



Leckwith Quays
Applicant Response to Vale of Glamorgan Landscape Officer Comments
Planning App. Ref. 2020/01218/HYB
Phil Worthing – instructed by Gareth Davies Project Services Ltd

May 2021

Comment 1

LVIA - There is a route through Leckwith Woods which is used by walkers and cyclists as a leisure route overlooking the proposed development. This was a promoted route called 'Trelai Park to Leckwith Woods' that was created as part of a cross border project, but I'm not sure how much it is still promoted. However, it is still used and the view from this route should be taken into consideration as a viewpoint when preparing the LVIA as it overlooks the development.

Applicant Response

This route was not discussed in the original consultation with VoG and is not marked as a Public Right of Way, however at the request of our client we surveyed a number of viewpoints from the route and here submit one of them as a representative view, Viewpoint 7 (see Appendix A). The tables below lay out the Visual Effects during Construction and Operation:-

**Visual Effects - Construction
Viewpoint 7.**

View 7: Path within Leckwith Woods, looking north-east		
	Assessment	Significance
Baseline Description	<p>This is a close view from a path that runs within the eastern boundary of Leckwith Woods, approximately 25m south-west of the proposed site boundary, looking north-east through the woodland edge towards the development site.</p> <p>The foreground is dominated by the vegetated slope at the base of Leckwith Hill.</p> <p>This vegetation comprises a mix of tree species of varying maturity, understorey and groundcover, which are just starting to come into leaf. The path visible on the left-hand side of the view is well used by cyclists. Also visible is some fly tipped refuse, which this part of the wood has an abundance of.</p>	

See space differently

	<p>Down and through the vegetation can be glimpsed the existing structures, vehicles and activities currently on the site.</p> <p>Beyond this is the flyover of the raised and embanked flyover section of the A4232. In the background is the peri-urban landscape of the out-of-town shopping centre, Cardiff City Stadium and their associated roads and infrastructure.</p>	
Value of View	<p>This view is from a pedestrian/cycle route looking through trees over the existing ad hoc industrial estate, a busy, elevated, four lane highway and the peri-urban surrounds of Cardiff. The woodland also contains a large amount of fly-tipped refuse.</p> <p>The view through the woodland is glimpsed at best and curtailed when the vegetation is in full leaf.</p>	Medium
Susceptibility of visual receptors to change	<p>Typical receptors might be cyclists and some pedestrians using the path for commuting or recreation, dog walking etc. The numbers of users is likely to be greater during the summer months.</p>	Medium
Sensitivity of receptor	<p>With a medium value of view and a medium susceptibility of receptor, the sensitivity of the receptor would be medium.</p>	Medium
Magnitude of visual impact	<p>The development proposals would result in the removal of all the material related to the commercial activities.</p> <p>During construction stage the site area now taken up with commercial units will be full of a fluctuating building activity, hoardings, cranes, scaffolding and plant vehicles. Resulting in a temporary impact.</p> <p>The woodland will remain on the slopes in the foreground, screening the site.</p>	Medium
Significance of construction visual effects	<p>The medium sensitivity of the receptor coupled with the medium visual impact would result in a moderate effect.</p>	Moderate Adverse

**Visual Effects - Operation
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See space differently

	<p>This vegetation comprises a mix of tree species of varying maturity, understorey and groundcover, which are just starting to come into leaf. The path visible on the left-hand side of the view is well used by cyclists. Also visible is some fly tipped refuse, which this part of the wood has an abundance of. Down and through the vegetation can be glimpsed the existing structures, vehicles and activities currently on the site.</p> <p>Beyond this is the flyover of the raised and embanked flyover section of the A4232. In the background is the peri-urban landscape of the out-of-town shopping centre, Cardiff City Stadium and their associated roads and infrastructure.</p>	
Value of View	<p>This view is from a pedestrian/cycle route looking through trees over the existing ad hoc industrial estate, a busy, elevated, four lane highway and the peri-urban surrounds of Cardiff. The woodland also contains a large amount of fly-tipped refuse. The view through the woodland is glimpsed at best and curtailed when the vegetation is in full leaf.</p>	Medium
Susceptibility of visual receptors to change	<p>Typical receptors might be cyclists and some pedestrians using the path for commuting or recreation, dog walking etc. The numbers of users is likely to be greater during the summer months.</p>	Medium
Sensitivity of receptor	<p>With a medium value of view and a medium susceptibility of receptor, the sensitivity of the receptor would be medium.</p>	Medium
Magnitude of visual impact	<p>In this view would be the houses and duplex apartments that form the western edge of Area 01, seen through the edges of the Leckwith Woods. These are five storey units set against the base of the slope.</p> <p>The current woodland vegetation would be retained. This vegetation would continue to obscure medium and long views at this point, greatly softening the housing's impact on this view.</p> <p>The housing would be three storeys taller than the existing buildings on site, but as receptors are looking down on them this change would have a minimal impact.</p> <p>The housing will contain areas of green infrastructure and be of substantially high quality that the present buildings, with less noise and activity.</p>	Medium
Significance of operational visual effects	<p>The medium sensitivity of the receptor coupled with the medium visual impact would result in a moderate effect.</p>	Moderate Beneficial

See space differently

Updated Visual Assessment

Seven viewpoints were analysed, five were judged to have a significant and adverse effect on the view during construction phase of the proposed development. Those were close views where the nature of construction activities and sensitivity of the viewer combined to create a significant effect. During operational life four views were judged to have a significant effect, three adverse and one beneficial.

Conclusion

The addition of this extra Viewpoint has no material impact on the conclusions of the report it still finds that the proposed development form is likely to cause some significant adverse landscape and visual effects during the construction stage, however it will confer several significant beneficial effects during the operational phase.

The negatives derive largely from the loss of trees from the ancient woodlands, with mitigation provided by new planting and habitat.

The positives derive from the improvement of the settings of several landscape receptors by replacing low quality, ad hoc light industrial and commercial uses currently on site with a sensitive, integrated housing scheme with a strong landscape strategy.

Comment 2

LVIA – can you clarify if the red dotted line indicated in Viewpoint 1 & 2 in Chapter 6, LVIA, Appendix 1 indicates the proposed upper extent of the building roof line which will be visible from Cardiff or is it just the extent of the site?

Applicant Response

We can confirm that the dotted red line only represents the horizontal extent of the site and in no way is intended to portray the proposed roof line.

Comment 3

LVIA – I recommend that some photomontages are prepared from key locations, such as Ely River Trail, Old Leckwith Road bridge, Leckwith Road and possibly the 4232. This would help understand the visual impact more clearly.

Applicant Response

Visualisations are appropriate in certain situations, for example to check if the proposals break the skyline, if the response is appropriate in a historic setting or if proposals will be visible in a special / high value view. None of those are the case in this situation. Visualisations were not requested in the original consultation with VoG.

It is clear from the LVIA that this is a well contained site with very limited views into the site, this is true even from the middle distance, let alone anything from a long distance. The housing portion of the development (for which the visualisations have been suggested) is currently only an outline application and so any visualisation would be unrepresentative of detailed proposals. In addition, the locations advanced for visualisations are very close from where any development, including the existing, would be visible which doesn't advance understanding of how the proposals would sit in the landscape. Once the proposals reach a detailed stage then these suggested views would be useful in appreciating those proposals.

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In this setting, with these proposals, at this stage of an outline application visualisations would have the propensity to be misleading and sow confusion.

Comment 4

NRW have recently issued a guidance note 'Using LANDMAP in Landscape and Visual Impact Assessments GN46' <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/using-landmap-in-landscape-and-visual-impact-assessments-gn46/?lang=en>.

I appreciate this guidance is very new but it may be of interest.

Applicant Response

Guidance post-dates the report.

Comment 5

I'm concerned about the overall impact of the loss of woodland areas to be removed to accommodate the development, in terms of the landscape and visual impact. From the information provided the areas seem quite extensive, however I'm finding it difficult to understand the following:

- a. Precise extent of trees, woodland / ancient woodland which will be lost,*
- b. Number of trees and areas of woodland which will be retained and*
- c. mitigation proposals for the loss of the Ancient woodland / woodland habitat.*

The ecological survey states that 180 semi-mature / mature trees will be lost but not exactly where from and does this include other areas of woodland?

Also the LVIA states in item 6.7.2 'While the planting of new tree, and other vegetation, to the streets, deck garden and public open spaces goes a small way towards mitigation nothing can truly compensate for the loss of ancient woodland'

The loss of woodland areas is of concern as any replanting will take many years to mature to achieve a similar ecological and landscape value. Also the Council has declared a 'climate emergency' and the loss of trees to accommodate a new road should be carefully considered in this context. Do you know if any other design options been considered that may minimise the loss of woodland areas?

A plan which clearly indicates areas and numbers to be lost should be provided with clear proposals and targets clarifying how the loss of this important habitat will be mitigated for. The scale and extent of mitigation proposals should be clarified and be meaningful.

Applicant Response

New Arborist drawing supplied by Arborwood Tree Care Ltd – Site Plan included within the Arborist Report (see Appendix C).

In total 180 semi-mature/mature trees across 0.99ha of woodland will be removed as part of these proposals (see Loyn & Co 1844/SK44). The majority both in terms of area and tree numbers, 065ha and 125 respectively, is due to the new realigned road and bridge. These elements of the proposals are a consequence of the pressing need to provide a replacement for the existing road bridge. The woodland trees

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proposed for removal are a mix of ash, beech, hawthorn, hazel and elm and are largely poor-quality specimens (see Arborist Report – Appendix C).

The construction zone for the housing development will necessitate the removal of a further 55 woodland trees across an area of 0.34ha (see Loyn & Co 1844/SK44). These are again mostly low-quality specimens, a mix of ash, field maple, sycamore, willow and goat willow.

All retained trees will be protected during construction to the relevant British Standards as specified in Section 5 of the Arborist report.

In mitigation a mix of native woodland species trees will be planted in the construction zones, but obviously outside any required visibility splays and engineering access locations, this area is measured at 0.45ha. Combined with the proposals for new planting within the development and marked improvements to the riparian planting will help mitigate loss from the woodland.

Comment 6

A full pre-development tree assessment indicating which trees are to be removed and which ones are being retained, with a plan indicating the measures required to protect those trees to be retained. Also Appendix 6 of the Arboricultural survey is unclear. Can the drawing be revised with a clearer indication of the notations, areas of trees and include the application area red line so that we can be clear that the whole of the site has been included in the survey

Applicant Response

We can confirm that this work has been carried out by Arborwood Tree Care Ltd (see Appendix C).

Comment 7

Cross sections through the whole development would be useful to aid understanding of the proposal. At present the sections only show the buildings and not their relationship with the proposed road or woodland path

Applicant Response

We can confirm that this work has been carried out by Loyns & Co Architects, see drawing S301A 3 (see Appendix B).

Comment 8

The Landscape Strategy indicated some Green Fingers located through the site which link the river with Leckwith Woods. This is a strong design element which I'm keen to retain as I think it will benefit the scheme.

- a) *The green finger seems to have been lost in the developing masterplan as the road appears to be coloured green. Some detail and clarity about how this will be achieved here is required.*
- b) *it is proposed to install the play area below the overhead electric cables in this open space. Would this be desirable or acceptable to Western Power?*

Applicant Response

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- a) As part of an Outline Submission it is tricky to detail and position a 'Green Finger' that will fit seamlessly into the eventual scheme, however the Landscape Strategy does contain advice and examples on how to incorporate green-infrastructure within the street, play areas and the public realm in general. These include street swales, canopy cover to aid 'hop-over' on roads, natural play areas and planting on podiums.

The best way to ensure the continuation of the 'Green Finger' strategy, linking Factory Woods and the Ely River, into the next stage of masterplan design development and consequently within the final scheme to is add a Planning Condition to that effect.

The most suitable location for a 'Green Finger' is towards the southern extent of the site, between the housing types D & E and the woodland houses, type H. This location will be amongst the darker and quieter on the site, positioned as it is away from the road bridge, the densest housing and with only the lightest vehicle load-bearing access road traversing it. The applicants proposes to remove from the masterplan the northern most woodland house would provide substantial width for a habitat link between woodland and river.

- b) Play space under the powerlines is a matter of detail for reserved matters.

We have placed a children's play facility (LEAP) within the open space beneath the overhead power lines on what is a very restricted site for level play. The power lines are between 25-30m above the play area, well above any restricted distances advised by the National Grid. It is however recognised that metal surfaces can give off minor static charges affected by the electric and magnetic fields around power lines. Therefore, play equipment in this situation will be restricted to avoid steel surfaces that are touched by hand.

Comment 9

Footpaths – it would be useful to have some indication of the levels of the footpaths and to confirm that it is possible to get the paths in without affecting any woodland to be retained. It is proposed to use a stonedust surfacing which is liable to scouring if is laid too steeply.

Also the crossing from the woodland access is missing on one of the plans. Can you clarify if this is a proposed route or not? If not then I recommend that there is good pedestrian / cycle access along the new road to link to the Ely riverside trail.

Applicant Response

It is outside the scope of an Outline Application to detail the exact pedestrian routes, include levels, within the woodland. At this stage only a strategy to provide paths and framework for how it could be done is all that is possible. This includes the early aspiration to include pedestrian access from the B4267 which is no longer possible to achieve. The proposals do include a 3.5m wide pedestrian/cycle access along the inner bend of the new road and a 2.0m wide new pedestrian footpath on the outer bend, both of which connect to the Elly Trail.

It is recommended that the 'no-dig' strategy for footpaths amongst the woodland, outlined in the landscape strategy, is made part of a Planning Condition to ensure that the practice forms part of future designs.

Comment 10

Acoustic Barrier. This is mentioned in the Landscape Strategy document but not on the plan. Can you please clarify if this is still being proposed? If it is can you indicate where it will be located (it is located outside the red line site plan below) and what it will look like.

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Applicant Response

It was considered by the design team that the visual/aesthetic compromises required from the barrier outweighed the effect of the minor benefits to external noise levels at dwellings. It is maintained that the noise levels without the barriers would still fall within TAN 11's noise exposure categories of A and B, and as such are relatively low and would not have an adverse impact upon future occupants.

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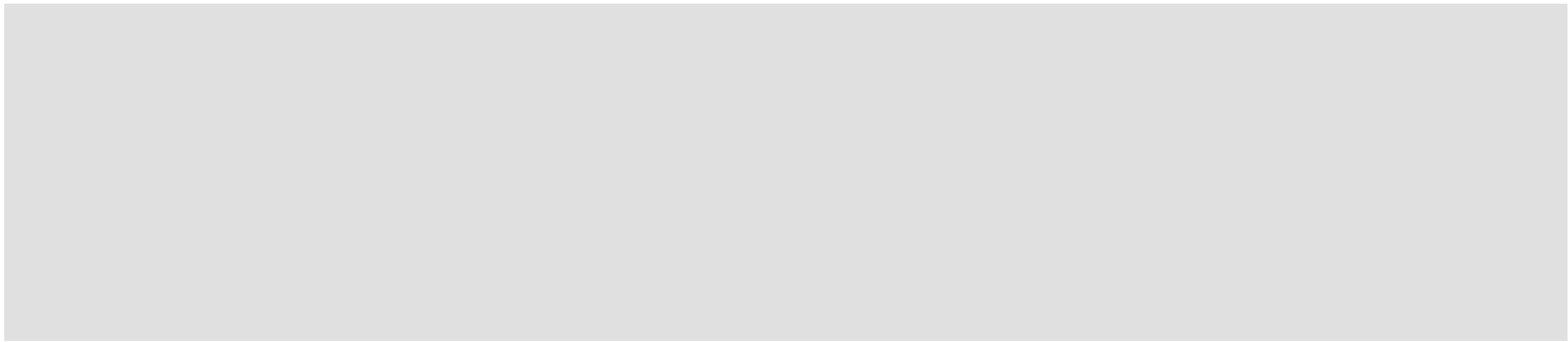
Appendix A

Viewpoint 7 – Plan and panorama





VIEWPOINT 7: Path in Leckwith Woods looking north-east.



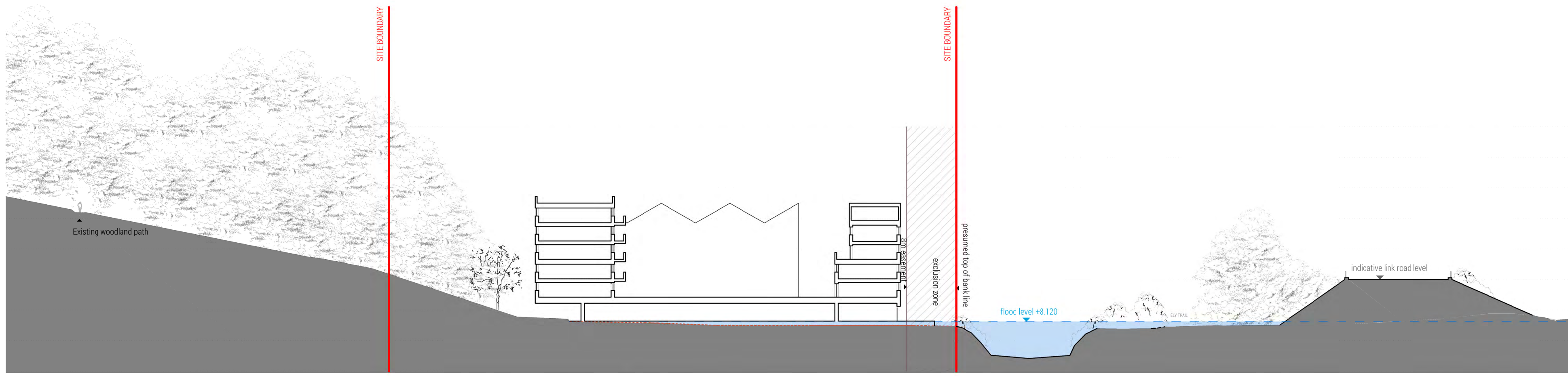
Photographs taken with 50mm lens (35mm digital equivalent) and scaled to be viewed from a distance of 300mm on A2. However due to image scaling and page formatting necessary within this document, accuracy in this respect is not guaranteed in reproduction. Please contact Novell Tullett if you would like to obtain copies of the original images.

VIEWPOINT 7:	
GRID REFERENCE	51.46923 -3.21128
ELEVATION	30m
DISTANCE FROM SITE	25m
Sensitivity of receptor	Medium
Magnitude of impact	Medium
Significance of effects	
Construction	Moderate adverse
Operation	Moderate beneficial

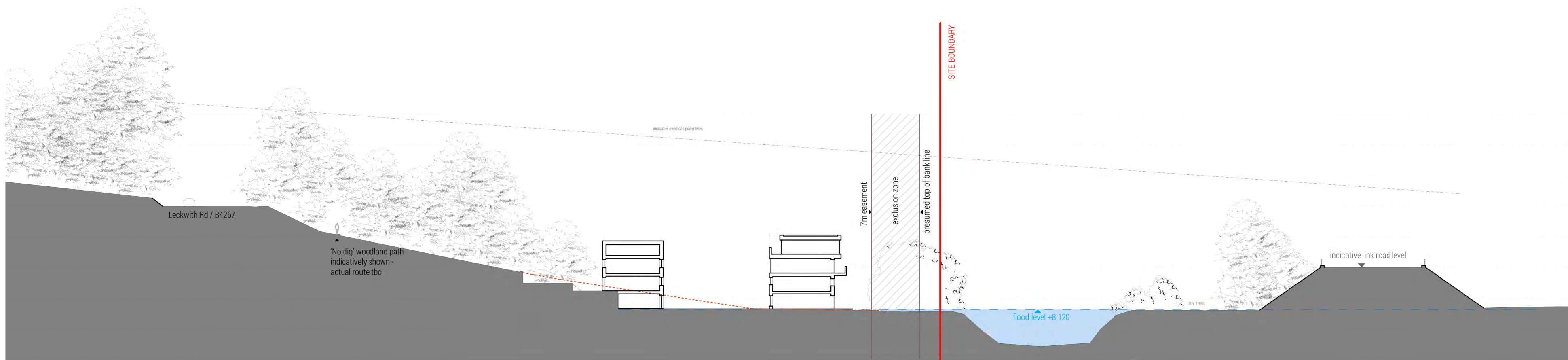
See space differently

Appendix B

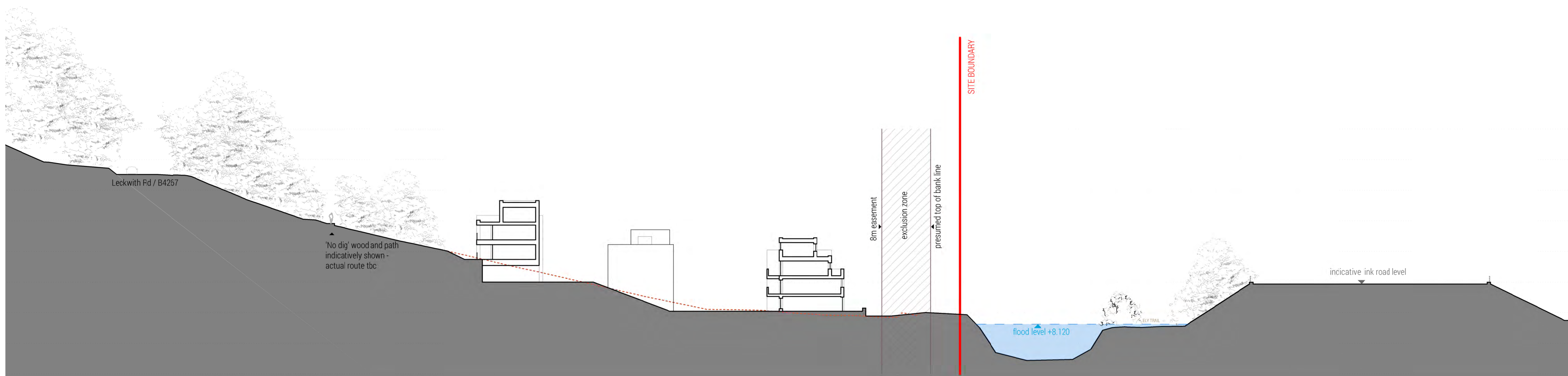
Proposed Sections S301A



AREA 01 - INDICATIVE MASSING SECTION 1A
1:500



AREA 02 - INDICATIVE MASSING SECTION 2C
1:500



AREA 03 - INDICATIVE MASSING SECTION 3A
1:500



REVISIONS:
A - 08.03.21 - DRAWING UPDATED TO CLEARLY SHOW
LECKWITh ROAD AND WOODLAND PATHS

OUTLINE PLANNING
1844/S.301A
LECKWITh QUAY

PROPOSED SITE
MASSING SECTIONS
1:500@A1 FEB 20

LOYN + CO
ARCHITECTS

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Appendix C

Aboricultural Assessment with Update Site Plan

Arboricultural Assessment

Site of Tree Hazard & Risk Assessment: Leckwith Quay
Leckwith
Cardiff
Vale of Glamorgan
CF11 8AU

Client: Phil Worthing
C/O Gareth Davies
Gareth Davies Project Services
The Walled Garden
Wenvoe Castle
Wenvoe Cardiff
CF5 6BE

Assessment carried out by: Douglas P J Burton (Arborist) & Tom K Valentino (Arborist)
Arborwood Tree Care Ltd
Little Oak
43 Caer Worgan
Llantwit Major
CF61 2SP

Date of Assessment: Tuesday 4th June 2019

Contents

1.

- 1.1 Assignment.
- 1.2 Methodology.
- 1.3 Limitations.
- 1.4 Disclaimer.

2.

- 2.1 Site visit.
- 2.2 Description of site.
- 2.3 Identification and location of trees.

3.

- 3.1 Clarification of Groups

4.

- 4.1 Roots protection area / construction exclusion zones.

5.

- 5.1-5 Tree protection during building works Specification.
- 5.6-10 General - Barriers and Ground protection
- 5.11-13 Barriers
- 5.14 Ground protection
- 5.15-18 Avoiding physical damage to the roots during construction
- 5.19-20 Disease

6.

- 6.1 Appendix 1 – Tree Survey
- 6.2 Appendix 2 – Protective Barriers
- 6.3 Appendix 3 – Ground Protective Barriers Guards
- 6.4 Appendix 4 – BS 5837:2012 Root Protection area table
- 6.5 Appendix 5 – Site Plan

1.

1.1 Assignment.

Arborwood Tree Care has been instructed by Phil Worthing. To carry out an arboriculture assessment for proposed large residential development, at Leckwith Quay. The site has been assessed in accordance with “BS5837:2005 Trees in relation to construction” – Recommendations. Client has requested that Arborwood Tree Care assess the area concerned with regards to the arboricultural impact of proposed building works.

1.2 Methodology.

The scope of this survey is concerned with the arboriculture aspects of the site only. Arborwood Tree Care has surveyed and classified the site in accordance with the BS 5837-2012. The survey was undertaken with the methodology to conduct a preliminary assessment of the trees and surrounding area. Trees are living organisms and are subject to change in a rapid manner. My recommendations within this report have been provided so that works may be adhered to in a timely manner. It is important to note, that any change to the surrounding environment, may have an impact on the trees structure which could invalidate my report. The assessment took place on a clear day and was undertaken by the Arborwood team. A good visual was had of all trees in the report.

1.3 Limitations.

All rights in this report are reserved. No part of it may be reproduced or transmitted, in any form or by any means without our written permission. Its contents and format are for the exclusive use of Ian Hunt and their associates. It may not be sold, lent out or divulged to any third party not directly involved in this situation without the written consent of Arborwood Tree Care Ltd.

1.4 Disclaimer.

We have no connection with any of the parties involved in this situation that could influence the opinions expressed in this report

2.

2.1 Site visit

The visit was carried out on Tuesday 4th June 2019. The assessment took place on a clear day and was undertaken by the Arborwood team. A good visual was had of all trees in the report.

2.2 Description of site

The site is an old quay site and has a number of industrial units within the site. There is an open field, waste land where the Ely river runs along its boundary. There is a woodland area on a steep bank with the Leckwith road running through and then along the site.

2.3 Site location.

The Site is located 51.469694,-3.212421 (CF118AU) Leckwith Quarry .

3. Site details

- 3.1 G1 – A group of mature Cypressus x leylandii – planted primarily as hedge or screening trees in moderate condition.
- 3.2 G2 – Mature woodland primarily made up of Ash, Hawthorn, Elm, Yew & English Oak with sign of Ash dieback & Dutch Elm Disease in poor to Moderate.
- 3.3 T1 – Dead Elms due to Dutch Elm Disease x3 – remove due to condition.
- 3.4 T2 – Over mature multi stemmed Ash in poor condition – remove due to condition.
- 3.5 T3 – Dead Single stemmed Ash – remove due to condition.
- 3.6 T4 – Over mature multi stemmed Ash in poor condition – remove due to condition.
- 3.7 T5 – Dead Elm due to Dutch Elm Disease x 10 – remove due to condition.
- 3.8 G3 – A group of mature Cypressus x leylandii in moderate – planted primarily as hedge or screening trees.
- 3.9 T6 – Over Mature Multi stemmed Field Maple in moderate to good condition.
- 3.10 T7 – Over mature single stemmed Ash in poor condition with sign of Ash dieback.
- 3.11 T8 – Over mature single stemmed Ash in poor condition with sign of Ash dieback.
- 3.12 G4 – A group of Hazel, Cherry & Apple in moderate condition planted by pond.
- 3.13 G5 – A group of Self-seeded young shrub trees Goat Willow, Ash, Buddleia, Birch and Elm in poor condition sign of Ash dieback & Dutch Elm Disease.
- 3.14 G6 – A group of Mature Cypressus x leylandii in moderate condition – planted primarily as hedge or screening trees.
- 3.15 G7 – A group of young growing along riverbank - Ash, Elm, Field Maple, Buddleia, Sycamore, Cypress in poor condition.
- 3.16 G8 – A group of Mature Cypressus x leylandii in poor – planted primarily as hedge or screening trees
- 3.17 G9 – A group of young to semi mature Goat Willow, Buddleia, Ash, Sycamore and Elm in poor condition with sign of Ash dieback & Dutch Elm Disease.
- 3.18 T10 – Over mature single stemmed Ash in moderate condition.
- 3.19 T11 – Mature Field Maple in good condition.
- 3.20 T12 – Over mature single stemmed Ash in poor condition with sign of Ash dieback – remove due to condition.
- 3.21 T13 – Dead Single stemmed Ash – remove due to condition.
- 3.22 G10 – A group of young to mature Hazel, Hawthorn, Buddleia, Ash, Sycamore and Elm in poor to moderate condition with sign of Ash dieback & Dutch Elm Disease.
- 3.23 G11 – A group of young to mature Willow, Elm, Sycamore, Goat willow, Hawthorn, Buddleia, Ash in poor to moderate condition with sign with sign of Ash dieback & Dutch Elm Disease.
- 3.24 T14 – Over mature single stemmed Ash in moderate condition.
- 3.25 G12 – A group of Semi mature Ash in moderate condition.
- 3.26 G13 – A group young to over mature Sycamore, Ash, Hazel, Buddleia, Hawthorn and Alder with sign of Ash dieback in poor to moderate condition.
- 3.27 T15 – Mature single stemmed Sycamore in moderate condition.
- 3.28 T16 – Over mature single stemmed Ash with sign of Ash dieback in poor condition - remove due to condition.
- 3.29 T17 – Mature multi stemmed Ash in moderate condition.
- 3.30 T18 – Mature single stemmed Ash in moderate condition.
- 3.31 T19 & T20 – Semi mature single stemmed Ash with sign of Ash dieback in poor condition - remove due to condition.
- 3.32 T21 & T22 – Dead Single stemmed Willow – remove due to condition.

4. Roots protection area / construction exclusion zones.

4.1 A root protection area is mandatory for any works around areas of retained trees See appendix 2 (RPA Area Chart) for clarification.

5. Tree protection during building works Specification.

Contractors to undertake works in strict accordance with BS 5837: 2012:

5.1. Where building works are proposed on a site where trees are to be retained, access facilitation pruning should be undertaken as necessary to prevent injurious contact between demolition plant and the tree(s). In some cases, working space may be provided by temporarily tying back tree branches. Pruning or tying should be undertaken in accordance with a specification prepared by an arboriculturist.

5.2. When building works a structure (including underground structures) within what would otherwise be the RPA, barriers should be erected, and ground protection installed (see 6.2.3 of BS 5837:2012), to protect the underlying soil to the edge of the existing structure.

5.3. All plant and vehicles engaged in building works should either operate outside the RPA or run on the ground protection (see 6.2.3 of BS 5837:2012). Where such ground protection is required, it should be installed prior to commencement of operations.

5.4. The advice of an arboriculturist should be sought where underground structures present within the RPA are, or will become, redundant. In general, it is preferable to leave such structures in situ, as their removal could damage adjacent tree roots.

5.5. Where an existing hard surface is scheduled for removal, care should be taken not to disturb tree roots that might be present beneath it. Hand-held tools or appropriate machinery should be used (under arboricultural supervision) to remove the existing surface, working backwards over the area, so that the machine is not moving over the exposed ground (see 7.2.2 of BS 5837:2012 for protection of exposed roots). If a new hard surface is to be laid, it might be

Barriers and ground protection

General

5.6. All trees that are being retained on site should be protected by barriers and/or ground protection (see 5.5 of BS 5837:2012) before any materials or machinery are brought onto the site, and before any demolition, development or stripping of soil commences. Where all activity can be excluded from the RPA, vertical barriers should be erected to create a construction exclusion zone. Where, due to site constraints, construction activity cannot be fully or permanently excluded in this manner from all or part of a tree's RPA, appropriate ground protection should be installed (see 6.2.3 of BS 5837:2012).

5.7. Areas of retained structural planting, or designated for new structural planting, should be similarly protected, based on the extent of the soft landscaping shown on the approved drawings.

5.8. The protected area should be regarded as sacrosanct, and, once installed, barriers and ground protection should not be removed or altered without prior recommendation by the project arboriculturist and, where necessary, approval from the local planning authority.

5.9. Where required, pre-development tree work may be undertaken before the installation of tree protection measures, with the agreement of the project arboriculturist or local planning authority if appropriate (see also 8.8.1 of BS 5837:2012).

5.10. It should be confirmed by the project arboriculturist that the barriers and ground protection have been correctly set out on site, prior to the commencement of any other operations.

Barriers

5.11. 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 tree(s). Barriers should be maintained to ensure that they remain rigid and complete.

5.12. The default specification should consist of a vertical and horizontal scaffold framework, well braced to resist impacts. The vertical tubes should be spaced at a maximum interval of 3 m and driven securely into the ground. Onto this framework, welded mesh panels should be securely fixed. Care should be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. If the presence of underground services precludes the use of driven poles, an alternative specification should be prepared in conjunction with the project arboriculturist that provides an equal level of protection. Such alternatives could include the attachment of the panels to a free-standing scaffold support framework.

5.13. Where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist and, where relevant, agreed with the local planning authority. For example, 2 m tall welded mesh panels on rubber or concrete feet might provide an adequate level of protection from cars, vans, pedestrians and manually operated plant. In such cases, the fence panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The distance between the fence couplers should be at least 1 m and should be uniform throughout the fence. The panels should be supported on the inner side by stabilizer struts, which should normally be attached to a base plate secured with ground pins. Where the fencing is to be erected on retained hard surfacing or it is otherwise unfeasible to use ground pins, e.g. due to the presence of underground services, the stabilizer struts should be mounted on a block tray. Please see 6.2 Appendix 2 – Protective Barriers

Ground Protection

5.14 The ground protection on construction sites to protect the ground from erosion and damage by construction vehicles in root protection areas. Ground protection are usually installed as a roadway consisting of a parallel track of 2.4m x 1.2m panels with a 1.2m space in between. Where a temporary roadway must pass near to trees, the following extra precautions must be taken in order to provide cushioning for the ground under the tree canopy:

1. Edge rails of 200 x 50mm sawn timber should be installed where the trackway will pass under the tree canopy. These should be staked on either side of the trackway using 50 x 50x 500mm timber stakes at 1.5m spacing.
2. A layer of geotextile membrane should be laid to cover at least the area under the tree canopy, and preferably under the whole of the trackway.
3. A pad of ground guards, three boards wide should be laid on top of the geotextile membrane, between the timber rails.
4. A 150mm deep layer of wood chippings should be laid.
5. The twin trackway can then be laid so that it rises over the wood chippings as it passes under the tree canopy. Extra ground guard boards should be installed in the gap between the twin trackway at this point to retain the wood chips in place.

Please see 6.3 Appendix 3 – Ground Protective Barriers Guards

Avoiding physical damage to the roots during construction

5.15. Air pressured root pruning to take place minimize and avoid physical damage to tree roots, existing ground levels should be retained within the RPA. Intrusion into soil within the RPA is generally not acceptable, and topsoil within it should be retained in situ. However, limited manual excavation within the RPA might be acceptable, subject to justification. Such excavation should be undertaken carefully, using hand-held tools and preferably by compressed air soil displacement.

5.16. Roots, whilst exposed, should immediately be wrapped or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.

5.17. Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist, as such roots might be essential to the tree's health and stability.

5.18. Prior to backfilling, retained roots should be surrounded with topsoil or uncompact sharp sand (builders' sand should not be used because of its high salt content, which is toxic to tree roots), or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

Disease

Ash Die Back

5.19. Ash Die Back - Ash dieback affects ash trees (*Fraxinus excelsior*) and is caused by the fungus *Hymenoscyphus fraxineus*. It blocks the water transport systems in trees causing leaf loss, lesions in the wood and on the bark and ultimately the dieback of the crown of the tree. Young trees are particularly vulnerable and die quickly once they succumb. Older trees can be slowly killed by a yearly cycle of infection. The spread of the disease in the UK is most likely to be as a result of the planting of infected nursery stock and wood but windborne distribution of the fungal spores also occurs. The disease is spread by spores from the fruiting bodies of the fungus produced on fallen ash leaves. These airborne spores can disperse naturally via wind over tens of kilometers. Evidence suggests young trees are killed quickly while many mature ash trees can resist infection for some time until eventually dying or becoming weakened and succumbing to attack from another pest or pathogen.

Ways to reduce Ash Die Back.

- Monitoring of the Ash trees to safeguard the resistance trees (2-3% resistance trees protected in the UK)
- Clean and disinfect tools, equipment, work boots and vehicle tyres before visiting another site. Make sure that ash wood is free of soil and leaf material before being transported. Where practical collect up and burn or compost fallen ash leaves on site. This will help to disrupt the life cycle of the pathogen. (Between June and October, the black toughened rachises (leaf stalks) can be found in amongst the leaf litter. You may also see the tiny white trumpet shaped fruiting bodies that have emerged from the stalk)
- Replanting of woodland with a mix of 45 native broadleaf trees including some following species: Oak, Hornbeam, Silver birch, wild cherry, Beech, Field Maple.

Elm disease

5.20 Symptoms first appear in early summer, clusters of leaves turn yellow and wilt, leaves then turn brown and fall. Affected shoots die back from the tip twigs sometimes turn down to form 'shepherd's crooks' twigs have dark streaks in the outer wood beneath the bark, or spots or rings in cross section. The beetles that spread Dutch elm disease have distinct feeding preferences for certain species of elm, so even susceptible elms can sometimes escape the disease if they are not attractive to the beetles.

Ways to reduce Elm disease.

- Replanting of woodland with a mix of 45 native broadleaf trees including some following species: Oak, Hornbeam, Silver birch, wild cherry, Beech, Field Maple.
- Clean and disinfect tools, equipment, work boots and vehicle tyres before visiting another site. Make sure that ash wood is free of soil and leaf material before being transported. Where practical collect up and burn or compost fallen ash leaves on site. This will help to disrupt the life cycle of the pathogen.

6.1 Appendix 1 – Tree Survey

ID/ Group	Species	Height Approx. in meter	Stem Diam. (D B H)	PC	Branch & Canopy Clearance	Life Stage	General Observation and Comments	RPA m ²	IVY covered %	Cat. Grade
G01	Cypress	12	675	Mod	0.25m	M	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure. Heavy Ivy covered.</p> <p>Stems / trunks: A group of Multi stemmed Cypress tree with no apparent signs of decaying, fractures or fungal faults which will fail the trees structure. Stem has grown next to a wall and pond.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.</p>	206	2%	C
G02	Hawthorn Elm Ash Yew English Oak	4-20	10-300cm	Poor - Mod	0.25 - 8m	Y-OM	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure on most of the woodland tree. Within copse has a number of trees with heave. Heavy Ivy covered.</p> <p>Stems / trunk: No apparent signs of decaying, fractures or fungal faults which will fail the trees structure on most of the woodland trees. Within group there is signs of Dutch Elms disease and Ash Die back.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Crown suppressed by others.</p>	707	50-80%	C
T1	Elm x3	12	25-100	Dead	6m	Dead	<p>Roots: Signs of soil disturbance and heave. Heavy Ivy covered.</p> <p>Stems / trunks: A Multi stemmed dead standing tree and has numerous signs of decaying</p> <p>Crowns: Dead – likely cause is Dutch Elm disease.</p>	452	50%	U
T2	Ash	20	250cm	Poor	10m	OM	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure. Heavy Ivy covered.</p> <p>Stems / trunk: No apparent signs of decaying, fractures or fungal faults which will fail the trees structure on most of the woodland trees.</p> <p>Crowns: Shows large amount of dieback and deadwood, decay and branches crossing with wounds.</p>	707	40%	C
T3	Ash	16	100cm	Dead	16m	Dead	<p>Roots: Signs of soil disturbance and heave. Heavy Ivy covered.</p> <p>Stems / trunks: A single stemmed dead standing tree and has numerous signs of decaying with hung up branches</p> <p>Crowns: Dead – likely cause is Ash dieback.</p>	452	45%	Dead
T4	Ash	25	125cm	Poor	2.2m	OM	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure.</p> <p>Stems / trunk: Multi stemmed with large cavity in 2 x stems at height of 1m width 1m. Tree is weighted with a 25%lean.</p> <p>Crowns: Shows large amount of deadwood, decay and branches crossing with wounds. Signs of Ash dieback within the crown.</p>	573	50%	C

T5	Elm x10	15	35 – 75cm	Dead	14m	Dead	<p>Roots: Signs of soil disturbance and heave. Heavy Ivy covered.</p> <p>Stems / trunks: A Multi stemmed dead standing tree and has numerous signs of decaying</p> <p>Crowns: Dead – likely cause is Dutch Elm disease.</p>	3	90%	Dead
G3	Cypress x 4	25-30	175cm	Mod	2m	M	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure.</p> <p>Stems / trunk: No apparent signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Crown has been raised. Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.</p>	707	2%	C
T6	Field Maple	25	2250cm	Mod – Good	1.5m	OM	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure. Ivy covered roots.</p> <p>Stems / trunk: Multi stemmed, with fence / gate growing through main stem. No apparent signs of fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Crown is suppressed by other trees. Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. With birds nesting in crown.</p>	707	35%	B
T7 & T8	Ash	25	1250cm	Poor	2m	OM	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure. Ivy covered.</p> <p>Stems / trunk: Both single stemmed, with large signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Shows larger than average amount of deadwood, decay and branches crossing with wounds. Signs of Ash dieback</p>	707	40%	U
G4	Hazel, Cherry & Apple	10	20 – 30cm	Mod	0.5m	M	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure.</p> <p>Stems / trunk: No apparent signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.</p>	48	40%	C
G5	Goat Willow, Ash, Buddleia, Birch Elm	2-6	5-15cm	Poor	0.5 – 2m	Y	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure.</p> <p>Stems / trunk: No apparent signs of decaying, fractures or fungal faults which will fail the trees structure but poorly formed and majority self-seeded scrub trees with no significant value. Dotted around industrial estate majority covered in bramble.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Some signs of Dutch Elm and Ash dieback</p>	10	20%	U

G6	Cypress x3	20-25	100cm	Mod	1m	M	<p>Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure. River bank grown trees.</p> <p>Stems / trunk: Multi stemmed, No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Nesting birds in upper crown and crown raised off unit.</p> <p>Note: Jappanese knotweed present.</p>	452	10%	C
G7	Ash, Elm, Field Maple, Buddleia, Sycamore, Cypress	2-10	5-45cm	Poor	0-4m	U-SM	<p>Roots: No apparent signs of soil disturbance, heave or subsidence and no apparent signs of decaying or fungal faults in root structure. Heavily Ivy & bramble covered.</p> <p>Stems / trunk: No apparent signs of decaying, fractures or fungal faults which will fail the trees structure. River bank grown with stems tapering out, most are multi stemmed.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Signs of Dutch Elm disease and Ash dieback</p>	92	40-60%	U
G8	Cypress	15-20	100cm	Poor	15m -2m 2 sided	M	<p>Roots: Banked soil around stems & signs of vehicle damage to roots.</p> <p>Stems / trunk: Vehicle damage to stems</p> <p>Crowns: Crown has been bare faced up back to stem up to 15m leaving crown unbalanced. Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Min powerlines through the group of trees</p>	452	5%	C
G9	Goat Willow, Buddleia, Ash, Sycamore and Elm	2-10	5-45cm	Poor	0-3m	Y-SM	<p>Roots: Heavily covered ivy and bramble roots.</p> <p>Stems / trunk: Heavily covered ivy and bramble stems.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Signs of Ash dieback and Dutch Elm Disease.</p> <p>Note: Japanese Knotweed present</p>	92	60%	U
T9	Elm	14	73cm	Dead	4m	Dead	<p>Roots: Heavy Ivy covered.</p> <p>Stems / trunks: A single stemmed dead standing tree and has numerous signs of decaying & heavily Ivy covered</p> <p>Crowns: Dead – likely cause is Dutch Elm disease.</p>	238	0%	Dead
T10	Ash	25	120cm	Mod	10m	OM	<p>Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure.</p> <p>Stems / trunk: Single stemmed, No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Crown has nesting birds.</p>	652	6%	C
T11	Field Maple	13	90cm	Good	2m	M	<p>Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure.</p> <p>Stems / trunk: Multi stemmed, No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.</p>	366	30%	B

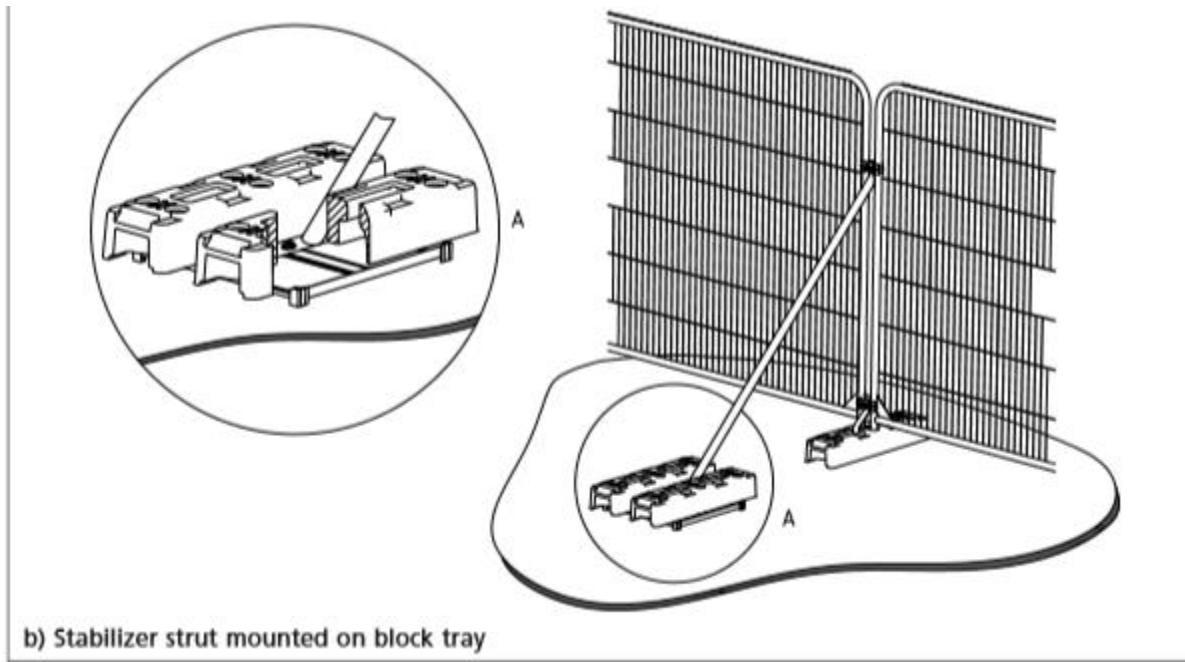
T12	Ash	15	76cm	Poor	10	OM	Roots: Heavily covered ivy and bramble roots. Stems / trunk: Heavily covered ivy and bramble stems. Crowns: Larger than average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Signs of Ash dieback	272	95%	C
T13	Ash	12	120cm	Dead	6	Dead	Roots: Signs of soil disturbance and heave. Heavy Ivy covered. Stems / trunks: Twinned stemmed dead standing tree and has numerous signs of decaying with hung up branches Crowns: Dead – No approx. cause	652	2%	Dead
G10	Sycamore, Hazel, Buddleia, Hawthorn, Elm, Ash	6-20	5-120cm	Poor – Mod	0-6	Y-M	Roots: Heavily covered ivy and bramble roots. Stems / trunk: Heavily covered ivy and bramble stems. Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Signs of Ash dieback and Dutch Elm Disease.	652	50%	C
G11	Willow, Elm, Sycamore, Goat willow, Hawthorn, Buddleia, Ash	6-20	5-120cm	Poor – Mod	0-6	Y-OM	Roots: Heavily covered ivy and bramble roots. Stems / trunk: Heavily covered ivy and bramble stems. Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Signs of Ash dieback and Dutch Elm Disease. Note: Powerlines running through	652	50%	C
T14	Ash	25	150cm	Mod	4	OM	Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure. Stems / trunk: Twinned stemmed, No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure. Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Crown has nesting birds. Some signs of dieback	707	40%	C
G12	Ash	10-20	100-250cm	Mod	2	SM	Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure. Stems / trunk: No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure. Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.	707	40%	C
G13	Sycamore, Ash, Hazel, Buddleia, Hawthorn, Alder	6-20	10-250cm	Mod-Poor	0.5 – 6	Y-OM	Roots: Heavily covered ivy and bramble roots. Stems / trunk: Heavily covered ivy and bramble stems. Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size. Signs of Ash dieback. Some trees are growing close to a wall tapering over a road and close to streetlights Note: Powerlines running through	707	4%	C
T15	Sycamore	25	250cm	Mod	5	M	Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure. Stems / trunk: No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure. Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.	707	95%	C

T16	Ash	20	Unable	Poor	2	OM	<p>Roots: Heavily covered ivy and bramble roots.</p> <p>Stems / trunk: Heavily covered in climber and bramble stems.</p> <p>Crowns: Shows several snapped out limbs, decay and branches crossing with wounds. Signs of Ash dieback</p>	707	95& Climber	U
T17	Ash	20	250cm	Mod	4	M	<p>Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure.</p> <p>Stems / trunk: Multi stemmed, No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure apart from a vehicle strike on stem closest to road.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.</p>	707	50%	C
T18	Ash	17	250cm	Mod	5	M	<p>Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure.</p> <p>Stems / trunk: No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Shows average amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size.</p>	707	50%	C
T19 &20	Ash	20	250cm	Poor	3	SM	<p>Roots: Roots are ivy covered and unable to identify any decaying or fungal faults in root structure.</p> <p>Stems / trunk: No Apparent signs of decaying, fractures or fungal faults which will fail the trees structure.</p> <p>Crowns: Shows large amount of deadwood, decay and branches crossing with wounds. All is average for a tree of its age and size has signs of ash dieback. Covered in climber</p>	707	50 – 70%	C
T21 – 22	Willow	10 – 15	200cm	Dead	3	Dead	<p>Roots: Signs of soil disturbance and heave. Heavy Ivy covered.</p> <p>Stems / trunks: Single stemmed dead standing tree and has numerous signs of decaying with hung up branches</p> <p>Crowns: Dead – No approx. cause</p>	707	95%	Dead

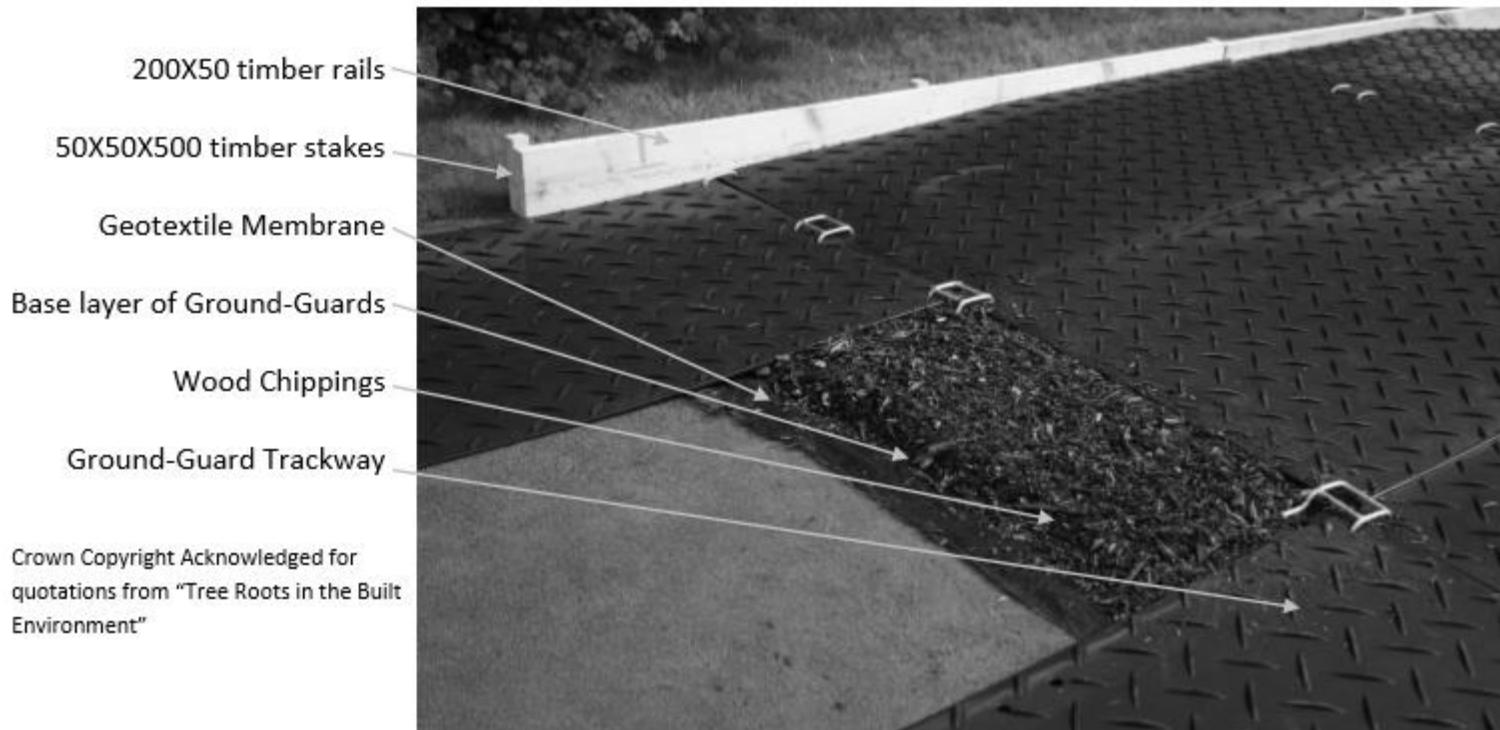
Key - Headings and Abbreviations: No.

COMMON NAME HEIGHT: IN METERS, TO NEAREST HALF METER – WHERE POSSIBLE APPROXIMATELY 80% ARE MEASURED USING AN ELECTRONIC CLINOMETER AND THE REMAINDER ESTIMATED AGAINST THE MEASURED TREES. IN THE CASE OF GROUPS AND WOODLANDS THE MEASUREMENT LISTED IS THAT OF THE HIGHEST TREE STEM DIAM.: STEM DIAMETER IN MILLIMETERS, TO NEAREST 10MM - MEASURED AND CALCULATED AS PER ANNEX C OF BS5837:2012. MS = MULTI-STEMMED, TS = TWIN-STEMMED BRANCH SPREAD: CROWN RADIUS MEASURED (OR ESTIMATED WHERE CONSIDERED APPROPRIATE) FROM THE FOUR CARDINAL POINTS (NORTH, EAST, SOUTH AND WEST) TO GIVE AN ACCURATE VISUAL REPRESENTATION OF THE CROWN BRANCH & CANOPY CLEARANCES: EXISTING HEIGHT ABOVE GROUND LEVEL, IN METERS, OF FIRST SIGNIFICANT BRANCH AND DIRECTION OF GROWTH (E.G. 2.5-N) AND OF CANOPY AT LOWEST POINT – TO INFORM ON CROWN TO HEIGHT RATIO, POTENTIAL FOR SHADING, ETC. LIFE STAGE: ESTIMATED AGE CLASS - Y = YOUNG, SM = SEMI-MATURE, EM = EARLY-MATURE, M = MATURE, PM = POST-MATURE PC: PHYSIOLOGICAL CONDITION - A MEASURE OF THE TREE'(S)' OVERALL VITALITY, I.E. D = DEAD, MD = MORIBUND, P = POOR, M = MODERATE, G = GOOD GENERAL OBSERVATIONS AND COMMENTS: COMMENTS RELATING TO THE TREE'(S)' OVERALL CONDITION AND ANY OTHER PERTINENT FACTORS INCLUDING STRUCTURAL DEFECTS, CURRENT AND POTENTIAL DIRECT STRUCTURAL DAMAGE, PHYSIOLOGICAL DECLINE, POOR FORM, ETC. MANAGEMENT RECOMMENDATIONS: EITHER PRELIMINARY OR IN CONSIDERATION OF THE PROPOSAL - IN THE CASE OF ARBORICULTURAL CONSTRAINTS SURVEYS THE RECOMMENDED MANAGEMENT WORKS ONLY TAKE EXISTING SITE AND TREE CIRCUMSTANCES AND CONDITIONS INTO ACCOUNT AND NOT PROPOSED DEVELOPMENTS. ARBORICULTURAL IMPACT ASSESSMENT AND METHOD STATEMENT RELATED SURVEYS TAKE THE PROPOSED DEVELOPMENT INTO CONSIDERATION WITH RECOMMENDATIONS MADE ACCORDINGLY. MORE THAN ONE OPTION MAY BE GIVEN IF CONSIDERED APPROPRIATE ERC: ESTIMATED REMAINING CONTRIBUTION - IN YEARS AS PER BS5837:2012 (I.E. <10, 10+, 20+, 40+) CAT. GRADE: CATEGORY GRADING - TREE RETENTION VALUE LISTED AS U, A, B OR C - IN ACCORDANCE WITH BS5837:2012 TABLE 1 RPA M²: ROOT PROTECTION AREA IN M² - CALCULATED AREA AROUND THE TREE THAT MUST BE APPROPRIATELY PROTECTED THROUGHOUT THE DEVELOPMENT PROCESS IN ORDER AVOID ROOT DAMAGE RPA RADIUS (M): ROOT PROTECTION AREA RADIUS - IN METERS MEASURED FROM THE CENTER OF THE STEM TO THE LINE OF TREE PROTECTION # (ESTIMATED DIMENSIONS): WHERE TREES ARE LOCATED OFF-SITE, OR ARE INACCESSIBLE FOR ANY OTHER REASON, AND ACCURATE MEASUREMENTS OR OTHER INFORMATION CANNOT BE TAKEN THEN THE INFORMATION PROVIDED IS ESTIMATED AND IS DULY SUFFIXED WITH A “#” SYMBOL

6.2 Appendix 2 – Protective Barriers



6.3 Appendix 3 – Ground Protective Barriers Guards



6.4 Appendix 4 – BS 5837:2012 Root Protection area table

BS 5837:2012

BRITISH STANDARD

Annex D (normative) Root protection area

The RPAs given in Table D.1 should be used for single stem trees and the equivalent resultant combined stem diameter for multi-stemmed trees.

Table D.1 Root protection areas

Single stem diameter mm	Radius of nominal circle m	RPA m ²	Single stem diameter mm	Radius of nominal circle m	RPA m ²
75	0.90	3	675	8.10	206
100	1.20	5	700	8.40	222
125	1.50	7	725	8.70	238
150	1.80	10	750	9.00	255
175	2.10	14	775	9.30	272
200	2.40	18	800	9.60	290
225	2.70	23	825	9.90	308
250	3.00	28	850	10.20	327
275	3.30	34	875	10.50	346
300	3.60	41	900	10.80	366
325	3.90	48	925	11.10	387
350	4.20	55	950	11.40	408
375	4.50	64	975	11.70	430
400	4.80	72	1 000	12.00	452
425	5.10	81	1 025	12.30	475
450	5.40	92	1 050	12.60	499
475	5.70	102	1 075	12.90	519
500	6.00	113	1 100	13.20	547
525	6.30	124	1 125	13.50	573
550	6.60	137	1 150	13.80	598
575	6.90	150	1 175	14.10	625
600	7.20	163	1 200	14.40	652
625	7.50	177	1 225	14.70	679
650	7.80	191	1 250+	15.00	707

NOTE These figures are derived from the calculations described in 4.6.



- NOTES
1. SITE BOUNDARY IS SHOWN INDICATIVELY ONLY. AS ENFORCED BY HIS PANEL TO BE CONFINED BY CLIMATE.
 2. WHERE TOPOGRAPHICAL SURVEY INFORMATION IS MISSING, ASSUMED CONTOURS ARE ENDS IN DASHED LINE.
 3. EXACT LINE OF RIVER BANK UNKNOWN IN PLACES DUE TO DIFFICULTY OF ACCESS.
 4. CONTOURS EVERY 5.25M CHANGE IN LEVEL.
 5. INFORMATION IS BASED ON TOPOGRAPHICAL SURVEY - WHERE SURVEY INFO IS NOT AVAILABLE, INFORMATION IS BASED ON OS DATA.

- KEY
- PLANNING SITE BOUNDARY (PLEASE SEE NOTE 1 ABOVE)
 - EXTENT OF OWNERSHIP
 - INDICATIVE EDGE OF WATERWAY
 - WOODLAND / DENSE VEGETATION
 - INDIVIDUALLY SURVEYED TREES
 - OVERHEAD POWER LINES
 - ASSUMED TOP OF RIVER BANK (SURVEY INFORMATION NOT FULLY AVAILABLE)

EXISTING
 1844/E.102
 LECKWITH QUAY
 SITE PLAN
 1:1250@A1 04.07.19

LOYN+CO
 ARCHITECTS

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