

Milwaukee County North-South Transit Enhancement Study

TIER 2 EVALUATION

Chapter 8

OPERATING AND MAINTENANCE COSTS

8.1 OVERVIEW

In this chapter, proposed BRT route alternatives are evaluated based on the estimated operating and maintenance (O&M) costs, including any changes to other MCTS routes that would be made with the implementation of the proposed BRT route alternatives. Changes to the other transit routes are described in Section 2.6, "Proposed Changes to Other Routes," of Chapter 2. The information and methodology used to estimate O&M costs, the O&M cost estimates, and route alternative evaluation are provided in the following sections.

8.2 OPERATING AND MAINTENANCE COSTS

Operating costs for the proposed BRT service route alternatives are those derived from labor, including the time required to pull the electric buses in and out of service and layover time, benefits, insurance, security and fare enforcement, tires, and utility costs required to run the electric buses, stations, and bus chargers. The electricity operational costs of the BRT service include those for overhead charging at each end of the route, plug-in charging at the maintenance garage, and electricity costs at the BRT stations.

Maintenance costs include those associated with maintaining the electric buses, electric bus chargers, stations, station platforms, bus ticketing and fare validation machines, and the automated electric bus arrival signage. In addition, O&M costs for a restroom for bus operators is included, as it is expected that a restroom will be needed at the terminus of the southern BRT route options.

Operation and maintenance costs for proposed changes to other routes, which would be made if the proposed BRT service was implemented, are also included in this analysis to provide an estimate of the total cost impact on the MCTS annual operating budget. Operating costs for these routes include labor, benefits, insurance, security, utilities, tires, and oil and fuel used for the buses that would operate on the other routes. Maintenance costs for these routes include those required to maintain clean diesel buses and bus stops.

Methodology

The O&M costs for the BRT and underlying local service are estimated by multiplying the cost per operating hour and the number of platform hours required for the service. Platform hours are a combination of revenue hours (which include service and layover time), plus deadhead hours (which include the time it takes for buses to travel to and from the maintenance garage). In this evaluation, the O&M costs do not specifically account for possible variations in BRT running types. The O&M costs are based on platform hours which may change slightly depending on what lengths of the route are running in mixed-traffic, a dedicated center lane, or a dedicated outside lane, and the deadhead hours may change to account for the number of buses required to maintain headways and service schedule. Chapter 4 provides recommendations for running types for each segment option.

Estimating Operating and Maintenance Costs for BRT Alternatives

MCTS determined the BRT service operating cost per hour to be \$120.19 in 2022 dollars by reviewing the annual operations and maintenance budget and applying a percentage for the total O&M costs that would be used for BRT-specific services, including those for the East-West BRT service, which is expected to start service in Spring 2023 with costs similar to the proposed BRT service in this corridor. To estimate BRT operating costs for an expected start of service in 2027, MCTS applied a two percent inflation rate per year, which reflects expected changes in materials, labor rates, and benefit costs, including the rising health insurance cost trends, which resulted in an estimated BRT service operating cost per hour in 2027 of \$132.70.

Estimating Operating and Maintenance Costs for Changes to Other Routes

The O&M costs for other transit routes that would be modified with the implementation of the proposed BRT service were determined to estimate the cost impacts of these changes. These routes are expected to use the same vehicles that are used today on local fixed route transit service. The operating cost per hour for these routes is \$120.39 in 2022 and, with an applied two percent per year inflation rate, is expected to be \$132.92 in 2027. As with the BRT O&M costs, MCTS determined this operating cost per hour based on a percentage of the overall MCTS O&M annual budget.

Additional Operating and Maintenance Costs

The bus operator restrooms are not included in the BRT O&M costs per hour, so they are included as a separate O&M cost item. For the purposes of the cost estimates, a restroom is included at the northern and southern ends of all proposed BRT route alternatives. A similar, operator-only restroom is included in the East-West BRT service with a cost of \$620 per month to operate and maintain in 2022. That cost was inflated by two percent per year for an O&M cost of \$1114.64 per month or \$13,376, and rounded to \$13,400, per year in 2027 for each restroom.

BRT Cost Estimates

Table 8.1 shows the estimated O&M costs for each of the proposed BRT route alternatives and the no-build alternative (the existing MCTS PurpleLine). These costs are calculated by multiplying the operating costs per hour in 2027 dollars by the platform hours and adding the estimated O&M cost for two operator restrooms. The no-build alternative has the least expensive annual O&M cost at \$10,757,700, followed by North Option 2 to South Option A at \$11,512,400. The proposed BRT alternative with most expensive O&M costs is North Option 1 to South Option B at \$13,743,900.

**Table 8.1
Estimated Operating and Maintenance Costs by Route Alternative: 2027**

Operating and Maintenance Costs (O&M)	Proposed BRT Routes Alternatives						No-Build Alternative
	North Option 1 to South Option A	North Option 1 to South Option B	North Option 1 to South Option C	North Option 2 to South Option A	North Option 2 to South Option B	North Option 2 to South Option C	
Operating Costs per hour ^a (\$)	132.70	132.70	132.70	132.70	132.70	132.70	132.92
Platform hours	94,591	103,369	97,271	86,553	93,357	91,818	80,934
Annual Operating and Maintenance Cost (\$)	12,552,200	13,717,100	12,907,900	11,485,600	12,388,500	12,184,200	10,757,700
Annual O&M Costs for Two Bus Operator Restrooms ^b (\$)	26,800	26,800	26,800	26,800	26,800	26,800	N/A
Total O&M Costs (\$, rounded to nearest \$100)	12,579,000	13,743,900	12,934,700	11,512,400	12,415,300	12,211,000	10,757,700

^a MCTS operating costs per hour include wages, fringe benefits, advertising, other outside services, maintenance services, security services, consultants, materials and supplies, bus parts, postage and printed forms, utilities, purchased transportation, insurance and recoveries, travel and meetings, dues, licenses and subs, other miscellaneous, bond interest, tire leasing and depreciation.

^b Milwaukee County provided monthly operations and maintenance costs for the existing operator-exclusive restrooms as \$620/month per restroom in 2022, and the operational and maintenance cost inflation factor of 2 percent per year has been applied for a cost of \$1114.64 per month or \$13375.68, rounded to \$13,400 per year in 2027.

Source: SEWRPC and MCTS

Cost Estimates for Changes to Other Routes

The O&M costs for planned changes to other routes are provided in Tables 8.2 and Table 8.3. These costs will be used to determine the net O&M costs for each route alternative given that changes made to other routes will have impacts on Milwaukee County’s future overall operating budget if the proposed BRT service is implemented.

Table 8.2 shows the cost estimates for the changes to other routes for BRT route alternatives that include North Option 1—including the removal of the existing PurpleLine route, the addition of future Route 27 from Bayshore to W. Loomis Road, truncating Route 12 to avoid the duplication of transit service along N. Teutonia Avenue, and the extension of Route 80 to expand access to the BRT route. Table 8.3 shows the cost estimates for BRT route alternatives that include North Option 2—including the removal of the existing PurpleLine route and the addition of future Route 27 from N. Green Bay Road to Loomis Road. These changes are described in more detail in Chapter 2. These O&M costs were calculated using the 2027 operating cost per hour for fixed route transit service (\$132.92) and multiplied by the platform hours that will be required after changes are made to each route. The net O&M costs for each route alternative were estimated by subtracting the existing O&M cost from the proposed future O&M cost with service changes.

As Table 8.2 shows, changes to other routes related to the BRT route alternatives that include North Option 1 would result in an estimated O&M cost savings of \$7,833,900 per year. As Table 8.3 shows, changes to other routes related to the BRT route alternatives that include North Option 2 would result in an O&M cost savings of \$7,484,700 per year.

Table 8.2
Operating and Maintenance (O&M) Costs for Proposed Changes to Other Routes for BRT Route Alternatives that Include North Option 1: 2027

Changes to Other Routes	Operating Cost per hour (\$)	Existing Platform Hours	Existing O&M Cost (\$)	Proposed Platform Hours	O&M Cost with Proposed Changes (\$)	O&M Cost Difference (\$)
Add Route 27 – Option 1	132.92	0	0	24,629	3,273,700	3,273,700
Truncate Route 12	132.92	39,037	5,188,800	30,018	3,990,000	-1,198,800
Extend Route 80	132.92	60,515	8,043,700	66,902	8,892,600	848,900
Remove PurpleLine	132.92	80,934	10,757,700	0	0	-10,757,700
Net Cost Changes (\$, rounded to nearest \$100)						-7,833,900

Source: SEWRPC and MCTS

Table 8.3
Operating and Maintenance (O&M) Costs for Proposed Changes to Other Routes for BRT Route Alternatives that Include North Option 2: 2027

Changes to Other Routes	Operating Cost per hour (\$)	Existing Platform Hours	Existing Operating Cost (\$)	Proposed Platform Hours	O&M Cost with Proposed Changes (\$)	O&M Cost Difference (\$)
Add Route 27 – Option 2	132.92	0	0	24,624	3,273,000	3,273,000
Remove PurpleLine	132.92	80,934	10,757,700	0	0	-10,757,700
Net Cost Changes (\$, rounded to nearest \$100)						-7,484,700

Source: SEWRPC and MCTS

Evaluation of Total Operations and Maintenance Costs for Route Alternatives

Table 8.4 shows the net total O&M cost estimates for each route alternative, which is calculated by combining the cost estimates for each proposed BRT route alternatives with the cost estimates for proposed changes to other routes. The annual O&M costs range from the least expensive, North Option 2 to South Option A at \$4,027,700 to the most expensive, North Option 1 to South Option B at \$5,910,000.

Table 8.4
Net Total Operating and Maintenance Costs by BRT Route Alternative: 2027

Operating and Maintenance Costs (O&M)	North Option 1 to South Option A (\$)	North Option 1 to South Option B (\$)	North Option 1 to South Option C (\$)	North Option 2 to South Option A (\$)	North Option 2 to South Option B (\$)	North Option 2 to South Option C (\$)
Proposed BRT Service	12,579,000	13,743,900	12,934,700	11,512,400	12,415,300	12,211,000
Changes to Other Routes	-7,833,900	-7,833,900	-7,833,900	-7,484,700	-7,484,700	-7,484,700
Total (\$, rounded to nearest \$100)	4,745,100	5,910,000	5,100,800	4,027,700	4,930,600	4,726,300

Source: SEWRPC and MCTS

Summary of Evaluation Results

Based on the O&M costs provided above, a rating for each proposed BRT route alternative is provided in Table 8.5. The rating system uses green, yellow, or red dots to signify whether each proposed BRT route alternative would have a minimal, moderate, or high impact on the MCTS operating budget. North Option 1 to South Option A, North Option 2 to South Option A and North Option 2 to South Option C alternatives are rated with a green dot since their annual O&M costs are lower and would have a minimal impact on the MCTS O&M budget. North Option 1 to South Option C and North Option 2 to South Option B are rated with a yellow dot since their annual O&M costs would have a moderate impact, and North Option 1 to South Option B would have the highest impact on the MCTS O&M budget.

Table 8.5
Summary of Annual Operating and Maintenance (O&M) Costs for BRT and Underlying Transit Services

Route Alternative	Annual O&M Cost
North Option 1 to South Option A	●
North Option 1 to South Option B	●
North Option 1 to South Option C	●
North Option 2 to South Option A	●
North Option 2 to South Option B	●
North Option 2 to South Option C	●

Source: SEWRPC