

S5 – Backfill



Researched, compiled and produced by



and



with support through TFL lane rental funding scheme

Introduction- SROH S5

This advisory document is designed to assist incoming and existing Inspectors as support and refresher material. It will be provided in simple language to aid in understanding and avoiding technical or descriptive explanation.

The current edition (Ed 4) of the Specification for Reinstatement of Openings in the Highway (SROH) has been updated to assist readers in understanding, and introduce new methods and developments within street-works.

Remember, the SROH applies to works undertaken on carriageway's, footway's and verge's maintained at public expense (not private roads or land).

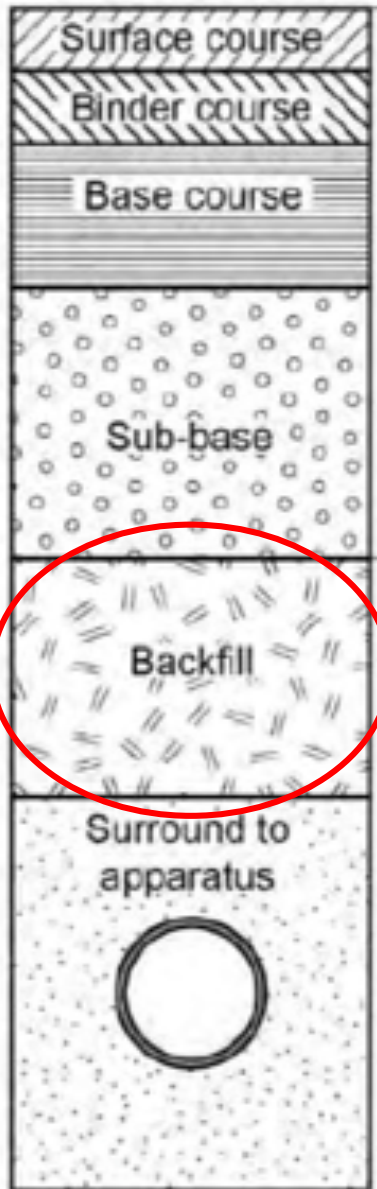
You will now be taken through the key items within S5 which will enable you to have a better understanding of what should happen when monitoring of backfill and the materials that apply.



Please note:

This presentation is simply to aid in understanding of the SROH and should not be used for any other purpose. The simplicity of language may detract from certain technical or descriptive requirements and, therefore, the SROH should be consulted for clarity.

S5 Backfill

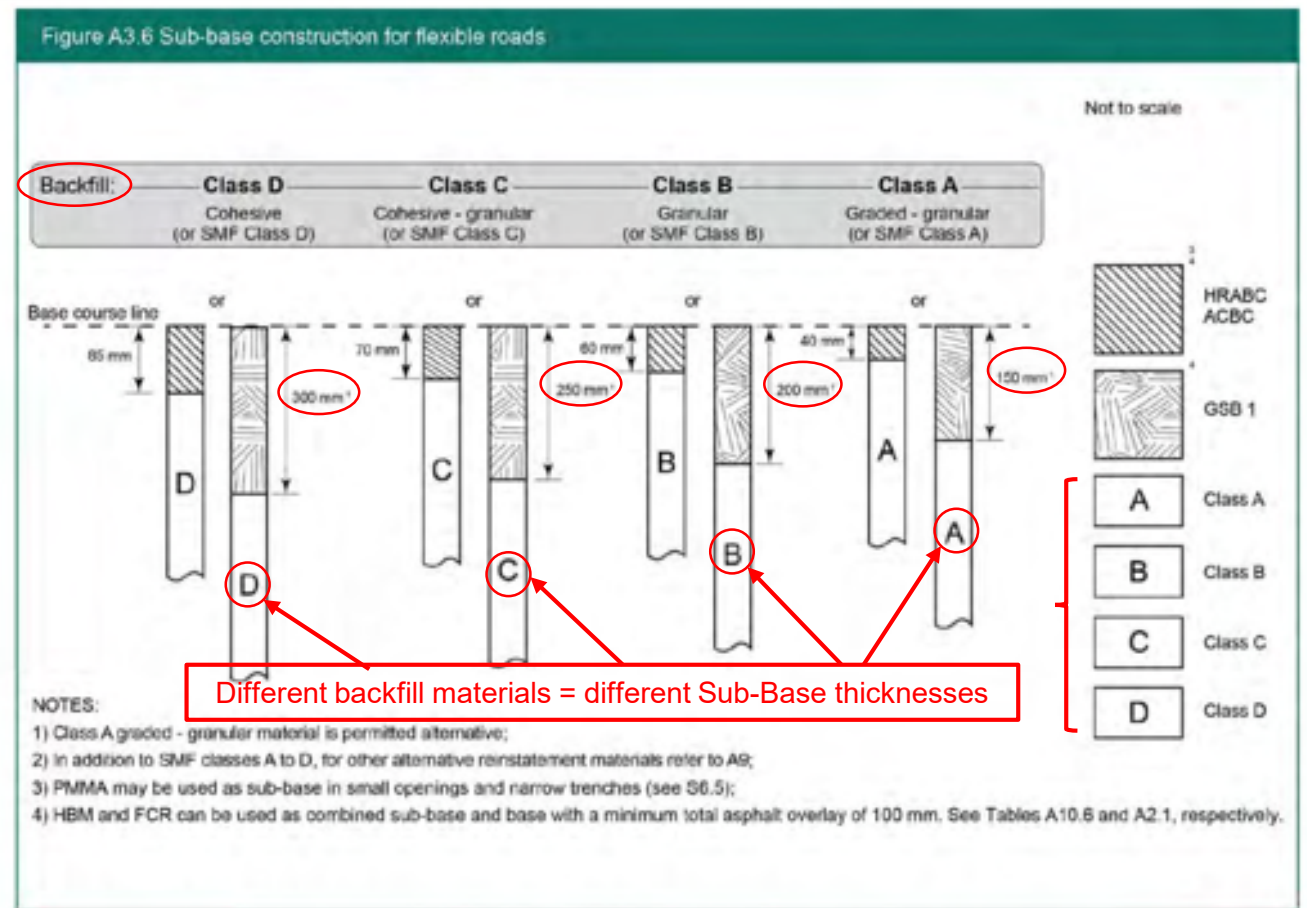


Flexible road reinstatement

It is a common mistake to think all unbound material being used within the reinstatement is known as backfill. This is absolutely not the case. The Base and Sub-Base layer's sit above the Backfill layer, and therefore, are structural and require the correct materials and methods to be used to maintain strength and integrity.

The materials we find under SROH – S5 show how and where backfill materials are to be used. What we have to be aware of is that if you use a poorer backfill material, you are required to increase the Sub-Base layer to compensate for this (SROH – Figure A3.6)

NOTE
For each drop in backfill material class, the Sub-Base increases by 50mm



S5 Backfill – Classes of materials

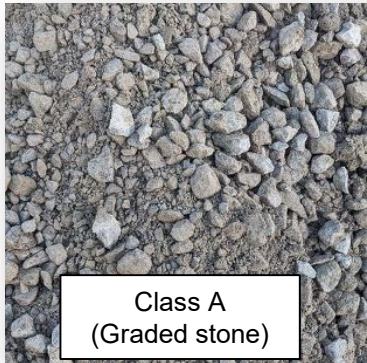
S5 General

S5.1.1 Backfill materials, whether imported or sourced from excavated materials, are classified as follows:

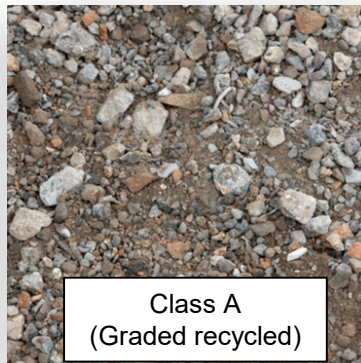
- Class A – Graded granular materials
- Class B – Granular materials
- Class C – Cohesive/Granular materials
- Class D – Cohesive materials
- Class E – Unacceptable materials
FCR's and HBM's

What it means

As you can see the materials used in backfill can vary but you need to be aware of the layers where each type can be used. You cannot simply excavate and re-use excavated material unless it is suitable and has been properly classified. Certain excavated materials may require modification for re-use in a reinstatement. It is important you familiarise yourself with these types of materials and classifications as the reinstatement layers or depth can be affected by them.



Class A
(Graded stone)



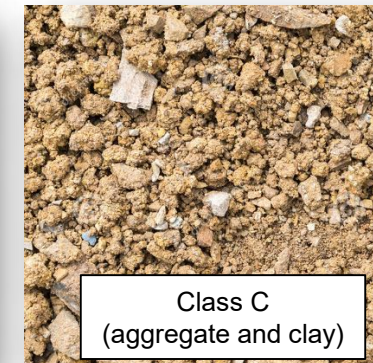
Class A
(Graded recycled)



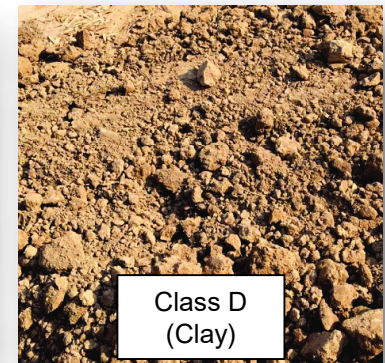
Class B
(Stone)



Class B
(recycled)



Class C
(aggregate and clay)



Class D
(Clay)

Graded material (Class A) means it has passed through sieves from large to small to aid better interlocking and compaction



Class E
(unacceptable)



Class E
(unacceptable)

Ungraded material means the aggregate is of similar size with no smaller aggregates to fill the voids to assist in interlocking and compaction.

S5 Backfill – Basic visual characteristics



Can you classify a material just by looking at it?

It isn't always easy, but common sense helps at times



Generally, a class A material is made from different sizes of aggregate from large to very small (graded). If you can see this it's quite simple.



A class B material is where the aggregate is generally all the same size with no smaller elements or fines (not graded).



These are basic descriptions – For confirmation and verification please refer to SROH-S5 for field tests



A class C material is mainly where the cohesive material (clay) and aggregate are found together.



A class D material is cohesive material (such as clay).



Thanks...that's very helpful

No problem!
Remember any material that isn't one of these is more likely to be placed under Class E - Unacceptable



S5 Backfill – FCR's & HBM's

What it says in the SROH

S5.1.9 FCRs and HBMs, complying with A2.5.3 to A2.5.18 and A10.2 respectively, are permitted within the backfill as the entire layer or combined with any other permitted backfill materials, in any proportion, within any reinstatement. These materials are classified as Class A for the purposes of determining the requirements for sub-base reinstatement in accordance with S6.2.

Foamed concrete for reinstatement (FCR) and Hydraulically Bound Materials (HBM) are equivalent to class A materials and can be used in backfill.

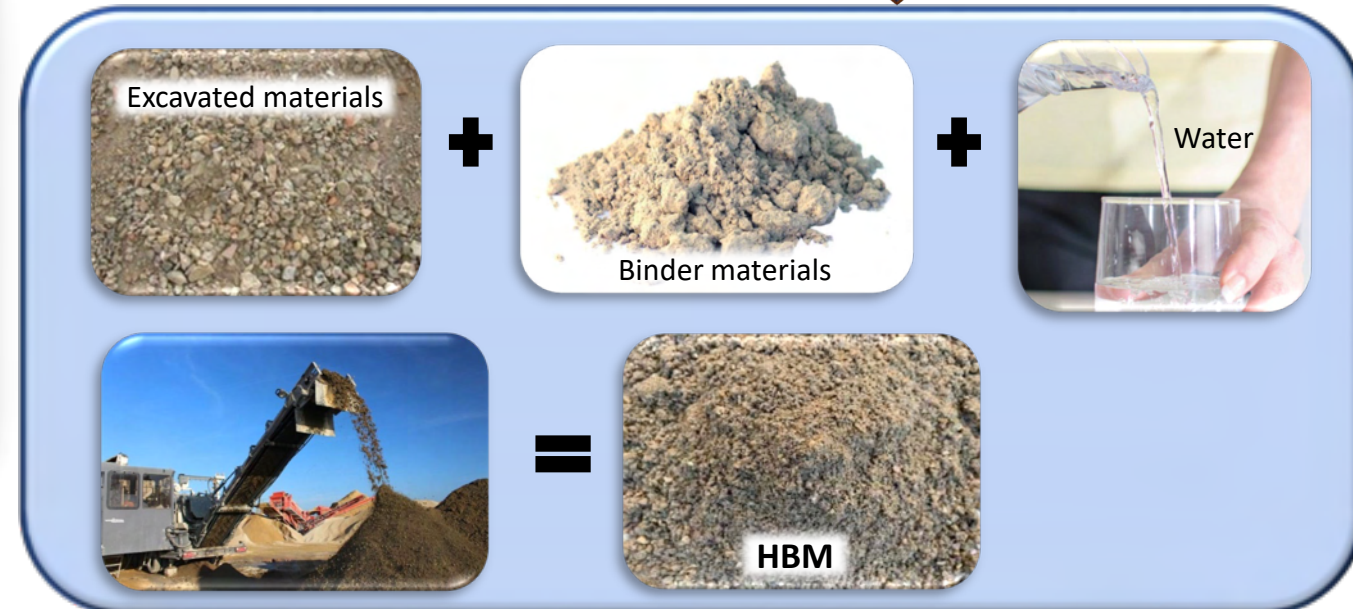
Be aware, they may be used in other structural layers such as Sub-Base and Base layers. However, always consult the SROH to see where this applies as it depends on road type and construction.

SROH A2.5.4 - FCRs must not encase cables or be used within 300 mm of a gas pipe.



Foamed concrete is simply a liquid mix concrete with an added foaming agent to create a lightweight honeycomb effect

On the other hand, HBM materials are manufactured through a controlled process where materials are recycled with special additives and water to provide a semi-dry material that can be compacted.



S5 - Summary



What exactly is a backfill layer?

The Backfill layer is found immediately below the structural Sub-Base layer in a reinstatement .

Why are materials classified as A, B, C, D and E?

These materials are classified in order of structural integrity and performance under compaction. Therefore, for backfill class A is the highest and class D is the lowest. Remember, HBM's and FCR's are class A materials

Why does backfill material affect thickness of Sub-Base?

Simply, as mentioned above, a weaker material needs to be compensated for by adding strength and integrity to the Sub-Base layer.

What is meant by an unacceptable material?

This is simply anything that may rot, corrode or move in some way as to affect the reinstatement. This is why organic materials are not allowed. These are collectively known as Class E materials

