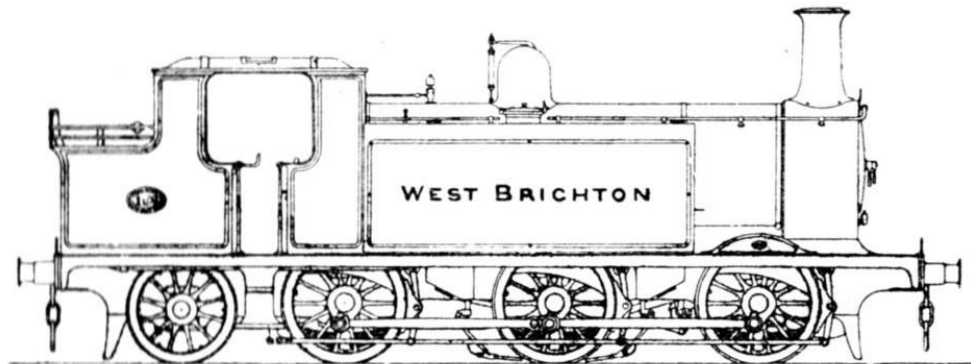
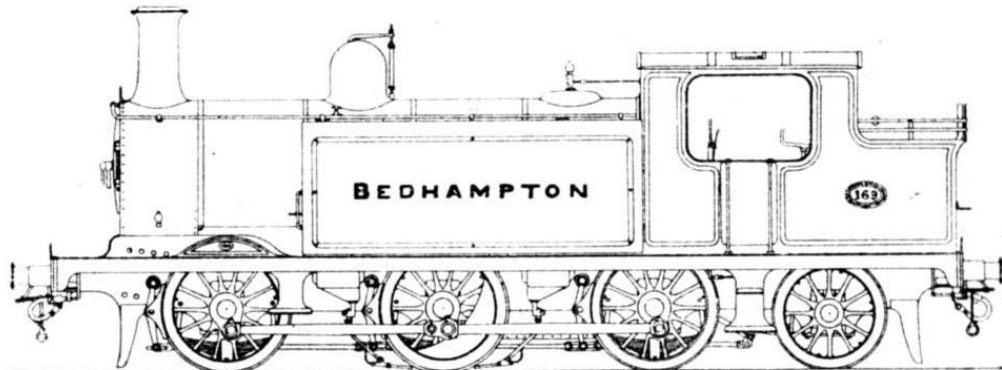


E.B. Models 4mm scale E3 Kit

Instructions for building Stroudley original 0-6-2 radial tank no 158 'West Brighton'



... and subsequent Billinton E3 0-6-2 Goods radial tank class no's 165-170, & 453-462



Historical Notes; *(These are a summary from 'Locomotives of the LB&SCR' vol. 1 p110-114 by Bradley, also with reference to 'Stroudley Locomotives' by Brian Haresnape.)*

Details:

Cylinders: 18¼" x 26"

Driving Wheels: 4' 6"

Trailing Wheels: 4' 0"

Wheelbase: WB 7' 6" x 7' 9" x 6' 0"

E3 7' 9" x 7' 6" x 6' 0"

Boiler diam. 4' 3"

Boiler length: 10' 2"

Firebox length: 5' 8¼"

Boiler Pitch: 7' 4¼"

Grate Area: 17 sq'

Working Boiler Pressure: 150lb

Names:	Built	w/drn	built	w/drn	built	w/drn		
165 Blatchington	11/1894	11/1959	453 Broadbridge	4/1895	7/1955	458 Chalvington	12/1895	3/1957
166 Cliftonville	11/1894	9/1959	454 Storrington	4/1895	3/1958	459 Warlingham	12/1895	6/1957
167 Saddlescombe	12/1894	10/1955	455 Brockhurst	4/1895	3/1958	460 Warminghurst	12/1895	3/1956
168 Southborough	12/1894	1/1956	456 Aldingbourne	4/1895	8/1959	461 Staplefield	12/1895	4/1957
169 Bedhampton	12/1894	7/1955	457 Waterfield	12/1895	5/1949	462 Washington	12/1895	5/1957
170 Bishopstone	12/1894	7/1957						



This kit is again a result of co-operation between members of the Brighton Circle and acknowledgement of help and encouragement is due to those who provided details that helped in the research. It is for both locos *as built*, though kit bashers will undoubtedly find ways to change the E3 to later versions, such as the E3X. Radical surgery at the front end would be needed.

Parts still needed to complete: As usual, motor, gearbox, wheels, axles, paint, transfers and couplings are not included – as these are left to the wide variety of personal choice. However, for Brighton Circle members, excellent Loco Name transfers are supplied by Ian White, who is geared up to produce the names needed for this kit. Eric Gates also supplies Stroudley Goods Livery lining transfers. Gibson wheels should be adequate.

General Advice:

The kit: *As there are only GA drawings for the E3 class, the dimensions for West Brighton are derived from a combination of the E3 drawings and outline drawings from Hambleton – as published by Russell* (on Southern Locos) and it is released on the understanding that there is only a limited amount of information available. Whilst the basic locos are similar in some details, they do differ significantly. As usual, it is vital to have a photo of the actual loco you are modelling.

Important Note:

If you have not built an etched brass kit before, or feel in need of assistance, the best all-round reference work is the Wild Swan book:- 'Etched Kit Building' by Iain Rice. This deals with a double framed (GWR) loco, but the principles apply, though construction details differ.

You can choose whether to begin with the chassis or the bodywork. I tend to begin with the latter to get the feel for and shape of the model. It also lets you see what motor space is available, but I start on the chassis as soon as the footplate, smokebox and cab have been positioned.

I assume you will use solder construction at most stages. The exception is the attachment of whitmetal castings, where I would advise the use of adhesives - though if you are adept at low-melt soldering, you *can* do so – *but proceed with great caution, as no liability can be accepted for damage to castings caused by soldering. However, purchase of replacements can be arranged.*

Careful removal of parts from the frets, and gentle cleaning up of tabs and any 'etch-cusp edges' with a needle file is recommended for all etched parts. Castings should also be lightly cleaned up as necessary, to remove any mould 'joint' or sprue residue.

Some arrangement for bending parts is necessary. Curves can simply be bent over a drill shank or rod of suitable diameter (do allow for some inevitable spring-back in the metal), held in a vice – jaws suitably lined to protect the part. Often pliers will suffice for sharp curves, on small items, pressed against a hard surface. (*Beware, though, of round nosed pliers, as they are usually tapered. Sometimes even just fingers will do!*)

Straight right-angle bends are best made using a vice, with the ½-etch bend line a hair's width above the jaws, and **facing you**. Carefully check that the bend line is parallel to the top of the vice jaws / bending bars, and, using a steel rule / piece of flat hardwood behind to support, bend the metal **towards** you in one go. This will ensure a clean bend, and maintain the flatness of the part. Usually, a slight tweak more than 90° is needed to get a true resulting right angle.

All bends are made with the ½-etched line on the inside of the bend, unless otherwise stated.

Where ½-etched dots are provided, these should be pressed through from the back with a scriber, to form bolt / rivet detail on the other side.

Sometimes holes are deliberately etched under-size, or even only half-etched. There are 2 reasons for this:-

- 1) *To cater for individual preferences where fittings are concerned (which do vary) – especially in the wheel department.*
- 2) *In some cases, especially using nickel silver, which is thicker, the action of etching removes more metal, and, in order to try and preserve the delicate proportions of some thin parts, especially ones where there is a hole in a round end, I have taken the cautious route. Drilling out gently and gradually **while the part is still on the fret** is safer. Taper broaches are even gentler than drills, which can 'snatch' work. That way you get more delicately shaped parts which so enhance a scale model, rather than an over-scale apology!*

Please also note that there are often areas that I have been deliberately cautious about – and I offer suggested procedures. This is due to the absence of either precise information or convincing proof as to the exact nature of the detail under consideration. In these cases, I suggest a way forward, rather than categorically state one. As you read through the instructions, it should be obvious where this occurs. I make no apology for even leaving some vague areas out completely – as, sometimes, insufficient information is available to produce a part. Just occasionally one even gets information too late to include in the kit!

Important introductory Notes:

- This kit is designed to use a Mashima 16xx series motor, with a Branchlines Multi-box gearbox or High Level gearbox – which can be built to 'fold back' under the firebox and power the rear axle.
- If you intend to model in 00, please note that this kit is designed with all three gauges in mind. Before commencing building, please note that P4, EM & 00 spacers are provided for. As we go along, relevant areas include instructions for 00. Sometimes it includes removal of material, at others a specially designed replacement part. For EM, just a little shaving of material with a file is usually all that is needed.

Construction:

A) Chassis: Nickel Silver fret: Part numbers in (brackets) after name.

Motor and Gearbox arrangements: Almost any sizeable Mashima Motor will fit inside this kit. I suggest that the drive is via either a Branchlines Multibox, or a High Level Kits Road Runner gearbox

1. Detach both **chassis frame sides (1-WB or 1-E3 & 2-WB or 2-E3** – depending which loco) from the nickel silver chassis fret. Also remove the four **frame spacers (3, 4, 5, 6)** Please note that there is one tapered spacer (**6**) that fits at the back, where the frames are bent inwards, as on the prototype, to allow more clearance for the radially mounted trailing axle. *They have the letter 'R' etched on them.*
Select which other ones you want to put where, as there are slight variations to enable you to fit 3 point flexichas, and the slotted spacers are there to allow the centre beam to pass through. Don't forget to punch the ½-etched dots out to form the bolt/rivet heads for the guard irons.
(It is possible to drill these out and fix much more positively with wire dowels, if so desired)
2. At this point you need to decide whether you are going to build a **rigid chassis, flexichas or sprung** one.
 - If **rigid**, then simply ream/open out the axle holes to the outside diameter of the top-hat bearings. **Note:** I have assumed 1/8" diameter driving axles, 2mm axles for the radial axle. Check with the axle supplied by your wheel manufacturer for 4' 6" driving and 4' 0" plain wheels. Gibson tender wheels may be most appropriate for the radial axle, as at time of writing, Sharman (was my preferred brand) have ceased production. For this reason, the holes in the radial box are for 2mm top hats – which should allow for most wheel and axle manufacturers.
 - **Rigid chassis** modellers may choose to simply mount the radial axle 2mm top hats in the frames – but beware, they are now curving inwards, so will need an axle, or 2mm rod, to align them while soldering. Some slight extra reaming may be needed to enable the top hats to turn very slightly in their holes to align properly with each other.
 - If you are using a style of **flexichas**, then you will need to cut out the front and centre rectangles around the **coupled** axle holes, but **not** the rear **coupled** ones. *(Remember the actual rearmost ones carry the 2mm axle of the radial axlebox, if used.)*
 - On the other hand, if you intend either **full compensation** or **springing**, all of them will need to be cut out. *(If using full compensation, you'll need to have the front two axles double beamed, and the rear coupled axle rocking, or vice versa.)* You will also need to decide what happens to the radial rear axle.
3. Fold up the **frame spacers** with ½-etched line across on the inside. Ideally, at first locate only the front and rear **normal width** ones and **diagonally** solder in place, to avoid heating & cooling distortion. Then, slightly springing the chassis apart, locate the middle one and solder in position. Note that slots are for flexichas beams to pass through. After fitting the 3 front spacers, carefully bend the rear of the chassis inwards to locate the tapered spacer. Solder up.
4. **Hornguides (7)** are attached on the inside of the fretted-out slots. Ensure axleboxes slide freely up & down, but with **no** front-to-back slop. I only give scant instructions here, as builders often use their own variations, or even alternative products (High Level kits do nice fold-up horn blocks). **Top hat bearings** can be fitted to the rear driving axle hole now. The radial axle box can be left until later, when the 2mm top hats are fitted. Driving wheels can be temporarily attached, and the brake hanger wires soldered in the holes in the chassis.
5. **Guard irons (8):** these can be fitted now, though, if preferred, they could be done after the chassis is complete with wheels – before painting. The ½-etched dots behind were already punched out earlier, so solder irons in place, lined up with these.
6. **Brakes (9) and brake pull rods (9a, 9b) – see diagram sheet. Give thought here as to whether you will want to allow wheels to be dropped out as complete axles.** *If so, you will need to modify these procedures.*
 - **West Brighton** had outside rods, being actuated by a large crank fitted to the end of the operating shaft on each side. Solder brake blocks on the brake hangers; clean up and solder to hanger wire you have

already mounted on the frames. Cut and fit cross wires into the lower holes, and locate the pull rods. With the wheels in position, or a temporary wheel-on-one-axle, ensure each brake sits a little way away from the wheel tread. Some judicious bending of the hanger wire may be necessary. Ensure that no short-circuits will happen later as a result of brakes touching the wheels.

- **For both locos** – remove brake blocks and solder them on to the hangers **before** removing these from the fret – as they had to be etched with the tab on the inside of the curve (not ideal). In this way, the block will assist in showing the correct contour when it comes to filing the tab off the hanger – best done with a half-round needle / Swiss file. Also you will need to open out the bosses to fit the hanger and cross wires. I deliberately kept these details as small and neat as possible – use 0.4 or 0.5 drill / wire.
- The **E3** had a centre pull rod (thick – two layers soldered together) through which the cross pull-beams fitted, in the slots. This means that the arrangement is differently mounted, as well as appearing different.
 - Remove and laminate the two parts of the central pull-rod, ensuring no solder fills the oval slots.
 - Prepare cranks, brake hangers and blocks as above, but this time lightly file, as appropriate, the extreme ends of the cross pull-beams into a thin cylinder to fit the lower hanger holes. (*the process of etching does not allow a cylinder to be formed for you; at best only a square section*)
 - Assemble with each beam passing through the now laminated central pull rod.
 - Solder up the outer ends of these, and, if so wished, solder up the central joints, where the beams pass through the rod. Look closely at the assembled brake gear, and make any necessary adjustments now.

Take care from now on that this work does not get damaged during handling.

7. **Sandboxes and Pipes:** these can be lengths of nickel silver wire glued into drilled holes in the base of the cast sand boxes. The sand boxes locate either side of the centre coupled axle.
8. **Coupling rods (10) n/s fret:** these are laminated – with the joint on the centre crankpin. Please note the wheelbases are not the same – they are opposite (7' 7" x & 7' 9" WB, and 7' 9" x 7" 7" E3) – and are labelled as such on the fret. Take great care not to fill the crankpin holes with solder.
9. **Radial Axlebox (11) + fittings (11a) n/s fret:** One is supplied for each of the three track gauges, and fold up to form a 'pony-truck'- style rear axle arrangement, that is attached with a wire. The 'wings' act as locator and guides, rather than a complete tube across the frames. The wire can either be soldered in place on the chassis to act as a centralising spring, or fitted as a kind of pivoting rod. **See Diagram Sheet**
10. Your choice of **pickups, wheels** and **gearbox** can be fitted now to give a running chassis. Test the chassis thoroughly before proceeding with attaching bodywork.

B) Locomotive superstructure: 2 brass frets

Part numbers (in brackets) after name.

1. Remove **platform / footplate (1)** from the brass body fret, and also the two **frame valences (1a, 1b)**, along with the two **buffer beams (2 & 3)**.
 - Arrange for a 90° 'fence' against which to solder the front buffer beam – with a small gap along the bottom – to enable the short (0.5mm) front and rear overhangs to slip underneath. (*A short length of aluminium angle screwed down to a piece of MDF as a base will do the job well; add washers in between to make the necessary gap*) Use plenty of solder on the inside of the joins, but be careful not to clog the ends of the long ½ etch grooves along the edges that will hold the valences, or the buffer socket holes.
 - Otherwise, there are 3 aids to construction on the brass sheets: 2 **valence jigs**, and a **buffer beam jig**. The valence jigs are used, carefully avoiding the solder, enabling the long and rather unwieldy valences to be held with 'third hands'. The latter has 2 fold-up base pieces that either sit on the up-turned footplate, or can be temporarily soldered to it to enable the buffer beams to be soldered exactly at 90°.
 - OO modellers may need to remove some material on the inner edges of the wheel clearance slots, to avoid fouling, at the front end of the footplate / platform. There are two ½-etched lines provided underneath indicating 14mm width for removal for wheel clearance.

- There will be some fouling to deal with later, when the smokebox saddle on either loco is attached to the footplate. See section beginning "**Front wheel splashers**"

- With the **front buffer beam** now in place, tack solder the front edge of the valence in place, and ensure it is in contact with the back of it, and **vertical**. The long straight edge must also be sitting fully in the 1/2-etch groove along the underside of the footplate, or it will not sit flat. *You can use the jigs provided to ensure that the two items are both secured vertically.*

- Now solder the **valence** end to the back of the **buffer beam**, and then, very carefully, run a continuous line of solder along the long edge on the inside, and ensure it is at 90° to the footplate.

- Repeat for the other side, and then check the **rear buffer beam** against them. Any slight adjustments must be made now, as these parts act together to form quite a stiff footplate base, on which the bodywork is built. Solder rear buffer beam in place.

2. Cab: The cab front (4) and rear spectacle plate (5), cab sides (6, 7), bunker back (8) and coal slope (9) are now detached. Note the tab and slot locating aids. Again, use a right-angle jig to assist in keeping the sides truly vertical. *Dry runs are essential, as they may show up areas of tightness that may need gentle relief.*

2.1. In the case of West Brighton, the 1/2 etched support bar at the bottom of the cab entrance needs to be removed first. This was not present on WB – whereas the cab sides on the E3 included a lower integral joining portion below the door, as with the other radials and D3.

2.2. Begin by attaching the **cab sides** at exactly 90° to the footplate. Solder up with a 'running seam' (as with the valences) along the footplate/cab side joints. There are tabs and slots to assist in correct location. Then offer up **front spectacle plate** in between the sides, and when satisfied they locate properly in their respective positions, solder up with another 'running seam' down the cab front inside corners, and along the bottom edge. **Elastic bands may be used temporarily, away from the heat zone, to hold groups of parts in place while soldering.**

2.3. Bunker back – this has interlocking tabs, at the base, to locate with the similar ones on the lower part of the sides to enable positive location. Solder up as with the cab sides, with a running seam. A little time may need to be taken to dress the joints around the interlocking tabs, after soldering, to enable them to 'disappear' into the square corners. *(Generous soldering or car body filler can be used to complete during preparation for painting.)*

2.4. It would be a good idea to decide now how you want to fix the body to the chassis at the back. Either use the fold-up etched **Rear fixing bracket (20)** that holds the rear frame behind the rear buffer beam (*with just one screw and captive nut under the smokebox*) or another rear captive nut over the hole in the bunker area. You will not be able to get access to this hole from above shortly.

2.5. Solder the **coal hole surround (5a)** inside **rear spectacle plate**, before fitting the spectacle plate itself in place, after bending at the two 1/2-etched strips to form what looks like a small shelf that will 'kick' back into the cab space, and drop vertically to the floor. Tabs locate on the cab sides. Again use 'running seams'. *As you become more competent with these, the kit will go together much better, and be very much easier to clean up afterwards. You can even go back and re-heat and, with a little more flux, re-flow earlier less satisfactory joins.*

2.6. The **coal slope** tabs locate at the front end in the two slots on the back of the **rear cab spectacle plate** – either side of the coal hole – and the bend-up edge locates on the back of the bunker – forming the divide between the coal space and the lower tank. Solder up. Any cleaning up of the tabs inside the cab should be done next – before the roof is fitted. *There is a school of thought that views sealed, or partially sealed, compartments as a nuisance when it come to washing and cleaning away flux after soldering – and retention of water in such places when drying to enable preparation for painting. If there is any doubt as to whether this area is totally sealed, drill some holes in it from the underside – to enable efficient drying.*

2.7. The roofs will be discussed later.

3. **Cab splashers (5b, 5c):** these are found on the footplate centre waste. Fold up the attached splasher sides on the footplate floor, inside the cab. Very carefully remove the actual splashers, clean up and fold so that the attached top forms a right angle with the splasher side attached to it. Solder on the inside of the curve. Higher melting solder is to be preferred here. Then carefully attach this unit to the captive splasher side in the cab, using much lower melting point solder – thus preventing the previous joint from melting.

Tip: when soldering these, a small block of MDF/wood plus 0.3 shim could be used to directly support the footplate (not the valences) to enable the 'loose' splasher to be supported in the open void, before the cab floor is attached.

00 modellers should find ample room here, as well as P4 gaugers, at the other extreme. When the boiler backhead is fitted, there will probably be some filing to do to remove whitemetal from the lower corners, to achieve a good fit.

- Check the location of the planked 'wooden floor' sheet (**10**), and trim to size and solder in place. Take a lot of care round the newly soldered splashers that are presently 'hanging in mid-air'. Gluing this in position might be preferable, though there is some 'land' between the rear driving and trailing wheels that can be used as a base on which to attach the floor. It may even be possible to attach from underneath, and slip the floor up through and on top of these protrusions

4. **Boiler (11):** remove the whole sheet, and anneal (soften). Roll up the unit, but be aware that the rear portion will be attaching to the upper part of the side tanks shortly. Give a good deal of attention to achieving a properly circular arc here. *See Diagram sheet 1.* Complete the front cylinder shape by using a former that is very slightly smaller than the finished diameter of the boiler. Solder the lower seam carefully, and then add the **front former (11a)** and **rear former (11b)** to keep the boiler front part cylindrical, and supported. These need to be as near the ends of the tube as possible, as it will enable precise location with the smokebox next.

5. **Smokebox:** *Please note that there are several options to choose from here, to enable personal preference and maximise success. Some options include parts that are 'lay-on', others are slotted.*

Remove the saddle parts (**12**) and the front and rear smokebox formers (**13, 14**). If you are building the **E3**, then ensure you first form the 4 inclined rivet impressions on either side - from the inside - with a blunt scribe, *before* bending up. Solder the two formers into the respective slots, and smooth off the outside of the joint, so that it will not be visible later. *See diagram sheet 1 for details.*

6. **Smokebox wrapper (15):** *Anneal the wrapper first to ensure a good result when bending - especially for the E3 which has quite a tortuous series of bends at the base of each of the smokebox sides.* Upend the newly-soldered unit, so that it sits squarely on a board - the saddle (*which is, in reality, upper portions of the frames*) will 'hang' over the edge. Carefully pre-bend the wrapper to as near the finished shape as possible, and slip into place over the smokebox formers – with no gaps; *having it gently clamping on to the formers is ideal.* Holding one end of the wrapper tight against the frame, gradually solder the wrapper along one edge from the top, ensuring it 'sits down' perfectly both *on*, and *all along* that edge. **Allow no gaps, and use a very controlled amount of solder to avoid it running too far ahead of the iron.** Tacking at intervals may assist this operation, as long as there are not 'gapes' where it moves away from the joint. Repeat with the other edge, and be very critical in your checking and cleaning up of the whole item – as it is very prominent right at the front of the loco.

7. **Boiler, cab and smokebox assembly:** Now offer up the boiler unit, and check everything is correctly lined up and to correct lengths. It is possible some filing may be needed here to achieve the best-looking result. **Now is the time to make 'tweaks' or rectify any mistakes.** When you are satisfied that all is as it should be, *and both square and parallel, as appropriate,* put aside until the side tanks are complete.

Slip the smokebox unit into position, and, as there is a now curved end-tab to locate in the curved slot on the cab front spectacle plate, solder this first. Attend to the other end later; **do not solder the smokebox to the boiler end yet,** as the tank front 'locks' into the notch just behind the full boiler diameter area. Leaving this arrangement slightly 'telescopic' will assist as a means of adjustment before finally soldering the boiler tube inside the smokebox wrapper. It might involve reducing the boiler length slightly from the **front end** to get the perfect fit - but using this sliding fit technique should find that out before starting to solder at the cab end. Remember, solder on the inside where you can, but a good clean joint on outside is a very close second choice. Sometimes it can't be avoided. *Diagram sheet 1 shows the options you can choose from.*

8. Front smokebox boiler 'band' (15a) - This thin band locates next to the edge of the rear of the smokebox, and is not so much a boiler band as part of the smokebox wrapper edge. Choose your preferred width from the group, with reference to a photo. Usually it is included as part of the smokebox wrapper, but in this case it has to be a separate part attached to the boiler, owing to the curved shape of the smokebox wrapper. Again, ensure it 'hugs' the boiler tightly, using minimal solder, when it is soldered up later. ***The fitting of the side tanks is a little tricky, so soldering only the cab end tab is advisable at this stage.***

9. Side tanks (16, 17) and tank front (18): ***Read this whole section before proceeding with construction.***

- The lengths of the tanks differ slightly for each loco. There are 1/2 etched lines to show where the tanks of the **E3** need to be reduced in length. (...leave as they are for **West Brighton**).

Once you have/have not removed the excess length, punch out the relevant 'rivet' detail from the inside. This will give the characteristic 8 'rivets' (*actually they're a bolting arrangement for the tanks*) that appear on virtually all pre 1900 Brighton tank sides. They are set as near 3⁵/₈" from the tank front and rear edges as possible, to enable the 1 1/2" black Stroudley livery lines to be centred on them.

Handrails and filler caps must now be considered here – before going any further with the tanks - as there are 1/2 etched holes provided underneath the tank tops that cannot be accessed after the tanks are in place.

The larger holes usually provided for big fittings, like the filler caps, could not be provided - as the West Brighton filler caps are centrally positioned – but those for the E3 are set at the front end of the tank tops - coinciding with the exact spot where the front handrail knobs for West Brighton fit – which are very much smaller – so all have been left as either 1/2-etched or fully etched 0.3mm holes - so builders will need to ascertain which are needed, and drill out (gradually in small stages) to the required size – depending on whether they are for large or small fittings. It is likely that the spigot size for the castings may be 2mm, but ***check that for yourself before drilling.***

The tabs on the lower edges of the tanks fit in the slots in the footplate, and the 1/2 etching on the inside of the tanks assist the bending of the distinctive curved top. *Don't be tempted to just rely on a 'finger bend' here, but still use assistance over a former to ensure a consistently curved bend – it is too distinctive and prominent to mess up. If any 'ridging' occurs, a gentle smooth with a fine file and/or wet-and-dry 500 – 1000 grade should cure it. Always work evenly.*

The **tank front panel** locates just ***inside*** the front edge of the side tanks, and flush with - *not 'on top' of* - the edges. It has a support arch on it that allows the curve of the narrow rear section of the boiler top to rest on it. ***Please note that the 'notch' on the rear of the full diameter boiler front section interlocks with the arch on the tank front panel.*** This avoids the boiler appearing to stop too short at that point, where it is still relatively visible. Take care now not to distort any part of the boiler. Some slight easing with a narrow Swiss file may be needed to enable satisfactory location. Dry runs may be essential.

- There is a simple 'notch' joint on the edge of the **front cab spectacle plate** and the rear edge of the **side tanks**. Ensure that the inner edges of the tanks bear very snugly against the boiler top. Solder carefully along the seams. Tacking in strategic places first may ensure a more accurate or easier job.

- two more optional 'arch supports' are provided for soldering below, as required, at the centre and rear of the truncated boiler section – as long as space above the motor permits. ***Check with your chosen motor and gearbox***

- If **West Brighton** is being built, the small 1/2 etched lines inside the 'crook' of the **boiler** notch indicate where the slightly longer **side tanks** will reach, and this small amount of material ***must*** be filed away to enable proper locating.

- This means that the side tanks must be built as a unit that locates first onto the cab front, and that the boiler then subsequently interlocks with this unit. ***See diagram sheet 1.***

10. Now the **smokebox unit can** be located on the 'nose' of the boiler and soldered both to it and to the footplate. Use a dry run as a final check that all is well and straight, and make any necessary adjustments. ***Don't forget to solder the 2mm captive nut for the body-to-chassis fixing over the hole in the saddle floor first.*** It should align perfectly with that in the footplate.

Now solder the saddle in place, and then the boiler into the smokebox.

- **Tank front grab rail and steps:** these are on one of the brass body frets, duly marked. Note that they are 'handed' – as the loop grab rail on West Brighton was on the inside of the step, and the E3 was the other way round. The location tab is such that it is offset to allow either arrangement. The grab rail is best made from nickel silver wire, using Bill Bedford's etched brass handrail jig – an excellent investment!

11. Cab steps (19): the two sets of steps can now be soldered together and fitted. They locate in the slots just behind the valence, and between the rear driving and trailing wheels. The E3 had both cab steps and forward steps, but West Brighton had no forward steps. ***Please note that when the tank front handrail and single steps are fitted, there will be a choice of 2 arrangements – stemming from the step, or lack of it, on the footplate.***

The vertical parts of these steps are raked backwards slightly, but I have no means of knowing – other than a photo – what the exact angle should be. It did not appear on the GA drawing. Clearly they must not foul the wheels or coupling rods. There will also need to be a 'return bend' towards the lower end to enable the lower step to be truly horizontal. Some form of extra unseen support – possibly in the form of a piece of etch scrap – might well assist in avoiding calamities with these rather vulnerable items, during handling.

12. Frame/bodywork location plate (20): remove and fold top and bottom flanges through 90°, as well as side 'cheeks', and solder ***exactly central*** on the back inside of the rear buffer beam. The rectangular/square holes assist in soldering. Frame-to-body attachment occurs as the frames locate between the 'cheeks'. Note that these allow for the frame curvature. Any slight adjustment can be made either by bending the cheeks slightly, or gently filing the frame to achieve the best fit. *See diagram.*

13. Cab beading (13): on n/s fret this is simply soldered on to the edge of the cab side opening, starting from the 'loop' end – here the handrail wire will be fitted. Pre-bend to exact shape, and use another 'running seam' part way (not stopping on a curve), and hold the rest in place and mark the surplus to be trimmed off before completing the run. Cut a piece of 0.7mm wire and solder in the 'eye' of the beading at the top (which may need broaching to size), and through the hole in the footplate at the bottom. Lightly trim and file smooth any excess. Brass wire is provided, but if you think these were polished steel, some nickel silver wire might be better. Another way is to tin the whole brass wire with solder, to appear like steel, and to ensure some varnish is applied to them during painting.

14. Make up the etched **cab reverser quadrant (14)** parts, **on n/s chassis fret**, with **lever**, to fit in the cab, to the right of the left-hand splasher. These are doubled to make sure that the finished item is strong and bulky enough.

15. Backhead casting: (Whitemetal). This can be glued in position now, and the **regulator casting** fitted to the spigot on the backhead – though take care that the backhead is appropriately located, and at what stage in the proceedings. Any further detail you wish to apply must be put on ***before gluing in place.***

16. Cab Roof: All cab detail must be added before this step, otherwise, leave until last.

Again, both locos had very different arrangements.

- **E3:** Simply bend the tabs at the top of the cab sides inwards to conform to the curve of front and rear spectacle plates. Curve the **lower roof (21a)** to fit snugly all round. Tack solder in position. Similarly curve the ½ etched **upper roof detail sheet (21b)** and offer up to the now tacked roof plate. If all is well, *and appearances are everything (!)*, complete soldering.
- **West Brighton:** detach the 4 parts of the **Stroudley roof. (21 c, d, e, f)** Bend up the edges of the 'square ring' to form a structure with a continuous 'upstand' all round. Curve the middle part so that it fits centrally, and the edges fit centrally in the angles of the sides of the upstand, reaching almost to the corners. Now bend the front and rear plates along the ½ etched lines, and locate so that the curved edges meet, and the narrow flat bent-up strip sits flat on the front and rear angles. When all appears tidy, solder up with plenty of solder under the curved joints. ***It is worth using something like Ersin Multicore solder for the first joins, and completing with plenty of lower melting point solder (145°) underneath these remaining joins – to avoid it all falling apart.*** Some filing will be needed to remove the sharp edges on the top, where the curved edges meet, to form a smooth return curve. Small sanding discs are obtainable for mini drills and are excellent for this task. The flooded solder underneath ensure that if you break through the brass, there will be solder underneath to complete the compound curves. Alternatively use the appropriate castings, if provided.

17. Roof Ventilator Frame (21g) This fits partly over the square roof door that sits proud in the centre top of the roof. Invert the frame, so that the ½ etched part fits exactly aligned with the relief square, and solder in place – so that it appears 'offset' to one side. This represents the guides to the ventilator, and the square on the roof - the ventilator door itself.

18. Front coupled wheel splashers: these are simply folded up from the footplate and the **splasher tops (22)** are bent as near the exact shape as possible – annealed as usual. Take care to produce the characteristic reverse-curve flare as far as possible, though this will be a little more difficult than with other locos, with such small wheels. Thinning the lower edges of the front and rear of the splasher may help in "bedding them down". The saddle arrangement should add to the ease of the soldering operation, as the splasher sits back against it in both cases. Careful soldering will be amply repaid by a tidy job that will be easier to clean up, paint and line later! **Take care not to destroy the rivets on the E3.**

***NOTE for 00 modellers:** there will be an issue here with front driving wheel clearances. You may need to set to with a disc cutter and remove material from behind the splashers – cutting into the underside of the smokebox saddle, to enable the drivers to clear, if wheel Back-to-Back is 14.5mm 00 - as the saddle is 15.9mm wide.*

19. A quantity of 'T' and straight **lamp irons (23)** is provided on the brass sheet. 3 of the 'T' ones are fitted on the front and rear edges of the platform - just above the buffer beam, and the others to the smokebox front (*and bunker rear?*) – duly bent with a slight double crank. Consult photos for exact shapes and locations.

20. Coal Rails: (24) these are in two parts, and are attached to the inside of the bunker sides and back sheets, with the 'tails' that protrude downwards. They are folded separately with the ½ etched line inside the right angled corners, and then joined together carefully with solder – ensuring the gaps are not filled. **A dry run will greatly help here.** If they don't go together too well directly from bending, you could separate the 3 sides of the inner layer and solder individually to the outer layer. Using both layers will give a stronger job, though, if preferred, you just use one.

21. Driving Wheel balance weights: (25). Position these as per the photographs you have of the loco you are modelling. They are different in location for each loco WB / E3. West Brighton has 3 – one on each wheel directly opposite the crank pin and symmetrically about its centreline. The E3, on the other hand, only has one on each driving wheel, and not symmetrically arranged in relationship to the crankpin. **See photo.**

22. Rear Bunker Steps (26): this has proved to be somewhat of a dilemma. They were certainly two on the E3, but I have yet to see photos of any on its predecessor – hence the lack of slots to locate. If building an E3, then bend up two steps, and solder symmetrically about the centre lamp iron at the top of the bunker, behind the coal rail – at about ²/₅ up the height of the rear bunker plate. A small parallel card template can be made to rest them on while soldering, to ensure they will be parallel to the footplate and equally spaced from either side.

See a photograph for the exact details.

CASTINGS:

Boiler backhead: this should be obvious! It is glued to the rear of the cab spectacle plate, with the cast regulator glued on the locating spigot.

Sandboxes - these locate on the frames of both locos – either side of the centre coupled (driving) axle. Attach sand pipes with wire glued in drilled holes in the centre of the underneath. **See a photo as usual.**

Chimney: The 'production E3' only ever had the Billinton pattern cast iron chimney, but for West Brighton, the original chimney was Billinton pattern, but was changed to the former Stroudley copper-capped pattern in the 1890s, as the new smokebox fitted could not take the Billinton pattern. Simply run an appropriate drill or rat-tail file gently through the now fitted smokebox and wrapper, ensuring the hole is the correct diameter for the casting to sit exactly upright on the smokebox.

It is possible to copper plate the chimney cap, while still separate, using Guy Williams' method of a battery, 2 leads, and some copper sulphate. I believe you can add a touch of Sulphuric Acid, but seek more knowledgeable advice than mine!

Dome: Merely clean up to remove joint lines, and ensure the hole provided on the boiler is opened out as necessary to the correct size. It is worthwhile ensuring, after fitting, that the flare of the skirt of both chimney and dome is very thin, as this enhances the look of the finished model. This was part of the artistry of these locos, and thick bases destroy that quality.

Salter valves: The levers of these appear on the loco body frets, as a fold up. Brass pillars by Markits are provided.

Westinghouse pump: This is best left until after painting, though it might be good to prepare the fuse-wire pipes and location arrangements (not provided for) at this stage - simplifying matters later. Small brass pegs would be a good way to attach it in drilled holes on the cab side.

Westinghouse brake pipes: These attach under the front and rear buffer beams of loco and tender.

Other fittings (non whitemetal)

Whistle – brass casting: locates just ahead of cab plate front on the manhole casting.

Brass boiler Handrail knobs: (see also comment above at the end of section **8** Bodywork) the provision is as follows:-

West Brighton had 4 on the top of the tanks, one section of rail sat on the side of the smokebox, and one on the front, above the smokebox door, locating the long section beginning by the filler caps. The E3 had 3 on the tank top – the two end ones and one centre one. The others are the same. ½-etched (underneath) and though-etched holes provide for these.

Smokebox door handles: Brass turnings from Markits are provided (even finer than Gibson's!). These fit in the centre of the cast **smokebox door**. This locates in the centre hole in the etched smokebox wingplate (which may require opening out). The boss on the carrying shaft could benefit by slimming off the diameter – which can be done in a small rotary drill / tool and a fine Swiss file.

Buffers: These are Gibson sprung ones. Simply follow instructions. The holes in the buffer beam may need some opening out. Do not do this until the buffers have been built, just prior to mounting on the beams.

Painting: These locos were all adorned with the Stroudley Dark Green Goods livery all their lives. Phoenix Precision Paints cater for all the Brighton stock paint shop requirements, though I add a fair quantity (c25%) of PPP Signal Yellow to lighten and enliven it, otherwise you cannot see the black lining in 4mm scale. Westinghouse fitted locos had 2 fine red line either side of the black bands. Humbrol post office red no 17 is used here – though, again, some toning down might be better – with a small quantity black added.

As mentioned at the outset, Goods lining transfers are available from Eric Gates, and loco name transfers from Ian White.

- If you intend to rule the lining by ruling pen, then buy **Gloss** paint – not dull or matt – and spray on to Phoenix Precision Paints 2 part etch primer, thinned with 2 parts of its own thinners and one part of cellulose thinners, as per Ian Rathbone's recipe. It is much easier to line using Humbrol gloss red, black and white, and yellow for the valences, with a bow pen onto gloss main colour. I talk from experience!

Ian Rathbone's new book in the Wold Swan series - on painting and lining is excellent – I recommend it!

The final finish can then be toned down with satin varnish later, and gentle weathering (see DVD on 'Painting and Lining' by Tony Wright and Ian Rathbone).

- Number plates and works date plates can be obtained from Ian MacCormac , now that Bill Bedford no longer does them. In both cases, number plate on cab side and works plate on front splasher.

MJW 04/2010