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**Date of report:** April 2012

**Norwich Zero station**  
**Call sign: Bowling Zero**

Rackheath Zero-station was the only zero station operating in Norfolk. It received transmissions from out-stations based at Edingthorpe, North Creake, Aldborough (sub-outstation), Southrepps (near Cromer), Aylsham (The Beeches, Pound Road – now Holman Road), Wroxham (call sign: Bowling 9) and one other as yet to be found outstation (possibly in the vicinity of Fritton near the Norfolk/Suffolk border). The Auxiliary Units Signals/ATS headquarters was based at Rackheath Hall.

Regarding its layout and contents, the structure is an almost identical clone of other known zero stations as indeed they were all built to the same specifications by units of the Royal Engineers.

[http://www.subbrit.org.uk/sb-sites/sites/h/hollingbourne\\_zero\\_station/index.shtml](http://www.subbrit.org.uk/sb-sites/sites/h/hollingbourne_zero_station/index.shtml)  
[http://www.subbrit.org.uk/sb-sites/sites/s/shipleigh\\_zero\\_station/index.shtml](http://www.subbrit.org.uk/sb-sites/sites/s/shipleigh_zero_station/index.shtml)

**Directions**

The zero station is located on private property.

**History**

In the 1940s the property was owned by a local merchants family and we were able to establish that one of the family members was a keen radio ham who built his own radio sets and experimented with frequencies etc.

In the 1940s, their gardener witnessed the construction of an underground chamber. The digging up of the family's tennis court is remembered by a family member, then a young boy. He never managed to find out why this had been done. As the Zero-station is situated below where the tennis court used to be it is probably safe to assume that it was dug up on the occasion of the station's construction. The gardener recalled that he to sign the Official Secrets Act and he never mentioned what he had witnessed until after his retirement, when he shared his secret with Mr G, who was employed by the new owners. He did, however, never show him the location. Mr G recalls having seen many cables of all sorts in the area, some in the ground and others running up trees. In 1988 he stumbled upon a cut electrical cable sticking out of the ground. He pulled the cable out of the ground and followed it for about 4 yards to what to him appeared to be a rough concrete manhole cover. He pulled on the cable again and more of it came sliding out from under the concrete lid. The length of cable retrieved measures about 10 metres. Mr G then remembered what the old gardener had told him many years ago. Curious, he lifted the cover which by then was quite deteriorated and crumbling. Underneath it he found a small square area with breezeblock walls, surrounded by a concrete lip, and a few steps leading into it. Lying at the bottom he found a 70 cm long steel pipe of about 6 cm outer diameter and a hook that was tied to a length of twisted steel wire. Mr G noticed the tunnel leading downwards from here but because he is claustrophobic he did not investigate any further. He did, however, inform his employers about what he had found but nothing ever came of it. Then Mr G retired.

When the property was put on the market and the owners contacted Mr G, by then retired, and asked him to tell them the exact location of the 'manhole' and adjoining 'bunker'. This he duly did. Shortly afterwards, a member of the Royal Engineers was called in to investigate. Mr G was present when the Royal Engineers sergeant and the two others went down the tunnel (the emergency exit passage) - they were the first human beings to access the underground structure 70 years after it had been closed. Mr G stayed outside because of his claustrophobia. Ten minutes later the men re-emerged, describing what they had seen as 'amazing'. Mr G recalls that the men had removed several artefacts including old milk bottles, a Quink ink bottle, an aluminium tea kettle, and a scrap of paper torn from a manual containing instructions of how to operate a Valor gas stove. Everyone present was advised not to mention what they had seen to anybody, and a short time later the property was sold. It was around that time that Mr G contacted the BRO Museum at Parham, urgently requesting that something be done to safe this unique underground 'bunker'. However, to his great frustration (and consternation), nobody at the BROM was willing to give him the time of day and consequently nothing ever happened. Until a number of years later Mr G contacted CART. We arranged to visit him within the same week. After having been shown the photos taken by the Royal Engineer, we decided to take immediate action.

## Action taken

After some deliberations we decided that the only way forward was to contact the owners and several days later, armed with spades, shovels, a crow bar, and a metal detector we met their representative at the site.

## Description

We found three concrete slabs (not original), covered by a layer of about 20 cm of soil laid over a small opening, which we established to have been the exit opening. The original cover (described to us by Mr G) was made from rough concrete and has since deteriorated. Only its rubble remains. Underneath, we saw the top half of a concrete culvert pipe into which soil and some concrete rubble had trickled over time below left). Originally there used to be a manhole-like space with cement walls in front of the tunnel, with a few steps leading down to it (described to us by Mr G). In the concrete lip surrounding the top of the manhole there are several small rectangular spaces which once would have carried a wooden frame and the original hatch. Years ago Mr G had found a steel hook tied to a length of twisted steel wire at the bottom of the manhole (below right).



The tunnel is 17 metres long. It was constructed by aligning 18 segments of concrete culvert pipe, each measuring about 90 centimetres (diameter and length). Two small (5 cm diameter) steel pipes can be seen emerging from the rubble and soil at the bottom of the 'manhole'. These pipes may have formed part of the original entrance hatch or its opening mechanism. The tunnel leads steadily downwards, curving in south-westerly direction about halfway down. The concrete pipes have an exterior lining of sheet metal, presumably to keep out dampness. This lining can be seen in the gaps created by the curve of the tunnel.



There is evidence of the existence of two cables, running parallel to each other along the whole length of the tunnel. The cables were held in place, about half-way up the right hand side, by double cable clips, fixed by nails that were hammered into crude wedges made from wood. Some of these wedges are still in place in the narrow gaps between the pipe segments and a number of cable clips are also still in situ, some on the tunnel floor. The existence of at least one cable is also supported by Mr G's find of one such cable and of actually pulling a 6-metre length of cable out of the tunnel.

The tunnel leads into a buried Nissan-type hut consisting of three rooms: the generator room, the radio room and a storeroom. The rooms are separated by 0.23 cm (9 inch) thick breezeblock walls. Access from the entrance into the radio room was through a wooden door concealed behind a storage shelf made to look like a bookcase. The radio room was exited through a twin door (leading into the generator room).

The room immediately adjoining the tunnel is the generator room - it adjoins the radio room in the north. Looking towards the tunnel opening, a different hue in the surrounding breezeblock wall can clearly be discerned. This indicates that the tunnel entrance was covered up. Some of the screws this cover was affixed to are still in place, embedded in the surrounding breezeblocks. Of the cover itself there is no trace. In all likelihood this room would have been used for housing a small generator and for storing the batteries powering the lighting and also the lead acid batteries required for running the TRD radio sets, as well as for the re-charging of batteries.

Two glazed ceramic pipes emerge from the end wall. One of these is to the right of the tunnel opening. The wall just above it is soot-stained and we think that this was where the generator stood, and that the pipe served to extract the generator exhaust fumes. A slightly larger pipe of similar type emerges from the same wall, centred above the tunnel entrance. This appears to be a ventilation pipe. At least one of these two pipes follows the course of the tunnel as it can be seen through a gap by the exit opening.

A sand-filled fuel container with an improvised wooden handle stands next to the wall opposite the two concrete ventilation pipes, just outside the entrance doorway into the radio room. The floor in this room is concrete.



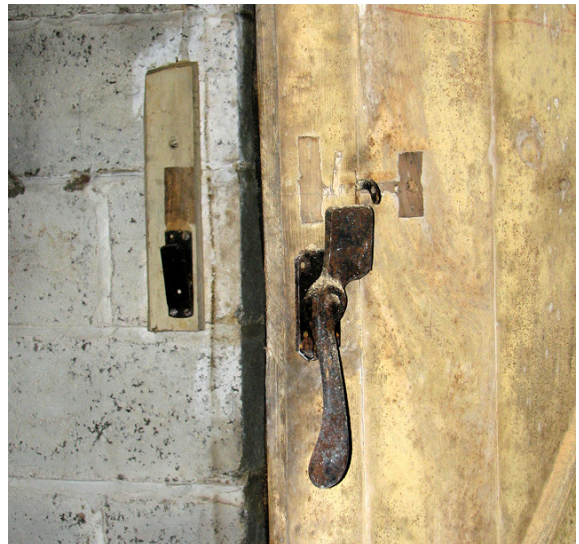
On the left hand side (looking at the exit tunnel) the generator room is traversed by two large concrete ventilation pipes, one near the bottom and one near the roof (above right). Both of these pipes have a small rectangular cut-out which provided ventilation. The joint of the bottom pipe is supported by a piece of breezeblock. At the bottom of the lower pipe, right next to the tunnel opening, the batteries termination board is still in place, albeit with all wires cut. Two lengths of power cable are still attached to it. The ends of this cable were stripped and pulled apart and they were in all likelihood clipped onto lead acid batteries that needed recharging. The two cables are of the same type as the power cable found by Mr G. This cable does not appear to run into the conduit above, indicating that it came in from somewhere else and ended here. What appears to be either a connecting block or a small fuse box is affixed to this panel. A second switchboard, connected with the termination board, is affixed to the opposite wall just below the top ventilation board and a pair of light fittings is on the wall slightly above it. Interestingly, the outline of this section of conduit and of the two light fittings can be seen outlined in red chalk on the wall. The main conduit continues through the wall into the radio room.



A small black-out screen (below left), measuring about 0.30 x 0.50 cm, is lying on the floor beside the tunnel opening. The black-out fabric is attached to four strips of wood. A small pile of ash that appears to have originated from burnt paper can be seen through the rectangular cut-out in the bottom ventilation pipe. Within this pipe there also is a short (0.50 cm approx) wooden board (a shelf?) with one straight and one rounded edge (below right). A similar shaped board is lying on the floor of the room that adjoins the entrance shaft.



From the generator room, the radio room was accessed through twin doors - two sturdy wooden doors, separated by a raised step. These doors are intact and complete, including handles and catches (mechanism seized due to corrosion). Both doors have some thick black textile fabric, appearing to have been soaked in oil, affixed all the way around their outer edges. We believe that the fabric - it is the same used to stop light penetrating outside through the entrance door, here served the purpose of sealing the twin doors so generator exhaust fumes could not penetrate into the radio room. There two thumb-sized holes at one end of the door lintel. What purpose they served we do not know.



The two aforementioned concrete ventilation pipes traversing the generator room emerge in the radio room, to the left of the twin doors (viewed from the entrance doorway). Their homemade plugs (used for noise reduction) are in situ. In the radio room

the cable conduit runs all the way along the roof, terminating at a switchboard on the opposite wall, beside the entrance doorway.



The floor of the radio room was originally covered with a layer of brown linoleum, small sections are still in place (above right) and some of these bear indents of objects that stood on them. Three aerial feeder cables emerge at about 40 cm above floor level near the right-hand corner, near the entrance doorway (below left). The presence of three feeder cables indicates that three aerials – each one on its own tree – were used. The table for the radio sets would have stood near this corner.



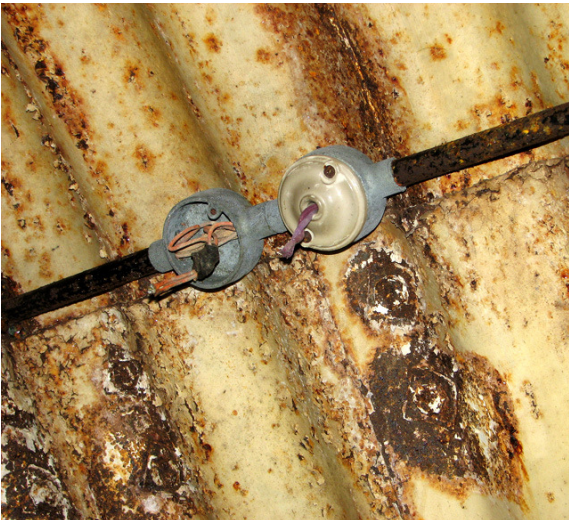
On the outside, part of one of the aerial feeder cables can still be seen high up on a pine tree, situated about 5 to 10 metres from where the duct enters the radio room through the west wall.

An in-depth description of the organisation and of the radio sets used, written by Arthur Gabbitas, is published under the heading of "Auxiliary Units Signals" at <http://www.auxunit.org.uk/>. A Gabbitas was a former Royal Signals Corps corporal who served with the Auxiliary Units. The following is an excerpt:

"The wireless set used was code-named TRD. It was housed in a metal case measuring about 0.40 x 0.24 x 0.23 cm and powered by a large conventional 6-volt 85 A.H. accumulator battery, the voltage of which was boosted to 240V by a vibrator contained within the set. The frequency used ranged from 48 to 65 mcs, nowadays commonly used by BBC1 TV. The aerial terminals were connected inside via a piece of flat twin feeder and to a 72-ohm flat twin feeder outside the front panel, leading to the dipole antenna hidden in a tree."



The presence of different types of wires (orange at left, pink at right) indicates that there would have been two lighting circuits - one AC circuit probably at 240V derived from the Chorehorse generator or similar and another separate LT circuit for silent running at 6V just as the radios did. Two pairs of light fittings are in the radio room (on ceiling) and a similar pair is in the generator room (on wall) – the right-hand lamp being 6V, the left-hand lamp being 240V.



The interior (radio room) side of the wooden entrance door was covered entirely with a sticky black textile fabric, large sections of which are still in place albeit in shreds (above right and below right). This door leads into another small room which still houses a 50-gallon water tank, covered with a piece of sheet metal. The tank is  $\frac{3}{4}$  full of water. Beside it there are two old fuel containers filled with sand. They have improvised wooden handles and served as fire buckets. Water tank and fire buckets stand near the wall on the left-hand side (viewed from the entrance shaft).



On the floor, right up to the end wall and beside (to the right of) the entrance shaft, there is a peculiar circular concrete aperture, set almost flush into the floor (below left). It has a hexagonal indentation at its centre. We do not know what purpose it might have served.



Looking out of the entrance doorway and across the small room adjoining the radio room in the south there is a drop-down entrance shaft which faces the doorway. A large heap of concrete rubble has accumulated at its bottom. Presumably this rubble was created when the top of the entrance shaft was demolished and the opening sealed up. Running down the wall to the left of the entrance shaft (seen from the radio room) there is a cast iron pipe (above right) which ends about 50 cm above floor level. Informants and runners would have dropped their messages, concealed in tennis balls, through this pipe, to be forwarded to headquarters by the radio operations.



Viewed from below, the entrance opening is covered over with wooden boards. We were unable to determine what lies on top of the boards as in fact the exact location of the entrance opening could not be determined from above. Almost at the top of the breezeblock wall there are several small rectangular depressions. They held the wooden frame that surrounded the opening and probably the entrance hatch. A small pulley (above left) can be seen on one side, still adhering to a section of badly deteriorated frame. Another pulley, embedded in a piece of rotted wood, lies amongst the rubble below. The pulleys were part of the opening mechanism that operated the concealed hatch which presumably was hidden underneath an earth-filled tray.

Coming down the entrance shaft, the uninitiated would have found themselves in a small room that appeared to be in use for storage, with a small water tank standing against the wall on one side. They would not have seen the doorway leading into the radio room because this was hidden behind what looks like a bookcase or storage shelves (below left). When the radio station was in use, these shelves would have held tins and other paraphernalia and perhaps a few boxes of ammunition. The 'bookcase' consists of a frame extending to both sides of the doorframe and also above the door to a height of 1.65m. The wooden brackets which would have supported the removable shelves are still in place and the door itself has small cutouts so that the shelves fitted partially into it, perfectly concealing both the door and the door frame. The three removable shelf boards are missing but the 'bookcase' is in situ.



The section of the bookcase above the door has two lengths of wood affixed to the panels covering the wall. These lengths of wood, one towards each side, appear to be fixed by two screws, one at each end. The one on the right hand side, however, is held by only the top screw. The bottom screw is a dummy. This piece can be moved sideways and in doing so it reveals a small carved out space with a drilled hole in it (below right). The hole is just large enough to allow for a piece of string to pass through. The door catch could be released by pulling the string, and the radio room could then be entered by swinging the door



forwards but not without first removing at least some of the shelves. The string is still tied to the catch (in the radio room) and can be seen running through the small hole. It has deteriorated and is missing on the other side from where it would have been pulled (below left).



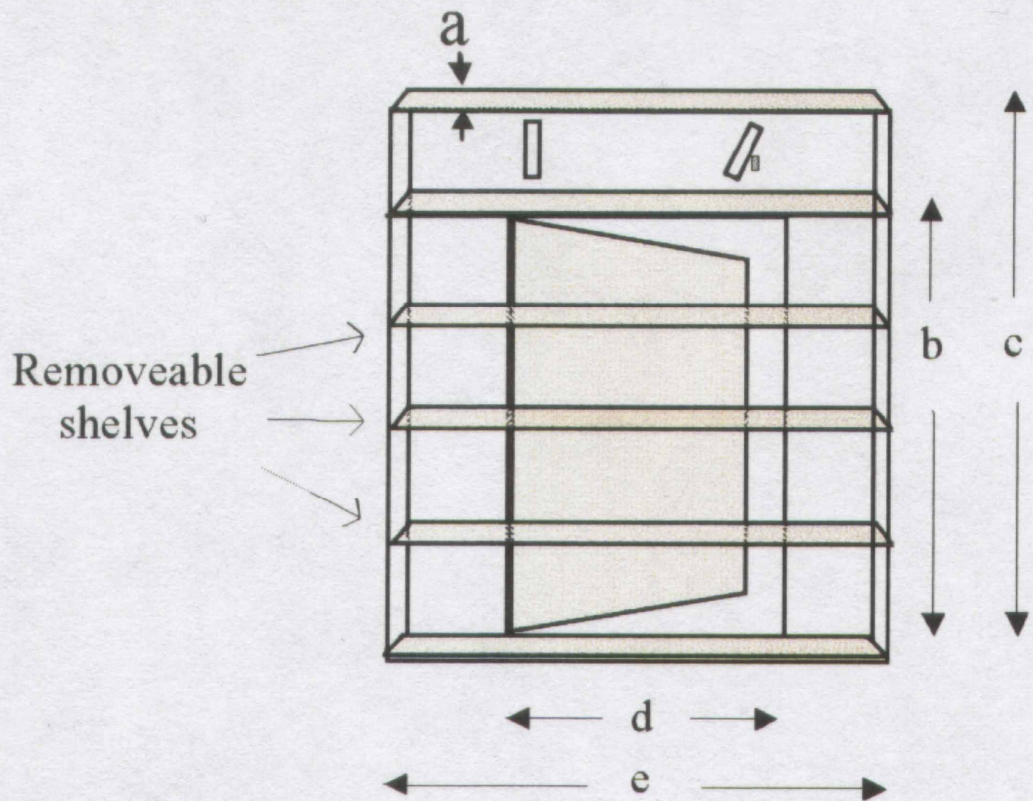
### **Conclusion:**

The property owners acted swiftly and with great responsibility in that the in-house surveyor as well as Norfolk County archaeologists were informed within hours. We wrote a report to be used for guidance by all concerned, knowing that nobody would be familiar with what they would be seeing, and that for this reason not only would many small details go unnoticed but, more importantly, the importance of this find might not be fully understood. We pointed out that nowhere in the UK was there another Zero station in a similar state of preservation with many original installations still in place. Consequently we suggested that the structure is of national importance and that it should be preserved in its entirety.

The Norfolk County archaeologists requested our presence on their assessment of the site and we were very happy to give them a guided tour. To our delight the archaeologists decided to bring in National Heritage so that the Zero station can be declared a Scheduled Monument and that it will be treated as such from now onwards. The property owners are happy to go along with this decision.

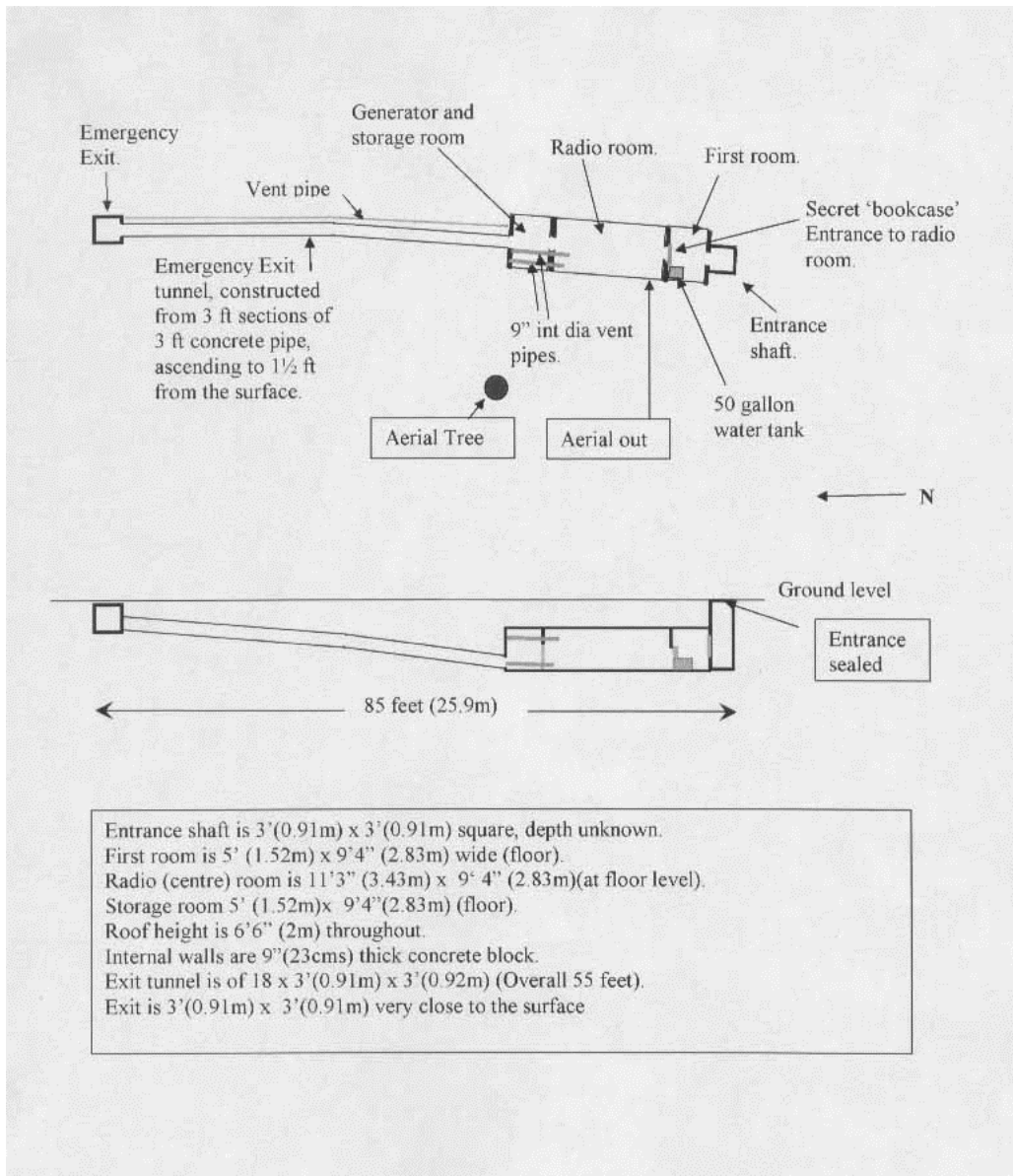
**Drawings:**

1) 'Bookcase' concealing entrance door



a = 5¼ inches	(13.34cms)
b = 4 feet 3 inches	(129.54cms)
c = 5 feet	(152.4cms)
d = 2 feet 6 inches	(76.2cms)
e = 4 feet	(122cms)

2) Plan drawing of Zero station view from above and from one side



**Dimensions:**

- Overall length from entrance to exit incl tunnel: 85ft = 26 metres
- Thickness of end walls: 23 cm/ 9in. Material: breezeblocks
- Roof height: 2.10m (6ft 10 inches)
- Entrance shaft: 0.90 x 0.90m / 3 x 3ft – 2.80 m (9ft) high from floor to covering boards
- Dimensions of small entrance room: 1.50 x 2.85m (5 ft x 9ft 4inches) on floor. Concrete floor
- Water tank: 0.76 wide x 0,55 x 0.55m - ¾ quarters full of water – sheet metal cover– tap in working order
- Entrance door: 1.35 x 0.81m – doorstep 4 cm high. Back blacked-out
- Bookcase: 17 (outer frame) x 24 x 14 (inner frame) cm deep
- Shelf: 14 deep x 1.24 long, 3 cm thick board. Height: 1.65m
- Dimensions of board that conceals door catch mechanism: 22.5 x 5 x 3 cm
- Radio room: 3.50 x 2.85m (11ft 3inches x 9ft 4inches) on floor
- Large vent pipes: concrete; both 23 cm (9 in) internal diameter
- Floor in radio room: Concrete, covered with linoleum.
- Exit doorways: 1.50 x 0.93 m – doorstep 78 cm wide by 11 cm high. Black-out fabric around edges
- Generator room: 1.50 x 2.85m (5ft x 9ft 4inches) on floor. Concrete floor
- 2 small vent pipes, one above tunnel (10 cm), one opposite twin doors (8 cm) - wall above soot-stained
- Exit tunnel: 18 3-foot sections of concrete pipe, 55 ft long = not quite 17 metres with exterior lining of sheet metal

**Notes:**

The regional headquarters of Auxiliary Units Signals was housed in Rackheath Hall (below) which has since been converted into private flats.

