APPENDIX 1

TRAFFIC STUDIES

Traffic Studies

Line Density of Passenger and Freight Traffic

Distribution of Passenger Traffic—Station Receipts

Distribution of Freight Traffic—Station Tonnage and Receipts

Distribution of Freight Traffic—Private Sidings

General Merchandise and Minerals Wagon-Load Traffics

Traffic not Carried by Rail Freight Sundries Traffic

TRAFFIC STUDIES

In July 1961 a number of traffic studies were embarked upon designed to obtain much more information than had hitherto been available regarding the working of the railway and its future prospects. These embraced the following:—

(1) A study to determine the contribution each station, depot, and section of line makes to the system as a whole in both the passenger and freight fields.
(2) A cost study to establish the characteristics of all wagon-load freight traffic and to determine which traffics were profitable to the railway and under what conditions.
(3) A study to ascertain the pattern and characteristics of all wagon-load mineral and merchandise traffic not passing by rail and the volume, direction, distance, and terminal requirements of that part of it judged to be favourable to rail. The study included consideration of how the traffic would be carried by rail.
(4) A study, similar to No. (3), in respect of coal class traffic.
(5) A study to establish the volume and characteristics of less than wagon-load traffic with the object of deciding upon the practicability of devising a plan for remunerative handling of this type of traffic.

Whilst each of the studies yielded information which was of value in itself, the group of studies was planned so that results could be integrated for the purpose of determining the shape and size of a railway fitted to present day conditions and requirements.

The outcome of these studies is described in considerable detail in the pages which follow and is illustrated by tables, graphs and maps.

LINE DENSITY OF PASSENGER AND FREIGHT TRAFFIC

In 1961 the route mileage open to traffic was 17,830. The density of passenger and freight traffic over each section of route, excluding certain areas of considerable complexity, was assessed during a normal week.

The following tables show the disparity between the different parts of the system measured by the percentage of passenger miles and freight ton miles occupying the route mileage in the groups.

Table No. 1

DENSITY OF PASSENGER TRAFFIC

Range—passenger miles	Route miles			Percentage of total passenger miles	
	Actual	Percentage of total			
	(Figures in brackets are cumulative)				
Less than 2,000 passenger miles	6,056	36		1	
2,000-9,999	4,612	27	(63)	7	(8)
10,000-19,999	2,186	13	(76)	10	(18)
20,000-39,999	1,982	11	(87)	17	(35)
40,000-79,999	1,349	8	(95)	23	(58)
80,000-179,999	689	4	(99)	24	(82)
180,000 passenger miles and over	188	1	(100)	18	(100)
TOTAL	17,062	100		100	

Table No. 2

DENSITY OF FREIGHT TRAFFIC

Range—ton miles	Route miles			Percentage of ton miles	
	Actual	Percentage of total			
	(Figures in brackets are cumulative)				
Less than 5,000 ton miles	7,221	42		3	
5,000-19,999 tons	4,061	24	(66)	13	(16)
20,000-39,999 tons	2,648	16	(82)	21	(37)
40,000-69,999 tons	1,779	10	(92)	25	(62)
70,000-99,999 tons	949	6	(98)	22	(84)
100,000 ton miles and over	404	2	(100)	16	(100)
TOTAL	17,062	100		100	

Table No. 3

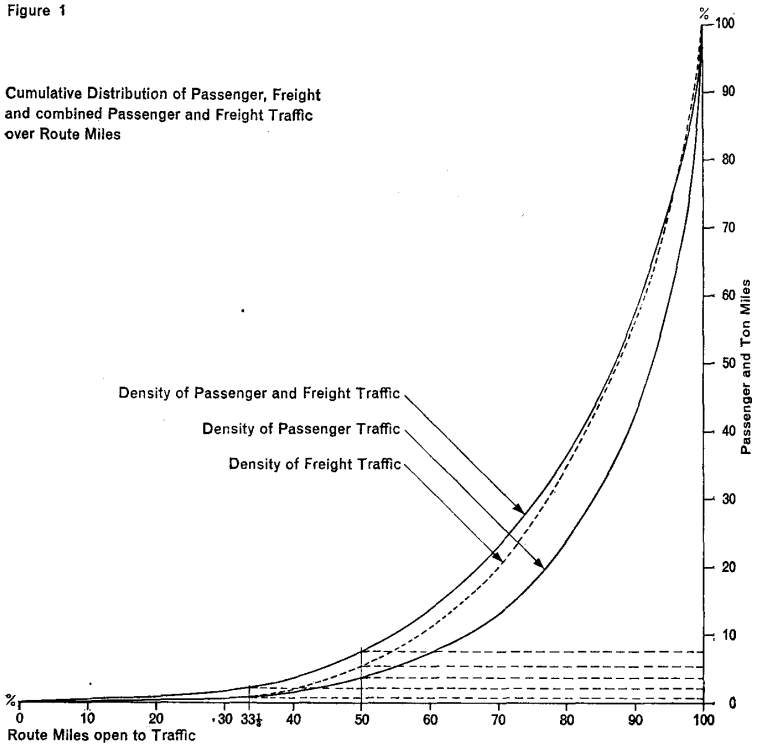
DENSITY OF PASSENGER AND FREIGHT TRAFFIC

Range— passenger miles combined with ton miles	Route miles			Percentage of passenger/ton miles	
	Actual	Percentage of total			
	(Figures in brackets are cumulative)				
Less than 10,000	6,633	39		3	
10,000-39,999	4,690	28	(67)	16	(19)
40,000-79,999	2,890	17	(84)	23	(42)
80,000-119,999	1,586	9	(93)	23	(65)
120,000-249,999	1,067	6	(99)	25	(90)
250,000 units and over	196	1	(100)	10	(100)
TOTAL	17,062	100		100	

The distribution of traffic between the least used and most used parts of the system is also illustrated by Figure No. 1.

Figure 1

Cumulative Distribution of Passenger, Freight and combined Passenger and Freight Traffic over Route Miles



It will be seen that one-third of the route mileage carries only 1 per cent. of the total passenger miles. Similarly,

one-third of the mileage carries only 1 per cent. of the total freight ton miles, and the corresponding figures for the least used half are 4 per cent. and 5 per cent. of passengers and freight respectively. It will also be seen that one-third of the route mileage carries only *2 1/2* per cent. of the total passenger and freight traffic, combined by adding passenger miles and ton miles as equal units, and half the route mileage carries only 7 1/2 per cent. of the total traffic.

Maps Nos. 1 and 2 show the distribution of passenger and freight traffic density over the railway route system. The volume passing in a normal week is indicated either by broken lines of different types or by continuous lines indicating density by their thickness.

There is a striking disparity between the heavily loaded and extremely lightly loaded lines shown on the maps.

It is noticeable, from both maps, that the majority of the little-used lines are away from main centres of population, industrial areas, centres of raw material production, and the major ports. As would be expected, the main routes between the key centres are those which are most used.

The two most striking differences between the map showing passenger travel and the map showing freight traffic occur in London and in the Leeds-Sheffield-Derby area.

The dominance of London in the passenger field as compared with the rest of the country is well illustrated. Equally, the freight movement in the industrial area mentioned dominates the freight picture.

The heavier passenger travel outside London and the large cities is concentrated on a lesser number of routes than is freight.

Short distance passenger movement into and out of the major cities is clearly seen. Much of this is twice daily peak travel at sub-standard fares, and the line thicknesses should be interpreted with this in mind.

Line densities are not the only measure of the use made of the railway and in the sections which follow the contribution made by stations in the fields of passenger travel and freight movement are given in supporting tables. Any apparent discrepancies in totals are due to rounding.

DISTRIBUTION OF PASSENGER TRAFFIC—STATION RECEIPTS

There are marked disparities in the contribution which stations make to passenger traffic. Whilst passenger receipts are not necessarily a true measure of the contribution each station makes, because some receive more traffic than they originate, they can be regarded as a reasonable guide.

Passengers

An analysis of the revenue accruing from passengers during 1960 at 4,300 stations which were still open to passengers at the end of 1962 is given in the following table: —

Table No. 4

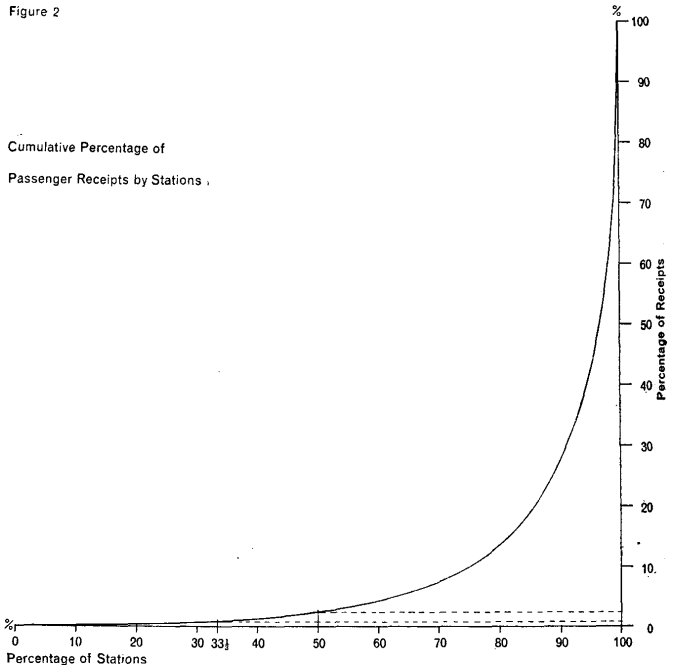
PASSENGER RECEIPTS

(per annum)

Range of passenger receipts	Number of stations			Passenger receipts		
	Actual	Percentage of total		£'000	Percentage of total	
		(Figures in brackets are cumulative)				
Less than £2,500	1,762	41		1,429	1	
£2,500-£9,999	1,119	26	(67)	6,028	5	(6)
£10,000-£49,999	884	21	(88)	20,220	16	(22)
£50,000-£199,999	406	9	(97)	39,484	30	(52)
£200,000-£499,999	95	2	(99)	28,226	22	(74)
£500,000 and over	34	1	(100)	34,196	26	(100)
TOTAL	4,300	100		129,584	100	

It will be seen, from Figure No. 2 which follows, that one third of the stations contributed only 1 per cent. to passenger revenue, and that half of the total number contributed only 2 per cent.

Figure 2



The geographical distribution of the stations throughout the country, together with an indication of the contribution each makes to passenger revenue, is shown in Map No. 3. It will be seen that the smaller stations are not necessarily confined to areas and lines of low density, although, as would be expected, it is in such localities that they predominate.

PARCELS TRAFFIC

Most passenger stations also deal with railway parcels and miscellaneous traffic by coaching trains although all stations open for parcels do not deal with passengers.
In the following table this traffic arising at the same stations is grouped according to originating receipts.

Table No. 5

PARCELS RECEIPTS

(per annum)

Range of receipts	Number of stations			Parcels receipts		
	Actual	Percentage of total		£'000	Percentage of total	
	(Figures in brackets are cumulative)					
Less than £500	2,457	57		341	1	
£500-£2,499	911	21	(78)	1,179	3	(4)
£2,500-£9,999	531	12	(90)	2,896	8	(12)
£10,000-£49,999	301	7	(97)	7,025	19	(31)
£50,000-£299,999	78	2	(99)	8,863	24	(55)
£300,000 and over	22	1	(100)	16,352	45	(100)
TOTAL	4,300	100		36,656	100	

The disparity between stations is again seen. Naturally most of the parcels traffic originates in, and is destined for, areas of dense population. It is not, therefore, surprising that at one end of the scale 2,457 or 57 per cent. of the stations, contribute only 1 per cent. of the parcels receipts, whilst at the other end 100 stations or 3 per cent. account for 69 per cent. of the receipts.

DISTRIBUTION OF FREIGHT TRAFFIC—STATION TONNAGE AND RECEIPTS

Most stations, particularly the smaller ones, deal with freight traffic in addition to passenger and parcels traffic. The respective levels of utilisation are not necessarily the same for passengers, parcels and freight traffics at individual stations, but in general they are similar.

Tables showing the 1960 tonnage of forwarded and received merchandise and minerals, and received coal traffic at 5,031 stations which were open at the end of 1962, follow:—

Table No. 6

MERCHANDISE AND MINERALS FORWARDED

(per annum)

Volume of traffic (tons)	Number of stations			Tonnage		
	Actual	Percentage of total		'000 tons	Percentage of total	
	(Figures in brackets are cumulative)					
Less than 500 tons	2,906	58		243	1	
500-2,499	1,124	22	(80)	1,389	8	(9)
2,500-9,999	668	13	(93)	3,395	20	(29)
10,00-49,999	276	6	(99)	5,685	33	(62)
50,000 tons and over	57	1	(100)	6,513	38	(100)
TOTAL	5,031	100		17,225	100	

Table No. 7

MERCHANDISE AND MINERALS RECEIVED

(per annum)

Volume of traffic (tons)	Number of stations			Tonnage		
	Actual	Percentage of total		'000 tons	Percentage of total	
	(Figures in brackets are cumulative)					
Less than 500 tons	2,526	50		310	1	
500-2,499	1,175	24	(74)	1,413	5	(6)
2,500-9,999	762	15	(89)	3,887	15	(21)
10,000-49,999	453	9	(98)	9,354	35	(56)
50,000 tons and over	115	2	(100)	11,726	44	(100)
TOTAL	5,031	100		26,690	100	

Table No. 8

COAL CLASS TRAFFIC RECEIVED

(per annum)

Volume of traffic	Number of stations			Tonnage			Number of wagons		
(tons)	Actual	Percentage of total		'000 tons	Percentage of total		'000 wagons	Percentage of total	
	(Figures in brackets are cumulative)								
Nil	1,172	23		0			0		
1-999 tons	1,007	20	(43)	395	1	(1)	39	2	(2)
1,000-2,499	783	16	(59)	1,326	5	(6)	123	5	(7)
2,500-4,999	653	13	(72)	2,364	8	(14)	211	9	(16)
5,000-24,999	1,181	24	(96)	12,619	45	(59)	1,121	45	(61)
25,000-49,999	171	3	(99)	5,840	21	(80)	510	21	(82)
50,000 tons and over	64	1	(100)	5,513	20	(100)	459	18	(100)
TOTAL	5,031	100		28,057	100		2,463	100	

A feature is that, although the tonnage of coal received by the smaller stations is small, it is greater than the combined forwarded and received tonnage of minerals and merchandise.

The table which follows shows the position when the forwarded and received traffic is aggregated.

Table No. 9

TOTAL FREIGHT TRAFFIC

(per annum)

Volume of traffic (tons)	Number of stations		Tonnage	
	Actual	Percentage of total	'000 tons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 2,500 tons	1,938	38	3,057	4
2,500-9,999	1,592	32 (70)	8,505	12 (16)
10,000-24,999	833	17 (87)	13,200	18 (34)
25,000-99,999	554	11 (98)	26,110	36 (70)
100,000 tons and over	114	2(100)	21,781	30 (100)
TOTAL	5,031	100	72,653	100

The geographical distribution of the stations throughout the country, together with an indication of the tonnage passing through each, is shown in Map. No. 4.

On Page 11 of the Report there is a reference to the revenue derived from freight traffic at the least used stations. Table No. 10 and Figure No. 3 show the originating receipts at the 5,031 stations during 1960.

Table No. 10

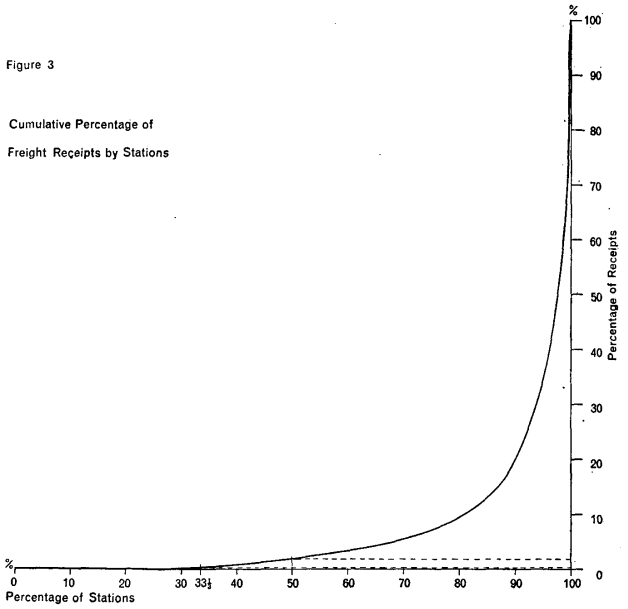
FREIGHT TRAFFIC RECEIPTS

(per annum)

Size groups (originating freight receipts) £'s	Number of stations		Receipts	
	Actual	Percentage of total	£'000	Percentage of total
	(Figures in brackets are cumulative)			
Less than 1,500	2,906	58	2,104	3
1,500-9,999	1,324	26 (84)	5,818	10 (13)
10,000-49,999	468	9 (93)	10,685	18 (31)
50,000-199,999	276	6 (99)	21,357	34 (65)
200,000 and over	57	1 (100)	21,710	35 (100)
TOTAL	5,031	100	61,674	100

Figure 3

Cumulative Percentage of Freight Receipts by Stations



Traffic Survey—April 1961

During the survey of freight traffic in April 1961, the opportunity was taken to record the volume of freight traffic dealt with at the stations which forwarded and received full wagon loads during that week. The results are of some interest compared with the very much more extensive record represented by Tables Nos. 6 to 9 of this Appendix. They are also a pointer to the extent to which many stations deal with no full load traffic at all, for quite considerable periods.

Traffic was distributed as under:—

STATIONS

(Excluding Private Sidings)

	Tons ('000)	*Number of stations*
Minerals and merchandise		
Forwarded	190	2,067
Received	370	2,990
Coal class		
Received	372	3,124

In all, 4,371 stations were concerned in the despatch and receipt of 932,000 tons of traffic.

STATIONS

(Including Private Sidings)

	Tons ('000)	*Number of stations*
Minerals and merchandise		
Forwarded	1,695	2,871
Received	1,695	3,749
Coal class		
Received	2,737	3,590

In all, 4,995 stations and associated private sidings were concerned in the despatch and receipt of 4-4 m. tons of traffic.

Even after making allowance for the fact that the record covered only one week, and for seasonal variations, a striking feature of the analysis was the number of stations which dealt with no freight traffic. There is no doubt that all stations play some part at some period of the year, but it is reasonable to assume that a large proportion of them only receive and forward traffic intermittently.

The eight tables which follow show the participation, firstly, of stations alone and, secondly, of stations including the private sidings associated with them.

Table No. 11

MINERAL AND MERCHANDISE TRAFFIC FORWARDED FROM STATIONS
(EXCLUDING PRIVATE SIDINGS)

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations			Volume of traffic		
	Number	Percentage of total		'000 tons	Percentage of total	
	(Figures in brackets are cumulative)					
Less than 10 tons	602	29		2-5.	1	
10-19	322	16	(45)	4-5	2	(3)
20-49	451	22	(67)	14-8	8	(11)
50-99	264	13	(80)	19-3	10	(21)
100-199	192	9	(89)	27-9	15	(36)
200-499	168	8	(97)	53-4	28	(64)
500-999	50	2	(99)	35-3	19	(83)
1,000-1,999	14	1	(100)	18-9	10	(93)
2,000 tons and over	4	..	(100)	13-6	7	(100)
TOTAL	2,067	100		190-3	100	

Table No. 12

MINERAL AND MERCHANDISE TRAFFIC RECEIVED AT STATIONS
(EXCLUDING PRIVATE SIDINGS)

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations			Volume of traffic		
	Number	Percentage of total		*000 tons	Percentage of total	
	(Figures in brackets are cumulative)					
Less than 10 tons	876	29		3-7	1	
10-19	466	16	(45)	6-3	2	(3)
20-49	591	20	(65)	19-0	5	(8)
50-99	342	11	(76)	25-2	7	(15)
100-199	282	9	(85)	41-3	11	(26)
200-499	265	9	(94)	86-7	23	(49)
500-999	110	4	(98)	80-2	22	(71)
1,000-1,999	40	1	(99)	53-3	14	(85)
2,000 tons and over	18	1	(100)	54-3	15	(100)
TOTAL	2,990	100		370-0	100	

Table No. 13

COAL CLASS TRAFFIC RECEIVED AT STATIONS (EXCLUDING PRIVATE SIDINGS)

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations			Volume of traffic		
	Number	Percentage of total		'000 tons	Percentage of total	
	(Figures in brackets are cumulative)					
Less than 10 tons	101	3		0.8		
10-19	607	19	(22)	7.8	2	(2)
20-49	859	28	(50)	27.3	7	(9)
50-99	580	19	(69)	41.1	11	(20)
100-199	486	16	(85)	67.7	18	(38)
200-499	353	11	(96)	103.6	28	(66)
500-999	107	3	(99)	71.6	19	(85)
1,000-1,999	24	1	(100)	28.5	8	(93)
2,000 tons and over	7	--	(100)	23.2	7	(100)
TOTAL	3,124	100		371.6	100	

Table No. 14

MINERAL AND MERCHANDISE FORWARDED AND RECEIVED AND COAL CLASS TRAFFIC RECEIVED—STATIONS (EXCLUDING PRIVATE SIDINGS)

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations		Volume of traffic	
	Number	Percentage of total	'000 tons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 10 tons	458	10	2-1	
10-19	557	13 (23)	7-5	1 (1)
20-49	917	21 (44)	30-3	3 (4)
50-99	701	16 (60)	50-2	5 (9)
100-199	633	14 (74)	91-4	10 (19)
200-499	640	15 (89)	204-5	22 (41)
500-999	268	6 (95)	190-8	20 (61)
1,000-1,999	148	4 (99)	200-4	22 (83)
2,000 tons and over	49	1 (100)	154-5	17 (100)
TOTAL	4,371	100	931-9	100

When private siding traffic is included, as shown in the following tables, it is noticeable that the effect at the lower levels is negligible. It will be seen from the above table that 1,932 stations, 44 per cent. of the total, dealt with only 40,000 tons, or 4 per cent. of the total at all stations. In Table No. 18, 2,356 stations with their associated private sidings, 48 per cent. of the total, dealt with 84,300 tons or 2 per cent. of the total of 4-4 m. tons passing during the test period.

Table No. 15

MINERAL AND MERCHANDISE TRAFFIC FORWARDED FROM STATIONS AND PRIVATE SIDINGS

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations		Volume of traffic	
	Number	Percentage of total	'000 tons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 20 tons	938	33	7-4	
20-49	493	18 (51)	16-2	(1)
50-99	347	12 (63)	25-5	2 (3)
100-199	297	10 (73)	43-7	3 (6)
200-499	321	11 (84)	104-8	6 (12)
500-999	178	6 (90)	126-3	7 (19)
1,000-1,999	126	4 (94)	182-1	11 (30)
2,000-4,999	99	3 (97)	319-7	19 (49)
5,000-9,999	44	2 (99)	306-2	18 (67)
10,000-19,999	20	1 (100)	323-7	19 (86)
20,000 tons and over	8	(100)	239-8	14 (100)
TOTAL	2,871	100	1,695-4	100

Table No. 16

MINERAL AND MERCHANDISE TRAFFIC RECEIVED AT STATIONS AND PRIVATE SIDINGS

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations		Volume of traffic	
	Number	Percentage of total	'000 tons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 20 tons	1,294	34	10-2	
20-49	669	18 (52)	22-0	1 (1)
50-99	446	12 (64)	32-6	2 (3)
100-199	379	10 (74)	55-0	3 (6)
200-499	434	12 (86)	141-6	8 (14)
500-999	240	6 (92)	172-8	10 (24)
1,000-1,999	144	4 (96)	205-8	12 (36)
2,000-4,999	80	2 (98)	251-4	15 (51)
5,000-9,999	39	1 (99)	282-6	17 (68)
10,000-19,999	14	1 (100)	188-7	11 (79)
20,000 tons and over	10	(100)	332-8	21 (100)
TOTAL	3,749	100	1,695-4	100

Table No. 17

COAL CLASS TRAFFIC RECEIVED AT STATIONS AND PRIVATE SIDINGS

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations		Volume of traffic	
	Number	Percentage of total	*000 tons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 20 tons	694	19	8-5	
20-49	814	23 (42)	26-5	1 (1)
50-99	559	16 58)	40-3	1 (2)
100-199	498	14 72)	71-0	3 (5)
200-499	431	12 84)	130-3	5 (10)
500-999	214	6 (90)	151-6	6 (16)
1,000-1,999	130	4 (94)	178-6	7 (23)
2,000-4,999	134	4 (98)	420-0	15 (38)
5,000-9,999	57	1 (99)	403-5	15 (53)
10,000-19,999	41	1 (100)	559-3	20 (73)
20,000 tons and over	18	. .	747-6	27 (100)
TOTAL	3,590	100	2,737-2	100

Table No. 18

MINERALS AND MERCHANDISE FORWARDED AND RECEIVED AND COAL CLASS TRAFFIC RECEIVED—STATIONS AND PRIVATE SIDINGS

Week ended 23rd April, 1961

Volume of traffic (tons)	Number of stations		Volume of traffic	
	Number	Percentage of total	'000 tons	Percentage of total traffic forwarded*
	(Figures in brackets are cumulative)			
Less than 20 tons	884	18	8-7	
20-49	796	16 (34)	26-5	
50-99	676	14 (48)	49-1	1
100-199	661	14 (62)	95-8	2
200-499	702	14 (76)	228-8	5
500-999	415	8 (84)	299-6	7
1,000-1,999	319	6 (90)	458-1	10
2,000-4,999	302	6 (96)	941-1	21
5,000-9,999	122	2 (98)	858-6	19
10,000-19,999	73	1 (99)	1,056-5	24
20,000 tons and over	45	1(100)	2,105-5	47
TOTAL	4,995	100		

* The total volume of traffic forwarded was 4.4 m. tons.

DISTRIBUTION OF FREIGHT TRAFFIC—PRIVATE SIDINGS

A considerable proportion of the freight carried by rail is dealt with through private sidings and, as in the case of stations, there is a large number through which very little traffic passes.

The tables which follow show the number of loaded wagons forwarded and received during 1960.

Table No. 19

PRIVATE SIDING TRAFFIC FORWARDED
(per annum)

Number of wagons	Number of private sidings		Wagons	
	Actual	Percentage of total	'000 wagons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 50 wagons	2,559	43	16	0
50-499	1,245	21 (64)	251	1 (1)
500-2,499	944	16 (80)	1,118	6 (7)
2,500-9,999	624	11 (91)	3,570	20 (27)
10,000-29,999	392	7 (98)	6,814	38 (65)
30,000 wagons and over	130	2(100)	6,441	35 (100)
TOTAL	5,894	100	18,210	100

It will be seen that 3,804 sidings forwarded only 1 per cent. of the traffic, whereas at the other end of the scale, 130 sidings accounted for 35 per cent.

Table No. 20

PRIVATE SIDING TRAFFIC RECEIVED *(per annum)*

Number of wagons	Number of private sidings		Wagons	
	Actual	Percentage of total	'000 wagons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 50 wagons	2,011	34	18	0
50-499	1,782	30 (64)	373	3 (3)
500-2,499	1,216	21 (85)	1,366	10 (13)
2,500-9,999	601	10 (95)	3,322	23 (36)
10,000-29,999	189	3 (98)	3,056	22 (58)
30,000 wagons and over	95	2(100)	5,891	42 (100)
TOTAL	5,894	100	14,026	100

The pattern is similar to the forwarded position, 3,793 sidings receiving only 3 per cent. of the wagons, whilst 95 sidings received 42 per cent.

Table No. 21

PRIVATE SIDING TRAFFIC FORWARDED AND RECEIVED

(per annum)

Number of wagons	Number of private sidings		Wagons	
	Actual	Percentage of total	'000 wagons	Percentage of total
	(Figures in brackets are cumulative)			
Less than 50 wagons	1,033	17	16	0
50-499	1,642	28 (45)	359	1 (1)
500-2,499	1,464	25 (70)	1,774	6 (7)
2,500-9,999	900	15 (85)	4,781	15 (22)
10,000-29,999 ..	621	11 (96)	10,687	33 (55)
30,000 wagons and over	234	4(100)	14,619	45 (100)
TOTAL	5,894	100	32,236	100

Clearly, a study of the position of each private siding in the smaller sized groups may well reveal that their usefulness is far removed from what was originally intended.

GENERAL MERCHANDISE AND MINERALS WAGON-LOAD TRAFFICS

During the week ended 23rd April, 1961, a special study was made of wagon-load freight traffic despatched by rail.

The test covered virtually the whole of the traffic forwarded to and from stations and private sidings during the selected week. In relation to the total traffic for 1961, it was estimated to represent about one week's proportion.

The week selected for the test was reasonably representative of the general pattern of the wagon-load traffic carried, although it was appreciated that there were substantial seasonal traffics and that there could be appreciable fluctuations in regular traffics.

The volume of wagon-load General Merchandise and Minerals traffic recorded in the test week was:—

Consignments	82,000
Tonnage	1,695,000
Loaded wagons and containers	182,400
Loaded wagon miles	18,652,000
The receipts and estimated costs shown below were:—	
Receipts	£2,253,000
Estimated direct costs	£2,274,100

Nature and Characteristics of Traffic Analysed

The tables on pages 82 to 89 together present a comprehensive picture of the wagon-load General Merchandise and Minerals traffic as a whole:—

Tables I, II and III, analyse the traffic in three alternative ways— by terminal conditions, by wagon loading and by transit distance— showing for each grouping the consignments, tonnage, wagons and containers used, direct costs and receipts.

Tables IV, V and VI, give a more detailed analysis of the tonnage and relative profitability of the traffics carried according to the different combinations of terminal conditions, wagon loading and distance.

Terminal Conditions

Table I is an analysis of traffic by various combinations of terminal conditions. The importance of any one of the individual terminal conditions is more strikingly illustrated if the figures are summarised in another way.

The following summary shows the volume of traffic affected by each of the different terminal conditions. Traffic for which the terminal conditions at the forwarding and receiving points are not identical appears under each of the two headings concerned:—

	Tons	*Percentage of total traffic*
Traffic dealt with by road at one or both ends of the transit	181,300	11
Traffic originating and/or terminating at station	324,000	19
Traffic originating and/or terminating at docks	316,700	19
Traffic originating and/or terminating at private sidings	1,560,400	92

The predominant influence of private sidings suggests that they are a prime factor in the retention to rail of wagon-load merchandise and minerals traffic;
only 8 per cent. of the traffic which passed during the test week was not dealt with through a private siding at one end or the other.

Wagon Loading

Table II analyses wagon loading. Whilst 84 per cent. of the total tonnage passes in loads of over 8 tons, there is a substantial amount of traffic which has a very low loading. Some 33,700 consignments, or 41 per cent. of the total, and 50,700 of the wagons forwarded, or 28 per cent. of the total, had loadings of 4 tons or less.

Distance

Table III gives an analysis by distance, whilst an analysis of the average wagon loading according to terminal conditions and distance is shown in Table IV. The relationship between wagon loading and distance shows no consistent pattern, although wagon loading is clearly linked with terminal conditions in that:—

(a) Low wagon loading is generally found when road conveyance features at one end of the transit. For road/road and road/station transits, the average wagon loads over all distances are only 2-2 and 3-1 tons respectively.

(b) Where private siding is one of the terminal conditions this is generally associated with high average wagon loading.

Terminal Conditions and Distance

The pattern of traffic by transit distance, in conjunction with terminal conditions, can also be seen from Table IV. Almost three-quarters of the tonnage falls into the siding/dock and siding/siding combinations of terminal conditions. Over one-half of the siding/dock traffic passes over distances of 25 miles or less, whilst about one-third of the siding/siding traffic is in the same range. Thereafter there is a fairly even spread of siding/siding traffic up to 200 miles. For other combinations of terminal conditions there is some concentration of traffic between 51 and 200 miles; the general pattern is summarised below in Table No. 22—

Table No. 22

ANALYSIS OF TERMINAL CONDITIONS BY DISTANCE

Transit distance (miles)	Siding/Siding	Dock/Siding	Other terminal conditions	Total
	'000 tons			
1-25	292-1	174-0	48-3	514-3
26-50	200-5	38-9	62-5	301-9
51-100	207-9	23-6	135-4	366-9
101-200	188-0	15-5	166-0	369-5
201-300	46-9	3-3	55-1	105-3
301 and over	10-6	0-9	26-0	37-5
TOTAL	946-0	256-3	493-1	1,695-4

Distance and Wagon Loading

Table VI shows the distribution of traffic by distance and wagon loading, without regard to terminal conditions, in terms of number of wagons. Taking all distances, the number of wagons employed carrying loads of 2 tons and under is almost as great as the number of wagons carrying loads of 12-16 tons. Yet the tonnages conveyed are in the ratio of 1 : 13, viz.:—

	Wagons	*Tons*
Wagon loading		
Up to 2 tons	25,400	29,900
Over 12 and up to 16 tons	29,900	400,500

In total, 28 per cent. of the wagons forwarded during the week carried some 6 per cent. of the traffic in loads of up to 4 tons, the balance of the traffic being carried with an average wagon load of over 12 tons.

Pattern of Relative Profitability

Whilst Tables I, II and III show the receipts, direct costs, and margin on the traffic as a whole, analysed in turn by terminal conditions, wagon loading and distance, these figures tend to obscure the range of results which emerges when the figures are further analysed by combinations of the three factors. The general pattern of profitability of the test week's traffic, as operated at the present time, can be more clearly seen from Tables IV, V and VI.

The tables show the volume of traffic for each heading, the overall margin, + or —, of receipts compared with direct costs, and also in brackets alongside each figure of margin, the percentage ratio of receipts to direct costs.

In all tables which show traffic analysed according to terminal conditions, the headings are arranged in descending order of terminal cost, commencing with road/road—normally the most expensive conditions—and ending with siding/ siding at lowest end of the scale. The tables show clearly the gradual trend of improvement in results as the three factors at work—terminal conditions, wagon loading and distance—become more favourable.

Table IV, which analyses the traffic and the results by terminal conditions and distances, shows that the only group of traffic making a contribution above direct costs is that where private sidings are involved at both ends.

At the other extreme, traffic which is dealt with by road at both ends of the transit fails, by a substantial margin, to cover its direct costs. This is primarily attributable to high terminal costs in conjunction with poor wagon loading.

A broadly similar pattern is found for other combinations of terminal conditions where road conveyance is involved.

Table VI shows the results analysed by terminal conditions and wagon loading. The groups of traffic conveyed in wagon loads of up to 6 tons failed to cover direct costs, whatever the terminal conditions. Traffic loaded between 6 and 12 tons per wagon produced little or no margin, except where sidings were used at both ends.

Conclusions

This particular Survey and series of analyses relates to the wagon-load general merchandise and minerals traffic taken as a whole and does not reveal the characteristics and relative profitability of particular commodities or flows of traffic, some of which may show individual patterns materially different. Moreover, it does not follow that all consignments of traffic within a particular group shown in the analyses conform to the overall results disclosed. Nevertheless, a number of facts emerge fairly clearly, and certain broad conclusions can be drawn. They are:—

(1) Traffic involving the higher cost terminal facilities (e.g. road conveyance or station) produces poor wagon loading and usually fails to cover its direct costs.

(2) Traffic involving the lower cost terminal facilities (i.e. private sidings) passes in higher wagon loadings and usually shows some margin over direct costs, except when in combination with one of the unfavourable terminal conditions at the other end of the transit.

(3) Transit distance does not materially alter the general position stated although results are better at the longer distances.

(4) The volume of wagon-load merchandise and minerals traffic which remains on rail and passes under the high terminal cost conditions is relatively very small.

(5) Charges do not adequately reflect the effects of poor wagon loading, high cost terminal conditions, and inflation of costs by declining traffic.

Some more detailed conclusions relating to particular groups are given in the Report.

TRAFFIC NOT CARRIED BY RAIL

Minerals and Merchandise

To establish the volume, distance, terminal requirements, and other information relating to traffic not passing by rail, information was collected in all Railway Commercial Districts from all major traders, whether railway customers or not, about regular wagon-load traffic conveyed by any form of transport during 1960.

Where the information was not obtainable from available records, the co-operation of traders estimated to have an annual transport bill of more than£10,000, whether on account of rail, road, water or own 'C' licensed fleet, was sought and found to be readily forthcoming. Other sources of information - British Road Services, British Transport Waterways, British Transport Docks - contributed their quota.

The study covered mineral and general merchandise as one group, and coal and coke as another.

The volume of mineral and merchandise traffic covered by the study was305 m. tons. Of this, 82 m. tons, or 27 per cent, passed by rail. Within the remaining 223 m. tons there were 93 m. tons of various types of traffic which, by reason of loadability, regularity, distance and terminal requirements, were judged to be potentially favourable to rail.

The distribution of the 93 m. tons of traffic between the methods of transport used was: -

	Million Tons
Conveyed by Road	
Private haulier	37-0
British Road Services .	7-4
'C' licence or contract 'A'	37-5
Other than by Road	
Sea	7-5
Inland waterways	2-9
Other methods	0-8

Map No. 5 shows the pattern of weekly road distribution of the tonnage considered to be potentially suitable for rail transport. There is a striking similarity between this pattern and that shown by the density map of freight already on rail routes.

The heaviest movement of freight traffic by both road and rail is between the main centres of population,

industry, and raw material production, and to and from the major ports. In consequence, the bulk of the movement by road takes place over those parts of the system which are parallel to the more heavily loaded portions of the rail network, and the pattern is one of side-by-side development of the two major forms of transport.

Table No. 23, Section 1, shows how the 223 m. tons not on rail we redistributed over different distances. It will be seen that one-half of the total traffic passed over distances of less than 50 miles. Most of this portion, by reason of distance and character, has no rail potential unless the most favourable conditions of terminal and consignment size apply.

Table No. 23

ANALYSIS OF NON-RAILBORNE WAGON-LOAD MINERAL AND MERCHANDISE TRAFFIC

Distance gradations (miles)	0-25	26-50	51-100	101-150	151-200	201-300	Over 300	Total
SECTION 1				(million tons)				
tonnage not on rail	62-2	53-6	51-0	29-2	13-1	9-4	4-4	222-9
SECTION 2								
tonnage initially judged favourable torail	6-5	19-7	26-5	18-4	11-6	6-7	3-7	93-1
	ANALYSIS BY CONSIGNMENT SIZE AND TERMINAL CONDITIONS							
Potential Full Train Loads	(million tons)							
Siding/Siding ..	0-2	0-7	1-9	3-2	0-7	1-1	0-5	8-3
Siding at one end	0-1	0-6	1-0	0-7	0-7	0-6	0-2	3-9
Jg Siding at neither end	••	0-1	0-1	• •	••	• •	••	0-2
total	0-3	1-4	3-0	3-9	1-4	1-7	0-7	12-4
Potential Blocks of Wagons								
Siding/Siding	0-7	0-8	1-5	0-9	0-6	0-5	0-1	5-1
Siding at one end	0-7	2-0	7-4	3-3	1-4	0-6	0-5	15-9
Siding at neither end		0-5	1-7	1-7	1-3	0-4	0-2	5-8
total	1-4	3-3	10-6	5-9	3-3	1-5	0-8	26-8
Wagon LoadsSiding/Siding	0-4	0-9	1-0	0-5	0-3	0-3	0-2	3-6
Siding at one end	2-5	10-8	8-4	3-7	2-9	1-4	1-1	30-8
Siding at neither end	1-9	3-3	3-5	4-4	3-7	1-8	0-9	19-5
total	4-8	15-0	12-9	8-6	6-9	3-5	2-2	53-9
SECTION 3	Miles		70-100	101-150	151-200	201-300	Over 300	Total
traffic suitable for liner trains	••	••	2-8	5-6	3-7	2-6	1-0	15-7

After the data had been assembled it was sifted and refined to assess what proportions could, in the broad sense, be regarded as having a good rail potential. Bulky and awkward traffic, traffics needing wide dispersal by road, irregular streams - all these and others were deemed to be unsuitable.

In deciding what traffics should be regarded as favourable, loadability, regularity of flow, distance and terminal requirements were all taken into account. The outcome of this first analysis was the 93 m. tons already referred to and its composition by distance is shown in the second line of Table No. 23.

Then, as far as practicable, the consignment sizes and the terminal conditions, which could apply if the traffic passed by rail, were determined. It was particularly desired to establish the volume which could comprise full, or part, train loads and pass under the most favourable terminal conditions. The results are shown in Section 2 of Table No. 23.

It will be seen that the potential volume of traffic in the larger consignment sizes passing under the most favourable rail conditions, i.e., siding/siding, amounts to 13-4 m. tons. There is also 3-9 m. tons of potential full train-load traffic, with siding conditions at one end only, and blocks of traffic, amounting to 15-9m. tons, with similar conditions. Distance grading may well be the final determining factor as to the rail value of these latter groups as it is only in the higher ranges, 150 miles and above, that a margin over direct costs can be expected.

All traffic embraced in the 93 m. tons, and moving more than 70 miles, was assessed as to its suitability for Liner Train conveyance. Estimates of the potential tonnage, in distance ranges, are shown in Section 3 of the table. Out of the15-7 m. tons, two-thirds would be drawn from wagon-load traffic where there would not be a siding at either end. The balance is drawn from traffic which could have terminal conditions involving a siding.

Further studies of the potential will be made to determine whether there remains, within the 130 m. tons discarded originally, any more traffic of Liner Train potential. Some traffics, by reason of fragility or other characteristics, might have been judged unsuitable in the earlier stages.

Coal, Coke and Patent Fuels

A similar study carried out with the full co-operation of the National Coal Board, merchants, and traders, covered 209 m. tons of fuel of which 150 m. tons passed by rail. The balance - 59 m. tons - was carried by private lines, sea, waterways, and road, or by a combination of some of these means.

Map No. 6 shows the volume and geographical distribution of fuel conveyed by road, canal and coastwise. A substantial proportion of the traffic passing coastwise is carried to the ports by rail, a combination of function which is probably the most suitable and economic.

A distance analysis of the coal conveyed by road, showing the proportion regarded as favourable to rail, is shown in the following table. It will be seen that by far the greater volume on road, some 20 m. tons, or 64 per cent, of thetntal nasses over distances less than 25 miles.

Table No. 24

COAL PASSING BY ROAD, ANALYSED BY DISTANCE GRADATION

	Distance Gradations (miles')					
	0-25	26-50	50-100	101-150	151-200	Total
	million ton,					
(A) Total traffic	19.6	6.3	3.7	0.7	0.3	30.6
(B) Favourable to rail traffic	8.1	4.7	3.4	0.7	0.3	17.1

Apparent discrepancies in totals are due to rounding.

The volume of coal on road and suitable for rail conveyance is such that a high proportion, 69 per cent, would comprise through train-loads, or part loads, for one destination if assembled at the marshalling yards immediately serving the originating collieries. The balance, 31 per cent., would require to pass through more than one yard. Table No. 25 shows the division of the 17 m. tons.

The setting up of coal concentration points, and any reduction in the number of collieries serving both them and larger individual receivers, could lead to a substantial increase in direct working from colliery to destination.

Table No. 25

FAVOURABLE TO RAIL COAL TRAFFIC PASSING BY ROAD, ANALYSED BY BROAD CONSIGNMENT SIZE AND TERMINAL CONDITIONS

Terminal conditions	Through train-loads	Block Wagon-loads	Wagon-loads	Total
		(million tons)		
Siding/Siding	3-9	4-7	1-7	10-2
Siding at forwarding end	-	3-2	3-7	7'0
Other.	-	-	-	-
TOTAL	3-9	7-9	5-4	17-1

Apparent discrepancies in totals are due to rounding.

FREIGHT SUNDRIES TRAFFIC

To determine the volume, distribution and composition of sundries traffic throughout the country, a test was made of all traffic passing on one day.

For the purpose of costing traffic, terminal and other operations were studied, recorded, and costed over one week.

Arising out of this investigation the annual volume and certain characteristics of sundries traffic were assessed under: -

	millions
Tons	3.4
Consignments	43
Packages	177
Loaded wagons forwarded	3.7

Average weights and number of packages in each consignment on the test day were recorded as being: -

Consignment weight.	178 Ib.
Package weight	43 Ib.
Packages per consignment	4.1
Originating weight per loaded wagon forwarded	0.92 tons

An analysis of consignments by weight is given in the following table: -

Table No. 26

Weight group	Percentage of total		Average number of packages per consignment
	(Figures in brackets are cumulative)		
Under 1 qr.	13		1-2
1 and under 2 qrs.	27	(40)	1-4
2 and under 3 qrs.	14	(54)	2-0
3 and under 1 cwt.	8	(62)	2-8
1 and under 2 cwt.	17	(79)	3-8
2 and under 3 cwt.	7	(86)	5-9
3 and under 5 cwt.	6	(92)	8-8
5 and under 10 cwt.	5	(97)	14-6
10 and over	3	(100)	20-1
	100		

Based on the study and detailed costing, the annual receipts were estimated to be £36 m. and the direct costs £47 m., a loss of £11 m., taking no account of indirect expenses or interest charges.

There are 550 rail stations operating as railheads for sundries traffic now. Collection and delivery services are based on them. Four hundred other stations, mostly small ones in sparsely populated country, handle small amounts.

Distribution of traffic over the 950 stations is set out in the following table: -

Table No. 27

Tonnage handled daily	Stations			Volume		
	Number	Percentage of total		Tons	Percentage of total	
	(Figures in brackets are cumulative)					
1-25.	698	73		4,581	17	
26-50.	121	13	(86)	4,232	16	(33)
51-100.	66	7	(93)	4,540	17	(50)
101-200.	39	4	(97)	5,236	20	(70)
201-300.	16	?	(99)	4,143	15	(85)
301 and above	10	1	(100)	4,090	15	(100)
TOTAL	950	100		26,822	100	

Over a period of seven years the tonnage of sundries traffic has declined as shown: -

Year	Tons
1954	5-5m.
1960	3-6m.
1961-2	3-4m.

Consequently, the opportunity to make direct loads diminishes. This leads to increase in transhipment, which increases costs and extends transit times. It is estimated that on average the total volume of sundries - 3-4m. tons - is loaded into and unloaded from rail wagons at least twice.

Hitherto the pattern of sundries working throughout the country has been by hand-stowing in, and unloading from, 12-ton covered vans, with increasing frequency and radius of road collection and delivery as towns expanded. There has also been a willingness to serve almost every hamlet and no effective restriction, through charging or other means, on the nature of consignments carried, however awkward they might be.

The pattern of movement of rail borne sundries traffic is shown in Map No. 7.As might be expected, it

follows closely that of full load traffic and the movement of traffic by road.

If the Railway is to remain in the business of carrying freight sundries then it must be made to pay, and the study has shown that this objective may be achieved by a combination of cost reduction and charges revision. Reductions in cost should be attainable by: -

(1) Reduction in the number of places at which the traffic is handled.
(2) Reduction in the volume transhipped.
(3) Development and extended use of mechanical appliances.
(4) Overhaul of cartage operations.
(5) Greater use of containers and pallets.
(6) Planned freight services following the Liner Train principle.
(7) Simplified documentation.

From this study there has already emerged the outline of a National Plan which can be adopted, once it has been established, through the investigations now in progress, that the business can be made viable.

The problems of transhipment are being studied. Investigations into the possibility of extending mechanical handling are proceeding. The need for so much documentation is being examined.

Subject to further study, and decision on the extent to which it is worth-while staying in some parts of the business, it is envisaged that the number of main depots will ultimately be in the region of 100. As would be expected, they should be located on, or near to, the more densely occupied routes, and the anticipated locations are shown on Map. No. 8.

The capital expenditure envisaged might be of the order of £11 m. Possible reduction in working costs has been assessed at £20 m. Use of containers and the movement of sundries by Liner Trains could further improve the position and attract new traffic.

An Officer has been assigned full-time to development of all aspects of the plan on a national scale.