Tempe

## PUBLIC MEETING AGENDA

# Transportation Commission

**MEETING DATE**
Tuesday, January 6, 2015
7:30 a.m.

**MEETING LOCATION**
Hatton Hall
34 E. Seventh Street
Tempe, Arizona

**MEETING AGENDA**

| AGENDA ITEM | PRESENTER | ACTION or INFORMATION |
|---|---|---|
| **1. Public Appearances**<br>The Transportation Commission welcomes public comment for items listed on this agenda. There is a *three-minute time limit* per citizen. | Pam Goronkin, Commission Chair | Information |
| **2. Approval of Meeting Minutes**<br>The Commission will be asked to review and approve meeting minutes from the December 9, 2014 meeting. | Pam Goronkin, Commission Chair | **ACTION** |
| **3. Commission Business**<br>The Commission will be asked to elect a chair and vice chair for 2015 as well as reach consensus on meeting date and time. | Pam Goronkin, Commission Chair | **ACTION** |
| **4. Streetcar**<br>Staff from Public Works and Valley Metro will provide an update on the project including vehicle types, propulsion technologies, stop locations and public input received. | Eric Iwersen, Public Works and Wulf Grote, Valley Metro | Information and Possible Action |
| **5. Bus Unification Update**<br>Staff will provide an update on the first year of bus operations by RPTA. | Mike Nevarez, Public Works and Ken Jones, City Manager's Office | Information and Possible Action |
| **6. Orbit Saturn**<br>Staff will provide the information that will be | Jason Hartong and Mike Nevarez, Public Works | Information and Possible Action |

| | | |
|---|---|---|
| presented to the public during the January public input process for possible expansion of Orbit south of US 60. | | |
| **7. Department and Regional Transportation Updates**<br>Staff will provide updates and current issues being discussed at the Maricopa Association of Governments and regional transit agencies. | Public Works Staff | Information |
| **8. Future Agenda Items**<br>Commission may request future agenda items. | Pam Goronkin, Commission Chair | Information |

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# Minutes
# City of Tempe Transportation Commission
# December 9, 2014

**Minutes of the Tempe Transportation Commission held on Tuesday, December 9, 2014, 7:30 a.m. at Tempe Transportation Center, Don Cassano Community Room, 200 E 5th Street, Tempe, Arizona.**

**(MEMBERS) Present:**
Pam Goronkin (Chair)
Jeremy Browning
Don Cassano
Aaron Golub
Ben Goren
Nikki Gusz
Kevin Olson
German Piedrahita
Charles Redman
Peter Schelstraete
Cyndi Streid
Philip Luna
Gary Roberts

**(MEMBERS) Absent:**
Charles Huellmantel
Sue Lofgren

**City Staff Present:**
Shelly Seyler, Deputy Public Works Director
Julian Dresang, Traffic Engineer
Mike Nevarez, Transit Manager
Eric Iwersen, Principal Planner
Joe Clements, Transit Financial Analyst
Sue Taaffe, Public Works Supervisor
Yvette Mesquita, Public Works Supervisor
Tammara Evans, Administrative Assistant
Laura Kajfez, Neighbor Services Specialist
Amanda Nelson, Public Information Officer

**Guests Present:**
Kathy DeBoer, WestGroup Research
Brian Sager, Kimley-Horn
Radu Nah, Kittelson and Associates
Bill Stratmen, Tempe Resident
Ryan Guzy

Commission Chair Goronkin called the meeting to order at 7:34 a.m.

**Agenda Item 1 – Public Appearances**
Bill Stratmen, Tempe resident and member of the Pecos Action Group presented two main concerns relating to the 8th Streetscape Project: the integration with other biking facilities in the community, traffic flow and cycle track as they relate to safety for the cyclist.

**Agenda Item 2 – Minutes**

Commission Chair Goronkin introduced the minutes of the November 18, 2014 meeting and asked for a motion. A motion was made to approve the minutes.

**Motion:** Commissioner Don Cassano
**Second:** Commissioner Charles Redman
**Decision:** Approved

**Agenda Item 3 – TIM Market Research Results**

Sue Taaffe from Public Works and Kathy DeBoer, WestGroup Research, provided an overview of the key findings from the September 2014 Tempe Transit telephone survey.

The purpose of the survey was to gain insights into perceptions about public transit among both riders and non-riders; data was collected from 409 Tempe residents in September/October 2014 by means of random digit dialing (RDD) according to Tempe zip codes. Shared were the changes to the scope and the comparative responses from prior year surveys with the key areas being Rider Characteristics and Opinions; Overall Satisfaction and Improvements of Tempe's Transit System; Potential Use of Tempe's Transit System; Tempe in Motion (TIM); Tempe Bicycling and Walking; and Tempe Youth Free Transit Pass Program. When compared to prior studies, the overall conclusions of the survey findings showed that Transit usage has leveled, overall satisfaction was at its highest level, and the effectiveness of messaging arguments have declined.

Discussion included refining and adding questions asked to residents as well as clarification on specific questions asked. It was shared that the reason for having the research done is to identify perceptions about public transit and to aid in developing the Fiscal Year 2015-2016 media plan.

**Agenda Item 4 – North/South Railroad Spur Multi-use Path Project**

Eric Iwersen, Public Works and Brian Sager, Kimley-Horn, provided an update on the North/South Railroad Spur Multi-use Path Project.

The city received $65,000 in design concept grant funding from the Maricopa Association of Governments (MAG) to advance the North/South Railroad Spur Multi-use Path project, which is a seven-mile multi-use pathway along or adjacent to the north south Union Pacific Railroad rail spur in Tempe. The project is planned to use city right-of-way, private property agreements and would extend from the Tempe Town Lake/downtown Tempe to Knox Road at the Chandler border. The project was described as rails with trails and would be the longest continuous pathway in the community with two segments already or nearly-built as part of the Encore on Farmer housing development and the Culinary Dropout Restaurant site. Staff will work with Kimley-Horn to have the design concept complete in early 2015 along with the preferred path alignment as well as a project prioritization list. The prioritization list will be used to present budget requests to Council and to compete for federal construction dollars. The construction phases, maintenance, crossings (no under pass crossings), purpose, cost and challenges of the seven segments included in the proposal; and public outreach were also discussed.

Motion was made to support the recommendations presented and to submit to Council a CIP request for $200,000 to initiate the first segment project and pursue federal construction dollars.

**Motion:** Commissioner Gary Roberts
**Second:** Commissioner Ben Goren
**Decision:** Approved

**Agenda Item 5 – Bike Share**

Eric Iwersen, Public Works provided an update on the regional Bike Share Program, GR:D.

An overview of the bicycle sharing program was provided as was the location selection and typical use. Included was the background information relating to the regional bike share contract and decision making as well as the system branding and corporate sponsorship efforts. Described were the next steps; concerns regarding funding; and current efforts to seek Council approval for operations funding to supplement the $636,000 in federal funds and $550,000 allocated from the Tempe Transit Tax for the capital needs of the project. On November 25, Phoenix launched their bike share program with 150 bicycles and 27 stations for public use with up to 500 bikes by the end of the month. Tempe anticipates a fall 2015 launch with 250 bikes and up to 25 stations in the core of downtown Tempe from McClintock Drive to Priest Drive between the Tempe Town Lake and Southern Avenue.

Discussion included the possible Request For Proposals for most current cost to launch and operate the program; need for a dedicated operations funding source; Gr:D contractor and City's' investment in bicycles; and membership fees/incentives.

Motion was made to support staff to submit a request to Council for dedicated operations funding of $100,000 for the initial project launch and a RFP to obtain the most accurate costs and systems for operating the program.

**Motion:** Commissioner Jeremy Browning
**Second:** Commissioner Ben Goren
**Decision:** Approved

**Agenda Item 6 – 8th Street Streetscape Project**

Eric Iwersen, Public Works, provided an update and presented the preferred design concept for the 8th Street Streetscape Project.

The background for the design concept for 8th Street and the adjacent proposed Creamery Rail Spur Path between Rural Road and McClintock Drive was provided including the shared space as well as the two-way cycle track. The concept was used to secure federal grant awards totaling approximately $1.3 million. It was explained the current budget was not sufficient to fund all elements in the preliminary design concept. The design was refined to fit within the budget and through public meetings at which two preferred design concepts were developed with one receiving overwhelming support. The design concept was described and the landscape elements were provided. Public process will continue with presentations to Tempe Boards and Commissions, and coordination with businesses, property owners and neighbors by late spring 2015. Construction could begin as early as January 2016.

Motion was made to support staff on the preferred option presented and to move the project into construction documents.

**Motion:** Commissioner Kevin Olson
**Second:** Commissioner Philip Luna
**Decision:** Approved

**Agenda Item 7 – Department and Regional Transportation Updates**

Shelly Seyler provided the following updates

- ADOT is moving into the next phase for near term I-10/ I-17 corridor improvements
- Thanked Commissioners Ben Goren, Gary Roberts, and Sue Lofgren for their service and time on the Commission and provided them with a gift as a token of appreciation.

**Agenda Item 8 – Future Agenda Items**

The following future agenda items have been previously identified by the Commission or staff:

- Chair and Vice Chair Elections (January)
- Bus Unification (January)
- Streetcar (January)
- Orbit Saturn (January)
- 2015/16 Media Buy (February)
- Bike Hero (February)
- Street closure procedures, notification and outreach update (February)
- Bicycle/pedestrian signal activation operations (March)
- City Budget Long-Range Forecast Update (Operating) & CIP follow-up (March)
- CIP Discussion (April)
- Orbit Saturn (April)
- Streetcar (April)
- MAG Pedestrian Design Assistance Grants (May)
- Bus Unification (May)
- City Tentative Fiscal Year 2015-16 Operating Budget (June)
- MAG Congestion Mitigation and Air Quality Program (CMAQ ITS) (June)
- Orbit Saturn & Larger Orbit buses (October)

The Commission's next meeting is scheduled for January 6, 2015 and will be held at Hatton Hall 34 E 7th Street, Tempe, Arizona.

**The meeting was adjourned at 9:04 a.m.**

Prepared by: Yvette Mesquita and Tammara Evans
Reviewed by: Sue Taaffe

# CITY OF TEMPE
# TRANSPORTATION COMMISSION

## STAFF REPORT

**AGENDA ITEM 3**

**DATE**
January 6, 2015

**SUBJECT**
Commission Business

**PURPOSE**
To request that the Transportation Commission makes selections for the positions of chair and vice-chair as well as reach consensus on meeting date and time.

**BACKGROUND**
At the January meeting of each year, the Commission addresses the following business:

- Chair and Vice-Chair. The Commission annually elects a Chair and Vice-Chair for the upcoming year per the Tempe City Code, Sec. 2-249 "The officers of the commission shall be selected by the commission members at the first meeting of the commission following the 31st day of December of each year and shall serve until the 31st day of December of the next succeeding year. No officer shall serve in the same capacity for more than two (2) consecutive one-year terms."
- Meeting Dates and Times. The Commission regularly scheduled meetings are the 2nd Tuesday of each month at 7:30 a.m.

As of January 13, 2015, the Commission has 14 of 15 member positions filled. All current Transportation Commission members are listed below:

1. JEREMY BROWNING
2. DON CASSANO (Current Vice Chair elected in Jan. 2014)
3. BONNIE GEREPKA
4. AARON GOLUB
5. PAM GORONKIN (Current Chair elected in Jan. 2014)
6. NICOLLE GUSZ
7. RYAN GUZY
8. CHARLES HUELLMANTEL
9. PHILLIP LUNA
10. KEVIN OLSEN
11. GERMAN PIEDRAHITA

12. CHARLES REDMAN
13. PETER SCHELSTRAETE
14. CYNDI STREID

**FISCAL IMPACT**
None

**RECOMMENDATION**
None

**CONTACT**
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Deputy Public Works Director
480-858-8854
shelly_seyler @tempe.gov

**ATTACHMENTS**
None

# MEMO

**AGENDA ITEM 4**

**To:** **Tempe Transportation Commission**

**From:** **Wulf Grote, Director of Planning & Development, Valley Metro**
**Eric Iwersen, Principal Planner, City of Tempe**

**Date:** **January 6, 2015**

**Re:** **Tempe Streetcar**

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This memorandum provides a summary of the content to be shared with Transportation Commission meeting scheduled for January 6, 2015.

**Public Involvement**

Valley Metro and the city of Tempe hosted a public meeting on December 1 at the Tempe Transportation Center with over 90 stakeholders in attendance. Door hangers, advertisements and email notices were used to notify residents to the public meeting. The meeting provided an update and prompted discussion on the modified route, proposed stop locations and traffic configuration and potential vehicle size and propulsion system. The meeting also provided an opportunity for stakeholders to assist in determining issues related to the federally-required Environmental Assessment (EA) for the project. A survey was distributed to gauge project elements and their order of importance. The survey was available on the project website (www.valleymetro.org/tempestreetcar) and comments were received through January 5, 2015.

Staff also made presentations to the Downtown Temp e Authority, Transportation Commission, Transportation & Governance Committee of the Tempe Chamber of Commerce and Arizona State University. Staff will continue to reach out to stakeholders and the community for feedback as well as make presentations at requested neighborhood or stakeholder meetings.

Valley Metro and Tempe staff will provide additional information on the following items:

- **Stop Locations** – Valley Metro and Tempe staff will discuss recommendations for proposed streetcar stop locations with Council. The proposed stop locations were reviewed with the public on December 1, 2014. Meeting participants were asked to provide feedback on the proposed stop locations (refer to attached feedback form). Information was also shared online, with the opportunity to provide input. Initial findings include:
  - Overall, public comments received are supportive of planned stop locations.
  - Overall public comments on proposed locations were positive. Specific comments were received on a stop more proximate to Tempe St. Luke's Hospital and more proximate to the ASU campus at Paseo del Saber.
    - Staff recommends that McAllister stop be moved to Paseo del Saber.
    - Staff recommends that a stop to serve Tempe St. Luke's be addressed in a future phase.

- **Propulsion Systems** – Valley Metro and Tempe staff will discuss the recommendation for the use of an on-wire propulsion system along the entire streetcar alignment with Council. Propulsion systems

and technologies were also reviewed with the public on December 1. Public responses received include the following:

  - A majority of the comments received indicate support for a proven on-wire streetcar technology and the use of a smaller vehicle in scale with the downtown area.

- **Vehicle Size -** Valley Metro and Tempe staff will seek direction on a preferred vehicle type while requesting that the size of the vehicle continue to be explored and ultimately selected later in 2015. Work is currently underway to evaluate the appropriate streetcar vehicle size to ensure sufficient passenger capacity, special events, accommodation of bicycles on the vehicle and at stops, stop design specifications relative to street block space, American's with Disabilities Act (ADA) requirements related vehicle access, maintenance and storage, streetscape scale, and downtown Tempe scale and character. Public responses received include the following:
  - Overall, public comments received are supportive of a smaller vehicle.

In addition to the items addressed above, staff will discuss forthcoming project efforts to evaluate specific track location in the street on Rio Salado Parkway and Apache Boulevard; and traffic impacts related to streetcar operations along Mill Avenue between University Drive and Rio Salado Parkway. Staff will also provide Council with a general update on the project's overall progress to date, highlighting efforts to reduce costs and create economies of scale.

Table 5 below (see entire report in attachment 1), is from the 2011 Streetcar Traffic Study and demonstrates that a streetcar operating at 10 minute frequency during peak travel does not alter the level of service rating for all stops along Mill Avenue in the downtown corridor.

**TABLE 5: INTERSECTION LEVEL OF SERVICE AND DELAY***

| INTERSECTION # | | | 2011 Existing | | 2015 No-Build | | 2015 Build | |
|---|---|---|---|---|---|---|---|---|
| | | | LOS | Delay sec/veh | LOS | Delay sec/veh | LOS | Delay sec/veh |
| | 1 | Rio Salado Parkway | C | 31 | C | 31 | C | 28 |
| | 2 | 3rd Street | A | 7 | A | 7 | A | 7 |
| | 3 | 4th Street | A | 3 | A | 3 | A | 3 |
| | 4 | 5th Street | C | 27 | C | 28 | C | 23 |
| | 5 | 6th Street | A | 7 | A | 8 | A | 9 |
| | 6 | 7th Street | B | 13 | B | 13 | B | 12 |
| | 7 | University Drive | D | 36 | D | 38 | D | 42 |

**Summary of Recommendations**

At the January 8, 2015 Council Issue Review Session, staff will be requesting Council action and direction on the following project elements:

- Support of the proposed stop locations
- Support the use of a wired propulsion system along the entire streetcar alignment
- Initial feedback on vehicle size


TEMPE TOWN LAKE
Rio Salado Pkwy.
Hayden Ferry
Marina Heights
3rd St.
5th St.
6th St.
University Dr.
9th St.
Ash Ave.
11th St.
Terrace Rd.
Dorsey Ln.
Apache Blvd.
Mill Ave.
College Ave.
McAllister Ave
Paseo del Saber
Rural Rd.
N
LEGEND
Valley Metro Rail / Station
Tempe Streetcar Route
Council-Approved Stop
Proposed Streetcar Stop

# FEEDBACK FORM

## TEMPE STREETCAR

**Please take a moment to fill out this feedback form to help the project team better understand your views and opinions about elements of the Tempe Streetcar Project. Your input will be incorporated into the study process and results.**

1. Do you live in the downtown Tempe area? (approximately Rio Salado to Apache, Ash to Rural)
   - ☐ Yes, at (cross streets): _____
   - ☐ No

2. Do you own or operate a business in the downtown Tempe area? (approximately Rio Salado to Apache, Ash to Rural)
   - ☐ Yes, at (cross streets): _____
   - ☐ No

4. How often do you currently use transit?
   - ☐ Daily ☐ Weekly ☐ Monthly
   - ☐ Occasionally ☐ Never

5. Would you ride this new streetcar route when it is operational?
   - ☐ Yes ☐ No ☐ Maybe

Route and Proposed Stop Locations


6. Looking at the proposed stop locations (see map above), do you agree with these locations or would you propose different locations:
   - ☐ Agree with stop locations on the map
   - ☐ Propose different locations (where)?_____

7. Both on-wire and off-wire technologies are being evaluated for powering the streetcar vehicles. Please take a moment to review the pros/cons table below.

| Propulsion System | Pros | Cons |
|---|---|---|
| ON-WIRE | • Proven technology<br>• Flexibility in vehicle choice/size<br>• Lower vehicle and operating costs | • Requires overhead wires on Mill Avenue between Rio Salado and University<br>• Higher infrastructure cost |
| OFF-WIRE (BATTERY) | • No overhead wires on Mill Avenue between Rio Salado and University<br>• Lower infrastructure cost | • Unproven technology (no other rail system in the United States currently uses off-wire technology)<br>• Higher vehicle and operating costs<br>• Uncertain if off-wire power sufficient to power and cool the streetcar vehicles<br>• Charging stations may be required |

**Please return to staff or send to Valley Metro at: Terry Gruver | 101 N. 1st Ave., Suite 1300 | Phoenix, AZ 85003 or by fax to: 602.523.6095, or email to tgruver@valleymetro.org. This survey may also be completed online at valleymetro.org/tempestreetcar.**

11-25-14

8. On a scale of 1 to 5, rank the following elements in order of importance, with 1 being MOST IMPORTANT and 5 being LEAST IMPORTANT.

_____ Keep project costs as low as possible.

_____ Maintain smaller vehicle size (smaller than current light rail vehicle)

_____ Continue to explore off-wire technology (requiring larger vehicle)

_____ Design for on-wire technology that carefully integrates with Mill Avenue landscape

_____ Build the project as quickly as possible

9. Other comments/questions:

_____

_____

_____

_____

To be added to Valley Metro's database and receive meeting notices and occasional project updates on the Tempe Streetcar Project, please provide the following information:

Name: _____ Phone Number: _____

Business Name (if applicable):_____

Email: _____

Address: _____ City: _____ State: _____ Zip:_____

**Please return to staff or send to Valley Metro at: Terry Gruver | 101 N. 1st Ave., Suite 1300 | Phoenix, AZ 85003 or by fax to: 602.523.6095, or email to tgruver@valleymetro.org. This survey may also be completed online at valleymetro.org/tempestreetcar.**

11-25-14

METRO

# TEMPE STREETCAR

ENVIRONMENTAL ASSESSMENT


## TRANSPORTATION TECHNICAL REPORT

February 2012

METRO

# Tempe Streetcar Study
# Environmental Assessment

## Transportation Technical Report

By

Grijalva Engineering

and HDR, Inc.

February 2012

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# 1.0 INTRODUCTION

This report provides an assessment of, and potential mitigation for, the impacts of the 2015 No-Build and 2015 Build Alternatives, including a shortened or Scalable Project, on the following transportation elements: traffic operations, on-street and off-street parking, loading zones, transit, pedestrian and bicycle facilities, freight routes, and truck routes within the project study area.

This information will assist METRO and the City of Tempe in understanding the potential transportation impacts of the proposed project and in developing appropriate design strategies, where needed, to avoid or minimize adverse impacts.

Definitions of the No-Build and Build Alternatives, including the Scalable Project, may be found in Chapter 2 of the Environmental Assessment (EA).

For a more definitive description of how Scalable Project varies from the Build Alternative, see Section 11 of this report.

# 2.0 EXISTING TRANSPORTATION CONDITIONS

A previously developed report, *Tempe Streetcar-Existing Transportation Conditions Report*, dated April 11, 2011 documented the existing roadway lane configurations, traffic volumes, traffic levels of service and delays, transit operations, on-street parking, loading zones, and pedestrian/bicycle facilities along the study area. This report is attached as Appendix A.

# 3.0 TRAFFIC OPERATIONS

This section of the report summarizes the traffic operations analysis conducted for the Tempe Streetcar project**.** The traffic analysis was conducted for the PM peak hour traffic conditions at the study intersections shown in Figure 1 in Section 3.2.3 for the following scenarios:

- 2011 Existing Conditions
- 2015 No-Build
- 2015 Build Alternative
- 2015 Build Alternative – Scalable Project (refer to Section 11)

This analysis documents and compares the impacts of each of the above scenarios based on the conceptual design available at this phase of the study. Detailed analysis using more advanced traffic analysis software will be conducted in Final Design for the selected locally preferred alternative (LPA).

## 3.1 METHODOLOGY

Traffic analysis of roadway and intersection operational performance for the study scenarios was performed using the Synchro/SimTraffic simulation analysis package (version 7, Build series 755) developed by Trafficware, Ltd, which evaluates intersection delay and congestion based on procedures similar to those given in the 2000 Highway Capacity Manual (Chapters 16 and 17). Basic inputs used for Synchro relate primarily to traffic data including traffic volumes, lane geometry (i.e., number of lanes, lane widths, turn-lane storage lengths), signal timing data, heavy vehicle traffic levels, on-street parking, bus blockage and a variety of other data items.

It should be noted that Synchro is limited when assessing streetcar operations. Since streetcar will operate much like a bus, the Synchro model will consider streetcar as part of the bus/transit codings. This was agreed to be sufficient by City of Tempe and METRO staff to be used for the No-Build Alternative and Build Alternative (including a Scalable Project) so that the results could be compared with regard to overall intersection level of service and delays. As mentioned, more sophisticated traffic software will be used in Final Design for the LPA.

The methodology used in this study was based on the 2000 Highway Capacity Manual (HCM), for the determination of Level of Service (LOS) for existing traffic conditions and future traffic conditions. The analysis results are expressed using LOS and Intersection Delay.

Level of Service is a quantitative measure based on intersection delay and capacity. LOS is frequently expressed in qualitative terms as LOS A (free-flow) to LOS F (congested). Tables 1 and 2 provide LOS definitions for signalized and unsignalized intersections, respectively. The “Description” column of each table qualitatively describes the perception of traffic conditions by motorists and passengers, while the “Average Delay” column quantitatively describes the number of seconds of delay per vehicle associated with each LOS.

## TABLE 1: SIGNALIZED INTERSECTION LOS DEFINITIONS

| Level of Service | Description | Average Delay (seconds/vehicle) |
|---|---|---|
| **A** | Operations with very low delay occurring with favorable progression and/or short cycle length. | ≤ 10 |
| **B** | Operations with low delay occurring with good progression and/or short cycle lengths. | > 10 – 20 |
| **C** | Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | > 20 – 35 |
| **D** | Operations with longer delay due to a combination of unfavorable progression, long cycle lengths, or high volume to capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable. | > 35 – 55 |
| **E** | Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | > 55 – 80 |
| **F** | Operations with delay unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths. | > 80 |

*Source: Highway Capacity Manual, Transportation Research Board, 2000*

## TABLE 2: UNSIGNALIZED INTERSECTION LOS DEFINITIONS

| Level of Service | Description | Average Delay (second/vehicle) |
|---|---|---|
| **A** | Little or no delay | 0 – 10 |
| **B** | Minor delay | > 10 – 15 |
| **C** | Average delay | > 15 – 25 |
| **D** | Moderate delay | > 25 – 35 |
| **E** | Lengthy delay | > 35 – 50 |
| **F** | Excessive delay/gridlock | > 50 |

*Source: Highway Capacity Manual, Transportation Research Board, 2000*

## 3.2 TRAFFIC ANALYSIS ASSUMPTIONS AND APPROACH

This traffic analysis employed a conventional approach that included basic data collection efforts, investigation of existing roadway and traffic conditions, and analysis of the above mentioned study scenario operational impacts.

New traffic counts (auto, pedestrian and bicycle) were performed at all signalized intersections along the study area including five non-signalized locations (future signalized locations). These counts were performed in the early parts of 2011 and 2012

and were conducted when classes at Arizona State University (ASU) were in session. Traffic signal timings were provided by the City of Tempe.

The study analyzed the PM peak hour traffic conditions, as the evening peak period is expected to generate the most congested traffic conditions during a weekday. As requested by the City of Tempe Traffic staff, two additional locations were studied during the AM peak periods - Mill Avenue/Southern Avenue and Mill Avenue/Alameda Drive.

### 3.2.1 Traffic Diversion Considerations

Traffic diversion and traffic reroute assessment were discussed with City of Tempe Traffic and METRO staff. Specific to the Maple-Ash neighborhood, there is the potential for traffic diversion to occur with the Build Alternative at University Drive and Ash Avenue and along Mill Avenue at 10th and 11th Streets. Comparing the Maricopa Association of Governments (MAG) Regional Travel Demand Models (TDM) No-Build and Build projected volumes revealed very little change between the two alternatives and in some locations the Build projected volumes were less than the No-Build. The project team concluded that for the purposes of this study at this phase, the traffic operations analysis results would focus on a comparative analysis between alternatives and would consider traffic diversions to have an insignificant impact on the analysis. During the next phase of study and design, the preferred alternative will be modeled to include potential traffic diversion, and mitigation will be proposed at that time if needed.

### 3.2.2 Special Events

Many special events occur along Mill Avenue during the course of the year. This often involves complete closure of Mill Avenue between Rio Salado Parkway and University Drive. This traffic analysis did not include assessments of any special event as part of this study phase.

### 3.2.3 Traffic Volume

- Existing Volumes

  Existing 2011 and Historical Average Weekday Traffic 24-Hour Traffic Volumes and 2011 PM Peak Hour Turning Movement Counts are provided in Section 4.3, Tables 5 and 6, of the *Tempe Streetcar-Existing Transportation Conditions Report*, included in Appendix A. As mentioned above, for this study, new traffic counts (auto, pedestrian and bicycle) were performed at all intersections along the study area including AM counts at select locations.

- 2015 No-Build Traffic Volumes: Auto; Pedestrian; and Bicycle

  Development of the 2015 No-Build traffic volumes (auto, pedestrian and bicycle) considered past and planned economic growth for Tempe; review of previous traffic

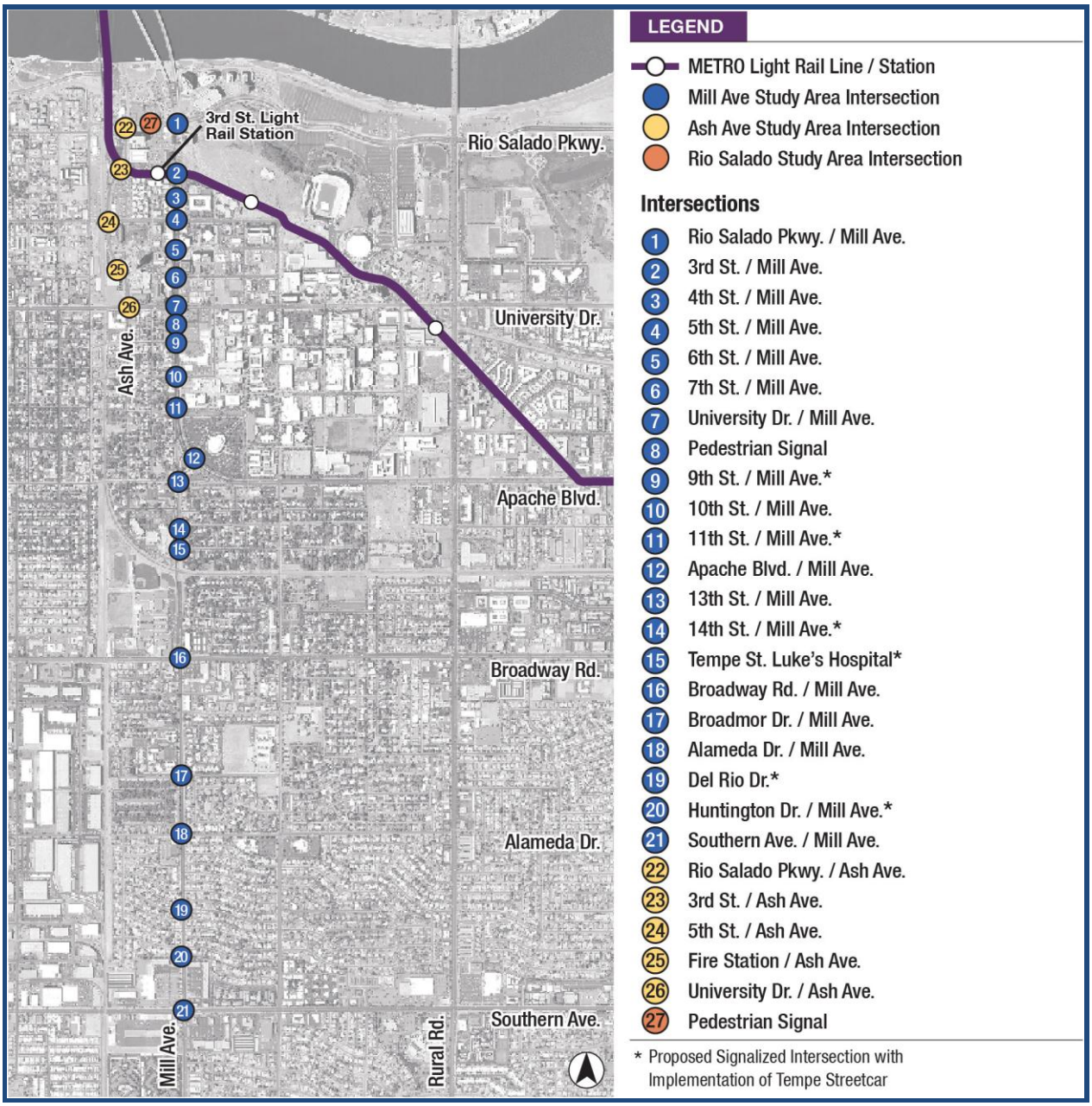
analysis reports; review of the MAG Regional TDM; and various meetings with City of Tempe Traffic Engineering and METRO staff. Based on these elements, it was agreed that an assumed 1% annual growth rate would be utilized to develop all auto, pedestrian and bicycle 2015 No-Build volumes. See Table 3 for 2015 Traffic Volumes and Table 4 for 2015 Pedestrian and Bicycle Volumes at the intersections identified in Figure 1.

- 2015 Build Alternative including Scalable Project Traffic Volumes: Auto; Pedestrian; and Bicycle

Development of the turning movement counts (TMC) for the 2015 Build Alternative and Scalable Project required review and understanding of the MAG TDM for the Tempe Streetcar study. Comparing the TDM No-Build and 2015 Build volumes found very little change between the two and in some locations the 2015 Build volumes were less than the No-Build. This was due mainly to revised transit schedule operations that include the streetcar. Therefore, it was agreed that the 2015 Build Alternative and Scalable Project volumes and TMC's would be the same as the 2015 No-Build volumes as shown in Table 3. This also applies to the 2015 Build bicycle volumes as shown in Table 4.

For the 2015 Build Alternative and Scalable Project pedestrian volumes, streetcar passenger boarding and alighting projections at the proposed streetcar stops were obtained from the MAG TDM. Based on crosswalk locations near each proposed streetcar stop, the streetcar passenger traffic was estimated from the TDM and then added to the background No-Build pedestrian volumes as shown in Table 4.

## FIGURE 1: TEMPE STREETCAR STUDY AREA INTERSECTIONS*




** - Figure 1 depicts the study corridor for 2015 Build Alternative. See Chapter 2 of the EA and Section 11 of this report for project description of Scalable Project.*

## TABLE 3: 2015 PM PEAK HOUR NO-BUILD AND BUILD TRAFFIC COUNTS AND TURN MOVEMENT COUNTS

| INTERSECTION #** | | | Approach Total | EASTBOUND (EB) | | | | WESTBOUND (WB) | | | | NORTHBOUND (NB) | | | | SOUTHBOUND (SB) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | EBL | EBT | EBR | Total | WBL | WBT | WBR | Total | NBL | NBT | NBR | Total | SBL | SBT | SBR |
| Mill Avenue | 1 | Rio Salado | 2451 | 699 | 125 | 529 | 45 | 586 | 159 | 280 | 147 | 590 | 34 | 353 | 203 | 577 | 134 | 340 | 103 |
| | 2 | 3rd Street | 1231 | 69 | 32 | 3 | 33 | 107 | 26 | 16 | 66 | 562 | 21 | 516 | 25 | 494 | 16 | 469 | 9 |
| | 3 | 4th Street | 1148 | 21 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 619 | 9 | 609 | 0 | 509 | 0 | 492 | 17 |
| | 4 | 5th Street | 1681 | 347 | 61 | 172 | 114 | 275 | 64 | 116 | 94 | 544 | 57 | 418 | 69 | 515 | 61 | 417 | 36 |
| | 5 | 6th Street | 162 | 92 | 11 | 24 | 56 | 69 | 2 | 4 | 41 | 567 | 4 | 501 | 22 | 635 | 49 | 560 | 27 |
| | 6 | 7th Street | 1411 | 86 | 9 | 10 | 67 | 165 | 93 | 3 | 70 | 534 | 43 | 441 | 50 | 626 | 45 | 561 | 21 |
| | 7 | University | 3651 | 1336 | 126 | 755 | 456 | 820 | 209 | 503 | 107 | 792 | 314 | 292 | 186 | 703 | 108 | 556 | 38 |
| | 8 | Pedestrian Signal* | 2037 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 824 | 0 | 824 | 0 | 1213 | 0 | 1213 | 0 |
| | 9 | 9th Street* | 2211 | 1336 | 126 | 755 | 456 | 77 | 25 | 0 | 52 | 848 | 21 | 802 | 25 | 1190 | 24 | 1147 | 19 |
| | 10 | 10th Street | 2734 | 156 | 26 | 6 | 124 | 250 | 215 | 16 | 19 | 1029 | 54 | 862 | 112 | 1300 | 7 | 1264 | 29 |
| | 11 | 11th Street* | 2866 | 71 | 1 | 0 | 70 | 211 | 44 | 4 | 16 | 1025 | 59 | 907 | 59 | 1559 | 108 | 1442 | 8 |
| | 12 | Apache | 1671 | 0 | 0 | 0 | 0 | 554 | 0 | 554 | 0 | 552 | 471 | 0 | 81 | 565 | 0 | 565 | 0 |
| | 13 | 13th Street | 2330 | 254 | 18 | 127 | 109 | 308 | 228 | 77 | 3 | 722 | 95 | 531 | 96 | 1046 | 8 | 1017 | 21 |
| | 14 | 14th Street* | 2156 | 96 | 22 | 3 | 71 | 12 | 5 | 2 | 5 | 753 | 30 | 712 | 11 | 1295 | 8 | 1281 | 6 |
| | 15 | St. Luke's Drive* | 2156 | 57 | 9 | 0 | 48 | 0 | 0 | 0 | 0 | 784 | 34 | 750 | 0 | 1315 | 0 | 1311 | 4 |
| | 16 | Broadway | 5349 | 2126 | 151 | 1519 | 456 | 985 | 174 | 682 | 129 | 843 | 136 | 572 | 135 | 1395 | 165 | 1106 | 124 |
| | 17 | Broadmor | 2621 | 10 | 7 | 0 | 3 | 19 | 5 | 1 | 12 | 811 | 8 | 785 | 18 | 1780 | 49 | 171 | 14 |
| | 18 | Alameda | 2747 | 60 | 21 | 17 | 23 | 50 | 28 | 4 | 18 | 883 | 21 | 829 | 33 | 1753 | 87 | 1649 | 17 |
| | | *Alameda AM* | *1962* | *26* | *8* | *3* | *15* | *72* | *35* | *0* | *36* | *1335* | *8* | *1302* | *25* | *529* | *12* | *511* | *6* |
| | 19 | Del Rio Drive* | 2593 | 10 | 3 | 0 | 7 | 18 | 6 | 0 | 12 | 905 | 7 | 890 | 8 | 1660 | 15 | 1641 | 4 |
| | 20 | Huntington* | 2598 | 94 | 23 | 6 | 64 | 43 | 15 | 3 | 25 | 843 | 27 | 789 | 27 | 1618 | 11 | 1555 | 52 |
| | 21 | Southern | 5197 | 1604 | 118 | 951 | 536 | 947 | 198 | 634 | 115 | 985 | 203 | 650 | 132 | 1661 | 249 | 1254 | 158 |
| | | *Southern AM* | *4567* | *1003* | *201* | *595* | *207* | *1511* | *90* | *1281* | *139* | *1461* | *432* | *931* | *99* | *592* | *78* | *411* | *103* |
| Ash Avenue | 22 | Rio Salado | 3450 | 7 | 0 | 6 | 1 | 407 | 204 | 2 | 201 | 514 | 1 | 217 | 295 | 422 | 324 | 97 | 1 |
| | 23 | 3rd Street | 782 | 3 | 1 | 0 | 2 | 45 | 29 | 1 | 15 | 409 | 7 | 374 | 27 | 336 | 8 | 312 | 16 |
| | 24 | 5th Street | 1088 | 214 | 41 | 146 | 28 | 208 | 55 | 105 | 48 | 333 | 21 | 252 | 60 | 333 | 63 | 170 | 100 |
| | 25 | Fire Station | 633 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 277 | 0 | 277 | 0 | 357 | 0 | 357 | 0 |
| | 26 | University | 2768 | 1212 | 124 | 1000 | 87 | 864 | 45 | 728 | 92 | 107 | 64 | 9 | 33 | 586 | 322 | 1 | 262 |
| Rio Salado | 27 | Pedestrian Signal* | 1043 | 626 | 0 | 626 | 0 | 417 | 0 | 417 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Source: HDR – HCM Signalized Intersection Capacity Analysis 2/2011

* Currently unsignalized intersection

**Refer to Figure 1 for intersection locations

**R** – Right turn

**T** – Through traffic

**L** – Left Turn

## TABLE 4: 2015 PM PEAK PEDESTRIAN AND BICYCLE COUNTS AT SIGNALIZED INTERSECTIONS

| INTERSECTION # | | | 2015 Pedestrian Volume | | | | | | | | 2015 Bicycle Volume | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | East leg | | West leg | | North leg | | South leg | | EB | WB | NB | SB |
| | | | No Build | Build | No Build | Build | No Build | Build | No Build | Build | No Build/ Build | No Build/ Build | No Build/ Build | No Build/ Build |
| Mill Avenue | 1 | Rio Salado Pkwy | 37 | 37 | 53 | 53 | 19 | 19 | 4 | 4 | 0 | 8 | 12 | 28 |
| | 2 | 3rd St | 30 | 22 | 68 | 68 | 124 | 115 | 110 | 110 | 4 | 6 | 25 | 36 |
| | 3 | 4th St | 227 | 227 | 233 | 233 | 108 | 108 | 54 | 54 | 4 | 1 | 30 | 37 |
| | 4 | 5th St | 304 | 304 | 327 | 327 | 256 | 256 | 120 | 120 | 23 | 24 | 18 | 29 |
| | 5 | 6th St | 110 | 119 | 111 | 111 | 230 | 238 | 261 | 261 | 4 | 9 | 33 | 32 |
| | 6 | 7th St | 174 | 174 | 146 | 146 | 91 | 91 | 46 | 46 | 2 | 8 | 35 | 31 |
| | 7 | University Drive | 156 | 156 | 87 | 87 | 154 | 154 | 175 | 175 | 33 | 59 | 36 | 36 |
| | 8 | Ped signal* | 0 | 0 | 0 | 0 | 0 | 153 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 9 | 9th St* | 25 | 25 | 17 | 17 | 36 | 36 | 46 | 46 | 7 | 4 | 20 | 14 |
| | 10 | 10th St | 39 | 39 | 34 | 34 | 86 | 86 | 134 | 134 | 49 | 130 | 21 | 15 |
| | 11 | 11th St* | 27 | 27 | 6 | 6 | 36 | 36 | 1 | 1 | 3 | 17 | 22 | 24 |
| | 12 | Apache | 37 | 37 | 0 | 0 | 0 | 0 | 15 | 15 | 0 | 18 | 5 | 0 |
| | 13 | 13th St | 10 | 10 | 15 | 15 | 41 | 41 | 25 | 25 | 23 | 41 | 14 | 29 |
| | 14 | 14th St.* | 1 | 1 | 8 | 8 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 16 |
| | 15 | St. Luke's Drive* | 3 | 3 | 7 | 7 | 0 | 1 | 0 | 1 | 1 | 0 | 3 | 15 |
| | 16 | Broadway | 40 | 40 | 159 | 159 | 88 | 103 | 49 | 64 | 9 | 7 | 9 | 10 |
| | 17 | Broadmor | 6 | 6 | 22 | 22 | 9 | 9 | 2 | 2 | 2 | 5 | 7 | 15 |
| | 18 | Alameda | 5 | 5 | 22 | 22 | 3 | 3 | 3 | 3 | 2 | 4 | 7 | 12 |
| | | *Alameda- AM* | *3* | *3* | *14* | *14* | *0* | *6* | *1* | *7* | 7 | *5* | *12* | *0* |
| | 19 | Del Rio Drive* | 4 | 4 | 6 | 6 | 2 | 2 | 0 | 0 | 17 | 5 | 2 | 4 |
| | 20 | Huntington* | 4 | 4 | 6 | 6 | 2 | 2 | 1 | 93 | 0 | 9 | 0 | 16 |
| | 21 | Southern | 19 | 19 | 51 | 97 | 23 | 69 | 50 | 50 | 10 | 17 | 12 | 15 |
| | | *Southern-AM* | *18* | *18* | *20* | *66* | *16* | *61* | *27* | *27* | *6* | *7* | *5* | *1* |
| Ash Avenue | 22 | Rio Salado Pkwy | 12 | 12 | 1 | 1 | 0 | 0 | 10 | 10 | 1 | 7 | 2 | 5 |
| | 23 | 3rd St | 30 | 30 | 4 | 4 | 10 | 10 | 10 | 11 | 0 | 4 | 2 | 1 |
| | 24 | 5th St | 18 | 18 | 12 | 12 | 66 | 66 | 49 | 49 | 26 | 52 | 21 | 7 |
| | 25 | Fire Station | 22 | 22 | 4 | 4 | 0 | 0 | 182 | 182 | 0 | 7 | 11 | 11 |
| | 26 | University Drive | 27 | 27 | 58 | 58 | 29 | 29 | 17 | 17 | 46 | 35 | 15 | 11 |
| Rio Salado | 27 | Ped signal* | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Source: HDR*
** Unsignalized currently*
***Refer to Figure 1 for intersection locations*

***EB:*** *Eastbound* ***NB:*** *Northbound*
***WB:*** *Westbound* ***SB:*** *Southbound*

### 3.2.4 Roadway Geometry

The 2011 existing roadway geometry, including lane configurations and turn lane storage lengths, has been obtained from available base mapping, aerial surveys and field reviews. This data was used for the 2011 and 2015 No-Build Synchro modeling.

For the 2015 Build Alternative and Scalable Project analysis, the roadway geometry, lane configurations and streetcar stops used in Synchro were based on drawings provided/developed by HDR dated March 2011 and updated in December 2011. Based on these drawings, three locations would require roadway improvements, lane configuration changes, or restricted turn movements. These are:

- At Mill Avenue and Huntington Drive (a new signalized intersection) the traffic operations analysis assumed that the intersection was reconstructed to a four-legged intersection. This would require future assessment of access and parking within the development on the east side of Mill Avenue. This applies only to the 2015 Build Alternative.
- Along Mill Avenue between University Drive and 11th Street – the number of southbound lanes is reduced from 3 lanes to 2 lanes to accommodate streetcar.
- At Ash Avenue and University Drive – the westbound to southbound left turn movement is removed/restricted to allow streetcar operations.
- At Mill Avenue and 14th Street, the southbound to eastbound left turn movement would be eliminated/restricted. This applies only to Scalable Project. See Section 11 of this report for further description and impacts.

### 3.2.5 Design Speed Input

Speed limits used for Synchro 2011, 2015 No-Build and 2015 Build Alternative including Scalable Project scenarios are those that are currently posted along the planned streetcar corridor as follows:

- 30 mph - Mill Avenue between Rio Salado Parkway and University Drive; Rio Salado Parkway between Mill Avenue and Ash Avenue; Ash Avenue between Rio Salado Parkway and University Drive..
- 35 mph - Mill Avenue between University Drive and Broadway Road; University Drive; Apache Boulevard.
- 40 mph - Mill Avenue between Broadway Road and Southern Avenue; Broadway Avenue and Southern Avenue.

### 3.2.6 Signal Timing and Phasing Input

The existing signal timing and phasing information along the study corridor was provided by the City of Tempe and was used for the 2011 scenario in Synchro. For the

2015 No-Build scenario, signal timings were adjusted to optimize performance using the existing signal phasing.

For the 2015 Build scenario including the Scalable Project, streetcar operations, in general, occur in the travel lanes along Mill Avenue with general purpose traffic and will operate with the existing signal system. Along Ash Avenue, the streetcar operates in "semi-exclusive" right of way in the southbound curb lane but mixes with right turning vehicles/lanes at intersections and driveway locations. There are a few locations where streetcar operations will require: new signals; transit detection to allow signal phasing changes that enable the streetcar to transition from one lane to the next at signalized locations; and/or transit detection to create a transit signal phase to allow the streetcar to move through the intersection exclusively. See section 11 of this report for further discussion of Scalable Project comparison to the 2015 Build Alternative.

New intersection signal locations for the 2015 Build Alternative and the Scalable Project are proposed on Mill Avenue at:

- 9th Street
- 11th Street
- Hudson Lane (Scalable Project only)
- St. Luke's Hospital Drive (2015 Build Alternative only)
- 14th Street (2015 Build Alternative only) At this location, a "blank-out" sign is proposed and would be coordinated with the St. Luke's Hospital Drive signal and would allow streetcar movements while holding 14th Street outbound left turns.
- Del Rio Drive (2015 Build Alternative only)
- Huntington Square Drive (2015 Build Alternative only)

New pedestrian signals for access to streetcar stops for the 2015 Build Alternative and the Scalable Project are proposed at:

- Mill Avenue between University Drive and 9th Street (this mid-block pedestrian signal to access center streetcar stop would need to be studied further in the next design phase with advanced traffic operational software that can simulate streetcar operations and any impacts to the University Drive and Mill Ave intersection before it is approved)
- Mill Avenue between Hudson Lane and 13th Street (Scalable Project only)
- Rio Salado Parkway between Mill Avenue and Ash Avenue

Transit detection allowing signal phasing changes for 2015 Build Alternative and the Scalable Project are needed on Mill Avenue at:

- 9th Street (new signalized intersection) to allow southbound streetcar to transition from left turn lane straight through the intersection;
- 10th Street to allow southbound streetcar to transition from left turn lane straight through the intersection;

- 11th Street (new signalized intersection) to allow southbound streetcar to transition from left turn lane to the curb lane through the intersection;
- St. Luke's Hospital Drive/14th Street to allow northbound streetcar to transition from curb side stop to inside travel lane. (2015 Build Alternative only)

Transit detection for transit signal phases for 2015 Build Alternative including the Scalable Project is needed at:

- University Drive and Mill Avenue to allow streetcar to transition from eastbound left turn lane to southbound striped median; allow auto eastbound to northbound left turns, auto northbound to eastbound right turns and auto southbound to westbound right turns during this phase as well.
- Huntington Drive and Mill Avenue (new signalized intersection) to allow northbound streetcar to transition across the intersection from End-of-Line stop on west side of Mill Avenue near Southern Avenue to curb lane on east side of Mill Avenue. (2015 Build Alternative only)
- University Drive and Ash Avenue to allow streetcar to transition from the southbound curb lane along Ash Avenue across the intersection to the eastbound left turn lane on University Drive.

### 3.2.7 Streetcar and Transit Input

As mentioned in Section 3.1, Synchro has limitations with regard to assessing streetcar operations. Since the streetcar will operate much like a bus, the Synchro model was coded as such. For streetcar and bus stop input into Synchro, it was decided that the "bus blockage factors" would be modified. The streetcar is modeled to operate at a 10 minute headway, which implies that, on an average, six cycles per hour will be impacted due to streetcar operation. Presently the traffic signals along the streetcar alignment operate at 110 second cycle length which equates to 33 cycles per hour. During various meetings with City of Tempe Traffic staff it was assumed that 4 out of the 33 cycles per hour will be impacted during streetcar operations so a bus blockage factor of 0.12 will be reasonable/conservative to apply at all signalized intersections where streetcar stops occur.

This streetcar blockage factor was input in addition to the background transit bus blockage factors for the 2015 Build Alternative including the Scalable Project. For description of background bus transit operations see Section 6.

The Central Phoenix/East Valley (CP/EV) Light Rail Transit (LRT) currently crosses Mill Avenue and Ash Avenue just north of 3rd Street. The LRT uses a "predictive priority" signal detection at these two signalized locations which allows LRT the ability to have priority over auto/general purpose traffic. Since the streetcar will operate in traffic much like a bus, it is assumed that LRT will have priority over streetcar operations. For the

purposes of this traffic operations analysis, based on the limitations of Synchro to model streetcar and LRT operations, no LRT crossing input into the model was considered.

More sophisticated software will be used to model traffic and streetcar operations in Final Design for the LPA.

### 3.2.8 Parking Input

The maneuvers into and out of on-street parking spaces are expected to impact the traffic flow on Mill Avenue and inputs used in Synchro. The number of such maneuvers during the PM peak hour considers the number of existing on-street parking spaces for 2011 and the 2015 No-Build Alternative and proposed on-street parking spaces for the 2015 Build Alternative including the Scalable Project.

For existing on-street parking space counts, and in the 2015 No-Build and 2015 Build Alternative, refer to Table 6 in Section 4.0. For the Scalable Project, parking counts would be the same as for the 2015 Build Alternative.

## 3.3 TRAFFIC OPERATIONS ANALYSIS RESULTS

Table 5 provides the overall PM Peak Hour average intersection level of service (LOS) and delay utilizing the data in sections 3.2.3 through 3.2.8. Based on these results, the 2015 Build Alternative will operate at an acceptable Level of Service, as the City of Tempe allows LOS E as acceptable during peak periods. (A comparison of the intersection LOS for the Scalable Project to the 2015 Build Alternative is provided in Table 10 in Section 11.) Table 6 is a summary of key findings based on traffic operations analysis results.

## TABLE 5: INTERSECTION LEVEL OF SERVICE AND DELAY*

| INTERSECTION # | | | 2011 Existing | | 2015 No-Build | | 2015 Build | |
|---|---|---|---|---|---|---|---|---|
| | | | LOS | Delay sec/veh | LOS | Delay sec/veh | LOS | Delay sec/veh |
| Mill Avenue | 1 | Rio Salado Parkway | C | 31 | C | 31 | C | 28 |
| | 2 | 3rd Street | A | 7 | A | 7 | A | 7 |
| | 3 | 4th Street | A | 3 | A | 3 | A | 3 |
| | 4 | 5th Street | C | 27 | C | 28 | C | 23 |
| | 5 | 6th Street | A | 7 | A | 8 | A | 9 |
| | 6 | 7th Street | B | 13 | B | 13 | B | 12 |
| | 7 | University Drive | D | 36 | D | 38 | D | 42 |
| | 8 | Pedestrian Signal (*Proposed)* | No Signal | | | | A | 2 |
| | 9 | 9th Street *(Proposed signal)* | No Signal | | | | C | 30 |
| | 10 | 10th Street | B | 20 | C | 22 | C | 25 |
| | 11 | 11th Street *(Proposed signal)* | No Signal | | | | C | 21 |
| | 12 | Apache Boulevard | A | 9 | A | 9 | B | 10 |
| | 13 | 13th Street | C | 21 | C | 22 | B | 14 |
| | 14 | 14th Street (*Proposed Signal*) | No Signal | | | | A | 8 |
| | 15 | St. Luke's Drive (*Proposed signal*) | No Signal | | | | A | 7 |
| | 16 | Broadway Road | D | 49 | D | 53 | E | 67 |
| | 17 | Broadmor | A | 3 | A | 3 | A | 5 |
| | 18 | Alameda Drive | A | 4 | A | 4 | A | 4 |
| | | *Alameda-AM* | A | 3 | A | 4 | A | 4 |
| | 19 | Del Rio Drive (*Proposed signal*) | No Signal | | | | A | 6 |
| | 20 | Huntington Drive *(Proposed signal)* | No Signal | | | | B | 16 |
| | 21 | Southern Avenue | D | 44 | D | 49 | D | 54 |
| | | *Southern-AM* | D | 37 | D | 38 | D | 39 |
| Ash Avenue | 22 | Rio Salado Parkway | C | 24 | C | 25 | C | 31 |
| | 23 | 3rd Street | A | 4 | A | 4 | A | 4 |
| | 24 | 5th Street | B | 13 | B | 13 | B | 10 |
| | 25 | Fire Station | B | 12 | B | 12 | B | 11 |
| | 26 | University Drive | B | 17 | B | 18 | C | 27 |
| Rio Salado Parkway | 27 | Pedestrian Signal (*Proposed*) | No Signal | | | | A | 3 |

*Source: HDR- HCM Signalized Intersection Capacity Analysis (Existing - March 2011; 2015 No-Build-May 2011; 2015 Build February 2012)*

** See Table 10, Section 11 for a comparison of Scalable Project to the 2015 Build Alternative*

**TABLE 6: KEY FINDINGS OF TRAFFIC OPERATIONS ANALYSIS***

| Scenario | Number of Intersections Operating at LOS D or E | Mill Avenue Intersections Operating at LOS D or E |
|---|---|---|
| 2011 Existing | 3 at LOS D | University Drive<br>Broadway Road<br>Southern Avenue |
| 2015 No-Build | 3 at LOS D | University Drive<br>Broadway Road<br>Southern Avenue |
| 2015 Build | 3 at LOS D/E | University Drive<br>Broadway Road<br>(Changed from LOS D to LOS E)<br>Southern Avenue |

** See Table 10, Section 11 for a comparison of Scalable Project to the 2015 Build Alternative*

# 4.0 IMPACTS TO ON-STREET AND OTHER OFF-STREET PARKING

An inventory of all existing on-street parking spaces, loading zones and bus stops along Mill Avenue and Ash Avenue in downtown Tempe was performed. The inventory of existing on-street parking spaces is included in Table 7. For the portion of the streetcar alignment south of University Drive there are no on-street parking spaces. Impacts to existing on-street parking are described below.

There are approximately 12,500 off-street parking spaces within the downtown Tempe area as stated in the Existing Conditions Report (April 2011). There are no impacts to off-street parking for the 2015 Build Alternative including Scalable Project.

## 4.1 MILL AVENUE

### 4.1.1 2015 No-Build Alternative

There are no anticipated impacts to on-street or off-street parking for the No-Build Alternative.

### 4.1.2 2015 Build Alternative

For the 2015 Build Alternative including the Scalable Project, in downtown Tempe, the streetcar would run in the northbound travel lane with the flow of traffic, minimizing impacts to the existing on-street parking. Due to the streetcar stops and bike lane transitions, 7 parking spaces would be displaced on the east side of Mill Avenue. The project would not displace any existing parking on the west side of Mill Avenue. See Table 7.

## 4.2 ASH AVENUE

The 2015 Build and Scalable Project streetcar alignment on Ash Avenue between Rio Salado Parkway and University Drive would run southbound in a semi-exclusive lane adjacent to the curb with shared operations with right turns into driveways and intersections. Based on the track and lane configuration design, all 19 existing parking spaces would be displaced on the west side of Ash Avenue and 3 parking spaces would be eliminated on the east side. See Table 7.

## 4.3 PARKING REPLACEMENT OPPORTUNITIES

There is a minor loss of 7 on-street parking spaces on Mill Avenue for which no replacement is provided. The loss of 22 parking spaces on Ash Avenue could not be replaced by creating additional on-street parking in the vicinity; however there is a substantial amount of off-street parking available nearby.

**TABLE 7: DOWNTOWN TEMPE ON-STREET PARKING INVENTORY AND IMPACTS WITH 2015 BUILD ALTERNATIVE INCLUDING SCALABLE PROJECT**

| STREET SEGMENT | MILL AVENUE EAST SIDE* | | MILL AVENUE WEST SIDE* | | ASH AVENUE EAST SIDE | | ASH AVENUE WEST SIDE | |
|---|---|---|---|---|---|---|---|---|
| | Existing Parking/ No-Build | 2015 Build | Existing Parking/ No-Build | 2015 Build | Existing Parking/ No-Build | 2015 Build | Existing Parking/ No-Build | 2015 Build |
| Rio Salado/ 3rd Street | 11 | 2 | 17 | 17 | 7 | 7 | 3 | 0 |
| 3rd Street/ 4th Street | 4 | 6 | 5 | 7 | 9 | 6 | 16 | 0 |
| 4th Street/ 5th Street | 5 | 6 | 5 | 6 | | | | |
| 5th Street/ 6th Street | 5 | 4 | 5 | 4 | 0 | 0 | 0 | 0 |
| 6th Street/ 7th Street | 5 | 5 | 5 | 5 | | | | |
| 7th Street/ University | 3 | 3 | 0 | 3 | | | | |
| **Total Parking** | **33** | **26** | **37** | **37** | **16** | **13** | **19** | **0** |

*Source: Tempe South Alternatives Analysis – Parking Inventory, July 30, 2010*
**There is no existing on-street parking on Mill Avenue south of University Drive*

Visual observations indicate that the parking stalls along Ash Avenue, which are metered/short-term parking, are not utilized during most times of the day (non-event days) and that most vehicles parking in this area are more likely to use the free off-street surface parking for the businesses they would be attending such as Macayos and

the Bash on Ash restaurants or are using the covered pay parking garage south of 5th Avenue rather than use the on-street parking along Ash Avenue.

### 4.4 OFF-STREET PARKING IMPACTS

The need for a surface park-and-ride facility near the southern terminus of the Tempe Streetcar route has been considered. It has been determined that there is insufficient demand for a park-and-ride facility to accommodate daily streetcar operations during the regular work week. However, there may be a temporary need for parking to accommodate some special events that occur in downtown Tempe as the City of Tempe and Arizona State University (ASU) host special events throughout the year such as the Insight Block Party, Festival of the Arts, and P.F. Chang's Rock-and-Roll Marathon. The commercial/retail uses near the intersection of Southern Avenue/Mill Avenue currently have large parking lots that appear to be under-utilized. An option may be to lease parking from one or more of these lots during selected special events to accommodate autos so that drivers can take the streetcar to attend a special event. The need to accommodate parking for these infrequent uses would be investigated during final design.

## 5.0 IMPACTS TO ON-STREET LOADING ZONES

### 5.1 MILL AVENUE

#### 5.1.1 2015 No-Build Alternative

There are no anticipated loading zone impacts for the 2015 No-Build Alternative.

#### 5.1.2 2015 Build Alternative including Scalable Project

Four on-street loading zones on the east side of Mill Avenue currently exist and are located in four block segments between: 3rd Street and 4th Street; 4th Street and 5th Street; 5th Street and 6th Street; and 6th Street and 7th Street. Based on the location of streetcar stops and bicycle lane transitions, 2 loading zones would be displaced.

On the west side of Mill Avenue, there are no impacts to the 3 on-street loading zones.

There are no existing on-street loading zones along Mill Avenue south of University Drive.

### 5.2 ASH AVENUE

There are no existing or planned on-street loading zones on either side of Ash Avenue between Rio Salado Parkway and University Drive.

### 5.3 LOADING ZONE REPLACEMENT OPPORTUNITIES

For the displaced loading zones along Mill Avenue, it is possible to replace an on-street parking space with a loading zone. For the Build Alternative, including Scalable Project, one of the remaining 26 parking spaces on the east side of Mill Avenue could be converted to a loading zone. There is also opportunity to create loading zones behind some of the buildings that front Mill Avenue. This will require further evaluation in future design phases and coordination with the City of Tempe and business owners.

## 6.0 IMPACTS ON TRANSIT

Valley Metro bus routes and Flash/Orbit circulator service would interline with the streetcar on Mill Avenue, and they would share many of the stops. Distinctions between the No-Build and the 2015 Build Alternative are as follows:

### 6.1 2015 NO-BUILD ALTERNATIVE

The No-Build transit network assumes local bus and circulator bus routes that are consistent with the MAG 2015 Network – derived from the constrained MAG Regional Transportation Plan. The No-Build Alternative assumes the existing CP/EV light rail line. The planned Central Mesa LRT Extension on Main Street in Mesa is not included. Table 8 summarizes the transit service assumptions.

**TABLE 8: NO-BUILD ALTERNATIVE TRANSIT SERVCE**

| Transit Service | Peak Headway | Off – Peak Headway |
|---|---|---|
| **LRT** | | |
| Central Phoenix/East Valley | 10 | 20 |
| **LOCAL BUS** | | |
| Route 62 | 15 | 30 |
| Route 65 | 30 | 30 |
| Route 66 | 30 | 30 |
| **CIRCULATOR** | | |
| Orbit Jupiter | 15 | 15 |

*Source: Tempe Streetcar Definition of Alternatives Summary – February 25, 2011*

### 6.2 2015 BUILD ALTERNATIVE INCLUDING SCALABLE PROJECT

The 2015 Build Alternative transit network assumes no route modifications to the existing local and circulator bus routes. The 2015 Build Alternative assumes the existing CP/EV light rail line. The planned Central Mesa LRT Extension on Main Street in Mesa is not included. Table 9 summarizes the 2015 Build transit service assumptions, with

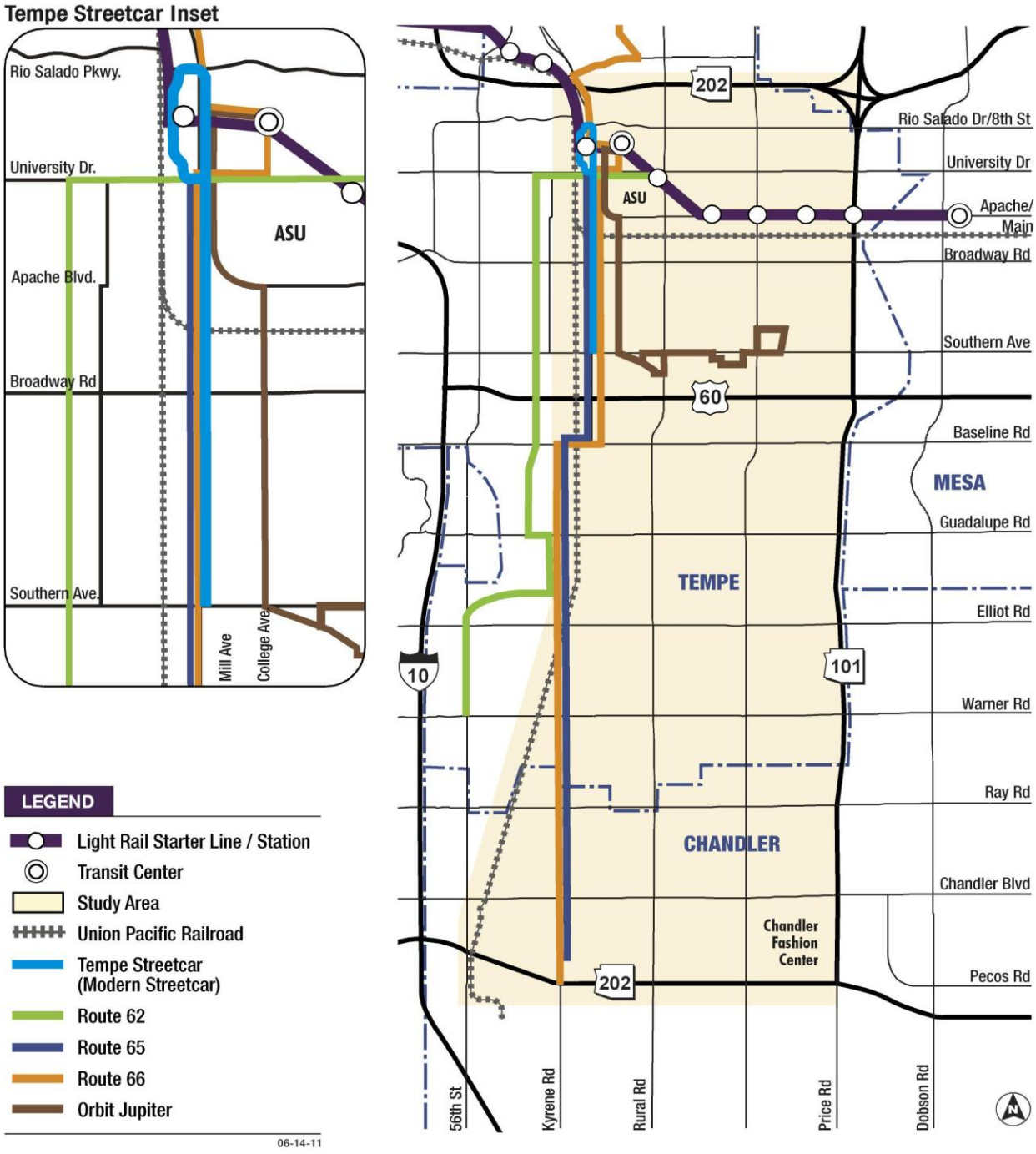
the addition of the Tempe Streetcar for both the full length 2015 Build Alternative and its shorter Scalable Project. Figure 2 displays the planned transit services.

**TABLE 9: 2015 BUILD ALTERNATIVE TRANSIT SERVICE INCLUDING SCALABLE PROJECT**

| Transit Service | Peak Headway | Off – Peak Headway |
|---|---|---|
| **LRT** | | |
| Central Phoenix/East Valley | 10 | 20 |
| **STREETCAR** | | |
| Tempe Streetcar | 10 | 10 |
| **LOCAL BUS** | | |
| Route 62 | 15 | 30 |
| Route 65 | 30 | 30 |
| Route 66 | 30 | 30 |
| **CIRCULATOR** | | |
| Orbit Jupiter | 15 | 15 |

*Source: Tempe Streetcar Definition of Alternatives Summary – February 25, 2011*

## FIGURE 2: 2015 BUILD ALTERNATIVE TRANSIT: LRT, STREETCAR, BUS AND CIRCULATOR




*Source: Tempe Streetcar Definition of Alternatives Summary – February 25, 2011 (Revised Transit Map 6/18/2011*

# 7.0 IMPACTS ON PEDESTRIAN AND BICYCLE FACILITIES

## 7.1 PEDESTRIAN FACILITIES

There are continuous pedestrian facilities (sidewalks and crosswalks) along each side of all arterials in the entire study area. These facilities appear to be of adequate design and code compliance; although as part of this study there has not been an inventory of sidewalk width, curb ramp compliance with Americans with Disability Act (ADA) standards, or a sidewalk capacity analysis.

All of the existing pedestrian facilities will be preserved and maintained in the 2015 No-Build condition.

For the 2015 Build Alternative including the Scalable Project, relocation of the existing sidewalks around the curbside streetcar stops may be required, and crosswalks and curb ramps may need to be replaced. The design of new pedestrian facilities will be based on the Tempe Streetcar Urban Design Guidelines. These guidelines are currently being developed especially for this project and will be consistent with the City of Tempe and ADA standards. The streetcar stop design and pedestrian connectivity are an important component of these new guidelines.

## 7.2 BICYCLE FACILITIES

In general, there are continuous, striped bicycle lanes all along the Tempe Streetcar alignment on Mill Avenue, Rio Salado Parkway, and Ash Avenue. There is a segment along Mill Avenue, between University Drive and 12$^{th}$ Street, in the southbound direction that is not striped, but cyclists use the 3$^{rd}$ southbound travel lane.

All of the existing bicycle facilities would be maintained in the 2015 No-Build condition.

For the 2015 Build Alternative, as well as the Scalable Project, the continuous striped bicycle facilities will be maintained, with some reconfiguration. The segment along Mill Avenue, between University Drive and 12$^{th}$ Street would be striped as an exclusive southbound bicycle lane. This can be accommodated because the 3$^{rd}$ southbound travel lane would be reduced to 2 travel lanes plus a bicycle lane to accommodate the Tempe Streetcar.

Along the Tempe Streetcar corridor on Mill Avenue, the northbound bicycle lane would be located to the right of the streetcar trackway and next to the sidewalk for the Build Alternative including the Scalable Project. Where on-street parking is maintained, the bicycle lane would be located between the trackway and parking spaces. At streetcar stops, the bicycle lane would be located between the stop and the sidewalk. See Chapter 2 of the EA for typical cross sections.

Along Ash Avenue, the southbound bicycle lane would be located to the left of the streetcar trackway, adjacent to the travel lane.

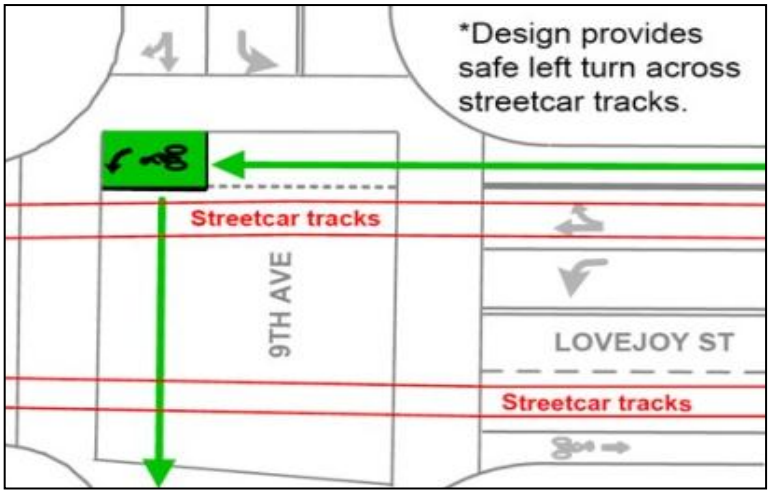
Other bicycle lane design options studied for Mill Avenue included bicycle lanes on the left side of trackway and bicycle lanes between on-street parking and sidewalk. For the bicycle lane on the left side of the trackway, due to the number of bicycle and trackway crossings on Mill Avenue, it was determined that there would be too many potential conflicts with track flanges and bicycle tires getting caught, thus this option was dropped. A bicycle lane design that offers a buffer from moving traffic by placing the bicycle lanes between on-street parking and sidewalk, referred to as a "cycle track", is an option that could be further evaluated during Final Design.

Safe bicycle turns across the trackway at intersections should be performed at angles greater than 60 degrees. Figure 3 shows a typical "Bike Box" that gives a bicyclist greater visibility and allows a bicyclist to safely make a left turn or to get through an intersection ahead of cars. For bicycle lanes that run parallel to the trackway, a "Left Turn Bike Box" design (shown in Figure 4) is proposed to facilitate a bicyclists' safe maneuver across the tracks. These turns are typically referred to "Copenhagen left turns" and are becoming the standard design across the country. These proposed designs will be further studied and designed in the next phase.

**FIGURE 3: TYPICAL BIKE BOX**


*Source:*
*Seattle Department of Transportation*

**FIGURE 4: LEFT TURN BIKE BOX**




*Source: City of Portland*

It is advisable to encourage slower bike speeds through the design of the bicycle lane where it transitions between the streetcar stop and the curb. Since Mill Avenue in downtown Tempe is a very active urban setting with large volumes of pedestrians and streetcar riders crossing the bicycle lane to the sidewalks, design elements should be used to slow bicycle speeds (10 - 15 mph) such as reduced taper lengths as the bicycle lane transitions behind the streetcar stop, and adequate signage and pavement markings.

# 8.0 IMPACTS ON FREIGHT ROUTES

## 8.1 FREIGHT RAILROAD FACILITIES

Union Pacific Railroad (UPRR) owns the rail corridor and operates freight hauling trains on the corridors in the Phoenix Subdivision as shown in the Arizona State Rail Plan, March 2011, published by the Arizona Department of Transportation.

According to the Tempe Comprehensive Transportation Plan (2008) – UPRR operates about 8 trains per day on their main line running along Ash Avenue and then over Mill Avenue.

## 8.2 FREIGHT RAILROAD IMPACTS

Both the 2015 No-Build and Build alternatives including Scalable Project will have no impacts on the movement of freight on the UPRR. However, freight rail operations may occasionally indirectly impact streetcar operations. Where the railroad intersects east/west streets with at-grade crossings, delays caused by freight trains to the movement of westbound traffic and southbound streetcar, could potentially create a back-up across Ash Avenue, especially at 5th Street, where the freight railroad is about 30 feet west of Ash Avenue. There may be times when right turning vehicles at 5th Street are stopped on the streetcar tracks waiting for a freight train to pass. Currently there are illuminated "Train Activity" signs to inform turning traffic from Ash Avenue to westbound on 5th Street. Additional signage at this intersection to instruct drivers to avoid stopping on the streetcar tracks may be helpful to avoid blocking the southbound streetcar on Ash Avenue.

# 9.0 IMPACTS ON TRUCK ROUTES

## 9.1 TRUCK ROUTES IN TEMPE

There are no designated arterial truck routes within the City of Tempe. However, the arterial system, typified within the Tempe streetcar study area by Mill Avenue, Southern Avenue, Broadway Avenue, Apache Boulevard, University Drive, and Rio Salado Parkway accommodates truck traffic related to commercial freight hauling to, from, through and within Tempe.

## 9.2 TRUCK ROUTE IMPACTS

For the 2015 No-Build Alternative, no impacts are anticipated to existing truck routes along the project corridor.

For the 2015 Build Alternative, trucking on Mill Avenue may be impacted by the operation of the streetcar. With the streetcar operating in the through lane, there would be minor delays when streetcars stop at stations. In general, since the streetcar would

operate in traffic as a large vehicle or transit bus, there should be minimal additional travel delays in the northbound travel direction within the downtown area.

Truck deliveries to businesses along Mill Avenue north of University Drive would be impacted due to the loss of some of the on-street loading zones. As mentioned in Section 5.3, there would be loading zone replacement opportunities either by converting parking spaces to loading zones along Mill Avenue or creating loading zones behind some of the existing businesses/buildings. This will be further evaluated in Final Design.

# 10.0 TRAFFIC ANALYSIS RESULTS

Based on the traffic operations analysis performed above utilizing the assumptions and approach stated, and the assessments on transit, parking, loading zones, pedestrian and bicycle facilities, the following summary of results can be concluded:

- Traffic operations in the 2015 Build Alternative, including Scalable Project, would be operating at acceptable Levels of Service ;
- The 2015 Build Alternative, including Scalable Project, would allow for adequate bicycle lane design, safety and continuity;
- Further traffic operational studies should be performed during Final Design on the Locally Preferred Alternative with advanced modeling software that simulates Streetcar and LRT operations with the proposed signal phasing schemes;
- The pedestrian signal proposed on Mill Avenue between University Drive and 9th Street requires further study during Final Design and approval by the City of Tempe for installation

# 11.0 TRANSPORTATION IMPACTS FOR SCALABLE PROJECT

This section of the report provides specific information of the potential impacts of the 1.3-mile Scalable Project on the transportation system and compares those impacts with those anticipated as a result of the full 2.6-mile 2015 Build Alternative. Refer to Chapter 2 of the Tempe Streetcar EA for a full description of the Scalable Project.

## 11.1 DIFFERENCES BETWEEN SCALABLE PROJECT AND 2015 BUILD ALTERNATIVE

The differences between the full-length 2015 Build Alternative and the Scalable Project track configurations, signalization and phasing, and stop locations south of 11th Street and in the vicinity of Tempe St. Luke's Hospital that could affect traffic elements include:

1. The Scalable Project southbound track configuration would transition from the 11th Street stop located in the left turn pocket to the inside through lane instead of

transitioning to the through curb lane. Both Scalable Project and 2015 Build Alternative will require a special streetcar transit traffic signal phase as the streetcar continues south.

2. For Scalable Project, a new signalized intersection would be required at Hudson Lane; a new pedestrian signal would be required on Mill Avenue between 13th Street and Hudson lane; and transit signal phasing changes and transit detection for transit signal phases would be as described above in section 3.2.6 and below in item 6 and 7.
3. The Build Alternative streetcar stops would be located south of the driveway to St. Luke's Hospital – the stops would include two side platforms operating within the traffic lanes.
4. The Scalable Project's end-of-line (EOL) streetcar stop would be located between 13th Street and Hudson Lane – the stop would include one center dual entry platform with streetcar operating in semi-exclusive guideway (not in traffic), thus there will be less traffic delay compared to the Build Alternative that has in-lane streetcar stops.
5. The Build Alternative would not require special transit signal phasing at this location, but would require a new traffic signal at the St. Luke's Hospital Drive, mainly to allow pedestrians to cross Mill Avenue safely to streetcar stop.
6. The Scalable Project would not require a signal at the St. Luke's Hospital Drive but would require two new pedestrian crossings on Mill Avenue for access to the center platform stop - one at Hudson Lane and one midblock between Hudson Lane and 13th Street. The design would include measures to enhance pedestrian safety through use of elements such as: pedestrian signals, hawks, or flashers; variable message sign; or a high visibility crosswalk that includes prominent signage. The specific measures would be determined during project development. It should be noted that the City of Tempe has some concern about this mid-block pedestrian crossing indicating that there are too many closely spaced signals. This would need to be further analyzed and approved by the City of Tempe.
7. The Scalable Project would require transit signal phasing on Mill Avenue at 13th Street for a shared northbound streetcar/left turn lane operation. When the streetcar proceeds north from the streetcar stop in the semi-exclusive guideway median into a shared left turn lane, it would transmit a signal to the 13th Street signal to extend an exclusive left-turn phase and place all other movements "red". All left-turning vehicles would clear the lane and the streetcar would proceed through the intersection and into the inside through travel lane. The traffic signal would resume normal operations upon clearance of streetcar through the intersection.
8. The intersection of 14th Street/Mill Avenue would require left-turn restrictions for the southbound to eastbound movement to 14th Street due to the removal of the left-turn

lane/introduction of streetcar stop in the median. Although motorists who now access eastbound 14th Street from southbound Mill Avenue would need to divert to other nearby cross streets such as 13th Street, Apache Boulevard, or College Drive to access 14th Street, the diversion would not substantially increase the amount of travel distance or travel time. On an average, approximately 1,100 feet of travel distance would be added for vehicular access to 14th Street. This is estimated to equate to approximately 15 to 30 seconds of travel time. Since the diversion route would no longer require vehicles to wait to make the southbound turn left onto 14th Street, this additional delay would be less. The left-turn restriction would reduce traffic into this residential area which could be considered a benefit. Based on experience with the LRT Starter Line, restricted access to residential streets for a one-mile stretch along Central Avenue north of Downtown Phoenix benefited the Willow District neighborhood by making the streets safer and more livable with fewer vehicles entering the neighborhood.

9. The Scalable Project would be less likely to adversely affect emergency vehicles entering the Tempe St. Luke's Hospital driveway as the streetcar tracks and stop would be located further from the hospital driveway entrance.

10. A Synchro analysis was performed for Scalable Project using the methods described in Section 3. Based on the analysis, the differences in LOS between the Scalable Project and the 2015 Build Alternative are shown in Table 10. As shown in Table 10, there are no substantial differences in intersection level of service or delay between the Scalable Project and the 2015 Build Alternative.

**TABLE 10: COMPARISON OF INTERSECTION LEVEL OF SERVICE FOR SCALABLE PROJECT AND 2015 BUILD ALTERNATIVE**

| Intersection* | | Build Alternative | | Scalable Project | |
|---|---|---|---|---|---|
| | | LOS | Delay sec/veh | LOS | Delay sec/veh |
| Mill Avenue | 13th Street | LOS B | 14 seconds | LOS C | 21 seconds |
| | Pedestrian Signal (between Hudson Lane and 13th Street) | No signal | No signal | LOS A | 4 seconds |
| | Hudson Lane** | No signal | No signal | LOS A | 2 seconds |
| | St. Luke's Hospital Drive | LOS A | 7 seconds | No signal | No signal |
| | Broadway Road | LOS E | 67 seconds | LOS D | 52 seconds |

*Source: HDR- HCM Signalized Intersection Capacity Analysis- February 2012*

** LOS for intersections north of those listed in this table are the same for both Scalable Project and 2015 Build Alternative, as shown in Table 6*

*** Scalable Project ends north of Hudson Lane*

### 11.2 DIFFERENCES FOR PARKING AND LOADING ZONES

There is no on-street parking or loading zones located in this area. Therefore, like the full-length 2015 Build Alternative, the Scalable Project would have no impact in this area on either on-street parking or loading zones. In downtown Tempe, the Scalable Project would have the same effects as the 2015 Build Alternative on parking on Mill Avenue and Ash Avenue as discussed in Section 4.

### 11.3 DIFFERENCES FOR PEDESTRIANS AND BICYCLES

Bicycle lanes would be included for either the Scalable Project or the full-length Build Alternative. The pedestrian facilities under either scenario would be designed in conformance with the Tempe Streetcar Urban Design Guidelines, and the streetcar stop designs and pedestrian/bicycle connectivity and safety are an important component of these new guidelines. The guidelines will conform to City of Tempe and ADA standards.

### 11.4 DIFFERENCES IN FREIGHT AND TRUCK ROUTES

There are no truck routes in this area. The UPRR is grade-separated where it crosses Mill Avenue south of Tempe St. Luke's Hospital. Therefore, neither the Scalable Project nor the full-length Build Alternative would have any effect on freight railroads or truck routes.

## 12.0 IMPACTS ANTICIPATED DURING CONSTRUCTION - MAINTENANCE OF TRAFFIC

The construction of the Tempe Streetcar project will include a number of elements including utility relocation, roadway improvements, and track and streetcar stop construction. These construction elements will impact and create disruptions to auto, bus, pedestrian and bicycle operations. These construction elements are temporary and once completed, traffic control will be restored to normal conditions.

This section of the report discusses traffic control and maintenance of traffic concepts during construction. The discussion applies to both the Build Alternative and the Scalable Project.

In general, maintenance of traffic (auto, bus, pedestrian and bicycle) facilities, will require a traffic control plan to be developed during preliminary and final design and will be developed in accordance with City of Tempe and Federal guidelines to minimize impacts to traffic and maintain access to residences, businesses, community facilities and services and local streets. The traffic control plan will include measures to:

- Maintain a minimum of one traffic lane in each direction on Mill Avenue, Rio Salado Parkway, Ash Avenue, and University Drive and on intersecting streets where construction activities are required. There may be short duration

(weekend) full closures for construction of trackwork at intersections. Evaluation of such full closures versus longer construction in stages at each intersection would be evaluated during Final Design.

- Temporary closure of sidewalks and crosswalks are possible during construction. Detours will be established and signage will be provided to safely guide pedestrians along detour routes until the sidewalks and crosswalks are restored per ADA accessibility guidelines.
- Temporary closure of bicycle lanes may be required. Detours will be established to safely guide bicyclists on the detour route. Proper wayfinding signs and pavement markings will be used to guide bicyclists through detours along temporary routes.

# APPENDIX A

Tempe Streetcar-Existing Transportation Conditions Report, April, 2011

# Tempe Streetcar
# Existing Transportation Conditions Report

Grijalva Engineering

/HDR

4/22/2011

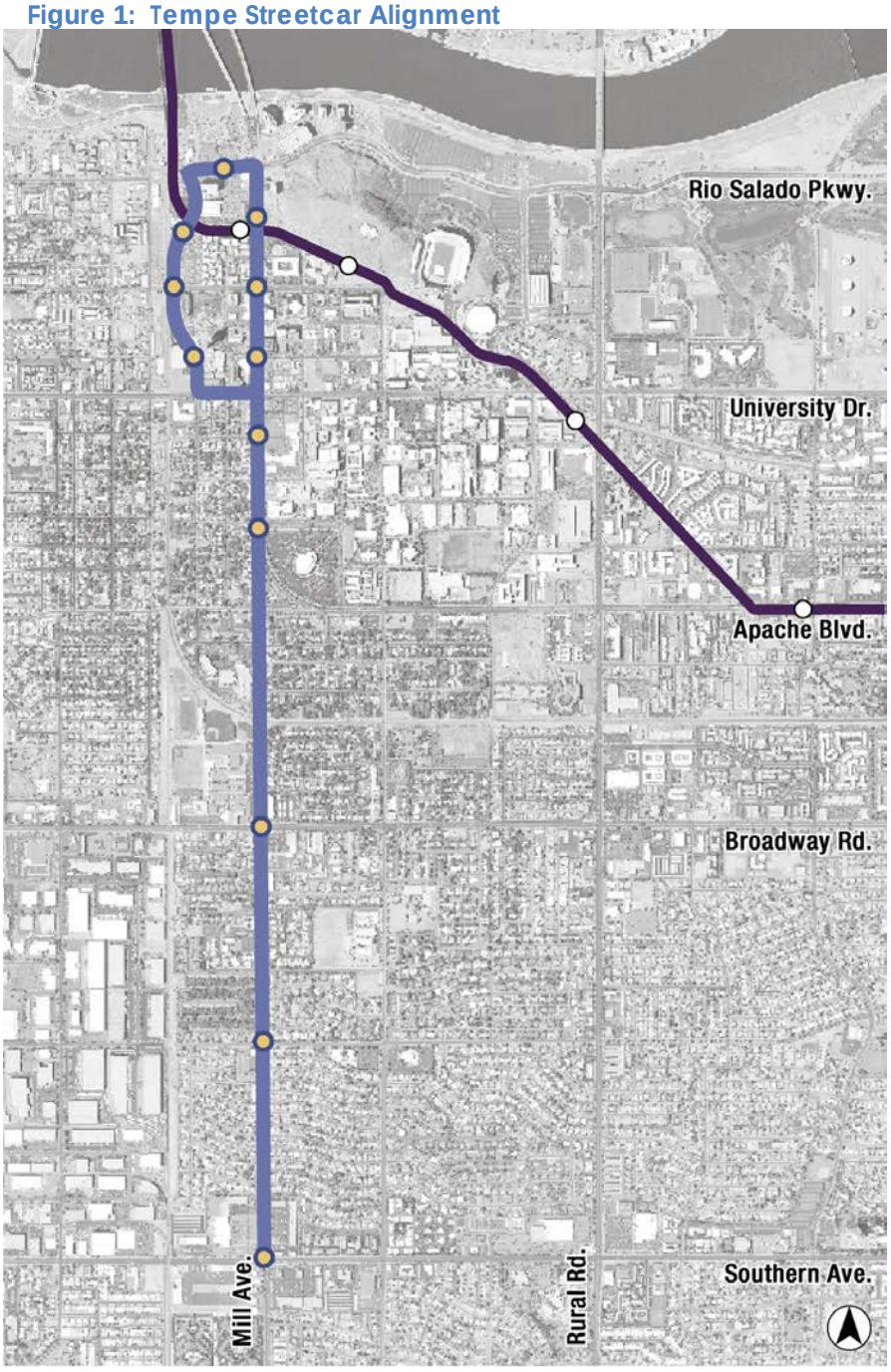
# Tempe Streetcar Study – Revised Existing Transportation Conditions Report

## Contents

## 1. Locally Preferred Alternative

As shown in Figure 1, the Tempe streetcar would operate along Mill Avenue, University Drive, and Ash Avenue from Southern Avenue to Rio Salado Parkway. Between University Drive and Rio Salado Parkway, a one-way loop on Mill Avenue (northbound) and Ash Avenue (southbound) is recommended.

**Figure 1: Tempe Streetcar Alignment**



## 2. Tempe Streetcar Study Area - Existing Conditions

In documenting the existing roadway conditions of the Tempe Streetcar study area, the existing adopted plans for roadway corridors are considered and described together with the physical conditions. Roadways in the study area simultaneously provide mobility for private motor vehicles, public transit, commercial vehicles, bicycles and pedestrians, and the documentation of the existing conditions and future plans for each of these users will inform decision-making relative to the alignment, station location and design, of the Tempe streetcar. Information in this section has been obtained from adopted policy documents, on-line resources, field investigations and satellite and "streetview" images.

## 3. Tempe Comprehensive Transportation Plan

The *Tempe Comprehensive Transportation Plan*, March 2008, describes the purpose, goals and objectives for the Tempe transportation system to 2030, and the street classifications and design considerations upon which transportation system improvements will be made.

### 3.1. Street Classification

The roadways upon which the planned streetcar will traverse – Mill Avenue, University Drive, Rio Salado Parkway, and Ash Avenue Street - are classified as arterials. These arterials are designed to carry large volumes of traffic, and also to accommodate transit, bicyclists and pedestrians. Further, the Tempe Comprehensive Transportation Plan categorizes Mill Avenue, University Drive and Rio Salado Parkway as "Transit Streets". Ash Avenue is categorized as a "Green Street". These street typologies are mapped in Figure 2 and described below with excerpts from the Tempe Comprehensive Transportation Plan. A strategy to encourage pedestrian and bicycle travel articulated in the Tempe General Plan 2030 is to implement improvements on designated Transit Streets and Green Streets to increase use by pedestrians, bicyclists and public transit.

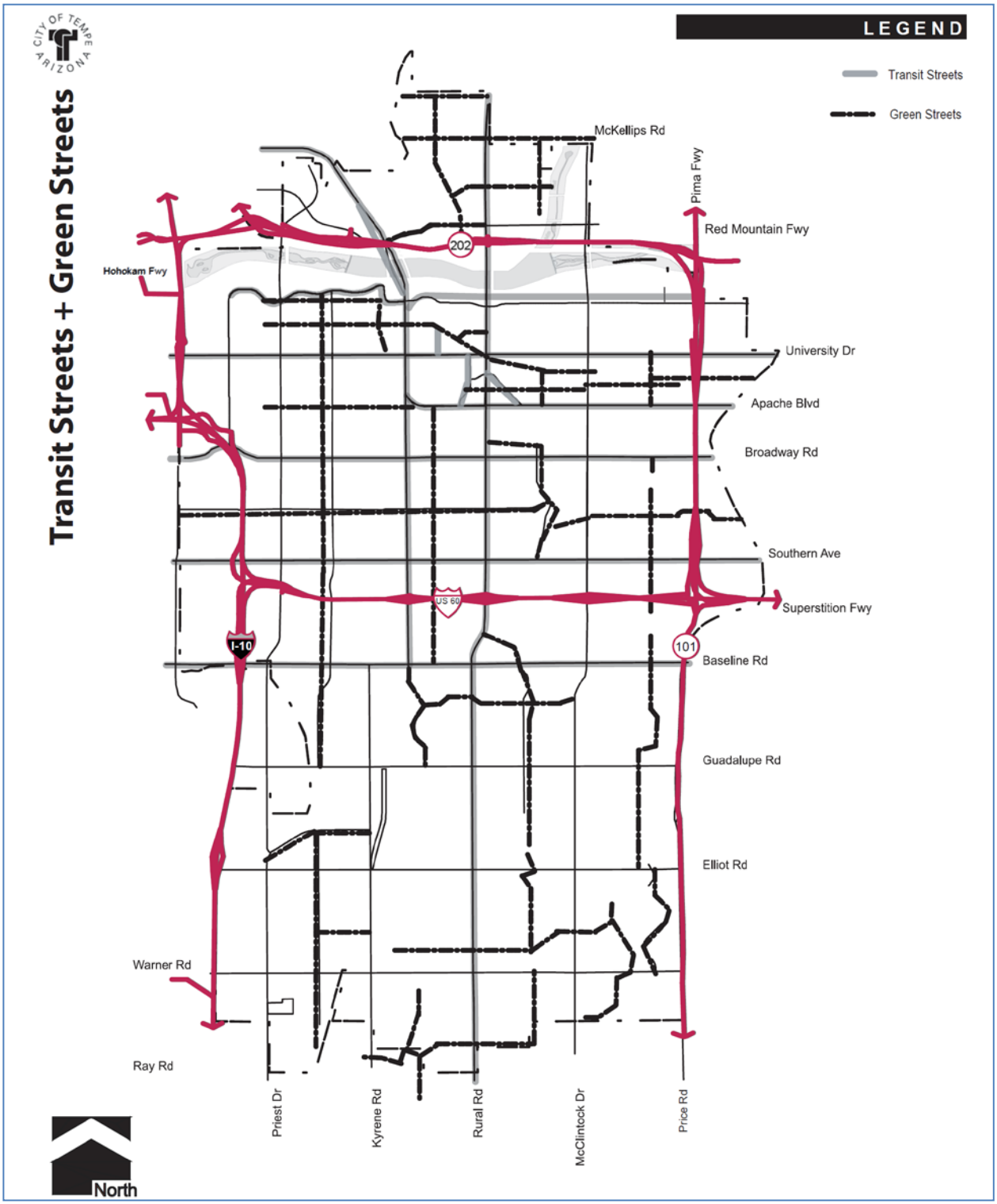
### 3.2. Green Streets

"Green streets" typically are high volume bicycle and pedestrian corridors. Green streets are priority routes for bicyclists and pedestrians and connect off-street multiuse paths. Green streets are particularly important in providing bicycle and pedestrian access to parks, shopping, schools, civic places, and other community destinations. Ash Avenue is categorized as a "Green Street". This street provides north-south connectivity between Rio Salado Parkway and the Tempe Town Lake park complex and high-rise and single family residential areas to the south.

**Typical Characteristics of Green Streets**

| | |
|---|---|
| • Wider sidewalks – generally 6' minimum, 8' desirable where space permits<br>• Sidewalk extends to the curb at intersections<br>• Bike lanes – 5' minimum<br>• Accessible intersections (curb ramps, signals, signs, etc.)<br>• Consideration of access to transit at intersections<br>• Shade and shelter (shade structures, trees etc.), particularly in the transit waiting area<br>• Pedestrian scale lighting<br>• Benches, low seat walls, or other seating and resting structures, particularly at transit area | • Traffic calming techniques<br>• Street trees and landscaping<br>• Mid-block crossings and related improvements where needed<br>• Medians for pedestrian refuge<br>• Curb extensions at intersections or midblock crossings<br>• Wayfinding signs<br>• Street furnishings<br>• Water amenities<br>• Integration of public art and creative expression in design<br>• On-street parking where feasible |

**Figure 2: Map of Tempe Transit Streets and Green Streets**



### 3.3. Transit Streets

Mill Avenue, University Drive, and Rio Salado Parkway are arterials that are designated Transit Streets in the Tempe Comprehensive Transportation Plan. Transit streets are street corridors that serve important functions as transit routes. Bus routes with 15-minute (or less) service frequency during the peak hour, and streets that share space with the light rail (and streetcar) corridors are examples. Transit streets accommodate transit and are typically improved to provide accessibility to transit by pedestrians and bicyclists.

Mill Avenue supports local and regional north-south transit service, with connections within downtown Tempe and the Arizona State University campus, and to adjacent neighborhoods. University Drive is an east-west arterial that accommodates significant transit service. Rio Salado Parkway currently provides no transit service, but has been selected as a segment of the Tempe streetcar route.

**Typical Characteristics of Transit Streets**

| | |
|---|---|
| •Wider sidewalks – generally 8 feet minimum, 10 feet to 14 feet preferred.<br>• Bike lanes 5 feet to 6 feet minimum<br>• Sidewalk extends to the curb at intersections and transit stops, creating an accessible area at least 10 feet to 14 feet wide.<br>• Accessible intersections (curb ramps, signals, signs, etc.)<br>• Mid-block crossings and related improvements where needed<br>• Curb extensions at intersections or mid-block crossings | • Shade and shelter (shade structures, trees etc.), particularly in the transit waiting area<br>• Pedestrian scale lighting<br>• Benches, low seat walls, or other seating and resting structures in transit waiting areas<br>• Wayfinding signs<br>• Street furnishings<br>• Water amenities<br>• Integration of public art and creative expression in design<br>• On-street parking where feasible<br>• Street trees and landscaping<br>• Medians for pedestrian refuge |

### 3.4. Great Streets

The American Planning Association (APA) named Mill Avenue one of 10 Great Streets for 2008 (http://www.planning.org/greatplaces/streets/2008/millavenue.htm). The section of Mill Avenue designated an APA Great Street is the seven block segment between Rio Salado Parkway and University Drive. APA cites two streetscape programs that made Mill Avenue a great street: a project in 1987 that widened brick sidewalks and added street trees and thematic lighting; and a 2004 project that reduced Mill Avenue from four lanes to two to calm traffic and accommodate bike lanes and on-street parking.

## 4. Existing Roadway Conditions

Table 1 documents the existing roadway conditions along the planned 2.6 mile Tempe streetcar corridor on Mill Avenue from Southern Avenue on the south to Rio Salado Parkway on the north through downtown Tempe and neighborhoods. Segments of Rio Salado Parkway, Ash Avenue, and University Drive comprise segments of the planned downtown Tempe one-way counter-clockwise streetcar route. Included in the documentation of existing conditions is the current travel lane configuration, intersection signalization, transit operations, on-street parking locations and pedestrian/bicycle facilities.

## Table 1. Existing Roadway Characteristics along the Planned Tempe Streetcar Alignment

| ROADWAY SEGMENT | TRAVEL LANES | SPEED LIMIT | INTERSECTIONS | | TRANSIT ROUTES | ON-STREET PARKING | BICYCLE | PEDESTRIAN |
|---|---|---|---|---|---|---|---|---|
| **Mill Avenue**<br>Southern Avenue to Apache Boulevard | Two lanes each direction<br>Center turn lane<br>***Note:***<br>***Grade-separated crossing:***<br>***Mill Avenue underpass at the UPRR crossing south of W. 15th Street*** | Southern to Broadway:<br>40 MPH<br><br>Broadway to Apache:<br>35 MPH | **Signalized**<br>Southern Avenue<br>Alameda Drive<br>Broadmor Drive<br>Broadway Road<br>13th Street<br><br>**Unsignalized**<br>Palmcroft Drive/<br>El Parquet Drive<br>Bonita Way<br>14th Street<br>W. Hudson Lane | **Unsignalized, cont.**<br>Geneva Drive<br>Fairmont Drive<br>Palmcroft Drive<br>Erie Drive<br>Del Rio Drive<br>Cairo Drive<br>Balboa Drive<br>Concorda Drive<br>Grandview Ave.<br>La Diosa Street<br>Hu Esta Drive/<br>Fiesta Drive | 65: Mill/Kyrene south of 5th Street<br>66: Mill/Kyrene south of Rio Salado Parkway | None | Striped shoulder each direction | Sidewalks both sides |
| **Mill Avenue**<br>Apache Boulevard to University Avenue | Three lanes southbound<br>One lane northbound<br>Raised median | Apache to University:<br>35 MPH | **Signalized**<br>Apache Boulevard<br>10th Street | **Unsignalized**<br>12th Street<br>Gammage Pkwy/<br>11th Street | 65: Mill/Kyrene south of 5th Street<br>66: Mill/Kyrene south of Rio Salado Parkway<br>ORBIT Venus: University to 10th St | None | Striped bicycle lane northbound only | Sidewalks both sides |
| **Mill Avenue**<br>University Drive to Rio Salado Parkway | One lane in each direction<br>Raised/landscaped median | University to Rio Salado:<br>30 MPH | **Signalized**<br>University Drive<br>7th Street<br>6th Street<br>5th Street<br>4th St (ped crossing)<br>3rd St. (LRT crossing)<br>Rio Salado Pkwy | **Unsignalized**<br>2nd Street | LRT Station on 3rd St west of Mill<br>66: Mill/Kyrene south of 5th St.<br>ORBIT Earth: Rio Salado to 5th St.<br>ORBIT Jupiter: 5th St. to 11th St.<br>ORBIT Mercury: University to 5th St.<br>FLASH Back/Forward: University to Gammage | West side only north of 2nd St.<br>Both sides north of 2nd Street | Striped bicycle lane each direction | Sidewalks both sides |
| **Ash Avenue**<br>University Drive to Rio Salado Parkway | One lane each direction<br>Center turn lane | University to Rio Salado:<br>30 MPH | **Signalized**<br>University Drive<br>Fire Station/pedestrian<br>5th Street<br>3rd Street (LRT crossing)<br>Rio Salado Parkway | | 48: 48th Street. Intersects Mill at 5th St.<br>62: Hardy. Intersects Mill and Ash at 5th St. | Both sides north of W. 5th Street | Striped bicycle lane each direction | Sidewalks both sides<br>Mid-block crossing at Fire Station #6 |
| **Southern Avenue**<br>Kyrene Road to Rural Road | Three lanes westbound<br>Two lanes eastbound<br>Center turn lane | Kyrene to Rural:<br>40 MPH | **Signalized**<br>Kyrene Road<br>Mill Avenue<br>College Avenue | **Unsignalized**<br>LaCorta Dr.<br>Ventura Dr.<br>McCallister Ave. | 61: Southern, between Superstition Springs and 39th Ave. | None | None | Sidewalks both sides |
| **University Drive**<br>Ash Avenue to Myrtle Avenue | Two lanes each direction<br>Center turn lane/short landscaped median west of Myrtle | Ash to Myrtle:<br>35 MPH | **Signalized**<br>Ash Avenue<br>Mill Avenue<br>Myrtle Avenue | **Unsignalized**<br>Maple Avenue | 30: University. Intersects Mill and Ash on University | None | Striped bicycle lane each direction | Sidewalks both sides |
| **Rio Salado Parkway**<br>Mill Ave to Ash Ave | Two lanes each direction<br>Raised median | Mill to Ash:<br>30 MPH | **Signalized**<br>Mill Avenue<br>Ash Avenue | **Unsignalized** | No transit service on this segment of Rio Salado Parkway | None | Striped bicycle lane each direction | Sidewalks both sides |

### 4.1. Curbside Uses: On-Street Parking, Load Zones, Bus Zones

Curbside uses of the public right of way contribute to the vitality and function of urban commercial streets. Table 2 identifies the curbside uses in downtown Tempe. On-street parking is a valuable asset for local residents and businesses with limited or no off-street parking. On-street parking in Tempe is metered and time-limited to encourage turnover and to discourage long-term parking. The presence of parked cars also serves to buffer pedestrians from moving traffic and enhances the pedestrian environment. According to the Downtown Tempe Community web site (http://www.millavenue.com) there are over 12,500 parking spaces within the Mill Avenue District, which lies between Tempe Town Lake on the north, University Drive on the south, Farmer Avenue on the west and College Avenue on the east. Over 500 of these parking spaces are found on-street.

Curbside load zones accommodate deliveries, and pick-up drop off activities out of the travel lanes. Tempe City Code *Chapter 19-1.b(4)* defines a curb loading zone as a space adjacent to a curb reserved for the exclusive use of vehicles loading or unloading passengers or materials. These too are valuable assets where off-street loading is not an option. Transit service also requires curbside space for passenger boardings and alightings. In downtown Tempe, each of these curbside uses is allocated space – metered parking is striped on the pavement, load zones are striped green on the curb and transit zones are striped red on the curb.

**Table 2. Curbside Uses Along Planned Streetcar Alignment Downtown Tempe**

| Road Segment | Mill Avenue East Side* | Mill Avenue West Side | Ash Avenue East Side | Ash Avenue West Side* |
|---|---|---|---|---|
| University/ 7th Street | Parking spaces: 3<br>Curb load zone: 0<br>Bus zone @ University | Parking Spaces: 0<br>Curb load zone: 0<br>Bus zone @ 7th St. | | |
| 6th Street/ 7th Street | Parking spaces: 5<br>Curb load zone: mid-block<br>Bus zone @ 7th St. | Parking spaces: 5<br>Curb load zone: mid-block<br>Bus zone @ 6th St. | Parking 0paces: 0<br>Curb load zone: 0<br>Bus zone: None | Parking Spaces: 0<br>Curb load zone: 0<br>Bus zone: None |
| 6th Street/ 5th Street | Parking spaces: 5<br>Curb load zone mid-block<br>Bus zone @ 6th St. | Parking spaces: 5<br>Curb load zone: mid-block<br>Bus zone @ 5th St. | | |
| 5th Street/ 4th Street | 5 Parking Spaces<br>Curb load zone: mid-block<br>Bus zone @ 5th St. | Parking spaces: 5<br>Curb load zone: mid-block<br>Bus zones: None | Parking spaces: 9<br>Curb load zone: 0<br>Bus zone @ 3rd St. | Parking spaces: 16<br>Curb load zone: 0<br>Bus zone: None |
| 4th Street/ 3rd Street | Parking spaces: 4<br>Curb load zone: south part<br>Bus zone @ 3rd St. | Parking spaces: 5<br>Curb load zone: 0<br>Bus zone @ 3rd St. | | |
| 3rd Street/ Rio Salado | 11 Parking Spaces<br>Curb load zone: 0<br>Bus zone @ Rio Salado | Parking spaces: 17<br>Curb load zone: 0<br>Bus zone @ Rio Salado | Parking Spaces: 7<br>Curb load zone: 0<br>Bus zone @ Rio Salado | Parking spaces: 3<br>Curb load zone: 0<br>Bus zone @ Rio Salado |
| **Total Parking** | **32** | **37** | **16** | **19** |

*Source: Google Maps satellite images and Streetview confirmed with field inventory*
** Proposed Streetcar alignment*

### 4.2.1. Driveways and Alleys

While arterial roadways provide vehicular access to the city and region, driveways and alleys provide access to residential and commercial properties. As described in this report, driveways and alleys provide vehicular access to one or more parcels and are at different grades than Mill Avenue - with a ramp from the grade of Mill Avenue to the grade of the driveway or alley. Driveways and alleys are distinct from local streets that also provide local access but are at the same grade as Mill Avenue.

**Table 3. Driveways and Alleys along Mill Avenue**

| Mill Avenue Segment | East side | West side |
|---|---|---|
| Southern - Alameda | 7 Driveways<br>5 Alleys<br>Commercial/Residential | 4 Driveways<br>7 Alleys<br>Commercial/Residential |
| Alameda - Broadmor | 0 | 0 |
| Broadmor - Broadway | 7<br>Commercial/Residential | 8<br>Walgreens/Residential |
| Broadway - 13th St | 3 Driveways<br>1 Alley<br>Residential | 2<br>Hospital |
| 13th St - 12th St | 0 | 5<br>Commercial/Residential |
| 12th St - 11th St | 0 | 1<br>Residence |
| 11th St - 10th St | 1<br>ASU Music/Fine Arts | 4<br>Commercial |
| 10th St - 9th St | 1<br>ASU Ceramics Center | 4<br>University Motel, Commercial |
| 9th St - University | 1<br>ASU Permit parking lot | 1<br>CVS Pharmacy |
| University - 7th St | 2<br>Jack in the Box, Chase Bank | 0 |
| 7th St - 6th St | 0 | 0 |
| 6th St - 5th St | 0 | 0 |
| 5th St - 4th St | 0 | 0 |
| 4th St - 3rd St | 0 | 0 |
| 3rd St - 2nd St | 0 | 0 |
| 2nd St - Rio Salado Parkway | 1<br>ASU gravel parking area | 0 |

*Source; Google Maps/Steetview*

**Table 4. Driveways along Ash Avenue**

| Ash Avenue Segment | East side | West side |
|---|---|---|
| 3rd St - Rio Salado Parkway | 1 | 3 |
| 5th St - 3rd St | 2 | 1 |
| University - 5th St | 6<br>4 Fire station bays | 3 |

*Source: Google Maps/Steetview*

### 4.3. Average Daily Traffic Volume

Table 5 provides the average weekday vehicle trips along the planned streetcar alignment on Mill Avenue, Ash Avenue, University Drive and Rio Salado Parkway. 2011 figures are derived from actual traffic counts conducted January 25, 26, 27 and February 8, 9, 10. Historical traffic data was obtained from the city of Tempe Traffic Counts map – with traffic counts available from locations with specific numbers assigned to allow for consistency in comparing data. Blank cells in Table 5 indicate that no data is available. As noted in section 3.4, Mill Avenue was reduced from 4 lanes to 2 lanes in 2004.

**Table 5. Average Weekday 24-Hour Traffic Volume***

| Traffic Count Location | 2000 - 2001 | 2001 - 2002 | 2002 - 2003 | 2003 - 2004 | 2004 - 2005 | 2005 - 2006 | 2006 - 2007 | 2007 - 2008 | 2008 - 2009 | 2009 - 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mill Ave s/o Broadway Rd | 30,645 | | 33,391 | | 30,455 | 30,805 | 30,625 | | | 25,849 | 26,912 |
| Mill Ave s/o Apache Blvd | 29,440 | | 28,240 | | 28,762 | | | 27,106 | | 25,257 | |
| Mill Ave s/o University Dr | 35,902 | | 35,097 | | 29,879 | | 32,610 | | | 28,184 | 26,392 |
| Mill Ave s/o 6th Street | | | | | | | | | | | 16,183 |
| Mill Ave s/o 5th Street | | | | | | | | | | | 16,713 |
| Mill Ave s/o Rio Salado | 20,328 | | 18,584 | | 14,981 | 18,431 | 14,512 | | | 14,225 | 14,670 |
| Ash Ave s/o Rio Salado | | | | | | | | | | | 7,492 |
| Southern w/o Mill Ave | | | | | | | | | | | 32,511 |
| Southern e/o Mill Ave | | | | | | | | | | | 26,670 |
| University Dr w/o Mill Ave | 33,070 | 31,431 | | 31,565 | | | 29,928 | | 27,003 | | 28,507 |
| University Dr e/o Mill Ave | | 31,768 | | 36,172 | | | | | 26,482 | | 22,483 |
| University Dr w/o Ash Ave | | | | | | | | | | | 25,737 |
| Rio Salado btw Mill and Ash | | | | | | | | | | | 9,012 |

*Source: 2011 24-hour traffic counts*

*Historical counts: City of Tempe Traffic Counts Map*

**Blank cells indicate that no data is available*

### 4.4. 2011 PM Peak Hour Traffic Counts

Table 6 provides the 2011 PM Peak approach volume for each leg of intersections along the planned streetcar route, and the turning movement counts. Selected AM Peak Hour traffic is noted in *Italics* in the table in the darker shaded rows in Table 6. Intersection numbers correspond to Figure 3 which shows turning movement count intersections and Figure 4 shows the turning movement counts at those intersections.

**Table 6. 2011 PM Peak Hour Traffic Counts and Turn Movements**

| Intersection | | | Approach Total | Eastbound (EB) | | | | Westbound (WB) | | | | Northbound (NB) | | | | Southbound (SB) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total | EBR | EBT | EBL | Total | WBR | WBT | WBL | Total | NBR | NBT | NBL | Total | SBR | SBT | SBL |
| Mill Avenue | #1 | Southern | 4997 | 1542 | 515 | 914 | 113 | 911 | 111 | 610 | 190 | 947 | 127 | 625 | 195 | 1597 | 152 | 1206 | 239 |
| | | ***AM** Southern* | *4391* | *964* | *199* | *572* | *193* | *1453* | *134* | *1232* | *87* | *1405* | *95* | *895* | *415* | *569* | *99* | *395* | *75* |
| | #2 | Huntington* | 2498 | 90 | 62 | 6 | 22 | 41 | 24 | 3 | 14 | 801 | 26 | 759 | 26 | 1556 | 50 | 1495 | 11 |
| | #3 | Alameda | 2646 | 58 | 22 | 16 | 20 | 48 | 17 | 4 | 27 | 849 | 32 | 797 | 20 | 1666 | 16 | 1586 | 84 |
| | | ***AM** Alameda* | *1887* | *25* | *14* | *3* | *8* | *69* | *35* | *0* | *34* | *1284* | *24* | *1252* | *8* | *509* | *6* | *491* | *12* |
| | #4 | Broadmor | 2522 | 10 | 3 | 0 | 7 | 18 | 12 | 1 | 5 | 780 | 17 | 755 | 8 | 1712 | 13 | 1652 | 47 |
| | #5 | Broadway | 5189 | 2044 | 438 | 1461 | 145 | 947 | 124 | 656 | 167 | 811 | 130 | 550 | 131 | 1341 | 119 | 1063 | 159 |
| | #6 | 13th Street | 2205 | 244 | 105 | 122 | 17 | 296 | 3 | 74 | 219 | 694 | 92 | 511 | 91 | 1006 | 20 | 978 | 8 |
| | #7 | Apache | 1717 | 0 | 0 | 0 | 0 | 533 | 0 | 533 | 0 | 531 | 78 | 0 | 453 | 543 | 0 | 543 | 0 |
| | #8 | 11th Street* | 2671 | 68 | 67 | 0 | 1 | 203 | 157 | 4 | 42 | 986 | 57 | 872 | 57 | 1499 | 8 | 1387 | 104 |
| | #9 | 10th Street | 2629 | 150 | 119 | 6 | 25 | 240 | 18 | 15 | 207 | 989 | 108 | 829 | 52 | 1250 | 28 | 1215 | 7 |
| | #10 | 9th Street* | 2135 | 93 | 7 | 4 | 82 | 74 | 50 | 0 | 24 | 815 | 24 | 771 | 20 | 1144 | 18 | 1103 | 23 |
| | #11 | University | 3454 | 1285 | 438 | 726 | 121 | 788 | 103 | 484 | 201 | 762 | 179 | 281 | 302 | 676 | 37 | 535 | 104 |
| | #12 | 7th Street | 1913 | 83 | 64 | 10 | 9 | 159 | 67 | 3 | 89 | 513 | 48 | 424 | 41 | 602 | 20 | 539 | 43 |
| | #13 | 6th Street | 1360 | 88 | 54 | 23 | 11 | 66 | 39 | 4 | 23 | 545 | 21 | 482 | 42 | 611 | 26 | 538 | 47 |
| | #14 | 5th Street | 1597 | 334 | 110 | 165 | 59 | 264 | 90 | 112 | 62 | 523 | 66 | 402 | 55 | 495 | 35 | 401 | 59 |
| | #15 | 4th Street | 1104 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 595 | 0 | 586 | 9 | 489 | 16 | 473 | 0 |
| | #16 | 3rd Street | 1184 | 66 | 32 | 3 | 31 | 103 | 63 | 15 | 25 | 540 | 24 | 496 | 20 | 475 | 9 | 451 | 15 |
| | #17 | Rio Salado | 2357 | 672 | 43 | 509 | 120 | 563 | 141 | 269 | 153 | 567 | 195 | 339 | 33 | 555 | 99 | 327 | 129 |
| Ash Avenue | #18 | Rio Salado | 1298 | 7 | 1 | 6 | 0 | 391 | 193 | 2 | 196 | 494 | 284 | 209 | 1 | 406 | 1 | 93 | 312 |
| | #19 | 3rd Street | 762 | 3 | 2 | 0 | 1 | 43 | 14 | 1 | 28 | 393 | 26 | 360 | 7 | 323 | 15 | 300 | 8 |
| | #20 | 5th Street | 1046 | 206 | 27 | 140 | 39 | 200 | 46 | 101 | 53 | 320 | 58 | 242 | 20 | 320 | 96 | 163 | 61 |
| | #21 | Fire Station | 459 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 266 | 0 | 266 | 0 | 343 | 0 | 343 | 0 |
| | #22 | University | 2662 | 1165 | 84 | 962 | 119 | 831 | 88 | 700 | 43 | 103 | 32 | 9 | 62 | 563 | 252 | 1 | 310 |
| Myrtle Avenue | #23 | University | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |

*Source: Actual counts January/February, 2011*
** Currently unsignalized intersection*
***No data is available at this time*

***R** – Right turn*
***T** – Through traffic*
***L** – Left Turn*

**Figure 3. Turning Movement Counts: Intersection Locations (* unsignalized currently)**

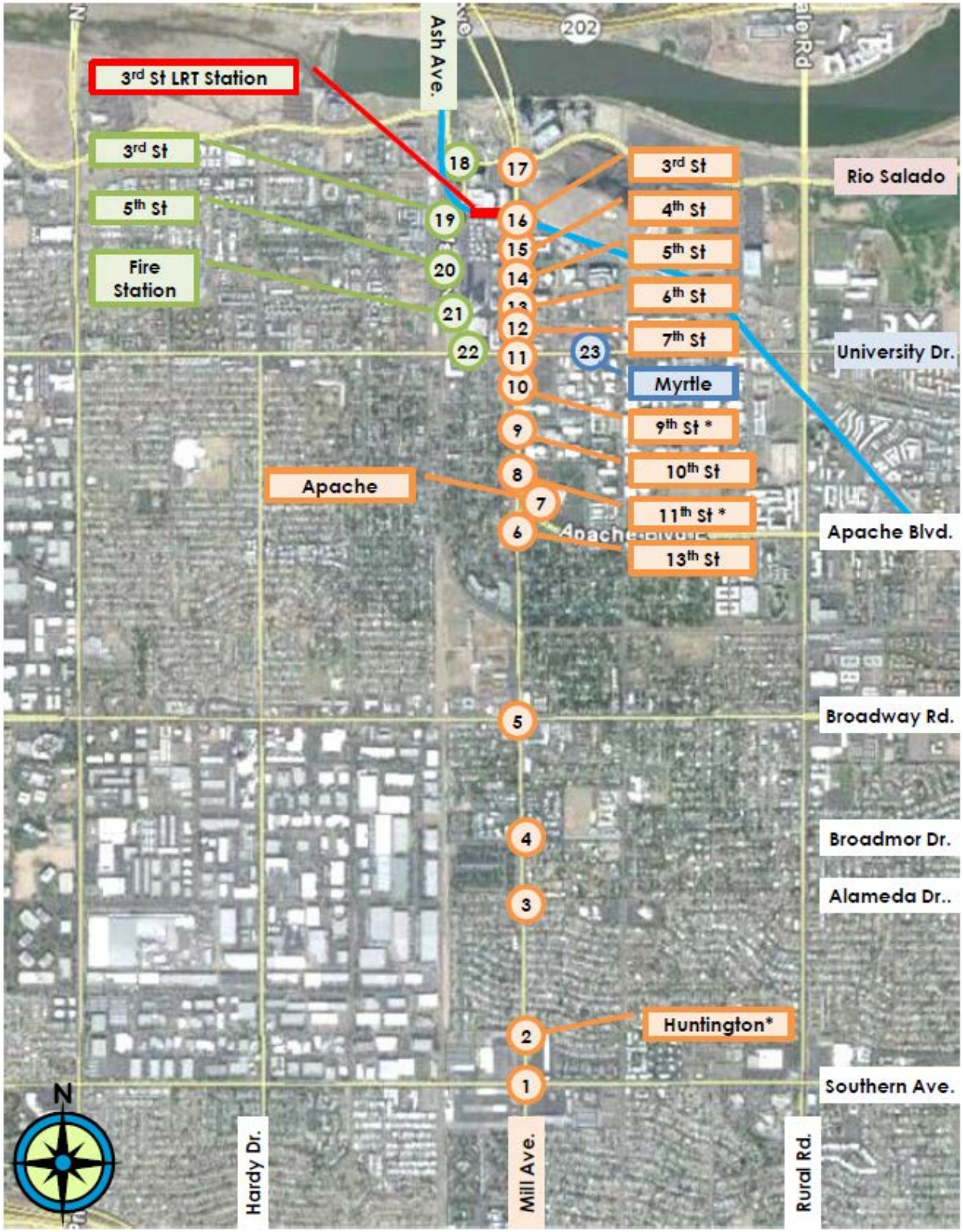


**Figure 4. PM Peak Turning Movement Counts and Intersection Level of Service (LOS)**

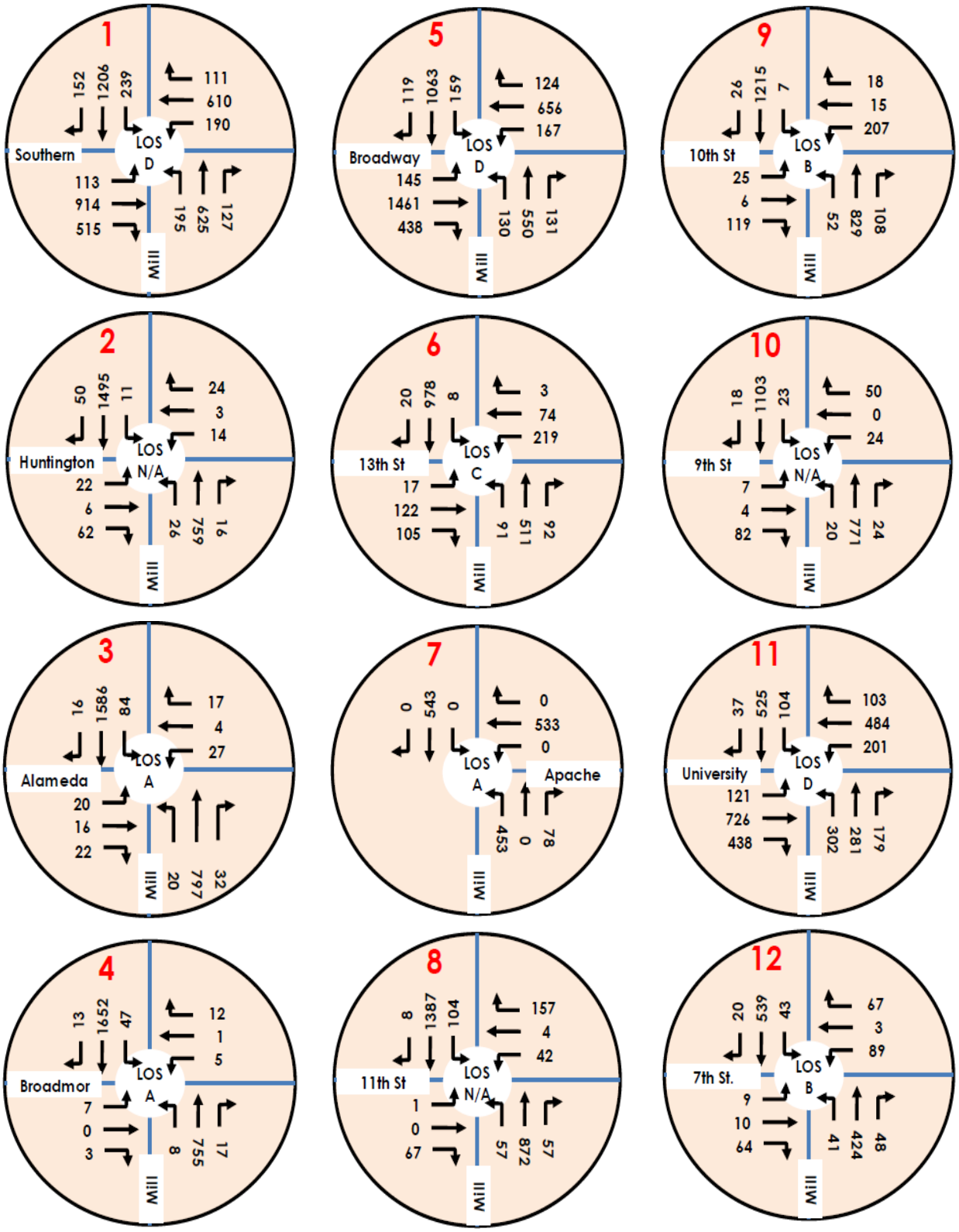
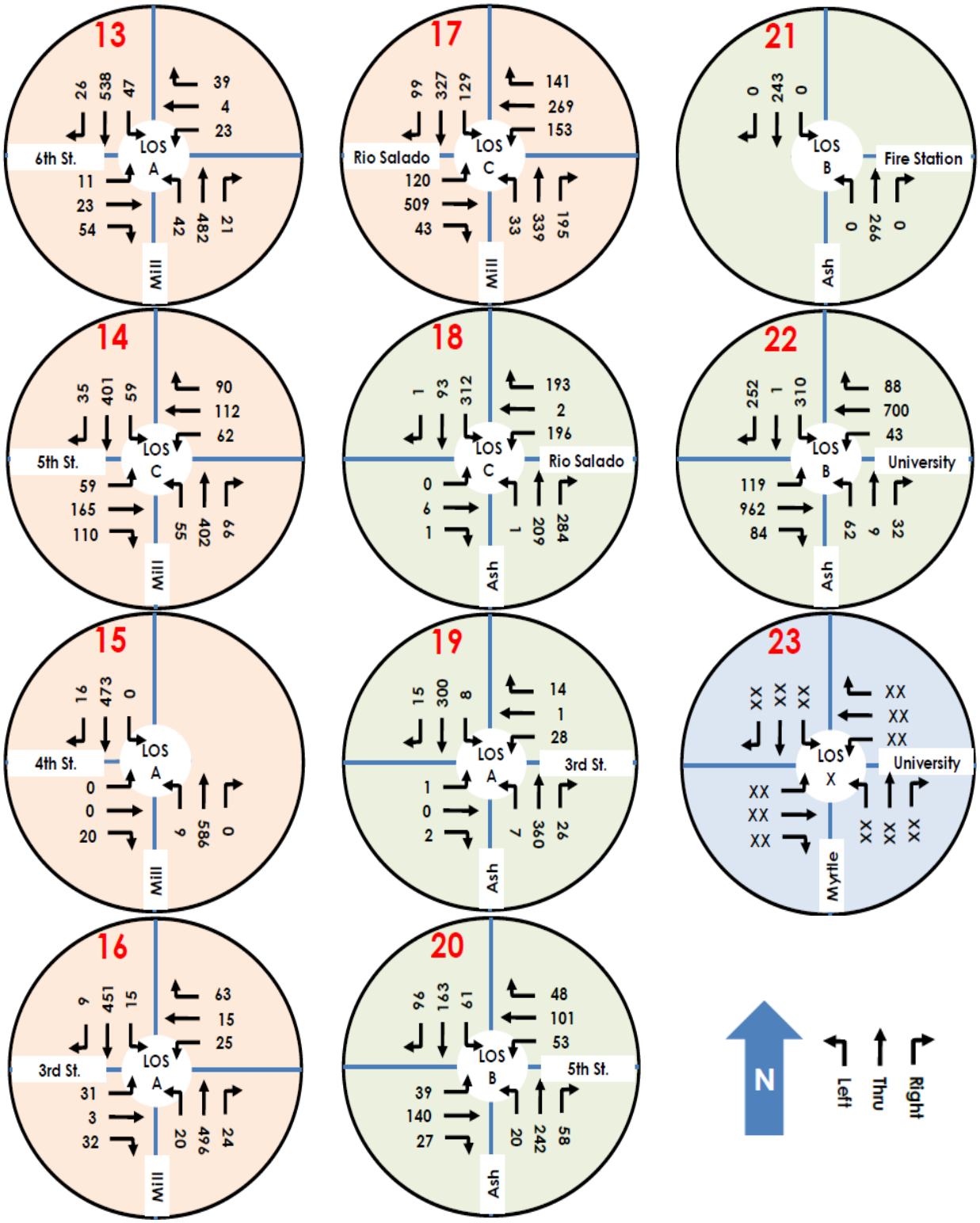


**Figure 4, continued. Turning Movement Counts and Intersection Level of Service (LOS)**



## 5. Transit

Transit service in the Tempe streetcar study area currently provides both local and regional connections, including bus and light rail modes.

### 5.1 Bus

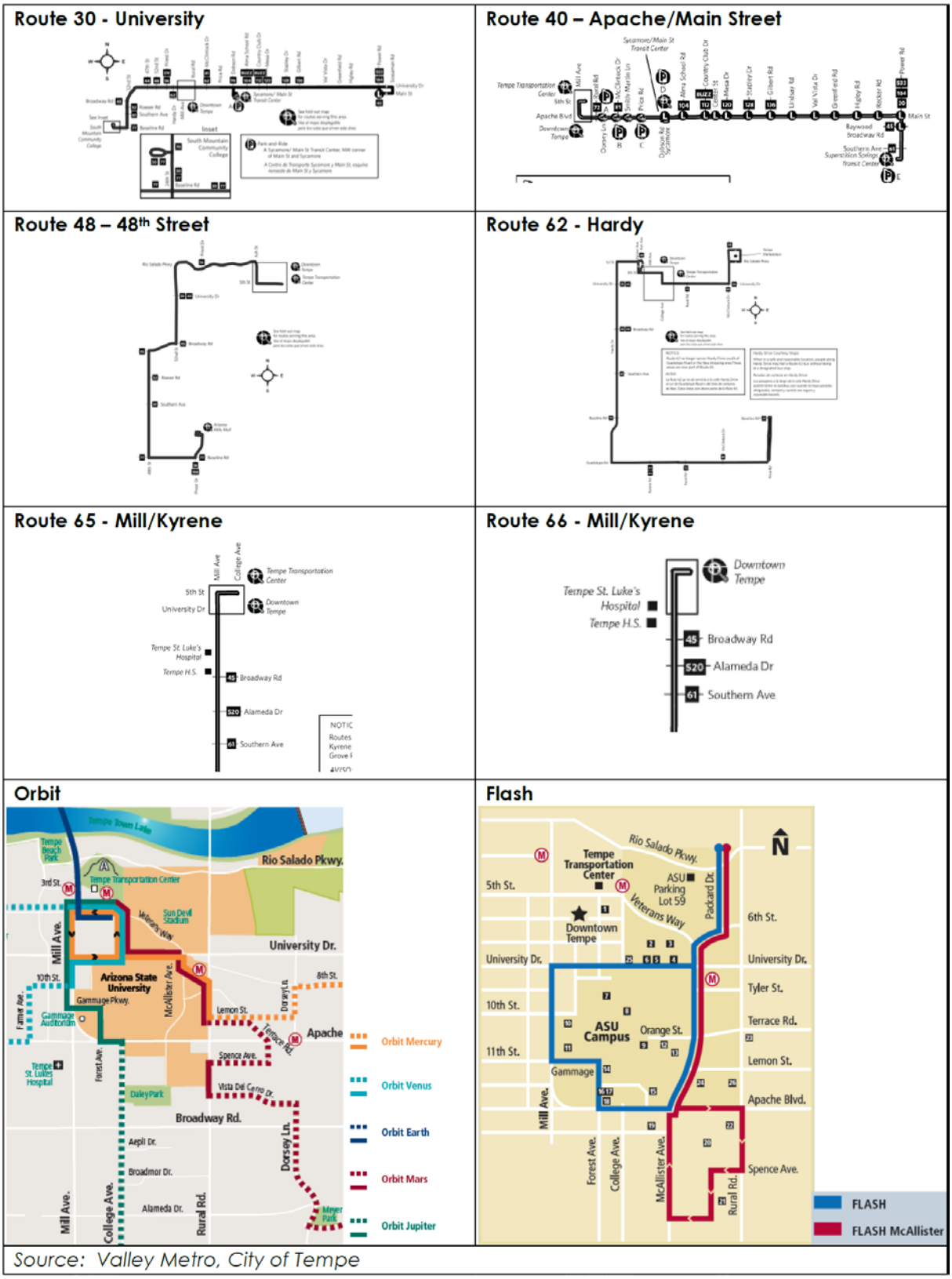
Valley Metro bus transit routes connect the downtown Tempe area with points throughout the region. Orbit and Flash circulator routes serve Downtown Tempe and the Arizona State University campus and provide connections to local destinations such as shopping areas, other neighborhoods, major bus routes, light rail, schools and community centers. Valley Metro bus routes, and Orbit and Flash routes are shown in Figure 5. Table 7 summarizes the existing bus transit service that operates on or near the planned Tempe streetcar alignment.

**Table 7. Downtown Tempe Area Bus Routes**

| Route | Corridor | Weekday Service Frequency | |
|---|---|---|---|
| Valley Metro Route-30 | University Drive | 30 minutes all day | |
| Valley Metro Route-40 | Apache Boulevard, Mill Avenue via 5th Street | 30 minutes all day | |
| Valley Metro Route-48 | Rio Salado Parkway, Ash Avenue via 5th Street | 15 minutes Peak<br>30 minutes off-Peak | |
| Valley Metro Route-62 | Farmers Avenue, Ash Avenue, 5th Street via University Drive | 15 minutes Peak<br>30 minutes off-Peak | |
| Valley Metro Route-65 | Mill Avenue from Rio Salado Parkway via Baseline Road | 30 minutes all day<br>60 minutes after 7 PM | |
| Valley Metro Route-66 | Mill Avenue (from McKellips Street) via Baseline Road | 30 minutes all day<br>60 minutes after 7 PM | |
| Flash Back/ Forward | Loop: Apache Boulevard, Mill Avenue, Rio Salado Parkway, Packard Drive and MacAllister Avenue. Interlined with Flash MacAllister | Forward | Back |
| | | 9 minutes all day | 10 minutes all day<br>15 minutes after 6 PM |
| Orbit Earth | Connects downtown Tempe with Tempe Marketplace through north Tempe neighborhoods | 15 minutes all day<br>30 minutes 9-11 PM | |
| Orbit Jupiter | Travels between downtown Tempe and McClintock High School (serving the Tempe Public Library) | 15 minutes | |
| Orbit Mercury | Travels between downtown Tempe and the Escalante Center | 10 minutes<br>15 minutes after 6 PM | |
| Orbit Venus | Circulates between downtown Tempe and Broadway Road/Beck Avenue | 15 minutes | |

*Source: Valley Metro Bus Schedules, Effective January 24, 2011*

## Figure 5. Downtown Tempe Area Transit Routes




Source: Valley Metro, City of Tempe

### 5.2.1. Light Rail

Valley Metro Rail provides light rail service between Phoenix and Mesa via Tempe. Downtown Tempe is served by a light rail station at Mill Avenue at 3rd Street, as shown in Figure 6. On weekdays, the current span of service at the Mill Avenue/3rd Street station is from about 4AM to Midnight with a frequency of service ranging from 10 minutes to 20 minutes, depending on the time of day

**Figure 6. Valley Metro Light Rail alignment and stations.**

## 6. Pedestrians and Bicyclists

Non-motorized transportation is a significant component of existing and planned mobility in downtown Tempe and nearby neighborhoods. Recent pedestrian and bicycle counts are documented in Table 8. Mill Avenue accommodates high volumes of both pedestrians and bicyclists, largely due to the adjacent and nearby land uses, and the provision of superior facilities for these users. Refer to Table 1 for documentation of on-street bicycle facilities.

**Table 8. Peak Hour (PM and select AM) Pedestrian and Bicycle Counts**

| Intersection** | | | Combined Count 3 – 6 PM | Peak Hour Starting: | Combined Peak Hour Count | Peak Hour Total | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Pedestrian | | | | Bicycle | | | |
| | | | | | | S leg | N leg | E leg | W leg | EB | WB | NB | SB |
| Mill Avenue | #1 | Southern | 488 | 3:30 | 189 | 48 | 22 | 18 | 49 | 10 | 16 | 12 | 14 |
| | | *Southern **AM*** | *172* | *7:45* | *96* | *26* | *15* | *19* | *17* | *7* | *6* | *5* | *1* |
| | #2 | Huntington* | 82 | 3:45 | 37 | 1 | 2 | 4 | 6 | 0 | 9 | 0 | 15 |
| | #3 | Alameda | 135 | 3:00 | 57 | 3 | 3 | 5 | 21 | 2 | 4 | 7 | 12 |
| | | *Alameda **AM*** | *63* | *8:00* | *41* | *1* | *0* | *3* | *13* | *7* | *5* | *12* | *0* |
| | #4 | Broadmor | 174 | 3:00 | 66 | 2 | 9 | 6 | 21 | 2 | 5 | 7 | 14 |
| | #5 | Broadway | 625 | 3:00 | 358 | 47 | 85 | 38 | 153 | 9 | 7 | 9 | 10 |
| | #6 | 13th St | 480 | 4:45 | 189 | 24 | 39 | 10 | 14 | 22 | 39 | 13 | 28 |
| | #7 | Apache | 155 | 4:30 | 72 | 14 | 0 | 36 | 0 | 0 | 17 | 5 | 0 |
| | #8 | 11th St* | 342 | 4:00 | 131 | 1 | 35 | 26 | 6 | 3 | 16 | 21 | 23 |
| | #9 | 10th St | 1227 | 4:00 | 488 | 129 | 83 | 37 | 33 | 47 | 125 | 20 | 14 |
| | #10 | 9th St* | 435 | 3:00 | 162 | 44 | 35 | 24 | 16 | 7 | 4 | 19 | 13 |
| | #11 | University | 1779 | 4:30 | 709 | 168 | 148 | 150 | 84 | 32 | 57 | 35 | 35 |
| | #12 | 7th St | 1357 | 4:00 | 512 | 44 | 87 | 167 | 140 | 2 | 8 | 34 | 30 |
| | #13 | 6th St | 2031 | 5:00 | 761 | 251 | 221 | 106 | 107 | 4 | 9 | 32 | 31 |
| | #14 | 5th St | 2568 | 5:00 | 1057 | 115 | 246 | 292 | 314 | 22 | 23 | 17 | 28 |
| | #15 | 4th St | 1790 | 5:00 | 662 | 52 | 104 | 218 | 224 | 4 | 1 | 29 | 36 |
| | #16 | 3rd St | 1036 | 5:00 | 388 | 106 | 119 | 29 | 65 | 4 | 6 | 24 | 35 |
| | #17 | Rio Salado | 363 | 5:00 | 156 | 4 | 18 | 36 | 51 | 0 | 8 | 12 | 27 |
| Ash Avenue | #18 | Rio Salado | 91 | 4:00 | 38 | 10 | 0 | 12 | 1 | 1 | 7 | 2 | 5 |
| | #19 | 3rd St | 145 | 4:45 | 60 | 10 | 10 | 29 | 4 | 0 | 4 | 2 | 1 |
| | #20 | 5th St | 550 | 4:15 | 221 | 47 | 63 | 17 | 12 | 26 | 7 | 21 | 7 |
| | #21 | Fire Station | 537 | 4:30 | 229 | 175 | 0 | 21 | 4 | 0 | 7 | 11 | 11 |
| | #22 | University | 647 | 3:30 | 229 | 16 | 28 | 26 | 56 | 44 | 34 | 14 | 11 |
| Myrtle | #23 | University | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** | *** |

*Source: Actual counts January 27, February 8, February 9, February 10, February 22, 2011*

** Unsignalized currently*

***Refer to Figure 3 for intersection locations*

**** Not available at this time*

## 7. Intersection Level of Service

Intersection level of service (LOS) is expressed as a letter representing the number of seconds a vehicle is delayed at an intersection. As shown in Table 9, LOS ranges from A (minimal delay) to F (congested conditions). Table 10 shows the existing LOS for the study area intersections.

**Table 9. Level of Service Descriptions**

| Capacity Criteria for Signalized Intersections | |
|---|---|
| **Level of Service (LOS)** | **Average Vehicle Delay (seconds per vehicle)** |
| A | Less than 10 |
| B | 10.1 – 20 |
| C | 20.1 – 35 |
| D | 35.1 – 55 |
| E | 55.1 – 80 |
| F | Over 80 |

*Source: 1997 Highway Capacity Manual*

**Table 10. 2011 Intersection Level of Service**

| **Intersection** | | | **PM Peak LOS** | **Delay (sec)** |
|---|---|---|---|---|
| **Mill Avenue** | **#1** | Southern Avenue | D | 45.4 |
| | **#2** | Huntington Square Driveway *(Unsignalized currently)* | - | - |
| | **#3** | Alameda Drive | A | 3.5 |
| | **#4** | Broadmor | A | 3.2 |
| | **#5** | Broadway Road | D | 53.4 |
| | **#6** | 13th Street | C | 20.9 |
| | **#7** | Apache Boulevard | A | 9.1 |
| | **#8** | 11th Street *(Unsignalized currently)* | - | - |
| | **#9** | 10th Street | B | 19.6 |
| | **#10** | 9th Street *(Unsignalized currently)* | - | - |
| | **#11** | University Drive | D | 36.0 |
| | **#12** | 7th Street | B | 13.2 |
| | **#13** | 6th Street | A | 7.4 |
| | **#14** | 5th Street | C | 26.5 |
| | **#15** | 4th Street | A | 2.9 |
| | **#16** | 3rd Street | A | 7.1 |
| | **#17** | Rio Salado Parkway | C | 30.6 |
| **Ash Avenue** | **#18** | Rio Salado Parkway | C | 24.7 |
| | **#19** | 3rd Street | A | 3.7 |
| | **#20** | 5th Street | B | 12.6 |
| | **#21** | Fire Station | B | 11.5 |
| | **#22** | University Drive | B | 17.2 |
| **Myrtle Ave** | **#23** | University Drive | N/A | N/A |

*Source: HDR March 2011*

# 8 Freight Routes

## 8.1 Freight Railroad Facilities

The Union Pacific Railroad (UPRR) owns the rail corridor and operates freight hauling trains on the corridors in the Phoenix Subdivision as shown in Figure 7 from the Arizona State Rail Plan, March 2011, published by the Arizona Department of Transportation.

The Phoenix Subdivision consists of approximately 125 miles of single track and connects the Sunset Route with Phoenix and points west of Phoenix to a junction near Arlington. This line was built in 1887, and was expanded in 1923-1926 from the West Valley to Wellington. The 9.5 mile Tempe Branch connects the Phoenix Subdivision with an industrial park in West Chandler – in Tempe this lead runs parallel to Mill Avenue and Kyrene Road. The 19.5 mile Chandler Industrial Lead runs parallel to Apache Boulevard before it turns south near Broadway Road at Center Street and terminates at Dock, formerly a railroad station and now the site of an industrial facility south of Chandler at about MP153 on Arizona SR 87.

Existing rail lines provide no passenger service to Tempe – passenger service ceased on the Phoenix Subdivision in June 1996. The nearest Amtrak passenger rail station is in Maricopa, approximately 30 miles to the south of Phoenix.

According to the Tempe Comprehensive Transportation Plan (2008) the UPRR operates about 8 trains per day on the main line (Phoenix Line) through Tempe, and one round-trip train per week on the Tempe Branch.

### 8.1.1 Phoenix Line

The Phoenix Line enters Tempe from the north across Tempe Town Lake just west of the Mill Avenue Bridge and extends south to W. 13th Street where it turns east and runs parallel to Apache Boulevard. The following streets cross the Phoenix Line in Tempe:

- Mill Avenue –Single-track, grade-separated crossing located approximately 250 feet south of East 15th Street. On southbound Mill Avenue, the clearance is 15-feet, 5-inches and the northbound clearance is 15-feet, 3-inches.
- West 5th Street – Double-track, at-grade crossing located approximately 30 feet west of Ash Avenue. The crossing is currently signalized and gated.
- University Drive – Single-track, at-grade crossing located approximately 300 feet west of Ash Avenue. The crossing is currently signalized and gated.
- West 9th Street – Single-track, at-grade crossing located approximately 1000 feet west of Mill Avenue. The crossing is currently signalized and gated.
- West 10th Street – Single-track, at-grade crossing located approximately 1000 feet west of Mill Avenue. The crossing is currently signalized and gated.
- West 13th Street – Double-track, at-grade crossing located approximately 1000 feet west of Mill Avenue. The crossing is currently signalized and gated. Tracks split south of W. 13th Street, one track continues south and one track turns east to cross over Mill Avenue.

### 8.1.2 Tempe Branch

The Tempe Branch splits from the Phoenix Line just south of W. 13th Street and extends south to Chandler running parallel to Mill Avenue and Kyrene Road. The following streets cross the Tempe Branch in Tempe:

- West Broadway Avenue – Single-track, at-grade crossing located approximately 1000 feet west of Mill Avenue. The crossing is currently signalized and gated.
- West Southern Avenue – Single-track, at-grade crossing located approximately 1100 feet west of Mill Avenue at Kyrene Road. The crossing is currently signalized and gated.

**Figure 7: UPRR Phoenix Subdivision – shown as red lines**


Source: *Arizona State Rail Plan, March 2011, Arizona Department of Transportation*

### 8.3 Truck Routes in Tempe

Regional truck routes on the freeway system are considered the backbone of regional trucking by the Maricopa Association of Governments (MAG Regional Freight Assessment, 2004). Freeway truck routes are supplemented by the regional and local arterial system which allows for truck access to local communities.

Arizona communities may designate truck routes to accommodate local and regional truck freight movement in a manner and location that is compatible with other local transportation and land use objectives. Tempe City Code Section 19-164 authorizes the city traffic engineer to determine and designate parts of streets or specific lanes as truck routes, with council approval, and when so designated all such trucks shall use routes to the closest point of the destination.

There are no specifically designated arterial truck routes within the city of Tempe. However, the arterial system, typified within the Tempe streetcar study area by Mill Avenue, Southern Avenue, Broadway Avenue, Apache Boulevard, University Drive, and Rio Salado Parkway accommodates truck traffic related to commercial freight hauling to, from, through and within Tempe.

# Tempe Streetcar

## Transportation Commission

January 6, 2015

# Agenda

- Streetcar Stop Locations (Direction)
- Streetcar Propulsion Systems (Direction)
- Streetcar Vehicle Size (Feedback)
- Project Cost Update
- Recommendations
- Next Steps

# Recap

- Nov. 13, 2014: Council IRS
- Nov. 18, 2014: Transportation Commission
- Dec. 1, 2014: Public Meeting
- Dec. 3, 2014: Transportation & Governance Committee of the Chamber of Commerce
- Jan. 6, 2015: Transportation Commission
- Jan. 7, 2015: Downtown Tempe Authority
- Jan. 8, 2015: Council IRS

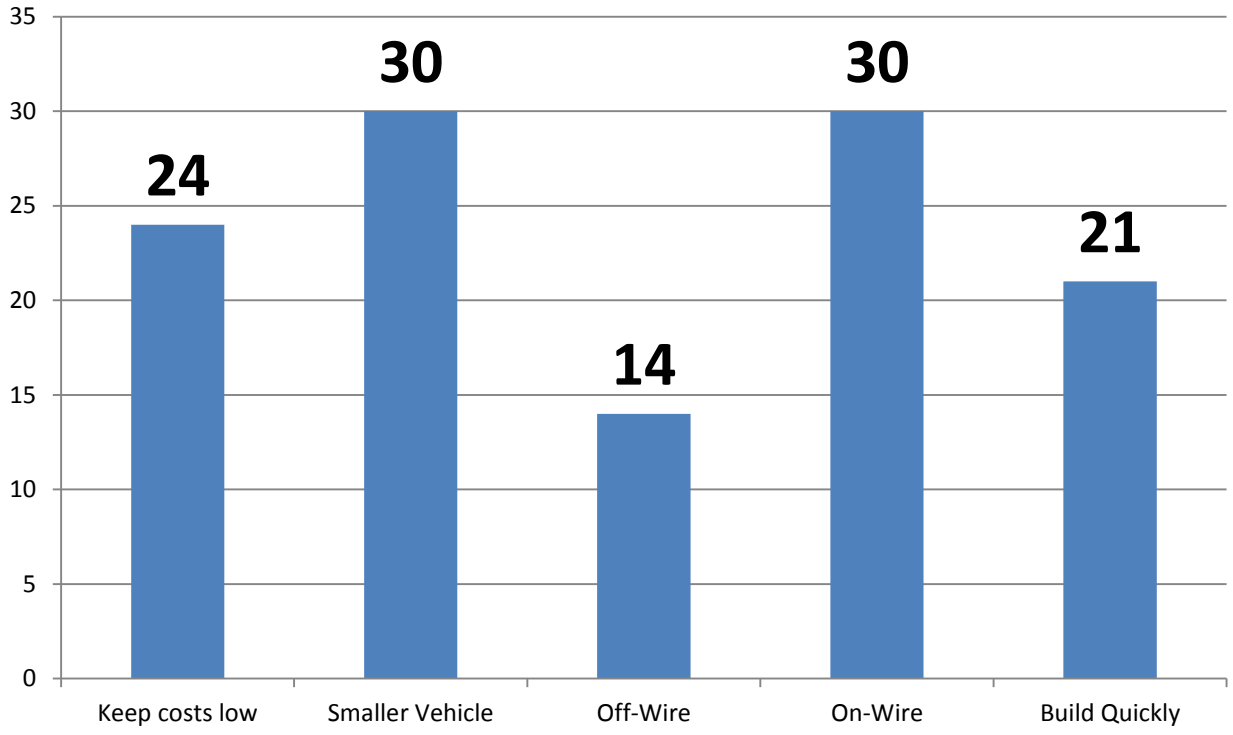
# Community Input Received

- As of Dec. 26, 2014: 61 surveys received
- 90+ residents attended community meeting
- Asked about:
  - Stop locations
  - Streetcar propulsion
  - Vehicle size
  - Project costs

# Survey Results

- Number of responses ranking first or second, out of 61 surveys received

- Extend streetcar to Tempe Marketplace
- McAllister stop moved to Paseo del Saber
- Consider stop for Tempe St. Luke's
- Build quickly



# Recommended Stop Locations

# Comparison: OBES and Wire Technology

| Propulsion System | Pros | Cons |
|---|---|---|
| **On-Board Energy Storage (OBES)** | No overhead wires on Mill Avenue | Not a proven technology in U.S. |
| | Reduced infrastructure cost (OCS) | Higher capital and operating costs |
| | | Sufficient power capacity given local conditions |
| | | Battery life unknown |
| | | Requires significant space for batteries |
| | | Charging stations may be required |
| **Wire Technology** | Proven technology | Overhead wires on Mill Avenue |
| | Lower capital and operating costs | Additional infrastructure cost (OCS) |
| | Flexibility in vehicle choice | |

# Estimated Additional Cost for Off-Wire

| Category | Capital | Operating/Maintenance |
|---|---|---|
| Vehicles (6)<br>• Includes batteries and pantograph | $3,650,000 | $4,520,000 |
| Overhead wire/poles | ($1,380,000) | ($146,000) |
| Maintenance facility | $50,000 | $2,750 |
| Energy | $0 | $132,000 |
| Subtotals | $2,320,000 | $4,508,750 |

**NET TOTAL ≈ $6,830,000**

**30-Year Life Cycle/2014 Dollars**

# Vehicle Propulsion Recommendation

- On-wire technology along entire alignment
  - Proven technology, cost efficient

Cantilever Arms


Span Wire

# Vehicle Sizes

## BUS

**Bus: Valley Metro (Orbit)**
**Length:** 24.5 ft
**Height:** 9.6 ft
**Width:** 8 ft
**Capacity:** 23

**Bus: Valley Metro**
**Length:** 40 ft
**Height:** 11.3 ft
**Width:** 8.5 ft
**Capacity:** 54

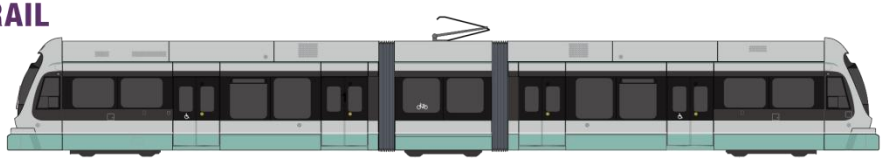
**Bus: Valley Metro LINK**
**Length:** 60 ft
**Height:** 11.1 ft
**Width:** 8.5 ft
**Capacity:** 83

## STREETCAR

**Streetcar: United Streetcar**
**City:** Tucson, Portland, DC, Seattle
**Length:** 66 ft
**Height:** 11 ft
**Width:** 8 ft
**Capacity:** 125

**Streetcar: CAF**
**City:** Cinncinati
**Length:** 78 ft
**Height:** 11 ft
**Width:** 8.7 ft
**Capacity:** 145

## LIGHT RAIL



**Light Rail: Kinkisharyo LRV**
**City:** Valley Metro
**Length:** 92 ft
**Height:** 12.2 ft
**Width:** 8.7 ft
**Capacity:** 190

## CAR

**Typical 4 Door Sedan**
**Length:** 16 ft
**Height:** 5 ft
**Width:** 6 ft

# Vehicle Size Criteria

- Vehicle Capacity
  - Daily service operations
  - Special event demand
- Influence on project design
  - Stop platform length
  - Streetscape scale and character
- Cost – compared to light rail vehicle
  - Spare vehicle requirements
  - Maintenance facility equipment needs

# 6th Street/Mill Avenue Simulation

- Single Wire Span – No Vehicle

# 6th Street/Mill Avenue Simulation

- 66-foot vehicle/single wire - cantilever

# 6th Street/Mill Avenue Simulation

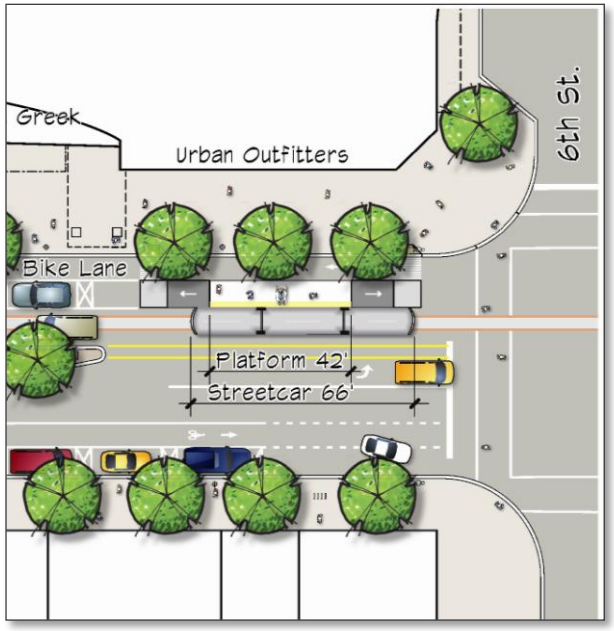
- 78-foot vehicle/single wire - span

# 6th Street/Mill Avenue Simulation

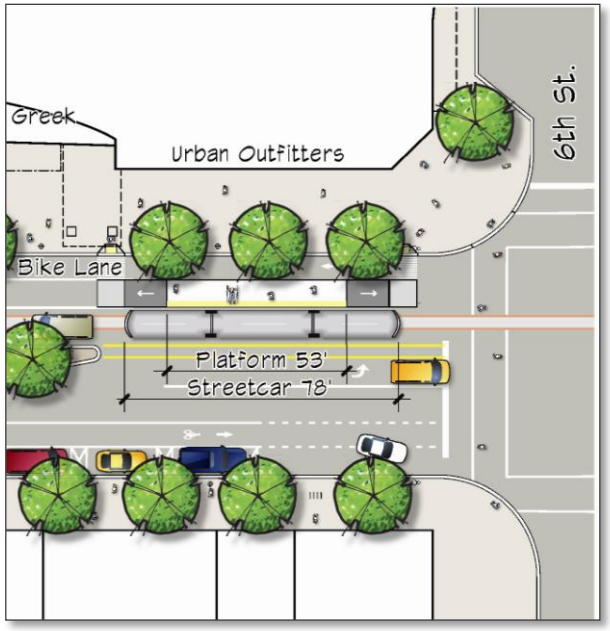
- 92-foot vehicle/single wire - cantilever

# 6th/Mill Street Stop Length

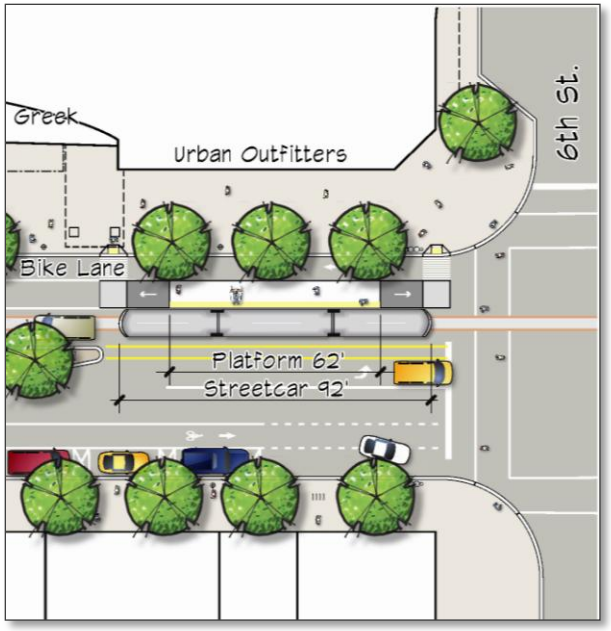
- 66 ft vehicle = 42 ft platform
- 78 ft vehicle = 53 ft platform
- 92 ft vehicle = 62 ft platform




**Existing** = 5 parking stalls
**Build** = 4 parking stalls




**Existing** = 5 parking stalls
**Build** = 3 parking stalls




**Existing** = 5 parking stalls
**Build** = 3 parking stalls

- Bus, streetcar stop sharing will be evaluated.

# Mill Avenue Streetcar Traffic Impacts

- Initial traffic analysis completed in 2011 assuming 2015 build conditions
- Analysis included Streetcar frequency operations at every 10 minutes
- All intersections on Mill between University and Rio Salado evaluated
- Findings: Streetcar does not degrade the current level of service

# Project Cost Update

- 177M Capital Costs
  - Assumes 6 on-wire unique vehicles (not LRT vehicle)
- Continuing to evaluate cost reduction options
  - Joint procurement opportunities with peer transit systems
  - Vehicle size and maintenance facility
  - Track alignment
- Independent review of project cost estimate
  - Evaluating risk

# Recommendations

- To support proposed streetcar stops
- To support use of on-wire propulsion
- To give initial feedback on a vehicle size

# Next Steps

- Awaiting Small Start Preliminary Justification rating from FTA (January)
- Street configuration (Spring)
- Finalize vehicle size recommendation (Spring)
- Environmental Assessment (August)
- Project financing (Ongoing)

# CITY OF TEMPE
# TRANSPORTATION COMMISSION

## Staff Report

**AGENDA ITEM 5**

**DATE**
January 6, 2015

**SUBJECT**
Bus Unification Update

**PURPOSE**

The purpose of this memo is to report the results of the first year of transit service provided by the Regional Public Transportation Authority (RPTA) through a transit service contract with First Transit Inc. In November 2012, the City Council approved the unification of Tempe and RPTA transit service operations. Known as the "Scout Program," unification is a step toward achieving the City Council's strategic goal of advancing a truly regional transportation system.

**BACKGROUND**

In 2011, a project team comprised of 20 RPTA and Tempe staff members evaluated the strengths, weaknesses, risks and risk mitigation strategies, as well as potential cost savings related to this initiative. The project team estimated $800,000 to $1,000,000 in potential annual contract cost savings to the region stemming from regional unification. Tempe's local contract cost savings were estimated in the range of $400,000 to $500,000 annually.

In January 2012, the City Council approved the effort to further examine the unification of Tempe and RPTA bus operations. As reported to Council in November 2012, the initiative revealed that benefits could be gained by combining the respective bus operations of Tempe and RPTA. In July 2013, the program was implemented to test the potential to reduce operating costs, improve operational and administrative efficiencies, improve service quality to the public and prevent cuts to productive Tempe bus service by strengthening the fiscal position of Tempe's transit fund and RPTA's 20-year Transit Lifecycle Program.

Anticipated financial outcomes of the unification Scout Program are:

1) Reduction of transit operating costs;
2) Preservation of productive Tempe bus service; and
3) Reduction of deficits to the Transit Fund and the regional Transit Lifecycle Program fund.

To determine the financial benefits of unification, the RPTA issued a Request for Proposals (RFP) requesting proposers submit three separate price proposals. Two proposals were to reflect the cost to operate RPTA and Tempe transit services separately from Valley Metro's East Valley Greenfield facility and from Tempe's East Valley Bus Operations and Maintenance facility (EVBOM). A third proposal was to offer a price reflecting a consolidated service operating from both facilities under a single service contract. Firms were directed to provide a proposal that reflected the proposer's price to operate service from both facilities in the most effective and efficient manner possible. This option allowed a proposer to reassign vehicles, staff and routes between the two facilities in the most efficient manner possible in order to provide the most advantageous service cost to the RPTA and Tempe.

Four firms submitted proposals resulting in the award of the contract to First Transit Inc. for unified services operated from the Mesa and Tempe facilities. The award was for an initial three-year period with an option for a seven-year extension. First Transit provided a fixed and firm proposal for the initial period with an optional term. No price increases could be requested during the initial term. The RPTA solicitation included the following language: "Milestone evaluation periods during the contract term will provide opportunities to address potential major marketplace changes that may affect the cost of operations. Prior to February 15th of the milestone years (i.e., 2016 and 2019), the contractor may request additional price increases for (a) performance based criteria (all successive contract periods), (b) capital-related programs, and (c) employee compensation and benefit schedules, to become effective July 1 of those same years." (RPTA RFP 1210018-S)

Below are contract operational efficiencies now in place as part of the Scout Program:

- *More Efficient Utilization of Facilities* – decrease in non-revenue miles due to reassignment of routes between the two operating facilities (non-revenue miles refer to travel when the bus is not actively in service).
- *Streamlined Contractor Management* – reduction in contractor staffing requirements through use of one contract management team to manage the two facilities instead of one for each facility.
- *Economies of Scale* – efficiencies gained in areas of service supervision, parts purchasing and inventory, operator and mechanic training and administrative functions.

In order to evaluate the general performance of transit service provided to Tempe, specific performance criteria and benchmarks were identified to gauge service quality. Table 1 includes the performance criteria to evaluate transit service and to help determine whether the unified approach should continue beyond Year 3 of the Scout Program.

**Table 1: Scout Program Performance Criteria**

| *Scout Program* Performance Criteria | Exceptional (A) | Above Benchmark (B) | Meets Benchmark (C) | Below Benchmark (D) | Unacceptable (F) |
|---|---|---|---|---|---|
| On-Time Performance (Reliability) | above 94.5+ | 93.8 - 94.4% | 93.0 - 93.7% | 92.0 - 92.9% | below 92.1% |
| Preventable Accidents per 100,000 miles (Safety) | below .50 | .51 - .90 | .91 - 1.40 | 1.41 - 1.90 | above 1.91 |
| Complaints per 100,000 Boardings (Customer Service/Reliability) | above 25.0 | 26.00 - 33.90 | 34.00 -40.90 | 41.00 -47.90 | above 48.00 |
| Mechanical Failures Per 100,000 Miles (Maintenance/Safety) | below 5.9 | 6.00 - 12.90 | 13.00 - 18.90 | 19.00 - 25.90 | above 26.00 |
| On-Time Preventive Inspections (Maintenance) | 91 - 100% | 81 - 90% | 80% | 79.9 - 70% | below 70% |

*Source: RPTA*

During the first few months of unification, First Transit experienced contractor-transition challenges such as management turn-over, timely maintenance performance and logistical and scheduling difficulties. In August 2013, the Scout Program also suffered a labor stoppage as a result of a strike by members of the Amalgamated Transit Union representing bus operators. The strike resulted in a four-day interruption of transit service primarily in Tempe and the East Valley. Since the strike, First Transit has worked to improve relationships with labor unions. The first year of service also included a major transition of service and fleet from RPTA's Mesa operations facility to EVBOM. Approximately 80 buses and more than 100 bus operators were transferred from the Mesa facility to the EVBOM facility. This transition was a fundamental change necessary to achieve the efficiencies of unification. The reassignment of buses between the respective operating facilities reduced the total non-revenue vehicle miles by 21 percent (475,000), which was a major premise in the price proposal submitted by First Transit.

During the first year of the Scout Program, Tempe staff worked with RTPA staff to identify and implement efficiency measures that became possible as a result of the unification of transit operations. Tempe staff maintains local control of the local bus system by assuring that transit service operated in Tempe is operated as efficiently as possible under the existing conditions. Tempe staff is also responsible for local planning and scheduling, evaluating service levels, system investment decisions and public relations/marketing.

**PERFORMANCE RESULTS**

As indicated in Table 1, the operational effectiveness of the Scout Program is evaluated by a series of performance indicators that reflect the ability to maintain the quality and reliability of transit service to which Tempe residents are accustomed. Table 2 displays First Transit's performance quantitatively for FY 13-14. With an acceptable performance benchmarked at "C." Table 3 shows a progressive improvement as measured by RPTA. Although the cumulative performance under the unification program is acceptable, progressive results indicate the challenges that were apparent during the transition period.

**Table 2: Scout Program Year 1 Performance Results**

| *Tempe Scout Program - Year One (FY13-14) Performance Results* | | |
|---|---|---|
| Contractor Performance Criteria | FY 2014 | Scout Program Grade |
| On-Time Performance | 93.1% | Meets Benchmark (C) |
| Preventable Accidents per 100,000 Miles | 0.42 | Exceptional (A-) |
| Complaints per 100,000 Boardings | 28.1 | Above Benchmark (B) |
| Mechanical Failures per 100,000 Miles | 5.1 | Exceptional (A-) |
| On-Time Preventive Maintenance Inspections | 92% | Exceptional (A-) |

*Source: RPTA*

**Table 3: Scout Program Year 1 Performance Results by Month**

| *Tempe Scout Program - Year One (FY13-14) Performance Results* | | | | | |
|---|---|---|---|---|---|
| | On-Time Performance | Preventable Accidents per 100,000 miles | Complaints per 100,000 Boardings | Mechanical Failures Per 100,000 Miles | On-Time Preventive Maintenance |
| | Grade | Grade | Grade | Grade | Grade |
| July | A | B | D | B | D |
| Aug. | C | B | D | C | F |
| Sept. | D | A | B | B | D |
| Oct. | D | B | A | A | A |
| Nov. | D | A | A | A | A |
| Dec. | C | A | A | A | A |
| Jan. | B | A | A | A | A |
| Feb. | D | A | A | A | A |
| Mar. | D | B | A | A | A |
| Apr. | C | A | B | A | A |
| May | B | A | B | A | A |
| June | A | B | C | A | A |
| Average | ***C*** | ***A-*** | ***B*** | ***A-*** | ***A-*** |

**RIDER SATISFACTION SURVEY RESULTS**

In September 2014, the City of Tempe commissioned WestGroup Research to complete a telephone survey of Tempe residents in an effort to gain insights into perceptions about public transit among both riders and non-riders. The report analyzed the data collected by the survey and, where appropriate, compared responses of the residents by meaningful demographic variables, as well as to data from previous studies. For the survey, the margin of error for this sample size is approximately ± 5 percent at a 95 percent level of confidence.

**Table 4: Overall Satisfaction with Transit System in Tempe**
(Among those with an opinion, both riders and non-riders who responded)
*Question: How satisfied are you with the quality of the transit system in Tempe?*

| Satisfaction | 2014 (n=376) | 2012 (n=355) | 2010 (n=377) | 2008 (n=333) |
|---|---|---|---|---|
| % Very/Somewhat satisfied | **72%** | **69%** | **66%** | **61%** |
| 5 – Very satisfied | 37% | 39% | 29% | 26% |
| 4 | 35% | 30% | 37% | 35% |
| 3 | 17% | 21% | 22% | 27% |
| 2 | 6% | 5% | 5% | 6% |
| 1 – Very dissatisfied | 5% | 5% | 6% | 6% |

Bus and Orbit riders were asked to rate their level of satisfaction with twelve different aspects of riding the bus. Riders rated the categories by using four-point nominal scales ("very satisfied," "somewhat satisfied," "not very satisfied," and "not at all satisfied.") Comfort on the bus and cleanliness on the bus received the highest proportion of "very satisfied" or "somewhat satisfied" ratings (92 percent and 91 percent, respectively). Attributes with the lowest satisfaction levels included bus service during major events (72 percent) and security at bus stops (65 percent). Satisfaction with ease of using the bus declined to 84 percent from 93 percent in 2012, while satisfaction levels for other attributes remained stable.

**Table 5: 2014 Satisfaction with Bus Service**
(Among bus and Orbit riders)
*Question: In general how satisfied are you with…*
*Indicates significant difference compared to 2012 at the 95 percent confidence level.

| Attribute | 2014 (n=109) | | | % Very/Somewhat satisfied | | | |
|---|---|---|---|---|---|---|---|
| | Very/ Somewhat Satisfied | Very Satisfied | Somewhat Satisfied | 2012 (n=141) | 2010 (n=203) | 2008 (n=166) | 2006 (n=119) |
| Comfort on the bus | 92% | 50% | 42% | 92% | 95% | 93% | 95% |
| Cleanliness of the bus | 91% | 42% | 49% | 88% | 92% | 89% | 93% |
| Driver courtesy and professionalism | 90% | 62% | 28% | 93% | 93% | 89% | 94% |
| Cleanliness of bus stops | 87% | 43% | 44% | 85% | NA | NA | NA |
| Reliability/on-time performance of buses | 85% | 40% | 45% | 86% | 80% | 76% | 80% |
| Ease of using the bus | 84%* | 55% | 29% | 93% | 91% | 90% | 93% |
| Hours of operation | 81% | 41% | 40% | 84% | NA | NA | NA |
| Safety on the bus | 79% | 44% | 35% | 82% | 95% | 92% | 92% |
| Route frequency | 79% | 39% | 40% | 79% | 74% | 78% | 78% |
| Amenities of bus stops | 76% | 32% | 44% | 72% | NA | NA | NA |
| Bus service during major events | 72% | 42% | 30% | 70% | NA | NA | NA |
| Security at bus stops | 65% | 28% | 37% | 65% | NA | NA | NA |

**FINANCIAL COMPARISION OF TEMPE ONLY VS. UNIFICATION**

To evaluate the financial benefit of the Scout Program, staff compared two cost elements that comprise the gross cost per revenue mile for transit service. The primary cost, which affords the highest opportunity for cost savings, is the contract cost which encompasses all costs to maintain and repair transit vehicles and operate transit service. Secondary costs are the elements of fully allocated overhead expenses. The allocated costs include all agency overhead costs added to the contract prices submitted by a service provider. This analysis compares the cost to Tempe under the current unified operations scenario to the alternative scenario of Tempe operating independently.

Table 6 shows the Tempe Only vs. Unified cost comparison for FY 13-14 through FY 15-16 by mode per mile submitted by First Transit in response to the Scout Program RFP.

**Table 6: First Transit Contract Cost Comparison (Cost Per Mile)**

| Mode | Tempe Only | | | Unified | | |
|---|---|---|---|---|---|---|
| | FY 13-14 | FY 14-15 | FY 15-16 | FY 13-14 | FY 14-15 | FY 15-16 |
| Local | $4.89 | $5.12 | $5.27 | $4.73 | $4.82 | $4.99 |
| FLASH | $4.89 | $5.12 | $5.27 | $4.73 | $4.82 | $4.99 |
| Express | $5.26 | $5.51 | $5.67 | $4.92 | $4.99 | $5.20 |
| Circulator | $4.81 | $5.08 | $5.22 | $4.70 | $4.71 | $4.91 |

Based on revenue miles operated solely in Tempe in FY 13-14 (4,008,401), Table 7 provides the estimated total First Transit contract cost to operate Tempe only service by mode. The contract costs in Table 7 verify that the contractor (First Transit) cost to operate consolidated services is less costly than operating separately (Tempe Only).

**Table 7: Tempe Only vs. Unified Cost Comparison**

| Mode | Tempe Only | | | Unified | | |
|---|---|---|---|---|---|---|
| | FY 13-14 | FY 14-15 | FY 15-16 | FY 13-14 | FY 14-15 | FY 15-16 |
| Local | $12,411,143 | $12,994,898 | $13,375,608 | $12,005,052 | $12,233,478 | $12,664,949 |
| FLASH | $627,328 | $656,835 | $676,078 | $606,802 | $618,348 | $640,157 |
| Express | $247,920 | $259,703 | $267,244 | $231,894 | $235,194 | $245,092 |
| Circulator | $6,228,536 | $6,578,163 | $6,759,451 | $6,086,096 | $6,099,045 | $6,358,028 |
| Total | $19,514,927 | $20,489,598 | $21,078,381 | $18,929,845 | $19,186,065 | $19,908,226 |

**Table 8: Contract Cost Savings – Tempe Only vs. Unified Cost Comparison Difference**

| FY 13-14 | FY 14-15 | FY 15-16 |
|---|---|---|
| $585,082 | $1,303,533 | $1,170,155 |

When adding the respective fully allocated overhead costs to the First Transit contract prices, the unified cost, including RPTA's slightly higher overhead costs, continues to provide a lower overall cost to Tempe. Table 9 shows the actual fully allocated cost per revenue mile comparison for FY13-14 and the projected comparisons for FY14-15 and FY15-16.

**Table 9: Fully Allocated Unit Cost Comparison (Cost per Mile)**

| Mode | Tempe Only | | | Unified | | |
|---|---|---|---|---|---|---|
| | FY 13-14 | FY 14-15 | FY 15-16 | FY 13-14 | FY 14-15 | FY 15-16 |
| Local | $5.75 | $6.11 | $6.32 | $5.61 | $6.04 | $6.25 |
| FLASH | $5.75 | $6.11 | $6.32 | $5.61 | $6.04 | $6.25 |
| Express | $6.12 | $6. 50 | $6.72 | $5.80 | $6.21 | $6.46 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Circulator** | $5.67 | $6.07 | $6.27 | $5.59 | $5.93 | $6.17 |

**Table 10: Tempe Only vs. Unified Fully Allocated Unit Cost**

| | Tempe Only | | | Unified | | |
|---|---|---|---|---|---|---|
| | **FY 13-14** | **FY 14-15** | **FY 15/-16** | **FY 13-14 (Actual)** | **FY 14-15** | **FY 15-16** |
| **Total** | $22,952,912 | $24,442,381 | $25,271,888 | $22,447,999 | $24,074,966 | $24,943,749 |

**Table 11: Fully Allocated Cost Savings Tempe only vs. Unified Cost Comparison Difference**

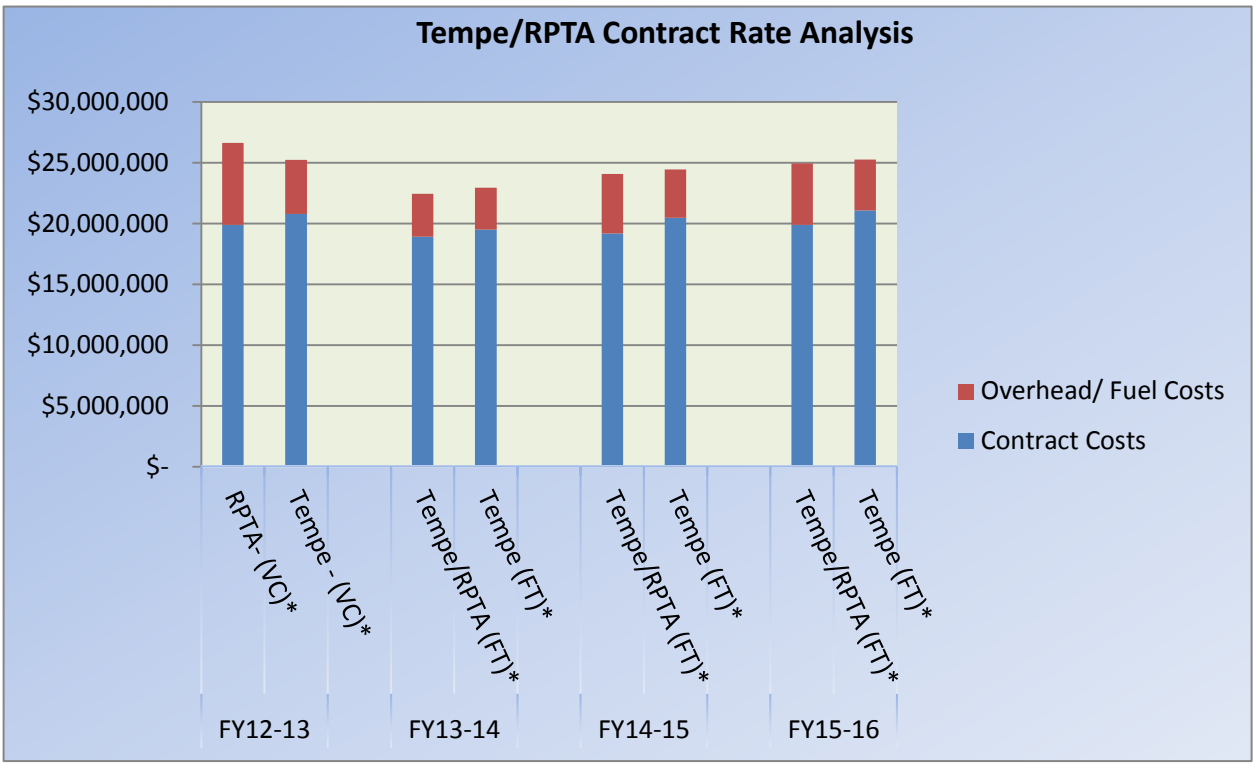
| FY 13/14 | FY 14/15 | FY 15/16 |
|---|---|---|
| $504,913 | $367,415 | $328,139 |

When comparing the cost benefits between operating Tempe Only service under the above scenario, the unified Scout Program yields a projected fully allocated cost savings for the City of Tempe under the unified scenario.

**Table 12: Tempe/RPTA Fully Allocated Contract Rate Analysis**
**Cost per Revenue Mile**

| Contract Service | FY12-13 | FY13-14 | FY14-15 | FY15-16 |
|---|---|---|---|---|
| Tempe Fixed Route | $ 5.24 | $ 4.89 | $ 5.12 | $ 5.27 |
| Tempe - Circulator | $ 5.11 | $ 4.81 | $ 5.08 | $ 5.22 |
| Tempe - Express | $ 5.41 | $ 5.26 | $ 5.51 | $ 5.67 |
| Tempe - Overhead/Fuel | $ 1.03 | $ 0.86 | $ 0.99 | $ 1.05 |
| | | | | |
| Tempe/RPTA Fixed Route | $ 4.94 | $ 4.73 | $ 4.82 | $ 4.99 |
| Tempe/RPTA Circulator | n/a | $ 4.71 | $ 4.71 | $ 4.91 |
| Tempe/RPTA Express | $ 4.67 | $ 4.92 | $ 4.99 | $ 5.20 |
| Tempe/RPTA - Overhead/Fuel | $ 1.67 | $ 0.88 | $ 1.22 | $ 1.26 |

**Table 13: Tempe/RPTA Fully Allocated Contract Rate Analysis**
***(Source Data – Table 12)***




*(VC)* - Veolia Contract* *(FT)* - First Transit Contract*

**CONCLUSIONS**

From a regional and Tempe perspective, the unification of Tempe and RPTA transit operations yields financial and operational benefits to all affected jurisdictions. Transit service contract costs have been reduced, which effectively helps control the growth of service costs, improving the effectiveness and efficiency of operating transit service in the East Valley.

However, to more thoroughly substantiate the Scout Program savings, Tempe and RPTA staff will continue to fully examine accounting practices and policies to maximize Tempe's savings and take full advantage of Tempe's capital investments that now serve a greater portion of the East Valley.

In April 2015, staff will present an update to City Council with additional transit service performance data and a comprehensive financial report that clearly describes the financial outcome of the Scout Program and a recommendation on the future of the unification project. The Council will be asked in May 2015 to provide direction regarding the future of unification.

**Notes:**

1. Mileage assumes total bus service operated in Tempe's jurisdiction – FY13-14 (4,008,401 miles - actual)
2. FY12-13 Tempe cost based on actual rates and mileage (Baseline Costs)
3. FY12-13 RPTA costs assumes costs at RPTA actual rates and Tempe Mileage
4. FY13-14 thru FY15-16 (Tempe-FT)* - Rates assumes contract rates proposed by First Transit, Tempe Only
5. FY13-14 (Tempe/RPTA-FT)* - Costs based on actuals
6. FY14-15 (Tempe/RPTA-FT)* - Contract rates based on revised RPTA-IGA schedules and First Transit contract rates

**RECOMMENDATION**

This item is for information only.

**CONTACT**

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mike_nevarez@tempe.gov

**ATTACHMENTS:** PowerPoint

# Tempe/RPTA Transit Operations Unification Update

## Transportation Commission
## January 6, 2015


City of Tempe
PUBLIC WORKS

# Background

- 2011: Project team evaluated strengths, weaknesses, risks and costs savings for unification.
  - Estimated $800K to $1M in annual operating cost savings regionally.
  - Tempe's savings estimated between $400K & $500K annually.

# Background

- January 2012: Council approved examining unification of Tempe/RPTA bus operations while maintaining local control.
- July 2013: Scout Program implemented for a 3-year period with a determination based on outcomes at the end of FY14-15 to decide to extend unification.

# Unification Cost Saving Measures

- More Efficient Utilization of Facilities
  - decrease in non-revenue miles due to reassignment of routes between two operating facilities
- Streamlined Contractor Management
  - reduce contractor staffing requirements through use of one contractor
- Economies of Scale
  - efficiencies gained in areas of service supervision, parts purchasing and inventory, operator and mechanic training and administrative functions

# Year 1- Scout Program Performance Results

| Contractor Performance Criteria | FY 13-14 | Grade |
|---|---|---|
| On-time Performance | 93.1% | Meets benchmark (C) |
| Preventable Accidents per 100,000 miles | 0.42 | Exceptional (A-) |
| Complaints per 100,000 boardings | 28.1 | Above benchmark (B) |
| Mechanical failures per 100,000 miles | 5.1 | Exceptional (A-) |
| On-time preventive maintenance inspections | 92% | Exceptional (A-) |

Source: RPTA

# Satisfaction with Transit Service in Tempe

- Sept. 2014: WestGroup Research conducted telephone survey of 409 Tempe residents.
- Margin of error at ± 5% with 95% level of confidence.
- 72% of bus riders (69% in 2012) rated the quality of Tempe's transit system very and somewhat satisfied.

# Overall Satisfaction with Tempe Transit System

| Satisfaction | 2014 (n=376) | 2012 (n=355) | 2010 (n=377) | 2008 (n=333) |
|---|---|---|---|---|
| NET very + somewhat satisfied | 72% | 69% | 66% | 61% |
| 5 – Very satisfied | 37% | 39% | 29% | 26% |
| 4 | 35% | 30% | 37% | 35% |
| 3 | 17% | 21% | 22% | 27% |
| 2 | 6% | 5% | 5% | 6% |
| 1 – Very dissatisfied | 5% | 5% | 6% | 6% |

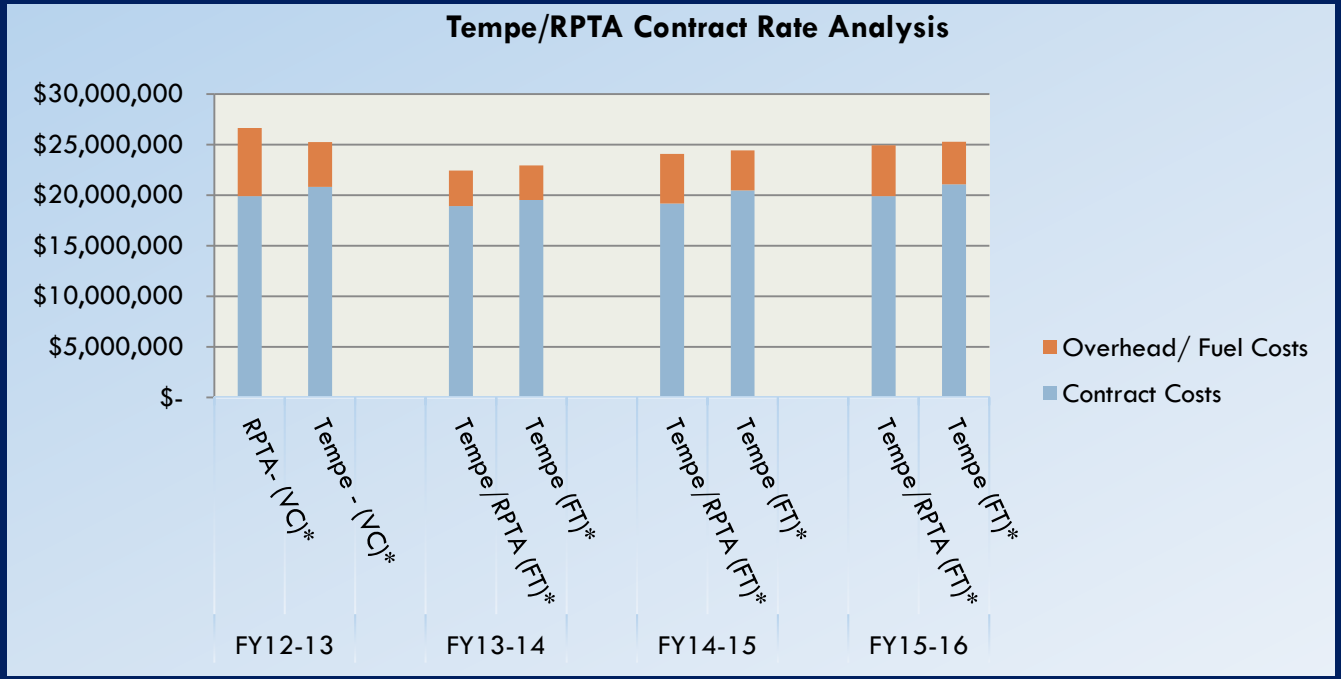
# Contract Rate Analysis

- 3 Contract Rate Proposals submitted by First Transit
  - Tempe Only – based on current operating service (Tempe Facility)
  - RPTA Only – based on current operating service (Mesa Facility)
  - Tempe/RPTA Combined – based on combined operating service (Tempe/Mesa Facility)
- Contract Rate Analysis - Procedures
  - Compare Tempe service rates to Tempe/RPTA combined service rates
  - Overhead rates added to contract rates – (fully allocated rates)
    - including fuel, staff, facility costs, maintenance repairs, etc.
- Comparison of Contract Rates & Overhead Rate Allocation
  - FY12-13 compares actual contract rates operated by Veolia prior to First Transit contract

# Tempe/RPTA Contract Rate Analysis Cost Per Revenue Mile

| Contract Service | FY12-13 | FY13-14 | FY14-15 | FY15-16 |
|---|---|---|---|---|
| Tempe Fixed Route | $ 5.24 | $ 4.89 | $ 5.12 | $ 5.27 |
| Tempe - Circulator | $ 5.11 | $ 4.81 | $ 5.08 | $ 5.22 |
| Tempe - Express | $ 5.41 | $ 5.26 | $ 5.51 | $ 5.67 |
| Tempe - Overhead/Fuel | $ 1.03 | $ 0.86 | $ 0.99 | $ 1.05 |
| | | | | |
| Tempe/RPTA Fixed Route | $ 4.94 | $ 4.73 | $ 4.82 | $ 4.99 |
| Tempe/RPTA Circulator | n/a | $ 4.71 | $ 4.71 | $ 4.91 |
| Tempe/RPTA Express | $ 4.67 | $ 4.92 | $ 4.99 | $ 5.20 |
| Tempe/RPTA - Overhead/Fuel | $ 1.67 | $ 0.88 | $ 1.22 | $ 1.26 |

# Tempe/RPTA Contract Rate Analysis




* (VC) Veolia Tempe, (FT) First Transit

# Contract vs. Fully Allocated

## Contract Cost Savings

| FY 13/14 | FY 14/15 | FY 15/16 |
|---|---|---|
| $585,082 | $1,303,533 | $1,170,155 |

## Fully Allocated Cost Savings (Net)

| FY 13/14 | FY 14/15 | FY 15/16 |
|---|---|---|
| $504,913 | $367,415 | $328,139 |

# Next Steps

- Work with RPTA to:
  - maintain high quality reliable transit service
  - define program costs that substantiate savings to Tempe
  - reconcile calculation of performance measures
- April 2015: Provide update to Council on reliability of transit services, program cost and performance measures.
- May 2015: Seek Council direction regarding the future of unification.

# CITY OF TEMPE
# TRANSPORTATION COMMISSION

## STAFF REPORT

**AGENDA ITEM 6**

**DATE**
January 6, 2015

**SUBJECT**
Orbit Saturn

**PURPOSE**
The purpose of this memo is to provide the Commission with an update on possibly expanding Orbit service into South Tempe.

**BACKGROUND**
In the 2007/08, Transportation staff began the planning process to expand Orbit service south of US 60. Several community meetings were held and draft routes developed, but due to the national economic down turn, expansion planning efforts were halted in order to address the structural budget deficit of the Transit Fund.

In April 2014, the City of Tempe commissioned WestGroup Research to conduct a telephone survey of Tempe residents living in the zip code 85283, which currently is not served by an Orbit circulator, to gauge support and reaction to a proposed additional route to the City's neighborhood circulator program. The survey, which reached 403 residents, showed general support for a circulator route in this area.

Currently, there are five neighborhood circulators operating in Tempe. Referred to as the Orbit system, the five routes are Earth, Jupiter, Mars, Mercury and Venus. All Orbit routes operate with no fare required and serve the area north of US 60. Orbit service operates seven days a week from 6 a.m. to 10 p.m. with 15 minute frequency on weekdays. Weekend service operates at a slightly reduced level.

In June 2014, the Tempe City Council authorized staff to conduct a public involvement process to explore implementing Orbit service in the area between US 60 to Elliot Road from the east city border with Mesa to the west city border with Guadalupe and Phoenix.

*Project Timeline*

The city of Tempe values public input and believes that community members should be engaged early on in decisions that affect them. A Public Involvement Program (PIP) has been created in order to foster an open and transparent process regarding any implementation of an Orbit neighborhood circulator system south of US 60.

- November/December 2014: Public meeting notification
- January 6, 2015: Transportation Commission meeting
- January 2015: Hold public meetings on January 21 and 24 at Marcos de Niza High School, 6000 S. Lakeshore Dr. with online comment form available. (Staff will also attend board and commission meetings, and neighborhood and stakeholder meetings). This series of meetings will gauge resident points of interest, hours, frequency and days of service levels.
- April 2015: Transportation Commission meeting
- April 2015: Hold public meetings on April 29 and May 2 at Marcos de Niza High School, 6000 S. Lakeshore Dr. with online comment form available. (Staff will also attend board and commission meetings, and neighborhood and stakeholder meetings). This series of meetings will include draft route(s) based on the previous public input from residents.
- September 2015: Hold public meetings on September 9 and 12 tentatively at Marcos de Niza High School, 6000 S. Lakeshore Dr. with online comment form available. (Staff will also attend board and commission meetings, and neighborhood and stakeholder meetings). This series of meetings will include a final proposed route for input based on the previous public input from residents.
- October 2015: Transportation Commission meeting
- November/December 2015: City Council meeting
- January 2016: Order Orbit vehicles, if approved by Council. Staff estimates that it would cost $850,000 in capital costs to purchase the required fleet.
- November 2016: RPTA New Service Implementation Process Initiated
- February 2017 or August 2017: Infrastructure/signs for Orbit stops, if approved by Council
- April 2017 or October 2017: Implement route, if approved by Council

Communication methods used to promote the meetings and online comment form will include:

- Press releases
- Door hangers
- Tempe Today articles
- Social media
- Tempe 11
- City online calendar
- Project web site
- Handouts at other city events and meetings

- Partner communication vehicles – i.e., working with Neighborhood and Homeowners' Associations, the Tempe Chamber, Tempe Tourism, Arizona State University, the school districts and others to include information about Orbit expansion south of US 60 in print newsletters, e-newsletters and online

*Route Parameters*

Because Orbit is a local area circulator, the route is not intended to provide direct service to destinations outside of the planning area. The new Orbit route will provide convenient connection opportunities to several bus routes that travel to great destinations such as downtown Tempe, Tempe Marketplace, Arizona State University, and many other places of interest.

**FISCAL IMPACT**

Staff estimates that it would cost $850,000 in capital costs to purchase the required fleet and $1.2 million annually to operate a five-mile Orbit route. Based on the financial forecast, Orbit operations in South Tempe would be planned to commence in April or October 2017.

**RECOMMENDATION**

This item is for information and input.

**CONTACTS**

Mike Nevarez
Transit Manager
480-858-2209
mike_nevarez@tempe.gov

Jason Hartong
Senior Planner
480-350-2747
jason_hartong@tempe.gov

**ATTACHMENTS**

PowerPoint


# Community Involvement

## Phase I – Parameters of Service

January 2015

# WELCOME

- Staff introductions
- Ground rules
- Orbit Saturn – Tempe South development steps
- Today's meeting purpose
- Orbit purpose, facts, and history
- Route parameters
- Approval process
- Implementation timeline
- Contact us

# GROUND RULES

- Be respectful
- Goals:
  - inform community about the program
  - solicit community input
  - provide a recommendation to City Council
- We will do our best to answer questions; if information isn't immediately available, we will follow up.
- *Please submit written comment cards to ensure that your opinion is recorded.*
- *Comment period for Phase I: Jan. 21 – Feb. 8.*

# DEVELOPMENT STEPS

- Orbit Saturn – Tempe South development
  - Phase I – Develop route parameters *(January 2015)*
    - Solicit community input
    - Develop draft route(s) and service scenario based on community input
  - Phase II – Present draft route(s) for public feedback *(April 2015)*
    - Solicit community input
    - Develop final proposed route and service scenario
  - Phase III – Present final proposed route *(September 2015)*
    - Present final proposal for feedback
    - Refine route and service scenario as needed

# PUPOSE OF TODAY'S MEETING

- Familiarize you with the existing transit network
- Introduce route development process
- Gain your insight regarding route parameters
  - Hours of service
  - Frequency
  - Operating days
  - Places of interest

# ORBIT HISTORY

- 1996: Tempe Transit Tax approved by Tempe voters (including Neighborhood Circulator buses).
- 2001: Neighborhood Flash circulator began operating; later became Mercury & Venus.
- 2006: Planning began for Neighborhood Circulator program expansion north of US-60.
- 2007-08: Five Orbit routes began operating.
- 2007-08: Planning began for Neighborhood Circulator program expansion south of US-60; planning process halted due to declining tax revenues.

# ORBIT BASICS

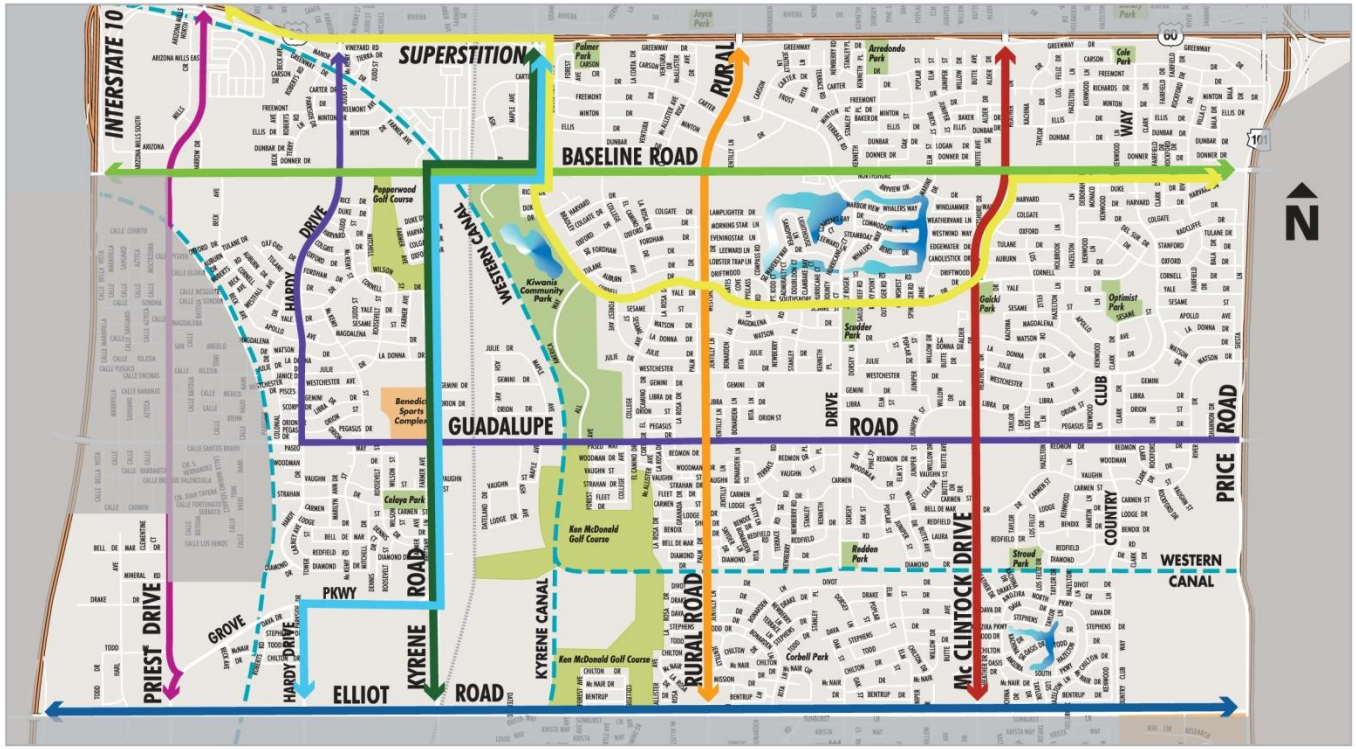
- Operations funded by half-cent Tempe Transit Sales Tax revenues
- Uses small buses to move people from neighborhoods to local places of interest and provide convenient links to major transit routes
- Passengers use Orbit to connect to multiple transit routes to reach destinations throughout Tempe and the region
- Capital costs are funded by a combination of local, regional,and federal funds
- Orbit is currently a free-fare service
- In fiscal year 2014, Orbit system had more than 2.6 million boardings
- In fiscal year 2014, the operating cost for Orbit system was $6.5 million

# ORBIT BUSES – INSIDE & OUT


- Powered by CNG or Gasoline
- 24' long x 8' wide
- Rack with space for 2 bicycles
- Quiet operation
- A slightly larger bus type was tested in 2013 and may be used on some Orbit routes in the future

- 17 seats with room for 6 standees
- Wheelchair lift and space for 2 mobility aids
- Fully climate controlled

# ORBIT SATURN PLANNING AREA




Bus routes in this area:

- 56 - Priest
- 62 - Hardy/Guadalupe
- 65 - Mill/Kyrene
- 66 - Mill/Kyrene
- 72 - Rural
- 77 - Baseline
- 81 - McClintock
- 108 - Elliot
- 521 - Express to Phoenix

# ROUTE PARAMETERS

- Annual operating budget – $1.2 million for the first year
- Route will travel within the planning area only
- Route will operate two-way with the possible exception of turnaround loops

# LENGTH OF ROUTE

Route length = Budget ÷ Cost per Mile ÷ Trips per Year

- Budget: $1.2 million
- Cost per Mile: $6.40
- Trips per Year: varies based on
  - Service span: hours of operation per day
  - Frequency: minutes between bus trips
  - Operating days: days of week route operates
- Longer service span and/or higher frequency = less route length
- *Please submit a comment card and tell us what is most important to you*

# PLACES OF INTEREST

- Work destinations
- Recreation opportunities
- Shopping districts
- Regional connections
- *Please submit a comment card and tell us what is most important to you*

# APPROVAL & IMPLEMENTATION

- Jan. 6, 2015: Transportation Commission meeting – *introduction*
- Jan. 21 & 24, 2015: Community meetings – *Phase I*
- April 14, 2015: Transportation Commission meeting – *results from Phase I*
- April 29 & May 2, 2015: Community meetings – *Phase II*
- Sept. 9 & 12, 2015: Community meetings – *Phase III*
- Oct. 13, 2015: Transportation Commission meeting – *results from Phase III*
- Nov./Dec. 2015: City Council meeting – *final recommendation*
- If program is approved by City Council:
  - Jan.2016: Procure Orbit vehicles
  - Nov. 2016: Valley Metro New Service Implementation Process Initiated
  - Feb. 2017 or Aug. 2017: Infrastructure/signs for Orbit stops
  - **April 2017 or October 2017: Implement route**

# CONTACT US

- Online comment form: available Jan. 21 – Feb. 8
  - www.tempe.gov/orbit
- Transit Operations
  - Mike Nevarez michael_nevarez@tempe.gov (480) 858-2209
  - Jason Hartong jason_hartong@tempe.gov (480) 350-2747
- Community Involvement Liaison
  - Shauna Warner shauna_warner@tempe.gov (480) 350-8883
- Mayor and City Council Members
  - www.tempe.gov/city-hall/mayor-and-city-council

# CITY OF TEMPE
# TRANSPORTATION COMMISSION

## STAFF REPORT

**AGENDA ITEM 8**

**DATE**
January 6, 2015

**SUBJECT**
Future Agenda Items

**PURPOSE**
The Chair will request future agenda items from the commission members.

**BACKGROUND**
The following future agenda items have been previously identified by the Commission or staff:

- 2015/16 Media Buy (February)
- Bike Hero (February)
- Tempe Bike Parking Corral(February)
- Street closure procedures, notification and outreach update (February)
- Streetcar (February)
- Bicycle/pedestrian signal activation operations (March)
- City Budget Long-Range Forecast Update (Operating) & CIP follow-up (March)
- North/South Railroad Spur Multi-Use Path (March)
- CIP Discussion (April)
- Orbit Saturn (April)
- Streetcar (April)
- Bus Unification (April)
- Highline Canal Multi-use Path Project (April)
- Alameda Streetscape Project (May)
- Bus Unification (May)
- MAG Pedestrian Design Assistance Grants (May)
- City Tentative Fiscal Year 2015-16 Operating Budget (June)
- MAG Congestion Mitigation and Air Quality Program (CMAQ ITS) (June)
- Highline Canal Multi-use Path Project (September)
- Orbit Saturn & Larger Orbit buses (November)
- Alameda Streetscape Project (November)

**FISCAL IMPACT**
None

**RECOMMENDATION**
This item is for information only.

**CONTACT**
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shelly_seyler@tempe.gov

**ATTACHMENTS:** City Annual Budget Planning Process and MAG Annual Grant Process

**City Annual Budget Planning Process**

| Council/Public Input Dates | Topic | Transportation Commission Input/Info. Dates | Action Requested by Transportation Commission |
|---|---|---|---|
| **August** | Issue Review Session –<br>Budget Strategy Update | **n/a** | |
| **October** | Issue Review Session –<br>Long-Range Forecast Presentation | **November** | Commission provided a copy of the long-range forecast. |
| **November** | Committee of the Whole –<br>Budget Discussion Follow-up | **n/a** | |
| **Early February** | Issue Review Session –<br>Introduction of CIP Requests | **December** | Staff requests that the Commission review and provide input regarding Transportation CIP requests. |
| **Mid-February** | Public Meeting(s) –<br>Budget (Operating and Capital Budgets) | **n/a** | |
| **Late February** | Issue Review Session –<br>Long-Range Forecast Update (Operating) & CIP follow-up | **March** | Commission provided with an update on Operating and CIP discussion. |
| **Mid-March** | Issue Review Session-<br>CIP Discussion | **April** | Commission provided with an update on the CIP discussion. |
| **Late April** | Issue Review Session –<br>FY 2014-15 Operating Budget Review | **n/a** | |
| **Late May:** | Council considers adoption of Tentative Fiscal Year 2015-16 Operating Budget | **June** | Commission provided with an update on the tentative adoption. |
| **Early June** | Council considers adoption of Final Fiscal Year 2015-16 Operating Budget and Public hearing and adoption of the Fiscal Year 2015-16 Capital Improvements Program | **n/a** | |

**MAG Annual Grant Process**

| Timeline | Grant Type | Transportation Commission Input Dates | Action Requested by Transportation Commission |
|---|---|---|---|
| **Annually released in Early to Mid-February and due in Early to Mid-March** | FTA Section 5310 - Grant for transportation for elderly and persons with disabilities. | **November** | Staff requests that the commission review and provide input regarding proposed project. |
| **Annually released Early March and due in late April** | Transportation Investment Generating Economic Recovery (TIGER) – Federal Department of Transportation discretionary grant program. Total available funds nationwide was $600 million for 2014. Regional projects are solicited by MAG. | **November** | Staff requests that the commission review and provide input regarding proposed project. |
| **Annually released in late May and due in late June** | MAG Pedestrian Design Assistance Grants | **May & June** | Staff requests that the commission review and provide input regarding proposed project. |
| **FY 2015 or 2016** | Highway Safety Improvement Program (HSIP) – There is a state portion (ADOT) and a regional portion (MAG). ADOT accepts requests for state funds on a continual/ongoing basis. Selections are based on safety needs and data. MAG regional funds are currently programmed through FY 2017. | **Not Applicable** | Based on historical safety data, staff has already identified the intersections of Rural Road & Southern Avenue and Rural Road & University Drive as priorities for future HSIP funding. |

| | | | |
|---|---|---|---|
| **February 2015** | Urbanized Area Formula Program (5307) – Administered by Federal Transit Administration and pays for capital projects such as transit facilities and rolling stock. Most of the funding is committed to pay for transit improvements identified in the MAG Regional Transportation Plan. Unspent portion of the funds are offered by MAG every two years via competitive grants. | **November** | Staff requests that the commission review and provide input regarding proposed projects. |
| **March 2015 with full solicitation, every 3 years** | Congestion Mitigation and Air Quality Program (CMAQ) – Bike and Pedestrian Improvements; PM2.5; Transit; Street Sweepers. | **November** | Staff requests that the commission review and provide input regarding proposed project. |
| **Mid-March 2016 and due Mid-April, every 2 years** | Job Access Reverse Commute (JARC) – Projects that are eligible must demonstrate improved job access for low income population. | **November** | Staff requests that the commission review and provide input regarding proposed project. |
| **August 2016 and due in mid-September, every 3 years:** | Transportation Alternatives Program (TAP) - Bike and Pedestrian Projects | **November** | Staff requests that the commission review and provide input regarding proposed project. |
| **ON HOLD Released in August and due in September** | Congestion Mitigation and Air Quality Program (CMAQ ITS) are Federal fund for ITS projects. Projects are selected based on air quality scores and committee member scores. Programming is set through FY 2017. It is not known at this time how the arterial ITS program will proceed. | **June** | Staff requests that the commission review and provide input regarding proposed projects prior to call for projects in August. |