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Appendix 12/5

Proposed Retail Development

Brighton Road, Shoreham

First issue for West Sussex CC approval	AVG	RRD	06/06/17	A
Description	Author	Approved	Date	Rev.

Requirements for Installation of Signal Equipment in West Sussex

Site Introduction

A new ELV puffin crossing is proposed as part of a new retail development on Brighton Road (near New Road / Surrey Hard) in Shoreham-on-Sea. This will be a standalone 4 pole nearside crossing equipped with overhead vehicle detection, as well as kerbside & on-crossing pedestrian detection. Duplicate primary heads shall be employed, together with secondary signal heads with primary hoods. The site shall be remotely monitored via the West Sussex CC RMS system.

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Requirements for Installation of Signal Equipment in West Sussex

1. Introduction

1.1 The aim of this note is to provide a guide to enable promoters of schemes to prepare traffic signal designs which address the specific requirements of West Sussex County Council.

1.2 Traffic signals for both vehicle and pedestrians control, in West Sussex are required to meet a number of requirements in both function and installation, to produce a consistency of approach for the benefit of the public who use the signals and to aid in maintenance. As a result this guide should be read with reference to West Sussex County Councils standard detail drawings. The most relevant of which are contained within the appendix of this document.

1.3 The National Code of Practice MCH 1969 shall apply throughout the design and installation cycle.
In addition, the "Guide to Good Practice" shall be used as a reference (when published by EITAC)

1.4 The standards complement, but do not replace, Department of Transport the Environment and the Regions (DETR) Advice Notes, guidelines, manuals etc.

1.5 Any deficiencies found in the design shall remain the responsibility of the promoter of the scheme for a period of 1 year from the date of the take-over of the site following a successful site commissioning or for a year following the date that the associated development is opened and the initial impact of the full traffic and pedestrian flows are realised, whichever is the greater. It is therefore the responsibility of the promoter to ensure that all data regardless of source is correct, and that the consequence of any imposed conditions are well documented and acknowledged.

1.6 On completion of the installation a site acceptance test (SAT) will be conducted with a representative from WSCC Traffic Signals and WSCC's term contractor.
The following documentation will be required: -

i. SAT form
ii. Electrical test certificate
iii. Take over certificate
iv. On completion of the SAT, site validation will be required to verify bus priority, remote monitoring, CCTV operation, timing parameters and/or UTC/MOVA setup.
v. To complete the design package an as built drawing, controller configuration and a validation report must be supplied to the WSCC traffic signals team

2. Method of Control

2.1 The method of control to be adopted will be determined by the location of the signal installation having specific regard to its' proximity to other installations and to the operational envelope, traffic patterns etc, the site is required to serve. Consideration should be given, for example, to sudden surges in flow from entertainment facilities, abnormal patterns from other activities in the area and any other feature of traffic pattern and behaviour, which the signals will be required to serve.

2.2 The method of control used for signals are:-

(a) UTC (Urban Traffic Control) normally SCOOT.
(b) MOVA – latest software specification
(c) Compact MOVA – latest software version
(d) VA (Vehicle Actuated)

2.3 The method of control in use for pedestrian signals are:-

(a) UTC
(b) VA
(c) MOVA

In all cases either Puffin, Pegasus, or Toucan with nearside Puffin type presentation shall be used.

2.4 UTC is adopted for all signal installations, which relate to existing areas of control and for new installations where proposals to implement the use of SCOOT exist. Or where proposals form part of or create a natural SCOOT region. Currently only the signals in Crawley and parts of Worthing and Horsham are controlled by UTC. (For detailed information on which sites are controlled by UTC please contact WSCC Traffic Signals on 01243 777677 or email traffic.signals@westsussex.gov.uk). The addition of a new site may require modification of existing equipment, particularly SCOOT loops, to take account of the changes to the network.

2.5 UTC signalised junctions will use MOVA as the fallback mode, although if justified VA will be considered.

2.6 MOVA is the preferred method of control for signalised junction sites, which do not form part of the UTC network.

2.7 VA shall be used as a fall back at all MOVA sites and may be adopted as the main method of operation for sites which have characteristics, which will not be best served by the adoption of MOVA. Such proposals will require justification.

2.8 UTC is adopted for pedestrian crossings using the same criteria as for signals, with the additional rider that there may be circumstances where linking to adjacent signals, rather than direct control by UTC is appropriate. All crossings within the UTC system shall be VA in method and operation.

2.9 For non UTC pedestrian crossings, the method of control is dependent upon the speed limit and the 85th%ile approach speed. The recommended operation will be as per Local Transport Note 2/95, although MOVA should be considered for 85th%ile >35mph and would be the preferred method of control for 85th%ile >45mph

2.10 All signalised junctions must incorporate the installation of at least one CCTV camera located in a suitable position to enable all approaches to the junction to be remote monitored. The system must conform to the latest WSCC CCTV standard and will be connected via an ADSL line. Details of equipment can be obtained from WSCC Traffic signals on 01243 777677 or email traffic.signals@westsussex.gov.uk

3. Signal Staging

3.1 Complex staging of the signals shall be avoided, because it causes inflexibility in control.

3.2 The requirement for pedestrian facilities shall always be considered and included where appropriate. Unless otherwise agreed they shall be to the Puffin format, to allow the cycle time to be minimised and thus the service to pedestrians maximised. The use of an all red stage will usually cause serious delay in the form of an excessively long cycle time and would require detailed justification.

3.3 Where signals are under UTC control and have an all red pedestrian stage, there shall be provision for a “dummy” phase and hurry call for the stage, activated by time of day, with UTC over-ride. If the design Engineer is unfamiliar with the technique, guidance may be obtained from WSCC Traffic Signal staff. If appropriate, the same methodology shall be used for other pedestrian phases.

3.4 Where significant numbers of buses are operating, special assistance to public transport shall be considered. This may include:-

(a) Bus Lanes

(b) Selective Detection

(c) Bus by-passes

3.5 If the proposed signal facility is part of a cycle route, special provision for cyclists shall be made, but this will not include a separate cycle stage unless a detailed justification is provided.

3.6 Parallel Stage Streaming and alternative stage selection by time of day or week, are both techniques, which should be used as appropriate.

3.7 The use of early starts is not common in the South of England. The adoption of an early start may be subject to detailed questions and require justification.

3.8 For Mid block crossings – Puffin and Toucan, in all cases a VA or MOVA controller build shall be supplied.

3.9 Pre-timed max shall be used where appropriate on non UTC mid-block crossings.

4. Timings

4.1 Minimum green times shall be 7 seconds for normal traffic phases, 4 seconds for indicative right turn green arrows. Dummy phases shall be given minimums appropriate for their purpose.

4.2 Vehicle intergreen times shall be calculated for the conflict points of the worst case in accord with TA/16/07 ref TAL 1/06

4.3 Where a phase has an 85th%ile of more than 35 mph or the posted speed limit is more than 30 mph, on a maximum change, the intergreen shall be extended by 2 seconds.

4.4 Intergreen's to pedestrian phases shall be calculated on the basis of the conflict point being just past the most remote pedestrian movement of the pedestrian phase that gains right of way.

4.5 Pedestrian Green Man times at signals shall be calculated as for a Puffin crossing of the same width and as specified in TAL 1/06

4.6 Pedestrian clearance times shall be calculated using the clearance times as for a Puffin. Whether the pedestrian clearance is extendable shall depend on the location of the site within the highway network. The decision shall be justified.

4.7 Any phase intergreen less than 5 seconds will be subject to audit, unless the phase gaining right of way is an indicative green arrow phase.

4.8 Phase delays shall be used to minimise overall delay, whilst having regard to safety and interpretation of movements on other phases by drivers. On occasion it may be necessary to sacrifice a few seconds of theoretical capacity in the interest of safety e.g. where two or more traffic phases should sensibly start together.

4.9 Ripple changes are permitted, however the need for the UTC system to be able to monitor the operation of the site shall be considered. This may impose some restriction on the use of this feature.

4.10 To standardise part of the controller specification (TR2500) the following settings should be used unless otherwise justified: -

- British Summer Time Start Week 13, End 43
- Min Green Limit for Traffic Phase = 7, Pedestrian Phase = 5 and Intergreen = 5
- Pedestrian Sequence Timings
  - Gap = 1
  - FRC = 1
  - Min = 3
  - Max = Width of crossing / 1.2
  - CLR = 0
  - XTR = 0
  - Demand Extension = 1
  - Push button, kerbside and on crossing extension = 1
- Starting Intergreen = Maximum intergreen – 3
- Detector names as below

  Loops = (Phase letter)(Loop type)(sequential number if required)
  Eg. AX1, AX2, BSL, BX, BY, BZ

  MVD's = MVD (Phase Letter)(sequential number if required)
  Eg. MVDA, MVDB1, MVDB2

  Detector = (Type)(Phase letter)(sequential number if required)
  Eg. IRDA1, IRDA2, ONCB3, ONCB8, KSB, PBB1, PBB4, AR

  Bus input = BUS (Phase)(sequential number if reqd)(R = Request, C = Cancel)
  Eg. BUSA1R, BUSA2R, BUSAC
- DFM times as below

Loops & MVD's	=	Active 30 Min	Inactive 18 Hours
Push Buttons (PB)	=	Active 1 Hour	Inactive Not Set
On Crossings (ONC)	=	Active 30 Min	Inactive 18 Hours
Kerb Side (KS)	=	Active 1 Hour	Inactive 72 Hours
Bus inputs (BUS)	=	Active 5 Min	Inactive Not set
IRD's & All Red (AR)	=	Active 1 Hour	Inactive 18 Hours

- Bleeper drivers to be timetable controlled – On = 7:00 Off = 22:00
- Special conditioning
    - Kerbside safety feature to be included on all pedestrian facilities with push button and kerbside detectors paired.
    - Auxiliary 1 switch to be configured as VA select
    - MOVA mode running lights AUX1 LED

Table 1 active/inactive states in DFM

Detector	**Active**	**Inactive**
Loops	A	A
MVD	A	A
BUS	I	N
Pushbutton	N	N
Kerbside	N	N
On-crossing	A	A

5. Detection

5.1. Stages that are not always required shall be demand dependant including when under UTC control.

5.2. Pedestrian phases may be non demand dependent when walk with traffic as long as there is no additional delay to vehicles. If an all red stage is required type 0 appearance should be considered but will be site specific and cyclic DFM's must be taken into account.

5.3. Where "on crossing" detection is provided, each crossing shall be a separate phase and monitored accordingly, and each detect will have a separate input to allow independent monitoring.

5.4. Far side pedestrian push buttons shall generally be mounted at 45 degrees for mid block crossings. For dual crossings and junctions angles are site specific and shall be specified on site by WSCC.

5.5. Near sided pedestrian push buttons on mid-block crossings shall be 'narrow angle of view' positioned to maximise convenience for the user. They shall be installed at an angle of 22.5 degrees from the pedestrian stud line, 67.5 degrees from the line of the carriageway.

5.6. Near sided pedestrian push button angles at dual crossings and signal junctions will require greater consideration and shall be 'narrow angle of view', due to the chance of motorists viewing the red man green man signal, in these circumstances angles are site specific and shall be specified on site by WSCC signal engineer. Consideration should also be given to using far side signals in certain circumstances.

5.7. Detection may be by any type of detector. The use of above ground detection (AGD) is encouraged, providing the detection characteristics are appropriate for the application. For SCOOT, the use of AGD must be justified for each location to demonstrate that it will give satisfactory results. The Highways Agency specifications MCE 0108 Issue C, TR 2123A, TR 2504, TR 2506, TR 2182B shall be applied as appropriate. The use of secondary or tertiary standard configurations will require justification.

5.8. Loop placement shall take account of ironworks, covers and drains in the carriageway during the design and not leave this to be determined during installation.

5.9. Presence detectors shall normally be 3m long in the direction of travel of the vehicles passing over them, to allow for a 2m separation between vehicles. This shall be adjusted as appropriate in special circumstances. The location of the loop shall be justified, but for an early cut off it is expected that it will normally be forward of the stopline.

5.10. Pedestrian detection shall use the appropriate device for both on crossing and footway detection. It will be necessary to justify the adoption of a specific type or model, if it is not in common use.

5.11. Footway detection for pedestrians is not mandatory, but is normal and omission shall be justified. It is the responsibility of the designer to ensure that the coverage of the detection is appropriate for the width of the crossing and the safety interlock feature is configured.

5.12. All above ground detection shall be connected up using standard plug and sockets, not wired direct. If the installers remove the plug sockets during installation, they will be required to replace them.

5.13. Slot cutting requires 50 mm of cover, with single part backfill. All slots shall be air dried before the backfill is poured. Loops may be laid in the base course of the carriageway, providing that the finished depth of cover does not exceed 60 mm.

5.14. All detector feeder cables laid in the carriageway, which exceed 5m, shall be armoured.

5.15. Standard bus detection for hurry calls or green waves utilise the ACIS priority system. Details of detection equipment can be obtained from WSCC Traffic signals on 01243 777677 or email traffic.signals@westsussex.gov.uk

6. Cable and Duct Requirements

6.1 Each signal pole shall be cabled directly to the controller. The looping of any cables between signal poles will not be accepted. ONLY in exceptional circumstances, and as directed by the Engineer, will alternative means of cabling be acceptable. Signals Installed on roads with a speed limit of 50mph plus shall have passively safe low access poles and quick disconnect system.

6.2 A separate 16 core cable shall be used to each push button pole for the push button and audible, and for future detection for Puffin type facilities, except where 2 poles for one pedestrian phase are on the same side of the carriageway, in which case they may be linked.

6.3 A cable drawing shall be incorporated within the construction drawing.

6.4 Signal cables shall not pass through ducts or boxes used for any other service.

6.5 Mains and extra low voltage shall not be mixed in the same cable.

6.6 Detector inputs shall not be brought back on the same cable carrying the LV supply to signal heads or push buttons.

6.7 The core provision shall provide not less than 25% spare cores overall to each pole.

6.8 Where a signal controller is controlled by a remote OTU there shall be two 16-core cables provided for UTC control purposes.

6.9 Where Puffin/Toucan controllers are linked / controlled from a remote controller/OTU, there shall be a 16-core cable provided, for every crossing.

6.10 All poles shall be mounted in a retention socket. A suitable system, the RS-Retention socket system can be obtained from N.A.L. Limited. Alternatives of equivalent specification will only be accepted if prior written agreement is obtained from West Sussex Traffic Signal Section.

6.11 All footway chamber lids shall have a Skid Resistance Value (SRV) of not less than 45.

6.12 Where the miss-use of the footway by goods vehicles is anticipated, heavy-duty frames and lids rated to 25 tonne or greater shall be used.

6.13 A length of duct (minimum 50 mm diameter) should run from each loop jointing chamber under the kerb and up through the road surface at the edge of the carriageway at the point where the loops will enter.

6.14 Chamber base section is to be set on a 150mm x 50mm concrete edging with 6mm clean gravel infill as a soak away.

6.15 Ducting shall be designed on the basis of a completely closed system and take note of the following:-

(a) One spare duct shall be supplied on each road crossing.

(b) Not more than eight cables shall be laid in each duct.

(c) The designer shall demonstrate that there is sufficient capacity in the ducts for the number of cables proposed.

(d) Each road crossing shall terminate in a chamber.

(e) Any corner with an angle less than 135 degrees shall be turned in a chamber.

(f) No straight run shall exceed 50m between chambers.

6.17 Chambers of the following sizes should generally be used:-

(a) Immediately by a pedestrian controller 600 x 600 x 600

(b) Immediately by a junction controller a minimum of 600 x 600 x 600

(c) At the end of road crossings, intermediate chambers in runs 450 x 450 x 600 mm

(d) For detector jointing 450 x 300 x 300

Any variations from these sizes shall be noted on the drawing

6.18 Duct shall be in accordance with NJUG Standards, Orange 100 mm diameter with 'traffic signals' stamped at regular intervals. All carriageway crossing shall have not less than two ducts. Draw cords shall be left in ducts on completion of cable installation.

6.19 Ducts and chambers shall be obtained from IDS Integrated Ducting Systems or STAKKAbox available from N.A.L. Limited, or Centurion Access Systems available from Civils and Lintels . Alternatives of equivalent specification will only be accepted if prior written agreement is obtained from West Sussex Traffic Signal Section.

7. Controller Requirements

7.1 The controller shall be the latest specification of TR 2500 (formerly TR2210 & MCE 0141) and will incorporate an externally visible DFM lamp which can be readily seen from the carriageway.

7.2 There shall be provision for the supply of a second controller configuration within twelve months of commissioning, to embody detail changes to timings and set up found necessary in the post-commissioning phase.

7.3 The mains input shall be to a Haldo pillar positioned close, but no closer than 1 meter, to the controller, in a position where the chance of impact by vehicles leaving the road is minimised.

7.4 Where a BT connection for UTC is required it shall be to BT keyline premier 4-wire circuit, or the latest equivalent.

7.5 All non UTC junction controllers and pedestrian facilities shall be provided with an Outstation Monitoring Control Unit (OMCU), which is compatible with a RMS in-station as specified by WSCC Traffic Signals. Communication will normally be via GSM or broadband, however where the GSM signal is unacceptable then consideration will be given to installing a standard domestic BT circuit.

7.6 All non UTC junction controllers should be fitted with integral MOVA running version 6 or greater.

7.7 All UTC junctions and pedestrian facilities shall be provided with a Outstation Transmission Unit (OTU), which is compatible with the WSCC Siemens UTC system.

7.8 The SCN of the site shall be displayed on the controller cabinet in characters approximately 50 mm high. (i.e. 3621) The method of application shall be approved by WSCC.

7.9 On completion of installation all cabinets, BT pillars, Haldo and other similar devices, shall be base sealed.

7.10 On sites where bus priority is to be installed (ACIS) a separate power supply controlled via a dedicated RCD is required.

7.11 On all signalised junctions the controller must accommodate the installation of the CCTV equipment including a dedicated power supply and a broadband line. Details of equipment can be obtained from WSCC Traffic signals on 01243 777677 or email traffic.signals@westsussex.gov.uk

7.12 Controller and associated equipment to be manufactured by the WSCC traffic signals term maintenance contractor. Alternatives of equivalent specification will only be accepted if prior written agreement is obtained from West Sussex Traffic Signal Section.

7.13 The controller configuration to be created by an approved WSCC supplier (i.e. TCT Consultancy Ltd)

7.14 Factory acceptance test (FAT) to be conducted on the new controller with a representative from WSCC Traffic Signals and their maintenance contractor represented..

8. Loop Design

8.1 All loops shall be cut per lane. The only exception to this is the Y and Z loops of the system D loops, which may have their loop cable joined in the loop pits. Otherwise where a multiple lane approach is encountered, loops shall be cut individually and if necessary can then be joined at a terminal block within the controller.

8.2 The use of soft loops to adjust the saturated flow, shall require justification if specified at all SCOOT UTC sites.

8.3 SCOOT loop design shall take account of:-

(a) Adjacent signal installations. (This may include requirements for the modification of adjacent installations, required as a consequence of the addition of the new site.)

(b) Sinks and sources between nodes.

(c) Lane use and width.

(d) Opposing flows, including the need for uni-directional detection link journey time.

(e) The need to separately identify vehicles for different phases as necessary.

(f) Good reflection of journey times and '**MAX**' queues,

Where compromises to the above are necessary, the reasons shall be recorded with any special requirements for system operation.

8.4 The need for unidirectional detection shall form part of the detector design and used as appropriate, for SCOOT, MOVA and stopline detection.

8.5 The need for exit loops and short link lengths, may be dictated by site performance, vehicle pathways and the junction design.

8.6 On MOVA sites each vehicle phase shall have separate stopline detection.

8.7 On MOVA sites where the loop positions are determined by vehicle speed, which can not be measured before the site is operational, permission can be sort from WSCC traffic signal section to cut the loops post commissioning. In these circumstances the duct network shall extend to an extent agreed with the WSCC traffic signal engineer.

8.8 There is a potential danger of loops cut in footways being a trip hazard therefore any loops, especially cycle loops in cycleways or footways shall be enclosed in 25mm plastic conduit which is laid in the hardcore base prior to the surfacing of the footway. In general the depth shall allow for 50mm of cover above the conduit surround.

8.9 All phases not in the reversion stage will require stop line detection.

8.10 Where advanced cycle stop lines are installed on phases not included in the reversion stage, these will include loop or IRD detection, any sites where they are omitted will require justification and written approval from a WSCC traffic signals engineer.

9. Signal Design

9.1 WSCC standard details shall be used where appropriate. Any variation to these shall be noted on the drawing

9.2 All optics shall be single light source ELV LED with a minimum 6 year warranty, not tungsten filament lamps.

9.3 On all two lane carriageways, the norm shall be both a Primary and Off Side Primary Signal Heads.

9.4 Separately signalled phases facing in the same direction shall not be included unless there is sufficient physical separation to allow the inclusion of a nearside primary signal on both phases.

9.5 Where there are three lanes on one approach, high level Primary optics shall be specified. All optics shall be single light source ELV LED with a minimum 6 year warranty, not tungsten filament lamps. High level optics may also be required where approach speeds are high or the topography indicates the need. The introduction of high level optics may introduce the need for similar provision at an existing installation, to minimise the risk of confusion between the two sites. This shall be considered as part of the design and safety audit.

9.6 Where there are three lanes near side and offside Secondary signals shall be specified. Secondary signals shall be not less than 7 m from the stopline.

9.7 Where an early cut off is used the secondary for the phase which is terminated early, shall normally be on the “near side” of the junction.

9.8 Where opposing phases on a junction appear simultaneously, arrows shall not be used for the ahead or right turn movements, because drivers expect to have right of way, when these are used. They may be used for segregated left turn movements.

9.9 Specific attention shall be given to the presentation of the signals to both drivers and pedestrians, to maximise the effective presentation of the signals and minimise the risk of confusion. In particular the potential for ‘see through’ for pedestrian optics shall be considered (including the standard use of narrow view pedestrian units). Where appropriate, special cowls, tunnel, cut away louvre etc may be used. Each shall be specified in detail. Where long tunnel cowls are used, any louvre’s shall be mounted at the outer end only (100 mm) and not for the whole length to minimise reflection within the cowl. In appropriate situations, cut away cowls will give better performance than louvres because there can be no reflection from the cut away side.

9.10 Clearance for all street furniture shall be at least to Design Manual Road and Bridges Standard. Where there is the regular presence of special vehicles, such as car transporters, which have special overhang requirements, these shall be taken into account.

9.11 All movements subject to Heavy Goods Vehicle turns shall be checked using proprietary software. These checks are required to show that sufficient road space is available to enable the movement to be carried out safely.

9.12 On routes subject to regular use by special loads, any necessary provision shall be included in the design. This shall include requirements for removable poles or special clearances.

9.13 It is Council policy that sight lines shall be preserved. Where relevant grass or hard surfaces shall be used, shrubs that obstruct sight lines shall be removed. Each tree within the sight lines, shall be considered on its’ merits, and any which it is proposed to remove should be checked for tree preservation orders.

9.14 Where formal pedestrian facilities are provided (i.e. red & green man) then tactile paving, (red, 400mm square), shall be laid in 'L shape' with the stem on the right hand side nearer the approaching traffic. For one-way streets where the traffic approaches from the left consideration shall be given for the stem to be on the left.

9.15 A pedestrian push button shall be supplied no more than 400mm from the outside right hand edge of the tactile paving. An additional push button will be required if the stem of the tactile paving is on the left.

9.16 If the crossing passes through an island, where it is not intended for pedestrians to wait, or where it does not form part of a staggered system, then generally tactile paving should not be laid within this island.

9.17 The width of the crossing shall be consistent throughout and shall normally be between 2.4 m and 3m unless it is to be shared with cyclists when it shall be a minimum of 4.0 m. Any deviation from these widths will require justification and written approval from a WSCC traffic signals engineer.

9.18 The outside edge of the pedestrian studs shall be in line with that of the tactile paving.

9.19 The footway slope to the dropped kerb shall be preferably 1 in 20 and no steeper than 1 in 12.

9.20 The drop kerb shall be flush with the carriageway surface with an absolute maximum permissible up stand of 6mm. It is the designer's responsibility to address any issues that may arise due to surface water run off, and to include for them in the design.

9.21 Where signal poles and guard rail are immediately adjacent, the poles shall be installed in line with the guard rail to minimise obstruction to pedestrians. This will probably require the use of cranked poles to maintain adequate clearance for signal heads.

9.22 The pedestrian heads shall be placed so that pedestrians on the crossing look toward traffic approaching on the far side of the road.

9.23 Tactile devices shall be fitted at all push button units. In addition an audible device should be fitted where allowed.

9.24 Staggered pedestrian facilities shall be considered on all crossings over 14m wide. The stagger shall normally be to the left and additional push buttons will be installed at the opposite side to the approaching vehicles. Only in exceptional circumstances will a right hand stagger be accepted. In these circumstances the designer shall fully justify the use of right hand stagger, and shall demonstrate that full care has been taken to ensure that pedestrian indications cannot be wrongly interpreted.

9.25 An absolute minimum clear width of 2.0m shall exist throughout the pedestrian area within the cage created by the guardrail. This shall be increased to 3.0m if cyclists share the facility

9.26 The distance between the limits of crossing shall be at least 3m, only in exceptional circumstances will a distance less that this be accepted. In these circumstances the designer shall fully justify the departure and include sufficient measures such as louvers to ensure that issues such as see through have been addressed.

9.27 There shall be preferably 3.0m between the stop line and the studs. If this needs to be reduced to a minimum of 2m the designer shall fully justify the departure from standard.

9.28 Each design shall include an area of hard standing, typically in the form of grasscrete, to allow for a maintenance vehicle to park. This area shall be accessed by 45 degree kerb units or similar. Where this is not achievable the designer shall carry out a risk assessment to assess if any measures are required to enable safe access by the maintenance engineer,

which shall include identifying a suitable parking location that allows easy access to the controller.

10 Controller UTC Interface

10.1 The mode priority on a controller shall normally be:

Selected Manual Control	1
Selected Manual FT	2
UTC	3
Priority	4
CLF	5
VA	6

A hurry call shall be priority 2 if used and MOVA shall rank as UTC.

Bus priority will be configured within SCOOT using a BD bit which is activated by an input from the ACIS equipment. If a hurry call is used for bus priority when the junction is under local control this will be below UTC on the mode priority (ie 4).

If MOVA and UTC are configured special conditioning will be used to determine which UTC inputs are used.

10.2 An AUX lamp shall be labelled and light when the controller is under UTC / MOVA control

10.3 The Manual Panel Signal On/Off switch shall be set to As Start Up.

10.4 On the UTC interface there shall be:

One “F” bit for each stage, with a “G” bit in a matching position on the reply word.

The “DX” bit followed by as many “D” bits as is necessary. The “DF” bit in the reply word shall match the position of the “DX” bit.

No bit in the control word, with the “RR” bit in the reply.

No bit in the control word, with the “LF1” bit in the reply to denote any lamp fault.

No bit in the control word, with the “LF2” bit in the reply to denote a second red

lamp fault. The “TS” bit in the control word, shall be matched by the “CS” bit in the

reply

Other bits such as “LL” shall be added as necessary, to suit the needs of the controller.

Separate phase reply bits shall be provided for demand dependant phases, though there may be restrictions on the bit availability. These shall be discussed with WSCC.

For Puffin/Toucans, the control bits shall be PV, PX, and LL if appropriate, matched by, GV, WC, LO

10.5 Where the interface is to be used for more than one controller, the bits of the remote controller shall be marked up on the interface specification of the controller which will house the OTU and the separate controller bit sets marked up with the SCN of each. The bits should follow the same pattern on the remote interface as on the signal controller interface. For Puffins, the bit pattern on the remote interface shall be as described in 10.3, irrespective of the controller sequence.

10.6 The SCN (System Code Number) will be supplied on request by WSCC Traffic Signals section Tel No 01243 777593.

10.7 Example:
The example is for a three stage set of signals, stages 2 and 3 demand dependant, with a linked Puffin.

	← 3646												→ 3672			
Bit No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Control Bits	FA	FB	FC	DX	DB	DC				TS			PV	PX		
Reply Bits	GA	GB	GC	DF	DR B	DR C	RR	LF 1	LF 2	CS			GV	WC	LO	

10.8 UTC control is required when Force bits are present.

10.9 G1/G2 on the reply denotes No Lamp Power / Signal Off.

10.10 RR on the reply denotes that Manual Mode is selected.

10.11 Bus priority will be configured within SCOOT using a BD bit which is activated by an input from the ACIS equipment. If a hurry call is used for bus priority when the junction is under local control this will be below UTC on the mode priority.

10.12 Changes required to the UTC/SCOOT database and the resulting validation will be conducted by Siemens or WSCC Traffic signals.

11. Presentation of Designs

11.1 All designs shall be prepared using Autocad and Keysignals. On completion of works, a copy of the
"as installed" drawing shall be supplied in an Autocad format agreed by WSCC Traffic Signals . The file may be 'zipped' when supplied on disk. All files supplied in electronic format shall be certified as virus checked and the software used with generation number, shall be quoted.

11.2 The drawing shall include a cable drawing and a staging drawing (if appropriate).

11.3 Special requirements relating to street furniture and signalling detail (special mounting arrangements, four-in-line heads, long cowls, louvres etc.) shall be outlined on the drawings and within notes accompanying the drawings.

11.4 Standard BS EN12368 (formerly BS 505) symbols shall be used.

11.5 All designs and installations shall be subject to Safety Audit either in accordance with HD 19/03 or IHT Standards. This shall include the completed Signal Controller Specification. The completed and Audited specification shall be signed and dated by the Engineer who caries out the Audit. The Original of all Audits shall be retained in the WSCC Traffic Signal section site file.

11.6 The drawing shall be accompanied by notes as dictated by the Code of Practice detailing all alternative signal designs that have been considered and reasons for choosing the design presented.

11.7 Specific reference to any design detail that does not comply with these standards or the appropriate DETR Advice Notes etc.

11.8 All signal poles shall be numbered, starting with the pole closest to the controller and proceeding in a clockwise direction around the facility.

12 Approved Suppliers Addresses

Ducts and chambers

IDS Integrated Ducting System
www.ids-access.co.uk

Civils and Lintels
www.civilsandlintels.co.uk

N.A.L. Limited,
www.nal.ltd.uk

Pole retention systems

N.A.L. Limited,
www.nal.ltd.uk

Controller

Telent Ltd
Unit N Acorn Industrial park
Crayford Road
Crayford
Kent
DA1 4AL

Controller Configuration

TCT
Consultancy
Ltd 11 Noon
Gardens
Verwood
Dorset
BH31 7WQ
www.tctconsultancy.co.uk