

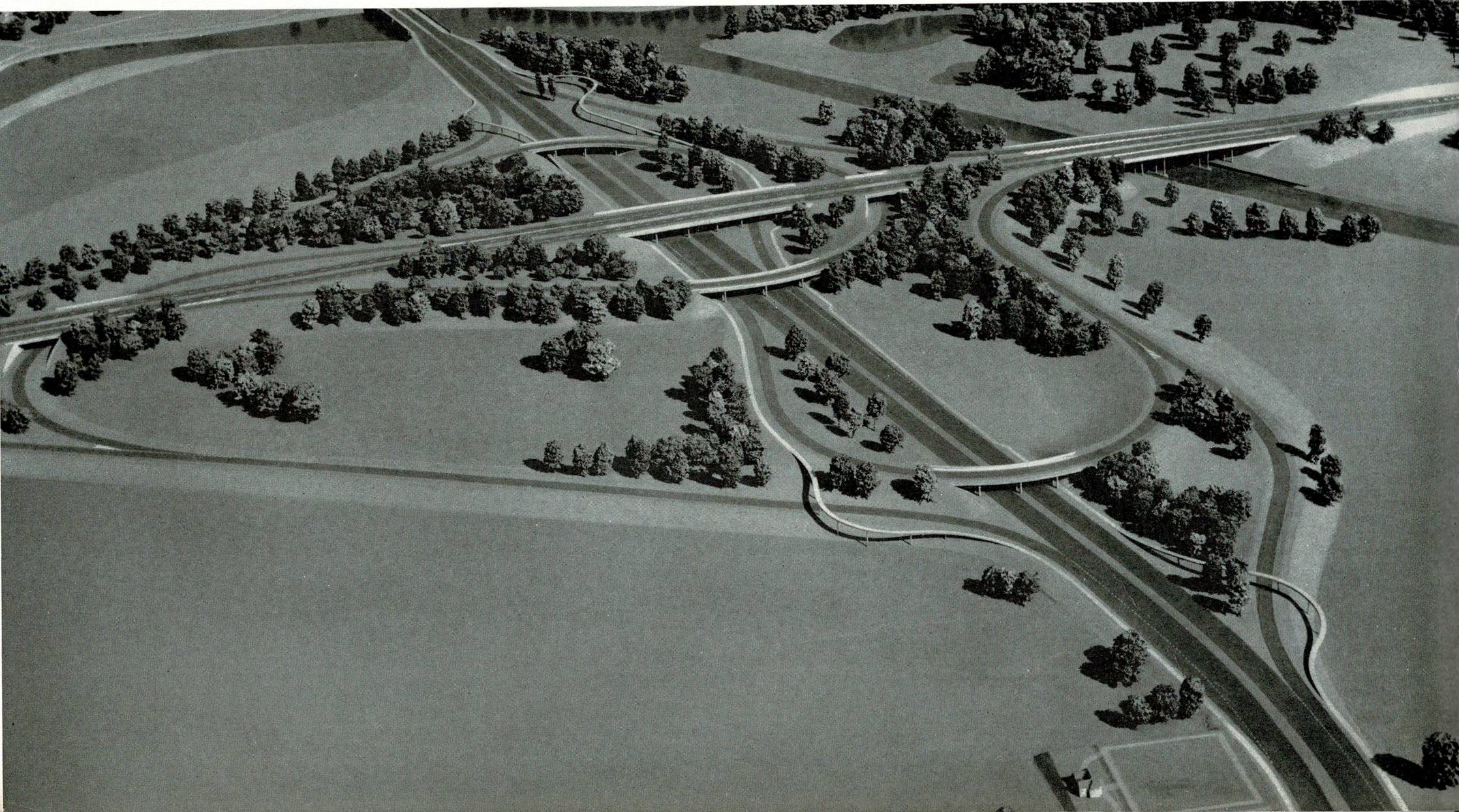


GLASGOW
MOTORWAY
ARCHIVE

M74



Hamilton Motherwell (A723) Interchange
looking towards Motherwell. (*Model*).



M74 Hamilton by-pass Stage 1

Scottish Development Department (Roads Division)

Consulting Engineers
Babtie Shaw & Morton CCE

Main Contractor
Christiani Shand

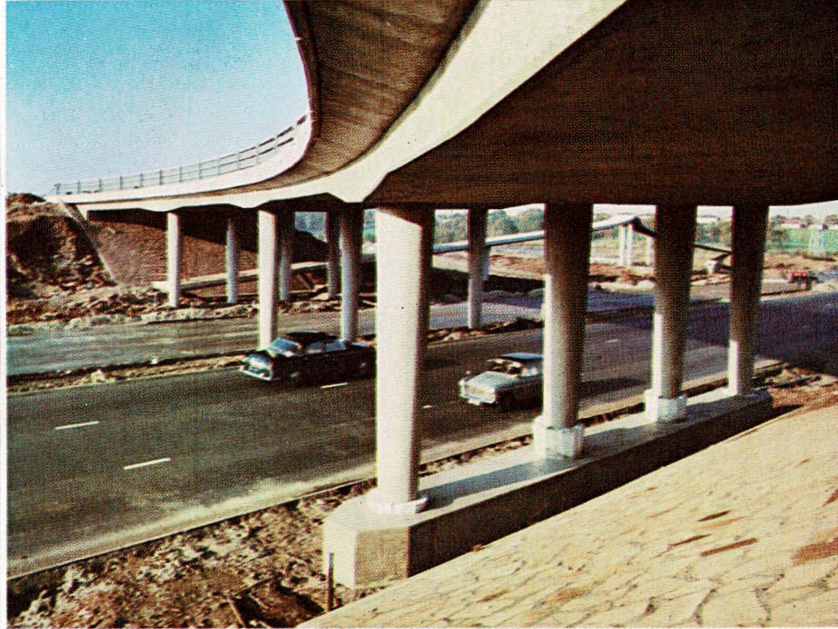
A joint venture by
Christiani and Nielsen Limited
Lehane, Mackenzie and Shand Limited

Stage I of the M74 Motorway runs from Hamilton nine miles south to Blackwood and is an important link in the great dual carriageway from Carlisle to Glasgow. The particular importance of this section lies in the by-passing of Lanarkshire urban areas where traffic congestion has been getting worse over recent years. The original investigation was conducted by the late Col. T. U. Wilson, County Surveyor of Lanarkshire. A preliminary line was chosen for the new road, roughly following the River Clyde and avoiding nearly all the built-up areas. Then in 1960 a traffic survey was conducted and from 30,000 roadside interviews analysed by computer, the size and shape of the future M74 were determined. Detailed planning and costing followed

immediately and the Scottish Development Department gave the go ahead to Stage I of the Motorway in June, 1964. The work has been completed in two and a half years and Stage II which is a wider three-lane dual carriageway from Hamilton extending for five miles to the outskirts of Glasgow will be completed in 1968. There will then be dual carriageway nearly all the way from Carlisle to Glasgow, a route which carries 75% of all commercial traffic between England and Scotland. In particular the most heavily used part of this route, through industrial Lanarkshire, will be of motorway standard to provide for a swift and easy flow of traffic.



1 A 723 Interchange

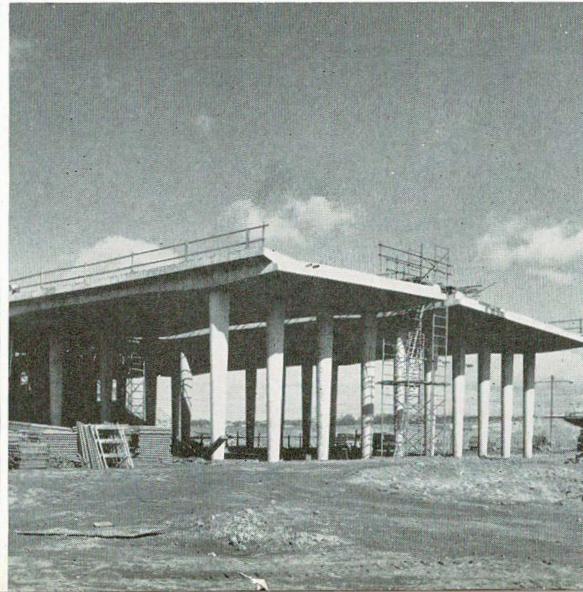


From the air this Interchange looks like a gigantic flower, spread over 90 acres of land ; from the ground it seems an exciting arrangement of fly-overs and under-passes. Why, asks the layman, should it be so large and complicated ? The answer is that this is one of the busiest crossroads in Scotland. A census of traffic showed that by 1980 this Interchange must be capable of coping with over 60,000 passenger cars in a normal day. The heavy Glasgow-Carlisle traffic is in fact exceeded by the greater cross traffic between Hamilton and Motherwell and of course there is a great deal of interchange between the two roads.

This is why it is necessary to create a delay-free crossing of the most modern design. Three miles of slip roads carry traffic between the two main routes and six road bridges are needed to keep them at separate levels. In addition four elegantly curved footbridges enable pedestrians on the A 723 to cross the Interchange in absolute safety, aided at night by illumination from lighting standards 100 feet high.

The northern part of the Interchange will not be in full operation until Stage II of the M 74 is further advanced. Meanwhile most north-bound traffic will have to cut off through Hamilton where congestion will unfortunately continue during 1967.

When the completed M 74 is in operation there will be a service area—garages, restaurants, etc. to the north-west of the Interchange on an attractive site in Hamilton Low Parks.



Top left Road works in progress at A 723.

Top right Slip Road Bridge over A 723, showing stone facing to side slopes.

Below left Slip Road Bridge over A 723, pedestrian foot bridge in foreground.

Below right An early stage of the bridge destined to carry the dual carriageways of the new Motorway over A 723.



2

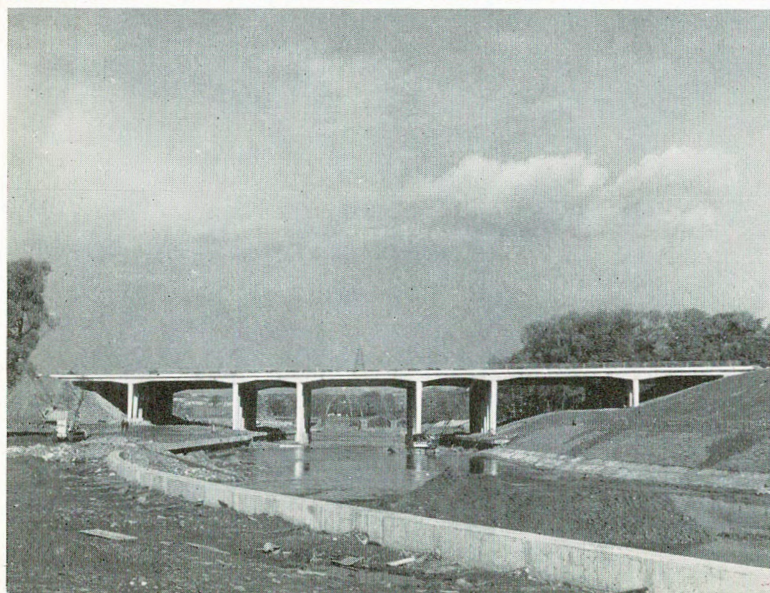
Avon Crossing



One of the great difficulties encountered by the designers planning the A723 Interchange was flooding in the Hamilton Low Parks area. To help solve this problem a hydraulic model was built to find out how high the M74 need be to avoid any possibility of flooding. To raise the Motorway level, masses of 'red blaes' from the old Palace Colliery bing at Bothwellhaugh were brought over a temporary bridge across the Clyde.

Usually roads are made to follow rivers or to cross them, but in order to obtain the full area necessary for the imaginative A723 Interchange, the River Avon was moved to suit the road. The Motorway bridge was constructed over a new dry channel, the Avon diverted into this when the bridge was completed, and the old channel was filled up to carry part of the Interchange. So the Avon now enters the Clyde at a new point, and the Clyde itself has been deepened in the area of the old bridge, the remains of which will unfortunately, have to be demolished.

The Avon Bridge itself is a fine structure whose piles had to be driven to considerable depths before they found a solid foundation. The north-bound carriageway on the bridge has built-in electric heating so that motorists turning on to the Hamilton slip-road can do so with safety even in wintry conditions.



Top left Sub-structure and column supports for new Avon Bridge.

Top right Old Clyde Bridge.

Below left The completed Avon Bridge.

Below right The Avon Bridge under construction.



3

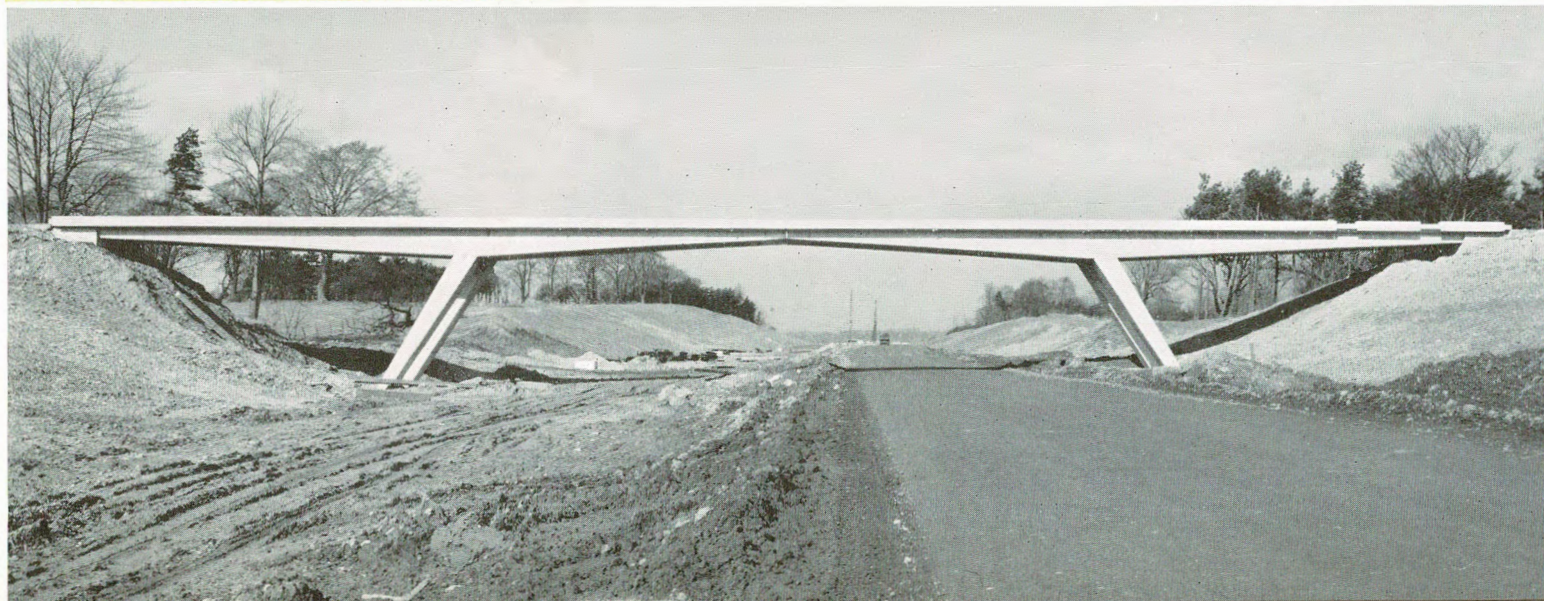
Ross Yard



Over the Avon Bridge we proceed into the Ross cutting where the Motorway is spanned by an elegant bridge carrying the access road to Ross House. At this point the projected line of the M 74 crossed a big railway marshalling yard, but with the decline of the local coal industry this was unnecessary, so British Railways were able to arrange its closure. Now only three out of thirty-eight railway tracks are left and these cross the Motorway on a new steel bridge.

An important experimental length of road has been constructed as the south-bound carriageway for 2 miles south of the Avon Bridge. This is the first stretch of road in Scotland laid by a new machine which can form a two-lane concrete carriageway in a single operation. The machine, the Slip Form Paver, is capable of laying one mile of reinforced concrete roadway in 3 days, so long as the lorries can keep its greedy hoppers topped up with concrete.

This rigid concrete may well be the road of the future, so experts will be keeping it under regular surveillance to see how it stands up to Scottish conditions, and it will be most interesting to watch the results of this experiment.



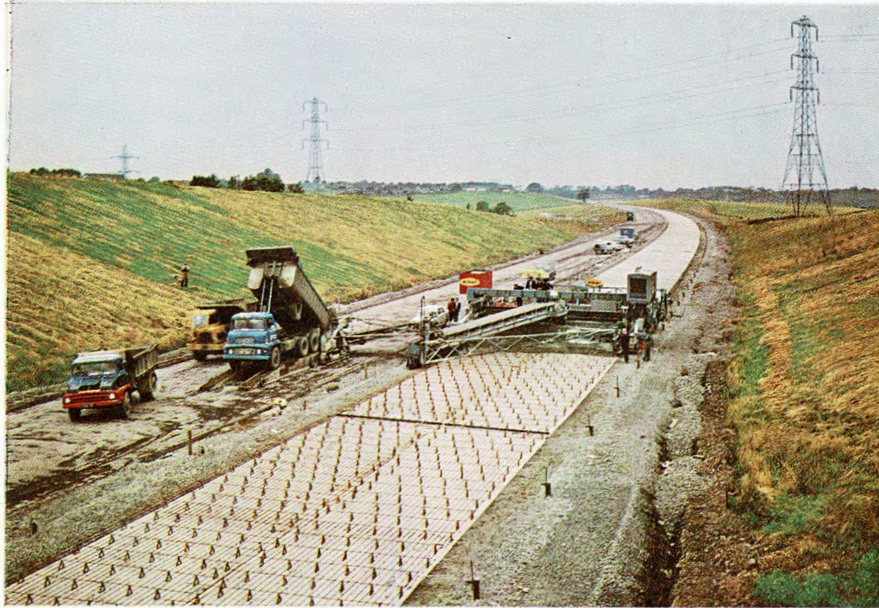
Top Removal of red blaes from an old colliery bing for use on the Motorway.

Below Ross House Access Bridge.



4

Allanton

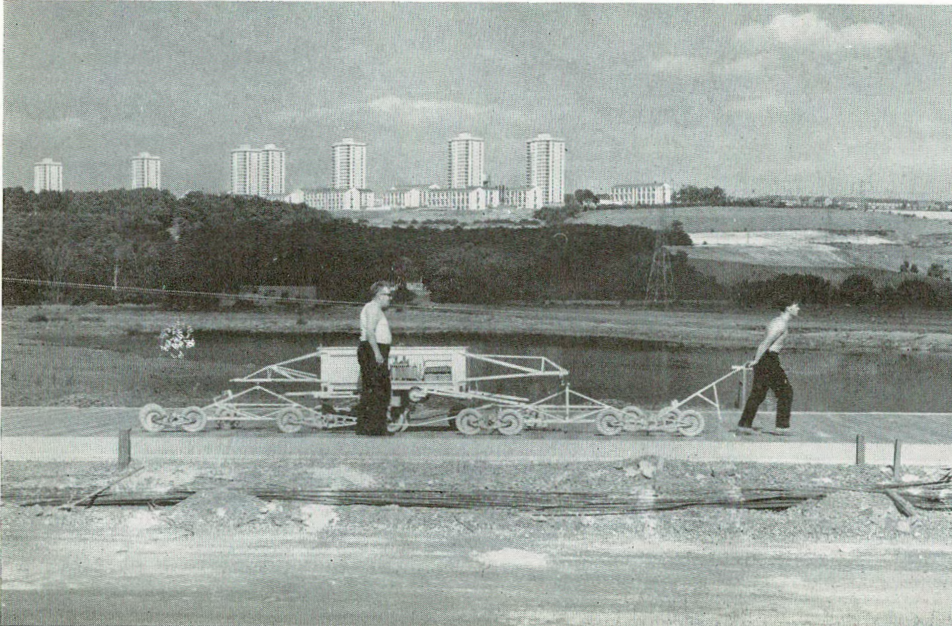


Upwards of half a million cubic yards of earth were removed from this cutting alone, yet now the motorist does not feel any sensation of driving through a deep cutting. Though the road is some fifty feet below the original height of the hill in some places, little of this is now visible as the sides have been so carefully sloped away to avoid any closed-in effect.

Beyond the cutting comes another embankment and here again one of the old colliery bings of the area has provided material and disappeared gracefully from sight. The 'blaes' or burned pit refuse, of the bings has been particularly important for raising the level of the road, and at the same time the road makers have cleared the horizon of several ugly man-made mounds. Altogether they have removed six of these unsightly bings to help with construction. Soil investigations were carried out early in the planning stages of the Motorway and over 500 boreholes were sunk and thousands of soil samples tested. This showed that much of the excavated soil would be too poor for banking and also indicated that the pile drivers would need to strike deep.

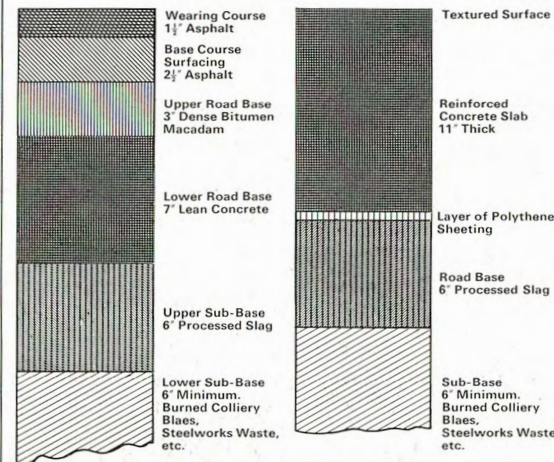
The thickness of the actual roadway varies from 26 inches upwards, depending on the quality of the ground beneath. The top 20 inches are frost proof.

All materials used in the construction of the Motorway were individually tested by a firm of independent consultants with an on-site laboratory.



Standard Road Construction

Concrete Road Construction



Top left The Slip Form Paver laying the concrete carriageway.

Top right Wintry conditions at Allanton Cut.

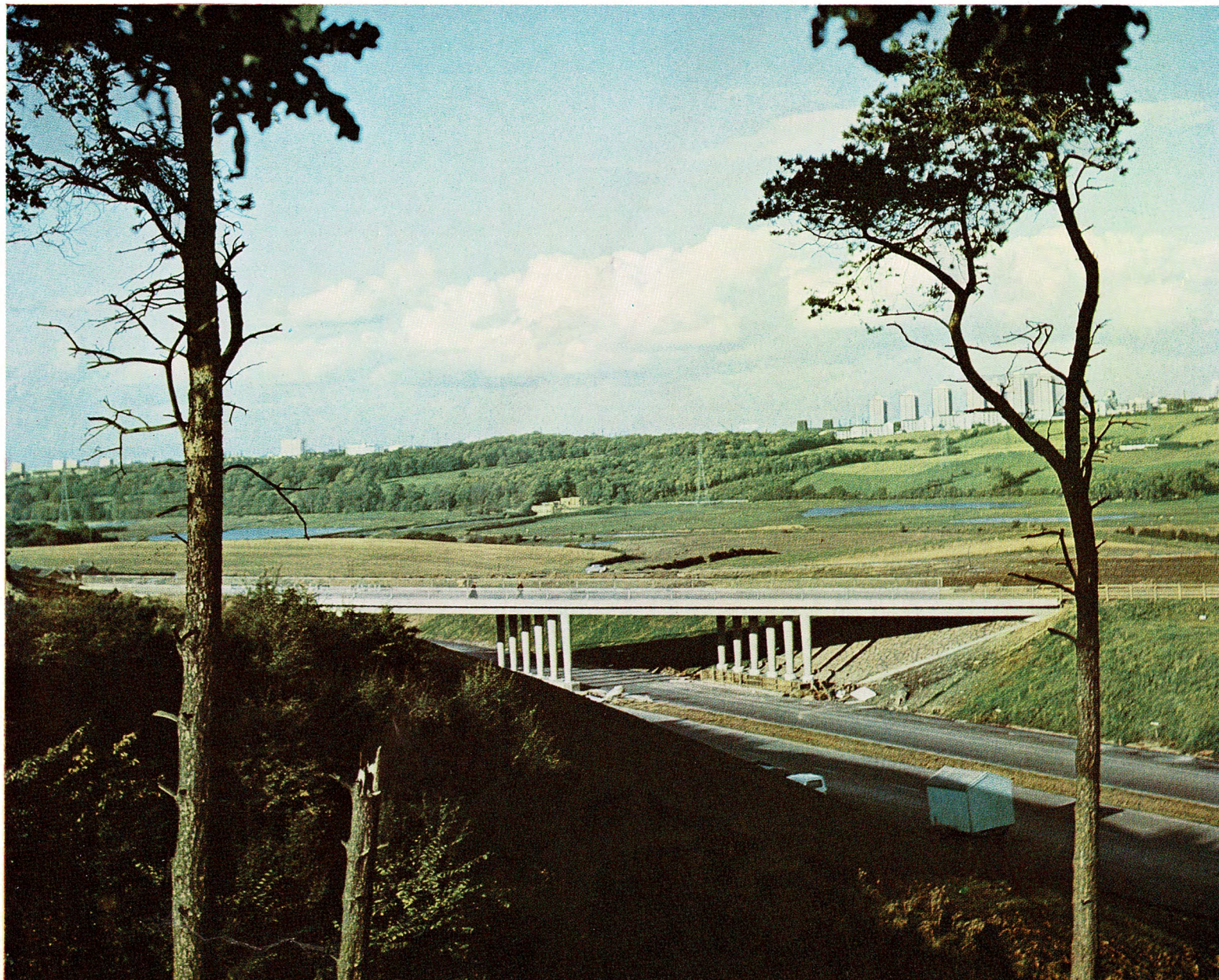
Below left Checking the accuracy of the concrete road surface with a Profileometer.

Below right Flexible and rigid construction details.



5

A 72 Interchange



This is not so busy as the other Interchanges and so movement to and from the Motorway has been restricted to two slip roads. Traffic from the north can cut off from the M 74 to Lanark and Lanark traffic can join the north-bound side of the Motorway. It is inadvisable to have too many exits and entrances on any stretch of motorway as this can affect the safety of through traffic.

Beyond this Interchange the road had to be cut through solid rock at Highlees. Some outcrops of this can still be seen but the general effect is once more pleasant and open.

Here too mention can be made of a typical construction problem. The Larkhall sewer had to be diverted beneath the Motorway. This kind of trouble with services such as gas, water, electricity cables and drains causes lots of headaches. On the other hand, since the line of Stage I of the M 74 skirts built-up areas, there was very little demolition of buildings.

The access bridge at this point has the attractive red-sandstone crazy-paved banks which are one of the decorative features of the Motorway bridges.



6

Golf Course Cutting



Now we approach the wide expanse of the Golf Course Cutting, where the two carriageways sweep round majestically, one slightly above the other. The fresh open aspect of this is further enhanced by the cut-back slopes which get rid of any closed-in feeling. The road builder has to use more land to achieve this effect and to do more excavation, but the appearance and atmosphere of the Motorway are greatly improved.

Great care had to be exercised on this stretch as there were many old mine shafts and galleries which had to be painstakingly filled in.

We now pass below two attractive bridges—the Burnhead Road Bridge, a steel girder bridge with a novel chequerboard pattern on the piers, one of several devices used by the engineers to add life and character to the features of the road. The second structure, carrying an old right-of-way, is an exciting tent-shaped pedestrian bridge with no central support.

Left Burnhead Bridge with vehicle guardrails being erected in foreground.

Top right Excavation of boulder clay in Highlees Cut.

Below left Pier texturing at Burnhead Bridge.



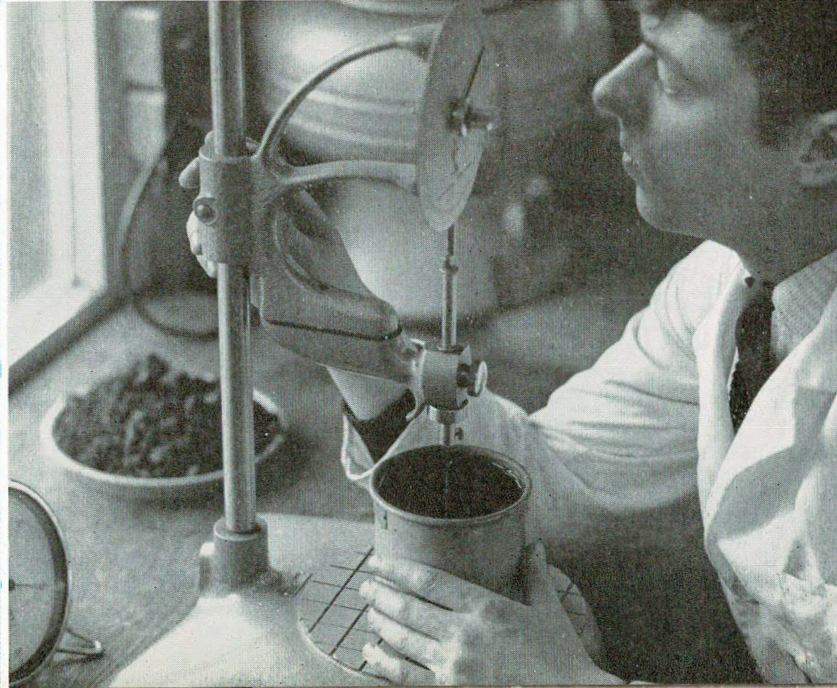
7 A 71 Interchange



We approach the A 71 (Edinburgh-Ayr) Interchange after passing along the Shaws Straight which is the only absolutely straight stretch in the 9 miles of Stage I. For the most part very gentle curves have been chosen to fit the landscape and these have been tested for appearance and safety on special models. Designs for the road have been conceived throughout in three dimensions, thus ensuring a smooth, safe ride for the motorist and a pleasing panorama for the eye.

Here we can admire the ingenious idea by which the surface of the slip roads turns red to distinguish them from the black motorway lanes. They are surfaced with tar-covered red chips, but the tar wears off when a little traffic has passed over them.

This Interchange which is of the modified diamond shape, is an important intersection as the Edinburgh-Ayr road carries a large volume of traffic. One of the slip road curves has electric heating to ensure winter safety.

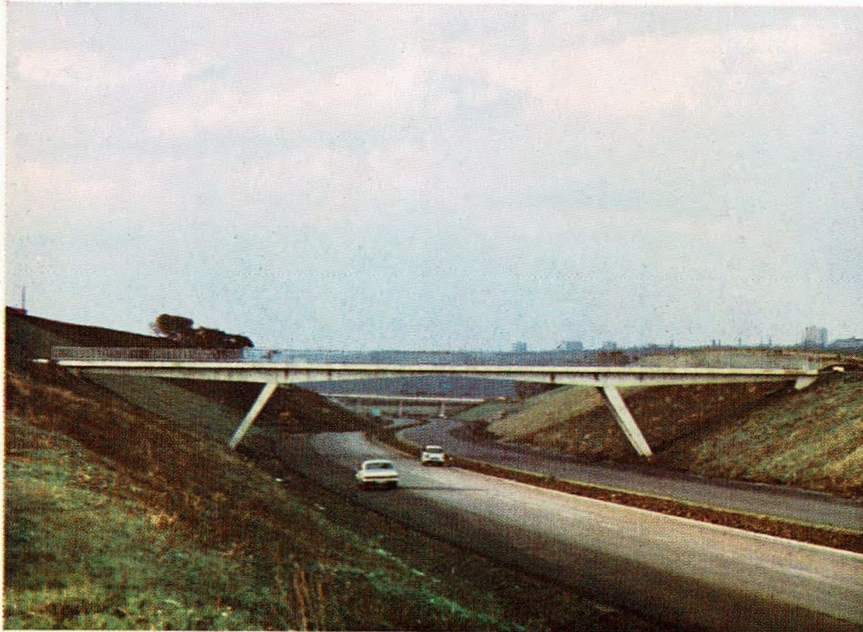


Top left Shaws Cut uncovers an old mine gallery.

Top right Shaws Footbridge.

Below left Electrical road heating at A 71 Interchange.

Below right Materials under test in the Site Laboratory.

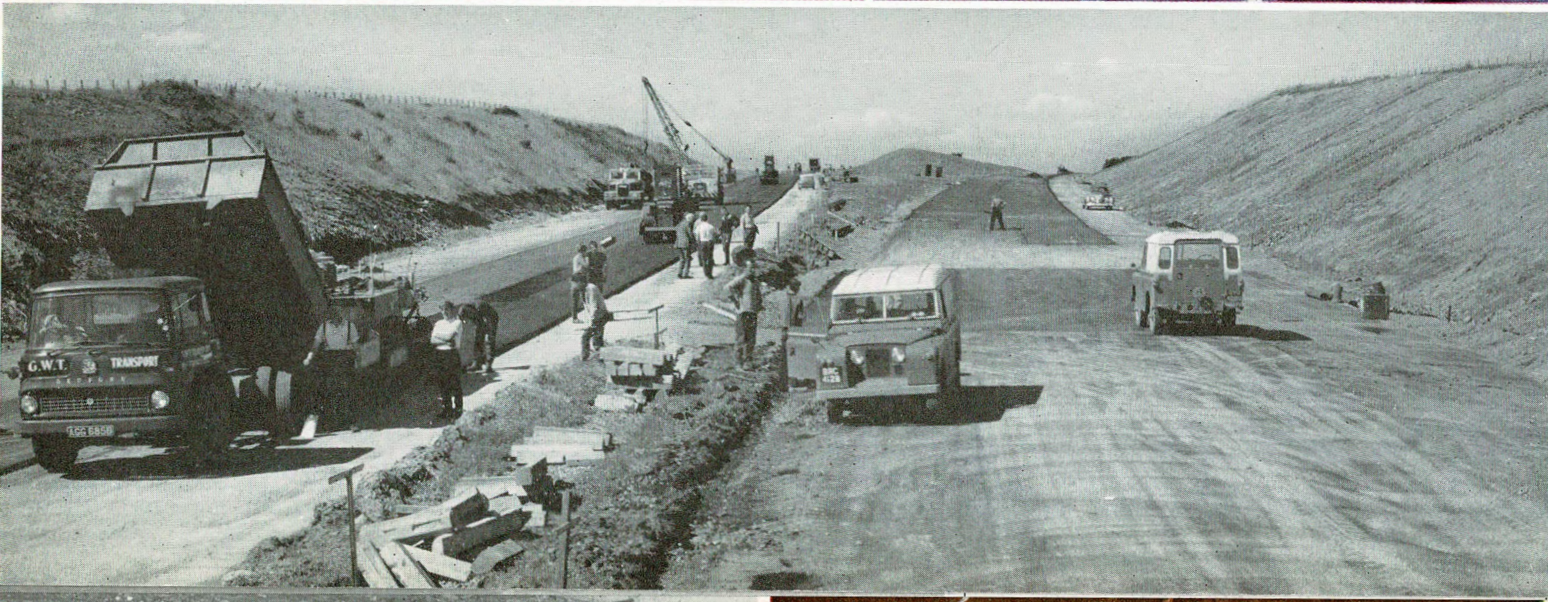


This is one of the most attractive sections on the whole Motorway and an existing cluster of pine trees has been retained between the carriageways which for some distance run nearly a hundred yards apart and at different levels. The road swings majestically past the trees, retaining the natural undulations of the rolling country alongside and between the carriageways.

To the north of this stretch the surface soil consisted of peat which was unsuitable for carrying the road and had to be removed to a depth of 20 feet and replaced by rock. Driving along this modern Motorway, it means little or nothing if we hear that eight million cubic yards have been excavated to make it. It means more if we see rows of earth scrapers plying backwards and forwards and watch the rugged patience of their drivers as they deftly manoeuvre their huge machines.

The last stretch of the M 74 slopes gently down to Blackwood where it joins the high standard dual carriageway A 74 to Carlisle.

From now on, thanks to the engineers and workmen who, in spite of many difficulties, completed these 9 miles of Motorway on schedule, our journey to Carlisle will be much faster as the miles tick past with the minutes.



Top left Typical Motorway Overbridges.

Top right Separated carriageways near the southern end of the Motorway.

Below Carriageway construction at the southern end of the Motorway.

Technical Data Stage 1**GLASGOW
MOTORWAY
ARCHIVE**

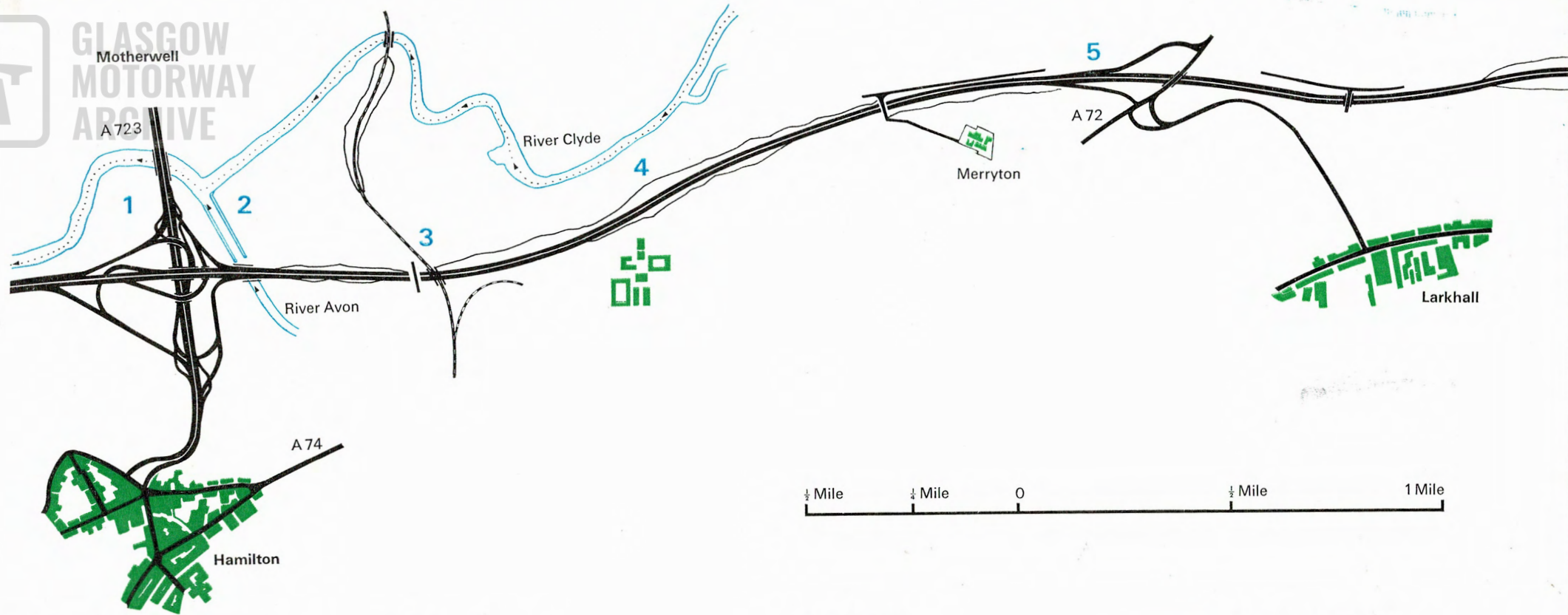
Construction period	30 months
Length	9 miles
Carriageways	2 x 24 feet
Hardshoulders	10 feet wide
Verges	10 feet wide
Central Reserve	15 feet wide
Minimum Radius	3,965 feet
Maximum Gradient	3%
Normal Crossfall	1 in 36
Excavation:	
Suitable Material	3,400,000 cu. yd.
Unsuitable Material	2,500,000 cu. yd.
Imported Fill	2,000,000 cu. yd.
Concrete in bridges	38,000 cu. yd.
Number of piles	
	Bored cast in situ
	55 ton 52 No.
	110 ton 44 No.
	Driven cased cast in situ
	70 ton 514 No.
	110 ton 674 No.
Area of surfacing	560,000 sq. yd.
Traffic Signs	194 No. (168 No. illuminated)
A723 Lighting	16 No. Masts, 100 ft. high
Design traffic flows (1980)	
	M74 27,275 p.c.u. (16 hour)
	A723 35,000 p.c.u. (16 hour)

Rigid Concrete Carriageway

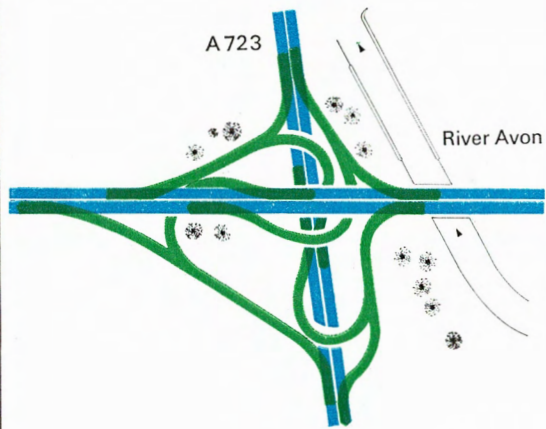
Length	2 miles
Width	27 feet
Thickness	11 inches
Reinforcement	10 lb/sq. yd.
<i>Joint spacing</i>	
Expansion	240 feet
Contraction	80 feet
Concrete Mix	5:1 Air entrained
Maximum labour force (on site)	695
Total Cost	£8.5 million



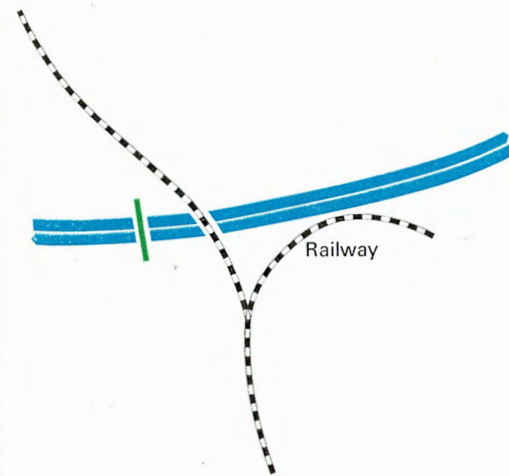
GLASGOW MOTORWAY ARCHIVE



1 A 723 Interchange **2** Avon Crossing



3 Ross Yard

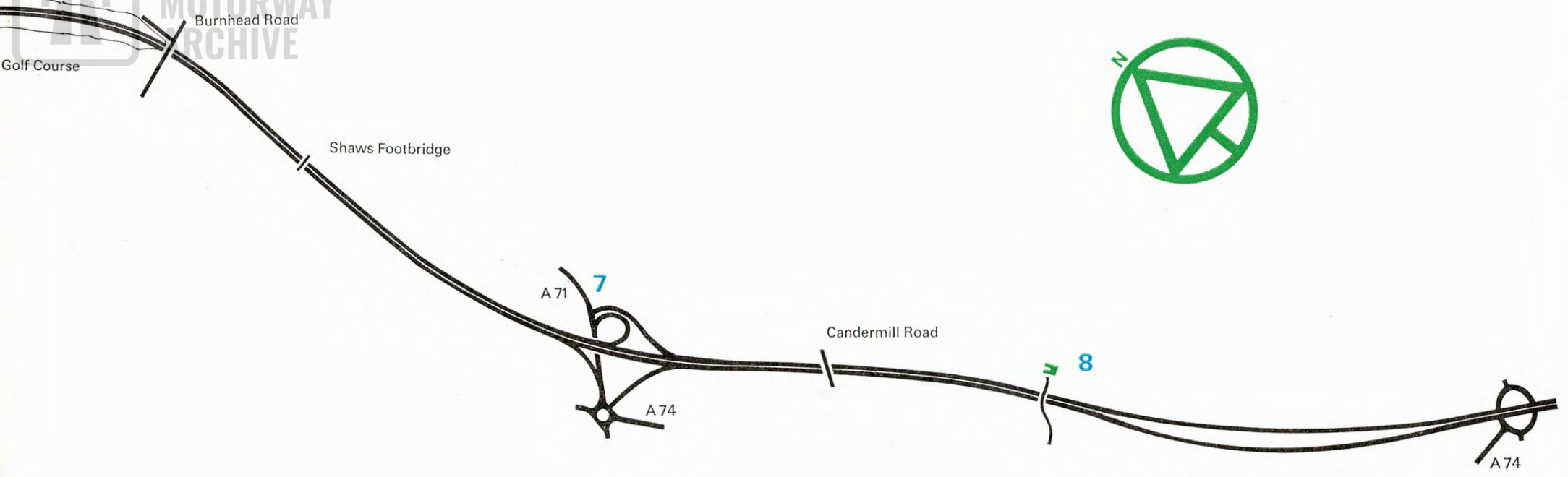


4 Allanton

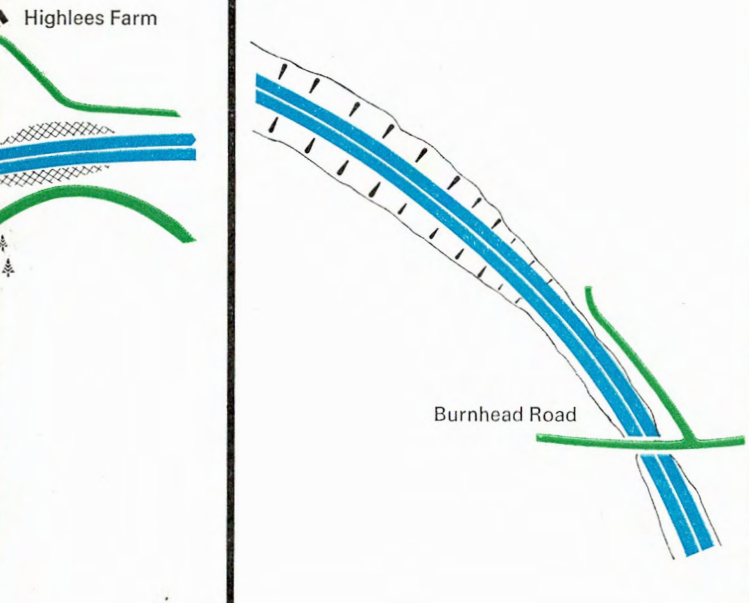


5 A 72 Interchange

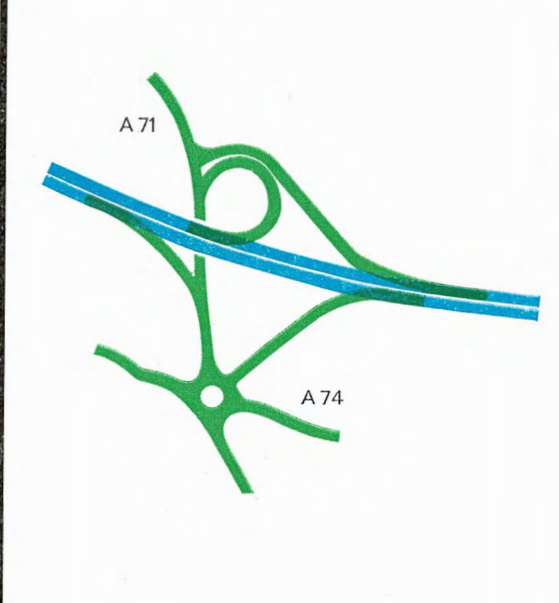




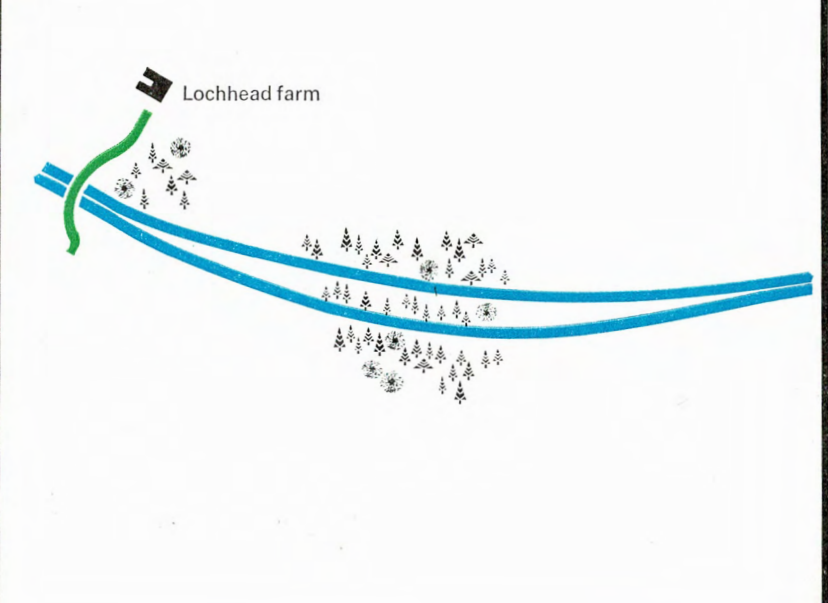
6 Golf Course Cutting



7 A 71 Interchange

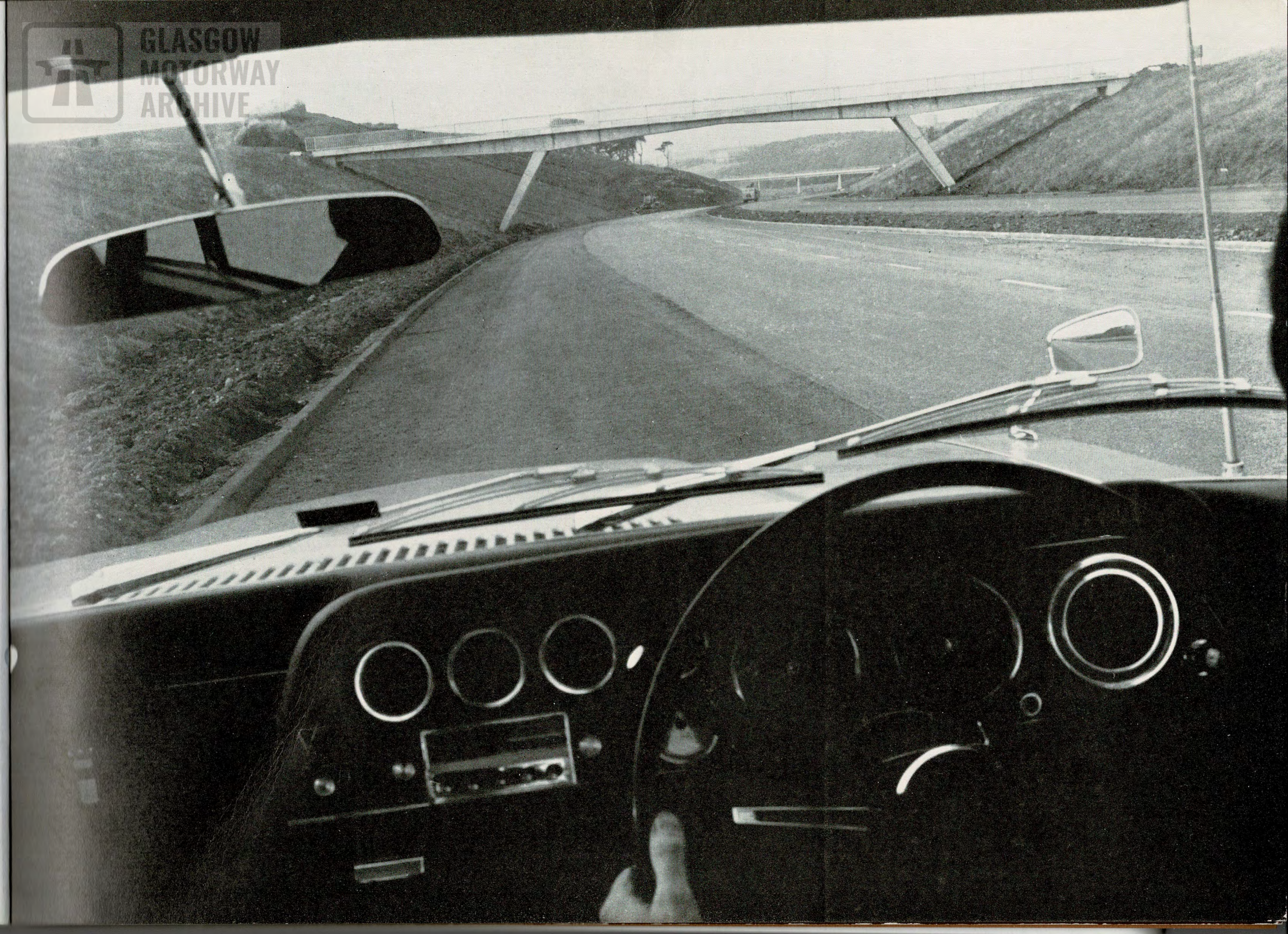


8 Cander Moss





GLASGOW
MOTORWAY
ARCHIVE





GLASGOW
MOTORWAY
ARCHIVE

Consulting Engineers/Babtie Shaw & Morton CCE Glasgow
Main Contractor/Christiani Shand Limited London