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GRAND FORKS TRANSIT
DEVELOPMENT PLAN
Route Alternatives Memo
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INTRODUCTION

As described in the Existing Conditions Report, there are currently 12 regular routes operated by Cities Area Transit (CAT). While some of these routes are currently effective and efficient, there are other routes that have low ridership and a high cost per passenger. Based on the performance of the existing routes and issues identified by the public, stakeholders, operators and the consulting team, route alternatives were developed for CAT. These alternatives were presented to the public, operators and city staff and were revised based on the feedback received.

PROPOSED ROUTE ALTERNATIVES

Operational Construct

Route alternatives are proposed for weekday and Saturday fixed routes and weeknight and Saturday night fixed routes. Routes were also explored for an industrial park route and a Sunday service route but are not recommended at this time.

Figure 1 shows the Weekday and Saturday routes. Figure 2 shows the night routes. Figure 3 shows future route concepts. Individual route maps are included at the end of this document.

Weekday and Saturday Routes

Route 1

Route 1 is proposed to operate between the Grand Cities Mall and the 13th Avenue N. Hugo's via the Metro Transit Center (MTC) and Home of Economy. The proposed route shortens and consolidates the current Routes 1 and 2. The proposed Route 1 would also provide connections to other routes at the MTC and Grand Cities Mall. Two of these proposed connections include Route 1 and Route 1SW. In order to maintain 60 minute circuitry of the interlined Routes 1SE and 1SW, 30 minute service is recommended on Route 1.

Route 1SE

The proposed Route 1SE is a circulator in the southeast area of Grand Forks. The route would serve Grand Cities Mall, Altru South, Walmart and 32nd Avenue S. Hugo's. The route is proposed to interline with every other trip of the Route 1, alternating with Route 1SW.

Route 1SW

The proposed Route 1SW is a circulator in the southwest area of Grand Forks. The route would serve Grand Cities Mall, 32nd Avenue S. Hugo's, Columbia Mall, Target and Walmart. The route is proposed to interline with every other trip of the Route 1, alternating with Route 1SE.

Route 3

Route 3 is proposed to operate between Altru and Northland Community College via Grand Cities Mall, the MTC and the East Grand Forks Hugo's. The route merges the most productive elements of the current Routes 10 and 11 with the current Route 3.

Route 4

Route 4 is proposed to operate between the MTC and the Gateway Drive Walmart via the University of North Dakota (UND). This route is a modification and consolidation of the current service on Routes 4 and 6.

Route 5

Route 5 is proposed to operate between Northland College and the Columbia Mall via the MTC. The route is a streamlined combination of the current Routes 5, 10 and 11.

Route 6

Route 6 is proposed as an interlined route that includes Routes 6E and 6W and operates between Columbia Mall and UND.

Route 6E

Route 6E is proposed to operate between Columbia Mall and UND via Altru. The route provides a direct connection between UND and the Columbia Mall. Additional coordination with UND will be necessary as operations on campus are planned.

Route 6W

Route 6W is proposed to operate between Columbia Mall and UND via the Alerus Center. The route provides a direct connection between UND and the Columbia Mall. Additional coordination with UND will be necessary as operations on campus are planned.

Route 8

Route 8 is proposed to operate between northwest East Grand Forks and the East Grand Forks Senior Citizens' Center via the East Grand Forks High School and downtown East Grand Forks. The route provides service to those wishing to travel within East Grand Forks and connects to the proposed Routes 3 and 5.

Weeknight and Saturday Night Routes

Stop level ridership data is currently unavailable for weeknight ridership. Therefore, the proposed weeknight routes are based on high demand weekday transit stops and reflect proposed weekday routes or portions of proposed weekday routes.

Route 1

The Route 1 night route is proposed to operate between the 13th Avenue N. Hugo's and the 32nd Avenue S. Walmart via the MTC, Grand Cities Mall, Columbia Mall and Target. The proposed route is a combination of the proposed weekday Routes 1SE and 1SW.

Route 3

The Route 3 night route is proposed to operate between Altru and Northland Community College via Grand Cities Mall, the MTC and the East Grand Forks Hugo's. The route merges the most productive elements of the current Routes 10 and 11 with the current Route 3.

Route 6

The Route 6 night route is proposed as an interlined route that includes Routes 6E and 6W and operates between Columbia Mall and UND.

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Figure 1: Day Routes Overview

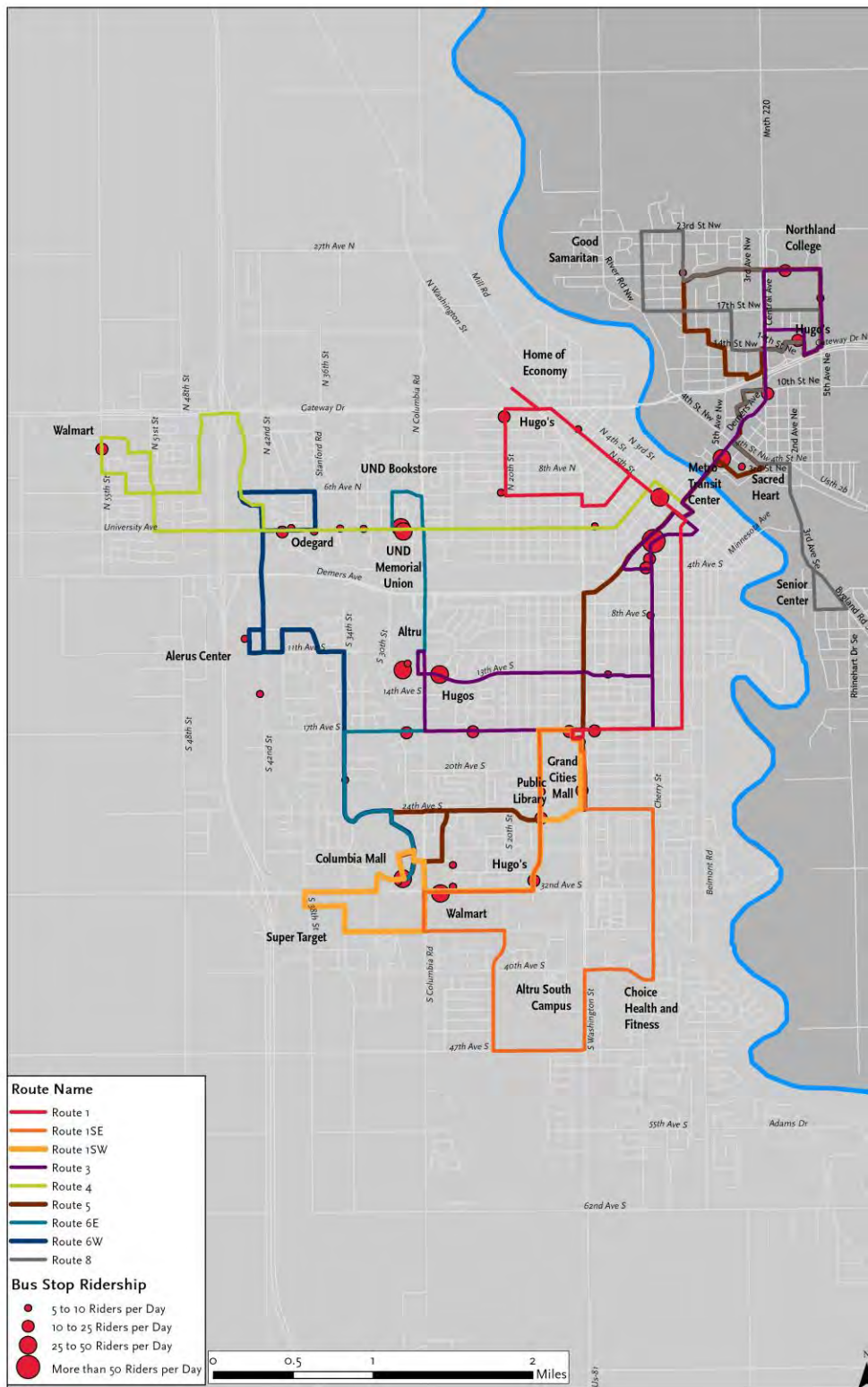


Figure 2: Night Routes Overview

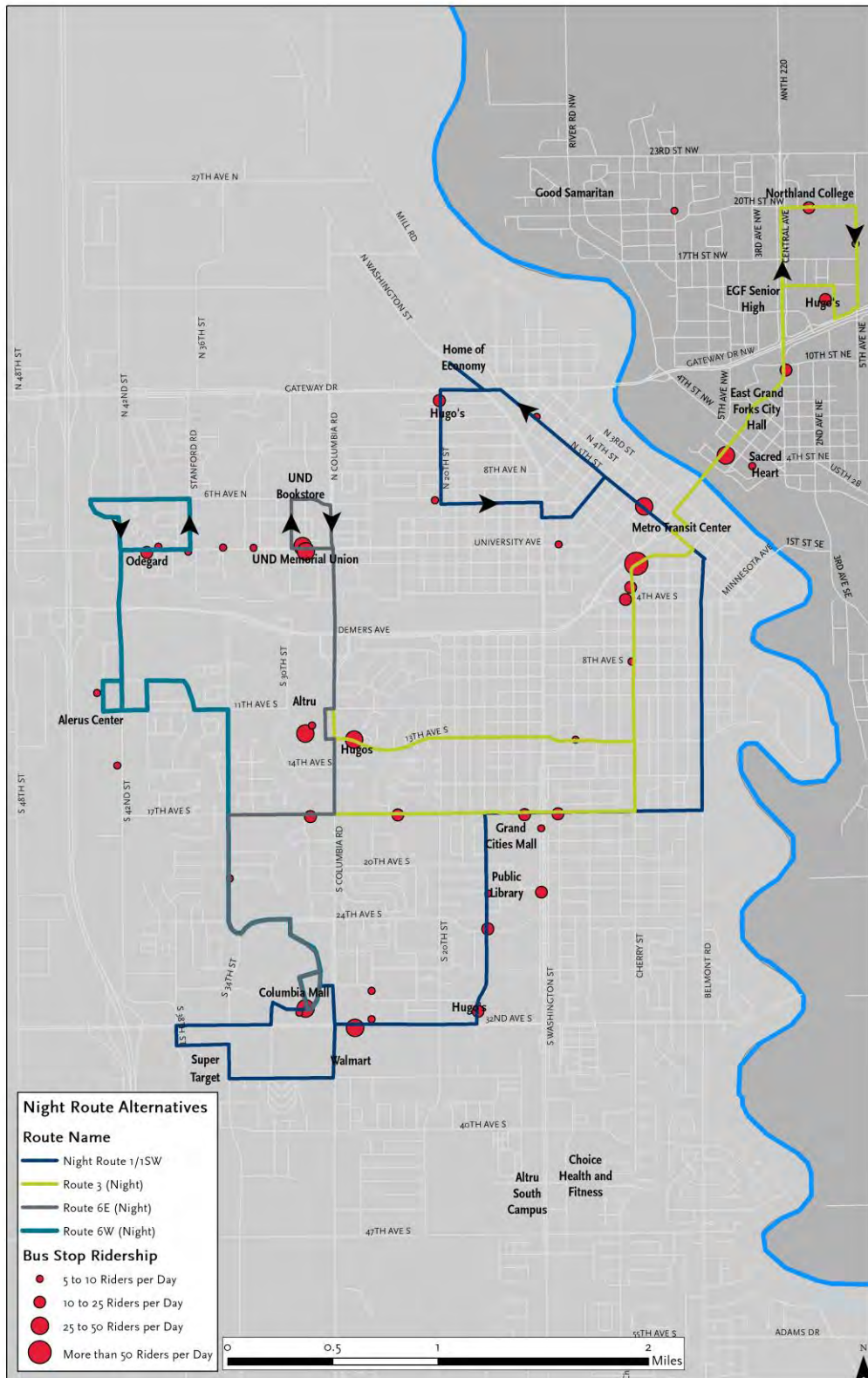


Figure 3: Routes for Future Consideration

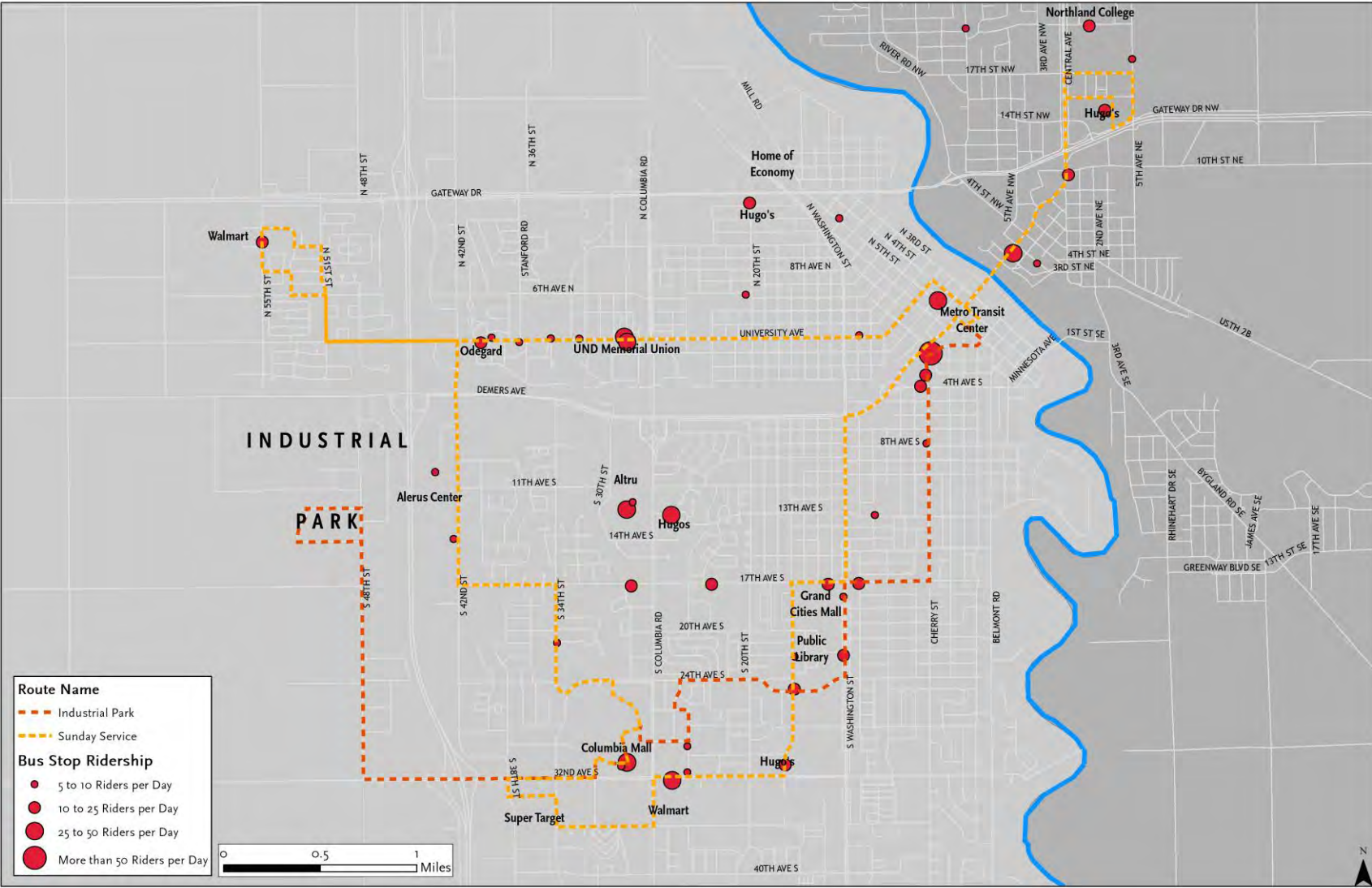


Figure 4: Routes 1, 1SE and 1SW

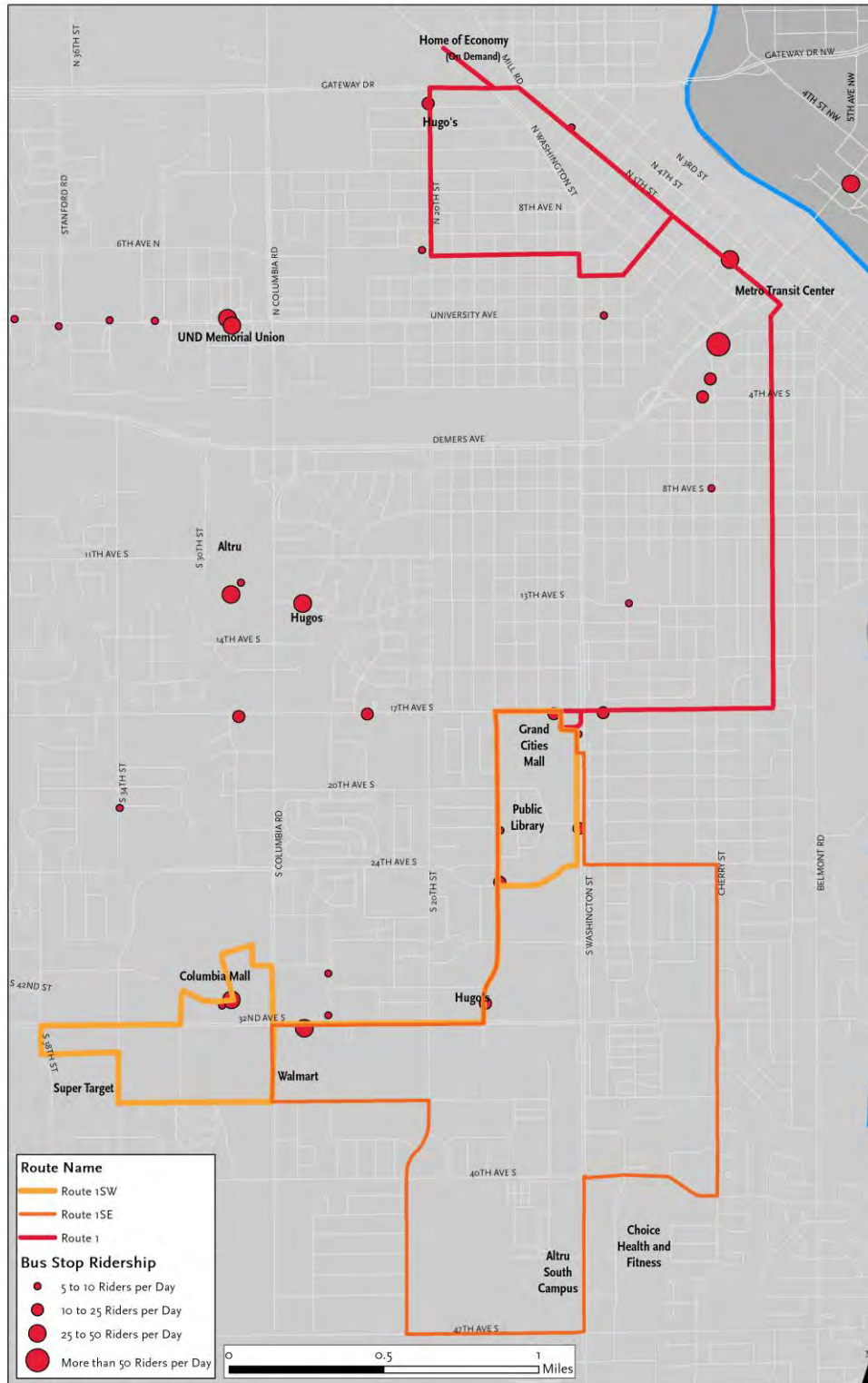


Figure 5: Route 3

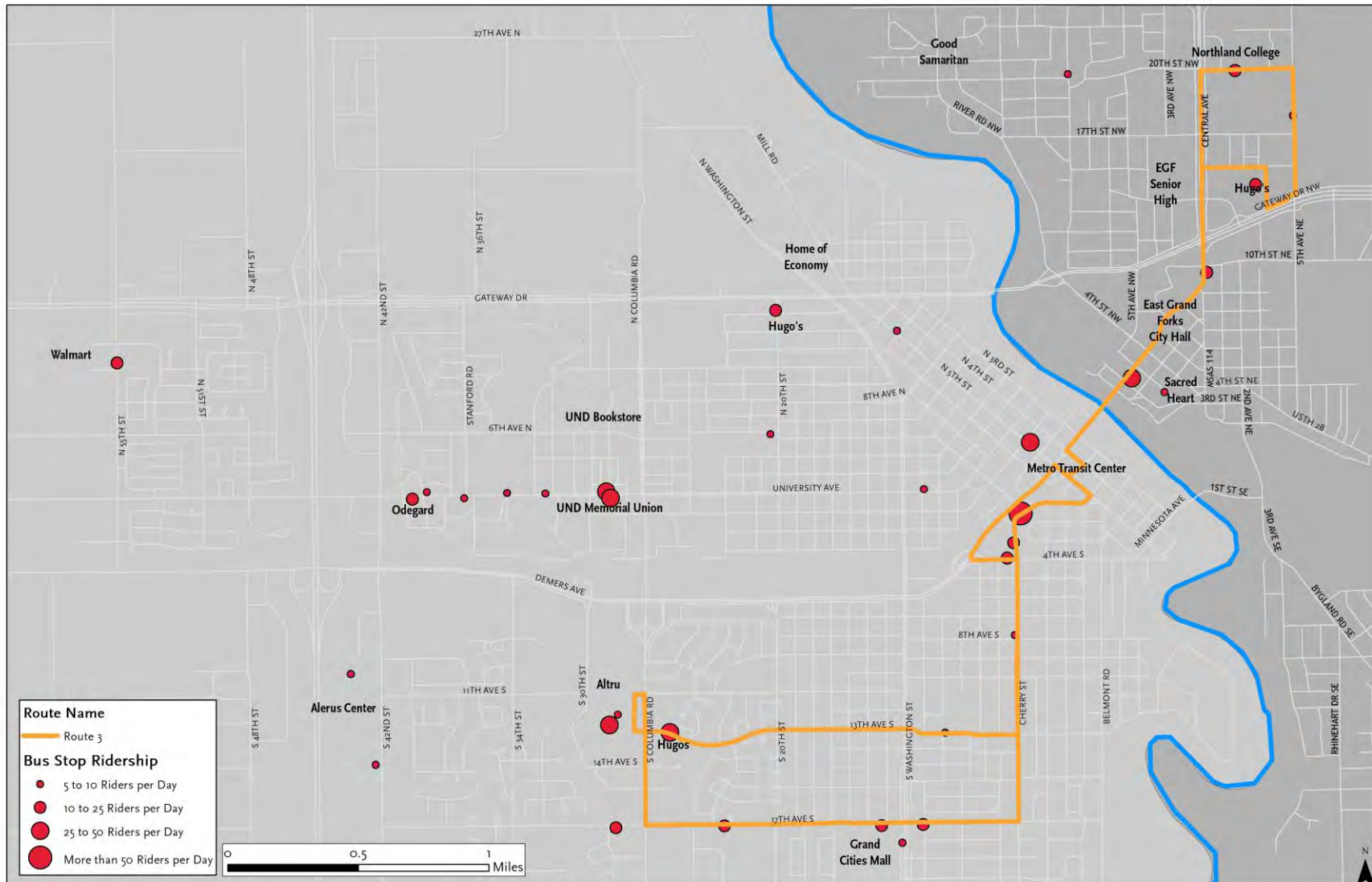


Figure 6: Route 4

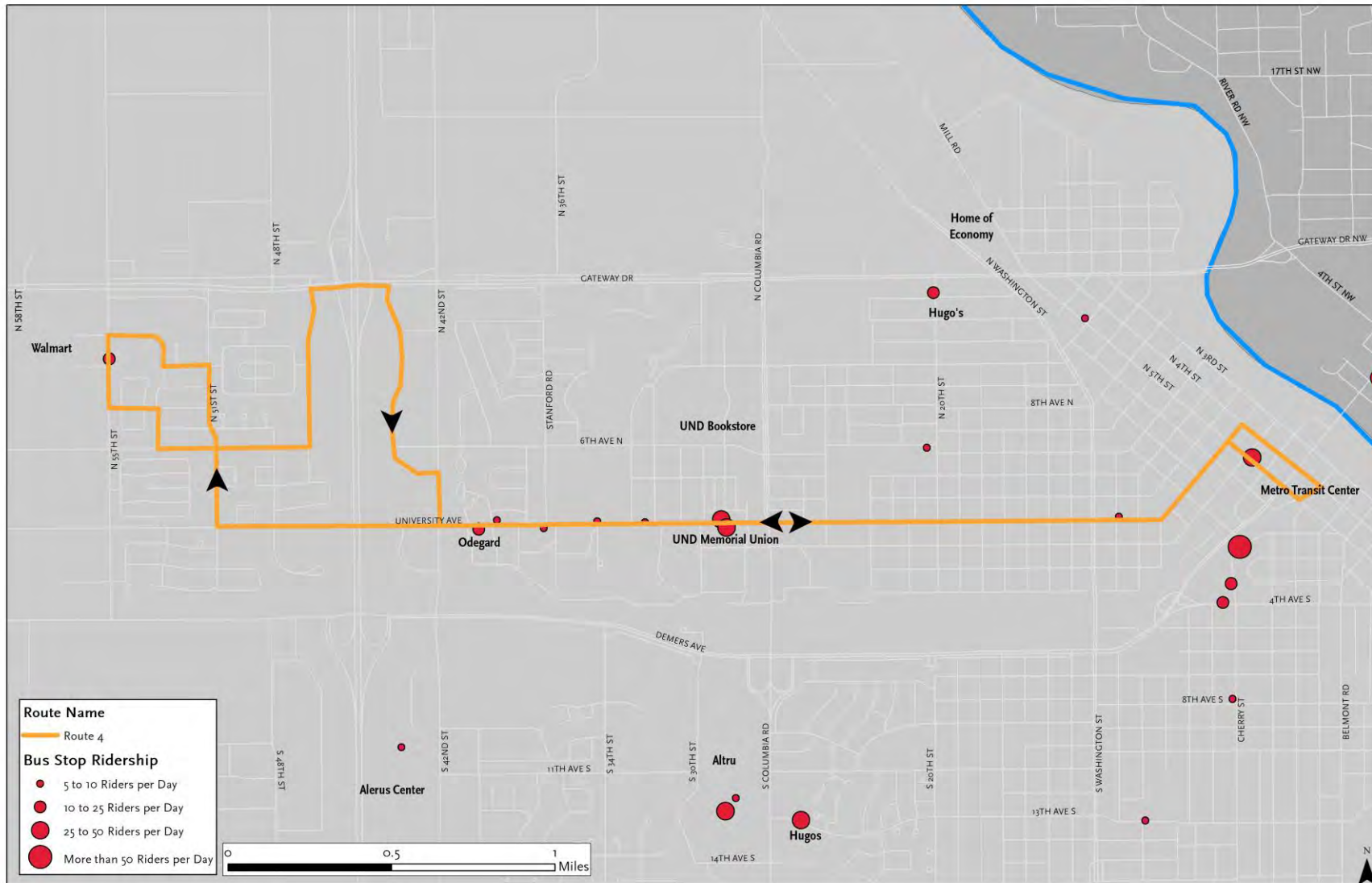


Figure 7: Route 5

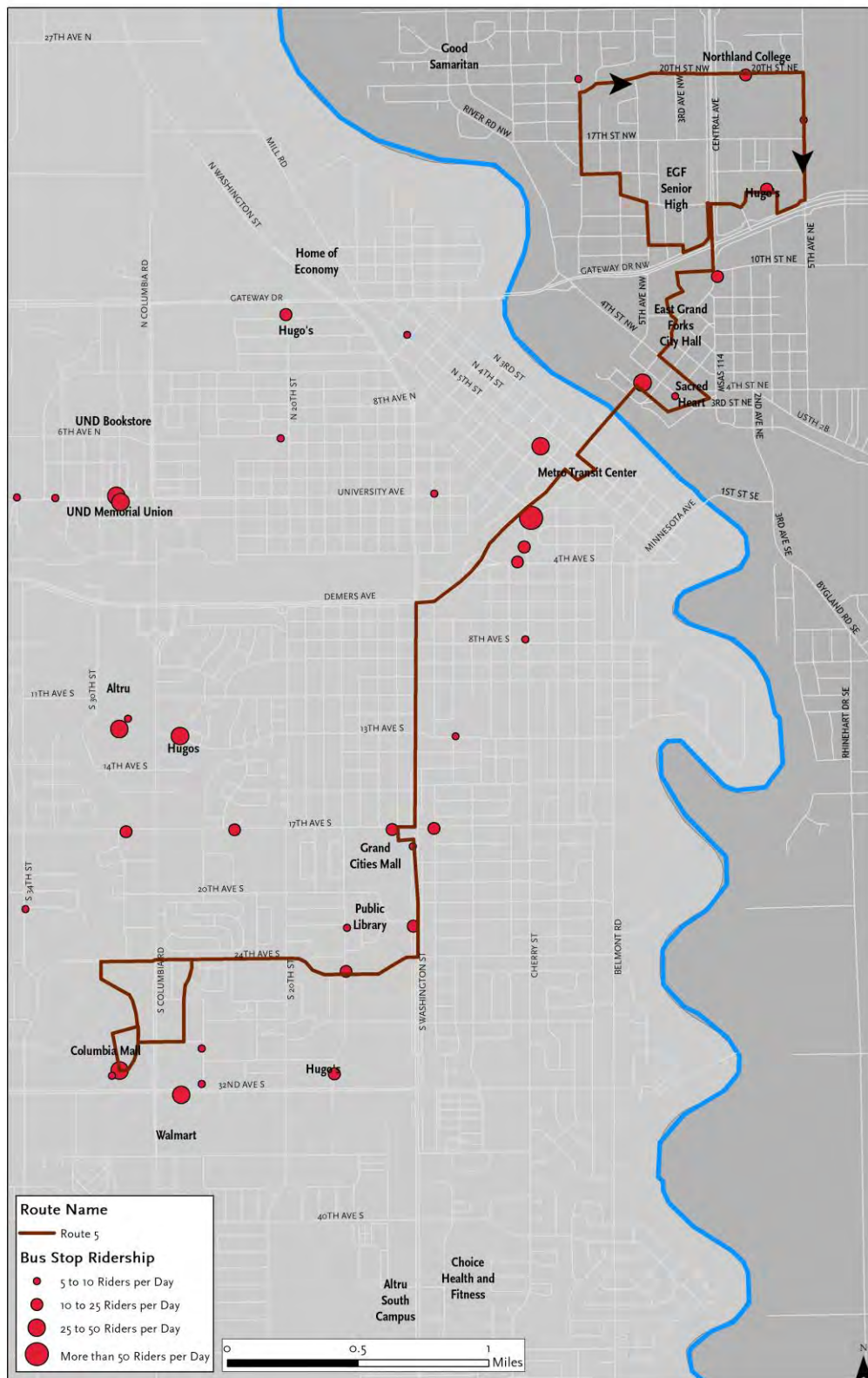
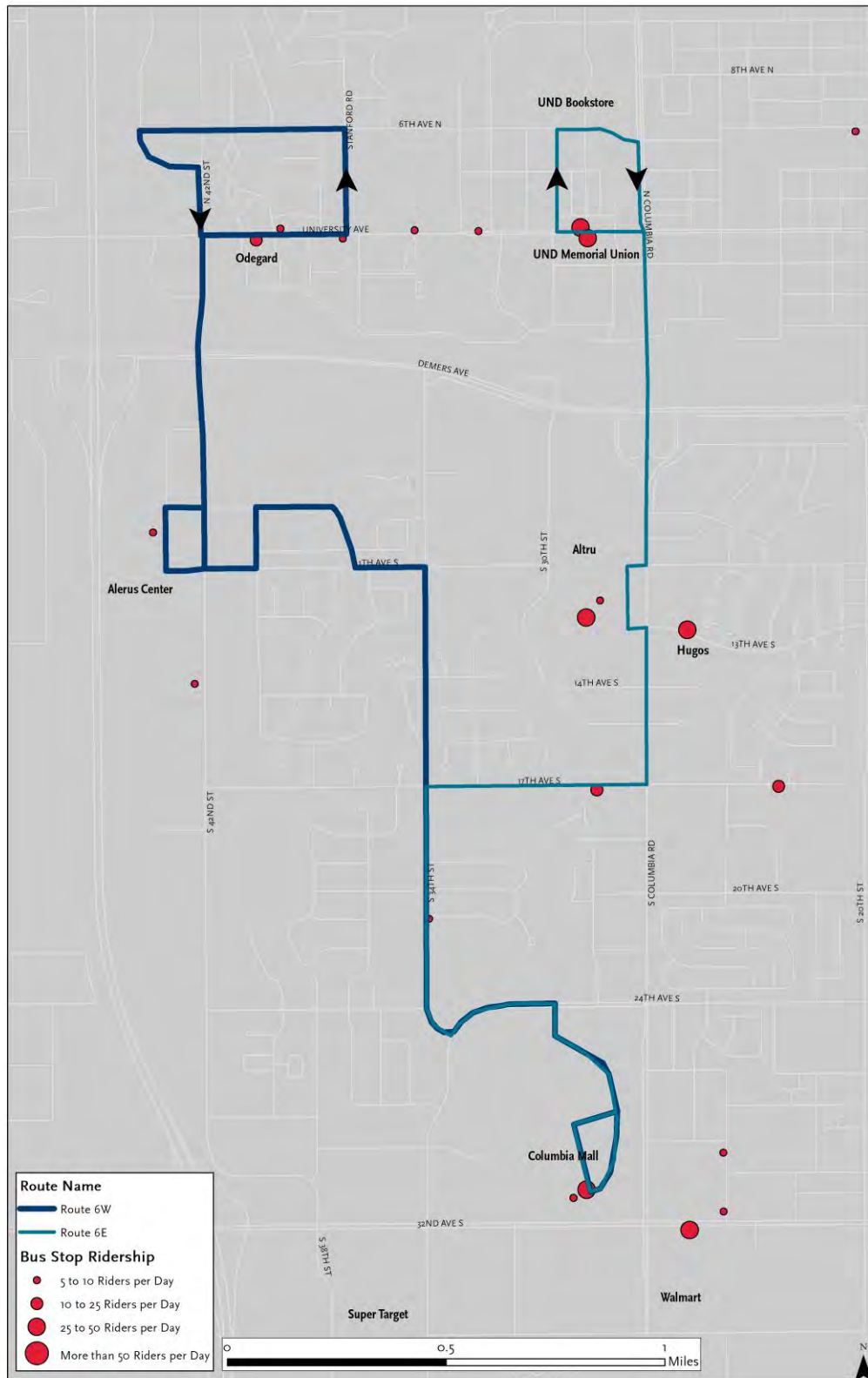


Figure 8: Routes 6E and 6W



Routes for Future Consideration

Industrial Park Route

Based on feedback received from the Grand Forks business community, a concept route was developed for a route serving the Grand Forks Industrial Park. The Industrial Park Route is a proposed route that would operate between the MTC and the Grand Forks Industrial Park via the Grand Cities Mall and the Columbia Mall. The route would provide a direct connection between downtown Grand Forks and the industrial park and would access the industrial park from 32nd Avenue South and South 48th Street. The Industrial Park Route would connect major employers to the transit system and would provide additional transit service to an area that is currently relatively poorly served. The Industrial Park Route is demonstrated in Figure 3.

The Industrial Park Route is not considered a part of any of the future Operational Alternatives discussed later. It is viewed as a standalone special service which would be additive to future service alternatives implemented by CAT.

Sunday Service Route

Based on feedback received from the public, a concept route was developed for Sunday service. In order to use resources efficiently and effectively, this route is proposed as a circulator service that would serve Grand Forks and East Grand Forks. The proposed route is similar to the existing night route and is proposed to serve:

- » The MTC
- » East Grand Forks
- » UND
- » Gateway Drive Walmart
- » Alerus Center
- » 32nd Avenue retail
- » Grand Cities Mall

Figure 3 illustrates the proposed Sunday Route. The Sunday Route is not considered a part of any of the future Operational Alternatives discussed later. It is viewed as a standalone special service which would be additive to future service alternatives implemented by CAT.

OPERATIONAL ALTERNATIVES

To assist with developing a range of potential system investment options, three Operational Alternatives are proposed for the Cities Area Transit (CAT) System: Each system builds upon the route framework discussed earlier. The change in new service is measured as a function of *revenue hours* between the base (Existing Condition) and each of the three proposed operational scenarios. Each Operational Alternative builds upon the next by adding additional levels of service through increasing headways.

- » **Cost Constrained:** Implements new route structure discussed earlier. Assumes some new service (mostly in East Grand Forks), but only to levels reasonably expected to be fundable in the in the very immediate future. System is right sized and scaled to meet regional needs balanced with new system route structure.
- » **Cost +:** Build on system restructure and focuses on improved headways and frequency of service.
- » **Cost ++:** Builds on Cost + by further expanding level of service and headways.

Capital Needs Analysis

As part of developing the Operational Analysis an assessment was conducted of the current inventory of CAT Fixed Route Vehicles. Table 1 demonstrates the current inventory of the fixed route vehicles operated by CAT. Based on this current inventory, CAT operates a fleet of 11 total fixed route vehicles.

Table 1: CAT Fixed Route Inventory Summary

CAT Fixed Route Inventory Summary				
Veh. #	Year	Make	Programming	Owner
103	2010	New Flyer	Replace 2022	GF
104	2010	New Flyer	Replace 2022	GF
105	2010	New Flyer	Replace 2022	GF
106	2010	New Flyer	Replace 2022	GF
976	1997	New Flyer	2017 (Programmed)	GF
42	2004	Gillig	2018 (Candidate)	GF
31	2003	Gillig	2017 (Programmed)	GF
91	2009	Chevy Arboc	2017 (Programmed)	GF
112	2011	Chevy Arboc	2018 (Candidate)	GF
161	2016	Ford Starcraft	2021	GF
162	2016	Chevy Arboc	2021	EGF

Spare Ratio Analysis

Table 2 below demonstrates the CAT Fixed Route fleet analysis relative to each Operational Scenario. These scenarios assume peak vehicle requirements with and without the HC Tripper and assume the addition of 0 to +2 in new Fixed Route Vehicles.

Fixed Route Assessment

Based on the existing CAT fleet inventory, it is assumed zero (0) new buses are needed to operate the Cost Neutral Scenario.

The Cost + Scenario assumes the addition of one (1) fixed route vehicle.

The Cost ++ Scenario assumes the addition of a two (2) new fixed route vehicles.

These assumptions assumed CAT continued to operate the HC Tripper and figured its operation into the peak vehicle needs and resulting spare ratio analysis. The spare ratio analysis is discussed below.

Evening Route Assessment

If the Cost Constrained evening routes are implemented, it will add an additional 15,000 miles annually or a total of 71,000 miles to the current CAT fleet over the five years of this particular plan. Based on this assumption, no additional rolling stock needs are suggested to support the Cost Constrained evening service.

If the Cost + Scenario evening routes are implemented it would add 29,000 service miles annually or 142,000 new service miles over the life of this five year TDP. Based on this assumption, no additional rolling stock needs are suggested to support Cost + evening service.

If the Cost ++ Scenario for evening service is implemented, it would add 75,000 service miles annually, or a total of 376,000 service miles over the life of this five-year plan. Therefore, one additional

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expansion vehicle would be recommended midway through the planning horizon if the Cost ++ Evening service were implemented.

Table 2: Spare Ratio Analysis

Spare Ratio Analysis (With HC Tripper)		
	Fleet Requirement	Spare Ratio
Total Fleet (Fixed)	11	x
Peak - Existing Condition	8	37.5%
Peak - Cost Neutral	9	22.2%
Peak - Cost +	11	0.0%
Peak - Cost ++	11	0.0%

Spare Ratio Analysis (No HC Tripper)		
	Fleet Requirement	Spare Ratio
Total Fleet (Fixed)	11	x
Peak - Existing Condition	7	57.1%
Peak - Cost Neutral	8	37.5%
Peak - Cost +	10	10.0%
Peak - Cost ++	10	10.0%

Spare Ratio Analysis (With HC Tripper) + 1 Vehicle		
	Fleet Requirement	Spare Ratio
Total Fleet (Fixed)	12	x
Peak - Existing Condition	8	50.0%
Peak - Cost Neutral	9	33.3%
Peak - Cost +	11	9.1%
Peak - Cost ++	11	9.1%

Spare Ratio Analysis (No HC Tripper) + 1 Vehicle		
	Fleet Requirement	Spare Ratio
Total Fleet (Fixed)	12	x
Peak - Existing Condition	7	71.4%
Peak - Cost Neutral	8	50.0%
Peak - Cost +	10	20.0%
Peak - Cost ++	10	20.0%

Spare Ratio Analysis (With HC Tripper) + 2 Vehicle		
	Fleet Requirement	Spare Ratio
Total Fleet (Fixed)	13	x
Peak - Existing Condition	8	62.5%
Peak - Cost Neutral	9	44.4%
Peak - Cost +	11	18.2%
Peak - Cost ++	11	18.2%

Spare Ratio Analysis (No HC Tripper) + 2 Vehicle		
	Fleet Requirement	Spare Ratio
Total Fleet (Fixed)	13	x
Peak - Existing Condition	7	75.0%
Peak - Cost Neutral	8	62.5%
Peak - Cost +	10	30.0%
Peak - Cost ++	10	30.0%

Operational Scenarios

- » The Cost Constrained Scenario assumes a roughly cost constrained investment relative to revenue hours and reflect investments in new revenue hours assumed to be constrained. Total new investment of \$254,000 is needed to support the Cost Constrained Scenario.
- » The Cost + Scenario reflects an increased investment of approximately \$1.2 million annually, which includes costs for the expansion of the Fixed Route fleet by one (1) vehicle.
- » The Cost ++ Scenario reflects an increased investment of approximately \$2.5 million annually, which includes the purchase of two (2) new fixed route vehicles.

Cost Constrained Scenario

As noted, the Cost Constrained Scenario is based on guidance from the cities of Grand Forks and East Grand Forks for existing and potential revenue to support these system investments. Most of the new cost for the Cost Constrained Scenario falls on East Grand Forks. The Cost Constrained Scenario includes most of the weekday/Saturday proposed routes operating at a 60-minute headway, with the exception of Routes 1, 4 and 8.

- » Route 1 is proposed to operate at a 30-minute headway.
- » Route 4 is proposed to operate at a 30-minute headway during the peak period and a 60-minute headway during off-peak period.
- » Route 8 is a peak period only route that is proposed to operate at a 45-minute headway.

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The Cost Constrained Scenario proposes the operation of the Route 1 night route and the Route 6 night route at a 75- to 90-minute headway and the Route 3 night route at a 60-minute headway.

Level of service information for the Cost Constrained Scenario is shown in Table 3.

Table 3: Cost Constrained Scenario Level of Service

Cost Constrained Scenario Level of Service		
Route	Weekday/Saturday Headway	Weeknight/Saturday Night Headway
Route 1	30	75-90
Route 1SE	60	-
Route 1SW	60	75-90
Route 3	60	60
Route 4	30/60*	-
Route 5	60	-
Route 6W	60	75-90
Route 6E	60	75-90
Route 8	45**	-

*30/60 indicates routes that run on 30-minute headways during the peak period (assumes additional cost to account for deadhead and driver change out) and 60-minute headways during the off-peak period

** Route 8 is a peak period only route that runs on a 45-minute headway

The cost of the Cost Constrained Scenario was estimated based on the assumed level of service. The estimated additional cost (beyond the current system costs) of the Cost Constrained Scenario for day and night service is approximately \$250,000 annually. Additional information regarding the cost estimate for the Cost Constrained Scenario is shown in Tables Table 4 and Table 5.

Table 4: Cost of the Cost Constrained Scenario Weekday/Saturday Service

Cost Constrained Scenario Weekday/Saturday Service			
Existing Condition			
	Total	Grand Forks	East Grand Forks
Revenue Hours	24,123	20,769	3,355
Peak Vehicles	7	6	1
Proposed Day Structure			
	Total	Grand Forks	East Grand Forks
Revenue Hours	25,574	21,020	4,554
Peak Vehicles	8	6	2
New Investment	System-Wide	Grand Forks	East Grand Forks
Revenue Hours	1,451	251	1,200
New Operating Cost (\$95/hr)	\$137,807	\$23,854	\$113,953
Additional Vehicles	0	-	
New Capital Cost	\$0	-	
Total New Cost (Day)	\$137,807	\$23,854	\$113,953

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Table 5: Cost of the Cost Constrained Scenario Weeknight/Saturday Night Service

Cost Constrained Scenario Weeknight/Saturday Night Service			
Existing Condition			
	Total	Grand Forks	East Grand Forks
Revenue Hours	1,086	1,220	0
Peak Vehicles	1	1	0
Proposed Day Structure			
	Total	Grand Forks	East Grand Forks
Revenue Hours	2,440	1,220	1,220
Peak Vehicles	3	2	1
New Investment	System-Wide	Grand Forks	East Grand Forks
Revenue Hours	1,354	0	1,220
New Operating Cost (\$95/hr)	\$115,900	\$0	\$115,900
Additional Vehicles		-	-
New Capital Cost		-	-
Total New Cost (Night)		\$0	\$115,900

Cost + Scenario

The Cost + Scenario includes most of the weekday proposed routes operating either at 60-minute headways all day and a 30-minute headway during the peak period and a 60-minute headway during the off-peak period.

- » Route 1 is proposed to operate at a 30-minute headway all day.
- » Route 8 is proposed at a 45-minute headway during the peak period only.

The Cost + Scenario includes the operation of the Route 1 night route, Route 3 night route and Route 6 night route at 60-minute headways.

Level of service information for the Cost + Scenario is shown in Table 6.

Table 6: Cost + Scenario Level of Service

Cost + Scenario Level of Service		
Route	Weekday/Saturday	Weeknight/Saturday Night
Route 1	30	60
Route 1SE	60	-
Route 1SW	60	60
Route 3	30/60*	60
Route 4	30/60*	-
Route 5	30/60*	-
Route 6W	60	60
Route 6E	60	60
Route 8	45**	-

*30/60 indicates routes that run on 30-minute headways during the peak period (assumes additional cost to account for deadhead and driver change out) and 60-minute headways during the off-peak period

** Route 8 is a tripper route that runs on a 45-minute headway during the peak period

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The cost of the Cost + Scenario was estimated based on the assumed level of service. The estimated additional cost (beyond the cost of the current system) of the Cost + Scenario for day and night service is \$1,154,167. Additional information regarding the cost estimate for the Cost + Scenario is shown in Tables Table 7 and Table 8.

Table 7: Cost + Scenario Weekday/Saturday Service

Cost + Scenario Weekday/Saturday Service			
Existing Condition			
	Total	Grand Forks	East Grand Forks
Revenue Hours	24,123	20,769	3,355
Peak Vehicles	7	6	1
Proposed Day Structure			
	Total	Grand Forks	East Grand Forks
Revenue Hours	29,622	23,044	6,578
Peak Vehicles	10	7	3
New Investment	System-Wide	Grand Forks	East Grand Forks
Revenue Hours	5,499	2,275	3,224
New Operating Cost (\$95/hr)	\$522,368	\$216,135	\$306,233
Additional Vehicles	2	1	1
New Capital Cost	\$800,000	\$400,000	\$400,000
Total New Cost (Day)	\$1,322,367	\$616,135	\$706,233

Table 8: Cost + Scenario Weeknight/Saturday Night Service

Cost + Scenario Weeknight/Saturday Night Service			
Existing Condition			
	Total	Grand Forks	East Grand Forks
Revenue Hours	1,086	1,220	0
Peak Vehicles	1	1	0
Proposed Day Structure			
	Total	Grand Forks	East Grand Forks
Revenue Hours	3,660	2,440	1,220
Peak Vehicles	3	2	1
New Investment		Grand Forks	East Grand Forks
Revenue Hours	2,574	1,220	1,220
New Operating Cost (\$95/hr)	\$231,800	\$115,900	\$115,900
Additional Vehicles	0	-	-
New Capital Cost	-	-	-
Total New Cost (Night)	\$231,800	\$115,900	\$115,900

Cost ++ Scenario

The Cost ++ Scenario includes about half of the proposed weekday/Saturday routes operating at 30-minute headways and the other half operating at 60-minute headways. The Cost ++ Scenario also maintains the proposal that Route 8 operate as a peak period route at a 45-minute headway.

The Cost ++ Scenario proposes that all weekday/Saturday routes, except Route 8, operate at 60-minute headways on weeknights and Saturday nights.

Level of service information for the Cost ++ Scenario is shown in Table 9.

Table 9: Cost ++ Scenario Level of Service

Cost ++ Scenario Level of Service		
Route	Weekday/Saturday	Weeknight/Saturday Night
Route 1	30	60
Route 1SE	60	60
Route 1SW	60	60
Route 3	30	60
Route 4	30	60
Route 5	30	60
Route 6W	60	60
Route 6E	60	60
Route 8	45**	-

** Route 8 is a tripper route that runs on a 45-minute headway during the peak period

The cost of the Cost ++ Scenario was estimated based on the assumed level of service. The estimated additional cost (beyond the cost of the current system) of the Cost ++ Scenario for day and night service is \$1,334,428. Additional information regarding the cost estimate for the Cost ++ Scenario is shown in Tables Table 10 and Table 11.

Table 10: Cost ++ Scenario Weekday/Saturday Service

Cost ++ Scenario Weekday/Saturday Service			
Existing Condition			
	Total	Grand Forks	East Grand Forks
Revenue Hours	24,123	20,769	3,355
Peak Vehicles	7	6	1
Proposed Day Structure			
	Total	Grand Forks	East Grand Forks
Revenue Hours	32,658	25,068	7,590
Peak Vehicles	10	7	3
New Investment	System-Wide	Grand Forks	East Grand Forks
Revenue Hours	8,535	4,299	4,236
New Operating Cost (\$95/hr)	\$810,788	\$408,415	\$402,373
Additional Vehicles	2	1	1
New Capital Cost	\$800,000	\$400,000	\$400,000
Total New Cost (Day)	\$1,610,788	\$808,415	\$802,373

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Table 11: Cost ++ Scenario Weeknight/Saturday Night Service

Cost ++ Scenario Weeknight/Saturday Night Service			
Existing Condition			
	Total	Grand Forks	East Grand Forks
Revenue Hours	1,086	1,220	0
Peak Vehicles	1	1	0
Proposed Night Structure			
	Total	Grand Forks	East Grand Forks
Revenue Hours	6,732	5,512	1,220
Peak Vehicles	3	2	1
New Investment		Grand Forks	East Grand Forks
Revenue Hours	5,646	4,292	1,220
New Operating Cost (\$95/hr)	\$523,640	\$407,740	\$115,900
Additional Vehicles	1	-	-
New Capital Cost	400,000	-	-
Total New Cost (Night)	\$923,640	\$407,740	\$115,900

Additional routes for future consideration were developed outside of any of the above scenarios. The cost breakdown for additional revenue hours and new capital are provided in Tables Table 12 and Table 13

Table 12: Future Considerations: Sunday Service

Future Considerations: Sunday Service			
New Investment	Total	Grand Forks	East Grand Forks
Revenue Hours	624	544	80
New Operating Cost (\$95/hr)	\$59,280	\$51,633	\$7,647
Additional Vehicles	-	-	-
New Capital Cost	-	-	-
Total New Cost	\$59,280	\$51,633	\$7,647

Table 13: Future Considerations: Industrial Park

Future Considerations: Industrial Park			
New Investment	Total	Grand Forks	East Grand Forks
Revenue Hours	1,830	1,830	0
New Operating Cost (\$95/hr)	\$173,850	\$173,850	-
Additional Vehicles	1	1	-
New Capital Cost	\$150,000	\$150,000	-
Total New Cost	\$323,850	\$323,850	-