



Arboricultural Impact Assessment

NRW Stephenson Street Flood Defences

Report Title: 274580-ARP-XX-XX-RP-EN-0005 Arboricultural Impact Assessment

Treework Reference: 210309-1.3-AIA-NRWSSFD-MW

On behalf of

ARUP

9th March 2021

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Executive Summary

- This report provides an assessment of the impact upon trees and a proposal for a flood defence scheme at and around Stephenson Street, Newport. The report considers relevant on and off site trees, and makes recommendations for mitigating any negative impacts. It is suitable for submission in support of a planning application.
- 121 tree features were surveyed to inform this report, comprising of 66 individual trees, 10 hedgerows, 35 tree groups, 9 woodlands and 1 shrub. Estimates on individual trees within groups, woodlands and hedgerows have been provided in the Tree Schedule at Appendix A. along with all other tree specific data.
- 5 sections of woodland and 7 sections of tree groups have been identified for removal to facilitate the development, of which 3 of the woodland groups and 2 tree groups are category B and 2 of the areas of woodland groups and 5 tree groups are category C. It is also recommended to remove all U category trees in any context due to their unsuitability in their current context.
- The remaining trees within all groups and woodlands, in addition to the individual trees will be retained and protected where necessary throughout the project construction period. Retained tree protection measures are discussed throughout this report and illustrated on the Tree Protection Plan at Appendix B.
- None of the retained trees are anticipated to require any remedial tree work to facilitate the development or reduce the likelihood of excessive pressure after the completion of the development.

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1 Introduction

1.1 Brief and Context

1.1.1 Treework Environmental Practice was instructed in November 2020 to provide a tree survey and Arboricultural Impact Assessment, in accordance with British Standard BS5837: 2012 *Trees in Relation to Design, Demolition and Construction – Recommendations*, of the effect of development proposals for a flood defence scheme at and around Stephenson Street, Newport.

1.1.2 Trees are a material consideration for a Local Planning Authority when determining planning applications, whether or not they are afforded the statutory protection of a Tree Preservation Order or Conservation Area. British Standard BS 5837:2012 *Trees in Relation to Design, Demolition and Construction* sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and new developments. The Standard recommends a sequence of activities that starts in the initial feasibility and design phase (RIBA Stage 2 'Concept Design') with a survey to qualify and quantify the trees on site and establish the arboricultural constraints to development (above- and below-ground) to inform the design in an iterative process, and continues with an assessment of the arboricultural impacts of the final design and measures to mitigate such impacts should they be negative. Detailed technical specifications for mitigation and protection measures are devised in the design phase that follows (RIBA Stage 3 and 4 'Spatial Coordination' and 'Technical Design'), and the sequence ends with the 'Handover' and 'Use' phases (RIBA Stages 6 and 7), with the implementation of those measures once planning permission is granted, guided by Arboricultural Method Statements (RIBA Stage 4 and 5, 'Technical Design' and 'Manufacturing and Construction') and professional guidance where appropriate.

1.1.3 This Arboricultural Impact Assessment (AIA) reports on the direct and indirect impacts of the proposed development on trees in terms of both the buildability of the proposals and the long-term impact of the finished scheme, and where necessary presents mitigation for these impacts.

1.2 Purpose of this Report

1.2.1 This AIA, and accompanying Tree Schedule and Tree Protection Plan, is provided to support a planning application for the proposed development. It sets out the arboricultural impacts of the proposals using the following considerations as a framework:

- Trees to be removed and trees to be retained.
- Remedial tree work to retained trees to allow development and ensure retained trees will form a harmoniously integrated component of the proposed development.

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- Suitable measures to protect retained trees.
- Special construction or engineering measures required to enable trees to be harmoniously integrated into the proposed development.

1.3 The Development

1.3.1 The proposed development is for a flood defence scheme at and around Stephenson Street, Newport.

1.3.2 The following documents have been reviewed by Treework Environmental Practice to inform this report:

Document Title	Document/Drawing number
Topographical Survey	STEPHENSON REV A 2D
Proposed Layout	OneDrive_2021-01-29
Tree Constraints Plan	210111-1.1-NRWSSFD-TCP-NC
Tree Protection Plan	210202-1.0-NRWSSFD-TPP-NC

2 Existing Tree Population and Constraints

2.1.1 A survey covering trees on site and trees on adjacent land close enough to be affected by the development was undertaken in November 2020. The full survey results are presented in the Tree Schedule at Appendix A.

2.1.2 The survey was undertaken based on trees plotted using an OS Mastermap base map as reference in Treework Environmental Practice's specialist tree management software – MyTrees. The basemap contained a topographical survey of some of the individual trees and group outlines. Topographical information was limited on the trees within groups woodlands and hedgerows. The position of these features were plotted on the basemap using topographical group outlines, GPS and aerial imagery as a reference, and their positions are therefore approximate.

2.1.3 The proposed development site is situated in and around Stephenson Street, Newport. This is mainly an industrial area and the trees within the groups and woodlands are mostly self-set and individually of low quality as they have not been managed. The majority would benefit from silvicultural thinning exercises, in order to develop better mature forms.

2.1.4 BS 5837:2012 recommends classifying trees into four quality and value categories to determine their relative retentive worth. A summary of the relative retentive worth of the trees on site as recorded during the tree survey and expressed by their categories is given in Table 1. Appendix A explains the BS 5837:2012 tree categorisation process.

Table 1: Trees/Groups in each Retention Category

BS Category	No. of Shrubs (S)	No. of Trees (T)	No. of Groups (G)	No. of Hedges (H)	No. of Woods (W)	Total
A	0	2	0	0	0	2
B	0	30	9	0	5	44
C	0	25	26	10	4	65
U	1	9	0	0	0	10
Total	1	66	35	10	9	121

2.1.5 Trees present constraints to development both above and below ground. The above ground constraints comprise the physical extent of tree crowns. The below ground constraints comprise the roots, and are expressed in terms of the root protection area (RPA), which is the minimum rooting area that a tree needs to sustain itself in reasonable health. These constraints, as established by the tree-survey, inform this assessment of the impact of the development proposals.

2.1.6 The full results of the tree survey on which this report is based are given in the Tree Schedule at Appendix A, and the above- and below-ground constraints are illustrated on the Tree Protection Plan at Appendix B. Each shrub (S), tree (T), tree group (G), woodland, (W) and hedge (H) has been allocated an individual number to which it is referred in this report and all associated documents. The survey method and limitations are set out in Appendix E.

2.1.7 An email enquiry was sent by Treework Environmental Practice to Newport Council on 23/11/2020. To establish the presence/absence of statutory constraints (Tree Preservation Orders (TPOs) or Conservation Areas). No response has been received to date.

3 Arboricultural Impact of the Proposals

3.1 Tree Removal and Retention

3.1.1 Every effort has been made to retain trees wherever possible. Where higher-quality trees have been found to be in conflict with the proposed design (B), the decision to remove such trees has been informed by an iterative process, following a review of alternative options.

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3.1.2 The 12 *sections* of groups and woodlands proposed for removal to facilitate the proposed development are summarised in Table 2 by BS5837: 2012 category. They have been identified for removal where they come into direct conflict with structures or where construction cannot be achieved without their removal. All Category U trees are recommended for removal due to their poor condition, which would be advisable regardless of the development proposal. 9 trees, 1 shrub and 5 groups have been categorised as U category, within the site boundaries.

Table 2 – Tree Features for Removal by BS Category

Category A Trees/Groups/Hedges/ Woodland	Category B Trees/Groups/Hedges/ Woodland	Category C Trees/Groups/Hedges/ Woodland	Category U Trees/Groups/Hedges/ Woodland
None	G82, G120, W58, W59, W83.	G56, G68, G77, G79, G80, W57, W62.	T6, T14, T22, T54, T72, T86, T93, T97, T102, S50, G69, G94, G95, G108, G109.
0	5	7	15 (recommended for removal in any context)

3.1.3 Due to the dense unmanaged nature of the groups and woodlands, it is not possible to exactly quantify the number of trees within groups to be removed. However, replanting mitigation/landscape improvement could calculate the areas to be cleared and work out an average number of trees to be removed based on cleared square metres, against the estimated overall tree numbers within each group/woodland. Alternatively, once the scheme has been set out, trees to be cleared could be manually counted and assessed.

3.1.4 All trees other than those in Table 2 will be retained and protected during development (see section 3.3).

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3.2 Facilitative Tree Works

- 3.2.1 No tree pruning works are anticipated to enable the proposed development, other than the removal of the trees listed in Table 2, however, where better specimen trees are found on the margins of the working areas, every effort will be made to retain these trees and this may include some facilitation pruning where necessary.

3.3 Tree Protection

3.3.1 *Root Protection Areas and Construction Exclusion Zones*

Retained trees will be protected during development by establishing a Construction Exclusion Zone (CEZ) around their Root Protection Areas (RPAs). RPAs are a layout design tool, indicating the minimum area around a tree deemed to contain sufficient roots and soil to maintain the tree's viability. RPAs should be treated as a precautionary area within which activities such as ground compaction, excavation, the storing of materials, ground level changes and other construction activity are likely to cause damage to trees and should therefore be excluded. This CEZ can be achieved by the erection of barriers at the locations shown on the Tree Protection Plan at Appendix B. Tree protection barriers must be installed before any demolition or construction works start, and, unless approved by the Local Planning Authority or by an arboriculturist approved by them, should remain in place until all construction activity has been completed.

- 3.3.2 The type of barriers should match the level of activity around the retained trees. Where a high level of construction activity is expected, fencing must be braced to be robust to vehicular impact and to prevent it from being easily repositioned; a specification similar to drawing 3 in BS 5837:2012 will be suitable (reproduced at Appendix D). In areas away from the main construction activity and vehicle movement, it may be appropriate to install a lower specification fencing, examples of which are given at Appendix D.

- 3.3.3 All protection fencing should carry identifying signs that state its purpose and proscribe its removal until all demolition and construction work is complete. An example sign is given at Appendix D.

The locations of the ground protection are shown hatched light blue on the Tree Protection Plan at Appendix B.

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3.4 Special Technical Measures

3.4.1 Conflicts between retained trees and aspects of the proposed development that cannot be dealt with by exclusion zones, tree protection or tree work can be mitigated by the use of special technical measures. General recommendations for these measures are presented in the sections that follow based on the information about the proposed development that is currently available. The specific details must be carefully planned once detailed construction information is available to avoid tree damage or an Arboricultural Method Statement should be produced before construction starts to guide sensitive works around trees, with provisions for supervision by a qualified arboriculturist where necessary.

3.5 Additional Precautions

3.5.1 *Utilities and Services*

Information on the location of utility and service runs for the proposed development was not available at time of writing. In principle, traditional trench-installed utilities should be routed outside of the RPAs of retained trees to avoid root damage. Where routing utility runs within RPAs is unavoidable, all work should comply with The National Joint Utilities Volume 4 and advice should be sought from a professional Arboricultural Consultant.

3.5.2 *Soft Landscaping*

The Arboricultural Consultant should review any landscape operations that involve any work within the RPAs of retained trees and input additional site specific methodology where necessary.

Appendix A

Tree Schedule

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Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
H1	20 3	<i>Ligustrum ovalifolium</i> Privet/Garden Privet <i>Crataegus monogyna</i> Common Hawthorn/Quick/May	1.0	1	5	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Hedgerow - Maintained.	1.1	0.6	10-20	C	2
H2	200	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	1.0	1	5	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Hedgerow - Maintained.	1.1	0.6	20-40	C	2
T3	1	<i>Tilia sp.</i> Lime sp.	13.0	1	50	N 5.5	E 5.0	S 6.0	W 5.0	2.0	3.0	Semi Mature	Fair		113.1	6.0	40+	B	1
T4	1	<i>Tilia sp.</i> Lime sp.	15.0	1	51	N 7.0	E 5.0	S 5.0	W 5.0	2.0	3.0	Semi Mature	Fair	Branch - Broken. Epicormic growth - Base. Not recorded on topographic survey. Location estimated.	117.7	6.1	40+	B	1
T5	1	<i>Populus x canescens</i> Grey Poplar	23.0	1	129	N 12.0	E 11.0	S 13.0	W 10.0	2.0	3.0	Late Mature	Fair	Branch - Broken. Crown reduction - Historic. Not recorded on topographic survey. Location estimated. Remove suspended or broken limb / limbs. 10cm dbh branch hung in West canopy at 12m	706.9	15.0	10-20	C	1
T6	1	<i>Acer platanooides</i> Norway Maple	11.0	1	50	N 5.0	E 2.0	S 4.0	W 4.0	3.0	3.0	Semi Mature	Poor	Arboricultural work - Historic. Die-back - Throughout crown. Decay / structural defect in crown limb / limbs - Suspected. Decay / structural defect - Base. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T7	1	<i>Aesculus hippocastanum</i> Horse Chestnut	9.0	1	53	N 5.0	E 5.0	S 6.0	W 6.0	2.0	3.0	Semi Mature	Fair	Crack - Longitudinal / shear crack. Decay / structural defect - Suspected. Foreign object.	127.1	6.4	10-20	C	1
T8	1	<i>Aesculus hippocastanum</i> Horse Chestnut	11.0	1	48	N 5.0	E 5.0	S 5.0	W 5.0	2.0	2.5	Semi Mature	Fair	Decay / structural defect - Minor.	104.2	5.8	20-40	B	1
T9	1	<i>Aesculus hippocastanum</i> Horse Chestnut	11.0	1	53	N 5.0	E 5.0	S 5.0	W 5.0	2.0	2.0	Semi Mature	Fair	Decay / structural defect - Extensive. Girdling roots - Minor. Raised surface roots.	127.1	6.4	10-20	C	1
T10	1	<i>Acer platanoides</i> Norway Maple	13.0	1	46	N 5.0	E 5.0	S 5.0	W 5.0	3.0	2.5	Semi Mature	Fair		95.7	5.5	40+	B	1
T11	1	<i>Sorbus aucuparia</i> Rowan/Mountain Ash	5.0	1	6	N 0.5	E 0.5	S 0.5	W 0.5	2.5	2.0	Young	Fair	Bark wound - Mechanical.	1.6	0.7	20-40	C	1
T12	1	<i>Fraxinus excelsior</i> Ash	18.0	1	75	N 8.0	E 7.0	S 10.0	W 10.0	4.0	3.0	Mature	Fair	Arboricultural work - Historic. Bark wound - Major. Pruning wounds - Historic. Shedding limb / limbs - Historic.	254.5	9.0	20-40	B	1
T13	1	<i>Fraxinus excelsior</i> Ash	18.0	1	55	N 7.0	E 4.0	S 7.0	W 3.0	3.0	3.0	Mature	Fair		136.8	6.6	20-40	B	1
T14	1	<i>Aesculus hippocastanum</i> Horse Chestnut	12.0	1	52	N 6.0	E 5.0	S 5.0	W 5.0	3.0	2.5	Semi Mature	Fair	Bark exudation. Decay / structural defect - Extensive. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			10-20	U	
T15	1	<i>Aesculus hippocastanum</i> Horse Chestnut	8.0	1	34	N 4.0	E 5.0	S 5.0	W 4.0	2.0	2.5	Early Mature	Fair	Bark exudation. Bark wound - Mechanical.	52.3	4.1	10-20	C	1

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Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T16	1	<i>Aesculus hippocastanum</i> Horse Chestnut	8.0	1	43	N 4.0	E 5.0	S 4.0	W 5.0	2.0	2.0	Semi Mature	Fair	Bark wound - Mechanical.	83.6	5.2	20-40	B	1
T17	1	<i>Acer platanoides</i> Norway Maple	16.0	1	53	N 8.0	E 6.0	S 7.0	W 6.0	3.0	3.0	Mature	Fair	Bark wound - Major.	127.1	6.4	10-20	C	1
T18	1	<i>Tilia sp.</i> Lime sp.	15.0	1	43	N 6.0	E 5.0	S 6.0	W 5.0	2.0	2.0	Semi Mature	Fair	Fork - Weak with included bark. Raised surface roots.	83.6	5.2	40+	B	1
T19	1	<i>Acer pseudoplatanus</i> Sycamore	15.0	1	40	N 7.0	E 4.0	S 5.0	W 7.0	2.0	2.0	Semi Mature	Poor	Decay / structural defect - Principal stems. Weak live growth.	72.4	4.8	10-20	C	1
T20	1	<i>Fraxinus sp.</i> Ash sp.	19.0	1	54	N 8.0	E 9.0	S 8.0	W 7.0	3.0	4.0	Mature	Fair		131.9	6.5	20-40	B	1
T21	1	<i>Acer pseudoplatanus</i> Sycamore	11.0	1	32	N 5.0	E 5.0	S 4.0	W 3.0	3.0	3.0	Early Mature	Fair	Bark wound - Mechanical.	46.3	3.8	40+	B	1
T22	1	<i>Acer pseudoplatanus</i> Sycamore	7.0	1	10	N 1.5	E 2.0	S 1.5	W 1.0	2.0	2.0	Young	Fair	Decay / structural defect - Extensive. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
T23	1	<i>Aesculus hippocastanum</i> Horse Chestnut	10.0	1	44	N 6.0	E 4.0	S 4.0	W 6.0	2.0	2.5	Semi Mature	Fair	Bark exudation. Physiological / cambial damage - Fungal.	87.6	5.3	10-20	C	1
T24	1	<i>Fraxinus excelsior</i> Ash	20.0	1	59	N 11.0	E 10.0	S 8.0	W 8.0	3.0	4.0	Mature	Good	Bark wound - Major. Girdling roots - Minor.	157.5	7.1	20-40	B	1
T25	1	<i>Carpinus betulus</i> 'Fastigiata' Fastigate Hornbeam	6.0	1	10	N 1.0	E 1.0	S 1.0	W 1.0	3.0	2.0	Young	Good	Bark wound - Mechanical.	4.5	1.2	40+	C	1

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T26	1	<i>Carpinus betulus</i> 'Fastigiata' Fastigate Hornbeam	6.0	1	15	N 1.5	E 1.5	S 1.5	W 1.5	1.5	1.0	Young	Good	Bark wound - Mechanical.	10.2	1.8	40+	B	1
T27	1	<i>Carpinus betulus</i> Hornbeam	5.0	1	10	N 2.0	E 2.0	S 2.0	W 1.0	2.0	2.0	Young	Fair	Bark wound - Mechanical. Leaning trunk - Minor.	4.5	1.2	20-40	C	1
T28	1	<i>Carpinus betulus</i> 'Fastigiata' Fastigate Hornbeam	7.0	1	15	N 2.5	E 2.5	S 2.5	W 2.5	0.5	0.5	Young	Good	Bark wound - Mechanical.	10.2	1.8	40+	B	1
T29	1	<i>Carpinus betulus</i> 'Fastigiata' Fastigate Hornbeam	6.0	1	15	N 2.5	E 2.5	S 2.5	W 2.5	0.5	0.5	Young	Good	Bark wound - Mechanical. Not recorded on topographic survey. Location estimated.	10.2	1.8	40+	B	1
T30	1	<i>Populus x canescens</i> Grey Poplar	23.0	1	110	N 8.0	E 10.0	S 15.0	W 12.0	4.0	4.0	Mature	Fair	Arboricultural work - Historic. Base / stems obscured - Vegetation. Branch weight - Heavy.	547.4	13.2	20-40	B	1
T31	1	<i>Ailanthus sp.</i> Tree Of Heaven	8.0	1	20	N 4.0	E 4.0	S 4.0	W 4.0	3.0	2.0	Early Mature	Fair	Base / stems obscured - Vegetation.	18.1	2.4	20-40	C	1
T32	1	<i>Ailanthus sp.</i> Tree Of Heaven	10.0	1	20	N 4.0	E 4.0	S 4.0	W 4.0	3.0	2.0	Early Mature	Fair	Base / stems obscured - Vegetation.	18.1	2.4	20-40	C	1
T33	1	<i>Ailanthus sp.</i> Tree Of Heaven	8.0	1	20	N 4.0	E 4.0	S 4.0	W 4.0	3.0	2.0	Early Mature	Fair	Base / stems obscured - Vegetation. Not recorded on topographic survey. Location estimated.	18.1	2.4	20-40	C	1
T34	1	<i>Ailanthus sp.</i> Tree Of Heaven	7.0	1	20	N 4.0	E 4.0	S 4.0	W 4.0	3.0	2.0	Early Mature	Fair	Base / stems obscured - Vegetation. Suppressed crown - Minor.	18.1	2.4	20-40	C	1
T35	1	<i>Populus x canescens</i> Grey Poplar	25.0	1	110	N 10.0	E 12.0	S 8.0	W 5.0	4.0	4.0	Mature	Fair	Base / stems obscured - Vegetation. Leaning trunk - Minor.	547.4	13.2	20-40	B	1

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T36	1	<i>Populus x canescens</i> Grey Poplar	25.0	1	130	N 15.0	E 6.0	S 12.0	W 9.0	4.0	4.0	Mature	Fair	Arboricultural work - Historic. Base / stems obscured - Vegetation.	706.9	15.0	20-40	B	1
T37	1	<i>Populus x canescens</i> Grey Poplar	28.0	1	150	N 8.0	E 9.0	S 12.0	W 6.0	4.0	4.0	Mature	Fair	Arboricultural work - Historic. Base / stems obscured - Vegetation.	706.9	15.0	10-20	C	1
T38	1	<i>Populus x canescens</i> Grey Poplar	28.0	1	130	N 15.0	E 5.0	S 10.0	W 7.0	4.0	4.0	Mature	Fair	Base / stems obscured - Vegetation.	706.9	15.0	20-40	B	1
T39	1	<i>Populus x canescens</i> Grey Poplar	28.0	1	100	N 13.0	E 5.0	S 10.0	W 8.0	4.0	4.0	Mature	Fair	Base / stems obscured - Vegetation.	452.4	12.0	20-40	B	1
T40	1	<i>Populus x canescens</i> Grey Poplar	20.0	1	120	N 10.0	E 15.0	S 8.0	W 7.0	4.0	4.0	Mature	Fair	Base / stems obscured - Vegetation.	651.4	14.4	20-40	B	1
T41	1	<i>Populus nigra 'Italica'</i> Lomardy Poplar	25.0	1	53	N 2.0	E 2.0	S 2.0	W 1.0	5.0	2.5	Semi Mature	Fair	Unbalanced crown - Minor.	127.1	6.4	20-40	C	1
T42	1	<i>Populus x canescens</i> Grey Poplar	25.0	1	130	N 9.0	E 10.0	S 10.0	W 18.0	3.0	4.0	Mature	Fair	Arboricultural work - Historic. Base / stems obscured - Vegetation.	706.9	15.0	20-40	B	1
T43	1	<i>Populus x canescens</i> Grey Poplar	25.0	2	141	N 13.0	E 9.0	S 8.0	W 10.0	3.0	3.0	Mature	Fair	Access to inspect base - Not possible. Arboricultural work - Historic. Base / stems obscured - Vegetation. Stems - Sub-dominant.	706.9	15.0	20-40	B	1
T44	1	<i>Populus tremula</i> Aspen	16.0	1	90	N 8.0	E 10.0	S 10.0	W 10.0	3.0	2.0	Mature	Fair	Access to inspect base - Not possible. Arboricultural work - Historic. Branch - Suspended. Stems - Sub-dominant.	366.4	10.8	10-20	C	1

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Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
G45	100	<i>Buddleja sp.</i> Buddleja	6.0	1	20	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	No topographic information available. Location estimated.	18.1	2.4	10-20	C	2
	50	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May																	
	10	<i>Salix fragilis</i> Crack Willow																	
	10	<i>Populus tremula</i> Aspen																	
T46	1	<i>Tilia sp.</i> Lime sp.	14.0	1	55	N 6.0	E 6.0	S 6.0	W 6.0	2.0	3.0	Semi Mature	Good	Dense crown. Epicormic growth - Base. Not recorded on topographic survey. Location estimated.	136.8	6.6	40+	A	1
T47	1	<i>Tilia sp.</i> Lime sp.	14.0	1	57	N 7.0	E 7.0	S 7.0	W 7.0	2.0	3.0	Semi Mature	Good	Dense crown. Epicormic growth - Base. Stems - Co-dominant. Not recorded on topographic survey. Location estimated.	147.0	6.8	40+	A	1
T48	1	<i>Magnolia sp.</i> Magnolia sp.	7.0	1	30	N 4.0	E 4.0	S 4.0	W 4.0	2.0	1.0	Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Stems - Co-dominant.	40.7	3.6	20-40	B	1
H49			2.0	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Hedgerow - Maintained.	4.5	1.2	10-20	C	1

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S50	50	<i>Buddleja sp.</i> Buddleja	5.0	1	15	N 1.0	E 1.0	S 1.0	W 1.0	0.0		Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Access restricted by site fencing. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
H51	10	<i>Ligustrum ovalifolium</i> Privet/Garden Privet	2.0	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Hedgerow - Maintained.	4.5	1.2	10-20	C	1
H52	5	<i>Ligustrum ovalifolium</i> Privet/Garden Privet	2.0	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Hedgerow - Maintained.	4.5	1.2	10-20	C	1
H53	40	<i>Ligustrum ovalifolium</i> Privet/Garden Privet	2.0	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Hedgerow - Maintained.	4.5	1.2	10-20	C	2
T54	1	<i>unrecognized</i> Unrecognised	0.0	1	40	N 0.0	E 0.0	S 0.0	W 0.0	0.0		Mature	Poor	Felled. Stump / stumps. Not recorded on topographic survey. Location estimated. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	

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G55	4	<i>Cupressus sp.</i> Cypress sp.	10.0	1	50	N 3.0	E 3.0	S 3.0	W 3.0	2.0		Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated.	113.1	6.0	20-40	B	2
	1	<i>Abies sp.</i> Fir sp.																	
	1	<i>Acer pseudoplatanus</i> Sycamore																	
	1	<i>Prunus sp.</i> Cherry sp.																	
G56	50	<i>Buddleja sp.</i> Buddleja	8.0	1	25	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Access restricted by site fencing. Fell - Ground level. Fell and clear 66.7msq area (estimated 12 trees to be removed).	28.3	3.0	10-20	C	2
	30	<i>Alnus sp.</i> Alder sp.																	
	30	<i>Betula pendula</i> Silver Birch																	
	20	<i>Populus tremula</i> Aspen																	
	10	<i>Prunus sp.</i> Cherry sp.																	
W57	50	<i>Salix caprea</i> Goat Willow/Great Sallow	14.0	1	30	N 4.0	E 4.0	S 4.0	W 4.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated. Fell - Ground level. Fell and clear 453msq area (estimated 19 trees to be removed).	40.7	3.6	10-20	C	2
	20	<i>Betula pendula</i> Silver Birch																	

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
W58	75	<i>Salix caprea</i> Goat Willow/Great Sallow	12.0	1	40	N	E	S	W	1.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated. Fell - Ground level. Fell and clear 871msq area (estimated 36 trees to be removed).	72.4	4.8	40+	B	2
	30	<i>Quercus robur</i> English Oak				4.0	4.0	4.0	4.0										
	30	<i>Betula pendula</i> Silver Birch																	
	1	<i>Fraxinus excelsior</i> Ash																	
W59	150	<i>Betula pendula</i> Silver Birch	20.0	1	30	N	E	S	W	1.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated. Fell - Ground level. Fell and clear 113msq area (estimated 10 trees to be removed).	40.7	3.6	20-40	B	2
	50	<i>Salix caprea</i> Goat Willow/Great Sallow				4.0	4.0	4.0	4.0										
	15	<i>Alnus sp.</i> Alder sp.																	
	10	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May																	
	5	<i>Quercus robur</i> English Oak																	

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
W60	75	<i>Alnus sp.</i> Alder sp.	20.0	1	25	N 4.0	E 4.0	S 4.0	W 4.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated.	28.3	3.0	20-40	B	2
	50	<i>Betula pendula</i> Silver Birch																	
	50	<i>Salix caprea</i> Goat Willow/Great Sallow																	
W61	50	<i>Salix caprea</i> Goat Willow/Great Sallow	10.0	1	30	N 4.0	E 4.0	S 4.0	W 4.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated.	40.7	3.6	20-40	C	2
	5	<i>Betula pendula</i> Silver Birch																	
	5	<i>Quercus robur</i> English Oak																	
W62	50	<i>Salix caprea</i> Goat Willow/Great Sallow	10.0	1	20	N 4.0	E 4.0	S 4.0	W 4.0			Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated. Fell - Ground level. Fell and clear 427msq area (estimated 6 trees to be removed).	18.1	2.4	10-20	C	2
G63	20	<i>Fraxinus excelsior</i> Ash	15.0	1	30	N 3.0	E 3.0	S 3.0	W 3.0			Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured.	40.7	3.6	10-20	C	2
	10	<i>Betula pendula</i> Silver Birch																	
	5	<i>Quercus robur</i> English Oak																	

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
W64	100	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	15.0	1	30	N	E	S	W	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated.	40.7	3.6	40+	B	2
	20	<i>Salix caprea</i> Goat Willow/Great Sallow				4.0	4.0	4.0	4.0										
	10	<i>Fraxinus excelsior</i> Ash																	
	10	<i>Quercus robur</i> English Oak																	
G65	24	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	7.0	1	15	N	E	S	W	1.0		Semi Mature	Fair		10.2	1.8	10-20	C	2
	5	<i>Salix caprea</i> Goat Willow/Great Sallow				3.0	3.0	3.0	3.0										
	3	<i>Betula pendula</i> Silver Birch																	
	3	<i>Buddleja sp.</i> Buddleja																	

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						N	E	S	W										
G66	50	<i>Buddleja sp.</i> Buddleja	8.0	1	20	N 3.0	E 3.0	S 3.0	W 3.0	1.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Access restricted by site fencing.	18.1	2.4	10-20	C	2
	15	<i>Salix caprea</i> Goat Willow/Great Sallow																	
	15	<i>Betula pendula</i> Silver Birch																	
	10	<i>Quercus robur</i> English Oak																	
G67	50	<i>Buddleja sp.</i> Buddleja	8.0	1	15	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Access restricted by site fencing. No topographic information available. Location estimated.	10.2	1.8	10-20	C	2
	5	<i>Betula pendula</i> Silver Birch																	
	5	<i>Salix caprea</i> Goat Willow/Great Sallow																	
	1	<i>Quercus robur</i> English Oak																	

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
G68	250	<i>Sambucus sp.</i> Elder sp.	5.0	1	30	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Dead tree / trees. Natural regeneration. No topographic information available. Site is inaccessible with the exception of a small number of paths cut through bramble dominated understorey. Knotweed present on site. No significant arboricultural constraints observed Fell - Ground level. Fell and clear 5099msq area (estimated 319 trees to be removed).	40.7	3.6	10-20	C	2
	200	<i>Buddleja sp.</i> Buddleja																	
	100	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May																	
	100	<i>Salix caprea</i> Goat Willow/Great Sallow																	
	2	<i>Cupressus sp.</i> Cypress sp.																	
	1	<i>Fraxinus excelsior</i> Ash																	
	1	<i>Prunus sp.</i> Cherry sp.																	
G69	100	<i>Salix caprea</i> Goat Willow/Great Sallow	2.0	1	30	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Poor	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Arboricultural work - Historic. Coppice stool - Regrown. Felled. Stump / stumps. No topographic information available. Access restricted by site fencing. Utility clearance under power line. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
	100	<i>Salix fragilis</i> Crack Willow																	
	20	<i>Fraxinus excelsior</i> Ash																	

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T70	1	<i>Quercus robur</i> English Oak	11.0	1	90	N 7.0	E 7.0	S 7.0	W 8.0	1.0	1.0	Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Form - Low canopy. Ivy or climbing plant. Not recorded on topographic survey. Location estimated. Located on slope adjacent to railway fencing.	366.4	10.8	40+	B	1
T71	1	<i>Quercus robur</i> English Oak	11.0	1	65	N 7.0	E 9.0	S 7.0	W 6.0	1.0	2.0	Semi Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Arboricultural work - Historic. Ivy or climbing plant. Not recorded on topographic survey. Location estimated. Located on slope adjacent to railway fencing.	191.1	7.8	40+	B	1
T72	1	<i>Quercus robur</i> English Oak	7.0	1	25	N 1.0	E 1.0	S 4.0	W 4.0	3.0	2.0	Semi Mature	Poor	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Arboricultural work - Historic. Die-back - Throughout crown. Deadwood - Major. Deadwood - Minor. Ivy or climbing plant. Suppressed crown - Major. Not recorded on topographic survey. Location estimated. Located on slope adjacent to fencing. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			10-20	U	

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G73	6	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	4.0	1	15	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Located on slope adjacent to railway.	10.2	1.8	10-20	C	2
T74	1	<i>Quercus robur</i> English Oak	11.0	1	50	N 7.0	E 6.0	S 7.0	W 5.0	1.0	2.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Ivy or climbing plant. Not recorded on topographic survey. Location estimated. Located on slope adjacent to railway fencing.	113.1	6.0	10-20	C	1
G75	10 5 2	<i>Buddleja sp.</i> Buddleja <i>Salix caprea</i> Goat Willow/Great Sallow <i>Betula pendula</i> Silver Birch	4.0	1	10	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Located on culvert edge.	4.5	1.2	10-20	C	2
G76	25	<i>Buddleja sp.</i> Buddleja	3.0	1	10	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Access restricted by site fencing. Viewed from outside southern rail fencing.	4.5	1.2	10-20	C	2

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G77	50	<i>Buddleja sp.</i> Buddleja	4.0	1	15	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Fell - Ground level. Fell and clear 32msq area (estimated 17 trees to be removed).	10.2	1.8	10-20	C	2
	5	<i>Fraxinus excelsior</i> Ash																	
	2	<i>Acer campestre</i> Field Maple																	
	2	<i>Salix caprea</i> Goat Willow/Great Sallow																	
G78	3	<i>Acer campestre</i> Field Maple	6.0	1	15	N 3.0	E 3.0	S 3.0	W 3.0	1.0		Semi Mature	Fair	No topographic information available.	10.2	1.8	20-40	C	2
	1	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May																	
G79	200	<i>Buddleja sp.</i> Buddleja	5.0	1	20	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Restricted / obscured. No topographic information available. Location estimated. Fell - Ground level. Fell and clear 2379msq area (estimated 129 trees to be removed).	18.1	2.4	10-20	C	2
	50	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May																	
	30	<i>Salix caprea</i> Goat Willow/Great Sallow																	
	20	<i>Betula pendula</i> Silver Birch																	
	15	<i>Salix fragilis</i> Crack Willow																	

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G80	50	<i>Buddleja sp.</i> Buddleja	8.0	1	35	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated.	55.4	4.2	20-40	C	2
	10	<i>Salix caprea</i> Goat Willow/Great Sallow												Fell - Ground level. Fell and clear 1456msq area (estimated 53 trees to be removed).					
	10	<i>Salix fragilis</i> Crack Willow																	
G81	10	<i>Buddleja sp.</i> Buddleja	8.0	1	35	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Fallen tree / trees - Partial collapse. No topographic information available.	55.4	4.2	10-20	C	2
	5	<i>Salix fragilis</i> Crack Willow																	
	2	<i>Salix caprea</i> Goat Willow/Great Sallow																	
G82	35	<i>Populus x canescens</i> Grey Poplar	20.0	1	60	N 3.0	E 3.0	S 3.0	W 3.0	3.0		Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Access restricted by site fencing. Linear feature. Fell - Ground level. Fell and clear 268msq area (estimated 3 trees to be removed).	162.9	7.2	20-40	B	2

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W83	500	<i>Betula pendula</i> Silver Birch	12.0	1	30	N 4.0	E 4.0	S 4.0	W 4.0	0.0		Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Natural regeneration. No topographic information available. Dense woodland with no clear routes. Fell - Ground level. Fell and clear 244msq area (estimated 46 trees to be removed).	40.7	3.6	20-40	B	2
	500	<i>Salix caprea</i> Goat Willow/Great Sallow																	
	250	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May																	
	50	<i>Prunus spinosa</i> Blackthorn/Sloe																	
G84	12	<i>Betula pendula</i> Silver Birch	18.0	1	20	N 3.0	E 3.0	S 3.0	W 3.0	3.0		Semi Mature	Good	Access to inspect base - Restricted / obscured. No topographic information available.	18.1	2.4	20-40	B	2
	6	<i>Salix caprea</i> Goat Willow/Great Sallow																	
G85	20	<i>Salix caprea</i> Goat Willow/Great Sallow	10.0	1	15	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available.	10.2	1.8	20-40	C	2
T86	1	<i>Salix fragilis</i> Crack Willow	7.0	1	160	N 2.0	E 2.0	S 2.0	W 2.0	2.0	2.0	Post Mature	Poor	Access to inspect base - Restricted / obscured. Arboricultural work - Historic. Base / stems obscured - Vegetation. Pollard - Regrown. Not recorded on topographic survey. Location estimated. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T87	1	<i>Fraxinus excelsior</i> Ash	8.0	1	14	N 3.0	E 2.0	S 1.0	W 3.0	3.0	3.0	Semi Mature	Fair	Access to inspect base - Restricted / obscured. Not recorded on topographic survey. Location estimated.	8.9	1.7	20-40	C	1
G88	6 3	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May <i>Fraxinus excelsior</i> Ash	7.0	1	20	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	18.1	2.4	10-20	C	2
G89	25	<i>Salix fragilis</i> Crack Willow	14.0	1	25	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Early Mature	Fair	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Multi-stemmed. Root environment - Restricted. No topographic information available. Location estimated. Ditch between trees and existing access road.	28.3	3.0	20-40	C	2
H90	15	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	2.0	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Access to inspect base - Restricted / obscured. Hedgerow - Maintained. No topographic information available. Location estimated.	4.5	1.2	10-20	C	2
G91	40	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	10.0	1	30	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Mature	Fair	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	40.7	3.6	10-20	C	2
H92	10	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	1.5	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Hedgerow - Maintained. No topographic information available. Location estimated.	4.5	1.2	10-20	C	2

NRW Stephenson Street Flood Defences

Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
						N	E	S	W										
T93	1	<i>Fraxinus excelsior</i> Ash	6.0	1	50	N 2.0	E 2.0	S 2.0	W 2.0	2.0	2.5	Semi Mature	Poor	Access to inspect base - Restricted / obscured. Arboricultural work - Historic. Base / stems obscured - Vegetation. Crown reduction - Historic. Not recorded on topographic survey. Location estimated. Utility reduction. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
G94	3 2	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May <i>Ulmus sp.</i> Elm sp.	5.0	1	15	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Poor	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
G95	15 10	<i>Ulmus sp.</i> Elm sp. <i>Fraxinus excelsior</i> Ash	7.0	1	15	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Poor	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
T96	1	<i>Salix fragilis</i> Crack Willow	13.0	1	120	N 9.0	E 1.0	S 0.0	W 7.0	3.0	2.0	Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Leaning trunk - Major. Stems - Co-dominant. Not recorded on topographic survey. Location estimated.	651.4	14.4	10-20	C	1

NRW Stephenson Street Flood Defences

Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T97	1	<i>Salix fragilis</i> Crack Willow	20.0	1	150	N 12.0	E 10.0	S 11.0	W 4.0	3.0	2.5	Late Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Deadwood - Major. Deadwood - Minor. Multi-stemmed. Not recorded on topographic survey. Location estimated. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
T98	1	<i>Salix fragilis</i> Crack Willow	10.0	1	80	N 12.0	E 3.0	S 4.0	W 4.0	2.0	1.0	Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Multi-stemmed. Not recorded on topographic survey. Location estimated.	289.5	9.6	10-20	C	1
T99	1	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	5.0	1	20	N 2.0	E 2.0	S 2.0	W 2.0	0.0	0.5	Early Mature	Fair	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Not recorded on topographic survey. Location estimated.	18.1	2.4	10-20	C	1
H100	200	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	2.0	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	4.5	1.2	10-20	C	2
H101	40	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	2.0	1	10	N 0.5	E 0.5	S 0.5	W 0.5	0.0		Semi Mature	Fair	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	4.5	1.2	10-20	C	2

NRW Stephenson Street Flood Defences

Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T102	1	<i>Salix fragilis</i> Crack Willow	10.0	1	100	N 10.0	E 3.0	S 4.0	W 4.0	2.0	1.0	Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Multi-stemmed. Not recorded on topographic survey. Location estimated. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			10-20	U	
T103	1	<i>Salix fragilis</i> Crack Willow	12.0	1	150	N 7.0	E 7.0	S 7.0	W 7.0	2.0	2.0	Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Multi-stemmed. Not recorded on topographic survey. Location estimated.	706.9	15.0	10-20	C	1
T104	1	<i>Salix fragilis</i> Crack Willow	14.0	1	150	N 7.0	E 7.0	S 7.0	W 7.0	2.0	2.5	Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Multi-stemmed. Not recorded on topographic survey. Location estimated.	706.9	15.0	10-20	C	1
T105	1	<i>Salix fragilis</i> Crack Willow	7.0	1	30	N 5.0	E 5.0	S 5.0	W 5.0	2.0	0.5	Semi Mature	Fair	Access to inspect base - Restricted / obscured. Branch - Broken. Stems - Co-dominant. Not recorded on topographic survey. Location estimated.	40.7	3.6	10-20	C	1
G106	5	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	12.0	1	20	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	18.1	2.4	10-20	C	2
	3	<i>Salix fragilis</i> Crack Willow																	
	2	<i>Ulmus sp.</i> Elm sp.																	

NRW Stephenson Street Flood Defences

Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
G107	10 10	<i>Buddleja sp.</i> Buddleja <i>Salix caprea</i> Goat Willow/Great Sallow	6.0	1	5	N 3.0	E 3.0	S 3.0	W 3.0	1.0		Young	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	1.1	0.6	20-40	C	2
G108	7	<i>Crataegus monogyna</i> Common Hawthorn/Quick/May	7.0	1	30	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Late Mature	Poor	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Ivy or climbing plant. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			0-10	U	
G109	20 5 5 5	<i>Salix fragilis</i> Crack Willow <i>Betula pendula</i> Silver Birch <i>Crataegus monogyna</i> Common Hawthorn/Quick/May <i>Fraxinus excelsior</i> Ash	12.0	1	30	N 3.0	E 3.0	S 3.0	W 3.0	2.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Bark wound - Mechanical. Ivy or climbing plant. Leaning trunk - Major. Root damage - Mechanical. Root damage - Vehicle. No topographic information available. Location estimated. Fell - Ground level. Removal is recommended due to poor quality or unsuitable context.			10-20	U	
G110	30	<i>Salix caprea</i> Goat Willow/Great Sallow	5.0	1	5	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Young	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated.	1.1	0.6	20-40	C	2

NRW Stephenson Street Flood Defences

Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
G111	20 1	<i>Salix caprea</i> Goat Willow/Great Sallow <i>Salix fragilis</i> Crack Willow	6.0	1	10	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Young	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	4.5	1.2	20-40	C	2
G112	120 10	<i>Salix caprea</i> Goat Willow/Great Sallow <i>Crataegus monogyna</i> Common Hawthorn/Quick/May	10.0	1	25	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	28.3	3.0	20-40	C	2
G113	15	<i>Salix caprea</i> Goat Willow/Great Sallow	10.0	1	25	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	28.3	3.0	20-40	C	2
G114	5 5 5	<i>Salix fragilis</i> Crack Willow <i>Crataegus monogyna</i> Common Hawthorn/Quick/May <i>Salix caprea</i> Goat Willow/Great Sallow	10.0	1	20	N 3.0	E 3.0	S 3.0	W 3.0	0.0		Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. No topographic information available. Location estimated.	18.1	2.4	20-40	C	2
T115	1	<i>Populus x canescens</i> Grey Poplar	16.0	1	60	N 7.0	E 7.0	S 7.0	W 7.0	2.0		Mature	Good	Forms part of a linear group. Surveyed from a distance due to access restrictions. Measurements have been estimated.	162.9	7.2	20-40	B	1

NRW Stephenson Street Flood Defences

Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m ²)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T116	1	<i>Populus x canescens</i> Grey Poplar	16.0	1	60	N 7.0	E 7.0	S 7.0	W 7.0	2.0		Mature	Good	Forms part of a linear group. Surveyed from a distance due to access restrictions. Measurements have been estimated.	162.9	7.2	20-40	B	1
T117	1	<i>Populus x canescens</i> Grey Poplar	16.0	1	60	N 7.0	E 7.0	S 7.0	W 7.0	2.0		Mature	Good	Forms part of a linear group. Surveyed from a distance due to access restrictions. Measurements have been estimated.	162.9	7.2	20-40	B	1
T118	1	<i>Populus x canescens</i> Grey Poplar	16.0	1	60	N 7.0	E 7.0	S 7.0	W 7.0	2.0		Mature	Good	Forms part of a linear group. Surveyed from a distance due to access restrictions. Measurements have been estimated.	162.9	7.2	20-40	B	1
T119	1	<i>Populus x canescens</i> Grey Poplar	16.0	1	60	N 7.0	E 7.0	S 7.0	W 7.0	2.0		Mature	Good	Forms part of a linear group. Surveyed from a distance due to access restrictions. Measurements have been estimated.	162.9	7.2	20-40	B	1
G120	4 3	<i>Salix caprea</i> Goat Willow/Great Sallow <i>Betula pendula</i> Silver Birch	10.0	1	40	N 4.5	E 4.5	S 4.5	W 4.5	1.0	1.0	Mature	Good	Dense group with high ground vegetation within and around them. Access restricted. surveyed from a distance. Group composition and measurements are indicative only. Fell - Ground level. Fell and clear 109msq area (estimated 3 trees to be removed).	72.4	4.8	40+	B	2
W121	50	<i>Salix caprea</i> Goat Willow/Great Sallow	10.0	1	20	N 4.0	E 4.0	S 4.0	W 4.0			Semi Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. No topographic information available. Location estimated.	18.1	2.4	10-20	C	2

Tree Schedule Key

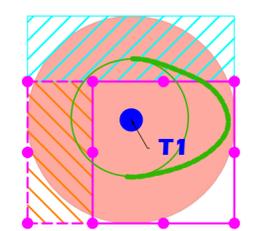
Tree/Group Reference	Reference number for individual trees or groups of trees, prefixed by T (Tree), G (Group), W (Woodland) or H (Hedge) to indicate type of feature.
No. of Trees	Number of trees of a particular species recorded within a group feature, with the default value of 1 for single trees.
Tree or Group Species	Scientific name followed by common name (where available).
Height (m)	Tree height to the nearest metre, either measured with laser device/clinometer or estimated. Tree height for group records refers to the estimated average height of trees within the group (unrepresentative trees within the group may be excluded from this estimate).
DBH (cm)	Stem Diameter at Breast Height, measured at 1.5 m above ground level in accordance with Annex C of BS5837: 2012. Diameters of multi-stemmed trees are presented as a combined stem diameter calculated in accordance with the formula in Section 4.6.1 of BS5837: 2012. Stem diameter for group records refers to the estimated average stem diameter of trees within the group (unrepresentative trees within the group may be excluded from this estimate).
No. of Stems	Number of stems (indicates whether tree is single-stemmed or multi-stemmed).
Spread N/S/E/W (m)	Spread of the tree crown in the four cardinal directions, estimated to the nearest half metre. Crown spreads for group records refer to the estimated average spreads of trees within the group (unrepresentative trees within the group may be excluded from this estimate).
Crown Clearance (m)	Distance between the ground and the lowest point of the crown periphery, estimated to the nearest half metre.
Age Class	Young, Semi-mature, Early Mature, Mature, Late Mature, Ancient or Veteran.
Physiological Condition	Good, Fair, Poor, Dead.
Structural Condition	Good, Fair, Poor.
Tree/Group Condition/ Recommendations	General observations, such as basic features and morphology, structural and physiological condition, and relevant growing conditions, with management recommendations to facilitate the proposed development, including trees to be removed.
RPA (m²)	Minimum area around a tree deemed to contain sufficient roots and rooting soil volume to main the tree's viability, in which the protection of roots and soil structure is treated as a priority, calculated from the DBH according to the formula in BS5837: 2012. Group RPAs are calculated based on a single average tree in the group (unrepresentative trees within the group may be excluded from the estimate of the average).
RPR (m²)	Radius in metres of the RPA.
Remaining Contribution	Estimated number of years for which the tree will continue to make a positive contribution to the site, banded as < 10, 10-20, 20-40, 40 +.
BS Category	Quality and value category (A , B , C or U) as defined in Table 1 of BS5837:2012 (reproduced below), where A = high quality and value; B = moderate quality and value; C = low quality and value and U = tree identified for removal due to poor condition. One or more sub-categories (1-3) for Categories A-C are assigned, where 1 = arboricultural qualities, 2 = landscape qualities and 3 = conservation and cultural value.

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"> Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix B

Tree Protection Plan



- T1 Tree or Group Reference Number
- Tree Stem Position A Category Tree
- Tree Stem Position B Category Tree
- Tree Stem Position C Category Tree
- Tree Stem Position U Category Tree
- Tree Crown
- Root Protection Area
- Tree Protection Fencing
- Initial Tree Protection Fencing
- Ground Protection
- Special Engineering /Supervised Excavations
- Construction Exclusion Zone
- Pruning/Tree Removal
- Site Boundary

Date: February 2021

Scale: 1:1000 @ A2

Project Name:
NRW Stephenson Street Flood Defences

Drawing Title:
Tree Protection Plan

Drawing Number:
210224-1.1-NRWSSFD-TPP-NC



Treework Environmental Practice
Monarch House
1-7 Smyth Road
Bedminster
Bristol
BS3 2BX

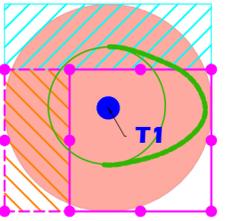
Tel: 0117 244 0012
Web: www.treeworks.co.uk
Email: info@treeworks.co.uk



Cut back area of G78, extending beyond the tree protection fencing.

Area of G77 will be removed. 59 trees have been estimated in this group. Removal estimates will be calculated based on the area to be cleared.

Exposed area of RPA not considered detrimental to T70 & T71.



- T1 Tree or Group Reference Number
- Tree Protection Fencing
- Tree Stem Position A Category Tree
- Tree Stem Position B Category Tree
- Tree Stem Position C Category Tree
- Tree Stem Position U Category Tree
- Tree Crown
- Root Protection Area
- Initial Tree Protection Fencing
- Ground Protection
- Special Engineering /Supervised Excavations
- Construction Exclusion Zone
- Pruning/Tree Removal
- Site Boundary

Date: February 2021

Scale: 1:1000 @ A2

Project Name: NRW Stephenson Street Flood Defences

Drawing Title: Tree Protection Plan

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 Monarch House
 1-7 Smyth Road
 Bedminster
 Bristol
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 Email: info@treeworks.co.uk

Trees p. based

FOR DETAILS OF PROPOSED HIGHWAY WORKS AND ASSOCIATED DRAINAGE REFER TO DRAWING 214580-ARP-XX-XX-OR-CX-1000

New junction formed to provide access to Marshalls site boundary to be completed by others

Work within Marshalls site boundary shown indicative and to be agreed with landowner/tenant

Upon completion of works it is assumed that the existing main access to Marshalls site will be completed by others

New junction formed as Marshalls site boundary to be completed by others

View to keep the outfall higher than AODSW. To divert with 300mm cover to correct swales banked in subsequent design stages.

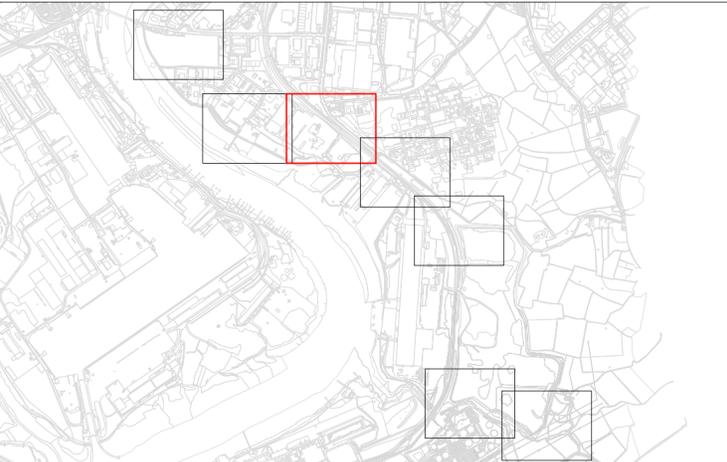
Permanent and Filter Link to be protected

New footway to tie in with existing Corporation Road

New access road to tie with existing Corporation Road

Outfall headwall to be Althen SFA 60 precast concrete finished with 200mm falling flash/vent. Outfall level +4.72m WL from Topo +4.72m

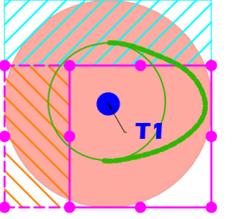
Corporation Road





ACCESS ENTRANCE IMPROVEMENTS

- EXISTING BOLLARDS TO BE TAKEN DOWN TO STORAGE AND RE-ERECTED ON COMPLETION.
- ENTRANCE TO BE WIDENED BEYOND EXISTING FENCE LINE TO ACCOMMODATE CONSTRUCTION TRAFFIC. THIS WILL REQUIRE SITE CLEARANCE OF VEGETATION AND TAKING DOWN EXISTING FENCE LINES.
- EXTENT OF WIDENING SUBJECT TO DETAILED DESIGN AND VEHICLE TRACKING.
- FENCES TO BE REPLACED FOR NEW ON COMPLETION.
- GATED ACCESS TO SITE CONTROLLED BY BANKSMEN.



- | | |
|------------------------------------|---|
| Tree or Group Reference Number | Tree Protection Fencing |
| Tree Stem Position A Category Tree | Initial Tree Protection Fencing |
| Tree Stem Position B Category Tree | Ground Protection |
| Tree Stem Position C Category Tree | Special Engineering /Supervised Excavations |
| Tree Stem Position U Category Tree | Construction Exclusion Zone |
| Tree Crown | Pruning/Tree Removal |
| Root Protection Area | Site Boundary |

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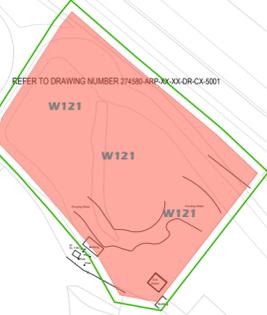
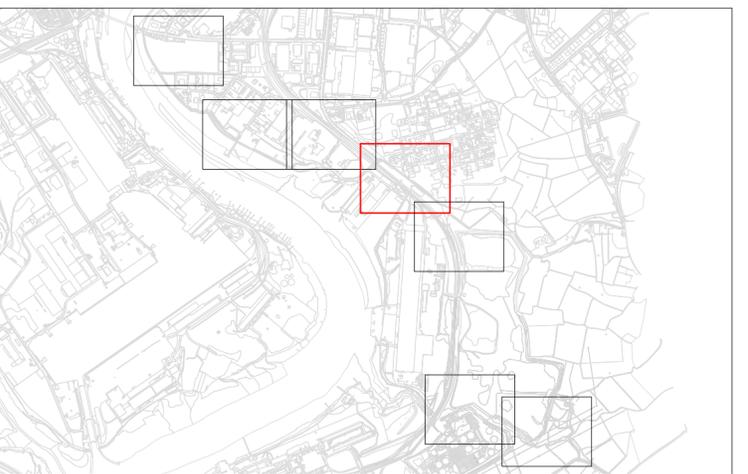
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REFER TO TYPICAL CROSS-SECTION A NORTH OF THIS POINT
REFER TO TYPICAL CROSS-SECTION B SOUTH OF THIS POINT

SECTION OF FENCE TO BE CONSTRUCTION FENCE TO CONSTRUCTION WITH VEHICLE FUTURE MAINTENANCE ACCESS

SINGLE TRACK RAILWAY LINE AND EMBANKMENT

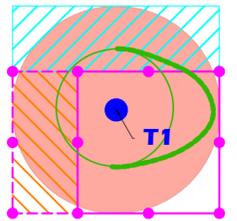
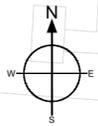
W57

G69

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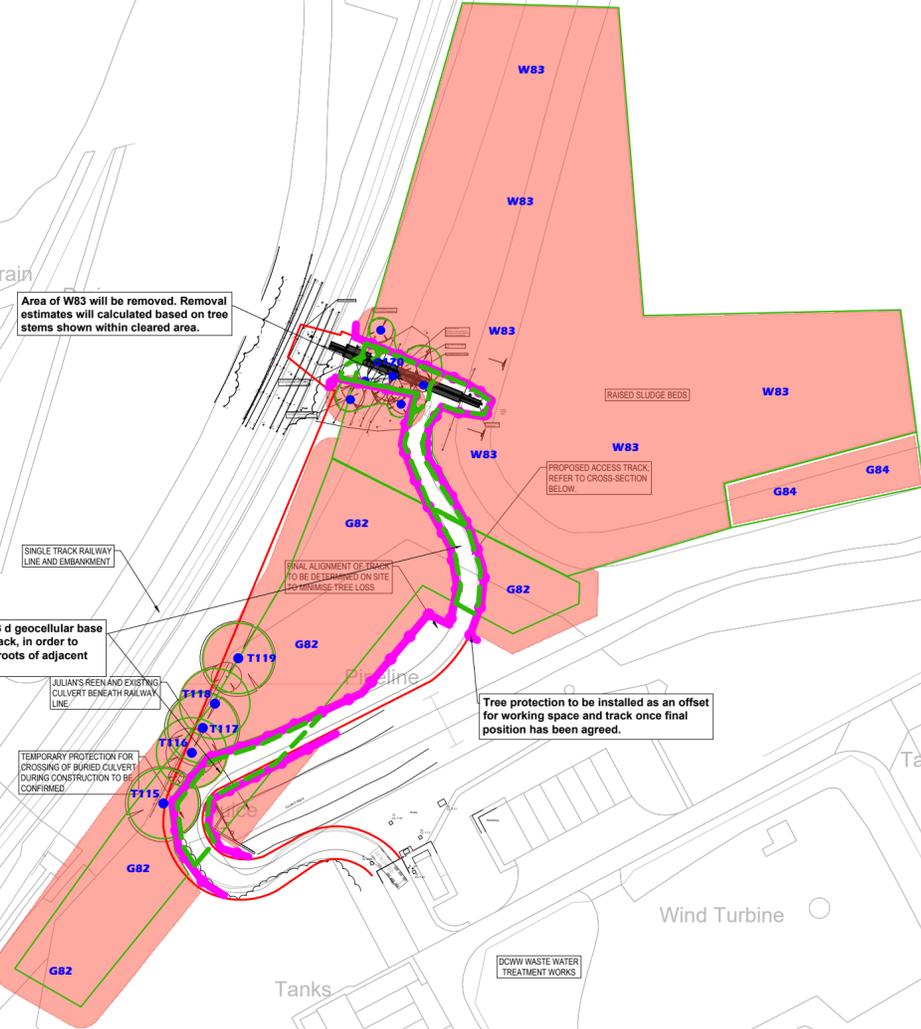
REFER TO DRAWING NUMBER 274580-ARP-XX-XX-DR-CX-002

PROPOSED LOCATION OF FLOOD GATE REFER TO DRAWING 274580-ARP-XX-XX-DR-CX-4004 FOR DETAILS



LIBERTY STEEL

Drain



Area of W83 will be removed. Removal estimates will be calculated based on tree stems shown within cleared area.

A no-dig approach and 3 d geocellular base is recommended for this track, in order to minimise impact on the roots of adjacent retained trees.

Tree protection to be installed as an offset for working space and track once final position has been agreed.

TEMPORARY PROTECTION FOR CROSSINGS OF BURIED CULVERT DURING CONSTRUCTION TO BE CONFIRMED.

JULIAN'S REEN AND EXISTING CULVERT BENEATH RAILWAY LINE.

SINGLE TRACK RAILWAY LINE AND EMBANKMENT

JULIAN'S GOUT

Pipeline

Tanks

El Sub Sta

Wind Turbine

Julian's Reen

Tanks

Gas Gov

Tank

DOWN WASTE WATER TREATMENT WORKS

k

Tank

Sewage Works

Hopper

- Tree or Group Reference Number
- Tree Stem Position A Category Tree
- Tree Stem Position B Category Tree
- Tree Stem Position C Category Tree
- Tree Stem Position U Category Tree
- Tree Crown
- Root Protection Area
- Tree Protection Fencing
- Initial Tree Protection Fencing
- Ground Protection
- Special Engineering /Supervised Excavations
- Construction Exclusion Zone
- Pruning/Tree Removal
- Site Boundary

Date: February 2021

Scale: 1:1000 @ A2

Project Name: NRW Stephenson Street Flood Defences

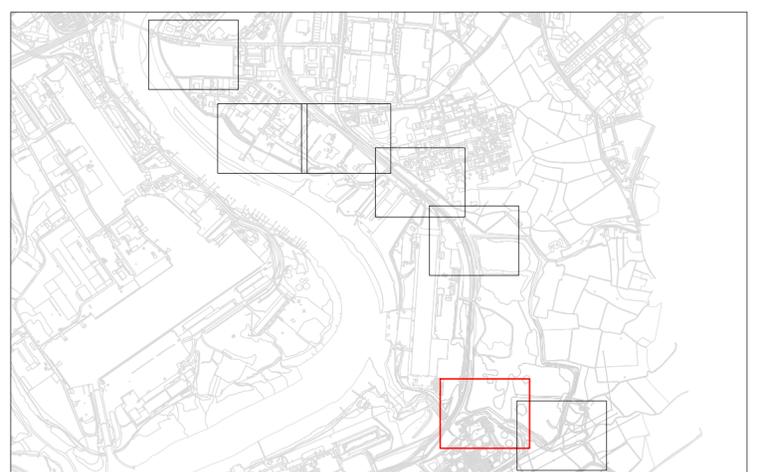
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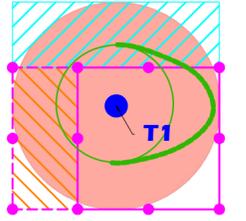
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- | | | |
|----|------------------------------------|---|
| TI | Tree or Group Reference Number | Tree Protection Fencing |
| | Tree Stem Position A Category Tree | Initial Tree Protection Fencing |
| | Tree Stem Position B Category Tree | Ground Protection |
| | Tree Stem Position C Category Tree | Special Engineering /Supervised Excavations |
| | Tree Stem Position U Category Tree | Construction Exclusion Zone |
| | Tree Crown | Pruning/Tree Removal |
| | Root Protection Area | Site Boundary |

Date: February 2021

Scale: 1:1000 @ A2

Project Name:
NRW Stephenson Street Flood Defences

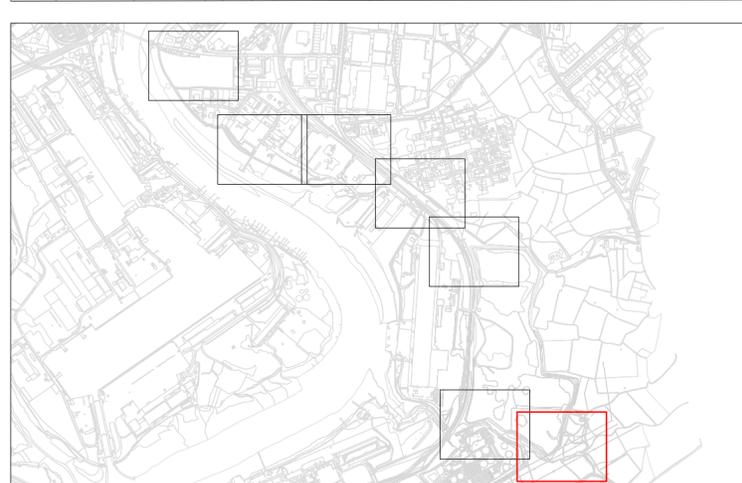
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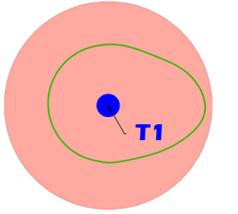
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Appendix C

Tree Constraints Plan



-  Tree or Group Reference Number
-  Tree Stem Position A Category Tree
-  Tree Crown
-  Tree Stem Position B Category Tree
-  Root Protection Area
-  Tree Stem Position C Category Tree
-  Tree Survey Boundary
-  Tree Stem Position U Category Tree

Date: January 2021

Scale: 1:1000 @ A2

Project Name:
NRW Stephenson Street Flood Defences

Drawing Title:
Tree Constraints Plan

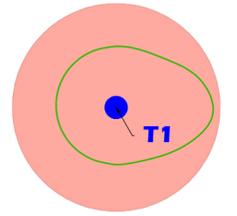
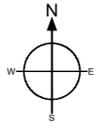
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Date: January 2021

Scale: 1:1000 @ A2

Project Name:
NRW Stephenson Street Flood Defences

Drawing Title:
Tree Constraints Plan

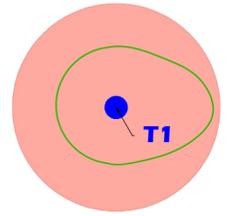
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NRW Stephenson Street Flood Defences

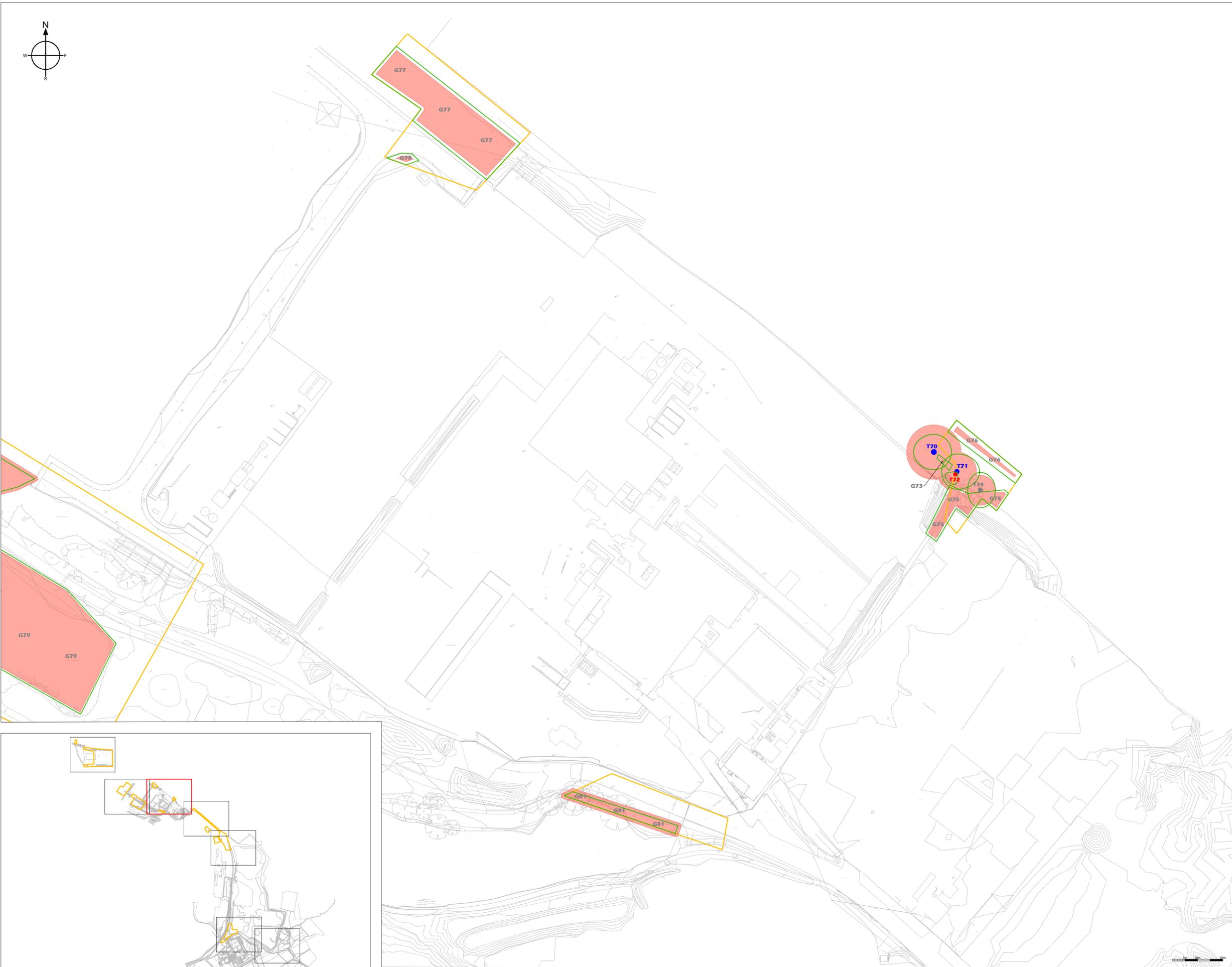
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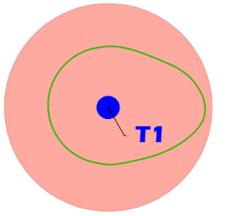
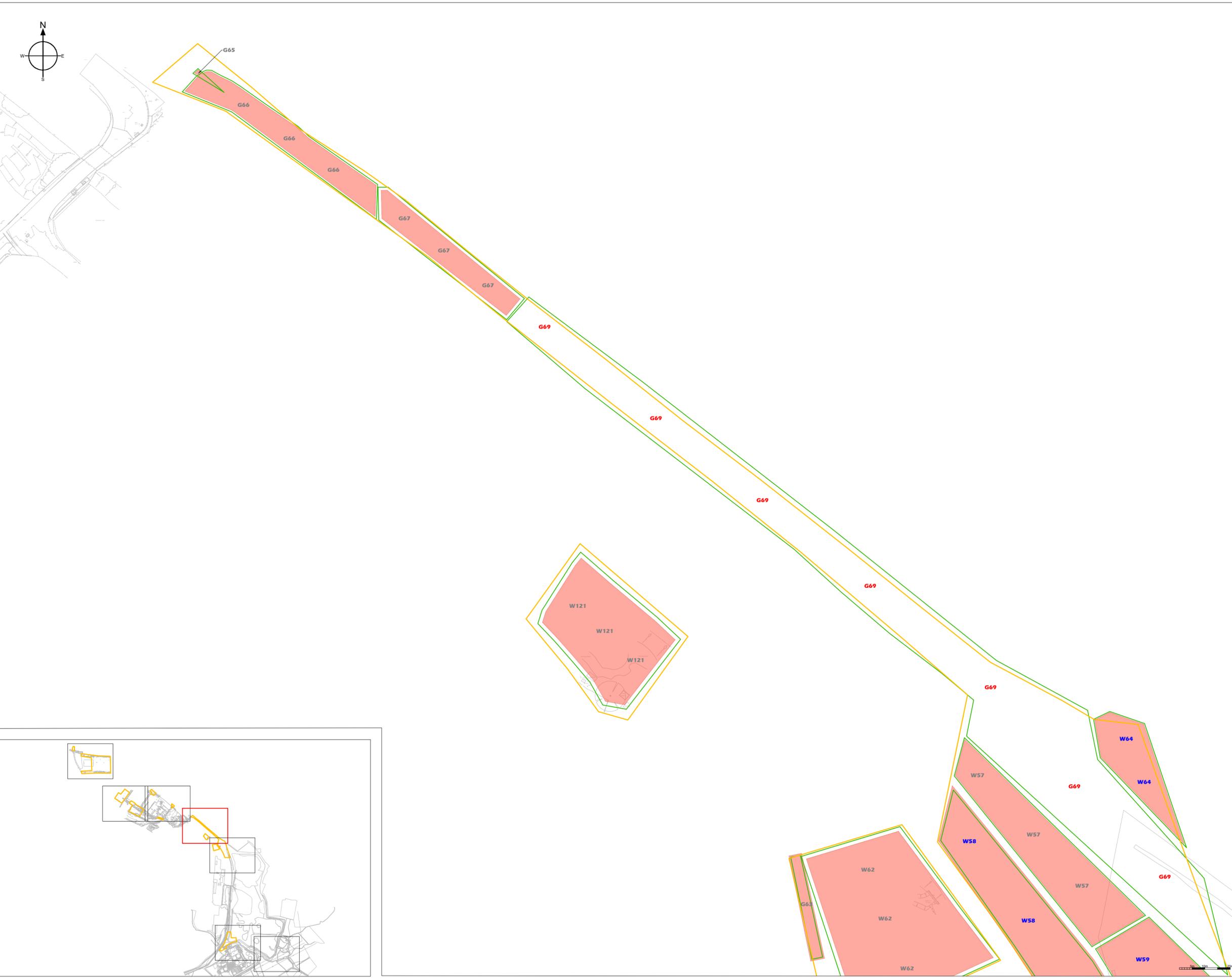
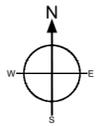
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Project Name: NRW Stephenson Street Flood Defences

Drawing Title: Tree Constraints Plan

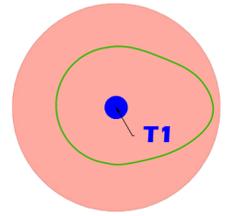
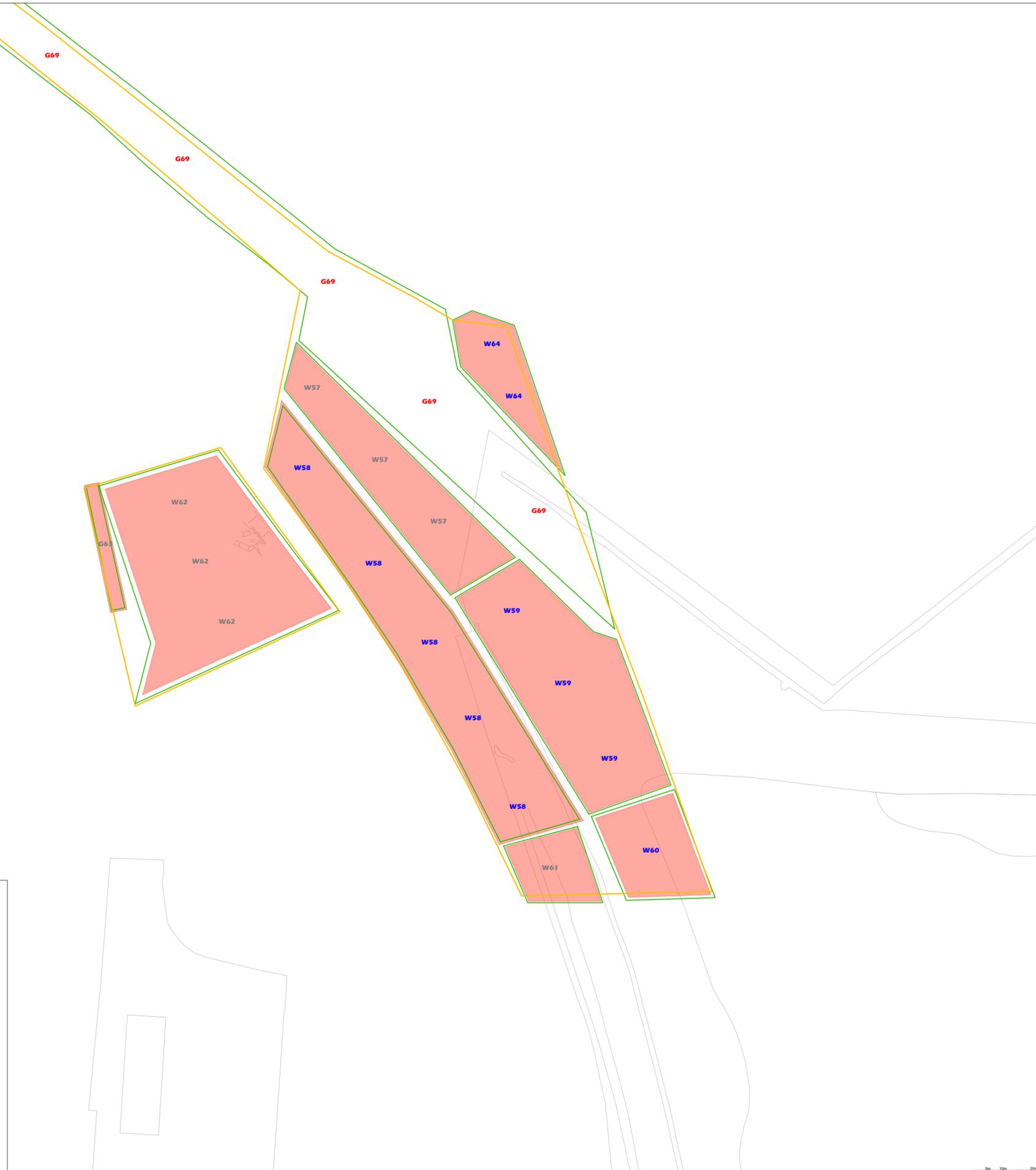
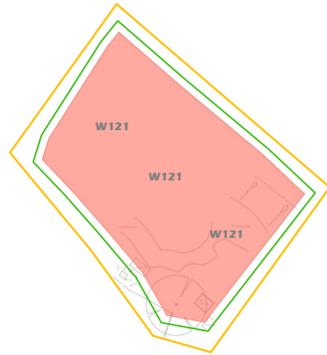
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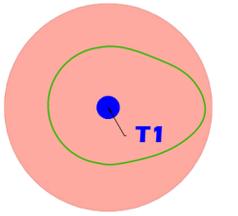
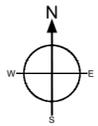
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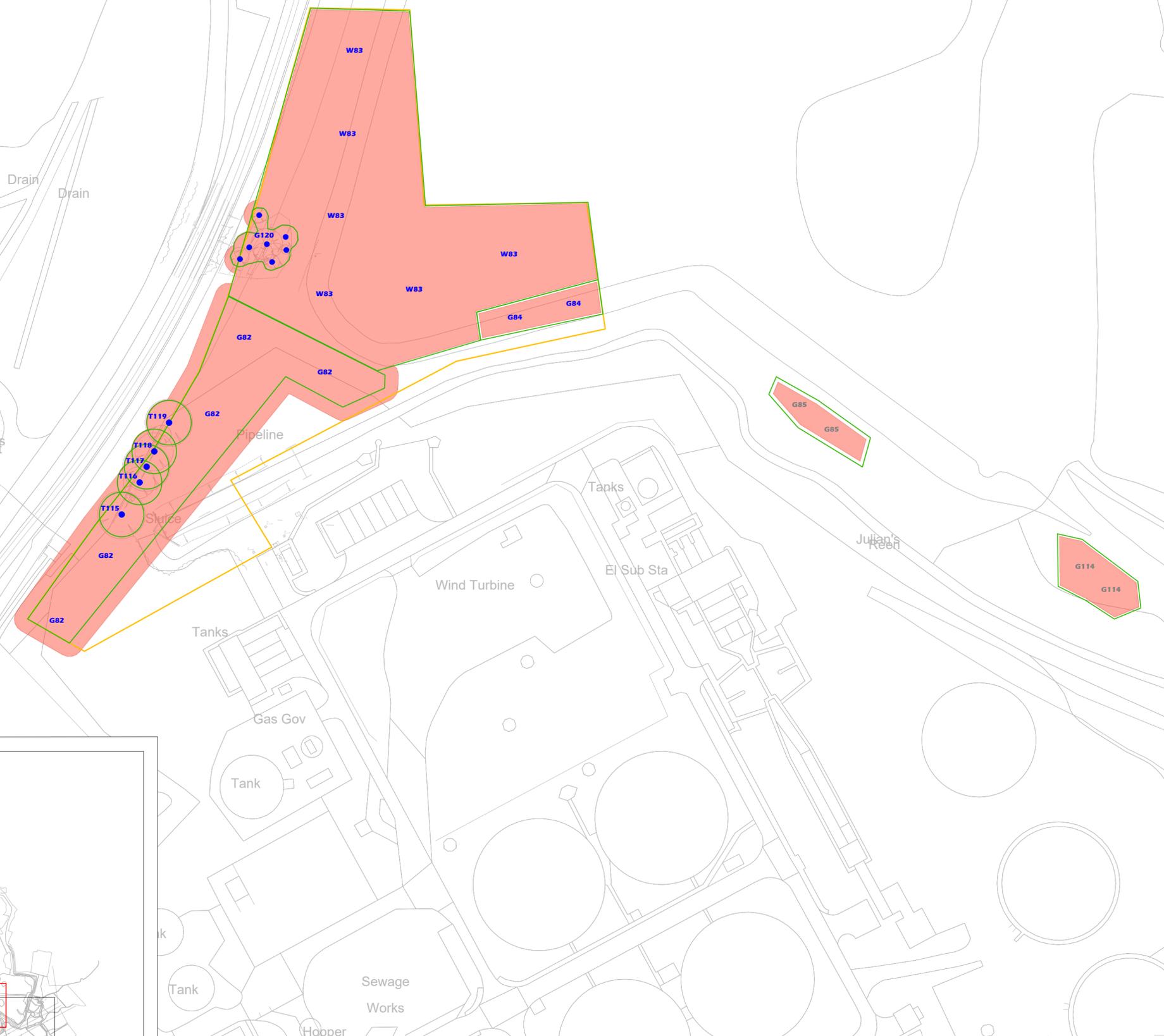
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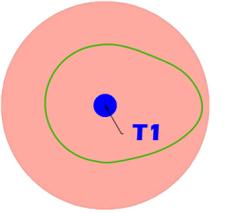
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Appendix D

Tree Protection Specifications

Technical Measures to Prevent Tree Damage

Tree Pruning

Tree pruning will be carried out where the design and/or planned site operations encroach into the crowns of trees and where these encroachments can be accommodated through facilitation pruning without significantly reducing the landscape value and/or viability of the tree.

Tree pruning operations will:

- be specified by the arboricultural consultant
- be in accordance with current best practice
- be carried out by a suitably experienced and qualified arborist

Tree Protection Fencing

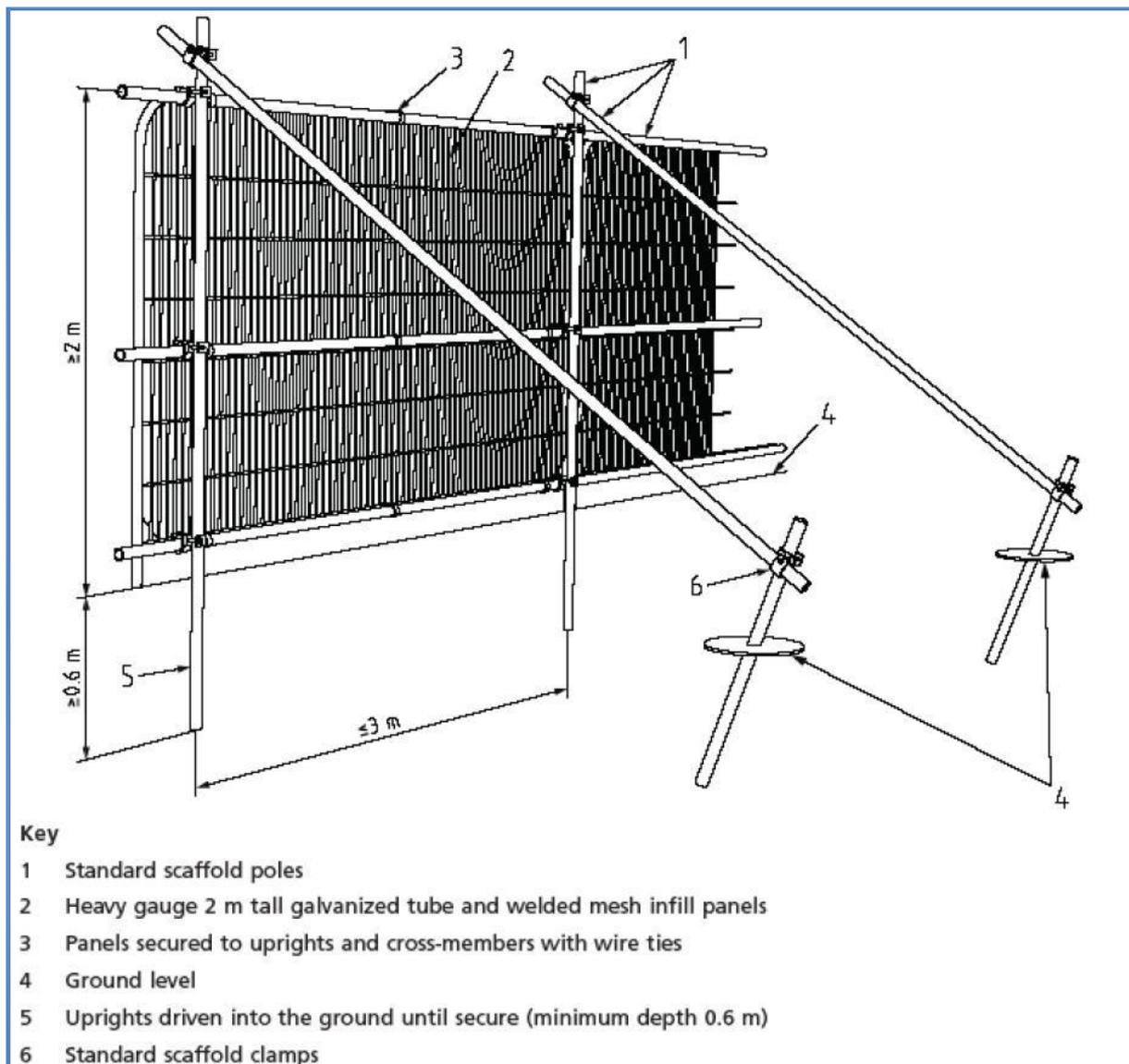
Tree protection fencing will be located at the edge of the Construction Exclusion Zone (CEZ) and will be suitably robust to provide sufficient protection for trees. The performance requirement for fencing will be determined by the type of activity that will take place in the area around the CEZ.

Typically the performance requirement for the Tree Protection Fencing will be:

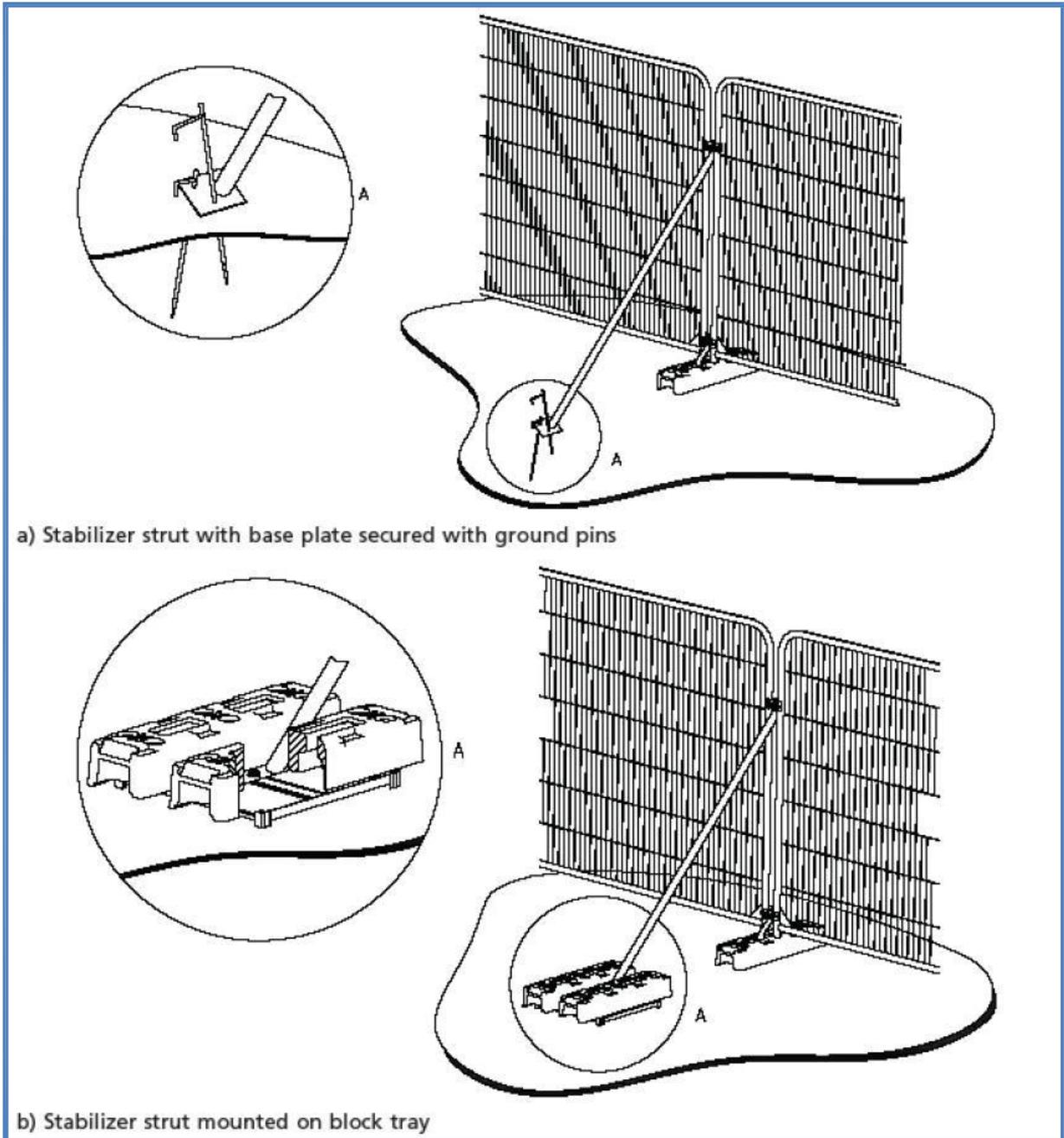
- Tree Protection Fencing will be installed prior to commencement of activity on the site.
- Tree Protection Fencing will only be removed once all works associated with the development have been completed.
- The Tree Protection Fencing will be installed and removed without causing damage to retained trees.
- Installation, removal and, where required, replacement of Tree Protection Fencing will be supervised and signed off by the Arboricultural Consultant.
- The Tree Protection Fencing will be stable and robust (typical construction method, in accordance with BS5837: 2012, see below).
- The area between the Tree Protection Fencing and the tree will be a Construction Exclusion Zone (CEZ)
- Fence panels will be made of mesh (e.g.: Heras fencing) or, if solid, will have 30cm windows cut into enough panels to enable conditions within the CEZ to be viewed.
- The CEZ will be clearly identified (see Construction Exclusion Zone sign example below)



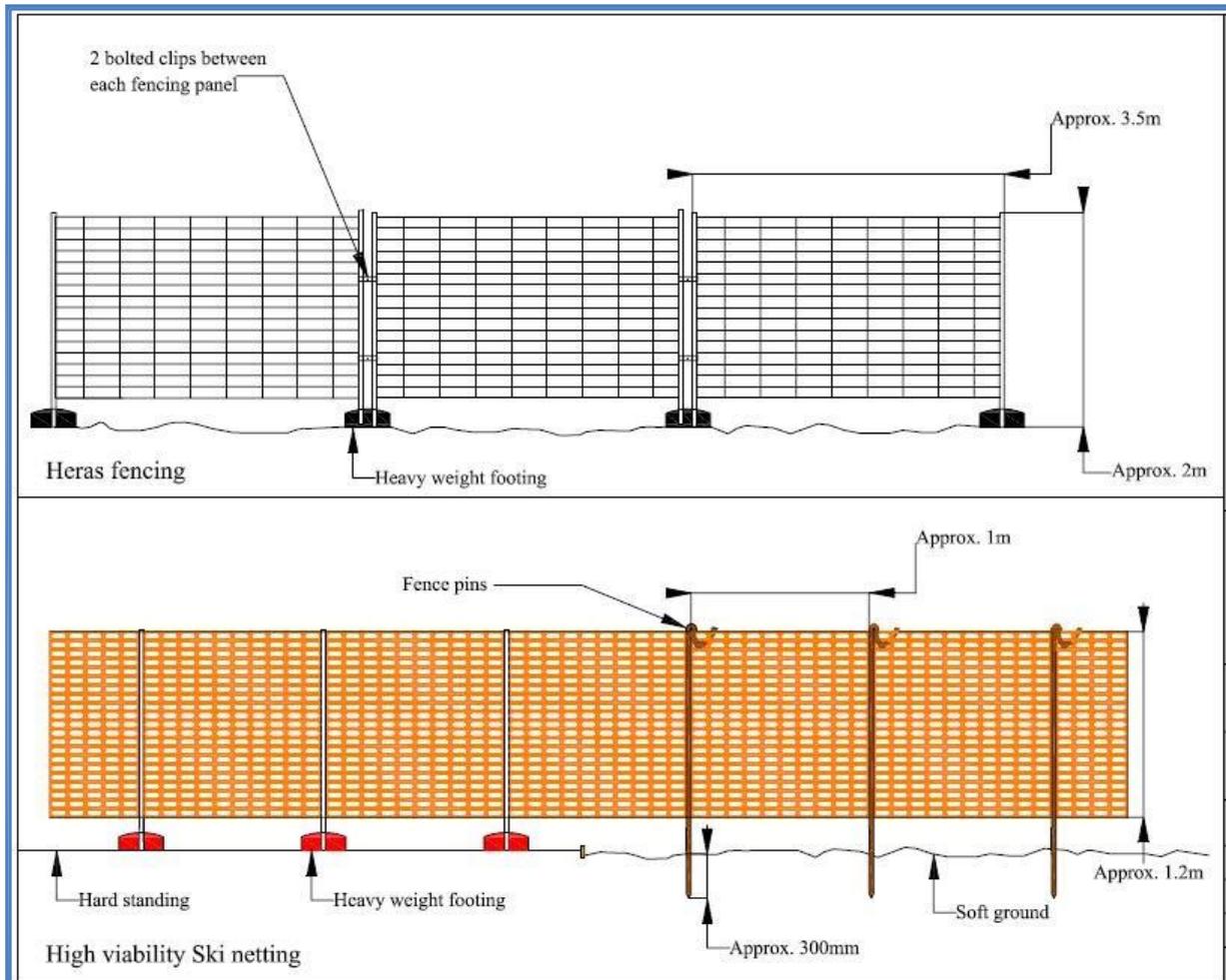
Example Tree Protection Fencing Sign



BS5837: 2012 - Figure 2 – Tree Protective Barrier



BS5837: 2012 - Figure 3 – Examples of Above Ground Stabilisation Systems



Examples of specification fencing that may be appropriate for areas of low-intensity activity

No-dig Construction and Special Engineering Measures

No-dig construction methods and special engineering measures will be employed to enable the construction of roads and other built features within the RPAs of trees without damaging tree roots. Installation of built features using no-dig and special engineering measures will meet the following performance criteria:

- Ensure that tree roots are not damaged.
 - *For the roots of the trees to remain undamaged there must be no excavation, soil stripping or site grading within the rooting areas – in other words NO DIGGING.*
- Ensure that soil is not compacted.
- Ensure that no spilled toxic materials seep into the soil.
- Ensure that sufficient rain water reaches tree roots.
- Ensure that gaseous exchange can take place within the soil around tree roots.
- All operations will be supervised and signed off by the Arboricultural Consultant.

Appendix E

Tree Survey Method and Limitations

Tree Survey Method and Limitations

Tree Survey Method

1. The tree survey was conducted from ground level aided by the Visual Tree Assessment method (Mattheck and Breloer, 1994) and in accordance with BS5837: 2012.
2. All trees on the site with a stem diameter of over 75 mm (measured at 1.5 m above ground) were included in the survey.
3. Offsite trees within influencing distance of the site (typically those located within a distance of up to 12 times their stem diameter away from the site) were included in the survey.
4. Data collected included:
 - a designated tree number
 - type of feature (trees, group, woodland, hedge)
 - number of trees in group
 - tree species
 - height (metres)
 - number of stems
 - stem diameter (in centimetres, as measured at 1.5 m above ground)
 - crown clearance (height of periphery of crown spread above ground level in metres)
 - height of lowest branch (metres),
 - branch spread (to N, S, E and W)
 - age class
 - physiological condition
 - useful life expectancy
 - structural condition
 - BS5837 retention category (A, B, C or U)
 - site notes (where this has a bearing on the present or future health or structural condition of the tree)
 - preliminary management recommendations.
5. All measurements were made in metric using measuring devices where applicable. Estimated stem diameters (e.g., due to lack of access or dense undergrowth) were recorded as such and are shown in the Tree Schedule in bold (see the key at the end of the Tree Schedule table at Appendix A for an explanation of the measurements and codes presented therein).
6. While the appraisals of the surveyed trees are not tree risk assessments, they nonetheless take into account observed structural defects in drawing conclusions about the trees' retentive worth.

Survey Limitations

1. The survey was a preliminary assessment from ground level and observations were made solely from visual inspection for the purposes of an assessment relevant to planning and development. Only binoculars, trowel, mallet and fine manual metal probe were used to aid tree assessment, where necessary. No invasive or other detailed internal decay detection devices were used in assessing trunk condition.
2. The conclusions relate to conditions found at the time of survey. Any significant alteration to the site that may affect the trees that are present or have a bearing on the planning implications (including level changes, hydrological changes, extreme climatic events or other site works) will require a re-assessment of the trees and the site.
3. This survey is not a tree safety inspection. It is carried out in order to inform the planning process. Where clear and obvious hazards have been observed, these have been addressed in the recommendations (see Appendix A - Tree Schedule). A full assessment of the levels of risk posed by trees would need to consider site use together with tree hazards.