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Clause No. (etc.)	Title and written Text
1771AR	**REMOVAL OF CONCRETE IN AREAS TO BE REPAIRED** **Requirements for the Removal of Concrete** 1. The Contractor shall cut out and remove concrete from areas specifically identified following inspection and testing. 2. Concrete shall be removed from the area until sound concrete is reached. Where reinforcement becomes exposed concrete shall be removed for a minimum distance of 25mm beyond the rear face of the reinforcement. Where corroded reinforcement is identified the area of concrete removed shall be extended to expose 100mm of uncorroded reinforcement. 3. Before cutting out the Contractor shall determine the position and depth of the reinforcement. The perimeter of the concrete to be removed shall be saw cut perpendicularly to the face of the concrete to a depth not less than 15mm or to within 10mm of the reinforcement whichever is the lesser. 4. At the upper limits of repairs to be made using repair concrete sloping cuts may be used to avoid the entrapment of air when the concrete is poured. 5. The saw cut edges shall be abraded by grit blasting or equivalent methods. 6. The concrete shall be removed by the use of suitable hand or mechanical tools or high pressure water jetting. Removal of concrete by water jetting shall be carried out by firms who are registered members of the Association of High Pressure Water Jetting Contractors. 7. Where concrete is removed by high pressure water jetting a lightweight electric or pneumatic chipping hammer may be used for final trimming of the area broken out. 8. Overbreak of concrete shall be made good using a concrete repair system selected from Clause 1773AR 9. Reinforcement damaged during concrete removal shall be made good. Existing reinforcement which has corroded or is otherwise damaged shall be removed and additional steel reinforcement shall be lapped or welded onto the existing reinforcement. All such welding shall be in accordance with Clause 1717. All loose reinforcement shall be securely tied with stainless steel tying wire. 10. The Site of the Operations shall be kept free of debris or standing water arising from the high pressure water jetting activities. 11. On completion of removal of concrete all concrete surfaces and exposed reinforcement which shall be in contact with repair materials shall be prepared in accordance with Clause 1772AR.

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Clause No. (etc.)	Title and written Text
1772AR	**SURFACE PREPARATION** **General Requirements** 1. Blast Cleaning – The Contractor shall ensure that the grade and particle shape of abrasives is adequate to achieve the appropriate standard of cleanliness. Non-metallic abrasive shall not be recycled. 2. Water for Cleaning – Only clean cold water which complies with sub-Clause 1702.3 shall be used for cleaning and rinsing. **Preparation of Surfaces of Reinforcement** 3. Standard – Bright steel: Removal of all detrimental contamination and corrosion products to produce a generally bright appearance overall. The surfaces shall be free of embedded abrasive particles and corrosion products when viewed through a x10 illuminated magnifying glass. 4. Method (i) Blast cleaning using dry/abrasive system or (ii) Wet blast cleaning using a low pressure air/water/abrasive system. The equipment shall not allow the air/water pressure to exceed 14 bar and shall incorporate a metering device to allow the abrasive quantity introduced to be adjusted from zero to 14 bar. 5. Standard – Concrete surfaces shall be clean and dry and free of cement laitance contaminants and loose friable material. The surface shall be such that repair concrete shall flow freely into all voids and be in intimate contact with the existing concrete. 6. Method (i) High Pressure Water Jetting. The surface profile after cutting out shall be irregular with aggregate particles projecting above the surrounding concrete matrix. (ii) Hand or Mechanical Tools All concrete surfaces to receive repair materials exposed by percussive methods using hand or mechanical tools shall be prepared by grit blasting or high pressure water jetting to remove all fractured or “bruised” concrete surfaces to expose sound aggregate particles 7. The Contractor shall remove cut back and prepare the surface of an area of one square metre of concrete to be repaired as a trial of the methods proposed for carrying out the work.

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Clause No. (etc.)	Title and written Text
1773AR	**CONCRETE REPAIRS** **General** 1. Concrete repairs shall be carried out using either normal flow concrete proprietary repair mortar high-flow repair concrete proprietary sprayed concrete or a proprietary repair system proposed by the Contractor and subject to consent in writing by the Engineer. Crack repairs carried out by a resin injection system shall be proposed by the Contractor and subject to consent in writing by the Engineer. 2. Proprietary repair materials and systems shall have an Agreement Board Roads and Bridges Certificate registered with the Department of Environment and Transport for the Regions/Highway's Agency. 3. Proprietary repair mortars shall be used for repair areas less than 1m² or repair depths less than 30mm deep. Normal flow concrete or high flow concrete or sprayed concrete shall be used for repair areas greater than 1m² or greater than 30mm deep or as otherwise proposed by the Contractor and subject to consent in writing by the Engineer. **Repairs using Normal Flow Concrete** 4. Materials (i) Repair concrete shall be a designed mix for special structural concrete as defined in Clauses 1701 and 1705. (ii) Cement content shall not be less than 400kg/m³ or more than 550kg/m³. (iii) Maximum aggregate size shall be 10mm. (iv) The free water/cement ratio shall not be greater than 0.4. (v) The minimum 28 day compressive strength shall be 40N/mm². (vi) Alkali – silica reaction shall be controlled as specified in Clause 1704. **Repairs Using Proprietary Repair Mortar** 5. Materials (i) Prebatched polymer modified cementitious mortars incorporating a shrinkage reduction agent shall be used. (ii) Mortars for hand screeding of surfaces to be waterproofed shall be sand/cement mortar containing styrene acrylate or styrene butadine polymer bonding admixture. (iii) The free water/cement ratio shall be no greater than 0.4. (iv) The maximum aggregate grain size in the mortar shall be suitable for the depths of repair required (v) Water required to mix repair mortars shall comply with sub-Clause 1702.3.

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Clause No. (etc.)	Title and written Text
1773AR (cont…)	**CONCRETE REPAIRS (continued)** **Repairs Using Proprietary Repair Mortar** (vi) The cement content shall be not less than 400kg/m³ or more than 550kg/m³. (vii) The total chloride ion content of the materials shall not exceed 0.1% of the weight of cement. Calcium chloride or admixtures containing chloride salts shall not be used. (viii) The minimum 28 day strength of the mortar shall be 40N/mm². (ix) Alkali-silica reaction shall be controlled as specified in Clause 1704. 6. Delivery and Storage of Material (i) The Contractor shall supply with each batch of the material delivered to the Site of the Operations certificates furnished by the supplier stating a) the polymer used b) evidence that the chloride contents are less than specified in sub-Clause 5(vii) above c) the content of sodium oxide equivalent in the mortar d) maximum shelf life (ii) The material shall be stored in a dry environment free from extremes of cold and heat. (iii) The materials shall not be removed from the store for use until immediately prior to mixing 7. Placing Repair Mortar (i) The repair shall be built up in layers in accordance with the repair mortar manufacturer's written instructions. The surface of each layer shall be scored to provide a key for the next layer. (ii) The repair mortar shall be suitable for the purpose intended i.e. for soffits or vertical surfaces as appropriate. (iii) Repair mortar shall not be applied when the temperature of the surface to be repaired falls below 5°C. (iv) The material shall be incorporated within 1 hour of mixing or such lesser period as stated in writing by the manufacturer. (v) Repair mortar shall be cured in accordance with sub-Clause 1710.5 and the manufacturer's written instructions. During the curing period the temperatures of the repair mortar shall be maintained at or above 5°C by artificial means if necessary. 8. Surface Finish to Repair Mortar (i) Repair mortar shall be float finished to produce a dense smooth uniform surface free from float marks to the specified line and level.

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1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using High-Flow Repair Concrete** 9. Materials (i) Cement shall comply with Clause 1702. (ii) Cement content shall be not less than 400kg/m³ or more than 550kg/m³. (iii) Alkali-silica reaction shall be controlled as specified in Clause 1704. (iv) The total chloride ion content of the materials shall not exceed 0.1% of the weight of cement. Any chloride or admixtures containing chloride salts shall not be used. (v) Aggregate shall be well graded with graded with the maximum size not exceeding 8mm except when pumping is to be employed when the maximum size shall not exceed 6mm and shall comply with sub-Clause 1702.2. (vi) Proprietary material shall be of such composition and grading that when mixed with water a flowable concrete is produced which shall flow freely into the confined spaces to be filled and shall not be prone to segregation bleeding or cracking in either the plastic or hardened state. (vii) Combinations and additions may comprise pulverised fuel ash ground granulated blast furnace slag microsilica plasticisers aggregate suspension agents and shrinkage reduction agents. Calcium chloride or admixtures containing chloride salts shall not be used. (viii) Microsilica content shall not exceed 5% of the mass of the cement. Microsilica shall comply with Table 17/70. (iv) Water shall comply with sub-Clause 1702.3. (x) The specified minimum 28 day strength of the concrete shall not be less than 40N/mm². The maximum free water/cement ratio shall not exceed 0.4. **TABLE 17/70 : Microsilica Content** **Item** — **Limit (by mass)** Silica content (SiO2) — Minimum 85% Alkali content (NaO2) — Maximum 2% Carbon — Maximum 2% Proportion passing 50 micron sieve — Minimum 99%

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Clause No. (etc.)	Title and written Text
1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using High-Flow Repair Concrete** 10. Delivery and Storage of Materials (i) Records shall be kept of each batch of material delivered to the site of the Operations and shall include a) Formulator's name and address b) Formulator's agent's name and address where applicable c) material identification d) batch reference number size of batch and number of containers in the delivery & date of manufacture e) evidence that the chloride contents are less than specified in sub-Clause 9(iv) of this Clause f) details of the significant rock components contained in the aggregates g) cement content h) combination and additions used i) the equipment sodium oxide content (ii) Containers shall be damp proof and readily emptied of their contents (iii) Containers shall be marked with the following information a) material identification b) batch reference number c) formulator's name d) net weight e) any warnings or precautions concerning the contents. (iv) The material shall be stored in a dry environment free from extremes of cold and heat (v) Material shall not be older than 3 months or lesser period specified by the formulator when used in the Site Operations (vi The materials shall not be removed from the store for use in the Site Operations until immediately prior to mixing.

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Clause No. (etc.)	Title and written Text
1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using High-Flow Repair Concrete** 11. Formwork Site Mixing Placing and Curing (i) Formwork shall be Class F2 to sub-Clause 1708.4 with the perimeter of the repair well sealed to prevent grout loss. Release agents shall be compatible with proposed surface treatments. (ii) Mixing in a forced action paddle mixer and placing shall be carried out strictly in accordance with the formulator's written instructions together with the following additional conditions a) The free water cement ratio shall not exceed 0.4. The water content shall be determined during approval tests and maintained for batch tests works tests and in the Operations within ± 2% of the agreed content b) No extra water shall be added after the original mixing c) The material shall be incorporated in the Site Operations within 20 minutes of completion of mixing or such lesser period as stated by the formulator. The concrete shall be continuously agitated after the mixing and before placing d) The material shall not be mixed or placed in the Site Operations at ambient temperatures lower than 5°C or where the surface temperature of the concrete in the repair void is less than 5°C e) The concrete when placed shall have a temperature of not less than 5°C and not more than 20°C f) The surface temperature of the concrete shall be maintained at not less than 5°C until the concrete reaches a strength of 10N/mm² as determined by tests on cubes cured under similar conditions to the structural concrete. Heat shall not be applied direct to any concrete g) Repair concrete shall not be placed against other concrete which has been in position for more than 30 minutes unless a construction joint is formed in accordance with Clause 1710. In addition the joint surface shall be saturated for a minimum of 2 hours before concrete is placed against it. When repair concrete has been in place for 4 hours no further concrete shall be placed against it for a further 20 hours h) Vibration shall not be used. The side shutters shall be tapped lightly with a hammer to expel surface air voids (iii) Immediately after placing and for 14 days thereafter concrete shall be protected against harmful effects of weathering including rain rapid temperature changes and frost and from drying out. Impregnation may be carried out in accordance with the manufacturers written instructions and not before 14 days as described in Clause 1709. Curing membranes shall not be used.

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Clause No. (etc.)	Title and written Text
1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using High-Flow Repair Concrete** (iv) When the mix proportions have been determined no variations shall be made in the manufacture supply mix proportions or method of mixing of the material. 12. Approval Tests (i) Before Site Operations commence all properties of the proposed high-flow repair concrete shall be demonstrated by the Contractor and the formulator's representative by carrying out the tests specified below in an accredited laboratory. Records shall be maintained of all tests (ii) The composition of the high flow concrete including the source of water the mix proportions and the method of mixing shall be the same as that proposed for use in the Site Operations. The composition shall not be varied throughout the course of the tests and the material shall be obtained from the same batch (iii) The tests fall into two categories flowability and compressive strength (iv) The flowability tests shall demonstrate a) flow characteristics in a trough at 5°C and 20°C as specified in Note 1 of this sub-Clause b) flow characteristics in a simulated soffit repair at 5°C and 20°C as specified in Note 2 of this sub-Clause. Note 1: The flow characteristics of the concrete in a trough shall be assessed. For each test the concrete and trough shall be at the specified temperature. The funnel of the apparatus shall be fitted with a rubber bung and charged with 6 litres of concrete. On release of the bung the concrete shall flow along the trough and the length of the flow along the trough shall be measured. A test shall consist of three readings the flow requirements shall be deemed to be satisfied if none of the readings is below 750mm in 30 seconds without signs of segregation or bleeding. Note 2: The flow characteristics of the concrete in a simulated soffit repair shall be tested in accordance with BD27. For each test the concrete and the apparatus shall be at the specified temperature. The concrete shall be poured in one operation into the supply tube until the level of the concrete has reached 100mm above the underside of the top plate. After the concrete has set the specimen shall be removed from the apparatus and sawn into two parts and the sawn concrete surfaces shall be examined. The concrete shall be in homogeneous free from excessive air holes voids segregation and other defects and shall completely fill the simulated repair.

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Clause No. (etc.)	Title and written Text
1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using High-Flow Repair Concrete** 13. Compressive Strength Tests (i) Compressive strength tests shall be carried out to determine the compressive strength of the concrete at 5°C and 20°C (ii) Test cubes shall be made in 100mm metal moulds to BS 1881: Part 108. The moulds shall be carefully filled by pouring concrete through a funnel to produce void free specimens. There shall be no compaction. The cubes shall be cured in accordance with BS 1881: Part 111. Testing shall be carried out in accordance with BS 1881: Part 116 (iii) The minimum compressive strength shall be established using a set of three cubes. The requirement shall be satisfied if none of the compressive strengths obtained is lower than the specified value and the difference between the highest and lowest values is not more than 20% of the average. 14. Batch Acceptance Tests Each batch of material delivered to the Site of the Operations shall be tested as follows (i) the material shall be taken at random from one or more containers from the same batch (ii) flow trough tests shall be carried out as specified in Note 1 of sub-Clause 12 of this Clause at 20°C (iii) compressive strength tests shall be carried out as specified in sub-Clause 113 of this Clause at 20°C 15. Site Tests (i) a) Flowability b) compressive strength (ii) The flowability of a sample of fresh concrete shall be determined in a trough as specified in sub-Clause 12 Note 1 (iii) The grain in strength of the repair concrete shall be monitored by testing cubes cured alongside the repaired areas at ambient temperature. For each days production of repair concrete six 100mm cubes shall be made in accordance with sub-Clause 13 of this Clause. The cubes shall be cured for 24 hours in the moulds with the top surfaces covered by polythene sheets. After 24 hours the cubes shall be stripped and placed in polythene bags which shall be sealed. The cubes shall continue to be stored alongside the repaired areas throughout the curing period until required for testing. The cubes shall be crushed at times determined by the Operating Company but at least 2 cubes shall be retained to be tested at 28 days.

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1773AR (cont…)	**CONCRETE REPAIRS (Continued)** 16. Materials (i) The proprietary material shall be pre-weighed and pre-mixed at a location off the site of the Operations. (ii) Cement shall comply with Clause 1702 (iii) Alkali-silica reaction shall be controlled as specified in Clause 1704 (iv) The total chloride ion content of the materials shall not exceed 0.1% of the weight of cement. Any chloride or admixtures containing chloride salts as defined by sub-Clause 1704.6 shall not be used (v) Aggregate shall be well graded with the maximum size not exceeding 3mm and shall comply with sub-Clause 1702.2 (vi) Combinations and additions may comprise pulverised fuel ash ground granulated blast furnace slag microsilica and plasticisers. Calcium chloride or admixtures containing chloride or admixtures containing chloride salts and expansion agents shall not be used (vii) The maximum sulphate content shall comply with sub-Clause 1704.5 (viii) Material shall be capable of being applied to a thickness of 100mm without the requirement for additional mesh reinforcement or fibres. Once placed it shall be capable of being profiled and trowel finished (to the equivalent of formed Class F2) without detrimental effects. 17. Performance Characteristics The proprietary material shall have performance characteristics as detailed in Table 17/71 which are to be verified by an independent testing authority. TABLE 17/71 : Performance Characteristics **TEST** — **PERFORMANCE** Adhesion to concrete substrate — greater than 2.0 N/mm² Characteristic strength of cores (28 days) — 40 N/mm² Static Modulus of elasticity — 27000 ± 3000 N/mm² Shrinkage — less than 0.002% Coefficient of Thermal Expansion — 8 to 12 x 10-6/°C Coefficient of Chloride Ion Diffusion — less than 700 x 10-15 m²/s

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1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using Proprietary Sprayed Concrete** 18. Delivery and Storage of Material (i) Records shall be kept of each batch of material delivered to the Site of the Operations and shall include: (a) formulator's name and address (b) formulator's agent's name and address where applicable (c) batch reference number size of batch and number of containers in the (d) date of manufacture (e) evidence that the chloride contents are less than specified in sub-Clause 16(iv) of this Clause (f) details of the significant rock components contained in the aggregates (g) cement content (h) Additives used (ii) the sodium oxide equivalent content (iii) containers shall be damp proof and readily emptied of their contents (iv) containers shall be marked with the following information (a) material identification (b) batch reference number (c) formulator's name (d) net weight (e) any warnings or precautions concerning the contents. (v) The material shall be stored in a dry environment free from extremes of cold and heat (vi) Material shall not be older than 3 months or lesser period specified by the formulator when incorporated in the Site Operations (vii) The materials shall not be removed from the store for use in the Site Operations until immediately prior to mixing. 19. Trial Mixes Practical tests shall be carried out on the Site of the Operations by constructing test panels to confirm the suitability of the mix for the Site Operations. In these tests the type of Constructional Plant used for mixing and placing and the finished face to the panel shall be similar in all respects to those intended for use in the Site Operations.

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1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using Proprietary Sprayed Concrete** 20. Procedure Trials (i) Before work commences on the site of the Operations procedure trials shall be carried out to pre-qualify the nozzlemen proposed for use on the Site Operations. Nozzlemen who have not been pre-qualified shall not be permitted to apply sprayed concrete on the site Operations. (ii) Each nozzleman shall carry out procedure trial panels. The procedure trial panels shall have minimum dimensions of 750mm x 750mm x 100mm deep and shall be made of plywood with 45° sloped edge to permit rebound to escape. (iii) One half of each procedure trial panel shall contain reinforcement representative of the size and spacing of the work. The second half of the procedure trial panel shall contain no reinforcement (with the exception of fibre reinforcement) to allow for the extraction of cores for testing in accordance with sub-Clause 29(ii) of this Clause. (iv) One procedure trial panel shall be carried out by each nozzleman proposed for use on the Site Operations using each proposed mixture proportion at each proposed orientation i.e. horizontal overhead and the like. (v) A minimum of three 100mm diameter cores shall be extracted from the location of interesting reinforcing steel to check the adequacy of consolidation of the sprayed concrete around the reinforcement. 21. Surface Preparation for Sprayed Concrete (i) Sound surfaces which are to receive sprayed concrete shall be thoroughly cleaned and roughened by grit blasting or high pressure water jetting. (ii) Grit blasting areas shall have sprayed concrete applied within 48 hours or shall be reblasted. (iii) Immediately prior to spray concreting all the surfaces to be sprayed shall be thoroughly cleaned and wetted with a strong blast of oil-free air and water to sub-Clause 1702.3. 22. Outline Definition (i) The outline of the finished sprayed concrete shall be defined by screed boards guide wires or other means proposed by the Operating Company and consented to in writing by the Director. (ii) Guide wires shall be installed tight and true to line and in such a manner that they may be easily tightened.

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1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using Proprietary Sprayed Concrete** 23. Mixing Sprayed Concrete (i) Sprayed concrete shall be mixed in a batch type mixer complying with the requirements of BS1305 except that the water shall be delivered direct to the nozzle. The delivery equipment shall be capable of delivering a continuous even stream of uniformly mixed material to the nozzle. Water supply at the nozzle shall be maintained at a uniform pressure sufficient to ensure adequate hydration at all times. The delivery equipment and nozzle shall be thoroughly cleaned and inspected at the end of each day and parts replaced as required. (ii) The temperature of water and cement when added to the mix shall not exceed 60°C and 65°C respectively. 24. Reinforcement Welded wire mesh fabric reinforcement shall be fixed to prepared surfaces and shall be carefully bent to follow the shape of the members and held in position by anchors spaced at not less than 2 per m^2. The fabric shall be spaced at not less than 25mm from the finished surface of the concrete. 25. Transport and Placing Sprayed Concrete (i) No concrete shall be sprayed in air temperatures less than 5°C. Surfaces shall be free from standing water. (ii) Sprayed concrete shall emerge from the nozzle in a steady uninterrupted flow and an uninterrupted supply of compressed air shall be provided to maintain adequate nozzle velocity. Should the flow become intermittent the nozzle shall be directed away from the work until the flow again becomes uniform. (iii) Sprayed concrete shall be applied under sufficient pressure so as to give a dense and homogeneous covering to the surface in one or more layers of a thickness compatible with the mix Design constituent's position of reinforcement and plane of application to ensure the placed concrete does not slump or sag. (iv) Adequate precautions shall be taken to ensure that sprayed concrete rebound is not incorporated in the finished work and that any previously deposited hardened rebound which may prevent a proper bond or encasement is removed from reinforcement. (v) Adequate protection shall be given to the nozzle and application surface during high winds. (vi) The final coat shall be hand screeded to a Class U3 finish in accordance with sub-Clause 1708.4.

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1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using Proprietary Sprayed Concrete** 26. Fibre reinforced Sprayed Concrete (i) The weight of steel and/or composite fibres shall not exceed 5% by weight of the combined weight of cement and aggregate. Fibres shall be added to the mix in such a manner that the fibres are evenly distributed and not bent. Procedure trials shall be undertaken to demonstrate that the proposed methods can achieve the requirements of this sub-Clause (ii) Unless otherwise stated elsewhere in the Contract a final 15mm thick coat of unreinforced sprayed concrete shall be applied over the whole exposed surface to cover exposed fibres (iii) The gun and nozzle shall be electrically earthed. 27. Construction Joints Construction joints in sprayed concrete shall be tapered at approximately 30 degrees or cut back square to the reinforcement and then tapered at 30 degrees. The construction joint shall be thoroughly cleaned all laitance and loose material removed and the surface wetted using a strong blast of air and water prior to the placement of adjacent sprayed concrete 28. Curing of Sprayed Concrete (i) Freshly sprayed concrete shall be protected from rain or water until the surface is significantly hard to resist damage (ii) Immediately after placing and for 14 days thereafter sprayed concrete shall be protected against harmful effects of weather including rain rapid temperature changes and frost and from drying out. Curing membranes shall not be used (iii) Impregnation in accordance with Clause 1709 may be carried out after 14 days. 29. Production Testing of Sprayed Concrete (i) One production test panel shall be carried out for each nozzle orientation for each day of sprayed concrete production or every 15m^3 of sprayed concrete whichever is the lesser. (ii) Sprayed concrete production test panels shall be made with dimensions 450mm x 450mm x 100mm thick with 45° sloped edge forms to permit escape of rebound. Production test panels shall contain no reinforcement (other than fibre reinforcement). The production test panels shall be marked cured cored and tested in compression in accordance with BS1881. They shall be tested in a UKAS accredited laboratory. Records shall be maintained of all tests and stored in the Central Office.

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Clause No. (etc.)	Title and written Text
1773AR (cont…)	**CONCRETE REPAIRS (Continued)** **Repairs Using Proprietary Sprayed Concrete** (iii) Routine tests shall be carried out by the Operating Company on the finished sprayed concrete. These shall consist of taking 25mm or 100mm dia. cores from the finished sprayed concrete and testing them in the same manner as cores taken from the test panels or by carrying out non-destructive tests by means of a "Schmidt" hammer or "Windsor Probe" to determine compressive strength and testing for bond by the use of a hand hammer. 30. Preparation of Surfaces Around Cracks (i) The concrete surface at least 50mm either side of the crack shall be dry blast cleaned to a sound surface free from dirt moss salt staining and loose concrete. The full extent of the crack shall be found and the cleaned area shall extend 50mm beyond the end of the crack or until the crack becomes too narrow to warrant resin injection. (ii) Where algae or other bacterial growth emanates from the crack it shall be removed by scrubbing with bactericide and rinsing with clean water. Health and safety precautions appropriate to the bactericide cleaning agent used shall be adopted including those recommended in writing by the manufacturers. Measures shall be taken to ensure that any adjacent water course is not contaminated and that run-off is collected and disposed of in a safe manner. 31. Moisture in Cracks (i) Where the moisture level in the crack to be resin injected is unacceptably high the crack shall be blown through with dry hot air starting at the top of the crack. A temporary crack sealant shall be applied immediately after blowing through and the resin shall be injected into the crack immediately the necessary preparations are complete. (ii) If for whatever reason the crack becomes damp before it is resin injected no further work shall be permitted until the temporary crack sealant is removed and the crack blown through again with dry hot air. (iii) The temperature of the hot air shall be sufficient to dry the full depth of the crack and shall not exceed the maximum temperature specified by the equipment manufacturer. 32. Resin Injection (i) Where the moisture level in the crack to be resin injected is unacceptably high the crack shall be blown through with dry hot air starting at the top of the crack. A temporary crack sealant shall be applied immediately after blowing through and the resin shall be injected into the crack immediately the necessary preparations are complete. (ii) The spacing of the nozzle positions shall be equal to the depth of the crack and shall not in any case be less than 250mm.

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Clause No. (etc.)	Title and written Text
113SR	**PROGRAMME OF WORK** 1. The requirements for Works programmes are specified in Appendix 1/13. 2. Subject to the other provisions of the Contract the Contractor shall maintain plant and labour records on a daily basis which show the allocation of all plant and labour employed on the Works and whether they are being used on measured Work, lump sum Work or standing. 3. Should the Contractor be required to carry out work adjacent to railway lines which require track possessions, the Contractor shall make his own arrangements for track possessions and shall meet all requirements specified in the Contract. 4. The Contractor shall establish a high level of co-operation with the Traffic Controller, Police and local Authorities to ensure that road users are provided with the best possible service and that disruptions to traffic flows are kept to a minimum.
117SR	**TRAFFIC SAFETY AND MANAGEMENT** 1. Traffic management measures shall be determined by the Contractor and may comprise Lane closures, Lane Occupations, mobile and short duration static Lane closures and Lane closures and diversions all as detailed in Appendix 1/17 or other such measures as may be necessary. The duration and scope of the traffic management measures shall vary according to the nature and extent of the work being undertaken by the Contractor and the work being carried out by other Contractors and outside bodies. 2. The Contractor shall ensure that to minimise disruption to traffic, optimum use shall always be made of traffic management provided as part of the Operations. 3. The Contractor shall provide, erect, maintain, reposition, cover and uncover and finally remove traffic signs as required by the work. In so doing, such other measures shall be taken by the Contractor as may be necessitated by the work in accordance with any special requirements in Appendix 1/17, recommendations in Chapter 8 (2009) of the Traffic Signs Manual published by the Stationery Office or any amendments thereto, or other requests of the Director listed in Appendix 1/17. 4. Traffic signs shall comply with the appropriate Clauses in Series 1200 of the Specification. The Contractor shall keep traffic signs clean, secure and legible. The Contractor shall ensure that all signs required to be lit by external or internal lighting are illuminated during periods when road vehicles are required to display lights. 5. All traffic safety and management measures necessitated by the work shall be fully operational before the Contractor commences any work which affects the public road. 6. Any area of public road which had previously been closed because of the work shall not be opened to traffic until it has been swept and cleared of all personnel, items of plant, materials and debris and until any appropriate traffic safety and management measures have been completed and the Trunk Road is in a suitable condition for public use.

APPENDIX 0/1: CONTRACT - SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (CONTINUED…)

Part A: Volume 1 Specification

Substitute Clauses, Tables and Figures

Clause No. (etc.)	Title and written Text
117SR (cont…)	**TRAFFIC SAFETY AND MANAGEMENT (Continued)** 7. Where work is carried out on, or adjacent to, a Trunk road open to vehicles the Contractor shall ensure that vehicles and mobile plant under its control operating on or adjacent to such road in the execution of the work shall be painted in a conspicuous colour. All vehicles used in mobile lane closures as defined in Chapter 8 of the Traffic Signs Manual published by the Stationery Office shall be non-reflectorised yellow (Colour No 355 to BS 381C or similar). All other vehicles under the Contractor's control shall be generally light in colour preferably but not necessarily non-reflectorised yellow and/or provide, over the full width and height of the vehicle which is exposed to approaching vehicles, conspicuous markings and signs to clearly define that the vehicle is a roadworks vehicle. Vehicles shall have a sign board reading 'Motorway Maintenance' or 'Highway Maintenance' (to Diagram 7404 of Schedule 12 Part V of The Traffic Signs Regulations and General Directions 2016) fixed at the rear. The lettering shall be 150mm 'x height' except that for light vans and cars it shall be the largest 'x height' that can be accommodated out of the following heights: 37.5, 50, 62.5 or 100mm. The lettering shall be black capital letters from the alphabet described in The Traffic Signs Regulations and General Directions 2016 Schedule 13 Part II on a yellow non-reflectorised background in accordance with BS 381 C, colour No 355. In addition, the Contractor's all purpose vehicles and plant shall each be provided with either roof mounted light bars or at least two amber flashing beacons and light vans and cars shall each be provided with a roof mounted amber flashing distinctive lamp. The lamps shall be switched on:- (i) when the vehicle or plant is manoeuvring into or out of the site or the Operations or operating at low speed on a carriageway or hardshoulder open to vehicles and; (ii) when the vehicle or plant is standing on a carriageway or hardshoulder open to vehicles. 8. Temporary lighting shall be provided in accordance with Clause 1405 where it is required in the execution of the work, and in any case shall always be provided during pavement works where traffic lane switching is employed. 9. Unless otherwise stated in Appendix 1/17, the Contractor shall provide, and suitably sign, points of entry and exit from the site of the operations for the vehicles and plant engaged on the work. Such provision shall be subject to written consent of the Engineer. The Contractor shall ensure that when any vehicle or item of plant is reversing within the site of the Operations on or adjacent to a road open to vehicles it does so only under the supervision of a person designated for the purpose of regulating traffic within the site of the Operations who shall be readily distinguishable from the remainder of the work force.

APPENDIX 0/1: CONTRACT - SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (CONTINUED…)

Part A: Volume 1 Specification

Substitute Clauses, Tables and Figures

Clause No. (etc.)	Title and written Text
117SR (cont…)	**TRAFFIC SAFETY AND MANAGEMENT (Continued)** 10. Where work is carried out on or adjacent to a Trunk road open to vehicles the Contractor shall ensure that the work force and site supervisory staff at all times wear jackets complying with BS EN 471 Class 3. The Contractor shall ensure that the person in charge of the workforce is readily distinguishable from the person designated in Sub-clause 12 of this Clause and from the remainder of the workforce. The Contractor shall ensure that the work force and site supervisory staff at all times wear safety helmets complying with BS EN 397. 11. The Contractor shall appoint a Traffic Safety and Control Officer (TSCO)who shall make all arrangements necessary for traffic safety and control including the provision and operation of breakdown recovery vehicles (where called for in Appendix 1/20).The TSCO shall have one or more nominated deputies. The Contractor shall provide the Engineer with the names of this Officer and his nominated deputies and with telephone numbers or details of other means by which they or one of them can be contacted at any time. Unless otherwise described in Appendix 1/17 the TSCO or nominated deputy shall be on the Site at all times when the traffic management is in operation and shall be readily available to deal with matters related to traffic safety and control (including breakdown recovery vehicles, where called for in Appendix 1/20) 12. All vehicles and plant operating within the site between sunset and sunrise and during periods of poor visibility and fog shall mandatory lights illuminated and shall travel in the same direction of flow as the adjacent traffic. Vehicles travelling within the site against the adjacent traffic flow shall not have headlights on or be similarly illuminated and shall keep as far away as possible from the Lanes open to vehicles. 13. The Contractor shall be restricted to entering and leaving the site and erecting and removing traffic management measures during the times quoted in Appendix 1/13 or Appendix 1/17. 14. If an accident or breakdown occurs on a carriageway or hardshoulder open to vehicles within or in the vicinity of the site, the Contractor and operators of recovery vehicles in accordance with Clause 11 shall act as requested by the Police. 15. The Contractor shall produce for each Operation a safety plan which amongst other issues shall identify the traffic management measures to be utilised and the surveillance and maintenance standards. 16. Traffic management measures shall be monitored and modified to ensure traffic delays are minimised. When traffic signals are in use, queue lengths shall be monitored to ensure that the phase settings result in equal queue lengths and are adjusted appropriately to accommodate the varying flows throughout the day. 17. The Contractor shall make good any damage or disturbance to temporary signs or other traffic management measures which is reported to him, within 30 minutes on highways and dual carriageways and 2 hours on single carriageways, of the report being received by the Contractor.

APPENDIX 0/1: CONTRACT - SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (CONTINUED…)

Part A: Volume 1 Specification

Substitute Clauses, Tables and Figures

Clause No. (etc.)	Title and written Text
117SR (cont…)	**TRAFFIC SAFETY AND MANAGEMENT (Continued)** 18. The Contractor shall advise the Engineer (who is responsible for reviewing and updating the 'roadworks diary') at least once during each working day and whenever there shall be a significant change to the planned programme. (The Operating Company shall forward this information to allow the Traffic Scotland operator to create messages on the Traffic Scotland variable message signs informing road users of potential delays and informing of alternative routes where applicable. The Traffic Scotland operator shall also provide this information to road users via the Traffic Scotland website. Each item entered on the roadworks diary shall be allocated a unique number which shall be quoted by the Operating Company in all communications with the Traffic Scotland operator.) 19. The Contractor shall inform the Operating Company (who shall immediately notify in writing by the most appropriate method the Traffic Scotland operator) when the Contractor becomes aware of changed circumstances which would significantly affect traffic movements. Such circumstances may include but shall not be restricted to the following: (i) where Site Operations or Works or incidents shall be anticipated which shall be or likely to cause additional traffic delays in excess of 10 minutes, (ii) where planned Site Operations or Works has been cancelled, (iii) Emergencies which have been notified to or identified by the Contractor, (iv) during severe winter conditions where road or Lane Closures or Lane Occupations have been put in place or shall be likely to be put in place. 20. The Contractor shall ensure that where Site Operations or Works are being carried out by a another Contractor or sub-contractor the provisions contained within paragraphs 19 and 21 of this Clause with regard to the duties of a Site traffic liaison officer shall be replicated within the contractual requirements of the other Contractor or sub-contractor. 21. Where Site Operations and Works shall be proposed which shall cause a closure of a traffic lane but shall not be likely to cause significant additional traffic delays in excess of 10 minutes the Contractor shall notify the Operating Company (who in turn shall notify the Traffic Scotland Operator by telephone quoting the unique reference number for the Site allocated by the roadworks diary): (i) 15 minutes prior to traffic management commencing at a Site or Works Operations location (ii) immediately the traffic management shall have been removed from a Site location.

APPENDIX 0/1: CONTRACT - SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (CONTINUED…)

Part A: Volume 1 Specification

Substitute Clauses, Tables and Figures

Clause No. (etc.)	Title and written Text
117SR (cont…)	**TRAFFIC SAFETY AND MANAGEMENT (Continued)** 22. Where Site Operations and Works shall be proposed within a section of the network covered by overhead gantries with lane control signals then the Contractor shall notify the Operating Company and shall also notify by telephone the police control room which operates the gantries, providing the information described in Sub-clause 20. 23. Where required in Appendix 1/17, the Contractor shall provide, erect, maintain and remove Driver Information Signs in accordance with sub-Clause 24 to 33 of this Clause. 24. Sign face layouts shall be in accordance with Signs 7004 and 7005 of the Traffic Signs Regulations and General Directions 2016. 25. Legends shall be selected as appropriate from Table 1/1 in Clause 117 of the Manual of Contract Documents for Highway Works, Volume 1, and Specification for Highway Works unless otherwise stated in Appendix 1/17. 26. Sign 7003.1 shall describe the work activity taking place. It shall be sited either: (i) Two miles from major maintenance works and Type A works, as defined by Topic 4 of Chapter 8 (2009)of the Traffic Signs Manual, on high speed dual carriageways; or (ii) One mile from routine and minor maintenance works and Type B works, as defined by Topic 5 of Chapter 8 (2009) of the Traffic Signs Manual, on high speed dual carriageways. 27. Sign 7005 shall indicate how long delays are possible. It shall be sited one mile from major maintenance and Type A works. At the commencement of Works the legend shall read, for example "……until Feb 10". At least 10 days before the end of carriageway restrictions the date shall be specified more for example "……until 20 Oct 11". This date shall be further updated, if necessary, until the restrictions are removed. 28. Sign 7004 shall be located within roadworks when part of the road is coned off, and the reason for this is not apparent from the carriageway, for any period exceeding 30 minutes, or one hour if the road capacity is maintained. 29. Signs located within roadworks shall only be used where they can be located at least 50 metres beyond the downstream end of a taper and in a position which does not prejudice traffic safety. 30. If indeed, Information Signs shall be sited at the beginning and at one kilometre intervals through the Work. They shall not be placed where they may distract drivers negotiating traffic management provisions. 31. Signs shall either be sited for the duration of the works where it is safe and appropriate to do so or provision made to enable their use at short notice. 32. The Contractor shall provide adequate storage facilities clear of any safety zone. Storage within the central reservation or in front of safety fencing shall not be permitted.

APPENDIX 0/1: CONTRACT - SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (CONTINUED…)

Part A: Volume 1 Specification

Substitute Clauses, Tables and Figures

Clause No. (etc.)	Title and written Text
117SR (cont…)	**TRAFFIC SAFETY AND MANAGEMENT (Continued)** 33. Information Signs shall only be displayed within roadworks where they accurately reflect the reason for the inactivity. 34. Where required in Appendix 1/17, a Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Roadworks (TASCAR) shall be provided in accordance with the requirements therein.

Part B - Volume 2 Notes for Guidance on the Specification for Highway Works

List of Additional Clauses, Tables and Figures

Clause No. (etc.)	Title
893NG*	CBR Strength Measurements (Interim Advice)
894NG*	Density Measurement (Interim Advice)
895NG*	Stiffness Modulus Measurement (Interim Advice)
896NG*	Wheelpath Deformation Measurement (Interim Advice)

List of Substitute Clauses, Tables and Figures

CLAUSE No. (etc.)	Title
	None

List of Cancelled Clauses, Tables and Figures

Clause No. (etc.)	Title
	None

APPENDIX 0/1: CONTRACT - SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

Part B - Volume 2 Notes for Guidance on the Specification for Highway Works

List of Additional Clauses, Tables and Figures

Clause No. (etc.)	Title and written Text
NG 893	**CBR STRENGTH MEASUREMENT** **General** 1 For coarse-grained materials, there might be an appreciable difference between CBR values obtained in-situ and in the laboratory, with the in-situ values being lower due to the effects of confinement in the laboratory test module (although this shall not be confused with low values resulting from exposure to rainfall or a high water table). This difference shall be taken into consideration when specifying in-situ requirements in Appendix 7/1. **Dynamic Cone Penetrometer (DCP)** 2 Further details of the calculation of subgrade CBR strength are provided in HD30 (DMRB 7.3.7). 3 Other dynamic cone equipment may only be permitted providing it has been calibrated against equipment meeting the requirements of Clause 893, on the same type of materials. 4 The calculation of the 50th percentile penetration rate will not be normally influenced by small stones in a generally cohesive material. 5 Where laboratory CBR tests have been carried out on the subgrade material, the DCP values shall be calibrated to those of the laboratory tests.
NG 894	**DENSITY MEASUREMENT** 1 Density testing of foundation layers is important to ensure that strength is provided through the full depth of the foundation layers and that secondary compaction does not take place. Density values can be low if the material is too dry during compaction. 2 In interpreting density results, due account shall be taken of the variation in maximum dry or wet density with composition of the material; the grading envelope for foundation materials can be very wide. Where possible, information on the variation of density with the gradation for the materials proposed shall be used. 3 For coarse materials it may not be possible to assess density using the nuclear density meter. Alternative standard, but time consuming, methods based on excavating a measured mass of material and determining the volume of the hole created are permitted by the Specification (subject to the Engineer's approval) and may need to be adopted.

APPENDIX 0/1: CONTRACT - SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

Part B - Volume 2 Notes for Guidance on the Specification for Highway Works

List of Additional Clauses, Tables and Figures

Clause No. (etc.)	Title and written Text
NG 895	**STIFFNESS MODULUS MEASUREMENT** 1 When the device applies its maximum stress, especially on lower class foundations and where intermediate stages are tested, the deflection of the structure tested can be over 1000 microns, whereas for the highest foundation class, maximum deflection of only about 50 microns will be produced. A peak stress of 100kPa shall be targeted for Foundation Classes 1 and 2 and 200kPa for Foundation Classes 3 and 4, unless the deflection measurement typically falls outside the range 100-1000 microns. 2 For unbound materials, normally 3 drops are necessary to ensure satisfactory seating before testing. For bound materials, one drop may confirm stability and satisfactory operation before testing. No more than 10 drops in total shall be applied to unbound materials to ensure that there are no unrepresentative results. 3 If any equipment is proposed which does not fully comply with the Specification, it may be permitted at the discretion of the Engineer provided that it is calibrated against equipment complying with the Specification for the specific types of material and layer thickness encountered on the site. This calibration would normally be carried out as part of the Demonstration Area testing.
NG 896	**WHEELPATH DEFORMATION MEASUREMENT** 1 The limit on rutting is primarily intended to ensure that significant ruts (.20mm) at subgrade level are avoided, to prevent accumulation of water and local subgrade softening. If the subgrade is sufficiently permeable, then this problem will not arise. It may also be possible for the Contractor to cut a trench and to prove that, notwithstanding the rut at the surface, no significant subgrade rut is present. Some sands and gravels may rut excessively during construction, however, following re-profiling and compaction, they may achieve satisfactory properties for placement of the upper layers and, once confined by the pavement, may perform satisfactorily in the long term. 2 The more stringent rut limits applying to stabilised/bound surface recognises the fact that, in practice, if visible rutting occurs in such materials, then this rutting will be accompanied by significant loss of stiffness, which is likely to result in non-attainment of the desired Foundation Class. 3 Whilst the presence of shoulders to a rut is indicative of a deformable material, and this may provide valuable information during trafficking trial, the actual specified measurement of deformation based on the change in level from untrafficked datum to the bottom of the rut. This is because this measure is more closely related to deformation taking place in the subgrade. 4 It is the Contractor's responsibility to ensure that the foundation does suffer excessive deformation. If a foundation needs to re-profiled during foundation construction, then the implication is that the foundation has already failed to comply with the Specification. Re-profiling alone may not stop further deformation and may disguise problems for the future such as ponding of water in ruts in the subgrade.

APPENDIX 0/2: CONTRACT SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

Part A: Volume 1 Specification

Clause No. (etc.)	Alterations to be made
	SERIES 600 EARTHWORKS
602	**GENERAL REQUIREMENTS** *Add sub-Clause 20 as follows* The Contractor shall take all precautionary measures to ensure that any trees encountered during the Works shall remain generally undisturbed and undamaged. When it is found essential to trim any branches the Contractor shall first obtain the consent of the Engineer in Writing. No excavation by mechanical means shall be carried out within the branch spread of trees. Excavations in these areas shall be by hand leaving roots larger than 25 mm diameter intact and undamaged these roots being 'dug under'. Should the roots sustain accidental damage they shall immediately be treated with a fungicidal sealant e.g. 'Seal and Heal'. Where appropriate, top soil and sub soil shall be kept separate for reuse. All stones over 50 mm in any dimension shall be discarded and where necessary to retain volume imported top soil to BS 3882 shall be used. The Contractor shall ensure that careful backfilling and compaction of top soil in the vicinity of tree roots is carried out. The Contractor shall be held fully responsible for any damage to trees caused by him and for any costs arising from such damage.
	SERIES 1400 ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS
1404	**CHANGE OF LIGHTING ARRANGEMENTS** Sub-Clause 1 insert 'written' between 'prior' and 'approval'.

APPENDIX 0/2: CONTRACT SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT (CONTINUED…)

Part A: Volume 1 Specification

List of Altered Clauses, Tables and Figures

Clause No. (etc.)	Alterations to be made
	NONE

APPENDIX 0/2: CONTRACT SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

Part B - Volume 2 Notes for Guidance on the Specification for Highway Works

List of Altered Clauses, Tables and Figures

Clause No. (etc.)	Alterations to be made
	NONE

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT

Appendix 0/3 is comprised of two lists, 'A' and 'B', of Numbered Appendices as follows:

List 'A' is a complete list of the Numbered Appendices referred to in the Specification for Highway Works with those not adopted marked "Not Used". Those identified by the letters T or C shall be completed by the Tenderer or Contractor respectively.

Guide to types of Numbered Appendices - who compiles/completes.

Symbol

(Co) Compiler compiles: Identified in the Notes for Guidance examples by the term 'Sample' included in their title

(Co/C) Compiler partially compiles and Contractor completes and returns to Engineer.

(Co/T) Compiler partially compiles and Tenderer completes and returns with Tender.

(C) Contractor completes and returns to Engineer.

(I) For Contractors information only.

(P) This indicates the Appendix is a national pro-forma and format must not be altered

** These Appendices relate to alternatives in the Sample Appendices where the choice is to be made by the Contractor and all appropriate alternatives shall be listed in List A.

These Appendices relate to alternatives in the Sample Appendices to be used in contracts administered by the Overseeing Organisation of Scotland.

List 'A'	Gives the list of Contract-specific Numbered Appendices devised for the Contract (11/09)		
Volume No.	**Completed by**	**Appendix No.**	**Title**
			INTRODUCTION
	(Co)	0/1	Contract-specific Additional, Substitute & Cancelled Clauses, Tables and Figures Included in the Contract
	(Co)	0/2	Contract-specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract
	(Co)	0/3	List of Numbered Appendices Referred to in the Specification & Included in the Contract.
	(Co)	0/4	List of Drawings Included in the Contract.
	(Co)	0/5	Special National Alterations of the Overseeing Organisation of Scotland / Wales / Northern Ireland

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (CONTINUED)

List 'A' (Cont)	Gives the list of Contract-specific Numbered Appendices devised for the Contract.		
Volume No.	**Completed by**	**Appendix No.**	**Title**
			PRELIMINARIES
	(Co)	1/1	Temporary Accommodation and Equipment for the Engineer.
	(Co)	1/2#	Vehicles for the Engineer.
	(Co)	1/3	Communication System for the Engineer.
	(Co)	1/4	Working and Fabrication Drawings.
	(Co)	1/5	Testing to be Carried out by the Contractor.
Not Used		1/6	Supply & Delivery of Samples to the Engineer.
	(Co)	1/7	Site Extent and Limitations on Use.
	(Co)	1/8	Operatives for the Engineer.
	(Co)	1/9	Control of Noise and Vibration.
Not Used		1/10	Structures to be Designed by the Contractor
Not Used		1/11	Structural Elements & other Features to be Designed by the Contractor.
	(Co)	1/12	Setting out & Existing Ground Levels.
	(Co/C)	1/13	Programme of Works.
	(Co)	1/14	Payment Applications.
Not Used		1/15	Accommodation Works.
	(Co)	1/16	Privately & Publicly owned Services & Supplies.
	(Co/C)	1/17	Traffic Safety & Management.
Not Used		1/18	Temporary Diversions for Traffic.
Not Used		1/19	Routeing of Vehicles.
Not Used		1/20#	Recovery Vehicles for Breakdowns.
	(Co)	1/21	Information Boards.
	(Co)	1/22	Progress Photographs.
	(Co)	1/23	Risks to Health & Safety from Materials or Substances.
	(Co)	1/24	Quality Management System.
Not Used		1/25	Temporary Closed Circuit Television (CCTV) System for the Monitoring of Traffic.
Not Used		1/26	Temporary Automatic Speed Camera for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR).
Not Used		1/27	Temporary Automatic Speed Camera for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR) - Particular Requirements
	(C)	1/71	Transportation and Disposal of Waste Materials
	(C)	1/72	Works Contract Carbon Management System

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (CONTINUED)

List 'A' (Cont)	Gives the list of Contract-specific Numbered Appendices devised for the Contract.		
Volume No.	**Completed by**	**Appendix No.**	**Title**
			SITE CLEARANCE
	(Co)	2/1	List of Buildings, etc. to be Demolished
	(Co)	2/2	Filling of Trenches & Pipes
	(Co)	2/3	Retention of Material Arising from Site Clearance.
Not Used		2/4	Explosives & Blasting
Not Used		2/5	Hazardous Materials
	(Co)	2/6	Site Clearance Environmental Requirements
			FENCING AND ENVIRONMENTAL BARRIERS
	(Co)	3/1	Fencing, Gates and Stiles.
			ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)
	(Co/C)	4/1	Road Restraint Systems (Vehicle and Pedestrian).
	(C)	4/2	Information required to demonstrate Compliance of Road Restraint Systems to BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 & DD ENV 1317-4:2002.
			DRAINAGE & SERVICE DUCTS
	(Co)	5/1	Drainage Requirements.
	(Co)	5/2	Service Duct Requirements.
Not Used		5/3	Surface Water Channels and Drainage Channel Blocks.
Not Used		5/4	Fin Drains and Narrow Filter Drains.
Not Used		5/5	Combined Drainage and Kerb Systems.
Not Used		5/6	Linear Drainage Channel Systems
	(Co/C)	5/7	Thermoplastic Structural Wall Pipes and Fittings
			EARTHWORKS
	(Co/C)	6/1	Requirements for Acceptability & Testing etc. of Earthworks Materials
	(Co/C)	6/2	Requirements for Dealing with Class U1B and Class U2 Unacceptable Materials.
	(Co/C)	6/3	Requirements for Excavation, Deposition & Compaction (Other than Dynamic Compaction).
Not Used		6/4	Requirements for Class 3 Material.
Not Used		6/5	Geotextiles Used to Separate Earthworks Materials.
Not Used		6/6	Fill to Structures & Fill Above Structural Foundations.
	(Co/C)	6/7	Sub-formation & Capping & Preparation & Surface Treatment of Formation
	(Co/C)	6/8	Topsoiling.
Not Used		6/9	Earthwork Environmental Bunds, Landscape Areas & Strengthened Embankments.

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (CONTINUED)

List 'A' (Cont)	Gives the list of Contract-specific Numbered Appendices devised for the Contract.		
Volume No.	**Completed by**	**Appendix No.**	**Title**
	(Co/C)	6/10	Ground Anchorages, Crib Walling & Gabions.
Not Used		6/11	Swallow Holes & Other Naturally Occurring Cavities & Disused Mine Workings.
	(Co/C)	6/12	Instrumentation & Monitoring.
Not Used		6/13	Ground Improvement.
Not Used		6/14	Limiting Values for Pollution of Controlled Waters
Not Used		6/15	Limiting Values for Harm to Human Health and the Environment
			ROAD PAVEMENTS - GENERAL
	(Co)	7/1	Permitted Pavement Options (Schedules 1, 2, 3, 4 and 5)
	(Co)	7/2	Excavation, Trimming and Reinstatement of Existing Surfaces
Not Used		7/3	Surface Dressing – Performance Specification (Sheets 1, 2 and 3)
	(Co/C)	7/4	Bond Coats, Tack Coats and Other Bituminous Sprays (Sheets 1, 2 and Binder Data Sheet)
Not Used		7/5	In Situ Recycling - The Remix and Repave Processes
	(Co)	7/6	Breaking Up or Perforation of Existing Pavement.
Not Used		7/7	Slurry Surfacing Incorporating Microsurfacing (Sheets 1, 2 and 3)
Not Used		7/8	Not Used
	(Co)	7/9	Cold-Milling (Planning) of Bituminous Bound Flexible Pavement
Not Used		7/10	Not Used
Not Used		7/11	Overband and Inlaid Crack Sealing Systems
Not Used		7/12	Arrester Beds
Not Used		7/13	Saw-Cut Crack and Seal Bituminous Overlays on Existing Jointed Concrete Pavements
Not Used		7/14	Preparation of Jointed Concrete Pavements Prior to Overlaying and Saw-Cutting and Seal of Bituminous Overlay
Not Used		7/15	Saw-Cut, Crack and Seat Existing Jointed Concrete Pavements
Not Used		7/16	Cracking and Seating of Existing Jointed Unreinforced Concrete Pavements and CBM Bases
Not Used		7/17	Cracking Plant and Equipment Progress Record
Not Used		7/18	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
Not Used		7/19	Site Specific Details and Requirements for Recycled Cement Bound Material

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (CONTINUED)

List 'A' (Cont)	gives the list of Contract-specific Numbered Appendices devised for the Contract.		
Volume No.	**Completed by**	**Appendix No.**	**Title**
Not Used		7/20	Site Specific Details and Requirements for Inducing Cracks
Not Used		7/21	Surface Dressing – Recipe Specification (Sheets 1, 2 and Binder Data Sheet)
Not Used		7/22	Repairs to Potholes
Not Used		7/23	Reinforcement Mesh
			ROAD PAVEMENTS - CONCRETE AND CEMENT BOUND MATERIALS
Not Used		10/1	Plant and equipment for the Construction of Exposed Aggregate Concrete Surface.
			KERBS, FOOTWAYS & PAVED AREAS
Not Used		11/1	Kerbs, Footways & Paved Areas
Not Used		11/2#	Access Steps
			TRAFFIC SIGNS
	(Co)	12/1#	Traffic Signs: General.
	(Co)	12/2	Traffic Signs: Marker Posts.
	(Co)	12/3	Traffic Signs: Road Markings & Studs.
Not Used		12/4	Traffic Signs: Cones, Cylinders, FTD's & Other Traffic Delineators.
	(Co)	12/5	Traffic Signs: Traffic Signals.
Not Used		12/6	Traffic Signs: Special Sign Requirements on Gantries.
			ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS
Not Used		13/1#	Information to be Provided When Specifying Lighting Columns and Brackets
Not Used		13/2	(Specification for Highway Works) Typical Lighting Column and Bracket Data Sheets 1 and 2.
Not Used		13/3	Instructions for Completion of Lighting Column and Bracket Data Sheets
Not Used		13/4	Information to be Provided When Specifying CCTV Masts
Not Used		13/5	(Specification for Highway Works) Typical CCTV Mast Data Sheet
Not Used		13/6	Instructions for Completion of CCTV Mast Sheets
Not Used		13/7#	Information to be Provided When Specifying Cantilever Masts
Not Used		13/8	(Specification for Highway Works) Typical Cantilever Masts Data Sheets 1 and 2
Not Used		13/9	Instructions for Completion of Cantilever Mast Data Sheets

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (CONTINUED)

List 'A' (Cont)	gives the list of Contract-specific Numbered Appendices devised for the Contract.		
Volume No.	**Completed by**	**Appendix No.**	**Title**
			ELECTRICAL WORK FOR ROAD LIGHTING and TRAFFIC SIGNALS
Not Used		14/1	Site Records.
Not Used		14/2	Location of Lighting Units and Feeder Pillars.
Not Used		14/3	Temporary Lighting.
Not Used		14/4	Electrical Equipment for Road Lighting.
Not Used		14/5	Electrical Equipment for Traffic Signs
			MOTORWAY COMMUNICATIONS
Not Used		15/1	Motorway Communications
Not Used		15/2	Cable Duct Requirements
			PILING AND EMBEDDED RETAINING WALLS
Not Used		16/1	General Requirements for Piling and Embedded Retaining Walls
Not Used		16/2	Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced Concrete Segmental Piles
Not Used		16/3	Bored Cast-in-Place Piles
Not Used		16/4	Bored Piles Constructed using Continuous Flight Augers and Concrete or Grout Injection through Hollow Auger Stems
Not Used		16/5	Driven Cast-in-Place Piles
Not Used		16/6	Steel Bearing Piles
Not Used		16/7	Reduction of Friction on Piles
Not Used		16/8	Non-Destructive Methods for Testing Piles
Not Used		16/9	Static Load Testing of Piles
Not Used		16/10	Diaphragm Walls
Not Used		16/11	Hard/Hard Secant Pile Walls
Not Used		16/12	Hard/Soft Secant Pile Walls
Not Used		16/13	Contiguous Bored Pile Walls
Not Used		16/14	King Post Walls
Not Used		16/15	Steel Sheet Piles
Not Used		16/16	Integrity Testing of Wall Elements
Not Used		16/17	Instrumentation for Piles and Embedded Walls
Not Used		16/18	Support Fluid

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (CONTINUED)

List 'A' (Cont)	gives the list of Contract-specific Numbered Appendices devised for the Contract.		
Volume No.	**Completed by**	**Appendix No.**	**Title**
			STRUCTURAL CONCRETE
Not Used		17/1	Schedule for the Specification of Designed Concrete.
Not Used		17/2	Concrete - Impregnation Schedule.
Not Used		17/3	Concrete - Surface Finishes.
Not Used		17/4	Concrete - General.
Not Used		17/5	Buried Concrete (05/02)
Not Used		17/6	Grouting and Duct Systems for Post-tensioned Tendons
			STRUCTURAL STEELWORK
Not Used		18/1	Requirements for Structural Steelwork.
			PROTECTION OF STEELWORK AGAINST CORROSION
Not Used		19/1	(Specification for Highway Works) Form HA/P1 (New Works) Paint System Sheet
Not Used		19/2	Requirements for Other Work
Not Used		19/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
Not Used		19/4#	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
Not Used		19/5	General Requirements
			WATERPROOFING FOR CONCRETE STRUCTURES
Not Used		20/1	Waterproofing for Concrete Structures
			BRIDGE BEARINGS.
Not Used		21/1	Bridge Bearing Schedule.
Not Used		22/1	Not Used.
			BRIDGE EXPANSION JOINTS AND SEALING OF GAPS
Not Used		23/1	Bridge Deck Expansion Joints Schedule.
Not Used		23/2	Sealing of Gaps Schedule (Other than in Bridge Deck Expansion Joints)
			BRICKWORK, BLOCKWORK & STONEWORK
	(Co)	24/1	Brickwork, Blockwork & Stonework
			SPECIAL STRUCTURES
Not Used		25/1	Requirements for Corrugated Steel Buried Structures
Not Used		25/2	Requirements for Reinforced Soil and Anchored Earth Structures
Not Used		25/3	Requirements for Pocket - Type and Grouted - Cavity Reinforced Brickwork Retaining Wall Structures
Not Used		25/4	Environmental Barriers
Not Used		25/5	Requirements for Buried Rigid Pipes for Drainage Structures

APPENDIX 0/3 – LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (CONTINUED)

List 'A' (Cont)	gives the list of Contract-specific Numbered Appendices devised for the Contract.		
Volume No.	**Completed by**	**Appendix No.**	**Title**
			MISCELLANEOUS
	(Co)	26/1	Ancillary Concrete
Not Used		26/2	Bedding Mortar
Not Used		26/3	Cored Thermoplastic Node Markers
			LANDSCAPE AND ECOLOGY
	(Co)(C)(P)	30/1	General, Sheets 1, 2 and 3
	(Co)	30/2	Weed Control
Not Used		30/3	Control of Rabbits and Deer
	(Co)	30/4	Ground Preparation
	(Co)	30/5	Grass Seeding, Wildflower Seeding and Turfing
Not Used		30/6	Planting, Sheets 1 and 2
	(Co)	30/7	Grass, Bulbs and Wildflower Maintenance
Not Used		30/8	Watering
Not Used		30/9	Establishment Maintenance for Planting
Not Used		30/10	Maintenance of Established Trees and Shrubs
Not Used		30/11	Management of Waterbodies
	(Co)	30/12	Special Ecological Measures
			MAINTENANCE PAINTING OF STEELWORK
Not Used		50/1	(Specification for Highway Works) Form HA/P1 (Maintenance) paint System Sheet
Not Used		50/2	Requirements for other Work
Not Used		50/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
Not Used		50/4#	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
Not Used		50/5	General Requirements

APPENDIX 0/3 – LIST 'B': CONTRACT-SPECIFIC NUMBERED APPENDICES DEVISED FOR THE CONTRACT

Volume No.	Completed by	Appendix No.	Appendix Title
	(C)	1/71	Site Waste Management Plan (SWMP) and Carbon Management Requirements.
	(C)	1/72	Works Contract Carbon Management System.

APPENDIX 0/4: LIST OF DRAWINGS AND DOCUMENTS INCLUDED IN THE CONTRACT

1: Contract-specific Drawings Supplied to Each Tenderer

Drawing No.	Title	Volume No.
13-NW-0901-052-100-001	Site Location Plan	5
13-NW-0901-052-110-001	Plan and Profile Sheet 1	5
13-NW-0901-052-110-002	Plan and Profile Sheet 2	5
13-NW-0901-052-120-002	Cross Sections Sheet 1	5
13-NW-0901-052-120-003	Cross Sections Sheet 2	5
13-NW-0901-052-120-004	Cross Sections Sheet 3	5
13-NW-0901-052-120-005	Cross Sections Sheet 4	5
13-NW-0901-052-140-001	Site Extents	5
13-NW-0901-052-200-001	Site Clearance	5
13-NW-0901-052-300-001	Fence Detail	5
13-NW-0901-052-300-002	Detail Design Fencing Layout	5
13-NW-0901-052-400-001	Detail Design RRS	5
13-NW-0901-052-500-001	Detail Design Drainage Layout	5
13-NW-0901-052-500-002	Typical Drainage Details Sheet 1 of 2	5
13-NW-0901-052-500-003	Typical Drainage Details Sheet 2 of 2	5
13/NW/0901/052/GDR/101	Earthworks General Arrangement Plan	5
13/NW/0901/052/GDR/102	Earthworks Cutting Cross Sections Sheet 1 of 2	5
13/NW/0901/052/GDR/103	Earthworks Cutting Cross Sections Sheet 2 of 2	5
13/NW/0901/052/GDR/104	Earthworks Indicative Cross Sections	5
13/NW/0901/052/GDR/105	Earthworks Soil Nail and Rock Mesh Anchorage Arrangement Plan	5
13/NW/0901/052/GDR/106	Earthworks Soil Nailed Slope and Rock Meshing Details Sheet 1 of 2	5
13/NW/0901/052/GDR/107	Earthworks Soil Nailed Slope and Rock Meshing Details Sheet 2 of 2	5
13/NW/0901/052/GDR/108	Earthworks Cutting Remedial Works Details	5
13/NW/0901/052/GDR/109	Earthworks Reinforced Soil Retaining Wall Details	5
13-NW-0901-052-700-001	Pavement Layout	5
13-NW-0901-052-700-002	Typical Pavement Detail Sheet 1 of 2	5
13-NW-0901-052-700-003	Typical Pavement Detail Sheet 2 of 2	5
13-NW-0901-052-1200-001	Detail Design Traffic Signs and Road Marking Layout	5
13-NW-0901-052-1200-002	Standard Details Typical Hazard Marker Post	5
13-NW-0901-052-1200-003	Standard Details Vehicle Activated Sign	5

Drawing No.	Title	Volume No.
13-NW-0901-052-1200-004	Standard Details Vehicle Activated Sign Post Mount Details	5
13-NW-0901-052-2700-001	Detail Design Public Utilities Sheet 1 of 2	5
13-NW-0901-052-2700-002	Detail Design Public Utilities Sheet 1 of 2	5
13-NW-0901-052-3000-001	Landscape Layout	5

APPENDIX 0/4: LIST OF DRAWINGS AND DOCUMENTS INCLUDED IN THE CONTRACT (CONTINUED)

2: Standard Drawings

2(i) Supplied to Each Tenderer

Drawing No.	Title	Volume No.
None		

2(ii) Inspected by Tenderers

Not Used

APPENDIX 0/4: LIST OF DRAWINGS AND DOCUMENTS INCLUDED IN THE CONTRACT (CONTINUED)

2(iii) Brought into the Contract by Reference

Drawing/ Document No.	Title	Date	Aspect / Alternative(s) required if not Whole Drawing
	BEAR A83 Strone Point Otter Disturbance Licence - Application Form Ground Investigation Factual Report BEAR A83 Strone Point Record of Determination.		

APPENDIX 0/5: SPECIAL NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATION OF SCOTLAND

List of Additional Clauses and Tables

Clause No. (etc.)	Title and written text
901SEA	In accordance with Scottish Executive Interim Note 12 – Bituminous pavement courses shall be made using the materials described in Appendix 7/1 and shall be in compliance with the sector Scheme Document for the laying of Asphalt Mixes described in Appendix A of the Specification for Highway Works.

List of Substitute Clauses and Tables

Clause No. (etc.)	Title and written text
#601TS	Classification, Definitions and Uses of Earthworks Material
#632TS	Determination of Moisture Condition Value (MCV) of Earthworks Materials in Scotland

List of Minor Alterations to Clauses and Tables

Clause No. (etc.)	Alteration to be made
	NONE

APPENDIX 0/5: SPECIAL NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATION OF SCOTLAND (CONTINUED)

Additional Clauses and Tables

Clause No. (etc.)	Title and written text
901SEA	SCOTTISH EXECUTIVE DEVELOPMENT DEPARTMENT TRANSPORT AND PLANNING GROUP – TRUNK ROAD DIVISIONS MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS (MCHW) VOLUME 1: SPECIFICATION FOR HIGHWAY WORKS – March 1998 APPENDIX A: QUALITY MANAGEMENT SCHEMES SEDD INTERIM AMENDMENT NO 12 INTRODUCTION Sector Scheme 14 (for the Production of Asphalt Mixes), within Appendix A of the Specification for Highway Works (8th Edition - March 1998), has been developed by the Quarry Products Association/Highways Agency/CSS Asphalt Technical Advisory Committee and was launched nationally as of 1 April 1999. In order to assess and take account of industry capability regarding implementation in Scotland, the Scheme was not as of that date made a mandatory requirement for Scottish trunk road use. However, it is judged that it is now appropriate to fully implement the Scheme on Scottish projects. AMENDMENT 1. Note 2 on page 8 of Appendix A of the Specification for Highway Works (8th Edition - March 1998) shall be deleted and replaced by the following:- The implementation date of this scheme is 1 January 2000. All tenders invited after the issue of this Interim Amendment are to include the above amendment. ENQUIRIES These shall be addressed to:- [redacted], Materials and QA Advisor, TRIPS 5, Transport Scotland Buchanan House 58 Port Dundas Road Glasgow, G4 0HF

APPENDIX 0/5: SPECIAL NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATION OF SCOTLAND (CONTINUED)

Substitute Clauses and Tables

Clause No. (etc.)	Title and written text
	Classification, Definitions and Uses of Earthworks Material
#601TS	*Text as per Page S1 Series 600 of the Specification for Highway Works Volume 1*
#632TS	Determination of Moisture Condition Value (MCV) of Earthworks Materials in Scotland
	Text as per Page S3 Series 600 of the Specification for Highway Works Volume 1

Minor Alterations to Clauses and Tables

Clause No. (etc.)	Alteration to be made
	NONE

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE ENGINEER

Accommodation Required

1. Principal office (for details, see paragraph 5 below)

Location of Accommodation

2. Accommodation shall not be erected at the Works site due to land constraints at the location, but shall be erected at a location away from the Works site, to be arranged by the Contractor, and to be agreed with the Engineer.

3. The Contractor shall take all necessary measures to protect kerbs, including all drains and services in the verge and land upon where the Accommodation shall be erected. The Contractor shall return the area, by him through Agreement with a landowner, taken for Accommodation to the same or better condition post-Works completion.

Duration of Time Accommodation required

4. Accommodation shall be required for the duration of the Contract plus 2 weeks post Completion.

Fittings and Furnishings of Accommodation

5. Principal Office

(i) The office buildings shall not be erected at the Works site due to land constraints at the location, but shall be erected at a location away from the Works site, to be arranged by the Contractor, and to be agreed with the Engineer and shall comply with the Offices, Shops and Railway Premises Act 1963 and any amendment thereof. They shall have sufficient hard standing for two Employer's parked cars and shall accommodate the space requirements of all Contractors vehicles that shall require to park at the office Accommodation.

(ii) The office buildings shall be constructed of secure 'anti-vandal' steel shell office-accommodation units, or any system deemed suitable for temporary accommodation of this nature which is acceptable to the Engineer. Three keys for each outer door shall be provided.

(iii) The accommodation shall consist of a minimum of two rooms, together with 1 lavatory, and kitchen. The ceiling height shall not be less than 2.3 metres.

(iv) The office buildings shall comply with and be maintained to comply with the Construction (Health, Safety and Welfare) Regulations 1996. The Electricity at Work Regulations 1989 shall be complied with in all respects in the case of equipment and furnishing of rooms in the office buildings. The buildings and access routes shall also comply with the Disability Discrimination Act 2005.

(v) Lighting shall be provided to give 300 lux.

(vi) Heating shall be provided to give a minimum temperature of 21 degrees Centigrade. Ventilation and other general requirements shall comply with the Offices, Shops and Railway Premises Act 1963 and any amendment thereof.

(vii) A 240 volts power supply will be provided to each office. Power sockets (13 amp) will be provided in each office at the rate of 2 No. per desk specified.

(viii) Approved equipment and supplies to be provided as follows:-

Main Offices — 2 Rooms with minimum plan area of 20 sq. metres each.

- 2 No. tables 1.8m x 1.0m
- 2 No. kneehole desks, 1.8m x 1.0m with at least 2No. lockable drawers.
- 4 No. padded desk chairs (swivel).
- 1 No. fireproof steel filing cabinet with lockable drawers.
- 3 No. waste bins.
- A3 colour printer/photo copier

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE ENGINEER (CONTINUED)

Lavatory	• Flushing toilet. • Paper hand towels, soap and water • Toilet paper. • Hand basin complete with hot and cold water supply • Sanitary bin
Kitchen	• Electric cooker with grill • Sink unit with draining board, complete with cupboards, worktop and hot and cold water supply (Drinking water quality) • Fridge • Microwave oven • 3 pint electric kettle with automatic switch-off • Mugs - 6 No. • Crockery (soup bowls, plates) Cutlery - 4 No. of each • Paper hand towels and cleansing materials (replenished as required) • Chilled water dispenser with supply of plastic tumblers (replenished as required) • Tea, coffee, sugar and milk • Table and 4 chairs (dining area) • Fire extinguisher (dry powder),fire blanket
Other Supplies	• First aid box complying with relevant regulations

The Contractor shall supply and maintain for the period of the contract all survey instruments, equipment and protective clothing for the exclusive use of the Engineer in accordance with the following schedules:-

SCHEDULE OF SURVEYING EQUIPMENT, PUBLICATIONS, ETC. TO BE RETAINED BY THE ENGINEER

Surveying Equipment

2 No. -	8 m flexible steel pocket tapes
1 No. -	50 m steel tape
1 No.	30 m fibreglass tape
1 No.	30 m gut line
2 No. -	1 m metre rules
1 No. -	Measuring wheel
1 No. -	1 m long aluminium spirit level, with plumb and level
2 No. -	Battery inspection lamps, with 2 sets of rechargeable batteries and charger to be provided as necessary
1 No. -	Laptop (specification - Intel® Core™ i7-4710HQ Processor - Quad-core - 2.5 GHz / 3.5 GHz with Turbo Boost - 6 MB cache, NVIDIA GeForce GTX 850 (2 GB) Graphics Card, 1 TB HDD, 5400 rpm Hard-drive, CD/DVD Drive, 15.6" screen, Microsoft Windows 7 Professional 64 bit, Microsoft Office 2010, pre-pay unlimited mobile broadband internet access and laptop carry case.
2 No. -	Digital camera 24.2 Megapixels - minimum X3 optical with date stamp facility, sound and video, complete with case, rechargeable batteries and charger, 2No. 8GB memory cards and night flash.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE ENGINEER (CONTINUED)

1 No. - Automatic level complete with tripod and levelling staff.

Supply of waterproof chalk, wooden pegs, nails and stationery (including paper for photocopier), pencils, pens, erasers, files, folders, note books, level and survey books etc. as required.

The Contractor will be responsible for the provision, repair and maintenance of above equipment and instruments and for the supply of labour and materials for cleaning same during the period of the Contract.

The Contractor shall supply with each level, levelling staff, rule, tape and measuring wheel certification that the maximum error does not exceed that laid down in the "Checking and Calibration Requirements of inspection, Measuring and testing Equipment" table.

Supply of Publications

The Contractor shall supply and maintain, on compact disk from the Stationary Office, the following documents.

1 Copy of the institution of Civil Engineers etc., publications:-
  (a) General Conditions of Contract (1986 reprint)
  (b) Schedule of Dayworks
  (c) Working Rule Agreement

1 Traffic Signs Regulation and General Directions 2016

1 Traffic Signs Manual Chapter 3 – Regulatory Signs (2008), published HMSO

1 Traffic Signs Manual Chapter 4 – Warning Signs (2004), published HMSO

1 Traffic Signs Manual Chapter 5 – Road Markings (2003), published HMSO

1 Traffic Signs Manual Chapter 8 – Road Works and temporary situations (2009), published by HMSO

1 Copy of each relevant current British Standard and Code of Practice as required

1 Copy of each relevant Road Note as required.

1 Copy of each relevant Eurocode as required.

1 Copy of the Manual of Contract Documents for Highway Works:

Volume 1 – Specification for Highway Work (Updated with amendment incl. November 2009)

Volume 2 – Notes for Guidance on the Specification for Highway Works (Updated with amendment incl. November 2009)

Volume 3 – Highway Construction Details (Updated with amendment incl. November 2008)

Volume 4 – Bills of Quantities for Highway Works (Updated with amendment incl. May 2009)

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE ENGINEER (CONTINUED)

Personal Protective Equipment (PPE)

For visiting personnel:

4 No.	White Safety helmets
4 Pairs	**Breathable Waterproof** protective safety boots with steel toe cap and mid-sole (Size: 1 pair each of sizes 8, 9, 10, 11)
4 No.	**Breathable Waterproof** protective jackets and overtrousers to BS EN 471 1994 "High Visibility Warning Clothing" – Class 3. (Size: 1 x medium, 2 x large, 1 x extra-large)
4 Pairs.	Latex grip work gloves (Size: 1 x medium, 2 x large, 1 x extra-large)
10 Pairs.	Safety Glasses
200 Pairs	Corded soft plugs for ear protection

The Contractor shall make provision for replacing worn, damaged or lost safety and protective clothing or other PPE as necessary.

The Contractor shall provide any other safety and protective clothing or other PPE deemed necessary by the Contractor's safe method of working or conditions arising during the execution of the New Works e.g. encountering contaminated land.

APPENDIX 1/1: TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE ENGINEER (CONTINUED)

CHECKING AND CALIBRATION REQUIREMENTS OF INSPECTION, MEASURING AND TESTING EQUIPMENT

ITEM	MAKE/MODEL	REQUIRED CHECKS	TIME BETWEEN CHECKS (MAX)	ACCEPTANCE CRITERIA
Level (Automatic)	All makes	Two peg test	3 months	±3 mm per single sight of up to 60 m.
Staff	All makes	Length to be checked against tape traceable to national standards	6 months	± 1mm per 1 m length ± 3 mm over entire staff length
Steel tapes	All makes	Length to be checked against tape traceable to national standards	1 year	± 2 mm per 1m length
Tapes over 5m in length	All makes	Length to be checked against tape traceable to national standards	1 year	Steel tapes:- ± 2 mm per increment Other tapes :- ± 5 mm per increment
Rules	All makes	Length to be checked against tape traceable to national standards	1 year	± 2 mm per 1 m length
Measuring wheel	All makes	Distance to be checked against established baseline as used to check E.D.M's	1 year	± 1.0% indicated distance

APPENDIX 1/2: VEHICLES FOR THE ENGINEER

Type	Number Required	Period Required
4 door estate car or 5 door (hatchback) car. The vehicle shall have a minimum of a 2 litre turbo diesel engine, a carrying capacity of at least 0.25 tonne, a minimum of ground clearance (un-laden) of 150 mm, power assisted steering and full independent suspension. The vehicle shall be finished in a conspicuous colour in accordance with TSM chapter 8 traffic Management part 2 para O5.2 and be free from markings identifying any company associated with the Contract. The equipment shall include: fire extinguisher, sign board reading 'Highway Maintenance' in accordance with Diagram 7404 of Schedule 12, Part V of the Traffic Signs Regulations and General Directions 2016 (The lettering shall be the largest x height that can be accommodated out of the following heights: 37.5, 50, 62.5, 75 or 100mm) and one or more suitable roof mounted amber flashing distinctive lamps fitted in accordance with paragraph O5.3 of Chapter 8 of the Traffic Signs manual and The Road Vehicle Lighting Regulations. The vehicles shall be equipped with high visibility rear markings. High visibility rear markings shall comprise of chevron markings formed from alternate strips of fluorescent orange-red retroreflective material and fluorescent yellow non-retroreflective material, of not less than 150mm width each, inclined at 45-60° to the horizontal and pointing upwards. The markings shall cover as much of the rear-facing portion of the vehicle as possible without obscuring windows, vehicle lighting or registration plates. Vehicle to be not more than 6 months old. Anticipated mileage is 1500mls/wk/vehicle. Insurance: Vehicles for the Engineer shall be included in the Motor Insurance Database (MID) in accordance with the 4th EU Vehicle Directive Legislation and Regulations. The Contractor shall provide insurance cover for the vehicles for use anywhere within the UK, and for use by any the Engineer, or Engineer's representatives.	1	2 weeks prior to Works commencement date until 2 weeks post Clause 14 programme completion date.

APPENDIX 1/3: COMMUNICATION SYSTEM FOR THE ENGINEER

1. Installation of a broadband connection and handset for the sole use of the Engineer to be available on the commencement of the contract.

   The whole communications system must be fully operational before any traffic closures are implemented.

   The Contractor shall provide mobile digital cellular telephone handsets available for the exclusive use of the Engineer and his staff.

2. The equipment to be installed shall be mobile hand sets and shall be issued to the following personnel:-

   (i) Resident Engineer (1 No.) M

   (ii) Assistant Resident Engineer (1 No.) M

3. Each mobile hand set shall be provided complete with carrying case, battery, recharging unit and spare batteries.

   Each mobile handset shall have a minimum of £[redacted] per month credit.

APPENDIX 1/4: WORKING AND FABRICATION DRAWINGS

Duplicate copies of the following drawings shall be submitted for the Engineer's approval at least two weeks before commencement of the related works:

1. Traffic safety and management proposals.
2. Temporary Works design proposals.
3. Road Restraint System including parapets and connections (refer to Appendix 4/1)

The Contractor shall supply 'As Built' drawings as hard copy, and electronically file in AutoCAD format to the Engineer. The AutoCAD files shall be supplied on a portable hard drive.

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Refer to Specification Annex 1/5 for a list of testing to be carried out in accordance with the following detailed requirements and any further requirements noted there.

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 300					
308 & 311	Preservation of timber	Full sapwood penetration	As required in sub-Clause 311.2(v)	Required for each batch	Quality management scheme applies *[Test/samples shall not normally be required]*

Series 400					
402	Welding	Welding procedures (Manufacturer's tests)	(Every seven years)		Quality management scheme applies
		Welder qualification (Manufacturer's tests)	As required in sub-Clause 402.6(iii)		
		Production testing (Manufacturer's tests)	Sub-Clause 402.6(iv)		
	Welded Joints	Destructive testing	*[see sub-Clauses 402.6(v) and 402.6(vi)]*		*††[See NG 402(n)]*
403	Anchorages and attachment systems for use in drilled holes	Ultimate tensile load (Manufacturer's tests)		Required	To provide well attested and documented evidence *[See NG 403.15]*
404		On-site tensile load test	As required in Appendix 4/1	Required	*†[See NG 404.2]*
	Post Foundations				*[See NG 404.3 and .4]*
406	Vehicles parapets			Required	Quality management scheme applies

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 400					
407	Anchorages and attachment systems for use in drilled holes	Ultimate tensile load (Manufacturer's tests)		Required	To provide well attested and documented evidence *[See NG 407.2]*
409	Vehicles parapet posts	Production testing as specified in BS6779-1 1998 and BS EN 1317-1:2010 (And No 14290, 21 March 2003) (Manufacturer's tests)		Required	Certification in accordance with Clause 409 is required
410	Anchorages in drilled holes	Loading test on site	Contractor to agree with product supplier	Required	*†[See NG 410.1]*
Series 500					
501	Pipes for drainage and service ducts				Product certification scheme applies *[Note 1. Additional Manufacture's tests are provided for in the relevant BS but shall normally be required]* *[Note 2. Certificates are provided for in the relevant BS but shall normally be required except for pipes which are not quality marked by a UKAS or equivalent accredited body listed in Appendix B]*
	Vitrified clay	*[See Note 1]*		*[See Note 2]*	
	Concrete-PC/SRC (Not exceeding 900 mm dia)	*[See Note 1]*			
	Concrete-Prestressed (Not exceeding 900 mm dia)				
	Iron-cast			*[See Note 1]*	
	Iron-ductile				
	PVC-U				
	GRP				
	Plastics. See Table 5/1				
	Corrugated steel	(Manufacturer's tests)		Required (AASHTO)	
	Corrugated steel bitumen protection (Not exceeding 900 dia)				
	Other materials			Required	BBA certification (or equivalent) applies
503	Pipe bedding	Grading and fines content	1 per week (min of 3)*	Required	*[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242.* *Appropriate tests/samples for the resistance to freezing and thawing (magnesium sulphate soundness) shall be scheduled where required [NG 803.4]*

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (Continued)					
503	Pipe bedding (continued)	Water-soluble sulfate (WS) content (N)	5 per source	Required	*[Minimum to allow for natural variability of sulphur compounds]*
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source		
		Resistance to fragmentation (N)	1 per source		*[LA category]*
505	Filter medium backfill	Plastic index (N)	1 per source*	Required	*[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242 and Annex D of BS EN 13285]*
		Resistance to fragmentation (N)	1 per source*		*Appropriate tests/samples for the resistance to freezing and thawing (magnesium sulphate soundness) shall be scheduled where required [NG 803.4]*
		Water-soluble sulfate (WS) content (N)	5 per source		*[Minimum to allow for natural variability of sulphur compounds]*
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	5 per source		
		Grading and fines content	1 per week		*[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242 and Annex D of BS EN 13285]*
		Permeability (N)	1 per source*		
506	Sealing existing drains	Tests as per 1700 series concrete and cement tests.			

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (Continued)					
507	Chambers				
	Precast concrete				Product certification scheme applies
	Corrugated galvanized steel	(Manufacturer's tests)		Required	Product certification scheme applies
	Manhole steps				
	Steel fitments				
	Covers, grates and frames				Product certification scheme applies
	Cover bolts				Quality Management scheme applies
508	Gullies and pipe junction				Product certification scheme applies
	Precast concrete				
	Clay				
	Cast iron and steel				
509	Watertightness of joints	Air test	All pipelines with watertight joints *[As required in Appendix 5/1 for partly watertight joints]*		
512	Backfill to pipe bays	Grading	1 per 50 tonnes (min of 3)*	Required	*Appropriate tests/samples for the resistance to freezing and thawing (magnesium sulphate soundness) shall be scheduled where required [NG 803.4]*
		Water-soluble sulfate (WS) content (N)	5 per source*		Minimum to allow for natural variability of sulphur compounds
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source*		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500 (Continued)					
513	Permeable backing to earth retaining structures	Plastic index (N)	1 per source*	Required	*Appropriate tests/samples for the resistance to freezing and thawing (magnesium sulphate soundness) shall be scheduled where required [NG 803.4]*
		Water-soluble sulfate (WS) content (N)	5 per source	Required	*[Minimum to allow for natural variability of sulphur compounds]*
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source		
		Resistance to fragmentation (N)	1 per source*		*[LA category]*
		Grading	1 per 200 tonnes (min of 3)*		
		Permeability (N)	1 per source*		
	Precast hollow concrete blocks	(Manufacture's tests)		Required	
517	Linear drainage systems	Load test	A minimum of 1 test and not less than 1 test per 1000m for each type and source	Required	Certification that the systems comply with Clause 517 is required. *[Kitemark certificate or equivalent applies]*
518	Thermoplastics structured wall pipes and fittings	(Manufacturer's tests)		Required	BBA certification (or equivalent) required
Series 600					
601, 631 to 637, 640	Acceptable material				
	Class : Description				
	1B : General granular fill	Grading (N) Optimum moisture content (N)	1 per 50m^3 of material 1 per 50m^3 of material	Required Required	
	2C : General cohesive fill	Grading (N) Optimum moisture content (N) mc/MCV (N)	1 per 50m^3 of material 1 per 50m^3 of material 1 per 50m^3 of material	Required Required Required	
	5A : Topsoil on site 5B : Imported topsoil	Grading (N) Grading (N)	Daily Daily	Required Required	
612	Compaction of fills Method compaction	Field dry density (N)	1 per 50m^3 of material	Required	See Clause 612.9
618	Acceptable material				
	Clas General				

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
	s	Description				
	5	Topsoil	Grading (N)	Weekly	Required	
624	Ground anchorages		Pull-out Testing	As required in Appendix 6/10	Required	
			Acceptance Testing	As required in Appendix 6/10	Required	
			Grout Cube Testing	1 set per batch or 1 min per day	Required	Test results to be provided at 7, 14 and 28 days.
			Grout Bleed Testing	Daily	-	
			Grout Flow-cone Testing	Daily	-	

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 700					
710	Constituent materials in recycled aggregate and recycled concrete aggregate	Quality control	As required by the 'Quality Protocol for the production of aggregates from inert waste'	Required	*[See NG 710.1 and NG 720.2]*
Series 800					
801, 803, 804, 805, 806	General requirements for unbound mixtures for adjacent to cement bound materials, concrete pavements, structures or products	Water-soluble sulfate (WS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes*	Required	*[Minimum to allow for natural vulnerability of sulphur compound]*
		Oxidisable sulfides (OS) content and total potential sulfate (TPS) content (N)	1 per 400 tonnes or per location if less than 400 tonnes*		
	Unbound mixtures beneath surface of a road or paved central reserve	Frost heave (N)	1 per source*		
		Grading and fines content	1 per week*		*[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242]*
		Plastic index (N)			
		Resistance to fragmentation (N)	6 monthly*		*[LA category]*
		Resistance to wear-micro-Deval test(N)			*[Where required. See NG 801.9]*
		Resistance to freezing and thawing (magnesium sulfate soundness) N	1 per source*		*[Where required. See NG 803.4]*
		Water absorption (N)	*[As required]*		*[See NG 801.10]*
		Volume stability of blast furnace slags	6 monthly		
		Volume stability of steel (BOF and EAF) slags	6 monthly		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 800 (Continued)					
		CBR (N)	1 per source and then monthly*		*[See Sub-clause 801.6]*
		OMC/mc (N)	*[As required]*		*[Declared values from the factory production control system operated by the producer to be provided – see Annex D of BS EN 13285]*
		Density (N)	*[As required]*		
		Water absorption (N)	*[As required]*		*[See NG 801.10]*

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
901, 925, 937, 938, 943	Aggregates for bituminous materials				
	Resistance to fragmentation (hardness)	Resistance to fragmentation (N)	Monthly*	Required	National quality management sector schemes apply
	Resistance to freezing and thawing (durability)	Soundness (N)	1 per source*		*[Where required – See NG901.2]*
		Water absorption (N)	*[As required]*		
	Cleanness	Sieve test (mass passing 0.063 mm sieve) (N)	Monthly*		Washing and sieving method to be used
	Shape	Flakiness index (N)	Monthly*		
	Blastfurnace slag	Bulk density (N)	1 per 500 tonnes*		*[BS EN 1097 – 3]*
		Soundness (N)	Once every 4 month*		
		Dicalcium silicate disintegration (N)	1 per 500 tonnes*		*[These are for air-cooled blastfurnace slag]*
		Iron disintegration (N)			
	Steel slag	Bulk density (N)	1 per 500 tonnes*		
		Volume stability (N)	1 per 500 tonnes*		
	Coarse aggregate for surface courses	Resistance to polishing (PSV) (N)	1 per source*		
		Resistance to surface abrasion (AAV) (N)	1 per source*		
	Binders for bituminous materials	Penetration (N)	1 per 750 tonnes*		National quality management sector schemes apply. Modified binders shall have a BBA HAPAS Roads and Bridges Certificate. In the event that no such Certificates have been issued, in the interim, only modified binders undergoing BBA assessment shall be considered for approval by the Engineer. *[More frequent tests/samples shall be scheduled for modified binders]*
		Softening point (N)	1 per 750 tonnes*		
		[Other BS EN tests]	*[As required]*		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (Continued)					
903 to 907, 909 to 912, 914, 916, 925, 926, 929, 930, 937, 938, 941, 943, 946 to 948	Bituminous mixtures	Grading (N) Binder Content (N)	For Audit Test purpose only		National Highway Sector Schemes apply
929	Base and Binder Course Asphalt Concrete (Design Mixtures)	Permanent Works - In situ air void content (N) Permanent Works - refusal air void content (N) Permanent Works – Deformation resistance	*(As required)*	Required	
		Deformation resistance (design) Stiffness (design)	*(As required)*	Required	The test certificate is the CE mark for the mixture
930	EME2	Permanent Works - In situ air void content (N)	1 pair of cores in the wheel-tracks every 100m laid (or part thereof if less than 100m) from each mixing plant	Required	To be tested to BS EN 594987 Clause 9.5.1.3
		Permanent Works – In situ air void content (N)	1 pair of cores for every 250m laid (or part thereof if less than 250m) from each mixing plant, taken 100m from final joint or at any open longitudinal joint.	Required	To be tested to BS EN 594987 Clause 9.5.1.3
		Stiffness	1 core every 500m laid (or part thereof if less than 500m)		To be tested to BS EN 12697-26 except each core shall be tested at 2.5Hz and 5Hz.
		Indirect Density Gauge	20m intervals in alternate wheel tracks and at core locations		To be tested to BS EN 594987 Clause 9.4.2 In situ void content determined in accordance with BS EN 12697-8

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900 (Continued)					
		Richness Modulus (design)	1 per source	Required	The test certificate is the CE Mark for the mixture
		Duriez (design)	1 per source		
		Deformation Resistance (design)	1 per source		
		Stiffness (design)	1 per source		
		Rate of spread (N)	*(As required)*		
921	Surface macrotexture	Volumetric Patch (N)	*(As required)*	Required	
924	High Friction Surfaces	Quality control checks	A required in sub-Clause 924.5	Required	BBA HAPAS Roads and Bridges certification (or equivalent) applies
		System coverage	A required in sub-Clause 924.6		
	Aggregate	Resistance to polishing (PSV (N)	1 per source* and as required for coated chippings in Clause 915.2	Required	
937	Stone mastic asphalt (SMA) binder course and regulating course	Permanent Works – In situ air void content (N)	*(As required)*	Required	
		Permanent Works – Deformation resistance			
		Binder drainage test (design)	*(As required)*	Required	The test certificate is the CE Mark for the mixture
		Deformation resistance (design)			
942	Thin surface course systems	General properties		Required	The test certificate is in the form of a BBS HAPAS Certificate.
920	Bond coats, tack coats and other bituminous sprays				
	Binder	Product identification	1 per product per source	Required	Tests are expected to be repeated every two years
		Vialit cohesion	1 per product per source	Required	
		Accuracy of spread	1 for each binder and sprayer per month	Required	Not more than 6 weeks prior start of work and once per month
		Rate of spread	1 per week		
		Penetration at 25°C and 5°C (N)	Every manufactured batch		Manufacturer's QA test results may be submitted
950	Depressions				BBA HAPAS Roads and Bridges Certification (or equivalent) applies

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 900 (Continued)						
Series 1100						
#1101	Precast concrete kerbs, channels, edgings and quadrants		Bending strength	Minimum of 8 per 1000 units of each product (BS EN 1340)	Required	
1102	In situ asphalt kerbs		Grading	1 test per 500 laid*	Required	*[See BS 5931 for materials for in situ asphalt kerbs]*
			Binder content	metres laid*		
1104	Precast concrete flags		Bending strength	Minimum of 8 per 1000 m^2 of each product (BS EN 1339)	Required	
	Bedding	Granular material				*[Appropriate tests/samples shall be scheduled where not included under other Clauses]*
		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 1000 m^2 of each product (BS EN 1344)	Required	
			Skid resistance	Minimum of 8 per 1000 m^2 of each 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 BS 8442 (2006) and BS EN 12899-1 (2007) is required
1207	Anchorages in drilled holes to supports of traffic signs		Loading test on site	*[As required]*		
1210	Holding down bolts and anchorages to base of permanent bollards				Required *[where considered appropriate]*	Certification that the holding down bolts and anchorages are capable of complying with the performance requirements of BS EN 12899-2 (2007) is required

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1212	Road Marking				National quality management sector scheme applies. Procedures are given in BS EN 1824
		Test specified in BS EN 1824		Required	
	Glass Beads	Arsenic trioxide content ant Antimony content (N)	One per contract and per specific source of supply	Required	
Series 1700					
1702 1704	Cement types as stated in sub-Clause 1702.1			Required	Certificate to be provided monthly for each type of cement. Quality management and product certification schemes apply.
	Cements (all types)	Chloride content	Monthly		Tests to be carried out by the manufacturer and results included on the test certificates required above
	Pulverised-fuel ash	Sulphate content	Monthly		
	Ground granulated blast furnace slag	Acid-soluble alkali content	Daily (PC) Weekly (pfa ggbs)		
	Aggregates	Grading and fines content	1 per delivery (per source)		Results of routine control tests from the factory production control system operated by the producer to be provided - see Annex H of BS EN 12620 Product certification scheme applies
		Shell content (N)	Monthly		
		Flakiness index (N)	Monthly		
		Resistance to fragmentation (N)	Monthly		
		Drying shrinkage (N)	1 per 5 years		
		Chloride content (N)	1 per week or as otherwise agreed		
		Sulphate Content (N)	Yearly		
	Blastfurnace slag	Bulk density (N)	Every 6 months		
		Stability (N)	Every 6 months		
		Sulphur content (N)	Every 6 months		
	Water	Tests specified in BS EN 1008	As required		

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
1700 continued					
1702 1704 cont	Water cont	Chloride content	Monthly		
		Sulphate content	Monthly		
		Acid-soluble alkali content	Weekly		
	Admixtures	Chloride Content	1 per consignment	Required (BS EN-934-2)	
		Sulphate content	1 per consignment	Required	
		Acid-soluble alkali content	1 per consignment		
1707	Concrete	Cube strength (N)	Pre stressed concrete two cubes from 12 m^3 or 2 batches whichever represents the lesser volume	Required	Company to cast and test sufficient additional cubes to demonstrate cube strength before transfer
			Reinforced concrete two cubes from 24 m^3 or 4 batches whichever represents the lesser volume		
			Mass concrete - two cubes from 50 m^3 or 50 batches whichever represents the lesser volume		
			Additional cubes for special purposes		
		Cube strength - identity testing as described in Appendix 17/4 (N)	2 cubes from each of 2 samples of each batch		
		Density	As required		
		Modus of elasticity			
	Fresh concrete	Consistence (slump or compacting factor or Vebe) (N)	Each batch	Required	
		Air content	Each batch		
		Cement content	As required		
		Water/cement ratio			

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700 (continued)					
1709	Silane			Required for each delivery	Certification that the silane complies with Clause 1709 is required
		Refractive Index	Three samples		
		Trial panels, where required in the Contract			
1712	Reinforcement				
	Steel bars			Required (BS4449+A2)	Product certification scheme applies
	Steel wire			Required (BS4482)	
	Steel fabric			Required (BS4483)	
	Stainless Steel			Required (BS6744+A2)	
1713	Fabricated reinforcement			Required	Certification that fabricated reinforcement complies with the routine inspection / testing requirements of BS 8666 shall be required if the fabrication is not covered by a product certification scheme listed in Appendix B
1716	Reinforcement jointing systems	Permanent elongation Characteristic strength (Manufacturer's test)		Required for each type of connection	BBA Roads and Bridges certificate or CARES certificate of product assessment or fully equivalent scheme apply
1717	Reinforcement metal arc welding	Welding procedure approval (BS7123)	As required in BS7123		Tests should be carried out by an independent testing body specified in BS 8666
		Welder approval (BS7123)			
1726	Stainless steel bar			Required (BS6744+A2)	Product certification scheme applies

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2600					
2601	Bedding mortar materials			Required for each batch	Certification in accordance with Clause 2601 is required
	Bedding mortar	Flow cone test	Each batch		† Laboratory tests
		Flow between glass plates			
		Compressive strength			
		Expansion test			
		Water absorption			
		Elastic stability	1 per source		
		Flow cone test Compressive strength	Each load		Site control tests
2604	Plastic coating to fencing posts, gates and ancillaries			Required (BS 1722: Part 16) applicator is required.	Certify by powder manufacturer and coating.
2607	Granolithic concrete				Testing to be in accordance with Clauses 1702, 1703, 1707 and 1710
Series 3000					
3001	General				Inspection reports as required in Appendix 30/1
3005	Grass seeding, Wildflower seeding and turfing	Rate of spread of fertiliser	1 per 1000 square metres*		
		Rate of spread of seeding	1 per 1000 square metres*		††
		Chemical analysis of fertiliser	1 per source*		
		Grass seed germination and purity (Official Seed Testing Station tests)	1 per source and mix variety*	Required prior to sowing	†

APPENDIX 1/5: TESTING TO BE CARRIED OUT BY THE CONTRACTOR (CONTINUED)

Key:

† Indicates a requirement in SHW for the test to be carried out by the Contractor; such tests shall therefore be scheduled in Appendix 1/5.

†† Indicates a statement in SHW that the test may/will be carried out under the direction of the Engineer: samples for such tests shall therefore be required in Appendix 1/6.

***** indicates that the frequency of testing is given in general guidance and is only indicative of the frequency that may be appropriate (ie. no frequency is given in the SHW or reference documents). Where materials are known to be marginal or if initial test results show them to be such, the frequency of testing shall be increased. Conversely where material properties are consistently in excess of specified minimum requirements or well below specified maximum limits, then the frequency of testing shall be reduced.

(11/03) (N) Indicates that a UKAS or equivalent accredited laboratory sampling and test report or certificate is required.

Notes:

1. Unless otherwise stated above, all sampling and testing in this Appendix shall be by the Contactor
2. Tests comparable to those specified in this Appendix will be necessary for any equivalent work, goods or materials proposed by the Contractor (See sub-Clause 105.4)
3. (N) indicates that a UKAS or equivalent accredited laboratory sampling and test report or certificate is required.
4. Unless otherwise shown in this Appendix tests for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
5. Cube strength tests are not required for concrete complying with Clause 2602.
6. Unless otherwise shown in this Appendix test certificates for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
7. The Contractor will carry out sampling and testing to the frequency stated below and the Contractor's rates for the work shall include this. **All sampling must be carried out by UKAS or equivalent accredited laboratory personnel. All tests must be carried out at a UKAS or equivalent approved laboratory**.
8. The Contractor shall allow the Engineer every reasonable opportunity and facility to inspect and monitor the sampling and testing processes. The Contractor shall notify the Engineer of what, where and when samples and testing are being carried out and be able to demonstrate that the UKAS accreditation required above is being complied with.

APPENDIX 1/6: SUPPLY & DELIVERY OF SAMPLES TO THE ENGINEER

Not used

APPENDIX 1/7: SITE EXTENT AND LIMITATIONS ON USE

The word “Site” shall be deemed to be that area of the Motorway or Trunk Road occupied in whole or in part by the Contractor at any one time including the area within the outer limits of his signing and the length of either carriageway being subjected to traffic restrictions.

1. Extent of the Site

The limits of the site are shown on Drawing 13/NW/0901/052/140/001. The site shall also include the carriageway, verges, and side slopes of the A83 within the limits of the scheme, and any areas of carriageway/verges required out-with the limits of the scheme for traffic management signing.

The extent of the Site shall include the areas of carriageway for the use by the Contractor for the implementation of the Traffic Management System and associated site operations to execute the Permanent Works. Use of these areas of carriageway shall be limited to the times stated below.

The location of advance warning signs and information boards shall be deemed to form part of the Site.

Wide and/or abnormal load ‘holding points’ and all signing for these shall be deemed to form part of the Site. Wide loads will need to be held in advance of the works in an area agreed prior by the Engineer due to constrained lane widths on site. The wide loads will require traffic management to be altered if there is insufficient width to pass through the works safely. The average number of wide load movements requested to BEAR Scotland per month is 25 journeys.

The foreshore is not deemed to be part of the site and the workforce are to be excluded from thus area at all times.

2. Limitations on the Use of the Site

Suspension of Works

The Engineer and the Police shall have the unqualified right at no extra cost to curtail or suspend the works during periods of fog, poor visibility or severe weather, which will not qualify for standing time payments.

The Police or the Engineer may from time to time decide (through the Engineer's Representative), that the works be suspended or curtailed in the interests of road safety, e.g. accident occurrences or exceptionally high volumes of traffic. These periods will qualify for standing time only if the whole labour force including supervisory staffs and plant were on site and at work and the progress of the work was significantly affected. Standing time payments will only be made in this respect for periods of suspension during the Contractor's elected and agreed working daily programme.

3. Public Liaison Officer

(a) The Contractor shall nominate a member of the site team to act as Public Liaison Officer who shall be supplied as required. The Public Liaison Officer will be required to inform these parties of the construction programme and actual working hours and will make contact with these parties when works are in close proximity.

4. Emergency Route

The Contractor shall maintain access through the site at all times for emergency vehicles.

APPENDIX 1/7: SITE EXTENT AND LIMITATIONS ON USE (CONTINUED)

5. Use of Site

(a) The Contractor must take cognisance of the restrictions defined in Appendix 1/9, 1/13 and 1/17.

(b) The Contractor shall obtain the approval of the Engineer for the location of all huts, equipment, stacks or heaps within the site. Such approval shall be given only when the Engineer has satisfied himself that no danger or limitation to sight distances affecting public traffic will be caused.

(c) In all instances the Contractor shall site the above in a position as far removed as possible from any live traffic lanes. Neither emergency crossing nor the central reserve shall be used either by vehicles or for the storage of plant and materials.

(d) The Contractor shall be responsible for the inspection, coning, signing and lighting of his plant, equipment, materials and works, and in particular plant, stockpiles (or excavations) parked or deposited within the Working Area.

(e) The Contractor shall take all due care to avoid damage to the grassed verges, central reserve and French drains. Any damaged areas of verge shall be reinstated by reforming the surface with at least 100 mm of approved topsoil, trimming and sowing in accordance with this Specification.

(f) The Contractor shall provide sleeper or other approved protection to all filter drains and where necessary to other drains wherever he requires to move plant or vehicles across such drains, and shall reinstate at his own expense, any such drains which become damaged or disturbed.

(g) Care must be taken not to damage the existing boundary fence, guardrails, safety fences and equipment on the carriageway and verge. No section of fence or barrier must be removed, unless required by the Contract.

(h) The storage of materials, movement of plant and other activities during construction is to be undertaken in a manner to prevent damage and minimise loss to the edges of plantation forestry and woodland, groundcover and naturally regenerated trees immediately adjacent to the road.

(i) Prior to commencement of tree felling, all existing trees to be retained which are in close proximity to the construction area, are to be identified and adequately protected from damage to roots and canopy during felling operations.

(j) Not Used.

(k) Drainage from the site, during site clearance, construction and post construction, shall comply with SEPA regulations to ensure that there is no environmental damage to any watercourses.

(l) All construction material arising from site clearance works to the existing road shall be removed from the site and disposed of at an official landfill site or recycled.

(m) The Engineer shall be consulted if visitors wish to gain access to the site, and his consent obtained before they are admitted. Arrangements shall be made for senior personnel of the Engineer, or the Contractor, as appropriate, to escort visitors to, within and from the site. A record shall be kept of all visitors who the Contractor, with the Engineer's permission, takes on the site. The record shall be submitted to the Engineer at weekly intervals. All visitors are to be inducted by the Contractor before entering the works area.

(n) No material shall be disposed of by burning.

(o) The Contractor shall allow the Employers' Representatives and the Performance Audit Group Representatives access to the location of the Works or Works Contractor's premises, with or without prior notification, subject to the requirements of the Contractors site rules and legal requirements.

(p) Particular care shall be taken to ensure that Statutory Undertakers' apparatus is sufficiently protected and not damaged during the Works. Any items damaged by the Contractor shall be repaired to the satisfaction of the Statutory Undertakers at the Contractor's expense.

(q) All vehicles transporting earthworks material along the public highway shall be road legal vehicles. Construction site dumpers shall not be permitted to transit along the public highway.

(r) The Contractor shall provide a method statement to the Engineer for acceptance regarding the location of the site compound. This shall also covers how the Contractor's staff/vehicles get between the compound and the site.

(s) The Contractor is responsible for security of the entire site at all time and included all materials.

(t) The Contractor is responsible for maintenance of the entire site extents throughout the contract period.

6. Use of the Site During Permitted Hours of Working

(a) The permitted hours of working shall be:

Monday to Sunday – 0:00 hrs to 24:00 hrs

(b) Restrictions identified in Appendix 1/9 and 1/17 shall still apply

APPENDIX 1/8: OPERATIVES FOR THE ENGINEER

1. **General**

(i) The Contractor shall make available the use of an operative as a chainman as reasonably required.

(ii) All operatives shall be equipped with suitable protective clothing and safety equipment by the Contractor.

(iii) All operatives shall be to the Engineers approval.

2. **Schedules of Operatives**

Operatives Required	No	Period Required
Chainman	1	20 days (minimum) as required within construction programme

APPENDIX 1/9: CONTROL OF NOISE AND VIBRATION

1. Noise Control

1.1 The Contractor shall employ the best practical means to minimise noise and vibration produced by his Operations and shall have regard to the recommendations in BS 5228 Part 1 1997 and 2 1997 (Noise and Vibration Control on Construction and Open Sites) and any similar British Standard or Code of Practice which may be considered relevant

1.2 Without prejudice to the Contractor's obligations under the preceding paragraph the Contractor shall comply in particular with the following requirements:

i) All vehicles and constructional plants used for the purpose of the Site Operations shall be maintained in good and efficient working order and shall be fitted with effective exhaust silencers.

j) 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 in writing by the manufacturers.

k) Machines in intermittent use shall be shut down in the intervening periods between Site operations or throttled down to a minimum.

l) When practicable Constructional Plant with directional noise characteristics shall be positioned to minimise noise.

m) Static machines shall be sited as far away as practicable from inhabited buildings.

n) Smooth blasting may be required to break out rock from the slope. The contractor will give a minimum of 7 days' notice to the local authority and Police Scotland in advance of any blasting activities. Blasting activities will be restricted between the hours of 7am and 11pm.

1.3 The Contractor's normal working hours within the site shall be Monday to Sunday 0000 to 2400 hours.

During this period the equivalent continuous A-weighted sound pressure level (LAeq) shall not exceed the following values measured 1 metre outside the facades of any adjacent occupied buildings-

Days	Times	Maximum Noise Level	
		LAeq (15mins)	LpA (max)
Monday to Saturday	07:00 – 19:00	75 dB (A)	-
	19:00 – 22:00	65 dB (A)	-
	22:00 – 07:00	40 dB (A)	50 dB (A)
Sunday & Public Holidays	00:00 – 24:00	40 dB (A)	50 dB (A)

Notes:-

a) The LAeq (15mins) is the equivalent continuous A-weighted sound pressure level arising from work operations measured (on Fast Weighting) or calculated over any continuous period of 15 minutes.

b) The LpA (max) is the maximum A-weighted sound pressure level (on Fast Weighting) arising from work operations measured during the time period.

APPENDIX 1/9: CONTROL OF NOISE AND VIBRATION (CONTINUED)

1.4 The Contractor shall furnish such information as may be required by the Local Environmental Health Officers in relation to noise levels emitted by Constructional Plant or equipment used or installed on the Site or which the Contractor intends to use or install on the Site and also afford all reasonable facilities to enable such officers to carry out such Site noise-monitoring as may be necessary.

Address: Environmental Health Officer

Contact: [redacted]

Planning and Regulatory Services (Environmental Health)

Argyll and Bute Council

Municipal Buildings

Albany Street

Oban

Telephone: [redacted]

1.5 An instruction may be issued to the Contractor to cease using any item of Constructional Plant insufficiently silenced or generating noise levels in excess of those specified.

1.6 Compliance with this Appendix and the other provisions of the Contract shall not itself constitute any ground of defence against any proceedings instituted under Section 59 of the Control of Pollution Act 1974 and the Environmental Protection Act 1990 (whereby any occupier of premises may complain to the sheriff of a noise nuisance).

1.7 If traffic signals are to be active overnight, the Contractor shall not use generator powered (i.e. diesel/petrol) traffic signals in areas where 24 hour working is not allowed (refer to App. 1/7 Section 5).

2. Vibration Control

2.1 The Contractor shall normally limit the vibration levels arising from site activities at any residential building to peak a particle velocity of 1.5mm/sec in a vertical direction between the hours of 07:00 to 19:00. No detectable vibration is permitted from work on site at any residential building at any other time. In addition, plant producing noise or vibration at frequencies of less than 10Hz and between 20Hz to 30Hz shall not be permitted to operate within 6 metres of any residential building without the permission of the Environmental Health Officer. Where vibration occurs, reference shall be made to ISO 2631 - Whole Body Vibration, and BS 6472 - Human Response to Vibration in Buildings.

3. General Environmental Requirements

3.1 The Contractor shall ensure that all Sub-Contractors engaged on the Site shall comply with all noise and vibration control requirements.

3.2 Before commencing any work on the Site, the Contractor shall give the Environmental Health Officer for the area of the Works at least 7 days written notice, and all properties fronting the Works at least 14 days written notice, with details of the work to be undertaken, with copies of all notifications issued to the Engineer. The Contractor shall appoint a person to be responsible for dealing with any complaints and provide a contact telephone number on the same correspondence.

3.3 In the areas closest to properties, the Contractor is to schedule any particularly noisy activity to normal working hours (07:00 – 19:00) whenever possible. This measure shall reduce the likelihood of any noise complaints.

3.4 The Contractor shall not be permitted to burn any materials on the Site.

APPENDIX 1/12: SETTING OUT AND EXISTING GROUND LEVELS

Setting Out Requirements

1. The Contractor shall be provided with electronic setting out information for the channel 'strings'. This shall be in the form of three-dimensional data for each point on the 'string' ('x' and 'y' coordinates for the horizontal position and 'z' for the corresponding level) from MX Professional surface-modelling programme, together with the coordinates and levels for the Ground Stations used for the existing ground model.

2. The Contractor shall be responsible for all setting out of the Works.

3. **The Contractor shall before work commences, check the co-ordinates and levels of the Ground Stations** and shall report any discrepancies to the Engineer.

4. The Contractor shall, with the approval of the Engineer, set out, mark and maintain until they are no longer required, all reference lines, templates, bench marks and markers, round stations and the like (permanent or temporary), necessary for setting out and for checking of the Works. The Contractor shall keep up to date schedules and drawings of such information, which he shall supply to the Engineer as the setting out proceeds.

5. If any of the bench marks or ground station markers becomes displaced during the Contract, then the Contractor shall re-establish them immediately at his own expense and shall provide the Engineer with the amended position and level details.

6. Prior to commencement of excavation the Contractor shall, set out, mark and maintain (at 10m intervals) until they are no longer required, all reference lines, templates, bench marks and markers, ground stations and the like (permanent or temporary), necessary for setting out and for checking of the Works (including the existing road). The Contractor shall keep up to date schedules and drawings of such information, which he shall supply to the Engineer as the setting out proceeds.

7. The Contractor should set out his level and alignment control assuming that the proposed horizontal and vertical alignment follows the existing carriageway levels and alignment with adjustments for widening of the carriageway as required by the Contract.

8. The Contractor shall ensure that the level control is checked regularly to ensure they have not been disturbed.

9. The Contractor shall propose, agree with the Engineer and establish a form or method of level control which is to be used to demonstrate the depth of each pavement layer laid. Should any pavement layer be outwith tolerance the Contractor shall seek approval from the Engineer any necessary rectification. Such rectification being at the Contractor's expense.

APPENDIX 1/13: PROGRAMME OF WORKS

1 General

1.1 The Contractor shall provide a Clause 14 programme in the form of a Gantt chart produced as a result of a 'critical path analysis' and must abide by constraints below. It shall show the level of detail appropriate to each stage of the Works and all activities and restraints, each of which shall be given a short title. All events shall be numbered and annotated with earliest and latest event dates. The critical path shall be clearly shown. A schedule showing outputs, labour and plant shall be allocated to each activity.

1.2 The Contractor is responsible for the phasing of the works and shall submit details to the Engineer for approval at least 14 days prior to the start of the works, notwithstanding this, the Contractor shall phase the cutting Works as follows:

a) The traffic management to carry out the works can be phased in any order subject to the requirements of Appendix 1/17.

1.3 The Contractor must provide a weekly programme every Friday to cover his operation in the following working week (Monday to Sunday) to the Engineer for his information. (A blank copy of the form is included at the end of this Appendix)

2 Schedule of Constraints

The following constraints shall be allowed for in the Contractor's programme:

(i) Possession of all land required for construction of the Works, as shown on the contract drawings, will be available to the Contractor at the time of commencement. The Contractor must not enter land, not indicated as part of the site, without prior written permission of the landowner and all other parties who may have a legal right of access.

(ii) Traffic safety and management including notice requirements.

(iii) Restrictions arising from the use of substances hazardous to health.

(iv) Provision of environmental protection prior to the main construction operations in accordance with the Pollution Prevention Guidelines as published by the Environment Agency, Environment and heritage service and SEPA.

(v) Date, day and time limitations for surface treatments.

(vi) Submission of approval forms contained in the Contract.

(vii) Constraints not listed separately above but implied or stated in the Contract.

(viii) The Network Access Request (NAR) for all closure requests must be issued by the Contractor a minimum of 2 weeks preceding the commencement of the work to BEAR Scotland (Appendix 1/17 – Booking of Roadspace).

APPENDIX 1/13: PROGRAMME OF WORKS (CONTINUED)

(ix) 7 day working week

(x) Phasing of the works.

(xi) The Contractor shall make allowance in his programme for the provision of access associated with the Road Safety Audits detailed below :

a) For the purposes of his Stage 3 Road Safety Audit of the temporary traffic management. The Contractor shall inform the Engineer of the appropriate date he intends to carry out his Road Safety Audit in accordance with DMRB HD19/03 or other such requirements.

b) For the purposes of the Stage 3 Road Safety Audit of the completed works. Free access shall be made available to inspect the measures for each phase of the works prior to use by traffic.

(xii) Compliance with technical approval procedures in relation to structures designed by the Contractor, including awaiting approvals, resubmissions and modifications. The earthworks operations and soil nailing operations will need to be certified prior to installing the rock netting.

(xiii) Tree and shrubs removal refer to Appendix 30/1 Clause 8

(xiv) Hold points, in the Works, for inspection by the Engineer, in accordance with the hold points identified in Appendix 6/3, and also for agreeing the exact location of the Ecological temporary protection fence. An ecological clerk of works will need to be present on site whilst the temporary ecological fencing is being erected.

(xv) The Contractor must give Openreach 8 weeks' notice in advance of Openreach Contractors being present on site to carry out their diversion works. The Contractor must work alongside Openreach Contractors and allow them to use the same traffic management on site. Further details can be found in Appendix 1/16.

3 Requirements for Contractor's Programme

The level of detail of the Contractor's programme shall be not less than the following.

Level 1

Within 14 days before acceptance of Tender - Conditions of Contract Clause 14.(1) and any subsequent revision to Clause 14.(2):-

(i) Site establishment and Traffic Management measures including operation of site accesses, plant crossing and temporary diversions. This will include locations of traffic management using the Chainages found on the drawings, and proposals as to how traffic will safely switch lanes. Details of dates and locations of when traffic management will be moved will need to be shown

(ii) Installation of temporary ecological fencing, and marking of trees to be retained.

(iii) Site Clearance

(iv) Earthworks

a) General excavation and deposition, including cutting of superficial deposits

b) Soil nailing

c) Rock drilling

d) Rock smooth blasting

e) Rock trap formation

f) Netting

(v) Roadworks

a) Drainage

b) Cold milling – proposals for the removal of existing surfaces shall be submitted to the Engineer for acceptance

c) Temporary surfacing requirements

d) Sub Base

e) Base

f) Binder

g) Surface Course

h) RRS

i) Signs & Lines

- an allowance in the programme shall be made to allow the Engineer to inspect formation surfaces prior to laying new material on top

- the above shall include lane and Chainage details and also details of joint location which should be passed to the Engineer prior to commencement for acceptance.

(vi) Any work required to/for privately and/or publicly owned services and supplies

(vii) Landscaping works.

(viii) Site and Traffic Management demobilisation.

In addition to the successful Contractor shall submit for acceptance a programme to the Engineer showing the following information:

(i) The starting date, possession dates and Completion Date,

(ii) For each operation, a method statement which identifies the Manpower, Equipment (including size and power) and other resources which the Contractor plans to use,

(iii) The order and timing of

(a) The operations which the Contractor plans to do in order to Provide the Works and

(b) Any work to be carried out by the Engineer and others either as stated in the Works Information, or as later agreed between the Engineer and the Contractor,

(iv) The dates when the Contractor plans to complete work needed to allow the Engineer and Others to do their work,

(v) Provisions for

(a) Float

(b) Time risk allowance

(c) Health and Safety requirements

(d) The procedures set out in the contract

(vi) Possession of a part of the Site if later than its *possession date,*

(vii) Acceptances and

(iv) Other information which the Works Information requires the Contractor to show on a programme submitted for acceptance.

APPENDIX 1/13: PROGRAMME OF WORKS (CONTINUED)

Level 2

At least 1 weeks before the commencement of any item of work:

(i) As for level 1. Including

Environmental mitigation measures/method statements as contained in Appendix 30/1

Proposed Resource allocation

Level 3

Daily notification shall be submitted detailing:

(i) Programme of work for the following day

(ii) Intended times and volumes of material supplies for the following day

(iii) Check level (dips) of formation and sub-base layer

(iv) Check surface levels (dips) of base layer

(v) Check surface levels (dips) of binder layer

(vi) Check surface levels (dips) of surface layer

4. Progress

The Contractor shall monitor progress at weekly intervals and in the event of his falling behind the Programme he shall submit to the Engineer at intervals not exceeding seven days when required by the Engineer a revised programme showing how he proposes to complete the Works within the Contract Period and the resources to be employed.

[redacted]

[redacted]

[redacted]	[redacted]	[redacted]	
[redacted]	[redacted]	[redacted]	
[redacted]	[redacted]	[redacted]	
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

APPENDIX 1/14: PAYMENT APPLICATIONS

1. The payment applications submitted to the Engineer in accordance with the Conditions of Contract by the Contractor shall, whenever dealing with matters covered by the Bill of Quantities, be set out under Part and Section heading similar to those in the Bill of Quantities and shall separately identify each item and specify quantity, unit, rate and value. Items not described in Bill of Quantities but appropriate for inclusion as measured work shall be shown at the end of the relevant section or under section headings as appropriate indicating quantity, unit rate and value. In respect of all other matters referred to in the Conditions of Contract the Contractor shall separately show in the invoice quantities, units and rates of goods and/or materials and also details of any other matters to which he considers himself entitled. The Contractor shall allow the Engineer to inspect invoices for goods or materials included in the statement as may be required.

2. Invoices shall be submitted to the Engineer for approval at monthly intervals commencing one month after the Date for Commencement of the Works pursuant to Clause 41 an invoice (in such form as may be prescribed in the Specification) in accordance with Clause 60 of the Conditions of Contract, however all invoices shall bear the following address:

   Transport Scotland
   Finance and Corporate Services Directorate
   Accounts Payable and Administration Team – TRBO
   9th Floor
   Buchanan House
   58 Port Dundas Road
   Glasgow
   G4 0HF

3. Invoices submitted must have the amount inclusive and exclusive of VAT due **rounded up** to the next whole pence.

APPENDIX 1/16: PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

1 This Appendix contains details of services and supplies affected by the Works, details of preliminary arrangements that have been made with Statutory Undertakers and others for the alteration of services affected by the Works, and details of any orders already placed.

2. The Contractor shall make arrangements with the Statutory Undertakers and others concerned, for the co-ordination of his work with all work which needs to be done by them or their Contractors concurrently with the Works. Compliance with the periods of notice given in this Appendix does not relieve the Contractor of his obligations. The Contractor must give Openreach 6-8 weeks' notice in advance of Openreach Contractors being present on site to carry out their diversion works. Openreach has estimated that their works will take 2 weeks to complete. The Contractor must work alongside Openreach Contractors and allow them to use the same traffic management on site.

3. Private Services to individual properties have not generally been listed or shown on the Drawings. The Contractor shall make arrangements with the Statutory Undertakers and others concerned for the phasing of all necessary disconnections and diversions of private services affected by the Works.

4. The names and contact details of the authorities serving in the locality are listed below.

Names	Address	Contact Details
Openreach	Telephone House 21 Ward Road Dundee DD1 1BA	[redacted]

5. Services and Supplies Affected by the works.

Location	Description	Group	Drawing No.	Details
Openreach Right Verge	New Underground Open reach duct	C	13/NW/0901/052/12700/001 & 002	Contractor to excavate trench for Openreach duct Contractors and backfill trench for Openreach duct on completion of laying of duct by others billed under Series 1400.

6. The Contractor only with the prior consent of the Statutory Undertakers and others concerned shall remove disconnected apparatus.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT

1. Traffic Safety and Management Requirements

1.1 Phasing of the Works

Traffic management phasing shall be the responsibility of the Contractor and shall take account of all the requirements as stated in Appendix 1/13 as described below and in Clause 117SR of the Specification. The phasing shall be as determined by the Contractor and shall comply with the requirements of Chapter 8 (2009) of the Traffic Signs Manual and the constraints as listed or inferred to within this Appendix. The proposed phasing of the works shall be submitted to the Engineer for approval at least two weeks before the start of the works on site.

The Contractor shall liaise with the relevant Roads, Police Authorities and Emergency Services and the proposed traffic management shall be to the satisfaction of these bodies. The Contractor shall also take in to account the requirements of bus and coach operators, persons and vehicles requiring access within the Works, including but not limited to Wind Turbine Transportations, Wind Towers Scotland Ltd, and shall take all reasonable steps to accommodate such requirements.

1.2 Traffic Management Layouts

The required traffic management layout shall be in accordance with the requirements and advice given in Chapter 8 (2009) of the Traffic Signs Manual

The layouts for each phase or part of phase shall be submitted to the Engineer for approval 2 weeks before they are to be implemented. Full detail drawings shall be provided together with risk assessments.

a) The Contractor shall phase the works to cause minimal delay to traffic using the A83 Trunk Road.

b) Only one set of temporary traffic signals to be used at any one time.

1.2.1 The Contractor shall take into account The Scottish Office Code of Practice for the Reduction of Traffic Delays at Roadworks. The Contractor shall take all steps necessary to minimise disruption to traffic at all stages of construction and maintenance of the Works.

1.2.2 The Contractor is responsible for the provision, erection, maintenance, repositioning and removal of all signing, coning, temporary lighting, road marking, etc. compatible with the progress of the Works. The Contractors responsibilities shall also include the following, to the satisfaction of the Engineer: -

(a) All traffic safety and management measures associated with the Works

(b) Ensuring that all equipment is in place and in full working order at all times;

(c) Enforcement of all relevant Health and Safety directions relating to operations and live traffic;

(d) Strict enforcement of site access requirements;

(e) Liaison with the Engineer and continued monitoring of the traffic management measures adopted;

(f) Arranging for watchmen and other staff such the site is patrolled and inspected at all times and equipment attended to and maintained and, when necessary, providing replacement signs, cones, bollards, lights, etc. available and erected without delay.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONT…)

1. Traffic Safety and Management Requirements (cont…)

1.2.3 All traffic management measures shall be in accordance with the requirements and advice given in Chapter 8 (2009) of the Traffic Signs Manual, and in particular the following details shall be submitted to the Engineer:-

(i) Drawings showing traffic management including:-

(a) Position of temporary traffic signals

(b) Width of lanes (minimum lane width = 3m)

(c) Working areas

(d) Safety zones (Absolute minimum safety clearance (lateral) = 0.5 m / Minimum safety clearance (longitudinal) shall be in accordance with Table 3.1)

(e) Running lane for emergency vehicles

(f) Location for emergency vehicles

(g) Method statement for Works accesses and exits

(h) Not Used.

(i) Temporary road markings

(j) Positions of temporary signs

(k) Safety zones shall be delineated with the use of temporary safety barriers or traffic cones when there is a level difference of 150mm or more between the traffic lane(s) and the working area.;

(l) Provisions for wide loads

(m) All cones shall be 1m high, and be fitted with a system of amber flashing warning beacons.

(n) Omnibus traffic orders are in place for the enforcement of any overnight closures (where approved) and 30mph speed limits through the Works for the duration of the contract period. The Contractor shall ensure his proposals provide all appropriate signing in this regard. The Contractor shall consider section 2 of this appendix should he deem further traffic orders are required to facilitate the construction of the works.

(o) The 300m maximum distance between traffic signals under clause D5.10.1 of Chapter 8 of the Traffic Signs Manual, is superceded by a contract specific maximum permissible distance of 500m.

(p) Manually operated Stop/Go will not be permitted

(ii) Timing of operations

(iii) Road lighting requirements

(iv) Restrictions arising from the use of substances hazardous to health (Appendix 1/23)

(v) Traffic management programme

(vi) Traffic Management method statement for each installation and removal. The method statement shall contain adequate details including proposed timing and labour and plant resources to be employed and be approved at least 48 hours prior to the work being carried out.

1.2.4 No traffic management measures will be permitted to be implemented or removed on any day between 06:30 to 09:30 hours, and 16:00 to 19:00. Pre-placement of signs etc., will be permitted outwith this period, with the agreement of the Engineer.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONT….)

1. Traffic Safety and Management Requirements (cont…)

1.2.5 The Contractor shall provide a suitable member of his staff to act as a Traffic Safety and Control Officer **(TSCO)** who will be available to the Police and the Engineer at all times on site throughout the Contract duration, when the traffic management is in place. It is not acceptable that this member of staff is also designated as the site agent. The responsibilities of the Traffic Safety and Control Officer and of his nominated deputy shall include the following matters:

(a) Monitoring with the assistance of sufficient mobile personnel and of sufficient other suitable and appropriate aids, the flow of traffic within the area and within the period for the operation of the vehicle recovery service;

(b) Recording and logging all incidents and all movements of recovery vehicles and, when called, all movements of the emergency services. For the purposes of this Appendix, an incident is defined as a shed load, vehicle breakdown, vehicle abandonment or traffic accident, whether or not the latter involves personal injury.

(c) Ensuring that, within 5 minutes of the occurrence of an incident, as defined above, that results in stationary vehicle(s) on a highway open to the public, the incident is reported to the vehicle recovery service;

2. Maintenance Requirements

The Contractor will be required to carry out the following maintenance requirements to the existing carriageway during the course of the site works:-

(i) Maintain carriageway in use within extent of the works free of debris and in serviceable condition.

(ii) Ensure existing drainage system is in operable condition throughout duration of the contract.

(iii) Ensure existing carriageway surface is kept in operable condition throughout duration of the contract.

(iv) Cover or uncover of advance direction signing compatible with the state of the Works.

(v) All conflicting markings shall be covered or removed and reinstated (see Clause 7.5 for restrictions on removal of markings).

(vi) During periods of adverse weather BEAR Scotland has the authority carry out emergency winter maintenance duties as necessary i.e. snow clearing, gritting. This may result in a need for the Traffic Safety and Control Officer and his deputy to reinstate any damage to the traffic management arrangements.

(vii) Delivery vehicles entering the site shall have working reversing bleeper's

3. Notice Requirements

The following <u>minimum periods</u> of notice are required by the Engineer to arrange for:-

(a)	making or amending traffic orders	10 weeks
(b)	authorising non-prescribed signs	5 weeks
(c)	authorising temporary traffic signals	2 weeks
(d)	the Contractor to move existing signs to be compatible with the progress of the Works as described in sub-Clause 117.11	1 weeks

'Traffic' Orders prepared by Transport Scotland will be in place for temporary speed limits. The appropriate temporary traffic signs shall be displayed to enforce the temporary speed limit required for the Site. The Contractor shall refer to item 5 of this Appendix.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

4. Details of Events That Could have a Bearing on the Work

(a) At this moment in time, there are no planned events which could have a bearing on the work, however the Contractor should review this with the regularly with the Engineer.

5. Highways, Private Roads and other Ways Affected by the Works

(a) The following public roads are under the control of Transport Scotland: -

Description	**Predicted 24 hour Annual Average Traffic AADT**	**Eighty Five Percentile Speed of Cars (mph)**	**Speed Limit (mph) if proposed** *[State if mandatory or advisory]*	**Type(s) of Traffic Control**	**Special Facilities** *[Pedestrian equestrian etc.]*	**Whether to be Kept Open or Closed**
A83 Trunk Road	2696	60	30 (M)	Traffic signals	None	Open
Notes: Speed limit: A = advisory M = mandatory						

(b) All public roads, private roads and private accesses affected by the works (e.g. Local Authority owned roads, farm accesses, and private dwelling accesses) are to be maintained and must not be obstructed without prior agreement.

Note:

Public roads described above under the Authorities of: -

Trunk Road

Authority	The Director
Address	Transport Scotland, Network Maintenance Trunk Road and Bus Operation Buchanan House, Glasgow G4 OHF
and maintained by	BEAR Scotland Bear House Inveralmond Industrial Estate Inveralmond Road Perth PH1 3TW

[redacted]

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

6. Driver Information at Roadworks

6.1 The following driver information signs shall be provided, erected and maintained by the Contractor in accordance with Sub-Clauses 23 to 34 of Series 100 Clause #117 of the Specification, on all affected routes.

(i) Advance Signs at Major Works (sited at 1 miles):-

Legend: "Delays possible until Spring 2017" Sign 7005.

(ii) Signs used within Roadworks Site (located as directed):-

Legend: "Work suspended, unsuitable weather"

(iii) Legend: "Lane closed for safety"

6.2 In addition 2 no Portable, Dynamic Message Signs shall be provided, erected and maintained by the Contractor in accordance with Appendix 1/21 sited at 500m from the start and end of the scheme in a suitable location as agreed with the Engineer.

6.3 In order to undertake elements of the surfacing works the Contractor is permitted to up to 5 overnight closures between 20:30 and 06:00 the following day.

6.4 The Contractor is required to supply advance 'Notification of Closure' signage a minimum of 2 weeks in advance of any closure of the A83 on both sides of the works.

6.5 The Contractor is required to provide diversion signage along the recognised diversion route via the A819, A85 and A82, during any closure of the A83.

7. Lighting, Signing and Road Markings

7.1 The Contractor shall cover and later uncover all permanent signs which do not apply during the particular phase of the traffic management.

7.2 Not used

7.3 All traffic signs associated with the roadworks shall be unobstructed at all times.

7.4 Permanent road lighting requirements do not form part of this contract.

7.5 Removal of existing carriageway markings as required prior to installation of traffic management system shall be by approved blasting methods only and NOT burning methods.

7.6 The Contractor shall provide, maintain and remove on completion of the works the following additional signage:-

'Queues Likely Ahead' signs on all routes at 500m intervals from the 2 miles Advance signs.

8. Programme and Notices

8.1 Programming constraints for the Works are described in Appendix 1/13.

8.2 The Contractor shall electronically submit a completed 'Roadspace Application Form' (RAF) (in Annex A to Appendix 1/17) to the Roadspace Manager; with a hard copy to the Engineer, seven days prior to the week of application. (An electronic copy of this form will be forwarded to the Contractor)

8.3 The Contractor shall give a minimum of 7 days' notice of any variations he may wish to make to the agreed traffic management scheme. Such variations shall be subject to the approval of the Engineer.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

8. Programme and Notices (cont…)

8.4 The Contractor shall complete and sign a copy of the Erection/Dismantle of Temporary Traffic Management measures Form and return it to the Engineer within 24 hours of erecting any lane or carriageway closure associated with each section of the Works. The completed form shall certify that the lane or carriageway closure associated with each section of the Works has been erected in accordance with and complies in full with, the requirements of the Contract Specification and Drawings. A signed copy of Form/App1 shall be submitted on each occasion any lane or carriageway closure is erected. (A blank copy of this form is included in Annex A to Appendix 1/17 of this document).

8.5 The Contractor must note that although every effort will be made to implement any particular lane or carriageway closure to suit the Contractor's approved programme of the works, it must be appreciated that in the event of emergency work elsewhere on the Trunk Road Network some delays and cancellations of closures can be expected.

8.6 It may become necessary to cancel, delay or curtail any traffic management measure in the event of fog or other weather conditions that give rise to adverse visibility or safety on the trunk road. The Contractor shall arrange his working to ensure that, as far as possible, all obstructions can be removed from the carriageway and traffic lanes opened within 30 minutes of a decision to remove traffic management.

9. Monitoring and Maintenance of the Traffic Management Arrangements

9.1 The Contractor shall inspect the temporary traffic management at a frequency of at least once every two hours. The Contractor shall complete, sign and return to the Engineer a copy of enclosed Form /INSP1 on a daily basis. (A blank copy of this form is included in Annex A to Appendix 1/17 of this document)

9.2 The Contractor shall keep clean and legible at all times all traffic signs, lamps, road markings, road studs, cones, cylinders, flashing lights, barriers and traffic control signals and he shall position, re-position, cover or remove them as necessitated by the progress of the Works.

10. Traffic queue monitoring

As part of his duties the Traffic Safety and Control Officer shall be responsible for informing Traffic Scotland in accordance with the following:

10.1 By means of a mobile telephone notify the Traffic Scotland Operator [redacted]

i) 15 minutes prior to the traffic management being implemented for the Works.

ii) 15 minutes prior to the traffic management layout being altered.

iii) Immediately delays to traffic exceed 10 minutes, thereafter at 30 minute intervals until such time as the delays have ceased.

iv) Immediately upon traffic management being removed from the carriageway.

10.2 When notifying Traffic Scotland quote the unique ADF No. and obtain the Traffic Scotland RRN No.

10.3 Maintain a diary record of all such notifications Traffic Scotland Form. (A blank copy of this form is included in Annex A to Appendix 1/17)

10.4 The traffic management installation shall be monitored and modified if necessary to ensure that traffic delays are minimised. The Contractor shall monitor the lengths of traffic queues at 2 hourly intervals. For the purposes of the Contract a queue is defined as being where the speed of vehicles is less than 20 mph.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

11. Wide Loads and Emergency Vehicles

11.1 Wide Loads

The traffic management layout shall allow vehicles up to 3.0m width to pass without conflict with cones etc. The Contractor shall assist the Police in moving cones, signs etc. to allow the passage of these vehicles and shall reinstate the closure to its proper condition afterwards.

Subject to agreement with the Police, the provisional holding lay-bys are proposed at the following locations:

Traffic Flow Direction.	Holding Lay-by.	Location.
i) for north/ east bound (Glasgow bound) traffic:	No Lay-by Reference	2.7 km from start of works
ii) for south / west bound (Campbelltown bound) traffic:	No Lay-by Reference	4.0 km from end of works

Provision for the passage of abnormal loads through the Works is to be as follows:

(a) The Contractor shall assist the Abnormal Load Self Escort/Police in moving abnormal loads through the Works by modifying the signing/coning as necessary. Signs/cones so moved shall be replaced immediately the abnormal loads have passed through the Works;

(b) The Contractor shall allow for an average number of abnormal loads of approximately 25 per month. The Contractor shall not be entitled to any further payment by the Engineer in respect to provisions made, measures taken or disruption caused by such abnormal loads. For the purposes of this Clause an abnormal load shall consist of any number of vehicles in convoy at any one time, requiring special measures to be taken in order to gain passage through the Works;

(c) All lay-bys within the Works are to be closed off during the Works. Advance signs for lay-bys to be covered when not required;

(d) The Contractor shall agree with the Police the location of holding lay-bys for abnormal loads.

(e) advance signing required for holding lay-bys as below;

A83 ROADWORKS
RESTRICTED WIDTH
LOADS GREATER THAN 3.0M
WIDE MUST STOP AT NEXT

LAY-BY ½ MILE

Colour - Black text on yellow background
'X' height 100mm
Dimensions - 2700mm wide x 1220mm deep

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

11. Wide Loads and Emergency Vehicles (Cont….)

WIDE LOADS STOP
IN NEXT LAY-BY

Colour - Black text on yellow background
'X' height 100mm
Dimensions - 1050mm wide x 750mm deep

WIDE LOADS STOP
CONTACT 24 HOUR
TEL. NO. – *NUMBER* -

Colour - Black text on yellow background
'X' height 100mm
Dimensions - 1050mm wide x 750mm deep

11.2 Emergency Vehicles

The Contractor must maintain an emergency access at all times, principally for the use of ambulances, fire appliances and Police. The Contractor shall so arrange his work that an Emergency route is able to be made available with minimal delay to the Emergency Services vehicles at all times.

12. Particular Health and Safety Requirements

12.1 Normal traffic shall have the right of way at access and egress points within the site. The Contractor shall provide signs and men to ensure this at all points where his traffic enters or leaves the traffic flow.

12.2 Under no circumstances shall vehicles be allowed to enter or leave the working area intermittently through a line of cones.

12.3 Any vehicle needing to reverse within the working area shall do so only under the supervision of a specifically designated marshal walking alongside the vehicle. All vehicles must be fitted with, and use, an audible and operational reversing beacon.

12.4 With the exception of personnel authorised to carry out approved signing works, and vehicles entering or leaving the working area, no labour, plant or material shall enter or overhang any part of the live carriageway.

12.5 All labour and drivers, including those delivering plant and materials shall be given clear instructions regarding the traffic arrangements applicable at any particular time.

12.6 The Contractor shall be responsible for the provision, maintenance and removal of all contract specific advance signing after discussion with the Engineer.

12.7 Only essential Vehicles shall be allowed to enter the works. Any vehicles deemed by the Engineer to be non-essential (especially private cars), or any vehicle not complying with the requirements of Clause 117SR and this Appendix shall not be permitted to remain on site.

12.8 All vehicles moving within the Working Area shall be subject to a maximum speed limit of 10mph.

12.9 All employees, drivers and representatives of the Contractor or any sub-contractor or supplier shall at all times wear high visibility garments complying with BS EN 471 class 3 Specification, head protection complying with BS EN 397 and footwear complying with BS EN 345 class S3 and work gloves. Any person not complying shall be requested to leave the site.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

12.10 The Contractor shall provide a method statement to the Engineer for acceptance regarding the location of the site compound, which also covers how the Contractor's staff/vehicles get between the compound and the site.

13. Contacts and Liaison

13.1 Trunk Routes described above are the responsibility of:

TRANSPORT SCOTLAND,
NETWORK MAINTENANCE,
TRUNK ROAD AND BUS OPERATION,
BUCHANAN HOUSE,
58 PORT DUNDAS STREET,
GLASGOW
G4 0HF

In the first instance contact shall be made with:

NORTH WEST ROADSPACE,
BEAR SCOTLAND,
BEAR HOUSE,
INVERALMOND INDUSTRIAL ESTATE,
PERTH
PH1 3TW

Telephone: [redacted]

Email: [redacted]

13.2 Liaison with Traffic Police shall be through the following office :

OPERATION SUPPORT DIVISION COMPLEX,
433 HELEN STREET,
GLASGOW,
G51 3HH.

In the first instance contact shall be made with:

[redacted]

[redacted]

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

13. Contacts and Liaison (cont. ...)

TEMPORARY TRAFFIC MANAGEMENT: LIST OF CONTACTS		
The names, addresses and telephone numbers of the authorities serving in the locality are listed below:-		
Names	**Address/Tel**	**Contact**
Argyll and Bute Council Traffic and Development Officer MAKI	Roads and Amenity Services 1A Manse Brae Lochgilphead, Argyll PA31 8RD	[redacted]
Mid Argyll Police Traffic Management Officers	Stirling Road Dumbarton G82 3RP	[redacted]
Fire and Rescue Services	Inveraray Fire Station Oban Road Inveraray PA32 8DX	Command & Control Tel: [redacted]
Scottish Ambulance Service	Scottish Ambulance Service 15 Craw Road Paisley PA2 6AD	[redacted]
Traffic Scotland Traffic Controller Unit The National Network Control Centre (NNCC)	8th Floor (North Wing) Buchanan House 58 Port Dundas Road Glasgow G4 0HF	[redacted]

14. General Requirements

14.1 The Contractor shall keep a daily record of all defects, the times when they were identified or reported to him, the action taken to correct the defects, and the times when they were successfully corrected. A copy of this record shall be forwarded to the Engineer on the following day, until the completion of those Works requiring the Lane or Carriageway Occupation.

14.2 Until the issue of the Completion Certificate, the Contractor shall be responsible for maintaining all lengths of the highway (including all associated signing, lighting, safety fences, etc.) on which any works are to be undertaken under this Contract and the highway approaches thereto for a distance of 60 metres on either side of such lengths of highway. He shall ensure that such lengths and approaches are swept clear of debris from any source and that safe access is maintained (including salting, gritting, snow clearing, etc.) to the satisfaction of the Engineer. Nothing in this proviso shall relieve the Contractor from his obligations under Clause 22(1) of the Conditions of Contract through his failure to perform the highway maintenance functions describe in this Sub-clause.

The Contractor shall not open any road which has not been appropriately treated as necessitated by the weather conditions.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

14. General Requirements (cont. ...)

14.3 (i) The Contractor shall submit his proposals for Traffic Safety and Management to the Engineer at least 7 days in advance of the proposed date for implementation. Such proposals shall take into account the requirements contained in this Appendix and his proposals regarding the maintenance of temporary studs and road markings.

(ii) Detailed proposals expanding upon the outline proposals shall be submitted at least 1 week prior to the proposed installation. These shall comprise: -

1. A written statement explaining the phase or phases and detailing the extent and content of the Works to be carried out. Details of access arrangements for off-road plant shall also be included.

2. 1/1250 scale drawings illustrating the proposed layouts with 1/500 scale detail drawings showing:

a) phasing of the Works

b) Chapter 8 coning references and sign and plate details and references

c) temporary tower lighting locations

d) safety zones and Work areas

e) Emergency service access and emergency service route

f) site accesses/exits

(iii) A method statement for the installation of the traffic management phase or phases, maintenance of these measures, and their removal upon completion of the Works.

14.4 The Contractor shall when submitting Traffic Safety and Management proposals, also submit details of safe working practices relating to such proposals e.g. erection, maintenance, adjustment, removal, etc.

14.5 The Contractor shall not open up any section of road for temporary use unless the following requirements are met: -

(a) traffic signs and road markings have been provided or removed as appropriate;

(b) temporary or permanent lighting is to the satisfaction of the Engineer;

(c) adjacent safety barriers have been erected to the satisfaction of the Engineer;

(d) the carriageway has been fully swept and cleared of all items of plant, personnel, materials, debris, etc. to the satisfaction of the Engineer.

Notwithstanding the above, the Contractor shall give at least 2 days' notice to the Engineer of his intention to open any completed or part complete road to traffic and shall not open any such road without permission.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

14. General Requirements (cont. ...)

14.6 All temporary traffic signs shall conform to the requirements of the Traffic Signs Regulations and General Directions (2016) or any subsequent alteration or revision. Traffic signing shall generally be in accordance with Chapter 8 (2009) of the Traffic Signs Manual. The Contractor's attention is also drawn to "Safety at Street Works and Road Works" published by The Stationery Office. Cone, cylinder and sign sizes shall be:

CONE, CYLINDER AND SIGN SIZES	Minimum height of Cone & Cylinders	Minimum height of Sign	Comments
All-purpose single carriageway (30 mph or less)	1000mm	600mm	All reflective material shall be Class 1.
All-purpose single carriageway (40 mph or greater)	1000mm	750mm	All reflective material shall be Class 1.

14.7 On the approach taper to lane closures the Contractor shall carry out the following:

(a) Place at road works on the Trunk Road road lamps conforming to regulation 55 of the Traffic Signs Regulations 2016 save that instead of complying with BS 3143, the luminous intensity of the lamps shall meet the following light output requirements as specified in Table 1 in BS EN 12352:2000: Class L4 (F2) for the duration of the flash, and Class L3 for the remainder of the light output cycle, and the flash rate shall comply with Class F2 in Clause 4.2.2.1 of that Standard.

(b) The said lamps shall be placed in accordance with Chapter 8 (2009) of the Traffic Signs Manual.ds

(c) The placing of the said lamps to flash in sequence shall continue only for the duration of the road works.

14.8 A single running lane of 3 metres minimum width must be provided for use with appropriate traffic control.

14.9 New surfacing to be salted, as required, prior to opening

14.10 The location of and signing for site accesses, e.g. access to the Works, to site offices etc., shall be to the satisfaction of the Engineer. The Contractor shall use only approved site access points. Approved entry and exit points shall be kept clear at all times. Signing for accesses shall be as described in Section D3.21 of Chapter 8 of the Traffic Signs Manual. No vehicle shall be permitted to stop on any part of the live carriageway in order to unload personnel, materials, plant, etc.

14.11 All vehicles including delivery vehicles shall be fitted with either roof mounted light bars or at least two amber flashing beacons visible through 360 degrees at all times. Hazard warning lights are not an acceptable alternative to roof mounted beacons. All vehicles excluding cars and light commercial vehicles shall be fitted with audible reversing warning alarms. Between sunset and sunrise and during periods of poor visibility and fog all vehicles shall have mandatory lights illuminated and shall travel in the same direction of flow as the adjacent traffic. Vehicles travelling within the site against the adjacent traffic flow shall not have headlights on or be similarly illuminated and shall keep as far away as possible from the lanes open to vehicles.

14.12 It is the Contractor's responsibility to ensure that all personnel working on or adjacent to live highways shall be issued with printed copies of safety instructions and receive training where necessary (e.g. when first time working on live carriageway site).

14.13 The name and contact number of the Contractors Traffic Safety and Control Officer shall be supplied to the Engineer.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

14. General Requirements (cont. ...)

14.14 The Traffic Safety and Control Officer's responsibilities shall include: -

(a) all necessary liaison with the Engineer, Traffic Controller and the Police;

(b) implementation of all requirements relation to the traffic management works;

(c) control of access to and exit from the site;

(d) operation and safety of all personnel, vehicles and plant (including sub-contractors and suppliers) on site;

(e) dealing with emergencies;

(f) supplying the Engineer on a daily basis a written record of all traffic management measures as detailed in this Appendix.

Standard surveillance of traffic management measures shall comprise periodic inspections of the signing and coning to ensure that any damage or disturbance or failure of equipment is rectified and the traffic management system is maintained in a safe and satisfactory condition. The frequency of inspections will be determined by the Contractor, taking into account the location of the traffic management and the likely frequency of damage. However, as a minimum, **traffic management must be inspected at least four times every 24 hours or as instructed by the Engineer.**

14.15 Continuous surveillance of traffic management measures shall comprise continual inspections of the signing and coning to ensure that any damage or disturbance or failure of equipment is rectified and the traffic management system is maintained in a safe and satisfactory condition. This shall apply to all traffic management even when no work is being undertaken.

14.16 Maintenance shall comprise surveillance as described above together with any appropriate remedial works if the inspection reveals damage or disturbance which is reported to the Contractor by the Engineer, Traffic Controller or the Police within 2 hours of such a report being received by the Contractor.

14.17 If any accident or breakdown occurs on a carriageway open to vehicles within or in the vicinity of the site, the Contractor shall act as requested by the Police.

14.18 The Contractor shall prepare and agree with the Engineer a suitable letter to advise all properties, businesses, and affected parties of the details of the works and the associated traffic management and access arrangements on both sides of the A83. The Contractor shall arrange to deliver this letter to those affected by the works.

14.19 The Contractor shall appoint someone who is a point of contact for environmental matters and is responsible for ensuring environmental constraints/zones are adhered to.

Annex A
to
Appendix 1/17

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT. (CONTINUED…)

COMMUNICATION WITH TRAFFIC SCOTLAND FORM /TRAFFIC SCOTLAND

Scheme Name: A83 Strone Point Improvement Scheme

Scheme No.: 13/NW/0901/052

Automated Diary Facility (ADF) item No. …… Page …….. of ……..

Dairy Record: Telephone Notifications

Date	Time	To	RRN No.	Est. Delay	Comments

Signed: ……... Traffic Safety and Control Officer

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)
NETWORK ACCESS REQUEST

Document: 4GNW-F148 Issue: 3.0 Related to: *Procedure* Page No. 1 of 4 Doc. owner: *Network Manager*	**4G NW Term Maintenance Contract** **Network Access Request**	BEAR	TRANSPORT SCOTLAND

Note: Before completing this form please read the Conditions of approval for carrying out works on the trunk road network at Appendix A.

SRWR /LA Reference:		Traffic Scotland ADF No:	
Route:		Location of Works:	
Description of the Works:			

Timing of the Works – *see attached Table 1/17 for restrictions*

Start Date	Start Time	End Date	End Time	M	T	W	T	F	S	S	M	DAY	
												NIGHT	
												CONTINUOUS	

1. Organisation Undertaking the Works			
Company Name			
Company Address			
Contact Name		Email Address:	
Contact Telephone		Mobile:	

2. Contractor for the Works			
Company Name			
Company Address			
Contact Name		Email Address:	
Contact Telephone		Mobile:	

3. Traffic Management Contractor for the Works			
Company Name			
Company Address			
Contact Name		Email Address:	
Contact Telephone		Mobile:	

4. Site Traffic Liaison Officer (STLO) for the Works			
Name:		Contact Number:	

Proposed Traffic Management for the Works (Tick requirement)

Road Closure	Contra-flow		Lane Closure		Mobile Lane Closure		Portable Light Signals		Convoy	Stop/Go	Verge Works	Single Vehicle Works
	2 + 2		Lane 1		Lane 1		2-way					
Layby Closure	2 + 1		Lane 2		Lane 2		3-way					
	1 + 1						4-way					

Temporary Traffic Restriction Order Required (Tick requirement)

Road Closure		Turning Movement		Contra-flow		50 mph		40mph		30mph		10mph	

BEAR Scotland Use Only

Further Info Required:	

Document: 4GNW-F146 Issue: 3.0 Related to: *Procedure* Page No. 2 of 4 Doc. owner: *Network Manager*	**4G NW Term Maintenance Contract** **Network Access Request**	BEAR	TRANSPORT SCOTLAND

Events affecting application:				
Events affecting application:				
Restriction's to be applied:				
JTRC Delay estimate:				
Roadspace Approved by Journey Time Reliability Coordinator		**Signed**	**Print Name**	**Date**
Yes	NO			
If No – reason for refusal:				
Approval by Network Manager / OCR if required:		**Signed**	**Print Name**	**Date**
Comments:				

Acceptance of Conditions by the Organisation Undertaking the Works	
We agree to comply with the conditions and restrictions in respect of this application.	
Name:	
Position:	
Signature:	
Date:	

Return of Completed Forms: Completed forms should be returned to the North West Unit Network team as follows:

Journey Time Reliability Coordinator
Bear Scotland
Bear House
Inveralmond Road
Inveralmond Industrial Estate
Perth
PH1 3TW

Telephone:
JTRC North: 03300080605
JTRC Central: 03300080606
JTRC South: 03300080609

Email: NWRoadspace@bearscotland.co.uk (please update any other email address with this revised address)

Route No	Section	General Restrictions (Dates Days and Hours)	Additional Restrictions and comments (Dates Days and Hours)
A9	Inveralmond to Luncarty	Monday-Friday 0730-0930 and 1600 - 1800	0600 - 2000 1 July to 31 August
A9	Inshes to North Kessock junction (including slip roads)	Monday-Saturday 0700 - 1900	0600 - 2000 1 July to 31 August and Public Holidays and Local Events.
A9	North Kessock to Tore (northbound)	Monday-Friday 1600 - 1800	0600 - 2000 1 July to 31 August and Public Holidays and Local Events.
A9	North Kessock to Tore (southbound)	Monday-Friday 0730 - 0930	0600 - 2000 1 July to 31 August and Public Holidays and Local Events.
A9	Thurso	Monday-Friday 0730 - 0930 and 1600 - 1800	0600 - 2000 1 July to 31 August
A82	Fort William	Monday-Friday 0730 - 0930 and 1600 - 1800	0600 - 2000 1 July to 31 August and Public Holidays and Local Events.
A82	Fort Augustus	None	0600 - 2000 1 July to 31 August
A82	Drumnadrochit	None	0600 - 2000 1 July to 31 August
A82	Tomnahurich Bridge to Kenneth Street	Monday-Friday 0730 - 0930 and 1600 - 1800	0600 - 2000 1 July to 31 August and Public Holidays and Local Events.
A82	Kenneth Street– Longman roundabout	Monday – Saturday 0730 - 0930 and 1600 - 1800	0600 - 2000 1 July to 31 August and Public Holidays and Local Events.
A82	Stoneymollan to Tarbet	None	0600 - 2000 Saturday & Sunday 1 April to 30 September and local Public Holidays and Local Events.
A82	Tarbet to Crianlarich	None	0600 - 2000 Saturday & Sunday 1 April to 30 September and local Public Holidays and Local Events.
A84	Stirling - Craigforth East to A84/B8075 junction	Monday-Friday 0730 - 0900 and 1600 - 1800	
A84	Callander - Eastern most speed limit to Tulipan Crescent	Monday-Friday 0730 - 0900 and 1600 - 1800	0600 - 2000 Saturday & Sunday 1 April to 30 September & public local holidays
A85	Crieff High Street - Dollerie Terrace to A822 Burrell Street	Monday-Friday 0730 - 0900 and 1600 - 1800	0600 - 2000 Saturday & Sunday 1 April to 30 September & public local holidays
A85	Oban - 30 mph to Argyll Square	Monday-Friday 0730 - 0900 and 1600 - 1800	0600 - 2000 Saturday & Sunday 1 April to 30 September & public local holidays
A86	Kingussie Main Street	Monday-Friday 0730 - 0900 and 1600 - 1800	0600 - 2000 1 July to 31 August
A86	Newtonmore Main street	Monday-Friday 0730 - 0900 and 1600 - 1800	0600 - 2000 1 July to 31 August
A87	Invergarry to Kyle of Lochalsh	None	0600 - 2000 1 July to 31 August
A87	Kyle of Lochalsh to Uig	Sunday 0000 - 2400	0600 - 2000 1 July to 31 August
A828	Connel Ferry Bridge - Approach to bridge north & south	All works to be agreed and programmed as required	
A830	Fort William to Corpach	Monday-Friday 0730 - 0900 and 1600 - 1800	0600 - 2000 1 July to 31 August
A830	Mallaig – 1 mile south of Mallaig		0600 - 2000 1 July to 31 August
A835	Maryburgh Roundabout	Monday-Friday 0730 - 0900 and 1600 - 1800	

Document: 4GNW-F146 Issue: 3.0 Related to: *Procedure* Page No. 4 of 4 Doc. owner: *Network Manager*	**4G NW Term Maintenance Contract** **Network Access Request**	BEAR	TRANSPORT SCOTLAND

Appendix A - Conditions

1. All traffic management must be designed and implemented in strict accordance with current edition Chapter 8 of the Traffic Signs Manual (2009)
2. A site location plan and drawing(s) of the proposed traffic management arrangements will be provided with the application.
3. Method statement(s) for the work(s) to be carried out will be provided with the application however this may not be required in the case of statutory undertakers, especially during emergency works
4. Where the work(s) affect road(s) other than the trunk road(s) the applicant will be responsible for all consultation with the relevant Local Authority. A record of the consultation will be provided with the application.
5. The applicant will be responsible for all consultation with the relevant Police force. A record of the consultation will be provided with the application.
6. A minimum notice period of eight weeks will be required for works that require a Temporary Traffic Regulation Order for a road closure, turning movement, contra-flow or speed limit reduction.
7. Applications for emergency work(s) will be treated on their individual merits.
8. Confirmation that network access has been granted will be provided through the issue of a copy of the application form signed by the BEAR Scotland Ltd Journey Time Reliability Coordinator.
9. The applicant's traffic management contractor will receive by e-mail by noon on the Thursday before the works are due to commence the unique Traffic Scotland reference number for the work(s). This unique reference number is for use only on the date(s) and time(s) applied for.
10. The traffic management contractor **must** notify Traffic Scotland 15 minutes prior to placing the first cone of the traffic management for the works and again when all traffic management is removed by telephoning **0131 203 8700** and quoting the unique Traffic Scotland reference number for the work(s) given on the weekly Programme of Intent.
11. For portable light signals the organisation undertaking the work(s) by making this application agrees to meet all reasonable costs incurred by BEAR Scotland Ltd in respect of giving emergency attention in the event that the emergency contact(s) cannot be reached or are unable to rectify any fault within 2 hours of the first notification that the signals or associated signing are faulty. It should be noted that BEAR Scotland Ltd and its employees accept no responsibility for any claim(s) or demands which may be brought against it by third parties in any way by virtue of the installation operation or emergency rectification of these signals.
12. For portable light signals the conditions set out in Form PLS-A of Advice Note 8: Portable Light Signals (Version 1.2/December 2006) issued by the Roads Authorities and Utilities Committee (Scotland) will apply unless superseded by these conditions.
13. Appropriately sized sign(s) must be erected to display the name and telephone number of the organisation undertaking the work(s).
14. The organisation undertaking the work(s) will appoint a Site Traffic Liaison Officer who will be on site throughout the work(s).
15. The organisation undertaking the works will put in place a system for determining the actual delays to the traffic as a result of the traffic management for the works. The system must be robust enough to determine a delay of 10 minutes with an accuracy of plus or minus 2 minutes at all times.
16. The Site Traffic Liaison Officer (STLO) will be responsible for immediately notifying Traffic Scotland by telephoning **0131 203 8700** and quoting the unique Traffic Scotland reference number for the works when delays to traffic exceed 10 minutes. The STLO will continue to notify Traffic Scotland at no more than 30 minute intervals or when delay changes of five minutes or more occur, giving details of the delay times until such time as the delays have ceased to exceed 10 minutes.
17. BEAR Scotland reserve the right to remove or to have removed any traffic management, if safe to do so, should exceptional circumstances such as a road traffic incident occur.
18. The approval applies only to the date(s) and time(s) stated on the Network Access Form.
19. A copy of the signed Network Access Form must be kept on site and will be shown on demand to any employee of BEAR Scotland Ltd or relevant others.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT. (CONTINUED)

Environmental Commitments

The Contractor shall comply with the following environmental commitments associated with traffic safety and management:

Issue	Baseline Conditions	Impact	Mitigation
Pedestrians Equestrians Cyclists & Community Impacts	The A83 trunk road at this location does not form part of any designated cycling or walking route. It is however recognised that this stretch of trunk road would still be used by cyclists. It is considered unlikely that this stretch of the A83 would be used by equestrians due to its busy nature.	Disruption during construction. Change in view from the road due to new layout and possible removal of vegetation.	• Traffic management plan shall minimise impacts on non-motorised users.

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT. (CONTINUED)

INSPECTION OF TEMPORARY TRAFFIC MANAGEMENT MEASURES

FORM /INSP1

Scheme Name: A83 Strone Point Improvement Scheme

Scheme No: 13/NW/0901/052

Section: A83

Type of closure: XXX

DATE	TIME		REMEDIALS UNDERTAKEN
	START	FINISH	

I HEREBY CERTIFY THAT THE ABOVE TEMPORARY TRAFFIC MANAGEMENT HAS BEEN INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATION AND DRAWINGS

SIGNED: DATE:

DESIGNATION: TIME:

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT. (CONTINUED)

ERECTION/ DISMANTLING OF TEMPORARY TRAFFIC MANAGEMENT MEASURES **FORM /APP1**

Scheme Name: A83 Strone Point Improvement Scheme

Scheme No: 13/NW/0901/052

Section: A83 Type of closure: XXX

DATE	(E) OR (D)	TIME		COMMENTS
		START	FINISH	

I HEREBY CERTIFY THAT THE ABOVE TEMPORARY TRAFFIC MANAGEMENT HAS BEEN ERECTED/DISMANTLED IN ACCORDANCE WITH AND COMPLIES IN FULL WITH THE REQUIREMENTS OF THE CONTRACT SPECIFICATION AND DRAWINGS.

Contractor	Engineer
SIGNED:	SIGNED:
DESIGNATION:	DESIGNATION:
DATE:	DATE:
TIME:	TIME:

APPENDIX 1/17: TRAFFIC SAFETY AND MANAGEMENT (CONTINUED)

ROADWORKS INFORMATION FORM (RIF)

				Programme Period – Week beginning: Monday										* Estimated delay completed by Roadspace Manager			
DIVERSION	LOCATION			ACTIVITY DETAILS	Days							Duration					
	ROUTE Jct. No. & Names DIRECTION			Scheme Name Scheme No.								Time		Est. Delay *	Coning/ Diversion By	Main Contractor	Secondary User
	Route	From	To	LOCATION/DESCRIPTION/REASON/DIVERSION	M	T	W	T	F	S	S	Start	End				

ALL CLOSURE REQUESTS MUST REACH THE ROADSPACE MANAGER BY 1200 HRS. ON TUESDAY, ONE WEEK PRECEEDING THE "WEEK BEGINNING" E-MAIL TO [redacted]

Contractor' s Traffic Safety and Control Officer…… 24 hour telephone contact No……..

ACCESS WILL ONLY BE GRANTED ON CONDITION THAT TRAFFIC SCOTLAND IS INFORMED BY T/PHONE([redacted] 15 MINS PRIOR TO THE FIRST SIGN/CONE BEING PLACED ON THE CARRIAGEWAY AND WHEN ALL TRAFFIC MANAGEMENT HAS BEEN REMOVED.

I HAVE READ AND UNDERSTAND THE ABOVE REQUIREMENTS

APPENDIX 1/21: INFORMATION BOARDS

Information Boards General

1. The Contractor shall supply and erect Information Boards on the approaches to the Works.
2. Information Boards shall be erected prior to the commencement of the Works in prominent locations to be agreed with the Engineer.
3. Information Boards shall be maintained and kept clean by the Contractor during the contract period. The Contractor shall remove Information Boards and posts at the end of the Works and make good the surrounding surfacing.

Information Boards

1. In addition to the requirements of Chapter 8, the Contractor shall provide signs in accordance with the Traffic Signs Regulations and General Directions 2016 Diagram No's 7002A, 7003.1 and 7007.1 ahead of the Works and Diagram No 7006 at the end of the Works
2. Details of the Information Boards to be erected are given below:
3. Type A (Diagram 7003.1) Information Boards (advance notice signs) shall be erected no later than two weeks prior to the commencement of the Works in prominent locations agreed with the Engineer and taken down on Day 1 of the Contract.
4. Type B (Diagram 7003.1 variant) Information Boards shall be erected on Day 1 of the Works at the extreme end of the Works at the point where the road becomes clear of the Works.
5. Type C (Diagram 7006) Information Boards shall be erected on Day 1 of the Works in prominent locations agreed with the Engineer.
6. Type D (Diagram 7002A) Information Boards shall be erected on Day 1 of the Works in prominent locations agreed with the Engineer.

TYPE A	Location(s):	Diagram	'x-height'
	1 no. for northbound traffic and 1 no. for southbound traffic ahead of site.	7003.1	100mm and 75mm & Diag. 7001 600mm

Notes:
a) Signs to be mounted in 'A' frames.
b) The actual location of signs to be agreed with the Engineer.

APPENDIX 1/21: INFORMATION BOARDS (CONTINUED)

TYPE B	Location(s):	Diagram	'x-height'

1 no. for northbound traffic and 1 no. for southbound traffic after any site where there is traffic control using 'stop-go' boards or temporary traffic signals.	7003.1 variant	100mm and 80mm & Diag. 7001 600mm

Notes:
a) Signs to be mounted in 'A' frames.
b) The actual location of signs to be agreed with the Engineer.

TYPE C	Location(s):	Diagram	'x-height'

1 no. for northbound traffic and 1 no. for southbound traffic after any site where there is traffic control using 'stop-go' boards or temporary traffic signals.	7006	100mm and 80mm & Diag. 7001 600mm

Notes:
a) Signs to be mounted in 'A' frames.
b) The actual location of signs to be agreed with the Engineer.

APPENDIX 1/21: INFORMATION BOARDS (CONTINUED)

TYPE D			Location(s):	Diagram	'x-height'
			1 no. for northbound traffic and 1 no. for southbound traffic ahead of site.	7002A	100mm and 75mm
			Notes: a) Signs to be mounted in 'A' frames. b) The actual location of signs to be agreed with the Engineer.		

APPENDIX 1/21: INFORMATION BOARDS (CONTINUED)

Dynamic Message Signs

In addition the Contractor shall supply 2 no Portable, Dynamic Message Signs. Exact location to be agreed with the Engineer two weeks in advance of the works for the duration of the contract. Each unit shall be controlled via a virtual private network for the use of BEAR Road Space Manager only.

Each unit shall be capable of:

- displaying character heights between 46 – 132cm
- fully operational using an onboard touch screen controller, with the ability to schedule events up to 1 year in advance. To also have the capability of performing diagnostic test.
- have the ability to group messages into a separate library for quick and secure operation
- have a quick reference library of 6 messages, instantly accessible via the touch screen controller for immediate access
- have the ability to programme and display graphics, as well as 4 lines of text
- fully operational remotely, via wireless or dial up connection
- have the facility of a multi modem with dual SIM cards for areas of poor network coverage
- have Radar Speed Detection using a radar which connects directly to the sign panel, and is fully operational through both the onboard controller and remotely
- have the facility to incorporate Data Logging equipment into the onboard system, with a simple plug in device and then to be able to extract the data from this device onto a laptop via a download.
- have the ability to incorporate day/night CCTV cameras into the existing wiring and software system, capable of 360 degree rotation, with zoom lens and recording facilities. Including military encryption for added security and then to be able to extract the images to a laptop computer or PDA
- To have flashing amber corner beacons in order to differentiate between informative and emergency messages
- Trailer to have a manual handbrake for emergency use
- To be tested and approved to withstand wind speeds of at least 80mph
- To incorporate a full 3 year warranty on all electrical and mechanical components
- To comply fully and adhere to Highways Agency specification TR2516B
- To comply to ISO9001:2015 standard for certified design and manufacture
- To be fully CE Approved

The Contractor shall ensure that each unit is appropriately protected with a temporary safety barrier in accordance with TD19/06.

APPENDIX 1/22: PROGRESS PHOTOGRAPHS

1. The Contractor shall arrange to have a photographic record of the Works taken on the following dates;

   (i) on the Date for the Commencement of the Works prior to any work on the ground,

   (ii) at weekly intervals

   (iii) on the day of Completion of the Works.

   The number of photographs taken shall be sufficient to cover the full extent of the Works and shall, be taken from similar locations for each set.

2. The photographs shall be supplied on a CD ROM.

3. The Contractor shall not use any photographs for advertising purposes nor publish any photographs without the written consent of the Employer.

4. The Contractor shall make allowance for the Engineer to be present when progress photographs are to be taken.

APPENDIX 1/23: RISKS TO HEALTH AND SAFETY FROM MATERIALS OR SUBSTANCES

Restrictions in relation to traffic management measures.

(i) None

Restrictions in relation to working practices.

(ii) Protective measures shall be taken to ensure that dust is adequately controlled in windy weather and that it is prevented from affecting persons / property in the vicinity of the works

Measures to be taken to protect members of the public.

(iii) The Contractor is reminded of the need to minimise the risk to the public of exposure to dust, bituminous binders, proprietary bedding and jointing materials, cement and concrete from the road maintenance operations and road marking operations.

Monitoring to be undertaken by Contractor.

(iv) (a) No specific monitoring will be required but the Contractor shall consider item (ii) above and his general obligation under the COSHH Regulations and to take action to eliminate or reduce problems that occur due to his site operations.

(b) The Contractor is required to keep records of all materials taken from site and must record the location of tips and the nature of the material from the site deposited within each tip. These records shall be provided to the Engineer within one week of the material being deposited at each tip.

Other Risks

(v) None known

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM

General

1. **General**

(i) The Contractor shall institute a Quality Management System complying with BS EN ISO 9002 and SHW Clause 104 for the works that he is undertaking. This shall be submitted to the Engineer.

(ii) The Quality Plan shall cover the following items:

(a) Contractor's organisation and management

(b) Contractor's method statements and construction procedures

(c) Contractor's construction quality control

(d) Supplier's Quality Plans

(for each of the quality management schemes listed at Appendix A of SHW Volume 1)

(iii) Quality Plans shall conform with the requirements of this Appendix, as follows:

2. **Contractor's Organisation and Management**

(iv) This section of the Quality Plan shall include:

(a) Definition of the Contract and its documentation.

(b) The organisation of the Contract, including the line of command and communication between parties involved in the Contract.

(c) Names, roles, responsibilities and authority of principals and key personnel.

(d) Identification of the Contractor's own staff responsible for overseeing each major activity

(e) The Contractor's control of sub-contracts.

(f) Document control.

(g) Programme for submission of method statements and Suppliers' Quality Plans.

(v) The Quality Plan shall identify procedures (which may be a part of the Contractor's general procedures) that cover the topics listed below. Copies of these procedures shall be made available to the Engineer on request.

The quality of plans for sub-contractors and suppliers of work, goods and materials which are the subject of quality management schemes.

Procedure for the preparation, review and adjustment of programmes for the effective progression of the Works and the recording of this.

Control and approval of purchases of materials.

Control of off-site activities (where appropriate).

Procedures for the regular review and recording by the Contractor of the quality of his Works.

Control of personnel selection, based on their care, skill and experience.

Management review/audits to monitor and exercise adequate control over the implementation of the quality plan.

Any other relevant item.

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (CONTINUED)

3. **Contractor's Method Statements and Construction Procedures**

(vi) This section of the Quality Plan shall include:

Detailed method statements for each major activity whether directly controlled or subcontracted.

For all activities that might affect the quality of the permanent and temporary works the method statements shall identify hold points and invoke:

(a) works instructions

(b) quality control procedures

(c) compliance testing/inspection requirements

(d) and work acceptance procedures

(e) Identify the relevant construction procedures in the Contractor's own Quality Management System (and provide copies on request).

4. **Contractor's Construction Quality Control**

(vii) This section of the Quality Plan shall include:

Statement of the Contractor's organisation for quality control.

Arrangements for "receiving" and "in-process" testing.

Control of test laboratories.

Control of test, measuring and inspection equipment.

Document control.

Procedure for monitoring and recording the inspection, test and approval status of the constructed/installed work.

Procedures for tests and inspections for the purpose of the Contractor certifying that prior to covering up, each part of the Works is complete and conforms to the Contract.

Procedure for the rectification of work submitted for review but not accepted as conforming to the Contract.

Procedure for the collation of quality records as identified in BS EN ISO 9002, and provision or copies when requested by the Engineer.

5. **Suppliers' Quality Plans**

(viii) This section of Quality Plan shall include:

Definition of the product or service to be provided

(a) The organisation of the Supplier describing the line of command and stating the name of the senior manager responsible for the contracted Work and the name of the Supplier's on-site management representative. Contact addresses, telephone numbers, etc, shall be provided.

(b) Identification of the relevant parts of the Supplier's quality system relevant to the product or service being provided. (Copies to be provided to the Engineer on request.)

(c) The control of personnel selection (at works and on site), including special requirements for skilled personnel e.g. certification of welders, training of operatives, experience requirements etc.

(Note that for item (b), where available and appropriate, copies of the Supplier's quality system/ general procedures may be acceptable.)

APPENDIX 1/24: QUALITY MANAGEMENT SYSTEM (CONTINUED)

5. Suppliers' Quality Plans (cont. …)

(ix) Specific procedures for the following:

(a) Receipt and examination of certificates of conformity and test results for purchased products.

(b) Product identification and traceability.

(c) Handling, storage, packaging and delivery to Site and storage and handling on Site.

(d) Quality records.

Note that for Items (a), (b) and (c) where available and appropriate, copies of the Supplier's quality system/general procedures may be acceptable.

Items ix (a) and ix (c) of the Quality Plan shall be submitted to the Engineer for acceptance not later than 14 days after the issue of the task order.

The Contractor shall submit other parts of the Quality Plan prior to the commencement of any related work or activity and to a timetable included in item (ix) (a).

APPENDIX 1/71 - TRANSPORTATION AND DISPOSAL OF WASTE MATERIALS

1. a) The haulier responsible for transporting waste materials shall ensure that they are registered with the Scottish Environment Protection Agency (SEPA) as a waste carrier. (The Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991 (as amended)).

   b) The Contractor shall ensure that all waste being removed from the site is accompanied by the relevant waste transfer note and that it is taken only by a registered waste carrier. (The Environmental Protection (Duty of Care) (Scotland) Regulations 2014).

   c) All waste transfer notes must include the following details:

      - give the name and address (including the postcode) of the transferor and the transferee;
      - give the date and place (including the postcode) of the transfer;
      - state whether the transferor is the producer of the waste;
      - state whether the transferor is the importer of the waste;
      - describe the type, composition and quantity of the waste being transferred (including, where the waste is in a container, the type of container);
      - identify the waste being transferred by reference to the appropriate six-digit code in the European Waste Catalogue;
      - identify the activity carried out by the transferor in respect of the waste being transferred by reference to the SIC code for that activity.

2. a) All waste produced during the course of the works shall be handled appropriately and only disposed of at a site which has a current WML or exemption. The WML or exemption must relate to the category of waste being disposed of In accordance with The Waste Management Licensing (Scotland) Regulations 2011.

   b) The Contractor shall be responsible for the disposal operation to be used, any charges to be paid and for ensuring that each site or facility has the necessary licenses and/or exemptions that may be required for the purpose of any statutory body.

   c) The Contractor shall provide the following information prior to the commencement of works for inclusion in the Construction Phase Plan, in accordance with Regulation 2 of the Construction (Design and Management) Regulations 2015:
      - The haulier waste carrier licence
      - The disposal site WML or exemption letter

   Should there be any changes to the haulier or disposal site indicated the required certification will be provided for authorization prior to their use.

3. Where the Contractor is responsible for the treatment and storage of waste materials, they shall ensure that they are registered with SEPA and have obtained all appropriate licences and/or exemptions in accordance with the Waste Management Licensing Regulations (Scotland) 2011.

4. a) Approval for the Construction Phase Plan will not be confirmed until all the requested certification (2c above) has been supplied and verified.

   b) No construction work will be allowed to commence until the client is satisfied that the Construction Phase Plan has been prepared in accordance with Regulation 16(a&b) of the Construction (Design and Management) Regulations 2015.

APPENDIX 1/71 – TRANSPORTATION AND DISPOSAL OF WASTE MATERIALS (CONTINUED)

Site Waste Management Plan:

1. The contractor shall produce a Site Waste Management. The Site Waste Management Plan shall be developed in accordance with current best practice guidance and it is suggested that the template available from BEAR should be used. (F354 – Site Waste Management Plan Pro Forma).

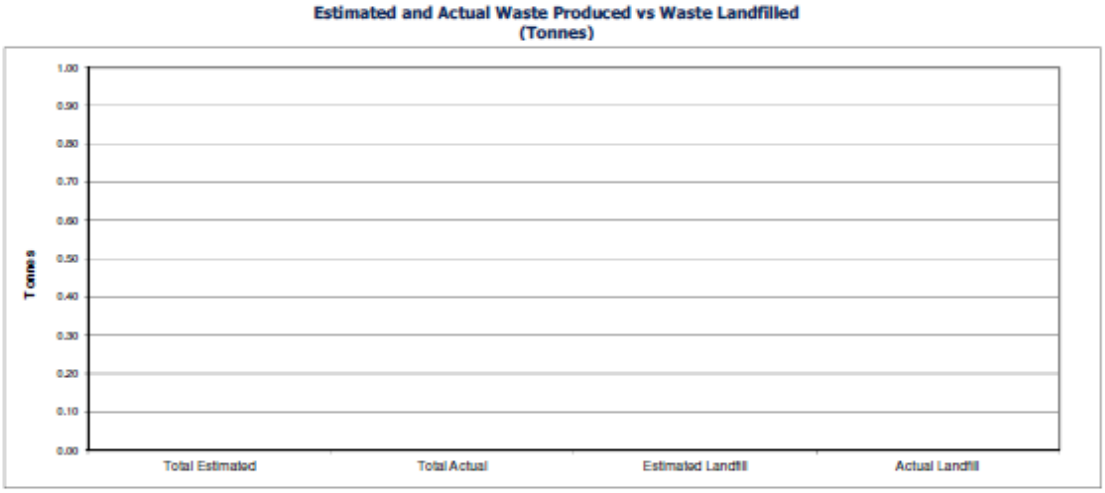
APPENDIX 1/72 – WORKS CONTRACT CARBON MANAGEMENT SYSTEM – F534 SITE WASTE MANAGEMENT PROFORMA

KPI Report

Total Actual Waste Produced (Tonnes) per £100k of Project Value:	
Total Actual Waste Landfilled (Tonnes) per £100k of Project Value:	
Total Cost of Waste as of (Date project last updated):	£0

Select Phase : Construction

	Estimated Tonnes	Actual Tonnes
Total Waste produced	0.00	0.00
Total Waste to landfill	0.00	0.00
% Waste diverted from landfill	0%	0%
% Waste reused on site	0%	0%



SWMP 'Lite' Sign-off

	Name	Signature	Date
Reviewed by:			
Approved by:			

APPENDIX 1/72 – WORKS CONTRACT CARBON MANAGEMENT SYSTEM – F534 SITE WASTE MANAGEMENT PROFORMA

Estimated Waste Totals -

Waste Stream	Total waste arising (Tonnes)	Total waste reused on site (Tonnes)	Total waste reused off site (Tonnes)	Total waste landfilled (Tonnes)	Total waste recycled / recovered off site (Tonnes)	Overall diversion from landfill rate
Aluminium (17 04 02)						
Asbestos cement (17 06 05*)						
Asbestos insulation (17 06 01*)						
Batteries (Hazardous) (20 01 33*)						
Batteries (Non-hazardous) (20 01 04)						
Biodegradable/garden waste (20 02 01)						
Cables (17 04 11)						
Cans (20 01 40)						
Ferrous Metal (17-04-05)						
Concrete, bricks, tiles (17 01 07)						
Copper (17 04 01)						
Dredgings (Non-hazardous) (17 05 06)						
Electronic equipment (20 01 35*)						
Non Ferrous Metal (17-04-02)						
Fluorescent tubes / mercury waste (20 01 21)						
Furniture (20 03 07)						
Glass (17 02 02)						
Gully/Street-Cleaning Residues (20-03-03)						
Hazardous waste (Segregated) (17 05 03*)						
Kerbs and Concrete (17-01-01)						
Metals (17 04 07)						
Mixed C&D waste (17 09 04)						
Mixed C&D waste (Hazardous) (17 09 03*)						
Packaging (17 02 03)						
Paint, adhesives etc. (20 01 27*)						
Paper (20 01 01)						
Plastic bottles (20 01 39)						
Plastic pipes (17 02 03)						
Refrigerant gasses (16 05 04*)						
Refrigeration gasses (Non-hazardous) (16 05 05)						
Septic tank waste (20 03 04)						
Soils and stones (Hazardous) (17 05 03*)						
Soils and stones (Inert) (17 05 04)						
Soils and stones (Non-hazardous) (17 05 03*)						
Steel (17 04 05)						
Textiles (20 01 11)						
Wood (17 02 01)						
Total						

Actual Waste Totals -

Waste Stream	Total waste arising (Tonnes)	Total waste reused on site (Tonnes)	Total waste reused off site (Tonnes)	Total waste landfilled (Tonnes)	Total waste recycled / recovered off site (Tonnes)	Overall diversion from landfill rate
Aluminium (17 04 02)						
Asbestos cement (17 06 05*)						
Asbestos insulation (17 06 01*)						
Batteries (Hazardous) (20 01 33*)						
Batteries (Non-hazardous) (20 01 04)						
Biodegradable/garden waste (20 02 01)						
Cables (17 04 11)						
Cans (20 01 40)						
Ferrous Metal (17-04-05)						
Concrete, bricks, tiles (17 01 07)						
Copper (17 04 01)						
Dredgings (Non-hazardous) (17 05 06)						
Electronic equipment (20 01 35*)						
Non Ferrous Metal (17-04-02)						
Fluorescent tubes / mercury waste (20 01 21)						
Furniture (20 03 07)						
Glass (17 02 02)						
Gully/Street-Cleaning Residues (20-03-03)						
Hazardous waste (Segregated) (17 05 03*)						
Kerbs and Concrete (17-01-01)						
Metals (17 04 07)						
Mixed C&D waste (17 09 04)						
Mixed C&D waste (Hazardous) (17 09 03*)						
Packaging (17 02 03)						
Paint, adhesives etc. (20 01 27*)						
Paper (20 01 01)						
Plastic bottles (20 01 39)						
Plastic pipes (17 02 03)						
Refrigerant gasses (16 05 04*)						
Refrigeration gasses (Non-hazardous) (16 05 05)						
Septic tank waste (20 03 04)						
Soils and stones (Hazardous) (17 05 03*)						
Soils and stones (Inert) (17 05 04)						
Soils and stones (Non-hazardous) (17 05 03*)						
Steel (17 04 05)						
Textiles (20 01 11)						
Wood (17 02 01)						
Total						

My Actions (Estimated Waste)

Waste Stream	Action	Action Owner	Lessons Learned

My Actions (Actual Waste Movements)

Waste Stream	Action	Action Owner	Action Status	Lessons Learned

APPENDIX 1/72 – WORKS CONTRACT CARBON MANAGEMENT SYSTEM – PROJECTS CARBON TOOL

TRANSPORT SCOTLAND | CARBON MANAGEMENT SYSTEM (CMS)

Materials specification					Materials transport to site				Maintenance	User notes	Carbon emissions (tCO2e)		
Select a data entry cell and click to add a new row or delete a row:					Mode 1		Mode 2						
Item category	Item specification	Depth (mm)	Quantity	Unit	Distance (km)	Mode	Distance (km)	Mode	Replacement frequency (item design life - years)	Notes	Materials embodied	Transport	Maintenance
Design 1													
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
										Totals	0.0	0.0	0.0
Design 2	*Copy data from:*												
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
										Totals	0.0	0.0	0.0
Design 3	*Copy data from:*												
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
											0.0	0.0	0.0
										Totals	0.0	0.0	0.0
As Built	*Copy data from:*												
			0								0.0	0.0	
			0								0.0	0.0	
			0								0.0	0.0	
			0								0.0	0.0	
			0								0.0	0.0	
			0								0.0	0.0	
General user notes and assumptions (also list any items here not available from the data entry table dropdown menus)										Totals	0.0	0.0	

APPENDIX 1/72 – WORKS CONTRACT CARBON MANAGEMENT SYSTEM – ENVIRONMENTAL SUSTAINABILITY AND WASTE – WORKS CONTRACTS DATA RECORDING TEMPLATE

Document:	Form 356
Issue:	1
Related to:	4GNW, 4GNE

Environmental Sustainability and Waste - Works Contracts Data Recording Template

The following 7 criteria are required to be recorded for all Works Contracts as per Schedule 5 Part 8 of the 4G Term Contracts:

(1) The total amount of material resources consumed in undertaking the Works Contract measured in tonnes per £100,000 of construction value.

(2) The proportion of total material resources consumed in the Works Contract which are from recycled, secondary or re-used sources.

(3) The proportion of total material resources consumed in the Works Contracts which are sourced from renewable or certified sources.

(4) The total amount of controlled waste produced in the Works Contract measured in tonnes per £100,000 of construction value, including a breakdown of the individual waste types produced. (Information will be contained within the Site Waste Management Plan).

(5) The total amount measured in tonnes per £100,000 of construction value and the proportion of the total amount of controlled waste produced in the Works Contract that is re-used, recycled and sent for disposal to landfill. (Information will be contained within the Site Waste Management Plan).

(6) The total amount measured in tonnes per £100,000 of construction value and the proportion of construction and demolition waste produced which is re-used, recycled and sent for disposal to landfill. (Information will be contained within the Site Waste Management Plan).

(7) The total volume of water consumed in the Works Contract

Information should be recorded in each of the numbered sheets in this Excel workbook.

APPENDIX 1/72 – WORKS CONTRACT CARBON MANAGEMENT SYSTEM – ENVIRONMENTAL SUSTAINABILITY AND WASTE – WORKS CONTRACTS DATA RECORDING TEMPLATE

Works Contract Title	0
Scheme ID (s)	0
Construction Value	0
Contractor	0

Document:	Form 356
Issue:	1
Related to:	4GNW, 4GNE

Section	Description	Value	Unit
1	Total Amount of Material Resources Consumed in Undertaking the Works Contract Measured in Tonnes per £100,000 of Construction Value	#DIV/0!	Tonnes
2	Proportion of total material resources consumed in the Works Contract which are from recycled, secondary or re-used sources.	#DIV/0!	%
3	Proportion of total material resources consumed in the Works Contracts which are sourced from renewable or certified sources.	#DIV/0!	%
4	Total amount of controlled waste produced in the Works Contract measured in tonnes per £100,000 of construction value	#DIV/0!	Tonnes
5	Total Tonnage of Controlled Waste sent to Landfill per £100,000 of Construction Value	#DIV/0!	Tonnes
	Total Tonnage of Controlled Waste Recycled per £100,000 of Construction Value	#DIV/0!	Tonnes
	Total Tonnage of Controlled Waste Re-Used per £100,000 of Constuction Value	#DIV/0!	Tonnes
6	Total Tonnage of Construction and Demolition Waste Landfill per £100,000 of Construction Value	#DIV/0!	Tonnes
	Total Tonnage of Construction and Demolition Waste Recycled per £100,000 of Construction Value	#DIV/0!	Tonnes
	Total Tonnage of Construction and Demolition Waste Re-Used per £100,000 of Constuction Value	#DIV/0!	Tonnes
7	Water Consumption (Litres)	0.00	Litres

APPENDIX 2/1: LIST OF BUILDINGS, ETC, TO BE DEMOLISHED OR PARTIALLY DEMOLISHED

Address	Description	Drawing No.	Ref No.	Requirements
A83 Strone Point Arrochar to Inveraray Road	Openreach underground chamber cover and frame at chainage 262m, shoreside verge	13/NW/0901/052/200/001	SP01	(i) Not Used. (ii) Not Used. (iii) Existing Openreach underground chamber cover and frame (reference number SP01) at chainage 262m, shoreside verge to be demolished. (iv) Voids left by the removal of equipment otherwise unaffected by the permanent works shall be backfilled immediately in accordance with the appropriate Clauses of the 600 Series with material compliant with the design. (v) Not Used. (vi) Not Used. (vii) Not Used.

APPENDIX 2/2: FILLING OF TRENCHES AND PIPES

(i) Not Used.

(ii) The contractor shall grout up the culverts shown in drawings 13/NW/0191/052/200/001 and 13/NW/0191/052/500/001 in accordance with Appendix 5/1.

(iii) Not Used.

(iv) Not Used.

APPENDIX 2/3: RETENTION OF MATERIAL ARISING FROM SITE CLEARANCE

Details of general site clearance are shown on Drawing 13/NW/0901/052/200/001. Full extent and timing of site clearance to be agreed with the Engineer on site at commencement of the works.

Description	Location	Delivered to	Requirements
16 traffic signs and 30 posts Including: 14 sharp deviation of route signs TSRGD Diag No. 515, 1 bend ahead sign TSRGD Diag No. 512, 1 parking sign TSRGD Diag No. 2501.	Lochside verge from Ch119 to Ch230m approximately	BEAR Depot, Dalmally Road, Inveraray. PA32 8UR	(i) Not Used. (ii) Not Used. (iii) The contractor shall ensure that signs are stacked in a manner that will prevent damage. (iv) The contractor shall ensure that there is appropriate signage in place before removing the existing traffic signs. (v) Voids left by the removal of equipment otherwise unaffected by the permanent works shall be backfilled immediately in accordance with the appropriate Clauses of the 600 Series with material compliant with the design.
Vehicle activated signs including post and associated equipment	Landward side verge at Ch.-10m approximately and lochside verge at Ch 362m approximately.	BEAR Depot, Dalmally Road, Inveraray. PA32 8UR	(i) Not Used. (ii) Not Used. (iii) The contractor shall ensure that signs are stacked in a manner that will prevent damage. (iv) Voids left by the removal of equipment otherwise unaffected by the permanent works shall be backfilled immediately in accordance with the appropriate Clauses of the 600 Series with material compliant with the design. (v) The contractor shall ensure that there is appropriate signage in place before removing the existing traffic signs.

APPENDIX 2/4: EXPLOSIVES AND BLASTING

1. Not Used.

2. Not Used.

APPENDIX 2/5: HAZARDOUS MATERIALS

Not Used

APPENDIX 2/6: SITE CLEARANCE ENVIRONMENTAL REQUIREMENTS

1. Refer to Appendix 30/12 for environmental site clearance restrictions that must be adhered to before the site clearance can commence. Site clearance restrictions shall remain in place for the duration of works.

2. Not Used.

3. Not Used.

APPENDIX 3/1: FENCING, GATES AND STILES

1 Temporary Fencing

Not Used.

2 Timber Quality

Not Used.

3 Fittings

Not Used.

4 Permanent Fencing: Wooden Fencing, Gates and Stiles including Planting Works Fencing

(i) Timber post and four rail fence, refer to 13-NW-0901-052-300-001, for location refer to 13-NW-0901-052-300-002. Permanent timber post and four rail fences shall be to drawing 13/NW/0901/052/300/001 as per Highway Construction Detail H3. No fencing works within the protection zones to be undertaken by the Contractor without the agreement and supervision of the Environmental Clerk of Works.

(ii) Not used.

(iii) Not used.

(iv) Not used.

(v) Concrete surrounds to base of posts shall be ST2 concrete at locations as agreed with the Engineer for the Works.

(vi) Not used.

(vii) Not used.

5 Permanent Fencing: Wire Dropper Fencing

Not Used.

6 Wire Mesh to Permanent or Existing Fencing

Not Used.

7 Badger Gates

Not Used.

8 Fenced Tree Guards

Not Used.

9 Preservation of Timber

Not Used.

10 Other

Not Used.

APPENDIX 4/1: ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)

1. Location : A83 Strone Point, LHS and RHS verge

1.1 Road Vehicle Restraint Systems

(i) The location, Containment Level, Impact Severity Level (ISL), Working Width Class and maximum height details are shown on Drawing No. 13/NW/0901/052/400/001 and the schedule in section 5 of Appendix 4/1.

(ii) Not used

(iii) The location, Performance Class, Impact Severity Level (ISL), Permanent Lateral Displacement Zone (PLDZ) Characteristic and Exit Box Class (D), details for terminals are shown on Drawing No. 13/NW/0901/052/400/001 and the schedule in section 5 of Appendix 4/1.

(iv) Not used

1.2 Pedestrian Restraint Systems – NOT USED

1.3 Anti-glare Screens – NOT USED

2. Other Details:

Safety Barriers, Terminals, Transitions, Crash Cushions and Motorcyclist Protection System

2.1 Not Used

2.2 Not Used

2.3 Any other Details [to be included as required]

(i) Contractor's design of their proposed road restraint system should take into account the ground conditions. Post foundations located in the westbound verge are anticipated to be formed in either made ground or superficial materials typically comprising of granular material. At the position of the proposed geogrid reinforced soil retaining wall (westbound, chainage 75m and 110m) road restraint system post foundations shall be limited to a maximum of 500mm to avoid damage to the geogrid reinforcement layers. Post foundations in the eastbound verge are expected to be typically formed in bedrock however, in some instances foundations in granular material may be required. **For tender purposes only**, all proposed post foundations should be assumed as set in ST5 concrete, for single sided barrier posts the assumed size should be 300mm by 300mm and 350mm deep and for terminal foundations the assumed size should be 600mm by 600mm by 800mm deep. The Contractor shall specify the dimensions of the foundations during the construction phase following post testing on site. In the event that any assumed post/foundation detail proves inadequate at any given location the Contractor shall agree with the Engineer additional suitable foundation details.

(ii) Motorcyclist protection system to be installed below single sided barrier in accordance with manufacturer's guidance. The location, containment level and impact severity level details are shown on 13/NW/0901/052/400/001 and the schedule in section 5 of Appendix 4/1. The motorcyclist protection system must be compatible and approved for use with the Contractor's chosen single side barrier in accordance with the manufacturer's guidelines and approved on the Highways England List of EN1317 Compliant Road Restraint Systems.

(iii) The Contractor's attention is also drawn to the presence of three existing carrier pipe road crossings and filter drain in eastbound verge. Refer to drawing number 13/NW/0901/052/500/001 to 3 for drainage details.

(iv) The Contractor must assume an appropriate foundation based on the existing information provided in notes (i) and (iii). **The Contractor MUST submit for acceptance with the Tender submission, all supporting information of his intended restraint systems, motorcyclist protection system and proposed foundation including size and type in accordance with Clause 401.**

(v) The Contractor's attention is also drawn to the presence of the temporary overground Openreach fibre and copper cables located behind the existing road restraint system in the westbound verge, refer to Public Utilities Drawing No 13/NW/0901/052/2700/001 and 002 for further details. The Contractor will construct a trench for Openreach to lay duct in westbound verge in accordance with Appendix 1/16 and Drawings No 13/NW/0901/052/2700/001 and 002.

(vi) Safety barrier post intervals to be widened in line with manufacturer's post deviation guidance where required to avoid interaction with catchpits. Road restraint barrier posts in the vicinity of catch pits to be installed in accordance with drawing 13/NW/0901/052/500/003.

2.4 to 2.12 Not Used

3 Testing

Destructive Testing

3.1 Not Used

Site Testing on Post Foundations

3.2 Site testing on safety barrier and terminal post foundations must be in accordance with Appendix 1/5 and clause 404 of the Specification for Highway Works.

Inspection and Testing of Vehicle Parapet Posts

3.3 Not used.

3.4 Not used.

Site Testing on Anchorages in Drilled Holes

3.5.1 Not used

3.5.2 Not used

4 Temporary Safety Barriers

Refer to Specification Appendix 1/17 for Traffic Safety and Management details.

(i) The Contractor is responsible for the provision of the temporary safety barriers, terminals and transitions in accordance with Clauses 405.

(ii) The Contractor is responsible for the design of temporary safety barriers, terminals and transitions in accordance with Clauses 401.

(iii) The Contractor is responsible for the design of temporary safety barriers, terminals and transitions in accordance with Clauses 401.

(iv) The Contractor is responsible for the design of temporary safety barriers, terminals and transitions in accordance with Clauses 401.

(v) The Contractor is responsible for determining where the temporary safety barriers, terminals and transitions will be located.

(vi) The Contractor is responsible for determining the location for the removal of temporary safety barriers on completion of the Works in accordance with Clause 405.

APPENDIX 4/1: ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN) (CONTINUED)

5. Schedule of Road Restraint System (Vehicle)

Location & Start Chainage (m)	Finish Chainage (m)	Position on Cross-Section	Type of Road Restraint System	Set Back (m)	Containment Level Performance Class	Impact Severity Level (ISL)	Working Width Class	Exit Box Class	Permanent Lateral Displacement Zone Characteristic	Other Requirements/ Comments	Proposed Restraint System TO BE COMPLETED BY TENDERER
-23.2	-10.8	RH Verge (Westbound)	Terminal	0.6	P4	B	W1	Z1	D1.1	To be fitted in accordance with manufacturers specification.	
-10.8	0	RH Verge (Westbound)	Single Sided Safety Barrier	Transitions from 0.6 to 0.85	N2	B	W1	n/a	n/a	Max. height 765mm	
0	20	RH Verge (Westbound)	Single Sided Safety Barrier	0.85	N2	B	W1	n/a	n/a	Max. height 765mm	
20	30	RH Verge (Westbound)	Single Sided Safety Barrier	Transitions from 0.85 to 1.2	N2	B	W1	n/a	n/a	Max. height 765mm	
30	294.1	RH Verge (Westbound)	Single Sided Safety Barrier	1.2	N2	B	W1	n/a	n/a	Max. height 765mm	
294.1	306.5	RH Verge (Westbound)	Terminal	1.2	P4	B	W1	Z1	D1.1	To be fitted in accordance with manufacturers specification.	

APPENDIX 4/1: ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN) (CONTINUED)

Location & Start Chainage (m)	Finish Chainage (m)	Position on Cross-Section +	Type of Road Restraint System	Set Back (m)	Containment Level Performance Class	Impact Severity Level (ISL)	Working Width Class	Exit Box Class	Permanent Lateral Displacement Zone Characteristic	Other Requirements/ Comments ++	Proposed Restraint System TO BE COMPLETED BY TENDERER
-23.8	306.5	RH Verge (Westbound)	Motorcyclist protection system	1.2	N2	Same as host	n/a	n/a	n/a	Motorcyclist protection system to be installed below single sided barrier in accordance with manufacturer's specification.	
-23.2	-10.8	LH Verge (Eastbound)	Terminal	1.2	P4	B	W1	Z1	D1.1	To be fitted in accordance with manufacturers specification.	
-10.8	294.1	LH Verge (Eastbound)	Single Sided Safety Barrier	1.2	N2	B	W1	n/a	n/a	Max. height 765mm	
294.1	306.5	LH Verge (Eastbound)	Terminal	1.2	P4	B	W1	Z1	D1.1	To be fitted in accordance with manufacturers specification.	
-23.8	306.5	LH Verge (Eastbound)	Motorcyclist protection system	1.2	N2	Same as host	n/a	n/a	n/a	Motorcyclist protection system to be installed below single sided barrier in accordance with manufacturer's specification.	

Note: + e.g. LH (Westbound) verge, central reserve, RH (Eastbound) verge etc
++ Height requirements etc.

DESIGN CERTIFICATE: ROAD RESTRAINT SYSTEMS CERTIFICATE NUMBER: DC (RRS)……

Order Reference ……..

Scheme Identifier ……

1. We hereby certify to the Scottish Ministers` in respect of the Design of the following further divided part of the Design or Design Element namely:

……..... (Name of part of Road Restraint System or Element)

that reasonable professional skill and care has been taken by us with a view to securing that the part of the Design or Design Element:-

(i) complies with the Scottish Ministers` Requirements.

(ii) has been accurately translated into the construction drawings and other Design documents bearing the unique numbers listed below:

(iii) shall not be detrimental to the whole Design or Design Element and shall not affect the completion of the Design Certificate(s).

(iv) that all aspects of the Design or Design Element of the Road Restraint System on the Contract have been developed by the use of a risk assessment approach.

(v) where required a Safety Audit Certificate for Stage * [2] *[3] is attached.

We agree that the words and phrases herein, unless otherwise stated, have the same meaning as attributed to them in the Contract between the Scottish Ministers` and the Operating Company.

Signed ……..... Firm: ……
DESIGNER (Team leader for Designer)

Name: ……. Date: ……
(Block capitals)

Signed: ……... Firm: ……
(On behalf of the Operating Company)

Name: ……. Date: ……
(Block capitals)

DESIGN CHECK CERTIFICATE: ROAD RESTRAINT SYSTEMS CERTIFICATE NUMBER: DCC (RRS)…….

Order Reference ……..

Scheme Identifier ……

1. We hereby certify to the Scottish Ministers` in respect of the check of the following further divided part of the Design or Design Element namely:

……..…... (Name of part of Road Restraint System or Element)

that reasonable professional skill and care has been taken by us in carrying out the independed Design check of the part of the Design or Design Element with a view to securing that the part of the Design or Design Element:-

(vi) complies with the Scottish Ministers` Requirements.

(vii) has been accurately translated into the construction drawings and other Design documents bearing the unique numbers listed below:

(viii) shall not be detrimental to the whole Design or Design Element and shall not affect the completion of the Design Certificate(s).

(ix) that all aspects of the Design or Design Element of the Road Restraint System on the Contract have been developed by the use of a risk assessment approach.

We agree that the words and phrases herein, unless otherwise stated, have the same meaning as attributed to them in the Contract between the Scottish Ministers` and the Operating Company.

Signed ……..... Firm: ……
CHECKER (Team leader for Checker)

Name: ……. Date: ……
(Block capitals)

Signed: …….. Firm: ……
(On behalf of the Operating Company)

Name: ……. Date: ……
(Block capitals)

APPENDIX 4/1: ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN) (CONTINUED)

6 Training

(i) The Contractor is required to host training for BEAR Scotland maintenance squads for any non-propriety safety barrier system proposed. The training course will take place at the BEAR Scotland depot in Inveraray.

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 AND DD ENV 1317-4:2002

The Contractor shall submit the following supporting information demonstrating compliance with BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002 to the Engineer for acceptance:

EUROPEAN COMMITTEE FOR STANDARDIZATION (CEN) COMPLIANCE [1]

Initial submission documents to be supplied for consideration of initial type test are as follows:

1 Test report in accordance with BS EN 1317 -1, Clause 9 (and including any additional test data required under BS EN 1317-3, Clauses 7.3 and 7.4 and DD ENV 1317-4:2002, Clauses 7.3 and 7.4).

2 Video/high speed film of test annotated showing date, test number and performance class.

3 Still photographs of complete installation including anchorage points.

4 Still photographs of vehicle before and after impact.

5 Full drawings of tested items.

6 Certification from the manufacturer that the item tested complies with drawings supplied.

7 Certificate from test house accredited in accordance with the requirements of Series 400 (MCHW 1.400).

Additional information, which will be required on acceptance of initial type test prior to installation.

8 Manufacturer's specification.

9 Installation drawings.

10 Manufacturer's installation instructions including foundation requirements and test methods to verify their performance.

11 Manufacturer's repair and maintenance manual.

12 Certificate of compliance with the Quality Management Scheme 1 for the Manufacture of fencing Components [2]

13 Compliance with the Quality Management Sector Scheme 2- Supply and Installation offences:

(i) Sector Scheme 2B for Vehicle Restraint Systems.[2]

14 Certificate of compliance for the Quality Management Sector Scheme 5 for the fabrication and Installation of Bridge Parapets and Cradle Anchorages[3]:

(i) Sector Scheme 5A for The Manufacture of Parapets for Road Restraint Systems; and

(ii) Sector Scheme 5B for The Installation of Parapets for Road Restraint Systems.

15 Nominal loads (direct forces, moments and co-existent shears) to be transferred from the parapet to the structure or foundation.[2 & 3]

Notes:

[1] All documents, which are not in English, will have to be translated. If they are in a language other than French or German the promoter will be required to supply a full translation.

[2] Items 12 and 13 are required for safety barrier systems and transitions

[3] Items 14 and, 15 are required for vehicle parapets. See also Note 1 under Sector Scheme B in Appendix A of the Specification for Highway Works.

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 AND DD ENV 1317-4:2002 (CONTINUED)

Sheet 1 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002
TYPE OF VEHICLE RESTRAINT SYSTEM:
CONTAINMENT PERFORMANCE CLASS/PERFORMANCE LEVEL/PERFORMANCE CLASS (*):
TEST REPORT NUMBER: (Test of)
Test Type: (Primary/Complementary Test) (*)
TEST NUMBER: TEST DATE: (*) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel: / Fax:/ E-mail: PRODUCT NAME:	

Initial submission documents to be supplied for consideration of Initial Type Test (ITT).

Item		Comment	Item Received (Y or N)	Date requested
1	Test report	In accordance with BS EN1317-1, Clause 9 (and including any additional test data required under BS EN 1317-3, Clauses 7.3 and 7.4 and DD ENV 1317-4:2002, Clauses 7.3 and 7.4).		
2	Video/high speed film	Of test coverage as specified in relevant part of BS EN 1317 or DD ENV 1317-4:2002. Annotated showing date, test number and performance class.		
3	Still photographs	Of complete installation including anchorage points.		
4	Still photographs	Of vehicle before and after impact.		
5	Drawings	Fully detailed drawings of tested item.		
6	Certification from the manufacturer	Confirming that the item tested complies with drawings supplied.		
7	Confirmation from test house	That the test conforms to the relevant requirements of BS EN 1317-1 (and including any additional test data required under BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002).		
Additional information, which will be required on acceptance of initial type test prior to installation.				
8	System specification	Manufacturer's specification.		
9	Installation details	Manufacturer's drawings.		
10	Installation procedures	Manufacturer's installation instructions.		
11	Maintenance Manual	Manufacturer's inspection, repair and maintenance instructions.		
12	Certificate of compliance	With the Quality Management Scheme 1 for Manufacture of Fencing Components.2		
13	Certificate of compliance	With the Sector Scheme 2B for the Supply and Installation of Fences Vehicle Restraint Systems.2		
14	Certificate of compliance	With the Quality Management Schemes 5 for the Fabrication and Installation of Bridge Parapets and Cradle Anchorages3: (i) Sector Scheme 5A for The Manufacture of Parapets for Road Restraint Systems; and (ii) Sector Scheme 5B for The Installation of Parapets for Road Restraint Systems.		
15	Support loads	Nominal loads (direct loads, bending moments and shear forces) that have to be transferred from the vehicle restraint system to the supporting structure or foundation.3		

Notes:

1. All documents, which are not in English, will have to be translated. If they are in a language other than French or German the promoter will be required to supply a full translation.

2. Items 12 and 13 are required for safety barrier systems and transitions.

3. Items 14 and 15 are required for vehicle parapets. See also Note 1 under Sector Scheme B in Appendix A of the Specification for Highway Works.

Signature:	Name:
Date:	

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 AND DD ENV 1317-4:2002 (CONTINUED…)

Sheet 2 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, BS EN 1317-2 and DD ENV 1317-4:2002
TYPE OF VEHICLE RESTRAINT SYSTEM: Safety Barrier, Vehicle Parapet or Transition (*)
CONTAINMENT PERFORMANCE CLASS/LEVEL(*)
TEST REPORT NUMBER: (Test of)
Test Type: (Primary/Complementary Test) (*)
TEST NUMBER: TEST DATE: (*) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel: / Fax:/ E-mail: PRODUCT NAME:	

			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1, Table 1	Vehicle Details	**Impact Conditions** Total vehicle mass (kg) Speed (kph) Angle (degrees)	 …… (± …) …… (0, +7%) …… (-1, + 1.5)			
		Centre of Gravity Vertical height (m) Longitudinal (m) Lateral (m)	 …… (± 10%) …… (± 10%) ± ……			
		Model				N/A
BS EN 1317-2, Clause 4.2	Vehicle Restraint System (VRS) Behaviour	1) The VRS shall contain and redirect the vehicle without breakage of principal longitudinal elements of the system. 2) No major part of the VRS shall become totally detached or present an undue hazard to other traffic, pedestrians or personnel in a work zone. 3) Elements of the VRS shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into the passenger compartment that can cause serious injuries are not permitted. 4) Ground anchorages and fixings shall perform according to the design of the VRS.				
BS EN 1317-2, Clause 4.3	Vehicle Behaviour	1) The centre of gravity (CG) of the vehicle shall not cross the centreline of the deformed system. 2) The vehicle shall remain upright during and after impact, although moderate rolling, pitching and yawing are acceptable. 3) The vehicle shall leave the VRS after impact, so that the wheel track does not cross a line parallel to the initial traffic face of the VRS, at a distance A (2.2 m) plus vehicle width + 16% of the length of the vehicle within a distance B (10 m) from the final intersection (break) of wheel track with the initial traffic face of the VRS.				
BS EN 1317-2, Clause 5.3.2	Installation	1) The length of the VRS shall be sufficient to demonstrate the full performance characteristics of the system. 2) If the VRS has to develop tension, end anchorages shall be provided in accordance with the VRS specification. Post foundation shall meet the design specification.				
BS EN 1317-2, Clause 4.4	Severity Indices		**SPECIFIED** THIV Limit 33 km/h PHD Limit 20 g ASI Limit 1.4	**ACTUAL** THIV …. … km/h PHD ……. g ASI …….		
BS EN 1317-2, Clause 5.7, Figure 3	Photo-graphic coverage	1) Photographic coverage shall be sufficient to clearly describe behaviour and vehicle motion during and after impact. 2) High speed cameras shall be operated at a minimum of 200 frames per second and stills. 3) As recommended in Clause 5.7 and Figure 3.				
	Drawings	Drawings included				
					N/A = Not Applicable	

FULLY COMPLIES WITH STANDARD: BS EN 1317-1, BS EN 1317-2, DD ENV 1317-4:2002

Signature:	Name:
Date:	

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 AND DD ENV 1317-4:2002 (CONTINUED…)

Sheet 3 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1 and BS EN 1317-3
TYPE OF VEHICLE RESTRAINT SYSTEM: **Crash cushion** **(Redirective [R] or Non- redirective [NR](*)**
TEST REPORT NUMBER: **TEST TYPE: (Primary/Complementary Test) (*)**
PERFORMANCE LEVEL: **VELOCITY CLASS:** **(Test of)**
TEST NUMBER: **TEST DATE:** (*) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel: / Fax:/ E-mail: PRODUCT NAME:	

			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1	Vehicle Details	**Impact Conditions** Total vehicle mass (kg) Speed (kph) Angle (degrees)	 …… (± …) …… (0, +7%) …… (-1, + 1.5)			
		Centre of Gravity Vertical height (m) Longitudinal (m) Lateral (m)	 …… (± 10%) …… (± 10%) ± ……			
		Model				N/A
BS EN 1317-3, Clause 6.2	Crash Cushion Behaviour	1) Elements of the crash cushion shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into, the passenger compartment that could cause serious injuries are not permitted. 2) No major element of the crash cushion, having a solid mass greater than or equal to 2.0kg, shall become totally detached, unless this is required by the working of the crash cushion. No major element of the crash cushion shall impede the path of adjacent traffic. The final position of the detached element shall be considered to determine the displacement classification.				
BS EN 1317-3, Clause 6.3	Vehicle Behaviour	1) The vehicle shall remain upright during and after the collision although yawing and moderate rolling and pitching are acceptable. The post-impact trajectory of the test vehicle shall be controlled by means of the exit box shown in Figure 2 and specified as detailed in Tables 11 and 12.				
BS EN 1317-3, Clause 7.3.2	Installation	1) The installation of the crash cushion for the test shall comply with the structural design details and the on-road system details as given in the design specification.				
BS EN 1317-3, Clause 5.4 and Table 4	Impact Severity Levels		**SPECIFIED**	**ACTUAL**		
		Level A:	THIV ≤44km/h (Tests 1, 2 & 3 THIV ≤33km/h (Tests 4 and 5) ASI ≤1.0			
		Level B:	THIV ≤44km/h (Tests 1, 2 & 3) HIV ≤33km/h (Tests 4 and 5) ASI ≤1.4			
		Levels A & B:	PHD ≤20 g			
BS EN 1317-3, Clause 7.7, Figure 4	Photo-graphic coverage	1) High speed cameras and/or high speed video cameras shall be operated at minimum of 200 frames per second. 2) Stills 3) As recommended in Clause 7.7 and Figure 4.				
	Drawings	Drawings included				
					N/A = Not Applicable	

FULLY COMPLIES WITH STANDARD: BS EN 1317-1 and BS EN 1317-3

Signature:	Name:
Date:	

APPENDIX 4/2: INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 AND DD ENV 1317-4:2002 (CONTINUED…)

Sheet 4 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1 and DD ENV 1317-4:2002

TYPE OF VEHICLE RESTRAINT SYSTEM: Terminal

PERFORMANCE CLASS (Test of)

Test Type: (Primary/Complementary Test) (*)

TEST TYPE NUMBER:

TEST NUMBER: **TEST DATE:** **(***) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel: / Fax:/ E-mail: PRODUCT NAME:	

			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1, Table 1, DD ENV 1317-4: 2002, Clauses7.4 and 7.5	Vehicle Details	**Impact Conditions** Total vehicle mass (kg) Speed (kmh) Angle (degrees)	 …… (± …) …… (0, +7%) …… (-1, + 1.5)			
		Centre of Gravity Vertical height (m) Longitudinal (m) Lateral (m)	 …… (± 10%) …… (± 10%) ± ……			
		Model				N/A
DD ENV 1317-4: 2002, Clauses 5.4 and 5.5.2	Terminal Behaviour	1) Elements of the terminal shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into, the passenger compartment that could cause serious injuries are not permitted. 2) No major part of the terminal shall become totally detached and come to rest outside the permanent lateral displacement zones defined in Clause 5.4. 3) Anchorages and fixings shall perform to the terminal design specifications and other specified requirements as listed in the test report.				
DD ENV 1317-4: 2002, clause 5.5.3	Vehicle Behaviour	1) The vehicle shall not overturn, although rolling, yawing and moderate pitching may be accepted. For the performance class P1 rolling onto a side may be accepted. 2) The exit box values for the specified test are as defined in Figures 5.6 and 7 (as appropriate).				
DD ENV 1317-4: 2002, Clause 7.3.2	Installation	1) The terminal shall conform to the structural design details and with the system installation details as given in the design specification of the manufacturer.				
DD ENV 1317-4: 2002, Clause 5.5.4 and Table 5	Impact Severity Classes	**SPECIFIED** Level A: THIV≤ 44km/h (Tests 1, 2,3 THIV≤ 33km/h (Tests 4, 5) ASI ≤ 1.0 Level B: THIV≤ 44km/h (Tests 1, 2,3 HIV ≤ 33km/h (Tests 4, 5) ASI ≤ 1.4 Levels A & B: PHD < 20g	**ACTUAL**			
DD ENV 1317-4: 2002, Clause 7.7 and Figure 7	Photo-graphic coverage	1) Photographic coverage shall be sufficient to describe clearly terminal and vehicle motion during and after impact. 2) High speed cameras and/or high speed video cameras at a minimum of 200 frames per second. 3) Stills				
	Drawings	Drawings included				

N/A = Not Applicable

FULLY COMPLIES WITH STANDARD: BS EN 1317-1 and DD ENV 1317-4:2002

Signature:

Date:

APPENDIX 5/1: DRAINAGE REQUIREMENTS

1. The Engineer has conducted a hydraulic design of the drainage systems, using the Modified Rational Method, for the scheme. The scope of the drainage works is shown on drawings 13/NW/901/052/500/001 to 003.

2. *The choice of pipes and bedding combinations is restricted to those detailed below.*

   The following pipe materials are permissible for surface water drains whilst meeting the requirements of Table 5/1.1;

   i) Vitrified Clay

   ii) Precast concrete

   iii) Unplasticised P.V.C.

   iv) Polypropylene (with a BBA Roads and Bridges Certificate)

   v) Ductile Iron

3. Not Used.

4. Ultimate pipe stiffness (STES) shall be in excess of 5000 N/sq.m when tested in accordance with BS 4962.

   Creep Ratio shall be a maximum of 2.5 for PVC-U and a maximum of 4.0 for PP / PE when tested in accordance with BS EN ISO 9967:2016

   Resistance to impact shall comply with BS 4962 except that the striker used in the test shall have a mass of 1 kg and a 25 mm hemispherical radius.

5 Not Used.

6. Not Used.

7. Not Used.

8. Not Used.

9. Not Used.

10. Not used.

11. Joints in surface water drains shall be watertight.

12. Not Used.

14. Not Used.

15. Type B filter material to be used for backfill up to finished levels.

16. For location of new drain to existing connections refer to drawing 13/NW/0901/052/500/001. For connection details refer to drawing 13/NW/0901/052/500/003.

17. A 1:10, cement/PFA mix in accordance with Clause 506.3, to be used for grouting existing culverts. For existing culverts to be grouted refer to Drawing Number 13/NW/0901/052/500/001.

18. Not Used.

19. Not Used.

20. Not Used.

21 Refer to Drawing Number 13/NW/0901/052/500/002 for catchpit details.

22. Not Used.

23. Not Used.

24. All pipes shall be 'mandrel' tested. Mandrel to be in accordance with HCD I2.

25. Chamber covers and frames in verge, shall be ductile heavy duty double triangular three point suspension non rock, opening to be square, to EN124, D400.

APPENDIX 5/1: DRAINAGE REQUIREMENTS (CONTINUED…)

26. Not Used.

27. Not Used.

28. Not Used.

29. Not Used.

30. Not Used.

31. Not Used.

32. Cleaning of Chambers and drains:

    a) The cleaning of catchpits, and drainage pipes shall to be in accordance with sub-Clause 509.5.

    b) All existing Filter drains that have to be retained shall have the top 30mm of Type B removed and replaced with fresh, clean, Type B stone.

33. Cleaning of Existing Drainage Systems:

    a) Not Used.

    b) The Cleaning of the Existing Drainage System shall be in accordance with Clause 520.

34. Not Used.

35 Not Used.

36 Not Used.

37 Filter drains to be lined with a permeable geotextile layer, refer to drawing 13/NW/0901/052/500/003 for details.

Table 5/1.1 Carrier Drain – Schedule of Allowable Pipes

Pipe Dia. (mm)	Pipe Group No.	Vitrified Clay					Precast Concrete			GRP		Ductile Iron	Thermoplastic	
		L	95	120	160	200	L	M	H	5kN/m^2	10kN/m^2	K9	PVCu	PP/PE
300	5	-	-	-	ASBFN	ASBFN	ASB	ASB	-	S	S	S	ST	ST
300	6	-	-	-	ASBFN	ASBFN	AS	ASB	-	S	S	S	ST	ST

Table 5/1.2 Filter Drain – Schedule of Allowable Pipes

Drain Type (Lower Trench) Refer to HCD Drawing F2	Pipe Dia (mm)	Pipe Group Number	Vitrified Clay					Precast Concrete			Thermoplastic	
			L	95	120	160	200	L	M	H	Structured Wall	SDR 41
G,H,I	150	3				✓	✓	✓	✓	-	✓	
G,H,I	225	3				✓	✓	✓	✓	-	✓	
G,H,I	300	3				✓	✓	✓	✓	-	✓	

APPENDIX 5/2: Service Duct Requirements

1. Details of the construction requirements for the Openreach ducts to be laid by others are shown on drawing 13/NW/0901/052/2700/002

2. Ducts to be supplied by Openreach and laid by others.

3. Not used

4. Not used

5. The approximate location of the Openreach chamber to be constructed by others is shown on drawing 13/NW/0901/052/2700/001 and 13/NW/0901/052/2700/002

6. Not used

7. Not used

8. Not used

APPENDIX 5/7: THERMOPLASTICS STRUCTURED WALL PIPES AND FITTINGS

Information to be provided by the Contractor

The Contractor shall provide the following information, in accordance with Sub-clause 518.2, for the range of pipes and fittings (to be verified by the Certification body – see sub-Clause 518.15):

1. Technical drawings showing dimensions and tolerances including sealing rings and weight per metre, together with properties, as specified in sub-Clauses 518.3 and 518.5
2. Material specification, as required in sub-Clause 518.2:

Table 1: Unplasticised polyvinyl-chloride (PVC-U)

Property	Test Method Reference	Specification
Tensile Properties	BS EN ISO 6259 BS EN ISO 527-1	
Vicat	BS EN 727	
Longitudinal reversion	BS EN 743	
K-value	BS EN 922	
PVC content	EN 1905	
Density	BS EN ISO 1183-3, ISO 4451	
Heat Reversion	ISO 12091	
Effects of heating (injection moulded fittings only)	BS EN 763	

Table 2: Polyethylene (PE)

Property	Test Method Reference	Specification
Tensile Properties	BS EN ISO 6259 BS EN ISO 527-1	
Oxygen induction time	BS EN 728	
Melt Flow Rate	BS EN ISO 1133	
Density	BS EN ISO 1183-3, ISO 4451	
Melt Flow Rate	ISO 4440	
Heat Reversion	ISO 12091	
Effects of heating (injection moulded fittings only)	BS EN 763	

APPENDIX 5/7: THERMOPLASTICS STRUCTURED WALL PIPES AND FITTINGS (CONTINUED)

Table 3: Polypropylene (PP)

Property	Test Method Reference	Specification
Tensile Properties	BS EN ISO 6259 BS EN ISO 527-1	
Oxygen induction time	BS EN 728	
Melt Flow Rate	BS EN ISO 1133	
Density	BS EN ISO 1183-3, ISO 4451	
Heat Reversion	ISO 12091	
Effects of heating (injection moulded fittings only)	BS EN 763	

APPENDIX 6/1: REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC. OF EARTHWORKS MATERIALS

1 Acceptable limits for fills

1.1 The acceptability of earthworks materials shall be determined by compliance with the Specification, including Table 6/1, as amended by this Appendix.

2 Special requirements for determining acceptability, who classifies and where, and whether trial pitting is required

2.1 The Contractor shall be responsible for the assessment and selection of materials in earthworks and shall be responsible for the classification of materials on site, or off site, as appropriate. Fill materials shall be assessed at the place of excavation for site won materials and the point of deposition for imported material.

2.2 The Contractor shall be responsible for monitoring the continuing acceptability of the earthworks materials in accordance with the frequency of testing given in Appendix 1/5 in order to confirm compliance with the acceptability limits detailed in Table 6/1 and on the relevant drawings.

3 Designation of material as Class 3

3.1 Class 3 material shall not be used.

4 Rendering unacceptable material acceptable

4.1 The Contractor is permitted to render unacceptable materials acceptable by processing. The processing method shall be chosen by the Contractor.

4.2 Processed material shall satisfy the acceptability limits defined in Table 6/1 and grading requirements in Table 6/2.

5 Requirements for groundwater lowering or other treatment

5.1 The Contractor shall take all reasonable measures in order to keep construction areas free of water ingress.

6 Minimum MCV required immediately before compaction for lime stabilised Class 9D material

Not used.

APPENDIX 6/1: REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC. OF EARTHWORKS MATERIALS (CONTINUED)

7 Contract-specific (local) requirements for acceptability and testing of unburnt colliery spoil

Not used.

8 Any permitted use of the rapid assessment procedure for material acceptability

Not used.

9 Requirements for removal off site of excavated acceptable material or unacceptable material requiring processing or retention of surplus material on site

9.1 All surplus earthwork materials shall be disposed of offsite to a licensed disposal facility.

9.2 No temporary or permanent stockpiling of excavated material on site shall be permitted unless agreed with the Engineer.

10 Permitted use of acceptable material required to be processed for purposes other than for general fill

Not used.

11 Requirements for in-situ resistivity tests

Not used.

12 Requirements for in-situ redox potential tests

Not used.

13 Bearing ratio requirements for Class 6R and 7I material.

Not used.

APPENDIX 6/1: REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC. OF EARTHWORKS MATERIALS (CONTINUED)

14 Requirements for the assessment of the effects of water soluble (WS) sulfate, oxidisable sulfides and total potential sulfate in accordance with BS EN 1744-1 clauses 10, 11 and 13.

14.1 Clause 644 shall apply.

15 Requirements for the magnesium sulfate soundness test.

Not used.

TABLE 6/1: ACCEPTABLE EARTHWORKS MATERIALS: CLASSIFICATION AND COMPACTION REQUIRMENTS

Class				General material description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1	Material Properties Required for Acceptability (in Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
									Lower	Upper	
GENERAL GRNAULAR FILL	1	A	-	Well graded granular material	General Fill	Rock fill excavated from within the site.	(i) grading	BS 1377: Part 2.	Tab 6/2	Tab 6/2	Table 6/4 Method 2
							(ii) uniformity coefficient	See Note 5.	10	-	
							(iii) moisture content	BS 1377: Part 2 See Note 4	Optimum mc -2%	Optimum mc +2%	
							(iv) MCV	Clause 632	Not used	Not used	
							(v) IDD of chalk	Clause 634	Not used	Not used	

TABLE 6/1: ACCEPTABLE EARTHWORKS MATERIALS: CLASSIFICATION AND COMPACTION REQUIRMENTS (CONTINUED)

Class				General material description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1	Material Properties Required for Acceptability (in Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within: Lower	Acceptable Limits Within: Upper	
GENERAL GRANULAR FILL	1	B	-	Uniformly graded granular material	General Fill	Rock fill excavated from within the site.	(i) grading	BS 1377: Part 2.	Tab 6/2	Tab 6/2	Table 6/4 Method 3
							(ii) uniformity coefficient	See Note 5.	-	10	
							(iii) moisture content	BS 1377:Part 2 See Note 4	Optimum mc -2%	Optimum mc +2%	
							(iv) MCV	Clause 632	Not used	Not used	

TABLE 6/1: ACCEPTABLE EARTHWORKS MATERIALS: CLASSIFICATION AND COMPACTION REQUIRMENTS (CONTINUED) (

Class				General material description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1	Material Properties Required for Acceptability (in Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
									Lower	Upper	
TOPSOIL	5	A	-	Topsoil or turf existing on site	Topsoiling	Topsoil or turf designated as Class 5A in the Contract	(i) grading	Clause 618	-	Clause 618	-
	5	B	-	Imported Topsoil	Topsoiling	General purpose grade complying with BS 3882	-	-	-	-	-

TABLE 6/1: ACCEPTABLE EARTHWORKS MATERIALS: CLASSIFICATION AND COMPACTION REQUIRMENTS (CONTINUED)

Class				General material description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1	Material Properties Required for Acceptability (in Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
									Lower	Upper	
SELECTED GRANULAR FILL	6	I	-	Selected well graded granular material	Fill to reinforced soil and anchored earth structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof except that chalk shall not be combined with any other constituent. None of these constituents shall include any argillaceous rock. (Properties (i), (ii) and (v) in the next column shall not apply to chalk) (Properties (viii), (ix), (x), (xi), (xiii) and (xiv) only apply when metallic reinforcing or anchor elements, facing units or fastenings are used). Recycled aggregate expect recycled asphalt. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, See Notes 8, 9 and 10: P (natural aggregates – except shale, siltstone or slate, see Note 7) A2 (crushed concrete) A3 (crushed bricks, masonry) D2 (air cooled blast furnace slag) G1 (red coal shale)	(i) grading	BS 1377; Part 2 (On-site)	Tab 6/2	Tab 6/2	Table 6/4 Method 2
								BS EN 933-2 (imported onto site)	Tab 6/5	Tab 6/5	
							(ii) uniformity coefficient	See note 5	10	-	
							(iii) SMC of chalk	Clause 634	Not used	Not used	
							(iv) mc	BS 1377; Part 2 See Note 4	Optimum mc -2%	Optimum mc +1%	
							(v) MCV	Clause 632	Not used	Not used	
							(vi) effective angle of friction and effective cohesion	Clause 636	$\phi'_{pk} = 35^o$ c' = n/a	-	
							(vii) coefficient of friction and adhesion (fill/elements)	Clause 639	0.6	-	
							(viii) pH value	BS 1377;Part 3	Tab 6/3	Tab 6/3	
							(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3	
							(x) water soluble (WS) sulfate content	BS EN 1744-1 clause 10	-	Tab 6/3	
							(xi) oxidisable sulfides (OS) content	BS EN 1744-1 clause 13	-	Tab 6/3	
							(xii) resistivity	Clause 637	Tab 6/3	-	
							(xiii) redox potential	Clause 638	Tab 6/3	-	

							(xiv) organic potential	BS 1377; Part 3	-	Tab 6/3	
							(xv) microbial activity index	Table 6/3	-	Tab 6/3	

TABLE 6/1: ACCEPTABLE EARTHWORKS MATERIALS: CLASSIFICATION AND COMPACTION REQUIRMENTS (CONTINUED)

Class				General material description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1	Material Properties Required for Acceptability (in Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612
							Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
									Lower	Upper	
SELECTED GRANULAR FILL	6	J	-	Selected uniformly graded granular material	Fill to reinforced soil and anchored earth	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof except that chalk shall not be combined with any other constituent. None of these constituents shall include any argillaceous rock. (Properties (viii), (ix) and (x), (xi), (xii), (xiii) and (xiv) in the next column only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) (Properties (i), (ii) and (v) in next column shall not apply to chalk.) Recycled aggregate except recycled asphalt. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, See Notes 8, 9 and 10: P (natural aggregates – except shale, siltstone or slate, see Note 7) A2 (crushed concrete) A3 (crushed bricks, masonry) D2 (air cooled blast furnace slag) G1 (red coal shale)	(i) grading	BS 1377; Part 2 (On-site)	Tab 6/2	Tab 6/2	Table 6/4 Method 3
								BS EN 933-2 (imported onto site)	Tab 6/5	Tab 6/5	
							(ii) uniformity coefficient	See note 5	5	10	
							(iii) SMC of chalk	Clause 634	Not used	Not used	
							(iv) mc	BS 1377; Part 2 See Note 4	Optimum mc -2%	Optimum mc +1%	
							(v) MCV	Clause 632	Not used	Not used	
							(vi) effective angle of friction and effective cohesion	Clause 636	$\phi'_{pk} = 35^o$ c' = n/a	-	
							(vii) coefficient of friction and adhesion (fill/elements)	Clause 639	0.6	-	
							(viii) pH value	BS 1377;Part 3	Tab 6/3	Tab 6/3-	
							(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3	
							(x) water soluble (WS) sulfate content	BS EN 1744-1 clause 10	-	Tab 6/3	
							(xi) oxidisable sulfides (OS) content	BS EN 1744-1 clause 13	-	Tab 6/3	
							(xii) resistivity	Clause 637	Tab 6/3	-	
							(xiii) redox potential	Clause 638	Tab 6/3	-	

							(xiv) organic potential	BS 1377; Part 3	-	Tab 6/3	
							(xv) microbial activity index	Table 6/3	-	Tab 6/3	

Footnotes to Table 6/1

1. App = contract specific Appendix
2. Tab = Table
3. Where in the Acceptable Limits column reference is made to App 6/1, only those properties having limits ascribed to them in contract specific Appendix 6/1 shall apply. Where contract specific Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. Where BS 1377: Part 2 is specified for mc, this shall mean BS 1377: Part 2 where the material is a soil or BS EN 1097-5 where the material is required to conform to a harmonised European Standard.
5. Uniformity coefficient is defined as the ratio of the particle diameters D60 to D10 on the particle-size distribution curve, where: D60 = particle diameter at which 60% of the soil by weight is finer D10 = particle diameter at which 10% of the soil by weight is finer
6. Not used.
7. Not used.
8. Where material source codes are referenced these are as listed in Table 6/7.
9. Where materials are required to be aggregates conforming to BS EN 13242 materials certificated as being compliant with BS EN 13285 are acceptable for use provided that they meet all the specification requirements and the Declaration of Performance for constituent parts to BS EN 13242 are provided to the Overseeing Organisation.
10. Materials shall comply with the current Environmental Regulations at the time of use. Reference shall be made to Annex ZA (informative) of BS EN 13242.

APPENDIX 6/2: REQUIREMENTS FOR DEALING WITH CLASS U2 UNACCEPTABLE MATERIAL

1 General

1.1 There are no areas of the site where Class U2 material is known to exist. No Class U1B material is anticipated other than the existing road pavement. The Contractor is responsible for keeping records of the location, volumes, extents, nature and test results for any Class U1B and / or Class U2 material if encountered. In the event that any such materials are excavated during construction of the works then the following clauses apply.

1.2 In the event of encountering U1B and / or U2 material, the Contractor must:

i) Give notice to the Engineer.

ii) Provide a method statement for safe excavation, removal and disposal of the U1B and / or U2 material, to be approved by the Engineer.

1.3 Any U2 material should be treated as hazardous until proven otherwise.

2 Requirements of the Environmental Legislation

2.1 If Class U2 material is found, it must be dealt with in accordance with the following acts and statutes:

i) Environmental Protection Act 1990 Part IIA.

ii) Control of Pollution Act, 1974 as amended by Environment Act 1995.

iii) The Water Environment (Controlled Activities) (Scotland) Regulations 2011.

iv) Special Waste Regulations, 1996.

v) The European Waste Catalogue 2000/532/EC as amended by 2001/118/EC and 2001/119/EC.

vi) Waste Management Licensing (Scotland) Regulations, 2011.

vii) Any other relevant statutory provisions and the Scottish Environment Protection Agency (SEPA) Requirements and Guidelines.

2.2 The Contractor shall obtain all necessary consents from local and national authorities as legislation and regulation requires.

2.3 The Contractor shall provide copies of all Waste Transfer Notes and Consignment Notes to the Engineer within 7 days of the transfer taking place.

APPENDIX 6/2: REQUIREMENTS FOR DEALING WITH CLASS U2 UNACCEPTABLE MATERIAL (CONTINUED)

3 Known Hazardous Materials

3.1 Class U1B material may potentially be present associated with the existing road pavement. All Class U1B materials shall be subject to contamination and Waste Acceptance Criteria (WAC) testing to confirm their waste classification. Following confirmation of waste classification, the material shall be taken directly to a licensed waste facility and disposed of in accordance with the requirements of the relevant legislation.

3.2 The Contractor shall be responsible for making his own arrangements as to the tipping sites to be used, any charges to be paid, and for ensuring that each site has the necessary licenses or permissions that may be required for the purpose by a statutory body.

3.3 Class U2 material is not anticipated but if encountered on site the Contractor shall immediately notify the Engineer and the Scottish Environment Protection Agency, and the requirements for any other regulator listed in Clause 2.1 above before any material is removed. The Contractor shall comply with the 1996 Special Waste Regulations at all stages.

4 Methods of Excavation, Precautions and Requirements for Handling

4.1 The Contractor is reminded of the necessary steps to be taken to minimise the risk posed by these materials to the workforce and members of the public, and the need to take special measures when excavating or transporting these materials under the COSHH regulations.

5 Special Requirements for Leachate and Contaminated Water

Not used.

6 Requirements for Special Drainage and Sealing Exposed Surfaces of Contaminated Material

Not used.

7 Testing

7.1 If the Contractor has reason to believe that Class U2 unacceptable material has been found the Contractor shall, in consultation with the Engineer, immediately carry out tests to determine the degree of contamination. Testing must be carried out by an MCERTS accredited laboratory. One copy of the results must be submitted to the Engineer within four working days of such material being uncovered.

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION

1 General & Drawings

1.1 The geotechnical solution requires a cutting into the natural hillside to facilitate the realignment of the carriageway. Steepened cuttings interfacing bedrock and superficial deposits shall be formed at a cutting angle of 56^0 (the steepened soil slope shall be a strengthened earthwork). There will also be un-strengthened soil cuttings locally with slopes formed at 26.5^0 within existing embayment features.

1.2 Earthworks requirements are detailed on the following earthworks drawings:

Drawing No.	Title
13/NW/0901/052/GDR/101	Earthworks General Arrangement Plan
13/NW/0901/052/GDR/102	Earthworks Cutting Cross Sections Sheet 1 of 2
13/NW/0901/052/GDR/103	Earthworks Cutting Cross Sections Sheet 2 of 2
13/NW/0901/052/GDR/104	Earthworks Indicative Cross Sections
13/NW/0901/052/GDR/105	Earthworks Soil Nail and Rock Mesh Anchorage Arrangement Plan
13/NW/0901/052/GDR/106	Earthworks Soil Nailed Slope and Rock Meshing Details Sheet 1 of 2
13/NW/0901/052/GDR/107	Earthworks Soil Nailed Slope and Rock Meshing Details Sheet 2 of 2
13/NW/0901/052/GDR/108	Earthworks Cutting Remedial Works Details
13/NW/0901/052/GDR/109	Earthworks Reinforced Soil Retaining Wall Details

2 Blasting

2.1 Blasting shall not be permitted. All excavations in soil and rock shall be formed by mechanical excavation techniques only.

3 Cutting faces

3.1 General

3.2 Steepened cuttings shall be formed in a ‘top down’ sequence with strengthened soil cutting slopes being completed prior to forming underlying sections of rock cut.

3.3 Limited working space is available at the site due to the existing topography and the requirement for a single lane of the A83 to remain open to traffic during the Works.

3.4 The Contractor shall develop a safe method of working using appropriate plant, equipment and working practices commensurate with the site constraints and incorporating appropriate traffic management to allow safe use of the Trunk Road during his works.

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (CONTINUED)

3.5 The Contractor shall be responsible for developing procedures that shall prevent debris or equipment reaching sections live carriageway in the path of oncoming traffic. This shall include the provision of a suitable temporary barrier between areas of active cutting formation and sections of live carriageway.

3.6 The Contractors method of working shall mitigate the risk of injury to construction staff from debris / rock falls during construction.

3.7 The Contractor shall provide a detailed Method Statement for all proposed excavation works for review by the Engineer at least four weeks prior to the construction of any cuttings.

3.8 Rock Cuttings

3.9 Rock cuttings shall be formed at the locations shown on the Contract Drawings to achieve an overall face angle of 56o to the horizontal.

3.10 The objective on completion of the rock cutting is to achieve a uniform face profile, with minimal disturbance to the rock mass. Any localised variations in the face profile shall maintain an average face angle of 560 to the horizontal when assessed over any 1.0m length of the finished face unless otherwise agreed with the Engineer.

3.11 To facilitate design an assessment of the excavatability of bedrock has been undertaken. The assessment is that blasting is not required and excavation by mechanical means will be adequate. However, the Contractor shall make their own assessment of the required excavation method, and shall confirm their conclusion as part of their tender.

3.12 The Engineer will check the rock cutting formation works during construction to confirm that the rock is not damaged as a result of the construction method to an extent that could jeopardise the design. If problems are identified the Contractor and Engineer shall agree any corrective actions required in terms of changes to the construction method and any localised remedial works required.

3.13 Assessment of potential rock slope stability indicates there to negligible potential for flexural toppling, block toppling and ravelling failure mechanisms for all proposed rock faces (Faces 1-5 on Drawing No. 13/NW/0901/052/GDR/101). The potential for plane failures is limited for all faces (Faces 1-5). There is an increased potential for wedge failures in all faces (Faces 1-5).

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (CONTINUED)

3.14 Rock cuts shall be excavated in sections not more than 15.0m in length and by the formation of successive temporary benches, working downwards. The maximum face height resulting from the formation of each temporary bench shall be restricted to 2.0m. Multiple faces can be worked on concurrently, providing there is a minimum gap of 10m between each working face ,or larger where required for construction safety. The Contractor shall make all temporary benches safe to access for rock face inspections to be undertaken by the Engineer.

3.15 There shall be a hold point upon completion of each temporary bench to allow assessment of the formed slope and identification of potential failure planes / blocks. Depending on the nature of the rock mass encountered and the risk of instability, the Engineer may instruct additional hold points during cutting formation and may instruct work that needs to be completed before further excavation can proceed.

3.16 The assessment of the formed rock slopes shall be undertaken by the Engineer to allow determination of specific stabilisation measures, if required. Typical details for remedial works are shown on Drawing No. 13/NW/0901/052/GDR/108.

3.17 Upon completion of the formed rock slope in each excavation section, the Engineer shall instruct the Contractor as to what stabilisation measures are required, if any, and confirm whether excavations may continue in the adjacent / underlying excavation section.

3.18 To limit the risk of instability following the formation of each section of rock cut face, any face stabilisation works instructed by the Engineer shall be completed within a maximum period of 48 hours, unless otherwise agreed with the Engineer.

3.19 Drainage channels shall be formed in rock cut faces at locations as instructed by the Engineer to address possible concentrated groundwater flows. This shall include below the location of any raking drains installed to overlying sections of strengthened soil cutting.

3.20 Where required rock face drainage channels shall be constructed in accordance with the detail shown on Drawing No. 13/NW/0901/052/GDR/108. The Engineer shall confirm if rock face drainage channels require a shotcrete finish to protect against possible erosion.

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (CONTINUED)

Shotcrete

3.20.1 Details of the proposed shotcrete mix and associated shotcrete mix testing/monitoring regime shall be submitted to the Engineer for acceptance a minimum of 7days prior to commencing rock cutting works. This shall include details of proposed on site verification testing of the mix.

3.20.2 The proposed shotcrete mix shall satisfy the requirements of the EFNARC European Specification for Sprayed Concrete and the following:

Cement type:	CEM I Portland Cement
Min. cement content:	425kg/m^3
Sand content (0-4mm):	956kg/m^3
Aggregate (4-8mm):	638kg/m^3
Max. Water cement ratio:	0.45
Min. cube strength:	30N/mm^2 (at 28 days)

3.20.3 All admixtures, including plasticizers, hydration control admixtures, and curing and bond improvers shall be subjected to the approval in writing by the Engineer.

3.20.4 All aggregates shall comply with the requirements of BS EN 12620:2013.

3.20.5 All surfaces to receive shotcrete shall be clean and sound. Pressuring washing shall be undertaken as instructed by the Engineer.

3.20.6 The application of shotcrete shall be undertaken in accordance with requirements of BS EN 14487-2:2006.

3.21 Strengthened Soil Cuttings

3.21.1 Strengthened soil cuttings shall be formed at the locations shown on the Contract Drawings at an angle of 56° to the horizontal unless instructed otherwise by the Engineer.

3.21.2 Steepened soil cuttings shall be strengthened using soil nails and a complex flexible facing in accordance with the details shown on Drawing No's. 13/NW/0901/052/GDR/104, 105 and106. Reference should also be made to Appendix 6/10 for details on the soil nail construction works and finishing details to the slope face.

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (CONTINUED)

3.21.3 The cut slope shall be excavated to the required depth in benches not more than 1.5m in height and 15.0m in length, unless otherwise agreed with the Engineer, with the soil nails and facing constructed as the excavation progresses. Excavation of each bench shall not be undertaken until the soil nail grout has achieved a minimum cube strength of $5N/mm^2$ and the soil nail head plates have been tightened to a pre-tensioning load of 20kN. The Contractor shall also note the requirements of Clause 4.3 of Appendix 6/10 of this Specification.

3.21.4 The details applied to steepened soil cutting slopes shall extend 0.5m below engineering rock head unless engineering rockhead is located below proposed verge level. Where engineering rockhead is located below verge level the facing shall be terminated at the toe of the formed cut slope.

3.21.5 The level of engineering rockhead shall be determined by visual inspection by the Engineer. This shall be undertaken during hold point during cutting formation. Engineering rockhead shall be taken as the level below which rock material is not disintegrated or decomposed as defined by Table 2 of BS EN ISO 14689-1:2003.

3.21.6 Localised ravelling/collapsing of the cut slope shall be reported to the Engineer and temporary stabilisation measures / repairs agreed. Reference should be made to Appendix 6/10 of this Specification for details.

3.21.7 Raking slope drains shall be installed at locations as instructed by the Engineer to address possible concentrated groundwater seepages or saturated areas.. This shall include low points in rockhead profile and other areas where concentrated flows are encountered during the formation of the strengthened cutting slope.

3.21.8 Where required raking drains shall be constructed in accordance with the detail shown on Drawing No. 13/NW/0901/052/GDR/108. This shall include the provision of a chimney drain extending to the base of the underlying strengthened soil cutting face.

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (CONTINUED)

3.21.9 Raking drains shall include a non-woven needle punched geotextile wrap satisfying the characteristics set out in the following table.

Geotextile Filter (Wrap to Raking Drains)		
Characteristic	**Test Standard**	**Value / Unit**
Tensile strength	BS EN ISO 10319	8 kN min.
Elongation at Maximum Load	BS EN ISO 10319	60 % max.
Static Puncture Strength (CBR)	BS EN ISO 12236	15 kN min.
Dynamic Perforation Resistance (cone drop test)	BS EN 918	40 mm max.
Characteristic Opening Size (O_{90})	EN ISO 12956	150 m max.
Water Permeability Normal to Plane	BS EN ISO 11058	100 l/m^2/s min.
Durability	BS EN 13251 (Table 1, Annex B and Annex C)	100 years min.
Thickness @ = 2 kPa	BS EN ISO 9863-1	1.0 mm min.

3.21.10 Chimney drains shall be constructed from single lengths of drainage geocomposite with a maximum width of 300mm and shall provide a positive connection to installed raking drains. The material used to construct chimney drains shall satisfy the characteristics set out in the following table.

Drainage Geo-composite (Chimney Drains)		
Characteristic	**Test Standard**	**Value / Unit**
Geotextile Data		
Tensile strength	BS EN ISO 10319	8 kN min.
Tensile elongation	BS EN ISO 10319	60 % max.
Characteristic Opening Size (O_{90})	EN ISO 12956	150 m max.
Water Permeability Normal to Plane	BS EN ISO 11058	100 l/s/m^2 min.
Durability	BS EN 13251 (Table 1, Annex B and Annex C)	100 years min.
Geonet Drainage Layer		
Polymer	HDPE	
Thickness at 200kPa	BS EN ISO 9863-1	5 mm min.

Drainage Geo-composite (Chimney Drains)		
Characteristic	**Test Standard**	**Value / Unit**
Tensile strength	BS EN ISO 10319	30 kN/m min.
In-plane Flow Capacity using hard/hard platens (i=1.0) @ 200kPa	BS EN ISO 12958	 1.8×10^{-3} m^2/s min.
Durability	BS EN 13251 (Table 1, Annex B and Annex C)	100 years min.
Geocomposite		
Static Puncture Strength (CBR)	BS EN ISO 12236	7 kN min.
Tensile Strength	BS EN ISO 10319	30 kN/m min
In-plane Flow Capacity using hard/hard platens (i=1.0) @ 20kPa @ 100kPa @ 200kPa	BS EN ISO 12958	 0.7 l/s/m min. 0.5 l/s/m min. 0.3 l/s/m min.

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (CONTINUED)

3.22 Un-strengthened Soil Cuttings

3.22.1 Un-strengthened soil cuttings shall be formed at the locations shown on the Contract Drawings at an angle of 26.5° to the horizontal unless instructed otherwise by the Engineer.

3.22.2 The cut face shall be inspected by the Engineer following the cutting works. Where groundwater seepages are evident, or groundwater is found to be higher than anticipated, the Engineer shall confirm if any remedial works are required which may include, but are not limited to, construction of counterfort drains or a reduced cut slope angle. These requirements shall be assessed by the Engineer based on the conditions encounterd.

3.22.3 Unless otherwise instructed by the Engineer un-strengthened cutting slopes and adjacent verge areas shall be finished with topsoil in accordance with Appendix 6/8 of the this Specification.

4 Watercourses

Not used.

5 Embankment Construction

5.1 Minor embankment construction is required beneath the proposed realigned carriageway and additionally to form the westbound verge.

5.2 Typical details for embankment construction are shown on Drawing No's. 13/NW/0901/052/GDR/104 and 109.

5.3 Permitted fill types shall be as detailed in Appendix 6/1 of this Specification.

5.4 Soft spots in areas of filling shall be defined as areas where the soil does not meet a minimum undrained shear strength Cu = 40kPa. The extent of soft spots shall be determined by inspection and in-situ testing using a hand shear vane or alternative method agreed with the Engineer. Proof rolling to help define the extent of soft spots shall be undertaken if requested by Engineer.

5.5 All soft spots shall be excavated and replaced with Class 1A or 1B fill unless otherwise instructed by the Engineer.

5.6 Records shall be maintained of any foundation inspections carried out, and any remedial measures necessary including the location and depth of any soft spots removed. These shall be made available to the Engineer upon request.

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (continued)

5.7 Unless otherwise instructed by the Engineer fill slopes and adjacent verge areas shall be finished with topsoil in accordance with Appendix 6/8 of this Specification.

6 Compaction

6.1 Compaction of fill shall comply with the requirements of Clause 612.

6.2 Placement and compaction of fill on frozen areas shall not be permitted.

6.3 There are no specific requirements for the compaction of drainage materials.

6.4 Field dry density testing and associated moisture content testing to validate adequate compaction has been achieved shall only be required if requested by the Engineer to demonstrate that adequate compaction has been achieved for any suspect areas.

7 Limiting distance for deposition of materials referred to in sub clauses 601.15, 601.16 or 601.17 and 601.18.

7.1 The standard requirements of clauses 601.15 and 601.16 shall apply.

7.2 Unburnt colliery spoil shall not be permitted as general fill therefore clause 601.18 shall not apply.

7.3 Pulverised fuel ash shall not be permitted as fill therefore clause 601.19 shall not apply.

8 Locations of excavations that are permitted to be battered and requirements for benching prior to backfilling and compaction.

8.1 Areas of fill shall be benched into existing undisturbed ground and previous sections of fill. The benching shall be a maximum 0.5m vertically and a minimum of 0.5m horizontally.

9 Locations where excavation supports are to be left in place.

9.1 Any excavation supports shall not be left in place.

10 Requirements for benching or shaping natural or earthworks slope faces to receive fill.

10.1 Slopes to receive topsoil shall be prepared in accordance with Clause 603.7 (ii) and (iii a).

APPENDIX 6/3: REQUIREMENTS FOR EXCAVATION, DEPOSITION & COMPACTION (continued)

11 Permitted variation in the maximum difference in fill level of Class 6M material on opposite sides of corrugated steel buried structures from 250mm.

Not used.

12 Contract specific permitted depth of any protection layer over corrugated steel buried structures.

Not used.

13 Contract specific permitted mixing of excavated materials where a combination of acceptable material is revealed in excavations.

Not used.

14 Fill to excavated voids or natural voids in excavation for foundations where ST1 concrete is not required or an alternative is permitted or required.

14.1 Any natural voids encountered in excavations shall be treated as instructed by the Engineer.

15 Additional requirements for corrugated steel buried structures.

Not used.

APPENDIX 6/7: SUB-FORMATION AND CAPPING AND PREPARATION AND SURFACE TREATMENT OF FORMATION

1 Drawing references which show locations where capping is required and its thickness and where capping will only be required when one of the pavement types is adopted.

1.1 The use of capping is not proposed. New sections of pavement construction are expected to have formation in rock or site won Class 1A or 1B fill used to raise existing carriageway levels.

1.2 A minimum design CBR value of 15% is required at formation level for all areas of new pavement which shall be constructed with a pavement foundation comprising a minimum 200mm thickness of sub-base.

1.3 The Contractor and Engineer shall undertake a joint inspection of prepared formation to confirm whether the required design CBR value is satisfied by the conditions encountered.

1.4 Design CBR values shall be validated by undertaking in-situ CBR testing at a minimum frequency of 50m centres along sections of new pavement construction. Additional CBR tests shall be undertaken at locations as instructed by the Engineer in areas of suspect or variable subgrade.

1.5 Where required in-situ CBR testing shall be by the Clegg Impact Soil Tester (type CIST 882) produced by CNS Farnell Limited or similar approved by the Engineer. Other alternative in-situ CBR testing may be undertaken if agreed in advance with the Engineer. The testing shall be undertaken by Contractors technicians or engineers trained in the use of the equipment, and the Contractor shall maintain a list of operatives approved for undertaking this testing. 3No. tests shall be undertaken at each test location instructed by the Engineer. All results shall be recorded although the Test Result shall be the lowest of the 3 tests undertaken at each location.

1.6 All testing required by this Appendix 6/7 shall be additional to the 600 series testing requirements of Appendix 1/5.

1.7 Where superficial deposits are present at subgrade level or the design CBR is not satisfied, the affected material shall be excavated and replaced with Class 1A or 1B material to bedrock or a minimum depth of 1.0m where bedrock is located at greater depth.

1.8 In all instances superficial deposits with a CBR value less than 2.5% shall be excavated and replaced.

APPENDIX 6/7: SUB-FORMATION AND CAPPING AND PREPARATION AND SURFACE TREATMENT OF FORMATION (CONTINUED)

1.9 Where superficial deposits with a CBR value less than 2.5% are excavated and replaced but similar superficial deposits remain, a CBR value of 2.5% shall be assumed for the sub-grade and the thickness of sub-base increased to a minimum of 450mm.

1.10 The Engineer may instruct further in-situ testing to be undertaken to demonstrate an adequate CBR has been achieved for the treated areas.

2 Allowed surface level tolerance.

2.1 The requirements of Clause 616.1 shall apply.

3 Permitted Classes of capping singly and in combination.

Not used.

4 In cuttings and on embankments, the procedure to be adopted for construction of capping, or which alternatives are permitted.

Not used.

5 Requirements for a demonstration area or areas including location and protection. Requirements for removal and reinstatement of demonstration area if not forming part of the Permanent Works.

Not used.

6 Drawing references which give shaping requirements for sub-formation.

Not used.

7 Whether quicklime, hydrated lime or other form of lime should be used for lime stabilisation.

Not used.

APPENDIX 6/7: SUB-FORMATION AND CAPPING AND PREPARATION AND SURFACE TREATMENT OF FORMATION (CONTINUED)

8 Locations where treatment of formation in accordance with sub – Clause 616.4(i) or 616.4(ii) is required.

8.1 Where rock is present at formation level and surface tolerances cannot be achieved the Engineer shall assess whether treatment to Clause 616.4 (i) or (ii) is most appropriate for each location; and the requirements for treatment shall be as advised by the Engineer to suit the typical ground conditions identified.

9 Details of any additional tests for rate of spread of lime.

Not used.

10 Intervals for preparation and availability of chemical analysis reports if different to weekly.

Not used.

11 Preparation of formation on existing sub–base material.

11.1 To be prepared as new formation.

12 Requirements for cement type in lime and cement stabilisation.

Not used.

13 Requirements for alternative thickness of layers to be stabilised.

Not used.

14 Alternative treatment requirements for layers to be stabilised.

Not used.

APPENDIX 6/8: TOPSOILING

1 General

1.1 Requirements for finishing of strengthened soil slopes are given in Clause 6 of Appendix 6/10.

1.2 Unless instructed otherwise by the Engineer all verge areas and un-strengthened cutting or fill slopes shall be finished with 100mm of topsoil where indicated on the earthworks drawings.

1.3 The Contractor shall, where practicable, re-use topsoil won during the excavation works to minimise the quantity of imported topsoil. However, it is considered unlikely that sufficient quantities of Topsoil Class 5A are present on site for re-use. Use of imported Topsoil Class 5B is permitted.

1.4 Topsoil stripped for re-use shall satisfy Clause 618, sub-paragraph 3. Storage and protection of the site won topsoil shall be in accordance with the Clause 602.10 of the Specification for Highway Works in a location agreed with the Engineer.

1.5 Surplus topsoil, if any, shall be disposed of off-site by the Contractor.

1.6 Where topsoil is required it shall be hydroseeded following placement and protected from erosion using bio-degradable erosion protection matting. The Contractor shall ensure that hydroseeding and the placement of the erosion protection matting and takes place as soon as practicable following topsoil placement and avoids leaving topsoil exposed on cutting surfaces for prolonged periods of time.

1.7 Bio-degradable erosion protection matting shall satisfy the requirements set out in the following table and shall be secured in accordance with the manufacturer's instructions.

Bio-Degradable Erosion Protection Matting (for un-strengthened slopes)	
Property	**Requirement**
Material	Biodegradable coir blanket
Construction	Evenly distributed coir fires stitched between upper and lower lightweight polymer grids
Tensile Strength (in any direction)	3.7kN/m min.
Weight	300g/m^2 min.
Roll width	2.0m min.
Normal functional life	1 to 2 years

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS

1 Ground Anchorages

Not used.

2 Crib Walling

Not used.

3 Gabions

Not used.

4 Soil Nailing

4.1 Details of the soil nailing works are shown on Drawing No's. 13/NW/0901/052/GDR/104, 105 & 106, and are detailed within this Appendix.

4.2 Soil nail and associated facing works shall be constructed in accordance with the recommendations of BS EN 14490:2010 by suitably trained personnel, working to an approved method statement.

4.3 The Contractor shall prepare a detailed method statement for the soil nailing works for the approval of the Engineer. The method statement shall be submitted at least two weeks prior to installing the first soil nails.

4.4 Materials for the soil nailing works shall be delivered to site in an undamaged condition and shall be handled, stored and protected in such a manner as to avoid corrosion and physical damage. Any soil nail components, e.g. tendons, couplers, centralisers, etc., not conforming to these requirements shall be notified to the Engineer for acceptance or rejection. Rejected materials shall be removed from site and shall not be used within the works.

4.5 All steel components shall be galvanised complying with BS EN ISO 1461:2009.

4.6 The cut slope shall be excavated in accordance with Clause 3.4 of Appendix 6/3.

4.7 Three to six rows of soil nails are envisaged, depending on the cut slope height, with a flexible facing. Soil nail layouts are shown indicative on Drawing No. 13/NE/0901/052/GDR/105.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

4.8 The first row of soil nails shall be installed 0.5m measured vertically above the crest of the cutting prior to commencing excavation of the cutting face. The second row of soil nails shall be installed 0.5m measured vertically below the crest of the proposed cutting. Subsequent rows of soil nails shall be installed with a maximum vertical spacing of 1.0m as the excavation progresses.

4.9 The bottom row of soil nails to strengthened soil cuttings overlying rock cuttings shall be installed 0.5m measured vertically below the level of engineering rockhead unless engineering rockhead is located below verge level. Where engineering rockhead is located below verge level the bottom row of soil nails shall be installed at the toe of the cutting slope.

4.10 The level of engineering rockhead shall be determined by visual inspection by the Engineer. This shall be undertaken during appropriate hold points during cutting formation. Engineering rockhead shall be taken as the level below which rock material is not disintegrated or decomposed as defined by Table 2 of BS EN ISO 14689-1:2003.

4.11 The horizontal spacing of soil nails shall vary along the cutting as shown on Drawing 13/NW/0901/052/GDR/105. The horizontal spacing of the top row of soil nails to be installed above the cutting crest shall be 0.75m where the natural slope above the cutting is greater than 30^0 and 1.0m where the slope angle is less than or equal to 30^0. The horizontal spacing of soil nails installed below the crest of the cutting shall be 1.5m where the natural slope above the cutting is greater than 30^0 and 2.0m where the slope angle is less than or equal to 30^0.

4.12 Soil nails may be installed with a reduced horizontal spacing to address localised issues subject to prior approval by the Engineer. All soil nails shall be installed with a staggered arrangement.

4.13 Drill holes for soil nails shall be nominal 100mm in diameter and shall have a maximum deviation of +/- 50mm at entry point unless approved by the Engineer. Only grout shall be used as the flushing medium for forming the soil nail drill holes.

4.14 Adequate stability of the drill hole shall be maintained during installation of the soil nails. The maximum hole size that shall be permitted to form at the installation face shall be nominally 150mm in diameter. If this limit is exceeded the Contractor shall propose an alternative method of working for the approval of the Engineer (e.g. provide a leading length of sacrificial plastic casing).

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

4.15 The soil nail drill holes shall be formed at 20° to the horizontal. The maximum deviation of the drill holes from the specified angle shall be +/- 2° unless approved by the Engineer. The Contractor shall check for nail deflection at the soil / rock interface and if significant deflection occurs adjust the method of installation.

4.16 Drill holes shall be progressed at least 3m into material assessed as competent bedrock to the satisfaction of the Engineer.

4.17 The soil nail tendons shall comprise of galvanised 32mm external diameter / 18mm internal diameter hollow steel threadbars (steel grade 520 / 670 N/mm^2), with a minimum characteristic yield strength of 220 kN. All ancillary equipment (drill heads, centralisers, couplers, washers, nuts, etc.) shall be obtained from the soil nail manufacturer and installed in accordance with their instructions.

4.18 Soil nail tendons shall be centralised in the drill hole using appropriate centralisers. The centralisers shall be spaced at centres not exceeding 2.0 m. The centralisers shall be fabricated from materials that have no detrimental effects on the soil nailing system, be suitably robust to ensure they suffer no detrimental damage during installation, and maintain an appropriate grout cover to the nails and couplers. The Contractor shall provide details of proposed centralisers for the approval by the Engineer prior to installing any soil nails.

4.19 All soil nail components shall be galvanised complying with BS EN ISO 1461:2009. Where it is necessary to cut the tendons then the cut end shall be at the protruding length of the nail. All cut surfaces shall be painted with a grey coloured zinc based anti-corrosion paint.

4.20 All soil nails shall be clearly referenced and shall have a reference tag tied to the protruding length of nail following completion. The reference tag shall confirm the nail ID, the date of installation and the nail length.

4.21 Any soil nails damaged during the construction works shall be replaced at the Contractor's cost.

5 Soil Nail Grouting

5.1 The drill holes shall be fully grouted with cement grout, consisting of a pumpable mixture of Portland cement. Grouting shall be undertaken as soil nail installation progresses using the grout as flush.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

5.2 Appropriate measures shall be implemented by the Contractor to control loss and spillage of grout at the face where soil nails are installed. Drill holes may be initially formed without grout injection being undertaken up to a maximum drill hole length of 1.0m to aid the control of grout at the installation face.

5.3 Any spillage of grout shall be removed from the final face or underlying verge area prior to final installation of the rock meshing.

5.4 Any voiding around exposed tendons resulting from grout shrinkage or localised face instability shall be filled with a proprietary non-shrink grout.

5.5 Mixing equipment shall be used that produces grout of homogenous consistency and shall be capable of providing a continuous supply to the injection equipment. The injection equipment shall be capable of continuous operation at a constant delivery pressure and shall include a system for recirculating the grout during pauses in the grouting operation.

5.6 Soil nail installation and associated grouting shall be discontinued if the ambient temperature falls below 3 degrees Celsius or if the grout temperature falls below 5 degrees Celsius.

5.7 The grout shall achieve minimum compressive cube strengths of 30 N/mm^2 at 28 days and 10 N/mm^2 at 7 days. Sampling and laboratory testing of the mixed grout shall be carried out as detailed in Clause 8 of this Appendix.

5.8 The water cement ratio of the grout shall not exceed 0.45 and the grout shall not be subject to bleeding in excess of 2 percent after 3 hours. Admixtures that can control, bleed or retard the set of the grout shall only be used when accepted in writing by the Engineer.

5.9 Grout flow cone testing shall also be undertaken daily and the results reported to the Engineer daily. Acceptable limits for flow cone testing shall be in accordance with the requirements of BS EN 447:2007 (T_o < 25s, and T_{30} < 25s and within 20% of T_0).

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

6 Soil Nail Facing

6.1 A flexible facing shall be constructed following installation of the nail tendons and as the excavation progresses. The facing shall comprise erosion protection matting beneath a high tensile steel wire flexible facing mesh. The facing details are shown on Drawing No. 13/NW/0901/052/GDR/106.

6.2 The facing system shall be constructed in accordance with this Specification and any additional manufacturer's instructions or recommendations. The facing shall be appropriately tensioned by pulling it tightly against the slope between the soil nails.

6.3 The flexible soil nail facing shall extend a minimum of 0.5m below engineering rockhead unless engineering rockhead is located below verge level. Where engineering rockhead is located below verge level the facing shall be terminated at the toe of the cut slope with the level of the bottom row of soil nails adjusted to provide anchorage of the facing along the toe of the cutting slope.

6.4 The erosion protection matting shall satisfy the requirements set out in the following table and shall be secured in accordance with the manufacturer's instructions.

Non-degradable Erosion Protection Matting (for strengthened soil slopes)	
Property	**Requirement**
Material	Polypropylene
Structure	Irregular loopy 3D
Thickness	18 mm min.
Weight	600g/m^2 min.
Void space	>95 %
Roll width	2.0m min.
Colour	Khaki grey / brown
Normal functional life	5 years min.

6.5 The colour of the erosion protection matting shall be sympathetic to the landscape to minimise visual impact of the cutting prior to re-vegetation. The Contractor shall submit samples of the proposed erosion matting to the Engineer for approval prior a minimum of four weeks prior to incorporation in the permanent Works.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

6.6 The bottom edge of the erosion protection matting shall be trimmed 0.5m below and parallel to the general profile of engineering rockhead.

6.7 The high tensile steel facing mesh shall satisfy the requirements set out in the following table and shall be secured in accordance with the manufacturer's instructions.

High Tensile Steel Facing Mesh (for strengthened soil slopes)	
Property	**Requirement**
Wire diameter	4 mm
Tensile strength of wire	≥ 1,770N/mm^2
Tensile strength of wire mesh	≥ 250 kN/m
Mesh dimensions	83mm x 138mm
Number of meshes, transversal	12 pcs/m
Number of meshes, longitudinal	7.2 pcs/m
Bearing resistance for proposed soil nail spike plates	
Bearing resistance of the mesh against puncturing	370kN
Bearing resistance of the mesh against shearing-off at the upslope edge of the spike plate	185kN
Bearing resistance of the mesh against slope-parallel tensile stress	75kN

6.8 Adjacent mesh panels (vertical and horizontal) shall be connected using high tensile steel mesh clips with a tensile strength ≥ 1,770N/mm^2. A mesh clip shall be provided at each mesh opening.

6.9 The facing mesh and all mesh clips mesh shall be Zn or Zn/AL coated to provide a minimum life expectancy for the coating of 100 years assuming a Class C2 atmospheric corrosion category in accordance with BS EN 12944-2.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

6.10 Both elements of the flexible facing shall be held in place at each nail location using proprietary spike plates satisfying the requirements set out in the following table and installed in accordance with the manufacturer's instructions.

Soil Nail Spike Plates	
Property	**Requirement**
Material	Galvanised steel (Grade S355J)
Thickness	7mm
Hole diameter	50mm
Length of spikes	7mm
Geometry	Diamond shaped
Longitudinal bending resistance	>8.0 kN/M

6.11 The lock-off nuts shall be tightened against the nail plates after grouting by applying torque that induces a pre-tensioning load of 20kN. A minimum characteristic cube strength of $5N/mm^2$ shall be achieved for the soil nail grout before tightening of the soil nail head plates is undertaken. This shall be demonstrated by the results of grout cube tests.

6.12 Lock-off nuts shall be in full contact with the spike plates. A tapered washer shall be used as necessary.

6.13 The soil nail tendons shall protrude a minimum of 100mm beyond the hexagonal lock-off nut to allow the tendons to be stressed after construction (for production testing).

6.14 Edge details for the flexible facing shall be as shown on Drawing 13/NW/0901/052/GDR/106.

6.15 The location of boundary cable anchor points shall be agreed with the Engineer during the Works. Turnbuckles shall be provided at a maximum spacing of 30m along top and bottom boundary cables to enable tensioning.

6.16 All boundary cables shall be nominal 16mm diameter 6 x 19 galvanised wire cable, manufactured to BS EN 12385-1:2002.

6.17 A minimum of 3 No. grips shall be provided where cable loops are formed. All boundary cable (wire rope) grips shall be galvanised and manufactured to BS EN 13411-5. Grips shall be spaced at 6 x cable diameter. All wire rope loops shall use galvanised steel thimbles to fit 16mm diameter wire rope.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

6.18 The facing mesh shall be connected to the boundary cables using high tensile steel press claws located at every third mesh opening. The press claws shall have a tensile strength ≥ 1,770N/mm^2 and shall be Zn or Zn/Al coated to provide a minimum life expectancy for the coating of 100 years assuming a Class C2 atmospheric corrosion category in accordance with BS EN12944-2.

6.19 Unless otherwise instructed by the Engineer localised collapses shall be repaired using no fines mass concrete. The Contractor shall provide a method statement for undertaking face repairs for the approval of the Engineer prior to commencing the soil nailing works.

6.20 The strengthened soil cutting surface shall be hydroseeded following construction of the facing to assist with the revegetation of the slope. The seed mix shall be in accordance with Appendix 30/5 of this Specification.

7 Soil Nail Testing

7.1 Soil nail testing shall comprise of pull-out testing on sacrificial test nails and production nails.

7.2 Pull-out testing shall be undertaken on five sacrificial nails prior to construction of working nails. The Contractor should consider the time to complete and report on the pull-out testing in his programme; no working nails shall be installed prior to written acceptance of the test results by the Engineer.

7.3 Locations for the installation and subsequent testing of the sacrificial test nails shall be confirmed by the Engineer on site.

7.4 Sacrificial test nails shall be installed using a similar technique, drill hole and tendon diameter as for the working nails and shall be installed to depths between 3m and 5m; the exact depth shall be confirmed by the Engineer following confirmation of the test locations. The bottom 1m of the sacrificial test nails shall be bonded with the remainder of the nail un-bonded, i.e. not grouted.

7.5 Grout for the test nails shall be as for the working nails and detailed within this Appendix. The test nail shall not be loaded until the minimum required compressive cube strength of 30 N/mm^2 has been achieved, an admixture may be used to accelerate the curing of the grout for the sacrificial nails. This strength shall be confirmed with grout cube testing.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

7.6 The Contractor shall provide a method statement for installing and undertaking the pull-out testing on sacrificial nails at least one week before construction of the sacrificial nails for the approval of the Engineer. The Contractor shall detail, as a minimum, the proposed temporary works to access the test locations, the proposed materials and the testing procedure, including details of how the test length will be isolated from the free length of the nail.

7.7 The pull-out testing shall comprise loading and unloading of the test nails in three cycles and shall be undertaken in accordance with BS EN 14490 (2010). In the first cycle the load shall be increased incrementally to 45 kN and have a minimum hold period of 30 minutes. Following unloading, the loading shall then be increased incrementally for the second cycle to a load of 95kN and have a minimum hold period of 30 minutes. Finally, following unloading the loading shall be increased incrementally for the third cycle to a load of 145kN and have a minimum hold period of 30 minutes.

7.8 Acceptance criteria for nails subject to pull out tests shall be in accordance with BS EN 14490:2010. A pull-out test result shall be accepted if:

i) The creep rate at the test load is less than 2mm per log cycle of time; and

ii) The measured extension at the head of the test nail at test load is not less than the expected elastic extension of any debonded length of the test nail.

7.9 If the above criteria are not satisfied the Engineer shall be notified to confirm any changes required to the proposed soil nails design.

7.10 The sacrificial test nails shall be clearly labelled during the works and shall be surveyed upon completion for inclusion on the as built drawings.

7.11 Sacrificial test nails shall not form part of the permanent works; any protrusions from the drill hole shall be cut flush with the ground surface.

7.12 Production testing shall be undertaken on twenty fully grouted working nails selected by the Engineer and in accordance with BS EN 14490:2010. A single load cycle is satisfactory with load increments of 10%, 25%, 50%, 100% and 150% of the design working load unless otherwise directed by the Engineer. All nails shall be tested to a proof load (P_p) of 172.5kN.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

7.13 Acceptance criteria for nails subject to production tests shall be in accordance with BS EN 14490:2010. A production test result shall be accepted if:

i) The creep rate at the test load is less than 2mm per log cycle of time; and

ii) The measured extension at the head of the nail at test load is not less than the expected elastic extension of any debonded length of the test nail.

7.14 If the above criteria are not satisfied the Engineer shall be notified to confirm any changes required to the proposed soil nails design.

7.15 A production nail test result shall be accepted if the creep rate at the test load is less than 2mm per log cycle of time in line with BS EN 14490:2010. If the creep rate is in excess of this criteria, either at or below any of the test loads, the Engineer shall be notified to confirm any changes required to the proposed soil nails design.

7.16 The Contractor shall provide details of his proposed remedial works where working nails do not meet the production test acceptance criteria In addition, the Engineer shall select additional nails for testing such that the extent of the unacceptable nails can be determined. The costs for the additional tests shall be borne by the Contractor.

8 Soil Nail Quality Control / Records

8.1 The Contractor shall keep records of the nails installed and shall submit to the Engineer on a daily basis. The records shall confirm the date, nail ID, installation depth, strata encountered (based on Driller's observations), and any other relevant information.

8.2 Grouting records shall be provided to the Engineer on a daily basis confirming the nails that were grouted, the volume of grout pumped into each drill hole, water/cement ratio, daily testing results, daily sample references and any other relevant information.

8.3 Four grout cubes shall be cast each day during the soil nailing works with and tested after 7, 14 and 28 days (with one spare). The test results shall be reported to the Engineer on a weekly basis. The Contractor shall provide details of his proposed remedial works to the Engineer where the test results do not demonstrate minimum compressive cube strengths of 30 N/mm^2 after 28 days and 10 N/mm^2 after 7 days as required by Clause 5.7 of this Appendix.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

8.4 Grout bleed testing shall be undertaken daily and the results shall be reported to the Engineer on the daily grouting records. The grout shall not be subject to bleeding in excess of 2% after 3 hours.

8.5 Grout flow cone testing shall also be undertaken daily and the results reported to the Engineer daily. Acceptable limits for flow cone testing shall be in accordance with the requirements of BS EN 447:2007 (T_o < 25s, and T_{30} < 25s and within 20% of T_0

9 Rock Meshing

9.1 All formed rock cut faces shall be meshed unless otherwise instructed by the Engineer.

9.2 Rock meshing shall be installed as a closed based draped rock mesh as shown on Drawing 13/NW/0901/052/GDR/107. It shall be supported along its top edge by the bottom row of soil nails and associated boundary cable to the overlying strengthened soil cutting facing.

9.3 The bottom edge of the rock meshing shall be secured by a boundary cable installed 1.0m above verge level and above the deformation zone of the vehicle safety barrier. The bottom cable shall be secured by anchorages installed at maximum 4.0m horizontal centres unless otherwise instructed by the Engineer.

9.4 Mesh installed to rock faces shall satisfy the requirements set out in the following table and shall be secured in accordance with the manufacturer's instructions.

Rock Mesh (for rock cut slopes only)	
Property	**Requirement**
Wire diameter	2 mm
Tensile strength of wire	≥ 1,770N/mm^2
Tensile strength of wire mesh	≥ 65 kN/m
Mesh dimensions	83mm x 143mm
Number of meshes, transversal	12 pcs/m
Number of meshes, longitudinal	7 pcs/m

9.5 Adjacent mesh panels (vertical and horizontal) shall be connected using high tensile steel mesh clips with a tensile strength ≥ 1,770N/mm^2. A mesh clip shall be provided at each mesh opening.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

9.6 The facing mesh and all mesh clips mesh shall be Zn or Zn/AL coated to provide a minimum life expectancy for the coating of 100 years assuming a Class C2 atmospheric corrosion category in accordance with BS EN 12944-2.

9.7 Edge details for the flexible facing shall be as shown on Drawing 13/NW/0901/052/GDR/107.

9.8 The location of boundary cable anchor points shall be agreed with the Engineer during the Works. Turnbuckles shall be provided at a maximum spacing of 30m along top and bottom boundary cables to enable tensioning.

9.9 All boundary cables shall be nominal 16mm diameter 6 x 19 galvanised wire cable, manufactured to BS EN 12385-1:2002.

9.10 A minimum of 3 No. grips shall be provided where cable loops are formed. All boundary cable (wire rope) grips shall be galvanised and manufactured to BS EN 13411-5. Grips shall be spaced at 6 x cable diameter. All wire rope loops shall use galvanised steel thimbles to fit 16mm diameter wire rope.

9.11 The facing mesh shall be connected to the boundary cables using high tensile steel press claws located at every third mesh opening. The press claws shall have a tensile strength ≥ 1,770N/mm^2 and shall be Zn or Zn/Al coated to provide a minimum life expectancy for the coating of 100 years assuming a Class C2 atmospheric corrosion category in accordance with BS EN12944-2.

9.12 D shackles shall have a minimum working load of 4.75 tonnes.

10 Rock Mesh Bottom Anchorages

10.1 The bottom of proposed rock meshing shall be secured by rock bolts with a minimum length of 2.0m into bedrock and installed at a maximum spacing of 4.0m or as otherwise instructed by the Engineer.

10.2 Drill holes shall have a minimum diameter of 100mm and shall be formed at 20^0 to the horizontal. The maximum deviation of drill holes from the specified angle shall be +/- 2^o unless approved by the Engineer.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

10.3 The rock mesh bottom anchorage tendons shall comprise galvanised 32mm external diameter / 18mm internal diameter hollow steel threadbars (steel grade 520 / 670 N/mm^2), with a minimum characteristic yield strength of 220 kN. All ancillary equipment (e.g. eye nuts and centralisers) shall be obtained from the threadbar manufacturer and installed in accordance with their instructions.

10.4 Centralisers shall be used to ensure correct alignment of tendons within the drill hole and to provide adequate grout cover. The arrangement and spacing of centralisers shall be confirmed by the Engineer on site. A minimum of 2 centralisers shall be provided in each hole. The maximum spacing of centralisers shall be 2.0m.

10.5 All anchorage components shall be galvanised complying with BS EN ISO 1461:2009. All exposed cut or damage surfaces shall be painted with a zinc based anti-corrosion paint.

10.6 All rock mesh anchorages shall be installed using cement grout and techniques as specified for soil nails in Clause 5 of this Appendix.

10.7 Acceptance tests shall be undertaken in accordance with BS 8081:2015 on five rock mesh bottom anchorages selected by the Engineer. Acceptance criteria shall be in accordance with BS 8081:2015 Tables G.4 (displacement-time) and G.5 (load loss) for an applied proof load (Pp) of 28.5kN (1.5 x Fserv) over the period of stressing.

10.8 On completion of each test, the Contractor shall prepare and submit to the Engineer a record including details of construction, information on the ground conditions and a plot of the anchorage performance under the test loading.

10.9 Anchorages which do not meet the acceptability criteria shall be abandoned and replaced at no additional cost. Not less than two adjacent anchorages shall then be subjected to acceptance testing and so on until the criteria are met.

11 Rock Dowels and Bolts Used for Rock Face Stabilisation

11.1 Rock doweling and / or bolting works may be required to address discontinuity controlled failure mechanisms (i.e. block type failures) identified within the rock cutting face as the excavation works proceed or as stabilisation measures to existing rock cuts to be retained.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

11.2 If potentially unstable blocks are identified by the Engineer, block dimensions shall be measured to confirm the block volume and associated design action. Where required the Contractor shall make measurements under the direction of the Engineer. The required number, depth and orientation of rock dowels or bolts shall then be confirmed by the Engineer such that the combined capacity of the proposed rock bolts or dowels exceeds the assessed mass of the block to be stabilised.

11.3 The number of, and length of rock bolts or dowels required shall be confirmed by the Engineer based on the following maximum working loads for different assumed bond lengths.

Fixed (Bonded) Length	Maximum Permissible Working Load
2.0m	47kN
2.5m	59kN

11.4 The maximum working load in tension of any installed rock bolt or dowel shall not exceed 59kN. If the required working load in tension of any individual rock bolt or dowel exceeds this value, additional rock bolts or dowels will need to be specified.

11.5 The maximum working load of dowels acting in shear shall not exceed 45kN. If the required working load in shear of any dowel exceeds this value, additional dowels will need to be specified.

11.6 Typical details for rock bolts and dowels shall be as shown on Drawing No. 13/NW/0901/052/GDR/108.

11.7 The drill holes for all rock dowels and bolts shall be a minimum of 75mmØ.

11.8 Rock bolts and dowels shall be 25mm Ø galvanised steel threadbar grade 500/550(N/mm^2) with a minimum yield strength of 245kN and have proprietary face plate arrangement as shown on Drawing No. 13/NW/0901/052/GDR/108.

11.9 Rock bolts shall have a fully galvanised protective top-hat cover installed with a protective grey paint coating.

11.10 All rock dowels and bolts shall be installed on the same day as drilling. If for any reason the installation is delayed the hole shall be probed to ascertain whether collapse of material has occurred which would prevent installation to the scheduled depth. Any such debris shall be removed, or if agreed by the Engineer, a substitute hole may be drilled at an agreed location. Immediately prior to installation of the anchorage dowel, the hole shall be flushed and cleaned out.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

11.11 All rock bolt and dowels shall be installed using cement grout as specified for soil nails in Clauses 5.2 to 5.9 of this Appendix.

11.12 Centralisers shall be used to ensure correct alignment of dowels / bolts within drill hole and to provide adequate grout cover. The arrangement and spacing of centralisers shall be confirmed by the Engineer. The maximum spacing of centralisers shall be 2.0 metres.

11.13 All steel components shall be galvanised complying with BS EN ISO 1461:2009.

11.14 The Contractor shall carry out acceptability tests on at least one rock dowel / bolt in accordance with BS 8081. On completion of each test, the Contractor shall prepare and submit to the Engineer a record including details of construction, information on the ground conditions and a plot of the anchorage performance under the test loading.

11.15 Acceptance criteria shall be in accordance with BS 8081:2015 Tables G.4 (displacement-time) and G.5 (load loss) for an applied proof load (Pp) over the period of stressing equivalent to 1.5 x F_{serv} (equivalent to 1.5 x Tw in BS 8081:1989). Anchorages which do not meet the acceptability criteria shall be abandoned and replaced at no additional cost. Not less than two adjacent anchorages shall then be subjected to acceptance testing and so on until the criteria are met.

12 Rock Dentition and Buttressing

12.1 The requirement for any rock dentition or buttressing shall be confirmed by the Engineer during the works.

12.2 Dowels installed to areas of dentition or buttressing works shall comprise 25mm diameter deformed bars (steel grade 500 / 600 N/mm^2).

12.3 All dowels shall be installed in accordance with Clauses 11.7, 11.8, 11.10, 11.12 and 11.13 of this Specification.

12.4 All concrete shall be applied as shotcrete with the final surface shaped by floating and brushing to mimic the existing pattern of bedding and jointing of rock unless otherwise instructed by the Engineer.

12.5 The requirements for shotcrete for rock dentition and buttressing works shall be in accordance with Clause 3.3 of Appendix 6/3.

APPENDIX 6/10: GROUND ANCHORAGES, CRIB WALLS AND GABIONS (CONTINUED)

13 Rock Slope Quality Control / Records

13.1 The Contractor shall keep records of all drilling and installation operations for all rock anchorages and all other rock slope remedial works and shall submit to the Engineer on a daily basis. The records shall confirm:

- date of installation;
- unique ID;
- location (chainage and height on rock face);
- diameter of drill hole, inclination and azimuth;
- installation depth / length;
- details of any loss or gain of drilling flush, drill hole and face stability;
- groundwater encountered;
- type of reinforcement and total length;
- Details of corrosion protection;
- any damage during installation and associated repairs / remedial measures;
- testing status; and
- any other relevant information.

13.2 Grouting records shall be provided to the Engineer on a daily basis confirming the dowels / bolts grouted, the volume of grout pumped into each drill hole, water/cement ratio, daily testing results, daily sample references and any other relevant information.

13.3 Four grout cubes shall be cast each day during the installation works and tested after 7, 14 and 28 days (with one spare). One copy of the test report shall be submitted to the Engineer within one working day of the completion of each test. The Contractor shall provide details of his proposed remedial works to the Engineer where the test results demonstrate a compressive strength less than 30 N/mm^2 after 28 days.

13.4 Grout bleed testing shall be undertaken daily and the results shall be reported to the Engineer on the daily grouting records. The grout shall not be subject to bleeding in excess of 2% after 3 hours.

13.5 Grout flow cone testing shall also be undertaken daily and the results reported to the Engineer daily. Acceptable limits for flow cone testing shall be in accordance with the requirements of BS EN 447:2007 (T_o < 25s, and T_{30} < 25s and within 20% of T_0).

APPENDIX 6/12: INSTRUMENTATION AND MONITORING

1 General

1.1 The Contractor shall install a line of temporary surface movement monitoring positions at 10m intervals, set back approximately 5m from the crest of the proposed strengthened cutting, prior to commencement of earthworks operations. Datum values for each position shall be established by the Contractor by taking three sets of base readings over a minimum two day period with a difference in values of less than 2mm.

1.2 During earthworks operations for the strengthened cutting, monitoring shall be undertaken by the Contractor at the start of each shift. All monitoring shall be carried out by appropriate trained and skilled personnel. The deviation from the datum value shall be measured to the nearest 2mm in three dimensions (X, Y and X). The monitoring results shall be provided to the Engineer on a daily basis within 6 hours of the monitoring being completed.

1.3 Following the completion of the cutting works the Contractor shall install a row of permanent surface movement monitoring positions at 10m intervals along the crest of the finished cutting. The monitoring positions shall be located so that post-construction monitoring is possible by surveying from finished carriageway level. The Contractor shall provide an initial set of base readings for the permanent monitoring positions on completion of the cutting works in accordance with Clause 1.1 above.

1.4 The Contractor shall install a row of survey pins at 5m intervals along the facing of completed westbound retaining wall. These shall be located so that post-construction monitoring is possible by surveying from finished carriageway level.

1.5 The Contractor shall submit details for all monitoring installations and his proposed method of undertaking monitoring a minimum of two weeks prior to commencing the works for approval by the Engineer.

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS.

PERMITTED PAVEMENT OPTIONS – SCHEDULE 1

Schedule 1: Permitted Pavement Options			
Drawing Reference	Area	General Requirements	Permitted Pavement Option
13/NW/0901/052/700/002	A1	Schedule 2	A1
13/NW/0901/052/700/002	A2	Schedule 2	A2
13/NW/0901/052/700/002	A3	Schedule 2	A3
13/NW/0901/052/700/002	A4	Schedule 2	A4
13/NW/0901/052/700/002	A5	Schedule 2	A5

2. GENERAL REQUIREMENTS – SCHEDULE 2

Schedule 2: General Requirements – Area A1, A2, A3, A4, A5		
Grid for checking surface levels of pavement courses	Longitudinal dimension:	10m
	Transverse direction:	2m
Surface regularity	Category of Road:	A
Interval for measurement of longitudinal regularity:		75m
Interval for measurement of transverse regularity:		20m

3. PERMITTED CONSTRUCTION MATERIALS – SCHEDULE 3

Schedule 3: Permitted Construction Materials		
	Pavement Option A1	
Pavement Layer	Material Reference	Thickness (mm)
Surface Treatment	STA	
Surface Course	SCA	40
Binder Course		
Base		
Upper Base		
Lower Base		
Subbase		
Regulating	RA1	Up to 60
Total Thickness		Up to 100
Capping is not required as described in contract specification Appendix 6/7		

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS (CONTINUED)

Schedule 3: Permitted Construction Materials		
	Pavement Option A2	
Pavement Layer	Material Reference	Thickness (mm)
Surface Treatment	STA	
Surface Course	SCA	40
Binder Course	BCA	60
Base		
Upper Base		
Lower Base		
Subbase		
Regulating	RA2	Up to 100
Total Thickness		Up to 200
Capping is not required as described in contract specification Appendix 6/7		

Schedule 3: Permitted Construction Materials		
	Pavement Option A3	
Pavement Layer	Material Reference	Thickness (mm)
Surface Treatment	STA	
Surface Course	SCA	40
Binder Course	BCA	60
Base		
Upper Base	UBA	100
Lower Base		
Subbase		
Regulating	RA2	Up to 100
Total Thickness		Up to 400
Capping is not required as described in contract specification Appendix 6/7		

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS (CONTINUED)

Schedule 3: Permitted Construction Materials		
	Pavement Option A4	
Pavement Layer	Material Reference	Thickness (mm)
Surface Treatment	STA	
Surface Course	SCA	40
Binder Course	BCA	60
Base		
Upper Base	UBA	100
Lower Base	LBA	100
Subbase		
Regulating	RA2	Up to 200
Total Thickness		Up to 500
Capping is not required as described in contract specification Appendix 6/7		

Schedule 3: Permitted Construction Materials		
	Pavement Option A5	
Pavement Layer	Material Reference	Thickness (mm)
Surface Treatment	STA	
Surface Course	SCA	40
Binder Course	BCA	60
Base		
Upper Base	UBA	100
Lower Base	LBA	100
Subbase	SBA	200
Regulating		
Total Thickness		500
Capping is not required as described in contract specification Appendix 6/7		

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS (CONTINUED)

4. GENERAL REQUIREMENTS FOR CONSTRUCTION MATERIALS – SCHEDULE 4

Schedule 4: General Requirements for Construction Materials	
Clause	Requirement
801.2	As stated
801.3	As stated
801.7	Material shall not be frost susceptible if it is used within 500mm of the designed final surface
802.4	As stated
802.14	As stated
810.6	As stated
818.1	As stated
818.3	As stated
820.2	As stated
901.6	As stated
901.7	As stated
901.8	As stated
902.2	As stated
903.21	As stated unless otherwise agreed on site with the Engineer's Representative
903.22	Options (iii) and (iv) will not be permitted
903.24	Option (iii) will not be permitted
903.25	As stated
903.27	As stated
925.2	As stated
1001.2	As stated
1004.7	As stated
1028	As stated
1033.10	As stated

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS (CONTINUED)

5. REQUIREMENTS FOR CONSTRUCTION MATERIALS – SCHEDULE 5

Schedule 5: Requirements for Construction Materials			
Material Reference	Clause	Description	Requirement
SBA	803	Type 1 unbound mixture	Mixtures containing crushed gravel course aggregate: Permitted: Yes Minimum CBR: 30 Trafficking trial: Required (complying with sub-Clause 802.12)
RA1	907	Regulating Course	Mixture Designation: AC 20 dense base 40/60 des void content at refusal monitoring: Not required. Resistance to permanent deformation classification Class 2 from Table B4 of PD6691. Alternative methods of laying and material types may be considered, but would need prior approval by the Engineer.
RA2	907	Regulating Course	Mixture Designation: AC 32 dense base 40/60 des void content at refusal monitoring: Not required. Resistance to permanent deformation classification Class 2 from Table B4 of PD6691. Alternative methods of laying and material types may be considered, but would need prior approval by the Engineer.
STA	924	High Friction Surfacing	Type Classification: Type 2 Required declared PSV: 68 Required maximum AAV category:[924.4] Colour: Grey
UBA & LBA	929	Dense Base Course Asphalt Concrete (Design Mixtures)	Mixture designation: AC 32 dense base 40/60 des Void content at refusal monitoring: Not required Resistance to permanent deformation classification Class 2 from Table B4 of PD6691. Resistance to permanent deformation monitoring: Not required

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS (CONTINUED)

BCA	929	Dense Binder Course Asphalt Concrete (Design Mixtures)	Mixture designation: AC 20 dense bin 40/60 des Void content at refusal monitoring: Not required Resistance to permanent deformation classification Class 2 from Table B4 of PD6691 Resistance to permanent deformation monitoring: Not required
SCA	942	Thin Surfacing Course Systems	Traffic count in cv/l/d: 353 at 40 years Site Category and Site Definition: H2 – Bend (not subject to 40mph or lower speed limit) radius <100m Required declared PSV category: 55 Required maximum AAV category in hot paver laid thin surfacing course systems: 16 Resistance to permanent deformation: Level 3 Road / Tyre noise level [942.8 and Table NG 9/30]: Level 0 Absolute minimum layer thickness at any point is 40mm. Interval and frequency of macrotexture measurements in accordance with 921.2: Initial texture depth in accordance with Table 9/3. Surface macrotexture Performance Guarantee [942.14 and Table NG 9/31]: 2 years

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS (CONTINUED)

6. THIN SURFACE COURSE SYSTEMS: INFORMATION TO BE PROVIDED BY THE CONTRACTOR – SCHEDULE 6

(Note to Contractor: Complete one sheet per system or variant of system that may be used)

The Contractor shall provide the following information with his tender:

(i) Certificate or Certificates for the Thin Surface Course System or systems that are proposed for use in the works, together with a copy of the Installation Method Statement associated with each Certificate.

(ii) For any Certificate that covers several variants of one Thin Surface Course System, proposed variant or variants of the system to be used in the Works [variants of a system occur from any option that results in different values being reported on the Certificate for one or more properties, and could involve changes in nominal maximum aggregate size, aggregate type, aggregate grading, binder type, binder content, fibres or other additives, type and rate of spread of bond coat].

(iii) If requested, or if the Thin Surface Course System is not produced under a Sector Scheme, the proposed component materials to be used in the Thin Surface Course System and their proportions for each proposed system.

(iv) Proposed source or sources of coarse aggregate together with statement of properties including Polished Stone Value, Aggregate Abrasion Value, Los Angeles Coefficient and flakiness index.

(v) If regulating material is to be used, evidence of its deformation resistance either independently or in combination with the Thin Surface Course System.

7. BINDER DATA REQUIREMENTS – SCHEDULE 7

The following data shall be provided to the Engineer for modified binders as required in sub-Clauses 937.4 and 943.4. The data should not be more than 12 months old. A table in which the binder data may be recorded is given at the end of this section.

I. Binder Samples

Bituminous binders shall be sampled from the delivery according to BS EN 58. For modifiers blended with the other component materials of the mixture at the mixer a simulated binder shall be prepared. Such modifiers are generally less intimately mixed with the bitumen and less well dispersed throughout the mixture than when pre-blended. Evidence that the simulated binder offers the same performance as the binder produced when the modifier is added at the mixer shall be provided.

II. Penetration

Binder penetration at 25°C (BS EN 1426), 100g 5 seconds, and at 5°C, 200g 60 seconds, before and after hardening in the Rolling Thin Film Oven Test (RTFOT) in accordance with BS EN 12607-1, or alternatively, after RTFOT and after RTFOT and Ageing in accordance with Clause 955.

III. Product Identification Test and Rheological Properties

Results for the binder(s) proposed shall comprise rheological data for each binder in the form of complex shear (stiffness) modulus (G*) and phase angle (δ) determined in accordance with Clause 956 for binder as supplied, after RTFOT and after RTFOT and Ageing in accordance with Clause 955.

IV. Storage Stability Test

All binders shall be stored strictly in accordance with the manufacturer's instructions. Polymer modified binders claimed to remain homogeneous in storage without agitation shall be tested for storage stability in the manner described in Clause 958. The mean of the differences in softening point between the top and bottom samples, of not less than five pairs of such samples shall not exceed 5°C. Manufacturers of preblended modified binders shall state what precautions are necessary to ensure that adequate homogeneity is maintained during storage.

V. Photomicrograph

A typical photomicrograph of the modified binder and binder using ultra-violet or other technique to provide maximum contrast of the polymer structure to the binder before modification shall be supplied together with details of sample preparation techniques.

VI. Cohesion

Vialit Pendulum cohesion test curve of the binder, in accordance with Clause 957 for the binder as supplied, after RTFOT and after RTFOT and Ageing in accordance with Clause 955.

VII. FRAASS Brittle Point

FRAASS brittle point measured using BS EN 12593 shall be provided on the binder as supplied, after RTFOT and after RTFOT and Ageing in accordance with Clause 955.

Summary of binder data

Manufacturer of Binder:	Product name		
Binder type:		Batch ref:	
Binder source:			
Softening point difference in storage stability test			
Test	Supplied binder	After RTFOT	After Ageing
Penetration at 25°C 0,1 mm (100g and 5 secs)			
Penetration at 5°C 0,1 mm (200g and 60 secs)			
Vialit pendulum cohesion see Clause 939 maximum peak value J/cm2	#	#	#
Product identification test	#	#	#
Complex shear (stiffness) modulus (G*) and phase angle (•) data. See Clause 928			
FRAASS brittle point			
Other properties the Contractor considers useful			
Manufacturer of Binder:			

Where indicated with # the Contractor shall attach a graphical output to this schedule.

8. MIXTURE DATA REQUIREMENTS – SCHEDULE 8

The following data should be provided to the Engineer for materials designed in accordance with Clause 901.17 and Clause 929 in respect of the proposed mixture.

I. Saturation Ageing Tensile Stiffness (SATS) ratio – as described in Clause 953

APPENDIX 7/1: PERMITTED PAVEMENT OPTIONS (CONTINUED)

Application for use of proprietary surface course system

Operating Company :		**OC Project Manager:**			
		OC Project Manager e-mail Address:			
Contract					
Scheme ID number	**Work Code**	**PMS Category**	**Work Year**	**Contract Name**	
Transport Scotland management		**Management arrangements**		**Contract arrangement**	
Asphalt Sub Contractor		**Laying Contractor**		**Lane Rental ?**	
Site					
Site description	**Speed Limit**	**Works type**	**PSV**	**Distance from Plant to Site**	
System Proposal					
System name	**Maintenance period**	**Description**		**Tack / Bond Coat**	
Proposed production plant	**BBA / HAPAS Certified**			**Material being replaced**	
System History					
Previous use	**Details of authorisation**			**Additional remarks**	

Transport Scotland scheme specific approval	**Yes / No**	**Comments:**	**To be completed by**	**Operating Company**
				Contractor
Signed:				**Transport Scotland**
Date:				

Please return to:
[redacted] Materials and QA Advisor, TRIPS 5, Transport Scotland Buchanan House 58 Port Dundas Road Glasgow, G4 0HF
e-mail - [redacted]@transportscotland.gsi.gov.uk

APPENDIX 7/2: EXCAVATION, TRIMMING AND REINSTATEMENT OF EXISTING SURFACES

1. Not used

2. Refer to Appendix 7/9 and Drawing 13/NW/0901/052/700/001 for areas of existing bituminous bound flexible pavement to be cold-milled (planed).

3. Refer to Appendix 7/1 for permitted construction materials and Drawing 13/NW/0901/052/700/002 for locations of permitted construction materials. The contractor must ensure that any longitudinal joints in any layer of surfacing are not within any temporary or permanent wheel track.

2. Not used
   I. Not Used
   II. Not Used
   III. Not Used
   IV. Not Used
   V. Refer to Drawing 13/NW/0901/052/700/003 for Typical Pavement details.
   VI. Not used

5. Full depth repairs and reinstatements
   I. Not Used
   II. Not Used
   III. Not Used
   IV. Not Used
   V. Not Used
   VI. Not Used
   VII Not Used

6. Not used

APPENDIX 7/4: BOND COATS, TACK COATS AND OTHER BITUMINOUS SPRAYS

SHEET 1 : Information to be provided by the compiler

1. Refer to Drawing No. 13/NW/0901/052/700/002 for details of proposed surfacing extents.

2. See Appendix 1/13 for details of access restrictions and timing constraints.

3. Base and Binder Courses – a bond coat in accordance with Clause 920 shall be applied to all new, cold-milled or existing bituminous bound flexible pavement layers prior to overlaying with new bituminous bound flexible pavement layers including regulating layers.

4. Surface preparation will be in accordance with the requirements of Clause 920.6.

5. Not used.

6. The rate of spread of the bond coat will be in accordance with the requirements of Clause 920.8.

7. Not used.

Sheet 2: Information to be supplied by the contractor

1. The product or products to be used together with their data sheets, product identification data and cohesivity data as specified.

2. For each product, a copy of the BS EN ISO 9001 certificate showing the name of the manufactures, the name of the certification body and the reference number and date of the certificate.
3. The spraying equipment proposed, and a test certificate.

4. Not used.

5. Contingency plans in the event of any breakdown.

6. The results of any other tests and other data the Contractor considers would assist the Engineer in assessing the technical merit of the treatment such as:

   (i) Tackiness test and / or trafficability time and methods of test.

   (ii) Breaking time test results for different weather conditions and substrates.

   (iii) Not used

Binder Data Sheet – Appendix 7/4			**Bond Coats, Tack Coats and other Bituminous Sprays**		
Manufacturer of Binder:			Product Name:		
Binder Type:			Batch Number:		
Binder Grade (Highlight as required)					
Conventional	Intermediate	Premium	Super-Premium	Non-Track	Other
Binder	**Source** ➔	**Recovered Binder**		**Recovered Binder after Ageing Test**	
Test ⬇		Recovered in accordance with Clause 923		Aged in accordance with Clause 923	
Penetration at 25ºC 0.1mm (100g and 5 secs)					
Penetrations at 5ºC 0.1mm (200g and 60 secs)					
Vialit pendulum cohesion (see Clause 957) Maximum peak value J/cm²		The Contractor will attach a Report and graphical output to this schedule as specified in Clause 957.		The Contractor will attach a Report and graphical output to this schedule as specified in Clause 957.	
Product Identification Test **The provision of data for identification and ageing is optional for unmodified emulsions to BS EN 12591 and cutback bitumen to BS EN 12591:2009 and BS EN 13924:2006.** Complex shear (stiffness) modulus (G*)and phase angle (δ) data. See Clause 956.		The Contractor will attach a Report and graphical output to this schedule as specified in Clause 956.		The Contractor will attach a Report and graphical output to this schedule as specified in Clause 956.	
Other properties the Contractor considers useful: Minimum Binder Content Binder temperature range for spray application Emulsion Properties and Viscosity Break time Breaking Agent Type Weather limits – information from binder manufacturer: road or air temperatures; humidity; wind chill adjustment; tolerance of surface dampness; etc Temperature max: Temperature min: Other:					

APPENDIX 7/6: BREAKING UP OR PERFORATION OF EXISTING PAVEMENT

1. Where the existing pavement is overlaid by Pavement Option A5 in Schedule 3 of Appendix 7/1, the existing pavement will be broken up.

2. Where the existing pavement is outside the new pavement alignment, the existing pavement will be saw cut longitudinally to a depth of 250mm along the edge of the new alignment and then broken up prior to being covered with suitable fill.

APPENDIX 7/9: COLD-MILLING (PLANING) OF BITUMINOUS BOUND FLEXIBLE PAVEMENT

1. Refer to Drawing 13/NW/0901/052/700/001 for the extent of cold-milling required.

2. Location and type of cold-milling required:

Left Lane - uphill slope side (based on finished setting out data)				Right Lane - Loch side (based on finished setting out data)			
From	To	Type	Maximum Depth	From	To	Type	Maximum Depth
-28.00	-5.00	0-40mm	40mm	-28.00	-5.00	0-40mm	40mm
-5.00	0.00	0-40mm	40mm	-5.00	0.00	0-40mm	40mm
0.00	10.00	No planing	0mm	0.00	10.00	No planing	0mm
10.00	20.00	No planing	0mm	10.00	20.00	No planing	0mm
20.00	30.00	No planing	0mm	20.00	30.00	No planing	0mm
30.00	40.00	No planing	0mm	30.00	40.00	No planing	0mm
40.00	50.00	No planing	0mm	40.00	50.00	No planing	0mm
50.00	60.00	No planing	0mm	50.00	60.00	No planing	0mm
60.00	65.00	No planing	0mm	60.00	65.00	No planing	0mm
65.00	70.00	Breaking up	300mm	65.00	70.00	No planing	0mm
60.00	70.00	Breaking up	300mm	60.00	70.00	No planing	0mm
70.00	75.00	Breaking up	300mm	70.00	75.00	No planing	0mm
75.00	80.00	Breaking up	300mm	75.00	80.00	Breaking up	300mm
80.00	85.00	Breaking up	300mm	80.00	85.00	Breaking up	300mm
85.00	90.00	Breaking up	300mm	85.00	90.00	Breaking up	300mm
90.00	100.00	Breaking up	300mm	90.00	100.00	Breaking up	300mm
100.00	110.00	Breaking up	300mm	100.00	110.00	Breaking up	300mm
110.00	120.00	Breaking up	300mm	110.00	120.00	Breaking up	300mm
120.00	130.00	Breaking up	300mm	120.00	130.00	Breaking up	300mm
130.00	140.00	Breaking up	300mm	130.00	140.00	Breaking up	300mm
140.00	150.00	Breaking up	300mm	140.00	150.00	Breaking up	300mm
150.00	160.00	Breaking up	300mm	150.00	160.00	Breaking up	300mm
160.00	165.00	Breaking up	300mm	160.00	165.00	Breaking up	300mm
165.00	170.00	No planing	0mm	165.00	170.00	No planing	0mm
170.00	175.00	No planing	0mm	170.00	175.00	No planing	0mm
175.00	180.00	No planing	0mm	175.00	180.00	0-40mm	40mm
180.00	185.00	No planing	0mm	180.00	185.00	0-40mm	40mm
185.00	190.00	0-100mm	100mm	180.00	190.00	0-100mm	100mm
190.00	200.00	0-100mm	100mm	190.00	200.00	0-100mm	100mm
200.00	205.00	0-100mm	100mm	200.00	205.00	0-100mm	100mm

Left Lane - uphill slope side (based on finished setting out data)				Right Lane - Loch side (based on finished setting out data)			
From	To	Type	Maximum	From	To	Type	Maximum
205.00	210.00	No planing	0mm	205.00	210.00	No planing	0mm
210.00	215.00	No planing	0mm	210.00	215.00	No planing	0mm
215.00	220.00	Breaking up	300mm	215.00	220.00	No planing	0mm
220.00	230.00	Breaking up	300mm	220.00	230.00	No planing	0mm
230.00	240.00	Breaking up	300mm	230.00	240.00	No planing	0mm
240.00	245.00	Breaking up	300mm	240.00	245.00	No planing	0mm
245.00	250.00	No planing	0mm	245.00	250.00	No planing	0mm
250.00	260.00	No planing	0mm	250.00	260.00	No planing	0mm
260.00	270.00	No planing	0mm	260.00	270.00	No planing	0mm
270.00	280.00	No planing	0mm	270.00	280.00	No planing	0mm
280.00	290.00	No planing	0mm	280.00	290.00	No planing	0mm
290.00	300.00	No planing	0mm	290.00	300.00	No planing	0mm
300.00	310.00	No planing	0mm	300.00	310.00	No planing	0mm
310.00	315.00	No planing	0mm	310.00	315.00	No planing	0mm
315.00	320.00	0-40mm	40mm	315.00	320.00	0-40mm	40mm
320.00	330.00	0-40mm	40mm	320.00	330.00	0-40mm	40mm
330.00	340.00	0-40mm	40mm	330.00	340.00	0-40mm	40mm
340.00	341.00	0-40mm	40mm	340.00	341.00	0-40mm	40mm

3. The existing pavement will be swept in accordance with Clause 709.11 prior to cold-milling.

APPENDIX 12/1: TRAFFIC SIGNS, GENERAL

1. Schedule of Traffic Signs

(i) Sign locations are shown approximately on Drawing Number 13/NW/0901/052/1200/001. Exact locations must be agreed on site with the Engineer.

Where a new sign is to be erected in the same position as an existing sign, the new sign shall be erected temporarily adjacent to the existing sign and be fully operational before the existing sign which it replaces is removed permanently. The existing sign(s) are to be placed on a temporary frame to keep continuity along the A83. The positions of all temporary sign(s) are to be agreed with the Engineer and shall be suitability weighted to resist overturning from high winds.

The position of the vehicle activated sign must be agreed with Engineer on site. It must be demonstrated to the Engineer on site that the vehicle activated sign receives signal and works as intended.

(ii) Diagram Numbers are in accordance with Schedules 1-16 of the current edition of The Traffic Signs Regulations and General Directions 2016 and as shown on drawing 13/NW/0901/052/1200/001.

(iii) For detail of sizes of sign plates refer to drawing 13/NW/0901/052/1200/001.

(iv) Sign plates shall be manufactured from sheet aluminium of not less than 3mm thickness extruded aluminium planks or from 1.25mm thickness steel sheet. All sign plates shall comply with BS EN 12899-1, this Appendix and Clause 1205.

Unless otherwise directed by the Engineer, the whole of the back surface of all sign plates shall be covered with grey non-reflective plastic sheeting or other grey finish for which a manufacturer's guarantee of not less than seven years has been obtained. No portion of the back shall be reflectorised.

All stiffening and framing shall be in aluminium section of equivalent strength (section modulus) to that of mild steel tabulated in Chapter 13 of the Traffic Signs Manual and coloured grey to match the back of the sign.

Where more than one sheet is used to make up a sign, the number of sheets shall be kept to a minimum and the sheets shall be rectangular and of comparable size and shape. Permanent and temporary sign plates shall be manufactured from one of the approved materials complying with BS EN 12899-1. The stiffening shall be constructed and applied in accordance with the manufacturer's recommended spacing so as to meet the mechanical properties and construction requirements of BS EN 12899-1. Where sign plates need to be stiffened this shall be achieved in a manner such that the sign face is not punctured or otherwise damaged to accommodate the stiffening. All traffic signs including regulatory plates shall be stiffened with a minimum of 2 channels. All vertical joints shall be covered with a strip of the same material as the plate. This strip shall be not less than 50mm wide.

APPENDIX 12/1: TRAFFIC SIGNS, GENERAL (CONTINUED…).

(iv) (continued)

All brackets, 'U' bolts and clips used in sign assemblies shall be manufactured from stainless steel, or in the case of plank type signs, extruded aluminium or cast aluminium. They shall be complete with stainless steel nuts and bolts and with 2 No. stainless steel washers and 1 No stainless spring washer for each bolt.

Clips shall be provided on every sign plate at the intersection of all posts and channelling.

The Engineer's approval is to be obtained before using stainless steel banding in place of purpose made brackets.

For signs mounted on a single post anti rotational sign clips to prevent forced rotation shall be provided.

There may be occasions when specialist fixings will be required to erect signs. In all circumstances the approval of the Engineer is required.

(v) The foundation shall be a minimum class ST4 concrete unless otherwise specified by the Engineer.

Any additional excavation carried out shall be filled with ST4 concrete, and the Contractor shall ensure that posts and foundations do not cause interference with new or existing drainage or new underground Openreach duct. Refer to Table 1 on drawing number 13/NW/0901/052/1200/001 for post and foundation details.

All excavations for foundations shall be carried out in compliance with Clause 604 and shall be cleared of all loose material before placing of concrete and backfilling.

The top of concrete foundation for sign post(s) shall be 150mm below finished ground level and backfilled to ground level, unless otherwise stated by the Engineer.

Post foundations located in the westbound verge are anticipated to be formed in either made ground or superficial materials typically comprising of granular material. Post foundations in the eastbound verge are likely be formed in bedrock (this applies to the vehicle activated sign).
Signs should be located so that the leading edge of the post is located outside of the working width of the barrier.

(vi) All posts with a diameter of 76mm or less shall be tubular steel unless otherwise specified by the Engineer. Each post shall be hot dipped galvanised to BS EN ISO 1461:2009 at the fabrication factory. The post will be covered in bitumen both outside and inside the post up to 150mm above proposed ground level.

All posts with a diameter greater than 76mm shall be 'Passive' posts and shall be non energy (NE) class passively safe posts that conform to BS EN 12767 as per Advice Note TA89/08. 'Passive' posts shall be made of glass fibre composite, the sign face mounted at a minimum of 1.8m from the ground level unless otherwise stated.

Refer to drawing number 13/NW/0901/052/1200/001 for details of post dimensions and locations.

Refer to drawing number 13/NW/0901/052/1200/003 and 004 for specific post details regarding vehicle activated signs.

Post shall not protrude above the top of the sign.

All posts shall be fitted with a tight fitting closing cap.

All posts shall be supplied complete with plastic end caps.

The corners of all backing boards shall be rounded.

APPENDIX 12/1: TRAFFIC SIGNS, GENERAL (CONTINUED…).

(vii) Not used.

(viii) Faces for permanent traffic signs shall be of Microprismatic type Class R3B (or approved equivalent) and shall comply with BS EN12899-1:2007.

All plastic sheeting shall be faced in accordance with the sheeting manufacturer's instructions.

All materials comprising the sign face, including the background border and legends shall be carefully matched for colour at the time of sign fabrication to provide uniform appearance both day and night.

Letters, numerals, symbols and borders shall be clear cut, sharp edged and without cracks.

All signs shall be covered over the whole front face with the appropriate combination of reflective and non-reflective plastic sheeting for which a manufacturer's guarantee of not less than 7 years has been obtained.

Each road sign shall be clearly and permanently marked on the reverse to show the date of manufacture, the manufacturer's name and shall be CE marked. The size of this marking shall not exceed 100 mm x 100 mm.

(ix) Not used.

(x) Not used.

(xi) Not used.

(xii) Not used.

2. Additional Information

Not used.

APPENDIX 12/2: TRAFFIC SIGNS, MARKER POSTS

(i) The dimension of hazard marker posts shall be as per the standard detail shown on Drawing Number 13/NW/0901/052/1200/002. The locations and hazard marker posts shall be as described in drawing number 13/NW/0901/052/1200/001.

(ii) Hazard marker posts shall be capable of being overrun by vehicles so that they deflect and spring back to an upright position without shattering in all weather conditions and with little or no vehicular damage. Hazard marker posts will also be passively safe and CE marked.

Hazard marker posts shall be fitted with anti-removal tabs below finished ground level.

The reflectors shall be of Class 1 retro-reflective sheet material to comply with Diagram 561 of Traffic Signs Regulations and General Directions 2016.

The foundation shall be a minimum class ST4 concrete unless otherwise specified by the Engineer.

Any additional excavation carried out shall be filled with ST4 concrete, and the Contractor shall ensure that posts and foundations do not cause interference with new or existing drainage or new underground Openreach duct. Refer to Table 1 on drawing number 13/NW/0901/052/1200/001 for post and foundation details.

All excavations for foundations shall be carried out in compliance with Clause 604 and shall be cleared of all loose material before placing of concrete and backfilling.

The top of concrete foundation for sign post(s) shall be 150mm below finished ground level, unless otherwise stated by the Engineer. The foundation will then be backfilled to ground level.

Post foundations located in the westbound verge are anticipated to be formed in either made ground or superficial materials typically comprising of granular material.

APPENDIX 12/3: TRAFFIC SIGNS: ROAD MARKINGS AND STUDS

1. The following general requirements shall apply to all work undertaken under this Contract.

(i) Locations of road markings are shown on Drawing 13/NW/0901/052/1200/001
The material used for white markings shall be high performance thermoplastic complying with the requirements of BS EN 1436 and the following:-

(a) Material Requirements

Aggregate:

The aggregate shall consist of a special blend of high quality white aggregates. The main material in the aggregate should have a minimum PSV of 55.

Pigment:

The pigment shall be titanium dioxide complying with the requirements of a high quality rutile grade (BS 1851 Type R).

Binder:

The binder shall consist of a high grade synthetic hydrocarbon resin.

Reflectorisation:

The markings shall be reflectorised with Class A glass beads premixed with the thermoplastic before laying (BS EN 1436) at the rate of not less than 20% by mass of the total material. Immediately following the application of material for any white markings, Class B solid glass beads shall be applied to the surface of the laid thermoplastic.

(b) Properties
Wear (Erosion) – Minimum of 70% Material Remaining
Spread – Not more than 10% of Specified Dimensions
Colour – Paint not less than 60%
(Luminance Factor) – Thermoplastic – Not less than 45%
Skid Resistance – >55PSV
Retroflectivity – Nominal 100mcd/m2/lux
Function Life – 24 months Minimum.

(c) Certificate of Compliance

The material must be a Kitemark product (or equivalent) and when submitting the Tender an independent Laboratory (NATLAS approved) Test Certificate not more than 6 months old shall be included detailing compliance with the requirements of BS EN 1436 and with the modifications given in paragraph (i) and (ii).

Once approved no substitute materials will be allowed without the express approval of the Engineer and subject to evidence of compliance with the Specification as detailed above.

(d) Containers

The thermoplastic shall be supplied in powder form in low melting point

bags to form a composite material when heated (BS EN 1436).

(e) Performance

Skid Resistance

Under normal conditions the skid resistance value shall not be less than 55 when measured by the Transport and Road Research Laboratory Portable Skid Resistance Tester (Road Research Note No 27) throughout the marking's guaranteed life.

Quality Control

The Engineer reserves the right to take samples of the contractor's materials (BS EN 1436) at intervals during the course of the contract to test any or all of the properties specified in this document. Failure to comply will be sufficient reason to cancel the contract and recover the costs of testing.

Guarantee

The Contractor shall provide a performance guarantee of **not less than 24 months.**

(ii) Carriageway edge lines shall have 150mm gaps at intervals no more than 30m apart to aid carriageway drainage as stated on drawing 13/NW/0901/052/1200/001.

(iii) All road markings, shall provide a skid resistance level of 55 (Clause 1212.6)

(iv) Temporary road markings shall be laid in accordance with BS EN 1790:2013

Fixing of studs shall be in accordance with the manufacturer's written recommendations with respect to whether the studs shall be fixed to existing or new surfacing.

(v) Locations of road studs as per drawing 13/NW/0901/052/1200/001. All white and red studs shall comply with Clause 1213. Red reflectors shall be uni-directional, white reflectors shall be bi-directional.

(vi) Not used.

(vii) Not used.

(viii) Not used.

APPENDIX 12/4: TRAFFIC SIGNS, CONES, CYLINDERS, FTDS AND OTHER TRAFFIC DELINEATORS

Not Used.

APPENDIX 12/5: TRAFFIC SIGNS: TRAFFIC SIGNALS

1. Not Used.
2. The Principal Contractor shall be responsible for providing all necessary traffic management arrangements in accordance with the requirements of the current Chapter 8 of the Traffic Signs Manual, for all signal installation works. Refer to Specification Appendix 1/17 for Traffic Safety and Management details.
3. Not Used.
4. Not Used.

APPENDIX 12/6: TRAFFIC SIGNS: SPECIAL SIGN REQUIREMENTS ON GANTRIES

Not used.

APPENDIX 24/1: BRICKWORK, BLOCKWORK AND STONEWORK

1. Not Used.

2. The open cracks found within the north section as detailed on drawing no 13/NW/0901/052/2400/01 are to be cleaned out and filled with mortar. The mortar for repointing is to be mortar designation (ii), in accordance with Table 24/1 of the Specification for Highway Works, colour matched to the existing mortar.

3. to 7. Not Used.

8. Where individual stones are to be replaced the surrounding masonry will be supported or shored as required during replacement. If the original stones cannot be reused replacement stones are to match the surrounding masonry.

9. Not Used.

10. Not Used.

11. Where there is loose mortar or mortar loss to the masonry the joint will be raked out and repointed. Defective mortar will be raked out to a minimum of 25mm. For open joints > 50mm the following may be considered; where the remaining mortar is sound and the masonry is stable it should be carefully re-pointed and if the stonework is unstable then the stones should be removed, the area raked and cleaned out followed by the replacement of the stonework and repointing. Re-pointing shall be carried out with the masonry in the damp condition by wetting the raked out joints. Re-pointing is to be carried out when the mortar is still green. Joints are to match the existing joint finish of the adjacent masonry. Where mortar is removed by pressure water jetting, any wetting agents added to the water shall be low foaming and biodegradable prior to recommencing pointing. All prepared joints will be free of vegetation and other mineral deposits.

12. to 23. Not Used

24. The location and indicative extent of the repairs are as indicated on drawing no 13/NW/0901/052/2400/01. Exact areas are to be agreed on site with the Engineer prior to commencing repairs.

25. All vegetation in contact with the masonry is to be removed and the masonry treated with weed killer to prevent regrowth in line with appendix 30/2. In particular the shrubs/tress growing on top of the wall is to be removed. After removal of vegetation any defects found, which require repair and which are not covered by drawing no 13/NW/0901/052/2400/01, are to be agreed with the Engineer.

26. The salt deposits and efflorescence shall be removed from the stonework using water and a stiff brush. Any defects found after cleaning, which require repair and which are not covered by drawing no 13/NW/0901/052/2400/01, are to be agreed with the Engineer.

27. Where crack width tell-tales are to be installed they shall monitor horizontal and vertical movement to an accuracy of +/- 1.0mm and by interpolation to +/- 0.5mm. The tell-tales should be suitable for use outside in all weathers. Locations and measurements should be recorded and dated on a crack record sheet after installation and passed to the Engineer for inclusion in the Operation and Maintenance manual.

APPENDIX 26/1: ANCILLARY CONCRETE

1. All concrete for bedding and channels shall be ST4 mix.

   All concrete for fencing foundations shall be ST2 mix.

   All concrete for drainage headwalls is as detailed on drawing 13-NW-0901-052-500-003.

APPENDIX 30/1: LANDSCAPE AND ECOLOGY GENERAL

1. The scheme extents lie partly within the boundary of Strone Point, North Loch Fyne Geological SSSI and in close proximity (within 30m) of the Upper Loch Fyne MCA.

   The Contractor shall comply with the A83 Strone Point Record of Determination, Scottish Natural Heritage granted licence and supporting information. Where, by reason of amended legislation or amended policy within the Scottish Government, the environmental commitments change and it is required that these changes are implemented in the construction of the Works, such changes shall be implemented by agreement between the Contractor, the Scottish Government, the planning authority and other interested parties as construction proceeds.

   The Contractor shall produce a Construction Environmental Management Plan (CEMP) and provide it to the Engineer no later 10 working days before the start of works for the Ecological Clerk of Works (ECoW) to review and approve before the works start. This plan shall refer to:

   - The Contractors Environmental Management System and supporting procedures,
   - The requirements set out in the contract specification with regard to the prevention of pollution, including adherence to SEPA's Pollution Prevention Guidelines and Special Requirements required to prevent pollution to Loch Fyne, and
   - How accidental spillages will be controlled.

   This CEMP and Contract specification document shall remain on site at all times to allow the Engineer to audit the Contractor at any time.

   BEAR Scotland will appoint an ECoW for this contract. The Contractor shall be responsible for informing the ECoW and the Engineer of any environmental issues on site as soon as they become apparent, including the discovery of injurious weed species, to be dealt with in accordance with Appendix 30/2.

   The Contractor shall give the Engineer notice of all items in sub-clause 3001.2.

   The Contractor shall liaise directly with landowners to give notice and arrange precise access dates for any Works that the Contractor proposes to undertake outside the Land Made Available (LMA).

2. Not used.

3. Pesticide record forms, detailing information as required in Sub-clause 3001.13, shall be submitted to the Engineer on a monthly basis or as required by the Engineer. A sample pro-forma to be used for such records is given in Sheet 2 of this Appendix 30/1.

4. The bird nesting season to apply for this Contract shall be from 1st March to 31st August inclusive. If works are to be undertaken during this period the Contractor shall inform the Ecological Clerk of Works of any grass and tree cutting planned to allow pre-construction surveys to be conducted.

5. The Contractor shall provide Inspection Reports for the landscape activities listed in Clause 3001.15 at intervals to be agreed with the Engineer and the ECoW. The reports shall identify the level of work activities undertaken for each operation on a form which shall contain the following as a minimum:

   (i) Date of visit;

   (ii) Duration of visit and number of operatives on site;

   (iii) List of operations carried out and locations;

   (iv) Weather conditions;

   (v) Details of weed removal and herbicide operations including areas treated, type and rate of herbicide applied;

   (vi) Report on the general condition of seeded areas;

   (vii) Proposed date of following visit.

   A sample pro-forma to be used for such records is given in Sheet 3 of this Appendix 30/1.

APPENDICES 30/1: LANDSCAPE AND ECOLOGY – GENERAL (CONTINUED…)

SHEET 2: Information to be provided by the Contractor

LANDSCAPE WORKS - PESTICIDES RECORD

Contract Reference number: 13/NW/0901/052 **Date of visit:** (Minimum one record / day)

Contract Name: A83 Strone Point Improvement Scheme

Name of Contractor: **Contractor's telephone no:**

Weather Conditions:

Operations carried out	Pesticide used	Locations of Operations
Weed control in any waterbody		
Selective herbicide to areas of grass		
Herbicide to cultivated plant beds		
Total herbicide around individual plants in grass		
Other (state purpose)		

Names of operatives on site: **Qualifications of operatives named:**

Supervisor..... .....

Storeman..... .....

Application by..... .....

Signed (for Contractor).....

Contractor's observations on damage by others or any incidents:

.....

.....

APPENDICES 30/1: LANDSCAPE AND ECOLOGY – GENERAL (CONTINUED…)

SHEET 3: Information to be provided by the Contractor

LANDSCAPE WORKS – INSPECTION REPORT

Contract Reference number: 13/NW/0901/052 **Date of visit:**

Contract Name: A83 Strone Point Improvement Scheme

Name of Contractor: **Contractor's telephone no:**

Weather Conditions:

Operations carried out	Locations of Operations

Names of operatives on site:

....

....

Contractor's observations on damage by others, additional work required or general condition of the works:

.....

.....

Observations of Engineer on standard of workmanship, additional work required or general condition of the works:

.....

.....

This maintenance visit has been satisfactorily completed.

SIGNED (for Contractor)..... .....

NAME: ..... DATE:

SIGNED (for Engineer).....

NAME: ..... DATE:

APPENDIX 30/2: WEED CONTROL

1. General weed control shall be carried out for all injurious weed species listed in sub-Clause 3002.1, with the addition of Rosebay Willowherb and Marestail, for the duration of the contract period at times to be agreed with the Engineer.
2. Total weed control shall apply at the bases of road restraint systems and signs, and around the retaining wall structure.
3. For site preparation herbicide shall be applied on all topsoil heaps in accordance with Sub-Clause 3002.4 at sufficient intervals to ensure that they are weed free.
4. A translocated herbicide approved by the Scottish Environment Protection Agency (SEPA) for use in or near water shall be used for weed control on all filter drains. Control shall be at sufficient frequency to eliminate weed growth throughout the New Works until the end of the Establishment Period.
5. Selective weed control using translocated herbicide shall be applied on all verges as and when necessary to restrict growth and prevent the spread of broadleaf weed species.
6. Weed control shall be carried out to target species listed in sub-Clause 3002.1 using spot treatment with translocated herbicide in accordance with Sub-Clause 3002.7 between April and September at a suitable frequency to eradicate weeds.
7. Not used.
8. Not used.
9. All arisings from weed control operations shall be removed from site. Injurious weed arisings shall be destroyed.

APPENDIX 30/3: CONTROL OF RABBITS AND DEER

Not used

APPENDIX 30/4: GROUND PREPARATION

1. Within areas of proposed seeding, all existing grass and herbaceous vegetation shall be cut, in accordance with sub-clause 3004.1.
2. Not used.
3. Not used.
4. Not used.
5. The requirement of sub-clauses 3004.8 – 3004.11 shall apply to all subsoil to be seeded or topsoil spread under the Agreement except where otherwise stated in Appendix 30/4.
6. Not used.

APPENDIX 30/5: GRASS SEEDING, WILDFLOWER SEEDING AND TURFING

1. Sowing of Wildflower and Grass seed generally will be carried out during the season from 1 May to 30 September. This period may be extended by the Engineer, depending on the weather, but not past 31 October. The Contractor shall pay due regard to the weather conditions before sowing grass seed and shall take all reasonable measures to promote its growth. Immediately prior to seeding the Contractor shall where required by the Engineer treat any undesirable vegetation using a weed killer specifically formulated to eradicate this vegetation.

2. The upper layer of soil shall be reduced to a fine tilth in accordance with sub-Clause 3005.2.
3. Not used.
4. Where directed by the Engineer, grass seed shall be a tested mixture from an approved source and certificates of purity and germination shall be provided 5 working days before use on site to the Engineer. Grass seed shall be to BS 4428.
   Grass seed for General Purpose Grass and Grass Verge areas shall be British Seed Houses (Germinal) mix A3 Embankments and Drought or similar approved, sown at a rate of 500kg/ha, and shall comprise the following mixture:

60%	Creeping Red Fescue
20%	Chewings Fescue
15%	Tall Fescue
5%	Browntop Bent

5. Sowing of seed shall be carried out in accordance with the supplier's recommendations.
6. Hydroseeding shall be required for seeding the topsoiled soil cutting and the soil nailed slope at the site. The seed mixture for hydroseeding shall be General Purpose Grass, The rate of application of grass seed for hydraulic seeding shall be the same as for hand or broadcast seeding unless otherwise agreed with the Engineer. The other ingredients in the hydraulic mixture shall be as recommended by the specialist hydroseeding sub-contractor and agreed with the Engineer. The topsoil shall be sprayed with hydroseed before the installation of the geosynthetic erosion matting. Following the installation of the geo-synthetic erosion matting and flexible mesh, the cutting and soil nailed slope shall be sprayed again with hydroseed.
7. Not used.
8. Not used.
9. Not used.
10. Not used.
11. Not used.
12. A minimum of two establishment cuts shall be undertaken on general purpose grass and grass verges, with further cuts undertaken as necessary to achieve coverage as stated in in sub-clause 3005.11 and one cut subsequent to the required sward coverage being achieved.
13. Not used.
14. All grass areas shall be left clear of grass clippings following each mowing by raking or other suitable method.

APPENDIX 30/6: PLANTING

Not used

APPENDIX 30/7: GRASS, BULBS AND WILDFLOWER MAINTENANCE

1. All grass areas within the boundary of the Site shall be maintained in accordance with Clause 3007.

2. Not used.

3. All grass areas shall be left clear of grass clippings following each mowing by raking or other suitable method.

4. Not used.

5. Not used.

6. Low frequency grass cutting shall be undertaken in accordance with sub-clause 3007.17 for the grass verge from the back edge of the westbound carriageway to the bottom of the slope.

7. All grass areas not cut at low frequency shall be cut at a 'minimal frequency' in accordance with sub-clauses 3007.18-21.

8. Not used.

9. Additional selective cuts shall be taken if required to maintain visibility of road signs. The areas subject to additional selective cuts shall be extended beyond the minimum area required to maintain visibility in order that they appear naturalistic with smoothly curving edges, avoiding straight lines and abrupt angles.

10. Not used.

11. Not used.

12. Not used.

13. Not used.

14. Not used.

15. Not used.

16. Not used.

17. Not used.

18. Not used.

19. Not used.

20. Additional clause. All damaged or failed sward shall be reinstated to match the seeding area.

APPENDIX 30/8: WATERING

Not used

APPENDIX 30/9: ESTABLISHMENT MAINTENANCE FOR PLANTING

Not used

APPENDIX 30/10: MAINTENANCE OF ESTABLISH TREES AND SHRUBS

Not used

APPENDIX 30/11: MANAGEMENT OF WATERBODIES

Not used

APPENDIX 30/12: SPECIAL ECOLOGICAL MEASURES

1. Appendix 0/4 brings into the Contract, by reference, one licence for European Protected Species. Special ecological measures shall be maintained for the duration of the Works.

2. Special ecological measures works shall be carried out in seasons to be agreed with Scottish Natural Heritage and any other relevant consultees.

   The Contractor shall comply with the licences, including the requirements of the Supporting Information Documents, in the execution of the Works.

   The Contractor's attention is particularly drawn to the requirements within the A83 Strone Point Record of Determination, Scottish Natural Heritage granted licence and supporting information.

3. The known locations of Protected Species activity shall be fenced off by temporary protective fencing to set out protection zones. Temporary fencing shall be erected to delineate the protection zone prior to construction works commencing and shall be maintained in effective condition until the Works have been fully completed. The protection zones will be clearly marked as out of bounds to personnel, machinery and plant throughout the course of the works. Should access be required within the protection zones the Contractor can do so under the supervision of the ECoW. No soil, spoil, fuel oil, chemical, construction materials or rubbish shall be stored or tipped within the protection zones.

4. Not used.

5. Not used.

6. Not used.

7. Not used.

8. Not used.

9. Not used.

10. Not used.

11. Information about the locations of known Protected Species is shown on drawing no. 13/NW/0901/052/3000/002. Tenderers shall treat the information on the existing otter couches and holts included in this Contract **IN CONFIDENCE** and shall not pass this onto any third party without permission of the Engineer.

12. A European Protected Species (EPS) Licence to disturb one otter holt and two otter couches has been granted by Scottish Natural Heritage. The Contractor shall comply with the requirements of this licence and its supporting information.