Engineering Procedure
Electrical Distribution Unit

PR D 78200

Description and Labelling of the High Voltage Feeder System

Version 1.2

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Procedure

Transport Sydney Trains

NSW GOVERNMENT

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Document control

Version	Date	Author/ Prin. Eng.	Summary of change
1.0	28 April 2015	Chris Leung	First issue as a Sydney Trains document, rebranded from previous RailCorp SMS-06-EN-0559 V1.2
1.1	2 July 2018	Chris Leung	Section 4. Control of the High Voltage Feeder Identification System updated from "System Control Engineer" to "Principal Engineer Power Systems"
1.2	19 February 2019	Nick Loveday	Updated PR D 78200 "Approved by" to Associate Director Electrical Distribution Unit

Summary of changes from previous version

Summary of change	Section

Table of Contents

1. Purpose and scope

To describe the arrangement and labelling conventions applicable to RailCorp's High Voltage (HV) AC feeder system.

This procedure does not apply to HV distribution equipment, the 1500 Volt DC traction system, the Low Voltage (LV) distribution system, LV installations, or signalling systems.

2. High Voltage System Description

Electric power for Sydney Trains' operations is supplied from other Network Operators' systems at a number of supply points at voltages of 11kV to 132kV.

RailCorp distributes this power via its own HV AC aerial lines and underground cables to a number of substations. RailCorp HV feeders are located both on and off the rail corridor. In some cases RailCorp power poles also support HV and LV aerial lines and other equipment belonging to other network operators. Such situations are usually noted on the reticulation diagrams. Similarly, in some cases RailCorp underground cables are sometimes buried with cables belonging to other network operators.

The substations contain equipment for voltage transformation, switching, overload and fault protection, voltage regulation and rectification for supply to the 1500 Volt DC traction system.

In addition to power for electric traction, power is supplied for signalling and other RailCorp installations and also for RailCorp's retail electricity customers including railway stations, offices, workshops and depots.

3. High Voltage Feeder Labelling

3.1. General

A HV feeder is the collective name given to the entire HV aerial line or cable that generally commences and finishes at a substation. The HV feeder extends out of a substation, and runs to the next substation. The HV feeder run may pass through one or more substations along the way but the switches and busbars inside these substations are not part of the HV feeder. The HV feeder usually commences and finishes on the feeder side of the respective substation disconnector e.g. air break switch or ACCB.

The RailCorp HV feeder labelling convention considers; voltage levels, sections and arrangement of cables, i.e. cables in parallel. An exception being the labelling convention used for the 2 kV signalling and lighting feeders.

The labelling conventions are described in the following sections:

3.2. Feeder Labelling

HV aerial lines and cable feeders are numbered in accordance with the voltage of the feeder. The numbers used are:

2 kV Feeders	Refer to section 3.4 of this Procedure
11 kV Feeders	500 to 699
33 kV Feeders	700 to 799, and 7A1 to 7Z9
66 kV Feeders	800 to 899
132 kV Feeder	285 (only 1 from Ausgrid (Port Hacking) SS to RailCorp's Heathcote SS)

NOTE:

Inorder to prevent confusion:

1) The following identifies are generally NOT assigned:

the letter "I" as it can be confused with the number "1",
the letter "O" as it can be confused with the number the "0", and
the letter "S" as it can be confused with the number "5".

2) A check to ensure that the proposed identifier would not be confused with other identifiers of other RailCorp or network distributor feeders at the same or adjacent locations is completed.

3.3. Section Numbers

The HV feeder may be divided into numbered electrical sections.

Where a HV feeder is sectioned by disconnectors, typically at substations, the sections are identified by adding a stroke and a number to the feeder number, for example, 11kV Feeder 644/1, 644/2, etc up to 644/n where n is the number of sections. Figure 1 shows a typical feeder broken into sections.

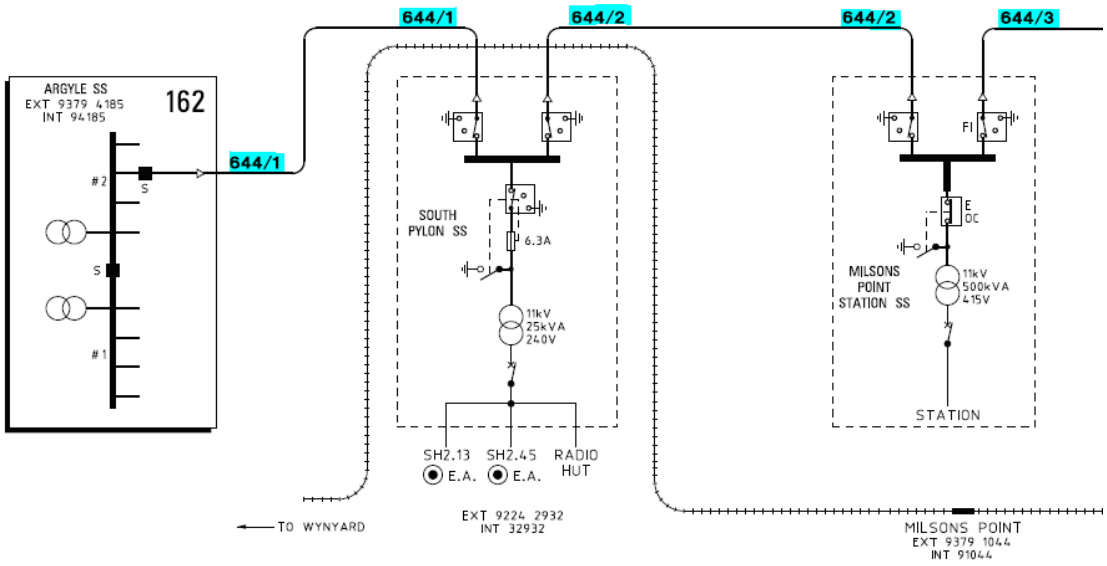

Figure 1 – A feeder run between substations is divided into sections

3.4. Cables in Parallel

Where HV cable feeders comprise two cables in parallel, the cables are identified by adding a letter to the feeder number, eg. the cables of 11kV Feeder 533 are 533A and 533B and for 33kV Feeder 766 are 766L and 766R. Refer Figures 2 and 3 below.

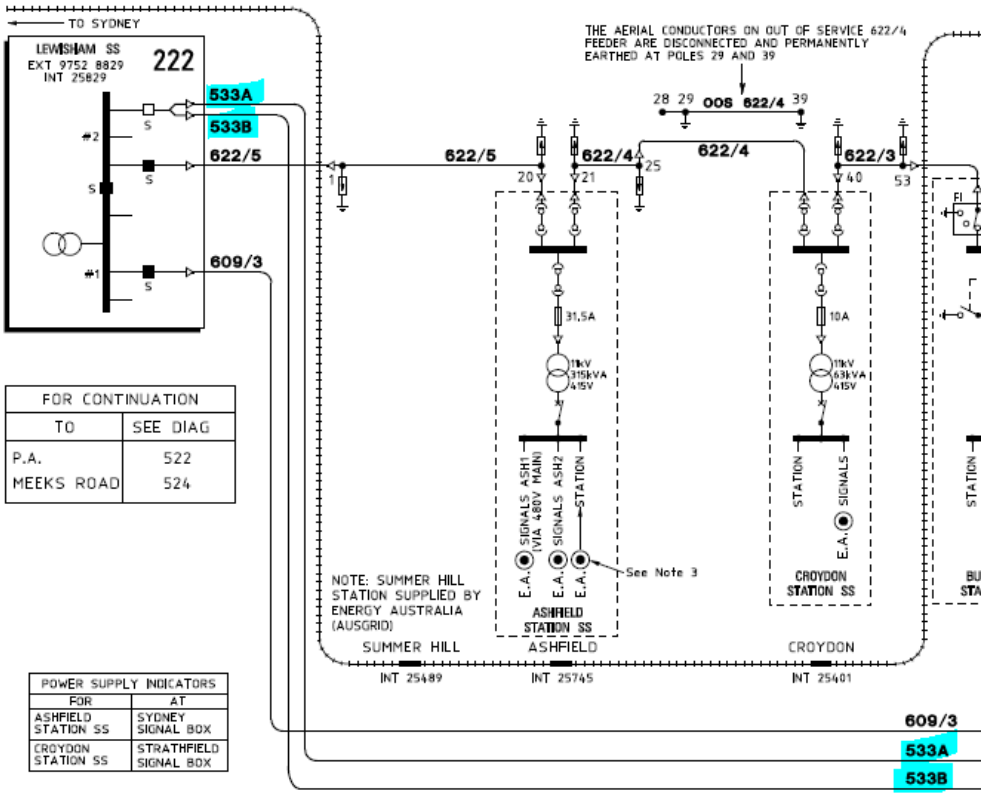

Figure 2 – An example of identification of cable feeders in parallel

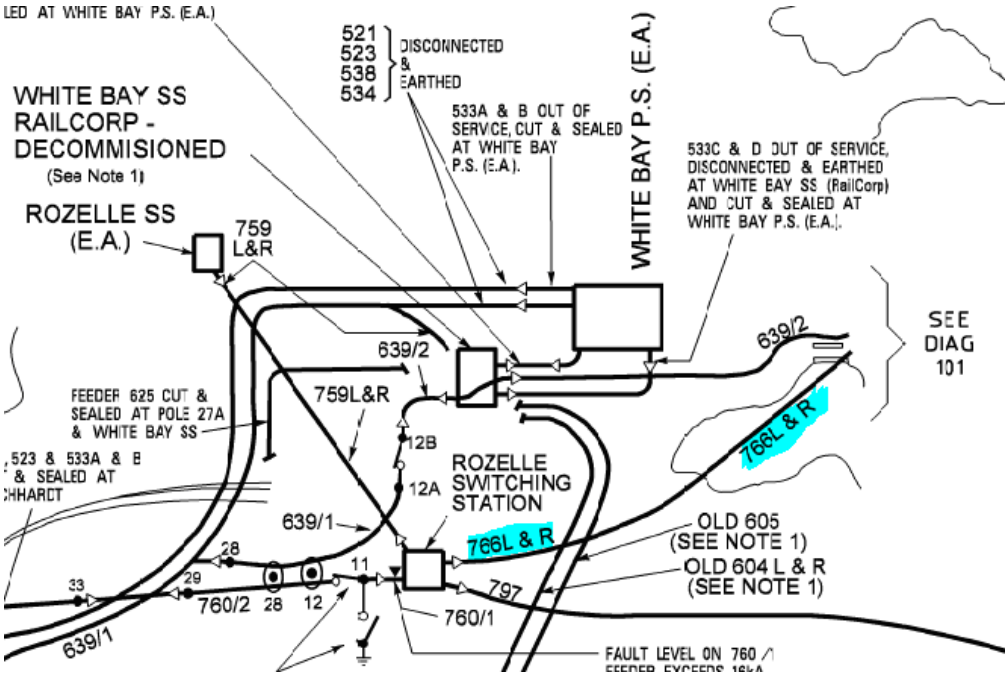

Figure 3 – An example of identification of cable feeders in parallel

3.5. 2 kV signalling and lighting feeder identification

An exception to the above numbering system is the convention used for the 2 kV signalling and lighting feeders where letters only or letters and numbers are used.

NOTE:
The 2kV system is being phased out and progressively replaced by the 11kV system.

Letters are used to designate the railway line where the feeder is installed and also whether it is a signalling or lighting feeder and the numbers are used to designate the section of the feeder. Numbers are used to indicate the approximate mileage of the far end of the feeder.

For example, the 2kV lighting feeder for the Illawarra signalling feeders is labelled IS3 – Erskineville to SY7, and IS1 – SY7 to SY6, with the IS designating Illawarra Signalling. The number indicates the approximate mileage of the far end of the feeder, eg IS 3 ends 3 miles from Sydney. Refer to Figure 4 below.

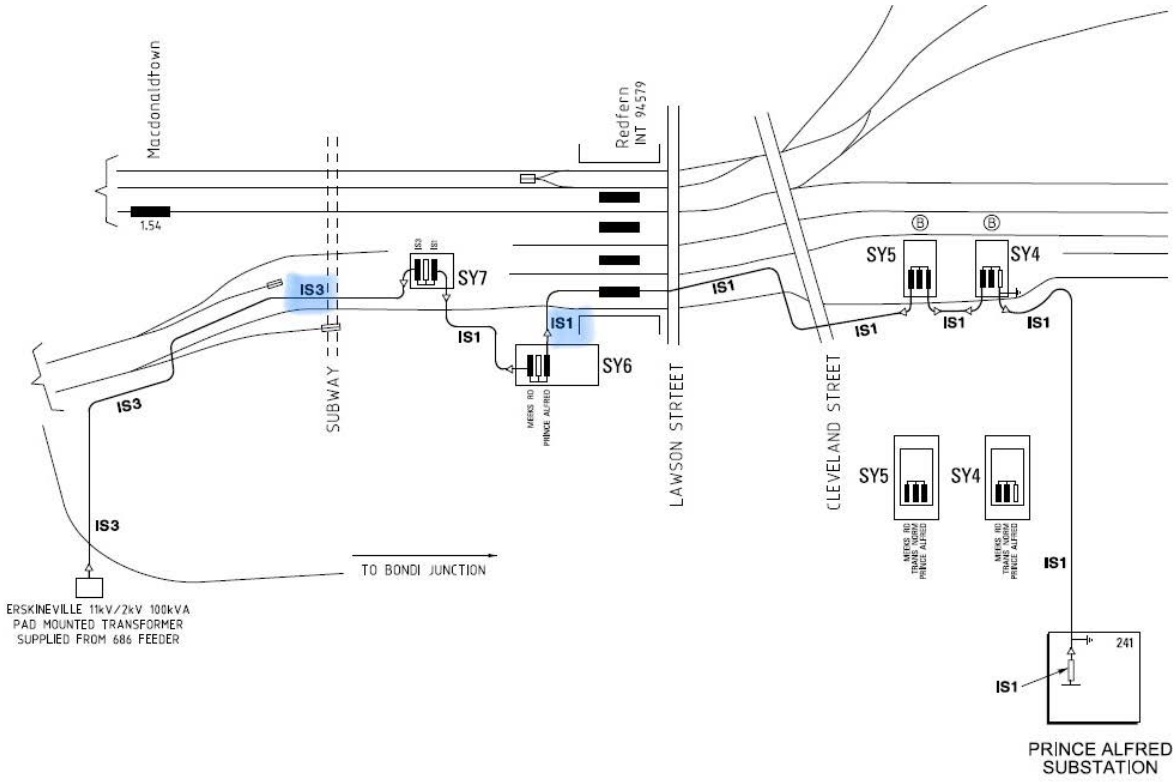

Figure 4 – An example of identification of the 2kV system

4. Control of the High Voltage Feeder Identification System

It is the Principal Engineer Power Systems' responsibility for assigning the identification to a high voltage feeder and managing a controlled list of feeder numbers allocated.

4.1. References

T HR EL 00001 TI	RailCorp Electrical System General Description
EL 0282787	RailCorp Sheet S4 AC Symbols Legend