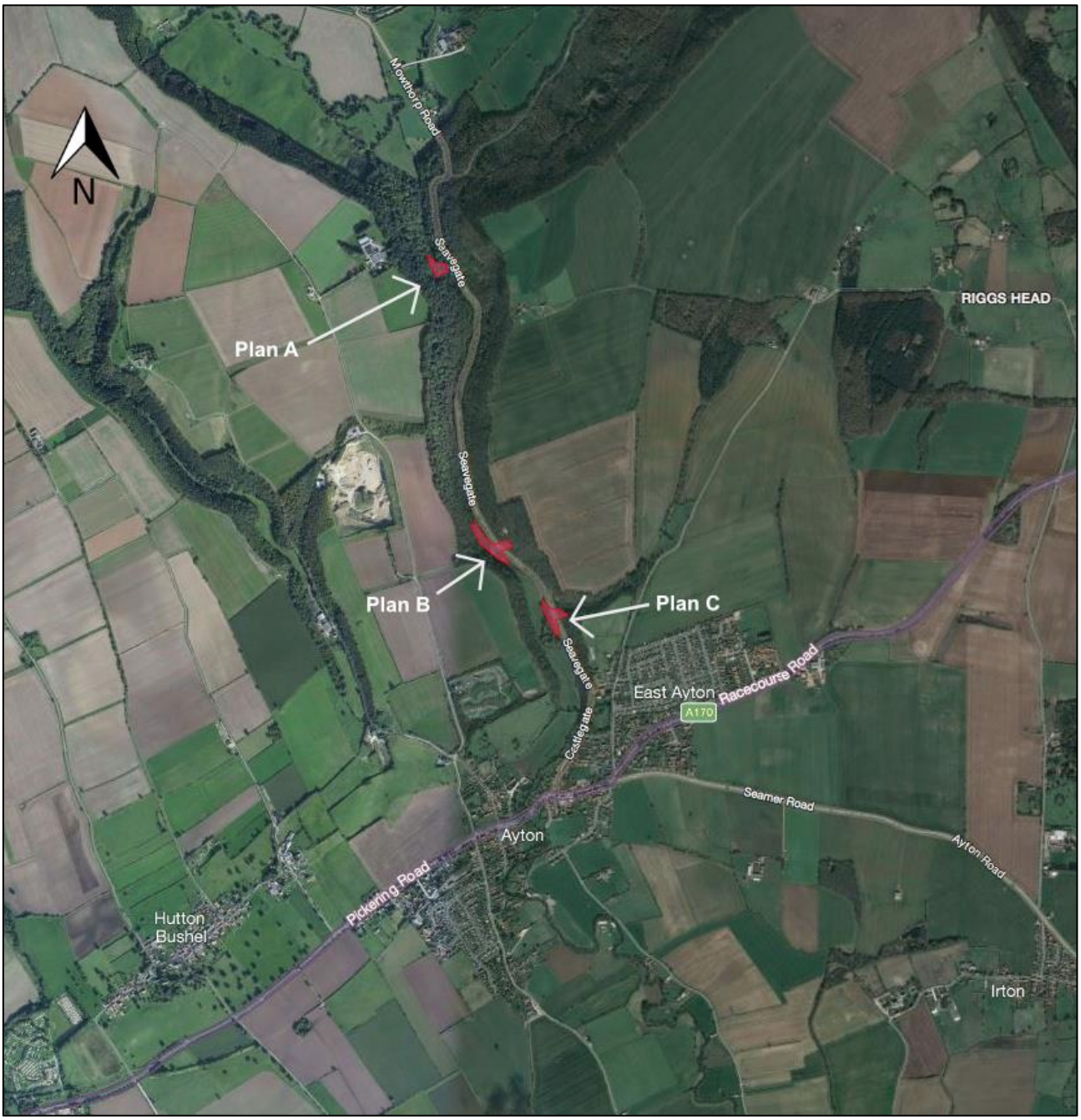
The area surveyed is located in Forge Valley, north of East Ayton, near Scarborough, North Yorkshire. It is accessible from Seavegate Road. Almost the entirety of Forge Valley lies within North York Moors National Park. The site is a Site of Special Scientific Interest.

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 – 10ºC
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**

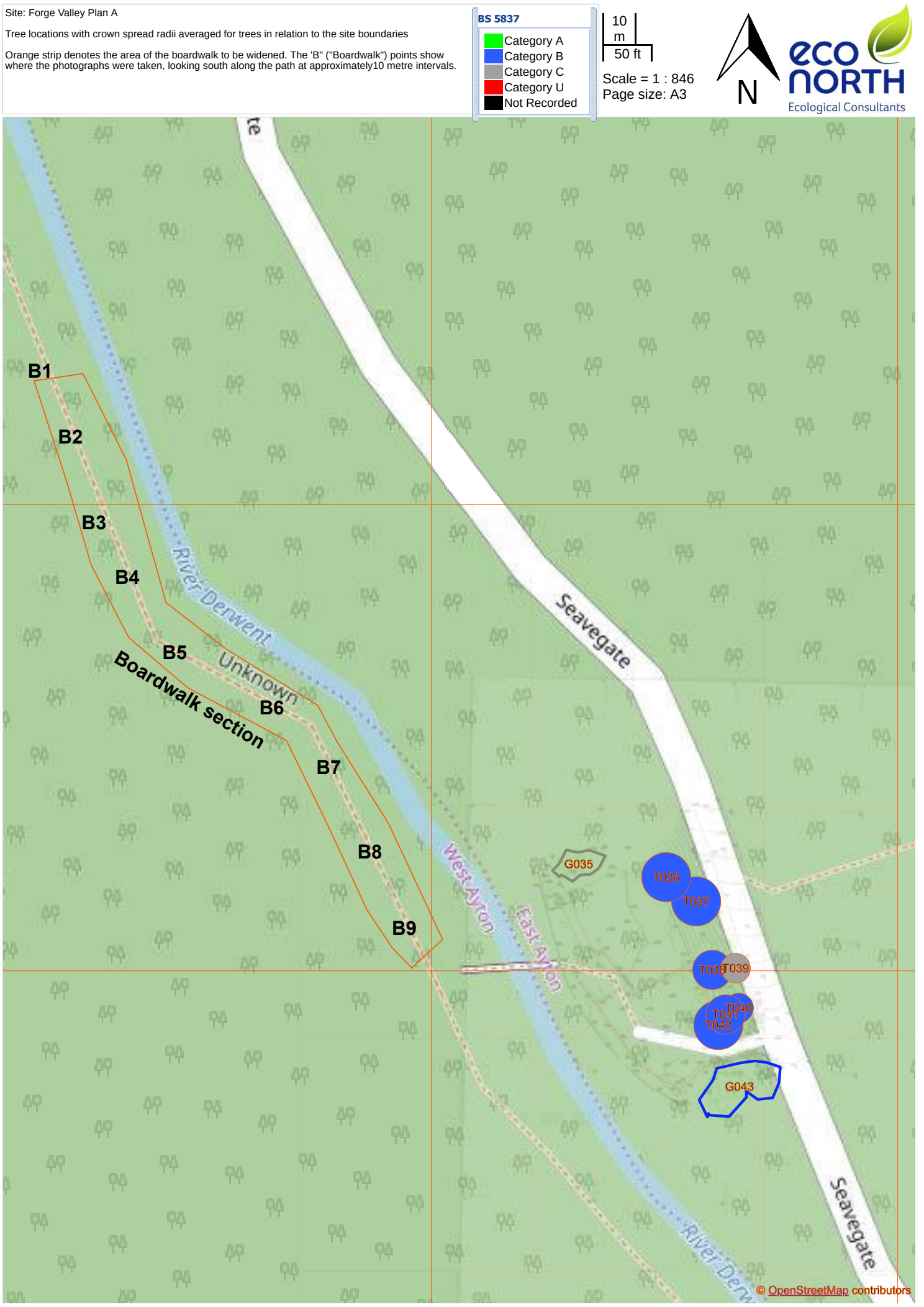


Figure 3: Plan B Location of Surveyed Trees

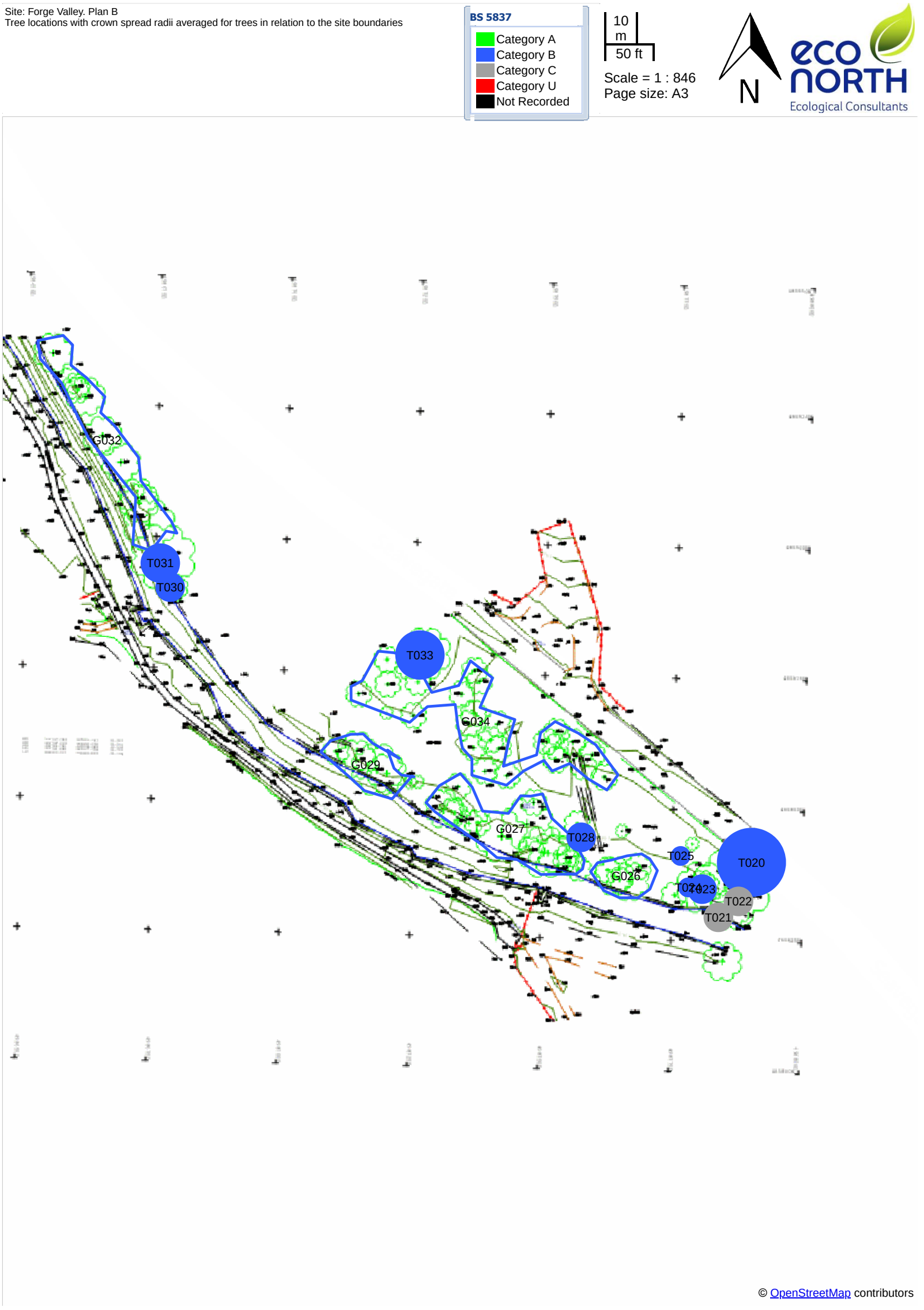
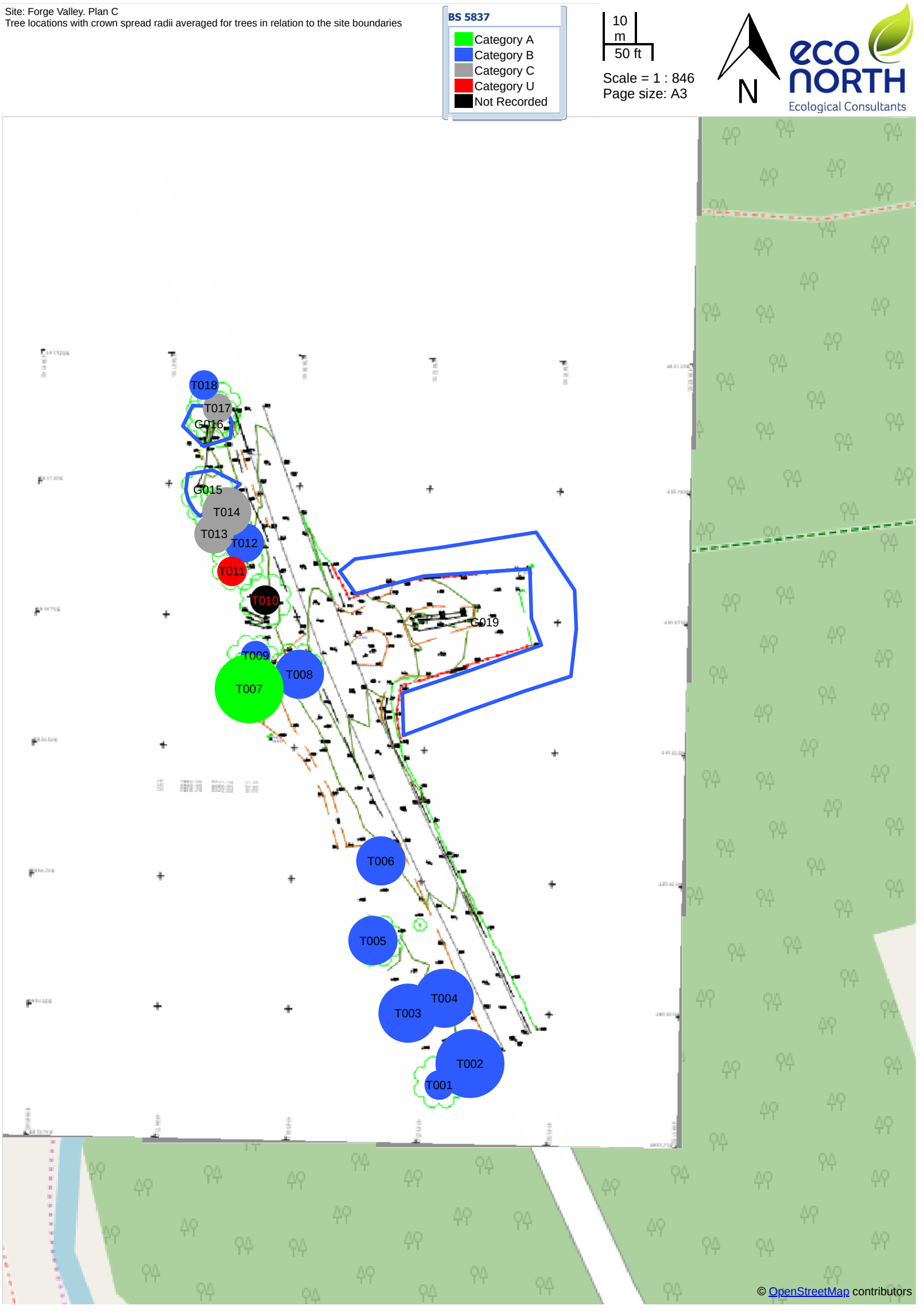


Figure 4: Plan C Location of Surveyed Trees



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

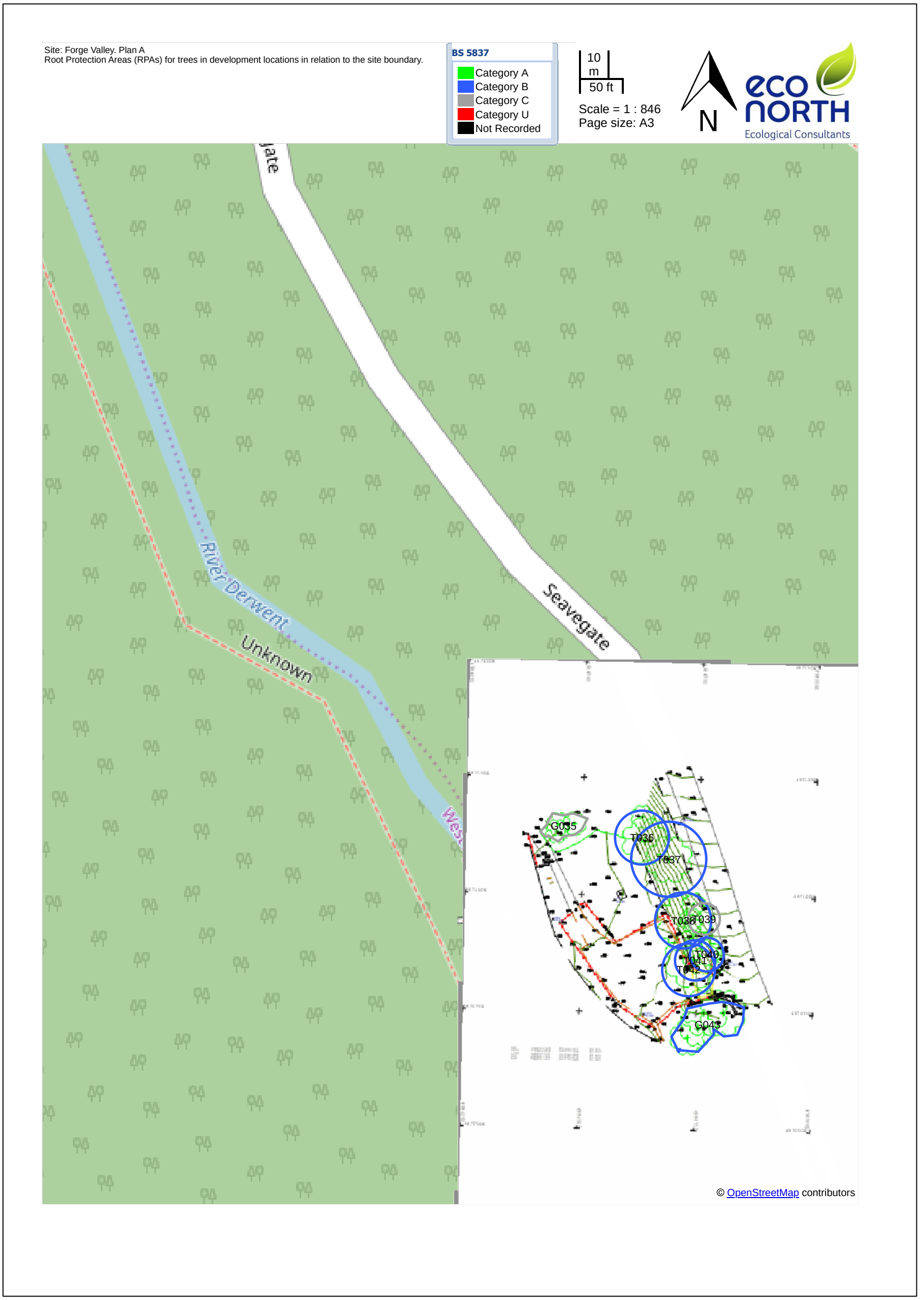


Figure 6: Plan B Tree RPA and Constraints Plan

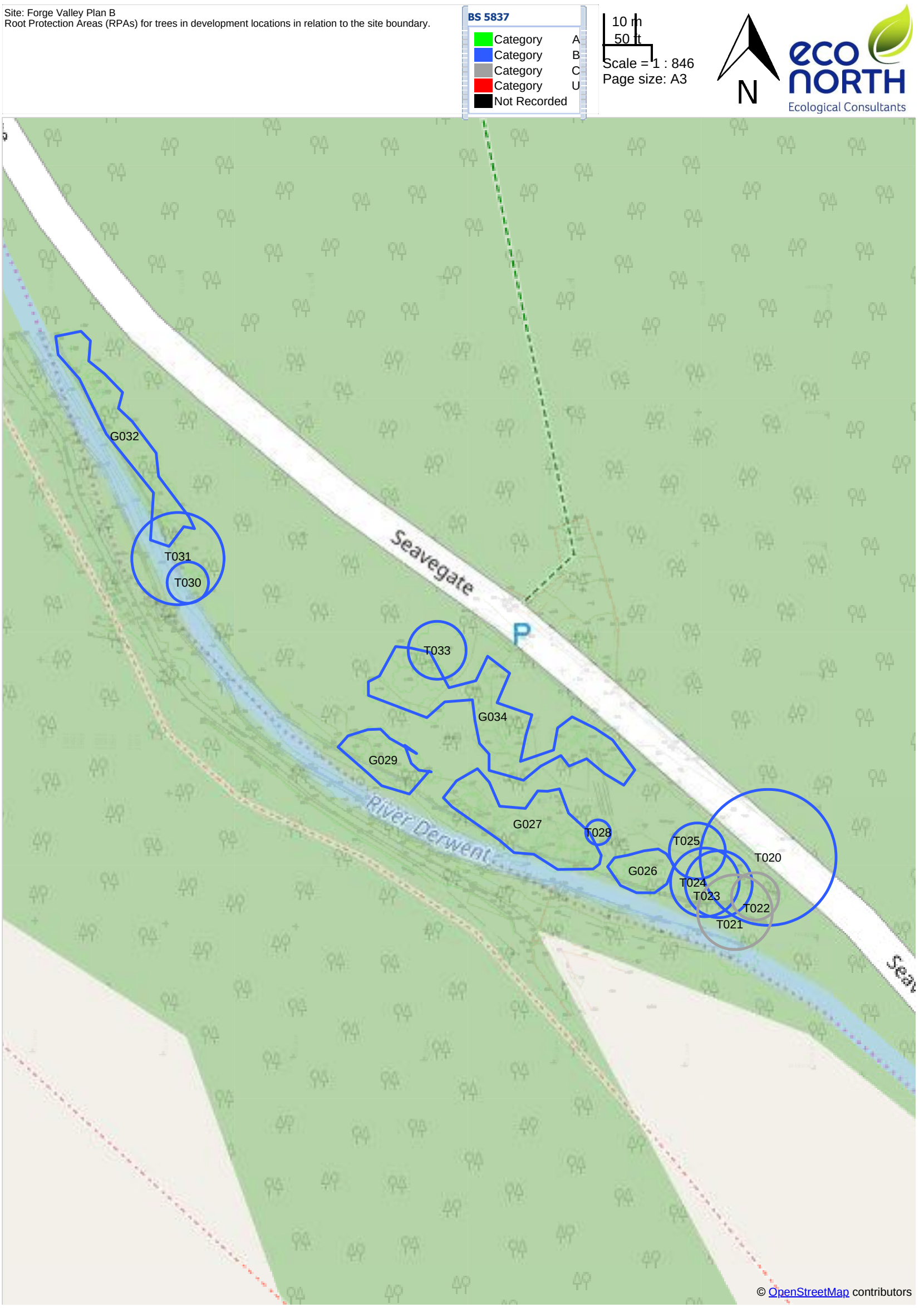
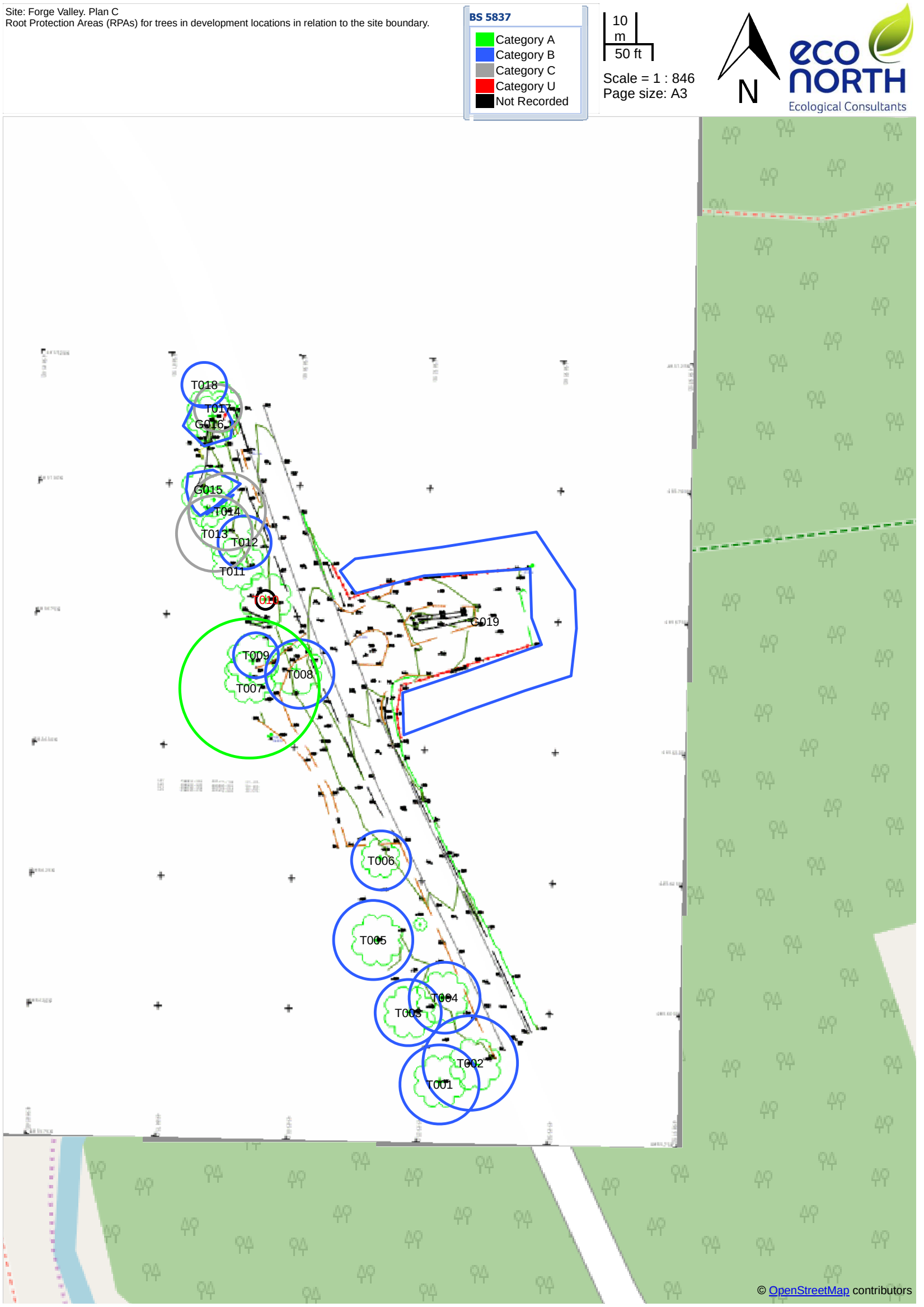
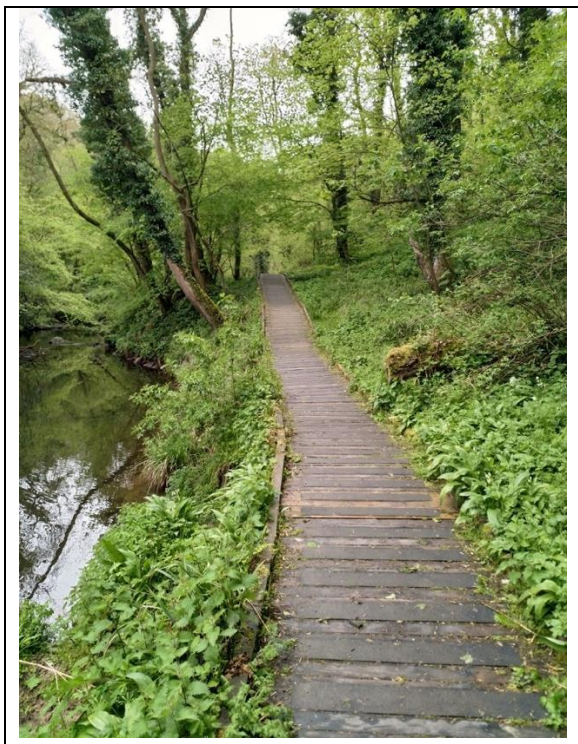


Figure 7: Plan C Tree RPA and Constraints Plan

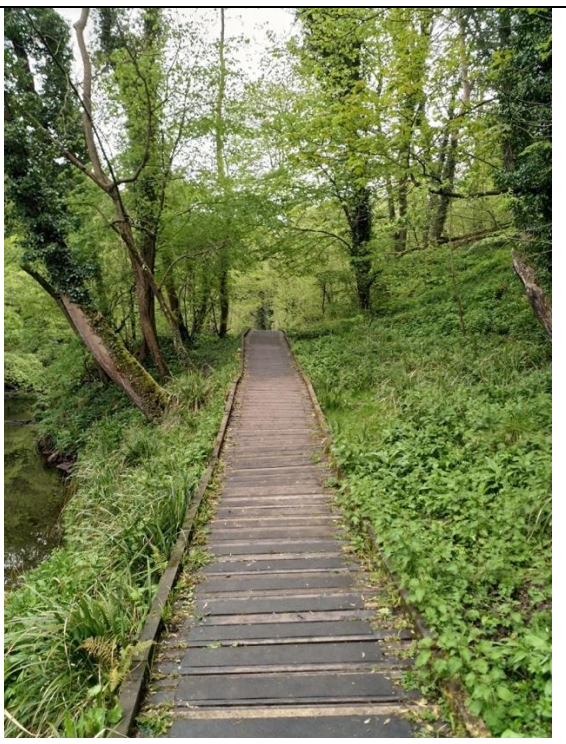


Appendix F: Photographs of Boardwalk area.

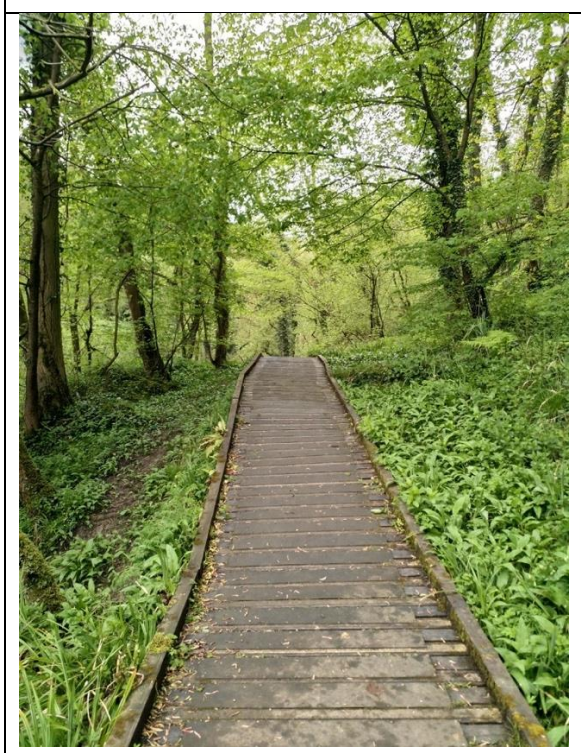
Photographs were taken from the most northerly point on the orange area at 10 metre intervals, moving south towards the bridge crossing at the car park in Plan A.



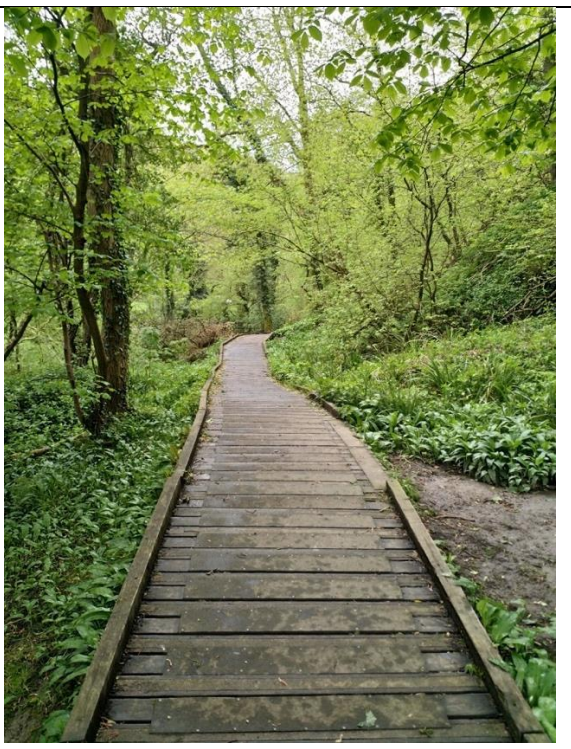
Location B1



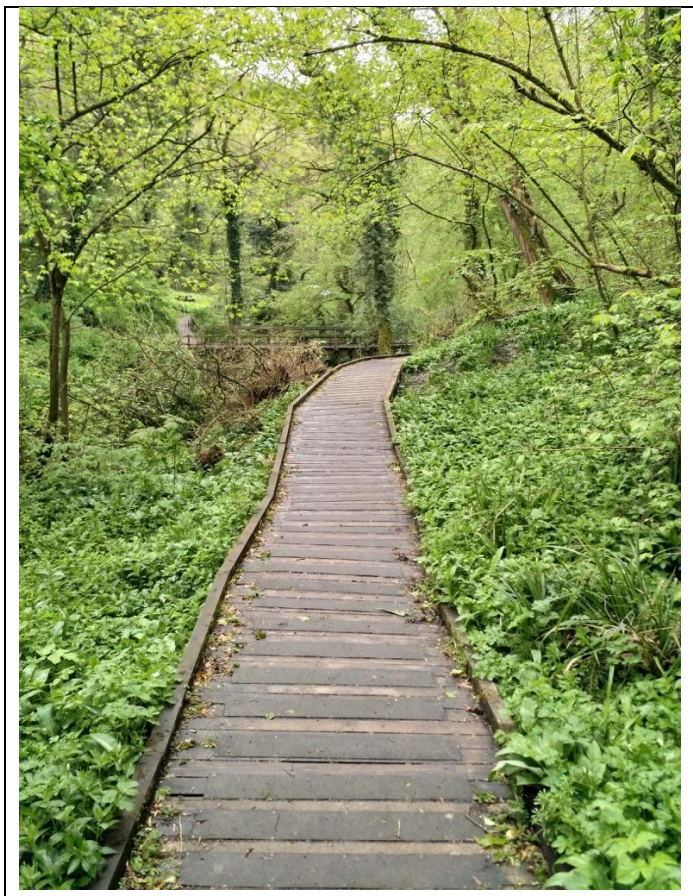
Location B2



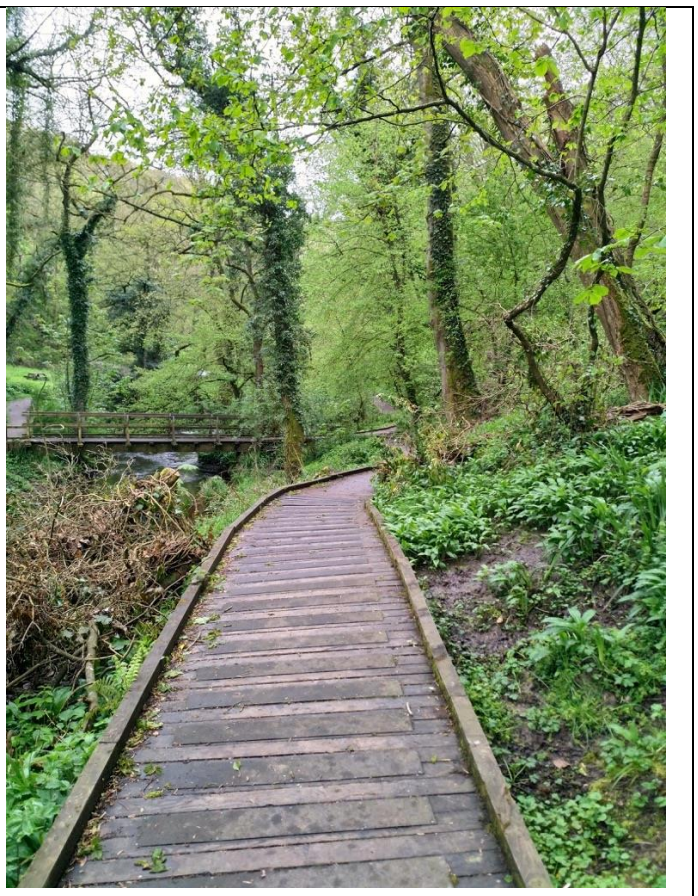
Location B3



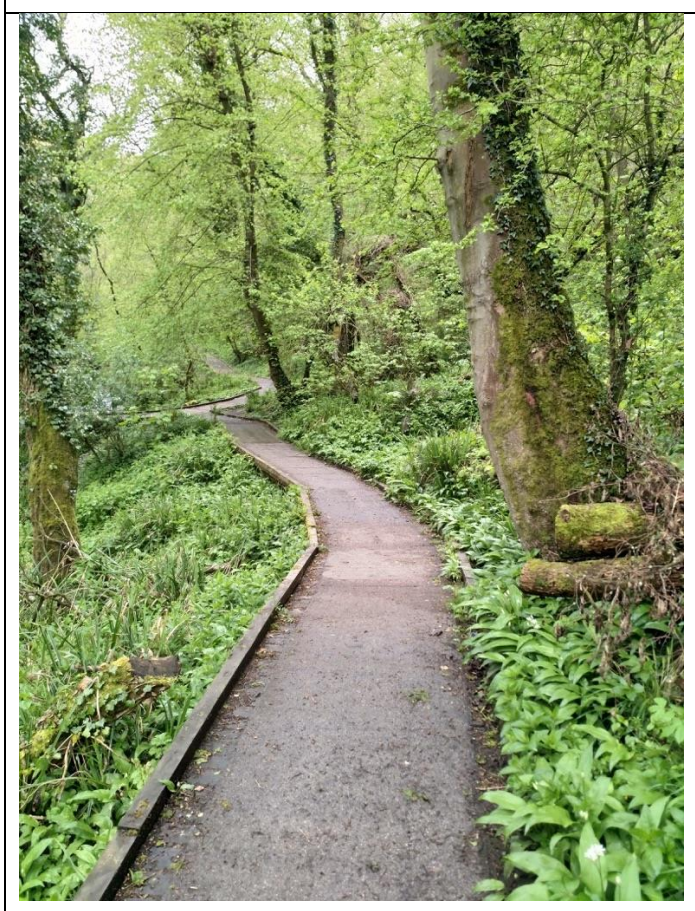
Location B4



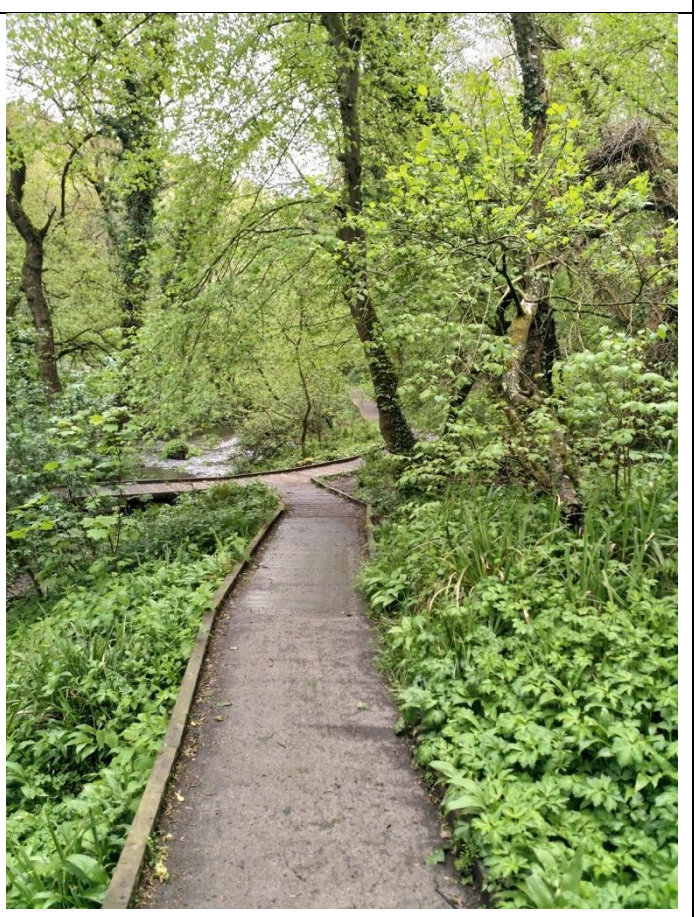
Location B5



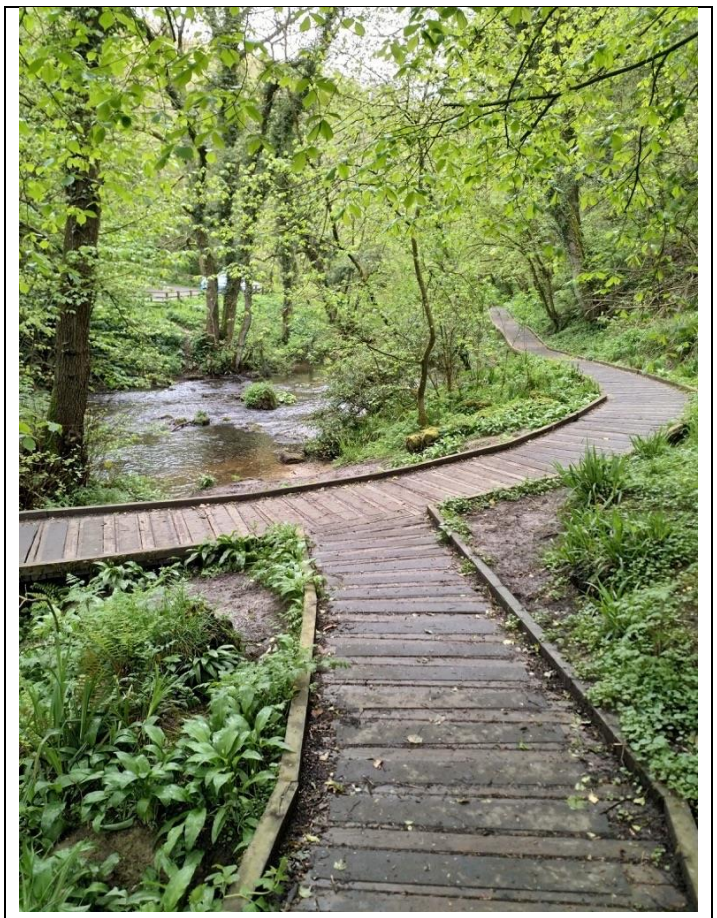
Location B6



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



Location B8.



Location B9