

Overview

This part of making it happen includes advice, guidance and information about the highway pavement and specification requirements for residential developments.

The thickness of foundation and pavement construction for industrial and commercial roads is not covered by this section. For these roads the design must be determined in accordance with the latest version of the Design Manual for Road and Bridges, for the estimated volume of traffic, as agreed with us.

General

The information in this section must be read in conjunction with the advice given in the main document and other sections of making it happen.

For work in environmentally sensitive areas, early joint discussions with the local District Planning Authority are essential to achieve good design solutions.

All materials and workmanship must be in accordance with all appropriate Standards and Specifications (e.g. European Standards, British Standard Specifications, Volume 1 of the Manual of Contract Documents for Highway Works [SHW], etc), current at the time of completion of the appropriate Agreement, as amended by the Kent Standard Contract. Where available all materials must have a CE mark.

Amendments and additions to the Specification are included here, but it will be necessary for you to prepare certain appendices relating to the site, for approval by us, and for incorporation into the relevant agreement.

Where documents are superseded or amended our Model Agreement may be adjusted with our permission.

Material Types

Roads are typically built with a foundation of granular sub-base and capping materials, with the upper layers constructed in bitumen bound materials. The top layer provides the impermeable and skid resistant surface to the road and is normally bitumen bound.

Footways are generally constructed in bitumen bound, block paving or small element paving materials. Paving slabs larger than 400 x 400 mm sq and other surfacing materials may be used, in appropriate locations, with our approval.

Materials and techniques specified in this section are those that are commonly used. However, alternative materials and techniques for road construction, that are not included within this section, may become widely available and will require our approval prior to use.

Where you propose to use materials that fall outside the scope of this document, you will be required to make a detailed proposal to the Asset Manager using our Technical Approval Process for Highway Assets in good time to permit their evaluation and approval prior to the relevant work proceeding. Your proposal will need to demonstrate that the materials offer a long lifecycle, lower lifecycle costs, and ease of maintainability. A commuted sum may be applied where the use of such materials will result in increased future maintenance costs.

In the selection of materials for your proposal, we recommend that you consult with our supplementary **Standard Palette of Materials** which exemplifies materials that have been successfully used on previous development sites.

Tests

You must make arrangements with a UKAS accredited testing laboratory for such site tests and investigations as may be required. Testing should be conducted in advance of the design, prior to construction of the works and at various stages throughout the construction.

All site testing during the construction phase must comply with the latest version of our '**Material Testing Requirements**', a copy of which may be obtained from the Proper Officer.

You must:

- ensure that your selected testing laboratory, including any other testing laboratory used by your contractors and sub-contractors, has UKAS accreditation that is specific to each of the tests that they are required to carry out; the test must appear in the laboratory's UKAS Schedule of Accreditation.
- ensure that the test results, materials' source approval and any necessary manufacturers' certificates are submitted to the Proper Officer in a timely manner for approval;
- make available during the construction of the works, such samples of materials as may be required for testing, and where necessary permit our inspection staff access to carry out in situ tests of road materials and checks on finished construction to verify compliance with the Specification; and
- provide such assistance and equipment as we may require - such as a chainman, labourers, instruments or tools. You are responsible for the costs associated with all such tests and assistance.

Our inspection staff may require you to open up the works to take cores or dig trial holes, and carry out tests at your own expense to determine the quality of the works to our satisfaction



Road Preliminaries

General

All areas of the new road to be adopted must be designed and constructed in accordance with the approved plans, the agreement and the requirements of this document.

Wherever possible road designs must include alternative construction thicknesses, which make the maximum use of the material available on the site for capping layer and sub-base.

The use of construction materials from sources that maximise the amount of recycled materials is strongly recommended.

We may request detailed method statements and techniques to assess that the proposed construction materials are satisfactory, particularly where you choose to use recycled and site resourced materials. The road construction must satisfy 4 structural functions. These are:

1. provide construction access routes for the building works;
2. provide a layer of sufficient stiffness so that subsequent layers can be compacted properly;
3. ensure that traffic loads during the life of the road do not exceed the capability of the construction to resist them without rutting or cracking; and
4. provide adequate protection for frost susceptible soils.

We have provided alternative designs in this section to assist you in selecting the most appropriate construction to satisfy all these requirements. Additionally, we are committed to sustainable construction practices, whereby methods which use the minimum amount of quarried aggregate, use recycled materials and waste as little of the site arising material as possible, are preferred and recommended. Where the road is to be used for construction access, you must ensure that the subgrade and paving materials are not overloaded, as evidenced by surface rutting. This will require that you have knowledge of the strength, of the existing subgrade at the time of construction.

Long term strength of the subgrade may be considerably different from that existing at the time of construction. In the summer months it is likely to be higher, at other times possibly lower. The long term strength of the subgrade is evaluated using the equilibrium CBR. This should be estimated in the Laboratory through soil classification testing including the determination of the plasticity index for cohesive soils.

You will be expected to use information collected through your site investigations to anticipate the thickness of your road foundation for design purposes. You will then be expected to carry out further testing just before construction commences along the road formation to establish the actual thicknesses required and adjust the design accordingly.

Site Investigations

Before any proposals are submitted for approval, a geotechnical investigation must be carried out in order to assess a number of design issues, including the following:

Disposal of surface water run-off:

- Depth to water table/perched water table;
- Chemical contamination risk assessment;
- Suitability of strata for soakaway discharges in accordance with the latest edition of our Soakaway Design Guide;
- Suitability of strata for features designed to delay discharge to watercourses e.g swales and lagoons;
- Consultation with the Environment Agency; and
- Impact on adjacent developments landslips, slopes etc.

Sub-soil drainage:

- Depth to water table/perched water table;
- Possibility of chemical attack on concrete pipes;
- Control of piping of fine grained soils;
- Treatment of solution features below drainage runs; and
- Impact on adjacent developments landslips, slopes etc.

Earthworks:

- Cutting/embankment fill side slopes;
- Frequency and treatment of solution features in cutting slopes;
- Limits for earthworks acceptability/recycling on-site materials;
- Chemical contamination risk assessment;
- Need for ground improvement of foundation soils;
- Impact on adjacent developments; and
- Geotechnical certification for strengthened embankments/reinforced structures.

Road thickness:

- Subgrade strength established through soil classification, plasticity index and appropriate CBR testing
- Frequency of treatment of soft spots, features, underground caves etc;
- Differential settlement risks/ need for ground improvement;

- Suitability of subgrade soils for in-situ lime/cement stabilisation (if required); and
- Shrinkage swelling potential over consolidated clays (particularly where trees are removed).

The geotechnical site investigation must be carried out in accordance with the requirements set out in 'Guidelines for Good Practice in Site Investigation'. The scale of the investigation will depend upon the scale of the project, but should typically comprise a desk study followed by a ground investigation.

The desk study is beneficial, even for small developments, with valuable data available from Well Records, published records, geological maps and memoirs, aerial photographs, local libraries, local District Planning Authority landfill databases, Speleological Society records and aquifer protection maps.

This literature search will help you optimise and accelerate the planning of the ground investigation and the subsequent design and construction process.

A separate chemical contamination risk examination must be undertaken for the whole development where necessary.

An environmental assessment study must be carried out to identify flora and fauna affected by the development and the steps to be taken to protect and conserve the species at risk. You should discuss any specific requirements with the Proper Officer.

The road design is based on the strength of the sub-grade to satisfy structural functions, both in the construction phase (the short term) and the post construction phase (the long term). The long term strength of the subgrade must be estimated by determining the plasticity index and, if found to be non cohesive, the California Bearing Ratio (CBR) established using appropriate testing methods.

Prior to laying the capping layer and/or sub-base materials, the existing ground must be checked to ensure the construction material thicknesses are correct and that the sub-grade can carry the required loads.

Sub-soil drainage

Where there is a possibility of the water table rising to within 600mm of the formation level, you must design a suitable drainage system to prevent this happening.

Earthworks

All turf and topsoil must be removed from the formation of the new road. It must be stored carefully on site up to a maximum of 2m in height to prevent deterioration and contamination with sub-soil etc and wherever possible be reused within the site.

Less material needs to be removed where in-situ stabilisation methods are used on the existing soil. This prevents large amounts of granular capping layer being imported.

All other organic materials within the site must be identified, removed and disposed of with our approval. Wherever possible these materials must be reused within the site, in the construction of appropriate mounds or landscaping features.

All highway areas must be excavated or filled to ascertain the agreed formation level. Where local areas are uncovered, which are softer than the general sub-grade, they must be excavated out to a depth appropriate for the soft area and backfilled with a suitable earthworks material.

Where soft areas exceed 25% of the total area of the highway, the whole area must be reduced in level and backfilled with suitable material.

All unsuitable materials, other than organic materials, must be considered where treatment permits, for use in the carriageways, footways, verges or other parts of the site. You can only remove surplus materials from the site with our permission.

Service ducts and pipework

Service ducts and pipework must, wherever possible, be located outside the road. Where this is not possible, service crossings must be installed prior to construction and protected from damage.

You must ensure that all services are installed in accordance with the requirements of the New Roads and Streetworks Act 1991.

Road Sub-Base and Capping Layer

Sub-Base and Capping Layer design thickness

For Industrial and Commercial Roads, the thickness of sub-base must be determined in accordance with the latest version of the Design Manual for Road and Bridges, for the estimated volume of traffic, as agreed with us.

For all other roads only flexible pavements are permitted. Other materials may be permitted in certain circumstances, subject to our approval.

The design process is as follows:

1. You should anticipate subbase and capping layer thicknesses, for detailed design purposes, using:
 - a. **the plasticity index:** of the subgrade, determined through your early site investigations
 - b. **the construction CBR:** an estimate should be made for the expected CBR at the time of construction factoring in the in-situ/lab CBR testing determined from your site investigations and other variables such as the summer/winter fluctuations in subgrade strength.
2. You must review and adjust the design thicknesses based on further testing conducted just prior to construction:
 - a. **the plasticity index:** this must be checked by having samples from along the road formation at 20m intervals sent to the laboratory for soil classification and determination of plasticity index. If the soil classification identifies presence of cohesive soils (indicated by a plasticity index of greater than zero), then a CBR of less than 2% must be used for construction purposes regardless of the results of any further CBR testing.
 - b. **the construction CBR:** where soils are not found to be cohesive, in-situ CBR testing must be conducted along the road formation at 20m intervals using a CBR method that is appropriate to the soil being tested.

You will be expected to carry out the testing and agree the construction thicknesses with us prior to the relevant works commencing. Works commencing in advance of this will be entirely at your risk.

Based on the results of your testing, you may determine on economic practicality or sustainability grounds whether to use the sub-base only option (Table B) or the combined capping/sub-base layer option (Table C).

Table A provides further information on the road types that are referred to in Tables B and C. Please note that Table B does not permit a sub-base only option for road types LD, or MAR/CL & MIR/HZ where the CBR is less than 2%.

For the purposes of this document the traffic figures shown in Table A have been assumed and are based upon a 40-year design life.

The surface of the sub-base must not be used for access purposes by construction traffic when the buildings are being constructed. All construction traffic must use the surface of the binder course.

A minimum thickness of 450mm road construction is required to provide frost protection for the subgrade.

Where the CBR is less than 3%, a non-woven geotextile separation layer is required between the sub-grade and the capping layer/sub-base. Records of the CBR at the time of construction, thickness and compliance data of laid materials and the compaction plant used, must be made available to us.

<u>Table A</u>	<u>Assumed Traffic for Design Purposes</u>			
Road Designation	Road Type Definition¹	Construction Traffic Standard axles	Commercial Vehicles Per day	Standard axles over design life (millions)
Local Distributor Road	LDR	1000	120	1.2
Major Access Road/ Country Lane	MAR/CL	1000	50	0.5
Minor Access Road/ Homezone (through road)	MIR/HZ	500	10	0.3
Minor Access Way/ Homezone (cul de sac)	MIW/HZ	200	1	0.05
Shared Access Way / Mews Court	SAW/MC	50	0.3	0.01

Notes on table A:

1. Road types are described in more detail in the main part of the document.

<u>Table B</u>	<u>Sub-Base only option</u>			
Plasticity Index above zero?	If 'Yes', use a Construction CBR of <2%. If 'No', test for Construction CBR			
Construction CBR (%)	< 2	2 to3	>3to<5	5+
Non woven geotextile layer required?	Yes	Yes	No	No
Road Type Definition				
LD,MAR/CL & MIR/HZ	Use Table C	480mm	370mm	270mm
MIW/HZ & SAW/MC	500mm	370mm	290mm	250mm

<u>Table C</u>	<u>Sub-Base + Capping Layer option</u>		
Plasticity Index above zero?	If 'Yes', use a Construction CBR of <2%. If 'No', test for Construction CBR		
Construction CBR (%)	< 2	2 to3	3+
Non woven geotextile layer required?	Yes	Yes	No
Sub base thickness	250mm of subbase laid over a Capping Layer thickness as below		
Road Type Def			
LD,MAR/CL & MIR/HZ	500mm	440mm	320mm
MIW/HZ and SAW/MC	300mm	150mm	150mm

Materials for Capping Layer

The capping layer is typically constructed using granular materials and using the most sustainable materials and methods. Stabilisation (e.g. lime/cement) may be considered in certain circumstances subject to our approval.

A demonstration area may be required to show that the equipment, techniques and binder used are satisfactory.

The capping layer must achieve a stiffness modulus of 60MPa when measured by portable dynamic plate at 10m intervals along the carriageway.

The Environment Agency must be consulted over the use of any material that could contain contaminants, which could generate an unacceptable leachate.

Materials for Sub-Base

The Sub-base should be type 1 Material in accordance with Clause 803 (SHW).

Other materials may be considered in certain circumstances subject to our approval.

Materials must be compacted using appropriate compaction plant/equipment before drying out or segregation, so that they achieve 95% of the density required when compacted in accordance with BS 1377 Part 9. The density must be measured in-situ using a calibrated nuclear density meter at a rate of 1 test per 20 lin m of road.

Materials must achieve an in-situ Stiffness Modulus measured by a Portable Dynamic Plate, of 100MPa, measured at a rate of 1 test per 20 lin m of road. Other equivalent testing methods may be considered subject to our approval.

There must be no deflection/movement in the compacted finished layer.

The surface of the sub base material, prior to laying the bituminous material, must achieve within a +10/-30mm tolerance of the finished layer level and must not have any ruts exceeding 10mm in depth, measured using a 3m straight edge.

On site sampling of the subbase material will be required to check grading analysis and moisture content against the material specification.

Additional testing will be required for recycled subbase materials, in advance of construction, due to the variability in such materials.

The Environment Agency must be consulted over the use of any material that may contain contaminants, which could generate an unacceptable leachate.

Hydraulically Bound Materials

Hydraulically Bound Materials (HBMs) in compliance with the 800 series clauses (SHW) and BS EN 14227 may be permitted, in certain site specific circumstances, subject to our approval. Where you propose to use HBMs, you must consult with us in advance to ensure that we agree that it is suited to the given application.

A design must be produced and guaranteed in all circumstances by an HBM manufacturer as an equivalent alternative to the construction depths and conventional materials provided in this document.

The long term performance of HBM relies heavily on the use of correct methods in the handling and installation of the material following its delivery to site. It is therefore expected that you, in conjunction with your design consultant and HBM manufacturer, ensure that a suitable contractor with appropriate qualifications and expertise in the laying of HBMs is appointed to undertake the work to the satisfaction of all parties involved.

We will also expect that, prior to works commencing, your appointed contractor will produce a site specific method statement detailing the procedures to be followed from production/delivery of material to site through to laying, compaction, testing, preservation (if the surface is left exposed), and any induced cracking procedures that may be required. The works must be undertaken in a manner which complies with our **General Laying and Testing Procedures** document in conjunction with the manufacturer's own handling and laying method statement.

You will be responsible for ensuring that an appropriate contractor is appointed to lay the HBM. Any workmanship falling short of the required methods, or test data indicating failure to meet the appropriate approval criteria, will result in the constructed works being unacceptable and determined unsuitable for adoption.

Geotextile Separation Layer

A geotextile is a layer of fabric complying with Clause 686AK of the additional Kent Clauses, and agreed with us prior to use. Its purpose is not to strengthen the road, but to ensure the integrity of granular material overlaying soft ground is maintained, without contamination from migrating fine material.

The layer must be laid on the prepared ground without tearing or punching. All joints must be lapped by a minimum of 300mm.



Road Pavement

Road construction using flexible pavements consists of surface course, binder course, and base course.

For Industrial and Commercial Roads the thickness of road construction must be determined in accordance with the latest version of the Design Manual for Road and Bridges for the estimated volumes of traffic as agreed with us. It is based upon a Class 2 Foundation (100MPa) measured by the Portable Dynamic Plate.

Flexible paving – bituminous

The thickness of road pavement construction layers and construction materials must be determined from Table D.

All materials must have demonstrated, by site installation trials independently monitored, that the requirements of the Specification have been met in the last 12 months prior to use.

Table D Construction Materials & Layer Thickness – bituminous surfacing (mm)			
	Materials	LDR	MAR/CL or MIR/HZ or MIW/HZ or SAW/MC
Base course	AC32 HDM base 40/60	180 (in two equal layers of the same material)	90
	OR HRA 60/32 base 40/60		
Binder course	AC20 HDM bin 40/60 WTR1	70	70
	OR HRA 60/20 base 40/60		
	OR SMA 20 bin 40/60 WTR2		
Surface course ¹	HRA 35/14 surf PMB des WTR2 +PCC 14/20 (the default option on all LDR and major roads)	45	45
	OR SMA10 close surf 40/60 WTR2 with fine gritting (for noise sensitive locations where HRA is not appropriate)	40	40
	OR HRA 55/10 surf PMB WTR2 (on lower duty roads where the full benefits of HRA with PC chippings or SMA are not required. Not to be used on sites 40mph or more)	Use alternative material	
	OR AC10 close surf 40/60 (on lower duty roads where the surface properties of HRA/SMA is not required)		

Notes on table D:

1. The surface course shall have a minimum Polished Stone Value (PSV) of 60.

The surface of each road course must achieve within the following tolerances, at a frequency required by the proper officer:

- Base course: +15/-15mm of finished layer level.
- Binder course: +0/-15mm of finished layer level.
- Surface course: +6/-0mm of finished layer level.

If kerbs are not laid prior to laying the base and binder courses, the datums for level control must remain in place to permit checks.

Surface regularity for LDR and MAR roads must accord with Clause 702.7 and 8 (SHW) and Table 7/2 for Category B.

The minimum delivery temperature and temperature immediately prior to rolling, must be in accordance with the relevant British Standard.

All materials must comply with Clause 901 (SHW) and the information included in this section.

Bituminous materials must be supplied and laid in accordance with the relevant British Standards and other relevant HAPAS Guidelines and method statements.

There may be a requirement for manhole chambers to be plated at subbase level if there are concerns about delamination, temperatures, and compaction due to excessive ramping. Plates should be dug out and ironworks set to position prior to rolling and compaction.

The satisfactory performance of asphalt surfacing depends upon a good bond between the layers. Binder courses should wherever possible be laid in conjunction with the base material, however sufficient time must be allowed between layers for cooling to mitigate the risks of premature trafficking (i.e. rutting). A maximum of one course shall be laid in any one day to provide this assurance. Any damage to the surface of any layer must be made good to our satisfaction.

Before a subsequent layer is laid all loose material or other material adhering to the surface of the base or binder course, must be removed by mechanical sweeper and where necessary water jetting. An appropriate tack coat/bond coat, in accordance with the manufacturer's requirements, must then be applied at the rate described in BS 594987 or the HAPAS Certificate.

Materials for base and binder courses must be checked on site for achieved compaction density and samples (every 200 tonnes) must be sent to the laboratory for grading analysis and binder content.. The density/air voids must be checked using a calibrated nuclear density meter, at a rate of 1 test per 20 linear meters of road.

Any high friction surfacing (HFS) must be limited to locations where its skid-resistant properties are needed for road safety, and its colour is appropriate to its use (generally black/grey, but buff on approaches to uncontrolled pedestrian crossings, and red only where essential to address a critical safety issue).



At interfaces between new and existing roads the longitudinal joints in the wearing course must be located outside of the wheel track zone. Ordinarily the surface course will extend to the centre-line or across the full width of the road.

Flexible Paving – blocks

The thickness of pavement materials must be determined from Table E.

<u>Table E Construction Materials and Layer Thickness - block paving (mm)</u>			
	Materials	LDR	MAR/CL or MIR/HZ or MIW/HZ or SAW/MC
Base course	AC32 dense base 40/60	180 (in two equal layers)	90
Binder course	AC20 dense bin 40/60	70	70
Sand laying course		35	
Surfacing¹	Concrete blocks to BS EN 1338 or Clay pavers BS EN 1344	80 (blocks) or 65 (clay)	

Notes on table E:

1. Blocks and pavers should be rectangular in shape.

Use of block paving should be minimised. Any block and/or small aspect paving should be limited to highlighting traffic calming/safety features, shared spaces, and service strips.

The colour of the blocks and the shape and finish must be approved by us in consultation with the local District Planning Authority, where appropriate. A sample of 0.5m² of blocks is required to determine the colour, which must be consistent throughout the scheme.

For LDR, MAR/CL and MIR/HZ, block paving must be laid in a 45 degree herringbone pattern.

Special consideration should be given to use of smaller block types in high stress situations.

For all block paving two stretcher courses adjacent to kerbs and a single stretcher course around ironwork are required.

Block, and slab paving shall have a minimum Polished Paver Value of 55.

Junction with Concrete Road

Where a flexible construction road meets an existing rigid concrete road, a flush 255mm deep kerb bedded on at least 150mm of ST2 concrete and jointed fully with strong cement mortar, must be laid across the full width of the interface between the kerb and the concrete road.

Kerbing and Edge Restraint

General

Precast concrete kerbs and edgings must comply with the requirements of BS EN 1340 and Clause 1101 (SHW). Plastic kerbs are not permitted.

The maximum kerb length to be used is 915mm.

Suitably sized pre-formed radius kerbs must be used to provide curvature, where required. Straight kerbs will only be permitted, on a case by case basis, where it is not possible to use radius kerbs.

Kerb type will generally be 125mm x 255mm half battered HB2 bedded and backed with 150mm of ST2 concrete.

Other kerb types may be used subject to our approval.

For footways, footpaths and cycleways edging types will generally be 50mm x 150mm type EF bedded and haunched with 150mm of ST2 concrete.

A suitable grade of polythene membrane must be used between the ST2 concrete and soft verges where the ground is susceptible to clay shrinkage.

Pre-cast concrete kerbs, and edgings must be laid in accordance with BS 7533-6.

All highway boundaries should be clearly defined, either by a change in surfacing or by a physical feature such as a precast concrete edging, kerb or channel block. Standard features of this type are located within the highway, with any non-standard boundary markers such as metal studs being located on private land.

Kerb face

Kerbs will normally show a 125mm face above the finished road surface. Exceptions will be through certain traffic calming measures, where required, at vehicular and pedestrian crossings, and bus borders.

Vehicular crossings and vehicle overrun areas

At vehicular crossings or places adjacent to the road where vehicles are likely or permitted to over-run, the kerbing must be lowered for the full length of the crossing or bend to show a 25mm face above the finished road surface.

When using pre-cast concrete kerbs, tapered kerbs are normally required at either end. Four dropped kerbs should be used between tapers for a single driveway, and six kerbs for a double driveway.

A minimum of 2.7m between crossings is desirable. Where the length is less than 1.8m, the crossing must be laid as one continuous crossing.

Construction details for vehicular crossings must be in accordance with Tables F & G.

Pedestrian Crossings

The establishment, alteration or removal of a pedestrian crossing requires an advertisement under S.23 of the Road Traffic Regulation Act 1984. You are expected to pay all costs incurred by us for advertising such needs.

Tactile Paving

At all pedestrian crossing points situated along local distributor roads and other places where pedestrian flows are likely to be high, such as main routes to shops, pedestrian crossing ramps must be provided with tactile surfacing in accordance with the latest 'Guidance on the Use of Tactile Paving Surfaces' produced by the DETR.

Where a cycleway runs alongside a footway or footpath, consideration must be given to providing tactile markings in accordance with Traffic Advisory Leaflet 4/90 'Tactile markings for segregated/shared use by cyclists and pedestrians' published by the Department of Transport.

Tactile Blister paving should be concrete with a thickness of 65mm. Where tactile paving is to be installed at junctions and in other locations subject to vehicle overrun, small aspect tactile pavers are used and/or an asphalt base course included in the pavement design.



Footways, Footpaths and Cycleways

General

The construction details for footways, footpaths and cycleways must be in accordance with Tables F & G.

Edgings

Edge restraint must be provided where footpaths or cycleways do not abut a kerb, channel or boundary wall.

Pre-cast concrete edgings are normally used for most types of edge restraint.

Drainage

Where necessary surface water run-off must be drained from footpaths and cycleways that do not abut the road.

The vertical alignment must be adjusted to ensure that no puddles form on the surface.

Depending on site conditions landscaped areas may be used for drainage areas from footpaths and cycleways.

Surface water run-off must be prevented from draining into private property and curtilages at all times.

Construction thickness

Construction thickness for footways, footpaths, cycleways and all other vehicle crossings must be in accordance with Tables F & G.

<u>Table F</u>	<u>Flexible construction thickness (mm)</u> (footways, footpaths, cycleways and vehicle crossovers)	
	Materials	All footways, footpaths, cycleways and crossovers
Sub-base	Type 1 to Clause 803 (SHW) (see note 1)	150 (laid above a non woven geotextile membrane)
Base course	AC20 dense base 100/150	70
	OR HRA 60/20 F bin 40/60	
Binder course	AC20 dense bin 100/150	55
	OR HRA 60/20 F bin 40/100	
Surfacing	AC6 dense surf 100/150	25
	OR HRA 15/10 F surf 100/150 ²	30

<u>Table G</u>	<u>Block paving and slab construction thickness (mm)</u> (footways, footpaths, cycleways and vehicle crossovers)	
	Materials	All footways, footpaths, cycleways and crossovers
Sub-base	Type 1 to Clause 803 (SHW) (see note 1)	150 (laid above a non woven geotextile membrane)
Binder course	AC20 dense bin 100/150	55
	OR HRA 60/20 F bin 40/100	
Sand bed		30
Concrete blocks³ paving or clay pavers⁴		80 (60 only where not susceptible to overrunning) (65 for tactile pavements)

Notes on tables F & G:

1. Where the subgrade material is found to be cohesive, you must anticipate enhancing the design to mitigate against the effects of clay shrinkage. You should also consider the effect of any other contributing site-specific factors on the footway design and construction. Such enhancements could include, but are by no means limited to, the use of an alternative Sub-base material (e.g. HBM, concrete, etc), the addition of polythene separation membranes, and an increased overall thickness of material layers.
2. The HRA option in footways may be more appropriate in heavy duty situations e.g. industrial estate roads, and at other locations where overrunning by HGVs is likely to occur.
3. Blocks must be rectangular in shape. Secondary treatment of corners and edges may be permitted where appropriate to the development.
4. Pavers must be rectangular in shape.
5. A footway, or combined footway/cycleway facility, also provides a service bay for Statutory Undertakers' apparatus. You must ensure that all services are installed in accordance with the requirements of the New Roads and Streetworks Act 1991, prior to footway surfacing carried out.

Wherever possible we will require you to use blocks that are locally sourced.

If requested by the Proper Officer, a sample of 0.5m² of blocks must be provided to determine the colour, which must be consistent throughout the scheme.

Blocks must be laid in accordance with the relevant part of BS 7533.