

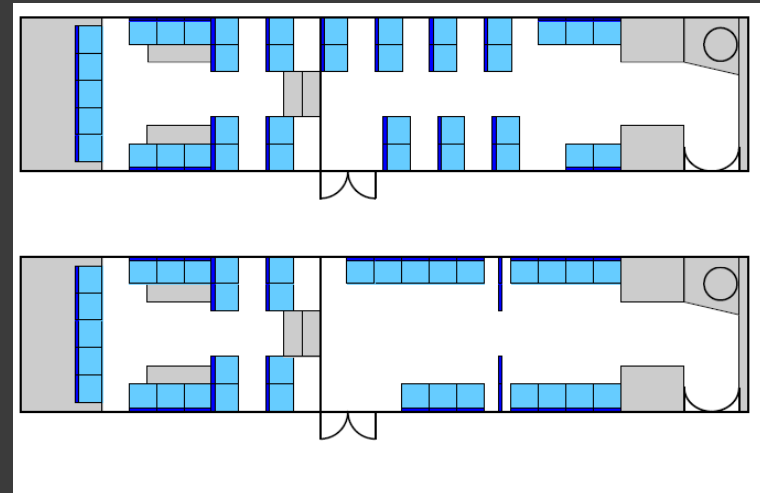
February 2014

BUS SIZE STUDY FOR METRO TRANSIT

Bus Size Study

- ⦿ Recommendation in 2008 Metro Transit Long Range Ad Hoc Plan
- ⦿ Project partners:
 - MPO
 - Steering committee
 - Nelson\Nygaard consultant team
 - Metro Transit (support)
- ⦿ Goal:
 - To Investigate the use of larger and smaller buses to diversify Metro's fleet

Metro Transit's Fleet



- About 210 buses in the fleet
- Standard 40-foot transit coaches with 35-38 seats (about 10% are hybrid-electric)
- Used for fixed-route service (Routes 1-84 and Supplemental Schoolday Service)
- 17 paratransit vans for Metro+Plus demand-response service

Small and Large Buses



- 60-foot articulated buses
- 50-55 seats
- 3 doors
- Higher fuel use and operating cost
- Reduces overcrowding, eliminates the need for some extra service



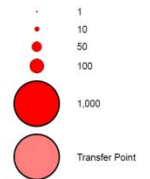
- 30-foot small heavy duty bus
- 25-30 seats
- 1 or 2 doors
- Lower fuel use, similar operating cost
- Improves the image of empty buses

Other vehicles include light- and medium-duty small buses, double-decker buses, and over-the-road coaches.

Metro Transit Ridership by Intersection Routes 1 to 84 October, 2013

Madison Area
Dane County, Wisconsin

Average Weekday Boardings
shown as proportional circles*

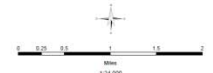


— Metro Transit Route (2013)

■ Incorporated Area

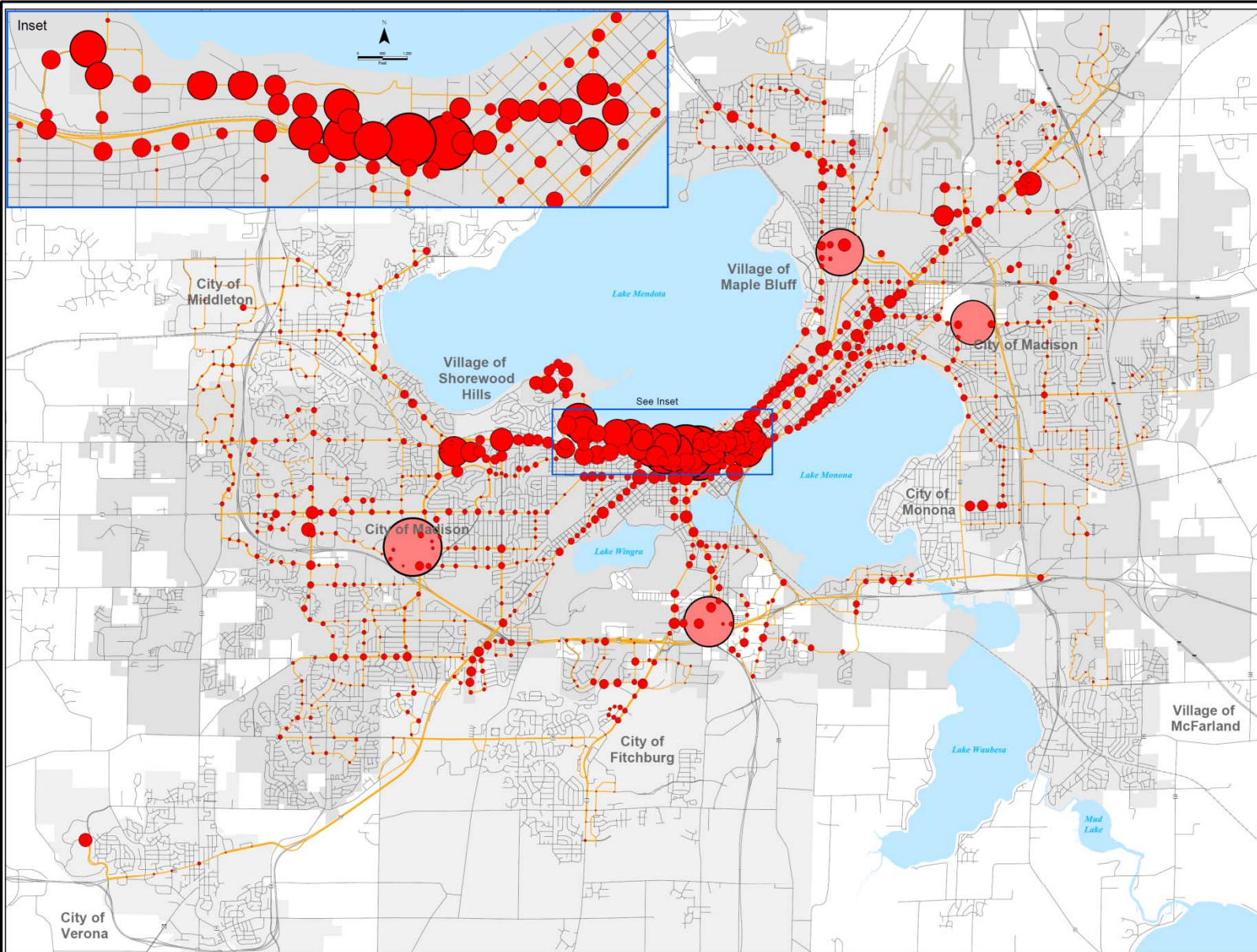
*Ridership data from October 8-10, 15-17, and 22-24, 2013.
Excludes supplemental school service.
Intersections combined on one-way pairs.

Prepared by: staff to the
T.P.B.
Transportation Planning Board
Dane County, Wisconsin
Dear Reader: 12/19/2013



Coordinate System: NAD 1983 NAD83 WISCONSIN DANE COUNTY FEET
Projection: Lambert Conformal Conic

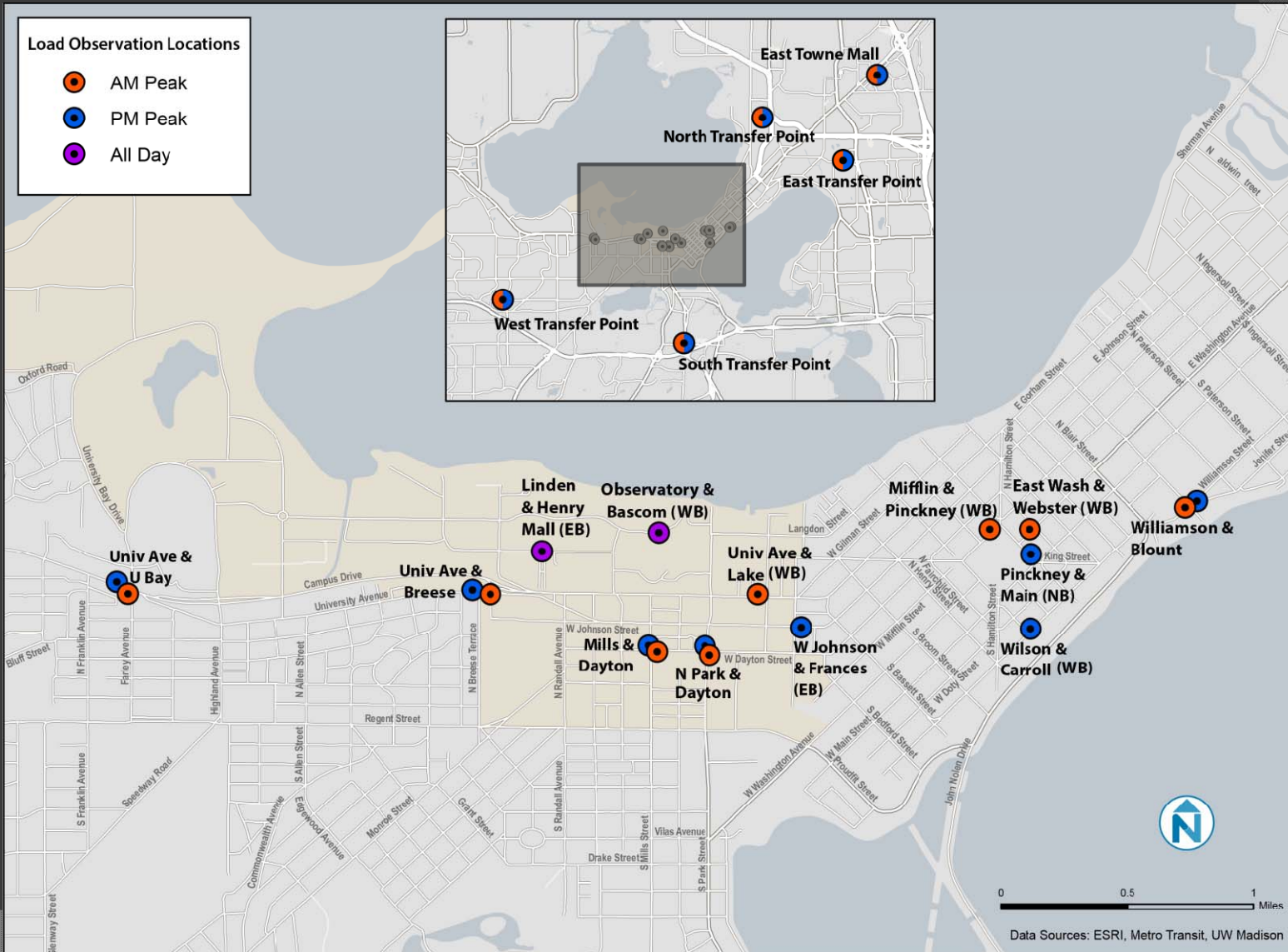
Source: GIS
Street Data: 2012 (DOT)
Waterbody Data: 2012 (DNR)

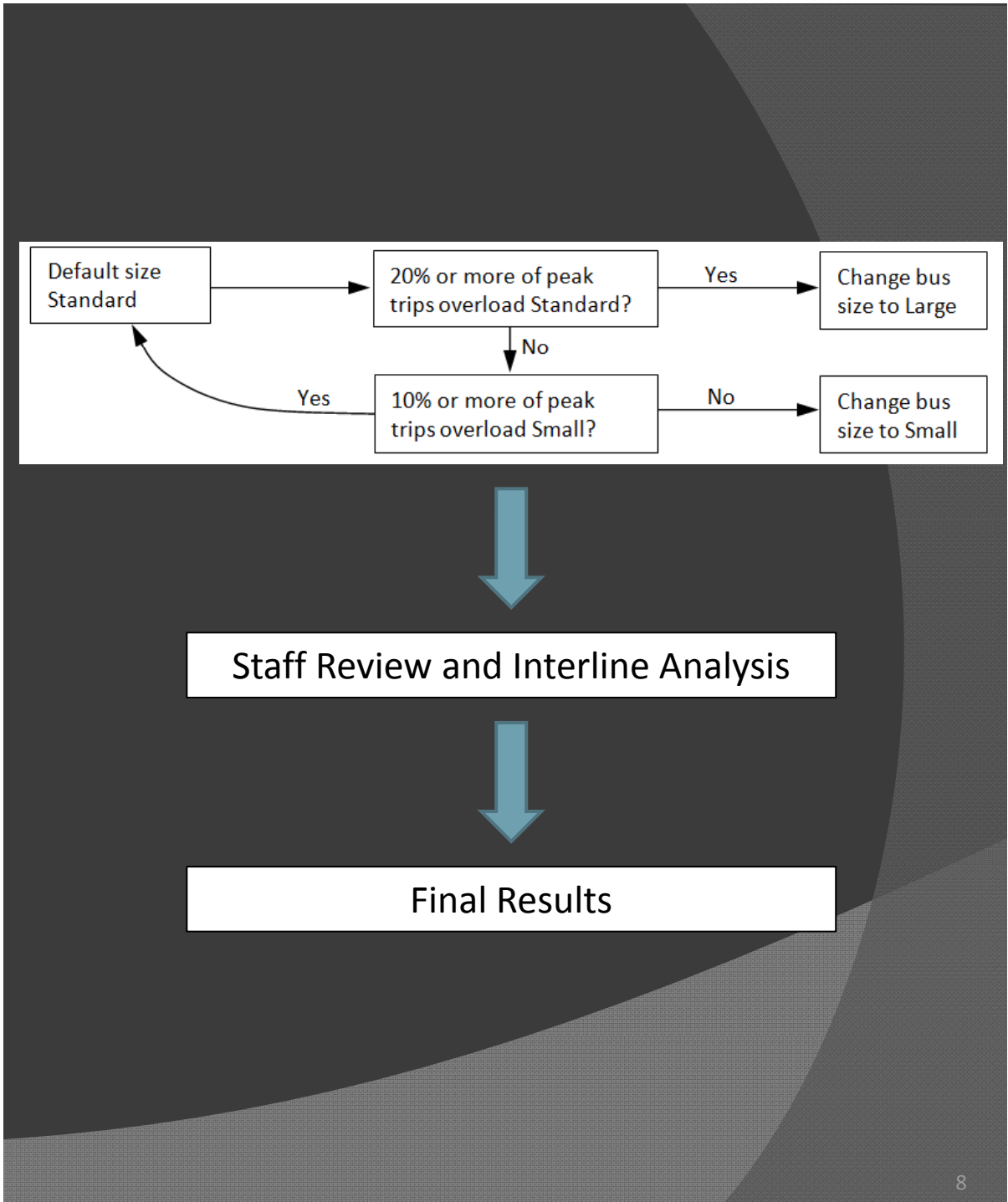
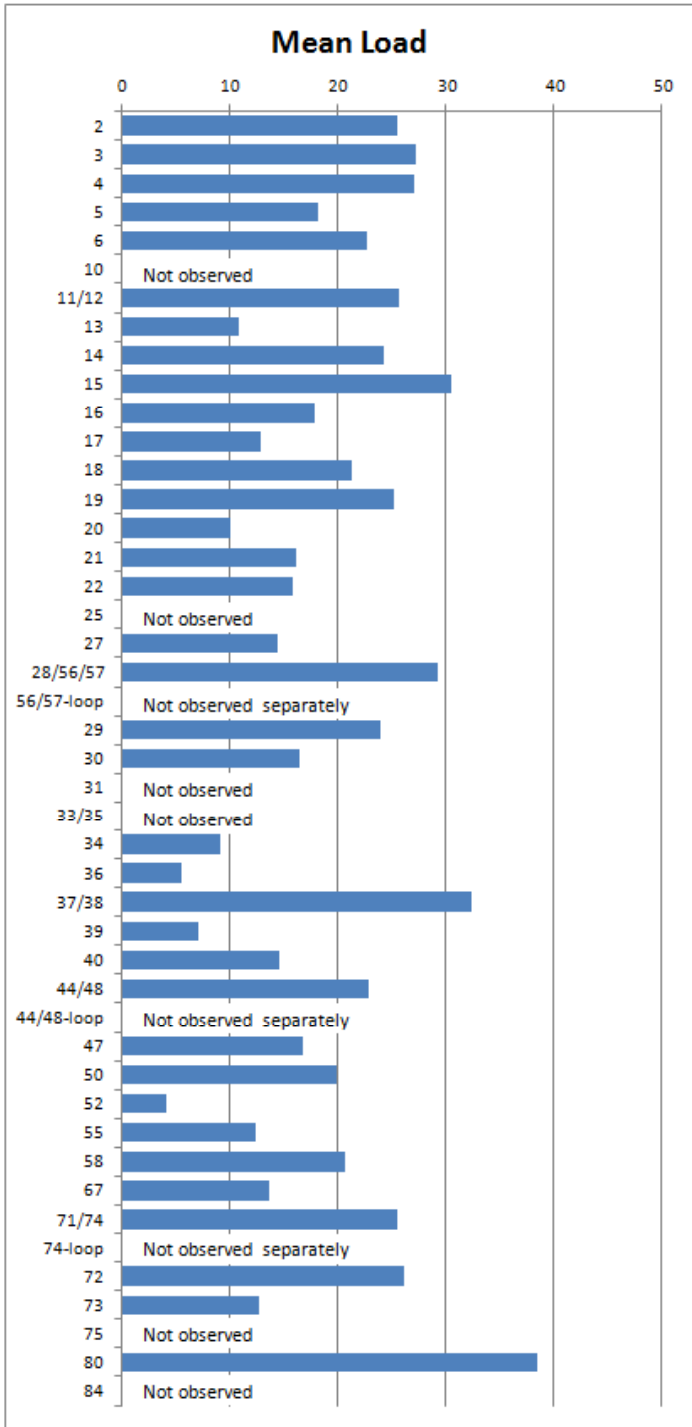


Analysis

- Screen-line loading analysis
 - Supplemental School day Service not included
 - All vehicles must be usable during peak periods
- Bus size criteria
 - During peak periods, no more than 20% of trips should overload a standard bus, no more than 10% of trips should overload a small bus
- Staff review and interline analysis
- Annualized cost and fuel use model
- Facilities review
 - Bus storage and maintenance facility on Ingersoll Street
 - Bus stops and transfer points

Load Observation Locations





Conclusions

- 38-48 buses in the fleet could be converted to large buses
 - Most are peak-only, creating inefficiency
 - Routes 2 and 80 are the highest priority, with 11 buses in service at a time
 - Converting Routes 2 and 80 to large vehicles could increase fuel use by 37,600 gallons of fuel annually (3.0% of system total) and increase capital and operating costs by \$650,000 annually
- 5-6 buses in the fleet could be converted to small buses
 - With some significant service restructuring, 10-12 buses could be converted to small buses
 - Converting 10 standard buses to small buses could save 3,700 gallons of fuel annually (0.3% of system total) with marginal effects to operating costs
- A minimum of about 10 vehicles of any new type are desired for logistical reasons

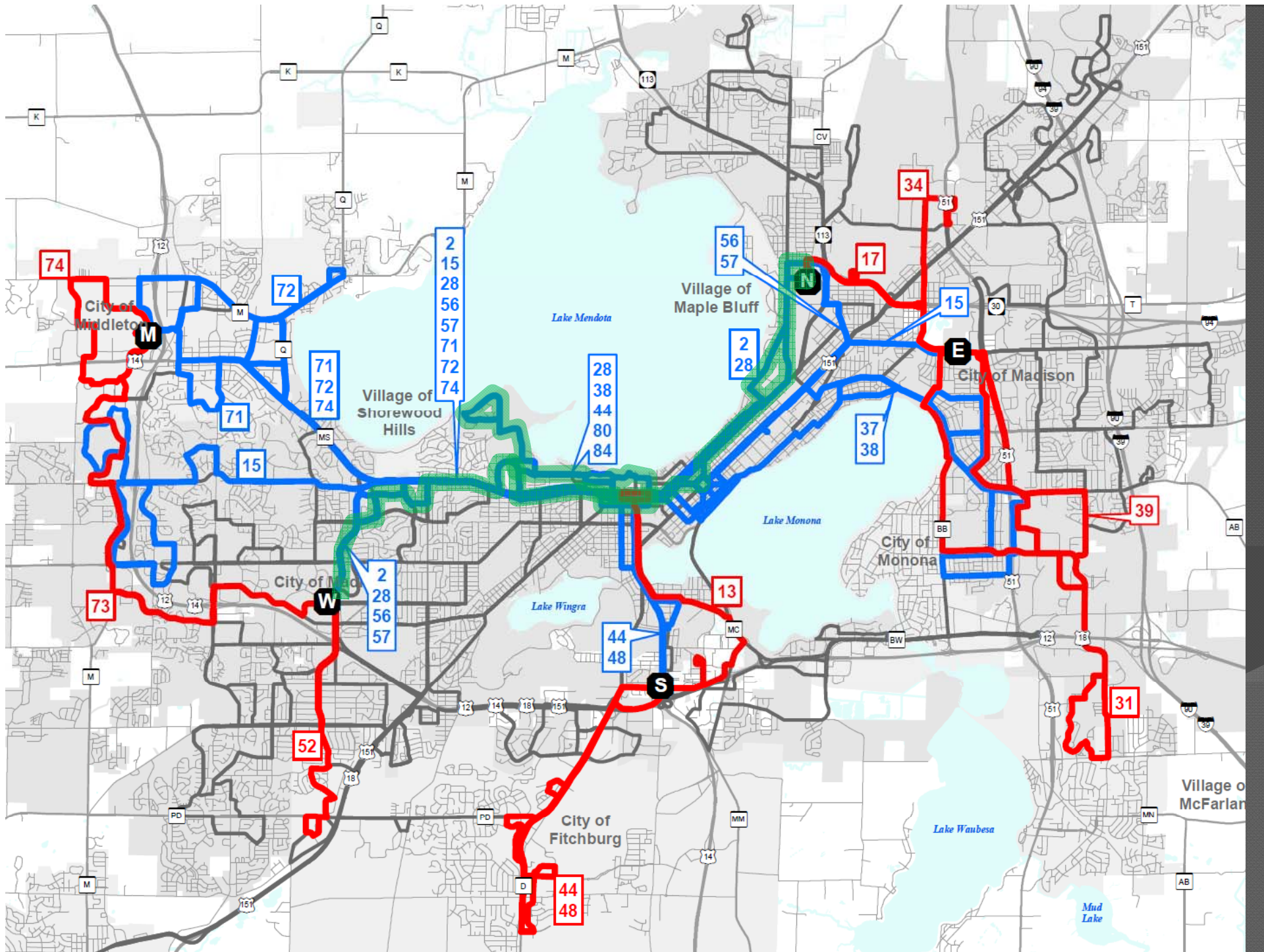
Large Bus Routes

Route	Number of Vehicles Required
2	4
15	5
28/56/57*	8
37/38*	8
44/48-main*	1.5
71/74-main*	3
72*	3
80/84*	7
Total	39.5 (48 with spares)

* Peak only

Small Bus Routes

Route	Number of Vehicles Required
Small Bus Candidate Routes	
13	2
17	1
34	0.5 – shared with Route 39
39	0.5 – shared with Route 34
52	1
Small bus fleet	5 (6 with spares)
Potential Small Bus Routes Requiring Additional Data or Restructure	
31	1
44/48-loop	1
73	2.5
74-loop	1
Maximum conceivable small bus fleet	10-11 (13 with spares)



Cost and Fuel Use Model

Scenario	Description	Total Annual Cost	Annual Fuel Use
1. Existing System	Metro's existing system modeled with the cost model.	\$47,438,000	1,236,780 gal
2. 10 Small Buses	10 standard buses are replaced with small buses. Some long routes may need to be restructured.	+ \$36,041	- 3,730 gal
3. 13 Large Buses	13 standard buses are replaced with large buses for use on Routes 2 (4 buses) and 80 (7 buses) with 2 spares.	+ \$648,013	+ 37,646
4. 10 Small and 13 Large	This scenario combines Scenarios 2 and 3.	+ \$684,053	+ 33,916
5. 40 Large Buses	40 large buses are replaced with standard buses for use on Routes 2, 15, 28/56/57, 37/38, 44/48, 71, 72, 80, and 84.	+ \$1,801,873	+ 90,711
6. 40 Large Buses with Service Change	Scenario 5 with some trips removed on Routes 10, 15, and 38 while maintaining peak capacity in those corridors.	+ \$909,807	+ 70,066

Conclusions

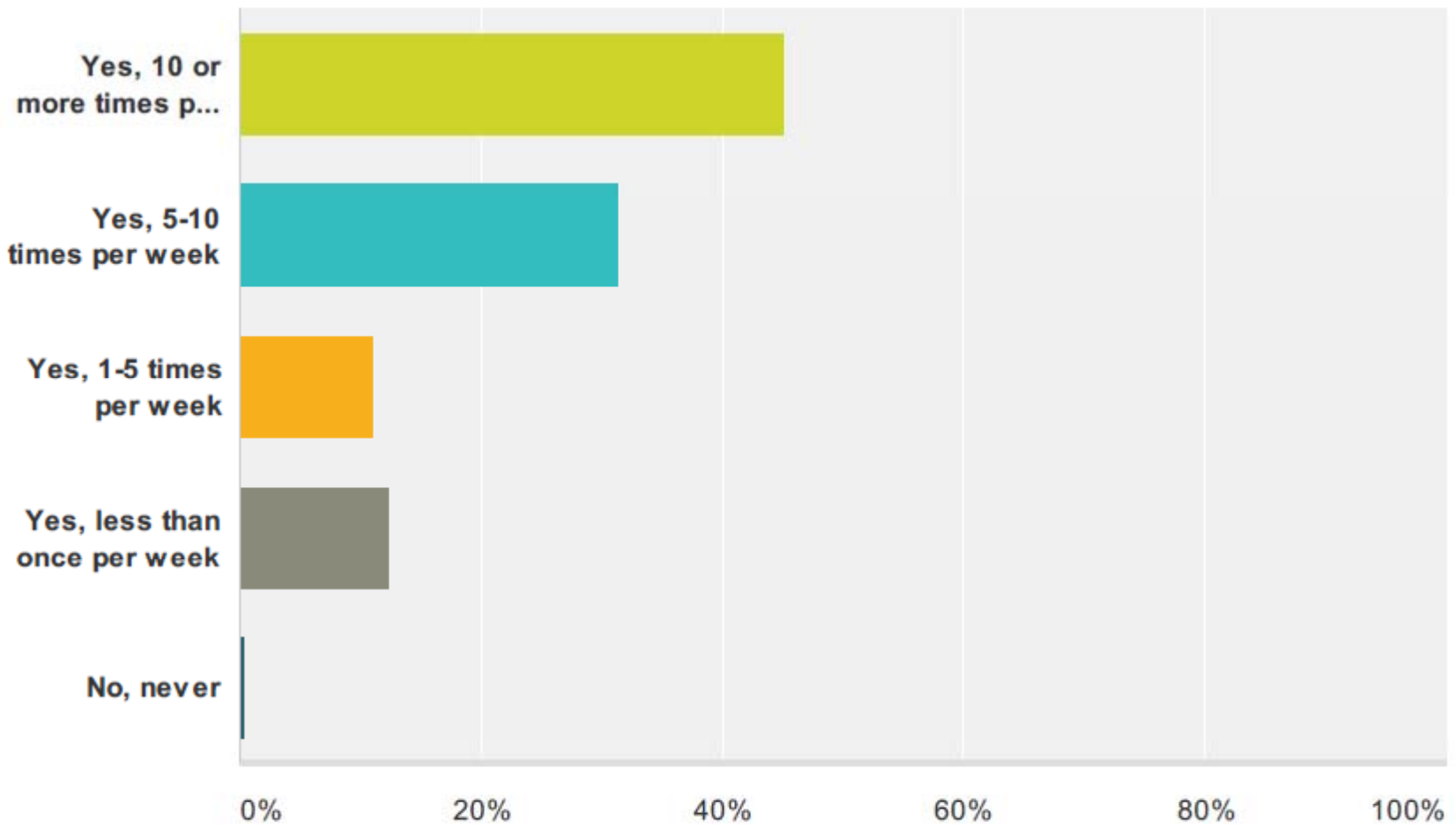
- The bus storage and maintenance facility cannot accommodate any new vehicles
 - Internal circulation is acceptable
- Modifications will likely be needed at transfer points and bus stops
- Development of a Bus Rapid Transit System would reduce the need for large buses in local service



Madison Metro Bus Size Study

Q1 Do you use Madison Metro bus route(s)

Answered: 310 Skipped: 3



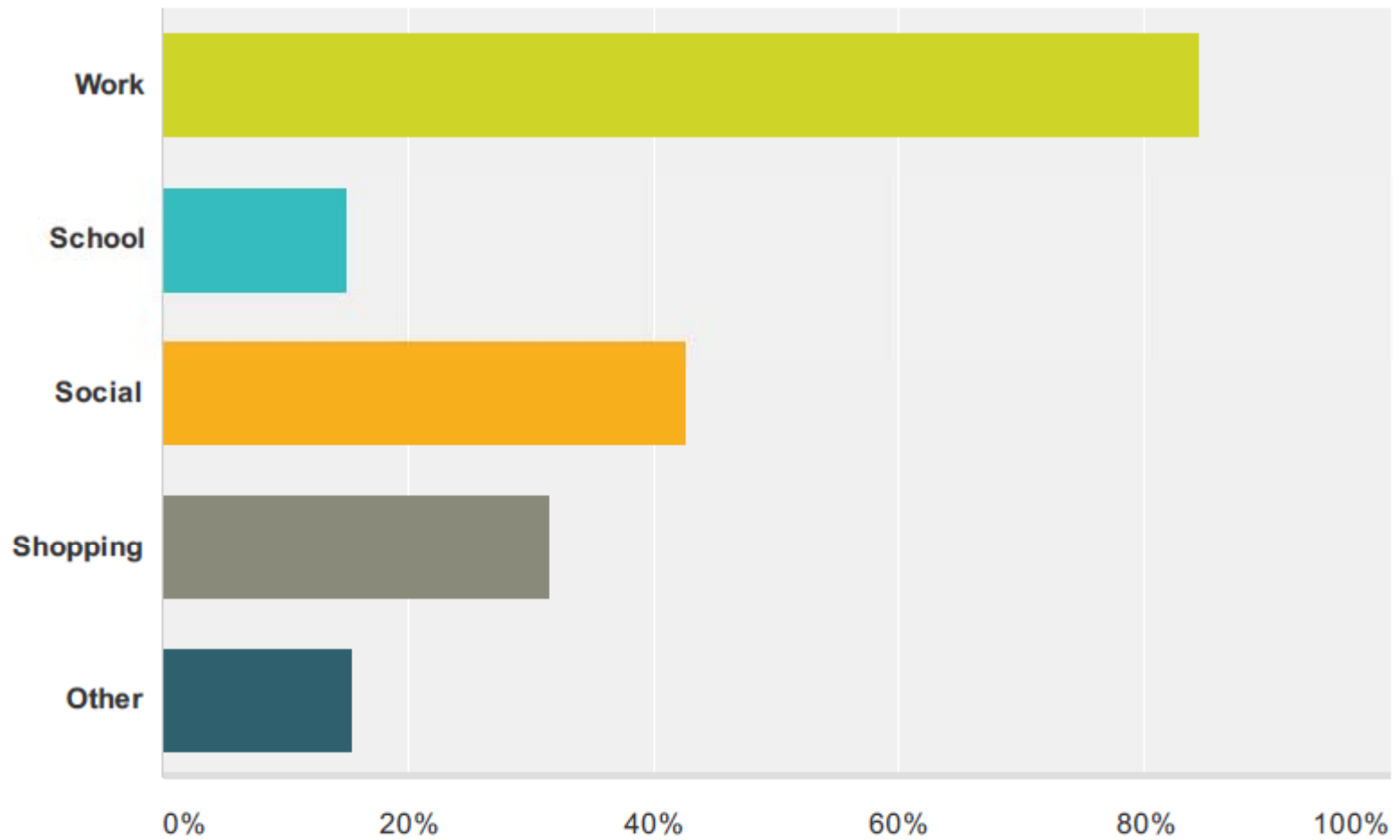
Q2: Which routes do you ride?

- Wide cross-section of routes reported

Madison Metro Bus Size Study

Q3 For what types of trips do you take the bus?

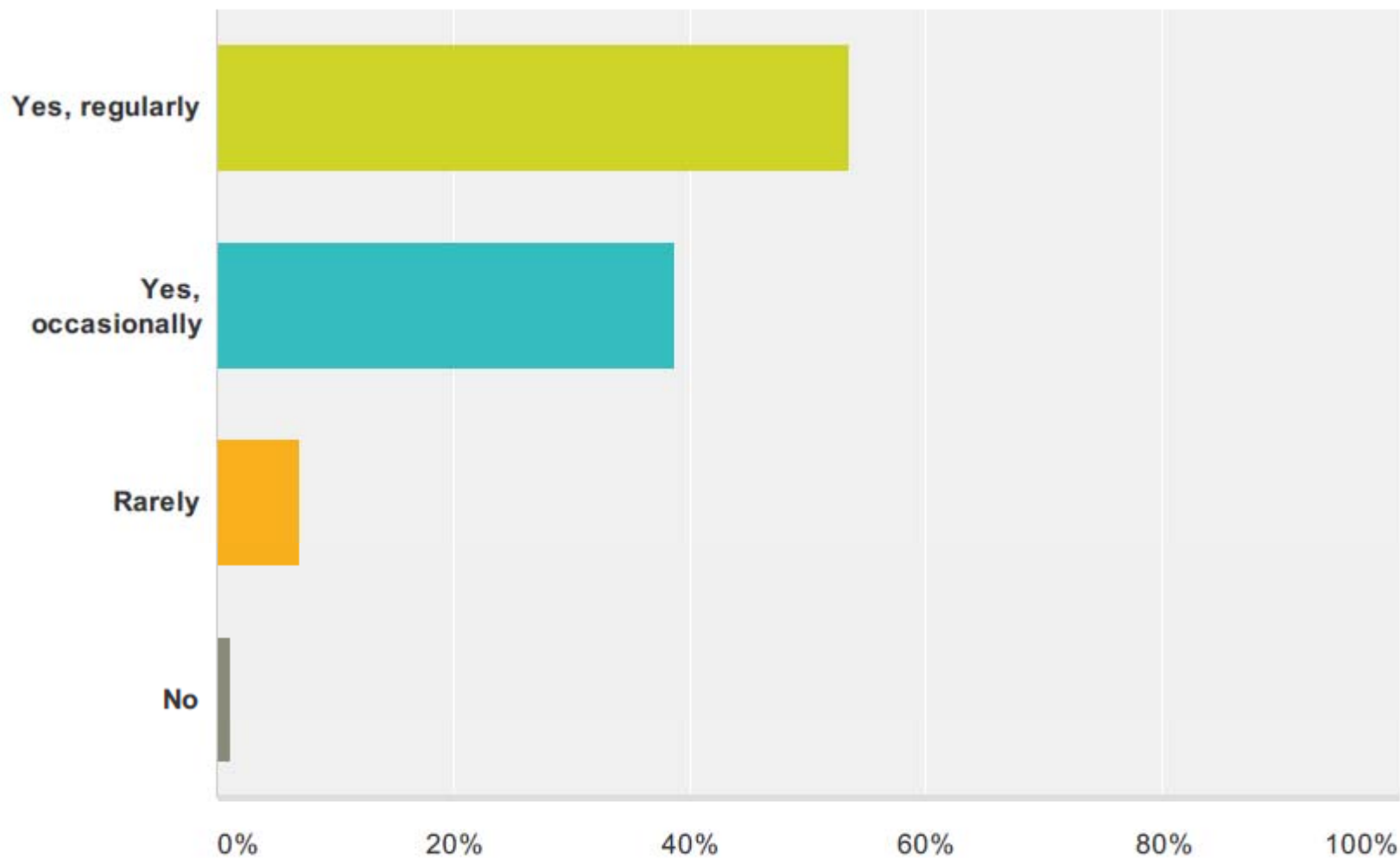
Answered: 305 Skipped: 8



Madison Metro Bus Size Study

Q4 Do you experience or have you noticed bus overcrowding?

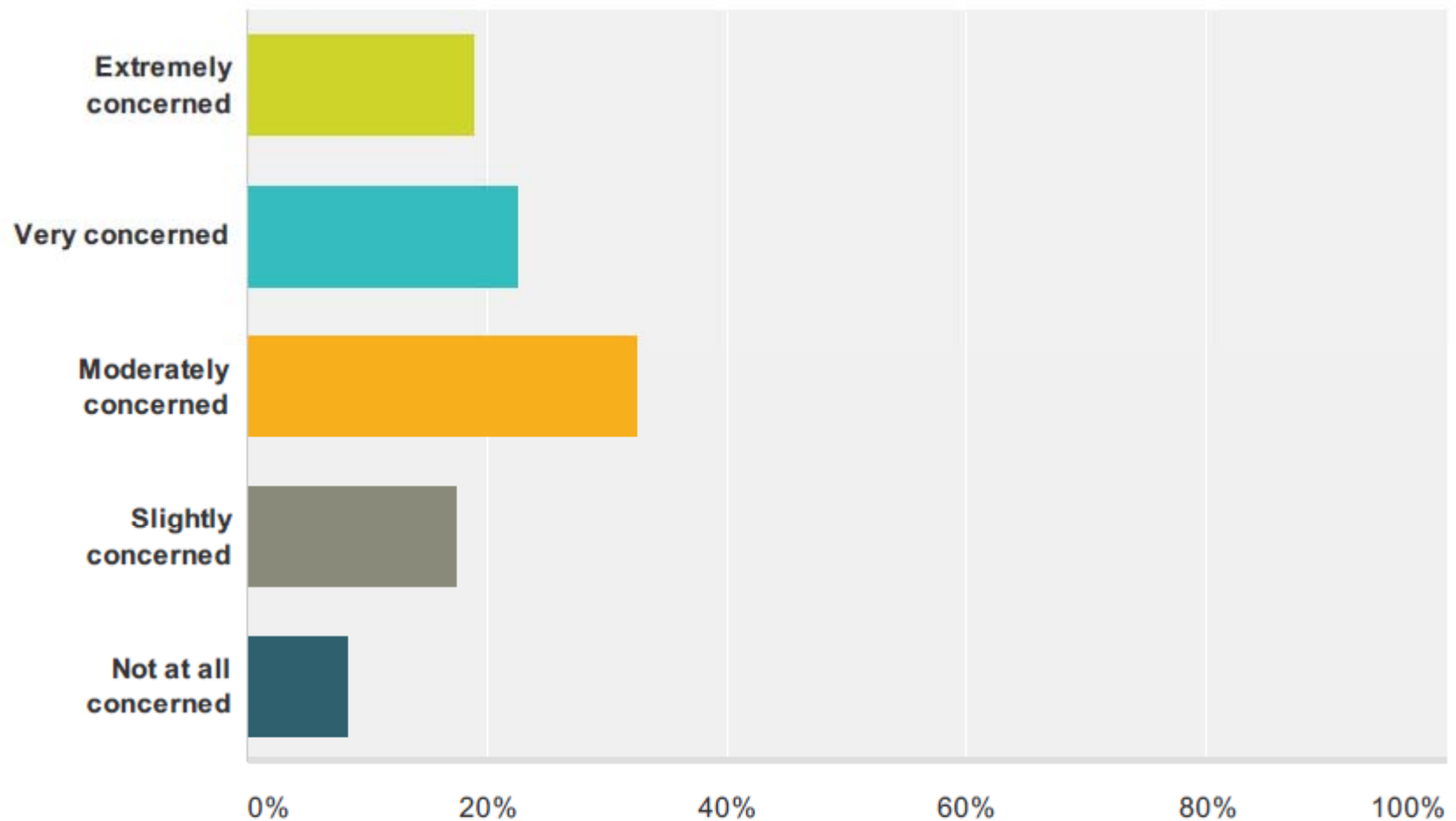
Answered: 301 Skipped: 12



Madison Metro Bus Size Study

Q5 Are you concerned about bus overcrowding?

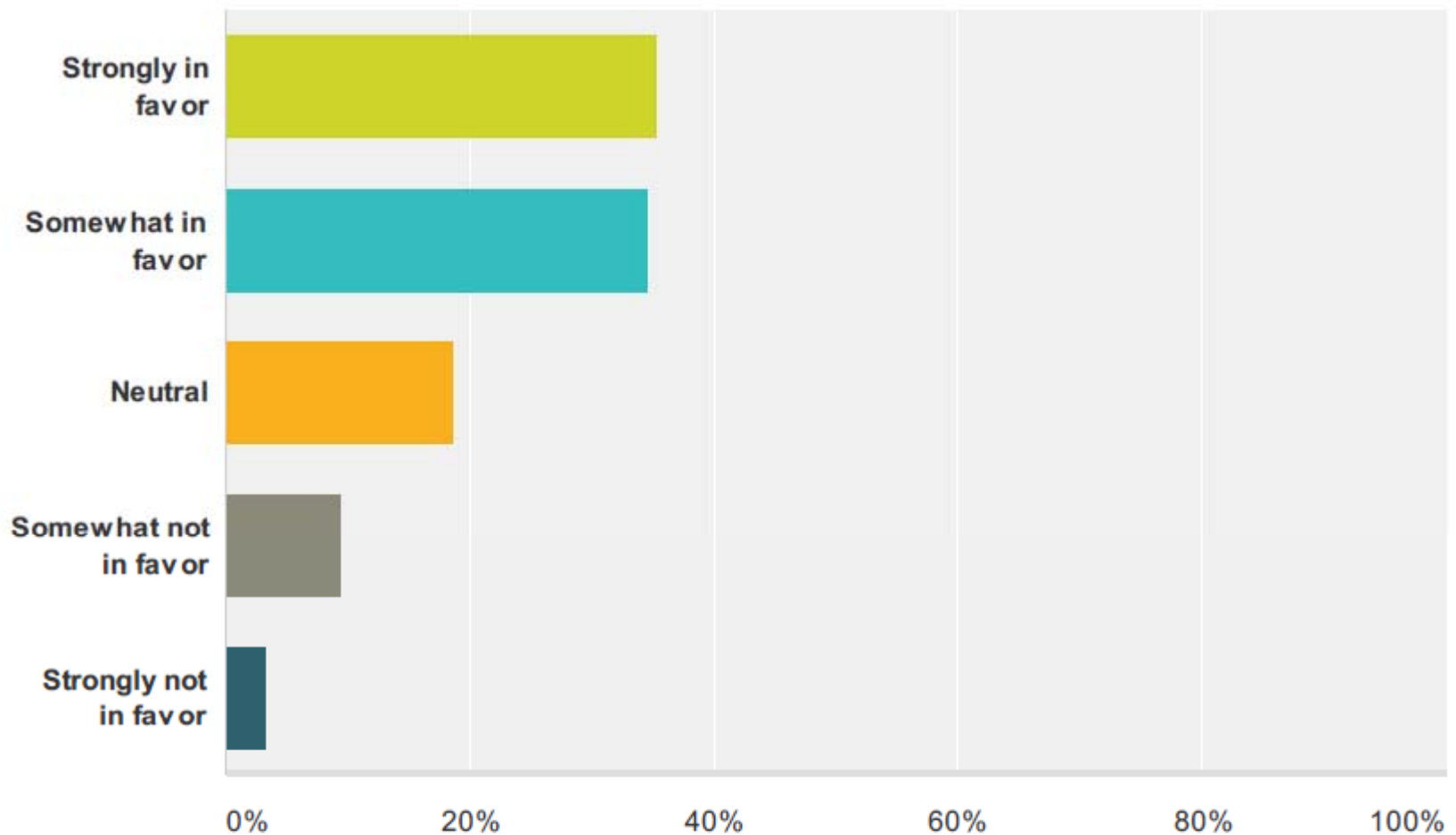
Answered: 301 Skipped: 12



Madison Metro Bus Size Study

Q6 Are you in favor of using larger buses to reduce overcrowding?

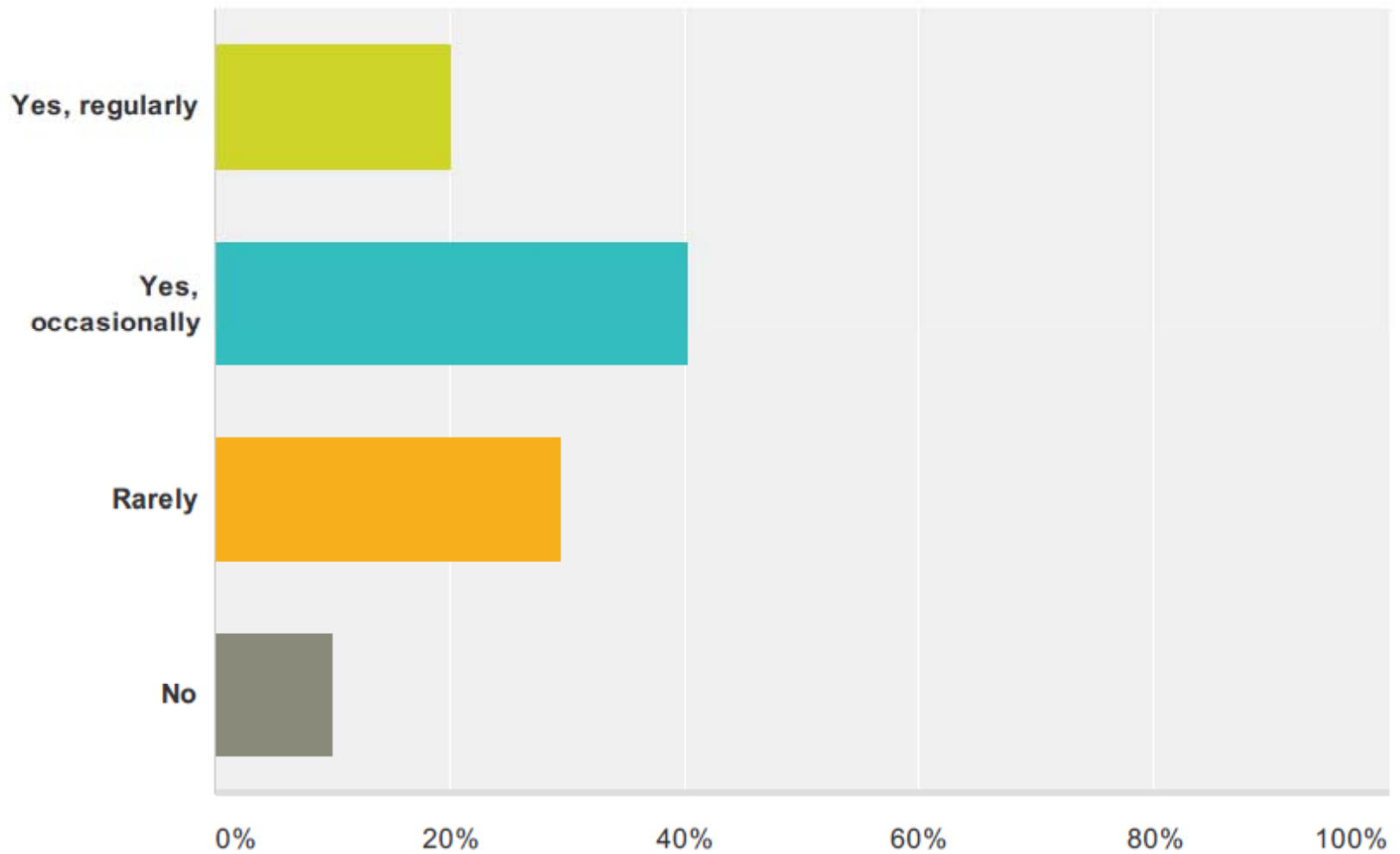
Answered: 301 Skipped: 12



Madison Metro Bus Size Study

Q7 Do you experience or have you noticed places where buses have only few passengers?

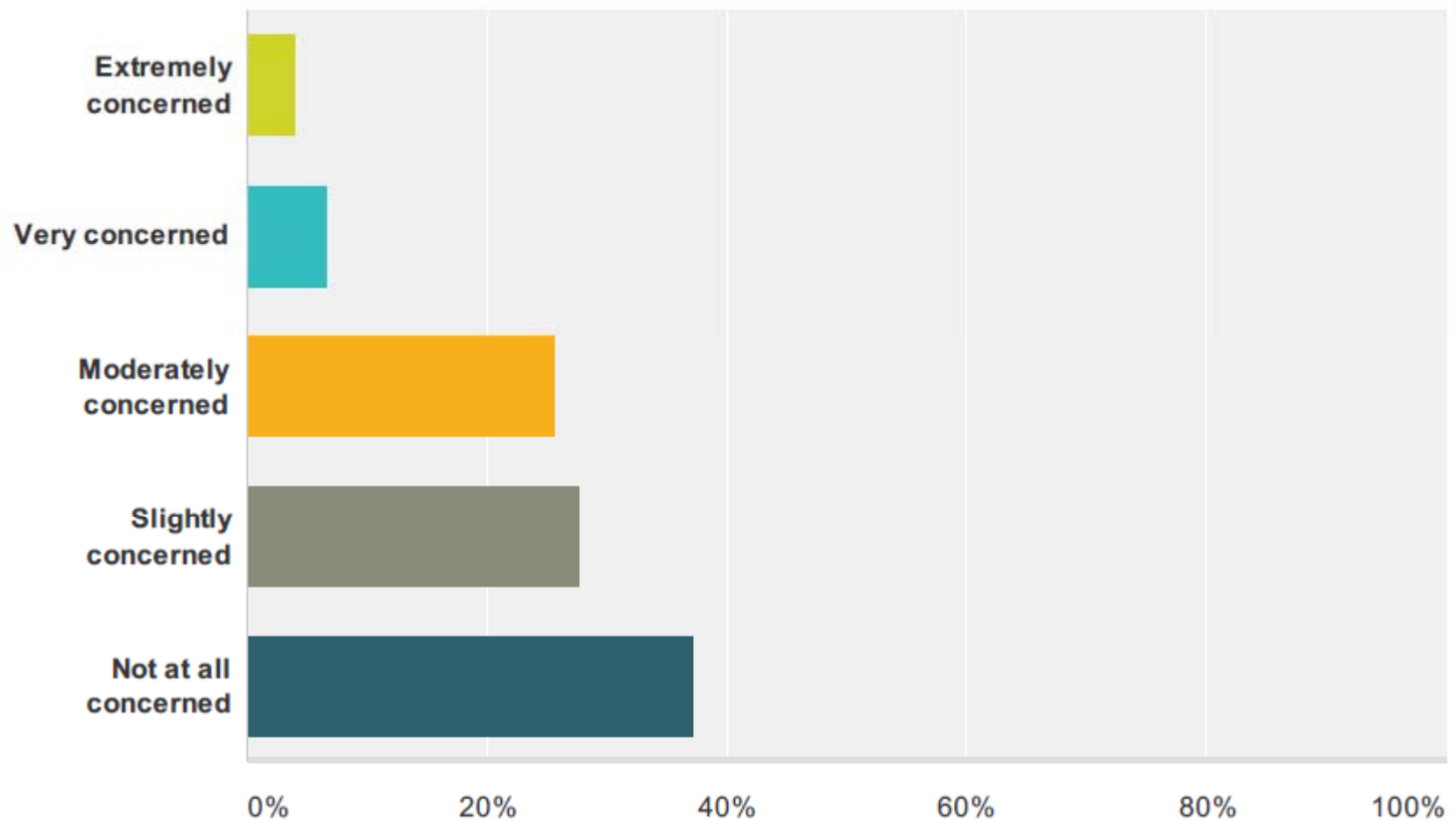
Answered: 298 Skipped: 15



Madison Metro Bus Size Study

Q8 Are you concerned about buses with many empty seats?

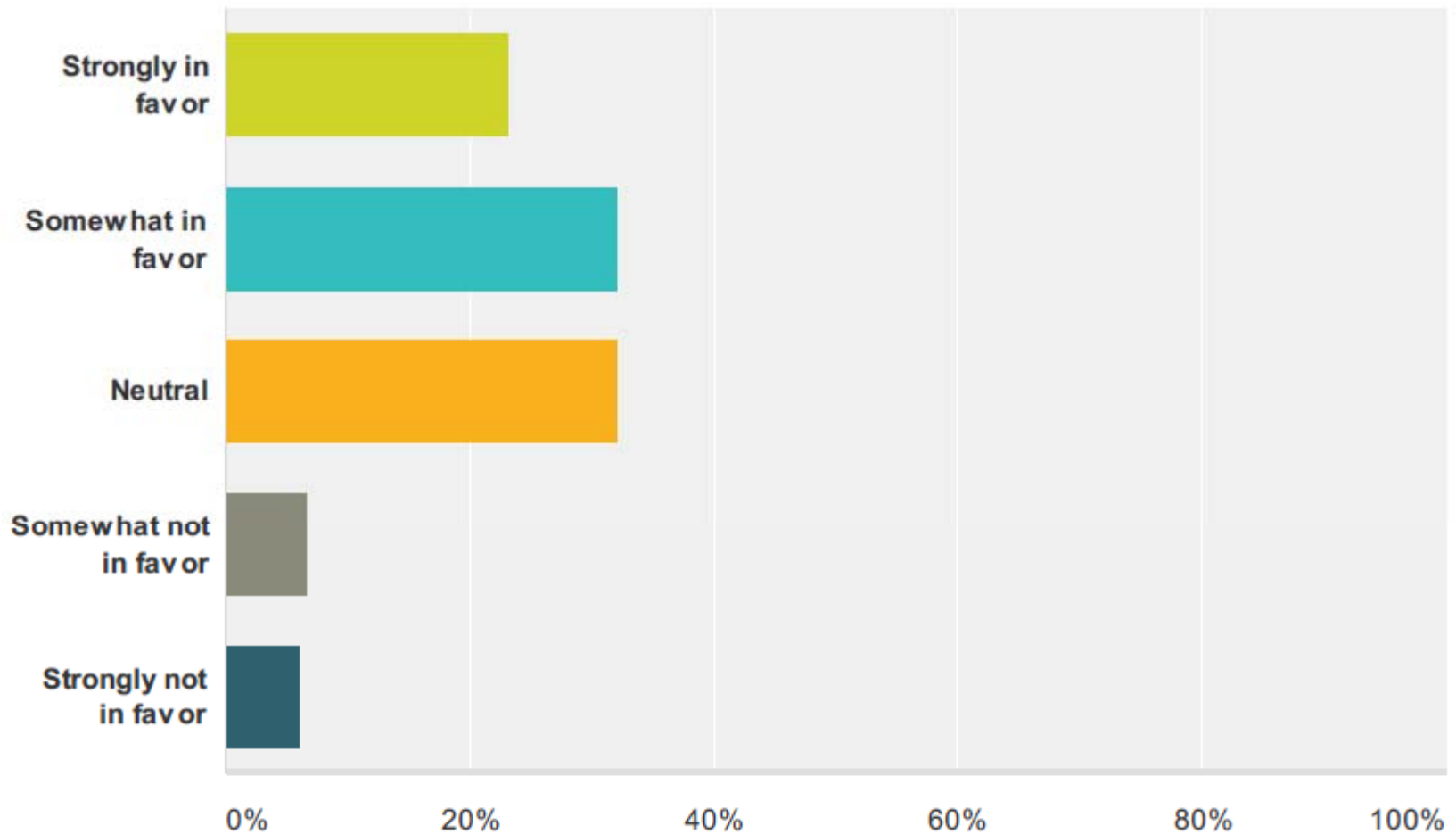
Answered: 296 Skipped: 17



Madison Metro Bus Size Study

Q9 Are you in favor of Metro using smaller buses on some routes?

Answered: 299 Skipped: 14



Videos

- ◎ https://www.youtube.com/watch?feature=player_detailpage&v=ELmiHd5yZhw#t=122
- ◎ https://www.youtube.com/watch?v=g6KnLJDzEfw&feature=player_detailpage#t=25

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QUESTIONS