Before looking into these test cases (shown on the following pages), it's important to first understand the service level likely for the Jane BRT. I have little idea about whether YRT will invest more operational resources into the corridor once the Jane BRT is built. Let us assume they do not. Additionally, I am assuming the Spring 2026 bus allocations for route 320 - Jane Express. I am aware these increase during the summer months.

For this analysis, assumed speeds are for the entire BRT line. These values will likely increase within the study area (e.g. a 25 km/h route may run 30 km/h in the study area).

AM Peak:

- Route 20 - Jane: 9 buses at 13-minute headway. Round-trip time (excluding layovers): 107 minutes.
- Route 320 - Jane Express: 5 buses at 14-minute headway. Round-trip time: 58 minutes

The BRT trip is approximately 9.5 kilometres, slightly shorter than Route 320 currently. This will allow for the following round-trip times, rounded up to the nearest minute and not including layover time:

- 15 km/h: 76 minutes
- 20 km/h: 57 minutes
- 25 km/h: 46 minutes
- 30 km/h: 38 minutes

The current 5-bus allocation would allow for the following headways, assuming at least 5 minutes of layover time is needed at each end (standard for YRT):

- 15 km/h: 18 minutes
- 20 km/h: 14 minutes
- 25 km/h: 12 minutes
- 30 km/h: 10 minutes

If three buses are removed from Route 20 - Jane (for it to run every 20 minutes) during the AM peak and added to the Jane BRT, it would run at the following headways:

- 15 km/h: 11 minutes
- 20 km/h: 9 minutes
- 25 km/h: 7 minutes
- 30 km/h: 6 minutes

During midday hours (after 11 a.m.) and the PM rush, Route 320 also runs five buses presently at a lower frequency due to the slower PM rush. 20 - Jane can only lose two buses and still maintain a 20-minute frequency. If these buses are given to the Jane BRT, it would run at the following headways:

- 15 km/h: 13 minutes
- 20 km/h: 10 minutes
- 25 km/h: 8 minutes
- 30 km/h: 7 minutes

If further buses are added, these headways will tighten further.

1. AM rush case: Jane BRT is implemented, 20 - Jane's AM rush hour frequency is reduced to every 30 minutes. No other changes from the existing plan.

The exact details of the Jane BRT are unknown. Operational details are far from implemented and the current political climate which has increasingly emphasized transit speed may not exist once the line is implemented. Additionally, the Jane BRT may work better or worse depending on whether my recommended solution without the Jane BRT is implemented. If the Jane BRT is infrequent, it may also cause problems. Thus, differing frequency and speed should both be tested. Table 1 examines this. Green cells indicate an improvement, yellow cells indicate minor change, and red cells indicate a worse value:

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)					Total Travel Time
			20	Jane BRT	29	21	26	
6	15	3594	3588	7213	2877	2228	500	300281
	20	2909	2857	9224	2626	2043	341	279687
	25	2625	2457	10176	2496	1971	275	268053
	30	2625	2259	10497	2407	1937	275	263464
	35	2375	1960	11286	2304	1862	213	252281
8	15	3965	3902	6323	2942	2308	560	306491
	20	3366	3246	8153	2694	2130	411	288199
	25	3160	2926	8929	2588	2053	334	277994
	30	3160	2757	9220	2519	2011	333	273828
	35	2973	2498	9877	2421	1944	287	264191
10	15	4495	4070	5395	3031	2367	642	312839
	20	3824	3491	7216	2804	2179	486	295294
	25	3587	3193	8002	2670	2123	425	285871
	30	3587	3043	8264	2597	2087	422	281994
	35	3272	2790	9049	2514	2020	355	271804
12	15	4883	4201	4628	3133	2447	708	317687
	20	4310	3714	6193	2903	2309	571	302258
	25	4112	3455	6889	2789	2236	519	294012
	30	4112	3314	7139	2727	2197	511	290548
	35	3816	3111	7887	2623	2114	449	281789
15	15	5248	4385	3829	3244	2498	796	322830
	20	4806	3981	5116	3056	2360	681	310112
	25	4627	3745	5742	2957	2303	626	302981
	30	4625	3630	5942	2901	2281	621	299833
	35	4373	3462	6575	2794	2229	567	292371

Table 1. Differences in passenger behaviour when speed and frequency of the Jane BRT are modified, during the AM rush hour.

If the Jane BRT is to be successful, it will need to be fast, but more than that it will need to be more frequent to make up for the discontinuation of route 320 - Jane Express and assumed reduction in frequency of Route 20 - Jane. A faster service should allow a tightening of headways without consuming more of YRT's operational resources in the area.

2. 20 - Jane instead runs every 20 minutes (AM rush)

This is the “20 is more frequent” case, meant for the case in which high ridership sustains Route 20 - Jane’s frequency due to high local demand.

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)					Total Travel Time
			20	Jane BRT	29	21	26	
6	15	3461	5335	5743	2807	2188	466	293624
	20	2815	4265	7985	2592	2012	331	275981
	25	2560	3710	9049	2465	1948	268	265538
	30	2560	3450	9428	2382	1912	268	261437
	35	2318	2998	10352	2286	1841	205	250871
8	15	3790	5725	4847	2865	2258	515	299136
	20	3228	4780	6865	2657	2085	385	283675
	25	3050	4313	7736	2563	2015	323	274508
	30	3050	4076	8060	2510	1981	323	270681
	35	2875	3688	8829	2418	1910	280	261830
10	15	4235	6006	3963	2919	2304	573	303559
	20	3659	5200	5816	2741	2146	438	289665
	25	3454	4755	6673	2628	2096	394	281457
	30	3454	4548	6966	2568	2072	392	278096
	35	3179	4197	7798	2494	1999	333	269152
12	15	4545	6169	3309	2994	2357	626	307129
	20	4042	5541	4853	2816	2234	514	295512
	25	3872	5162	5610	2717	2169	470	288693
	30	3872	4976	5892	2664	2130	466	285825
	35	3614	4650	6672	2580	2070	414	277932
15	15	4835	6357	2668	3078	2390	672	310211
	20	4441	5855	3900	2943	2274	587	300936
	25	4281	5530	4560	2854	2228	547	295289
	30	4278	5394	4766	2808	2208	546	292926
	35	4071	5157	5386	2720	2165	501	286672

Table 2. Differences in passenger behaviour as the frequency and speed of the Jane BRT are modified during AM rush hour, while 20 - Jane is running every 20 minutes.

Similar results to the previous case, but the 10-minute case is more clearly a success (apart from if it ran 20 km/h or slower).

3. My recommended solution is implemented (AM rush)

This scenario assumes a 30-minute frequency for Route 20 - Jane, as well as a 20-minute frequency on Edgeley on a blended schedule for routes 29 and 26. In this table, orange cells represents values worse than if my recommended solution were implemented and not the BRT, but better than the existing plan.

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)				Total Travel Time
			20	Jane BRT	29 & 26	21	
6	15	3064	3131	6524	5741	1540	267094
	20	2479	2502	8319	5226	1474	250120
	25	2290	2163	9113	4994	1440	240450
	30	2290	2011	9416	4845	1438	237264
	35	2083	1760	10165	4608	1384	228030
8	15	3311	3372	5867	5879	1571	272494
	20	2841	2843	7423	5391	1502	257284
	25	2699	2556	8100	5165	1480	248701
	30	2699	2439	8349	5044	1469	245729
	35	2537	2225	8945	4867	1426	237363
10	15	3828	3555	4950	6054	1613	278764
	20	3278	3114	6482	5576	1550	264512
	25	3162	2843	7120	5361	1514	256978
	30	3162	2707	7376	5250	1505	254062
	35	2840	2503	8155	5053	1449	245179
12	15	4175	3733	4212	6237	1643	283489
	20	3689	3313	5626	5799	1573	271004
	25	3563	3085	6213	5572	1567	264225
	30	3563	2989	6443	5457	1548	261774
	35	3320	2812	7102	5256	1510	254117
15	15	4542	3849	3507	6444	1658	288140
	20	4162	3536	4618	6064	1620	277695
	25	4065	3341	5102	5895	1597	271841
	30	4065	3241	5319	5783	1592	269666
	35	3857	3104	5904	5578	1557	263428

Table 3. Changes in traveller behaviour with changes in speed and frequency of the Jane BRT, assuming my preferred solution is implemented.

If my recommended solution is implemented, routes 29 and 26 compete with the Jane BRT for a large pool of riders further west. This causes a slight increase in the required quality of service for the Jane BRT to ensure its success, but all cases except the 15-minute cases and the slowest 12-minute case result in an improvement over the existing proposal based on this model.

4. Existing midday proposal

This scenario looks at how the service would perform assuming the existing midday service proposal. Route 20 - Jane is assumed to run every 30 minutes in this scenario.

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)			Total Travel Time
			20	Jane BRT	26	
8	15	5932	4668	8892	508	388305
	20	4881	3785	10970	364	356217
	25	4534	3387	11770	309	340763
	30	4534	3176	11982	308	333244
	35	4241	2869	12626	264	319376
10	15	6932	4915	7518	635	400214
	20	5691	4174	9659	476	369841
	25	5151	3764	10667	418	353796
	30	5151	3579	10860	410	346587
	35	4744	3304	11606	346	332737
12	15	7703	5078	6536	683	409418
	20	6669	4441	8348	542	382580
	25	6172	4109	9243	476	368315
	30	6172	3949	9410	469	361925
	35	5588	3692	10322	398	347675
15	15	8464	5361	5370	805	420485
	20	7599	4814	6924	663	397583
	25	7219	4517	7659	605	385413
	30	7195	4377	7830	598	379719
	35	6705	4183	8577	535	367726
20	15	9377	5532	4142	949	431913
	20	8668	5134	5886	812	413584
	25	8353	4897	5988	762	403658
	30	8330	4785	6137	748	399039
	35	7958	4630	6705	707	389501

Table 4. Differences in passenger behaviour between different speed and frequency scenarios during midday hours, assuming the existing plan is implemented.

To ensure the Jane BRT is a success south of Vaughan Mills, a 12-minute or better frequency may be necessary. From the beginning of this report, it appears a 10-minute frequency is most likely, so this line should do well as long as it is reasonably fast.

5. Midday, but my preferred solution is implemented.

This scenario looks at how the Jane BRT would perform in the event my preferred solution is implemented, rather than the current proposal.

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)			Total Travel Time
			20	Jane BRT	26	
8	15	5173	4163	7882	2782	346761
	20	4302	3371	9804	2523	321162
	25	4004	3029	10547	2420	308200
	30	4004	2859	10782	2355	302530
	35	3750	2588	11391	2271	290582
10	15	6053	4393	6648	2906	356695
	20	5002	3730	8620	2648	332378
	25	4608	3368	9488	2536	319625
	30	4608	3211	9711	2470	314239
	35	4202	2974	10461	2363	301997
12	15	6714	4531	5780	2975	364265
	20	5829	3956	7456	2759	342782
	25	5459	3664	8230	2647	331427
	30	5459	3538	8410	2593	326603
	35	4954	3315	9243	2488	314772
15	15	7360	4800	4723	3117	373023
	20	6658	4306	6124	2912	355175
	25	6379	4033	6790	2798	345753
	30	6367	3916	6986	2731	341708
	35	5934	3746	7684	2636	331583
20	15	8150	4951	3647	3252	382286
	20	7548	4587	4797	3068	367851
	25	7322	4381	5311	2986	360144
	30	7309	4290	5463	2938	356767
	35	6996	4155	5995	2854	348956

Table 5. Differences in passenger behaviour between different speed and frequency scenarios during midday hours, assuming my preferred solution for local routes is implemented.

The situation here is similar to my recommended solution during the AM rush: Even when the BRT is running less frequently, the Edgeley routing means the total travel time will still be less than the current travel time despite this effect not affecting the total number of people walking as much.

6. AM rush case: Jane BRT is implemented, 20 - Jane's PM rush hour frequency is reduced to every 30 minutes. No other changes from the existing plan.

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)					Total Travel Time
			20	Jane BRT	29	21	26	
6	15	3579	3271	7510	2947	2244	449	302739
	20	2893	2493	9594	2659	2050	311	281103
	25	2623	2132	10467	2559	1970	249	268831
	30	2623	1961	10767	2474	1926	249	264034
	35	2361	1672	11580	2351	1847	189	252722
8	15	3960	3583	6594	3029	2325	509	309371
	20	3358	2904	8471	2771	2135	361	289668
	25	3146	2606	9206	2673	2056	313	278917
	30	3146	2439	9498	2603	2005	309	274572
	35	2956	2186	10162	2498	1936	262	264600
10	15	4509	3767	5646	3110	2387	581	315811
	20	3833	3173	7482	2875	2207	430	297288
	25	3589	2870	8267	2755	2135	384	287147
	30	3589	2737	8509	2686	2099	380	283066
	35	3265	2542	9280	2576	2022	315	273031
12	15	4903	3912	4862	3185	2455	683	321108
	20	4334	3407	6460	2954	2307	538	304935
	25	4123	3156	7143	2874	2212	492	295952
	30	4123	3036	7375	2810	2173	483	292245
	35	3809	2834	8146	2692	2103	416	283070
15	15	5308	4121	3993	3321	2518	739	326749
	20	4854	3665	5348	3124	2391	618	313021
	25	4681	3451	5948	3032	2326	562	305375
	30	4679	3353	6130	2975	2307	556	302175
	35	4412	3209	6769	2867	2248	495	294497

Table 6. Differences in passenger behaviour when speed and frequency of the Jane BRT are modified, during the PM rush hour.

Due to the existing PM rush hour buses being much slower than the AM rush, the Jane BRT does not need to be as fast or frequent to succeed (though it still needs to be somewhat fast and frequent regardless). Thus, AM rush and midday are much more conservative cases for what is needed for the BRT to succeed than the PM rush is. This pattern repeats for the next two cases.

7. 20 - Jane instead runs every 20 minutes (PM rush)

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)					Total Travel Time
			20	Jane BRT	29	21	26	
6	15	3477	4871	6137	2883	2208	424	297420
	20	2824	3764	8463	2633	2021	295	278510
	25	2567	3199	9507	2538	1950	239	267069
	30	2567	2948	9883	2457	1906	239	262585
	35	2313	2563	10763	2337	1834	190	251838
8	15	3802	5250	5252	2955	2277	464	303167
	20	3237	4281	7310	2731	2100	341	286130
	25	3052	3829	8156	2640	2029	294	276312
	30	3052	3616	8483	2582	1976	291	272355
	35	2874	3283	9199	2487	1911	246	263108
10	15	4232	5557	4342	3024	2318	527	307914
	20	3654	4714	6227	2838	2170	397	292497
	25	3449	4295	7060	2729	2107	360	283665
	30	3449	4111	7345	2667	2070	358	280125
	35	3172	3814	8144	2572	1992	306	270990
12	15	4593	5771	3605	3075	2380	576	312345
	20	4076	5085	5243	2870	2246	480	299442
	25	3892	4685	6019	2800	2164	440	291587
	30	3892	4501	6305	2744	2121	437	288388
	35	3620	4232	7055	2646	2063	384	280144
15	15	4908	5965	2917	3174	2411	625	316053
	20	4512	5424	4198	3020	2309	537	305610
	25	4352	5127	4835	2940	2260	486	299284
	30	4348	4989	5053	2885	2240	485	296678
	35	4120	4759	5694	2811	2177	439	289954

Table 7. PM rush hour, while 20 - Jane is running every 20 minutes.

It is very difficult for the BRT to not be an improvement over the current situation in this case, though a slow or infrequent BRT may attract ridicule if the 20 - Jane is found to be generating more ridership. Of course, this excludes areas north of Vaughan Mills where the local routes are slower and have to go through Vaughan Mills Terminal. Those areas may make up for a dip in ridership south of Rutherford.

8. My recommended solution is implemented (PM rush)

This scenario assumes a 30-minute frequency for Route 20 - Jane, as well as a 20-minute frequency on Edgeley on a blended schedule for routes 29 and 26.

BRT Headway (min)	Speed (km/h)	Walked	Ridership Within Study Area (out of 20,000)				Total Travel Time
			20	Jane BRT	29 & 26	21	
6	15	3142	2902	6858	5485	1613	273236
	20	2530	2234	8723	4995	1518	255000
	25	2349	1938	9466	4779	1468	244815
	30	2349	1781	9783	4634	1453	241264
	35	2126	1545	10504	4421	1404	231463
8	15	3426	3125	6148	5656	1645	278694
	20	2911	2577	7811	5157	1544	262559
	25	2766	2314	8432	4975	1513	253220
	30	2766	2199	8692	4840	1503	250071
	35	2577	2007	9303	4658	1455	241445
10	15	3933	3319	5208	5861	1679	284948
	20	3343	2862	6826	5365	1604	269733
	25	3209	2602	7495	5122	1572	261836
	30	3209	2472	7749	5015	1555	258725
	35	2889	2294	8524	4811	1482	249702
12	15	4290	3496	4445	6076	1693	289799
	20	3802	3066	5926	5584	1622	276696
	25	3688	2858	6496	5358	1600	269615
	30	3688	2743	6754	5238	1577	266916
	35	3423	2584	7418	5031	1544	258966
15	15	4657	3612	3736	6277	1718	294540
	20	4236	3290	4937	5876	1661	283297
	25	4131	3106	5431	5681	1651	277102
	30	4131	3016	5639	5581	1633	274820
	35	3909	2877	6234	5398	1582	268127

Table 8. Changes in traveller behaviour with changes in speed and frequency of the Jane BRT, assuming my preferred solution is implemented.

In this case, it is clear a 15-minute frequency is too little. Luckily, that seems extremely unlikely (see the beginning of this document). A 10-minute service is the most likely outcome during the PM peak. 29 & 26 having ridership so close to the BRT in a large number of cases shows how much of an improvement better service on Edgeley would bring to the areas nearby.