RCA STRUCTURES
STRUCTURAL ENGINEERING AND DESIGN

2nd Floor, Unit 1, Birchanger Industrial Estate,
Stansted Road,
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SUNNYSIDE

KENTS LANE

NORTH WEALD

ESSEX

CM16 6AX

22358

REPORT ON STRUCTURAL INSPECTION

RCA STRUCTURES
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4th December 2020

Our Ref: MPL/22358

Mr. K. Fletcher
5 The Moat
Toot Hill
Ongar
CM5 9LR

Dear Sir,

Re: Structural Inspection to Sunnyside, Kents Lane, North Weald, CM16 6AX

1.0 Introduction

1.01 In accordance with your instructions we visited this property on the 4th December 2020.

1.02 The purpose of our visit was to carry out a structural inspection to the existing structure to assess feasibility of conversation to a two bedroom dwelling.

1.03 This report has been prepared by RCA Structures on behalf of our client noted above in connection with the site shown and takes into account their particular instructions and requirements. It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.

1.04 This report is a structural report to comment on the stability of the structure and its elements. We cannot comment on the condition of Architectural finishes, insulation of the building or waterproofing matters.

1.05 For ease of understanding terms within this report please also refer to the exploded view of a typical structure in Appendix 1.

2.0 Description of Property

2.01 The single storey property is detached and stands in the corner of a plot generally level in nature.

2.02 The front of the property is West facing.

2.03 The property is split into 4 smaller areas. For ease of understanding, areas referred to in this report are shown on the key plan forming Appendix 2.

2.04 We understand the structure is likely to have been built around the 1950s. We understand the building has previously been used as stables. Currently it is being used as storage.

2.05 The property is mainly formed of timber weatherboarding to the front elevation fixed to a timber frame wall behind. The rear elevation generally is formed from timber studs with corrugated metal sheeting. Please refer to photograph 1 & 2 in Appendix 1. An area of concrete hardstanding was noted in front of the structure.

2.06 The roof pitches generally from front to back draining off to the rear. Area 1 roof slopes in the opposite direction.

2.07 There are various large mature trees along the rear Eastern elevation and northern elevation. Most of the trees appeared to be Cypress Leylandii with possible Maple and Beech in places. Trees were in close proximity to the existing structure and under 1m away away in places. Please refer to Photograph 3 in Appendix 3.

3.0 Inspection

3.01 Area 1 - Please refer to Photograph 4 & 5 in Appendix 3. This roof in this area slopes down to the ditch on the north elevation. The roof was formed from small timbers around 100mm deep with corrugated sheeting directly on the top. No guttering was noted. Timbers studs forming the wall were at very large centres with corrugated sheeting fixed to them. There was no concrete floor in this area with just bare ground being used.

3.02 Area 2 - Please refer to Photograph 6 & 7 in Appendix 3. This roof in this area slopes down to the ditch at the rear eastern elevation. The Roof was formed from small timbers around 100mm x 50mm with corrugated sheeting directly on the top. Some of the timbers were turned on their side so only 50mm deep. No guttering was noted. Timbers studs forming the wall were at very large centres with corrugated sheeting fixed to them. There was no concrete floor in this area with just bare ground being used.

3.03 Area 3 - Please refer to Photograph 8 & 9 in Appendix 3. This roof in this area slopes down to the ditch at the rear eastern elevation. The Roof was formed from small timbers around 100mm x 50mm with roofing tiles laid directly on the top. The roof here was different to other areas and should be tested to see if made from Asbestos. Should Asbestos be found then they should be replaced by a specialist company. Timber studs forming the wall were at very large centres. An internal timber finish was present in this area. There was also a concrete floor in this area. Due to storage only parts could be seen but no disrepair was noted to visible areas.

3.04 Area 4 - Please refer to Photograph 9 & 10 in Appendix 3. This was the largest of the four different areas. The roof in this area slopes down to the ditch at the rear

eastern elevation. The Roof was formed from small timbers around 100mm x 50mm at 900mm centres with sheeting laid directly on the top. Leaks were noted at the time of our visit. Timber studs forming the wall were at very large centres. An internal timber finish was present in this area. There was also a concrete floor in this area. Due to storage only parts could be seen but no disrepair was noted to visible areas. The floors were notably wet from the leaking roof.

4.0 Conclusions & Recommendations

4.01 Following our inspection, we believe that the structure can be converted into a domestic dwelling.

4.02 Various means of strengthening and repair would be required to provide structural integrity and requirements to the building regulations.

4.03 We expect from a structure of this type and age that no or very shallow existing foundations are likely to have been used. We also expect from its location that the ground below is very likely to be a high plasticity clay material. Where buildings are founded on a layer of moisture susceptible material, it is prone to heave and desiccation especially when subject to high water demand trees in the vicinity. We believe the ditch may be helping keep roots away from the structure but the trees would still be having influence on the structure. Under current regulations (NHBC chapter 4.2 – Building near trees) foundation depths in this situation are set deep enough to avoid any influence from surrounding trees. We have run some calculations which form Appendix 4 and foundation depths would need to be over 3m deep. This depth is typically too deep for a traditional underpinning solution due to health and safety requirements so we would suggest that a scheme of piled underpinning might be required under the load bearing walls. This could be done by a mini piling rig internally to a suitable depth with a concrete beam formed below the walls.

4.04 We would suggest that there are not currently enough timber studs in the wall or sheathing to prevent racking. We would suggest that additional timbers are added to the external walls along with plywood sheathing to prevent the structure racking. Please refer to a typical detail on page 1 in Appendix 5. Where timbers have rotted or broken upon inspection these should be repaired and replaced. Please refer to a typical detail on page 2 in Appendix 5.

4.05 The roof timbers are currently undersized and new roof coverings and insulation are likely to slightly increase the load. Therefore, new roof timbers would be required. These could be laid in between the existing rafters and should be sized by a qualified structural engineer. Full strapping to outside walls for stability would need to be added. Please refer to a typical detail on page 3 in Appendix 5.

4.06 A system of draining the roof would need to be implemented to save the water running straight into the ground and affecting foundations. The roof currently leaks but would be repaired as part of any refurbishment works.

4.07 The areas where only the ground is forming the floor would need to be addressed. New concrete floors in these areas could be added. In new areas, these may be

required to be suspended with a void below to stop any possible heave from the tree influence. Insulation to Architects requirements would need to be installed.

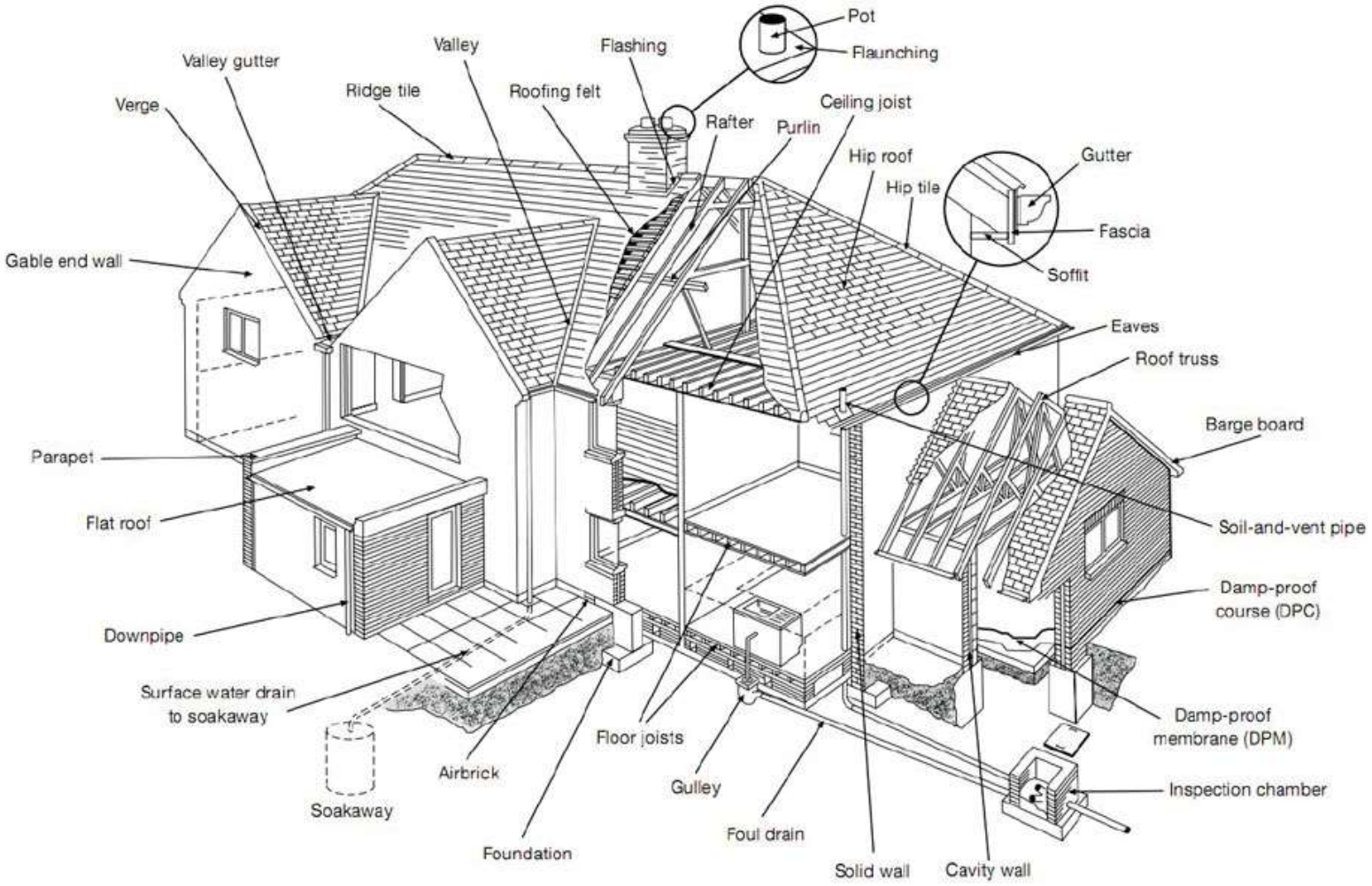
4.08 Should you require any further clarification of any points in this report, or further information or assistance, please do not hesitate to contact the writer.

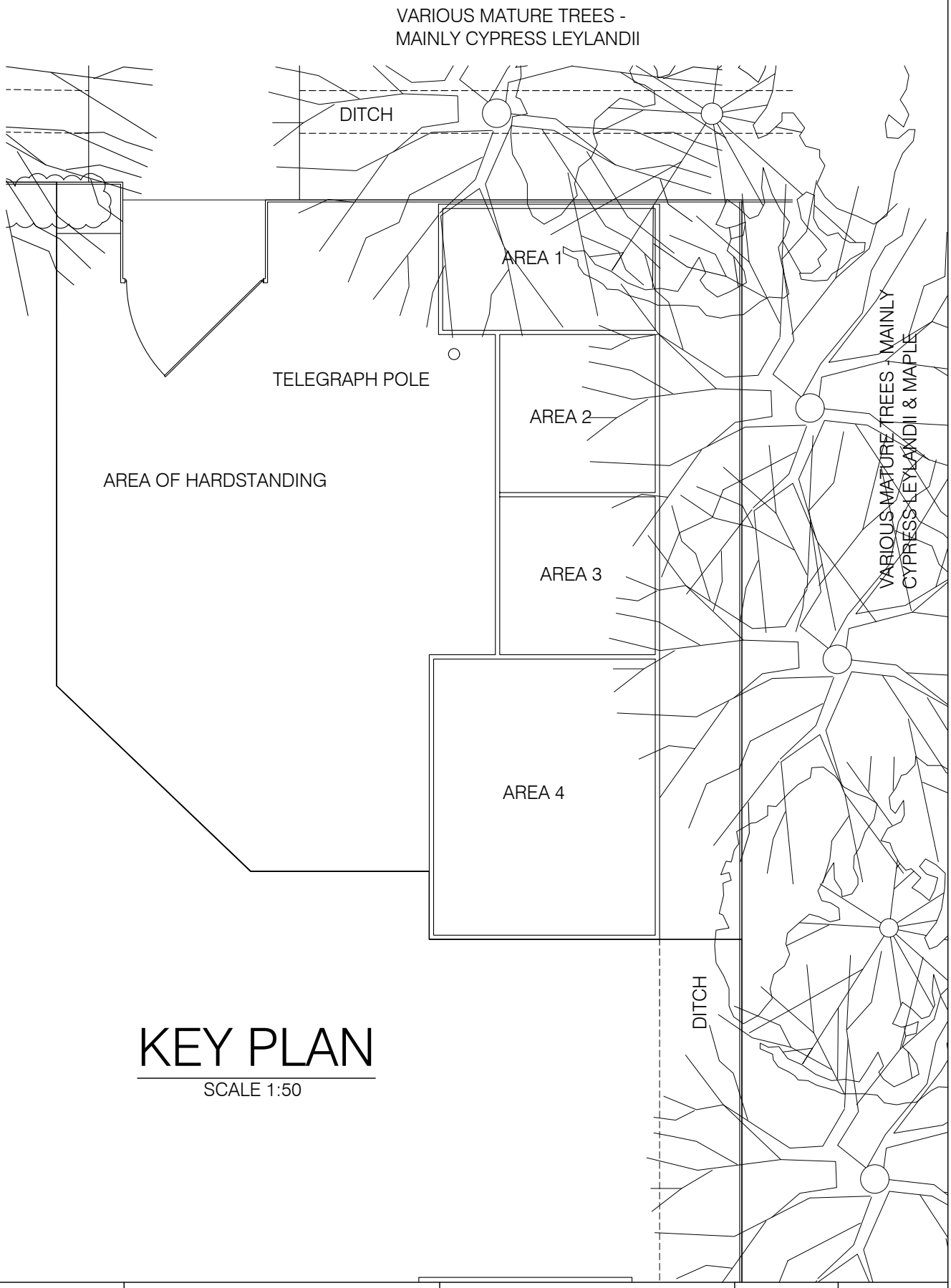
Yours faithfully,

M. P. Lambert BEng(Hons) CEng MIStructE

APPENDIX 1 – TYPICAL CONSTRUCTION TERMS

Clarification of typical terms used within this report:-





KEY PLAN

SCALE 1:50

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Photograph 1 – Building Front Elevation

Photograph 2 – Side Elevation

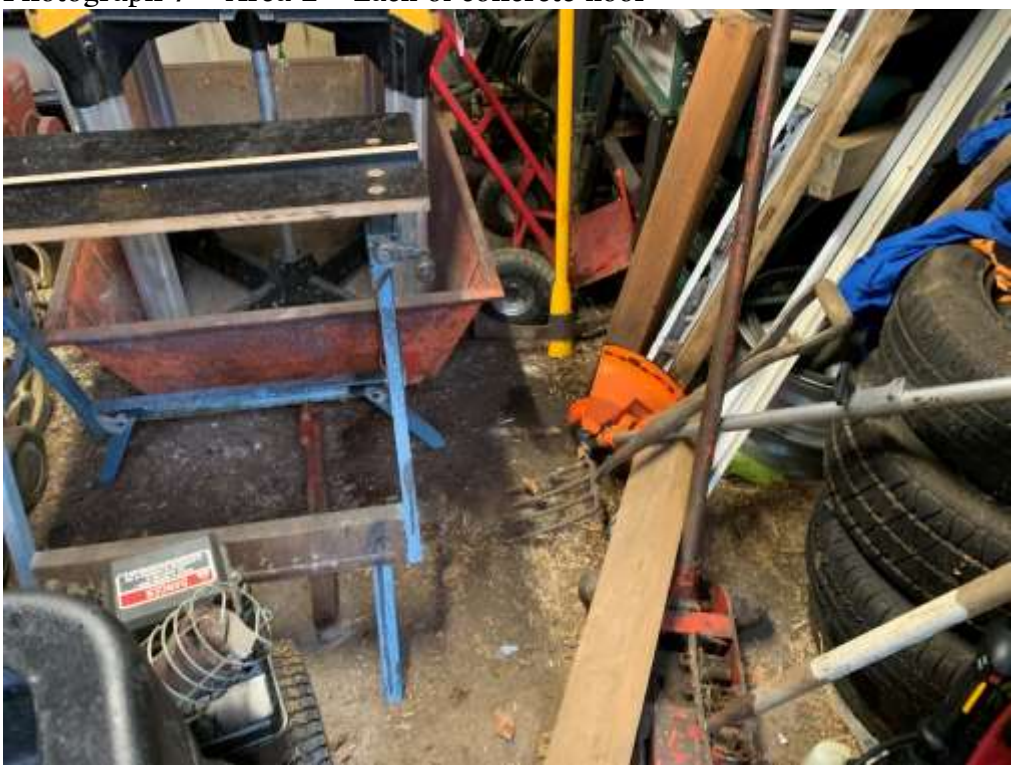
Photograph 3 – Trees to North Elevation

Photograph 4 – Area 1 – Internal View

Photograph 5 – Area 1 – Lack of concrete floor

Photograph 6 – Area 2 – Internal View

Photograph 7 – Area 2 – Lack of concrete floor



Photograph 8 – Area 3 – Internal View

Photograph 9 – Area 4 Internal View

Photograph 10 – Area 4 Concrete Floor

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Title of Scheme *Sunnnyside, Kents Lane, North Weald, CM16 6AX*

Job No. *22358*

FOUNDATION DEPTHS DUE TO TREES (NHBC CHAPTER 4.2)

Tree ref:- T1 *Species:-* Cypress (Leylandii)
Mature Height (m):- 20 m
Tree is Permanent *Therefore, use a height of* 20 m
Soil Plasticity:- High *Type:-* Coniferous
Distance spacings =:- 2 m *Water Demand:-* High

Distance Away (m)	1	3	5	7	9	11	13	15
D / H	0.05	0.15	0.25	0.35	0.45	0.55	0.65	0.75
Depth Required (m)	3.25	2.80	2.40	2.00	1.60	1.20	1.00	1.00

As footings are > 1.5m. Anti - heave precautions to footing are **Required**

If anti-heave precautions are required, based on High plasticity soil,
a required void dimension to the side of footing is 35 mm.
We recommend using 75 mm of VR Claymaster by Cordek.
(To be placed on inside face of external footings only).

As footings are > 1.5m. A suspended floor is **Required**

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FOUNDATION DEPTHS DUE TO TREES (NHBC CHAPTER 4.2)

Tree ref:- T2 *Species:-* Beech
Mature Height (m):- 20 m
Tree is Permanent *Therefore, use a height of* 20 m
Soil Plasticity:- High *Type:-* Broad Leafed
Distance spacings =:- 2 m *Water Demand:-* Moderate

Distance Away (m)	1	3	5	7	9	11	13	15
D / H	0.05	0.15	0.25	0.35	0.45	0.55	0.65	0.75
Depth Required (m)	2.30	2.10	1.95	1.75	1.60	1.40	1.20	1.00

As footings are > 1.5m. Anti - heave precautions to footing are **Required**

If anti-heave precautions are required, based on High plasticity soil,
a required void dimension to the side of footing is 35 mm.
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(To be placed on inside face of external footings only).

As footings are > 1.5m. A suspended floor is **Required**

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FOUNDATION DEPTHS DUE TO TREES (NHBC CHAPTER 4.2)

Tree ref:- T3 *Species:-* Maple (Norway)
Mature Height (m):- 18 m
Tree is Permanent *Therefore, use a height of* 18 m
Soil Plasticity:- High *Type:-* Broad Leafed
Distance spacings =:- 2 m *Water Demand:-* Moderate

Distance Away (m)	1	3	5	7	9	11	13	15
D / H	0.06	0.17	0.28	0.39	0.50	0.61	0.72	0.83
Depth Required (m)	2.30	2.10	1.95	1.75	1.50	1.30	1.10	1.00

As footings are > 1.5m. Anti - heave precautions to footing are **Required**

If anti-heave precautions are required, based on High plasticity soil,
a required void dimension to the side of footing is 35 mm.
We recommend using 75 mm of VR Claymaster by Cordek.
(To be placed on inside face of external footings only).

As footings are > 1.5m. A suspended floor is **Required**

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FOUNDATION DEPTHS DUE TO TREES (NHBC CHAPTER 4.2) (CONT)

Table to show heights of trees used:-

Water demand and mature height of trees

Table 12

Broad leafed trees		
Water demand	**Species**	**Mature height [m]**
High	Elm	
	English	24
	Wheatley	22
	Wych	18
	Eucalyptus	18
	Hawthorn	10
	Oak	
	English	20
	Holm	16
	Red	24
	Turkey	24
	Poplar	
	Hybrid black	28
	Lombardy	25
	White	15
	Willow	
	Crack	24
	Weeping	16
	White	24
Moderate	Acacia false	18
	Alder	18
	Apple	10
	Ash	23
	Bay Laurel	10
	Beech	20
	Blackthorn	8
	Cherry	
	Japanese	9
	Laurel	8
	Orchard	12
	Wild	17
	Chestnut	
	Horse	20
	Sweet	24
	Lime	22
	Maple	
	Japanese	8
	Norway	18
	Mountain Ash	11
	Pear	12
	Plane	26
	Plum	10
	Sycamore	22
	Tree of Heaven	20
	Walnut	18
	Whitebeam	12
Low	Birch	14
	Elder	10
	Fig	8
	Hazel	8
	Holly	12
	Honey Locust	14
	Hornbeam	17
	Laburnum	12
	Magnolia	9
	Mulberry	9
	Tulip tree	20

Coniferous trees		
Water demand	**Species**	**Mature height [m]**
High	Cypress	
	Lawson's	18
	Leyland	20
	Monterey	20
Moderate	Cedar	20
	Douglas fir	20
	Larch	20
	Monkey Puzzle	18
	Pine	20
	Spruce	18
	Wellingtonia	30
	Yew	12

Note:

1. Where hedgerows contain trees, their effects should be assessed separately. In hedgerows, the height of the species likely to have the greatest effect should be used.
2. Within the classes of water demand, species are listed alphabetically; the order does not signify any gradation in water demand.
3. When the species is known but the sub-species is not, the greatest height listed for the species should be assumed.
4. Further information regarding trees may be obtained from the Arboricultural Association or the Arboricultural Advisory and Information Service (see Appendix 4.2-G).

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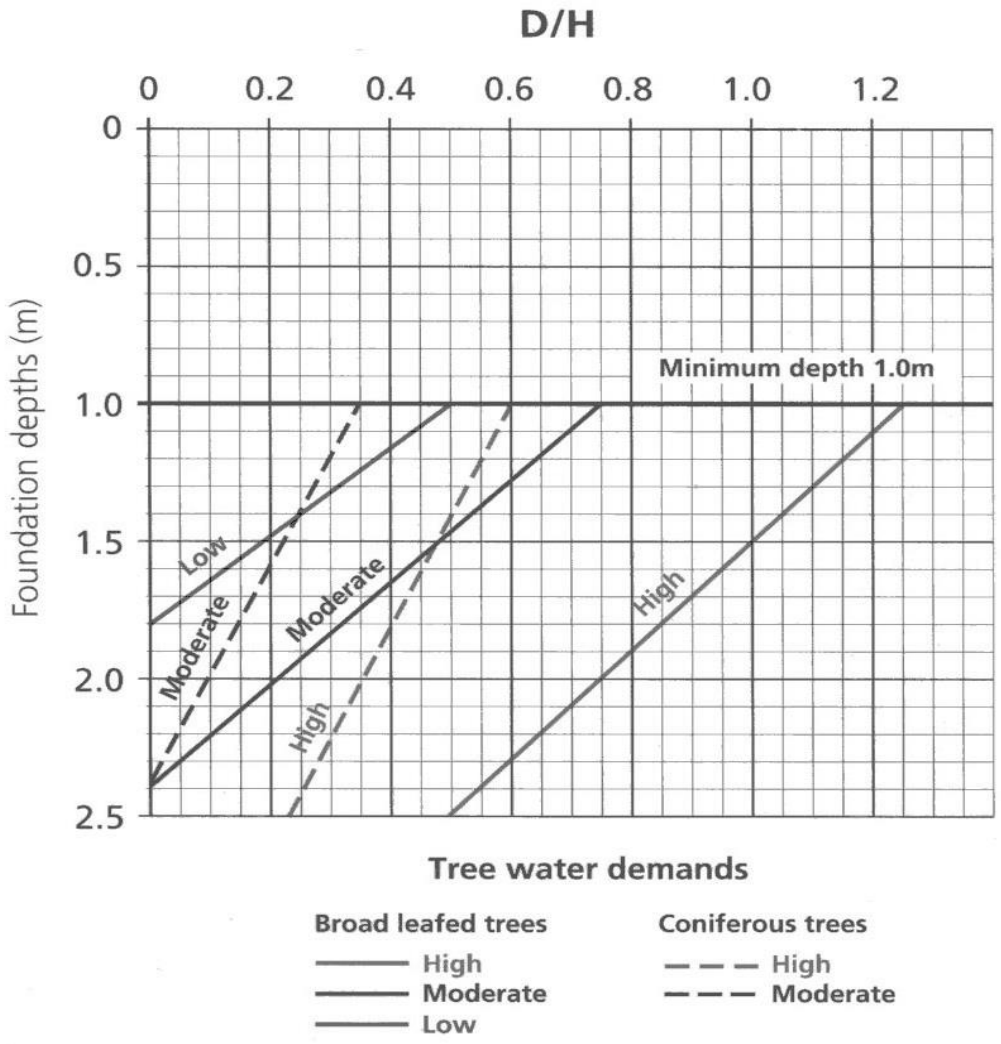
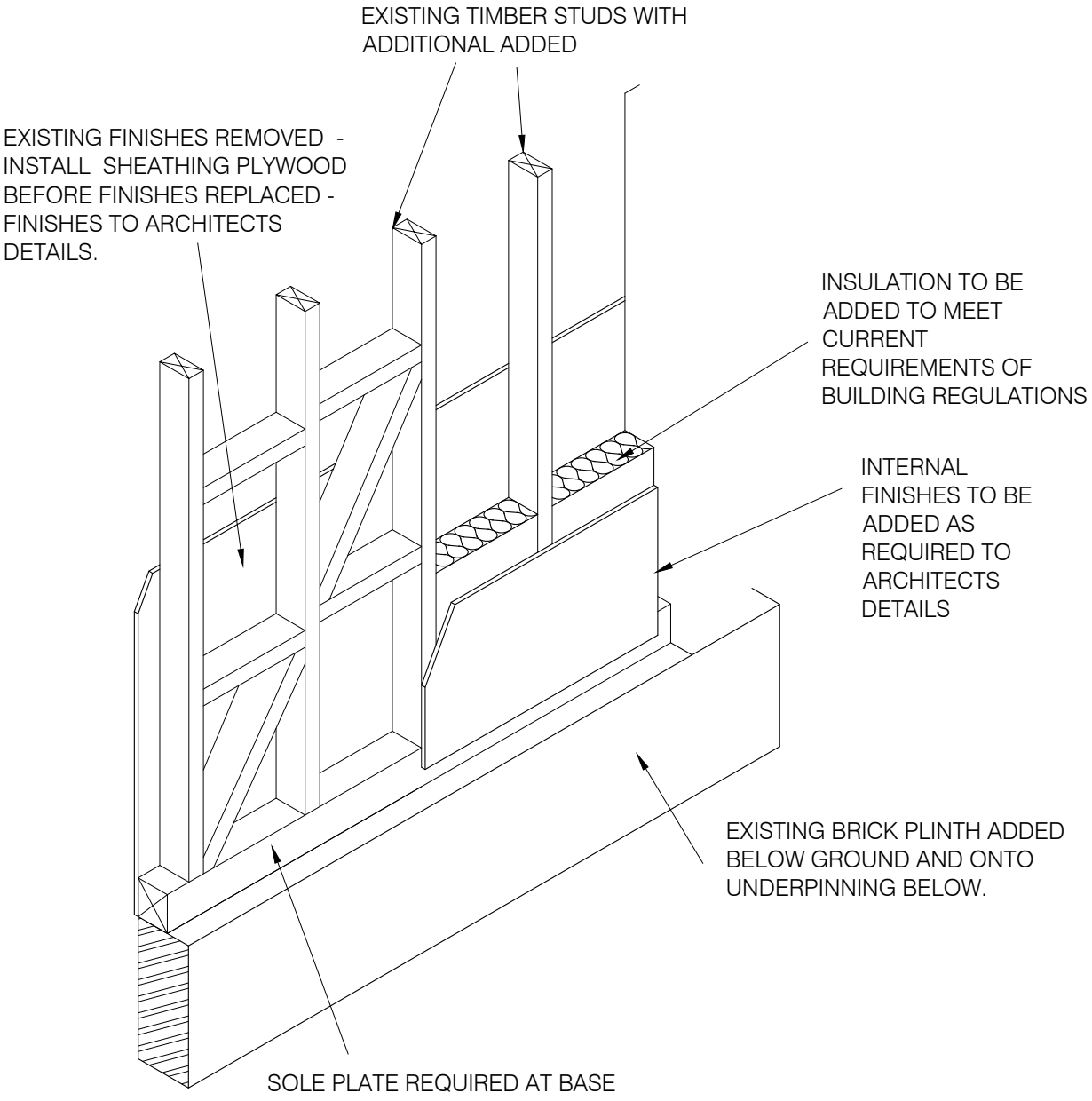
FOUNDATION DEPTHS DUE TO TREES (NHBC CHAPTER 4.2) (CONT)

Graph to show foundation Depths Required for **HIGH** plasticity soil





DETAIL 1 - SHEATHING

SCALE NTS

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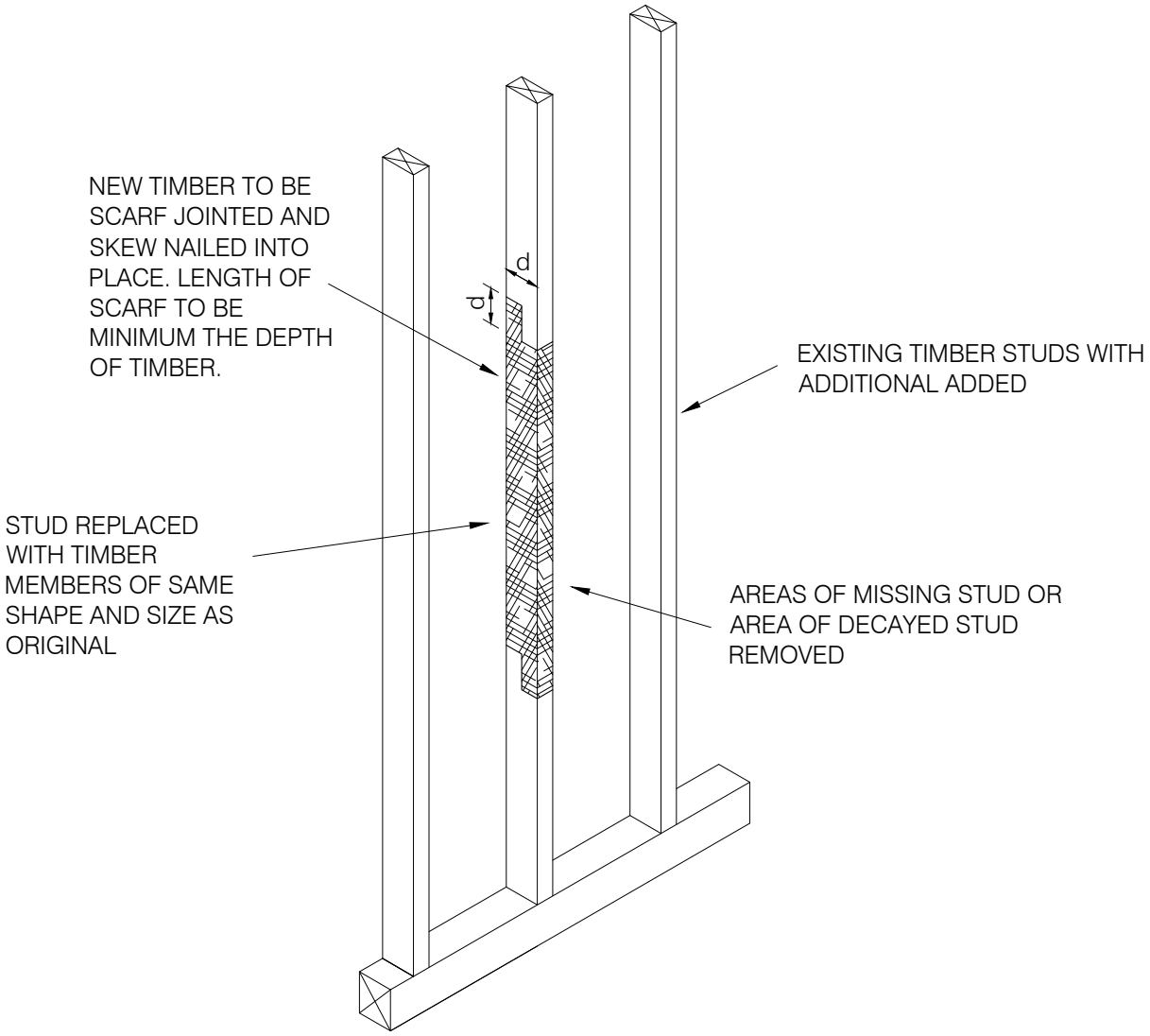

DETAIL 2 - EXISTING STUD REPAIR/REPLACEMENT

SCALE NTS

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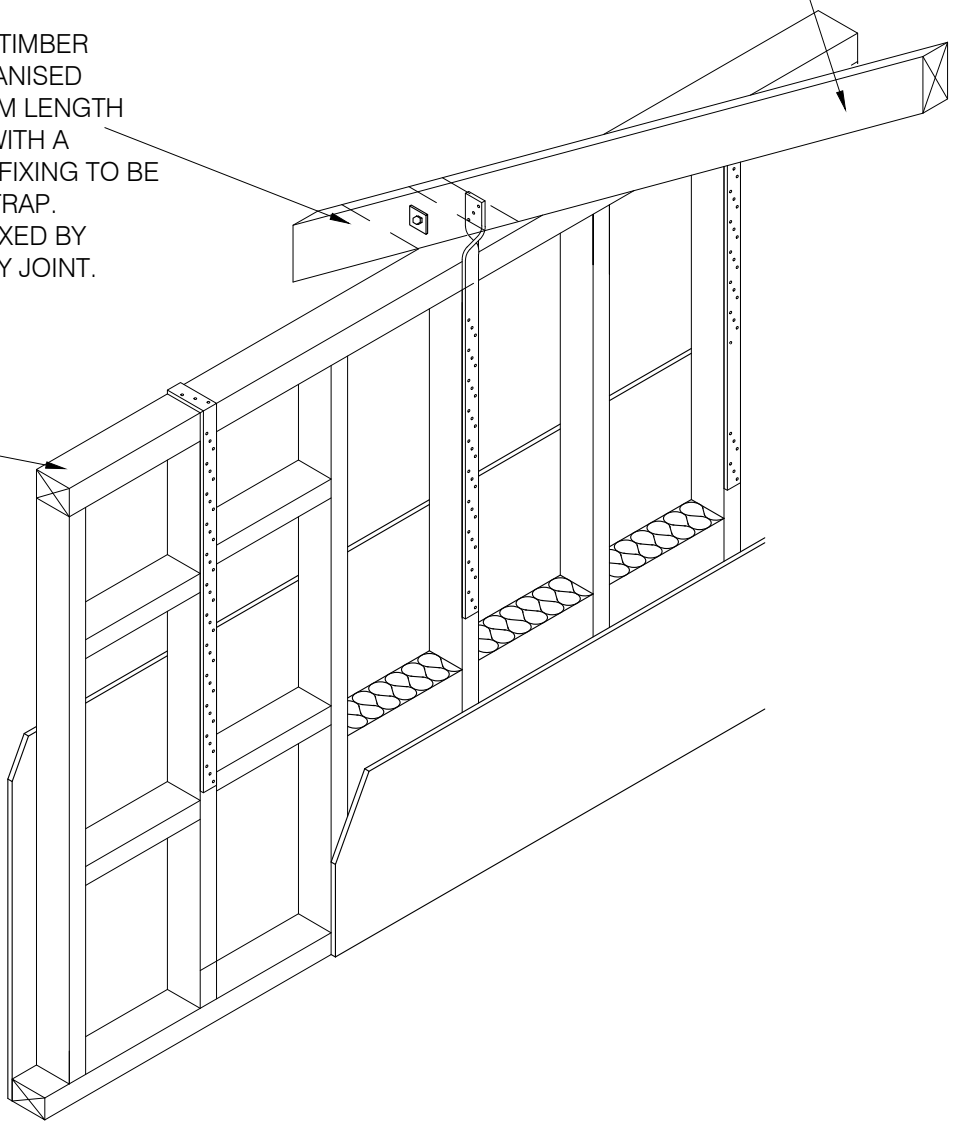
N.B.
RESTRAINT STRAPS ALSO REQUIRED AT WALLS PERPENDICULAR TO ROOF MEMBER SPAN. USE 30 x 5 MILD STEEL GALVANISED STRAPS WITH NOGGINS BELOW OVER FIRST 3 MEMBERS.

NEW RAFTERS

ROOF RAFTERS TO BE ANCHORED TO TIMBER STUD WALL BY MEANS OF 30 x 5 GALVANISED TWISTED MILD STEEL STRAPS, MINIMUM LENGTH 1.0m, SCREWED TO FACE OF TIMBER WITH A MINIMUM OF FOUR SCREWS. LOWEST FIXING TO BE WITHIN 150mm OF THE END OF THE STRAP. ALTERNATIVELY, THE STRAP MAY BE FIXED BY MEANS OF A TAIL BUILT INTO MASONRY JOINT.

WALL PLATE



DETAIL 3 - ROOF STRAPPING

NOT TO SCALE

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