



# Southampton Link Main

## Arboricultural Impact Assessment

On behalf of **Southern Water**

Project Ref: 331101000.100.00538 | Rev: P01 | Date: 13<sup>th</sup> December 2023

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## Document Control Sheet

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# 1 Executive Summary

- 1.1.1 This assessment describes the known arboricultural features and potential impacts upon them for the Southampton Link Main (SLM) scheme (the 'Proposed Scheme'). The Proposed Scheme falls under Southern Water Services (SWS) Water for Life Hampshire (WfLH) programme which aims to provide a more resilient water network and reduce how much water is abstracted from the chalk rivers of the River Test and River Itchen. The current Water Resources Management Plan (WRMP) aims to make up the shortfall of water as a result of decreased abstraction by 2027.
- 1.1.2 The UK planning framework, including guidance given by the National Planning Policy Framework 2021, requires that arboricultural assets which may be affected by these proposals are considered. Under Section 197 of the Town and Country Planning Act 1990, local authorities have a statutory duty to consider the protection and planting of trees when granting planning permission for proposed development. The effects of proposed development on trees are therefore a material consideration in dealing with planning applications, and this is normally reflected in local development planning policies. Planning should recognise the intrinsic beauty of the countryside, and the wider benefits from natural capital and ecosystem services, including the economic and other benefits of trees and woodland. Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads, and Areas of Outstanding Natural Beauty. Development resulting in the loss of irreplaceable habitats such as ancient woodland and ancient or veteran trees should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists.
- 1.1.3 The Proposed Scheme including the pipeline route does not pass through any statutory designated landscape areas. The South Downs National Park (SDNP), is located approximately 350m to the east of the nearest works which are at Otterbourne WSW. There will be no works within any Conservation Areas, Scheduled Monuments, Registered Parks and Garden or Areas of Outstanding Natural Beauty (AONBs).
- 1.1.4 A number of veteran trees and ancient woodlands are in close proximity to the Proposed Scheme and in some cases within the works boundary. These trees will be retained and protected as far as reasonably practicable.
- 1.1.5 In line with the requirements of BS5837: Trees in Relation to Design, Demolition and Construction (2012), Southern Water commissioned Stantec to provide arboricultural advice in relation to the Scheme. A full arboricultural survey of the Proposed Scheme was conducted between January and October 2023.
- 1.1.6 The tree survey identified a total of 1885 tree features including 1503 individual trees, 89 hedgerows, 239 groups of trees, and 54 woodlands within the wider survey area which had the potential to be impacted by the development proposals. Each tree was awarded a quality rating from A – U in accordance with the recommendations contained within Table 1 of BS5837: Trees in Relation to Design, Demolition and Construction (2012). 510 tree features were categorised as high A grade, 802 were moderate B grade, and 470 were C grade. A further 103 tree features were categorised as very low-quality U grade trees. These trees have less than 10 years safe useful life expectancy and should not be considered a constraint to any works proposals.
- 1.1.7 Thirty-six trees were identified as veteran trees which provide irreplaceable habitat. These trees will be retained and protected accordingly.
- 1.1.8 To ensure retained trees remain protected throughout the course of works, a range of mitigation measures are recommended including installation of tree protection fencing, ground protection and facilitation pruning.
- 1.1.9 Winchester and Test Valley Councils provided co-ordinates for the location of trees protected by TPO. 182 trees, nine groups and eight woodlands surveyed are protected by TPO. No trees surveyed are within a Conservation Area.

## 2 Introduction

- 2.1.1 This report has been prepared by Stantec on instruction from Southern Water to provide a tree survey, arboricultural impact assessment and tree protection plan in accordance with BS5837: Trees in Relation to Design, Demolition and Construction (2012) for the Southampton Link Main (SLM) scheme (the 'Proposed Scheme'). The start of the Proposed Scheme is located at Otterbourne Water Supply Works (WSW) (grid ref: SU 46693 23345), the pipeline then continues north to connect to Yew Hill Water Service Reservoir (WSR). From Yew Hill WSR the pipeline flows south west to end at Rownhams WSR (grid ref: SU 38285 18059).
- 2.1.2 The purpose of this report is to clearly identify the significant trees and hedges that may be impacted by the Proposed Scheme, the quality and value of the vegetation, the effect that the stages of the Proposed Scheme could have on existing vegetation, the significance of such impact in landscape terms, and to suggest appropriate methods to be adopted in order to mitigate any potentially negative impacts on existing trees and hedges.
- 2.1.3 The survey was carried out between January and October 2023 and the results are provided in the Tree Survey Schedule in Appendix B. The tree survey has been used to guide the design proposals in order to reduce arboricultural impact as far as possible.

## 2.2 Design Proposals

- 2.2.1 The elements of the Proposed Scheme comprise:

Pipeline between Otterbourne WSW and Yew Hill WSR, diameter of 700mm and approximately 4.35km in length.

Pipeline between Yew Hill WSR and Rownhams WSR, diameter of 800mm and approximately 14.7km in length.

Yew Hill WSR 9 ML additional storage tank (located on WSW operational land)

High Lift Pumping Station at Otterbourne WSW (located on WSW operational land)

- 2.2.2 Standard pipeline materials will be used depending on the method of installation and ground conditions. The majority will be either ductile iron or polyethylene (PE), with some sections made of polyvinyl chloride (PVC) or steel if required.
- 2.2.3 Construction is anticipated to start in January 2025 and finish early 2027. Commissioning will then start and the Proposed Scheme will be fully operational by summer 2028. Archaeological trial trenching has taken place throughout summer 2023, and archaeological mitigation works including strip, map and sample will take place early summer 2024.
- 2.2.4 The majority of the pipeline will be laid by open cut working within fields and minor roads. Construction works will be undertaken in accordance with best practice methods. A construction easement of 30m will be required to enable this construction, with topsoil stripping taking place and being stored within this easement. A 2m trench will be dug, and the subsoil material removed from the trench will be stored separately to topsoil. Topsoil will be replaced once the pipe has been laid and the working corridor is no longer required for access to the next section for pipe laying or for commissioning works.
- 2.2.5 The width of this working easement will be narrowed to approximately 10m when crossing over constraints such as hedgerows, watercourses and through sensitive habitats to reduce impacts, and 5m where a haul road isn't needed. Areas surrounding trenchless areas will require larger amounts of topsoil strip to make room for machinery required. Appendix E contains further details of the working widths required.

- 2.2.6 A number of trenchless methods will be employed where open cut will not be available. This will include microtunnelling and auger bore. Horizontal directional drilling is not possible due to the larger diameter of the pipe required to carry the volume of water required.

## **2.3 Site Description**

- 2.3.1 The start of the Proposed Scheme is located at Otterbourne WSW (grid ref: SU 46693 23345), the pipeline continues north to connect to Yew Hill WSR and then south west to end at Rownhams WSR (grid ref: SU 38285 18059).
- 2.3.2 From Otterbourne WSW, the Proposed Scheme enters Oakwood Recreation Ground before being tunnelled to a field east of the M3, and from there tunnelled to the west of the M3. The landscape through which the pipeline is located changes to mainly arable fields near Silkstead and Yew Hill WSR. It then continues to the south of the A3090 near Hursley and Ampfield before passing through a mixture of pasture and arable fields. The remainder of the route is defined by woodland, landfill and undeveloped fields before reaching Rownhams WSR. Generally, the topography of the route is flat, with slight rolling terrain between Romsey and Hursley.
- 2.3.3 The Proposed Scheme including the pipeline route does not pass through any statutory designated landscape areas. The South Downs National Park (SDNP), is located approximately 350m to the east of the nearest works which are at Otterbourne WSW. There will be no works within any Conservation Areas, Scheduled Monuments, Registered Parks and Garden or Areas of Outstanding Natural Beauty (AONBs).

## **2.4 Scope of the report**

- 2.4.1 This report is only concerned with trees in relation to design, demolition and construction. It includes an assessment based on the site visit and documents provided, namely the proposed layout plan. This report is not a full hazard or risk assessment of trees and should not be used as such.
- 2.4.2 Aerial tree inspection, invasive procedures, sub-soil investigations and detailed soil analysis are outside the scope of this report.
- 2.4.3 All trees directly affected by the Proposed Scheme have been considered, even where they are situated outside of the boundary of the Proposed Scheme.

## **2.5 Limitations**

- 2.5.1 No reliance shall be placed on any comment(s) the surveyor may have made in respect of the structural integrity of any main structure or drainage systems to which this survey and report relates. You are advised that where manmade structures are involved you may need to obtain structural engineering and/or geotechnical advice.
- 2.5.2 The Tree Protection Plan (TPP) contained in Appendix D has been developed from the tree survey information and the tree locations identified using GPS. The accuracy of GPS positions cannot be guaranteed, therefore it is strongly advised that where any potential conflict exists, the locations and RPA extents of trees are confirmed on site prior to commencement of works.
- 2.5.3 The recommendations made in this report are only relevant to the layout shown on the TPP. The level of arboricultural impact may increase or decrease depending on the final site layout.
- 2.5.4 The majority of trees surveyed are growing within hedgerows, or are otherwise inaccessible. It should be assumed that stem diameters have been estimated unless expressly stated otherwise in the tree survey schedule.
- 2.5.5 Trees are living organisms and as such their condition will vary over time. This report and recommendations are limited to observations made on the date of inspection. The report and survey information are valid for a maximum period of two years.

## 2.6 Legal constraints

2.6.1 Local Planning Authorities (LPAs) have the power to preserve selected trees and woodlands through the making of Tree Preservation Orders (TPOs). Similarly, special provision is provided to trees located within Conservation Areas (CAs) which are not the subject of a TPO. The LPAs powers to do this are provided by the following Act of Parliament and its associated regulations:

Town and Country Planning Act 1990

Town and Country Planning (Determination of Appeals by Appointed Persons) (Prescribed Classes) (Amendment) (England) Regulations 2008

Town and Country Planning (Tree Preservation) (England) Regulations 2012

2.6.2 The principal effect of a TPO is to prohibit the cutting down, uprooting, topping, lopping, wilful damage or wilful destruction of trees without first obtaining the consent of the relevant LPA.

2.6.3 Where works to trees within a CA are proposed, six weeks notification must first be given to the relevant LPA.

2.6.4 Unauthorised works to trees either protected by a TPO or those that are located within a CA, could result in a fine of up to [REDACTED] per tree in cases heard in a Magistrates Court, or unlimited fines in cases taken to Crown Court.

2.6.5 Winchester and Test Valley Council's provided co-ordinates for the location of trees protected by TPO. Surveyed trees protected by TPO are shown in Table 1 below. No trees surveyed are within a Conservation Area.

**Table 1: Trees Protected by Tree Preservation Order**

	Winchester	Test Valley
<b>Trees</b>	T279 T325 T326 T327 T328 T329 T330 T331 T683 T684 T685 T686 T687 T688 T689 T690 T691 T692 T693 T694 T695 T696 T697 T699 T701 T702 T703 T705 T707 T708 T709 T711 T712 T713 T714 T715 T716 T717 T718 T720 T723 T724 T725 T726 T728 T729 T730 T731 T732 T733 T734 T735 T736 T737 T738 T739 T740 T741 T742 T743 T746 T747 T748 T749 T750 T751 T752 T753 T754 T755 T756 T758 T761 T762 T763 T764 T765 T766 T767 T768 T769 T770 T771 T772 T773 T774 T775 T776 T777 T778 T781 T783 T784 T785 T786 T787 T788 T793 T795 T796 T797 T798 T800 T801 T802 T803 T804 T805 T806 T807 T808 T810 T811 T812 T813 T814 T815 T816 T817 T818 T819 T820 T821 T822 T824 T832 T836 T837 T841 T844 T846 T847 T848 T855 T856 T858 T859 T860 T863 T864 T865 T866 T867 T868 T869 T870 T871 T874 T876 T879 T881 T882 T884 T885 T887 T891 T893 T894 T895 T896 T897 T898	T507 T511 T521 T527



	T901 T903 T904 T905 T906 T907 T908 T911 T914 T830 T917 T918 T919 T922 T930 T933 T1513- T1551	
<b>Groups</b>	G160 G164 G165 G170 G171 G172 G174 G176, G233-G241	G100
<b>Woodlands</b>	W18 W20 W21 W25 W26 W28 W31 W32	None

## 2.7 Wildlife constraints

2.7.1 Various habitats and species of plant, bird and animal in England and Wales are afforded legal protection by the following pieces of legislation:


Wildlife and Countryside Act 1981 (as amended)

Natural Environment and Rural Communities Act 2006 (NERC Act)

Conservation of Habitats and Species Regulations 2010 (as amended)



The Hedgerows Regulations 1997

2.7.2 Protected animal species include, but are not limited to Great Crested Newt, reptiles (all species), wild birds (all species), bats (all species), Red Squirrel, Hazel Dormouse, Water Vole,  and Otter.

2.7.3 For birds it is an offence to take or harm them, their nests (whilst in use or being built) or their eggs.

2.7.4 Protected species must be considered prior to any tree or development works being carried out. Tree work and the timing of tree work should be carefully considered.

## 2.8 Ancient and Veteran Trees

2.8.1 Ancient woodland is any area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland comprising mainly trees and shrubs native to the site, usually arising from natural regeneration, and plantations on ancient woodland sites - replanted with conifer or broadleaved trees that retain ancient woodland features, such as undisturbed soil, ground flora and fungi. Wood pastures (managed through grazing) identified as ancient should be considered in the same way as other ancient woodland for planning purposes. Ancient woodland takes hundreds of years to establish and is defined as an irreplaceable habitat. Ancient woodland is often recorded on The Department for Environment, Food and Rural Affairs (DEFRA) Multi-Agency Geographic Information for the Countryside (MAGIC) online mapping system, however this is not an exhaustive list and it may be that other unregistered woodland may also be ancient.

2.8.2 According to the NPPF and draft National Policy Statement (dNPS) for Water Resources Infrastructure, development must seek to avoid causing the loss or deterioration of ancient woodland or ancient and veteran trees through direct or indirect impacts. Natural England and the Forestry Commission provide 'standing advice' for ancient woodland, ancient trees and veteran trees. Standing advice is a material consideration for local planning authorities and

should be taken into account when making planning decisions. It is separate to the advice and guidance provided in BS5837:2012.

- 2.8.3 For ancient woodlands, development should have a buffer zone of at least 15 metres from the boundary of the woodland to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, the proposal is likely to need a larger buffer zone. For example, the effect of air pollution from development that results in a significant increase in traffic.
- 2.8.4 For ancient or veteran trees (including those on the woodland boundary), the buffer zone should be at least 15 times larger than the stem diameter of the tree, or 5 metres from the edge of the tree's canopy, whichever is greater. Where assessment shows other impacts are likely to extend beyond this distance, a larger buffer zone may be needed.
- 2.8.5 Development resulting in the loss of irreplaceable habitat such as Ancient and Veteran trees should be refused unless there are exceptional reasons and a suitable compensation strategy exists.
- 2.8.6 A search of the DEFRA 'Magic map' found that the Proposed Scheme is in close proximity to a number of ancient woodlands. These are detailed in Table 2 below.
- 2.8.7 A search of the Woodland Trust Ancient Tree Inventory found only one tree designated as either ancient or veteran (T1512), however 26 individual trees were identified as veteran during the survey. These are T2, T30, T51, T96, T97, T106, T128, T184, T210, T214, T215, T218, T301, T306, T312, T314, T363, T394, T395, T410, T417, T466, T520, T569, T668, T793, T839, T951, T955, T972, T974, T1090, T1192, T1388 and T1512.
- 2.8.8 The Natural England buffer zone for those trees identified as ancient or veteran is shown in the tree survey schedule in Appendix B, the Tree Constraints Plan in Appendix C, and the Tree Protection Plan in Appendix D.

**Table 2: Identified ancient woodlands**

Woodland survey reference	Type of ancient woodland	Name of woodland
W30, W24, G161	Ancient and semi-natural woodland	Oakwood copse
W27	Ancient and semi-natural woodland	Sparrowgrove Copse
G207-G210	Ancient replanted woodland	None
W11	Ancient replanted woodland	Snows/Fitts Copse
T543 – on edge of ancient woodland	Ancient replanted woodland	None
G149, T678, G144	Ancient and semi-natural woodland	Pursers Great Copse
W9	Ancient & semi-natural woodland	Hoe Copse
W1	Ancient & semi-natural woodland	Packridge Wood

## 3 Tree Survey Methodology

### 3.1 Tree ID Number

3.1.1 Tree identification number relevant to plans and drawings included in this report.

### 3.2 Species

3.2.1 Species of tree as identified on site. The English common name is used, accompanied by the scientific species name where this is deemed necessary for clarification. In some cases it can be difficult to identify the exact species. The abbreviation 'sp.' is used where only the genus is known.

### 3.3 Height

3.3.1 Total height of tree measured to the nearest metre (or half metre for trees below 10m height) using a laser measurer or estimated where necessary.

### 3.4 Stem Diameter

3.4.1 Diameter of tree at breast height (1.5m) for single-stemmed trees. For multi-stemmed trees with 2-5 stems, each stem is measured at 1.5m above ground level and recorded, whilst for trees with 6 or more stems, an average stem diameter is recorded. Measured in mm, this figure allows calculation of the root protection area (RPA) as described in Section 3.12 of this report. Off-site or otherwise inaccessible trees where accurate measurements cannot be obtained have been given estimated diameters.

### 3.5 Branch Spread

3.5.1 Measured at 4 points (N, E, S, W) to determine shape of canopy. Measurements are rounded up to the nearest metre or half metre as appropriate. Canopy dimensions may impact on site layout or recommended routes for site vehicles and are therefore accurately represented on the accompanying plans.

### 3.6 Existing Height Above Ground Level

3.6.1 (1). Height in metres of the first significant branch, and the direction of growth.

(2). Height in metres of lowest part of crown.

### 3.7 Life Stage

3.7.1 Life stage is an estimation based on outward physical appearance. It has relevance to calculating safe useful life expectancy and current ecological or amenity value.

#### 3.7.2 Young (Y)

Young trees typically within the first 10 years of growth that can be easily transplanted, but as yet of limited significance in the landscape.

#### 3.7.3 Semi-mature (SM)

Well established trees with significant growth but not yet mature. Trees in this category will typically have reached less than 1/3 of their life expectancy.

#### 3.7.4 Early-mature (EM)

Trees in the early stages of maturity with high growth potential. These trees will typically have reached 1/3 - 2/3 of their life expectancy.

### 3.7.5 **Mature (M)**

Trees likely to have reached, or almost reached the maximum height and spread for the species and growing conditions. Growth rates for mature trees are generally much lower than those of younger trees.

### 3.7.6 **Over-mature (OM)**

Trees that have passed maturity and are either in or liable to decline. Growth is slower or crown retrenchment may be occurring. Trees in this category may have high environmental or cultural value.

## 3.8 **General Observations**

3.8.1 Any relevant observations are recorded, with particular reference to structural and/or physiological condition.

## 3.9 **Preliminary Management Recommendations**

3.9.1 Recommendations are made where management work is required for reasons of health and safety or sound arboricultural management.

## 3.10 **Estimated Remaining Contribution**

3.10.1 This is determined by expected lifespan of the species, current life stage, structural and physiological condition. The information is used for tree categorisation and quality assessment and is recorded in bands of either <10 years, 10+ years, 20+ years or 40+ years.

## 3.11 **Tree Category Grading**

3.11.1 The assessment conforms to BS5837: Trees in Relation to Design, Demolition and Construction (2012) guidance as outlined below. Trees are also subcategorised as having mainly arboricultural value (1), landscape value (2), or cultural or conservation value (3).

3.11.2 Tree categorisation is based on tree condition at the time of assessment and does not consider future management proposals.

### 3.11.3 **Category A**

Trees of high quality and value. In such condition as to be able to make a substantial contribution to the site for a minimum of 40 years, or those with high cultural or conservation value. Site layout should be designed to incorporate trees in this category, ensuring sufficient space is given to provide minimal conflict during construction and final development use.

### 3.11.4 **Category B**

Trees of moderate quality and value. In such condition as to make a significant contribution to the site, normally for a minimum of 20 years. It is highly recommended that trees in this category are retained.

### 3.11.5 **Category C**

Trees of low quality and value but in adequate condition to provide contribution to the site for more than 10 years. Includes young trees with a stem diameter below 150mm. It is preferable but not essential to retain trees in this category. Young trees should be transplanted to suit site layout where practical.

### 3.11.6 **Category U**

Trees with serious structural defects, dead, dying, seriously diseased or in very poor condition with a likely remaining life span of less than 10 years. Trees in this category should not be considered a constraint to any development proposals.

### 3.12 Root Protection Area (RPA)

- 3.12.1 The RPA is the minimum area in m<sup>2</sup> which must be left undisturbed around each tree in order to avoid significant damage to the root system and ensure its survival. For ease, the equivalent radius, which should be measured from the centre of the tree, is provided.
- 3.12.2 RPAs are capped at 707m<sup>2</sup> which is equivalent to a circle with a radius of 15m in accordance with BS5837: Trees in Relation to Design, Demolition and Construction (2012).
- 3.12.3 For single stem trees, the RPA is calculated as an area equivalent to a circle with a radius 12 times the stem diameter.
- 3.12.4 For trees with 2-5 stems the combined stem diameter is calculated as follows:

$$\sqrt{(\text{stem diameter } 1)^2 + (\text{stem diameter } 2)^2 \dots + (\text{stem diameter } 5)^2}$$

- 3.12.5 For trees with 6 or more stems the combined stem diameter is calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

- 3.12.6 Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area is produced. Any modifications to the shape of RPAs are highlighted in accompanying reports and plans.
- 3.12.7 The full tree survey is included as Appendix B.

## 4 Tree Survey Results

### 4.1 Tree Quality Assessment Summary

- 4.1.1 476 individual trees, 22 groups of trees and 12 woodlands were recorded as high A category. Their retention should be considered imperative to the design and construction of the Proposed Scheme.
- 4.1.2 643 individual trees, 108 groups of trees, 20 hedgerows, and 31 woodlands were recorded as moderate B category. Reasonable effort should be made to retain these trees where possible.
- 4.1.3 286 individual trees, 104 groups of trees, 69 hedgerows, and 11 woodlands were recorded as low C category. Where retention of these trees would cause undue restraint to development, it would be reasonable to remove them as part of the works proposals (subject to suitable ecological assessment and mitigation).
- 4.1.4 98 individual trees and five groups of trees were recorded as very low U category with less than ten years safe useful life expectancy and should not be considered a constraint to any works proposals.

**Table 3: Tree quality assessment summary**

Tree feature type	BS5837 Tree Quality Assessment Category				Totals
	A	B	C	U	
Individual trees	476	643	286	98	<b>1,503</b>
Groups of trees	22	108	104	5	<b>239</b>
Hedgerows	0	20	69	0	<b>89</b>
Woodlands	12	31	11	0	<b>54</b>
<b>Totals</b>	<b>510</b>	<b>802</b>	<b>470</b>	<b>103</b>	<b>1,885</b>

## 5 Impact appraisal and recommendations for tree protection

5.1.1 The arboricultural constraints have directly informed every element of the Proposed Scheme, therefore the majority of potential impacts have been designed out.

### 5.2 Tree Removals

5.2.1 Eighty-six individual trees, ten groups of trees, three hedgerows and one small woodland would need to be removed in full in order to accommodate the proposed scheme (Table 2).

5.2.2 Also, 23 groups of trees, 22 hedgerows and eight woodlands would be partially removed. Details are provided in Table 3 below. All tree work operations will be carried out in accordance with BS3998:2010 'Recommendations for Tree Work'; current arboricultural industry guidelines and best practice; and all relevant Health & Safety standards. Tree work is a specialist task that requires operatives to be appropriately qualified, skilled, and adequately insured.

5.2.3 No trees proposed for full or partial removal are considered ancient or veteran, however B grade tree T776 is protected by TPO.

**Table 2: Trees to be removed**

Tree feature type	BS5837 Tree Quality Assessment Category				Totals
	A	B	C	U	
Trees	T411, T412, T413, T414, T415, T502, T583, T845, T1087, T1089, T1113, T1132, T1133, T1412	T112, T153, T155, T157, T171, T172, T224, T267, T269, T270, T506, T776, T1077, T1091, T1094, T1095, T1096, T1117, T1359, T1362, T1369, T1370, T1416, T1418, T1419, T1421, T1423, T1424, T1425, T1426, T1454, T1472, T1474, T1475, T1478, T1516	T169, T342, T354, T509, T538, T550, T571, T1079, T1082, T1088, T1109, T1183, T1361, T1363, T1364, T1371, T1372, T1428, T1456, T1476, T1479, T1504, T1505, T1507, T1515	T434, T682, T1078, T1125, T1134, T1136, T1179, T1180, T1181, T1335, T1455	<b>86</b>
Groups of trees	None	G127, G129, G232	G112, G185, G195, G229	G86, G91, G192	<b>10</b>
Hedgerows	None	None	H3, H5, H89	None	<b>3</b>
Woodlands	None	None	W44	None	<b>1</b>
<b>Totals</b>	<b>14</b>	<b>39</b>	<b>33</b>	<b>14</b>	<b>100</b>

**Table 3: Trees to be partially removed**

Tree feature type	BS5837 Tree Quality Assessment Category				Totals
	A	B	C	U	
Groups of trees	G101	G9, G27, G51, G52, G55, G57, G67, G76, G104, G109, G122, G124, G147, G150, G193, G241	G7, G54, G79, G117, G215, G223	None	<b>23</b>
Hedgerows	None	H35, H37, H40, H41, H49, H55, H69	H9, H11, H18, H21, H29, H32, H33, H43, H44, H45, H46, H50, H72, H73, H85	None	<b>22</b>
Woodlands	W4	W13, W43, W45, W51	W42, W46, W50	None	<b>8</b>
<b>Totals</b>	<b>2</b>	<b>27</b>	<b>24</b>	<b>0</b>	<b>53</b>

### 5.3 Mitigation planting

- 5.3.1 There is currently a reasonable quantity of tree cover on site, enabling natural regeneration, and most trees will be unaffected by the proposed works. When crossing through hedgerows, wood chippings and ground protection will be used to protect the seedbank. Woodland trees will be coppiced to enable faster regeneration. SWS will ensure that permanent vegetation loss will be compensated for so that the landscape in respect of affected woodland and hedgerow is returned to its former condition in the medium to long term. On woodland crossings, certain deep-rooted species will not be planted above the pipeline, however natural germination will result in a range of species being present in the long term.
- 5.3.2 Opportunities to enhance hedgerows, woodlands and tree belts within the route corridor will be identified as part of an overall landscape and biodiversity enhancement strategy. .
- 5.3.3 Where sections of hedgerows must be removed to enable the section of pipeline construction they will be reinstated in the next planting season immediately after the construction works are complete or following the completion of testing and commissioning where access is required.
- 5.3.4 Proposals for replacement planting should consider the space available to allow trees to grow to their maximum mature height and spread without competing with existing trees or other new tree planting.
- 5.3.5 Tree planting should be in accordance with BS 8545:2014 'Trees: from nursery to independence in the landscape - Recommendations' and should be in-keeping with the local landscape character. Consideration to the areas of tree planting will be given to ensure that all planted trees will be protected or remediated if damaged during the construction phase.



## 5.4 Works taking place within RPAs of retained trees

5.4.1 Vehicle access and excavations will be required within the RPA of retained trees. Affected trees are shown in Table 4 below. No trees impacted are protected by TPO, however A grade trees T410, T417 and T569 are veteran trees. G207, G208, G209, G210 and W9 form part of ancient woodlands.

**Table 4: Works taking place within RPAs of retained trees**

Works taking place within RPA	BS5837 Tree Quality Assessment Category				Totals
	A	B	C	U	
Access required for site vehicles	T110, T115, T124, T145, T151, T173, T409, T410, T417, T464, T569, T1333, T1450 G207, G208, G209, G210 W9	T117, T139, T140, T141, T142, T146, T148, T513, T541, T576	T113, T120, T281, T282 G110, G111	None	<b>34</b>
Open cut excavations	W9	T541, T1360	None	None	<b>3</b>

### Excavations – Open cut

5.4.2 Open cut excavations will take place within the RPA of A grade ancient woodland W9, and B grade trees T541 and T1360. Trees with less than 10% of the RPA affected by excavations will be retained, however excavations will be undertaken under arboricultural watching brief. While there is no scope to retain any roots encountered, the watching brief will identify whether any of the affected trees will require removal as a result of root damage.

5.4.3 To avoid tearing out roots and causing more damage than necessary, excavation works inside the RPA of affected trees should proceed by supervised mechanical excavation, removing a few centimeters depth at a time. Any roots encountered should be pruned back to the edge of the excavated trench using a pruning saw or secateurs, leaving a clean-cut surface and to a lateral root where possible. No roots should be left exposed for a period of over 24 hours.

### Excavations - Trenchless

5.4.4 Trenchless excavations will take place beneath Oakwood Copse ancient woodland to install the pipeline. Beneath these woodlands the outside diameter of the auger bore or direct drill will be kept below 4m depth to avoid impact on the ancient woodland.

5.4.5 Trenchless excavations will also take place at Hoe Lane, Botley Road, Green Lane, Hook Road and Sandpit Copse. Hursley Road, to the east of Purser's Great Copse, Poles Lane and from The Coppins to Otterbourne (including beneath Oakwood Copse). TPOs affect trees at Hook Road (Test Valley BC reference: TPO.TVBC.211) and Silkstead Farm (Winchester City Council reference 177).

5.4.6 Entrance and egress pits for directional drilling will be positioned outside the RPA of retained trees.

## 5.5 Works taking place beneath canopies

- 5.5.1 Facilitation pruning will be required to all trees overhanging the proposed works area. 5m clearance from ground level will need to be provided to allow access for machinery and pedestrians without causing damage to branches of retained trees.
- 5.5.2 One stem from C grade tree T1514 will require removal as it hangs low over an access road.
- 5.5.3 All tree works should be carried out in accordance with BS3998:2010 and should be undertaken prior to the commencement of any works on site and prior to the erection of protective fencing. It should be the responsibility of the site manager and tree contractor to ensure that no tree works are carried out without the necessary notices served on the tree owner.

## 6 Proposed Tree and Ground Protection

### 6.1 Tree Protection Fencing

- 6.1.1 Fencing will be required to protect all retained trees on site. This fencing should be fit for the purpose of excluding construction activity and provide adequate protection to the trees.
- 6.1.2 Due to the length of the pipeline, it is recommended that temporary exclusion fencing is installed and dismantled on a rolling basis as works continue along the proposed route. This fencing will simultaneously act as tree protection fencing and site fencing by separating the worksite from surrounding trees and continued land use. The precise location and construction of site fencing will be agreed on site between the site supervisor the appointed arboricultural consultant before any site works commence. For the purpose of this report, it is assumed that tree protection fencing will be positioned along the perimeter of the proposed easement, allowing 15m of working space either side of the proposed pipeline, except at hedgerows where it will be reduced to lessen the requirement for hedgerow removal. The working widths required for the scheme are shown in Appendix E.
- 6.1.3 In line with Section 6.2.2 of BS 5837:2012, which requires that the tree protection barriers be fit for the purpose of excluding construction activity and that they provide adequate protection to the trees, hedgerows and woodland, fencing should consist of 2m tall, welded mesh panels (Heras fencing or similar) fixed to the ground via vertical tubes driven into the ground until secure. These tubes should be spaced at a maximum interval of 3m. Each panel will be secured to its neighbor with a minimum of 2 anti-tamper couplers. Where space allows, the panels should be supported on the inner side by stabilizer struts which are attached to a base plate and secured with ground pins. An example of this type of barrier is shown in Figure 1 below.
- 6.1.4 To clearly identify the purpose of protective fencing on site, all-weather notices will be attached to the barriers similar to the example shown in Figure 2 below.
- 6.1.5 Inside the protective fencing there will be no excavations; no storage of machinery, building materials, fuels, chemicals, or spoil; no fires; no vehicular or pedestrian access; no alteration to existing ground levels. The barriers will not be moved or temporarily dismantled unless agreed with the appointed Arboricultural Consultant and the relevant LPA.
- 6.1.6 Tree protection fencing will be installed before any materials or machinery are brought onto site and before site works commence. It will be removed only once all site works in the location are complete.

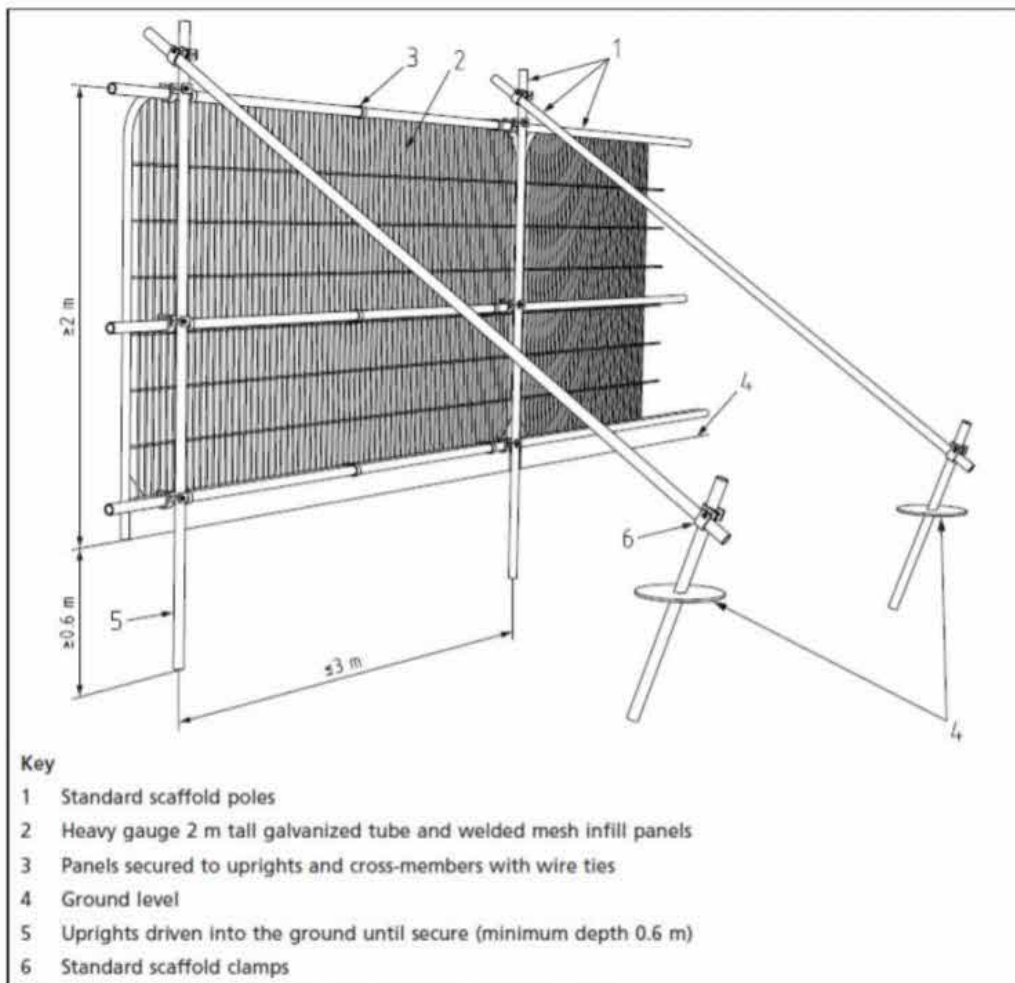


Figure 6: Tree protection fencing example



Figure 7: All-weather notice example

## 6.2 Ground Protection

- 6.2.1 To reduce the requirement for tree protection fencing and improve access for construction, ground protection, agreed and approved by the project engineer, will be installed within the RPA of 18 A grade tree features, ten B grade tree features, and six C grade tree features as described in Table 4 above. This includes the buffer zone of Hoe Copse ancient woodland (W9), G207, G208, G209, and G210 which form part of an unnamed ancient replanted woodland, and veteran trees T410, T417, and T569.
- 6.2.2 Ground protection is required to avoid compaction of the surrounding soil to such a degree that tree roots are no longer able to penetrate the soil, and air and moisture are no longer able to enter and move through the soil. In accordance with Section 6.2.3 of BS 5837:2012 ground protection will need to be fit for the purpose of supporting any traffic entering the RPA without causing compaction of the soil below. This will help to maintain a growing environment which is able to support the long-term growth of the retained trees.
- 6.2.3 Ground protection should be placed on top of existing ground levels. and should be installed before any materials or machinery are brought onto site and before site works commence. It would be removed only once all site works are complete.
- 6.2.4 Ground protection will incorporate Eve Trakway K-Trakpanel, Ground Guards Multitrack mat or similar, as appropriate for the weight of vehicles to be used including loads (see Appendix F). Ground protection will be installed in accordance with the manufacturers specification. Under no circumstances will topsoil stripping or any other excavation take place to install ground protection within the RPA of retained trees.
- 6.2.5 If ground levels must be raised within the RPA of retained trees to accommodate dips and changes in the existing ground levels, this should be achieved by the use of a granular material which does not inhibit vertical gaseous diffusion. Examples of suitable granular materials include, no-fines gravel, washed aggregate, or cobbles. Localised depressions may be filled with sharp sand. The area must not be rolled or consolidated.
- 6.2.6 Ground protection will be installed before any materials or machinery are brought onto site and before site works commence. It will be removed only once all site works are complete.

## 7 Other Considerations

### 7.1 Storage of Fuels and Chemicals

- 7.1.1 To reduce the risk of soil contamination and subsequent damage to tree roots, fuel and other harmful or toxic materials should be stored either off-site, in bunded units, or on drip trays.

### 7.2 Level changes

- 7.2.1 Ground level decreases must not take place within the RPA of retained trees. Level increases up to 200mm depth will have negligible impact on the health of retained trees. If ground levels must be raised within the RPA of retained trees to accommodate dips and changes in the existing ground levels, this should be achieved using a granular material which does not inhibit vertical gaseous diffusion. Examples of suitable granular materials include, no-fines gravel, washed aggregate, or cobbles. Localised depressions may be filled with sharp sand.
- 7.2.2 Should level increases greater than 200mm be required, these will be achieved through the layering of a cellular confinement system filled with no-fines gravel, washed aggregate, or cobbles. A permeable membrane should be placed on top of this to prevent any fines filtering down into the cellular confinement system. Once the required levels are achieved, a permeable surface layer should be installed.
- 7.2.3 Under no circumstances will topsoil stripping take place within the RPA of retained trees or within the buffer zone of veteran trees or ancient woodland.

### 7.3 Construction vehicle access

- 7.3.1 Construction vehicles will not be driven onto unsurfaced areas of ground within the RPA of any retained trees. If access is required for construction vehicles on unsurfaced areas of ground within the RPA of retained trees, ground protection will be installed as described in Section 6.2 above.

### 7.4 Site monitoring and watching brief

- 7.4.1 BS 5837:2012 states at paragraph 6.3 that wherever trees on or adjacent to a site have been identified as requiring protection, there should be an auditable system of arboricultural site monitoring. This should include arboricultural supervision whenever construction or development activity is to take place within RPAs of retained trees. Following each site visit a site monitoring report should be issued to the project manager. Copies of these reports should be kept and made available to the local authority on request.
- 7.4.2 Key timings for supervision include:

Following installation of tree protection barriers and ground protection, before commencement of works, to inspect tree and ground protection against approved plans.

For the duration of any excavations taking place within the RPA of retained trees.

Periodically, with a minimum of one supervisory visit every month to ensure tree protection remains correctly installed and is fit for purpose throughout the duration of works

## 8 Conclusions

- 8.1.1 The tree survey undertaken between January and October 2023 identified a total of 1885 tree features including 1503 individual trees, 89 hedgerows, 239 groups of trees, and 54 woodlands within the wider survey area which had the potential to be impacted by development proposals. 510 tree features were categorised as high A grade, 802 were moderate B grade, and 470 were C grade. A further 103 tree features were categorised as very low-quality U grade trees. These trees have less than 10 years safe useful life expectancy and should not be considered a constraint to any works proposals.
- 8.1.2 The tree survey information has been used to guide the design proposals and alterations have been made to allow the retention of the maximum number of tree features possible.
- 8.1.3 Fourteen A grade tree features, 39 B grade tree features, 33 C grade tree features, and 14 U grade tree features will be removed in full in order to accommodate the proposed works.
- 8.1.4 Two A grade tree features, 27 B grade tree features, and 24 C grade tree features will be partially removed to accommodate the proposed works.
- 8.1.5 Tree Preservation Orders affect numerous trees within and adjacent to the Proposed Scheme. Four of these trees (T776, T1515, T1516 and one tree within B grade tree group G241) will be removed as part of the design proposals. No other trees protected by TPO will be affected by works taking place within the Proposed Scheme. Two tunnels are proposed underneath copses protected by TPO, one at Hook Road (Test Valley BC reference: TPO.TVBC.211) and one at Silkstead Farm (Winchester City Council reference 177). No trees surveyed are within a Conservation Area.
- 8.1.6 No other trees impacted by the works are protected by TPO, however A grade trees T410, T417 and T569 are veteran trees. G207, G208, G209, G210 and W9 form part of ancient woodlands. These trees will have vehicle movements within their buffer zones, and W9 will also have open cut excavations within the buffer zone.
- 8.1.7 Temporary fencing will be required to protect all retained trees on site. This fencing should be fit for the purpose for excluding construction activity and provide adequate protection to the trees.

## 9 References

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# Appendix A    Site Location Plan



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# Appendix B Tree Survey Schedule

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# Appendix C Tree Constraints Plan

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# Appendix D Tree Protection Plan

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## Appendix E Working Widths

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# Appendix F Example Ground Protection