greenwillows associates ltd

**Land at 19 Bury Road, Ramsey PE26 1NE**
**Tree protection**
**(proposed layout 22442_03 Rev E June 2025) V2**

| SCALE : 1 : 200 @ A1 | DATE : 27/09/2025 | N |
|---|---|---|
| MAP FILENAME : | | |

THIS DRAWING MUST BE READ IN COLOUR

Crown Spread
Root Protection Area
Category 'A'
Category 'B'
Category 'C'
Category 'U'

0 30m

Temporary tree-protective construction exclusion zone enclosed by robust fencing in accordance with British Standard BS5837

Tree pruning - extent of pruning to trees 27 and 28 (for access)

Temporary tree root protective heavy-duty track mats in lieu of barrier fencing to allow adequate working space during the construction phase

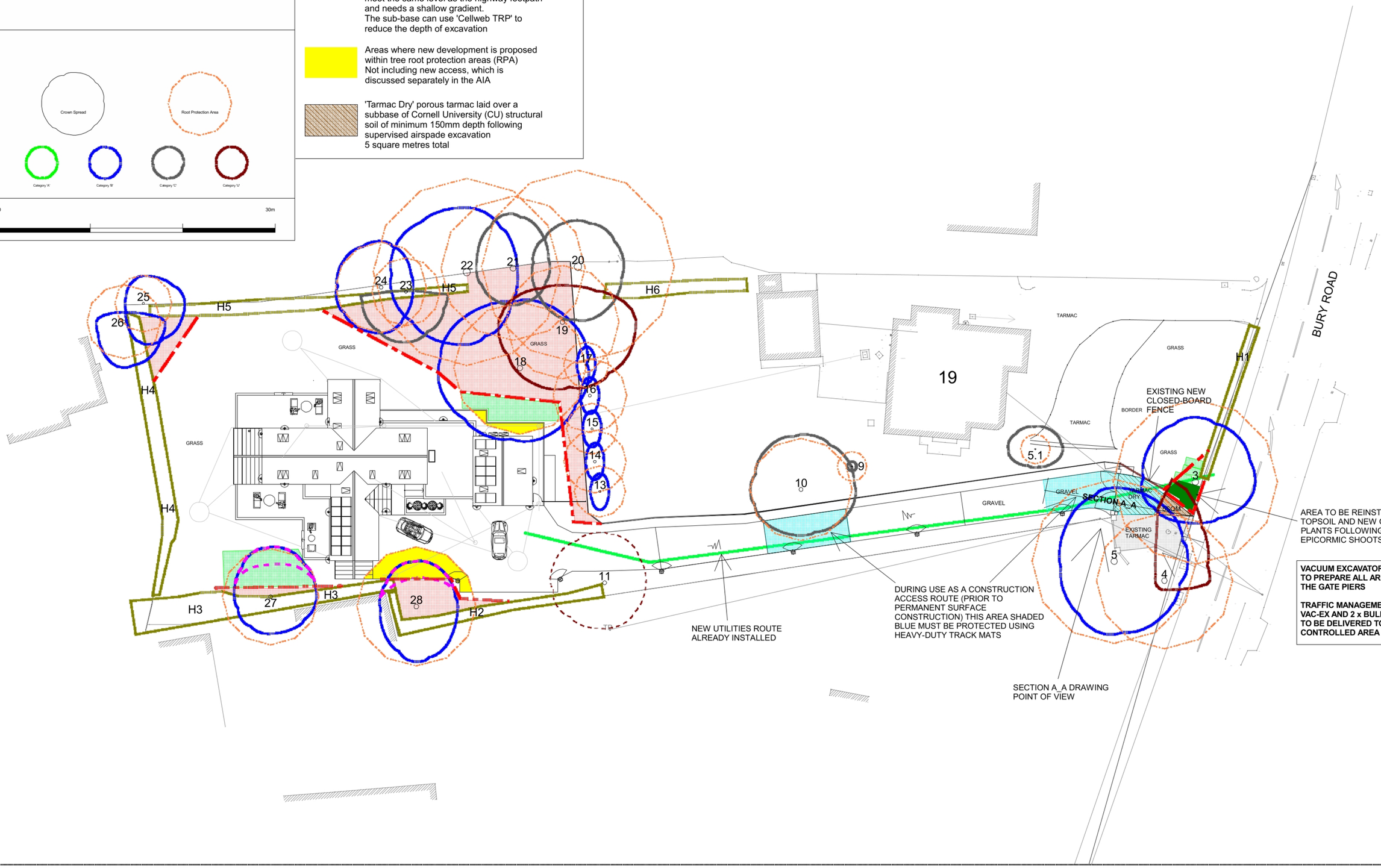
'Minimal-dig' section
A 'no-dig' solution is not possible in this area because the driveway finished level has to meet the same level as the highway footpath and needs a shallow gradient.
The sub-base can use 'Cellweb TRP' to reduce the depth of excavation

Areas where new development is proposed within tree root protection areas (RPA)
Not including new access, which is discussed separately in the AIA

'Tarmac Dry' porous tarmac laid over a subbase of Cornell University (CU) structural soil of minimum 150mm depth following supervised airspade excavation
5 square metres total

NOTES
SEE ARBORICULTURAL ASSESSMENT REPORT AND ARBORICULTURAL METHOD STATEMENT

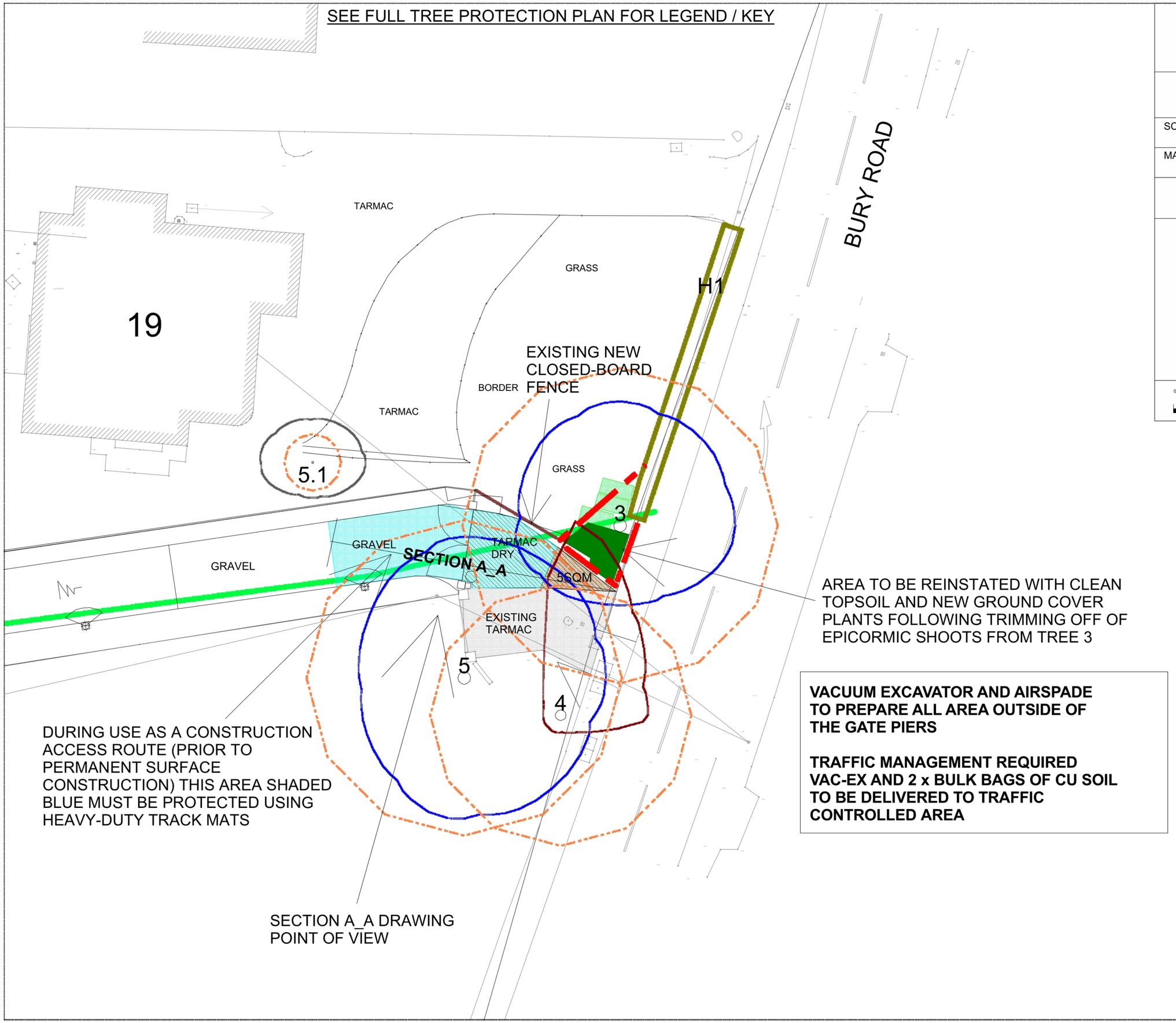
SEE DRAWING SECTION A_A




**VACUUM EXCAVATOR AND AIRSPADE TO PREPARE ALL AREA OUTSIDE OF THE GATE PIERS**

**TRAFFIC MANAGEMENT REQUIRED VAC-EX AND 2 x BULK BAGS OF CU SOIL TO BE DELIVERED TO TRAFFIC CONTROLLED AREA**

SEE FULL TREE PROTECTION PLAN FOR LEGEND / KEY




greenwillows associates ltd

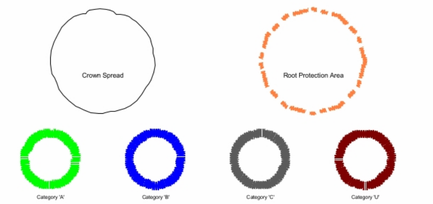
# NEW ACCESS CLOSE-UP

| SCALE : | DATE : |
|---|---|
| 1 : 100 @ A1 | 27/09/2025 |

MAP FILENAME :

N

THIS DRAWING MUST BE READ IN COLOUR






**CORNELL SOIL QUANTITY CALCULATION (SKY GARDEN LTD)**

Calculator

5 SQM 200 Depth (mm) Calculate

Required Bulk Bag: 2

Calculate cost

2 Bulk Bag 12kg Of $CO_2$ Offset by your roof per year

SEE ARBORICULTURAL METHOD STATEMENT

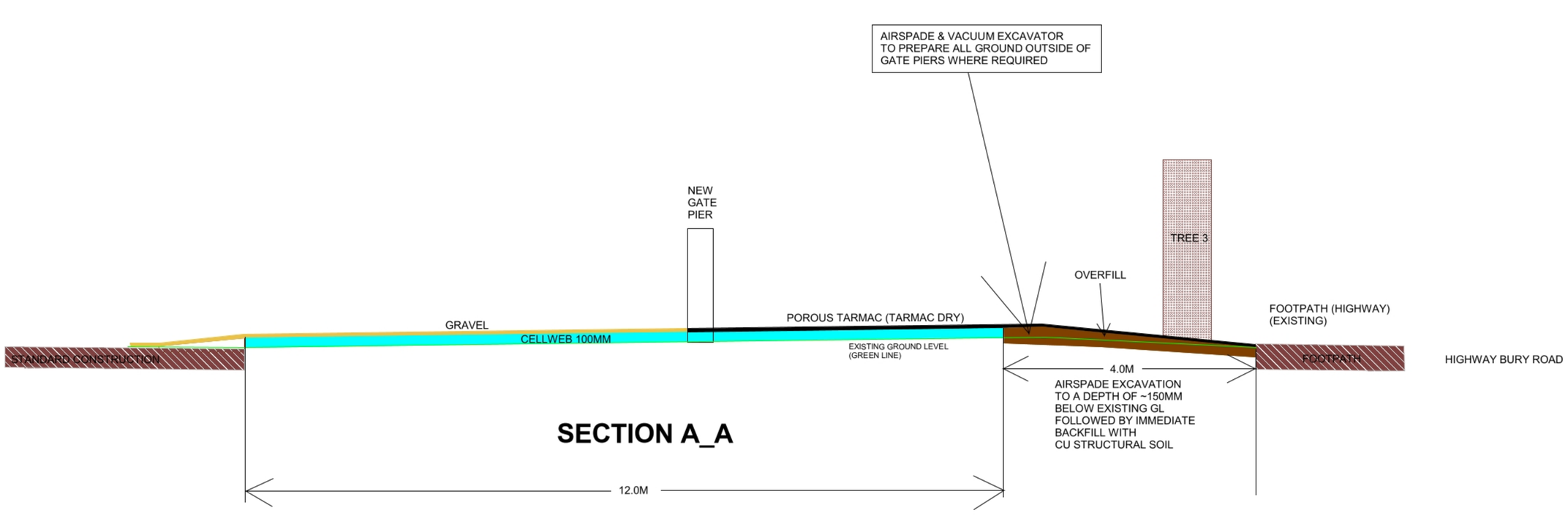
greenwillows associates ltd

**Land at 19 Bury Road, Ramsey PE26 1NE**
**SECTION A_A minimal dig surface**

| SCALE : 1 : 50 @ A2 | DATE : 25/07/2025 | N |
|---|---|---|
| MAP FILENAME : | | |

THIS DDRAWING MUST BE READ IN COLOUR

CELLWEB 100MM
OVERFILL 25MM
SURFACE BASE & WEARING COURSE 50MM



# ECHNICAL RECOMMENDATION

| APPLICATION [11 RUR-CEL] | Reinforcement of Roads with Cellweb |
|---|---|

Geosynthetics

| | | |
|---|---|---|
| PROJECT: | 19 BURY ROAD, RAMSEY, CAMBRIDGES | |
| DESIGNER/SPECIFIER: | | Mr. Ian Lorman |
| CLIENT/END USER: | Mr & Mrs Paul Jackson | |
| PLANNING AUTHORITY: | HUNTINGDONSHIRE DISTRICT COUNCIL | |

| Reference: | Version: | Location: | Date: |
|---|---|---|---|
| TR21-3789_RUR_CEL_19 Bury Road, Ramsey, Cambridgeshire - V1 | V1 | 19 Bury Road, Ramsey, Huntingdon | 13 October 2021 |

## PROJECT DESCRIPTION

Construction of an entrance to a residential home over a tree root protection zone with the use of Cellweb to help reduce the compaction of the existing ground. The project is located on 19 Bury Road, Ramsey, Huntingdon, PE26 1NE. Cellweb is a no dig tree root protection measure and it is recommended that no excavation be performed without prior approval and guidance from the tree officer.

This document TR21-3789_V1 provides the preliminary calculation of the reinforced areas over Tree Root protection zone, according to email and information delivered by Mr Ian Lorman on the 29/09/2021.

- **Ground conditions:**
  - Soil Info: Cohesive as per client details.
  - CBR: 2% as per client details.
- **Area: Total = 80m²** given in Cellweb questionnaire
- **Traffic Information:**
  - Traffic design: Cars for driveways
  - Maximum Gross Vehicle Weight GVW = Max 3,000 kg
  - Maximum axle load = 20 kN/axle.
  - Maximum wheel load = 10 kN/wheel
- **Infill material for Cellweb:**
  - 4mm to 20mm clean angular stone, Type 4/20 due to tree root protection requirement. Specification according to BS7533-13
- **Surface:**
  - During - 50mm Clean Angular Stone Type 4/20 loose gravel
  - After – Porous Tarmac, depth TBC (as per client details)

## OBJECTIVE

To propose a technical solution of reinforcement using the minimum required thickness of subbase Type 4/20 and Cellweb TRP and non-woven Geotextile Treetex for separation.

Due to tree root protection requirements, the solution has to be a no-dig and no-compaction system to protect tree roots. The Cellweb TRP with subbase Type 4/20 provides a stable structure to distribute the loads and reduce the pressure at the ground level. The system promotes the migration of water and nutrients, maintaining the soil bulk density at levels that are suitable for tree root growth.

## DESIGN METHOD

The methodology used is based on the design methods of reinforcement of unpaved roads proposed by Webster (1981). The first step in the design of a Cellweb reinforced pavement is to consider the ultimate bearing capacity of the pavement system under the greatest wheel load that it will have to support. This is undertaken following the guidance provided by Webster which uses conventional bearing capacity analysis to determine the applied and allowable pressure below the road pavement. The equations were derived for unpaved road design and make no allowance for the surfacing over the Cellweb. They are therefore considered to be conservative when permanent surfacing is placed over the Cellweb reinforced sub-base.

When additional sub-base is required beneath Cellweb the depth of this material may be reduced by placement of surfacing material above. If the thickness of surfacing is equal to or greater than the required sub-base, then the sub-base may be omitted.

## PARAMETERS AND CONSIDERATIONS

In order to perform the calculations, we used the methodology for reinforcement of unpaved roads, not taking account of any permanent surfacing that may be provided.

Standards and Specifications according to application:

- BS5837:2012
- APN 12
- BS7533-13:2009 for infill material

In the following tables, we present the parameters and assumptions used for the preliminary calculation. All parameters need to be verified by the client for final design.

| SOIL PROPERTIES | |
|---|---|
| **SUBGRADE SOIL** | |
| Soil Type: | Cohesive, as per client details. |
| CBR: | 2% as per client details |
| Undrained shear strength $C_u$: | 46 kPa |
| Internal friction angle, $\phi_u$: | 0 deg |
| Unit weight, $\gamma$: | 18 kN/m$^3$ |

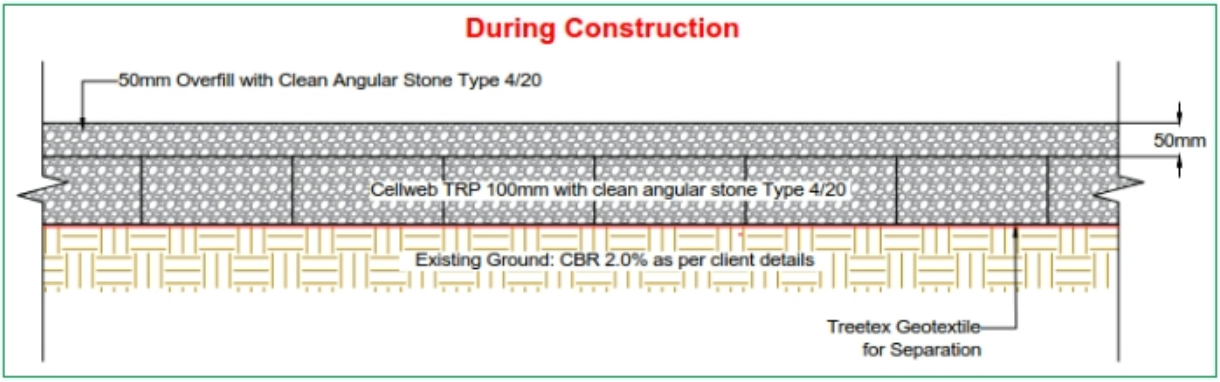
| FILL MATERIAL: CELLWEB AND SUBBASE | |
|---|---|
| Soil Type: | Clean angular stone |
| Type BS7533-13: | Type 4/20 |
| Internal friction angle, $\phi'_{pk}$: | 35 deg |
| Unit weight, $\gamma$: | 18 kN/m$^3$ |
| Particle size: | 4 mm to 20 mm |

| TRAFFIC DESIGN | |
|---|---|
| Type of Traffic: | Cars for driveways |
| Gross Vehicle Weight GVW: | < 3,000 kg |
| Max Axle load: | 20 kN/axle |
| Wheel load, P: | 10 kN/wheel |
| Tire inflation Pressure, p: | 250.00 kPa |

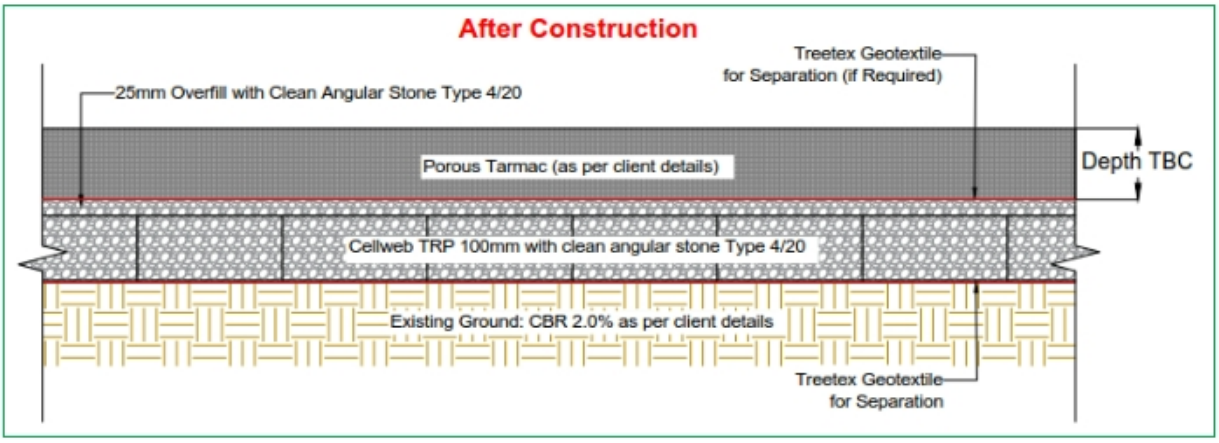
| SOLUTION: ACCESS ROAD OVER TREE ROOT PROTECTION AREA | | |
|---|---|---|
| **Phase:** | During Construction | After Construction |
| **Surface: (design by others accordingly to the appropriate standard)** | See overfill | Porous Tarmac (depth TBC) |
| **Separation: Above overfill and beneath the surface** | n/a | 1 layer of Geotextile Treetex |
| **Overfill: above Cellweb: clean angular stone Type 4/20** | Overfill: 50mm Clean Angular Stone Type 4/20 | Overfill: 25mm Clean Angular Stone Type 4/20 |
| **Cellweb TRP: fill with 4 to 20mm clean angular stone Type 4/20:** | Cellweb TRP: 1 layer of 100mm Cellweb | |
| **Subbase: 4 to 20mm clean angular stone Type 4/20** | Structural purpose: 0mm | |
| | Installation purpose: n/a | |
| **Separation: beneath Cellweb or Subbase** | 1 layer of Geotextile Treetex | |

**Note:**
Loose Gravel surface - Particle sizes, gradation and thickness to be specified by others according to the appropriate specification of the project. Regular use will cause movement and displacement of granular particles, giving as a result superficial deformation (rutting) and settlement of the surface. Therefore regular maintenance is very important when using loose gravel surface, including the replacement of gravel to keep the required minimum thickness of the surface.

## CROSS-SECTION: CELLWEB OVER TREE ROOT PROTECTION – DURING CONSTRUCTION



## CROSS-SECTION: CELLWEB OVER TREE ROOT PROTECTION – AFTER CONSTRUCTION




## RECOMMENDATIONS

**Granular Fill:** Clean angular stone Type 4/20. Please refer to BS7533-13:2009 and to the Design Manual for Roads and Bridges (DMRB), Volume 4 Geotechnics and Drainage, Section 1 Earthworks, HA44/91, Volume 7 – IAN 73/06 Design Guidance for road pavement foundations and Manual of Contract Documents for Highway Works (MCHW), Volume 1 Specification for Highway Works for the construction and maintenance of the fill material.

**Soil Properties:** All the properties of the soils have been assumed in order to perform the calculations. It is necessary to check the properties with the actual soil test results and the actual soils at the project site, so as to refine the calculations.

**Traffic information:** The traffic information has been extracted from the information sent by the client and the values have been assumed in order to perform the calculations. It is necessary to check the information with the actual traffic at the project site, so as to refine the calculations.

**Drainage systems:** Appropriate drainage systems need to be advised if applicable by the client/designer prior to final design. If drainage systems are required those needs to be designed and specified by others. Geosynthetics should be advised on the results of the drainage assessment, so it can be taking into account in the layout of the Cellweb System.

**Geotextile for separation:** we recommend the installation of a Non-Woven Geotextile Treetex under the Cellweb or under subbase if installed.

**Geotextile:** Overlapping between adjacent rolls of Geotextile: CBR > 3%: 300mm minimum, CBR between 1% and 3%: 500mm minimum, CBR ≤ 1%: 750mm minimum.

**Herbicide:** According to BS5837:2012 "The use of herbicides in the vicinity of existing trees should be appropriate for the type of vegetation to be killed, and all instructions, warnings and other relevant information from the manufacturers should be strictly observed and followed. Care should be taken to avoid any damaging effects upon existing plants and trees to be retained, species to be introduced, and existing sensitive habitats, particularly those associated with aquatic or drainage features."

**Loose Gravel surface**: Particle sizes, gradation and thickness to be specified by others according to the appropriate specification of the project.
Regular use will cause movement and displacement of granular particles, giving as a result superficial deformation (rutting) and settlement of the surface. Therefore regular maintenance is very important when using loose gravel surface, including the replacement of gravel to keep the required minimum thickness of the surface.

## CONTACT INFORMATION

For further information, please contact our technical department

**Geosynthetics Ltd.**
Fleming Road
Harrowbrook Industrial Estate
Hinckley, Leicestershire LE10 3DU
Tel : 01455 617139 Fax 01455 617140
sales@geosyn.co.uk
www.geosyn.co.uk

DISCLAIMER

Any calculations produced by us for you are provided for your assistance only and do not constitute any warranty as to fitness for purpose of any of our products in respect of any specific construction. It is your responsibility to determine the suitability of our products within a particular construction.
Our calculations are based entirely on the information provided by you and/or any assumptions made by us in good faith. We shall not be liable to you, whether in contract, tort (including negligence), breach of statutory duty, or otherwise, for any loss arising in consequence of incorrect, inaccurate or incomplete information provided to us by you or arising as a consequence of reasonable assumptions made by us in good faith.
Any advice (including any calculations) that we give to you in any form is provided solely for your own use and we shall not be liable to any third party, whether in contract, tort (including negligence), breach of statutory duty, or otherwise, for any loss arising as a result of or in connection with such advice.

Geosynthetics Limited Tel: 01455 617 139 Fax: 01455 617 140 Email: sales@geosyn.co.uk

# Cellweb® TRP Installation Guide



*Step 1: Prepare Surface*



*Step 2: Lay out Treetex™*



*Step 3: Lay out Cellweb® TRP*

- Cellweb® TRP is a NO DIG tree root protection measure and it is recommended that no excavation be performed without prior approval and guidance from the Local Authority Arboricultural Officer.
- Soil compaction from vehicles, machinery and materials is to be strictly prohibited during construction within Root Protection Areas (RPAs).
- Approval must be obtained from the Local Authority that the design and the method of construction is acceptable.
- Further information is available from the following two documents;
  - British Standard BS5837: 'Trees in Relation to Design, Demolition and Construction' (2012).
  - Arboricultural Advisory and Information Service: Practice note 12 – 'Through the Trees to Development' (APN12).

## Installation Method

### 1. Prepare the Surface

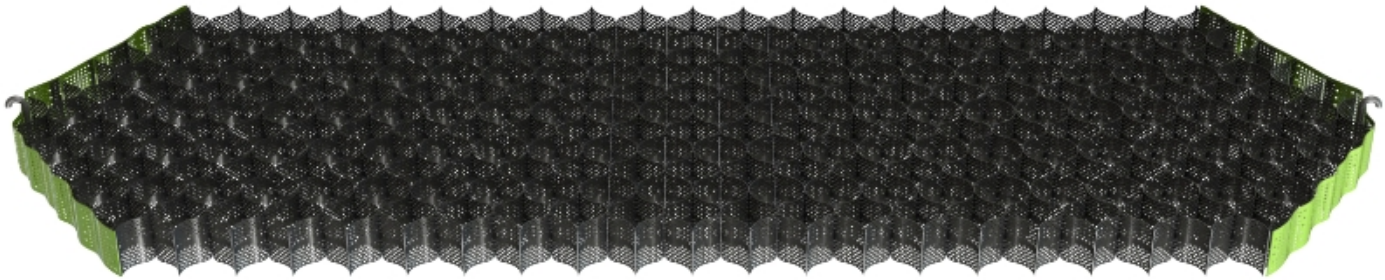
- Remove the surface vegetation using appropriate hand held tools or herbicide (see Note 1).
- Remove any surface rocks, debris and organic material.
- Do not level off high spots or compact the soil through rolling.

### 2. Lay out the Treetex™ Pollution Control Geotextile

- Lay out the Treetex™ over the prepared area, overlaying the edges of the required area by 300mm.
- Overlap any joins by 300mm minimum or more, depending on soil structure (see Note 2).
- Create a level surface by filling any hollows with clean angular stone or sharp sand.

### 3. Lay out the Cellweb® TRP Cellular Confinement System

- Lay out the collapsed Cellweb® TRP on-top of the Treetex™.
- Place one of the supplied J pins into the centre cell at the end of the panel and secure into the ground.



# Cellweb® TRP - Installation Guide

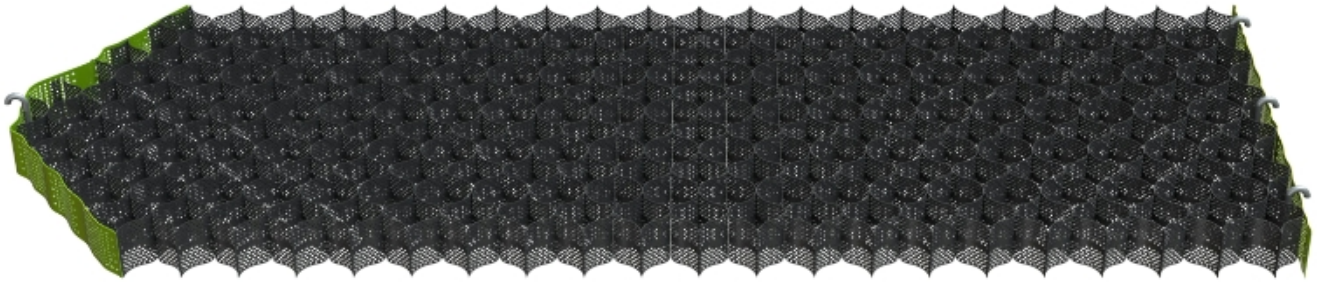


*Step 3: Pinning Cellweb ® TRP*

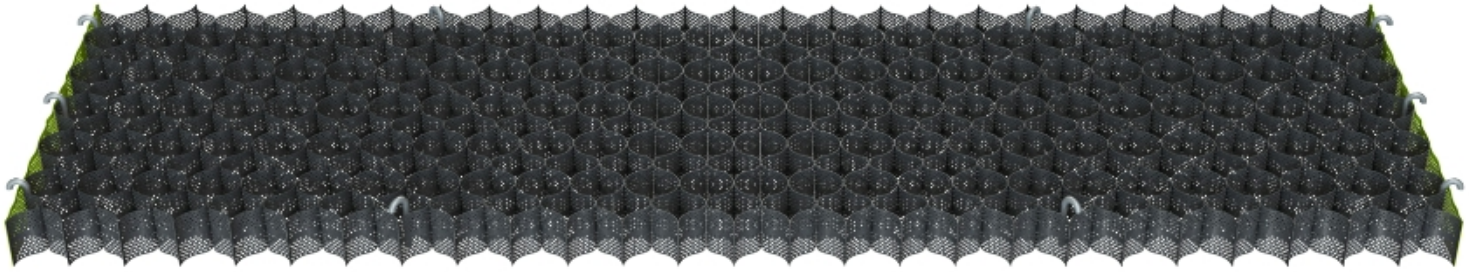


*Step 3: Stapling Cellweb ® TRP*

- Pull out the Cellweb® TRP to its full 8.1m length and secure its length with another J pin.



- Now measure its width to 2.56m and secure in each of the corners with the J pins.
- Use 10 pins per panel to create a panel measuring 8.1m x 2.56m.



- This will produce a cell size of 259mm x 224mm which is the required cell aperture. Each cell must be fully extended and under tension.
- Staple adjacent panels together at each cell (see Note 3).
- If a curved path or shape is required, this should be cut when the Cellweb® TRP panel is pinned out to 8.1 x 2.56m, ensuring complete cells remain. Do not try to curve or bend the Cellweb® TRP panels into place.
- When cutting Cellweb® TRP, please bear in mind that you will lose two internal cells per cut. Across a 8.1m long panel, this equates to a loss of 0.224m x 2 along the length or 0.259m x 2 across the width.

# Cellweb® TRP - Installation Guide



*Step 4: Clean Angular Stone*



*Step 5: Edge Restraints*



*Step 6: Surface Options*

**4. Infill the Clean Angular Stone**

- The infill material must be a clean angular stone Type 4/20mm (see Note 4).
- Do not use M.O.T type 1 or crushed stone with fines for tree root protection.
- Infill the Cellweb® TRP cells with the clean angular stone, working towards the tree and using the infilled panels as a platform.
- Minimum 25mm overfill of clean angular stone when used in conjunction with a hard surface.
- No compaction is required of the infill. Do not use a whacker plate or other means of compaction.
- Encourage settlement of the stone with the use of a light roller or with 2-3 passes of the construction plant used for installation.
- If the clean angular stone is being used as the final surface; regular maintenance will be required to ensure a minimum overfill of 50mm.

**5. Edge restraints**

- Excavations for kerbs and edgings should be avoided within the RPAs.
- Where edging is required for footpath and light structures, a peg and treated timber board edging is acceptable
- Other options include wooden sleepers, kerb edging constructed on-top of the Cellweb® TRP system, plastic and metal edging etc.

**6. Surface options**

- All surfaces in Root Protection Areas must be porous. Surfaces can include porous block paving, porous asphalt, loose gravel, grass and gravel retention systems (e.g Golpla), resin bound gravel, concrete and astro turf.

**NOTES**

1. **Herbicide:** According to BS5837:2012 "The use of herbicides in the vicinity of existing trees should be appropriate for the type of vegetation to be killed, and all instructions, warnings and other relevant information from the manufacturers should be strictly observed and followed. Care should be taken to avoid any damaging effects upon existing plants and trees to be retained, species to be introduced, and existing sensitive habitats, particularly those associated with aquatic or drainage features."
2. **Geotextile:** We recommend the installation of a Treetex™ under the Cellweb® TRP, or under the sub-base, if installed. The overlapping between adjacent rolls of Geotextile should be: CBR > 3%: 300mm minimum, CBR between 1% and 3%: 500mm minimum. CBR ≤ 1%: 750mm minimum.
3. **Staples:** Number of staples per join: 200mm: 5 staples. 150mm: 4 staples. 100mm: 3 staples. 75mm: 3 staples.
4. **Granular Fill:** Open graded sub-base, clean angular stone Type 4/20 or Type 20/40. Please refer to BS7533-13:2009 and to the Design Manual for Roads and Bridges (DMRB), Volume 4 Geotechnics and Drainage, Section 1 Earthworks, HA44/91, Volume 7 – IAN 73/06 Design Guidance for road pavement foundations and Manual of Contract Documents for Highway Works (MCHW), Volume 1 Specification for Highway Works for the construction and maintenance of the fill material.

This information corresponds to our current knowledge on the subject. It is offered solely to provide possible suggestions for your own experimentation. It is not intended, however, to substitute for any testing you may need to conduct to determine for yourself the suitability of our products for your particular purposes. This information may be subject to revision as new knowledge becomes available. Since we cannot anticipate all variations in actual end use conditions, Geosynthetics Limited makes no warranties and assumes no liabilities in connection with this information. Nothing in this publication is to be considered as a licence to operate under or a recommendation to infringe any patent right.

Geosynthetics Limited Tel: 01455 617 139 Fax: 01455 617 140 Email: sales@geosyn.co.uk

# Clean Angular Stone

## Type 4/20

Specification for open graded sub-base for use as storage below pervious pavements (also Type C filter material for filter drains and soakaway backfill in accordance with SHW Clause 505) Type 4/20

### Material to BS EN 13242 or BS EN 12620

Material to comprise crushed rock, concrete or blast furnace slag or similar approved. Crushed gravel is not permitted.

| Properties | Test Method | Value |
|---|---|---|
| Grading | BS EN 13242 | Grading 4/20 (Preferred) or 4/40, Gc 80/20, GTc 20/15 |
| Fines Content | BS EN 13242 | $f_4$ |
| Shape | BS EN 13242 | $FI_{20}$ |
| Resistance to Fragmentation | BS EN 13242 | $LA_{30}$ |
| Durability: | | |
| - Water absorption to BS En 1097-6:2000, Clause 7 | BS EN 13242 | $WA_{24}2$ |
| - For WA > 2%, magnesium sulfate soundness | BS EN 13242 | $MS_{18}$ |
| Resistance to Wear | BS EN 13242 | $M_{DE}20$ |
| Acid-soluble sulfate content: | | |
| - Aggregates other than air-cooled blast-furnace slag | BS EN 13242 | $AS_{0.2}$ |
| - Air-cooled blast-furnace slag | BS EN 13242 | $AS_{0.1}$ |
| Total Sulfur: | | |
| - Aggregates other than air-cooled blast-furnace slag | BS EN 13242 | $\leq$ 1 % by mass |
| - Air-cooled blast-furnace slag | BS EN 13242 | $\leq$ 2 % by mass |
| Volume Stability of blast-furnace and steel slags: | | |
| - Air-cooled blast-furnace slag | BS EN 13242 | Free from dicalcium silicate and iron disintegration in accordance BS EN 13242:2002, 6.4.2.2 $V_5$ |
| - Steel slag | BS EN 13242 | |
| Leaching of contaminants | BS EN 13242 | Blast furnace slag and other recycled materials should meet the requirements of the Environment Waste Acceptance Criteria for inert waste when tested in accordance with BS EN 12457-3 |

If compaction is required should be in 150mm layers with 4 passes of a smooth wheeled roller max weight of 1000kg/m width **without vibration**.

### Aggregate gradings for sub-base materials to BS EN 12620

| Sieve Size (mm) | Percentage Passing (%) | |
|---|---|---|
| | Coarse aggregate 4/40 | Coarse aggregate 4/20 |
| 80 | 100 | - |
| 63 | 98-100 | - |
| 40 | 90-99 | 100 |
| 31.5 | - | 98-100 |
| 20 | 25-70 | 90-99 |
| 10 | - | 25-70 |
| 4 | 0-15 | 0-15 |
| 2 | 0-5 | 0-5 |
| 1 | - | - |

This information corresponds to our current knowledge on the subject. It is offered solely to provide possible suggestions for your own experimentation. It is not intended, however, to substitute for any testing you may need to conduct to determine for yourself the suitability of our products for your particular purposes. This information may be subject to revision as new knowledge becomes available. Since we cannot anticipate all variations in actual end use conditions, Geosynthetics Limited makes no warranties and assumes no liabilities in connection with this information. Nothing in this publication is to be considered as a licence to operate under or a recommendation to infringe any patent right.

DR: 97/V2/16.12.14