

**Angus Council
A92 Upgrading - Dundee to Arbroath**

Schedule 4: O&M Requirements

Part 5 : Specification

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Schedule 4: O&M Requirements

Part 5: Specification

Preamble to the Specification

1. The Specification referred to in the Agreement shall be the 'Specification for Highway Works', published by The Stationery Office (formerly HMSO) as Volume 1 of the Manual of Contract Documents for Highway Works, as modified and extended by the following:
 - (i) Appendix 0/1: Additional, Substitute and Cancelled Clauses, Tables and Figures specific to Schedule 4;
 - (ii) Appendix 0/2: Minor alterations to existing Clauses, Tables and Figures specific to Schedule 4;
 - (iii) The Numbered Appendices listed in Appendix 0/3;
 - (iv) Appendix 0/5; Special national alterations of the Scottish Executive Development Department.

Appendix 0/4 contains a list of the drawings for Schedule 4.

2. The relevant publication date of each page of the Specification is given in the Schedule of Pages and Relevant Publication Dates included in Series NG000 in Volume 2 of MCDHW.
3. An additional clause as indicated by a suffix 'A' in Appendix 0/5 is an alteration originating from the relevant road authorities of Scotland, Wales or Northern Ireland. An additional clause as indicated by a suffix 'AR' in Appendix 0/1 is an alteration specific to this Agreement.
4. A substitute clause, as indicated by the suffix 'S' in Appendix 0/5 is an alteration originating from the relevant road authorities of Scotland, Wales or Northern Ireland. A substitute clause as indicated by a suffix 'SR' in Appendix 0/1 is an alteration specific to this Agreement.
5. A cancelled clause as indicated by a suffix 'C' in Appendix 0/5 is an alteration originating from the relevant road authorities of Scotland, Wales or Northern Ireland. A cancelled clause indicated by a suffix 'CR' in Appendix 0/1 is an alteration specific to this Agreement.
6. Insofar as any of the Appendices to this Part of this Schedule may conflict or be inconsistent with any provision of the Specification the Appendices to this Part of this Schedule shall always prevail. Additionally, Appendices 0/1 and 0/2 shall take precedence over Appendix 0/5.
7. Where a clause is altered any original table/figure referred to in the clause shall apply unless the table/figure is also altered. Where a table/figure is altered any reference in a clause to the original table/figure shall apply to the altered table/figure.
8. Where a clause in the Specification relates to work goods or materials which are not required for the Works it shall be deemed not to apply.

9. Any Appendix referred to in the Specification which is not used shall be deemed not to apply.
10. Where a clause or sub-clause in the Specification or Notes for Guidance on the Specification is annotated by "08/93" or similar, this indicates the relevant publication date that alteration(s) to the clause or sub-clause were made. The first double digit refers to the month, and the second double digit refers to the year.
11. Where a clause in the Specification or Notes for Guidance on the Specification is prefixed by an # this indicates that this particular clause has a substitute national alteration for one or more of the relevant road authorities of Scotland, Wales or Northern Ireland. Substitute or additional national clauses shall be used within countries to which they specifically apply and they are deemed to replace corresponding clauses in the main text of the Specification or Notes for Guidance on the Specification or to be included within the Specification as appropriate. The substitute national clauses are located at the end of the relevant series together with the additional national clauses of the relevant road authority.

Appendix 0/1**Additional, Substitute and Cancelled Clauses, Tables and Figures Specific to Schedule 4.****List of Additional Clauses, Tables and Figures**

Clause No etc	Title	Written on Page No. following
1222 AR	Illuminated Bollards	4-5-5
1270 AR	Chart Node and Section Markers	4-5-7
1471 AR	Special Tools	4-5-8
1472 AR	Fixings for Attachment to Structures	4-5-8

List of Substitute Clauses, Tables and Figures

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1402 SR	Site Records	4-5-10
1403 SR	Location of Lighting Units and Feeder Pillars	4-5-10
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List of Cancelled Clauses, Tables and Figures

Clause No. etc	Title
1409	Photo-electric Control Units (PECUs)
1410	Short Plugs (Dummy PECUs)
1422	Cable Joints
1425	Preparation and Finish of Metal and Other Surfaces

1222 AR Illuminated Bollards

1. All illuminated bollards shall be installed as per Angus Council's Standard Detail Drawing ASL18.
2. All illuminated bollards shall be base light type and be compatible with other manufacturers bollard shells.
3. Bollard Shell
 - (i) The bollard shell shall be of a flexible type manufactured from rotational moulded material and shall be one piece 5.00mm thick uniform wall thickness and designed in full conformance to the size and constraints in BS 873. The material shall be virgin grade translucent white and UV stabilised, flexible offering resistance to impact down to -20C and shall recover and have a good memory retention.
 - (ii) The material shall be guaranteed for 5 years against premature cracking and failure from ultra violet exposure.
 - (iii) The bollard shape shall allow it to flex and yield easily in diagonal impacts as well as face on impacts so that minimal stress is transmitted to the attached baselight and foundation.
 - (iv) The bollard shall be designed to provide good lighting levels at the upper section of the bollard, so that the diagram is enhanced and clearly visible from a distance.
 - (v) The bollard shell and shape must be capable of carrying a prescribed sign face on any of it's four faces.
 - (vi) The signface graphic and outer panels shall be physically moulded into the parent bollard material during moulding. All diagram graphics including the amber panels shall be bordered with 5.00mm wide black profile, which is moulded into the parent bollard. All signface and amber panels must be guaranteed against fading for a minimum period of 5 years. The exterior surface of the bollard shall be super smooth with minimum porosity to facilitate easy cleaning.
4. Bollard Body Anchorage Frame
 - (i) The frame shall be constructed of 3mm steel, be at least 50mm wide with 1 edge angled turned for rigidity and Galvanised after manufacturing and welding has been completed.
5. Baselight Unit
 - (i) The baselight shall be manufactured from cast Aluminium LM6-M grade with a large capacity sealed electrical enclosure, a hinged access bollard and lens retainer frame, a separate 5.00mm thick domed Polycarbonate lens and cable entry facility.
 - (ii) The gear tray housed within the base shall be fully supported, corrosion resistant and carry twin PL11 Watt lamps.

6. Baselight

- (i) The baselight enclosure shall form a sealed unit to IP 67 BS 4590.
- (ii) The baselight unit must withstand heavy vehicular overloads and shall have a minimum wall thickness of 4.00 mm with further engineering strength at load and impact bearing points to prevent distortion and breakage from typical vehicular impacts.
- (iii) The enclosure shall be supplied with a 12mm thick non hygroscopic fuse-board or similar material that is securely bolt fixed to the base bottom, an M8 earth stud shall be located adjacent to the board. The board shall be of sufficient size to allow a fused service cut out as per Angus Council's Standard Detail ACOM5 to be mounted.
- (iv) The base unit shall be supplied with 4 x M10 'J' Stainless Steel type rag bolts for foundation anchorage.
- (v) The hinge arrangement shall be a one piece stainless steel rod which interconnects between the frame and the base and runs in cast in stainless steel bearing to provide a maintenance free hinge mechanism. In the event of damage it shall be possible to remove the hinge spindle and replace the frame.
- (vi) To ensure maximum sealing of the baselight enclosure, the enclosure sealing rim shall be at least 20.00mm upstanding from the base platform and the enclosure lens shall be moulded continuously around the rim in such a way as to control the seal compression and prevent damage to the seal. The baselight shall incorporate a double pole isolator which shall 'Isolate' the gear-tray circuit upon removal of the enclosure lens.
- (vii) The baselight shall be clearly marked to indicate the 'FRONT' and shall have a continuous natural ground line which shall overhang to allow for accurate installation by the installer.

7. Baselight Lens

- (i) The baselight lens shall be detachable, moulded from 5.00mm thick minimum, UV stabilised clear Polycarbonate complete with a moulded actuator to depress the double pole isolator. The lens shall be complete with a rebated one piece seal and be domed to offer upward illumination in the event of a bollard shell loss.

8. Lens and Bollard Hinge Frame

- (i) The hinge frame shall be manufactured from the same material as the baselight unit LM6-M Aluminium and shall withstand multi directional bollard impacts. The hinge spindle shall be fully supported in the stainless steel bearings. Drive-in steel pins shall not be accepted as a hinge mechanism.
- (ii) The hinge frame and bollard seating shall allow compatibility with other manufacturers bollard shells and shall be no more than 350mm square in dimension. The hinge frame shall incorporate cast-in fixing centres for bollard attachment.

- (iii) The bollard seating shall allow the installer to attach the bollard shell by means of 4 No. stainless steel threaded Hex Set bolts and retain these from within the frame work by Nyloc stainless steel nuts to prevent the loss of the bollard shell.
- (iv) Easy access to the bollard base with the bollard shell attached shall be by means of a single Tri-head stainless steel threaded fixing screw. The fixing screw shall be retained by a stainless steel nut recessed into the base unit to provide a positive seal to the enclosure and to ensure that IP67 sealing is achieved.

9. Gear Tray

- (i) A fully detachable gear tray shall be manufactured from a non corrosive material with an integral earth tag that can be bonded onto the incoming supply plug. The plug/socket for the component tray must connect in the following order Earth, Neutral, Live and disconnect in the reverse order.
- (ii) The gear tray shall be fitted with twin PL11 Watt lamps.
- (iii) The lamps shall have independent gear and be independently fused and mounted over highly polished parabolic reflectors to optimise the available light output and all control gear shall be fixed in such a manner as to allow easy on-site replacement.
- (iv) All gear tray and reflector plates shall be de-burred for safety.
- (v) All wiring shall be in accordance with BSEN 60598-1: 1993.
- (vi) The gear tray circuit shall be power factor correct to no less than 0.85 lagging and be suitable for operation at:-
 - (a) 230V + 10% - 6% 50Hz AC supply
(or as an option)
 - (b) 24V DC format

10. Cable Entry and Glands

The base unit shall have the capability of allowing the termination of one 6mm² SWA cable and shall be terminated into a compression gland and sealed to IP 67 and one blanking plug.

1270AR Chart Node and Section Markers

- (1) Cored thermoplastic road markers shall be installed as chart nodes using the following method:
 - (a) A 100 millimetres diameter x 20 millimetres deep socket shall be formed using a central pilot bit surrounded by an annular bit. The pilot bit permits drilling of an annulus by the annular bit in a precise location by guiding the annular bit.

- (b) The base of the pocket after breaking out the surface material shall be left jagged. This jagged base assists in the retention of the stud in the pocket.
 - (c) The pocket shall be filled with hot fluid thermoplastic material to the uppermost edge of the pocket projecting slightly above the road surface. This projection depends on the surface tension of the material. The material is then allowed to cool and set to form a stud.
 - (d) The material shall consist of a plastic resin with the white filler and reflective glass particles to BS 3262. This is the same material as is used for white lining purposes.
- (2) Notwithstanding any other requirements of the Contract, record drawings of the chart node locations at a scale of 1:500 shall be provided to the Overseeing Organisation within 5 Working Days of the issue of the Certificate of Completion for the Works. The record drawings shall locate the chart nodes as a series of dimensions from carriageway features. The local and national grid co-ordinates of all chart nodes shall be detailed on the record drawings.

1471AR Special Tools

Duplicate sets of special tools, keys and handling devices essential for the correct running operation and maintenance of the equipment shall be provided to Angus Council.

1472AR Fixings for Attachment to Structures

Fixings for attachment to Structures shall use a resin fixed replaceable bolt system.

1401SR General

1. Materials equipment and workmanship required under the Contract shall comply with BS7671 1992 Requirements for Electrical Installations and the rules and regulations of the electricity supplier who provides the supply. The Company shall take into account Engineering Recommendations G.39 "Model Code of Practice covering Electrical Safety in the Planning Installation, Commissioning and Maintenance of Public Lighting and Other Street Furniture". Other relevant requirements are contained in the Electricity at Work Regulations, 1989.
2. The following definitions shall apply:
 - (i) A Road Lighting Unit shall consist of the following as described in the Contract: column, bracket, wall mounting, Electrical Equipment as defined in (iv) below and wiring excluding electrical supply cable.
 - (ii) A lit Sign Unit shall consist of a traffic sign requiring an electricity supply and Electrical Equipment and wiring as in (i) above.
 - (iii) The term Lighting Unit applies to both Road Lighting Units and Lit Sign Units.

- (iv) Electrical Equipment for Lighting Units shall consist of the following as described in the Contract: luminaries, lamps, time switches, ballasts, ignitors, starters, capacitors, cut-outs, fuses and fuse holders.
 - (v) The network is the electrical distribution system installed by the Company from the electricity supplier's interface to the Lighting Units.
 - (vi) A Control Pillar is a pillar which houses electrical equipment suitable for incoming cables from the electricity supplier, outgoing cables to lighting units and associated control and switching apparatus.
3. Unless otherwise specified in Appendix 14/2, each network shall operate on a single-phase 240V, 50Hz supply.
 4. The Company shall provide facilities for the electricity supplier for service connections and commissioning of the network.
 5. A dedicated feeder pillar shall be provided for the Overseeing Organisation's network. Supplies provided to electrical equipment and lighting units for third parties shall not be connected to the Overseeing Organisation's network. Where required, and described in Appendix 14/2, electrical isolation pillars shall be provided on the network at the maintenance boundaries between the Overseeing Organisation and third parties, with the prior agreement of the Overseeing Organisation.
 6. All mild steel shall be hot dip galvanised. All equipment shall be supplied new and manufactured from new materials.
 7. Where a British Standard is in existence at the date of the tender for material or equipment used, the equipment offered shall comply with the relevant latest standard.

1402SR Site Records

1. In accordance with the requirements of the Electricity at Work Regulations the Company shall, on the completion of the electrical work, provide a set of as-installed drawings or transparencies showing as a minimum the position and identification mark (including luminaire type, modification status, lamp setting, lamp type and serial numbers) of equipment requiring electrical connections, ducts underground cables and joints and the type and depth of cables. The Company shall also supply test certificates and Operation and Maintenance manuals. Any Additional requirements for records shall be as described in Appendix 14/1.
2. Locational measurements shall be taken of the underground equipment to the nearest 100mm from the nearest edge of the carriageway or fence line. Offsets to cables and ducts shall be recorded at 20m intervals along their line. Offsets shall be defined longitudinally by distance from a permanent highway feature, a marker post or other suitable point.
3. The Company shall keep a daily record of the work in sufficient detail, including the type and drum number of underground cables, to enable site records to be completed. A copy of the daily record shall be provided by the Company on the next Working Day for retention and use by the Overseeing Organisation.

1403SR Location of Lighting Units and Feeder Pillars

1. The Company shall provide details of the position of Lighting Units and Feeder Pillars. The exact location will be agreed on site before commencement of any associated ground work. The Company shall be responsible for recording the actual location.
2. In cases where the location of an item has been determined as indicated above and it is impossible because of underground obstruction to install the item then any excavation shall be backfilled and reinstated to its original condition.

1404SR Change of Lighting Arrangements

1. No Lighting Unit shall be switched on or off, dismantled, resited or removed without prior written approval of the Overseeing Organisation.

1405SR Temporary Lighting

1. The Company shall ensure that any temporary lighting he provides does not cause glare to traffic using any highway nor annoyance to occupants of surrounding property.

1407SR Luminaires

1. Luminaires for road lighting shall comply with all relevant parts of BS 4533 regarding the design, construction, safety and interchangeability.
2. Construction
 - (i) All luminaires shall be fitted with a Flat Glass bowl where available or with a bowl manufactured from polycarbonate.
 - (ii) All luminaires must have an internal reflector
 - (iii) Luminaires fixing shall be suitable for columns with outreach brackets or spigot adapters as follows:-

Side entry luminaires 34/42 mm internal diameter x 100mm long
Spigot mounted luminaires 76mm internal diameter x 100mm long
 - (iv) Luminaires shall be fitted in accordance with manufacturers instructions and completely cover the spigot.
 - (v) Wall mounted luminaires shall be suitable for surface mounting and be provided with a 20mm diameter tapped entry for a gland or conduit connection.
 - (vi) All luminaire optical systems shall have a minimum degree of protection as specified in BS 5490 category IP65. Gear compartments shall have a minimum degree of protection to not less than category IP43.

- (vii) All sealing gaskets will be one part and recessed to avoid damage during normal maintenance operations.
- (viii) All luminaires shall have bowls held captive in open positions.
- (ix) All luminaires shall have stainless steel allen fixing screws.
- (x) All luminaires shall have a low threshold increment classification.
- (xi) All luminaires shall have all hinges, toggle catches, captive screws and nuts manufactured in stainless steel or other non corrosive materials.
- (xii) All luminaires shall have means of supporting the lamp such that it's position relative to optical equipment remains fixed throughout the lamp's life.
- (xiii) All luminaires when fitted to brackets providing an uplift continue the line of uplift or provide a further five degrees uplift.
- (xiv) All luminaires shall not require to be fitted with shorting plugs.

3. Terminations

- (i) Terminals for the connection of internal or external wiring shall be of the screw type only and shall have a minimum degree of protection of IP2X.
- (ii) A suitably rated and readily accessible terminal block shall be provided for the connection of incoming supply cables and shall be situated as close as possible to the cable entry point.
- (iii) Cable clamps shall be situated as close as possible to the cable entry point.
- (iv) A readily accessible M6 (minimum) main Earth connection shall be provided.

4. For Group 'A' Luminaires the lighting requirements shall be not less than:-

Lighting for traffic routes BS 5489 Part 2:1992

5. For Group 'B' Luminaires the lighting requirements shall be not less than:-

Lighting for subsidiary roads BS 5489 Part 3:1992

6. Control Gear

- (i) All luminaires shall be Gear Enclosed.
- (ii) Luminaires for use with HPS lamps shall include a readily accessible electronic starting device suitably mounted in the lantern gear compartment.
- (iii) Luminaires for use with LPS/PLL lamps shall include High frequency control gear mounted in the lantern. Supply voltage 230V 50Hz + 10% - 6%.
- (iv) All gear shall be mounted on a tray and fitted with a plug/socket system to be connected in the following order, Earth, Neutral, Live and disconnect in the reverse order. All internal wiring to be heat resistant type.

- (v) SON circuits shall be suitable for use with SON 'T' PLUS type lamps and utilise Super Imposed Igniters.
7. Luminaires for sign lighting shall comply with all relevant parts of BS 873 regarding the design, construction, safety and interchangeability and shall be correctly positioned to meet the luminance requirements of the sign.
8. The lanterns shall be IP56 or greater.
9. Lanterns shall be suitable for mounting by bracket on a 76mm diameter column shaft and 76mm spigot.
10. The external luminaire shall be manufactured from LM6-M cast Aluminium which shall incorporate an outreach bracket. The unit shall be attached to the column by Post Top fixing of cast Aluminium LM6-M. The gear tray shall be detachable and the frame of the unit shall be fitted with a Polycarbonate lens. The light source shall be two 8w fluorescent lamps.
11. The Head
- (i) All bracket retention fixings shall be stainless steel and shall not be visible from the exterior of the installed unit.
 - (ii) All fixings used to secure the lens or Post Top bracket shall be into captive stainless steel nuts and no fixings shall be directly into the aluminium.
 - (iii) The complete unit once installed shall be fully supported and provide anti-rotational resistance in any plane, when subjected to a vandal attack.
 - (iv) The Post Top/spigot fixing shall be provided as a cast feature, and be available for fixing to 76mm diameter post.
 - (v) The installed head of the sign light shall not project more than 350mm from the mounting post, and must not obstruct or obscure the plate sign.
12. The Gear Tray
- (i) The supply cable shall be terminated on the gear tray with a shrouded plug/socket that is accessible when the lens is opened. The plug/socket for disconnection of the gear tray must connect in the following order, Earth, Neutral, Live and disconnect in the reverse order.
 - (ii) When the lens is opened the gear tray shall remain shrouded and protected from ambient weather conditions and the starters, fuses and lamps shall be accessible without further action.
 - (iii) The two 8 watt fluorescent lamps shall be independently immediately fused.
 - (iv) The gear tray shall be removable without the use of a tool or special keys.
 - (v) The unit shall have a power factor correction of not less than 0.85 lagging and be suitable for operation at 230V + 10% - 6% 50Hz.

- (vi) All electrical components mounted on a galvanised gear tray shall be secured by threaded stainless steel retention fixings to ensure a positive Earth and easy on site replacement if required.

13. The Lens

The lens shall be of 3.00mm UV stabilised Polycarbonate and shall be flat and smooth in finish. The lens shall be housed in an aluminium frame of the same material as the unit body, the lens shall be flush with the frame. The frame shall be detachable from the body, and retained against the body by a captivated, semi-rebated M8 Tri-head stainless steel screw, which shall thread into a stainless steel nut rebated into the unit body. When the lens frame is closed it shall be rebated within the body. The lens frame shall compress against a one piece gasket on the body of the unit to give an IP rating of 56 or greater. The seal shall be fully screened from UV exposure from direct sunlight or from the lamps.

14. Earth Continuity

Throughout the construction and assembly of the complete unit Earth continuity between components parts shall be maintained.

15. Cable Access

The cable entry through the pole and sign light unit shall be installed and engineered in such a way as not to chaff the sleeving of the cable.

16. Light Output

The light distribution shall conform to Categories 1 and 2 of Part 5, paragraph 8.2 of BS 873 1983.

17. The Finish

The whole external assembly including the bracket/head and lens frame shall be finished to provide a long term protection.

The finish shall consist of the following for the aluminium components

- (i) Pre-treatment acid clean
- (ii) A chromate conversion coating
- (iii) 150 microns of thermosetting polyester powder coating in Aircraft grey BS 381c: 1980 No. 693.

1408SR Lamps

1. This specification details the requirements for High Pressure Mercury Vapour, Compact Fluorescent, Fluorescent and High and Low Pressure Sodium discharge lamps operating on 230V+ 10% - 6% 50Hz AC mains supply with a ballast complying with EN 60947.
2. The lamps shall be compatible with the luminaires used.

3. The lamps shall not be fitted until columns, brackets and sign posts have been erected and the luminaires have been installed.

4. The lamps shall comply in all respect with the relevant current British Standards references:-

BS EN 60662	High Pressure Sodium Vapour Lamps
BS 1853	Tubular Fluorescent Lamps
BS 5101	Lamp Caps and Holders
BS 6702	Lamp Holders for Tubular Fluorescent Lamps and Starter Holders
BS 5371	Lamp Cap Temperature rise

5. Minimum Design Lumens

(i) Lighting design lumen output is defined as the light output from a lamp at 2000 burning hours and shall not be less than:-

Lamp Type	Minimum Design Lumens
8w fluorescent	480
13w fluorescent	980
11w PL	900
24w PL	1800
36w PL	3000
55w PL	4800
70W SON-E	5800
70W SON-T+	6500
100W SON-E	9200
100W SON-T+	10000
150W SON-E	15500
150W SON-T+	17500
250W SON-E	26500
250W SON-T+	33000

6. Minimum Lamp Life

PL	10000 Operational Hours
Fluorescent	9000 Operational Hours
SON	12000 Operational Hours

7. Construction

(i) High Pressure Sodium Lamps

The construction of High Pressure Sodium Lamps (SONT+) shall be of sturdy and robust simple construction with as few as welds as possible in order to reduce the risk of early failure due to external shock and vibration.

(ii) Integral Antenna

The antenna shall be integral with the discharge tube and shall allow more reliable starting and reduced hot starting time.

(iii) Getter

This shall be of such construction that it reduces sodium migration, and creates a cleaner vacuum to be maintained throughout the lamp life.

(iv) Internal Ignitors

SON-E lamps shall be supplied with internal ignitors.

1411SR Time Switches

1. Time switches shall be of an Electronic type, Solar dial, and Geographically for Angus Council Area, suitable for operation on a single phase 230V 50Hz+10%-6% supply.
2. All units shall have:-
 - (i) Battery (nickel cadmium) backup capable of operating for 2 weeks in the event of a power failure.
 - (ii) A Quartz Crystal time base
 - (iii) Setting resolution of 1 minute
 - (iv) Have 2 switching 'on/off' periods.
 - (v) The capability of switching a minimum 10A inductive load.
 - (vi) Automatic changeover between Summer and Winter time (BST and GMT)
 - (vii) The facility to be Din Rail mounted
 - (viii) Automatic adjustment for Leap Year.
 - (ix) Override capability.
 - (x) The capability of operating within the temperature range of -20/+60C.
 - (xi) Operate correctly for a period of not less than 5 years.
 - (xii) Cable termination's to accept maximum of 4mm².
 - (xiii) Time switches to be Year 2000 compatible.
 - (xiv) Maximum leakage current to be 5mA.
 - (xv) Relay Assisted Triac (RAT) switching device or equivalent.

1412 - 1415SR Discharge Lamp Gear

1. All items of ballast shall comply with the relevant latest edition and amendments of the following British Standards regarding design, construction, safety and interchangeability.

BS 7671 IEE wiring Regulations 16th Edition
 BS 2818 Ballast for Tubular Fluorescent lamps
 BS 3772 Specification for starters for fluorescent lamps
 BS 4017 Specification for capacitors for use in tubular fluorescent, high pressure mercury and low pressure sodium vapour discharge lamps
 BS 4782 Specification for ballast for discharge lamps
 EN 60 662 Specification for high pressure sodium vapour lamps
 EN 60 400 Lamp holders for tubular fluorescent lamps and starter holders

2. All items shall be suitable for use in an enclosure subject to condensation and ingress of dust and moisture and shall be adequately protected for such services.
3. Control gear can be an encapsulated unit or individual components.
4. All items shall have shrouded terminals of screw type to BS 5490 IP 2X.
5. Adequate provision for Earthing shall be provided on components manufactured or enclosed in non-insulating material.
6. All items shall be supplied complete with suitable mounting facility.
7. Wiring diagrams for the interconnection of elements of the ballast and the details of circuits electrical operating characteristics shall be provided by the manufacturer and attached to each component.
8. Maximum Circuit Wattage
9. When used with the appropriate components the maximum wattage of the circuit will be as detailed below and the circuit p.f. shall be not less than 0.85 lagging

Lamp Wattage Type		Circuit Wattage (w)
HPS	70w	84
	100w	114
	150w	172
	250w	279
PL	36w	45
	55w High Frequency	58
Fluorescent		
	8w	14
	13w	18

10. Chokes and Transformers
 - (i) Unless otherwise stated chokes and transformers shall be suitable for operation on a nominal 230V 50Hz+10%-6% single phase supply.

- (ii) High pressure sodium chokes and transformers shall be supplied with separate electronic starting devices. Superimposed type only.
- (iii) High frequency chokes and transformers shall be constructed and supplied complete with integral electronic starting devices.

11. Capacitors

- (i) Shall be of the dry film type
- (ii) Shall not be internally fused
- (iii) Shall be fitted with a leak resistor

12. Electronic Lamp Starting Devices

- (i) The device shall produce pulses of a frequency and magnitude to start the lamp, or pulse for a limited period whichever is shorter.
- (ii) The device shall be fitted with adequate radio interference suppression.
- (iii) The device shall be a superimposed type where the pulse is supplied to the lamp only and not to the ballast.
- (iv) Fluorescent Lamp Starter Switch shall comply with BS 3772.

1416SR Cut-outs, Fuse Holders, Fuses and Miniature Circuit Breakers (MCBs)

1. The cut-out shall be suitable for use with one, two and three single phase SWA cables all with copper conductors of a cross section area up to and including 16mm².
2. The units shall be constructed of non -hygroscopic, non-tracking high impact resistant insulating material and be constructed in such a manner that water dropping onto the unit is prevented from entering the interior of the unit.
3. Phase, Neutral and Earth terminals shall be as per Angus Council Specification and Standard Details for the following options, ACM01, ACM04 and ACM05.
4. All current carrying metal parts shall be of ample construction. Electrically energised parts shall as far as is reasonably practical be shrouded.
5. All interconnection within the cut-out shall be carried out by the manufacturer and tested before distribution. A copy of test certificates shall be supplied with each order dispatched.
6. The Isolator shall have the current carrying capacity of up to 32A.
7. The unit specified in standard detail ACM05 shall be of a double pole construction and have central pull device for removal of cover.
8. All covers shall only be removable by the use of a tool.
9. All termination shall be suitable for crimp type terminations. Crimp kits shall be supplied with each cut-out.

10. All necessary attachments for connecting Steel Wire Armouring shall be provided with the units as per Angus Council Specification and Standard Details :-

ACM01 - AC1 Cut-out
ACM04 - AC2 Cut-out with time clock
ACM05 - AC3 Cut-out

11. Materials

- (i) All materials shall comply with the relevant British Standard.
- (ii) All ferrous materials shall be electroplated to resist corrosion. Parts made from insulating materials shall comply with the requirements of BS 5733, Section 2. Current carrying parts shall be made of brass, copper or phosphor bronze, and shall be electroplated.

12. Markings

- (i) Every unit shall be marked with the following information
 - (a) Rated current in amperes
 - (b) Rated Voltage in volts
 - (c) The Phase conductor shall be marked by the letter 'L'. The terminals for Earth conductors shall be marked by the letter 'E'.
 - (d) The Isolator shall have a RED indicator for 'Power On' and a GREEN indicator for 'Power Off'.

13. Circuit Protection

- (i) The unit shall be designed for the installation of cartridge fuse to BS 88 Part 2 Type A1, ST or LST types between radial circuit and outgoing circuit.

14. Lantern Cable Entry

- (i) The unit shall be designed in such a way that the cable enters through one opening and is provided with a suitable cable sealing device.
- (ii) The cable entry shall be located at the side of the unit and not at the rear of the unit.

1417SR Base Compartment Fixing Arrangements

1. Electrical equipment described in Clause 1416 installed within the base compartment of columns or posts shall be positioned as per Angus Council Detail Drawing No. ACM01 as described in Appendix 14/4.

1418SR Feeder Pillars

1. The feeder pillar shall be as detailed in Angus Council Standard Detail Drawing ACM17.

2. The enclosure shall be constructed of a minimum of 3mm sheet hot dipped Galvanised Steel.
3. Access to the enclosure shall be by means of a hinged door opening to a full 180° at the front. Hinges shall be constructed from Stainless Steel. The door shall have a minimum clearance of 100mm above ground level (which shall be marked by a permanent line of weld 150mm long).
4. There shall be facilities to mount electrical equipment by means of a backboard which shall be manufactured from hardwood which is non-hygroscopic or equivalent.
5. The enclosure shall be designed to prevent the ingress of water, snow or foreign bodies and shall have a minimum ingress protection as Specified in BS 5490 of IP 54, except for the ventilator at the rear of the enclosure which shall have an ingress protection as specified BS 5490 of IP42.
6. The top of the enclosure shall be angled to shed water to the rear of the enclosure.
7. The security of the enclosure shall be ensured by 'Wedge' type locks. The locks shall be finished internally and externally in a suitable non-corrosive material and shall be guaranteed for the same period as the enclosure. All locks shall be supplied and fitted with either Stainless Steel or Brass cover plugs. There must be no extraneous components such as handles or hinges that can be vandalised. The door shall be flush with the surrounding framework. The door shall be fitted with a clear plastic pocket for the storage of a circuit/schematic diagram of the control pillar/street lighting layout. The door shall be fitted with a suitable Earth point, this shall be adjacent to the main Earth terminal of the Cabinet.
8. The main Earth terminal size M10 x 32mm long shall be provided at a ready accessible position within the cabinet section of the pillar and shall be fitted with a distinctly marked metal label 'Safety Electrical Connection - do not remove', label and lettering shall be as per BS 7671 - Section 514-13-01. All Earth terminals shall be brass and supplied complete with one full nut, and 2 half nuts and 2 washers all of which shall be brass.
9. The internal minimum dimensions are as follows:-

Single Door Medium	width 660mm (approx.)
	height 1150mm
	depth 250mm

 - (i) All Feeder Pillars shall have a "Warning Voltage" notice 75mm x 75mm to BS5378 displayed on the door.
10. Protection of the Planted Section for Feeder Pillar
 - (i) The external surface of the planted section shall be finished in accordance with Series 1900 of Volume 1 of the Specification for Highway works (7th Edition).
 - (ii) Protection System G1
11. Protection of Upper Section for Feeder Pillars

- (i) Protection System G2a
12. The feeder pillar shall be installed as per Angus Council Standard Detail Drawing ASL6.
13. This Specification describes the requirements for the mechanical and electrical design and construction of a single phase control panel for the control of a discharge lighting network (Pre-wired Control Panel). As per Angus Council Specification and as per the following Standard Details:
- ACM06 AC-CP1
14. Pre-wired Control Panel
- (i) The unit shall comply with the safety, performance and where appropriate, the interchangeability requirements of the relevant British Standard.
- BS 88 Cartridge Fuses
BS 5420 Degree of protection of enclosure of switch gear and control gear
BS 5424 Contactors
BS 5486 Parts 1 & 2 Factory built assemblies switch gear and control gear.
15. Mechanical Design and Construction
- (i) The mechanical design and construction shall comply with the relevant parts of BS 5486 Factory Built Assemblies.
16. Design
- (i) The drawing supplied, ACM06, is intended for guidance and details the essential design features and basic component layout.
- (ii) The minimum external dimension of the units shall be as per Angus Council Specification and Standard Details ACM06.
- (iii) Mechanical interlocking shall be provided to ensure that access to 'Live' parts and components can only be made after Isolation. The external door of the control panel shall be fitted with a Tri-head Wedge type door lock. The construction of the control panel shall be of steel and shall have a painted finish.
17. Electrical Design
- (i) The Electrical design shall comply with the relevant parts of BS 5486. The Main and Auxiliary circuits shall be connected as shown on Angus Council Specification and Standard Details ACM06.
18. Supply
- (i) The unit shall be suitable for use on a Single Phase 230V+10%-6% 50Hz supply.

19. Load

- (i) All components shall be suitable for use with inductive discharge lighting loads operating at 0.85pf.

20. Main Circuit

- (i) As specified in BS 5419 1977 the Isolator and Conductors shall be suitable for use in switching discharge lighting loads up to 63A.
- (ii) No diversity factors shall be applied and all conductors and insulation shall be suitable for maximum loading, the Neutral conductor being the same cross-sectional area as the Phase conductor throughout. The minimum size of the main Earth conductors shall be 16mm².
- (iii) Contactors shall be silent in operation and shall be of the Electro-magnetically operated, electrically maintained type with arc control devices and Neutral link.
- (iv) The Contactor shall be rated with an AC3 utilisation Category and also have readily replaceable contacts. Auxiliary coil circuits shall be separately fused and suitable for operation at 230V+10%-6% 50Hz.
- (v) Incoming Phase conductors of 25mm² shall be directly connected to the Isolator. All connections shall be provided with positive locking against vibration.
- (vi) The HRC fuse Control Panel shall be capable of providing at least the following number of 230V 50Hz Single Phase and Neutral outgoing circuits:
 - AC-CP1 8 way, 2 for internal circuit protection i.e. Clock and Contactor and
6 outgoing circuits
- (vii) All HRC fuses shall be mounted on a standard Din Rail Symmetrical Profile to BS5825 1980.
- (viii) All outgoing main circuits shall be wired directly into the fuse holder, maximum cable conductor cross sectional area of 16mm²
- (ix) The main Earth terminal on the Control Panel shall be M10 x 32mm Brass complete with 1 full nut, 2 half nuts and 2 washers all brass and shall be located as per Angus Council Specification and Standard Detail ACM06.
- (x) The Unit shall be supplied complete with 2 x 25mm² PVC insulated and sheathed cables and 1 x 16mm² protective conductor, each 0.75m long, suitably terminated, as incoming connections from the Electricity Supply Authority's cable termination.

21. Auxiliary Circuits

- (i) The auxiliary control circuits shall be suitable for operation on 230V 50HZ supply.

- (ii) Automatic control shall be achieved by means of a Solar Clock (Electronic) unit.

1419SR Wiring

1. All cables shall comply with BS6500.
2. All internal wiring between the street lighting cut-out and lantern shall be by means of a three core flexible Arctic Grade PVC insulated and sheathed cord with Tinned annealed stranded copper conductors.
3. General
 - (i) Temperature Range -20 to 70 Centigrade
 - (ii) Voltage Range 300/500V
 - (iii) Core Identification 3 Core Green/Yellow, Brown, Blue
 - (iv) Outer sheath Colour Blue
 - (iv) Minimum core cross-sectional area 2.5mm²

1420SR Earthing

1. All extraneous conductive parts shall be bonded to the main earth terminal using an equipotential bonding conductors of 6mm² cross-sectional area. All earthing in lanterns shall be 2.5mm² and shall be incorporated in the lantern supply cable.
2. Materials
 - (i) All equipotential bonding of 6mm² in cross-sectional area shall be of a Braided Copper type and shall be covered with a Green/Yellow sleeve, each end shall be terminated in a crimp connection.
3. Dimensions
 - (i) All Braided earth straps shall be 750mm long.
 - (ii) Angus Council Specification and Standard Detail ACM13 shows an example of the earth straps which have been given the following identification numbers:-
 - (a) ACES1 which shall be fitted with 1 x 6mm crimp and 1 x 8mm crimp (cut-out to column).
 - (b) ACES2 which shall be fitted with 2 x 8mm crimps (column to column door).

1421SR Underground Cable Duct System

1. All underground cable duct systems should be installed as per Angus Council Standard Detailed Drawing ASL3 as detailed in appendix 14/4

- (i) Cables shall be laid without sharp ends and kinks and in accordance with any particular requirements in appendix 14/4.
 - (ii) Cables following the same route shall be installed in separate ducts and occupy the same trench.
 - (iii) Power supply cables other than those associated solely with the communications systems shall not be installed within 500mm of signal or communication cables, within 300mm of telecommunication cables or within 300mm of HV cables, unless otherwise described in appendix 14/4.
 - (iv) Cables shall only be laid when the ambient temperature is above 0°C and the cable has been stored at a temperature greater than 0°C for the previous 24 hours.
 - (v) Cables shall not be bent to an internal radius of less than 12 times the external diameter of the cable or less than the radius recommended by the manufacturer whichever is the greater.
 - (vi) Sufficient length of cable shall be allowed for it's termination. When termination does not proceed immediately following the installation of the cable it's end shall be sealed against the ingress of moisture.
 - (vii) When duct or trough alignments differ from those of the trench the transition from one to the other shall not exceed 1:30 horizontally or vertically.
 - (viii) Street Lighting Cable in footways shall be installed in 100mm flexible duct, Street Lighting Cable in carriageway shall be installed in 100mm flexible duct inside 150mm twinwall duct. Street Lighting Cable to feed illuminated signs shall be installed in 60mm flexible duct
2. Corrugated polypropylene flexible utilities duct is a plastic duct intended for underground use. It is manufactured and coiled in transportable lengths and is uncoiled for installation without adversely affecting its properties or performance. The duct shall be sufficiently flexible to lay straight in an open trench and shall not exhibit excessive 'coil set'.
3. **Materials**
- (i) The duct shall be manufactured from Virgin Grade Copolymer Polypropylene or High Density Polyethylene with a minimum ESCR Value of 100 hours. The use of Wide Range or Off - Specification material is not permitted. Manufacturers reworked material may be used up to a maximum of 10% provided that it is sourced from duct produced to this Specification.
 - (ii) The masterbatch used shall provide UV protection and light-fastness sufficient to provide 2 years outside protection and a light stability of 7.
 - (iii) The colour shall be purple.
4. **Dimensions**
- (i) **Single Wall Flexible Duct**

Nominal Size	Min I.D.	Max O.D	Max Pitch	Standard Length
60	48mm	60mm	11mm	100m
100	90mm	105mm	13mm	40m

(ii) Twin Wall Duct

Nominal Size	Min I.D.	Max O.D	Max Pitch	Standard Length
150	150mm	178mm	13mm	6m

5. Tolerance

- (i) The internal diameter shall not vary from that stated by the manufacturer by more than +0.5 - 1.0mm.
- (ii) The external diameter shall not vary from that stated by the manufacturer by more than +0.5 - 1.0mm.
- (iii) The pitch shall not vary from that stated by +/-10%.

6. Accessories

- (i) Straight Coupling 150mm, 100mm and 60mm
- (ii) End Shroud 100mm and 60mm
- (iii) End Cap 100mm and 60mm
- (iv) Reducer Coupling 100mm/60mm

7. Workmanship

- (i) All ducts shall be homogenous throughout and free from visible cracks, holes, foreign inclusions or other defects. It shall be as uniform as practicable in colour density and other physical properties.

8. Cable Marker Tape for use in underground cable duct system shall be installed as per Angus Council Standard Detail Drawing ASL3, shall be 150mm wide x 100 Microns thick. Tape shall be of a Purple background with continuous black lettering 'Street Lighting Cable Below'. The letter's height will not be less than 75mm.

9. PVC Insulated PVC Sheathed Steel Wire Armoured and PVC Sheathed with Stranded Copper Conductors

- (i) All cables shall Comply with BS 6346
- (ii) Size of conductors to be 6mm² and 16mm² (3 core)

10. Steel Wire Armour Cables

- (i) All conductors shall be stranded plain annealed copper
- (ii) Phase Insulation shall be Red PVC compound.
- (iii) Binder shall be non-hygroscopic tape and shall overlap immediately under the Steel Wire Armour.

(iv) Outer sheath shall be an extruded layer of Purple compound.

11. PVC Insulated and Sheathed Straight Concentric Cable (for Hydro Electric Connections).

- (i) All cables shall comply with BS 6436/98. Minimum size 16mm²
- (ii) Outer Sheath shall be extruded layer of Black PVC compound.
- (iii) Phase Insulation shall be Red PVC compound.

1423SR Armoured Cable Terminations

1. Cables shall be individually terminated and secured at cut-outs and other electrical apparatus by means of an armour securing clamp complying with BS 6121 and a gland plate, all as detailed in Angus Council Standard Detail Drawing ACMO1, ACMO4 and ACMO5.
2. The Armour securing clamp and plate assembly shall incorporate at least one non-ferrous earthing terminal.
3. All glands shall be shrouded overall with PVC sleeves and the conductor shall be terminated with crimps.

1424SR Inspection and Testing to be Carried Out by the Company

1. Every Lighting Unit and network, on completion and before being energised, shall be inspected and tested to verify that the requirements of BS 7671 have been met. The method of testing shall be such that no danger to persons or property or damage to equipment can occur even if the circuit tested is defective.
2. The following tests shall be carried out in the sequence indicated below and recorded on Angus Council Electrical Test Certificates as detailed in appendix 1/5 which shall be submitted to the Overseeing Organisation immediately after completion of all the tests, including those on Lighting Units, within each network:

- (i) For Lighting Units (b), (c), (e), (f) apply.
- (ii) For networks (a), (b), (d), (e), (f), (g), apply

Standard methods of testing are given in BS 7671

- (a) Cable Sheath insulation test.
- (b) Continuity of protective conductors including main and supplementary equipotential bonding.
- (c) Insulation resistance at a test voltage of 500V to be not less than 1.0 M ohm.
- (d) Insulation resistance at a test voltage of 500V to be not less than 6 M ohm.
- (e) Insulation of the site-built assemblies.
- (f) Polarity, including the continuity of circuit conductors.

- (g) Earth fault loop impedance at every cut-out.
3. The Company shall give not less than 48 hours notice to the Overseeing Organisation of his intention to carry out any of the tests specified utilising Angus Council's Electrical Test Request Sheet as detailed in Appendix 1/5 and the Overseeing Organisation shall be given the opportunity to witness such tests.
 4. The Company shall furnish the Overseeing Organisation with two copies of a certificate verifying compliance with BS 7671 upon satisfactory completion of the inspection and tests.
 5. The Company shall ensure that all tests instruments have been calibrated and adjusted in accordance with BS EN ISO 9001 and come complete with calibration certificates to verify that BS EN ISO 9001 has been complied with.
 6. The Company shall carry out photometric tests to ensure compliance with design performance requirements.

Appendix 0/2

Minor Alterations to Existing Clauses, Tables and Figures Specific to Schedule 4

Clause or Table No	Alterations to be made
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104 Approvals	Standards, Quality Assurance, Agreement Certificates and Other
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Sub-clause 2, line 3

Delete “BS EN ISO9002” and insert “BS EN ISO 9001 or BS EN ISO 9002 where appropriate and BS EN ISO 14001:1996 (Environmental Management Systems)”.

Sub-clause 7, line 3

Delete “BS EN ISO 9002” and insert “BS EN ISO 9001 or BS EN ISO 9002 where appropriate and BS EN ISO 14001: 1996 (Environmental Management Systems)”.

602	General Requirements
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Add to sub-clause 9:

The removal of topsoil shall only take place in dry weather when the ground is dry and not frozen.

1218	Detector Loops
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Add the following to sub clause 8:

The loop shall be dry before installation and each loop tail pair within a slot shall be twisted with between 5 and 10 twists per metre so that individual loop tail pairs stay together throughout their remaining length.

Sufficient lengths of loop cable shall be left neatly coiled within the roadside chamber to permit future loop/feeder joints to be made outwith the roadside chamber.

1309	Amendments and additions to BS5649:Part 2 : 1978 (AMD 3136, 1979)
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Page 4 clause 3 Delete references to 3 degrees, 15 degrees, 1.5 metres and 2.5 metres.

add 'In the table delete bracket projections w of 1.25 metres, 2 metres and 3 metres'.

1710.2	Formwork
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Insert after sub-clause 1710.2(iv) the following additional sub-paragraph.

- v) Proprietary void formers in deck slabs shall be installed in accordance with the manufacturer's instructions. The fixings for all types of void formers shall be sufficiently strong to resist the effects of uplift from wet concrete and any surging from discharged concrete. Joints between adjacent units or units and form faces shall be sealed to prevent loss of grout.

1801 General

Insert after sub-clause 1801.2 the following additional sub-clause.

3. Where grade WR50C steel is specified the average minimum Charpy energy value obtained in V notch tests carried out in accordance with BS 7613: 1994 shall be 27 joules at -15 degrees centigrade for plate thicknesses up to and including 55 millimetres.

2003 Materials for Waterproofing Concrete Bridge Decks

Insert after sub-clause 2003.4 the following additional sub-clause:-

The Company shall prepare two film samples, sprayed onto open moulds (at least 200 x 200 millimetres in area and minimum thickness 2 millimetres), and test for tensile strength and elongation at break to BS 903 Part A2 and tear strength to BS 903 Part A3 Method C. The Company shall supply Angus Council with a copy of the test results.

The Company shall continuously monitor the coverage rate of the material applied to the deck. The Company shall continuously monitor the wet film thickness using a gauge pin or a standard comb type thickness gauge.

The Company shall measure the adhesion of the fully cured membrane to the deck. Three tests shall be carried out per 500 square metres of sprayed membrane. The Company shall reinstate the test areas including primer if necessary. Where test values fall below 0.7 newtons per square millimetre, these areas shall be removed and reinstated.

The finished waterproof membrane surface shall be uniform and continuous; any imperfections detected shall be rectified.

2104 Amendment and Additions to BS 5400 Part 9: Section 9.2:1983.

Delete "BS 3416" in amendments to page 6, paragraph 6.1, last line and replace with "BS 6949".

Appendix 0/3**List of Numbered Appendices Referred to in the Specification and included in Schedule 4**

Appendix 0/3 is comprised of a complete list of the numbered Appendices referred to in the Specification with those not adopted marked "Not Used".

The responsibility for compiling/completing the numbered Appendices is indicated by the following symbols:

- A Angus Council compiles
- A/C Angus Council partially compiles and Company completes and returns to Angus Council
- C Company completes and returns to Angus Council
- I For Company's information only
- (P) This indicates the Appendix is a national proforma and the format must not be altered.

The Company shall compile/complete the numbered Appendices in accordance with the Notes for Guidance on the Specification for Highway Works (MCDHW, Volume 2, published by HMSO), and provide as a minimum the information described in the sample appendices.

Appendix 0/3

List of Numbered Appendices Referred to in the Specification and included in Schedule 4

Compiled/ Completed By	App No.	Title
INTRODUCTION		
A	0/1	Additional, Substitute and Cancelled Clauses, Tables and Figures specific to Schedule 4
A	0/2	Minor Alterations to Existing Clauses, Tables and Figures specific to Schedule 4
A	0/3	List of Numbered Appendices Referred to in the Specification specific to Schedule 4
A	0/4	List of Drawings for Schedule 4
Not Used	0/5	Special National Alterations of The Scottish Executive Development Department
PRELIMINARIES		
A	1/1	Temporary Accommodation and Equipment for Angus Council
Not Used	1/2	Vehicles for Angus Council
Not Used	1/3	Communication System for Angus Council
Not Used	1/4	Working and Fabrication Drawings
A/C	1/5	Testing to be Carried out by the Company
Not Used	1/6	Supply and Delivery of Samples to Angus Council
A	1/7	Site Extent and Limitations on Use
Not Used	1/8	Operatives for Angus Council
A	1/9	Control of Noise and Vibration
Not Used	1/10	Structures to be Designed by the Company
Not Used	1/11	Structural Elements and Other Features to be Designed by the Company
C	1/12	Setting Out and Existing Ground Levels
C	1/13	Programme of Works
Not Used	1/14	Payment Applications
C	1/15	Accommodation Works
C	1/16	Privately and Publicly Owned Services and Supplies
C	1/17	Traffic Safety & Management
C	1/18	Temporary Diversion for Traffic
C	1/19	Routeing of Vehicles
C	1/20	Recovery Vehicles for Breakdowns
C	1/21	Information Boards
C	1/22	Progress Photographs

C	1/23	Risks to Health and Safety from Materials or Substances
A	1/24	Quality Management System
C	1/25	Temporary Closed Circuit Television (CCTV) System for the Monitoring of Traffic
C	1/26	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR)
C	1/27	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR) – Particular Requirements
		SITE CLEARANCE
C	2/1	List of Buildings, etc. to be Demolished
C	2/2	Filling of Trenches & Pipes
C	2/3	Retention of Material Arising from Site Clearance
C	2/4	Explosives & Blasting
C	2/5	Hazardous Materials
		FENCING AND ENVIRONMENTAL BARRIERS
C	3/1	Fencing, Gates and Stiles
		SAFETY FENCES, SAFETY BARRIERS AND PEDESTRIAN GUARDRAILS
C	4/1	Safety Fences and Safety Barriers
C	4/2	Pedestrian Guardrails
		DRAINAGE AND SERVICE DUCTS
C	5/1	Drainage Requirements
C	5/2	Service Duct Requirements
C	5/3	Surface Water Channels and Drainage Channel Blocks
C	5/4	Fin Drains and Narrow Filter Drains
C	5/5	Combined Drainage and Kerb Systems
C	5/6	Linear Drainage Channel Systems
C	5/7	Thermoplastics Structural Wall Pipes and Fittings
		EARTHWORKS
C	6/1	Requirements for Acceptability & Testing etc. of Earthworks Materials
C	6/2	Requirements for Dealing with Class U2 Unacceptable Material
C	6/3	Requirements for Excavation, Deposition, Compaction (Other than Dynamic Compaction)
C	6/4	Requirements for Class 3 material
C	6/5	Geotextiles Used to Separate Earthworks Materials
C	6/6	Fill to Structures & Fill Above Structural Foundations
C	6/7	Sub-formation & Capping & Preparation & Surface Treatment of Formation
A/C	6/8	Topsoiling

C	6/9	Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments
C	6/10	Ground Anchorages, Crib Walling and Gabions
C	6/11	Swallow Holes & Other Naturally Occurring Cavities & Disused Mine Workings
C	6/12	Instrumentation & Monitoring
C	6/13	Ground Improvement
		ROAD PAVEMENTS - GENERAL
C	7/1	Permitted Pavements Options
C	7/2	Excavation & Reinstatement of Existing Surfaces
C (P)	7/3	Surface Dressing Sheets 1 of 2
C	7/4	Bituminous Sprays
C	7/5	In Situ Recycling: The Remix and Repave Process
C	7/6	Breaking Up or Perforation of Existing Pavement
C)P)	7/7	Slurry Surfacing Incorporating Microsurfacing (Sheets 1, 2 & 3)
Not Used	7/8	Not Used
C	7/9	Cold-Milling (Planing) of Bituminous Bound Flexible Pavement
C	7/10	Worksheet Pro Forma for Results of Testing for Constituent Materials in Recycled Coarse Aggregate and Recycled Concrete
C	7/11	Overbanding and Inlaid Crack Sealing Systems
C	7/12	Arrester Beds
C	7/13	Saw-Cut and Seal Bituminous Overlays on Existing Concrete Pavements
C	7/14	Preparation of Jointed Concrete Pavements Prior to Overlaying and Saw-Cutting and Seal of Bituminous Overlay
C	7/15	Saw-Cut and Seal Existing Jointed Concrete Pavements
C	7/16	Cracking and Sealing of Existing Jointed Unreinforced Concrete Pavements and CBM Roadbases
C	7/17	Cracking Plant and Equipment Progress Record
C	7/18	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
C	7/19	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
C	7/20	Site Specific Details and Requirements for Inducing Cracks
C	7/21	Surface Dressing – Recipe Specification
C	7/22	Repair to Potholes
		ROAD PAVEMENTS – CONCRETE AND CEMENT BOUND MATERIALS
C	10/1	Plant and Equipment for the Construction of Exposed Aggregate Concrete Surface
		KERBS, FOOTWAYS AND PAVED AREAS
C	11/1	Kerbs, Footways & Paved Areas
C	11/2	Access Steps

TRAFFIC SIGNS

C	12/1	Traffic Signs: General
C	12/2	Traffic Signs: Marker Posts
C	12/3	Traffic Signs: Road Markings & Studs
C	12/4	Traffic Signs: Cones, Cylinders, Flat Traffic Delineators & Other Traffic Delineators
C	12/5	Traffic Signs: Traffic Signals
C	12/6	Traffic Signs: Special Sign Requirements on Gantries

ROAD LIGHTING COLUMNS AND BRACKETS

C	13/1	Information to be Provided when Specifying Lighting Columns & Brackets
A/C	13/2	Columns & Bracket Data Sheets 1 & 2
(P)	13/3	Instructions for Completion of Column & Bracket Data Sheet
Not Used	13/4	Information to be Provided When Specifying CCTV Masts
Not Used	13/5	Typical CCTV Mast Data Sheet
Not Used	13/6	Instructions for Completion of CCTV Mast Sheets

ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS

C	14/1	Site Records
C	14/2	Location of Lighting Units & Feeder Pillars
C	14/3	Temporary Lighting
A/C	14/4	Electrical Equipment for Road Lighting
C	14/5	Electrical Equipment for Traffic Signs
A	14/71	Labour Requirements
A	14/72	Plant Requirements
A/C	14/75	Competent Persons Authorisation Certificate

MOTORWAY COMMUNICATIONS

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Not Used	15/2	Cable Duct Requirements

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C	16/1	General Requirements for Piling and Embedded Retaining Walls
C	16/2	Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced Concrete Segmental Piles
C	16/3	Bored Cast-in Place Piles
C	16/4	Bored Piles Constructed using Continuous Flight Augers and Concrete or Grout Injection through Hollow Auger Stems
C	16/5	Driven Cast-in-Place Piles
C	16/6	Steel Bearing Piles
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C	16/8	Non-Destructive Methods for Testing Piles

C	16/9	Static Load Testing of Piles
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C	16/11	Hard/Hard Secant Pile Walls
C	16/12	Hard/Soft Secant Pile Walls
C	16/13	Contiguous Bored Pile Walls
C	16/14	King Post Walls
C	16/15	Steel Sheet Piles
C	16/16	Integrity Testing of Wall Elements
C	16/17	Instrumentation for Piles and Embedded Walls
C	16/18	Support Fluid
		STRUCTURAL CONCRETE
C	17/1	Concrete - Classification of Mixes
C	17/2	Concrete - Impregnation Schedule
C	17/3	Concrete - Surface Finishes
C	17/4	Concrete – General
C	17/5	Buried Concrete – Sulphate Attack
C	17/6	Grouting and Duct Systems for Post-tensional Tendons
		STRUCTURAL STEELWORK
C	18/1	Requirements for Structural Steelwork
		PROTECTION OF STEELWORK AGAINST CORROSION
C (P)	19/1	Form HA/PI (New Works) Paint System Sheet
C (P)	19/2	Requirements for Other Works
C (P)	19/3	Form HA/P2 Paint Data Sheet
C (P)	19/4	Form HA/P3 Paint Sample Despatch List, sheets 1&2
C (P)	19/5	General Requirements
		WATERPROOFING FOR STRUCTURES
C	20/1	Waterproofing for Concrete Structures
		BRIDGE BEARINGS
C	21/1	Bridge Bearing Schedule
		PARAPETS
C	22/1	Parapet Schedule
		BRIDGE EXPANSION JOINTS AND SEALING OF GAPS
C	23/1	Bridge Deck Expansion Joint Schedule
C	23/2	Sealing of Gaps Schedule (other than in Bridge Deck Expansion Joints)
		BRICKWORK, BLOCKWORK AND STONEMWORK
C	24/1	Brickwork, Blockwork and Stonemwork
		SPECIAL STRUCTURES
C	25/1	Requirements for Corrugated Steel Buried Structures

C	25/2	Requirements for Reinforced Soil and Anchored Earth Structures
C	25/3	Requirements for Pocket Type and Grouted Reinforced Brickwork Retaining Wall Structures
C	25/4	Environmental Barriers
C	25/5	Requirements for Buried Rigid Pipes for Drainage Structures

MISCELLANEOUS

C	26/1	Ancillary Concrete
C	26/2	Bedding Mortar
C	26/3	Cored Thermoplastic Node Markers

LANDSCAPE AND ECOLOGY

A/C	30/1	General, sheets 1, 2 & 3
A/C	30/2	Weed Control
A/C	30/3	Control of Rabbits and Deer
A/C	30/4	Ground Preparation
A/C	30/5	Grass Seeding, Wildflower Seeding and Turfing
A/C	30/6	Planting, sheets 1 & 2
A/C	30/7	Grass, Bulbs and Wildflower Maintenance
A/C	30/8	Watering
A/C	30/9	Establishment Maintenance for Planting
A/C	30/10	Maintenance of Established Trees and Shrubs
A/C	30/11	Management of Waterbodies
A/C	30/12	Special Ecological Measures

Appendix 0/4 List of Drawings for Schedule 4

The drawings referred to in this Appendix are bound in separate volumes as shown below:

Title	Drawing No
Schedule 4, Part 10: Extent of O&M Site Drawings	
Claypotts to Panmurefield Village	A92/OM/01 Rev A
Panmurefield Village to Ardownie	A92/OM/02 Rev A
Ardownie to Woodhill	A92/OM/03 Rev A
Southern Section to Upper Victoria Link	A92/OM/04 Rev A
Woodhill to Upper Victoria	A92/OM/05 Rev A
Upper Victoria to Muirdrum	A92/OM/06 Rev A
Muirdrum to Salmondsmuir	A92/OM/07 Rev A
	Not used
Salmondsmuir to Balcathie	A92/OM/09 Rev A
Hatton Road	A92/OM/10 Rev A
Balcathie to Westway	A92/OM/11 Rev A
Barry Bypass	A92/OM/04A

Schedule 4, Part 11: Miscellaneous O&M Drawings

Angus Council Street Lighting Details

Excavation Details for Street Lighting Column Installation	ASL2
Installation Details for Street Lighting Road Duct and Footway Duct	ASL3
Typical Planting Details for Feeder Pillar	ASL6
Joint Hole Details (new supplies)	ASL8
Standard Detail for AC1 cut-out	ACM01
Standard Detail for AC2 cut-out with clock	ACM04
Standard Detail for AC3 with cut-out	ACM05
Schematic Layout for Control Box with Pre-wired Pillar AC-CP1	ACM06
Stepped Column Detail (Pole Top)	ACM09
Illuminated Sign Pole Detail	ACM12
Earth Strap for Column and Door	ACM13
Hinged Column Details	ACM15
Feeder Pillar	ACM17
Foundation Details for Baselight Bollard	ASL18

Permanent Rights of Servitude

Ardownie Farm	A92/PRS/01
Nether Kelly Farm	A92/PRS/02
Mains of Kelly Farm	A92/PRS/03

Other Drawings

Noise Survey Control Stations	A92/NSCS/01 Rev A
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Appendix 1/1 Temporary Accommodation and Equipment for Angus Council

1. Computer Equipment

Angus Council expects to base the Angus Council Representative at its Divisional Office at Kirriemuir Road, Forfar for the duration of the Full Service Period.

The following equipment shall be provided by the Company at the location specified by Angus Council.

Personal Computer as specified below:

Processor: Pentium III 500MHz or better
Memory: 256Mb RAM
Hard Disk: 13 Gb Drive
Monitor: 17" SVGA, MPR2 Compliant
Parts: 1 parallel, 2 serial, 1 mouse
Floppy Disk: 3.5" 1.44Mb Drive
CD Rom: DVD Rom Drive
Software: Same software as used by the Company; shared working software, e.g. Lotus Notes; McAfee virus scanner

1 No. external modem BAPT approved and with auto dial and auto detect capability. Modem to be of latest communication capability.

1 No. ISDN line with direct connection to the PSTN.

1 No. uninterruptible power supply with a continuous rating of 1400VA for 20 minutes from power failure and associated software and cabling both for power and control.

1 No. LaserJet printer with 12Mb of RAM and associated software and cabling. Paper and toner to be supplied by the Company as required for the reasonable business of the Angus Council Representative.

All computer equipment shall be replaced on a 3 year basis to the latest highest specification.

2. Surveying Equipment

1 No. 50 metres fibron tape
2 No. 30 metres fibron tapes
4 No. 5 metres pocket tapes
1 No. universal straight edge with wedge gauge
1 No. 35mm Automatic SLR camera with databack
1 No. Digital camera. 2m pixels.
4 No. Flashlights

All surveying equipment to be replaced as required.

Supplies of:

Marking chalk, batteries, spray paint, 35mm colour film (including printing); to be renewed by the Company as and when required.

The Company shall afford to Angus Council the use of any equipment reasonably necessary for Angus Council to carry out monitoring in accordance with the Agreement.

Appendix 1/5 Testing to be carried out by the Company

1. This Appendix shall be completed to a standard not less than that given in Table NG 1/1 of the Notes for guidance on the Specification for Highway Works, for types of test and frequency of testing.
2. This Appendix shall be submitted to Angus Council in accordance with the Review Procedure.
3. Tests comparable to those specified in this Appendix shall be undertaken for any equivalent work, goods or materials proposed by the Company.
4. Tests for works, goods or materials as scheduled under any one clause are required for all such work, goods or materials in the O & M Services.
5. Where the Company uses work, goods materials for which a testing schedule is not shown in Appendix 1/5 of the Specification, the Company shall use a test and frequency of test on the work, goods, materials as recommended by the manufacturer in respect of such O & M Services, the Designer and Checker. A Consultation Certificate shall be signed to this effect by the Company, the manufacturer, the Designer and Checker. The Company shall submit to Angus Council two copies of the certificate, with original signatures. One copy of the certificate will be returned within 5 Working Days of receipt, signed in acknowledgement by Angus Council. The Company shall not commence such testing until this procedure is completed. If Angus Council has not acknowledged a valid certificate within 5 Working Days of receipt such certificate shall be deemed to have been acknowledged by Angus Council.
6. Cube strengths shall not be required for concrete complying with Clause 2602 of the Specification.
7. The Company shall complete where appropriate the following:-
 - Angus Council Electrical Test Certificate
 - Angus Council Electrical Request Sheet

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1400					
1424(s)	Lighting Units	Tests specified in Clause 1424(s)	Each Unit	Required on Attached Form	Product Certification scheme applies Certification that the Installation complies with BS7671 (the IEE Wiring Regulations) is required
	Networks	Tests specified in Clause 1424(s)	Each Network	Required on Attached Form	Certification that the Installation complies with BS7671 (the IEE Wiring Regulations) is required

Appendix 1/5 Angus Council Electrical Test Certificate

(All entries recorded on this sheet to be determined by measurement. All instruments must bear a current calibration label).

Commissioning

Note: All commissioning and pre-adoption inspections to be carried out by the Company and witnessed by an accredited representative from Angus Council Roads Department.

Date of Test _____

Instruments to be used

Date when last calibrated

Voltmeter 240/415V

Ammeter 0-50 amp

Megger 1000V

Loop Impedance Meter

Prospective Short Circuit Tester

Control Pillar

Installation de-energised (with all fuse carriers removed)

Continuity of Protective Conductors (R1 + R2):-

Polarity:-

incorrect

Mark for correct or for

Circuit 1 _____ Ω

Circuit 1

Circuit 2 _____ Ω

Circuit 2

Circuit 3 _____ Ω

Circuit 3

Circuit 4 _____ Ω

Circuit 4

Insulation Resistance:
(Note: Remove neutral conductor from PME system)

Insulation Resistance (Column Wiring):-
(All Columns)

Circuit 1 P-N _____ Ω
P-E _____ Ω
N-E _____ Ω

Circuit 1 Column No _____
P-E _____ $M\Omega$
N-E _____ $M\Omega$

Circuit 2 P-N _____ Ω
P-E _____ Ω
N-E _____ Ω

Circuit 2 Column No _____
P-E _____ $M\Omega$
N-E _____ $M\Omega$

Circuit 3 P-N _____ Ω
P-E _____ Ω
N-E _____ Ω

Circuit 3 Column No _____
P-E _____ $M\Omega$
N-E _____ $M\Omega$

METHOD OF EARTHING:- TN-C-S

Appendix 1/5 Angus Council Electrical Test Certificate

Insulation Resistance - Column wiring

(All Columns)

Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω
Circuit	Column No		Circuit	Column No	
	P-E	_____ Ω		P-E	_____ Ω
	N-E	_____ Ω		N-E	_____ Ω

Appendix 1/5 Angus Council Electrical Test Certificate

Installation Energised

(Measurements taken under load at cut-out incoming terminals)

Voltage at Origin _____ V
 Prospective Short Circuit Current at Origin _____ KA
 Loop Impedance at Origin _____ Ω
 No of Phases _____
 Load at Origin _____ A

Measured Load:-

Voltage at end of Circuit

Circuit 1 _____ A
 Circuit 2 _____ A
 Circuit 3 _____ A
 Circuit 4 _____ A

Circuit 1 _____ V
 Circuit 2 _____ V
 Circuit 3 _____ V
 Circuit 4 _____ V

Loop Impedance at end of each circuit

Prosp. Short Circuit Current at end of Circuit

Circuit 1 _____ Ω
 Circuit 2 _____ Ω
 Circuit 3 _____ Ω
 Circuit 4 _____ Ω

Circuit 1 _____ KA
 Circuit 2 _____ KA
 Circuit 3 _____ KA
 Circuit 4 _____ KA

I/We being the person(s) responsible (as indicated by my/our signature(s) below) for the inspection and test of the street lighting and associated electrical installation particulars of which are described on the attached appendices of this form certify that the said work for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with Angus Council current Specification for the Installation of Road Lighting and the Regulations for Electrical Installations published by The Institution of Electrical Engineers, 16th Edition (BS 7671: 1992) except for departure, if any, stated in this certificate.

The extent of liability of the signatory is limited to the work described above as the subject of this certificate.

For the inspection and test of the installation at:-

Signed Firm

O&M Contractor (Authorised Person)

Name Date.....

Signed: _____	Firm: _____
Company (Authorised Person)	
Name: _____	Date: _____

<u>Receipt is acknowledged</u>	
Signed: _____	
on behalf of Angus Council	
Name: _____	Date: _____



STREET LIGHTING ELECTRICAL TEST REQUEST SHEET

Job No

Job Description

Location

Date Work Completed _____

As the above works have been completed I would be obliged if you would be present on site on in order to witness the Electrical Test being carried out.

Signed _____ Firm _____ Company (Authorised Person)

Name: _____ Date: _____

Please note that 48 Hours notice is required prior to the Electrical Test being carried out

Date Electrically Tested _____

Remedial Works Required YES/NO

Details of Remedial Works _____

Date Remedial Works Completed _____

Signed _____ Firm _____ Company (Authorised Person)

Name: _____ Date: _____

Signed Firm

O&M Contractor (Authorised Person)

Name Date.....

Please return this sheet to the Angus Council Representative upon completion

Date Form returned to Angus Council _____ Receipt is acknowledged

Signed _____ Date _____ on behalf of Angus Council

Name: _____

Appendix 1/7 Site Extent and Limitations on Use

The extent of the O&M Site and limitations on its use are shown on the drawings in Part 10 of this Schedule.

Appendix 1/9 Control of Noise and Vibration

1. Noise Control

- 1.1 The Company shall seek the opinion of the relevant local authority under the Control of Pollution Act 1974 as to whether it wishes to control noise and working hours for the O&M Services through a formal consent in terms of the Control of Pollution Act 1974, Part III, Section 61. If the relevant local authority prefers this approach, then the Company shall submit an application under the Control of Pollution Act 1974, Part 111, Section 61 to the relevant local authority and receive consent prior to any O&M Services taking place. The additional measures in this Appendix are indicative only and are given as a guide. The Company shall liaise with the relevant local authority prior to and during the performance of the O&M Services at an agreed frequency (at least quarterly) in order to identify any areas of concern and to ensure that the relevant controls are implemented.
- 1.2 All construction plant used on the O & M Services shall be the quietest of its type practical for carrying out the work required and shall be maintained in good condition with regard to minimising noise output. All construction plant shall be operated and maintained in accordance with the manufacturer's recommendations including the use and maintenance of any specific noise reduction measures.
- 1.3 All necessary measures shall be employed including the use of mufflers on pneumatic tools, the use of non-reciprocating plant and the use where practical of effective sound reducing enclosures to ensure all construction plant used in connection with the O & M Services operates with the minimum of noise.
- 1.4 Unless otherwise stated the working hours in respect of any O & M Services within the O & M Site shall be Monday to Friday between 0800 and 2000 hours and on Saturday between 0800 and 1600 hours, with no working on Public Holidays. Consent for work outside these hours may be given after any necessary consultations (this consent not to be unreasonably withheld). 15 Working Days notice is required from the Company when seeking such consent.
- 1.5 The Company shall provide Angus Council with all necessary assistance in measurement and control of the noise levels on and adjacent to the O & M Services. At any time during the Project Period when requested by Angus Council, the Company shall supply, construct, maintain, move or remove such equipment or facilities as may be requested by Angus Council to enable Angus Council to measure the level of noise on or adjacent to the O & M Services.
- 1.6 The noise levels (see Note (ii) below) scheduled in Paragraph 1.7 of this Appendix for periods outside the working hours shall only be permitted when consent has been granted by Angus Council.
- 1.7 The ambient noise level, Leq (see Note (ii) below) from all sources when measured 2.0 metres above the ground at noise control stations shall either not exceed the appropriate level given in Table 1 or not exceed by more than 3dB(A) the existing ambient noise level Leq (see Note (iii) below) at the control station measured over the same period, whichever level is the greater. The maximum sound level at any noise control station shall not exceed the level given in Table 1. Exceptionally the Company may be given permission by Angus Council to carry out O & M Services which exceed the noise levels in Table 1 provided that 15 Working Days notice of the date and timing of these works is given to Angus Council and the Company

demonstrates that it intends to take all necessary measures to mitigate the noise nuisance. After consultation with the Relevant Authority and Interested Parties a decision will be given by Angus Council within 10 Working Days of receipt of the notice.

Table 1: Total Noise Levels at Control Stations

Schedule		Total Noise Levels at Control Stations		
Period	Hours	Ambient noise level Leq measured at control station dB(A)	Period of hours over which Leq is applicable	Maximum Sound Level (See note (iv) below) measured at control station dB(A)
Mondays to Fridays	0800 – 2000	75	12	96
Mondays to Fridays	2000 – 2200	65	2	70
Mondays to Fridays	2200 – 0800	50	1	55
Mondays to Fridays	0800 – 1900	50	1	55
Friday/Saturday	1900 – 0800	70	8	80
Saturdays	0800 – 1600	50	1	55
Saturday/Sunday	0800 – 1600	60	7	65
Sundays	1600 – 0900	50	1	55
Sunday/Monday	0900 – 1600			
	1600 – 0700			

Notes

- (i) Noise levels relate to free field conditions. Where noise control stations are located 1 metre from the façade of buildings, the permitted noise levels can be increased by 3 dB(A).
- (ii) The ambient noise level Leq, at a noise control station is the total Leq from all the noise sources in the vicinity over the specified period.
- (iii) The existing ambient noise level, Leq, at a noise control station is the total Leq from all the noise sources in the vicinity over the specified period prior to the commencement of the O & M Services
- (iv) Maximum sound level is the highest value indicated on a sound level meter which meets the requirements of BS EN 60651: 1994 type 1 or 2 set to SLOW response and frequency weighting A.

1.8 All vehicles and mechanical plant used on the O & M Services shall be fitted with effective silencers and shall be maintained in good efficient working order. Machines

in intermittent use shall be shut down in the periods between work or throttled down to a minimum. The engines of lorries, dump trucks and other haulage vehicles shall whenever reasonably practicable, be switched off if they are to remain stationary for any period of more than three minutes. The Company shall remove from the O & M Sites any item of constructional plant which in the opinion of Angus Council is insufficiently silenced.

- 1.9 All compressors shall be 'sound reduced' models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers. Pumps and mechanical static plant shall be enclosed by acoustic sheds as recommended in BS.5228:1984.
- 1.10 Piling including temporary piling shall be carried out using equipment which incorporates a recognised noise reduction system. The method employed shall be subject to the requirements of the appropriate Relevant Authorities. Piling shall not be carried out before 0800 hours or after 1700 hours Monday to Friday and before 0800 hours or after 1300 hours on Saturday with no working on Public Holidays or Sundays without the written consent of Angus Council. When the use of explosives is permitted by Angus Council, blasting shall be restricted to the hours authorised in Angus Council's written consent.
- 1.11 Any construction plant such as generators and pumps which are permitted to operate outside the working hours as specified in Paragraph 1.4 of this Appendix shall be surrounded by an acoustic enclosure to the Approval of Angus Council which shall restrict the maximum noise levels to 5dB(A) below the levels quoted in Table 1 of this Appendix for normal night-time working.
- 1.12 The Company shall organise its operations with regard to the positioning of construction plant and location of haul routes, and the like, so as to minimise the 'free-field' or 'façade' noise levels as appropriate at adjacent properties.

2. Vibration Control

- 2.1 Vibration levels due to the Company's construction plant or method of operation recorded on any structure in the vicinity of the Works shall not exceed the greater of:
- a) the existing ppv's experienced in each of the noise stations situated adjacent to the works or
 - b) the following assessment criteria
 - i) 3mm/s in the case of continuous vibration
 - ii) 8mm/s in the case of intermittent vibration

Should this level of vibration be exceeded, all work causing the breach of this requirement shall cease immediately. The Company shall then submit to Angus Council its proposed modifications to the construction plant or method of operation to permit the construction plant or method of operation to recommence. Should the Company's modifications to the construction plant or method of operation fail to comply with the peak particle velocity specified herein, then the Company will be required to submit further modifications until the specified value is not exceeded.

- 2.2 The vibrations shall be monitored by the Company and the records submitted to Angus Council every 20 Working Days.

- 2.3 Angus Council will not be liable in any way whatsoever for any, or all, costs incurred, whether direct or indirect, by the Company having to cease work and make modifications in compliance with this Appendix.
- 2.4 The peak particle velocity shall be calculated in accordance with Specification Clause 607.2 (viii).
- 2.5 The Company shall keep the appropriate Relevant Authorities advised of its method of working and the steps it proposes in order to minimise vibration.
- 2.6 The Company shall comply with the Control of Pollution Act 1974.

Table 2: Noise Control Stations

Station	Address
1	21 Clifftown Gardens
2	South Lodge
3	8 Westerton Avenue
4	61 Glendevon Way
5	East Lodge
6	2 Alder Place
7	North Grange Farm House
8	South Grange Nursing Home
9	Ardownie Cottages
10	Dairyman's Cottage, Mains of Ardestie
11	No 1 Inn Cottage, Woodhill
12	Travebank Restaurant
13	Cottage, Upper Victoria
14	Cul Mhor, Upper Victoria
15	1 Muirdrum
16	Grieves House, Salmonds Muir
17	Nether Kelly Farm Cottages
18	No 4 Balcathie Farm Cottages
19	5 Gables, Elliot
20	West Bay Cottage
21	Barry Primary School
22	55 Ravensby Park Gardens
23	1 Westfield Street
24	Greenlawhill

Note : For location of Noise Survey Control Stations refer to drawing number A92/NSCS/01.

Appendix 1/24 Quality Management System

The Quality Management System requirements are as detailed in Schedule 6.

Appendix 6/8 Topsoiling

Action No.	Sub-Clause Ref.	Details
1	602.9	Topsoil and subsoil to be stripped to their full depth for areas stated in 602.9
2	602.10	No stockpiles of topsoil, or any other material, shall be stored within the root zone of mature trees or in areas where existing trees/habitats may be damaged or where surface run off to water courses would be detrimental to water quality.
3	618.2	There shall be no imported topsoil without the prior written approval of the Angus Council Representative (such approval not to be unreasonably withheld or delayed), for which supporting evidence that the supply of existing topsoil, 5A, has been responsibly used and exhausted.
4	618.4(1)	<p>Topsoil depths shall be:</p> <ul style="list-style-type: none"> (a) 50-100mm in areas of grass on verges, embankments and cuttings where no planting is required and the land is not to be returned to agriculture. (b) not less than 400mm in areas of grass where the land is to be returned to agriculture. (c) 300-400mm of topsoil in areas to be planted with native shrub, scrub or woodland mixes, using material won from the site, to minimise noxious weed growth during the establishment period and promote a rich herb layer throughout the remainder of the Project Period. (d) 35-50mm topsoil shall be spread in areas to be wildflower seeded. (e) No topsoil shall be spread in areas of planting into inverted turves. <p>The above does not apply to the topsoil in rock niches.</p>
5	618.4(ii) and (iv)	<p>The removal of stones and undesirable material relates to areas to be planted or seeded. The maximum stone and debris size shall be as follows:</p> <ul style="list-style-type: none"> (a) Grass verges and sightlines: 50mm protruding stone after topsoil has been firmed/rolled. (b) All other Grassland and Wildflower Grassland: 75mm (c) Planted Areas (all planting except amenity/ornamental shrub planting): 100m. (d) Amenity/Ornamental Shrub Planting: 75mm.

Action No.	Sub-Clause Ref.	Details
		<p>The stone removal for (c) and (d) applies to the full depth of topsoil. No stones are to protrude greater than 50mm for any of the above vegetation cover types.</p>
		<p>The overall stone content by % volumes relates to the characteristics of the in-situ soils: within any area of respread topsoil there should not be a greater stone content by % volume than the adjacent existing soils.</p>
		<p>The above supersedes all clauses within the specification and BS4428 relating to the stone size.</p>

Appendix 13/2 - Typical Column And Bracket Data - Sheet 1

Name of Manufacturer:

Column Reference No	
Revision No	
Date	

Name Of Contract

Part A General

Column nominal height (m)

Acceptable positions bracket arms relative to dc position

Column material	<input type="text"/>	<p>Door Opening</p>					
Material design strength	<input type="text"/> (N/sq mm)						
No of door openings	<input type="text"/>						
Door opening size - Height	<input type="text"/> (mm)						
- Width	<input type="text"/> (mm)						
Cross section of base compartment	<table border="1"> <tr> <td>Height (mm)</td> <td>Width (mm)</td> <td>Depth (mm)</td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </table>		Height (mm)	Width (mm)	Depth (mm)	<input type="text"/>	<input type="text"/>
Height (mm)	Width (mm)	Depth (mm)					
<input type="text"/>	<input type="text"/>	<input type="text"/>					
		Manufacture's drawing reference no <input type="text"/>					

Corrosion protection (steel columns only) - basic system type (NG 1901)

(mm)

Part B Foundation Data

Planted base (m)

Diameter of concrete (if any)	390	230
-------------------------------	-----	-----

Flange base

Hole diameter	Design load/bolt (mm)	(N)
<input type="text"/>	<input type="text"/>	<input type="text"/>

NOTE: For flange plates with slotted holes a diagram shall be included with this Data Sheet

Appendix 13/2 - Typical Column And Bracket Data - Sheet 2

Part C Acceptable Lanterns Characteristics

Lantern Maximum

Post Top Column	Lantern Connection		Standard k Factors (see BS 5649)						
			1	1.8	2.2	2.5	3.0		
	Lantern Max Wt (kg)	Maximum Windage Area (m) for standard k factors							
	Dia	Length							

Single Arm Bracket Colou	Lantern Lever Arm (mm)	
	Due to wt of lantern	Due to windage on lantern

Bracket Projection (m)	Ref No	Drawing No	Material		Lantern Fixing Angle	Lantern Connection		Lantern Maximum				
			Grade	Design Strength (N/sq mm)		Dia (mm)	Lgth (mm)	Wt (kg)				

Double Arm Bracket Colou	Lantern Lever Arm (mm)	
	Due to wt of lantern	Due to windage on lantern

Bracket Projection (m)	Ref No	Drawing No	Material		Lantern Fixing Angle	Lantern Connection		Lantern Maximum				
			Grade	Design Strength (N/sq mm)		Dia (mm)	Lgth (mm)	Wt (kg)				

Part D Certificate

It is certified that the information given in this Data Sheet has been obtained in accordance with the requirements of BS 5649 as implemented by Departmental Standard BD 26 and the Specification.

Signed on behalf of the Company

Date

Appendix 14/4 - Electrical Equipment For Road Lighting

1. Luminaires

Manufacturer	Cat No	Glare Control Class (T1)	IP Rating	PECU Socket	(Design Table Ref No)	(Isoluminance Template Ref No)

2. Ancillary Equipment

Item	Manufacturer	Catalogue or Type No
Cut-out Wiring		

3. Feeder Pillars

Item	Manufacturer	Catalogue No
Feeder Pillar Pre-Wired Panel		

4. Cables and Ducts

Item	Manufacturer	Catalogue No
Cable Duct		

Appendix 14/71 - Labour Requirements

1. General

- a) The Company shall appoint a Supervisor specifically for electrical works. He shall provide the Angus Council Representative with the name of this officer and his nominated deputies and with telephone numbers or details of others means by which they or one of them can be contacted at any time.

The Supervisor or his nominated deputy shall be on the O & M Site at all times when electrical work is proceeding and shall be readily available to deal with all related matters.

- b) The Supervisor shall report to the Angus Council Representative daily during the subsistence of electrical works on works progress and labour and plant employed on all ongoing works and complete reports as Appendix 14/73 and 14/74.
- c) The Supervisor shall have suitable transportation and be provided with a mobile telephone and a radio compatible with the O & M Site communication system.
- d) All electrical connections into cut-outs, switchgear or underground cable joints shall be made by qualified electrical personnel only.
- e) All rates of pay shall as a minimum be in accordance with Joint Industry Board for the Electrical Contracting Industry for the category of staff of Approved Electricians and Electricians.
- f) The Company shall ensure that all personnel employed are fully equipped with protective clothing for working in all weathers and site conditions
- g) The Company shall complete the Form For Competent persons detailed in Appendix 14/75. The criteria for competent persons is given in Electricity Council Engineering Recommendations G39 and shall be for the Supervisor, Approved Electricians and Electricians. Forms are also required for any labourers engaged on column erection.

It will not be sufficient for a person to be classified as an Electrician without meeting the full criteria in paragraph 3 and 4.

2. Supervisor

The Supervisor must:-

- a) have a minimum 3 years' supervisory experience in Public Lighting Installation Work,
- b) have the ability to organise all types of Road Electrical Installations functions efficiently,
- c) have the ability to organise and programme the installation of Electrical and Lighting Equipment,
- d) have a thorough working knowledge of the:-

- i) National Working Rules of the Electrical Contracting Industry
 - ii) IEE Regulations
 - iii) Electricity Supply Regulations
 - iv) Health and Safety at Work Act
 - v) G39 and notes
 - vi) Relevant British Standard Codes of Practice
 - vii) Working Practices of local Electricity Companies
 - viii) Electricity at Work Regulations 1989
- e) have a suitable electrical Qualification which should be City and Guilds A, B and C Certificate or similar as approved by the Angus Council Representative.

3. **Approved Electrician**

The Approved Electricians must:-

- a) have served an approved Electrical Apprenticeship;
- b) have at least one year's Public Lighting Maintenance experience;
- c) have the ability to work in an emergency situation without direct supervision on all types of lighting equipment and underground cabling systems;
- d) have the ability to carry out underground jointing of cables up to 240 sq mm 4-core with a voltage rating of up to 1000 volts;
- e) have a working knowledge of the:-
 - i) IEE Regulations
 - ii) G39 and notes
 - iii) Health and Safety at Work Act
 - iv) Working Practices of local Electricity Companies
 - v) Electricity at Work Regulations 1989
- f) have thorough knowledge of Maintenance and Installation procedures of Electrical Systems including fault finding;
- g) be able to set out jobs from drawings and specifications and requisition the necessary materials;
- h) have suitable electrical qualifications which should be City and Guilds A, B and C Certificate or similar as approved by the Angus Council Representative.

4. **Electricians**

Electricians shall:-

- a) have served an Approved Electrical Apprenticeship;
- b) have the ability to carry out underground jointing of cables up to 240 sq mm 4-core with a voltage rating of up to 1000 volts;
- c) have the ability to locate faults on discharge lighting circuits and components;

- d) have a working knowledge of the:-
 - i) IEE Regulations
 - ii) G39 and notes
 - iii) Health and Safety at Work Act
 - iv) Electricity at Work Regulations 1989
- e) have suitable electrical qualifications which should be City and Guilds A or B Certificate or similar as approved by the Angus Council Representative.

5. **Labourers/D.L.O.**

- a) Labourers shall assist electricians in the installation and maintenance of road lighting equipment.
- b) They will also be required to do other work of an unskilled nature under supervision.
- c) All labourers used on column erection and installation of other equipment shall be adequately trained and fully conversant with all relevant working methods and procedures.

Appendix 14/72 - Plant Requirements

1. General

- a) The Company shall ensure that all vehicles are maintained in good working order and serviced in accordance with manufacturer's recommendations.
- b) The Company shall when requested by the Angus Council Representative produce all relevant certificates for any vehicle within 24 hours.
- c) All vehicles used must have a flashing light and a sign prominently displayed with Road Maintenance in 150mm high black letters on yellow background.

2. Platform

- a) The vehicle to be used shall have a mechanically, electrical hydraulically operated hoist arm.
- b) the working platform shall be of sufficient size and capable of being loaded to accommodate 2 operatives with working equipment.
- c) The vehicle shall have operating controls duplicated on the vehicle chassis, the vehicle chassis controls shall have priority control.
- d) The vehicle chassis shall be fitted with stabilising jacks.
- e) The hoist arm or boom shall have interlocks to prevent the hoist arms boom interfering with traffic in adjacent lanes.
- f) These facilities shall enable the vehicle to service 12m mounting height columns with 2.5m bracket project 10m from one right hand lane.
- g) The interlock system shall ensure that:-
 - i) the stabilising jacks do not operate until the handbrake is applied;
 - ii) the working platform cannot be moved until the stabilising jacks are lowered;
 - iii) the stabilising jacks cannot be retracted until the working platform is parked;
 - iv) the vehicle cannot be driven with the stabilising jacks down.
- h) The hoist system, including jacks, shall lock in the event of any component or combination of components in the system failing.
- i) The vehicle shall be in all ways suitable for the purposes intended and shall comply with all relevant Regulations, Specifications and Codes of Practice.
- j) The working platform shall be fitted with 2 anchor points for safety harnesses.
- k) A warning notice shall be prominently displayed in the cab of the vehicle drawing the attention of the operators to the dangers which may arise from operating the lift platform in the vicinity of overhead power lines. Instructions for resuscitation from electric shock shall also be displayed in the cab of the vehicle.

- l) A dry powder fire extinguisher shall be mounted in the cab.
- m) The working platform shall have a simple system of communications with the cab of the vehicle.
- n) A bucket of sand shall be carried on every vehicle for covering of any spillage of hydraulic oils on the carriageway.
- o) The vehicle shall be fitted with flashing beacons at the front and rear.
- p) The vehicle shall have an extended cab to provide messing and toilet facilities including means of heating food.
- q) The vehicle shall have a door at the rear of the cab to give access to the walkway, stores and working platform without leaving the vehicle chassis.
- r) The vehicle shall be provided with 2 water tanks minimum capacity 180 litres each and lockers to accommodate a day's replacement equipment and consumable stores.
- s) The vehicle shall be fitted with adequate lighting for carrying out maintenance functions during darkness.

3. **Lorry With Crane Lifting Facility**

The vehicle shall:-

- a) have a lifting capacity capable of lifting a 4.5 tonne cable drum from at least 1m away;
- b) have facilities for carrying 12 metre columns.

Appendix 14/75 - Competent Persons Authorisation Certificate

CERTIFICATE NUMBER

AREA COVERED BY THIS CERTIFICATE: Roads in the Operating Company's area of operations.

CATEGORY OF AUTHORISATION:

Category 1

To supervise the erection of lighting columns and fittings in the vicinity of Electricity Company overhead lines.

Category 2

To carry out all electrical duties including the following:

- 1 The testing of installations.
- 2 The wiring of installations to the outgoing side of the Electricity company's cut-out
- 3 The maintenance of installations
- 4 The initial insertion, removal or replacement of the Electricity company's cut-out fuses subject to the Company's discretion. (Public lighting fuses only).

Category 3

To work in the vicinity of the Electricity Company's overhead lines and to withdraw and replace the Electricity Company's cut-out fuse carriers for:

- 1 Lamp replacement and cleaning purposes.
- 2 Painting of structures.

NAME OF COMPETENT PERSON (BLOCK LETTERS)

CATEGORY OF AUTHORISATION

APPROVED BY(SGD) POSITION DATE.....

RECEIVED(SGD) DATE

THIS CERTIFICATE IS VALID UNTIL (DATE)

A copy of this Certificate shall be held by the Competent Person named above.

Appendix 30/1 General

Action No.	Sub-Clause Ref.	Details
1	3001.1	The Company shall give Angus Council notice of all items in sub-clause 3001.1 as well as for works in or adjacent to all watercourses and any other areas identified by the Ecologist.
2	3001.1	The Company shall liaise directly with landowners to give notice and arrange precise access dates for works outside the contract boundary.
-	3001.2	No amendment
3	3001.12	Pesticides Records Forms, detailing information as required in sub-clause 3001.12, are to be submitted to Angus Council on a monthly basis.
4	3001.13	The bird nesting period for this contract will be from the end of March to the end of July, unless otherwise advised by SNH.
5	3001.14	Inspection Reports shall be submitted as required in Schedule 4, Part 2.

Appendix 30/2: Weed Control

Action No.	Sub-Clause	Details
1	3002.1	Weed control for all injurious weed species, including those listed in sub-Clause 3002.1, shall be carried out throughout the Works at sufficient frequency to control their growth until the Agreement Expiry Date.
2	3002.3	<p>Total weed control shall apply to the following locations:</p> <ul style="list-style-type: none"> (i) Bases of safety fences or barriers (ii) Around columns, posts and signs (iii) All paved areas and hardstandings <p>The Company shall apply herbicides at sufficient frequency to eliminate weed growth until the Agreement Expiry Date.</p>
3	3002.4	<p>Total weed control by non-residual herbicide shall apply to the following locations:</p> <ul style="list-style-type: none"> (i) All landscape areas prior to seeding or planting so as to be in a weed free condition (ii) All stockpiles of topsoil which should be maintained in a weed free condition (iii) All planted areas <p>until the Agreement Expiry Date.</p>
4	3002.5	<p>A translocated herbicide approved for use in or near water shall be used for weed control in all filter drains and other drainage channels and in proximity to all watercourses.</p> <p>Control shall be at sufficient frequency to eliminate weed growth until the Agreement Expiry Date.</p>
5	3002.6	Selective weed control in grass areas shall be applied if necessary to control broadleaf weed species. Selective herbicides shall only be used in the second season following successful establishment of the grass.
6	3002.7	<p>Weed control by spot application of translocated herbicide shall be applied as necessary, and in any case no less than twice a year until the Agreement Expiry Date at the following locations:</p> <ul style="list-style-type: none"> (i) For control of injurious weeds in grass/wildflower areas (ii) All woodland and planted areas (iii) Hedgerow planting areas

Action No.	Sub-Clause	Details
7	3002.8	Weed control by hand weeding shall be carried out as necessary, and in any case no less than twice a year until the Agreement Expiry Date at the following locations: (i) Groundcover planting where spot application may cause damage (ii) Hedgerow planting where spot application may cause damage (iii) Wildflower areas where spot application may cause damage.
8	3002.9	Weed control by cutting shall be carried out as necessary in areas where the extent of growth or type of weed is not effectively controlled by herbicide application.
-	3002.10	The Company shall remove all arisings in accordance with sub-clause 3002.10 from weed control operations that involve hand weeding and cutting

Appendix 30/3: Control of Rabbits and Deer

Action No.	Sub-Clause	Details
1	3003.1	The Company shall carry out rabbit control in all planting areas until the Agreement Expiry Date.
2	3003.8	The Company shall ensure effective rabbit control until the Agreement Expiry Date.
3	3003.9	Angus Council may request an inspection of the site with a representative of the Company at three times a year to ensure effective control has been achieved.
4	3003.12	The Company shall keep planting enclosures free of rabbits, rabbit burrows including exit/entry holes and deer until the Agreement Expiry Date.
5	3003.14	The Company shall replace failed plants annually and maintain them until the Agreement Expiry Date to ensure a full and covered canopy.

Appendix 30/4: Ground Preparation

Action No.	Sub-Clause	Details
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1	3004.1	Within areas of proposed planting or seeding, all existing grass and herbaceous vegetation shall be cut, in accordance with sub-clause 3004.1, and treated with herbicide as per suppliers recommendations.
2	3004.2	All areas to be planted shall be treated with herbicide with the exception of areas to be planted in existing woodland, areas to be planted in inverted turfs within areas of undisturbed ground and on rock faces.
3	3004.5	Subsoil in planting areas shall be ripped prior to spreading of topsoil to a minimum depth of 300 mm, excluding areas to be planted in inverted turfs within areas of undisturbed ground . Areas in existing arable or pasture land to be planted shall be ripped to a minimum depth of 600 mm to ensure the breaking up of any subsoil compaction.
4	3004.6	Spacing between the tine furrows shall be in accordance with sub-clause 3004.6.
5	3004.7	The requirements of sub-clauses 3004.8 - 3004.11 shall apply to all subsoil to be seeded or topsoil spread under the contract.
6	3004.8	All undesirable material brought to the surface including stones, roots, tufts of grass and foreign matter larger than the sizes specified below is to be removed to Company's tip unless otherwise agreed with the Angus Council.

The size of the stones / debris which is required to be removed relates to the proposed vegetation cover, the maximum stone / debris size permitted for each, is as follows :

- (a) Grass Verges and sight lines: 25mm protruding stone after topsoil has been firmed / rolled
- (b) All other Grassland and Wildflower Grassland: 75mm
- (c) Planted Areas (all planting except amenity / ornamental shrub planting) : 100mm.
- (d) Amenity / Ornamental Shrub Planting and woodland planting in the vicinity of junctions and properties : 75mm.

The above stone removal applies to the full depth of topsoil required for the proposed vegetation cover.

The overall stone content by percentage volume should not be greater than the adjacent soils.

The above supersedes all clauses within BS 4428 relating to the stone size and content.

Stones brought to the surface during final preparation of soils shall be retained on site if agreed by Angus Council, to be used to form habitat piles in locations that are not visually intrusive and do not interfere with access or the performance of the O & M Services.

Appendix 30/5: Grass Seeding, Wildflower Seeding And Turfing

Action No.	Sub-Clause	Details
1	3005.1	Grass seed will be sown as per sub-clause 3005.1. Wildflower will be sown at the same time as grass unless otherwise instructed by the supplier and agreed with Angus Council.
2	3005.2	All areas to be seeded or turfed shall be cultivated as per sub-clause 3005.2, with the exception of rock faces. A 250mm radius shall be left clear of seeding round each new plant.
3	3005.3	All areas to be seeded with grass shall have fertiliser or other soil ameliorants incorporated into the upper 50 mm of soil where it is considered necessary in compliance with the Quality Plan and associated Method Statements at the rate considered necessary for successful seeding.
4	3005.4	All seed mixes shall be in compliance with the Schedule 4, Part 4, the Quality Plan and associated Method Statements.
5	3005.7	All seeds which are required to be of local provenance shall be selected and procured in accordance with Schedule 4, Part 4.
6	3005.8	Sowing of seed shall be carried out at the rate specified in compliance with Schedule 4 Part 4, the Quality Plan and associated Methods Statements. The sowing of seed shall be carried out as soon as practicable in order to benefit soils stabilisation.
-	3005.10	No amendment
9	3005.13	No amendment
10	3005.14	Any turf imported shall comply with sub-clause 3005.14 and shall contain a grass and/or herb mixture in compliance with Schedule 4, Part 4, the Quality Plan and associated Method Statements.
11	3005.25	Turf shall be secured as per sub-clause 3005.25.
12	3005.26	Newly laid turf will be watered as per sub-clause 3005.26.
13	3005.29	There is to be a minimum of one establishment cut; with enough cuts to achieve a coverage as stated in sub-clause 3005.11 together with one cut subsequent to the required sward coverage being achieved.
14	3005.30	Where grass height is less than 200mm at the time of cutting, grass cuttings are not required to be moved.

Appendix 30/6: Planting

Action No.	Sub-Clause	Details
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1	3006.3	Plant stock and sizes shall be as Tables 30/6.1, 30/6.2, and 30/6.3. Species and varieties and plant spacings are to be in accordance with Schedule 4, Part 4, and in compliance with the Quality Plan and associated Method Statements.
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With reference to BS4428: 1989. Section 7 . This section is titled Amenity Tree Planting. This section is applicable to all feathered and standard tree planting within the O & M Site (not just 'amenity' planting) ; with the exception of the requirement to backfill treepits with topsoil and compost: refer to Appendix 30/6

Table 30/6.1 Extra Heavy Standard and Heavy Standard Rootballed Trees

Type	Girth at 1m Above Ground Level (centimetres (cm))	Clear Stems from Ground Level (metres (m))	Minimum Height from Ground Level (metres (m))	Maximum Height from Ground Level (metres (m))
Extra heavy standard	14-20	1.8	4.25	6.0
Heavy standard	12-14	1.8	3.5	4.25
Large rootballed specimens	-	-	1.5	1.75

Table 30/6.2 Feathered Trees, Transplants, Container Grown and Cell Grown Stock

Type	Minimum Age	Minimum Height Above Ground Level	Minimum Container Size
Cell grown stock:			
Broadleaves	18 months	400 mm	200 cubic cm
Conifers		300 mm	
Transplants whips (broadleaves only)	2+1 years	450 mm	-
Transplant in tree shelters (broadleaves only)	1+1 years	450 mm	-
Container grown evergreens	2+1 years	300 mm	2 litres
Feathered Trees	as B.S.	1.5-2.5	-

Table 30/6.3 Shrubs, Conifers, Hedge Plants, Climbers and Ground Cover Plants

Type	Minimum Age	Column A Acceptable Height	Column B Minimum Height for Small/ Slow Growing Plants not Readily Available to Sizes Shown in Column A	Maximum Volume (litres)
Bare root/Hedge plants	3 years	400-600 mm	-	-
Whip transplants in shrub shelters	1+1 years	400-600 mm	-	-
Container grown shrubs and conifers	2+1 years	450-600 mm	300-450 mm	2
Container grown climbers	2+1 years	600-900 mm	400-600 mm	2
Ground cover plants	2+1 years	300-450 mm	150-200 mm	2
Rooted Cuttings	2 years	400-600		

Action No.	Sub-Clause	Details
-	3006.4	No amendment
2	3006.5	No amendment
3	3006.6	The selection and provenance requirements of native species shall be in accordance with Schedule 4, Part 4.
4	3006.7	Delete clause. Substitute clause. The Company may be requested to make special arrangements for Angus Council to inspect plant material at the nursery.
-	3006.10	No amendment
-	3006.12	Topsoil shall be site won.
5	3006.13	No compost required, however site won peat and/ or site won composted timber products may be incorporated into the planting pits with the Approval of Angus Council.
6	3006.14	Compost pH, conductivity and nutrient composition shall be decided in compliance with the Quality Plan and associated Method Statements following analysis of soil test results.
7	3006.15	Slow release fertiliser shall be incorporated into backfill, into the top 75 mm of planting bed soil, in accordance with sub-clause 3006.15 and at a rate based on the results of the soil tests where the site topsoil is a poor medium for plant growth. Works to be in compliance with the Quality Plan and associated Method Statements.
8	3006.16	Root dips shall be applied to all bare root plants and anti-desiccant sprays shall be applied to all evergreens at the following times: <ul style="list-style-type: none"> (i) At the time of lifting from the nursery (ii) On arrival at site (iii) Immediately prior to planting
9	3006.17	All bare rooted, rootballed and cell grown stock shall be planted whilst the plants are dormant and within the dormant season which falls between the beginning of November and the end of March unless otherwise agreed with Angus Council.
-	3006.19	No amendment
-	3006.22	No amendment
10	3006.23	Bare root whip transplants and cell grown plants may be notch planted into areas of cultivated or existing topsoil of minimum 300 mm depth in accordance with methods (I) and (ii) of sub-clause 3006.23 or the inverted turf method in areas of proposed planting in undisturbed ground.

Action No.	Sub-Clause	Details
11	3006.24	Arisings from planting pits and trenches shall be retained on site and deposited within proposed landscape earthworks.
-	3006.27	Drainage material should be site won.
12	3006.28	Hedge trench backfill is to consist of site topsoil Compost and slow release fertiliser to be added if required to make up deficiencies in soil texture and nutrient content.
13	3006.29	Delete the words: '...removing all live injurious weed roots and growth to a tip off site.'
		All areas with spread or existing topsoil shall be cultivated in accordance with sub-clause 3006.29 prior to planting.
		Soil ameliorants and slow release fertilisers shall be incorporated as required by the results of a topsoil test to make up any nutrient deficiencies as determined in compliance with the Quality Plan and associated Method Statements to provide adequate growth.
14	3006.30	All hedgelines except those that have been backfilled shall be cultivated in accordance with sub-clause 3006.30.
15	3006.33	All extra heavy standard, heavy standard, and standard free stock and rootballed conifers shall be watered to field capacity immediately following planting.
-	3006.34	No amendment
16	3006.35	Compost or other soil ameliorants shall only be incorporated into backfill in accordance with sub-clause 3006.35 in areas where topsoil test results indicate soil deficiencies. This will be determined in compliance with the Quality Plan and associated Method Statements.
-	3006.36	No amendment
-	3006.37	No amendment
17	3006.38	If required by the relevant authorities.
18	3006.41	The minimum length of stake shall be 2 m and the minimum width 75 mm.
-	3006.42	Stakes to be vertical as per sub-clause 3006.42 except where planting on a slope where stakes may be driven at an angle mid way between the slope and the vertical tree stem.
-	3006.43	Heavy and extra heavy standard trees shall be double staked with the vertical stakes unless planting on a slope where stakes to be angled as per sub-clause 3006.42
-	3006.44	No amendment

Action No.	Sub-Clause	Details
19	3006.45	Semi-mature trees shall be planted in compliance with the Quality Plan and associated Method Statements.
20	3006.46	No compost shall be incorporated into the treepit backfill
21	3006.49	All trees shall be watered to field capacity immediately following planting.
22	3006.50	No irrigation pipe is required in the treepits.
23	3006.52	Plant protectors shall be provided for all two year transplants, cell grown plants, shrubs and conifers. <ul style="list-style-type: none"> (i) Tree shelters shall be a minimum of 750 mm height and 80-100 mm diameter (ii) Shrub shelters shall be a minimum of 750 mm height and 100-150 mm diameter. <p>Where the species is to be Fagus, base ventilation shall be provided. Shelters shall be supplied with timber stakes and adjustable ties according to the manufacturer's specification.</p>
24	3006.53	All tree planting shall be watered to field capacity, as required, prior to the application of mulch.
25	3006.54	Timber mulch in accordance with sub-clause 3006.55(ii) shall be applied to all amenity shrub and groundcover planting except where slopes exceed a gradient of 1 in 2.
26	3006.55	Timber mulch shall be according to grade (ii) in sub-clause 3006.55.
-	3006.58	No amendments.
-	3006.64	No amendments.
27	3006.66	Bulbs shall be planted at the rate of 25/m ² .
28	3006.67	Bulbs shall be planted with the base at the depth in compliance with the Quality Plan and associated Method Statements.
-	3006.68 - 3006.72	No amendments
29	3006.73	Reeds, rushes, marginal and aquatic plants shall be planted around the margins of wet pond drainage features in compliance with Schedule 4, Part 4, the Quality Plan and associated Method Statements.
30	3006.77	Excavated material from sub-clause 3006.77 operations shall be spread throughout the planting area.
-	3006.80	No amendments.
-	3006.85	No amendments.

Action No.	Sub-Clause	Details
31	3006.87	The Company shall replace all plants found to be defective or vandalised annually to the Agreement Expiry Date to ensure a full and covered canopy. Works to be undertaken to meet Schedule 4 part 4
-	3006.89	No amendment
32	3006.91	All replacement extra heavy standard, heavy standard, standard and rootballed evergreen stock shall be watered to field capacity following planting.
33	3006.92	The Company shall carry out maintenance of new planting in accordance with clauses 3007 and 3009 to the Agreement Expiry Date.

Appendix 30/7: Grass, Bulbs and Wildflower Maintenance

Action No.	Sub-Clause	Details
1	3007.1	All grass and wildflower areas within the boundary of the works are to be maintained in accordance with clause 3007.
2	3007.5	No cutting shall be carried out within 250 mm of unprotected trees and shrubs.
-	3007.6	No amendment
-	3007.9	No amendment
-	3007.13	No amendment
3	3007.17	All grass areas identified as amenity grass areas shall be cut according to sub-clause 3007.17
-	3007.18 -	All grass areas shall be cut at a 'minimal frequency' in accordance with sub-clauses 3007.18-21, with the exception of areas identified in clause 3007
	3007.19	No amendment
	3007.20	No amendment
4	3007.22	All banks and ditches shall be cut in accordance with sub-clause 3007.22. All arisings shall be dispersed over the sward avoiding the blocking of drains and ditches.
5	3007.23	All grass cutting in planting areas shall be cut in accordance with sub-clause 3007.23.
-	3007.24 - 3007.25	No amendments
6	3007.26 - 3007.27	All areas seeded with wildflower shall be cut according to the most appropriate regime detailed in sub-clause 3007.26 and according to sub-clause 3007.27. Regime to be in compliance with the Quality Plan and associated Method Statements to suit the wildflower mix.
7	3007.28	The ground shall be scarified only where it is necessary for wildflower colonisation in compliance with the Quality Plan and associated Method Statements.
10	3007.29	Spot herbicide treatment in accordance with sub-clause 3007.29 shall be carried out in wildflower areas to eliminate undesirable broadleaf species. Areas of self-seeding broadleaf plants considered to be desirable for nature conservation shall be retained. These areas shall be identified by the Company and Approved by Angus Council.
11	3007.30	Areas of wildflower seeding to be hand weeded shall be in compliance with the Quality Plan and associated Method Statements.

Action No.	Sub-Clause	Details
-	3007.31	No amendment
-	3007.32	No amendment

Appendix 30/8: Watering

Action No.	Sub-Clause	Details
1	3008.6	The Operation and Maintenance Period shall be the Full Service Period as defined in the Project Agreement.
2	3008.7	<p>Additional watering in accordance with sub-clause 3008.7 may be required for all planting and seeding to the Agreement Expiry date in periods of abnormally dry conditions.</p> <p>Additional watering of trees shall be at rates in compliance with the Quality Plan and associated Method Statements.</p>

Appendix 30/9: Establishment Maintenance For Planting

Action No.	Sub-Clause	Details
1	3009.1	All planting and planting areas shall be maintained to the Agreement Expiry Date in accordance with sub-clauses 3009.2 to 3009.25.
2	3009.4	Tree stakes, tubes guards and ties that are no longer required shall be offered to Angus Council for re-use.
3	3009.10	Translocated herbicide shall be used at the locations and rates in compliance with the Quality Plan and associated Method Statements and in accordance with sub-clause 3009.10.
4	3009.11	Residual herbicide shall be used at the locations and rates in compliance with the Quality Plan and associated Method Statements and in accordance with sub-clause 3009.11.
5	3009.12	Mulch shall be maintained in accordance with sub-clause 3009.12 in amenity / ornamental shrub planting areas.
-	3009.13	No amendment
-	3009.16	No amendment
6	3009.18	Mulch shall be maintained in accordance with sub-clause 3009.18 in all cultivated beds.
-	3009.19	No amendment
7	3009.20	All hedge bases shall be maintained weed free in accordance with sub-clause 3009.20.
-	3009.24	No amendments
8	3009.25	All extra heavy standard, heavy standard and rootballed conifer trees shall be inspected and maintained annually in accordance with sub clause 3009.25

Appendix 30/10: Maintenance of Established Trees and Shrubs

Action No.	Sub-Clause	Details
1	3010.1	All established trees and shrubs shall be maintained to the Agreement Expiry Date in accordance with sub-clauses 3010.2 - 3010.71.
2	3010.2	No amendment
3	3010.4	No amendment
4	3010.8	<p>Shrubs grown for coloured stems shall be pruned at a frequency in compliance with the Quality Plan and associated Method Statements.</p> <p>Overgrown shrubs to be coppiced back in compliance with the Quality Plan and associated Method Statements.</p>
5	3010.12	All existing hedges shall be cut once a year in compliance with the Quality Plan and associated Method Statements. Cutting to take place in winter prior to any significant budding.
-	3010.15	No amendment
6	3010.20	Hedges to be laid shall be in accordance with the Quality Plan and associated Method Statements.
7	3010.22	Mixed hedgerows shall be laid in a style in compliance with the Quality Plan and associated Method Statements.
-	3010.23	No amendment
-	3010.27	No amendment
-	3010.30	No amendment
8	3010.31	New hedge plants shall be of size, species, and planting density in compliance with the Quality Plan and associated Method Statements.
-	3010.32 - 3010.35	No amendments
9	3010.45	Tree size categories shall be in compliance with the Quality Plan and associated Method Statements.
-	3010.51	No amendment
10	3010.54	Crown lifting shall be in compliance with the Quality Plan and associated Method Statements.
11	3010.55	Crown thinning shall be in compliance with the Quality Plan and associated Method Statements.
12	3010.56	Crown reduction or reshaping shall be in compliance with the Quality Plan and associated Method Statements.

Action No.	Sub-Clause	Details
13	3010.57	Straight felling shall be in compliance with the Quality Plan and associated Method Statements.
14	3010.58	Sectional felling shall be in compliance with the Quality Plan and associated Method Statements.
15	3010.59	Stumps shall be cut to the height in compliance with the Quality Plan and associated Method Statements.
16	3010.60	Stump treatment shall be in compliance with the Quality Plan and associated Method Statements.
17	3010.62	Stump removal shall be in compliance with the Quality Plan and associated Method Statements
18	3010.63	All arisings shall be removed to Company's tip off site.
19	3010.65	Thinning shall be in compliance with the Quality Plan and associated Method Statements.
20	3010.68	Scrub control shall be in compliance with the Quality Plan and associated Method Statements.
21	3010.69	Scrub species to be controlled in compliance with the Quality Plan and associated Method Statements.
-	3010.70	No amendment
22	3010.71	Operations in accordance with sub-clause 3010.71 shall be carried out in compliance with the Quality Plan and associated Method Statements.

Appendix 30/11: Management of Waterbodies

Action No.	Sub-Clause	Details
1	3011.1	The management operations shall take place in all waterbodies and open ditches within the O&M Site.
2	3011.3	All inlets and outlets that form part of the works shall be inspected in accordance with sub-clause 3011.3.
3	3011.4	No amendment
4	3011.6	Weeds on the banks of water courses and within the O&M Site shall be removed by handweeding in accordance with sub-clause 3002.8.
-	3011.8	No amendment
5	3011.9	All reed beds and marginal plants shall be inspected twice a year according to sub-clause 3011.9.

Appendix 30/12: Special Ecological Measures

Action No.	Sub-Clause	Details
1	3012.1	Special Ecological Measures shall be maintained to the Agreement Expiry date.
2	3012.2	Special Ecological Measures works shall be carried out in accordance with Schedule 4, Part 4.
3	3012.3	Tunnels, ledges, fencing and underpasses for wildlife shall be designed and located in agreement with Schedule 4, Part 4.
4	3012.4	Wildlife grilles shall be designed and located in accordance with Schedule 4, Part 4.
-	3012.5	No amendment
6	3012.6	Reflectors shall be designed and located in accordance with Schedule 4, Part 4.
7	3012.7	Reflectors shall be located in accordance with Schedule 4, Part 4.
8	3012.8	Bat boxes, dormice or bird nesting boxes or roosting perches shall be designed and located in accordance with Schedule 4, Part 4.
9	3012.9	Bat boxes or bird nesting boxes or roosting perches shall be inspected in accordance with Schedule 4, Part 2.
10	3012.10	Bat boxes or bird nesting boxes or roosting perches shall be repaired in accordance with Schedule 4, Part 4.
11	3012.11	Other habitat creation measures shall be required in accordance with Schedule 4, Part 4.
12	3012.12	Known locations of protected species or their habitats shall be advised in accordance with Schedule 4, Part 4.
13	3012.13	The Company shall obtain licenses or use only licensed operatives where required in order to comply with Schedule 4.