

Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

This unit covers the requirements that you must meet when reinstating sub-base and base (roadbase) in non-bituminous materials. **You must ensure that you act in accordance with all current specifications and procedures and that you follow safe working practices at all times when carrying out the activities covered in this unit. The Code of Practice specified in this unit is *Specification for the Reinstatement of Openings in Highways*.**

The unit contains the following four elements, which you must cover:

- 5.1 Prepare subgrade to receive subsequent layers
- 5.2 Select and store materials for sub-base and base (roadbase)
- 5.3 Reinststate the pavement structure
- 5.4 Dispose of surplus materials

In element 5.1, you will prepare the subgrade to receive subsequent layers, by removing all loose matter, making good subgrade defects and checking that the backfill layer construction is correct.

In element 5.2, you will need to identify and select excavated materials for re-use as backfill and ensure that they are appropriately and safely stored on site. You must identify, unload and store imported materials that are suitable for use as backfill safely and correctly, and you will need to store all materials on site without obstructing or damaging facilities and street furniture.

In element 5.3, you will reinststate the pavement structure, selecting the appropriate equipment to use for the prescribed operation. You will need to reinststate the pavement layer using the correct quantities of materials, and to complete the pavement layer construction.

In element 5.4, you will dispose of surplus material. You will need to identify materials that are unsuitable for re-use or are surplus to requirements, and ensure that safe temporary storage is provided for them on site. You must load all materials for disposal safely for transportation, using the appropriate equipment, and you must leave the site in a clean and safe condition.

Please note: *You must use metric units of linear measurement when undertaking this unit.*

*Where the term **utilities' apparatus** is used within these qualifications, this includes the following:*

- *gas mains (plastic and metallic)*
- *water mains (plastic and metallic)*
- *sewers and drains*
- *electricity cables (low- and high-voltage)*
- *telecommunications and television cables*

Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.1 Prepare subgrade to receive subsequent layers

Performance criteria									
<p>You must show that:</p> <p>a) you remove loose and deleterious matter from the area to be reinstated using the appropriate equipment</p> <p>b) you identify and make good subgrade defects using approved materials and the appropriate equipment</p> <p>c) you check and confirm that the backfill layer construction is correct using the appropriate equipment</p> <p>d) you follow safe working practices for preparing the subgrade to receive subsequent layers, that are in accordance with current relevant specifications and procedures</p>									
Knowledge requirements	Related performance criteria								
<p>You need to know:</p>									
1 how to remove loose matter from the area to be reinstated	a								
2 the requirements for a firm subgrade in the specification, and the alternatives available to use when the subgrade is not adequate	b								
3 potential subgrade defects, and the equipment and materials that can be used to make them good	b								
4 the implications of leaving subgrade defects untreated	b								
5 how to confirm that the backfill construction is correct, and the checks to make to ensure this	c								
6 safe working practices for preparing the subgrade to receive subsequent layers	all								
Range to be covered									
<p>I. You must show that appropriate equipment for preparing the subgrade layer includes:</p> <ol style="list-style-type: none"> i. square and round mouth shovels ii. hand pick iii. hard bristle broom iv. measuring tape <p>II. You must show that safe working practices include:</p> <ol style="list-style-type: none"> i. safe use of tools and equipment ii. use of appropriate personal protective equipment, including as necessary: <table border="0" style="width: 100%;"> <tr> <td>• high visibility jacket or waistcoat</td> <td>• dust mask</td> </tr> <tr> <td>• hard hat</td> <td>• gloves</td> </tr> <tr> <td>• ear defenders</td> <td>• protective footwear</td> </tr> <tr> <td>• eye protection visor/goggles</td> <td>• waterproof clothing</td> </tr> </table> iii. use of risk assessment methods to identify and control hazards on site iv. precautions to minimise danger or inconvenience to road users v. precautions to minimise danger or inconvenience to site personnel vi. precautions to minimise damage to equipment or apparatus <p>III. You must show that specifications and procedures are:</p> <ol style="list-style-type: none"> i. Health and Safety Executive Guidelines (<i>HSG 185: Health and Safety in Excavations</i>) ii. Specification for the Reinstatement of Openings in Highways 		• high visibility jacket or waistcoat	• dust mask	• hard hat	• gloves	• ear defenders	• protective footwear	• eye protection visor/goggles	• waterproof clothing
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Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.1 Prepare subgrade to receive subsequent layers

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for a reinstated excavation in an actual or simulated footway or carriageway:
 - A. Remove loose and deleterious matter.
 - B. Confirm the measurement of the cavity depth.
 - C. Make good subgrade defects.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.
- The excavated area must be a minimum surface area of at least 0.7 square metres.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you preparing the subgrade to receive subsequent layers.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways and Safety at Street Works and Road Works A Code of Practice* under the New Roads and Street Works Act 1991. No specific guidance is produced within the Specification regarding the preparation of formation. Notes for Guidance NG3.2 refer to HSG 185 (*Health and Safety in Excavations*) which gives health and safety guidance to those carrying out excavations.

Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.2 Select and store materials for sub-base and base (roadbase)

Performance criteria									
<p>You must show that:</p> <p>a) you identify and select excavated materials that are suitable for re-use and store them appropriately and safely on site</p> <p>b) you identify imported materials correctly that are suitable for use in sub-base and base (roadbase)</p> <p>c) you unload and store imported materials appropriately and safely on site</p> <p>d) you store all materials to be used in sub-base and base (roadbase) on site without causing obstruction of essential facilities and street furniture</p> <p>e) you follow safe working practices for the selection and storage of sub-base and base (roadbase) materials that are in accordance with current relevant specifications and procedures</p>									
Knowledge requirements	Related performance criteria								
<p>You need to know:</p>									
1 how to identify excavated and imported materials that are suitable for use in reinstating sub-base and base (roadbase)	a, b								
2 the permissible range of alternative reinstatement materials (ARMs) and materials for use as surround to apparatus	a, b								
3 how to store excavated materials correctly on site	a								
4 correct procedures and locations for unloading and storing imported materials on site	c								
5 the precautions to take to ensure that stored materials do not obstruct essential facilities and street furniture	d								
6 safe working practices for selecting and storing sub-base and base (roadbase) materials	all								
Range to be covered									
<p>I. You must show that materials identified for use in reinstating sub-base and base (roadbase) include:</p> <ol style="list-style-type: none"> granular Type 1 sub-base materials excavated granular sub-base material category 3 cement bound material (CBM3) foamed concrete <p>II. You must show that safe working practices include:</p> <ol style="list-style-type: none"> safe use of tools and equipment use of appropriate personal protective equipment, including as necessary: <table border="0" style="width: 100%;"> <tr> <td>• high visibility jacket or waistcoat</td> <td>• dust mask</td> </tr> <tr> <td>• hard hat</td> <td>• gloves</td> </tr> <tr> <td>• ear defenders</td> <td>• protective footwear</td> </tr> <tr> <td>• eye protection visor/goggles</td> <td>• waterproof clothing</td> </tr> </table> use of risk assessment methods to identify and control any hazards on site precautions to minimise danger or inconvenience to road users precautions to minimise danger or inconvenience to site personnel precautions to minimise damage to equipment or apparatus <p>III. You must show that specifications and procedures are:</p> <ol style="list-style-type: none"> Health and Safety Executive Guidelines (HSG 185: Health and Safety in Excavations) Specification for the Reinstatement of Openings in Highway 		• high visibility jacket or waistcoat	• dust mask	• hard hat	• gloves	• ear defenders	• protective footwear	• eye protection visor/goggles	• waterproof clothing
• high visibility jacket or waistcoat	• dust mask								
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Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.2 Select and store materials for sub-base and base (roadbase)

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for a reinstated excavation in an actual or simulated footway or carriageway:
 - A. Use field identification tests to select suitable excavated materials for use in sub-base and base (roadbase).
 - B. Check and confirm the quality of imported materials.
 - C. Store and protect materials on site.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.
- The excavated area must be a minimum area of 0.7 square metres.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you selecting and storing materials for sub-base and base (roadbase).
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways*. The following sections of the Specification provide particular guidance on various items within the performance criteria:
 - i. S1.6.3 allows alternative options such as stabilised materials to be used as surround to apparatus, and at backfill and sub-base layers, provided they meet the relevant performance requirements of this Specification.
 - ii. S5 deals with classification of backfill material, whether imported to site or derived on-site from excavated materials, including alternative reinstatement materials (ARMs) and those used as surround to apparatus.
 - iii. S6.2 and S6.3: Sub-base and base (roadbase) materials respectively.
 - iv. NG5.1 and NG5.3: Requirements of conventional and alternative backfill materials, respectively.
 - v. Appendix A1: Necessary properties of backfill materials.
 - vi. Appendix A9: Properties of the alternative reinstatement materials.
 - vii. Appendix A11.2 and Appendix A11.3: Material specifications for base (roadbase) and surface course materials.

Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.3 Reinstatement of the pavement structure

Performance criteria	
<p>You must show that:</p> <p>a) you select appropriate equipment that is suitable to the material type and trench width dimensions and ensure that it is fit for purpose</p> <p>b) you reinstate the pavement structure to the specified level using the correct quantities of materials</p> <p>c) you complete the pavement construction correctly</p> <p>d) you follow safe working practices for reinstating the pavement structure that are in accordance with current relevant specifications and procedures</p>	
Knowledge requirements	Related performance criteria
<p>You need to know:</p>	
1 how to select the appropriate hand tools and compaction equipment for the prescribed operation and material type	a
2 how to ensure that equipment is fit for purpose	a
3 the quantities of different materials required to ensure the correct layer thickness is produced after compaction	b
4 the level to which the pavement should be reinstated and how to measure the specified level of each layer	c
5 how to check that the pavement construction is correctly completed	c
6 safe working practices for reinstating the pavement structure	all
Range to be covered	
<p>I. You must show that equipment for reinstating the pavement structure includes:</p> <p>i. Appropriate hand tools – including square mouth shovels and travelling site stick or depth gauge</p> <p>ii. powered equipment – including vibrotamper, vibrating plate, percussive rammer and vibrating roller</p> <p>II. You must show that material includes:</p> <p>i. granular Type 1 sub-base material</p> <p>ii. excavated granular sub-base material Class A-D</p> <p>III. You must show that safe working practices include:</p> <p>i. safe use of tools and equipment</p> <p>ii. use of appropriate personal protective equipment, including as necessary:</p> <ul style="list-style-type: none"> • high visibility jacket or waistcoat • hard hat • ear defenders • eye protection visor/goggles • dust mask • gloves • protective footwear • waterproof clothing <p>iii. use of risk assessment methods to identify and control any hazards on site</p> <p>iv. precautions to minimise danger or inconvenience to road users</p> <p>v. precautions to minimise danger or inconvenience to site personnel</p> <p>vi. precautions to minimise damage to equipment or apparatus</p> <p>IV. You must show that specifications and procedures are:</p> <p>i. Health and Safety Executive Guidelines (<i>HSG 185: Health and Safety in Excavations</i>)</p> <p>ii. Specification for the Reinstatement of Openings in Highways</p> <p>iii. manufacturer's operating procedures for powered equipment</p>	

Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.3 Reinstatement of the pavement structure

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for an actual or simulated footway or carriageway, previously prepared to receive sub-base and roadbase material:
 - A. Select appropriate equipment for the reinstatement.
 - B. Place material layers.
 - C. Compact layers.
 - D. Construct sub-base.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.
- The area used must have a minimum surface area of 0.7 square metres and must have been previously prepared to receive sub-base and roadbase material.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you reinstating the pavement structure.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways*. The following sections of the Specification provide particular guidance on various items within the performance criteria:
 - i. S6: Reinstatement of flexible and composite roads, including Notes for Guidance NG6.
 - ii. S7: Reinstatement of rigid and modular roads, including Notes for Guidance NG7.
 - iii. S8: Reinstatement of footways, footpaths and cycle tracks, including Notes for Guidance NG8.
 - iv. S10: Compaction requirements during reinstatement, including Notes for Guidance NG10.

Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.4 Dispose of surplus materials

Performance criteria	
<p>You must show that:</p> <p>a) you identify materials that are unsuitable for re-use or surplus to requirements and provide safe temporary storage for them on site</p> <p>b) you load all types of materials for disposal safely for transportation to the designated disposal area, using the appropriate equipment and at the appropriate time</p> <p>c) you leave the site in a clean and safe condition</p> <p>d) you follow safe working practices for disposing of surplus materials that are in accordance with current relevant specifications and procedures</p>	
Knowledge requirements	Related performance criteria
<p>You need to know:</p>	
1 how to determine whether excavated materials are unsuitable for re-use or surplus to requirements	a
2 how to store unsuitable materials away from re-usable materials on site, and the distance required between them to ensure re-usable or imported materials are not contaminated	a
3 how to load materials safely for transportation	b
4 the time limit to impose in removing surplus materials	b
5 the action to take to leave the site in a clean and safe condition at the conclusion of works	c, d
6 safe working practices for disposing of surplus materials	all
Range to be covered	
<p>I. You must show that materials are:</p> <p>i. unsuitable surplus materials</p> <p>ii. surplus materials that are suitable for re-use</p> <p>II. You must show that the appropriate equipment for disposing of surplus materials includes:</p> <p>i. square mouth shovel</p> <p>ii. hard bristle broom</p> <p>III. You must show that safe working practices are:</p> <p>i. safe use of tools and equipment</p> <p>ii. use of appropriate personal protective equipment, including as necessary:</p> <ul style="list-style-type: none"> • high visibility jacket or waistcoat • hard hat • ear defenders • eye protection visor/goggles • dust mask • gloves • protective footwear • waterproof clothing <p>iii. use of risk assessment methods to identify and control any hazards on site</p> <p>iv. precautions to minimise danger or inconvenience to road users</p> <p>v. precautions to minimise danger or inconvenience to site personnel</p> <p>vi. precautions to minimise damage to equipment or apparatus</p> <p>IV. You must show that specifications and procedures are:</p> <p>i. Health and Safety Executive Guidelines (<i>HSG 185: Health and Safety in Excavations</i>)</p> <p>ii. Specification for the Reinstatement of Openings in Highways</p>	

Unit 5 Reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 5.4 Dispose of surplus materials

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for a surfaced area of actual or simulated footway or carriageway following reinstatement of sub-base and base (roadbase) in non-bituminous materials:
 - A. Identify, provide temporary storage for, and load surplus materials for disposal.
 - B. Clean the site.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you disposing of surplus materials following reinstatement of sub-base and base (roadbase) in non-bituminous materials.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways*. The following sections of the Specification give particular references to re-usable materials:
 - i. S3.3.2 indicates that "any excavated material which is unsuitable for reuse should be removed from site as soon as practicable."
 - ii. S6.3.4 (*Disposal of modular materials within the excavation*): Under item (3) it states that "where surplus modules, cobbles or setts are removed from site, they shall remain the property of the Authority. The Undertaker shall notify the Authority and retain them for 10 days following such notification. Thereafter, the Undertaker shall be free to dispose of all remaining modules, cobbles and setts."