

ARBORICULTURAL SURVEY

FOR A PROPOSED FLOOD ALLEVIATION SCHEME AT WHITEKNIGHTS ROAD, READING, RG6 7BT

Prepared For

Topbond Plc Group
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Castle Road
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DOCUMENT ISSUED RECORD

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REVISION RECORD

Revision	Date	Document	Prepared By:	Admin

AMENDMENT RECORD

Revision	Date	Amendments

EXECUTIVE SUMMARY

Report Description	Geosphere Environmental Limited was commissioned by Topbond Plc Group, to undertake an arboricultural survey of the site at Whiteknights Road, Reading, RG6 7BT. The site is located at National Grid Reference, (NGR), SU 73833 72339. The site is to be developed into a flood alleviation scheme with associated services. The proposed development plan Drawing ref. 27560/4004/400/rev C has been provided by the client.
Summary of Main Findings	The Tree Constraints Plan Drawing ref. 1976,AR/001/Rev 0 in Appendix 6, shows the locations of all the trees surveyed with the above and below ground constraints plotted on the plan. A total of nine trees and one group of trees were surveyed. No trees were classed as category A trees. No trees were classified as category B trees. Nine trees and one group of trees were classified as Category C trees. No trees were categorised as category U trees. The BGS digital mapping indicated that the site comprised of a bedrock layer of London Clay Formation, (clay, silt and sand), with no recorded superficial layer. These soils potentially contain cohesive materials and therefore there is a risk of shrink swell soil present on site. A further site investigation should be undertaken to confirm the findings of the BGS digital maps. Three Tree Preservation Orders are potentially present on site. The exact trees protected by the Tree Preservation Order are difficult to determine, due to the lack of detail contained within the Tree Preservation Order directory.
Arboricultural Impact Assessment	The Tree Retention Plan Drawing ref. 1976,AR/002/Rev 1, shows the trees which will require to be removed prior to development. The retained trees on site will be protected by fencing and ground protection as per the Tree Protection Plan, Drawing ref. 1976,AR/003/Rev 1, according to the Arboricultural Method statement in Appendix 7. Three trees, (T5, T6, and T7), and one group of trees, (G1), will have to be removed to facilitate development. Any trees, scrub or hedgerows removed during the construction process should be replaced on a one to one basis. Tree planting should be incorporated into the proposed landscaping of the flood defence scheme.
Tree Management	The trees highlighted for removal within the Tree Retention and Removal plan, Drawing ref. 1976,AR/002/Rev 1 should be removed, prior to the commencement of construction works. Any remedial action required following construction works should be undertaken following the Arboricultural Method Statement.
Recommendations	All of the trees which are to be retained must be protected following BS 5827: 2012. These protection measures are detailed within Tree Protection Plan Drawing ref. 1976,AR/003/Rev 1. The protection measures are explained within the Arboricultural Method Statement.

This Executive Summary only provides a summary of the site data and its assessment. It does not provide a definitive analysis and is for guidance only. It is recommended that the reader reviews the report in its entirety and any material referenced therein.

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1. INTRODUCTION

1.1 General

Geosphere Environmental Limited was commissioned by Topbond Plc Group, to undertake an Arboricultural Survey of the site at Whiteknights Road, Reading, RG6 7BT. Any limitations and conditions pertaining to the report are stated within Appendix 1, with a full list of technical references provided within Appendix 2.

The site is located at National Grid reference, (NGR), SU 73833 72339.

1.2 Aims

This report provides baseline data for an arboricultural assessment of the site, and identifies the tree constraints and root protection areas of trees on or near the site. A tree Retention and Removal Plan has been designed based upon the tree survey, to highlight trees which are planned to be removed during development. A tree protection plan has been included to detail the protection measures which are to be put in place, to protect the trees retained throughout the development.

2. TECHNICAL APPROACH

2.1 Arboricultural Survey

The arboricultural survey has been undertaken in general accordance with BS 5837:2012, (ref. **R.1**). The recommendations for tree remediation works are in accordance with current legislation and guidance, including BS 3998: 2010 Tree work- Recommendations, (ref. **R.2**).

The data collected during this survey is based entirely upon arboricultural grounds and reflects the condition of the trees on the day the survey was undertaken. The locations of the trees were detailed on a topographical survey provided by the client. All locations of trees are assumed to be correct. Any trees not noted on the topographical plan have been added where appropriate, during the tree survey.

Scientific names and common names of plant species identified are as they appear in Stace, (ref. **R.3**). For species not listed in Stace, scientific and common names were taken from Johnson and More, (ref. **R.4**).

2.2 Soil Assessment

A desk based assessment of the soil was undertaken to determine potential for volume changing soils on site, using BGS mapping, (ref. **R.5**).

2.3 Site Specific Limitations

The trees were not climbed, but surveyed from ground level. The survey recorded any defects which were observed, but a full tree health and safety inspection for the site is beyond the scope of this survey.

Some trees were covered with ivy which limited the visibility of the stem size and structure. This may have increased the margin of error when recording measurements and assessing the quality of the trees. In cases where the trees were obscured or inaccessible, the parameters which could not be accurately measured were estimated as per BS 5837: 2012, (ref. **R.1**).

3. TREE SURVEY AND ASSESSMENT

The survey was undertaken by an experienced surveyor from Geosphere Environmental Ltd on 23 August 2016, to record data relevant to the assessment of the trees on and adjacent to the site.

3.1 General Site Description

The site comprises of a portion of an allotment, adjacent to Whiteknights Road, and includes an area of the grounds of the adjacent residential home. There is a hedgerow along the boundary of the allotment and Whiteknights Road. Trees are present within the allotments and the grounds of the adjacent residential home.

3.2 Tree Survey Results

A full description of the surveyed parameters is included at the end of the survey schedule description in Appendix 3.

The results of the tree survey are shown within the Tree survey schedule in Appendix 4, with a key to scientific names used attached within Appendix 5. The results are summarised below:

- A total of nine trees and one group of trees were surveyed;
- Some the trees are likely to be located under shared or separate ownership;
- No trees were classed as Category A trees. This is the highest classification available under BS 5837:2012. These trees are of high quality and confer particular visual importance on the landscape. These trees are likely to be required to be protected during the development;
- No trees were classified as Category B trees. These trees are of moderate quality and confer considerable importance on the landscape. These trees should be retained where possible during development;
- Nine trees and one group of trees were classified as Category C trees. These trees are of low quality and confer lower levels of benefits to the landscape. The local authority may find it acceptable to remove these trees during development;
- No trees were categorised as Category U trees. These trees are of poor condition and are unlikely to provide significant value to the landscape for more than ten years. The local authority should find it acceptable to remove these trees during development;
- A number of tree stumps were noted within the hedgerow of G1. The visible stumps were well weathered indicating the trees had not been removed recently.

3.3 Soil Assessment

The BGS digital mapping indicated that the site comprised of a bedrock layer of London Clay Formation, (clay, silt and sand), with no recorded superficial layer. These soils potentially contain cohesive materials and therefore there is a risk of shrink swell soil present on site. A further site investigation should be undertaken to confirm the findings of the BGS digital maps.

The combination of shrinkable soils and trees, hedgerows or shrubs represents a hazard to structures that requires special consideration. Trees and hedgerows can take moisture out of the ground. In cohesive soils this can cause volume change resulting in ground movement and damage to building foundations.

In order to minimise the risk, foundations should be designed in accordance to NHBC Standards Chapter 4.2 Building near Trees, (ref. **R.5**).

4. TREE CONSTRAINTS PLAN

A Tree Constraints Plan Drawing ref. 1976,AR/001/Rev 0 has been prepared for the site, and is attached within Appendix 6.

The Tree Constraints Plan describes constraints that the trees may place on the development. These are described as above and below ground constraints as detailed in section 4.1 and 4.2 below.

4.1 Above Ground Constraints

The current branch spread and height are shown on the Tree Constraints Plan. Any trees which are selected for retention may require additional protection for the stem and canopy during construction.

4.2 Below Ground Constraints

The Root Protection Areas are shown on the Tree Constraints Plan. The Root Protection Areas have been calculated using the stem diameter as per BS 5837:2012, (ref. **R.1**). The Root Protection Areas will require protection throughout development.

5. PERMISSIONS AND COUNCIL RESTRICTIONS

The Reading Borough Council Tree Preservation order directory, (ref. **R.7**), was accessed to determine if any trees on site were protected by a Tree Preservation Order. Three Trees were identified as protected on Whiteknights road:

Table 1 – Tree Preservation Orders			
Location	Order No.	Type	Site specific comments
Whiteknights road	7/00	(T31) (G2)	25 (Lakeside Care Home)
Whiteknights road	44/14	(T3)	149
Whiteknights road	111/07	(T3)	149

It is not possible to determine from this exactly which trees are protected by Tree Preservation Orders; it is recommended to contact the local authority to determine exactly which trees are protected before site works begin.

A number of tree stumps were noted within the hedgerow of G1. It is possible that some of the TPOs have been removed. The visible stumps were well weathered indicating the trees had not been removed recently.

6. ARBORICULTURAL IMPACT ASSESSMENT

The proposed development plan Drawing ref. 27560/4004/400 Rev C is attached in appendix 6. The site is to be developed into a flood alleviation scheme with associated services.

6.1 Proposed impact on trees

The trees listed in Table 2 below, will be affected by the development. The Tree Retention and Removal plan, Drawing ref. 1976,AR/002/Rev 1, shows which trees will be removed and which trees will be retained. The Tree Protection Plan, Drawing ref. 1976,AR/003/Rev 1, shows the protection measures required for the retained trees:

Table 2 – Proposed Impact of Construction on Trees		
Tree number	Category	Impact on Tree
T5	C	Remove
T6	C	Remove
T7	C	Remove
G1	C	Remove

6.4 Construction Facilitation Pruning

The canopies of the retained trees will be protected with protective barriers. An area of the canopy of T4 lies outside of the protective barriers, however, T4 has a canopy height of 4m and should be sufficient for the construction works.

6.5 Tree Protection

The protective barriers and ground protection should be erected in the locations shown in the Tree Protection plan Drawing ref. 1976,AR/003/Rev 1, according to the Arboricultural Method statement in Appendix 7.

6.6 Mitigation

Any trees, scrub or hedgerows removed during the construction process should be replaced on a one to one basis. Tree planting should be incorporated into the proposed landscaping of the flood defence scheme.

7. TREE MANAGEMENT

The trees highlighted for removal within the Tree Retention and Removal plan, Drawing ref. 1976,AR/002/Rev 1 should be removed, prior to the commencement of construction works. Any remedial action required following construction works should be undertaken following the Arboricultural Method Statement.

All specified tree work is to be carried out in general accordance with BS 3998:2010 Tree work- Recommendations, (ref. **R.2**), by a professional and specialist arboricultural contractor, who carries the appropriate experience and insurance cover.

8. RECOMMENDATIONS AND CONCLUSIONS

8.1 Recommendations

All of the trees which are to be retained must be protected following BS 5837: 2012, (ref. **R.1**). These protection measures are detailed within the Tree Protection Plan Drawing ref. 1976,AR/003/Rev 1 in Appendix 6. The protection measures are explained in the Arboricultural Impact Assessment section 6 above, and within the Arboricultural Method Statement in Appendix 7.

8.2 Tree management

The trees highlighted for removal within the Tree Retention and Removal plan, Drawing ref. 1976,AR/002/Rev 1 should be removed, prior to the commencement of construction works. Any remedial action required following construction works should be undertaken following the Arboricultural Method Statement.

8.3 Conclusions

The Tree Retention Plan Drawing ref. 1976,AR/002/Rev 1, shows the trees which will require to be removed prior to development.

The retained trees on site will be protected by fencing and ground protection as per the Tree Protection Plan, Drawing ref. 1976,AR/003/Rev 1.

In order to ensure that there will be negligible impact on the overall quality and quantity of trees on site post development, it is recommended to plant trees on a one to one basis for those that will be removed throughout the development process.

APPENDICES

APPENDIX 1 – REPORT LIMITATIONS AND CONDITIONS

This report was prepared only for our client and is not intended to be relied on by any other party.

The Executive Summary and Recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon until considered in the context of the whole report.

Interpretations and recommendations contained in the report represent our professional opinions, which were arrived at in accordance with currently accepted industry practices at the time of reporting and based on current legislation in force at that time.

This report is prepared and written in the context stated in the introduction to this report and should not be used in a differing context. Furthermore, new information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances or after the expiry of six months from the date of the report, the report should be referred to us for re-assessment and, if necessary, re-appraisal.

Any physical changes that happen to the site after the tree survey was undertaken have the potential to invalidate or change the findings of this report. Therefore the consultant shall not be responsible for any event that may happen after the survey was undertaken due to factors that were not apparent at the time.

Any hazards that were visible on the day of the survey have been noted in the tree management recommendations section of the tree survey schedule (Appendix 4). However, this report should not be considered a substitute for a tree risk assessment or management plan, which would be required to minimize the risk and liability associated with the trees found on site.

APPENDIX 2 – REFERENCES

- R.1. BSI (2012) BS 5837:2012 Trees in relation to design, demolition and constructions- Recommendations.
- R.2. BSI (2010) BS 3998:2010 Trees work- Recommendations.
- R.3. Stace, C. A. (2010). New Flora of the British Isles (third edition), Cambridge University Press.
- R.4. Johnson and More (2006). Tree Guide, Harper Collins Publishers Ltd.
- R.5. <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> (accessed 31 August 2016).
- R.6. National House-Building Council, Standards, Chapter 4.2, 2003 'Building Near Trees'.
- R.7. http://www.reading.gov.uk/media/1197/TPO-Directory/pdf/Tree_Preservation_Order_Directory.pdf (accessed 31 August 2016).

APPENDIX 3 – SURVEY SCHEDULE DESCRIPTIONS

TREE SURVEY SCHEDULE DESCRIPTION

Tree Survey Schedule Description		
Column Number	Heading	Description
1	Tree No.	Sequential reference number (as recorded on the tree constraints plan)
2	Species	Species listed by common name
3	Height (m)	Total height of the tree
4	Stem Diameter (mm)	Stem diameter measured at 1.5 m above ground level in accordance to BS 5837:2012
5	No of stems	Total number of stems of a tree
6	Branch spread (m)	Branch spread, taken at the four cardinal points, to derive an accurate representation of the crown (plotted on the tree constraints plan)
7	First branch hgt (m)	Existing height above ground level of first branch measured at the union with the stem
8	Canopy hgt (m)	Existing height of the average clearance of the canopy above ground level
9	Life stage	The age of the tree determined by life stage category: Y-young, SM- semi-mature, EM-early mature, M-mature, OM-over mature, V- veteran
10	Physiological condition	The physiological condition of a tree based on a tree health assessment: G- good, F- fair, P- poor, D- dead
11	Structural condition	The structural condition of a tree based on structural integrity and signs of structural defects which may cause failure: G- good, F- fair, P- poor, D- dead
12	Tree work recommendations/ comments	Work which is recommended for a tree to improve its longevity and safety in its present context. The recommendations are recorded primarily to assist with the categorisation of the trees. Please see Section 6, Tree Management for further limitations.
13	Remaining contribution (yrs)	Estimated remaining contribution in years that the trees will have on the landscape in their current context. A tree will not necessarily remain safe for the entirety of the remaining years. The remaining contribution has been categorised as follows: <10, 10+, 20+ and 40+
14	Category grading	The trees have been graded as per BS 5837: 2012 recommendations. The grading is formed by a letter and a number. The letter denotes the quality grading of the tree, the number represents one of three sub categories. Sub categories 1, 2 and 3 reflect arboricultural, landscape and cultural qualities respectively. The primary letter grading is as follows: 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 A- Trees of high quality with an estimated remaining life expectancy of at least 40 years B- Trees of moderate quality with an estimated remaining life expectancy of at least 20 years 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
15	RPA (m ²)	The root protection area has been calculated following BS 5837: 2012
16	RPA radius (m)	The root protection area radius has been calculated following BS 5837: 2012

APPENDIX 4 – TREE SURVEY SCHEDULE

TREE SURVEY SCHEDULE

1	2	3	4	5	6				7	8	9	10	11	12	13	14	15	16
Tree No.	Species	Height (m)	Stem diameter (mm)	No. of Stems	Branch Spread (m)				First Branch Height (m)	Canopy Height (m)	Life Stage	Physiological Conditions	Structural Condition	Tree Work Recommendations/ comments	Remaining Contribution (Years)	Category Grading	RPA (m²)	RPA Radius (m)
					N	E	S	W										
# denotes estimated values due to lack of access																		
T1	Common Alder	18.0	362	1	4	4	4	4	2.0	2.0	SM	F	G		20+	C	59.3	4.3
T2	Sycamore	14.0	220	1	3	3	3	3	4.0	5.0	SM	F	F		20+	C	21.9	2.6
T3	Sycamore	14.0	238	1	3	3	3	3	4.0	4.0	SM	F	F		20+	C	25.6	2.9
T4	Sycamore	20.0	512	1	4.5	4.5	4.5	4.5	6.0	4.0	SM	F	F	Ivy clad stem cleared to measure diameter but still obscuring main features.	20+	C	118.6	6.1
T5	Sycamore	16.0	515	1	3	3	3	3	6.0	6.0	SM	F	F	Ivy clad stem cleared to measure diameter but still obscuring main features, wound in main in stem.	20+	C	120.0	6.2
T6	Sycamore	16.0	415	1	3	3	3	3	7.0	8.0	SM	F	F	Ivy clad stem cleared to measure diameter but still obscuring main features.	20+	C	77.9	5.0
T7	Goat Willow	12.0	374	1	3.5	3.5	3.5	3.5	2.0	1.0	SM	F	F		20+	C	63.3	4.5

TREE SURVEY SCHEDULE

1	2	3	4	5	6				7	8	9	10	11	12	13	14	15	16
Tree No.	Species	Height (m)	Stem diameter (mm)	No. of Stems	Branch Spread (m)				First Branch Height (m)	Canopy Height (m)	Life Stage	Physiological Conditions	Structural Condition	Tree Work Recommendations/ comments	Remaining Contribution (Years)	Category Grading	RPA (m²)	RPA Radius (m)
					N	E	S	W										
# denotes estimated values due to lack of access																		
T8	Apple	4.0	105	1	1.5	1.5	1.5	1.5	1.0	1.0	SM	F	F		20+	C	5.0	1.3
T9	Plum	4.0	105	1	1.5	1.5	1.5	1.5	1.0	1.0	SM	F	F		20+	C	5.0	1.3
G1	Hawthorn, Garden Privet Hedge	1.5	50	-	1	1	1	1	-	-	SM	F	F		20+	C	1.1	0.6

APPENDIX 5 – KEY TO SCIENTIFIC NAMES

SCIENTIFIC NAMES KEY

Common Name	Scientific Name
Sycamore	<i>Acer pseudoplatanus</i>
Alder	<i>Alnus glutinosa</i>
Hawthorn	<i>Crataegus monogyna</i>
Garden Privet	<i>Ligustrum ovalifolium</i>
Apple sp.	<i>Malus sp.</i>
Plum	<i>Prunus domestica</i>
Goat Willow	<i>Salix caprea</i>

Common and scientific names based on Stace (2010) New flora of the British Isles (3rd Edition), Cambridge University Press. For species not present in Stace, scientific and common names were taken from Johnson and More (2006). Tree Guide, Harper Collins Publishers Ltd.

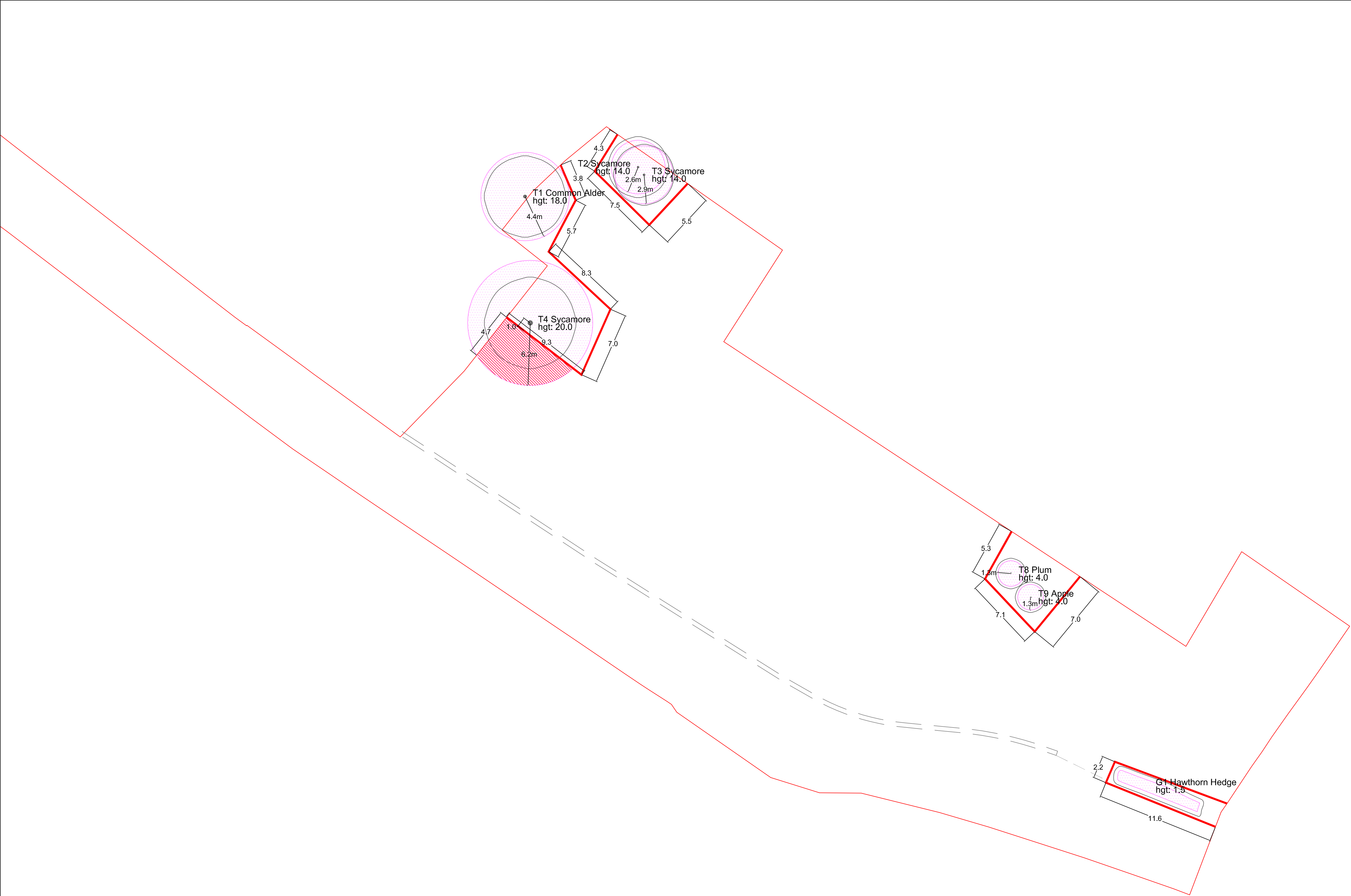
APPENDIX 6 – DRAWINGS

Tree Constraints Plan – Drawing ref. 1976,AR/001/Rev 0

Tree Retention and Protection Plan – Drawing ref. 1976,AR/002/Rev 1

Tree Protection Plan – Drawing ref. 1976,AR/003/Rev 1

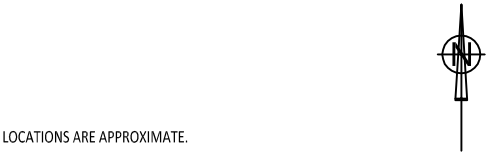
Proposed Development Plan – 27560/4004/400 Rev C



REV	DATE	DESCRIPTION
LEGEND		
	Category A	Trees of high quality
	Category B	Trees of moderate quality
	Category C	Trees of low quality
	RPA using formula in accordance with BS5837:2012	
	Protective barriers	
	Ground Protection	
# denotes estimated values due to lack of access		

Trees categorised in accordance with BS5837:2012 "Trees in relation to design, demolition and construction – Recommendations"

The original of this drawing was produced in colour – a monochrome copy should not be relied upon



LOCATIONS ARE APPROXIMATE.

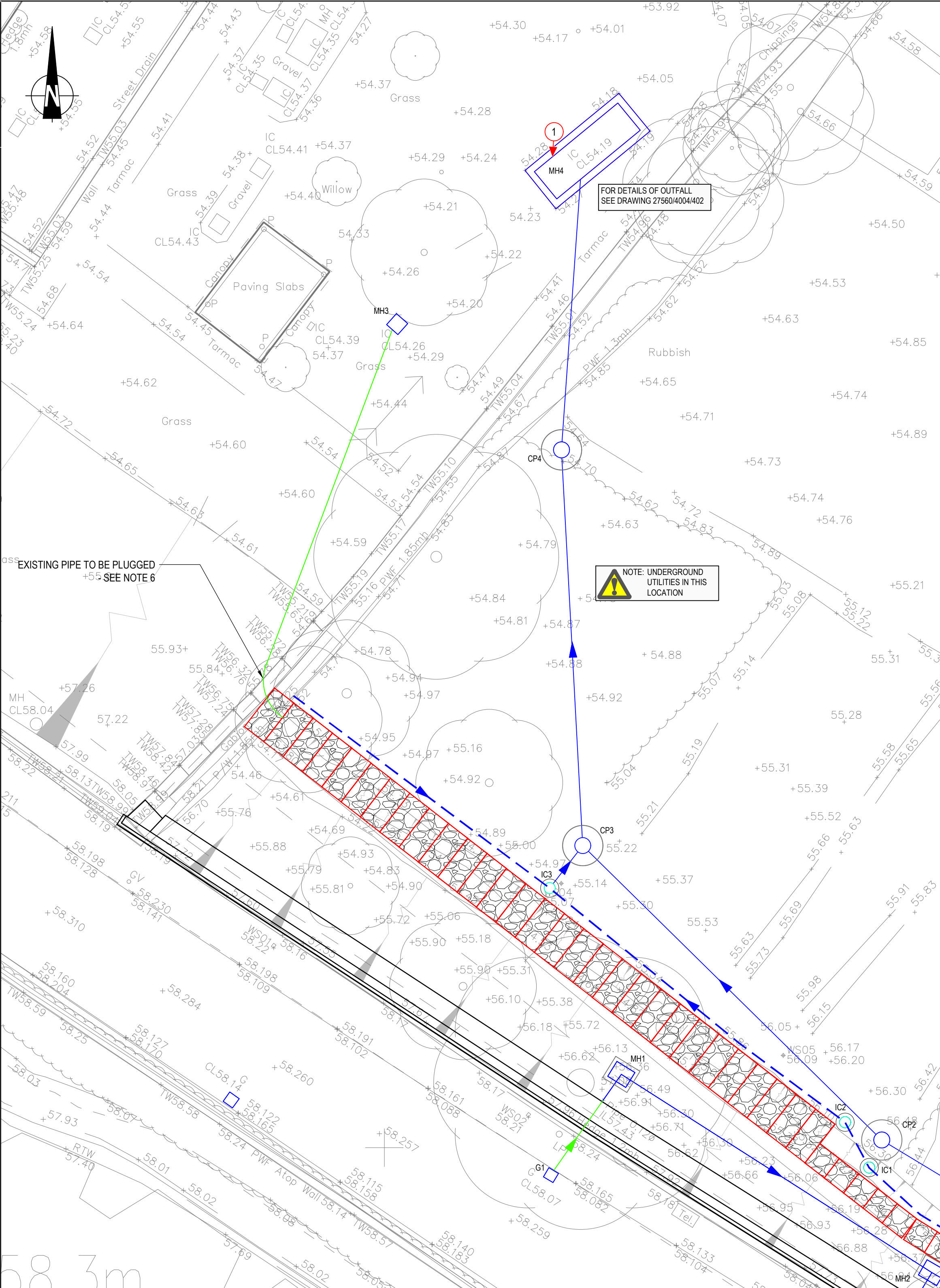
PROJECT
Whiteknights Road,
Reading RG6 7BY

TITLE
Tree Protection Plan

DRAWING NUMBER
1976,AR 003/ rev 1

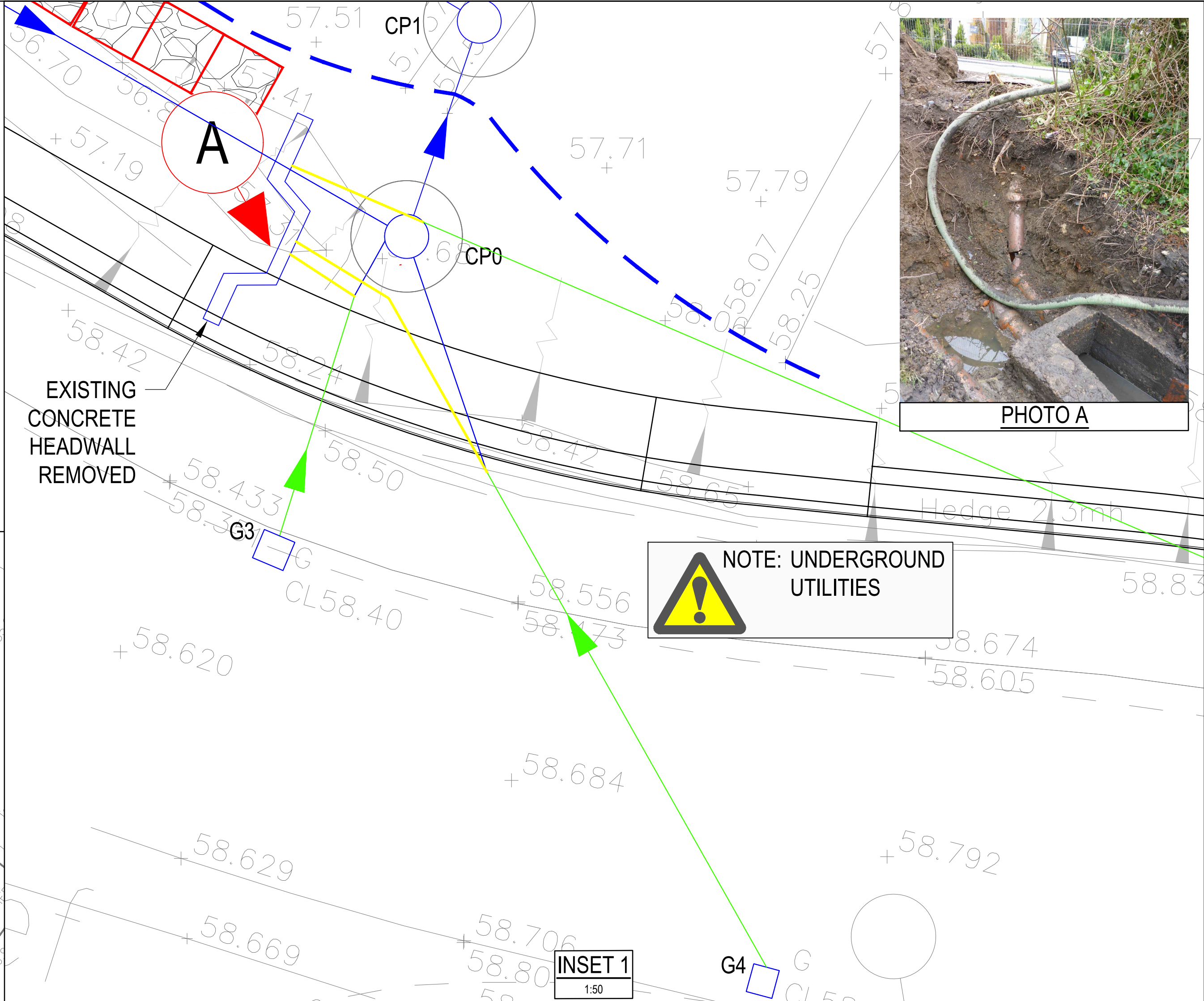
CLIENT
Top Bond

SCALE 1:200 @ A1 DATE 24/08/16



- NOTES:
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 27560/4004/401 & 402.
 - ALL DIMENSIONS IN METRES UNLESS STATED OTHERWISE.
 - ALL LEVELS ARE IN METRES AND RELATIVE TO ORDNANCE DATUM (NEWLYN).
 - THIS DRAWING IS BASED UPON SURVEY INFORMATION SUPPLIED BY LONGDIN & BROWNING, DATED JULY 2015.
 - INVERT LEVEL OF ALL EXISTING GULLIES & EXISTING 9" DIA HIGHWAY DRAIN TO BE CONNECTED TO NEW HIGHWAY DRAINAGE ARE TO BE CHECKED AT INTERSECTION WITH NEW WALL FOUNDATION (SEE SPECIFICATION REQUIREMENTS).
 - FIRST 0.5m OF EXISTING PIPE DRAINING THE EXISTING DITCH TO THE CARE HOME IS TO BE PLUGGED WITH GROUT IN ACCORDANCE WITH SPECIFICATION FOR HIGHWAY WORKS TO ENSURE THIS FLOWPATH IS BLOCKED.
 - THE EXISTING WATER MAIN AND GAS PIPES ARE TO BE EXPOSED BY HAND DIGGING IN THE ALLOTMENTS IN THE VICINITY OF THE PROPOSED DRAINAGE WORKS TO CONFIRM THE LOCATION AND ELEVATION OF THE SERVICES. CONTRACTOR TO REFER TO UTILITY RECORDS GIVEN IN SITE INFORMATION (VOLUME 2) AND SUMMARISED ON DRAWING Nos 27560/4004/700 - 701. CONTRACTOR TO COMPLY WITH REQUIREMENTS OF RELEVANT STATUTORY UNDERTAKERS.
 - EXISTING GULLIES G1 - G4 TO BE CONNECTED TO NEW HIGHWAY DRAINAGE.
 - EXISTING 225 DIAMETER VC PIPE TO BE CONNECTED TO CATCHPIT CP0. SEE SITE INFORMATION (VOLUME 2) FOR ARCHIVE DRAINAGE PLANS AND TRIAL PIT RESULTS.
 - ALLOWANCE IS TO BE MADE FOR CONTROLLING GROUNDWATER INFLOWS AND SURFACE WATER/HIGHWAY INFLOWS DURING THE WORKS.
 - CONTRACTOR TO ALLOW FOR ALL TEMPORARY DISCHARGE LICENCES.

SAFETY, HEALTH AND ENVIRONMENT INFORMATION	
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS:	
CONSTRUCTION	
1. HIGH CONCENTRATION OF UTILITIES IN WORKING AREA, INCLUDING HIGHWAY, FOOTWAY AND ALLOTMENTS. 2. WORKING AREA LOCATED ON DAM AND IMMEDIATELY DOWNSTREAM OF DAM. BE AWARE OF: 2.1 OPERATIONAL REQUIREMENTS FOR RESERVOIR; 2.2 FLOOD RISK; 2.3 ENSURING INTEGRITY OF EMBANKMENT AT ALL TIMES; 2.4 KNOWN SEEPAGE REPORTED THROUGH DAM. 3. STABILITY OF EMBANKMENT:	
MAINTENANCE	
1. HIGH CONCENTRATION OF UTILITIES IN HIGHWAY, FOOTWAY AND ALLOTMENTS. 2. WHITEKNIGHTS ROAD FORMS THE DAM TO WHITEKNIGHTS RESERVOIR, BE AWARE OF: 2.1 OPERATIONAL REQUIREMENTS FOR RESERVOIR; 2.2 FLOOD RISK; 2.3 STABILITY OF EMBANKMENT; 2.4 KNOWN SEEPAGE REPORTED THROUGH DAM. 3. ALL FUTURE WORK TO COMPLY WITH THE REQUIREMENTS OF THE RESERVOIRS ACT 1975.	
DEMOLITION/DECOMMISSION	
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Highway drainage

Structure	Chainage (cumulative distance measured to chamber centres)	Cover level	Inlet invert	Outlet invert	Gradient (1/x)
MH1	0	57.65	As existing (assumed ~57.25)	57.000	75
MH2	15	57.75	56.800	56.775	40
CP0	30	57.68	56.400	56.375	45
CP1	33.4	57.59	56.300	56.275	22
CP2	50.4	56.38	55.500	55.475	14
CP3 (from CP2)	67.5	55.1	54.225	54.200*	35
CP3 (from IC3)	67.5	-	54.425	-	-
CP4	83.7	54.69	53.740*	53.715	52
MH4 (Care Home chamber)	94.8	As existing	53.500	-	-

Toe Drain (Details 3 and 4 on drawing number 27560/4004/401)

Structure	Chainage (cumulative distance measured to chamber centres)	Cover level	Inlet invert	Outlet invert	Gradient (1/x)
Eastern end	0	58.3	-	57.700	9
IC1	24.2	56.36	55.100	55.050	14
IC2	26.3	56.22	54.900	54.850	41
IC3 (from IC2)	41.7	-	54.475	-	-
IC3 (from IC2)	41.7	55.05	54.475	54.450*	-
Western end	54.7	54.8	-	54.500*	520

* Invert level subject to review, following level survey of water main in allotment

KEY:

- APPROXIMATE ALIGNMENT OF EXISTING DRAINAGE
- EXISTING DRAINAGE TO BE ABANDONED AND REMOVED
- EXISTING ROAD GULLY TO BE CONNECTED WITH HIGHWAY DRAINAGE
- PROPOSED 225Ø VC PIPE IN CONCRETE SURROUND (HIGHWAY DRAINAGE)
- PROPOSED 150Ø SEMI-PERFORATED PLASTIC PIPE
- PLASTIC INSPECTION CHAMBER
- PRECAST CONCRETE CIRCULAR CATCH PIT
- PRECAST CONCRETE RECTANGULAR MANHOLE
- FLOOD WALL
- LINE OF GABION BASKETS
- PHOTO LOCATION MARKER

C	PHOTO LOCATION MARKERS ALTERED	01.08.16	Jfds	NKA	DH
B	OUTFALL LOCATION AMENDED	28.06.16	Jfds	NKA	DH
A	MINOR AMENDMENTS	20.05.16	Jfds	NKA	DH
Mark	Revision	Date	Drawn	Chkd	Appd

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.
UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status

FOR CONSTRUCTION

RBC LLFA SUPPORT WHITEKNIGHTS RESERVOIR GABION OPTION PROPOSED DRAINAGE ARRANGEMENT

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Date of 1st Issue 13.05.16	Designed RMW	Drawn JLW
A1 Scale AS SHOWN	Checked NKA	Approved DH
Drawing Number 27560/4004/400		Revision C

APPENDIX 7 – ARBORICULTURAL METHOD STATEMENT

ARBORICULTURAL METHOD STATEMENT

1. INTRODUCTION

1.1 Aim

The aim of this Arboricultural Method Statement is to outline working practices to ensure that planning conditions are fulfilled during the construction works at the site located at Whiteknights Road, Reading, RG6 7BT.

1.2 Root Protection Area

The Root Protection Area refers to an area of ground around a tree which needs to be protected to comply with planning conditions. It covers the area of roots that a tree will need to be sufficiently rooted in the ground, in order to survive and remain safe. If any damage is caused to the roots within this area, a tree will suffer health consequences, and may become a hazard.

The Root Protection Area is plotted on the Tree Constraints Plan Drawing ref. 1976,AR/ 001/ Rev 0. The Tree Protection Plan Drawing ref. 1976/003/Rev 1, details the type of protection that is suitable, for example protective barriers to limit access to an area, or ground protection to form a physical barrier to protect the roots under the ground.

1.3 Construction Exclusion zones

Barriers will be erected to protect tree canopies and Root Protection Areas. These barriers should remain in place until construction works are complete. Once the barriers are erected they delineate the boundary between the construction zone, and the construction exclusion zone. No construction activities should be undertaken within the construction exclusion zones without the specification from the Consultant Project Arboriculturalist.

The Consultant Project Arboriculturalist can authorise the movement of the construction exclusion zone at stages of development when required, for example to allow specified work to commence within the Root Protection Areas, under specific circumstances as outlined below in section 3.2-Works within the Root Protection Area.

ARBORICULTURAL METHOD STATEMENT

1.4 Development Phases

Phase of development	Arboricultural Input
Phase 1- Preconstruction	○ Planning ○ Tree management ○ Protective fencing ○ Ground protection ○ Pre-development inspection
Phase 2- Construction process	○ Monitoring to ensure Arboricultural Method Statement is being carried out
Phase 3- Post construction	○ Post development Inspection ○ Removal of protective fencing ○ Remedial tree works ○ Signing off

2. PHASE 1- PRECONSTRUCTION

2.1 Appoint a Project Arboriculturalist

A Consultant Project Arboriculturalist will be appointed to oversee all the arboricultural aspects of the development project outlined in this method statement. It is recommended that the arboriculturalist takes an active role in the development from the beginning of the project to advise in the planning stage, and supervise site works throughout development. The arboriculturalist should be appropriately qualified and experienced.

2.2 Potential damage to stems and limbs

The trees will be pruned prior to the beginning of construction to allow adequate clearance for construction work to commence. Beyond this, care must be taken to ensure that all activities on site are planned so that no plant or materials come into contact with the remaining trees.

In the event of damage to trees, the project arboriculturalist must be contacted, in order that they may assess any hazards that may have arisen from the damage.

ARBORICULTURAL METHOD STATEMENT

2.3 Protective barriers

Temporary protective barriers will be erected as detailed in the Tree Protection Plan Drawing ref. 1976/ 003/ Rev 1. The designs for barriers are specified in BS 5837: 2012. The barriers must be fit for the purpose of excluding construction activity, and be appropriate to the degree and proximity of the work to the protected tree.

Where construction activities are limited, and there is a low risk of incursions into the protected area it is acceptable to use 2m high weldmesh panels, with rubber or concrete supports and back stay supports as shown in Figure 1 on Page 4.

Barriers should not be affixed directly to any part of the tree they are protecting.

In cases where construction activities provide a higher risk than in low risk situations, more sturdy barriers will be required. BS 5837: 2012 stipulates that in such situations a scaffolding frame should be driven at least 0.6m into the ground with mesh panels attached, as shown in Figure 2 on Page 5.

Once the exclusion zone has been protected by barriers and/or ground protection, construction can commence. All weather notices should be fixed to the barriers with the words: "Construction exclusion zone – Keep out" or similar.

ARBORICULTURAL METHOD STATEMENT

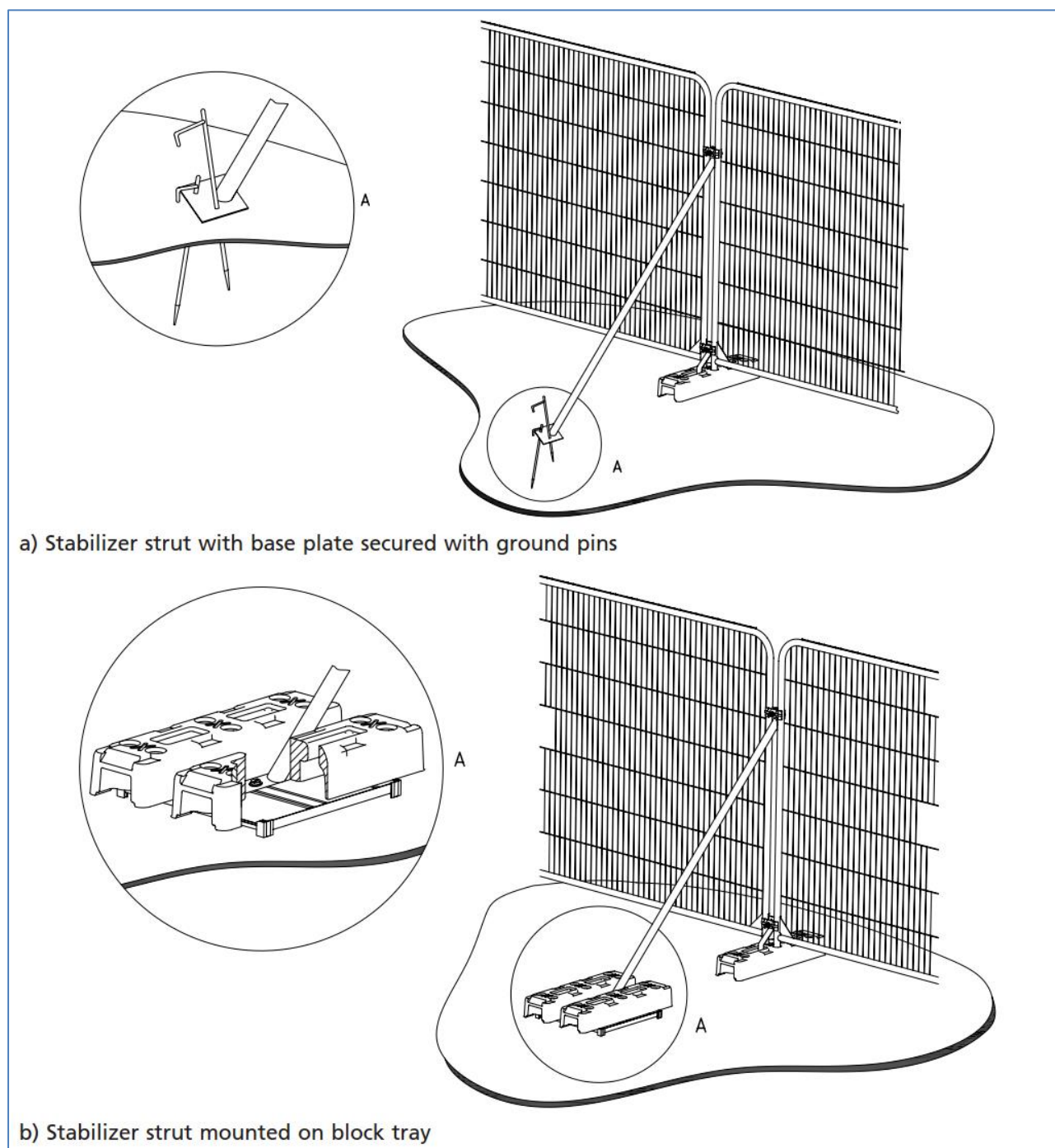


Figure 1. Low risk fencing solution from BS 5837: 2012

ARBORICULTURAL METHOD STATEMENT

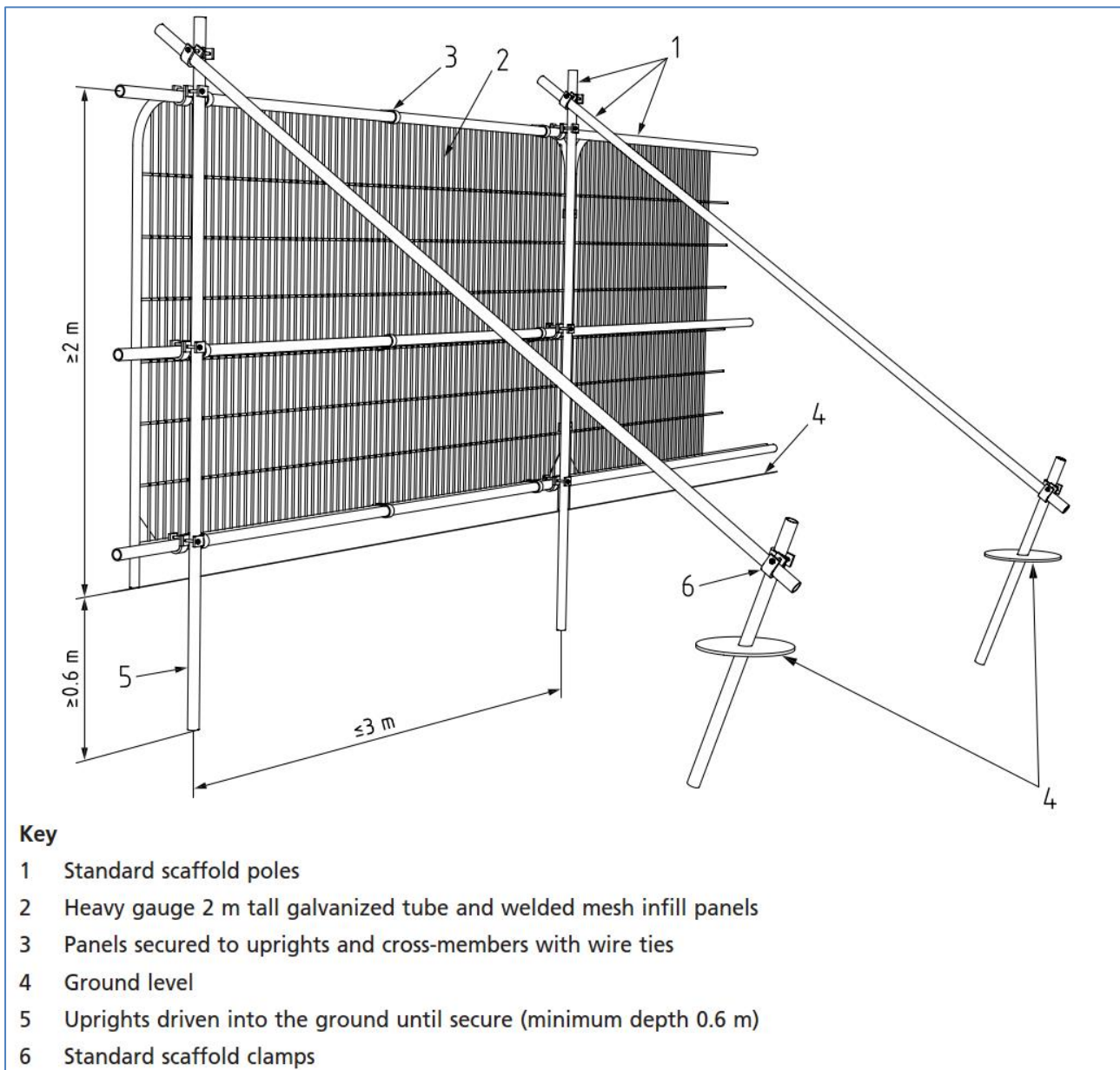


Figure 2. Standard fencing solution from BS 5837: 2012

2.4 Ground protection

Where access through the Root Protection Area or construction working space is required within a Root Protection Area, the protective barrier will be set back and adequate protection for the roots will be provided. These areas are detailed in the Tree Protection Plan Drawing ref. 1976/ 003/ Rev 1.

The ground protection must be suitable for the type of traffic which is expected to enter the Root Protection Area, without causing any compaction of the underlying soil.

For light traffic of less than 2 tonnes, it is acceptable to create a temporary ground barrier by laying a non- compressible material over a geotextile membrane, with interlocking ground protection boards placed on top.

For traffic over 2 tonnes it is required to use a system designed to engineering specifications capable of handling the expected loads, without causing any compaction to the soil beneath.

ARBORICULTURAL METHOD STATEMENT

2.5 Pre-development inspection

The pre development pruning works, protective fencing and ground protection will be signed off by the project arboriculturalist before proceeding to the construction phase.

3. PHASE 2- CONSTRUCTION PROCESS

Areas behind protective barriers are to be considered construction exclusion zones unless specified by the project arboriculturalist. When entry is required by the construction process, additional precautions will need to be taken as detailed in section 3.2 below.

3.1 Monitoring

The site will be monitored on a monthly basis by the project arboriculturalist, to ensure that the construction works follow the recommendations of the Arboricultural Method Statement.

3.2 Works within Root Protection Areas

All works within the Root Protection Areas will need to be authorised by the Project Arboriculturalist and may require on site supervision. Adequate Ground Protection must be in place during any works.

3.2.1 Ground level

The ground level within the Root Protection Area of trees will be maintained at the pre-development levels, throughout the works. Any changes of ground level near Root Protection Areas, will consider the impacts of irrigation and drainage on protected tree roots.

3.3 Works outside the construction exclusion zones

Other works on site which may damage trees will have to be controlled so the damage to trees is limited. For example, excessive dust generated through demolition and construction works will be removed from trees by spraying water over the trees. Other activities such as chemical storage or fires must be kept back from trees so damage is not caused to the canopy, roots or stem.

4. PHASE 3- POST CONSTRUCTION

4.1 Post Construction Inspection

When the construction process is complete, the site should be inspected by the project arboriculturalist or Local Authority Tree Officer. The inspection will be used to gather evidence on the condition of trees post construction and to advise any remedial action that may need to be taken. The evidence gathered during the inspection will be used for a closing report which provides evidence that the work was carried out following the recommendations of this Arboricultural Method Statement.

4.2 Removal of protective fencing

Following the Post construction inspection, the Project Arboriculturalist or Local Tree Officer can authorise the removal of the protective fencing and ground protection. Any proposed landscaping operations by heavy machinery should be carried out before the protective fencing is removed.

ARBORICULTURAL METHOD STATEMENT

4.3 Remedial tree works

During the Post Construction Inspection, the condition of the trees will be assessed. Any damage caused during construction will be noted, and remedial action will be recommended. Any tree works undertaken will comply with BS 3998:2010 Trees work- Recommendations.

4.4 Planting of trees lost during development

Trees should be planted on site to mitigate any trees lost during development. The details of the planting scheme should be included in the landscape plans. The post construction inspection will include checking the condition of newly planted trees.



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