

OW/ME/26

VENTILATION SURVEY

CHAT. WHITFIELD COLLIERY

CARRIED OUT AUG. 1964

NATIONAL COAL BOARD

West Midlands Division

No.1 (North Staffs.) Area.

CHATTERLEY WHITFIELD COLLIERY.

Ventilation Survey

Introduction.

A quantity/pressure survey was carried out at Chatterley Whitfield Colliery during the annual holidays in August, 1964. The survey covered all main roads, and in addition to air quantities and ventilating pressures, roadway sizes throughout the mine were also measured.

Water Gauge Absorption.

Water gauge absorption rates for the various districts are shown on plans 1 to 3 inclusive. Where the rate of water gauge absorption exceeds 1 inch/1,000 yards of roadway the rate is excessive and indicates the desirability of roadway enlargement.

Also enclosed are roadsize plans (Plans 1A to 3A inclusive) which indicate the cross-sectional area of the roadways. In considering the efficiency of any airway the cross-sectional area and the water gauge absorption rate must be taken into account.

Detailed Results of Survey.

Plans 1 and 1A.

From plan 1 it can be seen that the most serious bottleneck in the Hesketh Pit ventilation system are the Banbury dips, 2.3 inches W.G. being absorbed in 1,100 yards of roadway. From a point 200 yards up the back dip 1.3 inches W.G. are absorbed in 200 yards of roadway and between the top of the dip and the shaft inset 0.7 inches W.G. are absorbed in 300 yards of roadway. In the main dip, the 300 yards of roadway immediately above 4's Landing absorbs 1.1 inches W.G., the remaining 1.2 inches W.G. being fairly evenly distributed up the dip.

The cross-sectional area of the back dip varies between 20 sq.ft. and 60 sq.ft. whilst the cross-sectional area of the main dip, except for one or two short lengths, is in the region of 80 sq.ft. The difference in the two dips is clearly illustrated by the ratio of the air split which is 4.5:1, 21,000 c.f.m. of air going up the back dip and 91,000 c.f.m. of air going up the main dip.

The Hesketh back crut, from the Cockshead junction inbye varies between 40 and 70 sq.ft. with short lengths (too short to show on plan) between 10 and 20 sq.ft.

Plans 3 and 3A.

In the Middle Pit the roadways are generally large enough for the amount of air they are required to carry. The only serious bottleneck occurs between the sludge crut and the pit bottom where 0.5" W.G. is absorbed in 200 yards.

Future Ventilation Requirements.

From the survey results obtained, the Ventilation Network Calculator was set up and a series of exercises carried out.

Exercise 1.

Hesketh to Middle Pit connection completed -
existing fan running.

Thurling the Hesketh to Middle Pit crut would make little or no difference to the present ventilation system. Approximately 20,000 c.f.m. of air would travel from Middle Pit to the Hesketh via the new crut. The air quantity travelling down the Middle Pit shaft would increase by 20,000 c.f.m. with a corresponding decrease down the Hesketh shaft.

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Exercise 2.

Hesketh to Middle Pit connection completed -
new fan running.

This exercise revealed that with the conditions underground unchanged regarding roadsizes etc., the initial duty of the fan would be approximately 360,000 c.f.m. of air at 14.0" W.G.

For the purpose of the exercise the following districts were regulated to have the flows stated:-

Brights	45,000 c.f.m.
Bullhurst	90,000 c.f.m.
Cockshead	30,000 c.f.m.
Hesketh to Middle Pit Crut	40,000 c.f.m.

The Brights and Cockshead air quantities would be similar to the existing quantities, but the Bullhurst quantity would be increased by 20,000 c.f.m. of air. The new crut could be regulated according to the Managements requirements. However with 40,000 c.f.m. of air going along the new crut a total of 66,000 c.f.m. of air would be available to ventilate the Moss district, an increase of 20,000 c.f.m. of air compared with existing conditions. The ventilation of the Middle Pit would remain unchanged except for the districts on the Nort Side, which would suffer a slight reduction in quantity.

Exercise 3.

This exercise was similar to Exercise 2, the difference being,
the Hesketh cruts were made parallel intakes up to Old Whitfield
and the new crut was not regulated.

There would be no apparent difference in the fan performance.

The amount of air travelling along the new crut would be 30,000 c.f.m. unregulated. The amount of air available for the Moss would be 77,000 c.f.m. The amount of air in the Moss district would be approximately 30,000 c.f.m. of air more than is circulated at the present time.

The ventilation of the Middle Pit would be unchanged. Some difficulty would be experienced in ventilating the No.1 North Moss pressure stoppings and the Ten Feet Battery charging station as a return airway would not be easily accessible.

Exercise 4.

As exercise 3 with both Banbury dips each enlarged
to at least 80 sq.ft. throughout.

The overall effect on the mine of enlarging both Banbury dips to at least 80 sq.ft. would be to increase the quantity of air available in the Moss seam to 90,000 c.f.m. All other districts along the Hesketh crut being regulated. The Middle Pit would not be affected.

Exercise 5.

Middle Pit to Platt pit connection complete -
All air returning up Platt Shaft. Middle Pit filled in.

The duty of the fan would be 405,000 c.f.m. of air at 13.0 inches W.G.

The Bellringer, Bullhurst and Cockshead districts were regulated as in previous exercises. The new crut was regulated to carry 50,000 c.f.m. of air from Hesketh to Middle Pit and the Bellringer dip was regulated to 10,000 c.f.m. of air. The Middle Pit ventilation would be more efficient using this method as almost all the air could be usefully employed. There would be 70,000 c.f.m. of air available to ventilate the Moss districts.

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Exercise 6.

Platt and Institute Shafts as parallel upcasts.

The fan duty would be 420,000 c.f.m. of air at 13.0 W.G. With the districts regulated as in previous exercises the ventilation in the Middle Pit would remain unchanged.

In the Moss districts 77,000 c.f.m. of air would be available. The air would split up the two shafts as follows:-

Platt Shaft	240,000 c.f.m.
Institute Shaft	150,000 c.f.m.

Recommendations.

It is recommended that all sections of roadway that are coloured either Blue, Red, Grey or Brown on Plan 1A should be enlarged to at least 100 sq.ft.

This roadway enlargement would increase the Equivalent Orifice of the mine, which in turn would enable the fan to work more efficiently.

It was noted during the survey that work had commenced to enlarge the Banbury back dip.

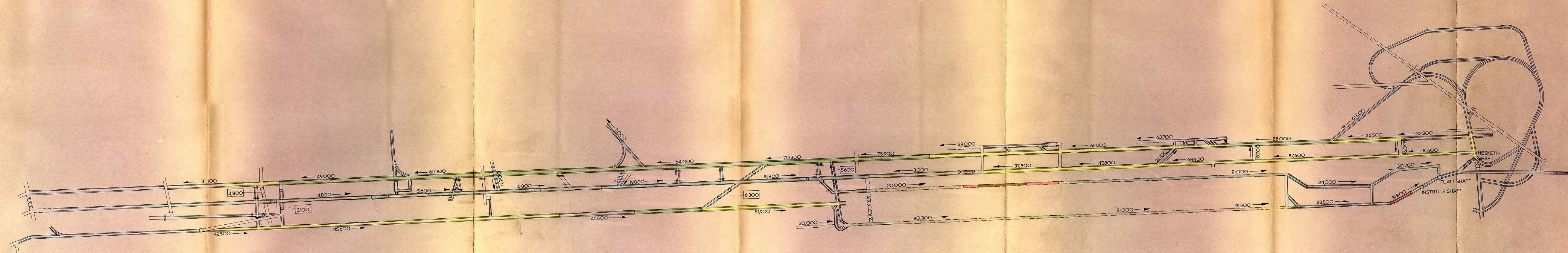
R Kirk

Ventilation Section.
8th December, 1964.

Air Quantities Shown in Cubic Feet Per Minute
 Leakages Shown Thus: 3000

Roadway Area in Square Feet

Less than 10	
10 — 20	
20 — 30	
30 — 40	
40 — 60	
60 — 80	
80 — 100	
More than 100	



NATIONAL COAL BOARD			
WEST MIDLANDS DIVISION		No. 1 NORTH STAFFS AREA	
CHATTERLEY WHITFIELD COLLIERY			
ROAD SIZE PLAN FOR HESKETH PIT MAIN ROADS			
DRAWN BY	B.B.	SCALE	DRAWING No. CH.W/SUR/8
TRACED BY		1/2500	
CHECKED BY		DATE	
PASSED BY		AUG 1964	

Water Gauge Absorption Rate

1 inch in more than 2000 yards shown
 1 .. 1000 to 2000 ..
 1 .. 750 to 1000 ..
 1 .. 500 to 750 ..
 1 .. less than 500 ..

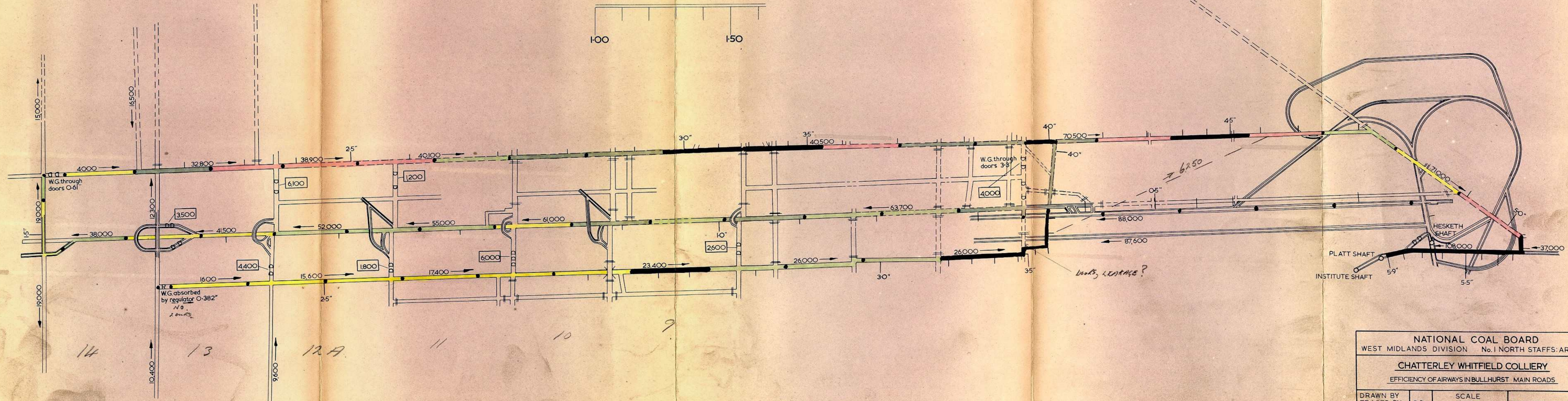


Distribution of Ventilation Pressure in Inches Water Gauge Shown Thus:



Air Quantities Shown in Cubic Feet Per Minute

Leakages Shown Thus: 3000

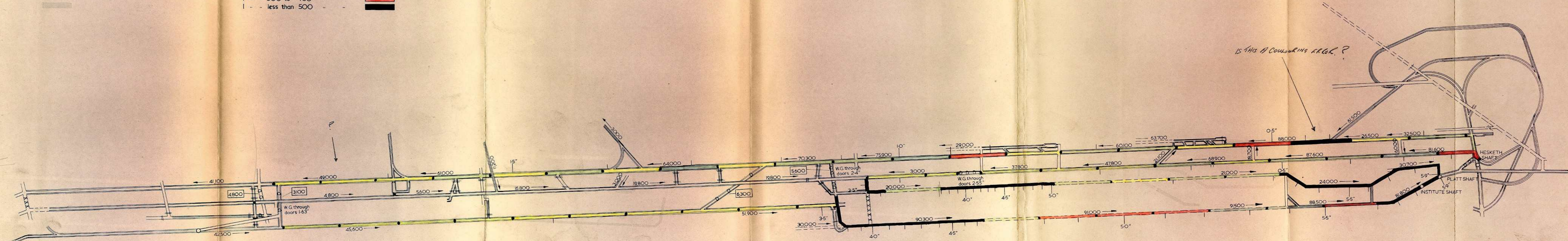


NATIONAL COAL BOARD			
WEST MIDLANDS DIVISION No. 1 NORTH STAFFS AREA			
CHATTERLEY WHITFIELD COLLIERY			
EFFICIENCY OF AIRWAYS IN BULLHURST MAIN ROADS			
DRAWN BY	B.B.	SCALE	DRAWING No.
TRACED BY		1/2500	
CHECKED BY		DATE	
PASSED BY		AUG. 1964	CH.W/SUR/6

Water Gauge Absorption Rate
1 inch in more than 2000 yards shown
1 .. 1000 to 2000 ..
1 .. 750 to 1000 ..
1 .. 500 to 750 ..
1 .. less than 500 ..

Distribution of Ventilation Pressure in
Inches Water Gauge Shown Thus:
1.00 1.50

Air Quantities Shown in Cubic Feet Per Minute
Leakages Shown Thus :- 3000

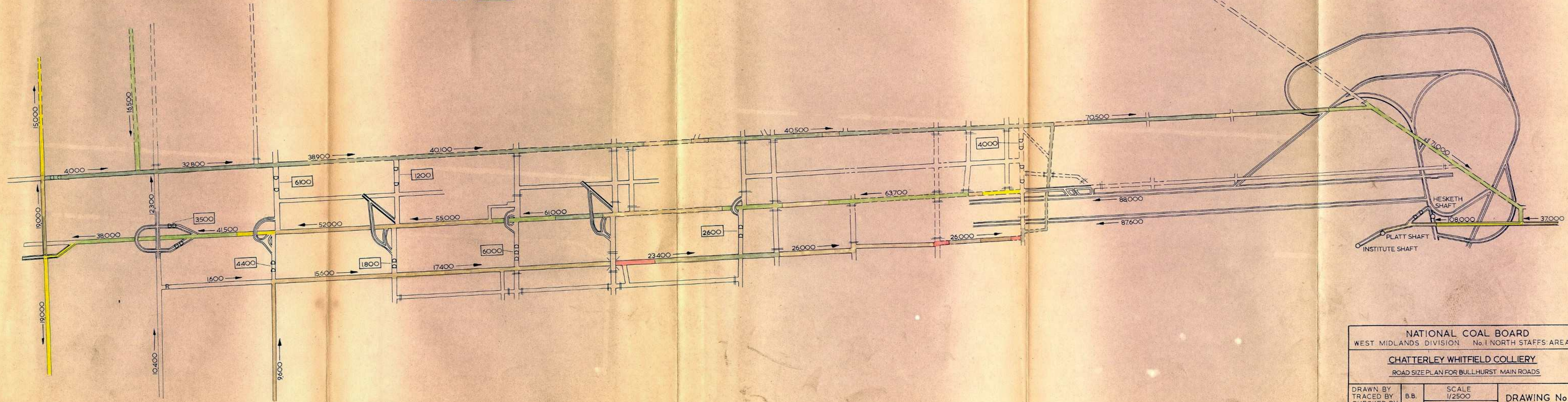


NATIONAL COAL BOARD			
WEST MIDLANDS DIVISION No. 1 NORTH STAFFS AREA			
CHATTERLEY WHITFIELD COLLIERY			
EFFICIENCY OF AIRWAYS IN HESKETH PIT MAIN ROADS			
DRAWN BY	B.B.	SCALE	DRAWING No. CH.W/SUR/5
TRACED BY		1/2500	
CHECKED BY		DATE	
PASSED BY		AUG. 1964	

Roadway Area in Square Feet

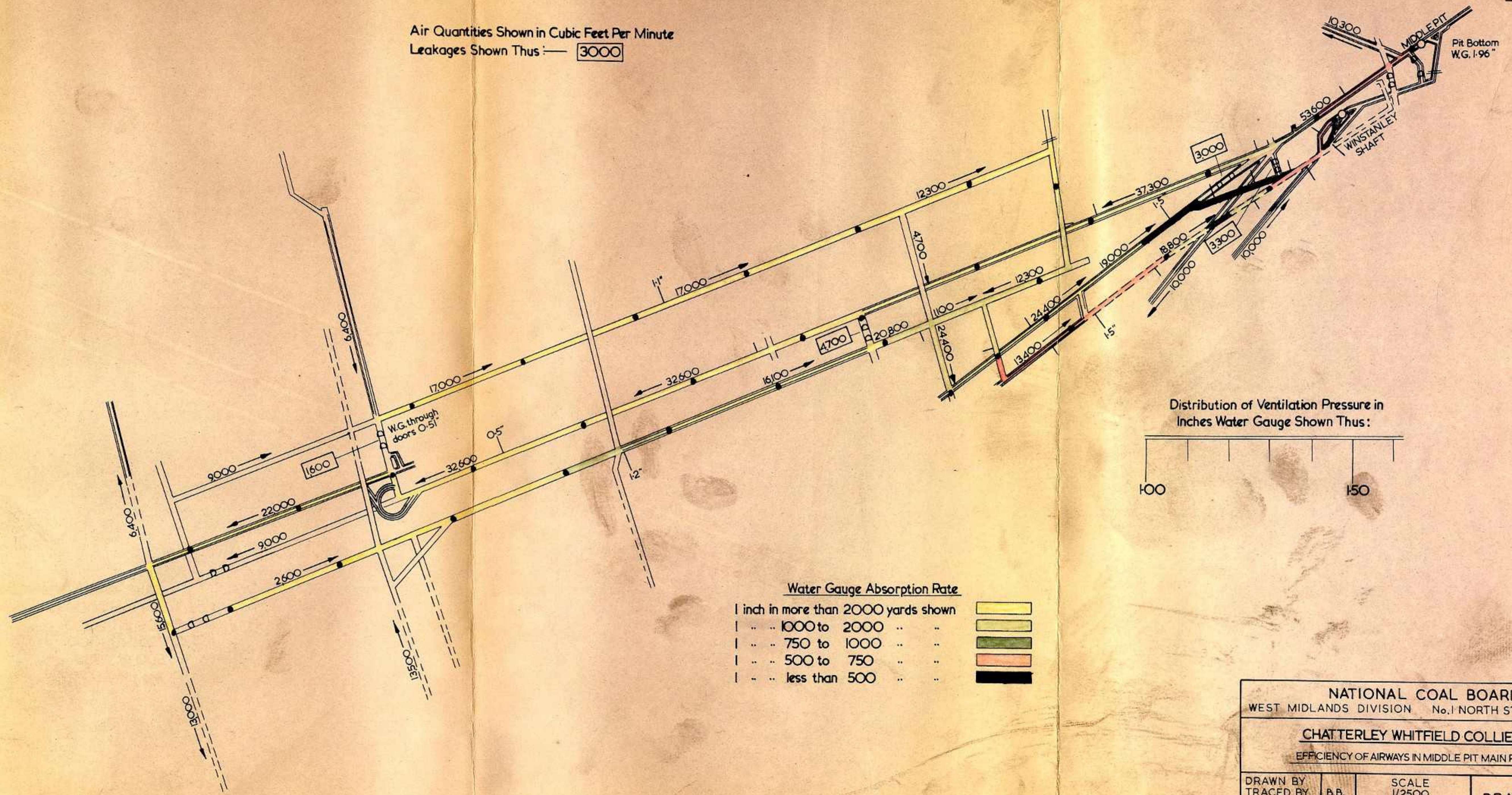
Less than 10	
10 — 20	
20 — 30	
30 — 40	
40 — 60	
60 — 80	
80 — 100	
More than 100	

Air Quantities Shown in Cubic Feet Per Minute
Leakages Shown Thus :— 3000



NATIONAL COAL BOARD			
WEST MIDLANDS DIVISION No. 1 NORTH STAFFS AREA			
CHATTERLEY WHITFIELD COLLIERY			
ROAD SIZE PLAN FOR BULLHURST MAIN ROADS			
DRAWN BY	B.B.	SCALE	DRAWING No. CH.W./SUR/9
TRACED BY		1/2500	
CHECKED BY		DATE	
PASSED BY		AUG. 1964	

Air Quantities Shown in Cubic Feet Per Minute
 Leakages Shown Thus: 3000



Distribution of Ventilation Pressure in
 Inches Water Gauge Shown Thus:

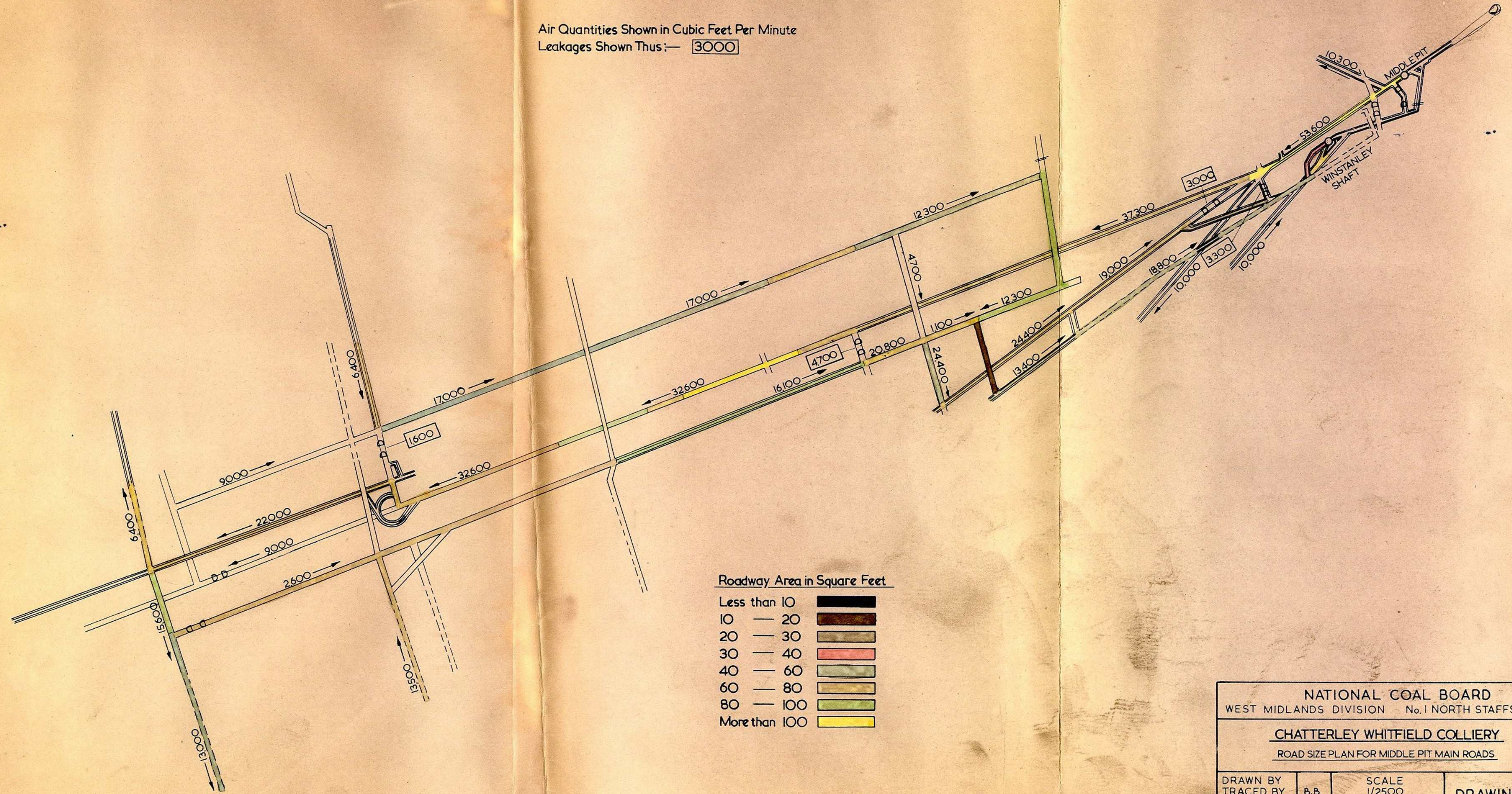


Water Gauge Absorption Rate

1 inch in more than 2000 yards shown	
1 .. 1000 to 2000	
1 .. 750 to 1000	
1 .. 500 to 750	
1 .. less than 500	

NATIONAL COAL BOARD WEST MIDLANDS DIVISION No. 1 NORTH STAFFS AREA			
CHATTERLEY WHITFIELD COLLIERY EFFICIENCY OF AIRWAYS IN MIDDLE PIT MAIN ROADS			
DRAWN BY	B.B.	SCALE	DRAWING No.
TRACED BY		1/2500	CH.W/SUR/7
CHECKED BY		DATE	
PASSED BY		AUG. 1964	

Air Quantities Shown in Cubic Feet Per Minute
Leakages Shown Thus: 3000



Roadway Area in Square Feet

Less than 10	
10 — 20	
20 — 30	
30 — 40	
40 — 60	
60 — 80	
80 — 100	
More than 100	

NATIONAL COAL BOARD WEST MIDLANDS DIVISION No. 1 NORTH STAFFS AREA		
CHATTERLEY WHITFIELD COLLIERY ROAD SIZE PLAN FOR MIDDLE PIT MAIN ROADS		
DRAWN BY TRACED BY CHECKED BY PASSED BY	B.B.	SCALE 1/2500 DATE AUG. 1964
		DRAWING No. CH.W/SUR/10