3.8. Electrical

3.8.1. Approval Sheet

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| APPROVED BY    | SIGNED: Con Shakas  
                | DATED: 12th July 2005  
                | MANAGER  
                | TRAFFIC ENGINEERING TECHNOLOGY |
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3.8.3. Overview

3.8.3.1. Scope

This document sets out the Authority’s requirements for the organisation of CADD data and the presentation of Electrical Design Drawings for the installation or modification of Electrical Equipment for Traffic Control Signals and other Traffic Control Installations.

3.8.3.2. Objective

The objective of this guideline is to provide Electrical Design Drawings for Traffic Control Signals and other Traffic Control Devices in a format that can be read by the Authority on its equipment and stored.

It defines the way in which data is to be organised and how it is to be presented to the Authority.

3.8.3.3. Document Status

This is a controlled document, which is the responsibility of the RTA CADD Advisory Group. Submissions to amend this document are to be forwarded to The Secretary, RTA CADD Advisory Group.

Interpretation and clarification of issues contained within this document can be obtained by contacting the Secretary, RTA CADD Advisory Group.
3.8.4. Standards

3.8.4.1. Reference Documents

The following documents are to be read in conjunction with this Guideline.

DESIGN BRIEF FOR THE WORK
CADD DATA EXCHANGE STANDARDS
TRAFFIC SIGNAL PRACTICE - DESIGN
SPECIFICATION INSTALLATION AND RECONSTRUCTION OF TRAFFIC LIGHT SIGNALS AND ITS ASSOCIATED DRAWINGS

STANDARDS AUSTRALIA PUBLICATIONS:

AS1100 TECHNICAL DRAWING
AS1102 GRAPHICAL SYMBOLS FOR ELECTROTECHNOLOGY
AS/NZS4383 PREPARATION OF DOCUMENTS USED IN ELECTROTECHNOLOGY
AS3000 SAA WIRING RULES
AS3008 SELECTION OF CABLES
AS3100 ELECTRICAL EQUIPMENT
3.8.5. Drawings

3.8.5.1. General

3.8.5.1.1. Component Drawings for Traffic Control Signals and other Traffic Control Installations

Electrical Design for installation or reconstruction of Traffic Control Signals and other Traffic Control Installations usually require two or three component drawings as follows:

a. CABLE INSTALLATION
b. CABLE CONNECTION CHART
c. DUCT LAYOUT (Optional)

NOTE: The Duct Layout plan is optional and is usually only required at sites with major roadworks.

Standard equipment and installation methods are utilised in the majority of installations but on rare occasions additional drawings may be required for the installation of special hardware:

d. MANUFACTURING DETAILS OF EQUIPMENT
e. INSTALLATION DETAILS OF EQUIPMENT
f. CIRCUITS AND CONNECTION DIAGRAMS

3.8.5.1.2. Drawing Media

Both hard and electronic copies of the specified drawings are to be supplied.

Electronic CADD files shall be in Microstation or AutoCAD format, reduced to a manageable size and free of all redundant data.

3.8.5.1.3. Available Templates

For the Cable Installation and Duct Layout; an electronic copy of all the information contained in Levels (Layers) 1 and 2.

For the Cable Connection Chart, an electronic copy of all the information contained in Level (Layer) 1.
3.8.5.2. **Specification for Drawings**

**3.8.5.2.1. Sheet Size**

The most common sheet size is A1 but may vary through the range A0, A1, A2, A3, A4 and is to be in accordance with the ISO-A series specified in AS1100.

**3.8.5.2.2. Scales**

Scales to be used for various plans:

Cable Installation drawings and Duct Layout drawings shall be prepared and submitted in real world coordinates 1:1 using metres as the unit of measurement and plotted at a scale of 1:200, unless otherwise agreed by the Liaison Officer.

Drawings of Manufacturing Details of Equipment shall be prepared and submitted in real world coordinates 1:1 using millimetres as the unit of measurement and may be plotted at various scales of 1:1 to 1:10 depending on which is the most practical.

Drawings of Installation Details of Equipment shall be prepared and submitted in real world coordinates 1:1 using metres or millimetres as the unit of measurement and may be plotted at various scales of 1:2 to 1:20 depending on which is the most practical.

Cable Charts are not to scale and shall be prepared and submitted in paper size.

Circuits and Connection Diagrams are not to scale and shall be prepared and submitted in paper size.
3.8.5.2.3. **Drawing Registration and CADD File Naming Convention**

The registration number of a group of drawings for a traffic signal installation comprises 6 parts:

The first 4 digits represent the main road number

The next 3 digits represent the council number

The 2 letters represent the series

The next 4 digits represent the unique Traffic Signal Site number

The sheet number in the group is shown in a separate box

The alphabetical letter representing issue of that sheet is also shown in a separate box

A typical example registration: 0164.479.VV.1000 Sheet 11 Issue B

The first 3 parts of the registration number, the main road number, the council number and the series are usually evident.

The Traffic Management Centre or their delegate issues the unique Traffic Signal Site number.

The sheet number is issued consecutively from the RTA CARMS plan-registering database and the sheet number is available from regional offices.

The next alphabetical issue letter is used for each revision of an existing drawing.

The CADD file name is derived from the registration number, the first 2 letters of the file name is the series, the next four digits is the unique Traffic Signal Site number, then an underscore followed by 2 digits representing the sheet number and a letter representing the current issue, then an underscore followed by 3 letters which is an abbreviation for the plan type. The abbreviated plan type is shown in all cases except for the Traffic Signal Civil Design where these 3 letters are omitted. The file name is ended with a dot and file extension, .DGN or .DWG depending on the file type.

The following are hypothetical examples of file names:

Traffic Signal Civil DesignVV1000_10A.dgn

Cable Installation VV1000_11B_INS.dgn

Cable Connection Chart VV1000_12C_CHT.dgn

Duct Layout VV1000_13A_DCT.dgn

3.8.5.2.4. **Font and Line Styles**

Refer to CADD Data Exchange Standards, Section 2.1 of CADD Manual.

3.8.5.2.5. **Symbols (Cells)**

Refer to RTA CADD Cell Library.
3.8.6. Functional Grouping of Information

3.8.6.1. Composition of Component Drawings for Traffic Control Signals and Other Traffic Control Installations

3.8.6.1.1. Cable Installation

Will comprise the following groupings:

- LEVEL (LAYER) 1
- LEVEL (LAYER) 2
- LEVEL (LAYER) 3
- LEVEL (LAYER) 4 (OPTIONAL)

3.8.6.1.2. Cable Connection Chart

Will comprise the following groupings:

- LEVEL (LAYER) 1
- LEVEL (LAYER) 2
- LEVEL (LAYER) 3

3.8.6.1.3. Duct Layout

Will comprise the following groupings:

- LEVEL (LAYER) 1
- LEVEL (LAYER) 2 (OPTIONAL)
- LEVEL (LAYER) 3
- LEVEL (LAYER) 4 (OPTIONAL)

3.8.6.1.4. Manufacturing Details of Equipment

Will comprise the following groupings:

- LEVEL (LAYER) 1
- LEVEL (LAYER) 2
- LEVEL (LAYER) 3
3.8.6.1.5. Installation Details of Equipment

Will comprise the following groupings:

- LEVEL (LAYER) 1
- LEVEL (LAYER) 2
- LEVEL (LAYER) 3

3.8.6.1.6. Circuits and Connection Diagrams,

Will comprise the following groupings:

- LEVEL (LAYER) 1
- LEVEL (LAYER) 2
- LEVEL (LAYER) 3

3.8.6.2. Composition of Groupings in Component Drawings for Traffic Control Signals and Other Traffic Control Devices

3.8.6.2.1. Cable Installation, Level (Layer) 1

- Title Block and Border template
- Completed details in the Title Block and Border as called for:
  - Plan Registration Number and Issue
  - File Number
  - Scale
  - Site Location and Plan type
  - Designed by
  - Checked by
  - Approved by
- Reference plans
- Road, island and property outlines including; utilities, street names and north point.

3.8.6.2.2. Cable Installation, Level (Layer) 2

- Post types and locations
- Post number assigned to each post
- Detector location, width and identifying number
- Electric supply point
- Location and type (graphical representation) of Controller
3.8.6.2.3. **Cable Installation, Level (Layer) 3**

This group shows the additional information necessary for the "CABLE INSTALLATION" which is not shown in the preceding groups. Typically it will contain:

- Cable and duct locations
- Cable and duct depths
- Pit types and locations
- Dimensions
- Labels and leaders
- Cable Layout Diagram.
- All notes
- Job Instruction issue change notes

3.8.6.2.4. **Cable Installation, Level (Layer) 4**

This group is an optional Group.

This group contains the outlines of existing road and island channelisation before any modifications due to roadworks. If the outline is not modified, it is not required.

3.8.6.2.5. **Cable Connection Chart, Level (Layer) 1**

Cable Connection Chart Title Block, Border and Grid Template

Completed details in the Title Block and Border as called for:

- Plan Registration Number and Issue
- Site Location and Plan type
- Designed by
- Checked by
- Approved by
- Reference plans
3.8.6.2.6. **Cable Connection Chart, Level (Layer) 2**

All connection information needed in grid:

- Names of Signal Facilities
- Housing Terminals
- Cable labels and size
- Post numbers
- Lines to define post width in columns
- Number of Post Terminals
- Post Terminals
- Cable Cores
- Number of Spares
- Detector labels and terminations
- All notes
- Job Instruction issue change notes

3.8.6.2.7. **Cable Connection Chart, Level (Layer) 3**

All information contained in the ‘CABLE LAYOUT’ sketch

3.8.6.2.8. **Duct Layout, Level (Layer) 1**

Title Block and Border template

Completed details in the Title Block and Border as called for:

- Plan Registration Number and Issue
- File Number
- Scale
- Site Location and Plan type
- Designed by
- Checked by
- Approved by
- Reference plans

Road, island and property outlines including; utilities, street names and north point.
3.8.6.2.9.  **Duct Layout, Level (Layer) 2**

This group is an optional Group.
- Post types and locations
- Post number assigned to each post
- Electric supply point
- Location and type (graphical representation) of Controller

3.8.6.2.10. **Duct Layout, Level (Layer) 3**

This group shows the additional information necessary for the “DUCT LAYOUT” which is not shown in the preceding groups. Typically it will contain
- Duct size and locations
- Non-standard duct depths
- Pit types and locations (Optional)

- Dimensions
  - Labels and leaders
  - All notes
  - Job Instruction issue change notes

3.8.6.2.11. **Duct Layout, Level (Layer) 4**

This group is an optional Group.

This group contains the outlines of existing road and island channelisation before any modifications due to roadworks. If the outline is not modified, it is not required.

3.8.6.2.12. **Manufacturing Details of Equipment, Level (Layer) 1**

- Title Block and Border template

Completed details in the Title Block and Border as called for:
- Plan Registration Number and Issue
- File Number
- Scale
- Site Location and Plan type
- Designed by
- Checked by
- Approved by
- Reference plans
3.8.6.2.13.  Manufacturing Details of Equipment, Level (Layer) 2

Outlines of actual components

3.8.6.2.14.  Manufacturing Details of Equipment, Level (Layer) 3

Hatching
Dimensions
Labels and leaders
All notes
Job Instruction issue change notes

3.8.6.2.15.  Installation Details of Equipment, Level (Layer) 1

Title Block and Border template
Completed details in the Title Block and Border as called for:
Plan Registration Number and Issue
File Number
Scale
Site Location and Plan type
Designed by
Checked by
Approved by
Reference plans

3.8.6.2.16.  Installation Details of Equipment, Level (Layer) 2

Outlines of actual components

3.8.6.2.17.  Installation Details of Equipment, Level (Layer) 3

Background details to location of component
Hatching
Dimensions
Labels and leaders
All notes
Job Instruction issue change notes
3.8.6.2.18.  **Circuits and Connection Diagrams, Level (Layer) 1**

Title Block and Border template

Completed details in the Title Block and Border as called for:

Plan Registration Number and Issue

File Number

Site Location and Plan type

Designed by

Checked by

Approved by

Reference plans

3.8.6.2.19.  **Circuits and Connection Diagrams, Level (Layer) 2**

Outlines of actual electrical components including terminators

3.8.6.2.20.  **Circuits and Connection Diagrams, Level (Layer) 3**

Background details to location of components

Wiring and connections

Hatching

Labels and leaders

All notes

Job Instruction issue change notes
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3.8.8. Appendix B  Standard A3 Cable Connection Chart
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**TRAFFIC SIGNAL CABLE CONNECTION CHART**

**CABLE LAYOUT (N.T.S.)**

**ROADS AND TRAFFIC AUTHORITY NSW**

**TRAFFIC ENG. TECH. - TECHNICAL SERVICES BRANCH**

**MAIN STREET NAME**

**SIDE STREET NAME**

**SUBURB**

**SHEET NO**

**SHEET**

**REGO NO**

**SHT**

**TCS NO**

**ISSUE**

**A**

**ELECTRICAL DESIGN MANAGER**

**DATE**

**APPROVED**

**SHEET NO**

**DRAWN**

**CHECKED**

**DATE DRAWN**

**DATE CHECKED**

**DETECTOR FUNCTION**

**HOUSING TERMINALS**

**CONTROLLER TYPE**

**REFERENCE PLAN**

**DESIGN LAYOUT**

**CABLE INSTALLATION**

**DRAWN BY**

**CHECKED BY**

**DATE**

**TCS NO**

**ISSUE**

**A**

**SHEET**

**REGO NO**

**SHT**

**EARTH**

**NO OF SPARES**

**LAMP ACTIVE**

**LAMP RETURN**

**PB RETURN**

**NO OF SPARES**
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### Cable Installation Design Layout

- **Controller Type:**
- **Reference Plans:**
- **Approved:**
  - Electrical Design Manager: [Date]
  - [Date]

### Traffic Signal Cable Connection Chart

- **Main Street Name:** [Street Name(s)]
- **Suburb:** [Suburb]

### Road and Traffic Authority NSW

- **Design Office:** Parramatta - Sydney Technical Services
- **Traffic Signal Cable Connection Chart**
3.8.11. Appendix E  Standard Cable Installation Drawing
3.8.12. Appendix F   Standard Cable Connection Chart Drawing
3.8.13. Appendix G  Standard Duct Layout Drawing
NOTES

1) ALL WORK CARRIED OUT AND MATERIALS USED SHALL BE IN ACCORDANCE WITH THE AUTHORITY'S SPECIFICATION "REQUIREMENTS FOR THE INSTALLATION OF UNDERGROUND CABLE DUCTS FOR TRAFFIC LIGHT SIGNALS". THIS DOCUMENT IS AVAILABLE FROM THE TRAFFIC TECHNOLOGY BRANCH (101 OXFORD STREET, SYDNEY).

2) ALL DUCTS TO BE 2 X 80 mm HEAVY DUTY PVC ELECTRICAL CONDUITS UNLESS OTHERWISE STATED.

3) THE COVER ABOVE CONDUITS IS 0.75 m IN ROADWAYS AND 0.5 m IN FOOTWAYS UNLESS OTHERWISE STATED.

SYDNEY CITY COUNCIL AREA
TRAFFIC SIGNALS AT INTERSECTION OF MAJOR ROAD (MR000) AND MINOR STREET
SYDNEY

LEGEND

2 X 80mm Heavy Duty PVC Electrical Conduit

To access unless otherwise stated.

REFERENCES

1) ALL WORK CARRIED OUT AND MATERIALS USED SHALL BE IN ACCORDANCE WITH THE AUTHORITY'S SPECIFICATION "REQUIREMENTS FOR THE INSTALLATION OF UNDERGROUND CABLE DUCTS FOR TRAFFIC LIGHT SIGNALS". THIS DOCUMENT IS AVAILABLE FROM THE TRAFFIC TECHNOLOGY BRANCH (101 OXFORD STREET, SYDNEY).

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