

CITY OF TEMPE



ORBIT NEIGHBORHOOD CIRCULATOR PROGRAM



Implementation and Evaluation Report

Prepared for

Tempe City Council

June 2008

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1.0 EXECUTIVE SUMMARY

Following an extensive public participation process, the Tempe City Council in June 2007 formally approved four new Orbit Neighborhood Circulator bus routes (Mercury, Venus, Earth, and Mars) and conditionally approved the College Avenue segment of a fifth route (Jupiter). The Mercury and Venus routes began operating in July 2007 with the Earth route commencing in September 2007, Mars in November 2007, and Jupiter in January 2008.

The Council approved implementation of the Alternative 1 Jupiter route (refer to page 11) on a conditional basis for a six-month trial period. The trial period was to include performance evaluation and professional public opinion research in order to gather the information needed for the Council to either permanently authorize Alternative 1 or select from among the other alternatives presented to the Council in June 2007. This report contains service performance and public opinion information on all five Orbit routes, but focuses primarily on the Jupiter route.

1.1 Major Conclusions

Strong Jupiter Ridership - At 157,284 total boardings (Jan-Apr) and 1,470 average boardings per day, Jupiter ridership is now second only to Mercury which has a seven-year ridership base. It should also be noted that the WestGroup Research telephone survey reported that 44 percent of Jupiter riders had not used transit in Tempe prior to their use of the Orbit route.

Strong Increase in Jupiter Support - All indicators of public opinion show a strong increase in support for the Orbit Jupiter route after the service was started.

- Public comments: Increased in support from **65 percent to 98 percent**
- Telephone Survey: Increased in support from **72 percent to 86 percent**
- Web-Survey: Increased in support from **77 percent to 91 percent**

Jupiter External Impacts - City staff investigated potential external impacts associated with the Orbit Jupiter including traffic volume, traffic speed, accidents, neighborhood parking, and community engagement by residents.

- Traffic Volume & Speed – Findings emanating from the traffic volume and speed analysis are inconclusive; however, ridership and public opinion survey data enable staff to estimate that the Orbit service overall removed 1.3 million automobile miles from Tempe streets between July 2007 and April 2008. Between January and April 2008, the Jupiter route removed an estimated 346,654 automobile miles.
- Accidents – The WestGroup telephone survey concluded that concerns among Jupiter area residents regarding the safety of the service appear to have dissipated. There were two Orbit Jupiter accidents between January 15 and April 30, 2008. Neither occurred on College Avenue nor did they involve bicyclists or pedestrians. Both were the responsibility of the other vehicle involved.
- Neighborhood Parking – The absence of neighborhood complaints along with field observations indicate that ASU students are not presently parking on neighborhood streets adjacent to College Avenue in order to use the Orbit Jupiter.

- **Community Engagement** - Though not expressly investigated, the record of comments suggests that the Orbit service may be instrumental in enhancing community engagement among residents, both within and across neighborhoods.

1.2 Jupiter Recommendation

On May 13, 2008, the Transportation Commission voted unanimously to approve the staff recommendation that the present Orbit Jupiter route (Alternative 1 on page 12) be permanently authorized based on the demonstrated increase in public support and strong ridership performance.

1.3 Planned Orbit Improvements

Based on the findings of this report, the following improvements are planned. Sufficient funds are available to implement these improvements during fiscal year 2008/2009.

- **Mars** – In December 2008, the Mars will extend to connect with the Price and Apache light rail station and Mercury route. Staff will evaluate performance to determine whether additional modifications are needed. Annual operating cost estimated to be \$300,000.
- **Earth** – In November 2008, the Earth route will extend to directly connect Tempe Marketplace to downtown Tempe. Staff will evaluate performance to determine whether additional modifications are needed. Annual operating cost estimated to be \$500,000.
- **Mercury** – Staff are developing budget-neutral strategies for accommodating the extraordinary high demand associated with Arizona State University students.

1.4 Potential Future Improvements

The following potential improvements are recognized as important to ensure continued ridership growth, system effectiveness, and appropriate geographic distribution. However, the costs of these improvements are not presently included in the FY 2008/2009 operating budget or long range financial plan, and funds are not presently available for allocation. Projecting when these improvements may be made is difficult because of the upcoming transit services procurement and the uncertainty regarding future contract rates. Once the new rate is established staff will be in a position to determine when and to what extent these improvements may be made. In addition, staff is pursuing sources of offsetting revenue at the regional level and through grant opportunities as well as extracting all possible efficiencies from the present system.

- **Extension of Hours** – Public opinion research indicates a desire for extended hours of operation. Table 1-1 present options and operating costs for extending Orbit operating hours to various times of night during all or selected days of the week.

Table 1-1: Orbit Hours Extension Options

Option	Description	Cost
1	To Midnight (Sun – Mon)	\$1.25 million
2	To Midnight (Sun - Thu) and To 2am (Fri – Sat)	\$1.43 million
3	To 3am (Sun – Mon)	\$3.12 million

- **Tempe Center for the Arts** – As an important cultural amenity to Tempe, this facility should be served by transit or neighborhood circulator services. Incorporating the Tempe Center for the Arts into the Orbit system requires an expansion of one or more routes and carries additional costs. Table 1-2 presents three alternatives.

Table 1-2: Tempe Center for the Arts

Option	Description	Cost
1	Full Mercury Extension (All trips) <i>Requires two additional buses</i> <i>Improves service to 5th St. & Hardy Dr. neighborhood</i>	\$500,000 (Operating) \$150,000 (Capital)
2	Limited Mercury Extension (Events only) <i>Requires two additional buses</i>	\$100,000 (Operating) \$150,000 (Capital)
3	Limited Venus Extension (Events only) <i>Requires one additional bus</i> <i>Complicates route and public understanding</i>	\$50,000 (Operating) \$75,000 (Capital)

- **South Tempe** – A planning process for neighborhoods south of US 60 began with exploratory meetings in 2006 moving to neighborhood planning workshops in 2007. The process was placed on hold pending the outcome of the transit services contract procurement and the determination of new contract rates. To provide Orbit service to a scope and degree consistent with central and north Tempe, the annual operating cost is estimated to be \$4-5 million with capital costs of approximately \$1.5-2 million.

2.0 APPROVED ORBIT PROGRAM

The constructive dialogue emanating from the public planning phase achieved near consensus in some areas while revealing more divergent opinions in others. The Orbit route recommendations presented to and approved by the City Council in June 2007 reflected the best efforts by staff and residents to forge a service that would benefit and satisfy the most people while mitigating potential concerns.

In June 2007, the City Council unanimously approved staff's route recommendations for four of the five routes (Mercury, Venus, Earth, Mars) and approved a six-month trial period for the College Avenue segment of the Jupiter route. Maps of all routes as presently operated are provided on pages 7-10 & 12. The hours of operation on all routes were approved as 6am to 10pm for all days of the week. Service frequency on all routes was approved at every 15 minutes.

Table 2-1: Approved Orbit Routes

Route	Area Served	Approval	Start Date	Map Pg. #
Mercury	East of Downtown	Approved	Jul 23, 2007	Page 7
Venus	West of Downtown	Approved	Jul 23, 2007	Page 8
Earth	North Tempe	Approved	Sept 17, 2007	Page 9
Mars	Country Club/ Evergreen	Approved	Nov 26, 2007	Page 10
Jupiter	College / Dorsey	Six Month Trial	Jan 15, 2008	Page 12

Figure 2-1: Orbit Mercury

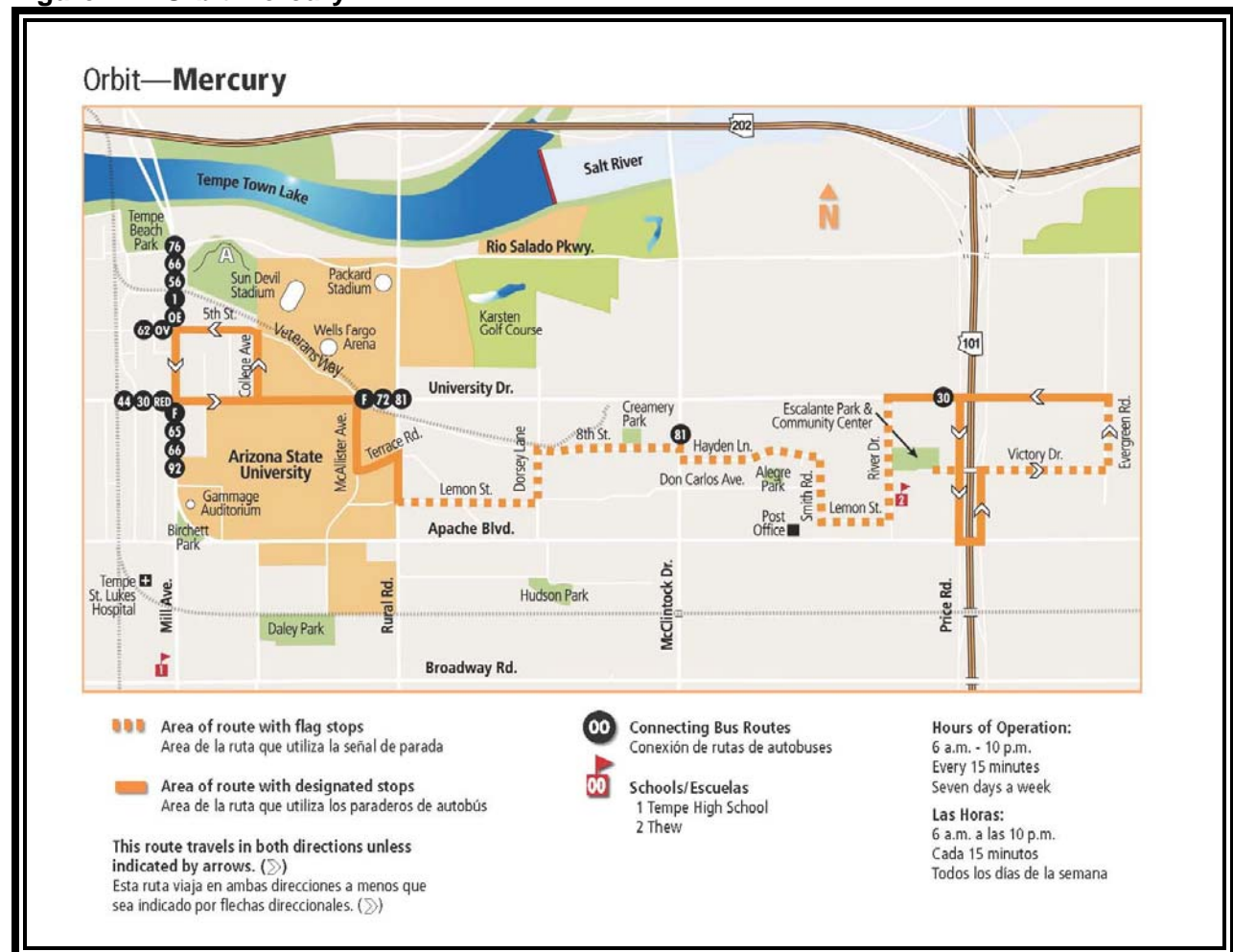


Figure 2-2: Orbit Venus

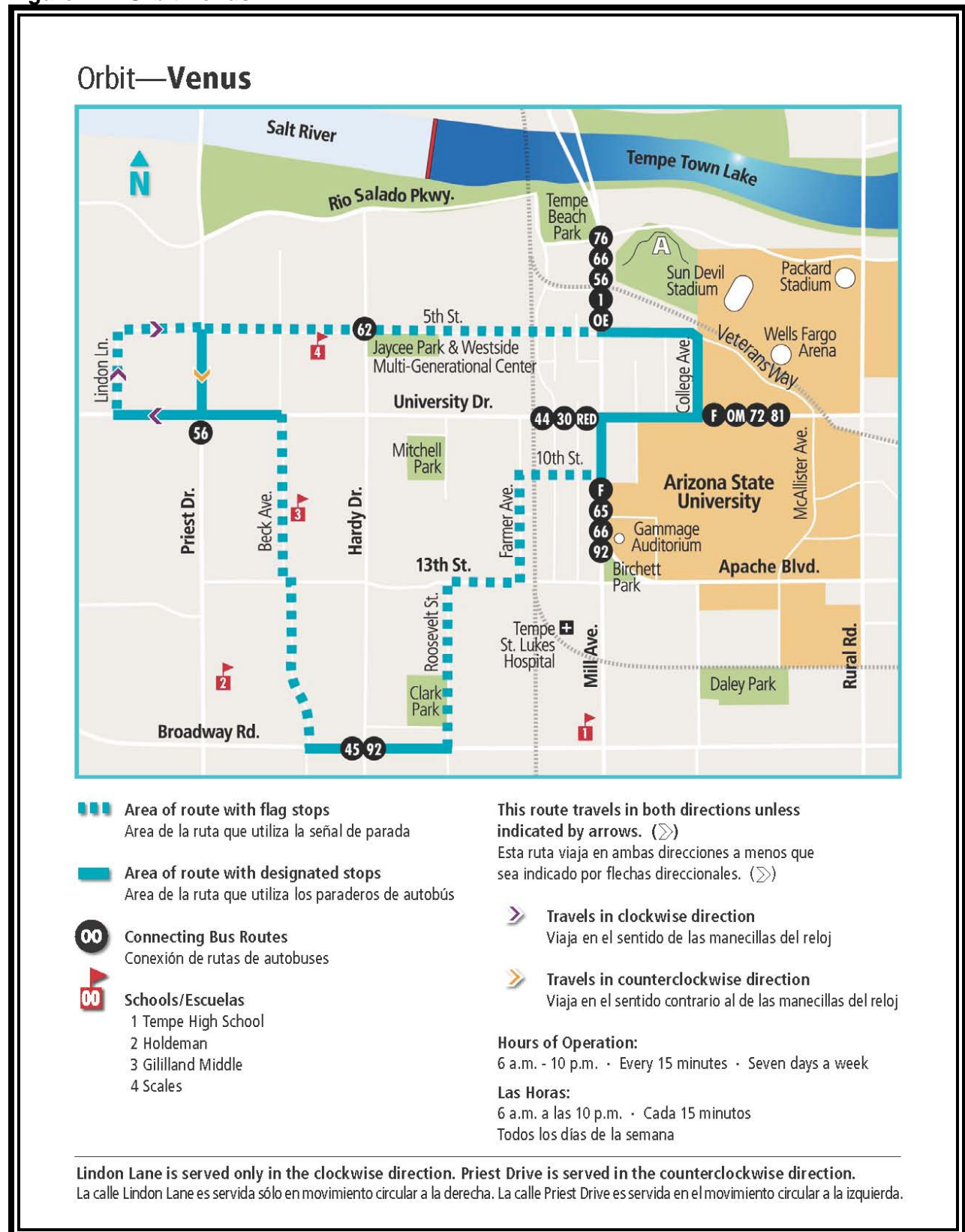






Figure 2-3: Orbit Earth

Orbit—Earth



Hours of Operation:
6 a.m. - 10 p.m. • Every 15 minutes
Seven days a week

Las Horas:
6 a.m. a las 10 p.m. • Cada 15 minutos
Todos los días de la semana

-  **Area of route with flag stops**
Area de la ruta que utiliza la señal de parada
-  **Area of route with designated stops**
Area de la ruta que utiliza los paraderos de autobús
-  **Connecting Bus Routes**
Conexión de rutas de autobuses
-  **Schools/Escuelas**
1 Laird



- This route travels in both directions unless indicated by arrows. (↔)**
Esta ruta viaja en ambas direcciones a menos que sea indicado por flechas direccionales. (↔)
-  **Travels in clockwise direction**
Viaja en el sentido de las manecillas del reloj
-  **Travels in counterclockwise direction**
Viaja en el sentido contrario al de las manecillas del reloj

Figure 2-4: Orbit Mars



2.1 ORBIT Jupiter (College Avenue / Dorsey Lane)

Strong support for the route was present during the 2005-2007 public planning process, although public opinion at the time was more divided along the College Avenue corridor.

In June 2007, staff provided the City Council with five (5) route alternatives for Jupiter. Table 2-2 contains basic information on the previously presented route alternatives along with page numbers for each associated map. All alternatives were predicated on the same assumptions for operating hours (6am through 10pm) and service frequency (15 minutes).

Alternative 1 was approved for a six-month trial period after which staff were to present findings of performance and resident evaluation of the service.

Table 2-2: Orbit Jupiter 2007 Alternatives

Alt.	% on College Ave	Description	College Restoration Assumptions	Map Page #
A-1	100%	On College: Apache to US 60	N/A	Page 12
A-2	75%	On College: Apache to Alameda	Restore College from Alameda to Southern following streetscape improvements.	Page 13
A-3	25%	On College: Apache to Broadway	Integrate* College from Broadway to US 60 following streetscape improvements on College.	Page 14
A-4	0%	No service on College	Restore College from Apache to US 60 following streetscape improvements.	Page 15
A-5	0%	No Jupiter Route	N/A – Entire route indefinitely deferred.	N/A

* A-3 indicates potential *integration* of College Avenue since the interim route shown would likely have developed a ridership base and support making simple restoration of the College Avenue segment problematic.

Alternative 5 is a “no-build” option meaning that consensus around this alternative would indefinitely defer all Orbit neighborhood circulator service in the entire College/Dorsey area.

Figure 2-5: Orbit Jupiter (Alternative 1) – Presently in Operation

Note: College Avenue segment between La Jolla and US 60 – formerly a part of the conditionally approved route - eliminated due to operational and safety considerations.

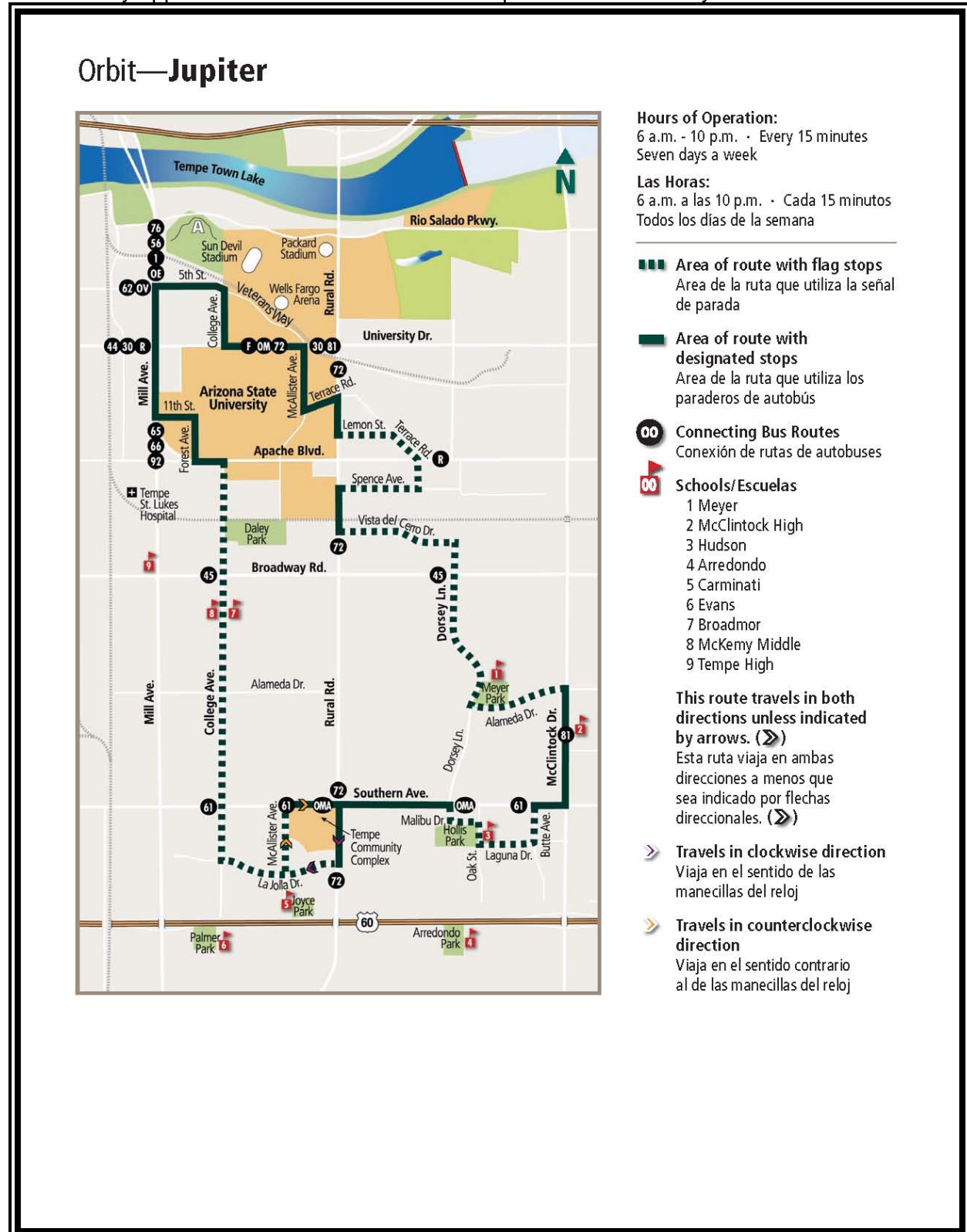




Figure 2-6: Orbit Jupiter (Alternative 2)




Figure 2-7: Orbit Jupiter (Alternative 3)

Proposed Neighborhood Circulator Route

Orbit Jupiter — College/Dorsey Alternative 3



This route travels in both directions unless indicated by directional arrows.

➤ Route travels in this direction

■ ■ Proposed route

00 Connecting bus routes

LR Future Light Rail stop

Schools



- 3 Broadmor
- 5 Carminati
- 14 Hudson
- 16 McKemy Middle
- 17 Meyer
- 28 Tempe High
- 29 McClintock High

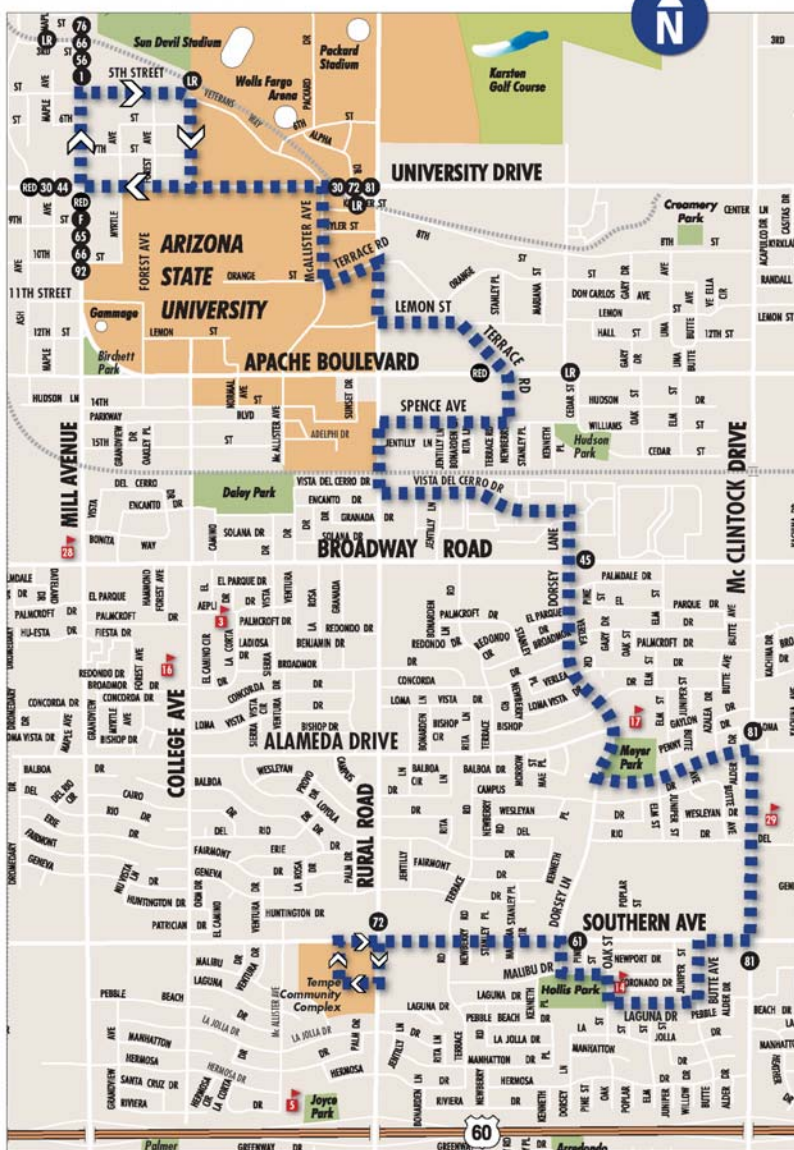
Proposed hours:
6am to 10pm,
7 days a week

Proposed frequency:
Every 15 minutes

Proposed Neighborhood Circulator Route

Orbit Jupiter — College/Dorsey Alternative 4





This route travels in both directions unless indicated by directional arrows.

➤ Route travels in this direction

■ Proposed route

00 Connecting bus routes

LR Future Light Rail stop

Schools

- 3 Broadmor
- 5 Carminati
- 14 Hudson
- 16 McKemy Middle
- 17 Meyer
- 28 Tempe High
- 29 McClintock High

Proposed hours:
6am to 10pm,
7 days a week

Proposed frequency:
Every 15 minutes

3.0 IMPLEMENTATION AND EVALUATION

The Mercury and Venus routes began operating in July 2007 with the Earth route commencing in September 2007, Mars in November 2007, and Jupiter in January 2008. In advance of implementing each of the Orbit routes staff carried out marketing and community outreach activities along with supplemental training for Orbit bus operators.

In conjunction with City Council approval of the Transportation Commission's recommendations for the five new Orbit routes, the Council also directed staff to evaluate the performance of each route with particular emphasis on the conditionally-approved Orbit Jupiter route (Alternative 1). The evaluation focused on the four general categories noted below:

- System and Route Level Performance
- Operational Performance
- Passenger and Resident Experience
- External Impacts

3.1 Marketing & Community Outreach

The following marketing and community outreach tools were implemented to familiarize the community with the Orbit service in advance of service implementation:

- Articles in the Tempe Today water bill each time an Orbit route began operation.
- Press releases for local media each time an Orbit route began operation.
- Route information on Tempe 11 cable channel each time an Orbit route began operation.
- Brochure/direct mailer sent to all single and multi households within ¼ mile of each route each time an Orbit route began operation.
- Information posted on TIM web site.
- Orbit system map included in Tempe Opportunities (Parks & Rec brochure) – mailed to every single-family household in Tempe, and distributed to various community facilities.
- Mailings sent to all schools and community centers located along the routes each time an Orbit route began operation in the area.
- Information-post bus stop signs installed along routes each time an Orbit route began operation.
- Staff presentations at various community meetings and multi-gen centers to help Tempe residents learn about transit service, including how to use the Orbit.

3.2 Supplemental Bus Operator Training

In preparation for the roll out of each of new Orbit route, city and Veolia Transportation staff partnered on supplemental training for Orbit drivers. The sessions supplemented drivers' regular training and emphasized the need for safe, slow, defensive, and sensitive driving in neighborhoods. They provided drivers with information and tactics for dealing with the complicated situations encountered on residential streets including bicyclists, pedestrians, school zones, security concerns, and how to work with homeless individuals. Critical to the success of these sessions was the participation of Sgt. Mike Powell of the Tempe Police Department and Theresa James of Tempe's Homeless Coordination Office.

3.3 System and Route Level Performance

At the conclusion of April 2008, total Orbit ridership approached 1.3 million boardings. This constitutes an estimated 19 percent of total Tempe transit ridership for the period of Jul 2007-April 2008. Since the Orbit system was phased in over 2007-2008, the percentage for a full year in which all routes are operating may be estimated to reach approximately 25%. Table 3-1 presents total Orbit ridership by route by month.

Table 3-1: Orbit Ridership

Month	Mercury <i>Began 7/23</i>	Venus <i>Began 7/23</i>	Earth <i>Began 9/17</i>	Mars <i>Began 11/26</i>	Jupiter <i>Began 1/15</i>	Total
Jul-07	14,814	4,246	0	0	0	19,060
Aug-07	78,159	25,816	0	0	0	103,975
Sep-07	83,091	28,564	6,781	0	0	118,436
Oct-07	85,613	33,701	19,484	0	0	138,798
Nov-07	73,840	29,864	20,620	806	0	125,130
Dec-07	53,472	23,820	20,382	7,590	0	105,264
Jan-08	62,430	28,633	21,184	10,337	17,567	140,151
Feb-08	65,873	31,028	27,398	10,465	41,805	176,569
Mar-08	64,062	28,502	26,536	11,408	45,323	175,831
Apr-08	69,180	29,135	27,936	13,946	52,589	192,786
Total	650,534	263,309	170,321	54,552	157,284	1,296,000

Table 3-2 presents average daily ridership, productivity statistics, and months in service for each of the Orbit routes. Statistics for Phoenix and Scottsdale neighborhood circulator routes at their as well as the arterial bus system are provided for comparative purposes. Some caution should be taken in making direct comparisons of the different operating environments.

Table 3-2: Orbit Ridership Productivity

Route	City	Average Daily Ridership	Productivity (Boardings per Mile)	Months in Service
Mercury	Tempe	2,299	2.66	84 ¹
Jupiter	Tempe	1,470	1.12	3.5
MARY ³	Phoenix	1,289	1.07	4
Arterial Bus ²	System	1,076	1.72	n/a
Venus ⁴	Tempe	930	1.33	9
SMART ³	Phoenix	990	0.73	4
Earth	Tempe	750	0.70	7.5
ALEX ³	Phoenix	463	0.36	4
Mars	Tempe	347	0.40	5
Neigh. Connector ³	Scottsdale	226	0.72	4
Deer Run ³	Phoenix	74	n/a	4
DART ³	Phoenix	52	n/a	4

¹ Mercury represents eastern half of former Neighborhood Flash.

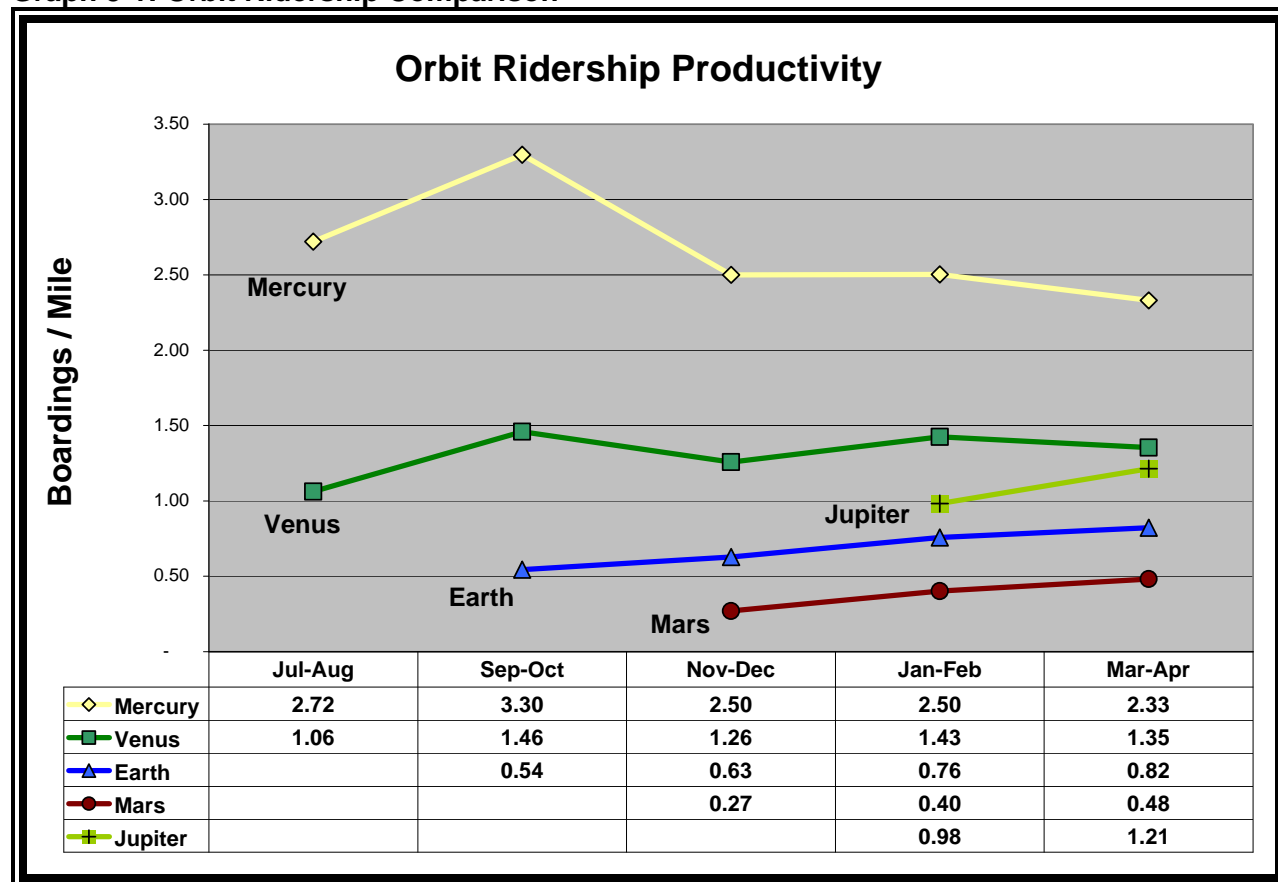
² Arterial bus system *per route* average provided for comparison.

³ Phoenix and Scottsdale Neighborhood Circulators at their various 4 month marks for Jupiter comparison.

⁴ Venus ranked higher than SMART due much higher productivity.

Graph 3-1 illustrates bimonthly productivity statistics for each Orbit route. Monthly figures were converted into bimonthly figures to maintain the graph at a reasonable size. The graph demonstrates strong ridership growth on Jupiter with more moderate growth on the Earth and Mars routes. The higher productivity figures on Mercury and Venus routes reflect a historical ridership base; the fluctuations are seasonal and related to university and public school calendars.

Graph 3-1: Orbit Ridership Comparison



Based on the absolute figures and productivity statistics, ridership for each of the routes may be classified into the following broad categories:

High Ridership – High Productivity

- MERCURY - Carries the most passengers and is most productive due to its mature ridership base inherited from the Neighborhood Flash as well as the higher residential density of the service area and its proximity to downtown Tempe, ASU, and the Escalante Multi-generational Center.

High Ridership – Moderate Productivity

- JUPITER – For a route that is barely five months old, the daily ridership on Jupiter is exceptional. Similar to Mercury, the Jupiter residential area lies in the middle of major

destinations such as downtown Tempe and ASU, the Tempe Library Complex, and the McClintock & Southern commercial district. In contrast to Mercury, the Jupiter route is 40 percent longer, serves a lower density residential area, and did not inherit a six-year ridership base. Jupiter's performance despite these limitations makes the ridership all the more exceptional.

Moderate Ridership – Moderate Productivity

- VENUS – A portion of this route serves the Fifth Street neighborhood, which was also served by the Neighborhood Flash. Similar to Mercury, the Venus service area is adjacent to downtown Tempe and ASU and directly services the Westside Multi-generational Center, Gililand Middle School, and Scales Elementary School. Venus is the shortest of all the Orbit routes, which, in conjunction with the more moderate residential density, partially explains the moderate ridership and relatively higher productivity.

Low Ridership – Low Productivity

- EARTH – Connecting North Tempe to several major destinations including Tempe Marketplace, the North Tempe Multi-generational Center, and downtown Tempe/ASU, Earth is the second longest route in the Orbit system and serves a relatively low density area. Noted in the section on *Passenger and Resident Experience*, several improvements would likely increase ridership and productivity including the opening of light rail, extending the route to operate directly between Tempe Marketplace and downtown Tempe, connection with the Scottsdale Neighborhood Connector, and minor adjustments in the North Tempe area.
- MARS – A number of geographic/operational difficulties combine with low residential density and the lack of a truly major destination to limit ridership potential on this route. Noted in the section on *Passenger and Resident Experience*, the planned extension of Mars to connect with the Apache & Price light rail station and the Orbit Mercury will likely increase ridership and productivity. Following the connection to light rail in December 2008 and some minor adjustments, staff will closely monitor performance to determine whether further adjustments or action may be needed.

3.3.1 Ridership Data Accuracy

Since the Orbit is a free service, the buses are not equipped with fareboxes, so passenger boardings must be recorded by bus operators. Both machine and human driven systems are subject to error. City staff have paid close attention to the process of passenger counting and have worked with Veolia Transportation personnel to develop, manage, and monitor this process. An evaluation of the process in practice indicates that the highest potential for inaccurate ridership figures stems from bus operators failing to turn-in ridership record logs. City and Veolia staff estimate that approximately 10 percent of driver logs are lost or never submitted. City staff has directed Veolia to improve training, supervision, and process oversight to minimize these kinds of data losses. Assuming that up to 10 percent of ridership logs are not submitted for data entry to the Orbit database, than the ridership figures presented in Table 3-1 above may be **underreported** by as much as 10 percent.

3.3.2 Major Destinations

Using the Orbit system, Tempe residents most often visited Downtown Tempe, Arizona State University, the Tempe Library Complex and Tempe Marketplace. Other frequented destinations include workplaces, public schools, and the various multi-generational centers. To ensure the continued success of the Orbit system, future planning and route modifications must recognize the importance of these core destinations as well as their connection to each other.

Each of the city's major survey instruments (WestGroup telephone survey, WestGroup web-survey, city on-line comment form, and city on-board passenger surveys) asked Orbit Jupiter passengers and residents what destinations they most often use the Orbit to visit. Destination information for the other Orbit routes was obtained only through the city's on-line comment form and on-board surveys. Table 3-3 presents the information on the top destinations. Future city implemented surveys will strive to lower the percentage of "other" responses.

Table 3-3: Orbit Destinations

ORBIT DESTINATIONS	Mercury	Venus	Earth	Mars	Jupiter		
	City On-line & On-Board Surveys				WG-Phone ¹	WG-Web ¹	City Surveys
Downtown Tempe	23%	25%	15%	7%	44%	72%	21%
ASU	24%	24%	7%	3%	32%	46%	30%
Tempe Library Complex	2%	1%	3%	33%	20%	38%	13%
Work	10%	8%	10%	7%	8%	21%	5%
School	1%	3%	5%	7%	13%	16%	3%
Tempe Marketplace	3%	1%	30%	4%	11%	13%	1%
Grocery Store					2%	9%	
Multi-Gen Center	4%	1%	6%		1%	4%	
Park					2%	2%	
Post Office					1%	2%	
Church					1%	2%	
Restaurant Bar					1%	1%	
Friend's/Relative's House					1%	1%	
To see where route went					4%	0%	
Home					1%	0%	
Other	30%	37%	22%	31%	4%	6%	26%
Don't know/No Answer	2%	1%		8%	3%	2%	0%

¹ Percentages do not add up to 100% due to respondent's selection of multiple destinations.

² Areas shaded in green represent most popular reported destinations.

3.4 Operational Performance

Provided below is an array of operational performance measurements that are standard to the transit industry. Data for each of the indicators was gathered internally, from passenger surveys, and WestGroup research survey results.

3.4.1 On-time Performance

Since the Orbit bus system is not presently equipped with transit fleet's vehicle management system components, staff must rely on internal observations and the passenger experience. For the present purpose, assessments of on-time performance are drawn from passenger experience on Jupiter as communicated through the WestGroup surveys.

In the telephone survey, 82 percent of respondents reported they were either "very satisfied" or "satisfied" with the on-time performance of the Jupiter service. In the web survey, 84 percent of respondents reported that they were either "very satisfied" or "satisfied" with the on-time performance.

The acceptable range for on-time performance is 90 percent or above, so the experience reported by Orbit users is concerning. In any new service there will be a period of adjustment where schedules are refined and personnel gain familiarity with the operating conditions and expectations of the riders. In addition to regular monitoring and collaborating with contractor staff to address problems, city staff have taken several steps to ensure the dependability of the service. First, staff modified the Orbit brochure to include the scheduled time-points so that passengers know, as well as drivers, when the bus is supposed to be at a given location. Second, staff developed an Orbit Bus Operator Policies and Procedures Guide to provide additional guidance and clear expectations for Orbit operations.

3.4.2 Missed Service

The city's transit services contractor Veolia Transportation reported 1,042 miles of missed Orbit service out of 963,282 miles of scheduled service or .11 percent. The city's contract with Veolia allows missed service up to .10 percent of scheduled service allowing for situations outside the contractor's control including excessive traffic and non-preventable accidents or incidents. When missed service exceeds this threshold, the contractor's payments are deducted. Present missed service trends, though slightly outside the contractual limit, are not considered problematic at this time.

3.4.3 Accidents and Incidents

Since July 2007, there were seventeen (17) accidents involving Orbit buses. Ten (10) of these accidents are deemed to be the fault of a secondary vehicle outside the bus operator's control. Seven (7) of the accidents are deemed to be the fault of the bus operator. Of the seventeen (17) accidents, there was one (1) reported injury to a passenger. This was the result of a pedestrian stepping into a crosswalk as the Orbit bus approached, causing the bus operator to brake which then caused the passenger to report the injury. This is the only reported injury to date. There are no known accidents involving bicyclists or pedestrians. There was one reported incident on an Orbit bus involving an intoxicated passenger falling out of a wheelchair.

The accident rate, typically calculated as accidents per 100,000 vehicle miles, is estimated to be 1.60. The city's contract with Veolia Transportation requires that the accident rate be kept under 2.0 per 100,000 vehicles miles.

3.4.5 Mechanical breakdowns

There were 25 reported mechanical breakdowns that caused service interruptions. The contract with Veolia Transportation requires that miles between mechanical breakdowns not fall below 6,501. However this figure is configured around the liquid natural gas heavy transit fleet and is also a composite accounting for seasonal affects on fleet performance. The Orbit fleet is less complex, newer, and easier to maintain than heavy, alternatively fueled transit buses. In addition, the present reporting period (July 23-April 30) leaves out nearly half of the summer when the heat places additional demands on the buses. At 42,384 vehicle miles between mechanical breakdowns, the Orbit fleet is demonstrating solid performance as is Veolia Transportation's Maintenance Department.

3.5 Passenger and Resident Experience

Four major methods were employed to assess public opinion on the Orbit system in general and the Jupiter route in particular. These included: 1) participating in a professionally administered telephone survey, 2) participating in an "opt-in" web-based survey, 3) participating in an April 8, 2008 Jupiter public meeting, and 4) submitting official public comments to council or city staff. Though no one method constitutes a fully representative snap-shot of public opinion, the triangulation of methods provides a way to better understand the complexity of residents' thoughts and feelings. Summary statistics on the information collected through all these methods follows below. The full reports are appended to this document as follows:

Appendix A: Westgroup Telephone Survey (Jupiter)

Appendix B: Westgroup Web-based Survey (Jupiter)

Appendix C: Transcript of Proceedings: April 8, 2008 Jupiter Public Meeting

Appendix D: Record of public comments received through on-line comment form and on-board survey/comment forms

3.5.1 Orbit Support

Table 3-4 below indicates that support for the Orbit service in the Jupiter area has increased dramatically and remained relatively stable for the other routes.

Table 3-4: Orbit Support Levels - Before and After

Route	Self-Reported Public Comments		WestGroup Telephone Survey		WestGroup Web Survey	
	Before	After	Before	After	Before	After
Mercury	91%	87%	n/a*	n/a**	n/a*	n/a**
Venus	96%	97%	83%	n/a**	88%	n/a**
Earth	98%	93%	82%	n/a**	72%	n/a**
Mars	69%	78%	71%	n/a**	53%	n/a**
Jupiter	65%	98%	72%	86%	77%	91%

* Mercury was not pre-surveyed due to six-year presence of the Neighborhood Flash.

** WestGroup "After" survey only conducted for Jupiter

Though not presented above, the telephone survey conducted by Westgroup Research reports that levels of support for Orbit Jupiter service ***on one's street*** increased from 61 percent in 2007 to 87 percent in 2008. Likewise, the Westgroup web-survey reported an increase from 73 percent to 82 percent.

3.5.2 User Satisfaction

User satisfaction with the Orbit Jupiter is very high. The various public opinion indicators show that between ***89-95 percent of Jupiter residents*** are either ***very satisfied or satisfied*** with the service overall. Satisfaction levels are more mixed for the other routes with composite percentages ranging from the mid-70s for Mercury and Venus to the high 70s and mid 80s for Mars and Earth respectively. Table 3-5 provides satisfaction levels for convenience and overall satisfaction.

Table 3-5: Orbit Satisfaction Levels

Route	Self-Reported Public Comments		WestGroup Telephone Survey		WestGroup Web Survey	
	Convenience ¹	Satisfaction ²	Convenience ³	Satisfaction ³	Convenience ³	Satisfaction ³
Mercury	83% (187)	62% (187)	n/a	n/a	n/a	n/a
Venus	83% (178)	70% (178)	n/a	n/a	n/a	n/a
Earth	86% (173)	83% (174)	n/a	n/a	n/a	n/a
Mars	76% (122)	78% (122)	n/a	n/a	n/a	n/a
Jupiter	93% (319)	89% (319)	95% (117)	92% (117)	95% (103)	95% (103)

Parantheses denote number of respondents

¹ Percentage of those who rated service "Very Convenient" or "Convenient"

² Percentage of those who rated service "Excellent" or "Very Good"

³ Percentage of those who indicated "Very Satisfied" or "Satisfied"

Through the city's on-line comment form and on-board surveys, the city has received 869 comments from residents and passengers. When broken down into categories, the numbers of comments approach 1,000. City staff conducted an extensive content analysis of the comments and placed them into categories in order gain a better understanding of the scope and magnitude of passengers' and residents' thoughts. Only comments received through the city's online comment form and on-board surveys were coded and included in Table 3-6 on the following page. Comments made at the April 8, 2008 Orbit Jupiter public meeting were not received from the transcription firm in time to be analyzed and included.

Table 3-6: Passenger and Resident Comments

PASSENGER/RESIDENT COMMENTS	Mercury		Venus		Earth		Mars		Jupiter	
	#	%	#	%	#	%	#	%	#	%
CUSTOMER SERVICE										
Helpful/Excellent Drivers	18	10%	23	12%	28	15%	7	6%	30	9%
Driver Was Rude/Unprofessional/Unsafe	19	11%	18	9%	1	1%	2	2%	20	6%
Driver Went Wrong Way/Didn't Let Me Off/On	14	8%	9	5%	6	3%	2	2%	11	3%
ROUTE/SERVICE IN GENERAL										
Orbit Is Convenient/Good Service	32	18%	64	33%	79	43%	44	39%	157	49%
Orbit Needs Increased Capacity/Route Expansion	52	29%	33	17%	13	7%	19	17%	43	13%
Orbit Routes Should Be Changed	20	11%	24	13%	26	14%	15	13%	12	4%
Orbit Should Run Later/During Special Events	8	4%	5	3%	8	4%	1	1%	14	4%
Orbit Disruptive To Neighborhoods	2	1%	2	1%	5	3%	7	6%	2	1%
BUSES/BUS STOPS										
Buses/Bus Stops Need Physical Improvements	13	7%	10	5%	8	4%	6	5%	24	7%
ORBIT/PERSONAL EXPENSE										
Saves Me Gas/Money/Time	1	1%	4	2%	10	5%	8	7%	8	2%
Waste of Money/Taxes	0	0%	0	0%	0	0%	1	1%	0	0%
Total	179	100%	192	100%	184	100%	112	100%	321	100%

Note: Top three types of comments for each Orbit are highlighted in green

Orbit is Convenient/Good Service - 38 percent overall

The most prevalent kind of written comment received indicated that the “Orbit is convenient/good service.” Mercury and Venus passengers reported this opinion the least out of the five routes which is consistent with responses to the specific survey questions presented in Table 3-5. The source of the lower overall satisfaction is clearly related to concerns over a sense that these routes need additional capacity/service, changes to the route itself, and in some cases, improvements in bus operators’ performance.

Orbit Needs Increased Capacity/Route Expansion – 16 percent overall

The second most common comment raised by passengers/residents relates to a sense that the capacity of the route(s) is insufficient and requires higher frequency or that it requires expansion in terms of hours or additional destinations. City staff continue the process of analyzing the comments in order to develop incremental improvements for December 2008 and after. Expansion of the Mars route to the Apache & Price light rail station, where it will also connect with the Mercury route, is already planned for December 2008. Also planned is an expansion of the Earth route to directly connect Tempe Marketplace with downtown Tempe. Additional destinations that would add value and ridership to the service in general include the Tempe Center for the Arts, additional light rail connections, other city facilities. Many residents also indicated a desire for an extension of operating hours into the later evening. Finally, as additional resources become available, additional capacity is needed on the Mercury.

Helpful/Excellent Drivers – 11 percent overall

The comments received on the professionalism of Orbit bus operators is corroborated by the findings of the WestGroup telephone and web surveys. When asked about satisfaction with the “Driver Overall,” 94 percent of telephone respondents indicated they were “very satisfied” or “satisfied;” 93 percent of web respondents similarly. Most Orbit bus operators are doing an outstanding job; the service is successful in large measure because of their professionalism, thoughtfulness, and caring.

Orbit Routes Should Be Changed – 10 percent overall

There is some overlap between this category and “Orbit Needs Increased Capacity/Route Expansion,” although respondents placed in this category were mostly concerned with the need for additional destinations such as Tempe Marketplace, Tempe Center for the Arts, Tempe St. Luke’s Hospital, as well as several minor destinations. Respondents also suggested the need for the Mars to connect with light rail when it opens, the Mercury route, and possibly Tempe Marketplace. Another common concern was the length of the Earth route and the lack of a direct connection between Tempe Marketplace and downtown Tempe.

Driver Was Rude/Unprofessional/Unsafe – 6 percent overall

Though the implementation of the Orbit expansion has not been without its challenges, the bus operators are nicely making the adjustment to the Orbit operating environment. The work of Orbit driving is qualitatively different than fixed route transit driving and although the Neighborhood Flash had been in service for six years it was a very small proportion of Tempe’s overall transit system. City and Veolia staff have gone to great lengths to provide the proper training and education on the Orbit system, but it will take some time for bus operators to learn the nuances of operating in a neighborhood and adjusting to the different system rules and expectations.

3.6 External Impacts

It is to be expected that the Orbit routes will have some external impacts on the neighborhoods served. Possible impacts that could be attributed to the presence of the Jupiter route, and which were identified by residents as key concerns, include changes to traffic volume, traffic speeds, accidents, and parking volume. At least one additional impact that staff did not set out to purposefully examine, but which nonetheless became evident, is the positive affects for community engagement.

With the possible exception of Orbit-related accidents, accurate assessment of the remaining potential impacts and their relationship to the Jupiter route is a complex endeavor. City staff developed data collection and analytical methods to provide as accurate an assessment of external impacts as practical, but resource limits to data collection and the very short time horizon for evaluation (two months post-service implementation) constrict the possibility of revealing detectable impacts.

3.6.1 Traffic Volume

It has been suggested that neighborhood circulator buses like those in the Orbit system can serve to reduce traffic volume on neighborhood streets because some residents choose to ride the bus rather than drive their automobiles for local trips. Impacts on traffic were assessed in two ways: Impact assessment of traffic volume on College Avenue and assessments of displaced auto-trips as reported by Orbit users through the various survey methods.

Findings with respect to aggregate changes in traffic volume are inconclusive due in part to the practical limits on the research design and the extremely short time span between Jupiter implementation and traffic volume measures. However, by extrapolating from actual ridership, statistics on displaced automobile trips and miles can be calculated.

1. Traffic Volume - Traffic counting devices were deployed along College Avenue in six places (14th St., Encanto Dr., Aepli Dr., Balboa Dr., Fairmont Dr., and Malibu Dr.) between October 29 and November 26, 2007 and March 16 and April 5, 2008 to acquire data prior to and following Orbit Jupiter's implementation.

The goal in acquiring and analyzing these data was to determine if any statistically significant differences existed between the data acquired before the Orbit Jupiter was in operation and the data acquired after the Orbit Jupiter was in operation. Data were analyzed in aggregate and by hour. Only summary findings only are presented here.

The analysis indicated only one statistically significant decline in traffic volume (Southbound - North of Malibu) and two significant increases (Northbound - North of 14th St. and Northbound - Between Erie Dr. and Fairmont Dr.) in the weekday group. The vast majority of comparisons between means showed no statistically significant differences. In the weekend day group, again the majority showed no significant differences, but two statistically significant increases were noted (Southbound - North of Aepli Dr. and Southbound - North of Balboa Dr.). These analyses suggest that traffic volume had changed little between the before and after periods, and that the Orbit Jupiter did not induce a significant decline in traffic volume. It is important to note, however, that any increase or decline in traffic volumes could not directly be attributed to the Orbit system given the limited methodology of this study. Staff were not able to control for many important factors that could influence traffic volume on College such as the price of gas, the price of parking at ASU, traffic volumes external to College Avenue, or construction or accident data from arterial streets near College such as Mill or Rural.

2. Displaced Automobile Trips – City staff calculate that the Orbit system has removed 1.3 million automobile miles from Tempe's streets from July 2007 through April 2008 with the Jupiter route amounting to 346,654 of that total. With gasoline prices continuing to rise, there are growing financial savings that can accrue to Orbit users. This calculation comprises the following steps:
 - a. Existing ridership (1,296,000 boardings);
 - b. Boardings multiplied by average trip length in miles $(2.90)^1 = 3,758,400$ passenger miles;

¹ Average Trip Length (ATP) – 2005 ATP of 3.24 was reported to the Federal Transit Administration. This figure includes the entire transit system where trips are typically longer than on circulator routes. Lacking sufficient data to isolate the ATP for the Orbit system, a figure of 2.90 was determined to be reasonable.

- c. Passenger miles multiplied by survey responses on auto trips taken in absence of Orbit (varies for each Orbit route – ranges from 24%-76%);
- d. 1,305,793 auto miles displaced.

3.6.2 Traffic Speed

Like traffic volume, it has been suggested that neighborhood circulator buses can serve to reduce overall speed on neighborhood streets. Such an outcome is deemed possible because of the slower pace of the Orbit buses relative to auto traffic causing a decline in overall speed. The same traffic counting devices deployed along College Avenue for the collection of traffic counts are also capable of measuring speed.

Findings with respect to changes in traffic speed are inconclusive due in part to the practical limits on the research design and the extremely short time span between Jupiter implementation and traffic volume measures.

Statistical analysis indicated that at five counter locations the percentage of vehicles speeding declined while the percentage increased at four counters. Two declines in percent speeding were quite large (Northbound - North of Malibu Dr. saw a 17.6 percentage point decline and Southbound - North of Aepli Dr. a 12 percentage point decline) but again, there is not sufficient evidence to suggest that these significant increases or decreases can be attributed to the presence of Orbit Jupiter. The weekend day group saw the most significant declines in the percentage of vehicles speeding. Six counters saw significant declines while only one counter saw a small, yet significant, increase.

Regarding the by hour analysis of traffic volume and speed, no obvious pattern emerged. Nearly every locational analysis saw increases and declines in speed, with many showing no statistically significant increase or decrease.

These analyses suggest that traffic speed had changed little between the before and after periods, and that the Orbit Jupiter did not induce a significant decline in speed. It is important to note, however, that any increase or decline in speed could not directly be attributed to the Orbit system given the limited methodology of this study.

3.6.3 Accidents and Incidents

There were two Orbit Jupiter accidents between January 15 and April 30, 2008. Neither occurred on College Avenue nor did they involve bicyclists or pedestrians. Both were the responsibility of the other vehicle involved. No accidents or incidents are known to have occurred on College Avenue. Refer to section 3.4.3 – *Accidents and Incidents* on page 21 for system level data on Orbit accidents.

3.6.4 Parking Trends

Increases in neighborhood parking by ASU students brought on by the Jupiter route was cited by residents as a concern with the service. Two indicators taken together suggest that ASU

students have not been motivated to park on neighborhood streets due to the presence of the Orbit Jupiter.

1. *Absence of complaints/petitions for permit parking* – To date city staff have not received complaints from residents regarding ASU students improperly parking on neighborhood streets to use the Orbit Jupiter. Also, city staff have not received any petitions for permit parking in the Jupiter service area.
2. *Before & After Automobile Counts* - City staff reviewed aerial photography from a single date and time in November 2007 - prior to Orbit Jupiter implementation - creating a count of all cars parked on adjacent streets perpendicular to College Avenue and within one eighth (1/8th) of a mile of College Avenue. Covering the same area, City staff also manually counted parked automobiles on Monday, April 21, 2008. Comparison of the two dates in time suggests the Orbit Jupiter has not affected neighborhood parking trends, although there is insufficient data (parked automobiles counted at two time points only) to make any general statement about any effect the Orbit Jupiter has had on neighborhood parking.

The count data combined with the absence of complaints suggests that the Orbit Jupiter has had little, if any, discernible impact on parking these neighborhoods. Staff will continue to monitor neighborhood parking.

3.6.4 Community Engagement

Though not expressly investigated, the record of comments suggests that the Orbit service may be instrumental in enhancing a sense of community, both within and across neighborhoods. The Orbit neighborhood circulator system is about mobility to be sure. It is also more fundamentally about connection, not merely between places, but between people. The following excerpts from the April 8, 2008 Jupiter public hearing provide some grounding for this assertion (full record provided in Appendix C):

"We have been supporters of the bus before it started. We are still supporters of the bus. We took it down here as well. And hello, neighbor. We got to meet many of our neighbors because of the bus. We got to meet them when we hosted kind of an Orbit kickoff at our house back in – I believe it was the end of January...It has, I think, created a sense of community and enhanced, frankly, my experience as a resident in Tempe. I think it's a fantastic thing (pp. 5-6).

And as a result of riding the Orbit, I've met some of my neighbors...who I see somewhat regularly coming back from ASU...I enjoy being able to talk to people on the bus. I see that there is a certain amount of camaraderie among those who ride it. We've always got a story about what's happening here and there. It's a good thing. It's increasing our feelings towards our neighbors, and I think that's a very positive step (pp. 9-10).

My experiences with the bus has been wonderful. I've done the whole entire route just to see where it went and did the library and the senior center. And being a senior citizen, this is important not only to me, but to my entire neighborhood, which is about 80 percent of senior citizens. And some are handicapped (p. 15).

I find it not only convenient, but a delightful part of the day. I meet people. I meet neighbors I didn't know beforehand as well as many I know but hardly ever see. And we have lots of fun conversations (p. 17).

We also did a kind of an Orbit kickoff with our neighborhood as well. And we had, you know, quite an age range, which was great, from ages 25 to 36. And probably had about 14 people go. So this really also brought our neighborhood together (p. 24).

I like the fact that you see friends on it. That's kind of nice. I think it's promoting neighborliness, especially since we don't really have front porches anymore (p. 26).

4.0 JUPITER RECOMMENDATION

On May 13, 2008, the Transportation Commission voted unanimously to approve the staff recommendation that the present Orbit Jupiter route (Alternative 1 on page 11) be permanently authorized based on the demonstrated increase in resident support and the strong ridership performance.

5.0 PLANNED & POTENTIAL ORBIT IMPROVEMENTS

5.1 Planned Orbit Improvements

Based on the findings of this report, the following improvements are planned. Sufficient funds are available to implement these improvements during fiscal year 2008/2009.

- **Mars** – In December 2008, the Mars will extend to connect with the Price and Apache light rail station and Mercury route. Following this extension, staff will continue to monitor and evaluate performance of the Mars route to determine whether additional modifications are needed. Annual cost estimated to be \$300,000.
- **Earth** – In November 2008, the Earth route will extend to directly connect Tempe Marketplace to downtown Tempe. Following this extension, staff will monitor and evaluate performance of the Earth route to determine whether additional modifications are needed. Annual cost estimated to be \$500,000.
- **Mercury** – Staff are developing budget-neutral strategies for accommodating the extraordinary high demand associated with Arizona State University students.

5.2 Potential Future Improvements

The following potential improvements are recognized as important to ensure continued ridership growth, system effectiveness, and appropriate geographic distribution. However, the cost of these improvements is not presently included in the FY 2008/2009 operating budget or long range financial plan, and funds are not presently available for allocation. Projecting when these improvements may be made is difficult because of the upcoming procurement of the transit services contract and the uncertainty regarding future contract rates. Once the new contract rate is determined staff will be in a position to determine when and to what extent these improvements may be made.

- **Extension of Hours** – Public opinion research indicates a desire for extended hours of operation. Table 5-1 present options and costs for extending Orbit operating hours to various times of night during all or selected days of the week.

Table 5-1: Orbit Hours Extension Options

Option	Description	Cost
1	To Midnight (Sun – Mon)	\$1.25 million
2	To Midnight (Sun - Thu) and to 2am (Fri – Sat)	\$1.43 million
3	To 3am (Sun – Mon)	\$3.12 million

- **Tempe Center for the Arts** – As an important cultural amenity to Tempe, this facility should be served by transit or neighborhood circulator services. Incorporating the Tempe Center for the Arts into the Orbit system requires an expansion of one or more routes and carries additional costs. Table 5-2 presents three alternatives.

Table 5-2: Tempe Center for the Arts

Option	Description	Cost
1	Full Mercury Extension (All trips) <i>Requires two additional buses</i> <i>Improves service to 5th St. & Hardy Dr. neighborhood</i>	\$500,000 (Operating) \$150,000 (Capital)
2	Limited Mercury Extension (Events only) <i>Requires two additional buses</i>	\$100,000 (Operating) \$150,000 (Capital)
3	Limited Venus Extension (Events only) <i>Requires one additional bus</i> <i>Complicates route and public understanding</i>	\$50,000 (Operating) \$75,000 (Capital)

- **South Tempe** – A planning process for neighborhoods south of US 60 began with exploratory meetings in 2006 moving to neighborhood planning workshops in 2007. The process was placed on hold pending the outcome of the transit services contract procurement and the determination of new contract rates. To provide Orbit system coverage to a degree consistent with central and north Tempe, the annual operating cost is estimated to be \$4-5 million with capital costs of approximately \$1.5-2 million.