

SMART

PART B

SPECIFICATION

(FOR ADOPTABLE ASSETS)

This document is part of the “Shropshire Manual for Adoptable Roads & Transport” (SMART) and should be read in conjunction with all other appropriate documents.

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B.1. SCOPE

1. The design and construction of all potential public highways by (or on behalf of) a private developer, where it is intended that Shropshire Council, as local Highway Authority, will undertake to adopt the agreed highway infrastructure and assets, as “maintainable at public expense”, after the satisfactory and authorised completion of the works.
2. It is expected that this will be undertaken through the successful application of a **Section 38 and/or Section 278 Agreement** under the **Highways Act 1980**, together with any other relevant processes. These agreements and processes are considered in the following documents:
 - SMART - Part C – Legal Agreements
 - SMART - Part D - Procedures
 - SMART – Part E - Technical Note 1: How to make a S38 Agreement
 - SMART – Part E - Technical Note 3: How to make a S278 Agreement
3. The specifications are presented in a similar numbering series and sequence as used by the Design Manual for Roads & Bridges, and New Engineering Contract (NEC 3 & NEC4) for ease of reference.
4. All the specifications presented in this document are considered applicable to all highway agreements. Where an item is specific to either S38 or S278 this will be indicated in the sub-section title.
5. It should be noted that the specification of items and materials used in this document have been developed to ensure appropriate longevity and provide economic maintenance of the asset.
6. **All new adoptable assets are expected to have a minimum design life of 60 years.** Where this cannot be provided an appropriate commuted sum will be applied, which will be based on achieving this design life, in accordance with the relevant ADEPT Guidance.
7. Not every item or asset likely to be present within the adoptable highway is covered in this specific document, therefore the developer will need to provide an appropriate design and specification for consideration by Shropshire Council.

B.2. SERIES 100

B.2.1. RISK ASSESSMENT

8. The contractor shall, before commencement of any work within the public highway, ensure that all such works are assessed for their risks in accordance with the general requirements of the MANAGEMENT OF HEALTH AND SAFETY AT WORK REGULATIONS 1999.
9. It should be noted that within any existing road pavements there may be ‘tar’ present and the developer’s contractor must be familiar with the required actions and precautions, in the event of encountering tar. Copies of Hazardous Waste Consignment Notes for the disposal of road-tar contaminated arisings are to be provided to Shropshire Council.
10. Furthermore, the contractor shall also ensure the safety of his employees and others who may be affected by his work activity by conducting risk assessments, as required by the following Health and Safety Regulations: -
 - a. The Control of Substances Hazardous to Health Regulations.
 - b. Manual Handling Operations Regulations.
 - c. Health and Safety (Display Screen Equipment) Regulations.
 - d. The Provision and Use of Work Equipment Regulations.
 - e. Personal Protective Equipment at Work Regulations.
 - f. The Noise at Work Regulations.
11. The contractor shall, before the commencement of any works associated with the public highway, provide to Shropshire Council, copies of all risk assessments prepared in

accordance with the requirements of the preceding paragraph of this clause, if requested to do so.

12. Where throughout the duration of the contract, any of the risk assessments prepared in accordance with the requirements of this clause, are in any way modified or amended, the contractor shall provide a copy of any such amendment or modification to the project manager.
13. The contractor shall ensure that, prior to the commencement of any work on the part of any sub-contractor in relation to the contract, the sub-contractor carries out risk assessments in accordance with requirements of the previous paragraph and submits the risk assessment to the contractor.
14. The contractor shall ensure that any risk assessment submitted by a sub-contractor is sufficient to meet the requirements of the regulations under which they are made and are in accordance with any assessments made by the contractor.
 - The contractor shall provide to the project manager copies of all assessments provided by any sub-contractor.
 - The contractor shall ensure that, prior to the commencement of any works associated with the contract, all information contained in the risk assessment is relayed to all workers who may be affected.
 - Furthermore, the contractor shall ensure that all risk assessments carried out by any sub-contractor shall be brought to the attention of workers who may be affected by any such risk assessment.
 - Where Shropshire Council, or its representative, is dissatisfied with the suitability or sufficiency of any risk assessment submitted by the contractor, the contractor shall revise the risk assessment and in doing so shall comply with any direction given by the Shropshire Council, or its representative.

B.2.2. COMMENCING WORKS

15. The developer is to ensure that all Permits and Licences have been obtained prior to carrying out any works within the adopted Highway: The Council must be given at least three months' notice prior to the commencement of the Highway works.
16. The developer may be required to prove the integrity of the works, at any stage of the project, which the Council may stipulate. For example, if there is a need to prove the thickness of a material layer that has been covered prior to inspection, then the developer will be required to undertake coring to indicate the as constructed thickness and compaction level. This work will be undertaken at the developer's expense.
17. All roads and visibility splays shall be set out and constructed in accordance with the approved plans and associated specification. They are to be maintained in this form until the completion of all works.
18. At the location(s) where the new development joins the existing public highway, the new junction bellmouth, visibility splays and footways, located within the extent of the existing public highway, will be constructed to finished surfacing levels prior to any other works commencing on site.
19. It should be noted that these finished areas will require reconstruction prior to adoption of the new assets, if they have deteriorated during the development's construction.
20. Resurfacing and/or reconstruction of any existing footway(s) and/or carriageway(s) are to be extended to include any reinstatements or service trenches connected with the new development. Reinstatement edges are to be cut back to a clean vertical edge and the development constructed up to that point. The surfacing course shall be overlapped by 300mm with the vertical joint receiving hot applied 50 pen bitumen, unless otherwise directed by Shropshire Council.
21. No storage of materials will be allowed on the public highway and all visibility splays are to be maintained throughout the construction works.

B.2.3. PRECAUTIONS AGAINST DUST, MUD, DIRT AND DEBRIS

22. The developer is reminded that it is an offence under the Highways Act 1980 to deposit or allow materials to be washed onto a highway and should therefore take all reasonable steps to ensure that the highway is kept clear of all mud, clay, lime or similar material during the execution of the works.
23. The existing public highway must not be used for stockpiling or storing plant, materials or equipment. The use of the existing publicly maintained highway by plant and machinery is likely to cause damage to the highway and the developer/contractor will be liable for the cost of the reinstatement under Section 59 of the Highways Act 1980, if any damage has been caused to the highway.
24. The developer shall take all reasonable steps to minimise nuisance caused by dust, mud, dirt and other debris during construction of the works. Such measures shall include:
 - Dampening of surfaces producing dust when required or as instructed by Shropshire Council or their representative
 - Soiling and seeding areas to be completed as nearly concurrent with earthworks and filling operations as possible, and keeping these surfaces dampened as necessary.
 - Protection of fill material embankment surface where necessary for longer periods by the placing of a protective layer of surface dressing or bituminous spray or dampened suitable cohesive material as defined in Clause 601. Such protective layer to be removed only immediately prior to the recommencement of further filling operations.
 - Ceasing work in areas at times when climatic conditions prevail such that the previous three measures prove to be unsatisfactory in the opinion of the supervisor.
25. All existing highways used by vehicles of the developer, contractor or supplier of materials or plant, and similarly any new or diversion routes which are part of the development or near the works shall be kept clean of all dust, mud, dirt and other debris. Any such matter spreading onto these areas shall be immediately cleared by the developer's contractor by manual sweeping or shovelling or using mechanical sweeping and clearing equipment. Additionally, if so directed by Shropshire Council such areas shall be thoroughly cleaned by hosing or watering.
26. Access within, and to and from the site across any public highway, diversion road or any other way used by public traffic shall be strictly limited, as approved by Shropshire Council. Vehicles and plant shall enter onto such public traffic routes only after thorough cleaning.
27. Where specified, the developer's contractor shall provide vehicle washing plants as part of the temporary accommodation. Such washing plants shall be utilised for thoroughly cleaning all vehicles and plant prior to its entrance onto any public highway, diversion road or any other route used by public traffic.
28. Each washing plant shall include hard standings and adequate drainage facilities and an approved mechanical wheel washer. The wheel washers shall be connected to a mains water supply and discharge into a new or existing drainage system and shall be through traps and filters approved by Shropshire Council to prevent the entry of silt, clay, or any other contaminating material into the drainage system.
29. The vehicle washing plants shall be sufficient in number and capacity at all times, in the opinion of the Council. Unless otherwise permitted by the Council, they shall be installed immediately on occupation of the site by the developer's contractor and utilised always.
30. The developer's contractor shall keep those parts of the site, which are within the existing public highway, clean and tidy by removing all rubbish from the site as work proceeds, or as necessary and when required to do so by the Council.
31. Compliance with the foregoing shall not relieve the developer or the contractor of any responsibility for complying with the requirements of the Highway Authority in respect of keeping the public highway clean.

B.2.4. CONTROL OF NOISE AND VIBRATION – (S278)

32. The developer's attention is drawn to the Control of Pollution Act 1974 and to Sections 60 and 61 which relate to noise on building and construction sites. It will be the developer's responsibility to carry out any works within (or immediately adjacent to) the public highway, in such a way as to satisfy the Local Authority's interpretation of this Act, which may impose restrictions upon the type of plant, method of working and working hours. The developer is to allow for any additional costs which may arise out of compliance with the Act.
33. The developer may wish to seek a Consent Notice under Section 61 of the Control of Pollution Act 1974 from the Environmental Health Officer of Shropshire Council.
34. Without prejudice to the generality of the developers' obligations and the preceding paragraph the contractor shall comply with the following requirements: -
 - a) all vehicles and mechanical plant used for the works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order;
 - b) all compressors shall be "sound reduced" models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers;
 - c) Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum.
 - d) All static plant, e.g. mixers, compressors and vehicle compound/material stores etc., shall be positioned as far from residential properties as is reasonably practical.
 - e) Where it is unavoidable that plant shall be situated close to residential properties the contractor shall consider the provision of temporary acoustic screening.
35. The developer shall furnish such information as may be required by the Environmental Health Officers of Shropshire Council in relation to noise levels emitted by plant or equipment used or installed on the site or which the contractor intends to use or install on the site.
36. The developer's contractor shall take all steps necessary to limit vibration caused by plant and machinery used on the site.
37. No machine will be permitted which uses a system of dropping a heavy weight, whether power-assisted or by gravity, for breaking up paving or foundations.

B.2.5. WEATHER CONDITIONS

38. All bituminous materials shall be laid in accordance with the requirements of BS594987.
39. Working in wet conditions will adversely affect and damage existing ground including the sub base and sub grade. If these materials have deteriorated due to trafficking, then the material shall be removed and replaced with MOT Type 1 material.
40. No material in a frozen condition may be incorporated into the works.
41. No material shall be laid on any surface that is frozen or covered with ice or snow.
42. Footway and cycleway surface courses will be laid in accordance with BS594987
43. Consideration will be given to the adverse effects of applying coated chippings to rolled asphalt materials in cold weather. Wind chill factors can rapidly reduce the temperature of the laid material. The developers attention is drawn to the minimum rolling temperatures contained within BS594987
44. Materials containing cement shall not be laid when the descending air temperature in the shade falls below 3°C and laying shall not be resumed until the air temperature reaches 3°C.
45. Where fresh concrete or mortar containing Portland cement has been placed within the works and the temperature is expected to fall below 0°C within a period of up to 48 hours

after placing, then suitable insulating blankets should be used to ensure that the materials do not freeze. These blankets must remain in place until the air temperature is at 3°C and rising. The incorporation of additives or cement replacements may retard the early strength gain. Therefore, care must be taken to ensure that damage does not occur after the initial 48-hour period.

B.2.6. HAZARDOUS MATERIALS

46. Any tar bound material found must be disposed of as hazardous waste. The contractor should carry out his own checks and dispose of arisings to suitably licenced facilities.
47. The developer's contractor must refer to COSHH statements regarding any hazardous substances that he proposes to use.
48. The use of chemicals should be limited to the need for a base seal to the feeder pillars.
49. Health risk from dust generated in slot cutting works and burns from hot substances used
50. The developer's contractor is to ensure that:
 - Risk Assessments, method statements, training and PPE are in place
 - The manufacturer's instructions and the COSHH regulations are followed
 - Suitably competent personnel, CSCS certified, are employed to carry out works.
51. It is unclear from currently available information of the risks associated with materials within the highway containing asbestos. However, when encountered, it is generally in the form of asbestos-cement and there could be a risk of inhaling fibres, particularly in confined spaces (i.e. in chambers, culverts and ducts) especially if the material is damaged or disturbed.
52. If the contractor suspects asbestos is contained in any material within the public highway, they shall seek competent advice immediately and advise Shropshire Council. Proposals for dealing with the material accordingly by a competent contractor must be submitted. The cost of these works will be borne by the developer

B.2.7. ACCESSING THE WORKS

53. Shropshire Council and any other persons authorised by the Council shall at all times have access to the works.

B.2.8. MAKING GOOD DAMAGE TO THE HIGHWAY

54. Prior to commencement of the works, the developer shall arrange for the existing highway network, which is to be used by construction traffic, within the vicinity of the site to be inspected in the presence of the Council's representative. A photographic and video record of the condition of the highway shall be made, on the date of inspection, for future reference.
55. Where the surface of any existing highway or public area of any kind has been disturbed during the course of the works, these shall be fully reinstated with the same or comparable materials to the satisfaction of the Council.
56. Any damage sustained to the footways, verges, carriageways or existing public highway by delivery vehicles and plant servicing the development shall be deemed to be the responsibility of the developer. Such damage shall be rectified to the Shropshire Council's satisfaction before adoption of the development roads will be considered and shall be remedied at the developer's expense.
57. Failure on the developer's part to so do may result in the Council or its Agent carrying out these works and recharging all costs incurred to the developer.

B.2.9. SIGNING, GUARDING AND LIGHTING THE WORKS

58. The developer shall provide and maintain any necessary watching and lighting, temporary barricades, traffic control, etc., as required for the safe execution of the works, in accordance with the Traffic Signs Manual - Chapter 8.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/203669/traffic-signs-manual-chapter-08-part-01.pdf

59. For emergency use outside normal working hours, the developer shall prior to the commencement of the works, provide the Council in writing with the name, daytime and night-time telephone numbers and address of the person responsible for site security and traffic safety and control. The developers must obtain the approval of the Council before using any temporary signals on the existing highway.
<https://www.shropshire.gov.uk/roads-and-highways/road-network-management/application-forms-and-charges/section-50-street-works-licence/>

B.2.10. SAFE SYSTEMS OF WORK AND METHOD STATEMENTS

60. The developer's contractor is to appoint to the site a suitably qualified, specifically trained person to act as a safety supervisor. This person is to be present on site: -
- when certain operations are being carried out that can be considered to involve more risk or difficulty than normal (to be agreed), to ensure that the developer's contractor adheres to a prepared and approved method statement,
 - at other times as reasonably practised in his capacity as safety supervisor or, when specifically requested by the Council.
61. When the Safety Supervisor is away from the site a telephone contact number is to be given to the Council.
- a) Section 2(2) of the HSW Act requires the provision of safe systems of work and the preparation of method statements by the contractor is generally considered to be an important step in complying with that obligation.
 - b) Additionally, under the contract it will be a requirement that method statements will be submitted to the Council by the developer's contractor to demonstrate his intentions in ensuring health and safety for certain agreed operations.
 - c) These operations will be those involving a greater than normal risk or difficulty and will be identified and agreed between the Council and developer's contractor as soon as possible after the award of the contract. The Council may also request method statements from the developer's contractor for other site operations at any time during the contract.
 - d) The Council may inform the developer in writing within a reasonable period after receipt of the method statement where in the opinion of the Council it fails to comply with the HSW Act; the developer shall not unreasonably refuse to amend the method statement accordingly.
 - e) The developer's contractor shall not subsequently change the method statement without the prior knowledge and consent in writing of Shropshire Council, which shall not be unreasonably withheld.
62. The contractor is to comply, where applicable, with the Construction Regulations, General Provisions C (GP) 24 (Prevention of Drowning) and in Health & Safety Executive (HSE) Guidance Notes GS29/1 4 (Demolition).
63. At all times, the 'standard' (i.e. the contractor's system of work complying with the HSW Act) shall be the minimum to work from, not the standard to come up to.
64. Nothing in this section shall relieve the contractor from their general obligations under the contract nor is it intended to relieve the contractor or employer from their obligations under general law.

B.2.11. EMERGENCY TELEPHONE NUMBERS

65. The developer/contractor will erect and maintain an information board on site for the duration of the works within the public highway. The board will provide the name and contact phone number of a responsible person for the works on the public highway. The person will be available 24 hours a day, 7 days a week to allow notification of dangerous event, incident or accident should they occur.
66. The information board must be clearly visible from the public highway.

67. When working on the existing highway the appropriate information board will be visible to all road users and will include the relevant Shropshire Council permit number, and any other required relevant information.

B.2.12. TRAFFIC SAFETY AND MANAGEMENT

68. In all cases, where the proposed works involve vehicular access to an existing public highway. The developer's contractor shall nominate a Traffic Safety Officer who shall be directly employed by the contractor and whose duties shall include: -
- i. 24 hour every day availability in emergencies (achieved through a nominated deputy if necessary). Equipped with a mobile phone, the number for which shall be supplied to Shropshire Council and the police.
 - ii. Ensuring that the traffic control requirements of Shropshire Council are carried out.
 - iii. Ensuring that all equipment is inspected and maintained.
 - iv. Arranging diversions and temporary highway crossings and accesses.
 - v. Dealing with traffic in emergencies.
 - vi. Arranging duties for watchmen so that the site is patrolled and inspected and equipment attended to and maintained, at all times.
 - vii. The officer will liaise with businesses and private individuals to ensure that the work does not prevent people entering / leaving their workplaces and residences.

B.2.13. TEMPORARY TRAFFIC SIGNAL AND ROAD CLOSURE APPLICATIONS

69. All traffic management shall be designed by the contractor and shall incorporate the requirements of this section (B.2.13) and submitted to Shropshire Council, as part of the application for the appropriate road works permit.
70. All appropriate signing shall be provided by the developer's contractor to comply with the Traffic Signs Manual - Chapter 8, Parts 1, 2 and 3.
71. Details of road closures and the necessary diversion drawings for the proposed traffic management requirements must be submitted to Shropshire Council's Street Works Team at least 3 months prior to the commencement of works on any public highway. No work is permitted within the existing public highway without the approved consent of Shropshire Council's Street Works Team.
72. The necessary temporary speed limit and/or closure orders for the works will be processed by Shropshire Council (at the developer's expense) and be in place prior to commencement of works on the site. The closure dates are fixed and shall be incorporated within the developer's submitted programme.
73. The developer's contractor shall fully utilise the road closure periods available to them, as outlined on the approved phasing plan and programme. Access to all properties within the site must be maintained during the closure periods.
74. Road closures must be manned with gatemen at the locations of the actual physical closures to liaise with and direct motorists. Gatemen shall work in pairs. At each manned location signs stating, 'CCTV IN OPERATION' (1050mm x 750mm) shall be displayed. Each gateman will wear a video camera capable of recording 48 hours of continuous footage. Each gateman shall wear a safety helmet with a sticker on the front saying, 'CCTV IN OPERATION'. Cameras shall be turned off when not in use and shall be switched on when required. The camera shall be capable of being recharged on site or within a vehicle. Recorded video images must not be retained, published or used for any other purpose other than the intended purpose of recording and discouraging occurrences of threatening behaviour towards gatemen/construction personnel and for assisting in criminal prosecutions if necessary. Copies of CCTV footage shall be provided to police on request. The use of CCTV in this way complies with the requirements of the Data Protection Act.
75. The diversion route signing shall be provided, maintained and removed by the developer's contractor. All diversion route signing shall be checked by the developer's contractor each evening and early morning.

76. Only one length of traffic control will be allowed on site at any one time unless otherwise approved by Shropshire Council. The extents of which shall be limited to 600m during day time hours and 300m during night time hours.
77. The utmost care shall be taken in the positioning of the light heads due to the horizontal and vertical curvature of the carriageway, the potential forward visibility and queue lengths.
78. No work will be permitted outside the traffic management areas unless permission is granted by Shropshire Council following submission of a satisfactory method statement.
79. When traffic signals are in use in combination with convoy vehicles they must be manually operated to coordinate with convoy vehicle operators to reduce traffic queues and speeds. At all other times they must be on sensor control to detect waiting traffic.
80. Operators of convoy vehicles and signal control operator must have radio communication. Side roads and accesses emerging into the convoy system will need signs "CAUTION – CONVOY SYSTEM IN OPERATION – ONLY ENTER TRAFFIC BEHIND CONVOY" (sign 1200mm x 750mm).
81. On commencement of lane closures and/or road closures, existing traffic signs (or parts of) shall be covered by the developer's contractor so that they do not conflict with the temporary traffic management signs.
82. Emergency traffic shall be permitted through the site always.
83. The contractor shall provide a well-defined pedestrian and cyclist route through all traffic management areas within each affected site length and access shall be maintained at all times.
84. Access to all properties within the site must be maintained at all times.
85. The cost of all traffic management and associated signing defined above and any additional that will be required on the direction of Shropshire Council shall be met by the developer
86. All road markings to Diag. 1003 & 1009 of the current Traffic Signs Regulations and General Directors (TSR&GD) must be completed no later than 24 hours (unless agreed with Shropshire Council) after completion of the surfacing. Reinstatement of all other road markings must be completed no later than 36 hours (unless agreed with Shropshire Council) after completion of the surfacing. 'No Road Marking' signs must be erected during the interim period.

B.2.14. INFORMATION BOARDS

87. Where works are to be undertaken within the public highway, information boards shall be provided as described below.
88. Static signs, Sign Reference A and B, shall be erected on the approach to each site in positions as agreed with Shropshire Council at the times stated. The signs shall have the following legend and be mounted on 'A' frames or lighting columns

SIGN REFERENCE A:

Permit No. XXXXX* ROAD WORKS START HERE ON XX/XX/XXXX FOR X WEEKS TEL: 0345 678 9000

(Black Lettering, Yellow Background, Black Border, x height = 150mm)

Information Boards including Sign Reference A shall be provided and erected three weeks prior to the start of works.

(* Permit numbers and dates to be confirmed at the pre-start meeting.)

SIGN REFERENCE B:

THIS ROAD WILL BE
CLOSED HERE
ON XX/XX/XXXX*
FOR XX DAYS

(Black Lettering, Yellow Background, Black Border, x height = 150mm)

Information Boards including Sign Reference B shall be provided and erected two weeks prior to the road closure.
(* Permit numbers and dates to be confirmed at the pre-start meeting.)

89. Shropshire Council may also require the developer to provide additional information signs, such as “Businesses Open as Usual” and/or further advance warning signs, as appropriate for the local area and local circumstances.

B.2.15. UTILITIES

90. All planned new and diverted utility apparatus associated with the development, will require submission to Shropshire Council for technical review. All required trenching works within the existing adopted highway will be subject to the following minimum surface course reinstatements

Reinstatement in	Minimum length	Minimum Width
Carriageway	15m	A full lane width on roads greater than 5.5m Full carriageway width on roads 5.5m or less
Footway	5m	Full width between kerb and edging

91. All works required on the adopted highway due to operations by either the developer, their contractor or any utility providers will need to be included in the adoption area plan, and be coloured accordingly (see SMART – Part C: Legal Agreements).

92. All ducting plans shall include a proposed minimum depth for areas of carriageway, footway and verge. All carriageway duct crossings must extend beyond the channel a minimum distance equivalent to its depth; this is to ensure that any kerb race is not undermined by connection works. Where possible ducting provision should be installed prior to the installation of kerb bed.

93. Where duct boxes or utilities chambers are located within areas of verge the covers to these must be a minimum of 100mm deep. Future maintenance of verges should be considered and all covers must be installed flush to allow for grass cutting.

94. Recessed covers should be specified for use with telecommunication chambers in locations of block paved footway. Guidance on approved cover manufacturers should be obtained from the statutory undertaker and subsequently be approved by Shropshire Council.

95. The blocks/slabs must be bedded into the frame using a high strength epoxy bedding mortar.

96. All chamber covers located within block paving must be specified with frames at a sufficient depth to allow for a full depth pavior to be laid adjacent to the cover, reduction in the depth of a block will not be permitted.

97. All chambers and covers located in shared space are to be constructed for carriageway loading, unless vehicle overrun is physically restricted.

B.3. SERIES 200

B.3.1. GENERAL SITE CLEARANCE & RETENTION OF MATERIAL ARISING

98. Shropshire Council’s Environmental Charter stresses the importance of re-cycling materials wherever possible. Therefore, when working within the public highway it is encouraged that any disposal and/or reuse of materials is undertaken in an environmentally sensitive manner.

99. Shropshire Council will require written confirmation that the recipients of all arisings from milling operations have the appropriate certificates to receive the material.
100. Existing traffic signal controllers are to be disconnected from the mains supply, removed and returned in serviceable order to the Shropshire Council store.

101. **Removal of traffic signal controllers, poles and associated equipment, chambers and chamber lids (incl. frames), cables, ducting:**

Description	Delivered To	Requirement
Traffic Signal lanterns and other equipment installed on traffic signal poles.	Traffic signal equipment that are not being stored are to be recycled.	For re-cycling Contractor must ensure that all equipment installed on the traffic signal poles are removed for re-cycling or removed to storage WARNING , do not dismantle equipment until it has been proven that Electric Supply has been DISCONNECTED at Source.
Traffic Signal Pole & Pole Box,	Recycling	For re-cycling WARNING , do not dismantle equipment until it has been proven that Electric Supply has been DISCONNECTED at Source.
Chambers, frames and lids	Recycling	For re-cycling
Traffic Signal Cables	Recycling	For re-cycling Redundant cables are to be removed from the old system. WARNING , do not remove cables until it has been proven that Electric Supply has been DISCONNECTED at Source. Contractor must maintain traffic signal cables that are necessary to keep the junction operational until the new controller is commissioned and operational.
Traffic Signal Ducting	To be left in situ	
Detector Loops (vehicle detection)	To be left in situ	

102. Redundant items of electrical and electronic equipment shall be disposed of in accordance with European Directive (2002/95/EC) Waste Electrical and Electronic Equipment.
103. Where redundant chambers or cables remain, they must be removed and remaining ducts are to be abandoned. Any redundant duct runs must be blocked off at the duct end with expanding foam or similar, to the approval of Shropshire Council.

B.4. SERIES 500

B.4.1. HIGHWAY DRAINAGE

104. It is usual that the local drainage authority under a section 104 agreement will adopt new drainage systems. Shropshire Council will only adopt the gullies and connections which have been installed to the satisfaction of the Shropshire Council representative.
105. Where no public storm water sewer is proposed, an adequate piped highway surface water drainage system of approved pipe sizes; gradients and materials shall be provided to an outfall/ attenuation.

106. Highway surface water drains shall be laid in straight lines at uniform gradients between manholes. Sight rails shall be erected at intervals of no more than 45m and at changes of gradient.
107. A gully & pipe drainage system shall be provided where the longitudinal gradient of the carriageway is 1:99 or steeper, and the spacing will be based on the guidance in DMRB HA 102/00 and the flow widths detailed in paragraph 119 below.
108. Shropshire Council does not accept gully spacing less than 20m apart. Where this is anticipated the vertical profile of the proposed highway should be increased. Where this is not practical, consideration can be given to the use of kerb drainage systems, subject to approval of Shropshire Council.
109. Where an outfall sewer or pipe unavoidably passes under land which is to be conveyed to a dwelling, or which is to remain undedicated as highway, an easement will be required giving the Highway Authority right of access, at all times, for the purpose of maintenance or repair.
110. Acknowledgement of the presence of such a drain under each affected property must be safeguarded by the incorporation of a suitable easement within the conveyance of that property by the developer.
111. Where an outfall, drain ditch or pipe will discharge into an existing drain, pipe or watercourse not maintainable by the Local Highway Authority, written evidence of the consent of the authority or owner responsible for the existing drain etc. to such discharge shall be provided to the Council.
112. No highway surface water outfall drain shall pass beneath any building or structure.
113. The following types of pipe may be used for surface highway drains, subject to the jointing and installation being undertaken in accordance with the appropriate manufacturers' specification
- Concrete pipes manufactured with sulphate resistant cement
 - PVCu twin walled with smooth internal and ribbed external surface walls with current BBA certification
 - Vitrified clayware pipes
114. All drainage runs irrespective of depth shall have a bed and surround of 150mm of concrete grade ST4 WITH sulphate resistant cement to SHW clause 2602. In the case of plastic pipes care should be taken to ensure that the pipes do not float when the concrete is placed.
115. To maintain a degree of flexibility 13mm fibreboard (Flexcell or otherwise approved) shall be placed at the pipe joints to the full width of the concrete surround.
116. For porous pipes the surround shall comprise of at least 150mm of no fines concrete to SHW Clause 2603.
117. Soakaways will not be permitted within any carriageway, footway or cycleway on new developments unless all other courses of action have been eliminated. The Council must approve their use prior to their inclusion within the development.
118. On completion of the works and prior to adoption, all drains, manholes, gullies etc., shall be left free from all debris and obstruction (power cleaning may be required) demonstrated by CCTV survey, to the satisfaction of the Council.

B.4.2. FLOW WIDTHS

119. All highway drainage shall be designed using DMRB HA102 (equivalent to 5-year 15-minute storm) with the following flow widths:
- 0.5m on all carriageways with footways (or other kerbed channel), or;
 - 0.75m on all carriageways adjacent to a flush soft verge/swale, or;
 - 1.0m on carriageways which have a dedicated hard-shoulder.

B.4.3. COMBINED DRAINAGE AND KERB SYSTEMS (KERB DRAINAGE)

120. Kerb drainage shall be provided where the longitudinal gradient of the carriageway is 1:100 or below
121. Kerb Drains shall be compliant with Highways Agency Interim Advice Note IAN117/08 and clause 516 of the Specification for Highway Works and accreditation to EN 1433.
122. Maximum width of top component to be 100mm and maximum width of base unit to be 280mm. Maximum combined unit depth to be 535mm.
123. The kerb upstand of the combined drainage and kerb system must match that of the adjacent kerbing within the development.
124. Kerb profile to be 45° splayed top component.
125. All components shall comply with the British Standard BS EN1433:2002, load classification E600 and the following:
 - The water inlet aperture shall increase in size towards the inside of the unit with a minimum divergence angle of 5°
 - The angle of incline of the water inlet aperture shall be at least 30° to the horizontal
 - Water inlet apertures shall be wholly within individual units and not within 100mm of the end of each unit
 - When installed, the depth of construction from the top of the base channels to the drained area surface shall be not less than 100mm
 - The Top Block shall have an Unpolished Skid Resistance Value (USRV) 70+ when tested in accordance with BS 7263: Part 3
 - The system shall have a minimum of 12,850mm²/m water inlet aperture area.
126. System to be laid at 1:200 (to match the proposed channel profile) and have a minimum flow capacity of 20 l/s.
127. To have an inline side outlet connected to the existing carrier drain via an appropriate chamber.
128. At the upstream end of the system there is to be an end cap and a 45° splayed access cover and frame.
129. All components are to be installed to the line and levels specified on drawings specified within the legal agreement (S38/278) and in accordance with the manufacturer's instructions and standard details.

B.4.4. HIGHWAY IRONWORK

130. Chamber Covers, Gully Gratings and Frames shall;
 - conform to the full requirements of BS EN 124:2015
 - be produced by a manufacturer who operates an Occupational Health & Safety Management System which complies with the requirements of BS OHSAS 18001:2007 covering the design, manufacture and supply of ductile iron access covers & gratings
 - be produced by a manufacturer who shall source materials in a responsible manner which is carried out under the license using BRE's Responsible Sourcing scheme methodology and underpinning processes independently verified and certified to BES 6001
 - be produced by a manufacturer who can evidence that any welding processes and techniques of component parts have been successfully undertaken in a continuous arrangement for no less than 5 years. (Type testing and documentary evidence may be requested at any time by Shropshire Council)
 - be produced by a manufacturer who have a detailed schedule of accelerated physical Dynamic Testing to simulate a minimum 20-year lifespan, which can be evidenced.
 - be provided with a full method statement describing the installation procedure and the opening/closing procedures
131. The performance and durability requirements of all Gully gratings, Chamber Covers and frames shall:

- be made of non-malleable spheroidal graphite cast iron (ductile iron) grade 500/7 in accordance with BS EN 1563:2011
- will have a minimum classification of D400 for all highway applications
- all frames shall be equal to or greater than the gully grating or chamber cover to be fitted on it and must be fully supported beneath the vertical wall of the frame. Only inboard seating will be allowed to encroach within the clear opening of the chamber top. (The chamber shall be sized at the nearest imperial size that is larger than the metric e.g. 600mm² becomes 24" (609.6mm²))
- have a defined raised pattern, on the upper surface of all covers, comprising a surface area of not less than 10% of the total surface area of the combined covers. The raised pattern must be no less than 4mm deep and should have an independently tested and verified \geq PSRV68 when tested in accordance with BS 9124
- have a single level raised surface, such as lettering, logos or linear features. Patterns greater than 72mm in length in any plain is not permissible.
- (the cover) shall have no area \geq 23mmx85mm without a minimum of 2 vertical ($\pm 5^\circ$) edges, leading to a change in height of \geq 4mm perpendicular ($\pm 45^\circ$) to the 85mm length. An area 23mm inside the periphery of the frame shall be excluded from this test
- D400 Chamber Covers & Gully Gratings shall achieve silence in operation performance by means of a double triangular covers system, based on the three-point suspension principle or by means of a continuous elastomer gasket which absorbs >50% of traffic load or in the case of single piece hinged gratings by means of a wedged seating principle.
- (Gully Gratings) shall incorporate an anti-theft captive hinge and an integral automatic lock as standard
- (All Chamber Covers and Gully Gratings) have depth of the seating from the top of the frame shall not be less than 50mm.
- (The frames) shall be a minimum of 150mm deep, except where the product incorporates a continuous elastomer gasket or where the Gully Grating is of a pedestrian design where a frame depth of 100mm will be acceptable.
- the reference point for Gully Gratings shall incorporate vertical frame stiffening webs/gussets shall be provided and should be located adjacent to seating.
- to improve the durability of Chamber Covers & Gully Gratings with square or rectangular openings the frames of the reference products shall feature an increased flange width adjacent to the load bearing seating areas on all four corners to assist with the distribution of stress into the bedding mortar. Such designs shall improve bedding mortar adhesion resulting in a reduction of the dynamic stress transmitted into the sub structure by \geq 50%
- supporting FEA data shall be supplied showing the distribution of stress around the flange, along with maximum stress levels and areas of high stress
- all Chamber Covers & Gully Gratings the bedding flange should have a minimum thickness of 5mm at any point along its horizontal surface and shall not incorporate any elongated slots. Skeletal frames will not be accepted
- the bearing pressure in relation to the test load described in BS EN 124 for systems with load distribution flange designs must not exceed 1.9N/mm²
- All Chamber Covers and Gully Gratings shall be free from any external coating other than factory applied anti-skid coatings when required by the specifying authority, so that it can be visually demonstrated that products are free from blow holes, cold shuts and other similar defects
- bear visible, durable and integral markings required by BS EN 124 (as defined in Chapter 9 Marking) and badged S.W. (Surface Water) or F.W. (Foul Water)
- be tested by a UKAS accredited or UKAS accepted third-party organisation that has BS EN 124 within its scope
- have product conformity certificates to BS EN 124 that are issued and audited by a single UKAS accredited certification body (e.g. BSI Kite Marked)

- shall be manufactured and kite marked to the requirements of BS EN 14001:2004 Environmental Management Systems
 - in the interests of product traceability, the EN124 certificates and schedules of compliant products shall bare the name of the of the manufacturing facility which produced the products concerned
132. In addition, all Chamber Covers & Gully Gratings shall be fully compliant with the requirements of Highways England Guidance Note HA104/09 “Chamber Tops and Gully Tops for Road Drainage & Services: Installation & Maintenance”, more particularly “Chapter 4 Design Requirements Manhole Tops”:
133. If a hinged Chamber Cover solution is utilised, consideration must be given to the following;
- the chamber cover shall include features as standard that allow safe and efficient man entry to below ground assets for inspection and maintenance purposes, Preference will be given to products that include the following standard features
 - cover sections will be of a design that reduces the required effort to operate or remove the individual cover sections
 - covers shall be fitted with a system to prevent them from opening not less than 90° and beyond 110° (or by angle specified)
 - each cover section shall be safely retained/blocked at a 90° angle to prevent accidental closing of covers, avoiding the need for cover removal. The 90° blocking feature shall be deactivated without the need to lift the cover section, but must incorporate a separate primary action before closing the cover.
 - multiple hinged cover sections shall be designed according to the master / slave principle, where the master cover is operated prior to the slave cover[s] when opening
 - each cover section shall be independently hinged and will be 1 person-operable, by means of single standard heavy duty lifting key, keyways shall be compliant to BS 7903
134. Where specified by Shropshire Council, high friction anti-skid performance shall be compliant with the requirements of HA104/09 Chapter 3 Paragraph 3.4, more particularly;
- shall achieve a >PSRV70 when tested in accordance with BS 9124
 - shall have an independently proven in service >PSRV70
 - comprise of a factory applied anti-skid treatment, in which the process is audited and compliant with the requirements ISO 9001 Quality Management Systems
135. All products shall offer the facility to promote enhanced installation techniques and best practice through:
- allowing accurate threaded adjustability of the frame height and gradient of between 15mm and 50mm
 - include visual features to aid installation practices ensuring a minimum depth of bedding material of 20mm from the top surface of the flange and 15mm below the bottom surface of the flange
 - offering the facility to have said features available as a retro fit option
136. Bedding Materials shall be HAPAS approved and selected in accordance with the requirements of “Chapter 6 Bedding Materials” paragraph 6.1 within Highways England Guidance Note HA104/09 “Chamber Tops and Gully Tops for Road Drainage & Services: Installation & Maintenance” and shall exhibit the following properties:
- is cementitious and contains recycled materials
 - be non-flowable for sealing the clear opening between the frame of the Manhole/ Gully Top to prevent the ingress of surplus bedding mortar
 - demonstrate flowable characteristics to completely envelope without voids the flange as described in this section
 - a minimum workable life of 15 minutes and have flowable characteristics;
 - the compressive strength of the material shall exceed 30MPa in 1 hour,
 - the tensile strength of the material shall exceed 5MPa in 3 hours,

- shall be capable of being used in all weathers including wet conditions with the above results
 - materials should be styrene free
137. Notwithstanding the above, where the proposed highway infrastructure (S38) within a development, is likely to support the occupation of dwellings for 12 months or more, as well as construction traffic. The highway ironwork (gully gratings, chamber covers and frames) shall be laid flush with the binder course, using standard traditional techniques.
138. Prior to final surfacing the sacrificial layer of binder shall be removed and the gully gratings, chamber covers and frames shall be reset within the carriageway to the finished surface level, using the appropriate process and materials quoted above.

B.4.5. GULLY POTS

139. Gully pots used for carriageway gullies shall generally be of precast concrete using Sulphate Resisting Cement (SRC). They shall have internal dimensions 450mm diameter by 900mm deep and shall be of the trapped type unless otherwise directed by the Council.
140. PVCu plastic gully pots (BBA Approved) of the above dimensions may be used at the discretion of the Council. The typical detail of this type of gully installation shall incorporate suitable provisions to prevent the pots floating and distorting when the concrete surround is placed and compacted. The installation shall be entirely in accordance with the BBA approval certificate requirements. The Council will expect the BBA requirement to at least be equivalent to a concrete base slab provided below the pot bed and surround and which may take the form of a paving slab set on 100mm of ST2 concrete to SHW Clause 2602.
141. Concrete gully pots shall be installed in accordance with BBA approval requirements. The pots are to be set on and surrounded by 150mm of ST2 concrete sulphate resistant cement to SHW clause 2602.
142. PVCu plastic pots shall be set on and surrounded by ST2 concrete. The surround shall be 200mm thick with a 100mm bed above the base slab in ST2 concrete sulphate resistant cement to SHW clause 2602

B.4.6. HEADWALLS

143. All pipe inlets or outlets to or from open watercourses must be provided with a headwall incorporating any necessary apron, scour baffle, handrails or other works. Suitable designs must be submitted to the Council for approval. A suitable Design is included within Part 5 Appendix IX. Standard Details for Adoptable Highway Assets.
144. In certain locations, and with the approval of the Environment Agency, flap valves may be required. Flap valves should be made of heavy duty plastic (low maintenance type) or other approved by the Council.
145. The invert level of the outlet pipe through the headwall shall be subject to scrutiny and approval by the Council to ensure satisfactory flow through the drainage system.
146. Where headwalls are located within 6m of the footway, cycleway or carriageway they shall be provided with pedestrian safety railings to the requirements of the Council.

B.4.7. ATTENUATION & SURFACE WATER STORAGE

147. The use of multiple and/or 'oversize' pipes (> 900mm dia.) or any other forms of culvert or reservoir, used for attenuating or storing surface water will not be permitted within any carriageway, being offered for adoption.
148. Consideration may be given to such systems, within non-trafficked areas of the highway (i.e. open space) or within private driveways, parking areas, gardens (with appropriate wayleave), but only if all other solutions for surface water discharge have been demonstrated as being unsuitable.

B.4.8. FLOW CONTROL CHAMBERS

149. Shropshire Council requires that flow control chambers (hydro-brakes) are designed using the methods and practises set out in the Design Manual for Roads and Bridges, BD 2, Technical Approval of Highway Structures, with some additional structure specific procedures
150. A typical flow control chamber comprises three main elements,
- the chamber and any associated foundations,
 - the flow control mechanism,
 - the cover slab.
151. The technical approval process for flow control chambers follows the same step by step process as retaining walls, outlined in Part G (Structures). The exception being the way in which the category of check is selected. Any Flow Control Chamber built underneath the highway or highway adopted land will be considered a 'Highway Related Structure', and must go through the technical approval process in order for the highway to be adopted under a Section 38 Agreement.
152. The proposed check category for cover slabs will be based on its maximum span in accordance with the Design Manual for Roads and Bridges and BD 2. Whereas; the category of check required for chambers will be defined by diameter. The category of check required for both cover slabs and chambers can be typically designated as follows (where cover is less than 1.0m):
- Category 0** - $0.9\text{m} < \text{Span} < 5.0\text{m}$
 - Category 1** - $5.0\text{m} \leq \text{Span} < 20.0\text{m}$
 - Category 2** - $20.0\text{m} \leq \text{Span} < 50.0\text{m}$
 - Category 3** - $50.0\text{m} < \text{Span}$
153. As with pre-cast retaining wall units, pre-fabricated flow control chambers and cover slabs will not require a full technical check, provided a certificate and evidence of compliance with the following criteria can be provided:
- Fully compliant with the Construction Products Regulation
 - Either CE marked or a similar recognised product registration system (to current national standards)
 - Being used for their correct intended use
 - Satisfy specified performance standards

B.4.9. LAND DRAINS, WATERCOURSES AND SEWERS

154. The developer shall replace any land drains which have been disturbed in carrying out the works and make good the same in a manner and with materials similar to those previously existing or otherwise shall deal with such land drains as the Council may direct. Also refer to: www.shropshire.gov.uk/drainage-and-flooding/
155. The developer shall not during the construction and maintenance of the works allow any naturally occurring materials, construction, and building materials, chemical, poisonous and inflammable substances, obnoxious solid, gasses or fluids, sewage or other organic and inorganic impurities to be discharged from the works and cause pollution or obstruction to any canal, river, watercourse, ditch or surface water sewers and drains.
156. Should the developer be aware, or informed that pollution is being caused by reason of his operations then he shall immediately cease the operation causing or considered to be causing the pollution and shall as a matter of urgency and without delay inform the Environment Agency and the Council of the location and estimated extent of the pollution.
157. The developer will also advise all parties of the action being taken to alleviate or prevent further pollution taking place.
158. The developer shall only recommence operations when he has taken effective preventative measures to the satisfaction of the Environmental Agency and the Council to ensure that no further pollution will occur. www.shropshire.gov.uk/drainage-and-flooding/

B.5. SERIES 600

B.5.1. EXCAVATION AND FILLING

TOPSOIL STRIPPING

159. Turf, topsoil and other organic and unsuitable materials shall be stripped from all areas beneath proposed carriageways, cycleways, footways and embankments to a minimum depth of 150mm or as directed.
160. Topsoil shall be suitably stockpiled to a maximum depth of 2m and protected to prevent rainfall scour and loss due to wind. The stockpiles should be stored separately from other materials to avoid cross contamination.
161. No material shall be deposited within 5m of any trees or as directed should a Tree Preservation Order be in place.

EXCAVATION TO FORMATION

162. The proposed area shall be excavated to a depth of 150mm or as directed. Unsuitable material is to be removed and be replaced with an approved granular material.

AREAS BELOW FORMATION

163. Areas below formation following the removal of turf etc. are to be made up with an approved suitable fill material.
164. Approved granular fill shall be used to fill any ditches or similar that run beneath the line of the proposed works. The line of ditches should be piped if it is necessary to maintain flow along this drainage path. If this is the case, the developer should liaise with Shropshire Council and/or the Environment Agency.
165. Approved granular material should also be used to fill isolated deep pockets such as old basement voids. Any vertical walls shall be broken out to below formation level and the granular material placed and compacted to an approved specification.

FORMING AREAS OF FILL

166. Material used to make up levels to formation shall be placed and compacted in accordance with the requirements of this document.
167. Any widening works to carriageways on embankments must be undertaken with approved granular material and shall be benched and compacted in accordance with this document.

GRANULAR MATERIAL BACKFILL

168. MOT Type 1 or Type 2 Granular sub base should be used. Alternatively, the developer may submit a detailed earthworks design for technical assessment. If accepted, the material shall be laid and compacted in accordance with the approved specification.
169. If a granular material other than that specified within this document has been placed as fill and in the opinion of Shropshire Council exhibits a deficiency, including an open textured compacted surface then the following action should be taken:
 - Spread a fine granular material over the surface and vibro-roll to fill all prevalent voids prior to the placement of sub base.
 - If Shropshire Council considers that this is not satisfactory, a separating membrane shall be installed prior to the placement of the sub base.

BACKFILLING TRENCHES

170. Trench reinstatements on site should be undertaken in accordance with this Specification.
171. Trench reinstatements in the existing highway are to be undertaken in accordance with the requirements of 'NRSWA Specification for the Reinstatement of Openings in Highways'.

PREPARATION OF FORMATION (OVER THEIR ENTIRE WIDTH OF ALL HIGHWAYS)

172. Following reinstatement of any defective areas the formation shall be cleaned of any mud and slurry prior to being compacted in accordance with the MHW requirements. The

resulting profile shall be properly shaped to an even and uniform surface in accordance with the design levels. Providing CBR test results and obtaining the approval of the Council before further works can proceed.

173. If the CBR value of the formation is <5% the developer will supply a full pavement design for consideration and subsequent approval by Shropshire Council.
174. The formation shall be adequately protected from the weather and shall not be used by construction traffic. The area should be covered with sub base as soon as is practicable.

B.5.2. DRAINAGE OF SUB GRADE

175. Adequate drainage shall be provided on all sites to ensure that the water level is maintained at a depth of at least 300mm below formation. The sub grade drain pipes must be run to an approved outfall.
176. Subgrade drainage can be omitted where there is no evidence of free standing water, and
- Where a site investigation has deemed that the highest annual ground water level is 300mm or greater below formation
 - Free draining sand and gravel strata are prevalent at formation
177. Where sub grade drainage has been found to be required but is impractical to achieve. The developer will submit an alternative design proposal for approval by the Council.

B.6. SERIES 700

B.6.1. BREAKING UP OR PERFORATION OF EXISTING PAVEMENT

178. Breaking up of the existing pavement shall be undertaken with intent to recycle and re-use recovered materials.
179. Adequate precaution shall be taken to ensure that breaking of the existing pavement does not exceed the specified boundaries that form part of the existing pavement and does not risk damage to Public Utilities' buried apparatus.
180. Areas of the pavement to be broken shall be delineated both longitudinally and transversely by saw cutting in advance.
181. Where existing bituminous or concrete road pavements are to be broken up for drainage purposes and left in place, the breaks shall penetrate the pavement to the sub-grade to the satisfaction of Shropshire Council.
182. The maximum plan area of the broken pieces shall be 0.25 square metres, e.g. 0.5m x 0.5m. The perforations shall be at least 75 mm in diameter and backfilled with free draining material
183. Areas of the existing pavement that are to be overlaid with sub-base shall be perforated as above and re-compacted prior to placing and compacting the sub-base.

B.6.2. COLD MILLING OF BITUMINOUS BOUND FLEXIBLE PAVEMENT

184. Shropshire Council is committed through their Environmental Charter to utilise and recycle material wherever possible. Therefore, the developer's contractor is encouraged to forward any residual arising from the milling operations, not required to be re-used on site, to a Quarry for re-mixing. In the event of this not being possible, the material should be disposed of in an environmentally sensitive manner off site.
185. All recipients shall hold a licence or have an Exemption Certificate from the Environment Agency.
186. No milled areas shall be trafficked by public vehicles for more than 48 hours.

B.6.3. CARRIAGEWAY FOUNDATION

187. On all sites it will be assumed that the CBR value of the formation will be no greater than 2% and therefore will require a minimum capping layer of 600mm.

188. Shropshire Council will consider a pavement design incorporating a thinner capping layer (see table below) if the equilibrium CBR value of the formation can be demonstrated with appropriate independent testing.
189. Appropriate testing is to be carried out to establish the existing bearing pressure of the pavement formation.

190. **Capping Layer thickness with known CBR values**

CBR	Capping Thickness	Sub-base Thickness
5-15%	No capping	225mm
>4%	350mm	225mm
>3%	450mm	225mm
>2%	600mm	225mm
<2%	Detailed design required. Council approval must be sought	
Material	DfT SHW, Clause 613, and class 6FS (or 6F2 with min 10% fines Value of 50kN	Type 1 sub base conforming to DfT SHW Clause 803 granular material

191. Consideration will be given to localised provision of additional capping in soft areas, which are identified by the developer.
192. Capping and Sub base material is to be deposited and compacted evenly on the formation in accordance with the requirements of the DMRB.
193. The moisture content of the material is to be within the range optimum –2% to +1% and must not be segregated.
194. The full thickness of the capping and the sub base should be continued to 300mm beyond the back of kerb.
195. The sub formation shall have the same longitudinal gradient, cross fall and surface level tolerance as the formation.
196. Any damage to sub formation or capping caused by construction traffic, or otherwise shall be made good to the satisfaction of the Council.

B.6.4. CARRIAGEWAY LAYERS

197. The surface finishes shown in the Technical Submission **must** reflect those which are shown on the approved Planning Layout, unless written consent to vary or change the surface finishes has been secured.
198. Tables 6.7., 6.8., and 6.9 below, indicate the minimum requirements for carriageway construction acceptable for adoption by the Highway Authority. However, consideration will be given to alternative pavement designs submitted for Technical Assessment, in accordance with the requirements of DMRB, which are equal to or ideally exceed these minimum requirements.
199. All new road construction will be laid with a full depth binder course, plus 30 mm depth of sacrificial binder within 7 days of the base being laid. This will serve to protect the Base (road foundation) during the course of the development build out. Immediately prior to the laying of the surface course, the sacrificial binder depth (30mm) shall be removed (milled).
200. All section 278 schemes must have a pavement design submitted for Technical Assessment, an accordance with the requirements of the DMRB to ensure that minimum pavement thickness and materials are adequate.

B.6.5. BOND COATS, TACK COATS AND OTHER BITUMINOUS SPRAYS

201. Clause 903.4 (SHW) requires a bond coat to be applied prior to placing bituminous material on any bound substrate, it shall be applied at a uniform rate in accordance with Clause 920 and at a minimum rate of 0.2kg/m² residual bitumen. There shall be no bare areas or areas of ponding. Bond coats shall be in accordance with BS EN 13808.
202. Street Furniture, iron work and drop kerbs shall be masked using self-adhesive masking materials before application starts and removed prior to the completion of the works.

203. If the bituminous material is a proprietary product then the material shall be in accordance with the manufacturer's BBA certification.
204. Bond coats shall not be temporarily trafficked.

B.6.6. 'STANDARD' BITUMINOUS CARRIAGEWAY CONSTRUCTION

205. The following specification is to be used for all adoptable estate roads of a carriageway width of 5.5m or below:

Surface Course	HRA 55/10 C surf 40/60* PEN PSV 55 to BS EN 13108-4.	40mm
Binder Course	AC 20 dense bin 40/60 PEN to BS EN 13108-1	60mm
Base	AC 32 dense base 40/60 PEN to BS EN 13108-1	125mm
Sub Base	Type 1 granular material (assuming a CBR >5%) to Clause 803 Specification for Highway Works	225mm
*PEN values of bituminous material must be reviewed with the Site Inspector when low temperatures are expected during laying operations		

206. All bituminous materials are to be supplied and laid in accordance with BS 594987, or to the requirements of the Highway Authority. A bond coat will be provided between all bound layers. All vertical faces including kerbs and ironwork shall be sealed. The materials formulation and compaction shall be such to ensure that in situ air voids are more than 2% but less than 7%. Delivery and rolling temperatures are to be in accordance with the requirements of BS594987.
207. All DBM materials shall conform to the requirements of the Specification for Highway Works (SHW).
208. The limit of surfacing shall be indicated on a construction plan and be in accordance with the minimum surface course reinstatement following the installation of utility apparatus associated with the development.
209. The minimum step in bituminous layers is 300mm for both lateral and longitudinal joints. Adequate milling of the existing carriageway should be undertaken to enable a machine laid width of binder course to be compacted in accordance with the specification for Highway works.
210. Longitudinal joints in the surface course will only be permitted along the opposing channel/verge/kerb line on all roads 5.5m wide or less (i.e. full carriageway). On roads which are greater than 5.5m wide the longitudinal joint may be made along the centre or marked traffic lane line.
211. Perpendicular surface course joints will be made level with the tie-in with the furthest extent of the new bellmouth (i.e. transition point between junction radii and existing road alignment.)
212. All surface course reinstatements on the existing highway network must match (or exceed) the properties of the existing surface material
213. Where required the use of ST4 concrete will be permitted as a substitute for base, as narrow widening, for widths up to 1.0m. Appropriate expansion joints in the concrete must be provided.
214. Bituminous materials shall be machine laid with the exception of small areas which **must** receive prior approval of the Council.
215. Where damage occurs to the previously laid bituminous materials then the area shall be rectified to the satisfaction of the Council prior to being overlain.

B.6.7. BITUMINOUS 'SHARED SURFACE' CARRIAGEWAY (LIGHT) CONSTRUCTION

216. The following specification is to be used for all adoptable estate roads which are designated as a 'shared surface' carriageways. The previous notes for Bituminous Carriageway Construction, shall also apply.

Contrast surface	Cold applied HAPAS approved MMA Surface treatment (The contrasting colour must be approved by the Council prior to planning consent).	3mm thick
Surface Course	HRA 55/10 C surf 40/60* PEN PSV 55 to BS EN 13108-4.	40mm thick
Binder Course	AC 20 dense bin 40/60 PEN to BS EN 13108-1 Laid in accordance with the requirements of BS594987	60mm thick
Base	AC 32 dense base 40/60 PEN to BS EN 13108-1 Laid in accordance with the requirements of BS594987	125mm thick
Sub Base	Type 1 granular material (assuming a CBR >5%) to Clause 803 Specification for Highway Works	225mm thick

B.6.8. GROUTED BITUMINOUS CARRIAGEWAY (HEAVY) CONSTRUCTION

217. The following specification is to be used on all adoptable estate roads for the construction of humps, plateaus, raised tables, which are designated as normally trafficked carriageways. The above notes for Bituminous Carriageway Construction, shall also be applied.

Grout (bituminous or cementitious)	The proposed product must be HAPAS approved (an appropriate coloured grout may be used to emphasise specific areas of carriageway, with the prior approval of Shropshire Council)	
Surface Course	10mm PMB surface course, 40/60* PEN, PSV 65+ to BS EN 13108-4. (Class 4 PMB should be used)	40mm thick
Binder Course	AC 20 dense bin 40/60 PEN to BS EN 13108-1 Laid in accordance with the requirements of BS594987	60mm thick
Base	AC 32 dense base 40/60 PEN to BS EN 13108-1 Laid in accordance with the requirements of BS594987	125mm thick
Sub Base	Type 1 granular material (assuming a CBR >5%) to Clause 803 Specification for Highway Works	225mm thick

218. The surface course (grouted layer) shall extend a minimum of 5 metres either side of the feature.

219. This specification is also recommended for the construction of the circulatory carriageways and approaches of all roundabout junctions, high speed corners and any areas where there is likely to be considerable HGV turning manoeuvres. For these situations the grout shall be upgraded to a cementitious formula, to a specification to be submitted to Shropshire Council for approval.

B.6.9. BLOCK PAVED CARRIAGEWAY CONSTRUCTION

220. As an alternative to the above shared surface carriageway construction, the following 'block paved' carriageway construction may be used but only at the discretion of the highway authority and may be subject to an appropriate commuted sum payment.

Block Paving	Concrete paviour to BS1338:2003, Laid in a 45 degree herringbone pattern & colour approved by Council. Minimum cut block to be no smaller than a 1/3 block	80mm thick
Laying course	Category II sharp sand to BS 7533-3	30mm thick
Base	AC 32 dense base 40/60 PEN to BS EN 13108-1	125mm thick
Sub Base	Type 1 granular material to Clause 803 Specification for Highway Works (Assuming a CBR >5%)	225mm thick

221. All blockwork shall be retained within appropriate kerb races, especially on humps, platforms and at junctions. In order to maintain their stability and resistance to failure due to tracking vehicle movements and changing weight distributions.

222. Gaps between block paving, kerb face and blocks and between ironwork and blocks must be kept to a minimum and sealed with a proprietary self-binding jointing sand for paving systems. To be swept into the joints with the addition of water to form an impermeable polymeric adhesive with specially selected and graded sand conforming to BS7533 part III and part IV.

B.6.10. 'PERMEABLE' CARRIAGEWAY CONSTRUCTION

223. All permeable carriageway construction proposed will be subject to a full pavement design in accordance with the appropriate guidance and manufacturers' specification. This will ensure that the minimum pavement thickness and materials are adequate for adoption.

224. The highway authority reserves the right to apply an appropriate commuted sum payment for the ongoing additional maintenance likely to be required with this type of carriageway construction.

B.6.11. SURFACE REGULARITY AND TOLERANCES

225. The surface regularity of the completed surfaces of estate road carriageways shall comply with:

226. **Transverse and Longitudinal Straight Edge Measure** (BS594987:2015 / BS7533-4:2006)

	Max deviation under a 3m straight edge
Surface Course	7mm
Binder Course	13mm
Base Course	25mm
Sub-base	30mm
Blockwork	max 2mm difference in level between adjacent blocks

227. Additionally, for estate roads exceeding 40m in length and for associated cycleways, footways, footpaths and shared surfaces without drop kerbs a longitudinal rolling straight edge test in accordance with MCHW Vol 1 Series 700 will also apply.

228. Trenches cut through any carriageway must be reinstated such that the finished wearing course profile is level with the immediately adjacent surface, in line with the NRSWA requirements.

229. The developer shall set all fixed surface features, boxes and ironwork in footway, cycleway or carriageway to coincide with the level of the immediately adjacent surface. This work must be undertaken prior to the application of the wearing course.

230. The difference in level of a fixed surface feature and the adjacent surface shall not exceed a tolerance of +/-6mm except for those contained in the following Table:

231. TOLERANCES FOR FIXED SURFACE FEATURES

Kerb Upstand	125mm +/-5mm
Vehicular Crossing Kerb Upstand	25mm +/-3mm
Footway/Cycleway Crossing Kerb Upstand	3mm +/- 3mm
Surface adjacent to Gullies (BS 7533 Pt3)	+5mm to +10mm

232. Where kerbs are required to be flush with the carriageway the tolerance shall be +3mm. For a diagrammatic detail of the stepped construction detail refer to Appendix (Standard Details).

B.7. SERIES 1100

B.7.1. FOOTWAYS/CYCLEWAYS

233. The general geometric requirements for both footways adjacent to the carriageway and independent routes are listed below:

Footway Width	Recommended 2.0m Min:1.5m at obstructions (subject to approval)
Footway Cycleway	Shared Recommended 4.0m (Min. 3.0m)

	Segregated Recommended 4.0m (Min. 3.5m)
Longitudinal Gradient	Max. 1:20 - Min. 1:100
Crossfall	Recommended 1:30 (Max. 1:20 Min. 1:40) 1:12 at crossing points. Where numerous driveways cross the footway, over a distance >7.5m, a crossfall of 1:40 shall be maintained.
Service Margin	Minimum 1.0m wide. Street furniture clearances <u>must</u> be maintained

234. The formation of the footway/footpath/cycleway/emergency access route shall be levelled and compacted with a vibrating roller or other approved suitable item of plant to a properly shaped, even and uniform surface.
235. The formation shall be treated with an approved weed killer before construction commences. Only trained and certificated operatives will be permitted to use weed killers.
236. Bituminous materials shall always be machine laid. However, where the Council has given specific approval small areas may be permitted to be hand laid.
237. The table below identifies the minimum construction thicknesses for bituminous footways and vehicular overruns (including all footway/verge vehicular crossings)

	Surface Course	Binder Course	Sub-base
Footways fronting all Residential development	AC 6 dense surf 40/60 PEN to BS EN 13108-1 20mm thick	AC 20 dense bin 40/60 PEN to BS EN 13108-1 80mm thick	Type 1 granular material to Clause 803 (SHW) 200mm thick

238. Where shared space areas are included in the technical submission, they shall be designed to match that of the carriageway, full width if vehicle overrun is not restricted.
239. Where a foot/cycleway is being constructed and is not fronted by development (i.e. across open space) and is not to be used for emergency or maintenance vehicular access, then the sub-base can be reduced to 125mm thick and the binder reduced to 60mm thick.
240. An examination of the surface course will be undertaken prior to adoption to ascertain any visible defects. All defects identified are to be rectified at the developers expense, prior to adoption.
241. Where a footway does not abut a kerb or boundary wall a 50mm x 150mm hydraulically pressed, precast, flat topped, concrete edging to BS EN 1340 Type EF, shall be provided. The precast edging must be securely bedded on a foundation of ST1 concrete SHW Clause 2602 - a minimum of 200mm deep and 200mm wide. It shall be backed with ST1 concrete from the back of the bedding to within 50mm (minimum 40mm) from the top of the edging.

B.7.2. KERBS AND EDGINGS

242. The type of kerbing should be determined at planning stage, however the principles below set out the minimum requirements for standard road kerbs and footway edgings.
- All kerb and channel Races are to be installed prior to the laying of the base course material.
 - Kerb Races shall be constructed in accordance with the standard detail in SMART Part E TN10 using ST1 concrete to SHW Clause 2602 not less than 150mm thick and 425mm wide at the profile shown in the standard detail. The kerbs shall be backed with ST1 concrete.
 - The kerb bed is to be to be 225mm wider than kerb unit for a two part construction process, 175mm wider than kerb unit will be permitted for a one part construction process. The bed and backing should be a minimum of ST2 and where kerbs are

installed as a two part process, 16mm dowel bars at 450mm centres must be installed. In all scenarios the sub-base shall extend 500mm back from the channel.

- Kerbs shall be laid to general regularity and with upstands indicated below, and to the requirements of BS7533.
- Manual handling of precast concrete units shall be taken into account during the design and construction phases of the Development.
- Kerb upstands shall be as follows:

Scenario	Kerbface
Standard carriageway	125mm upstand
Bus Stops	160mm upstand
Pedestrian crossings & Table Tops	0-6mm upstand
Vehicular crossings	25mm upstand

- Where an asphalt surface course is employed, precast concrete kerbs shall be used. Such kerbs shall be 125mm x 255mm hydraulically pressed, concrete Type HB2, half batter to BS EN 1340 and laid upright. Kerbs are to be bedded on mortar within 50mm of the face of the concrete bed, laid with dry joints and backed with ST1 concrete to a minimum thickness of 150mm, to within 50mm of the top of the kerb. Alternatively, the mortar bed may be omitted if the kerbs are laid on a concrete bed that is still plastic.
- For locations where the kerbface is reduced to 50mm or less the kerb profile will be bullnose.
- No cut kerb shall be less than 300mm in length.
- Flat top edgings, laid flush are to be specified where required

243. All kerb radii are to be designed using available manufactured radius units of the style of kerb chosen. Radii between 12m & 20m require the use of 600mm long straights.

244. The permission of the Council is to be sought in all cases where it is proposed to use cut kerbs to achieve a smooth line on curves in excess of 12m. Cut kerbs shall be of equal lengths between 450 and 600mm and shall be suitably tapered cuts free of spalling to achieve a smooth front face of kerb.

245. Should block paving features be accepted, in trafficked areas, these shall be bound by 255mm deep kerbs laid flush on a 150mm thick ST4 bed and a minimum of 150mm thick type 1 sub-base. Or otherwise bounded by a flat top footway edging kerb, in non-trafficked areas.

B.7.3. VEHICULAR, PEDESTRIAN AND CYCLE CROSSINGS

246. Vehicular crossings are to be provided at the entrances to all garages and residential properties with sufficient width to accommodate a vehicle.

247. A minimum of four precast concrete kerbs 125mm x 150mm to BS EN 1340 Type BN, shall be installed to provide a vehicular crossing with a minimum width of 3.6m. These dropped kerbs shall be set to show an upstand of 25mm with tolerances as given in this specification

248. Where pedestrian routes cross carriageways and footways at junctions, a minimum of two dropped kerbs with tapers shall be provided on each side of the carriageway. Tactile paving shall be installed in accordance with the Standard Details.

249. Where a cycleway adjacent to the carriageway is interrupted by pedestrian or vehicular crossings, the change in level shall be achieved over at least two kerbs, using standard precast concrete kerbs and laid to suit in place of the standard one taper kerb.

250. Pedestrian/Cycle dropped kerbs shall be ideally set flush with the finished carriageway channel level or with an upstand of a maximum of 6mm.

251. All residential vehicular accesses shall be constructed in accordance with the approved details or the standard detail shown in SMART Part E - Standard Details (SD-1100-12).

252. For accesses serving commercial premises, where there is a likelihood of HGV movements, the construction shall be equivalent to the Standard Road Specification.

- 253. Dropped kerbs and tapers shall comply with the requirements of BS EN 1340.
- 254. Kerbs shall be laid to a flowing alignment and to the construction requirements of this Specification.
- 255. Where the interval between adjoining vehicular crossings is such that less than three kerbs show the full face of 125mm the intervening kerbs between these crossings shall also be 125mm x 150mm laid to show an upstand of 25mm.
- 256. **No grass verge will be allowed between dropped crossings less than 3 full height kerb faces apart.**

B.7.4. STANDALONE FOOTWAY/VERGE CROSSING

- 257. Alternatively, where a developer is not seeking adoption of the highway but is required to construct a new access direct to an existing highway, the applicant is guided to use the Council's Section 184 (HA1980) procedure.
- 258. SMART Part E TN 2 – How to make a S184 Agreement provides detailed information, or apply on-line via: <https://www.shropshire.gov.uk/roads-and-highways/road-network-management/application-forms-and-charges/vehicle-access-dropped-kerb/>

B.8. SERIES 1200

B.8.1. TRAFFIC SIGNS

- 259. All signs to be laterally offset a minimum of 500mm from the carriageway edge, measured from the closest edge of the sign assembly to the face of kerb or pavement edge where no kerb is provided.
- 260. The contractor shall agree with the supervisor the exact location of all traffic signs prior to erection.
- 261. All posts shall be fitted with base plates. Open-ended posts shall be fitted with matching plastic caps.
- 262. Traffic signs shall conform to BS EN 12899-1:2007, be CE marked with a Declaration of Performance (DoP) provided from the manufacturer. Posts are to comply with Class SP1 corrosion resistance and be hot dipped galvanised and finished in a powder coating or equivalent system. The final colour shall be as identified on the traffic signs drawings.
- 263. Temporary traffic signs require a remove by date to be placed on the rear face of the sign, to be located in a conspicuous location easily identifiable when viewed from ground level.
- 264. Passive sign posts and supports are to conform to BS EN 12767:2007 and meet the energy absorption category specified on the drawings. Where passive posts are specified on the drawings, equivalent sized circular hollow section steel posts are indicated as a guide only.
- 265. Concrete for sign foundations to be Standardised Prescribed Mix ST2 to BS 8500-2:2015+A1:2016 unless stated otherwise by the sign post manufacturer/supplier.
- 266. The contractor shall ensure that posts and foundations do not interfere with existing drains or services and that the concrete backfill does not encase or adhere to drains and services. Where drains or services have been exposed in the post hole excavation, a separation membrane, as approved by the supervisor, shall be used to ensure compliance with this requirement.
- 267. All excavations in the vicinity of trees shall be by hand excavation, ensuring that the tree roots remain undamaged and undisturbed. Excavation in the proximity of trees shall comply with NJUG Volume 4 Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.

B.8.2. TRAFFIC BOLLARDS

268. All bollards are to be laterally offset a minimum of 500mm from the carriageway edge, measured from the closest edge of the bollard to the face of kerb or pavement edge where no kerb is provided.
269. The contractor shall agree with the supervisor the exact location of all bollards prior to erection.
270. Self-righting one-piece moulded non-illuminated retro-reflective bollards, 270mm minimum diameter retroreflective sign face as indicated on the drawing are to be provided. Bollards are to be fixed down by drilled in anchor bolts or by a cast in situ cradle, as specified in the manufacturer's installation instructions.

B.8.3. ROAD MARKINGS

271. Road markings shall be thermoplastic screed to Clause 1212.2(l) of Volume 1 of the Specification for Highway Works.
272. Performance of the road markings shall have the following minimum standards for a period of 2 years from the date of application.
273. White road markings performance requirements – REFLECTORISED

Property	Reference BSEN 1436	Requirement	Value
Colour	Table 6	White	x, y co-ordinates given
Luminance Factor	Table 2	Class B2	0.3
Skid Resistance	Table 7	Class S3	55
Retro-reflectivity	Table 3 Classes of RL for dry road markings	Class R2	100
Retro-reflectivity (wet night)	Table 4 Classes of RL for road markings during wetness	No requirement	

274. Yellow road markings reflectorised or non-reflectorised, requirement:

Property	Reference BSEN 1436	Requirement	Value
Colour	Table 6	Yellow Class Y1	x, y co-ordinates given
Luminance Factor	Table 2	Class B1	0.2
Skid Resistance	Table 7	Class S1	45
Retro-reflectivity	Table 3 Classes of RL for dry road markings	Class R0 or R1 as required	No requirement or 80
Retro-reflectivity (wet night)	Table 4 Classes of RL for road markings during wetness	Class RWO	No requirement

B.8.4. STREET NAMEPLATES

The developer should seek guidance and approval from Shropshire Council before use of this specification in areas where it would be incompatible with the local style and character of street furniture.

275. The following information is to serve as guide to developers with regards to materials and workmanship.

- Aluminium plate with Class1 reflective sign face with channels and clips. Sign face to have protective film applied to seal lettering; Kindersley lettering in capitals - x height + 62.5mm 'No Through Road' sign (Diag. 816.1 - TSRGD) where applicable;
- Sign face colours – Black on white or White on black
- Sign to be fixed to 1.5m plain tubular galvanised steel posts (75mm dia.) Alternative these posts can have a black plastic coating (to be agreed with Shropshire Council)
- Posts are to be set in concrete 600mm below ground level; accordance with the requirements of BS7671.

276. Signs are to be black lettering on white sign face with a black border;

- Signs must be located within an area to be adopted as public highway (or existing public highway) and should be fixed as near as possible to street corners in order that they are easily readable by drivers as well as pedestrians. If in doubt, the position should be agreed on site with the supervising officer;
- Street nameplates should be mounted so that the top edge of the plate is approximately 0.9m above the ground;
- Where numerous cul-de-sacs have the same name, house numbers should be incorporated as supplementary plates (contact the supervising officer in these cases);
- See DOT Circular Roads 3/93 for more guidance.

B.9. SERIES 1300

B.9.1. STREET LIGHTING AND TRAFFIC SIGNALS

277. The majority of S278 and S38 schemes require the inclusion of a street lighting design which encompasses the areas affected by the development. Where the existing adopted highway is affected, consideration of lighting will be required as part of the technical audit process.

278. Shropshire Council's Street Lighting Design Guidance and Specification is provided in SMART Part E Technical Note 7 - Street Lighting. All procedures and requirements contained therein, should be fully complied with.

279. Any proposed lighting design should be submitted to Shropshire Council at the same time as the Highway Agreement Application is made and include the following details:

- Site Location Plan including road names/numbers
- General Arrangement Plan highlighting the extent of works
- Extents of areas to be offered for adoption
- Layout drawing detailing the location and type of each light
- Reality calculations
- Ducting & cabling details for any illuminated signs/bollards
- Landscaping Proposals
- Planning Application conditions affecting street lighting
- Predicted traffic flow (24hr AADT format) for S278 schemes
- Scheme specific features (e.g. cycleways or controlled crossings)

280. Should the development (S38 and/ S278 agreement) require any alteration or installation of any traffic signals, the Traffic Signal Design Guidance and Specification shall be applied (SMART Part E, Technical Note 8)

B.10. SERIES 1700

B.10.1. CONCRETE AND GROUT

281. Concrete shall be either site batched or ready mixed and shall comply with the requirements of Clause 1704 and BS8500.

282. Concrete aggregates shall comply with clause 1702.

283. Fine and coarse concrete aggregates shall be separately stored on a free draining hard standing or similar clean foundation, kept clean and free from all impurities and foreign substances, and protected from frost.
284. Cement shall comply with BS EN 197 Portland cements or BS4027 Sulphate resisting Portland cement. 7.4.2 ordinary Portland cement shall be used unless otherwise directed by the Council
285. Approved rapid hardening cement may be used in lieu of ordinary Portland cement only with the prior approval of the Council. All special conditions stipulated by the manufacturer of the brand concerned as to its use shall be strictly observed.
286. Sand shall be clean washed, sharp, pit or river sand free from clay, organic matter etc. and comply with BS EN 12620.
287. The contractor shall be responsible for making his own arrangements with the water company for obtaining mains water and he shall comply with all local conditions regarding its use.
288. If water for the works is not available from a public utility undertaking supply, the approval of the Council shall be obtained regarding the source of supply and manner of its use. If so required, the contractor shall arrange for tests of the water to be carried out in accordance with BS EN 1008 and it shall only be used if the test results are satisfactory.
289. Cement grout for general use shall be used within one hour of mixing and shall consist of ordinary Portland or sulphate resisting Portland cement and water mixed in the proportions necessary to ensure that the mix has adequate workability and a suitable consistency for the intended use. Unless as the result of grouting trials or where otherwise directed by the Council, the maximum water cement ratio for any grout for general use shall be 0.5.

B.11. SERIES 3000

B.11.1. DESTRUCTION OF WEEDS INJURIOUS TO AGRICULTURE

290. The contractor shall take all necessary precautions on the site, including land temporarily occupied, against the growth of weeds injurious to agriculture until the end of the period of maintenance.
291. The contractor shall not contaminate any watercourse with the use of weed killers.

B.11.2. VERGES AND VISIBILITY SPLAYS

SEEDING AND TURFING - GENERAL

292. The developer shall carry out all work in the Specification in accordance with BS 7370 General Landscape Operation or a standard approved by the Council.

INITIAL GROUND PREPARATION

293. The topsoil shall be cultivated to a depth of 125mm avoiding the disturbance of the subsoil, by suitable approved mechanical means, or by hand on banks or confined areas.
294. All stones over 25mm in any dimension, weeds, roots and other undesirable material shall be removed from the site and disposed at an approved refuse disposal site. Soil shall be brought to a friable tilth by treading, firming and raking. Where applicable the degree of accuracy in determining a level profile shall be determined by boning rods, or other approved means, after firming in accordance with BS 7370. Operations shall not be carried out during periods of inclement weather where the ground is saturated, boggy or frost covered.

FERTILIZER APPLICATION

295. After final grading all areas to be seeded or turfed shall have a base dressing of an approved granular pre-seeding fertilizer applied at the rate of 50g per sq.m. The dressing shall be applied by means of approved fertilizer distributor machinery or by hand in small confined areas and then lightly worked into the surface with harrow or rake. The final level

for seeding shall be 50mm above any adjacent hard surface area and shall be flush with any adjacent hard surface for turfing.

SEEDING

296. After cultivation operations have been carried out, the areas shall be sown with approved grass seed to BS 7370. The developer shall be required to supply certificates for all grass seed stating the source, mixture, percentage, percentage purity and percentage germination rate and date of purchase. The Council will be entitled to take samples of the grass seed mixture for testing. Following an even distribution of seed, the developer shall carry out a light raking or harrowing of the area and ensure consolidation of the seed with the soil by the use of a light roller. All reasonable precautions shall be taken to ensure that pedestrians and other traffic does not cross areas during cultivation or until the grass is established.

TURFING

297. After cultivating operations have been carried out, the areas shall be laid to turf, a sample of which has previously been approved by the Council. Turf shall be to a uniform size and thickness from an approved supplier. It shall be laid with the use of boards in order that the developer does not allow the previously laid grass to be walked on. All turf laid down shall be firmed with a wooden turfing hammer to give a uniform even area finishing 25mm above the edge of any adjacent hard area. Turf shall be laid in broken joints in a half band pattern. All turf shall be laid within 24 hours of delivery from the supplier and shall not be damaged or yellowed. Following turf laying an approved top dressing shall be spread and brushed over the turfed area ensuring all joints are adequately filled. To prevent scorching and shrinkage the turf shall not be allowed to dry out during establishment.

MAINTENANCE OF SEEDED AREAS

298. During the spring following seeding, and before the application of any selective weedkiller, the grassed area shall be dressed with an approved granular post seeding fertilizer applied at the rate of 50g per sq.m. During the period of establishment, all newly grassed areas shall be cut twice, each cut reducing the growth height by one third. The first and second cuts shall take place when the growth height reaches 75mm. Seeded areas shall be lightly rolled to consolidate the surface one week prior to the first cut. Cutting is to take place using suitable mowing machinery when conditions are not excessively wet or damp. Cutting shall be continued at appropriate intervals until the finished maximum height is 25mm.

MAINTENANCE OF TURFED AREAS

299. During the spring following seeding, and before the application of any selective weedkiller, the grassed area shall be dressed with an approved granular post-seeding fertilizer applied at the rate of 50g per sq.m. During the period of establishment, all newly grassed areas shall be cut twice, each cut reducing the growth height by one third. The first and second cuts shall take place when the growth height reaches 75mm. Cutting is to take place using suitable mowing machinery when conditions are not excessively wet or damp. Cutting shall be continued at appropriate intervals until the finished maximum height is 25mm. During the period of establishment the developer shall water the turf as often as necessary to ensure it does not dry out prior to establishment.

OVER SEEDING

300. When instructed by the Council the developer shall over seed sparse or thin areas of turf. The turf shall be over seeded using suitable and appropriate cultivars of grass seed approved by the Council at the rate of 35g per sq.m. The surface shall be graded or top soiled as necessary to provide even running levels and a surface suitable for seeding.

EDGE SUPPORT DELINEATION

301. Edge support delineation through vehicular, pedestrian crossing points and around street lighting columns shall be provided by the installation of 50mm x 150mm Hydraulically-pressed, precast, flat topped, concrete edgings to BS EN 1340 Type EF.

LANDSCAPING

302. The location and species of planting will be determined through the planning process however is it extremely important that all statutory undertakers' equipment (including plot connections) and street furniture is considered prior to fixing the locations of trees and shrubs.

303. Trees situated within areas of carriageway or footway construction will require special treatment in order to support the surrounding ground and ensure the long life of the tree. The minimum size of pit shall be in accordance with the Specification for Highway Works (DfT) and be constructed from ridged cells and root director to accept topsoil backfill. The ridged cells shall be bounded by a linear root barrier system that is capable of redirecting roots. The pit will include for aeration and irrigation system. The tree grill/cover will be reviewed on a scheme by scheme basis. Where grilles are to be used the void between the gaps within the grille is to be backfilled with decorative gravel, resin bounded material or an alternative approved method.

304. Where trees are located within highway verge or adjacent to the highway within private land the tree pit will receive linear root barrier system, capable of redirecting roots. The barrier is to be 1000mm deep, parallel with the carriageway/footway for a distance of 4m. Where tree pits are proposed within 750mm of the carriageway edge, structural soil will be required below the zone of influence of the carriageway (i.e. a line at 45° from the channel when drawn in section).

B.12 TESTING REQUIREMENTS FOR ADOPTABLE ASSETS

305. The following provides guidance on the testing requirements for proposed adoptable highway assets

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500					
501	Pipes for drainage and service ducts				Product certification scheme applies
	Vitrified clay	[See note 1]			
	Concrete-PC/SRC	Less than 900 mm dia	[See note 1]	[See Note 2]	
	Concrete - Pre-stressed				
	Iron- cast				
	Iron-ductile			[See Note 2]	
	PVC-U				
	GRP				
	Plastics. See Table 5/1				
Corrugated steel	Manufacturer tests		Required (AASHTO)		

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
		Corrugated steel Bitumen protection	Less than 900mm dia			
		Other materials			required	BBA certification (or equivalent) applies
503	Pipe bedding		Grading and fines content	1 per week (min of 3)	Required	
			Water-soluble sulphate (WS) content (N)	5 per source		
			Oxidisable sulphides (OS) content and total potential sulphate (TPS) content	5 per source		
			Resistance to fragmentation	1 per source		
506	Sealing existing drains					
		Concrete				
		Grout				
507	Chambers					
		Precast concrete				Products certification scheme applies
		Bedding mortar		1 per source	Required	Product certification, HAPAS or equivalent.
		Corrugated galvanised steel	Manufacturer tests		Required	Product certification scheme applies
		Manhole steps				
		Steel fitments				
		Covers, grates and frames				Product certification scheme applies
	Cover bolts				Quality management	

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
					scheme applies
508	Gullies and pipe junction				Product certification scheme applies
	Precast concrete				
	Clay				
	Cast iron and steel				
509	Water tightness of joints	Air test	All pipelines with watertight joints	Required	
Series 600					
612	Compaction of granular fill	Field intact dry density & moisture content	1 per 500 tonnes	Required	Test in accordance with BS 1377-9
Series 700					
702.5 to 702.9	Surface Regularity	Rolling Straight Edge		Required	Contractor to measure texture depths within 24 hours of laying surface course, to ensure conformity with specification

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
710	Constituent materials in recycled aggregate	Quality control	Checks are to be carried out by the contractor in accordance with the procedure set down in 'Quality Control – Production of Recycled Aggregates' and with those in this Clause	Required	<p>The quality control procedure should be in accordance with the 'Quality Control – Production of Recycled Aggregates' published by Waste and Resources Action Programme is available from WRAP website, http://www.wrap.org.uk</p> <p>The results of all quality control checks shall be delivered promptly to the Overseeing Organisation on request</p>

Series 900						
903	Compaction Control			BS 594987 Cl 9.5.1.	Required	Contractor to test compaction on site to ensure conformity with Specification
906 942SR	Bituminous Mixtures		Grading (N) Binder Content	1 per 100 tonnes or part thereof Surface Course 1 per 150 tonnes or part thereof Base and Binder Course/ Regulating	Required	Contractor to sample materials on site to ensure conformity with Specification
921SR	Surface Macrotexture		Volumetric Patch Technique (N)	BS EN 13036-1 BS 594987 Cl 8	Required	Contractor to measure texture depths within 24 hours of laying surface course, to ensure conformity with specification
Series 1100						
1101	Precast concrete kerbs, channels, edgings and quadrants.		Bending strength	Minimum of 8 per 1000 units of each product (BS EN 1340) 1000 units of each	Required	
1102	In situ asphalt kerbs		Grading	1 test per 500 metres laid*	Required	
			Binder content			
1104	Precast concrete flags		Bending strength	Minimum of 8 per 1000 m ² units of each product (BS ED 1339)	Required	
	Bedding	granular material				
		mortar				
1107	Concrete block paving		Compressive strength	Minimum of 8 per 1000 m ² of each product (BS EN 1338)	Required	

1108	Clay pavers	Bending Strength	Minimum of 8 per 10000 m ² products (BS EN 1344)	Required	
		Skid resistance	Minimum of 8 per 10000 m ² product (BS EN 1344)		
Series 1200					
1202	Permanent traffic signs			Required (Where considered appropriate)	Quality management scheme applies. Certification that the traffic sign is capable of passing the tests in BS873: Part 1 is required.
1212	Road marking				National Quality management sector scheme applies. procedures are given in BSEN