
**VOLUME 9 NETWORK - TRAFFIC
CONTROL AND
COMMUNICATIONS
SECTION 4 SYSTEMS DESIGN**

PART 5

TA 76/97

MOTORWAY CONTROL OFFICES

SUMMARY

This Advice Note explains the design and operation of the National Motorway Communications System Control Offices. It gives guidance on criteria regarding the layout and operational requirements of the Control Room and Equipment Room.

INSTRUCTIONS FOR USE

This is a new document to be inserted into the Manual.

1. Insert TA 76/97 into Volume 9 Section 4.
2. Archive this sheet as appropriate.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from the Stationery Office Ltd.



THE HIGHWAYS AGENCY



THE SCOTTISH OFFICE DEVELOPMENT DEPARTMENT



**THE WELSH OFFICE
Y SWYDDFA GYMREIG**



**THE DEPARTMENT OF THE ENVIRONMENT FOR
NORTHERN IRELAND**

Motorway Control Offices

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This Advice Note explains the design and operation of the National Motorway Communications System Control Offices. It gives guidance on criteria regarding the layout and operational requirements of the Control Room and the Equipment Room.

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1. Introduction
2. References
3. Enquiries

1. INTRODUCTION

1.1 General

1. This Advice Note explains the design and operation of the National Motorway Communications System Control Offices. It gives guidance on criteria regarding the layout and operational requirements of the Control Room and the Equipment Room.

Organisation, this would not result in significant additional expense or delay progress. Design Agents should confirm its application to particular schemes with the Overseeing Organisation.

1.2 Scope

1. This Advice Note is applicable to the design of Motorway Control Offices, within motorway communications, motorway construction and motorway improvement schemes.

2. The specific requirements for each Overseeing Organisation are contained in the relevant Annex to this Advice Note. They are as follows:

- Annex A for England;
- Annex B for Scotland;
- Annex C for Wales;
- Annex D for Northern Ireland.

3. This Advice Note is intended to be used by Overseeing Organisation staff, their consultants, Agents and maintenance contractors.

1.3 Related Standards and Advice Notes

1. There are no Technical Directives related to the design of Control Offices.

2. The following Advice Notes are of relevance:

TA 70: Introduction;

TA 71: Design and Implementation (Overview);

TA 72: National Motorway Communications Systems (NMCS).

1.4 Implementation

1. The appropriate Annex should be used forthwith on all motorway communications, motorway construction and improvement schemes currently being prepared provided that, in the opinion of the Overseeing

2. REFERENCES

TA 70: Introduction
(DMRB 9.2.1)

TA 71: Design and Implementation (Overview)
(DMRB 9.3.1)

TA 72: National Motorway Communications Systems
(NMCS) (DMRB 9.4.1)

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**VOLUME 9a NETWORK - TRAFFIC
CONTROL AND
COMMUNICATIONS**
SECTION 4 SYSTEMS DESIGN

PART 5

TA 76/97 Annex A (England only)

MOTORWAY CONTROL OFFICES

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1. Introduction
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A1. INTRODUCTION

A1.1 General

1. This Annex is for the specific requirement of motorway communications in England.

DMRB Structure

2. Section 1 of Volume 9 of the Design Manual for Roads and Bridges (DMRB) contains Technical Directives (TD) which detail the Standards of Provision.

3. Section 2 onwards contains Technical Advice (TA) Notes which reflect current practice in the field of motorway communications and control.

Design Loop

4. Figure A1.1a shows the 'Design Loop' illustrating the general sequence in the iterative design process, which starts with the design for emergency telephones and signals followed by transmission and Control Office designs. Last in the cycle is the design of the infrastructure that will be required to support all communications equipment and systems.

Glossary

5. A Glossary of Terms is given in Chapter A6.

Standard Drawings and Specifications

6. Standard MCX and MCY drawings and MCH and TR specifications are issued by Network Control Division (NCD) of the Highways Agency (HA).

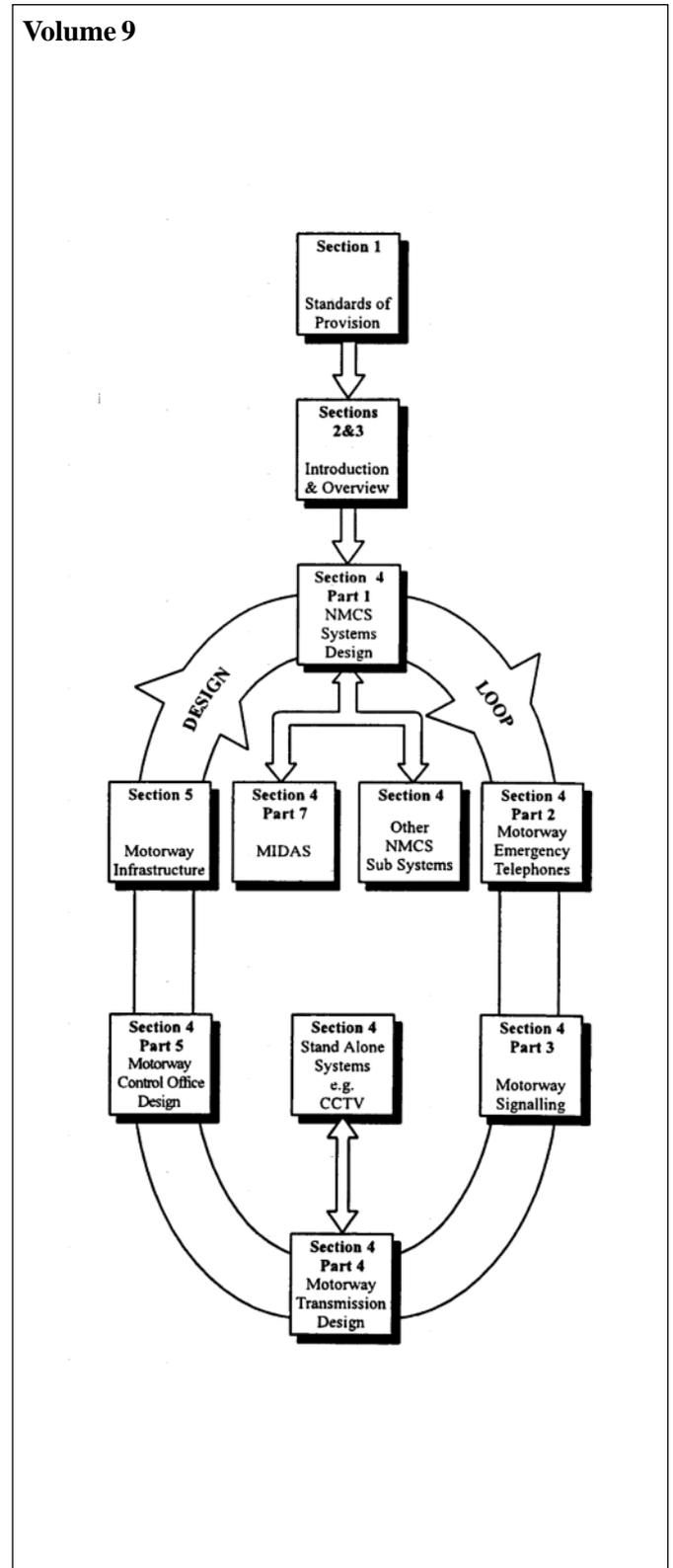


Figure A1.1a Structure of Volume 9 of the Design Manual for Roads and Bridges

A2. GENERAL DESCRIPTION

A2.1 Overview

1. The Control Office (CO) is the location from which the police operate motorway signals and answer emergency telephones. The CO usually consists of two separate rooms:

- (i) The Control Room, from which the police answer telephones, set and monitor signals, communicate with patrols, etc;
- (ii) The Equipment Room, which houses the NMCS computers, Closed Circuit Television (CCTV) equipment, transmission racks and incoming cable terminations.

2. No two COs are the same. There will be differences in furniture, layouts, levels of activity and variations in the amount of police communications facilities. Motorway communications is only part of the work of the police. Any alterations to COs, such as NMCS1 to NMCS2 changeover, should always be with full police co-operation. This could involve changes to the Control Room layout, ergonomic design, internal cable layout (Police Building Services need to be involved), Equipment Room size, ventilation, Uninterruptible Power Supply (UPS) provision, etc.

A2.2 Responsibilities

1. The Highways Agency (HA) is responsible for the maintenance and upkeep of COs and should always be aware of any liaison between the police, consultants, contractors and agent authorities concerning the CO.
2. NMCS data circuits within the CO are the responsibility of the specialist Regional Maintenance Contractor (RMC).

A2.3 NMCS1 Control Offices

1. Within an NMCS1 CO there are:
 - (i) Between two and four telephone answering panels;
 - (ii) At least one signal setting terminal, (Personal Computer based) CO306 or CO308;

- (iii) A mimic diagram;
- (iv) A printer;
- (v) A CO304 minicomputer equipment cabinet;
- (vi) Transmission equipment/Private Wire (PW) terminations;
- (vii) A CO306/CO308 equipment cabinet.

2. Items i, ii and iii will be found in the Control Room. Item iv could be in the Control Room, Equipment Room or other location regularly visited by CO staff. This is to ensure the paper rolls are renewed or do not become jammed. Items v, vi, vii are usually found in the Equipment Room.

3. Further details on the actual operation of NMCS1 can be found in TA 72/95: National Motorway Communications Systems.

4. The only contractor who may be involved in any permanent or temporary move of NMCS1 CO's equipment (for instance during the installation of CCTV or NMCS2) is the RMC, with whom contact should be made via the HA.

A2.4 NMCS2 Control Offices

1. Within an NMCS2 CO there are:
 - (i) Up to ten Operator Interfaces (OIFs) which can have telephone answering and signal setting capabilities. The Operator Control Panel (OCP) component can be used on its own as a telephone answering panel, though there is still a limit of six telephone answering positions. In addition to the OIFs, there are also Inter Control Office (ICO) key and lamp units which connect adjacent CO's on the ICO telephone link. The number of panels is dependent upon CO requirements in agreement with the Highways Agency's Transmission Branch;
 - (ii) NMCS2 Control Office Base System (COBS) computer equipment, Subsystem equipment;

- (iii) Transmission equipment:
 - (a) COBS Local Area Network (LAN),
 - (b) Equipment connected to local and National Motorway Communications Networks;
 - (iv) Engineer's terminals;
 - (v) Printer.
2. All of this equipment, with the exception of the OIFs, will be in the Equipment Room. Under special arrangement between the Highways Agency and the police, a mimic diagram may also be present in the Control Room.
3. Installation of NMCS2 is normally undertaken by the system manufacturer. Maintenance of operational systems is the responsibility of the specialist Regional Maintenance Contractor (RMC).
4. The NMCS2 instation is configured as a Local Area Network (LAN). For details refer to MCH 1617 and MCH 1618.

A2.5 CCTV Equipment

1. Installation of Closed Circuit Television (CCTV) equipment is normally undertaken by the system manufacturer. Maintenance of CCTV equipment may be the responsibility of a specialist maintenance contractor or the RMC.

A3. DESIGN RESPONSIBILITIES

A3.1 General

1. Design responsibilities for motorway communications equipment within Control Offices (CO) are co-ordinated by the Highways Agency (HA). The police will have an important input to the Control Room arrangements or to any alterations made to the Control Office and should be involved in the implementation process as early as possible.

2. The HA will have regular liaison with the police. This will involve the following:

- (i) The passing on of information regarding operational facilities available on the NMCS;
- (ii) The gathering of information from the police on operational problems, eg signal sequencing;
- (iii) Informing the police of forthcoming improvements to motorway communications in the CO, eg the installation of an NMCS1 CO308;
- (iv) Training the police to use the system safely and efficiently.

A3.2 Control Office Design

1. The primary consideration is that the police will have to use the equipment provided. Consultation should take place with all levels of Control Room staff from the civilian operators, through to the Duty Inspectors and the senior officer in charge of communications. A good layout will encourage operators to use the systems provided. This is particularly important in 'quiet' COs where motorway traffic is comparatively low and use of motorway communications facilities is small.

2. Space, both in the Equipment Room and in the Control Room, is often at a premium, therefore early consultation with the police is essential.

3. The use of an Ergonomics consultant for major CO layout changes should be considered. The type of desk to be used to mount operator interfaces on will be defined by the police. Designs should take account of, and comply with, all current Health and Safety legislation. This requires, for example, that display screens are able to swivel and tilt, and keyboards can tilt

and have sufficient space in front of them to provide support for the hands and arms of the operator.

4. A CO move, refurbishment or the installation of NMCS2 will require close co-operation between the Police, Building Services, Communications Manager and Communications Engineers. Installation programmes, particularly for Building Services, may need integrating into advance or concurrent works undertaken by others. The use of existing Agency Agreements should be considered in preparing an implementation strategy.

5. Should microwave radio be provided, access to the police Radio Equipment room will be required. This may require special clearance from the police, in addition to national licensing requirements.

6. The options provided at the CO may depend on the available space within the Control Room and the associated Equipment Room. Where additional space is required for Subsystems, and can be made available by the police at the CO, the full complement of facilities should be considered.

7. MCH 1507 provides details of the scale of provisions for NMCS CO facilities. Telephone lines may be selected from the range of 2, 4, and 6. Data System Operator Interfaces may be selected from the range between 2 and 6.

A3.3 CCTV

1. The installation of a CCTV system presents particular problems within a CO. The first is that the CCTV contract is likely to be separate from other works in the CO, perhaps even using a different Design Agent. The second is the actual mounting of monitors, both for general view and at operator positions. Substantial frameworks may be required and air conditioning may need enhancement to cope with the additional heat loads generated by the monitors.

2. In the Equipment Room cabinets to house transmission, video multiplexing and terminations will be required. However, if space is at a premium and is restricting the system design, consideration should be given to siting the video switching matrix and associated motorway transmission equipment at a Transmission Station instead of at the CO.

A3.4 Mimic Diagram

1. In NMCS1 Control Offices, an active mimic diagram is an operational requirement. This is not the case for NMCS2 where the maps within the OIF take on this function. However, where the CO is equipped with an existing active mimic and both the police and HA agree on a requirement and funding is made available, then either a passive wall map or mimic on an NMCS2 Subsystem may be provided.

A4. CONTROL ROOM

A4.1 Introduction

1. This chapter describes the operator positions, mimic diagram, NMCS2 Operator Interface (OIF) and Control Room Facilities.

A4.2 Operator Positions

1. For both NMCS1 and NMCS2 Control Offices (CO), the motorway communications operator positions form part of the Police Operator positions. Possible equipment also located at a position might include:

- (i) Police Radio;
- (ii) Police Message Handling terminal and keyboard;
- (iii) Police Database terminal and keyboard;
- (iv) Police Touch Screen Telephone System;
- (v) Police National Computer (PNC) terminal and keyboard;
- (vi) Message Sign Stand Alone Controller terminal and keyboard;
- (vii) NMCS1 Telephone Answering Panel;
- (viii) NMCS1 CO306/CO308 PC terminal and keyboard;
- (ix) NMCS2 Operator Interface (OIF) terminal and keyboard;
- (x) NMCS2 Telephone Answering Panel;
- (xi) Phase 1 Telephone Answering Panel;
- (xii) Inter-CO link panel;
- (xiii) CCTV monitors and control panel.

A4.3 NMCS1 Positions

Overview

1. It is normal to have at least one signal setting

position in an NMCS1 CO. The CO306/308 is usually positioned so that the operator has a full view of the mimic diagram when using the terminal.

2. Telephone answering panels are usually part of a larger console. In some COs, the telephone positions are in a separate room to the signal setting positions. The operators patch through to the motorway signalling console if signals are required.

3. Phase 1, NMCS1 and NMCS2 telephone systems are capable of providing common headset working. This is where the police operator's headset is switched automatically to connect him to whatever service is used from the control console. Normally, three basic facilities are offered, namely access to the Private Automatic Branch Exchange (PABX), radio, or Motorway Emergency Telephones, and the operation of any key on the system required automatically switches the headset for the relevant conversation.

Signal Setting Position

4. In NMCS1 Control Offices, signal setting is only available at one 'live' terminal. Originally this terminal was a 'Trend' teletypewriter and provided instant hard copy. Later developments saw the teletype being replaced by a VDU in some COs.

5. In the mid 1980s the personal computer (PC) made it possible for a better and simplified method of signal setting to be introduced. The CO306 PC provided a more user-friendly interface and had schematic detail maps identifying signal and telephone positions CO306 PCs are still in use.

6. The terminals are placed in the operators' area. The processor, a back up processor and an engineer's terminal are contained in a cabinet usually adjacent to the CO304 cabinet.

7. The CO306 has been improved on by the CO308 which has additional features such as multiple access to maps. It also allows more than one operator to prepare signal setting proposals at a time. There is a maximum of 6 CO308 terminals in a CO. Most Trend teletypes had been replaced with either CO306 or CO308 terminals by mid 1992.

8. The Trend is retained at the CO to provide a print out of activity at the CO. It is often now located in a side room to the Control Room.

9. The CO308 Control Office interface system is specified in MCE 2107.

10. The operator can set signals by either typing a proposal in directly on the qwerty keyboard, or by using the cursor control keys to locate signals on the map and using the function keys to select the restriction. Multiple restrictions can be contained within one proposal.

11. There are two levels of map on the CO306/CO308 - overview and detailed.

Telephone Answering Panel

12. A CO Type C0304 may contain up to six Phase 2 telephone panels. Two or four is the normal provision, depending on telephone traffic.

13. The specification for the Phase 2 Answering Panel (Telephone Unit 3148) is MCE 1353. The instruction for operation is detailed in MCH 1427.

14. Each Panel requires a 12-wire connection back to the CO304 cabinet.

15. Any work to move, rewire or replace panels will normally be carried out by the specialist Regional Maintenance Contractor (RMC) under instruction from the Highways Agency (HA). Any work to upgrade panels will normally be carried out by the National Facilities Engineer (NFE).

Line 1 Monitor Units

16. The Line 1 monitor is used when communication links between CO and CP are non operational. It provides a rudimentary method of signalling telephone calls on Line 1 or Line 5 if fitted - refer to MCH 1370.

A4.4 Mimic Diagram

Overview

1. Mimic Diagrams form part of the specification for an NMCS1 Control Office. Individual drawings for the panels that make up the mimic are held by the Highways Agency.

2. Mimic diagrams are not proscribed in NMCS2 COs. Passive maps, refurbished NMCS1 mimics, or new mimics may be provided with the agreement of the HA. Funding for some or all of this work may be required from the police.

Description

3. The mimic diagram comprises a schematic diagram of the motorways or motorway section controlled by that CO. Each signal is represented by one or more display points which are illuminated when the signal is in use. Telephone and signal numbers are shown on the display in their respective positions.

4. The display diagram in any given CO is unique to that CO, but the colours have been standardised as follows:

- (i) The background is blue;
- (ii) Carriageways that have carriageway signalling are white;
- (iii) Carriageways that have lane signalling are grey;
- (iv) Carriageways in neighbouring CO areas are grey;
- (v) Lettering outside the control area is red;
- (vi) Telephone addresses are brown;
- (vii) All other lettering is black.

5. Indicator lamps on the display diagram are to show the signal activity and the system status. The colours used are as follows:

- (i) Carriageway signal - white;
- (ii) Lane signal - white and red;
- (iii) System alarm - red;
- (iv) Computer on - green;
- (v) Computer alarm - red;
- (vi) Transmission alarm - red;
- (vii) Typewriter off-line - red;
- (viii) Check restriction - amber;

- (ix) Time check - amber;
 - (x) C0304 controller mains - red.
6. When a carriageway signal is in use, the corresponding white indicator is illuminated steadily.
7. When a lane signal is displaying an aspect other than 'stop', the corresponding white indicator is illuminated steadily. When it is displaying 'stop' but the carriageway is not closed, the corresponding red indicator is also illuminated steadily. However, when a lane signal is displaying stop aspects to close the carriageway, the corresponding red indicator is flashed.
8. A buzzer is mounted behind the display diagram to attract the operator's attention in the event of a fault.

Design Information

9. The mimic display can have up to 512 display lamps for signals and alarms. They are driven by a Lamp Driver Unit (LDU). Each LDU can drive up to 256 lamps. Each LDU requires a 4-wire connection back to the CO304 cabinet. The specification for an LDU is MCE 2040.
10. Maintenance of the Mimic and LDU is by the RMC. Alterations are usually carried out by the NFE.

A4.5 NMCS2 Positions

Description

1. The typical NMCS2 CO installation should comprise of a Control (operations) Room and an Equipment Room in the same building, so that cable runs between equipment do not exceed 50m. The Control Room should allow for a minimum of 2 and a maximum of 10 operator positions. Telephone answering positions only require an Operator Control Panel (OCP). An Operator Interface (OIF) consisting of an OCP with Visual Display Unit (VDU) is used for controlling signalling and other Subsystems. Qwerty keyboards may be provided for each individual OIF, or the whole room. A nominal one square metre plan area should be allowed for each operator position, not including the seating/access area.
2. Common to all operators will be a system printer (usually situated in the Equipment Room) and a separate audio recorder to record all motorway telephone calls. This recorder may be provided by the police.

3. The systems may be arranged in any order so that there could be separate operators for each system (ie telephones and data). This also allows any combination of the systems through to operators controlling a fully integrated NMCS2 system.

4. OIF's may be delegated for specific Subsystems in addition to normal NMCS2 work. The position of operator positions in the CO is stipulated by the police. Some operator positions could be situated away from the main Control Room in an incident room, command and control room, etc. This is always providing that the maximum provisions of six OIF's capable of answering telephones is not exceeded.

5. Phase 1, NMCS1 and NMCS2 telephone systems are capable of providing common headset working. This is where the police operator's headset is switched automatically to connect whatever service is used from the control console. Normally, three basic facilities are offered, namely access to the PABX, radio, or motorway telephones, and the operation of any key on the system required automatically switches the headset for the relevant conversation.

6. The telephone system will permit calls to be transferred between telephone operator answering positions. Operators controlling the setting of signals, signs, etc, need to consult directly (ie verbally) to resolve concurrent conflicts for control of the system. These may occur when there are separate incidents in the same period. The NMCS2 system allows for more than one operator to control the setting of different signals or signs simultaneously. An automatic warning is given if more than one operator attempt to control the same signal or sign.

Design Information

7. The HA should provide the Design Agent with the cabling and power requirements for each OIF, and the dimensions of the terminal to be used. Consultation should take place with Police Building Services to ensure that these requirements can be accommodated.

A4.6 NMCS2 Operator Interface (OIF)

Overview

1. The CO is equipped with up to ten NMCS2 Operator Interfaces (OIF).

2. These consist of keyboards (sometimes referred to as Operator Control Panels) and intelligent colour visual display units (VDU) for displaying Subsystem and telephone information for the CO area, and the entry of commands to access these devices. They form the common interface between the data and telephone communication systems.

3. An Operator Control Panel can be used without a VDU to provide a telephone answering position only. Similarly a full OIF can be designated for data system (eg signal setting) use only.

VDU Display

4. The information on the overview display consists of a small scale map of the entire CO area showing its geographical layout, the junctions and major landmarks. The map also shows the position and state of the signal sites and telephones in colours. These colours contrast with the colour of the road when they are in an active area.

5. Any part of the overview display can be switched to a large scale map known as the detailed display.

6. By using the cursor keys the display can be scrolled around the CO Area at the detailed level.

7. The information contained on the large scale map consists of the signal gantries, post signals and telephones on both carriageways of the motorway. Their relative positions with respect to slip roads and landmarks are shown along with their geographic addresses.

8. The state of each emergency telephone is shown to indicate items such as new, held or active calls.

9. On request, the display also provides the operator with diary and notebook facilities, along with the capability of viewing 'help' information.

10. The display can provide pages of fault and status logs concerning various items of equipment in the system.

11. The functions of the display are all menu driven. The VDU also has a set of indicators on view to show the current state of the system.

Phase 3 Telephone Answering Panel

12. The telephone answering panel has keys to select

functions and dial-up telephones. The identity and state of the telephone is shown on a small alphanumeric display.

A4.7 Control Room Facilities

Equipment

1. It is very likely that NMCS2 OIFs and CCTV desk monitors will be accommodated on furniture specified by the police. Design Agents should ensure that motorway communications equipment is laid out to the best effect. If necessary the police should be encouraged to consider alternative layouts of equipment.

2. All monitors and keyboards should comply with current Health and Safety legislation.

3. Main overview CCTV monitors require careful consideration. Picture cycling can reduce the numbers. How each monitor is designated should be thoughtfully planned. Ideally, the duty inspector should be able to view all monitors. Monitors should not be too large.

Cabling

4. A dedicated NMCS2 cable management system should be installed. The cables should have a clear, unambiguous identification system that cannot be confused with other cables within the CO.

Power

5. Provision of satisfactory power supplies for OIFs should be confirmed with Police Building Services. CCTV monitors and associated equipment within the Control Room may put an additional load on the available supply.

Heating and Ventilation

6. All equipment generates heat. This is particularly true of a large bank of CCTV monitors. Careful consultation is required to ensure sufficient ventilation/air conditioning is installed, in the correct place, in the Control Room.

Miscellaneous

7. All modifications to the Control Room involving motorway communications facilities should satisfy local Fire and Building Regulations.

A5. EQUIPMENT ROOM

A5.1 Overview

1. NMCS1 equipment will consist of a CO304 cabinet and a CO306 or CO308 cabinet. A transmission rack may also be provided if transmission equipment is not all contained in the CO304 cabinet.
2. For NMCS2 the Equipment Room will provide accommodation for all telephone and data systems installation equipment together with a logging printer. There will be an Engineer's Console with an Operator Interface (OIF) type terminal and a qwerty keyboard.
3. Design information contained in this Chapter is for the installation of NMCS2 equipment.
4. The number of CCTV cabinets will be determined by the type and size of system to be installed.

A5.2 Equipment Room Facilities

Racking

1. The system equipment will be contained in racks requiring floor space and provision for opening access doors to the front and rear of the racks. Provision should be made for a 1 metre clearance to the front and rear of the racks. Space provision should be made for two racks 1m² in plan area for each of the telephone and data systems. Provision for additional rack space should be made if the Local Communications Controller (LCC) and/or Sector Interface are to be sited at the Control Office (CO). This provision of rack space should provide for most installations, irrespective of the system capacity or number of installed operator positions.

Cabling

2. Internal cables between equipment and control rooms will normally be installed underfloor, in trunking or on trayplate.
3. Wherever possible a dedicated NMCS2 cable management system should be installed. This will require the agreement of the Police Building Services and may need to be carried out by their nominated contractor/agent. The cables should have a clear, unambiguous identification system that cannot be confused with other cables within the CO.

4. Communications cables entering the CO building will be terminated in the Cabinet 2304. Private Wire termination arrangements will require the agreement of the Highways Agency.

Power

5. Mains supplies are required for the equipment. They should be separately controlled and protected. They are normally sourced from protected power supplies (such as a stand-by generator or Uninterruptible Power Supply (UPS)) to maintain operation during mains supply disruption. Where standby generators are provided the contactor should cut in/out in an ordered manner after the load on the generator has stabilised and after inductive/capacitive loads such as air conditioning and fluorescent lighting have been taken up.

Heating and Ventilation

6. The heat that will be generated by new equipment should be calculated. If additional ventilation is required within the Equipment Room this should be brought to the notice of the Police Building Services as early as possible.

Security

7. It is important to ensure that access to the Equipment Room is restricted to authorised personnel.

Miscellaneous

8. Anti-static precautions are advised. Ideally special flooring would be specified.
9. All modifications to the Equipment Room should satisfy local Fire and Building Regulations.

A6. GLOSSARY

Closed Circuit Television (CCTV)

A system using remotely controlled television cameras to monitor traffic patterns at sites susceptible to traffic congestion such as tunnels junctions and interchanges. The images are transmitted from the camera to the Control Office (CO) over the fibre optic cable infrastructure.

Control Office Base System (COBS)

That part of the installation which performs those functions which are common to all NMCS2 systems. Includes the Operator Interfaces (OI).

Engineer's Console

A means of engineer's access to the database and the system at large. Access will be used to retrieve system performance/status data. Except for control of motorway devices, all facilities at the Operator's Interface (OIF) are available.

Engineer's Terminal

A means of engineer's access to the database and the system at large. Access will be used to change nominated sub-system site data and retrieve system performance/status data. Except for control of motorway devices, all facilities at the Operator's Interface (OIF) are available.

Enhanced Message Sign (EMS)

A sign which is used to display a variety of legends or messages. The legend or message is controlled from the installation. EMS has 2 rows of 12 characters. Can be mounted on a gantry or cantilever.

Inter Control Office (ICO)

A communications link between Control Offices.

Local Area Network (LAN)

Telecommunications terminology for a data communications network used to interconnect personal computers and equipment over a limited area.

Local Communications Controller (LCC)

An NMCS2 data system message switching unit, the most significant CO area data system communications node. Sited at the most strategic point on the motorway network, it provides the downside on the Database Processor (DBP) - LCC level 2 link and the master on the four LCC-Transponder HDLC links.

Message Sign

A generic term for signs which can display messages; this includes EMS, MS2 and FTMS.

Mimic Diagram

A large diagram which schematically represents the Control Office Area (COA) and indicates the status of the devices and systems in the COA.

National Motorway Communications System (NMCS)

The motorway traffic control and emergency telephone network adopted to serve the motorways of England.

National Motorway Communications System 1 (NMCS1)

A combined signalling and telephone system controlled from Regional and National central processors, installed up to 1988.

National Motorway Communications System 2 (NMCS2)

A system using locally based distributed processing to control telephones and signals, installed from 1988.

Operator Control Panel (OCP)

An NMCS2 unit, designed primarily for the telephone system to provide indicators, message display and keyed input to and from the operator. It also provides a means of input from the operator to the data system, in conjunction with the Operator Interface (OIF), using function keys to drive the menus and cursor keys to manipulate maps and text. Thirdly, it can provide a full text input when a QWERTY keyboard is plugged into the OCP.

Operator Interface (OIF)

The OIF provides a means of controlling the systems and can consist of an operator's control panel, a QWERTY keyboard and a visual display unit.

Private Automatic Branch Exchange (PABX)

Small telephone exchange owned by an organisation other than a Public Telecommunications Operator.

Private Wire

A dedicated permanent circuit provided by a Public Telecommunications Operator between two locations.

Public Telecommunications Operator (PTO)

A licensed provider of Public accessible telecommunications services (eg British Telecommunications Ltd, Mercury Communications Limited).

Regional Maintenance Contractor (RMC)

A Contractor responsible for the day to day maintenance of instation and outstation equipment. Also has first line responsibilities for the transmission equipment in their region.

Stand Alone Control

A non NMCS2 system used to control and update Message Signs.

Stand Alone Controller

The operator interface with the Message Signs in a Stand Alone Control system.

Subsystem

A group of commands, communications messages and types of Motorway Devices which together implement a primary function of the system, eg Fog, Signals.

The subsystem provides the format, sequence and information for the use of its facilities in NMCS2. Examples are as follows:

SIG	Signals
MSS	Message Signs Subsystem
FOG	Fog Detection
MIDAS	Motorway Incident Detection and Automatic Signalling
MET	Meteorological Monitoring (ie wind speed and direction, ice, etc.)
LTG	Lighting Control

Telephone Answering Panel (TAP)

A TAP is the instation element of the temporary telephone system. Telephone Bridging Units and Telephone Answering Units operate in pairs.

Uninterruptible Power Supply (UPS)

A power supply device which prevents failure of the main power supply from disrupting the operation of equipment. A UPS will usually be of sufficient capacity to allow a secondary power supply (eg a generator) to be brought into operation, initiate alarms and in some cases initiate a controlled shutdown of equipment.

Variable Message Sign

A sign which can display a number of defined legends or messages.

Visual Display Unit (VDU)

A VDU comprises a colour monitor for the presentation of active data system and telephone information superimposed on road layouts. It may be a component of the Operator's Interface provided for each Control Office operator position.

A7. REFERENCES

MCE 1353 - Telephone Unit Type 3148 - 4/8 Lines, NMCS1

MCE 2040 - Control Office CO304 - Lamp Driver Unit

MCE 2107 - Specification for Control Office - CO308 facilities at Police Control Offices

MCH 1370 - NMCS1 Line 1 Monitor Application Guide

MCH 1427 - Operating Instructions for Telephone Unit Type 3148

MCH 1507 - Standard for NMCS Control Office Facilities

MCH 1617 - NMCS2 Management Overview

MCH 1618 - NMCS2 Technical Overview

TA 72/95: National Motorway Communications Systems (DMRB 9a.4.1)