



# Permeable Paving Aggregates

▶ All materials used as permeable paving aggregate must comply to the grading and physical requirements or below, as well as the general requirements of BS EN 12620 and BS EN 13242. Sub-base laying course materials should be clean, sound, non-fragile and sound crushed rock material. Rounded gravel materials are not recommended for sub-base layers. The jointing material may be either clean crushed material or clean gravel material. The materials should be tested to confirm that it meets the requirements below.

4/40mm Coarse Graded Permeable Paving Aggregate	Percentage Passing	80	100	98-100	63	40	31.5	20	10	4	2
Steve Size (mm)		80	100	98-100	63	40	31.5	20	10	4	2
Percentage Passing		100	98-100	90-99	25-70	-	0-15	0-5			

2/6.3mm Laying Course Paving Aggregate	Percentage Passing	14	10	6.3	2	1
Steve Size (mm)		14	10	6.3	2	1
Percentage Passing		100	98-100	80-99	0-20	0-5

4/20mm Coarse Graded Permeable Paving Aggregate	Percentage Passing	40	31.5	20	10	4	2
Steve Size (mm)		40	31.5	20	10	4	2
Percentage Passing		100	98-100	90-99	25-70	0-15	0-5

3mm Jointing Grit	Percentage Passing	40	8	6.3	4	2	1	0.063
Steve Size (mm)		40	8	6.3	4	2	1	0.063
Percentage Passing		100	95-100	85-99	15-35	0-10	0-0.15	







Property	Category to BS EN 13242 or BS EN 12620
Grading	4/20 (preferred) or 4/40 as per table above
Fines Content	F4
Shape	FI20
Resistance to Fragmentation	LA30
Water Absorption to BS EN 1097-6:2000	WA2
For water absorption > 2% Magnesium Sulfate Soundness	MS18
Resistance to Wear	MDE20
Acid Soluble Sulfate Content	AS0.2
Total Sulfur	≤1% by mass
Recycled Aggregates	Seek guidance from Kilsaran Technical Department

The contractor shall also ensure that on-going deliveries to site are checked frequently for grading, shape and inspected to ensure cleanliness. During installation on site, great care and attention must be paid to ensure that the aggregates are kept free of contamination and deleterious matter. Construction traffic cannot be allowed to traverse the layers of permeable paving aggregates during installation.

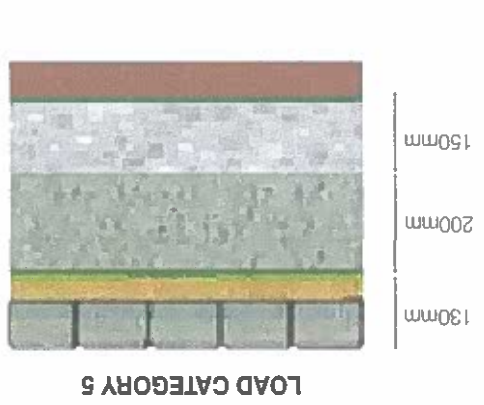
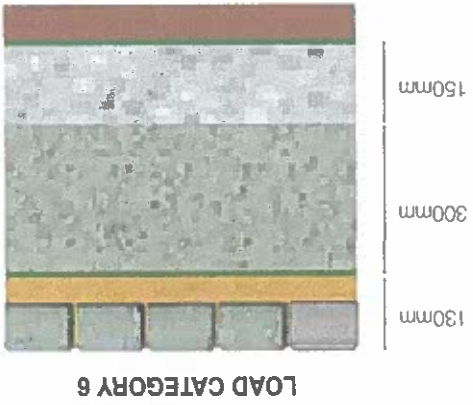
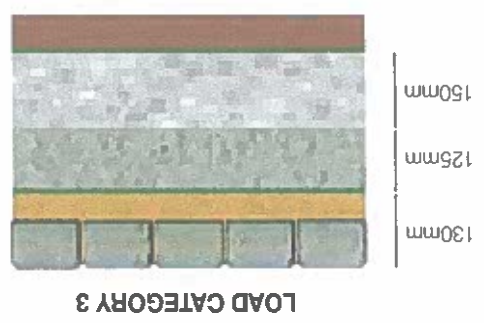
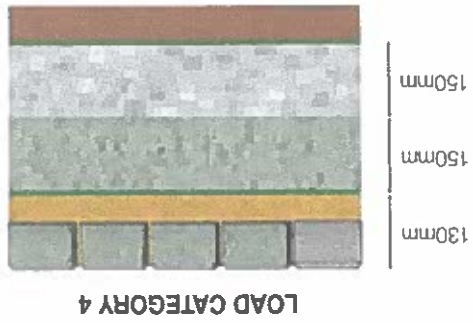
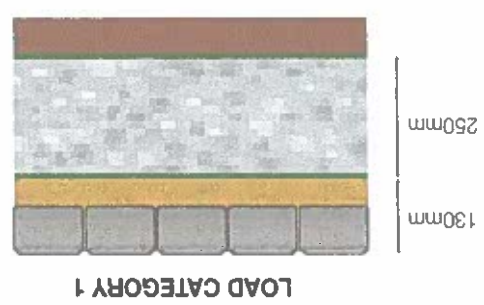
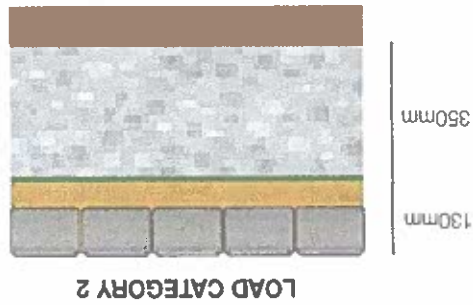
# Typical Design Diagrams

Below are typical build-up details for permeable pavement systems based on BS 7533-13:2009. These diagrams are based on ideal site conditions for drainage and CBR values of 5% or greater. The diagrams are for project appraisal purposes only and in all cases a site specific design in accordance with BS 7533-13:2009 will be required.

**Key:**

-  2 / 6.3mm Laying Course
-  Hydraulically-Bound Coarse Graded Aggregate or 80mm of DBM Macadam
-  4 / 20mm Coarse Graded Aggregate and/or 4/40mm Coarse Graded Aggregate
-  Capping Material
-  Approved Geotextile
-  Approved Impermeable Membrane

## System A & B (Infiltrating & Partial Infiltration Systems)



Alternative build up / materials may be used depending on project specific details.

For load categories 3-6 the hydraulically-bound coarse graded aggregate (porous no fines concrete) layer may be replaced with 80mm depth of DBM Macadam to act as a stiffening layer. The macadam layer should be punctured at 750mm centres on grid. Further details on the DBM macadam layer are given on page 19.

Where the depth of aggregate sub-base is in excess of 350mm for the given loading category, it may be possible to reduce the depth of aggregate required and provide a more cost effective design with the use of an appropriate and approved geo-grid. This can be appraised at design stage.



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**Terry & O'Flanagan Ltd**  
**Ground Investigation Report**  
**January 2022**

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Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Final	A Browne	J Cashen	B Sexton	Dublin	18 January 2022

Project Title	Grangebrook Avenue
Engineer	Terry & O'Flanagan Ltd
Client	Beckett Developments Ltd.
Project No	11264-11-21
Document Title	Ground Investigation Report

## DOCUMENT CONTROL SHEET

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**APPENDICES**

Appendix 1 Site Location Plan

Appendix 2 Soakaway Testing Records



## 1.0 Preamble

On the instructions of Terry & O'Flanagan Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd, in December 2021 at the site of the proposed housing development at Grangebrook Avenue, Rathfarnham.

## 2.0 Overview

### 2.1. Background

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. The site is located within the gardens of a residential property and is predominantly greenfield. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

### 2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 4 No. Soakaways to determine a soil infiltration value to BRE digest 365
- Report with recommendations

## 3.0 Subsurface Exploration

### 3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling. The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground investigation and testing (SEN 1997 – 2:2007) and B.S. 5930:2015.

### 3.2. Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the

The recommendations given and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has

### 5.1. General

## 5.0 Recommendations & Conclusions

No groundwater was noted during the investigation however we would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall, nearby construction and other factors.

### 4.2. Groundwater

**COHESIVE DEPOSITS:** Cohesive deposits were encountered beneath the Topsoil and were described typically as *brown slightly sandy gravely CLAY*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix.

**MADE GROUND:** Made Ground deposits was encountered beneath the Topsoil at SA04 and was present to a depth 0.50m BGL. This deposit was described as *dark brown slightly sandy gravely CLAY with occasional fragments of plastic, tin, ceramic, and metal.*

**TOPSOIL:** Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.2m BGL.

- Topsoil
- Made Ground
- Cohesive Deposits

The sequence of strata encountered were consistent across the site and are generally comprised:

The ground conditions encountered during the investigation are summarised below with reference to *insitu* and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

### 4.1. General

## 4.0 Ground Conditions

soakaway test and were backfilled with arisings upon completion. The soakaway test results are provided in Appendix 2 of this Report.



The recommendations provided in this report should be verified in the design of the proposed buildings, using the full details of the loading conditions and taking into consideration the allowable tolerable settlements/movements that the building can accommodate. The founding strata should be inspected and verified by a suitably qualified engineer prior to construction of the building foundations.

At all locations the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.

## 5.2. Soakaway Design

been provided at the ground investigation stage and any designs based on the recommendations or conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.