# Winteringham Ings to South Ferriby Flood Alleviation Scheme

## Arboricultural Impact Assessment

Version C01, November 2018

We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

*Quality Assurance*

| | |
|---|---|
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| Project 1B1S reference | IMAN002289 |
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| Version number | C01 |
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*Approvals*

| Name | Signature | Title | Date | Version |
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# Executive summary

This Arboricultural Impact Assessment (AIA) has been prepared for the Winteringham Ings to South Ferriby Flood Alleviation Scheme (FAS). The AIA was undertaken on the 4th October 2018 by Miranda Cowan (Technician Arboricultural Association) and Katie White (Environmental Consultant), who assisted with data collection. The location of surveyed trees was informed by a topographic survey plan for the scheme, as shown on Figure 1a, 1b and 1c (Appendix A). The tree survey to inform this AIA was undertaken in accordance with '*Tree in relation to design, demolition and construction – Recommendations*', BS 5837:2012'. The Scheme would give rise to the following impact on trees.

**Summary of Impacts on Trees**

| BS5837:2012 grades | Removal | Partial Removal | Encroachment |
|---|---|---|---|
| A | 0 | 0 | 0 |
| B | T11, T12, T21, T22, T23, T24, T25, T26, T27, T28, T30, T32, T39, T40, T41, T42, T46 | G4 – 13 trees: 4 poplar, 8 ash and 1 alder tree<br><br>G8 – 5 trees<br><br>G7 – 2 ash trees<br><br>G9 – 30 trees | 0 |
| C | 0 | 0 | 0 |
| **Total** | **17** | **62 individual trees of tree groups** | **0** |

# Contents

# 1. Introduction

## 1.1 Background

This Arboricultural Impact Assessment (AIA) has been prepared for the Winteringham Ings to South Ferriby Flood Alleviation Scheme (FAS), hereafter referred to as the Scheme. The Scheme location is shown in Appendix A and largely comprises construction of new tidal flood defences at South Ferriby, including managing the erosion risk using set-back defences to the south of Fulseas pumping station, raising the height of some existing walls and using new walls and demountable defences to reduce flooding to properties and businesses east and west of South Ferriby Sluice during tidal flood events.

The AIA was undertaken on the 4th October 2018 by Miranda Cowan (Technician Arboricultural Association) and Katie White (Environmental Consultant), who assisted with data collection. The location of surveyed trees was informed by a topographic survey plan for the scheme, as shown on Figure 1a, 1b and 1c (Appendix A). The tree survey to inform this AIA was undertaken in accordance with 'Tree in relation to design, demolition and construction – Recommendations', BS 5837:2012'.

The requirements of the AIA are to:

- Record the location of trees and gather dimensional information (i.e. tree height and girth size), together with an assessment of tree heath and arboricultural value.
- Assess the potential impacts upon trees likely to affected by the proposed scheme.
- Where required, identify any further survey and reporting requirements to ensure tree protection and proposals for tree removal are undertaken in accordance with best practice and relative to the time frame of the proposed scheme.

## 1.2 Scheme description

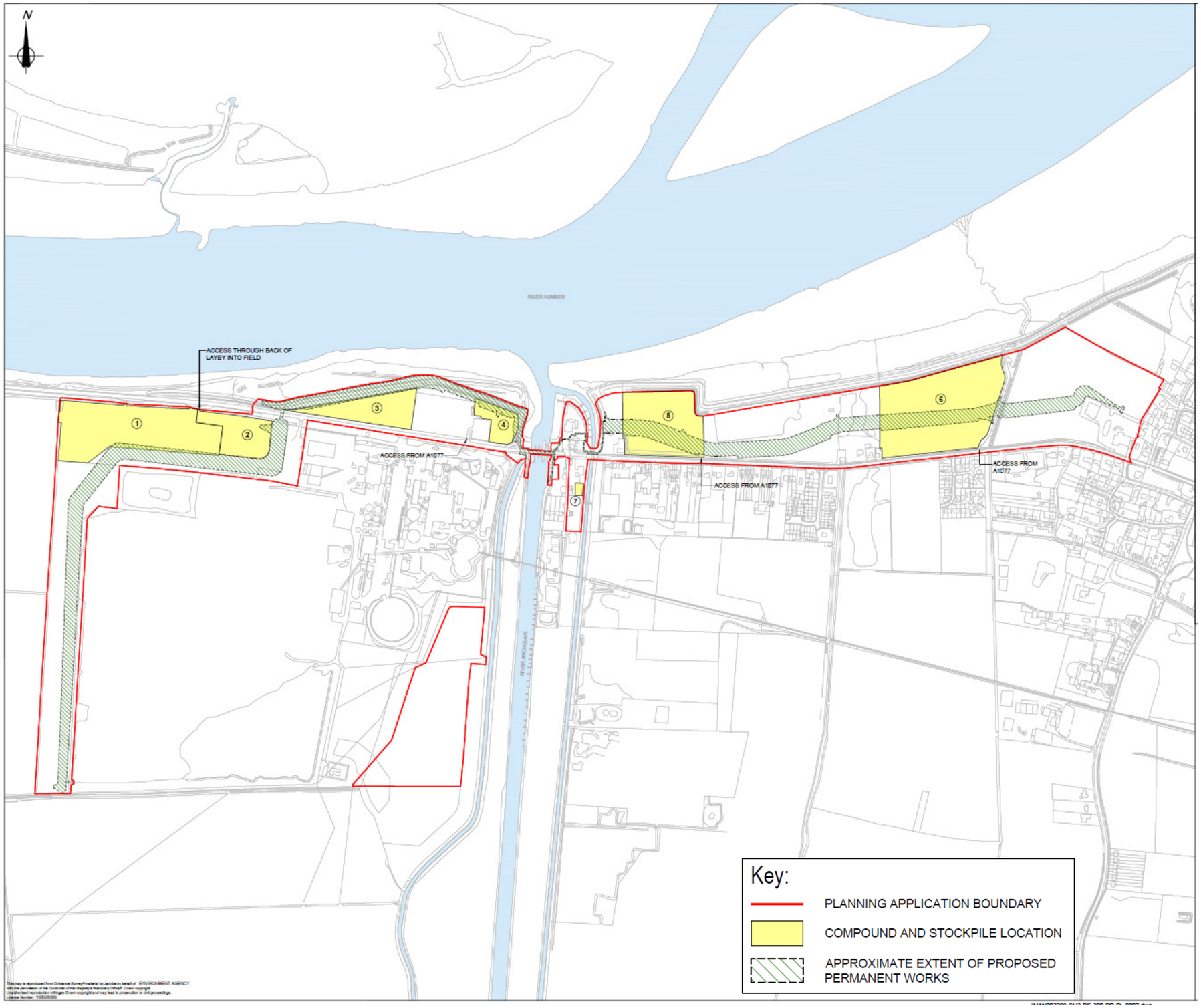
The scheme comprises works to improve the standard of flood protection to properties in South Ferriby and to the CEMEX cement plant to the west of the village, along with other assets (for example agricultural land). The works consist of the raising of existing embankments, the construction of new embankments, sections of hard defences (flood walls) adjacent to properties, public highways and watercourses; and the provision of a number of demountable defences.

Construction works are currently programmed to commence in March 2019 and be completed by the end of December 2020.

**Table 1: Description of each frontage and other aspect of the Scheme**

| Frontage 1 | Location | Description |
|---|---|---|
| Frontage 1 | To the north and west and north of the CEMEX Plant. | The defence level rises from 3.32m at the southern extent of the frontage to a maximum of 6.2m in front of the CEMEX plant.<br><br>A demountable defence is required where the frontage crosses the A1077, west of the CEMEX Plant. Short length of walls are required to tie in the embankments to the demountable. |

| Frontage 1 | Location | Description |
|---|---|---|
| | | Access points for tractors or remotely controlled vehicles to maintain the embankment are provided. |
| Frontage 2 | This is north of the CEMEX plant to the north of the A1077 Sluice Road, South of the Humber Estuary. and west of the River Ancholme and ties into the Ferriby Sluice. | The embankment north of the A1077 will tie into the existing flood embankment and includes reprofiling the existing embankment to a defence height of 6.2m. This ties into the existing sheet piled wall west of the Ferriby Sluice.<br><br>Drainage will be provided at the toe of the embankment. |
| Frontage 3 | In the vicinity of the Ferriby Sluice, West Drain and East Drain. | A demountable defence will be required across the A1077, west of the Ferriby Sluice as flood water is modelled to overtop the Ferriby Sluice.<br>To the East of the Ferriby Sluice this is combination of replacing existing walls, new walls and demountable defences on the A1077 and to the front of the Hope and Anchor Pub.<br><br>Short length of walls are required south of the A1077 to tie the demountable defences into the Ferriby Sluice, west and east of the River Ancholme.<br><br>The height of walls will vary dependent on ground levels but would not exceed 1.7m in height. |
| Frontage 4 | Agricultural land between north of the A1077 Sluice Road and South of the Humber Estuary | Embankment from the East Drain to higher ground to defend the residential area of South Ferriby. It is designed to provide a flood defence level of 6.2m.<br><br>Drainage is provided at the toe of the embankments.<br><br>Crossings suitable for maintenance access for vehicles are incorporated into the embankment. This is to maintain access for agricultural activity and to the Fulseas Pumping Station.<br><br>The temporary concrete defences currently in place will be removed as part of this project. The pedestrian footbridge over the East Drain will be retained in situ as part of the Scheme. |
| CEMEX Plant | Land within the CEMEX Plant | 4.4 ha of land within CEMEX has been identified to provide replacement tree planting at a ratio of three replacement trees for every tree lost. |
| Allowance for Settlement | All embankments | An assessment of ground conditions has shown that embankments are likely to start to settle almost immediately after construction. Embankments will be constructed 600mm higher than the actual defence level (maximum defence level height is 6.2m so construction height is 6.8m). The defence level is likely to be reached within 12 months. |


N
RIVER HUMBER
ACCESS THROUGH BACK OF LAYBY INTO FIELD
ACCESS FROM A1077
ACCESS FROM A1077
ACCESS FROM A1077
1
2
3
4
5
6
7
RIVER ANCHOLME
Key:
PLANNING APPLICATION BOUNDARY
COMPOUND AND STOCKPILE LOCATION
APPROXIMATE EXTENT OF PROPOSED PERMANENT WORKS

# 2. Survey Methodology

## 2.1 Collection of tree data

Table 2 lists the survey criteria applied during the tree survey. This involved collecting dimensional data and observational information. Dimensional data includes using a Diameter Class measuring tape for recording tree diameter, use of a Clinometer to determine tree height and use of a standard measuring tape to record the spread of the tree canopy. The survey related to trees with a stem diameter of 75mm or more measured at 1.5m above ground level. No internal investigation was carried out or tissue samples taken from the surveyed trees.

Observational information includes noting features associated with the physiological and structural condition of trees, including the presence of crown die back, weak/split limbs, the presence of fungal fruiting bodies and features associated with past management, such as pruning wounds and cavities.

Trees are self-optimising, living organisms whose health and condition can change rapidly. Even trees recorded as healthy at the time of survey (4th October 2018) are at risk from unpredictable climatic and man-made events.

Not all trees were accessible due to their position within private dwellings. In these instances, the trees were visually assessed at a suitable distance and an estimation was derived.

## 2.2 Tree Preservation Orders

The Environmental Trees and Landscape Officer for North Lincolnshire Council has confirmed that there are no Tree Preservation Orders (TPO) or Conservation Areas with the scheme extent.

## 2.3 Tree Retention Value

Based on information collected in the field, trees were assessed in respect of their quality and benefits within the local geographic context and relative to amenity and wildlife value. This was achieved by categorising trees according to their retention value linked with arboricultural, landscape, cultural and conservation qualities. A summary description of the value applied to trees is summarised below, with full assessment criteria included as Appendix B.

- **Category A:** Trees of high arboricultural quality with an estimated remaining life expectancy of at least 40 years. Category A trees should be retained within a proposal site.
- **Category B:** Trees of moderate arboricultural quality with an estimated remaining life expectancy of at least 20 years, or make little visual contribution to the wider landscape, but are integral with a tree group so as to increase collective tree value. Such trees should be retained, where possible.
- **Category C:** Trees of low arboricultural quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm. They generally do not place a constraint on a proposal site, unless they have conservation value.
- **Category U:** Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years. Selection for

removal however is relative to the position of the tree within the geographic context, i.e. there would be no requirement to remove the tree if it does not pose a risk to the public.

## 2.4 Root Protection Area

The Root Protection Area (RPA) for individual trees was determined using BS5837:2012 calculation methods. The RPAs are represented on Figures 1a, 1b, 1c and 1d (Appendix A) and Appendix C (Schedule of Existing Trees). The RPA in this report is drawn from the center of the main stem of individual trees. The RPA for tree groups relates to measuring the largest stems towards their respective margins, which is then merged to encompass intersecting RPAs.

Where a tree canopy spread extends beyond its calculated RPA value, the RPA has been increased accordingly to ensure uniform constraints are presented above and below ground.

**Table 2: Tree Survey Criteria**

| | |
|---|---|
| **Tree ref** | Corresponding number on plan – T=Tree/H=Hedge/G=Group |
| **Species** | Common name followed by botanical name shown in *italics* |
| **Height** | A measure of the height of the tree using a clinometer. |
| **Stem Diameter at breast height (DBH)** | Diameter measured in centimetres at approximately 1.5 m above ground level, depending on topography and tree structure. A specified tape measure is used for this.<br><br>(MS = Multi-stem tree with diameter measured at base/above root flare) |
| **Crown spread** | Taken as a minimum at the four cardinal points, to derive an<br><br>accurate representation of the crown |
| **Crown clearance** | existing height above ground level of:<br><br>1) first significant branch and direction of growth (e.g. 2.4-N);<br><br>2) canopy,<br><br>to inform on ground clearance, crown/stem ratio and shading; |
| **Age** | Young (Y)<br><br>Semi-Mature (SM)<br><br>Early mature (EM)<br><br>Mature (M)<br><br>Over Mature (OM)<br><br>Classification is given in relation to the life expectancy of the specific species. |
| **Structural Condition** | Good = No signs of defects or structural weakness<br><br>Fair = Minor defects not causing structural weakness<br><br>Poor = severe decay in the main stem or branches structurally weak |

| | |
|---|---|
| **Physiological condition** | G = Good<br><br>F = Fair<br><br>P = Poor<br><br>D = Dead |
| **General Observations** | general observations, particularly of structural and/or physiological condition (e.g. the presence of any decay and physical defect), vitality relating to the size, coloration and density of leaf cover. |
| **Life expectancy** | Estimated remaining contribution, in years (<10, 10+, 20+, 40+); |
| **Retention Category** | 1=Arboricultural value<br><br>2=Landscape value<br><br>3=Cultural value |
| | **U**: Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years<br><br>**A**: Trees of high quality with an estimated remaining life expectancy of at least 40 years<br><br>**B**: Trees of moderate quality with an estimated remaining life expectancy of at least 20 years, or make little visual contribution to the wider landscape<br><br>**C**: Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm |
| **Root Protection Area (RPA)** | Calculation of the extent of roots growing out from the tree (BS5837:2012). |

# 3. Arboricultural Impact Assessment

## 3.1 Schedule of existing trees

The tree survey recorded 42 individual trees and 9 tree groups. The collective number of trees across all tree groups is 138, which equates to a total of 180 trees within the surveyed area. Table 3.1 summarises the survey findings, relative to their value, with the location of the trees shown as Figure 1a, b and c.

**Table 3: Summary of trees and their arboricultural value**

| BS5837: 2012 grades | Trees | Tree groups | Sub Totals |
|---|---|---|---|
| A | T29, T31, T38, T39 | - | 4 |
| B | T1 to T28, T30, T32 to T36, T40 toT42. | G1, G2, G3, G4, G5, G6, G7, G8, G9 (combined number of trees within groups is 138) | 37 individual trees, 138 trees within 9 tree groups |
| C | 37 | - | 1 |
| U | - | - | - |
| **Sub Totals** | | | **42 individual trees, 138 trees within 9 tree groups** |

Trees throughout the survey area are mostly semi-mature planted specimens. Individual trees T1 to T15 and grouped trees G1 and G2 have numbered tree tags and are potentially monitored due to their position within an Environment Agency car park and amenity space adjacent to the River Ancholme.

Tree groups G4 and G5 occur as regularly spaced specimens, all of which are semi-mature and were in good physiological and structural condition. There is consistent evidence of pruning management, mostly of small lower canopy branches. Poplar *Populus sp.* species were noted to have a wider canopy spread than the ash *Fraxinus excelsior* trees, which are the more abundant species of the tree groups.

The majority of trees within the survey area are of moderate arboricultural value, mainly due to them being semi-mature and their collective value as a tree group. High value trees are mostly mature and stand prominently in an otherwise sparsely tree covered landscape. The mature horse chestnut (T30) *Aesculus hippocastanum* is otherwise down-graded due to impaired condition.

## 3.2 Impacts on trees

Table 3 displays the findings of the AIA, illustrating the number of trees and tree groups considered likely to be affected by the current scheme design. Definition of terms is as follows:

- **Removal** refers to trees that cannot be realistically retained due to the land take required for construction of the new embankment.
- **Partial Removal** relates to tree groups for where a section of that tree group is to be removed to facilitate the works.
- **Encroachment** relates to trees that can be retained during the works, although will require protection measures prior to the start of the enabling works.

**Table 3**: **Summary Impacts on Trees**

| BS5837:2012 grades | Removal | Partial Removal | Encroachment |
|---|---|---|---|
| A | 0 | 0 | 0 |
| B | T11, T12, T21, T22, T23, T24, T25, T26, T27, T28, T30, T32, T39, T40, T41, T42, T46 | G4 – 13 trees: 4 poplar, 8 ash and 1 alder tree<br><br>G8 – 5 trees<br><br>G7 – 2 ash trees<br><br>G9 – 30 trees | 0 |
| C | 0 | 0 | 0 |
| **Total** | **17** | **62 individual trees of tree groups** | **0** |

A total of 79 trees will be removed to accommodate the works. This includes one mature prominent tree (T30), semi-mature road side trees and a small number of trees located in gardens. As the local landscape is not significantly tree covered the loss of trees will be visually notable and is therefore a significant impact that will require mitigation. i.e. tree replacement planting.

# 4. Recommendations

Prior to construction an Arboricultural Method Statement (AMS) and Tree Protection Plan (TPP) will be prepared by an arboriculturalist. The AMS and accompanying TPP will be prepared in accordance with '*Tree Work Recommendations British Standard BS3998*'. The AMS will detail methods for completing the following works:

- The best practice approach for removing trees.
- Details on how to avoid or reduce encroachment impacts of the RPA and tree canopies.
- The location, specification and timing for installing tree protective fencing will need to be specified in the AMS and TPP.

The AMS will need to acknowledge wider constraints relating to ecology, i.e. potential for breeding birds during the breeding season (March to August, inclusive). The scheme will replace of trees lost at a ration of at least 3:1, as loss of 79 trees to the scheme is considered to be a significant loss.

Any subsequent design alterations, additional design information or changes to the schemes proposals following this AIA could result in a change of impacts to the trees. This may result in the requirement for additional tree removals or aid the tree retention, however, this should be assessed by an arboriculturalist.

# References

1. British Standards Institute, 2012. British Standard 5837: 2012 Trees in relation to design, demolition and construction – Recommendations. London: BSI Ltd.

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