

Visit by Institution of Municipal Engineers to
Site of Road Diversion & New Bridge at
Canderside near Stonehouse, Route A.71,
on Thursday, 10th June, 1965.

The location of the Works is on the East & West Highway A.71 commencing 300 yards West of the roundabout at Canderside Toll and diverting to the North-West of the existing road for a distance of approximately 1200 yards to rejoin the existing road just East of Stonehouse. The new bridge crosses at an approximate height of 80 ft. above the Cander Water and is situated 150 yards downstream from the existing masonry three span arch bridge constructed by Thomas Telford in 1821.

This improvement scheme has been undertaken due to the sub-standard vertical and horizontal alignment conditions of the road in general and of the bridge approaches in particular. Also the narrow deck width of the existing bridge, which accommodates two minimum carriageway lanes with no provision for pedestrians, presents an accident hazard. In addition, difficulties have been encountered in recent years in maintaining the stability of 100 yards of road embankment on the North approach to the bridge.

In the initial planning stages three road lines and bridge sites were considered, and for this investigation work the services of a Mineral Consultant and Mining Engineer proved invaluable in finally locating a satisfactory route and bridge site, near to the line of a demolished railway viaduct, which is free of faulting and has limited areas of shallow mineral workings. Consequently a considerable amount of site preparation and clearance has been required involving the consolidation of a 2 ft. deep Virtuewell coal seam in two areas under the bridgeworks, together with excavation through the old railway viaduct foundations and the removal of demolished masonry.

The roadworks consist of a 24'0" carriageway 8'-0" verge and 8'-0" footpath throughout the length of the diversion, but an allowance has been made in the earthworks on the Canderside Toll side of the bridge for a widening of the carriageway to 33'-0" width, with an additional 9'-6" verge between the footpath, when warranted by traffic conditions.

On the Stonehouse side, the road and earthworks have been kept to a minimum to take the 24'-0" carriageway only plus verge and footpath. The future proposal being to realign from the new bridge and construct a 33'-0" carriageway to by-pass Stonehouse on the line of the disused railway.

The bridge is 325'-0" long overall. The decking, of 10 No. - 32'-6" long simply supported spans, is of composite slab construction with 24 No. P.C.D.G. prestressed beams, of three types, in each span and has an in-situ service duct under the footpath. These spans will be linked for longitudinal thrust and expansion into two groups of 5 No. spans and at the semi-fixed supports, the spans are carried on strip rubber bearings which with dowel bars and rubber caps will form a thrust connection between these supports and the decking concrete. At each bankseat and at the central decking support, individual composite metal and rubber bonded expansion bearings will be used under each beam. It is also proposed to use a recently developed rubber expansion joint strip in the road surface over each expansion joint.

The reinforced concrete substructure consists of terminal bankseats and a series of two hinged portal supports forming two and three/

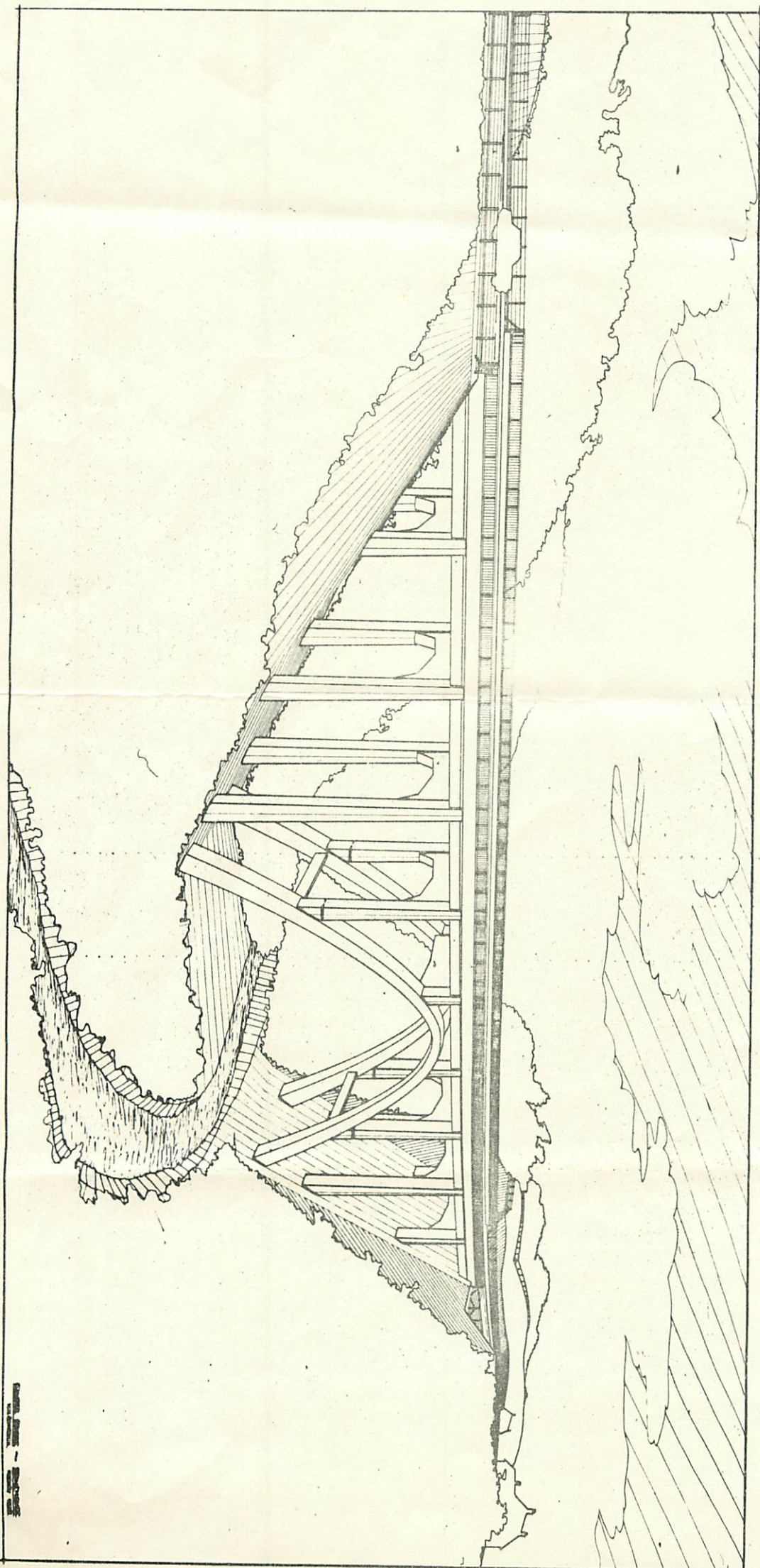
three approach spans on the East and West sides respectively, with the five remaining spans being carried over the Cander Water on an open spandrel arch structure. The arch consists of two parallel parabolic fixed end arch ribs at 40'-2" centres apart having a span of 130'-0" and a rise of 55'-0" from springer to crown measured on the arch axes. Each arch rib is 7'-0" wide and is 5'-0" deep at the springer reducing to 3'-0" deep at the crown and they are interconnected at the $\frac{1}{8}$ th points by tension members and at the $\frac{3}{8}$ th points, near the crown, by fixed end cross-head supports. The arch abutments have been located in strata comprising of sandstone, fakes and ribs lying well below the levels of the consolidated coal workings and they also act as a combined footing for the two largest two hinged portal supports which rise to just over 60 ft. in height. The mass concrete bankseats are the only substructure units to have foundation levels higher than the areas of the consolidation works.

A constructional feature of note has been the adaptation of "Bailey" bridging units as centering for the arch ribs. Specially designed for the Contractor, the units have been linked together so as to closely conform to the parabolic arch shape and it has resulted in a unique solution to the falsework problem. Each arch rib is supported on a "five-single" panel system which are inter-connected transversely, by normal transoms and tie rods, through a similar "double-single" arch lying along the longitudinal axis of the bridge.

The centering of the approach span portals has been carried out using a proprietary system of scaffolding but another system may be employed for the four supports on the arch structure as during construction all additional loading must be taken from ground level.

On opposite sides of the glen two concrete plants are in operation and the whole site is covered by two well positioned 5 ton, 150 ft. jib derrick cranes.

The work is being carried out by Murdoch Mackenzie Ltd., Motherwell, on behalf of T.U.Wilson, C.B.E., T.D., D.L., M.I.C.E., M.I.Mun.E., F.Inst.H.E., County Surveyor & Engineer of the County Council of the County of Lanark.



Station	Existing Grade	Proposed Grade
0+	492.56	492.56
1+	491.52	491.26
2+	490.25	490.25
3+	489.28	487.10
4+	488.25	487.11
5+	486.23	485.25
6+	487.56	486.24
7+	488.25	486.24
8+	489.25	486.24
9+	489.23	484.28
10+	487.28	485.25
11+	487.28	485.25
12+	483.25	485.25
13+	480.28	485.25
14+	481.25	485.25
15+	481.25	485.25
16+	481.25	485.25
17+	481.25	485.25
18+	481.25	485.25
19+	481.25	485.25
20+	481.25	485.25
21+	481.25	485.25
22+	481.25	485.25
23+	481.25	485.25
24+	481.25	485.25
25+	481.25	485.25
26+	481.25	485.25
27+	481.25	485.25
28+	481.25	485.25
29+	481.25	485.25
30+	481.25	485.25
31+	481.25	485.25
32+	481.25	485.25
33+	481.25	485.25
34+	481.25	485.25
35+	481.25	485.25
36+	481.25	485.25
37+	481.25	485.25
38+	481.25	485.25
39+	481.25	485.25
40+	481.25	485.25
41+	481.25	485.25
42+	481.25	485.25
43+	481.25	485.25
44+	481.25	485.25
45+	481.25	485.25
46+	481.25	485.25
47+	481.25	485.25
48+	481.25	485.25
49+	481.25	485.25
50+	481.25	485.25

