

Number	Scenario Name	Flow Group	Network Control Plan	Flows	Time	Cycle Time (s)	PRC (%)	Delay (pcuHr)	Status	Mark
1	2022 Early AM	2022 Early AM	Network Control Plan 1	Assign Flows...	07:00 - 08:00	60	-3.1	86.75	PRC Optimised	
2	2022 Early AM with dev	2022 Early AM + dev	Network Control Plan 1	Assign Flows...	07:00 - 08:00	60	-6.1	96.39	PRC Optimised	
3	2032 Early AM	2032 Early AM	Network Control Plan 1	Assign Flows...	07:00 - 08:00	60	-14.0	164.73	PRC Optimised	
4	2032 Early AM with dev	2032 Early AM + dev	Network Control Plan 1	Assign Flows...	07:00 - 08:00	60	-16.7	208.75	PRC Optimised	
5	2022 AM Peak Base	2022 AM base	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	-7.2	73.68	PRC Optimised	
6	2022 AM Peak base with d...	2022 AM base + dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	-10.3	83.97	PRC Optimised	
7	2032 AM Peak base	2032 AM base	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	-18.2	127.96	PRC Optimised	
8	2032 AM Peak base with d...	2032 AM base + dev	Network Control Plan 1	Assign Flows...	08:00 - 09:00	60	-21.2	157.39	PRC Optimised	
9	2022 Early PM	2022 Early PM	Network Control Plan 1	Assign Flows...	16:00 - 17:00	60	-9.5	85.68	PRC Optimised	
10	2022 Early PM with dev	2022 Early PM + dev	Network Control Plan 1	Assign Flows...	16:00 - 17:00	60	-12.2	96.06	PRC Optimised	
11	2032 Early PM	2032 Early PM	Network Control Plan 1	Assign Flows...	16:00 - 17:00	60	-21.2	158.07	PRC Optimised	
12	2032 Early PM with dev	2032 Early PM + dev	Network Control Plan 1	Assign Flows...	16:00 - 17:00	60	-23.9	179.24	PRC Optimised	
13	2022 PM Peak Base	2022 PM base	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	-5.7	73.77	PRC Optimised	
14	2022 PM Peak base with d...	2022 PM base + dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	-8.4	84.62	PRC Optimised	
15	2032 PM peak base	2032 PM base	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	-17.5	121.48	PRC Optimised	
16	2032 PM Peak base with d...	2032 PM base + dev	Network Control Plan 1	Assign Flows...	17:00 - 18:00	60	-19.7	149.26	PRC Optimised	

Number	Scenario	Time	prc	highest	LMR	MMQ	In M	Vary + 1 sec to LMR (st 2)					Degree of saturation									
								prc	highest	LMR	MMQ	In M	LMR	1 CW	5 BHR	4 HR	3 BNR	Ext	Int	Ext	Int	Ext
1	2022 early AM	0700-0800	-5.8	95.2	95.2	14.2	82	-3.1	92.8=BHR	89.8	10.8	62	14	85	61	92	64	90	70	91	51	
2	2022 early AM+dev		-9.7	98.7	98.7	19	109	-6.1	95.5=BHR	93.1	12.9	74	14	87	64	95	66	94	73	92	51	
3	2032 early AM		-17.1	105.4	105.4	37.1	213	-14.0	102.6=BHR	99.4	20.8	120	14	94	68	102	71	99	77	101	56	
4	2032 early AM+dev		-21.9	108.9	108.9	51.2	294	-16.7	105.0=BHR	102.7	30.7	176	14	102	78	105	72	103	79	102	55	
5	2022 AM	0800-0900	-24.2	111.8	111.8	49.2	282	-17.1	105.4=LMR	105.4	33.4	192	17	79	46	96	52	79	66	88	41	
6	2022 AM+dev		-29.4	116.4	116.4	65.7	377	-22.0	109.8=LMR	109.8	48.0	275	17	81	50	98	54	83	69	89	41	
7	2032 AM		-37.2	123.5	123.5	84.1	482	-29.4	116.5=LMR	116.5	66.8	383	17	87	51	106	58	87	72	97	45	
8	2032 AM+dev		-42.4	128.1	128.1	102.6	588	-34.3	120.8=LMR	120.8	84.1	482	17	89	54	109	59	91	74	99	45	
9	2022 early PM	1600-1700	-9.5	98.6	83.7	8	46	-9.5	98.6=BHR	77.8	7.2	41	13	91	53	98	60	77	78	89	50	
10	2022 early PM+dev		-12.2	100.9	90.4	10.3	59	-12.2	100.9=BHR	83.9	8.5	49	13	93	58	100	62	81	81	90	56	
11	2032 early PM		-21.2	109.1	92.8	11.5	66	-21.2	109.1=BHR	86.2	9.1	52	13	101	59	109	66	86	83	99	53	
12	2032 early PM+dev		-23.9	111.5	99.4	18.8	108	-23.9	111.5=BHR	92.3	11.8	68	13	103	64	111	68	89	85	100	58	
13	2022 PM	1700-1800	-7.6	96.8	96.8	14.6	84	-5.7	95.1=BHR	89.9	10.5	60	13	80	53	95	61	76	73	85	48	
14	2022 PM+dev		-15.0	103.5	103.5	26.4	151	-8.4	97.5=BHR	96.1	14.8	85	13	13/19	81	59	97	63	79	77	86	54
15	2032 PM		-19.2	107.3	107.3	34.3	197	-17.5	105.7=BHR	99.6	19	109	13	88	59	105	67	84	80	94	52	
16	2032 PM+dev		-26.6	114.0	114.0	55.6	319	-19.7	107.8=BHR	105.8	34.6	198	13	90	63	107	69	88	82	96	58	

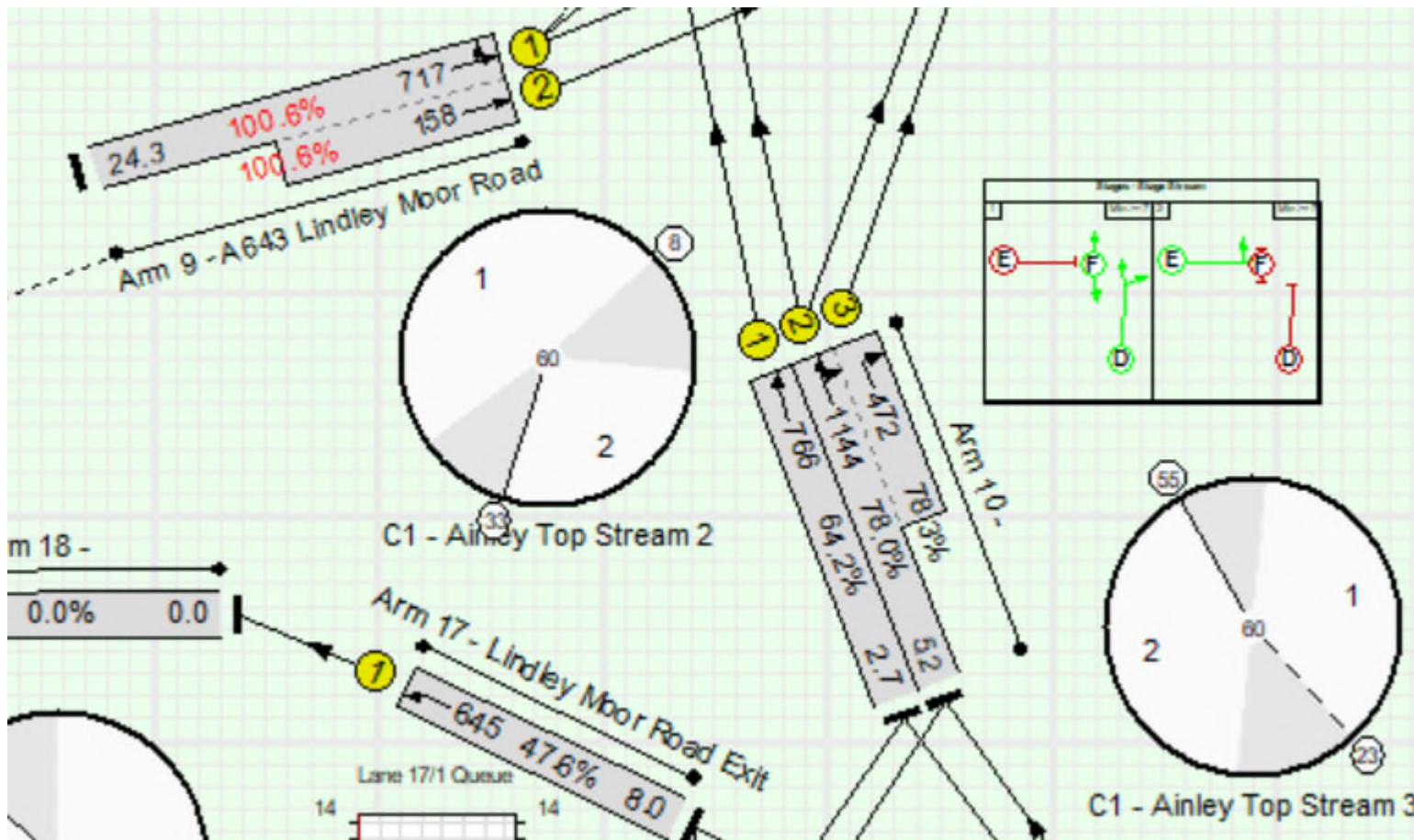
BHR is Brighthouse Road, arm 4/1 & 4/2

**AM Peak results with vary of 4 seconds**

Number	Scenario	Time	prc	highest	LMR	MMQ	In M	Vary + 4 sec to LMR					Roundabout arm 10		
								prc	highest	LMR	MMQ	In M	Int(%)	MMQ	(m)
5	2022 AM	0800-0900	-24.2	111.8	111.8	49.2	282	-7.2	96.2=BHR	91.1	12.3	71	70.8	3.7	21
6	2022 AM+dev		-29.4	116.4	116.4	65.7	377	-10.3	98.9=BHR	95.5	16.2	93	71.9	3.7	21
7	2032 AM		-37.2	123.5	123.5	84.1	482	-18.2	106.4=BHR	100.6	24.3	139	78.3	5.2	30
8	2032 AM+dev		-42.4	128.1	128.1	102.6	588	-21.2	109.1=BHR	105.1	37.8	217	79.4	5.3	30

predicted queue lengths on circulatory arm 10 are still within acceptable limits and do not block back to the upstream node.

Details of arm 10, internal approach at the Lindley Moor Road node

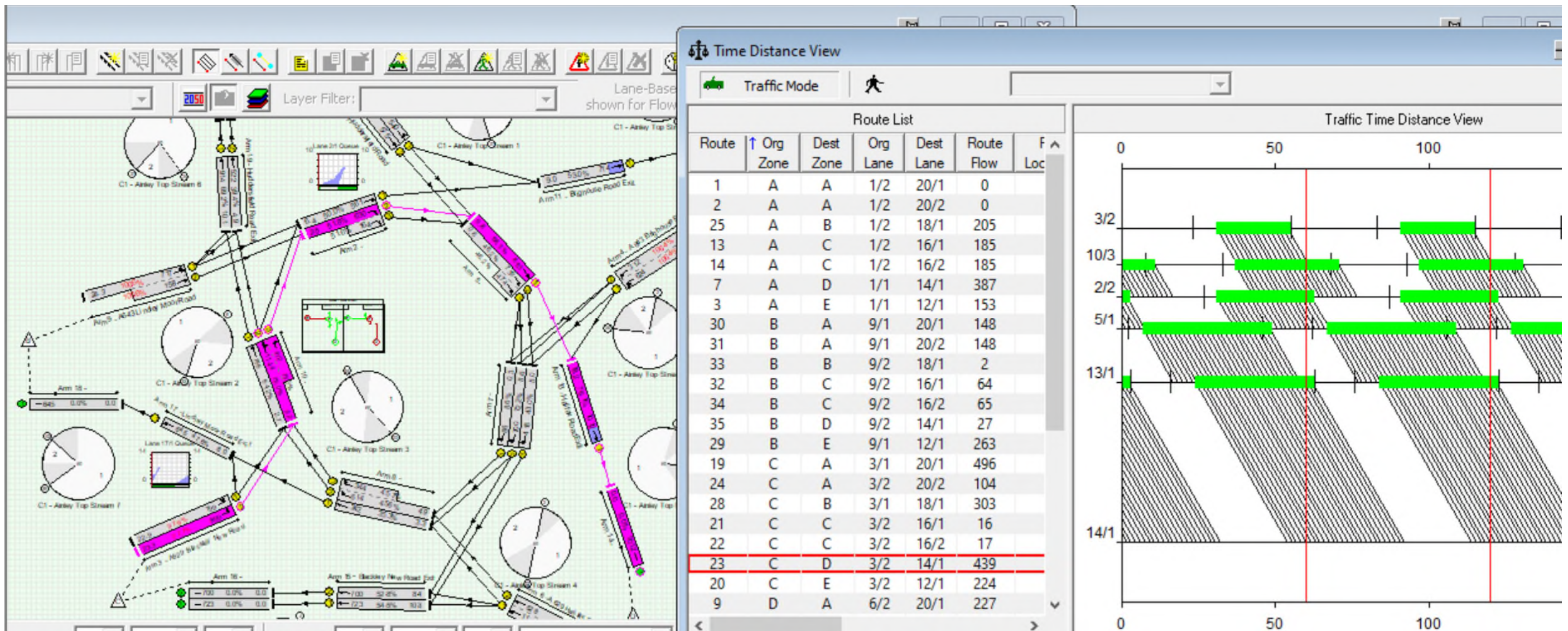


Link 10/1 nearside is declared as 60m  
 Link 10/2 middle is declared as 60m  
 Link 10/3 offside flare is declared as 37m

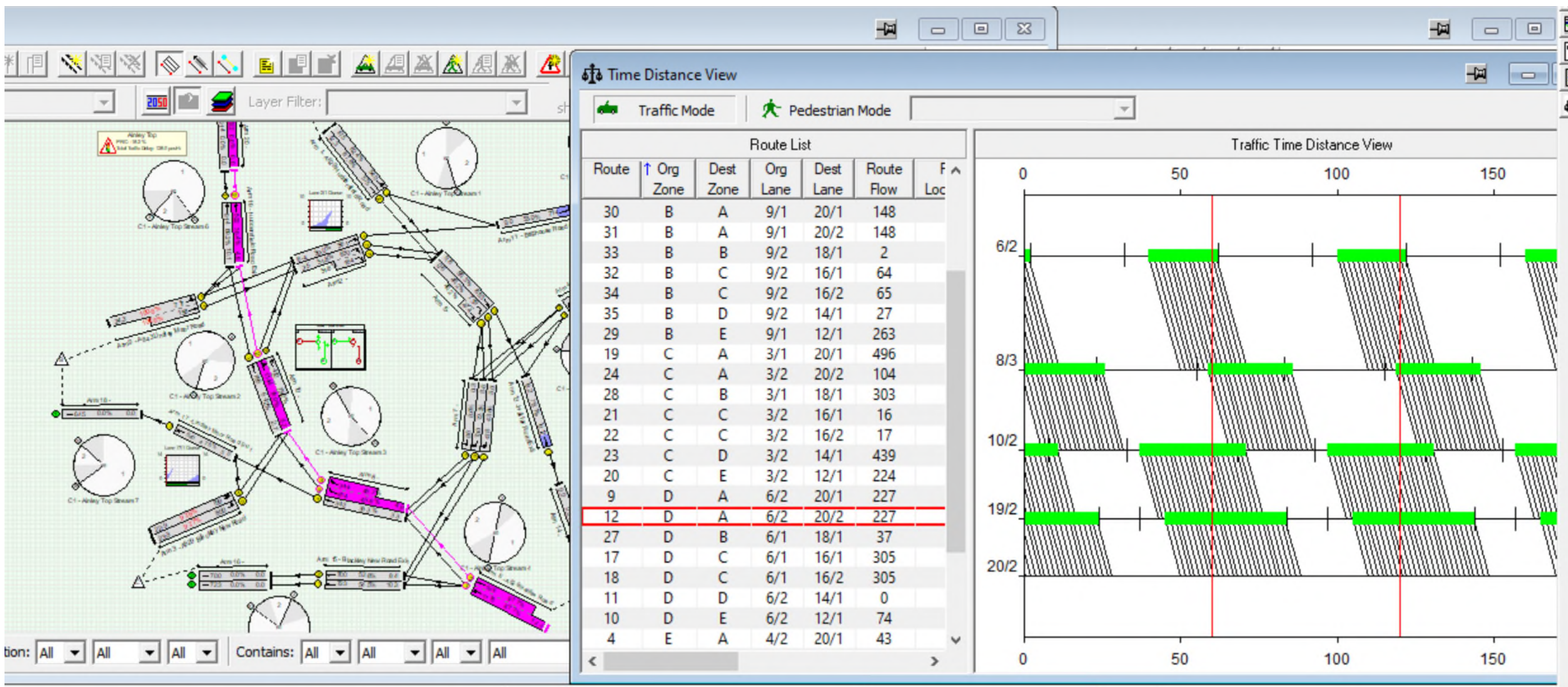


The stop line storage is open to interpretation. I would declare 50m so that exiting traffic for Lindley Moor Road could still get through without hindrance.

The flared section is only worth 25m. Beyond that there is insufficient width for a vehicle. Combined centre lane and flare storage is in the order of 75m and the results at the foot of page 1 with a MMQ (Mean Maximum Queue) of 5.2 pcu or just 30m, is less than 75m available stacking space.



Signal co-ordination from A639 Blackley New Road (from the motorway) to Huddersfield arms 3/2->10/3->2/2 is progressed on the first 3 stop lines.



Progression from A629 Halifax Road (Huddersfield) to A629 Huddersfield Road "Calderdale Way"/ (Halifax) is subject to being held at the internal stop line – arm 10. Co-ordination 6/2-> to 8->3 is provided, but the stop line for the Lindley Moor Road internal will be closing down. It is this traffic that the reservoir will need to accommodate. Scenario 8, 2032 AM 0800-0900 + dev has an hourly flow from Halifax Road of 597. 597/60 cycles is about 10 vehicles per cycle. This traffic has the potential to be stopped at the Lindley Moor (arm 10) approach. 10x 5.75 is less than 60m, and dependent on how traffic stacks at the stop line, the reservoir capacity is 75, which is greater than the stopped traffic. In a worst case 60m in a single lane (no use of the flare) could still be stored in either lane 2 or 3 and still allow traffic to slip past to exit on Lindley Moor Road.

The 4 second switching of time by Paragon to favour Lindley Moor Road may not be feasible, nevertheless they have demonstrated it doesn't bring the whole roundabout to a standstill. The initial one second switch initiated by Kirklees UTC did take the heat away from LMR and showed that Brighouse Road became the weakest link.

The exercise has demonstrated that work will need to be done to re-validate the site, with timing adjustments to go some way to accommodate the new development AND also assist other approaches at different times in the peak period. We currently run a single signal plan for the whole of the peak, where additional plans for specific times and individual approaches could make better use of the signal asset. This may be delivered through a SAPS (System Activated Plan Selection) or by using AI through the Simplifai platform to make traffic dependent adjustments throughout the working day. For this it would be appropriate to consider a 278 agreement to enable the development to progress and deliver a more dynamic signal operation for the greater good of all uses of the site.