



Arboricultural Method Statement & Tree Protection Measures

(Phase E)

LAND AT FELPHAM
BOGNOR REGIS
WEST SUSSEX

Produced for:
Barratt Homes Ltd

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tree : fabrik

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1.0 Introduction

- 1.1 We are instructed by Barratt Homes Ltd to provide recommendations and guidance on tree protection in respect of the site layout, tree survey assessment and tree protection measures recommended in British Standards 5837 (2005) 'Trees in relation to construction', government guidance and current good practice.
- 1.3 For Landscape mitigation measures please refer to Hard and Soft Landscape General Arrangement Phase E [D1530.L.270 – 272] by fabrik.
- 1.4 **Documents Provided:** The following documents were provided prior to carrying out the assessment;
- Arboricultural Survey [tf/ts/607] dated June '06 by *tree:fabrik*
 - Engineering Layout Drawings [DRG.4348: 01 - 03] dated July '09 by DHA Engineers
- 1.5 **Purpose of this report:** The primary purpose of this Method Statement is to aid the preservation of retained trees through setting out the appropriate working practices, construction techniques and tree protection measures that are to be adopted when the proposed construction is undertaken in the proximity of trees.
- 1.6 In order for tree and root protection measures to work effectively, all personnel associated with the construction process must be familiar with this Method Statement and the principles of tree protection contained herein and the tree protection plan. A copy of this document and tree protection plan will be retained on site at all times.
- 1.7 Barratt Homes Ltd are to include information on the Tree Protection Orders (TPO F/1/07 & TPO 9/67) and required protection measures within the Project Management Plan. This document is issued to all involved parties with the project including subcontractors and designers. Information on the Tree Protection Order and required protection measures will also be provided at site induction and the site office.

2.0 Development Description

- 2.1 The development comprises of ground works and construction activities with associated drainage, car parking and landscaping.

3.0 Tree Survey

- 3.1 A preliminary arboricultural survey was carried out by *tree:fabrik* Arboricultural Consultants June '07.
- 3.2 This report and associated tree removal and protection plans retain all tree numbers within the tree survey schedule for ease of reference.

4.0 General

- 4.1 General phasing, site set-up, delivery, storage areas and method statements by third party contractors shall consider all aspects of tree protection and guidance outlined within this document and incorporate tree protection as part of the detailed construction drawings.
- 4.2 The methodology of this Tree Protection Strategy follows a logical sequence of events. Variations to the sequence could significantly reduce the efficiency of the tree protection measures.
- 4.3 To ensure that the Local Planning Authority Tree Officer has an opportunity to visit the site, the Local Authority is to be given notice in writing 5 full working days prior to the date of commencement of development to check all physical tree protection.
- 4.4 All damage to protective barriers or accidental damage to trees must be reported to the Site Manager immediately. Works occurring within the vicinity will cease immediately until adequate tree protection measures are rectified. A record of the damage will be made by the Site Manager and, in consultation with the appointed Arboricultural Consultant, remediation measures carried out.
- 4.5 It is proposed therefore to phase tree protection through the construction processes as follows:
 - Stage 1 Pre-Contract Meeting
 - Stage 2 Execute agreed tree works.
 - Stage 3 Erection of protective barriers and ground protection prior to ground works.
 - Stage 4 Construction within the RPA of retained trees.
 - Stage 5 Remove and re-position temporary protection barriers to facilitate the final areas of 'no dig' drives and pathways located within the construction exclusion zones.
 - Stage 6 Dismantle protective barriers.
- 4.6 Equally as important as the physical measures of tree protection are the links of communication. The section below should include the details of the relevant parties and individuals that are important in the process of tree preservation at this development site.

Such details should be retained by all relevant parties and available on site at all times. It is an undertaking that the relevant parties are advised of any changes in personnel or contractor during the development process.

	Company	Contact	Tel.
Client	Barratt Homes		01489 779200
LPA representative (Tree Officer)	TBA		
Site Manager	TBA		
Arboricultural Consultant	Tree:fabrik		01420 593250

5.0 Arboricultural Supervision

- 5.1 During development, operations are required within the RPA and Construction Exclusion Zone of retained trees. It is recommended that works within the RPA or construction exclusion zone of any retained tree be carried out under supervision by an experienced and qualified Arboricultural Consultant.
- 5.2 It is the responsibility of the client to appoint an Arboricultural Consultant prior to commencement of works to an agreed scope of works.
- 5.3 The agreed works stages and scope of arboricultural supervision shall be informed by the Method Statement.
- 5.4 It is the responsibility of the site manager to inform the appointed Arboricultural Consultant at least 72hrs before commencement of each operation within the scope of works to enable attendance by the Arboricultural Consultant and inform the Local Authority Representative.
- 5.5 The Site Manager will contact the appointed Arboricultural Consultant of any unscheduled works within the RPA or construction exclusion zone. The extent of works will be discussed and a method statement and provision for tree protection implemented. All unscheduled works must be agreed by the appointed Arboricultural Consultant and the Local Authority Representative prior to commencement of the works.
- 5.6 Following completion of each work stage the appointed Arboricultural Consultant will circulate a report to the Site Manager and Local Authority Representative within two weeks.

6.0 Pre-Commencement Meeting

- 6.1 A pre-commencement meeting shall be held on site prior to any construction works. This shall be attended by the contractor's site manager or agent, the appointed Arboricultural Consultant and Local Authority Representative (Tree Officer).
- 6.2 The methods of tree protection outlined in this statement shall be fully discussed at the meeting, so that all aspects of their implementation and sequencing are made clear to all parties. This will include agreement of facilitative tree works required and specification thereof.
- 6.3 Any clarifications or modifications to this statement shall be recorded and circulated to all parties in writing. If appropriate, the tree surgery and any other specialist contractors should also attend this meeting.
- 6.4 A copy of this Method Statement shall be supplied to all relevant site personnel who have control over any aspect of excavations within the crown spread of any trees to be retained. The contractor will provide adequate instruction on its implementation for all relevant staff.
- 6.5 The Site Manager shall inform the appointed Arboricultural Consultant at the completion of each stage for inspection and a report circulated to all parties and the Local Planning Authority in writing.

7.0 Tree Surgery Works

- 7.1 All tree works to facilitate access and development must be agreed with the Local Planning Authority at the Pre-Commencement meeting.
- 7.2 Selected individuals and groups of trees within the site are subject to Tree Preservation Order F/1/07 administered by Arun District Council. In addition, part of the site is covered by Tree Preservation Order number 9 of 1967 administered by Arun District Council. TPO 9 of 1967 is formed by area A1 marked on the TPO Plan and refers to Oak and Ash within the TPO Schedule running from Lindsey Court to New Barn Lane. TPO F/1/07 duplicates the 1967 TPO to some extent.
- 7.3 The Tree Removal & Protection Plan TF607/TPP/101-102revA (Phase E) sheet 1 to 2 dated July '09 by *tree:fabrik* (Appendix 2) identifies the trees covered by the above TPOs. However, it is strongly recommended that Local Planning Authority be contacted to clarify which trees and groups are covered by TPO.

- 7.4 All tree works are to be carried out in accordance with BS 3998 *Recommendations for Tree Work* and current good arboricultural practice by a qualified and experienced tree contractor. All cuts will be made to secondary live growth.
- 7.5 The clients' attention is drawn to the responsibilities under the Wildlife & Countryside Act (1981) as amended by the Countryside and Rights of Way Act 2000. It is the responsibility of the tree contractor to ensure all aspects of the Acts are considered and carried out prior to commencing works.
- 7.6 Trees identified for removal or pruning are located throughout the site. The preliminary tree works schedule are listed within table 2 below and the position of the trees shown within the Tree Removal & Tree Protection TF607/TPP/101-102revA (Phase E) sheet 1 to 2 dated July '09 by *tree:fabrik* (Appendix 2), which forms appendix 1.
- 7.7 It is recommended that following practical completion of construction all trees be re-inspected and remedial or amenity tree works (including removal of deadwood) are carried out in accordance with the change of land-use and in agreement with the LPA.

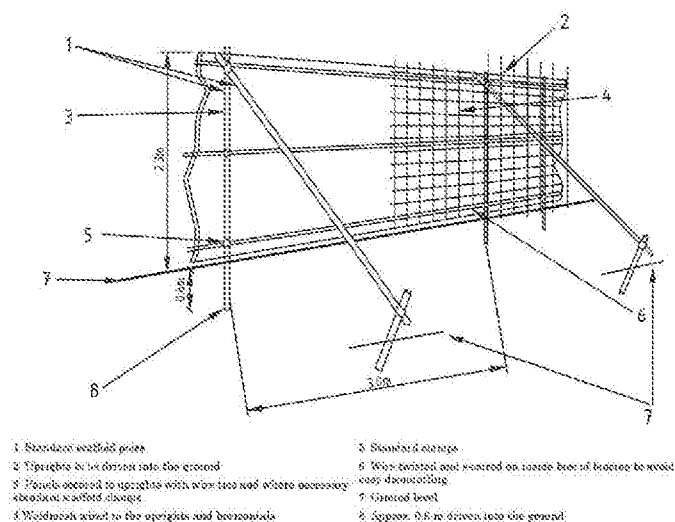
Table 2 – tree works

Tree Survey Schedule No.	TPO	Reason for Removal	BS 5837 (2005) category grade
38	G4	To facilitate internal road	C1
39	G4	To facilitate internal road	C1
41	G4	To facilitate internal road	C1
G32	G5	Part removed to facilitate internal road	C2
G58	N/A	Part removed to facilitate internal road	C2
G78	G2	Part removed to facilitate perma-crib wall	C2
G90	N/A	Part removed to facilitate perma-crib wall	C2
91	G8	Removed to facilitate perma-crib wall	C
92	G8	Removed to facilitate perma-crib wall	C
G93	G7 & G8	Removed to facilitate perma-crib wall	C2
94	N/A	Removed to facilitate perma-crib wall	R
95	G8	Removed to facilitate perma-crib wall	C1
96	G8	Removed to facilitate perma-crib wall	C1

Tree Survey Schedule No.	TPO	Reason for Removal	BS 5837 (2005) category grade
97	G8	Removed to facilitate perma-crib wall	B1
98	G7	Removed to facilitate perma-crib wall	C1
G99	G6	Removed to facilitate perma-crib wall	C2
100	G6	Removed to facilitate perma-crib wall	C1
H128	G5	Garden boundary	C2

8.0 Tree Protection Barriers

- 8.1 Following the completion of facilitative tree works and removal, the tree protection barriers will be erected. The position for barriers is shown on *tree:fabrik* drawing Tree Removal & Protection Plan tf 607/TPP/101-102revA (Phase E) sheet 1 to 2 dated July '09 by *tree:fabrik* (Appendix 2) and the individual root protection area calculations form Appendix 2. The area excluded from activity by the barriers forms the **Construction Exclusion Zone**.
- 8.2 The position of the barriers are to be marked out on site and agreed at each stage with appropriate representatives from the Contractor and appointed Arboricultural Consultant. The barriers will be erected **PRIOR** to any works in the vicinity of the trees or the delivery of machinery, materials, plant or equipment to the site or any adjacent land thereto.
- 8.3 Barriers must be fit for purpose and should consist of a scaffold framework comprising of a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum of 3m. Onto this, weldmesh panels should be securely fixed with wire or scaffold clamps unless similar fencing is agreed with the Local Planning Authority see Detail of Tree Protection Barriers (extract of Fig.2 BS5837 2005) below.



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- Diagram illustrating the installation of a protective fence around a tree trunk, showing two cross-sectional views.
- Left View (Protective Fence):**
- Edge of trunk
 - Protective fence
 - Protective zone
 - Drainage and drainage system
- Right View (Protective Fence):**
- Protective fence
 - Protective zone
 - Drainage and drainage system
 - Drainage and drainage system

- 8.5 Ground Protection for Vehicular movements will be formed by a temporary load bearing surface such as Evetrakway (www.evetrakway.co.uk). Any hollows within the existing ground surface will be filled to provide a flat surface. A geotextile material will then be laid within the position shown. The track way will then be laid and secured in place in accordance with manufacturers instructions.
- 8.6 Once the barriers and ground protection has been properly installed and erected in position, the fenced area is to be considered sacrosanct and must not to be removed or altered in any way without prior approval from the Arboricultural Consultant or Local Authority Tree Officer. A record of the position and adequacy of the fence is to be signed off by the Site Manager and Local Planning Authority.
- 8.7 Notices are to be fixed to the outside of the barriers with words such as **'TREE PROTECTION AREA – NO ACCESS AND NO STORAGE OR WORKING WITHIN THIS AREA'**.
- 8.8 The barriers are to remain in position from before site preparation, demolition and ground works until final completion or a time agreed by the Local Authority and Contractor. All personnel using the site including site managers, agents, supervisors, operatives and other relevant personnel are to be informed of the role of the tree protective fences and its importance.

- 8.9 If 360-degree excavators are to be used during construction, at no time is the excavating arm to encroach over the position of the tree protection fence. Operation must always be in a way that avoids contact with lower branches.
- 8.10 No fires are to be lit within 10m of the tree protection barriers or crown, whichever is greater.
- 8.11 Within the Construction Exclusion Zone:
- No** mechanical or hand excavation
 - No** changes in soil levels
 - No** storage of plant, equipment or materials
 - No** vehicles
 - No** Spillage or discharge of chemical substance, cement washings or other materials
 - No** fires

9.0 Excavation and Utilities

- 9.1 Utility or drainage runs should be designed not to encroach within the RPA of retained trees using existing service routes where possible, obviating the requirement for new trenches. In the event that excavation is required within the RPA as part of agreed utility and drainage plans, hand tools only must be used in accordance with the guidance provided in National Joint Utility Guidelines Vol. 4 issue 2 dated Nov' 07 (see Appendix 3).
- 9.2 In the event that roots are required to be pruned, sharp cutting tools are to be used to ensure the minimum damage is caused. Clean cuts can result in the redevelopment of fine roots. Poor untidy cuts can, however, result in root die back and decay. No roots greater than diameters of 25mm are to be pruned without prior agreement with the appointed arboricultural consultant or Local Authority representative.
- 9.3 All utility and drainage runs within the RPA shall be installed either by directional drilling/thrust boring or open trench and the method of installation agreed with the Local Authority representative and the Arboricultural Consultant. The appropriate method will consider both the site constraints and the potential impact on the health and stability of the tree.
- 9.4 **Installation by directional drilling or thrust boring:**
- Within the RPA no excavation is to occur. Installation of all utilities will be by directional drilling or thrust boring.

- Prior to commencement of any works in connection with this operation, the launch and receiving pit will be clearly marked out by the Site Manager in agreement with the Arboricultural Consultant.
- All tree protection barriers will remain in-situ. The launch and receiving pit shall be located outside of the RPA.
- Following excavation of the launch pit the soil profile will be inspected and where possible the depth of the root zone established.
- The bore hole shall be made at a minimum depth of 1000mm below ground level or below the root zone, whichever is deepest.
- Lubrication of the 'mole' or drilling head shall be with water. Oil or other lubricant may contaminate the soil and are prohibited.
- A single length of ducting shall be used to avoid future tree root damage.

9.5 **Installation by open trench:**

- Within the RPA of trees installation of utilities and drainage runs will be by open trench method.
- No plant machinery will be used within the RPA of retained trees.
- Prior to commencement of any works in connection with this operation, the line of the trench will be marked out by the Site Manager in agreement with the Arboricultural Consultant. The narrowest practical width of trench will be marked.
- The Tree Protection Barriers will be set back to enable the minimum practical working space required. Ground protection shall then be installed between the barrier and the nearside of the trench and from the far side of the trench to the edge of the RPA.
- Surface vegetation or existing overburden will then be removed using hand tools.
- Excavation shall be carried out using a pick or fork to first loosen the soil, where roots are present the soil will be cleared using a compressed air soil pick and the loosened soil removed using hand tools.
- All excavated material to be re-used shall be protected from excessive drying or wetting during storage.
- No roots greater than diameters of 25mm are to be pruned without prior agreement with the appointed arboricultural consultant or Local Authority representative. In the event

that roots are required to be pruned, sharp cutting tools are to be used to ensure the minimum damage is caused. Clean cuts can result in the redevelopment of fine roots. Poor untidy cuts can, however, result in root die back and decay.

- Any tree roots exposed by such operations should be treated at once. Exposed roots will be wrapped in dry, clean Hessian sacking to prevent desiccation and to protect from rapid temperature changes.
- Utilities and drainage runs will then be fed into the trench using a single length of duct to avoid future tree root damage.
- The trench will then be backfilled with 200mm to 300mm depth of excavated soil and firmed with the heel. The use of whackers or machine operated compactors are prohibited.
- This operation will be repeated until the trench is filled.
- Immediately following completion the ground protection will be removed and the tree protection barriers erected to the original tree protection line.

10.0 Cranes, Rigs & Booms

10.1 Precautionary measures must be observed to avoid contact with the crown of any retained trees from tall loads, plant with booms, plant & counterweights.

- Protection and precautionary measures shall be considered by the client and Contractor and provision made within the contractor's Method Statement.
- A copy of the protection and precautionary measures contained within the contractor's Method Statement will be provided by the Site Manager to the Arboricultural Consultant for checking.

11.0 Installation of Garden Fences and Footpaths

11.1 Within **Precautionary Area 1** or any RPA and following completion of practical construction or at a time otherwise agreed with the local planning authority 'no dig' features agreed as part of the approved plans will be installed.

- **Footpaths** within the RPA must follow the principles of 'no dig' construction methods and laid at or above ground level in order to avoid root severance/disturbance. Footpaths shall be aligned to pass no closer than 1 metre

from the base of any tree. Prior to laying of foundations a non porous membrane will be laid to protect the soil from potential toxic effects of concrete.

- The final surface of the paths may be gravel, paving slabs or brick paviours and should be dry-bedded on the sub-base and joints left unsealed.
- **Post holes** within the RPA shall be installed using hand tools only in order to minimise root severance/disturbance. The pit shall be positioned to avoid root disturbance/severance of major roots. Roots smaller than 25mm diameter may be pruned back, preferably to a side branch, using proprietary cutting tools. The resultant hole shall be lined with a non porous membrane to protect the soil from potential toxic effects of concrete prior to setting of the post and pouring.

12.0 Storage of Materials

12.1 All materials for construction purposes should be carefully stored outside the enforced construction exclusion zone.

- Any accident or spillage adjacent to the protection barriers or within the vicinity of ground protection must be reported immediately to the Site Manager. Works occurring within the vicinity will cease immediately until adequate tree protection measures are rectified.
- A record of the damage will be made by the Site Manager and, in consultation with the appointed Arboricultural Consultant, remediation measures carried out. Were necessary remedial measures will be agreed with the Local Authority Representative prior to implementation.
- In the event of spillage, the area is to be secured with sandbags on the line of the tree protection area and measures taken to drain/soak any spillage away from the protected area.

13.0 Landscaping Works

13.1 All landscaping will avoid soil re-grading and disturbance within the tree protective areas where possible. If cultivation of the soil and making up of levels is required, cultivation should not exceed 50mm depth and must at all times be by hand. All landscaping works, soft and hard, should be carried out as the last process of development. Any agreed soil re-profiling required to achieve the finished levels around trees will be carried out by hand with General Purpose grade topsoil and under supervision of the appointed arboricultural consultant.

14.0 Tree Protection and Dismantling Protective Barriers

- 14.1 In order to implement final surface treatments it will be necessary to dismantle the protective barriers. Within tree protection distances all works will conform to the principals set in paragraphs 8.1 to 8.11
- 14.2 A minimum of seven days notice will be given to the Local Authority prior to the dismantling of the protective barriers.
- 14.3 Under no circumstances will the soil levels be altered after the protective barriers have been removed.

APPENDIX 1

Root Protection Area Calculations

LAND AT FELPHAM, BOGNOR REGIS
METHOD STATEMENT

Tree No.	Species	Stem Dia (mm)	Age Class	Remaining contribution (est. years)	Category grading	Root protection area		
						Radius (m)	M ²	Square
1	Hawthorn	540*	M	10 to 20	C1	5.4*	91.6*	9.6*
2	Blackthorn	150e	MA	<10	R	1.8	10.2	3.2
3	Hawthorn	150*	M	10 to 20	C1	1.5*	7.1*	2.7*
4	Oak	340e	MA	20 to 40	C1	4.1	52.3	7.2
5	Hawthorn	200e	M	10 to 20	C1	2.4	18.1	4.3
6	English Elm	600*	Y	<10	R	6*	113.1*	10.6*
7	Hybrid Black Poplar	1600*	M	10 to 20	C1	15*	707*	26*
8	Hybrid Black Poplar	1800*	M	10 to 20	C1	15*	707*	26*
9	Hybrid Black Poplar	1800*	M	10 to 20	C1	15*	707*	26*
G10	6x Hybrid Black Poplar	200ave	MA	10 to 20	C1	2.4	18.1	4.3
11	Hawthorn	190e	M	10 to 20	C1	2.3	16.3	4
12	Hybrid Black Poplar	960e	M	10 to 20	C1	11.5	417	20.4
13	Monterey Cypress	860	M	<10	R	10.3	334.6	18.3
14	Hybrid Black Poplar	870e	M	10 to 20	C1	10.4	342.5	18.5
15	English Elm	220ave	Y	<10	R	2.6	21.9	4.7
16	Monterey Cypress	550	MA	20 to 40	C1	6.6	136.9	11.7
17	Hybrid Black Poplar	750*	MA	10 to 20	C1	7.5*	176.7*	13.3*
18	Cherry	190e	M	10 to 20	C1	2.3	16.3	4
19	Bay	210*	MA	10 to 20	C1	2.1*	13.9*	3.7*
20	English Oak	1200*	M	10 to 20	C1	12*	452.4*	21.3*
21	Ash	900*	MA	<10	R	9*	254.5*	16*
22	Field Maple	350*	MA	<10	R	3.5*	38.5*	6.2*
23	English Oak	520	MA	10 to 20	C1	6.2	122.3	11.1
24	English Oak	960*	M	20 to 40	B1	9.6*	289.6*	17*
25	English Oak	1080*	M	20 to 40	B1	10.8*	366.5*	19.1*
G26	70% Field Maple, 20% Hawthorn, 2% Ash, 2% Hazel, 1% Elder	200ave	M	10 to 20	C2	2.4	18.1	4.3
27	Field Maple	220e	M	10 to 20	C1	2.6	21.9	4.7
G28	2x Field Maple	400ave	M	10 to 20	C2	4.8	72.4	8.5
G29	2x Field Maple	420ave	M	10 to 20	C2	5	79.8	8.9
30	English Oak	550e	M	20 to 40	B1	6.6	136.9	11.7
31	2x English Oak	410ave	MA	20 to 40	B1	4.9	76.1	8.7
G32	30% Blackthorn, 25% Hazel, 25% Elder, 10% Hawthorn, 5% Field Maple, 5% Grey Willow	160ave	M	10 to 20	C2	1.9	11.6	3.4
33	English Oak	610e	M	20 to 40	B1	7.3	168.4	13
34	English Oak	990	M	20 to 40	B1	11.9	443.4	21.1
35	40% Hawthorn, 40% Blackthorn, 20% Elder	140ave	M	10 to 20	C2	1.7	8.9	3
36	Monterey Cypress	1180	M	10 to 20	C1	14.2	630	25.1
37	Oak	400e	Y	10 to 20	C1	4.8	72.4	8.5
38	Monterey Cypress	1330	M	10 to 20	C1	15	707	26
39	Hybrid Black Poplar	400e	MA	20 to 40	C1	4.8	72.4	8.5
40	Hybrid Black Poplar	430e	MA	10 to 20	C1	5.2	83.7	9.1
41	Hybrid Black Poplar	860*	M	10 to 20	C1	8.6*	232.4*	15.2*
42	Hybrid Black Poplar	400e	MA	20 to 40	C1	4.8	72.4	8.5
43	4x hybrid Black Poplar	220ave	MA	20 to 40	C2	2.6	21.9	4.7
44	Monterey Cypress	1010	M	<10	R	12.1	461.5	21.5
45	Oak	340	MA	10 to 20	C1	4.1	52.3	7.2

LAND AT FELPHAM, BOGNOR REGIS

METHOD STATEMENT

Tree No.	Species	Stem Dia (mm)	Age Class	Remaining contribution (est. years)	Category grading	Root protection area		
						Radius (m)	M ²	Square
46	Monterey Cypress	1130*	M	10 to 20	C1	11.3*	401.2*	20*
47	Oak	200	Y	40+	C1	2.4	18.1	4.3
48	Oak	760*	MA	10 to 20	C1	7.6*	181.5*	13.5*
49	Hybrid Black Poplar	680*	MA	10 to 20	C1	6.8*	145.3*	12.1*
50	Monterey Cypress	1100*	M	10 to 20	C1	11*	380.2*	19.5*
51	Oak	590	MA	20 to 40	B1	7.1	157.5	12.5
52	Monterey Cypress	870	M	<10	R	10.4	342.5	18.5
53	Hybrid Black Poplar	940*	MA	10 to 20	C1	9.4*	277.6*	16.7*
54	Oak	580	MA	20 to 40	B1	7	152.2	12.3
55	Oak	300	Y	<10	R	3.6	40.7	6.4
56	Oak	380	Y	<10	R	4.6	65.3	8.1
57	Oak	300	Y	20 to 40	C1	3.6	40.7	6.4
G58	50% Hawthorn, 40% Blackthorn & 10% Elder	180ave	M	10 to 20	C2	2.2	14.7	3.8
59	Hybrid Black Poplar	500e	M	<10	R	6	113.1	10.6
60	Monterey Cypress	1100	M	<10	R	13.2	547.5	23.4
61	Monterey Cypress	940	M	<10	R	11.3	399.8	20
62	Oak	340	Y	40+	C1	4.1	52.3	7.2
63	Hybrid Black Poplar	1600*	M	10 to 20	C1	15*	707*	26*
64	Monterey Cypress	960	M	10 to 20	C1	11.5	417	20.4
65	Hybrid Black Poplar	960	M	10 to 20	C1	11.5	417	20.4
66	Oak	250	Y	20 to 40	C1	3	28.3	5.3
67	Oak	300	Y	10 to 20	C1	3.6	40.7	6.4
68	Hybrid Black Poplar	760	M	<10	R	9.1	261.3	16.2
69	Hybrid Black Poplar	1200*	M	10 to 20	C1	12*	452.4*	21.3*
70	Oak	200	Y	20 to 40	C1	2.4	18.1	4.3
71	Oak	330	Y	<10	R	4	49.3	7
72	Hybrid Black Poplar	840	M	<10	R	10.1	319.2	17.9
73	Oak	2100*	M	20 to 40	B1	15*	707*	26*
74	Oak	1200*	M	20 to 40	B1	12*	452.4*	21.3*
75	Oak	500e	M	20 to 40	B1	6	113.1	10.6
G76	10% Hazel, 25% Blackthorn, 20% Elder, 25% Hawthorn, 20% Grey Willow	150ave	M	10 to 20	C1	1.8	10.2	3.2
77	4x Common Ash	450ave	MA	10 to 20	C2	5.4	91.6	9.6
G78	30% Hazel, 5% Field Maple, 5% Elder, 30% Blackthorn, 30% Hawthorn	200ave	M	10 to 20	C2	2.4	18.1	4.3
79	Scots Pine	400e	MA	<10	R	4.8	72.4	8.5
80	Purple Sycamore	550e	M	20 to 40	B1	6.6	136.9	11.7
81	Horse Chestnut	280e	MA	<10	R	3.4	35.5	6
82	Maritime Pine	550e	M	20 to 40	B1	6.6	136.9	11.7
83	Purple Sycamore	500e	M	20 to 40	B1	6	113.1	10.6
84	Scots Pine	480e	M	<10	R	5.8	104.2	10.2
85	Maritime Pine	800e	M	20 to 40	B1	9.6	289.6	17
86	Maritime Pine	300e	MA	<10	R	3.6	40.7	6.4
87	Purple Sycamore	360e	MA	<10	R	4.3	58.6	7.7
88	Maritime Pine	800e	M	20 to 40	B1	9.6	289.6	17
G89	6% Laburnum, 2% Cypress, 2% Holly, 40% Hawthorn, 40%	180ave	MA	10 to 20	C2	2.2	14.7	3.8

LAND AT FELPHAM, BOGNOR REGIS
METHOD STATEMENT

Tree No.	Species	Stem Dia (mm)	Age Class	Remaining contribution (est. years)	Category grading	Root protection area		
						Radius (m)	M ²	Square
	Blackthorn							
G90	20% Hazel, 40% Elder, 10% Blackthorn, 20% Field Maple, 10% Hawthorn	160ave	MA	10 to 20	C2	1.9	11.6	3.4
91	Field Maple	600*	M	10 to 20	C1	6*	113.1*	10.6*
92	Common Ash	540e	MA	10 to 20	C1	6.5	131.9	11.5
G93	25% Hawthorn, 25% Blackthorn, 25% Field Maple, 25% Grey Willow	ave	MA	10 to 20	C2	0	0	0
94	Common Ash	360e	M	<10	R	4.3	58.6	7.7
95	Oak	320e	Y	40+	C1	3.8	46.3	6.8
96	Oak	580e	M	20 to 40	C1	7	152.2	12.3
97	Common Ash	600e	M	20 to 40	B1	7.2	162.9	12.8
98	Oak	600e	MA	40+	C1	7.2	162.9	12.8
G99	2x Common Ash	400ave	MA	10 to 20	C2	4.8	72.4	8.5
100	Oak	380e	Y	10 to 20	C1	4.6	65.3	8.1
101	Common Ash	600*	Y	<10	R	6*	113.1*	10.6*
102	Common Ash	300*	Y	<10	R	3*	28.3*	5.3*
G103	10% Elder, 60% Hazel, 20% Hawthorn, 10% Blackthorn	400ave	M	10 to 20	C2	4.8	72.4	8.5
104	Oak	430e	MA	40+	B1	5.2	83.7	9.1
G105	14x Field Maple	340ave	M	10 to 20	C2	4.1	52.3	7.2
G106	11x Field Maple	340ave	M	10 to 20	C2	4.1	52.3	7.2
G107	30% Grey Willow, 30% Blackthorn, 20% Walnut, 20% Hawthorn	180ave	MA	<10	R	2.2	14.7	3.8
108	Oak	440e	MA	20 to 40	C1	5.3	87.6	9.4
109	Common Ash	430e	MA	20 to 40	C1	5.2	83.7	9.1
110	Oak	400e	MA	40+	C1	4.8	72.4	8.5
111	Common Ash	400*	MA	<10	R	4*	50.3*	7.1*
112	Common Ash	700*	MA	<10	R	7*	154*	12.4*
G113	25% Hazel, 25% Hawthorn, 25% Blackthorn, 25% Elm	150ave	M	10 to 20	C2	1.8	10.2	3.2
114	Common Ash	240e	Y	20 to 40	C1	2.9	26.1	5.1
115	Oak	200e	Y	40+	C1	2.4	18.1	4.3
116	Oak	180e	Y	10 to 20	C1	2.2	14.7	3.8
117	Oak	180*	Y	10 to 20	C1	1.8*	10.2*	3.2*
118	Common Ash	2000*	M	10 to 20	C1	15*	707*	26*
G119	11x Field Maple	450ave	M	10 to 20	C1	5.4	91.6	9.6
H120	Hazel, Hawthorn, Blackthorn	140ave	M	10 to 20	C2	1.7	8.9	3
121	Common Ash	520e	M	10 to 20	C1	6.2	122.3	11.1
122	Common Ash	210e	MA	<10	R	2.5	20	4.5
123	Common Ash	700*	MA	10 to 20	C1	7*	154*	12.4*
124	Oak	480e	MA	10 to 20	C1	5.8	104.2	10.2
G125	30% Grey Willow, 30% Blackthorn, 20% Hawthorn, 10% Hazel, 10% Crack Willow	190ave	M	10 to 20	C2	2.3	16.3	4
126	Common Ash	160e	Y	10 to 20	C1	1.9	11.6	3.4
127	Oak	1800*	M	40+	B1	15*	707*	26*
H128	10% Hazel, 45%	180ave	M	10 to 20	C2	2.2	14.7	3.8

LAND AT FELPHAM, BOGNOR REGIS
METHOD STATEMENT

Tree No.	Species	Stem Dia (mm)	Age Class	Remaining contribution (est. years)	Category grading	Root protection area		
						Radius (m)	M ²	Square
	Hawthorn, 45% Blackthorn							
G129	16x Aspen	200ave	MA	10 to 20	C2	2.4	18.1	4.3
130	Field Maple	800*	M	10 to 20	C1	8*	201.1*	14.2*

APPENDIX 2

Tree Removal & Protection Plan

APPENDIX 3

**National Joint Utility Guidelines Vol. 4 issue 2 Nov'07
(extract)**



NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

Volume 4

**NJUG GUIDELINES FOR THE PLANNING, INSTALLATION AND
MAINTENANCE OF UTILITY APPARATUS IN PROXIMITY TO
TREES**

PLEASE ENSURE THAT YOU READ THE LEGAL NOTICE AND DISCLAIMER
WHICH APPEARS IN APPENDIX B OF THIS PUBLICATION

Issue 2: 16th November 2007

NJUG has a vision for street works, this vision is simply:

- Safety is the number one priority
- Damage to underground assets is avoided
- Utilities work together and in partnership with local authorities to minimise disruption
- Utilities deliver consistent high quality
- Utilities maximise the use of sustainable methods and materials
- Street Works in the U.K. are regarded as world class

This document forms part of that vision.

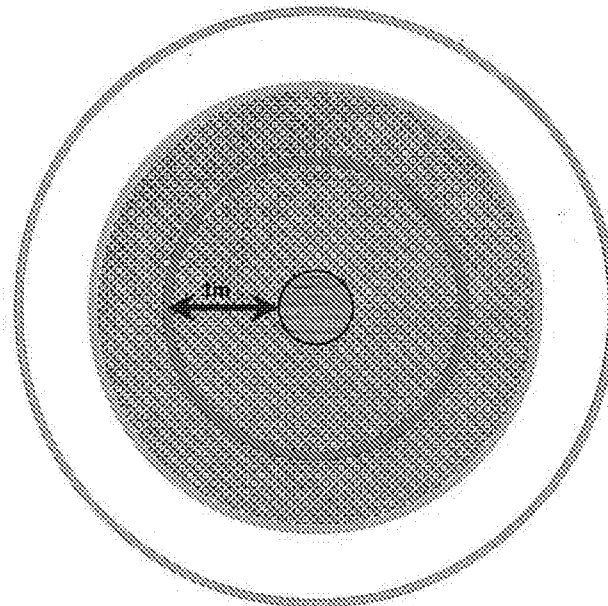
Mark Ostheimer
Director, Safety and Policy



The National Joint Utilities Group

NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

FIGURE 1 – Tree Protection Zone



Key



Trunk of tree



Canopy or branch spread



PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with the local authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.



PRECAUTIONARY ZONE – 4 x tree circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with the local authority Tree Officer if in any doubt.



PERMITTED ZONE – outside of the precautionary zone. Excavation works may be undertaken within this zone, however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.



The National Joint Utilities Group

NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

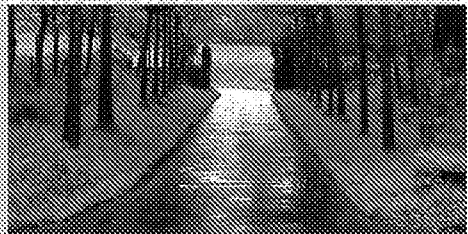
TABLE 1 - Prevention of Damage to Trees Below Ground

Causes of Damage	Type of Damage	Implications to Tree	Precautions
Trenching, mechanical digging etc.	Root severance	- The tree may fall over - Death of the root beyond the point of damage - Potential risk of infection of the tree The larger the root the greater the impact on the tree.	Hand excavate only within the Precautionary Zone. Work carefully around roots. Do not cut roots over 25mm in diameter without referring to the local authority tree officer. For roots less than 25mm in diameter use a sharp tool and make a clean cut leaving as small a wound as possible.
Trenching, mechanical digging, top soil surface removal etc.	Root bark damage	- The tree may fall over - If the damage circles the root it will cause the death of the root beyond that point - Potential risk of infection of the tree The larger the root the greater the impact on the tree.	Do not use mechanical machinery to strip the top soil within the Precautionary Zone. Hand excavate only within the Precautionary Zone. Work carefully around roots. Do not cut roots over 25mm in diameter without referring to the local authority tree officer. For roots less than 25mm use a sharp tool and make a clean cut leaving as small a wound as possible.
Vehicle movement and plant use. Material storage within the precautionary area.	Soil compaction & water saturation	Restricts or prevents passage of gaseous diffusion through soil, the roots are asphyxiated and killed affecting the whole tree.	Prevent all vehicle movement, plant use or material storage within the Precautionary Zone.
Top-soil scouring, excavation or banking up.	Alterations in soil level causing compaction or exposure of roots.	Lowering levels strips out the mass of roots over a wide area. Raising soil levels asphyxiates roots and has the same effect as soil compaction.	Avoid altering or disturbing soil levels within the Precautionary Zone.
Use of herbicides.	Poisoning of the tree via root absorption	- Death of the whole tree - Death of individual branches Damage to leaves and shoots.	The selection and application of herbicides must be undertaken by a competent person in accordance with COSHH regulations.
Spillage of oils or other materials.	Contamination of soil	Toxic and asphyxiation effects of chemicals, oils, building materials (cement, plaster, additives etc.) on the root system can kill the tree.	Never store oils, chemicals or building materials within the Precautionary Zone or within the branch spread of a tree, which ever is the greater.
Placement or replacement of underground apparatus.	Various	Death of all or part of the tree.	Effective planning and liaison with local authority tree officer, taking into consideration the position of trees, and their future growth potential and management

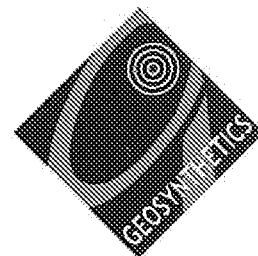
APPENDIX 4

**Tree Root Protection System
using CellWeb by Geosynthetics Ltd
(www.geosyn.co.uk)**

CellWeb



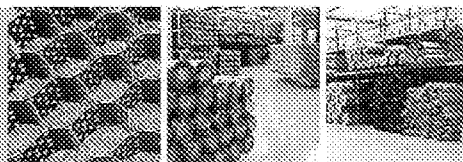
Tree Root Protection System



Geosynthetics Limited

CellWeb

Tree Root Protection System



CellWeb Tree Root Protection System provides a flexible and permeable solution for protecting tree roots while creating a strong stable surface for traffic.



With increased urbanisation and more redevelopments of existing properties, the need to be mindful of the impact on the surrounding environment is more important than ever.

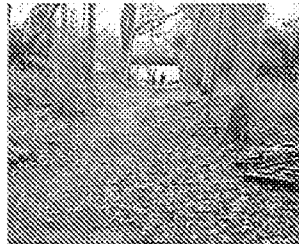
The demand for building site access, driveways and parking around existing trees can have a potentially fatal impact on the tree if carried out incorrectly. Tree preservation orders (TPO's) ensure that trees are not wilfully damaged. However the need for vehicle access over and around tree roots can still cause the following problems:



Problems:

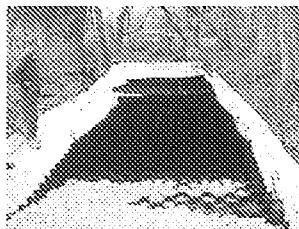
- Compaction of subsoils (especially by construction traffic) causing oxygen and nutrient depletion
- Creating an impermeable surface that prevents water reaching the roots
- Changes in ground level and water table
- Damage caused during excavation
- Contamination of the subsoil

By using CellWeb Tree Root Protection System you can avoid these problems and ensure the tree's long-term future. BS 5837:1991 (revised 2006) and APN 1 provide information for the protection of trees during the construction process, and CellWeb is a well-established solution that conforms to these guidelines.

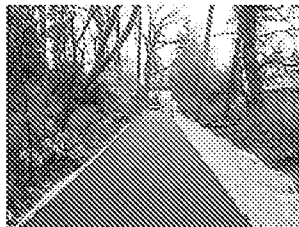


Access road for the National Lake District Parks Authority.

Site before construction pictured above.



CellWeb during installation.



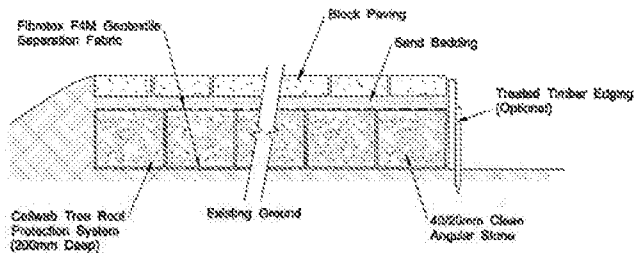
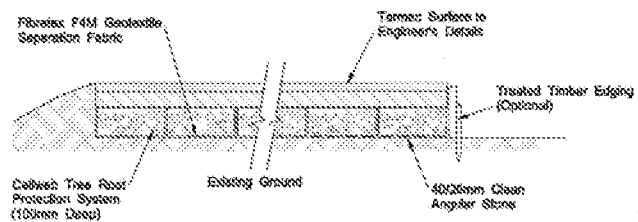
Final surfacing.

Final surfacing

The CellWeb Tree Root Protection is totally confined within the clean stone sub base, therefore you can choose whichever surface materials are most appropriate for your installation. Some materials are more suitable than others and serious consideration should be given to the porosity of the surface for continued healthy growth of the tree. An ideal surfacing are DuoBlocks: a grass reinforcement and gravel retention system. Geosynthetics can supply these systems for a visually attractive surface that also has the advantage of being fully porous.

Loose or bonded gravels can be used as an alternative hard landscaping and CellWeb can also be used with block pavers whose porous joints will permit moisture and air transfer to the roots. Where planning allows, porous asphalt is yet another possible surfacing treatment.

Call our sales office on 0870 850 1018 for more information.

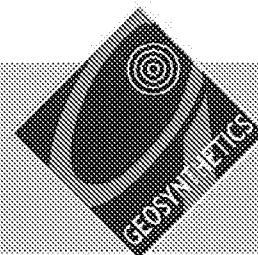


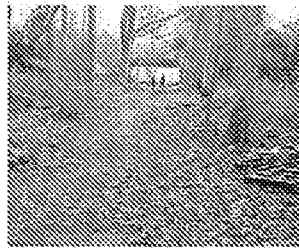
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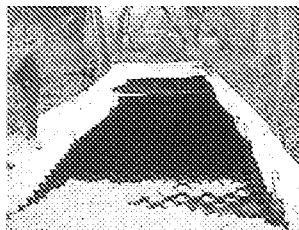
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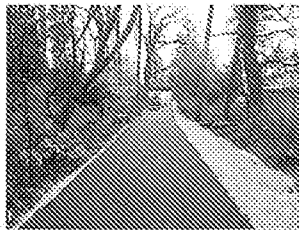


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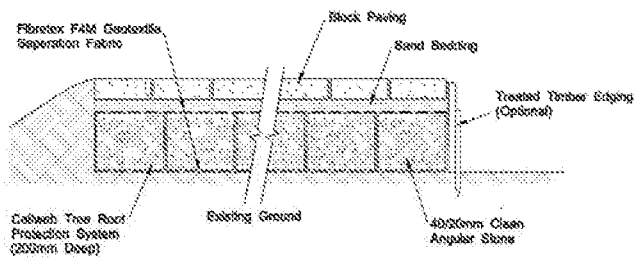
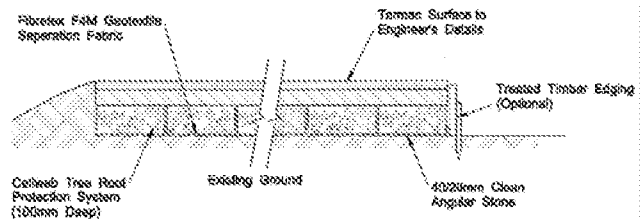
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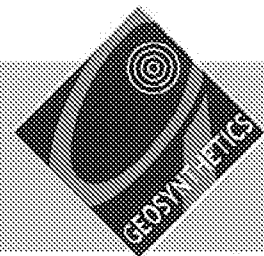


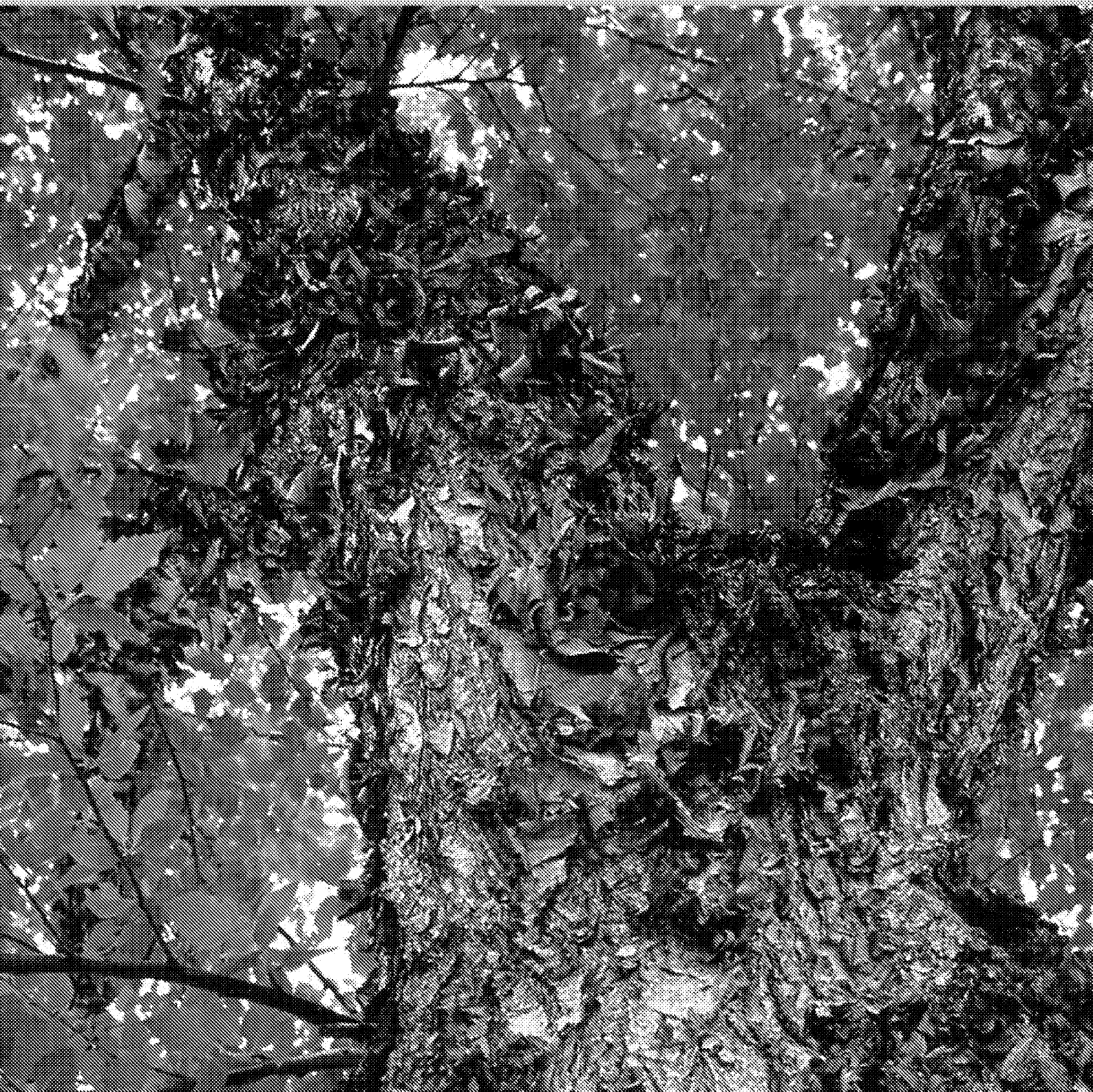
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