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# Society Contact Information

(Front cover). Photo David Langley

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# Minutes of Meeting held Friday 18 November 2016, At the Box Hill Miniature Steam Railway Society, Elgar Road, Box Hill North, Victoria

Present: – Ken Ashman, Noel Bamford, Wilfrid Brook, Glenn Cumming, John Dennis, Mike Drew, Graeme Dunn, Michael Formaini, Ray Gomerski, Chris Gordon, Andrew Gostling, Chris Guy, Graeme Henderson, Bill Johnston, David Jones, Chris King, Keith Lambert, David Langley, Neil Lewis, Andrew McLean, Philip Miller, Alex Ratcliffe, Laurie Savage, Brian Sherry, Rod Smith, David Stosser, Bob Taaffe, Rob Weiss, Andrew Wheatland and Ray Williams.

Apologies: – Steven Dunne, Judy Gordon, Steve Malpass, Michael Menzies, Peter Silva, Colin Rutledge and Andrew Waugh.

Visitor: – Bill Hanks and Kevin Taig.

The President, Mr. David Langley, took the chair & opened the meeting at 20:05 hours.

Mr. Bill Hanks, President of the Box Hill Miniature Steam Railway Society welcomed everybody to the BHMSRS club rooms.

Minutes of the September 2016 Meeting: – Accepted as published. Chris Gordon / David Stosser. Carried.

Business Arising: – Nil.

Correspondence: – Letter to David Ward at Metro Trains Melbourne thanking him for granting permission for the signal box tour.

Letter to Trevor Wyatt at Metro Trains thanking him for his assistance with the suburban signal box tour.

Letter to Keith Lambert thanking him for his assistance with the suburban signal box tour.

Letter to Surrey Hills Neighbourhood Centre with dates for meetings in 2017.

Letter and cheque received from AREA providing funding for a project to establish a website for SRSV and to commence scanning of documents in SRSV collection.

Letter to AREA acknowledging receipt of cheque and thanking AREA for providing the funding.

Philip Miller / Michael Formaini. Carried.

Reports: – Tours. A report on the successful signal box tour in September 2016 was provided. Suggestions are invited for future tours.

General Business: – Keith Lambert provided details about various works in the Metropolitan District. A summary of the discussion follows: –

* Sunshine Signal Box was abolished on Sunday 23 October 2016. Control has been transferred to Metrol.
* Ringwood Signal Box will be converted from a unit lever control panel to screen based computer equipment next weekend.
* Grade separation works at Bayswater will be completed by Monday 12 December 2016.
* At Lilydale, pedestrian gates will be provided at the pedestrian crossing at the Down end of the platform.
* A proposal for alterations to the junction of the Cranbourne Line at the point of divergence was described.

Keith Lambert described arrangements for absolute occupations in the Flinders Street – Richmond area. Up trains from the Caulfield Lines will terminate at Richmond. The trains will use the tracks in the underground loop tunnel portals to reverse to form Down trains for the Caulfield Lines.

Rod Smith asked when the Burnley – Camberwell re-signalling works will be completed. The answer given is that these signalling works are planned for completion in Easter 2017.

Michael Formaini congratulated Andrew Waugh on the article on Communications Based Train Control (CBTC) published in the November 2016 issue of “Somersault”.

Syllabus Item: - The President introduced members Ken Ashman and Bob Taaffe to present the Syllabus Item.

Ken and Bob discussed Absolute Permissive Block (APB) systems in Australia and New Zealand.

Bob commenced the discussion by reviewing the various APB systems introduced across Australia and New Zealand in the 1920’s based on his research to date. Similarities and differences in details like signal spacing and arrangements at crossing loops were compared between each system.

Ken followed with a discussion on the development of APB by Sedgwick N. Wight of the General Railway Signal Company followed by a detailed explanation of the how the system worked.

Ken then provided details of how the APB system had been modified in New Zealand along with an explanation of how the system operates in New Zealand today.

A number of questions from those present were answered by Ken and Bob.

At the completion of the Syllabus Item, the President thanked Ken and Bob for the presentation & this was followed by acclamation from those present.

At the completion of the meeting, the President thanked Bill Hanks and the Box Hill Miniature Steam Railway Society for hosting tonight’s meeting and for the tour of the signal box.

Meeting closed at 22:46 hours.

The next meeting will be on Friday 17 February, 2017 at a location to be advised, commencing at 20:00 hours (8.00pm).

# Signalling Alterations

The following alterations were published in WN 1/17 to WN 9/17, and ETRB A circulars. The alterations have been edited to conserve space. Dates in parenthesis are the dates of publication, which may not be the date of the alterations.

27.12.2016 Blackburn (SW 425/16, WN 1)

After 0300 hours on Tuesday, 27.12., the signal box was closed.

06.01.2017 Huntingdale – Clayton (SW 433/16, WN 1)

On Friday, 6.1., the pedestrian crossing on the Up side of Clayton Road was closed to allow regrading works. Automated pedestrian gates 8 & 9 were closed.

06.01.2017 Clayton – Westall (SW 432/16, WN 1)

On Monday, 9.1., the Up and Down lines were slued in the vicinity of Centre Road.

Home WTL724 (21.200 km) was relocated to the slued line. Automatic D650 (21.327 km) was replaced by a new post on the slued line. Home WTL726 and Automatics D634 and D664 were re-focused for the new track alignment.

The boom barriers and flashing light masts were upgraded and relocated to suit the altered level crossing. The two pedestrian crib crossings were altered to cross the lines at right angles. The pedestrian crossings will remain passive crossings. The pedestrian crossing on the Down side was temporarily closed (expected reopening in March 2017)

09.01.2017 Camperdown (SW 2/17, WN 2)

Effective Monday, 9.1., Camperdown was reclassified as an Intermediate Train Order Terminal Station. The fixed signals at Camperdown will normally be at stop when a signaller is in attendance.

Operating Procedure 76 (Camperdown) was issued to cover the procedure for crossing trains and the issuing of train orders.

(10.01.2017) Traralgon – Sale (SW 150/16, WN 2)

Diagrams 106/14 (sic) (Traralgon) and 104/14 (sic) (Rosedale – Sale) replaced 46/13 and 24/13 respectively. The principle changes are the provision of notice boards at Traralgon, Rosedale and Sale.

13.01.2017 Blackburn & Ringwood (SW 425/16, WN 1)

At 1700 hours on Friday, 13.1., control of the Blackburn interlocking was transferred to Ringwood signal box.

16.01.2017 Caroline Springs (SW 1/17, WN 2)

On Monday, 16.1., Caroline Springs was provided at 21.256 km. The station comprises an island platform 193 metres in length. The signalling at the new station is worked from the Ballarat Corrido VDU at Centrol.

The existing single line was renamed No 2 Road. A new No 1 Road was provided on the Up side of the island platform. Both No 1 Road and No 2 Road were signalled as bi-directional tracks. A short dead end is provided at the Down end of No 1 Road, but this is not available for train movements.

Up Automatic A208 was abolished.

Down Automatic A201 and Up Automatic A246 were altered to display normal and medium speed aspects. Down Home DPW730 was renumbered DPW706. Down Dwarf DPW732 was renumbered DPW708. Up Dwarf DPW724 was renumbered DPW714. Up Home DPW726 was relocated in the Down direction to 20.085 km. Up Homes DPW710 & DPW712 and Down Departure Homes DPW730 & DPW732 were provided.

Points 630 were renumbered DPW7D, and Points 724 were renumbered DPW9. . Points DPW7U were brought into use. Crossover DPW27 was provided.

Train Stop TPWS was provided at all Home signals at Deer Park West. All ‘track circuits’ between Homes DPK922/DPW706 and the down side of Points DPW27 are axle counter circuits.

The line speed for Up trains is reduced to 130 km/h at Home DPW726. The passive 160 sign for Down trains was relocated to be opposite DPW726.

Amend Diagram 26/15 (Ardeer – Rockbank)

16.01.2017 Oak Park (SW 8/17, WN 2)

On Monday, 16.1., the trap track circuit was removed from Devon Road. SW 26/16 was cancelled.

16.01.2017 Blackburn (SW 425/16, SWP 1/17, WN 1 & 2)

On Monday, 16.1., the line between Blackburn and Ringwood was closed for grade separation works.

Down Automatic BBN304 was converted to a Home signal and provided with a low speed head. Down Automatic BBN308 was converted to a Home signal, and provided with a low speed head and illuminated letter A. A friction buffer was provided on the Down side of Home BBN310. A temporary pedestrian crossing was provided on the Down side of the friction buffer and Home BBN310 for pedestrian access.

The Blackburn CBI was upgraded to a Westrace Mk 2.

Diagram 27/16 (Blackburn – Ringwood) replaced 81/13.

Burnley Group Operating Procedure 6 (Blackburn failure of signals) was reissued.

14.01.2017 Centrol & Ararat (SW 7/17, WN 3)

On Saturday, 14.1., the Ararat WestCAD VDU at Centrol was removed. The control of Ararat was integrated in the Ballarat Corridor VDU at Centrol.

(17.01.2017) Ardeer – Rockbank (SW 8/17, WN 3)

Diagram 6/17 (Ardeer – Rockbank) replaced Diagram 26/15 account the commissioning of the signalling at Caroline Springs.

(17.01.2017) Ararat (SW 6/17, WN 3)

Operating Procedure 82 (Ararat) was reissued. The main alteration was altered instructions dealing with securing the Train Staff. SW 185/09 was cancelled.

17.01.2017 Pascoe Vale (SW 9/17, WN 2)

On Tuesday, 17.1., the trap track circuit was removed from Gaffney St. SW 26/16 was cancelled.

17.01.2017 Pakenham (SW 22/17, WN 4)

On Tuesday, 17.1., the ‘80’ speed indicators on Homes PKM6 and PKM28 were disabled. This was due to the TPWS equipment was incorrectly causing over speed interventions.

18.01.2017 Glenroy (SW 10/17, WN 2)

On Wednesday, 18.1., the trap track circuit was removed from Glenroy Rd. SW 26/16 & 77/16 were cancelled.

21.01.2017 North Dynon (SW 4/17, WN 3)

On Saturday, 21.1., Points VTD40 (Up end broad gauge connection between Nos 9 and 7 tracks) was removed. No 7 Track will be booked out for broad gauge movements. Points VTD22 (Down end broad gauge connection to No 7 Track) was secured to lie for No 5 Track.

23.01.2017 Carnegie (SW 19/17, WN 3)

On Monday, 23.1., the station was temporarily closed for grade separation works. The control of the signals was altered to allow for express running through the station. The stopping selection for Down trains between Caulfield and Murrumbeena has been disable and all level crossings between Caulfield and Murrumbeena will operate under express conditions. The Up stopping selection for Koornang Road has been supressed and all trains will operate under express conditions.

(24.01.2017) Deer Park West – Wendouree (SW 13/17, WN 4)

Operating Procedure 67 (Deer Park West – Wendouree Defective Signals) was reissued due to the alterations at Caroline Springs. SW 58/16 was cancelled.

(24.01.2017) Frankston (SWP 2/17, WN 4)

An existing special instruction was codified as a new Caulfield Group Operating Procedure 10B (Frankston – Operating restriction Siding No 5).

Due to insufficient clearance, trains or rail vehicles must not arrive into Frankston Siding No 5 while people are working on trains in Sidings 4 or 6. The Driver must confirm with the Signaller that no staff are attending to trains in Sidings 4 or 6 and visually check that no employees are present. When a Driver is to dock a train from Sidings 4 or 6, they must inform the Signaller prior to attending the train or commencing the train preparation. When possible, trains in Sidings 4 and 6 must be removed from the sidings before any movement in Siding 5 is undertaken.

27.01.2017 Broadford (SW 19/17, WN 5)

From Friday, 27.1., Broadford may be switched in as a Double Line Block Post. SW 40/16 is cancelled.

27.01.2017 Menzies Creek (A2/17)

On Tuesday, 17.1., a repeating signal was provided for the Down pedestrian gates crossing protection signal. The repeating signal is located under the No 1 Road platform verandah, above the up end bay windows for the signal bay, and faces in the Up direction. It repeats the

30.01.2017 Ringwood (SW 23/17, WN 4)

On Monday, 30.1., the Westrace Mk2 data will be updated. The changes include: commissioning the traffic light co-ordination for the Bedford Rd/Great Ryrie St intersection and updates to the WestCAD.

20.01.2017 Bayswater (SW 20/17), WN 4)

Between Friday, 27.1., and Monday, 30.1., the signal offset brackets on Home BAY310 were replaced.

(31.01.2017) Book of Rules – Disconnecting track circuits during trackwork (SW 23/17, WN 5)

Section 4 Rule 4 will no longer be used on the V/Line Network. Section 36 Rule 5 clauses b and c will no longer apply. Clause 5.4. of NIST 2650 will be followed instead. This requires that signals maintenance staff must be advised in advance when rails are to be removed or cut in track circuited areas so that signalling arrangements can be made. It also highlights the potential need to provide flagging protection at active level crossings.

(31.01.2017) Book of Rules - Switching a block signal box in or out during an instrument failure (SW 18/17, WN 5)

The rules in the Book of Rules, Section 20, Rule 21 dealing with switching a block post in or out during an instrument failure were amended.

Clause f (Switching out where a failure has occurred)

A new Clause J (Switching in where a failure has occurred) was added. The Train Controller must confirm with the Signal Maintenance Technician that switching in the signal box will not affect resolving the failure. The Train Controller must then ensure that all trains have cleared the through block section. The Train Controller can then authorise the signal box to be switched in. Trains are to be worked through the block sections under system failure conditions, unless the local block sections are found to be working. In this case normal working can be resumed.

(31.01.2017) Camperdown (SW 22/17, WN 5)

Operating Procedure 76 (Camperdown) was reissued. The alteration was to Clause 12 respecting the operation of fixed signals before the setting back of a passenger train from No 1 Road. SW 2/17 is cancelled.

31.01.2017 North Ballarat (SW 3/17, 5/17, & 20/17, WN 2, 3, & 5)

On Tuesday, 31.1., pedestrian gates were provided at Heinz Lane (159.441 km, Maryborough line) with emergency gate control locks. Amend Diagram 16/15 (North Ballarat).

06.02.2017 Blackburn – Nunawading (SW 4/17, WN 2)

On Monday, 6.2., the new grade separated lines at Blackburn Road were brought into use.

Blackburn Road level crossing (18.932 km) was replaced by an over line bridge. The pedestrian crossings at Cottage St (19.310 km – automatic gates) and Oliver Ave/King St (19.896 km – crib crossing) were replaced by foot bridges.

A dual control point machine was provided on Points 206. Down Automatics BBN208 and L597 were abolished. Dwarf BBN307 was abolished. The 5P keyswitch controlling Home BBN310 was abolished.

Automatics BBN206 and L599 were provided. Up Automatics L578 & L598 were replaced by new masts.

Diagram 33/16 (Blackburn – Ringwood) replaced 27/16.

06.02.2017 Mitcham – Ringwood (SW 5/17, WN 2)

On Monday, 6.2., the new grade separate lines at Heatherdale Road were brought into use. An over line road bridge was provided at 24.314km. The new Heatherdale station (25.421 km) was opened with two 164m long platforms.

Down Automatics L727, L474, & L767, and Up Automatics L728, L740, L756, & L772 were abolished.

Down Automatics L729, L755, & L777, and Up Automatics L732, L748, and L764 were provided. All new signals are LED. The new signals are worked from the Mitcham CBI.

10.02.2017 Camberwell (SW 31/17, WN 5)

On Friday, 10.2., the SigMap and SigView software was update to display the automatically signalled area between Hawthorn and Auburn. This will not become operational, however, until the final commissioning on 13.2.

11.02.2017 Warragul (SW 25/17, WN 7)

On Saturday, 11.2., the Loop siding adjacent to the North line (Back Platform Track) was abolished. Points B, the point lever, HLM electric point lock, V5PSW key switch, rodded connections, and catch points were abolished. Amend Diagram 128/14 (Warragul – Yarragon).

13.02.2017 Burnley (SW 32/17, WN 5)

On Monday, 13.2., Points 219U were provided with an M23A dual control point machine. The selector lever is secured by a SMT padlock. A new JZA field station was commissioned.

13.02.2017 Glenferrie (SW 32/17, WN 5)

On Monday, 13.2., a disaster recovery site was commissioned at Glenferrie for Camberwell. An emergency signal control panel, a kingfisher unit, and telephone communications were installed. A 5P key switch was provided for switching over.

13.02.2017 Hawthorn - Auburn (SW 32/17, WN 5)

On Monday, 13.2., the existing 25Hz 2.2KV signalling power supply between Hawthorn and Auburn was upgraded to 50Hz. Kingfisher units were provided at locations 179ZB, 197ZB, 230ZB, and 260ZB to provide indications for the tracks between Hawthorn and Auburn. The existing PLC system was decommissioned.

13.02.2017 Huntingdale – Clayton (SW 433/16, WN 1)

On Friday, 6.1., the pedestrian crossing on the Up side of Clayton Road was reopened.

13.03.2017 Carnegie (SW 19/17, WN 3)

On Monday, 13.3., the station was reopened for traffic. The alterations in the stopping/express selection were removed.

20.02.2017 Yarraville (SW 46/17, WN 7)

On Monday, 20.1., the trap track circuit was removed from Anderson Rd. SW 61/16 was cancelled.

21.02.2017 Spotswood (SW 47/17, WN 7)

On Tuesday, 20.1., the trap track circuit was removed from Hudson Rd. SW 62/16 was cancelled.

22.02.2017 Newport (SW 50/17, WN 8)

On Wednesday, 22.2., Points 608U was provided with an M23A dual control point machine. The selector lever will be secured by an signal maintenance padlock. Amend Diagram 13/15 (Newport)

28.02.2017 Colac – Camperdown (SW 27/17, WN 9)

On Tuesday, 28.2., boom barriers were provided at the existing passive crossing at Back Larpent Road (158.478 km). Operation of the level crossing will be by axle counters. Healthy state indicators and yellow whistle boards will be provided. Remote monitoring equipment will be provided. There will be no local axle counter reset functions available, and on or off tracking of road rail vehicles will not be permitted until further notice. Amend Diagram 118/14 (Birregurra – Colac).

End£

# Lattice Signal Masts

## The introduction of lattice masts

It appears that the Victorian Railways moved from wooden semaphore masts to lattice masts around 1912, but there is evidence of lattice bracket masts and dolls from around 1910.

In the late 1980s I made a copy of a calculation book held in the interlocking office. Dating from the period 1909-?, it was probably produced by SP Jones. The first calculation in the book, dated 11 March 1909 is for a ‘double dolly bracket signal post’. This is clearly a lattice bracket post with 13 foot dolls. In June 1909 there was a set of calculations for the signal bridge at Essendon – this used lattice dolls, but with McKenzie & Holland finials. In August 1909 the calculations for the east end signal bridge at Ballarat were carried out; this bridge still exists today, out of use, and has lattice dolls.

The first evidence for straight lattice semaphore masts in the calculation books is from January 1912 when the moment of resistance of 15’, 20’, 30’ & 35’ masts were calculated. This culminated in a table comparing the costs of wooden and lattice masts. The handwritten table was annotated with ‘type 6 copies’, these were probably for review.

In August 1912, The Argus noted that “The replacement of wooden semaphore masts by mild steel latticed masts has been proceeded with the object of effecting economies in renewal.”

This would tend to imply that straight lattice semaphore masts superseded wooden masts around the middle of 1912, and were introduced after lattice bracket masts and dolls.

## Straight lattice mast design

The current detail drawing for straight lattice masts, B938, was produced as late as March 1941 and, curiously, did not supersede an earlier drawing. Presumably there was an earlier drawing, but whether it had been lost is not known. Much of the following is drawn from the 1941 drawing, but from the sparse details in the 1912 calculations book, it appears that little changed.

Drawing B938 has three separate designs for masts between 15’ and 24’ (1B938), 25’ to 29’ (2B938), and over 30’ (3B938)[[1]](#footnote-1). In each case the design of the mast was nearly identical; the taller masts having ironwork of slightly larger dimensions.

The four angles forming the corners of the mast were positioned with the angles outside. For masts under 25’ in nominal height, the angles were 1½”x1½”x5/16”. Masts between 25’ and 29’ had heavier angles of 2”x2”x3/8”. Masts over 30’ had approximately the lowest 18’ of 2½“x2½”x3/8” angles; the remainder was 2”x2”x3/8” angle. The two portions were butt welded together. It is quite likely that the design for 30’ and over masts was new in 1941. The 1912 calculation book shows that the 30’ and 35’ masts had angles of 2”x2”x3/8”.

All masts were 6” square at the top and were tapered. Masts under 25’ tapered approximately ¼” per foot, while taller masts tapered approximately 3/16” per foot[[2]](#footnote-2). A 15’ mast would be roughly 10” square at the top of the foundation, a 24’ mast 12.3” square (in a 15” square foundation), a 25’ mast 11” square, and a 30’ mast 11.9” square (in an 18” square foundation). Working backwards from an 18” square foundation, this would suggest that the maximum mast height was around 48 feet.

The angles were stitched together with single bracing of 1¼”x5/16” steel flat. In masts below 25’ the bracing was riveted to the angles using 5/16” rivets, while above this height 3/8” rivets were used. The bracing commenced 4” below the top of the mast. For masts below 25’, the first bay of bracing was 24”, for masts of greater height the first bay was 25.5”. As the masts tapered, the length of each succeeding bay down the mast increased slightly in length. The bracing continued into the foundation until there was no further space for another section.

In addition to the vertical cross bracing, there was also diagonal bracing fitted across the mast to ensure that it remained square. This was again 1¼”x5/16” flats secured to the angles using the same rivets as the vertical bracing. One of these diagonal braces was fitted “approximately every 5’ – in fact, it must have been every 2½ bays of vertical bracing.

A concrete foundation was cast around the lower end of each mast. Masts below 25’ had a foundation that was 15” square and 6’ deep. For masts between 25’ and 29’, this foundation was 18”, but still 6’ deep. For masts taller than 30’, the depth of the foundation was increased to 6’6” but it remained 18” square. In all cases a hollow 9” square and 4’6” deep was cast into the centre of the bottom of the foundation to reduce the weight. The plan indicates reinforcing was riveted or welded to the bottom of the angles, but gives no dimensions.

A cast iron distance piece was riveted inside the angles at the top of the mast. Apart from reinforcing the top of the mast, the distance piece had holes to secure the finial. In September 1965 the drawing was altered, with the distance piece being replaced by four 2”x1/4” flats welded to the outside of the angles. A finial could not have been fitted over these flats, and this probably marks the cessation of fitting finials to new posts.

The mast was finished by a cast iron finial. A very few lattice masts were provided with McKenzie and Holland finials; the main examples being around Bendigo D signal box. These may have been early lattice masts.

Most lattice masts were fitted with a “Type A” finial (3B936). This part was cancelled on the drawing in September 1965, and posts produced after this date would not have had a finial. The finial served no structural purpose on a lattice post and was purely decorative. At some date, most finials were removed from the lattice masts. I have been told that this occurred after a lampman grabbed a finial and it came off in his hand.

One of the criticisms of lattice masts in the UK was that the open latticework was much less conspicuous than a solid wooden post. Several means were adopted to resolve this problem – such as expensive double latticework, and even turning the post so that the corners fact the oncoming trains. The Victorian Railways adopted a far simpler solution. Sections of 18 SWG galvanised iron sheeting were cut to the shape of the front of the mast and simply wedged between the angles and the bracing. This was cheap and effective.

## Signal fittings

## Lattice mast history

## McK&H lattice masts

Pipe Signal Masts

Andrew Waugh

We have the bicycle to thank for the pipe mast. Until 1895 steel tube was expensive to make. When William Murdock began lighting London with gas around 1815, he purchased musket barrels from the Napoleonic war to use as gas pipe. The growth in the gas industry spurred new ways of making tubes – particularly the Whitehouse method of heating a flat plat and drawing it through a bell or die that curved it into a tube and welded the seam. But the process was still relatively expensive

F074 dated 4.8.15. Drawn by RSA, traced by FJW. “Signal mast base”. Base for 5 ½” tubular post.

F083 dated 16.8.15. Copied from RSA drawing 1034, tracked by FJW. “Base for 6 ½” Pipe Signal Mast”.

F144 dated 8/8/17. Drawn by SCO and amended 22/9/65 probably to add ¼” MS plate cap welded to mast. 1F144 noted “dimensions refer to Tramway Pole as obtained”. Basic pole is 29’3” long made up of three sections of pipe. The bottom 16’4” is of 7” diameter pipe, then 6’8” of 5 ½” diam pipe, swagged out to 7” at bottom for 3”, and the final 6’3” is of 4 1/8” diam, again swagged out for 3” at the bottom. 2F144 is derived from 1F144, except the final section is replaced by a section of 5 ½” pipe, with the lower pipe swagged to form an 18” overlap. The upper section length is “as required.”

B097 dated 25/8/17, redrawn & revised 2/3/67. “Two arm Signal Mast”. Pipe mast with 2 arms (& no marker) using F144 masts. 1B97 is for masts with height not exceeding 19’0” (to cl bottom arm, there is 7’0” to cl top arm, and 3’1” thence to top of mast). Both working platforms 3’6” below cl arm. This mast uses 1B97 mast on a 2B117 foundation. 2B97 is for masts with height 20’6” to 25’0” (again, height to cl bottom arm, other dimensions the same). This uses a 2B97 mast on a 2B117 foundation. The proportions of 7” and 5 1/2” pipe are as for 2B97, except that 24’0” masts have 15’4” of 7” pipe, and 18’9” of 5 ½ “ pipe.

B099 dated 5/10/17, redrawn & revised 2/3/67. “One Arm Signal Mast”. Pipe mast using F144 masts. 1B99 is for masts not exceeding 21’0” (height measured to cl arm) and uses 1F144. Top of pipe 3’1” above cl arm, marker light 6’0” below, and working platform 3’6” below. It also uses 1B117 foundation. 2B99 is for masts between 22’0” and 26’0” and is identical to 1B99 except for a second brace to the ladder and the use of 2B117 foundations. 3B99 is for masts between 27’0” and 32’0” and uses 2F144 masts and 2B117 foundations. The main dimensions are the same, but the braces to the ladders are at different spacings.

B079 dated 6/10/17, retraced 9/10/62. “Clips for Pipe Masts”. Drawn by SCO. Most clips for 5 ½” pipe, but two for 4 1/8”, one for 6 ½” and three for 7” mast. Amended in 1986.

B011 dated 5/12/17 “Clamps for Signal Masts”. Redrawn 1/10/30 with some parts moved to F188. Clamps appear to be for 5 ½” dolls. Also a packing piece for 4 1/8” dolls.

F194 dated 1/6/19. Drawn by ALR and amended 22/9/65, probably to add ¼” MS plates welded to top and bottom of masts. 1F194 is 15’10.25” long, 2F194 is 20’3” long. 3F194 is 13’3” long. Shows position of drilling holes with four positions A/E, G/C.

F176 dated 18/1/18. “3 Position Light Signal on Pipe Mast (E236)”. Uses a 1B99 mast in 1B117 foundation. Height to lowest lens in head is 18’0” with 6’0” down to marker. Not clear total height of pipe mast.

B369 dated 27/9/20 drawn by EJR “Signal Mast for Two Light Signals” (Style VR - automatic). Uses 1F144 mast stepped in F83 on a 2B117 foundation. Height not to exceed 19’0” (height to bottom lens of B arm). Spacing between two red lenses is 7’0”. Working platforms 3’9” below red lenses – note not amended to have footsteps and handrails to get to front of signal. Other oddity is that the ladder is founded on a red gum base 10”x5”, not the cast iron.

F159 date 28/4/21 (redrawn on 22.8.61 as A2482). Base for 6”d Pipe Mast. This was the same design as F83, and was probably based on a c1915 RSA drawing.

B395 dated 11/10/21. Drawn by FWH “Two arm signal mast with low speed signal 5” & 6” pipe”. Mast must be 16’0” or under. Height is measured to cl low speed light. The top 5” section is always 17’9”. The bottom 6” is of ‘length to suit’, and is swagged in to form an 18” spigot. Centreline of top arm is 3’1” from top of pole. Working platform is 3’6” below centreline of arm. B arm is 7’0” below centreline of top arm, with working platform again 3’6” below arm. Low speed light (and ‘A’ light) is 3’0” below centreline of arm. Maximum height of top arm is consequently 26’. Masts are stepped into CI steps F159 which are mounted on larger foundations 2B117. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

B396 dated 14/9/21. Drawn by FWH. “Two arm signal mast 5” & 6” pipe”. (primarily for two armed autos, or home not fitted with low speed lights.) Construction is the same as B395, except height is measured to cl of B arm. 1B396 is for masts 21’0” and shorter (i.e. A arm height 28’0” or less), and 2B396 is for masts 21’6” to 26’0” (i.e. A arm height to 33’0”). The difference is another support for the ladder. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

B397 dated 9/9/21. Drawn by FWH. “One arm signal mast 5” & 6” pipe”. Mast construction as for B395. Height of mast is from centreline of arm to top of base. Centreline of arm is 3’1” from top of pole. Working platform is 3’6” below centreline of arm, and marker light 6’ below centreline of arm. 1B397 is for masts not exceeding 22’0” in height and has mast directly mounted in foundation 9B117. 2B397 is for masts between 22’6” and 28’0” tall, and 3B937 is for masts between 28’6 and 33’0 tall; the difference is another support for the ladder. Both of the taller masts are stepped into CI steps F159 which are mounted on larger foundations 2B117. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

B398 dated 20/9/21. Drawn by FWH. “One Light Signal Mast 5” & 6” pipe”. Masts identical to B397, differ in mounting of Style VR head. Bottom (red) light is 2’10” below top of pipe, with working platform 3’9” below cl red light. Head can be mounted on either side of mast. Marker light mounted 7’0” below cl red light, with ‘A’ light at same height. Height of mast is to cl of red light. Amended on 12/9/23 with inspection step and handrail added to allow access to front of light. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

B408 dated 24.11.21. “Two Light Signal Mast with Low Speed Signal 5” & 6” pipe”. Drawn by FWH. Mast the same as B395 with same maximum height of 16’0” and under. Height measured to cl of C light. Like B398, top light 2’10” (lowest lens) below top of mast, with second light 7’0” (lowest lens) below that, and C light 3’3” below that. Working platform 3’9” below cl red light for both A and B arms. Maximum height to cl red A light is 26’3”, and to top of mast 29’1”. Amended on 12/9/23 with inspection step and handrail added to allow access to front of light. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

B654 dated 21/7/27. Drawn by SCO. “Pipe Signal Mast – Type B – Assembly”. Main feature is the lack of an upper working platform – ladder is directly secured to mast with a hoop for safety. 1B654 is for one operating head. Uses 5” and 6” pipe swagged together. A minimum of 13’9” of 5” pipe must be used, with the 6” pipe to suit. Mast mounted in a 13B117 foundation. Ladder fixed to mast 3’7” below top of mast, with step located 2’9” below this. 2B654 is a mast for a two head signal – and is identical to 1B654 except that a small lower landing is provided 8’2” below the upper hoop. For ordering nos see [?] and F2384. Drawing amended on 22/9/65, 5/8/70, and 14/1/75. With the last alteration, top had been amended to have a vertical plate with two holes for lifting mast.

F3343 dated 12/7/3[3?] redrawn 20/3/62. “Dwarf signal Style R. Uses foundation 15B117, with a total post height of 3’0”. Probably 5” pipe. No ladder or landing, of course. Amendments 5/3/63, 22/9/65, & 8/12/67.

F4107 Cap for signal pipe mast. Date [20/7/41?]. This was a flat welded cap, 2.25” tall. Original designs were provided for 4” pipe (2F4107) and 5” pipe (1F4107). An option for 3” pipe (3F4107) was added in July 1969. Amended on 3.12.86 for galvanised finish. Welded MS construction.

B1444 Dated 20/3/62 “Dwarf Signal Style ‘R’ with ladder & fittings”. Uses a 5” pipe with a 13B117 post, ladder similar to B654 with no landing and front foot step. Cable ingress 8F1295. Height to cl bottom lens – note ‘Standard 9’0” to 10’0”’. If over 10’0” consideration needs to be given to use a purple lens to prevent confusion with home signal. Total mast height H+2’2”.

## RM1 signals

F5728 dated 16.2.76 amended to 10/76. “Signal Mast & Fittings for Style ‘RM1’ signals Ordering Details.” Based on WB&S type RMI-2-3 (modular) heads. Installed on Frankston line resignalling south of Mordialloc. Uses mast 1B4903 (one head) or 2B4903 (two heads). Height in all cases is measured to cl of lowest lens (red) in A head. Maximum height is 23’3”. Lowest light in B head or marker in single head auto is 5’ below this. Top of mast is 2’9” above mark. Illuminated letter A or C light is 2’3” below red light of B unit. Cl Speed Indicator at cl of red lens in B unit. Marker light 2H145, Low speed light 1H1037, Illuminated letter ‘A’ 2A909, Speed signal 1B2853.

B4903 dated 16/2/76. “Signal Mast with Modular Style “RM1” color light signal”. Curiously, this doesn’t give any details of the actual mast or fittings. It has the two hole lift at the top of the mast, but this is not B654 as a top landing is provided.

B4904 dated 16/2/76. “Signal Mast with Modular Style “RM1” lights/Home signal fitted with speed indicator”. Drawing of complete equipped signal.

## Bracket posts

A026 dated 3/7/16 redrawn as B103 on 30/8/17. “One Arm Bracket Signal”. Drawing amended on 22/9/65 (removal of final?) and 3/8/70. Standard lattice bracket 2B103 (details B14) with breast 5’0”. Doll 5 ½”. Height from top of foundation to top of breast. Cl arm 4’0” above that, top of doll 3’1” above that. Marker 4’6” below cl arm.

B014 dated 9/10/17 (redrawn on this date). “Details of One Arm Bracket Signal” Drawn by VCR.

B094 dated 5/11/17, redrawn and revised on 2.3.67. “Two Arm Bracket Mast”. Based on B95 with the length of the breast of 5’0”. Height is from top of foundation to top of breast. Doll is 5 1/2”. Cl B arm is 3’9” above top of landing (probably 2 ½ ” above top of breast), with Cl A arm 7’0” above that, and top of mast 3’10” above that. C light is 9” below top of landing. Landing is 3’9” below cl A arm.

B095 dated 23/11/17, redrawn with a revision on 16/1/75. “Bracket Signal – details”. This is the details of the lattice bracket with a standard 5’0” space between cl mast and doll. Doll is 5 ½” diam. Minimum horizontal distance breast to contact wire is 3’0”. Altered 3/8/70.

B478 dated 23/10/23. Drawn by SCO. “Bracket Mast for two unit light signal”. Based on bracket mast B95 with a breast length of 4’0”. Style VR lights. Height is from top of foundations to top of breast. Cl lowest light was 4’0” above this, and top of mast 2’10” above this. Vertical distance to marker light was about 4’9”. Style VR light could be either to left or right of doll. Minimum horizontal distance from breast to contact wire was 3’0”. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

B480 dated 17/12/23. Drawn by SCO. “Bracket Mast – One Unit Light Signal”. Based on Bracket mast B14, with a distance from cl post to cl doll of 4’0”. Style VR lights. Height is from top of foundations to top of breast. Cl lowest light B head was 4’0” above this, cl lowest light A head 7’0” above this, and top of mast 2’10” above this. Vertical distance to marker light was about 4’9”. Style VR light could be either to left or right of doll. Minimum horizontal distance from breast to contact wire was 3’0”. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

## Fixed Lights

N276 dated 27/1/31, redrawn with parts moved to A1305 on 12/6/59. “Light Signal Single Unit Type “B” Assembly”. B478 dated 23/10/23. Drawn by SCO. “Bracket Mast for two unit light signal”. Based on bracket mast B95 with a breast length of 4’0”. Style VR lights. Height is from top of foundations to top of breast. Cl lowest light was 4’0” above this, and top of mast 2’10” above this. Vertical distance to marker light was about 4’9”. Style VR light could be either to left or right of doll. Minimum horizontal distance from breast to contact wire was 3’0”. Drawing amended on 22/9/65 (removal of final?) and 3/8/70.

B480 dated 17/12/23. Drawn by SCO. “Bracket Mast – One Unit Light Signal”. Based on Bracket mast B14, with a distance from cl post to cl doll of 4’0”. Style VR lights. Height is from top of foundations to top of breast. Cl lowest light B head was 4’0” above this, cl lowest light A head 7’0” above this, and top of mast 2’10” above this. Vertical distance to marker light was about 4’9”. Style VR light could be either to left or right of doll. Minimum horizontal distance from breast to contact wire was 3’0”. Drawing amended on 22/9/65 (removal of final?) and 3/8/70 Variations had a red lens, yellow lens, and clear lens. Uses Style R lens components.

A1305 dated 12/6/59, supersedes 1N276. “Light Signal Single Unit – Type “B” Case Assembly”. Appears to be used for Low Speed lights B3966 and illuminated letter ‘A’ A909. Amended to 1978.

## Low Speed Lights

B109 dated 8/9/17, redrawn 4/2/20. “Low Speed Light Signal Assembly & Details”. Amended to 26/11/60. Assembly superseded by H1037.

B3966 dated 15/8/74 “Low Speed Light Signal Type ‘C’ fitted with 5 3/8 Lens”. Uses Style R components. Amended to 1983.

## Illuminated Letter ‘A’

B10 dated 2.5.14 “Illuminated Letter ‘A’ Lamp”. Amended 4.6.17. Uses special case mounted on standard lamp prong.

B347 dated 20/7/20 drawn by FWH. “Illuminated letter ‘A’ Details”. Marker light type.

H850 Dated 5/4/48 “Illuminated Letter ‘A’ Stencil for light signal 8” lens”. Revised to Metric 30/5/78.

A909 Dated 14/9/50, redrawn 12/6/59, and again in 14/7/65. “Illuminated Letter ‘A’ Type B”. Uses stencil H850, and Style R lens/lamp parts. Converted to Metric in 1978.

## Route Indicators

B3537 dated 13.2.74 “Route Indicator WB&S Type Assembly”. Shows mountings on side or top of mast. Can be mounted on 5 ½” or 6 ½” pipe. Uses WB&S Part M14938. Amended to 1979.

1. The height of a lattice mast was measured from the top of the concrete base to the rivets of the first half bay of lattice work – this was 16” or 16.75” below the very top of the mast. These rivets mark the nominal centreline of the topmost arm. [↑](#footnote-ref-1)
2. This must be the total taper of the post; the taper on each side would be half that, otherwise the masts would not fit within the foundations [↑](#footnote-ref-2)