MOTT MACDONALD

Hodder WTW

Arboricultural Report

22 November 2019

United Utilities

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Contents

Executive summary

Mott MacDonald has been appointed by MMB on behalf of United Utilities to undertake an arboricultural survey for the proposed works at Hodder Water Treatment Works (WTW).

The survey and associated report have been undertaken in accordance with *BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations*, which is intended to assist decision making with regard to the existing trees in the context of proposed development.

This survey is not, nor should be taken to be, a full or thorough assessment of the health and safety of trees on or adjacent to the site. Therefore, it is recommended that detailed tree inspections are undertaken on a regular basis with the express purpose of complying with the land owners' duty of care and satisfying health and safety requirements.

There were 29 individual trees, 12 tree groups and four hedges surveyed as part of the Hodder WTW Scheme. The following tree retention categories were assigned:

- Category A i.e. trees of high quality; 0 trees;
- Category B i.e. trees of moderate quality, 16 individual trees, 1 tree group and 4 hedges;
- Category C i.e. trees of low quality, 11 individual trees and 11 tree groups; and,
- Category U i.e. trees to be removed for arboricultural reasons: 2 individual trees.

Due to the limited topographical information available, a significant percentage of the site has been recorded as tree groups and therefore, for the most part, the loss of trees has been calculated by area (m^2) as opposed to by counting of individual trees.

A total of 8 individual trees require felling to facilitate construction:

- Category A: no trees;
- Category B: 1 individual tree;
- Category C: 5 individual trees; and,
- Category U: 2 individual trees.

A total area of 4383m^2 of tree groups (4230m^2) and hedges (153m^2) will also require removal as part of this Scheme.

The Scheme falls within the administrative boundary of Ribble Valley Borough Council (RVBC). RVBC has confirmed that there are no TPOs within the boundaries of Hodder WTW, and that this area does not fall within a CA.

Temporary protective barriers and ground protection (for Tree 19) must be installed to protect the existing trees and tree groups during the construction phase of this Scheme.

Group G4 is a small mixed species group which contains 5 ash trees suspected to be infected by ash dieback (*Hymenoscyphus fraxineus*). The site has a relatively low population of ash trees however it is recommended that any ash trees within this site are managed in accordance with the guidance detailed on the Forestry Commission website.

The perimeter of the additional compound area is to be fenced with temporary barrier to define and contain the compound area. The crowns and RPAs of the adjacent boundary groups extend over the existing boundaries and the perimeter of the additional compound area must be offset

outside the existing boundary by an appropriate distance to prevent conflict with their RPAs and the above ground structure of the trees.

United Utilities employ a ‘no net’ loss and 2:1 replacement strategy in relation to trees impacted by construction. Therefore, it is recommended that 16 individual trees and an area of 8606m^2 is planted to provide mitigation for the tree loss associated with this Scheme.

As part of the detailed design process for this Scheme it will be necessary to update this report to conclude the final direct and indirect impacts of this Scheme on existing trees. An update to the Arboricultural Method Statement (AMS) of this report (Section 4) will be required following confirmation of a detailed construction methodology to demonstrate that the site operations can be undertaken with minimal risk of adverse impact on trees to be retained.

1 Introduction

1.1 Background

1.1.1 MMB have been contracted to undertake works on behalf of United Utilities at Hodder WTW. The works will consist of the construction of a new first stage filtration system, modifications to the pH correction system, works to the sludge treatment process and an increase in the overflow weir of the adjacent Stocks Reservoir.

1.2 Purpose of Arboricultural Report

1.2.1 Mott MacDonald has been appointed by MMB on behalf of United Utilities to undertake an arboricultural survey for this Scheme. The findings of the survey are presented in this Arboricultural Report, which is provided in support of a planning application for the development.

1.2.2 This report is designed to meet the following objectives:

- to set out the constraints to development posed by existing tree stock;
- to identify trees or areas of arboricultural significance; and,
- to support the detailed design and construction stage of this Scheme in relation to minimising or avoiding impact on trees.

1.3 Tree Assessment Methodology

1.3.1 The tree survey was carried out by a qualified Mott MacDonald arboriculturalist on 16 July 2019 and 16 September 2019 to assess the quality and value of the principal trees within or adjacent to the Scheme footprint.

1.3.2 The survey was undertaken in accordance with the guidelines set out in *BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations*. The tree data contained within the Tree Survey Schedule (Appendix C) was recorded by visual survey from ground level and no invasive tree inspection measures were employed.

1.3.3 The survey process categorises the trees on site, selects those appropriate for retention and reviews the options for incorporating these trees within the developed landscape.

1.3.4 The full Tree Survey Schedule, categorisation of the trees in their existing context and Root Protection Areas are stated in Appendix C (to be read in conjunction with the Key to Tree Survey Schedule, Appendix B).

1.3.5 In accordance with BS 5837:2012, the following information was recorded for each tree:

- Sequential reference number (recorded on the tree constraints plan);
- Species listed by common name and scientific name;
- Life stage recorded as:

Table 1: Life Stage Categories

Abbreviation	Life Stage	Description
Y	Young	Trees aged less than 1st quarter of their life expectancy
SM	Semi-mature	Trees within 2nd quarter of their life expectancy
EM	Early mature	Trees within 3rd quarter of their life expectancy

Abbreviation	Life Stage	Description
M	Mature	Trees aged within final quarter of their life expectancy
OM	Over Mature	Over-mature - declining or moribund trees of low vigour
V	Veteran	Specimens exhibiting features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned

- Height (metres);
- Crown spread (metres), taken as a minimum at the four cardinal points, to derive an accurate representation of the crown (plotted on the tree constraints plans);
- Existing height (metres) above ground level of:
  - First significant branch; and
  - Canopy.
- Stem diameter (millimetres) in accordance with Annex C of BS 5837:2012. The stem diameters of single stemmed trees were measured at 1.5 metres above ground level and multi-stemmed trees measured in accordance with Annex C;
- The Root Protection Area (RPA) calculated in accordance with Section 4.6 of BS 5837:2012. The two measurements provided are a 'Root Protection Radius (m)' (circle centred on the base of the stem) and an overall 'root protection area (m²)';
- General observations, particularly of structural and/or physiological condition (e.g. the presence of any decay and physical defect), and/or preliminary management recommendations;
- Estimated remaining contribution, in years (<10, 10 +, 20+, 40+); and,
- Retention category recorded as A, B, C or U in accordance with BS 5837:2012 (see Table 1.2 below) to be recorded on the tree survey plan (Appendix A). This gives an indication as to each tree's arboricultural, landscape and cultural value and significance as well as its suitability for retention in the context of the proposed redevelopment of the site. These sub-categories [1 - Arboricultural values; 2 - Landscape values and 3 - Cultural values, including conservation] are included where considered necessary to clarify why a tree has been assigned to a particular retention category. The categorisation criteria are summarised below:

Table 2: BS5837:2012 Retention Categories

Category	Description
Category A	Trees of high quality and value whose retention is most desirable (suggested minimum contribution 40 years)
Category B	Trees of moderate quality and value whose retention is desirable if practicable (suggested minimum contribution 20 years)
Category C	Trees of low quality and value or limited long-term potential, which could be retained if not in conflict with development proposals or young trees with a stem diameter of less than 150mm (suggested minimum contribution 10 years)
Category U	Trees requiring removal irrespective of any development proposals due to significant structural defects, irreversible decline or with a very short-term life expectancy of less than 10 years

1.4 Limitations of Survey

1.4.1 This report provides comment on the general quality of the trees on the site but is not, nor should be taken to be, a full or thorough assessment of the health and safety of trees on or adjacent to the site. It is recommended that a full tree survey should be undertaken on a regular basis to satisfy health and safety requirements.

1.4.2 Only limited topographical information was available at the time of this report. Where locational information was not present, the estimated locations of the trees have been plotted, either as individual trees or tree groups, onto the base plans provided with their approximate positions determined by GPS (not guaranteed to less than 5m accuracy) and/or existing site features.

1.4.3 Due to the limited topographical information available, a significant percentage of the site has been recorded as tree groups and therefore the loss of trees has been calculated by area (m^2) as opposed to counting individual trees.

1.4.4 Previous management and/or surveys in relation to the health and safety of trees on this site have not been taken into account as part of this report.

1.4.5 Distances were recorded using a standard metric tape measure where appropriate and stem diameter was recorded using a diameter tape. Tree height was estimated to the nearest metre.

2 Tree Summary

2.1 Overview

2.1.1 The largest group on site is G1. This group is located to the north of this site and is the area identified for the construction of the Rapid Gravity Filter (RGF). The group consists of a dense block of vegetation at thicket stage and the point at which a first thin should be undertaken to improve spacing. No access was available into the plot due to the post and wire fence around the perimeter however, it appears that very little space between plants is available throughout the plot.

2.1.2 The species present include goat willow (*Salix caprea*), common alder (*Alnus glutinosa)*, silver birch (*Betula pendula*), occasional pedunculate oak (*Quercus robur*) and common ash (*Fraxinus excelsior*). The trees in this plot range from 4 to 10m in height.

2.1.3 The majority of the groups have been assessed as Category C as they are of low arboricultural quality. A number of other categories

2.1.4 Group G4 is a small mixed species group which contains 5 ash trees suspected to be infected by ash dieback (*Hymenoscyphus fraxineus*), an air-borne fungal infection that has potential to kill young trees and render older ash susceptible to infections by pathogens e.g. honey fungus. This disease is listed in the Forestry Commission Tree Pests & Diseases matrix and is not a reportable disease unless it has been identified in a previously unconfirmed area. The www.chalaramap.fera.defra.gov.uk/ shows that ash dieback has already been confirmed in this location (Year infection first confirmed 2014). The site has a relatively low population of ash trees however it is recommended that any ash trees within this site are managed in accordance with the detailed guidance stated on the Forestry Commission website.

2.1.5 A total of 29 individual trees were surveyed across this site. The majority of these have been assessed as moderate quality (Category B).

2.1.6 Species present are predominately native and naturalised trees including ash (Fraxinus excelsior), sycamore (*Acer pseudoplatanus*), common alder (*Alnus glutinosa*), crab apple (*malus sylvestris*) and hawthorn (*Crataegus monogyna*). Other species include common beech (*Fagus sylvatica*) which has predominately been planted to form single species hedges across the site, and occasional oak (*Quercus robur*) generally located within the tree groups onsite.

2.1.7 Trees 2, 16, 17, 18, and 19 form part of a mature avenue along the unnamed road leading to main Hodder WTW site entrance. These trees are in good condition and have a significant presence in the landscape.

2.1.8 Trees 26 to 29 also have a presence in the landscape (refer to figure 14). These trees are mature and over mature common alders in the centre of the field identified for the additional compound area. These trees have a significant presence in the landscape as they are the only feature within an open field. From an arboricultural perspective they have been assessed as Category B due to the fact alder are a short-lived species and these trees are starting to come to the end of their useful life expectancy. A range of defects are present, typical of the species at this stage in their lifecycle, including failed limbs and deadwood.

2.1.9 Four hedges have been recorded on this site. All of these hedges are single species (Common beech, *Fagus sylvatica*) and range from 2 to 3m in height. They have been assessed as category B2 as they are of moderate arboricultural value and also contribute to the landscape value of the site (see figure 4 for view of H2 and figure 13 for view of H4).

2.2 Site photos

Figure 1: Tree 2 (foreground) and Tree 5 (centre left) adjacent main road to WTW site.

Source: Mott MacDonald, July 2019

Figure 2: Group G1 – block of vegetation at thicket stage, fenced around the perimeter.

Source: Mott MacDonald, July 2019

Figure 3: View from reservoir embankment looking west, G3 (foreground) and G1 (centre)

Source: Mott MacDonald, July 2019

Figure 4: Trees 6, 7 and 8 viewed from access road looking south, H2 located behind tree line.

Source: Mott MacDonald, July 2019

Figure 5: Young Trees 12 and 13 (foreground) and G6 (back ground)

Source: Mott MacDonald, July 2019

Figure 6: Within G7 looking north to Tree 9 (centre of photo).

Source: Mott MacDonald, July 2019

2.3 Construction compound area

2.3.1 The trees recorded in this location consist of a continuous linear belt separating the existing site compound from the proposed additional compound area (refer to Figures 11, 12 and 15). The linear belt runs on a north south axis and the trees in this location consist of a limited species mix dominated by common alder (*Alnus glutinosa*) and dominant and frequent goat willow (*Salix caprea*).

2.3.2 The trees are mostly young to semi-mature specimens with the occasional mature tree (see Figures 7 and 8). G8 has been assessed as a Category C group i.e. trees of low arboricultural quality but have been awarded a sub-category of '2' to identify they form part of a cohesive belt of vegetation and have landscape value in their current context.

2.3.3 Two mature ash trees have been recorded individually within the group, Tree 10 has a large limb that has previously failed on the east side and is rooted on back edge ditch, and Tree 11 appears to be in reasonable health located along the boundary of the field and close to the existing access road. Both trees have been assessed as Category B trees and should be retained as part of this Scheme.

2.3.4 A number of other mature trees are also present along the boundary of G8, with the majority containing a range of defects including hollow stems, cavities, failed limbs and dead branches.

Figure 7: G8 viewed from existing compound, linear belt of trees separating existing from proposed compound.

Source: Mott MacDonald, July 2019

Figure 8: View of G8 from open field, Tree 10 on right of photo.

Source: Mott MacDonald, July 2019

Figure 9: Hedge H4, looking west along adjacent road

Source: Mott MacDonald, September 2019

Figure 10: Trees 26 to 29, viewed from the south

Source: Mott MacDonald, September 2019

Figure 11: G8, Tree crowns extending over additional compound location, north west edge of group, looking north.

Source: Mott MacDonald, September 2019

Figure 12: Hedge H3, to be removed to create additional access point into compound area. Tree 14 on right of photo.

Source: Mott MacDonald, September 2019

2.1 Tree Quality Summary

2.1.1 29 individual trees, 12 tree groups and four hedges were recorded as part of this survey. The following provides a summary of their quality and value as assessed in accordance with BS 5837:2012 (Table 2.1 – Cascade chart for tree quality assessment).

Table 3: Summary of BS 5837:2012 tree categories assigned to the surveyed trees

Tree Category	Description	Total Number surveyed
Category A	Trees or groups of high quality	0 trees
Category B	Trees or groups of moderate quality	16 individual trees, 1 group and 4 hedges
Category C	Trees or groups of low quality	11 individual tree and 11 tree groups
Category U	Trees or groups for removal	2 individual trees

2.2 Tree Preservation Orders (TPOs) and Conservation Areas (CAs)

2.2.1 The primary measures which provide statutory protection to trees are Tree Preservation Order (TPO) and Conservation Area (CA) status. Where present, these measures determine that either notification to the Local Planning Authority (LPA) for CA designations or consent from the LPA for TPO designations is required for any works that may affect trees or tree groups.

2.2.2 The Scheme falls within the administrative boundary of Ribble Valley Borough Council (RVBC).

2.2.3 RVBC has confirmed (phone conversation with Alex Shutt, 22 August 2019) that there are no TPOs within the boundaries of Hodder WTW, and that this area does not fall within a CA.

3 Arboricultural Impact Assessment

3.1 The Scheme

3.1.1 The proposed recommendations in Table 3.1 are based on the outline design contained within the Tree Protection Plans (80040117-01-MMB-HODDE-97-DR-L-0003 and 0004, refer to Appendix A).

3.2 Root Protection Areas – background information

3.2.1 Working anywhere in the vicinity of trees is likely to cause some root damage due to the fact that in the order of 80% of the roots of any tree will occur within the upper 600mm of the soil. Roots will spread out for a considerable distance from a tree and may be encountered at a distance beyond the canopy spread of a tree.

3.2.2 Where construction activities are proposed within the rooting zone of trees, the potential for significant damage exists. Table 2 of BS 5837:2012 prescribes a methodology for the calculation of an RPA.

3.2.3 The RPA represents the minimum area that should be retained undisturbed around a tree or trees for the avoidance of an unacceptable degree of root disturbance. The required RPA of a tree is calculated, and typically plotted as a circle (or where appropriate as a square of equivalent area) to determine constraints or the location of protective fencing. In certain circumstances the actual shape of this area may then be adjusted to take account of local topography or any existing site features that may serve as restrictions to 'normal' root development.

3.2.4 The RPA calculations are stated within Appendix C.

3.3 Recommended Actions

3.3.1 The construction of this Scheme must be undertaken in accordance with the Tree Protection Plan (see Appendix A) and the following recommendations to enable integration between with the Scheme and the existing tree constraints on site.

Table 3.1: Recommended actions for existing trees

Ref	Species	Retention Category	TPO	CA	Recommended Actions
1	Common ash	C2	No	No	Fell – direct conflict with pipework to be installed.
2	Sycamore	B2	No	No	Fell – direct conflict with pipework to be installed.
3	Common ash	U	No	No	Fell – direct conflict with footprint of Rapid Gravity Filter (RGF).
4	Sycamore	U	No	No	Fell – direct conflict with footprint of RGF.
5	Cherry plum	C	No	No	Fell – direct conflict with pipework to be installed.
6	Common lime	B2	No	No	Retain – no direct impact however temporary pedestrian walkway to be installed within RPA and along back edge of road. Walkway to be 2m wide and created by placing stone on existing ground level to create level footpath. Protective barrier to be installed along back edge of walkway approximately 3m from tree.

7	Common lime	B2	No	No	Retain – no direct impact, however temporary pedestrian walkway to be installed within RPA and along back edge of road. Walkway to be 2m wide and created by placing stone on existing ground level to create level footpath. Protective barrier to be installed along back edge of walkway approximately 3m from tree.
8	Common lime	B2	No	No	Retain – no direct impact, however temporary pedestrian walkway to be installed within RPA and along back edge of road. Walkway to be 2m wide and created by placing stone on existing ground level to create level footpath. Protective barrier to be installed along back edge of walkway approximately 3m from tree.
9	Goat willow	B1;2	No	No	Retain – current proposal will install pipeline within hardstanding of adjacent access road - this tree is set up on an embankment above the surrounding ground level therefore no recommendation has been made to install temporary protective barrier.
10	Common ash	B2	No	No	Retain – no impact from Scheme.
11	Common ash	B2	No	No	Retain – no impact from Scheme.
12	Common alder	C	No	No	Fell – direct conflict with footprint of new dirty backwash tanks.
13	Common alder	C	No	No	Fell – direct conflict with footprint of new dirty backwash tanks.
14	Sycamore	C	No	No	Retain – no direct impact
15	Sycamore	C	No	No	Retain – no direct impact
16	Sycamore	B1;2	No	No	Retain – no direct impact
17	Sycamore	B1;2	No	No	Retain – no direct impact
18	Sycamore	B1;2	No	No	Retain – no direct impact
19	Sycamore	B1;2	No	No	Retain – no direct impact – the alignment for construction access and working room crosses RPA of this tree on eastern side of tree. Temporary protective barrier is to be installed to protect as much of the RPA as possible while still facilitating vehicle movement and working room. Ground protection in accordance with BS5837 (refer to Appendix D3) must be installed across the remaining section of the RPA not protected by the barrier — refer to section 4.3.
20	Goat willow	B1;2	No	No	Retain – no direct impact
21	Goat willow	C1	No	No	Retain – no direct impact
22	Common alder	C	No	No	Fell – direct conflict with pipeline
23	Common alder	C	No	No	Retain – southern edge of crown overhangs access road and requires minor pruning – refer to section 4.1.
24	Common alder	C	No	No	Retain – southern edge of crown overhangs access road and requires minor pruning – refer to section 4.1.
25	Common alder	C	No	No	Retain – no direct impact

26	Common alder	B2	No	No	Retain – no direct impact – RPAs of trees to be protected by temporary barrier. Note: an existing post and wire fence surrounds Trees 26 to 29, however protective barrier must be installed outside this fence to protect the full RPAs of this tree – refer to section 4.2.
27	Common alder	B2	No	No	Retain – no direct impact – RPAs of trees to be protected by temporary barrier. Note: an existing post and wire fence surrounds Trees 26 to 29, however protective barrier must be installed outside this fence to protect the full RPAs of this tree – refer to section 4.2.
28	Common alder	B2	No	No	Retain – no direct impact – RPAs of trees to be protected by temporary barrier. Note: an existing post and wire fence surrounds Trees 26 to 29, however protective barrier must be installed outside this fence to protect the full RPAs of this tree – refer to section 4.2.
29	Common alder	B2	No	No	Retain – no direct impact – RPAs of trees to be protected by temporary barrier. Note: an existing post and wire fence surrounds Trees 26 to 29, however protective barrier must be installed outside this fence to protect the full RPAs of this tree – refer to section 4.2.
G1	Mixed group	C2	No	No	Fell (3119m^2) – direct conflict with footprint for new RGF structure.
G2	Mixed group	C	No	No	Fell (132m^2) – direct conflict with connecting pipework between new RGF structure and dirty backwash tanks
G3	Mixed group	C	No	No	Fell part of group (20m^2) – direct conflict with associated pipework from new RGF structure. Protect retained section of group with temporary barrier in accordance with BS5837:2012.
G4	Mixed group	C	No	No	Retain – no direct impact. Protect group with protective barrier in accordance with BS5837:2012.
G5	Mixed group	C2	No	No	Retain – no direct impact.
G6	Mixed group	C2	No	No	Fell (879m^2) – remove to facilitate access to and working room for construction of dirty backwash tanks and installation of associated pipework. Protect retained section of group with temporary barrier in accordance with BS5837:2012.
G7	Mixed group	C2	No	No	Retain - alignment of connecting pipework to be routed outside of this group. Northern edge of group overhangs access road and requires minor pruning – refer to section 4.1.
G8	Mixed group	C2	No	No	Retain – no direct impact – RPAs of trees adjacent to boundary with additional compound area to be protected by temporary barrier – refer to section 4.2 and 4.4.
G9	Mixed group	C	No	No	Retain – no direct impact - RPAs of trees to be protected with temporary barrier – refer to section 4.2 and 4.4.
G10	Mixed group	C	No	No	Retain – no direct impact – RPAs of trees adjacent to boundary with additional compound area to be protected by temporary barrier – refer to section 4.2 and 4.4.

G11	Common lime	C1	No	No	Retain – no direct impact – RPAs of trees to be protected with temporary barrier – refer to section 4.2 and 4.4.
G12	Sycamore	B1;2	No	No	Retain – no direct impact – RPAs of trees to be protected with temporary barrier – refer to section 4.2 and 4.4.
H1	Beech hedge	B2	No	No	Fell section (98m^2) – remove southern section of hedge to facilitate access to and working room for construction of dirty backwash tanks and installation of associated pipework.
H2	Beech hedge	B2	No	No	Retain – no action, hedge is set back and separated from access road by G4 and individual Trees 6, 7 and 8.
H3	Beech hedge	B2	No	No	Fell (55m^2) - remove to facilitate additional access point into new proposed compound area to enable one-way traffic system to be operated.
H4	Beech hedge	B2	No	No	Retain – no direct impact – RPAs of hedge trees to be protected with temporary barrier. Max RPAs calculated as 1.8m with stems located 0.5m back from fence. Barrier to be offset from existing post and wire fence by 1.3m.

3.4 Mitigation Planting

United Utilities employ a 'no net' loss and 2:1 replacement strategy in relation to trees impacted by construction. The following provides a summary of trees lost and recommended replacement planting:

- Individual trees removed: 8; individual trees to be planted: 16.

- Tree groups and hedges to be removed:
  - Group G1 3199 m^2
  - Group G2 132 m^2
  - Group G3 20 m^2
  - Group G6 879 m^2
  - Hedge H1 98 m^2
  - Hedge H3 55 m^2

In total an area of 4383m^2 is to be felled; the area to be replanted = 8766m^2.

4 Arboricultural Method Statement

4.1 Tree Work – Pruning

4.1.1 The access road to be used for the construction phase of this Scheme will require a 4m vertical clearance above the road. The majority of the proposed route currently has an appropriate vertical clearance however the following trees and groups have been identified for minor pruning works to achieve the required 4m vertical height:

- Trees 23 and 24 (refer to figure 15);
- Northern edge of G7 (refer to figure 16);
- Tree 20 (refer to figure 17); and,
- Northern end of G8 (adjacent to the gateway into existing compound).

4.1.2 No other pruning work has been identified however, if a requirement for pruning work is identified during the construction stage of this project, a tree work specification must be produced by the Scheme arboriculturalist prior to any works being undertaken.

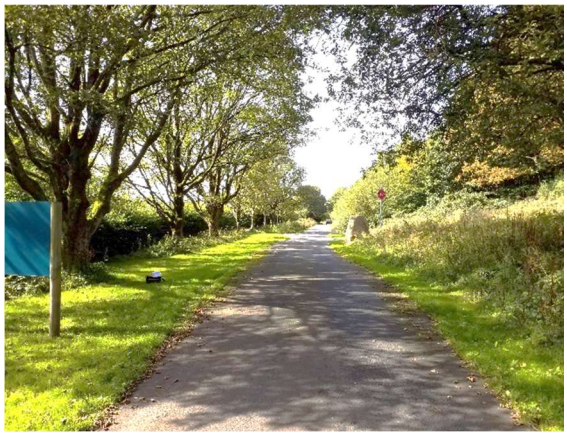
Figure 13: Trees 25 (left), 24 (centre) and 23 (right): Trees 23 and 24 require minor pruning by 0.5m back from edge of access road

Source: Mott MacDonald, September 2019

Figure 14: Northern edge of G7 adajcent to access road, minor pruning back by 2.5m required to faciliate access

Source: Mott MacDonald, September 2019

Figure 15: Tree 20 (right) requires minor pruning to raise the crown to 4m above ground level



4.2 Temporary Protective Barriers

4.2.1 Protective barriers will be erected in accordance with BS 5837:2012 and positioned to enclose the defined RPA and 'above ground' structure of trees for retention (refer to Appendix D for details of the BS 5837:2012 default specification for protective barriers). Any other fence or barrier used must be approved by the Arboriculturalist prior to installation.

4.2.2 The location and alignment of all temporary protective barriers are detailed within the Tree Protection Plan (Appendix A).

4.2.3 Protective barriers will ensure that construction can be undertaken without intruding into the RPA, remaining in place until the work has been completed.

4.2.4 The area within the protective barriers i.e. tree side, will be a 'Construction Exclusion Zone' (CEZ) for the duration of the works.

4.2.5 All weather notices should be erected on the barrier with words such as:

"Tree Protection Area — Keep out".

4.2.6 The following prohibitions shall also apply within the area enclosed by the temporary protective barriers:

- No mechanical digging or scraping;
- No storage of plant, equipment or materials;
- No vehicular or plant access;
- No fire lighting within 10m of tree canopies;
- No handling, discharge or spillage of any chemical substance, including cement washings and vehicle washings within 10m;
- No action likely to cause localised water-logging;
- No alteration of ground levels;
- No construction of hard surfaces;
- No attachment of boards, hoarding, cables or notices or fencing to trees; and,
- No storage of excavated materials.

4.2.7 Special care is to be taken on sloping ground where spillages could run towards the trees. A collecting channel dug along the outer line of the protective fencing would be one method of avoiding such damage.

4.2.8 If excavators are to be used during construction, at no time is the excavating arm to encroach over the position of the tree protection barriers.

4.3 Ground Protection

4.3.1 Ground protection in accordance with BS5837 (refer to Appendix D3) must be installed within the RPA of one tree (19).

4.3.2 The alignment for construction access and working room crosses the RPA on eastern side of this tree. Temporary protective barrier is to be installed to protect as much of the RPA as possible while still facilitating vehicle movement and working room. Ground protection in accordance with BS5837 (refer to Appendix D3) must be installed across the remaining section of the RPA not protected by the barrier.

4.3.3 Ground protective for Tree 19 will ensure that construction can be undertaken without intruding into the RPA, remaining in place until the work has been completed.

4.4 Construction Compounds

4.4.1 This Scheme will require an extension to the existing construction compound to facilitate construction of this Scheme. The existing site compound is based in a car park area to the south west of the site. An open field to the north west is to be used as an additional compound area.

4.4.2 The existing compound has been fenced and demarked with temporary barriers around the perimeter, with cabins and walkways all confined to hard standing.

4.4.3 The perimeter of the additional compound area is to be fenced with temporary barrier in accordance with BS5837 (Appendix D) to define and contain the compound area.

4.4.4 The crowns of G8 overhang the existing boundary fence and extend into the open field to be used for the additional compound area. The maximum RPA along the north west edge of G8 is 10.4m and the maximum RPA for the trees along the western edge of G8 is 7m. The perimeter of the additional compound area must be offset from the existing post and wire fence by these distances, and subsequently outside the drip line of these trees, to prevent conflict with their RPAs and above ground structures.

4.4.5 Group G10 borders the south western corner of the new compound area. The maximum RPA within the group is 5.6m and the protective barrier alignment is to be offset this distance from this group to ensure their RPAs are adequately protected.

4.4.6 Group G11 contains young lime trees with the maximum RPA calculated as 2.1m. The stems are located 1m back from boundary and therefore protective barrier is to be offset from existing post and wire fence by 1.1m to ensure their RPAs are adequately protected.

4.4.7 Hedge H4 follows the north side of the field boundary and the stems of the hedge plants are located 0.5m from the existing fence. The maximum RPA has been calculated as 1.5m and therefore protective barrier is to be offset from the existing post and wire fence by 1m to ensure their RPAs are adequately protected.

4.4.8 Group G12 contains mature trees and is located north of Hedge H4. The maximum RPA has been calculated as 6m. The tree stems are located 5m back from boundary and therefore protective barrier is to be offset from existing post and wire fence by 1m to ensure their RPAs are adequately protected.

4.4.9 Trees 26 to 29 are located within the centre of the additional compound. These trees are to be retained as part of this Scheme and, while they are currently separated from the open field by a post and wire fence area approximately 2 to 4m from their trunks, protective barrier must be installed at the following distances to protect their full RPAs:

- Tree 26 – 10.7m;
- Tree 27 – 10.8m;
- Tree 28 – 8.5m; and,
- Tree 29 – 7.3m.

4.4.10 The temporary barrier is to remain in-situ for the duration of the construction works.

4.5 General Recommendations

4.5.1 No construction will be required within the RPAs of retained trees, however the following general recommendations must be followed during the construction phase of this Scheme:

- Where roots are encountered, every effort should be made to avoid severance or damage to the root bark;
- Any exposed roots over 25mm in diameter, or bundles of several smaller roots must be protected to avoid drying or extremes of temperature. This is best achieved by immediately covering with damp Hessian or similar material;
- Should roots be severed they must be trimmed back using a sharp tool (pruning saw, secateurs or loppers), then protected as above;
- If roots larger than 25mm are identified, and are in direct conflict with construction works, then the advice of the Scheme arboriculturalist should be sought prior to any severance or damage of the root;
- Infill around exposed or severed roots should comprise a clean, moist, sharp sand (not 'builder's' sand) and good quality top soil. This fill should be gently firmed but must not be compacted. Backfilling should be undertaken as soon as possible;
- Soil levels around the base of retained trees are to be maintained as existing; and,
- The site agent or manager is to be responsible for the day to day prevention and exclusion of all actions and operations near protected trees that are likely to cause damage to retained or protected trees, such as the use of cranes and excavators, transportation of equipment or hot works.

4.6 Arboricultural Inspection

4.6.1 An arboriculturalist must inspect the protective barriers following installation and prior to commencement of any construction work.

4.6.2 On completion of the development, an arboriculturalist must look for signs of intolerance to the change in conditions, the effect of the development and any accidental damage to retained trees, to identify the need for further tree works in addition to those originally specified at the outset of the project.

4.7 Responsibilities

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

4.7.2 All tree work associated with this Scheme must be carried out in accordance with *BS 3998:2010 Tree Work – Recommendations*.

4.7.3 The Contractor will be responsible for contacting the Scheme arboriculturalist, and the LPA as appropriate, at any time issues are raised relating to the trees on site.

4.7.4 The Contractor will be responsible for ensuring that protected species are considered during any tree works and the timing of tree works should be carefully considered. European protected species such as bats, dormice (*Muscardinus avellanarius*) and great crested newts (*Triturus cristatus*) are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017. Other species that may be affected by tree works include breeding birds, badgers and reptiles which are protected under the Wildlife and Countryside Act 1981 (as amended).

5 Conclusions

5.1.1 There were 29 individual trees, 12 tree groups and four hedges surveyed as part of the Hodder WTW Scheme.

5.1.2 The full tree survey results, including assigned tree retention categories and RPA measurements, are stated within the Tree Survey Schedule contained within Appendix C, and detailed on the associated drawings in Appendix A.

5.1.3 A total of 8 individual trees require felling to facilitate construction:

- Category A: no trees;
- Category B: 1 individual tree;
- Category C: 5 individual trees; and,
- Category U: 2 individual trees.

5.1.4 A total area of 4383m^2 of groups (4230m^2) and hedges (153m^2) will also require removal as part of this Scheme.

5.1.5 United Utilities employ a 'no net' loss and 2:1 replacement strategy in relation to trees impacted by construction therefore it is recommended that 16 individual trees and an area of 8606m^2 is planted to provide mitigation for the tree loss associated with this Scheme.

5.1.6 As part of the detailed design process for this Scheme it will be necessary to update this report to conclude the final direct and indirect impacts of this Scheme on existing trees. An update to the Arboricultural Method Statement (AMS) of this report (Section 4) will be required following confirmation of a detailed construction methodology to demonstrate that the site operations can be undertaken with minimal risk of adverse impact on trees to be retained.

Appendices

A. Drawings

A.1 Tree Constraints Plan Sheet 1 of 2: 80040117-01-MMB-HODDE-97-DR-L-0001

A.2 Tree Constraints Plan Sheet 2 of 2: 80040117-01-MMB-HODDE-97-DR-L-0002

A.3 Tree Protection Plan: Sheet 1 of 2: 80040117-01-MMB-HODDE-97-DR-L-0003

A.4 Tree Protection Plan: Sheet 1 of 2: 80040117-01-MMB-HODDE-97-DR-L-0004

Sheet Layout
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NOTES

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LEGEND

13 TREE REFERENCE

APPROXIMATE EXTENT OF CANOPY

TREE ROOT PROTECTION AREA (RPA)

INDIVIDUAL TREES

- NO CATEGORY
- CATEGORY A TREES
- CATEGORY B TREES
- CATEGORY C TREES
- CATEGORY U TREES TO BE REMOVED FOR REASONS OF SOUND ARBORICULTURAL MANAGEMENT

TREE GROUPS

- CATEGORY A TREES
- CATEGORY B TREES
- CATEGORY C TREES
- CATEGORY U TREES

CURRENT ISSUE INFORMATION

SCALE 1 : 500

m 5 0 50 m

VERSION	AUTH	CHK	REVD	REASON FOR ISSUE	DATE
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AMP6 FRAMEWORK

HODDER WTW

TREE CONSTRAINTS PLAN

SHEET 1 0F 2

SCALE	SHEET SIZE
1 : 1000	A1
DRAWING NUMBER	REVISION
80040117-01-MMB-HODDE-97-DR-L-0001	P02

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LEGEND

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APPROXIMATE EXTENT OF CANOPY

TREE ROOT PROTECTION AREA (RPA)

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- CATEGORY C TREES
- CATEGORY U TREES TO BE REMOVED FOR REASONS OF SOUND ARBORICULTURAL MANAGEMENT

TREE GROUPS

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- CATEGORY C TREES
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TREE CONSTRAINTS PLAN

SHEET 2 0F 2

Sheet Layout

SCALE: 1:5000

SHEET 1

SHEET 2

SCALE	SHEET SIZE
1 : 1000	A1
DRAWING NUMBER	REVISION
80040117-01-MMB-HODDE-97-DR-L-0002	P02

PROPOSED SITE COMPOUND

NOTE FOR H4, G11 AND G12:
TREE PROTECTION BARRIER OFFSET FROM EXISTING FENCE.

NOTE FOR G8:
G8 PRUNING ONLY, CROWN OF TREE 11 CURRENTLY PROVIDES APPROPRIATE VERTICAL CLEARANCE FOR CONSTRUCTION ACCESS AND RPA IS ADEQUATELY PROTECTED BY EXISTING ACCESS ROAD.

NOTE:
EXISTING FENCING AROUND THE CONSTRUCTION COMPOUND ACTS AS APPROPRIATE PROTECTIVE BARRIER FOR G8. NO ADDITIONAL PROTECTIVE BARRIER HAS BEEN SPECIFIED.

NOTE FOR TREES 26, 27, 28 AND 29:
TREE PROTECTION BARRIER OFFSET FROM CENTRE OF TREE.

NOTE FOR G8:
TREE PROTECTION BARRIER OFFSET FROM EXISTING FENCE

NOTE FOR G10:
TREE PROTECTION BARRIER OFFSET FROM EDGE OF TREE CANOPY.

STAFF OFFICES AND STAFF PARKING COMPOUND

CUTLINE

CUTLINE

Phynis

Ford

FB

CG

Def

1.1 1.0 1.0 7.0 10.4 7.3 8.5 10.8 10.7 5.6

H1 H2 H3 H4 G1 G2 G4 G5 G6 G7 G8 G9 G10 G11 G12

1 2 3 5 6 7 9 10 11 12 13 14 15 16 17 18 19 20 21 23 24 25 26 27 28 29

Sheet Layout

SCALE: 1:5000

SHEET 1

SHEET 2

NOTES

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LEGEND

- PROPOSE DEVELOPMENT AREA
- DESIGN
- PIPELINE
- ACCESS ROAD
- 13 TREE REFERENCE
- APPROXIMATE EXTENT OF CANOPY
- TREE ROOT PROTECTION AREA (RPA)
- TREE TO BE REMOVED
- TREE TO BE PRUNED
- TEMPORARY GROUND PROTECTION TO BE INSTALLED
- TREE PROTECTION BARRIER

INDIVIDUAL TREES
- NO CATEGORY
- CATEGORY A TREES
- CATEGORY B TREES
- CATEGORY C TREES
- CATEGORY U TREES TO BE REMOVED FOR REASONS OF SOUND ARBORICULTURAL MANAGEMENT

TREE GROUPS
- CATEGORY A TREES
- CATEGORY B TREES
- CATEGORY C TREES
- TO BE REMOVED
- TO BE PRUNED

CURRENT ISSUE INFORMATION

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TREE PROTECTION PLAN

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LEGEND

- PROPOSE DEVELOPMENT AREA
- DESIGN
- PIPELINE
- ACCESS ROAD
- 13 TREE REFERENCE
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- TREE TO BE REMOVED
- TREE TO BE PRUNED
- TEMPORARY GROUND PROTECTION TO BE INSTALLED
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INDIVIDUAL TREES

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AMP6 FRAMEWORK

HODDER WTW

TREE PROTECTION PLAN

SHEET 2 0F 2

SCALE	SHEET SIZE
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DRAWING NUMBER	REVISION
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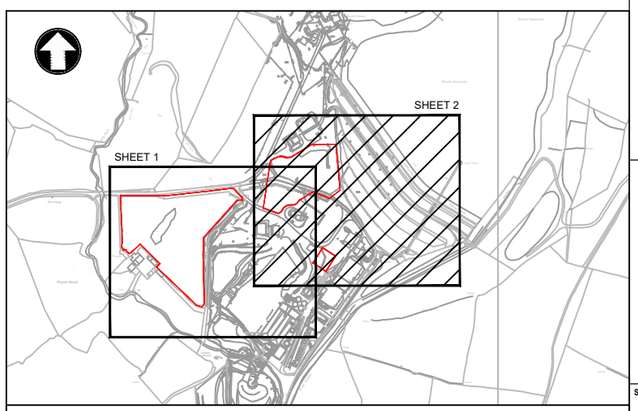

Sheet Layout
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B. Key to Tree Survey Schedule

Key to Tree Survey Schedule		
Tree Reference	Unique reference or Tree Tag number, identifying each tree and/or tree group on the accompanying plan/s.	
Species	Tree species giving the vernacular and full botanic name.	
Life Stage	Estimated life expectancy assessed in accordance with figures provided in Arboricultural Association Leaflet No. 4 tree Management. Note: these age classes may be pre-fixed with 'Early' or 'Late' in the Tree Survey Schedule to provide a more accurate indication of age.	
	Y	Young: within first quarter of normal life expectancy.
	SM	Semi Mature: within second quarter of normal life expectancy.
	EM	Early Mature: within third quarter of normal life expectancy.
	M	Mature: within final quarter of normal life expectancy.
	OM	Over Mature: senescent trees nearing end of their anticipated life expectancy.
	V	Veteran: exhibiting features of biological, cultural or aesthetic value characteristic of individuals surviving beyond typical age range.
	D	Dead.
Height	Recorded in metres, measured in m from the base of the tree.	
Crown Spread	Tree canopy extent taken from centre of tree trunk to edge of general canopy line along the four principal points of the compass (note this distance is to the general canopy line in certain cases and that an exceptional or etiolated branch may extend beyond stated figure).	
Crown Height	Existing height above ground level of first significant branch and direction of growth (e.g. 2.4 N)	
	Existing height above ground level of canopy to inform on ground clearance, crown/stem ratio and shading. Measured in m (rounded up to nearest half metre for dimensions up to 10m and up to nearest metre for dimensions over 10m.	
No. of stems	The number of stems within a tree used to calculate its Root Protection Area (RPA).	
Stem Diameter	Tree trunk diameter measured at 1.5m above ground level (on sloping ground above highest ground level) or immediately above root flare for multi-stemmed trees. Expressed in millimetres. (est) dimension estimated; (av) average or max maximum dimension used in groups.	
Condition	General assessment of condition from observations, particularly of structural and/or physiological condition (e.g. the presence of any decay and physical defect).	
Root Protection Area (RPA)	Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority (as defined by *BS5837:2012 Trees in relation to design, demolition and construction – recommendations*).	
Category Grading in accordance with Table 1 (BS 5837:2012)	Tree categorisation as defined by Table 1 – Cascade chart for tree quality assessment of British Standard 5837:2012. Decisions regarding which trees are to be retained should be influenced by their retention categories as suggested below.	
	A	Trees of high quality and value; >40 years contribution remaining; marked light green on plan. Category is sub-divided as follows: 1) particularly good example; essential component of group e.g. in avenues; 2) screening value, 3) particular visual importance; significant conservation, historical, commemorative or other value (includes veteran or wood pasture trees). **Tree retention is highly desirable**: s**ignificant amendments to any proposed development should be considered before removing these trees**
	B	Trees of moderate quality and value with a significant life expectancy; >20 years contribution remaining; marked mid-blue on plan. Category sub-divided as follows: 1) Trees that may be of impaired condition in relation to trees in category above; 2) Trees present in numbers/groups attracting higher collective rating; internal to site, of limited visual impact to locality; 3) Trees with clear conservation or cultural benefits. **Tree retention is desirable: amendments to any proposed development should be considered before removing these trees.**
	C	Trees of low quality and value; >10 years contribution remaining; marked grey on plan. Includes young trees below 150mm diameter (to which consideration for transplanting should be given). Note that "C" trees will usually not be retained where they would impose a significant constraint on development. Category sub-divided as follows: 1) Trees not qualifying in higher categories; 2) Trees within groups of low landscape value, having limited screening value; 3) Trees with very limited conservation or other cultural benefits. **Trees could be retained however the removal of some of these trees should be considered acceptable if required to facilitate any proposed development.**
	U	Trees for removal; those in such a condition that are dead, dying, dangerous, severely suppressed or where any existing value would be lost within 10 years; marked dark red on plan. **These trees should be removed or treated in such a way as to make them safe where they have high ecological value or benefits.**
Estimated remaining Contribution	Relates to the potential life expectancy of the tree in its current setting, shown in years as one of the following categories: <10; 10+; 20+ and 40+.	
Comment	Any additional general comments relating to the tree/s or site.	

C. Tree Survey Schedule

Table 4: Hodder WtW Tree Survey Schedule

Tree Ref	Tree Type	Life Stage	Height (m)	Av Crown Spread (m)				1st branch	Average crown height	No of Stems or trees	Stem Diameter (mm)	Root Protection Area (RPA)		Condition				BS5837 Category		Useful remaining contribution (years)	Comment
				N	E	S	W					RPA Radius (m)	RPA (m2)	Crown	Stem	Basal Area	General Physical	Category	Sub Category		
1	Common ash	Early Mature	20	8	8	8	8	3	5	1	1000	12	452	Fair	Fair	Poor	Dying	C	2	10+	Over mature ash in decline, dieback on all main limbs, no blackening of foliage, 2.5m beech hedge on north preventing access to tree.
2	Sycamore	Early Mature	16	8	8	8	8	1.5ne	4	1	670	8	203	Fair	Good	Good	Good	B	2	20+	Approx. 5m south of road, no other constraints to roots, minor snapped branch (100mm diameter) in lower crown originating at 3m south west.
3	Common ash	Semi Mature	9	1	2	6	2	1.5	4	1	800	9.6	290	Fair	Fair	Poor	Dying	U	n/a	<10	Ash tree in decline, canker on main stems, dieback in main limbs, no access to tree.
4	Sycamore	Semi Mature	12	5	5	5	5	4	5	1	600	7.2	163	Fair	Fair	Poor	Dying	U	n/a	<10	Sycamore in decline, no access to tree, significant stem snapped out historically.
5	Cherry plum	Semi Mature	6	3	3	3	3	2	2.5	2	265 / 175	3.8	46	Fair	Fair	Poor	Fair	C	-	10+	Unbalanced crown due to suppression.
6	Common lime	Semi Mature	20	4	2			3	4	1	450	5.4	92	Fair	Good	Good	Fair	B	2	20+	Branch stub from snapped out stem (200mm diameter) at 2.5m north west, closest of the three lime trees to road - 4.7m from back edge kerb stone
7	Common lime	Early Mature	18	5	3	5	3	4	4	1	425	5.1	82	Good	Good	Good	Good	B	2	20+	
8	Common lime	Early Mature	18	4	4	4	3	4	3	1	485	5.8	106	Good	Good	Fair	Good	B	2	20+	
9	Goat willow	Mature	12	8	8	8	8	1	3	1	910	10.9	375	Good	Good	Good	Good	B	1;2	20+	Goat willow of good balanced form, not particularly prominent as forms part of larger group/woodland area but very good example of species - prioritise retention.
10	Common ash	Mature	15	6	6	6	6	4	4	1	750	9	255	Fair	Fair	Good	Fair	B	2	20+	Large limb failed on east at 3m (400mm diameter), rooted on back edge ditch, avoid RPA with haul route.
11	Common ash	Mature	15	7	7	7	7	3	3	1	600	7.2	163	Fair	Fair	Fair	Fair	B	2	20+	Avoid RPA with haul route.
12	Common alder	Young	5	2	2	2	2	1.8	2	1	175	2.1	14	Fair	Fair	Fair	Fair	C	-	20+	Planted as individuals on bank, within maintained grass in front of woodland plot.
13	Common alder	Young	5	2	2	2	2	2	2	1	200	2.4	18	Fair	Fair	Fair	Fair	C	-	20+	Planted as individuals on bank, within maintained grass in front of woodland plot.
14	Sycamore	Young	9	4	5	6	7	2.2	5	1	265	3.2	32	Fair	Fair	Fair	Fair	C	-	20+	Not on topographical layer, 1.25m off edge kerb, 3.1m from stem of beech hedge, first tree in line, 5m clearance above running course, no pruning required

Tree Ref	Tree Type	Life Stage	Height (m)	Av Crown Spread (m)				1st branch	Average crown height	No of Stems or trees	Stem Diameter (mm)	Root Protection Area (RPA)		Condition				BS5837 Category		Useful remaining contribution (years)	Comment
				N	E	S	W					RPA Radius (m)	RPA (m2)	Crown	Stem	Basal Area	General Physical	Category	Sub Category		
15	Sycamore	Young	7	3.5	3.5	3.5	3.5	5	5	1	265	3.2	32	Fair	Poor	Fair	Fair	C	-	10+	Crown lifted to 5m, limited crown, 1.6m to kerb, no pruning works required
16	Sycamore	Semi Mature	7	3.2	3.2	3.2	3.2	1.8	4	1	295	3.5	39	Good	Fair	Good	Fair	B	1;2	20+	Minor dead wood in crown, 3.2m crown in direction of road, does not reach road, no need for pruning, 2.8m to stems of beech hedge behind
17	Sycamore	Mature	12	7.5	7.5	7.5	7.5	2.5	5	1	795	9.5	286	Good	Good	Good	Good	B	1;2	20+	3.8m from road edge, 4m road width, extends over road however no pruning required due to appropriate vertical clearance (approx. 5m)
18	Sycamore	Mature	12	7.5	7.5	7.5	7.5	1.5	5	1	530	6.4	127	Good	Fair	Good	Fair	B	1;2	20+	Extends over road however no pruning required due to appropriate vertical clearance (approx. 5m)
19	Sycamore	Mature	14	7	7	7	7	1.2	6	1	920	11.0	383	Good	Good	Good	Good	B	1;2	20+	Extends over road however no pruning required due to appropriate vertical clearance (approx. 6m)
20	Goat willow	Mature	10	7	7	7	7	3	4	1	685	8.2	212	Good	Good	Good	Good	B	1;2	20+	Potential need for minor crown lifting
21	Goat willow	Semi Mature	9	5	5	5	5	3	4	1	380	4.6	65	Fair	Fair	Fair	Fair	C	2	20+	Crown comes to within 0.5m of edge of road - no need for pruning
22	Common alder	Young	4	2.5	2.6	2.7	2.8	0.5	1	1	150	1.8	10	Good	Good	Good	Good	C	-	20+	Self-set tree within mown area of grass
23	Common alder	Young	5	2	2	2	2	1.5	1.2	1	135	1.6	8	Good	Good	Good	Good	C	-	20+	1.6m from road, crown just extends to road, minor pruning back by 0.5m required
24	Common alder	Young	4.5	2.5	2.6	2.7	2.8	1.8	-	1	170	2.0	13	Fair	Good	Fair	Good	C	-	20+	1.5m from kerb, crown extends slightly over road, minor pruning back by 0.5m required
25	Common alder	Young	4	1.5	1.6	1.7	1.8	1.8	3	1	135	1.6	8	Good	Fair	Fair	Fair	C	-	20+	2.2m set back from kerb, no need for pruning
26	Common alder	Over Mature	15	8	8	8	8	4	5	1	890	10.7	358	Fair	Good	Fair	Good	B	2	20+	Fenced off, centre trunk 2.5m from fence north side, 1.5 from fence south side
27	Common alder	Over Mature	12	7.5	7.5	7.5	7.5	3	3	1	900	10.8	366	Good	Fair	Fair	Fair	B	2	20+	2.5m from fence on both north and south side of tree, significant limbs previously snapped out, localised *Laetiporus sulphurous* on wound – no action recommended.
28	Common alder	Over Mature	15	7	7	7	7	4	5	1	710	8.5	228	Good	Good	Fair	Good	B	2	40+	Good balanced tree, better health than others
29	Common alder	Over Mature	12	6	6	6	6	3	4	1	605	7.3	166	Poor	Fair	Fair	Fair	B	2	20+	Limb (300mm diameter) previously ripped out from 2.5m above ground level. Located 11m from end fence, Hawthorn understorey, some still in spiral guards, large cavity (0.5m x 0.3m) at 3m above ground level on east side, hollowing likely to extend north and south from this point.

Tree Ref	Tree Type	Life Stage	Height (m)	Av Crown Spread (m)				1st branch	Average crown height	No of Stems or trees	Stem Diameter (mm)	Root Protection Area (RPA)		Condition				BS5837 Category		Useful remaining contribution (years)	Comment
				N	E	S	W					RPA Radius (m)	RPA (m2)	Crown	Stem	Basal Area	General Physical	Category	Sub Category		
G1	Mixed group	Semi Mature	4-10	3	3	3	3	1	1	10+ trees	125av	1.5av	7.1av	Fair	Fair	Fair	Fair	C	2	20+	Block of vegetation enclosed by fence - no access, thicket stage with bramble understorey. Goat willow, common alder, silver birch, occasional oak, occasional ash, 1 x semi mature ash (in decline) on southwest corner adjacent road, 4 to 10m height, loss of area to be calculated by area.
G2	Mixed group	Young	6	2	2	2	2	2	2	9 trees	100av	1.2av	5av	Fair	Fair	Fair	Fair	C	-	10+	Linear strip of goat willow 20m long on approach to main gate
G3	Mixed group	Young	3 8	2.5	2.5	2.5	2.5	2	2	10+ trees	150av	1.8av	10av	Fair	Fair	Fair	Fair	C	-	20+	Linear strip of low-quality self-set vegetation adjacent to main plot - includes goat willow, hawthorn and common alder
G4	Mixed group	Young	6	2	2	2	2	2	3	8 trees	200av	2.4av	18av	Fair	Fair	Fair	Fair	C	-	10+	Goat willow x 1, plum x 2, ash x 5, cherry x 3, elder x 1; short linear section of vegetation east side of gate, 1 x plum in decline, mown strip at front of verge, ash dieback has killed 3 of 5 stems
G5	Mixed group	Semi Mature	8	3	3	3	3	1	2	10+ trees	200av	2.4av	18av	Fair	Fair	Fair	Fair	C	2	20+	Block of planted vegetation including common alder, goat willow, occasional oak and silver birch
G6	Mixed group	Semi Mature	10	3	3	3	3	2	3	10+ trees	250av	3av	28av	Fair	Fair	Fair	Fair	C	2	20+	Planted block comprised of single age structure - includes common alder, European larch, common oak and silver birch
G7	Mixed group	Semi Mature	15	4	4	4	4	3	3	10+ trees	300av	3.6av	41av	Fair	Fair	Fair	Fair	C	2	20+	Nettle understorey - species mix predominately goat willow with occasional hawthorn and common alder
G8	Mixed group	Young	8	2	2	2	2	2	3	10 + trees	175av	2.1av	14av	Fair	Fair	Fair	Fair	C	2	20+	Common alder dominant with occasional goat willow. Also contains mature and over mature ash
G9	Mixed group	Young	7	2	2	2	2	0.5	0.5	10+ trees	125av	1.5av	7.1av	Good	Good	Good	Good	C	-	20+	5m back building, common oak, hawthorn, goat willow, alder, birch, hazel, 2 to 7m range, set back from road 5m
G10	Mixed group	Semi-mature to mature	10	5	5	5	5	0.5	1.5	10 trees	470max	5.6max	99.9 max	Fair	Fair	Fair	Fair	C	-	20+	1 x ash, 470mm stem diameter, in decline, located at northern end of group) dying, 7 x hawthorn (RPA to be calculated on 250mm av stem diameter) 2 x multi-stemmed hazel (RPA to be calculated on 10 stems at 125mm av. diameter)
G11	Common lime	Young	4	1.5	1.5	1.5	1.5	1	1.5	7 trees	175av	2.1av	13.9 av.	Good	Good	Good	Good	C	1	40+	Newly established lime trees forming part of the avenue
G12	Sycamore	Mature	15	7	7	7	7	2.5	4	5 trees	500av	6.0av	113.0 av	Good	Good	Good	Good	B	1;2	20+	5 mature sycamore approx.5m from fence line

Tree Ref	Tree Type	Life Stage	Height (m)	Av Crown Spread (m)				1st branch	Average crown height	No of Stems or trees	Stem Diameter (mm)	Root Protection Area (RPA)		Condition				BS5837 Category		Useful remaining contribution (years)	Comment
				N	E	S	W					RPA Radius (m)	RPA (m2)	Crown	Stem	Basal Area	General Physical	Category	Sub Category		
H1	Beech hedge	Semi Mature	3	1	1	1	1	0.5	0.5	10+ stems	125av	1.5av	7.1av	Good	Good	Good	Good	B	2	20+	Continuous section of hedge
H2	Beech hedge	Young	1.5 to 2.5	1	1	1	1	0.5	0.5	10+ stems	125av	1.5av	7.1av	Good	Good	Good	Good	B	2	20+	Clearance from footpath, pedestrian walkway (1.2m width) to be installed along edge of road
H3	Beech hedge	Young	2.5	1	1	1	1	0.5	0.5	10+ stems	175av	2.1av	13.9 av	Good	Good	Good	Good	B	2	20+	Set back 3m from road
H4	Beech hedge	Semi Mature	3	1	1	1	1	0.5	0.5	10+ stems	125av	1.5av	7.1av	Good	Good	Good	Good	B	2	20+	Beech hedge, fenced, crown extends into field at 1.8m by approx. 0.5m, offset compound by 1.5m, stem approx. 0.5 from fence, mature sycamore (5 no), set back behind hedge by 5m

D. Tree Protection Measures

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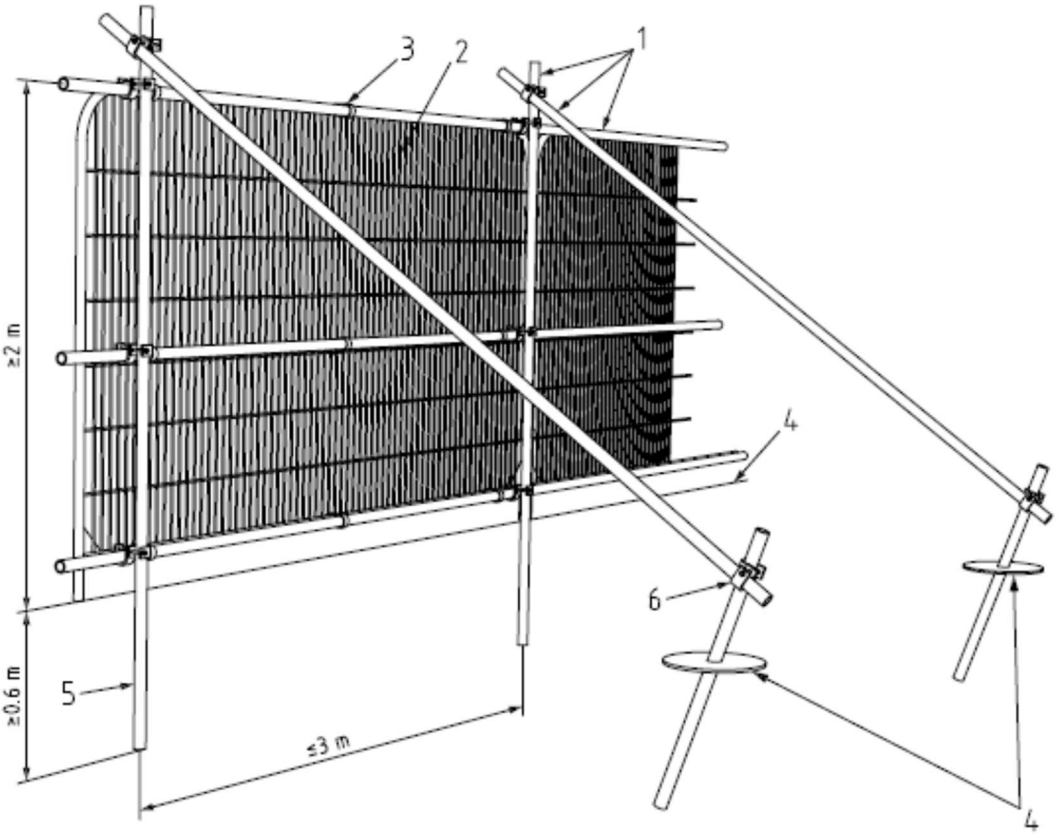
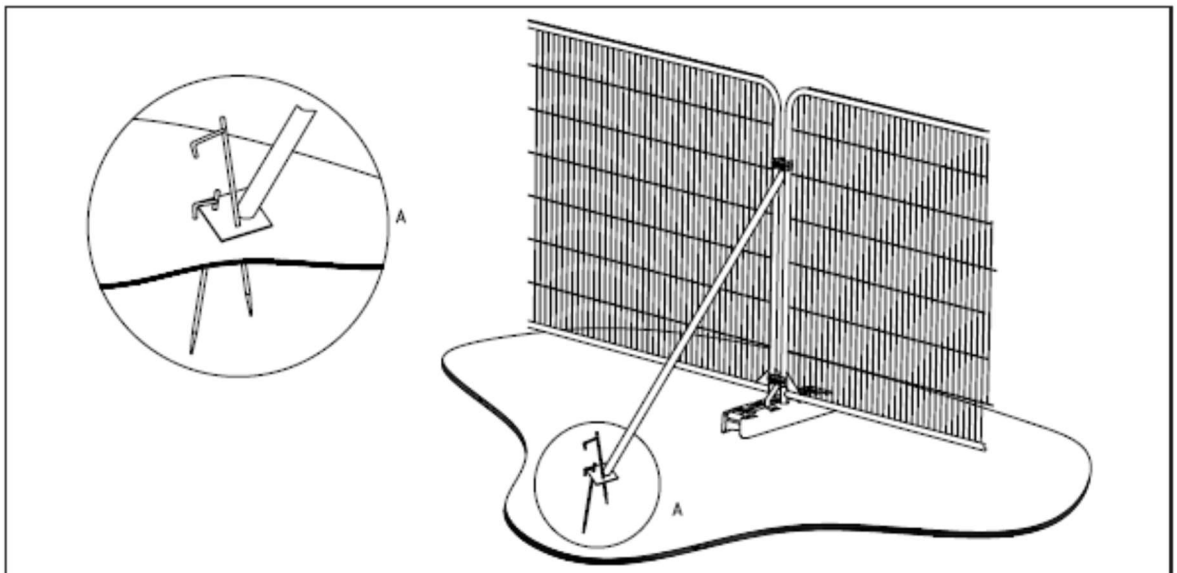
D.1 Extract from BS5837:2012 Default specification for protection barrier



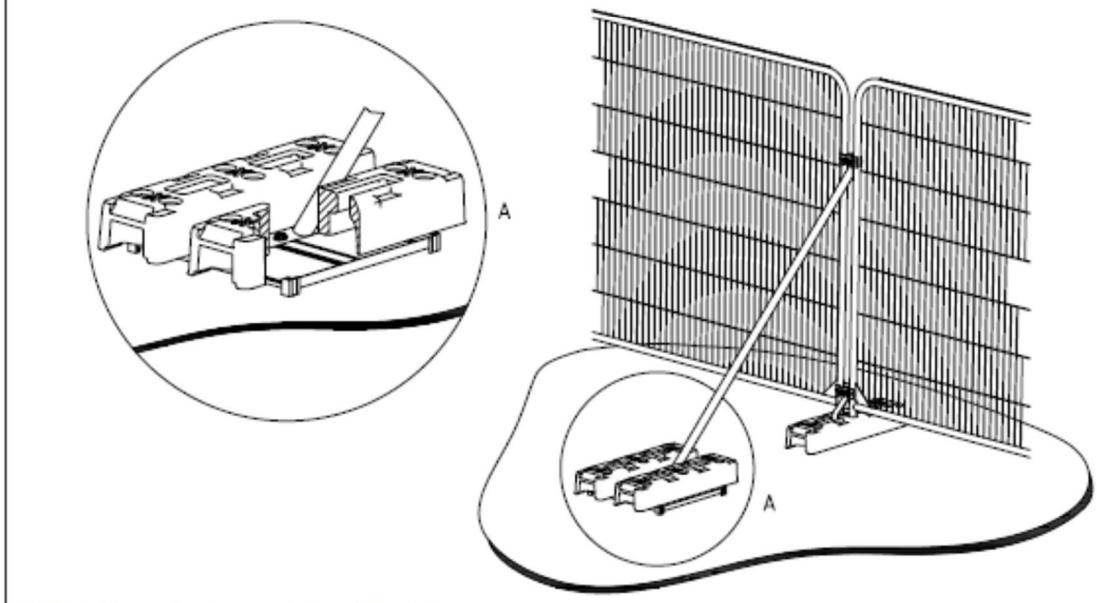
Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

D.2 Extract from BS5837:2012 Examples of Ground Stabilising systems



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

D.3 Extract from BS 5837:2012 Ground Protection during Demolition and Construction

6.2.3.2 Where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site.

6.2.3.3 New temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.

NOTE The ground protection might comprise one of the following:

a) for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;

b) for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;

c) for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

6.2.3.4 The locations of and design for temporary ground protection should be shown on the tree protection plan and detailed within the arboricultural method statement (see **6.1**).

6.2.3.5 In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

E. References

British Standard BS 5837:2012 Trees in Relation to design, demolition and construction – Recommendations; April 2012; ISBN 978 0 580 69917 7

British Standard BS 3998:2010 Recommendations for Tree Work; Third (present) edition, December 2010; ISBN 978 0 580 53777 6

The National Joint Utilities Group, Issue 1 – 8th October 2007, Volume 4 - Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

Arboricultural Association, 1991, Leaflet 4 - Tree Management

Forestry Commission website: (https://www.gov.uk/government/organisations/forestry-commission).

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