Call to the Audience Guidelines

- 2 Call to the Audience opportunities
- Must fill out participant card
- Participants called in the order cards are received
- 3 minutes allowed per participant
- CTF Facilitator will call on speakers and manage time
- CTF members cannot discuss matters raised
- CTF cannot take action on matters raised
- CTF members can ask project team to review an item
Meeting Agenda

1. Call to Order/Agenda Review/Announcements
2. 1st Call to the Audience 15 min
3. Approval of Meeting Summary: April 18, 2013 5 min
4. Confirm CTF Meeting Dates through Charrette #2 (September/October 2013) 5 min
5. Public Input Report, and Reports on Project Presentations & Outreach 10 min
6. Draft “Transportation” Performance Measures including Related Qualitative Assessment of Example Cross Section Concepts 55 min
7. Initial Cross Section Concepts 70 min
8. 2nd Call to the Audience 15 min
9. Next Steps/CTF Roundtable 10 min
10. Adjourn
CTF Charrette Approach

• **Charrette** – an intensive and focused series of meetings and working sessions to advance major work items for Broadway Boulevard

• This week’s charrette is mainly a planning charrette not a heavily design-oriented charrette

• We do not plan to use small group or interactive working sessions

• We will focus on facilitated discussions and decision-making with the full CTF as a group
CTF Charrette Approach

• Tonight is focused on discussion and refinement of
  – Draft Transportation Performance Measures
  – Draft Example Cross Section Concepts

• Wednesday and Thursday the Planning Team will
  – Make revisions to the Performance Measures and Example Cross Section Concepts
  – Prepare some initial assessments based on the Performance Measures
CTF Charrette Approach

• Thursday night is focused on discussion and refinement of
  – Draft **Non**-Transportation Performance Measures
  – Updated Transportation Performance Measures
  – Initial assessments of updated Example Cross Section Concepts

• Thursday, May 30\(^{th}\) CTF Meeting will finalize a set of work products for Stakeholder Agency review and comment:
  – Draft Transportation and Non-Transportation Performance Measures
  – Example Cross Section Concepts
  – Initial assessment of Cross Section Concepts
Call to the Audience

15 Minutes

Please limit comments to 3 minutes

• Called forward in order received
• CTF members cannot discuss matters raised
• CTF cannot take action on matters raised
• CTF members can ask project team to review an item
Approval of Meeting Summary:
4/18/2013 Meeting

Jenn Toothaker, Project Manager
City of Tucson Department of Transportation
Confirm CTF Meeting Dates through Charrette #2 (September/October 2013)

Jenn Toothaker, Project Manager
City of Tucson Department of Transportation
## Confirm CTF Meeting Dates

**BASE SCHEDULE –**
Meeting dates marked with an “*” are set; those without are tentative until finalized with CTF and project team.

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 21, 2013*</td>
<td><strong>#13 (Action Mtg.)</strong> – Transportation analysis comment response, transportation performance measures, and initial example cross sections</td>
</tr>
<tr>
<td>Tuesday p.m. Charrette</td>
<td></td>
</tr>
<tr>
<td>May 23, 2013*</td>
<td><strong>#14 (Action Mtg.)</strong> – Non-transportation performance measures, initial example cross sections, and update on transportation performance measures</td>
</tr>
<tr>
<td>Thursday p.m. Charrette</td>
<td></td>
</tr>
<tr>
<td>June and later</td>
<td><strong>Stakeholder Agency Review #1:</strong></td>
</tr>
<tr>
<td></td>
<td>- Mayor &amp; Council – June Study Session</td>
</tr>
<tr>
<td></td>
<td>- RTA Tech/Mgmt Committee – TBD; possibly July/Aug.</td>
</tr>
<tr>
<td></td>
<td>- RTA CART Committee – TBD; possibly July/Aug.</td>
</tr>
<tr>
<td></td>
<td>- RTA Board – TBD, possibly August/September</td>
</tr>
<tr>
<td></td>
<td>- Pima Co. Bond Advisory – No meeting until Sept.</td>
</tr>
<tr>
<td>June 20, 2013</td>
<td><strong>#16 (Study Session Mtg.)</strong> – update on Stakeholder Agency Review to date, 3 informational presentations</td>
</tr>
<tr>
<td>September 5, 2013</td>
<td><strong>Public Meeting #3</strong> – Potential cross sections and performance measures/assessment</td>
</tr>
<tr>
<td>September 30, 2013</td>
<td><strong>#18 (Action Mtg.)</strong> – Review Input from Public Mtg. #3, Start identification of Street Cross Section, Alignment, and Corridor Development Options</td>
</tr>
<tr>
<td>Monday p.m. Charrette</td>
<td></td>
</tr>
<tr>
<td>October 3, 2013</td>
<td><strong>#19 (Action Mtg.)</strong> – 2ND MEETING to finalize Street Cross Section, Alignment, and Corridor Development Options</td>
</tr>
<tr>
<td>Thursday p.m. Charrette</td>
<td></td>
</tr>
</tbody>
</table>

Dates from this point on are tentative and are subject to change
Public Input Report consists of a spreadsheet and attachments:

- **Spreadsheet** = Input received from 4/9/2013-5/8/2013
- **Attachments** = Documentation of only new input received
Reports: Past and Upcoming Project Presentations & Outreach

Jenn Toothaker, Project Manager
City of Tucson Department of Transportation
Reports: Past and Upcoming Project Presentations & Outreach

- May 16, 2013 RTA Technical Management Committee
- May 22, 2013 RTA CART Meeting

Jenn Toothaker, Project Manager
City of Tucson Department of Transportation
Draft “Transportation” Performance Measures Including Related Qualitative Assessment of Example Sections

Phil Erickson
Community Design + Architecture

Mike Johnson
HDR Engineering

Jim Schoen
Kittelson & Associates
Transportation Performance Measures

• Agenda for this item:
  – Overview of Performance Measures
  – Review of Transportation Performance Measures
  – CTF discussion of refinements, alternatives, additional issues to measure, etc.
Overview Performance Measures

• Reflective of
  – Public input and discussions with CTF to date
  – Guidance from US EPA’s *Guide to Sustainable Transportation Performance Measures*
  – Other best practices research including:
    • ITE, *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*
    • NACTO, *Urban Bikeway Design Guide*
    • US Access Board *Public Right-of-Way Accessibility Guidelines*
    • AASHTO *Green Book*

• Starting point for selecting and further developing “Transportation” and “Non-transportation” measures for Broadway
Overview Performance Measures

• Tonight focuses on potential Transportation Measures organized by topic areas
  – Pedestrian access and mobility
  – Bicycle access and mobility
  – Transit access and mobility
  – Vehicular access and mobility
Overview Performance Measures

• Thursday we will discuss potential Non-Transportation Measures organized by topic areas
  – Sense of Place
  – Environment/Public Health
  – Economic Vitality
  – Project Cost
Assessment of Example Cross Section Concepts

• At this level of design development most assessment will be qualitative.

• Impacts related to alignment cannot be fully evaluated as alignment is not included in design concepts at this point. But future width allows for some qualitative comparisons.

• We plan on assessment report out being similar to the following—
# Assessment of Example Cross Section Concepts

<table>
<thead>
<tr>
<th>Cross Section Concept</th>
<th>Perf. Measure 1</th>
<th>Perf. Measure 2</th>
<th>Perf. Measure 3</th>
<th>Cost Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image 1" /></td>
<td>●●●</td>
<td>●</td>
<td>●</td>
<td>$</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image 2" /></td>
<td>●●</td>
<td>○</td>
<td>●●●</td>
<td>$$</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image 3" /></td>
<td>○</td>
<td>●</td>
<td>●●●</td>
<td>$$$</td>
</tr>
<tr>
<td><img src="image4.png" alt="Image 4" /></td>
<td>●●</td>
<td>●●●</td>
<td>○</td>
<td>$$$</td>
</tr>
</tbody>
</table>

**Legend**

- ●●●: Best Performance
- ○: Neutral
- ●●●: Worst Performance
- $$$: Highest Cost
- $: Lowest Cost
CTF Discussion

• Initial discussion will occur for each of the 4 topic areas covering 2 to 3 performance measures

• Followed by overall discussion of potential additional measures, refinements, etc.
Pedestrian Access and Mobility

1a. Functionality of Streetside for Pedestrian Activity
1b. Separation from Vehicular Traffic
1c. Pedestrian-Oriented Facilities or Improvements
1d. Walkable Network/Neighborhood Connections
1e. Pedestrian Crossings
1f. Vehicle/Pedestrian Conflicts at Driveways
1g. Universal Design
1h. Walkable Destinations
# Pedestrian Access and Mobility

## 1a. Functionality of Streetside for Pedestrian Activity

<table>
<thead>
<tr>
<th>Description</th>
<th>• Is there enough width to support desired activity, landscaping, street furnishings and other improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>• Meet or exceed ITE Walkable Thoroughfare Manual guidance</td>
</tr>
<tr>
<td>Factors</td>
<td>• Width of pedestrian/landscape area</td>
</tr>
<tr>
<td></td>
<td>• Infrastructure provided in area</td>
</tr>
<tr>
<td>Ability to Effect</td>
<td>• High</td>
</tr>
<tr>
<td>Ability to Evaluate</td>
<td>• High for this point in process</td>
</tr>
</tbody>
</table>
## Pedestrian Access and Mobility

### 1b. Separation from Vehicular Traffic

<table>
<thead>
<tr>
<th>Description</th>
<th>• Width and design character of area between outside edge of vehicle lane and sidewalk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>• Width meets or exceed ITE Walkable Thoroughfare Manual guidance</td>
</tr>
<tr>
<td></td>
<td>• Frequency and quality of street trees or other large landscape</td>
</tr>
<tr>
<td>Factors</td>
<td>• Width of landscape area</td>
</tr>
<tr>
<td></td>
<td>• Width of bicycle lane</td>
</tr>
<tr>
<td></td>
<td>• Frequency and quality of large landscape</td>
</tr>
<tr>
<td>Ability to Effect</td>
<td>• High</td>
</tr>
</tbody>
</table>
Functionality of Streetside for Pedestrian Activity
## Pedestrian Access and Mobility

### 1c. Pedestrian-oriented Facilities or Improvements

| Description | • Extent of shade, lighting, seating, drinking fountains and other features to serve pedestrian needs and provide for visual interest |
| Measurement | • % shade, lighting levels and consistency, number/frequency of design features  
• Qualitative evaluation |
| Factors | • Provision for and increase in number of features |
| Ability to Effect | • Minimal at the cross section and alignment level, beyond provision of enough pedestrian area to allow for detailed facilities. Evaluation of space is generally covered by measures 1a and 1b. |
| Ability to Evaluate | • Moderate at this level of design  
• Design does not currently include details for streetscape design, but lower cost cross section concepts may allow more budget to be spent on pedestrian facilities |
# Pedestrian Access and Mobility

## 1d. Walkable Network/Neighborhood Connections

<table>
<thead>
<tr>
<th>Description</th>
<th>• Ability for pedestrians to access neighborhoods and pedestrian network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>• Number, length, and quality of connections</td>
</tr>
</tbody>
</table>
| Factors     | • Likely varies by quality of environment on Broadway and frequency of crossings  
|             | • Frequency and quality of connections to adjacent pedestrian network |
| Ability to Effect | • High to Moderate                                                   |
| Ability to Evaluate | • Low  
|                | • Quality of environment along Broadway is measured through #1a and #1b  
|                | • Other factors require alignment and crossing design                  |
# Pedestrian Access and Mobility

## 1e. Pedestrian Crossings

<table>
<thead>
<tr>
<th>Description</th>
<th>• Ease of crossing Broadway</th>
</tr>
</thead>
</table>
| Measurement       | • Frequency, length, and quality of pedestrian crossings  
|                   | • Time needed to cross street  
|                   | • Signal timing for pedestrian phase (VISSIM analysis) |
| Factors           | • Width and number of lanes (through and turn)  
|                   | • Width and number of medians  
|                   | • Level of pedestrian comfort in medians  
|                   | • Frequency of crossings  
|                   | • Signal timing design |
| Ability to Effect | • High |
| Ability to Evaluate | • Moderate at this phase – several factors are directly related to cross section design, several are not |
# Pedestrian Access and Mobility

## 1f. Vehicle/Pedestrian Conflicts at Driveways

<table>
<thead>
<tr>
<th>Description</th>
<th>• Conflicts between pedestrians and vehicles exist at driveways for site access; strongly related to #2b</th>
</tr>
</thead>
</table>
| Measurement | • Provision of level pedestrian crossings  
• Travel speed to vehicles  
• Frequency of driveways |
| Factors     | • Width of roadside to accommodate level pedestrian crossings  
• Target speed and roadway design’s support of speed management  
• Frequency and width of driveways |
| Ability to Effect | • High |
| Ability to Evaluate | • Moderate – some factors are directly related to cross section design, several are not |
### Pedestrian Access and Mobility

**1g. Universal Design**

| Description | Going beyond base requirements of access (ADA) design for people of all ages and abilities |
| Measurement | Provision of access and mobility design elements that achieve Universal Design |
| Factors | All other pedestrian access and mobility factors measure performance related to aspects of universal design. Likely that other factors will be most affected by details of design. Potential to implement design details likely affected by width of roadside and cost of other project elements (lower cost for other elements may allow more budget for Universal Design) |
| Ability to Effect | High |
| Ability to Evaluate | Low |
| Details are not provided by current level of design |
Universal Design
### Pedestrian Access and Mobility

**1h. Walkable Destinations**

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Presence and access to jobs, homes, shopping, etc.</td>
<td>• Determine density of households and jobs within walkable distance of uses along Broadway</td>
</tr>
<tr>
<td>• Presence of sufficient density of other uses and access from other uses to support market for employment, shopping, etc.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factors</th>
<th>Ability to Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>• #1d Walkable Network/Neighborhood Connections</td>
<td>• High for #1d</td>
</tr>
<tr>
<td>• Potential for jobs, commercial uses, and homes along Broadway</td>
<td>• Uncertain for land use related factors (#5c Broadway as a Destination, #6f Land Use Mix, and other non-transportation performance measures)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ability to Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Same as #1d</td>
</tr>
<tr>
<td>• Low to Moderate for non-transportation performance measures (to be discussed further on Thursday)</td>
</tr>
</tbody>
</table>
Bicycle Access and Mobility

2a. Separation of Bikes and Arterial Traffic
2b. Bike Conflicts with Crossing Vehicles (note this is revised since CTF hand out)
2c. Vehicle/Bike Conflicts at Side Streets (combined into 2b)
2d. Pavement Condition
2e. Bike Facility Improvements
2f. Bike Network Connections
2g. Corridor Travel Time
2h. Bike Crossings
## 2a. Separation of Bikes and Arterial Traffic

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater separation is a factor related to bicyclist safety and comfort, and therefore likely bicycle use of Broadway</td>
<td></td>
</tr>
<tr>
<td><strong>Measurement</strong></td>
<td></td>
</tr>
<tr>
<td>Relationship of proposed separation compared to ITE Walkable Thoroughfares Manual recommendation of 6 feet</td>
<td></td>
</tr>
<tr>
<td><strong>Factors</strong></td>
<td></td>
</tr>
<tr>
<td>Combination of bike lane and buffer (painted line or other) width</td>
<td></td>
</tr>
<tr>
<td>Buffer other than painted line</td>
<td></td>
</tr>
<tr>
<td>Location of transit stops (street side or median)</td>
<td></td>
</tr>
<tr>
<td><strong>Ability to Effect</strong></td>
<td>• High</td>
</tr>
<tr>
<td><strong>Ability to Evaluate</strong></td>
<td>• High for cross section and location of transit stops</td>
</tr>
<tr>
<td></td>
<td>• Low for intersections (crossings of bike lane for right turns)</td>
</tr>
</tbody>
</table>
## Bicycle Access and Mobility

### 2b. Bike Conflicts with Crossing Vehicles
*(note this is revised since CTF hand out, and includes the 2c perf. measure)*

<table>
<thead>
<tr>
<th>Description</th>
<th>• Vehicles cross bike lanes for a variety of reasons, the design and frequency of these crossings can effect bicyclist safety and comfort</th>
</tr>
</thead>
</table>
| Measurement | • Frequency and type of traffic crossing bike lanes  
• Length of uninterrupted bike lane  
• Design details of crossing area |
| Factors     | • Reducing number and length of crossing points  
• Design details of crossing area |
| Ability to Effect | • High |
| Ability to Evaluate | • Moderate at current level of design (location of transit stops and use of local access lanes)  
• Design does not include current details of site access or intersections |
## Bicycle Access and Mobility

### 2d. Pavement Condition

<table>
<thead>
<tr>
<th>Description</th>
<th>• Smooth pavement is a priority for bicyclist comfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>• Input from TDOT and Bicycle Advisory Committee</td>
</tr>
<tr>
<td></td>
<td>• Best practice guidance, possibly including NACTO Bike Guide</td>
</tr>
<tr>
<td>Factors</td>
<td>• Concrete with proper joint design versus asphalt</td>
</tr>
<tr>
<td>Ability to Effect</td>
<td>• High</td>
</tr>
<tr>
<td>Ability to Evaluate</td>
<td>• Low to none</td>
</tr>
<tr>
<td></td>
<td>• Pavement type not dependent on cross section design, except for potential for lower cost cross section concepts to allow for more budget to be spent on bike lane pavement</td>
</tr>
</tbody>
</table>
# 2e. Bike Facility Improvements

| Description | • Extent of bike racks, shade, drinking fountains, green pavement (bike boxes, etc.) and other features to serve bicyclists needs |
| Measurement | • % shade, number/frequency of design features  
• Qualitative evaluation |
| Factors | • Increase in number of features |
| Ability to Effect | • Minimal at the cross section and alignment level, beyond provision of enough area in streetside to allow for facilities. Evaluation of space is generally covered by measures 1a and 1b. |
| Ability to Evaluate | • Moderate at this level of design  
• Design does not currently include this level of design, but lower cost cross section concepts may allow more budget to be spent on bike facilities |
Bike Facility Improvements

Parking Lane Configuration

Crosswalk Setback Configuration
Wider corner radii, set back pedestrian crossing, and/or narrowed bikeway space, provides opportunity for queue box.

T-Intersection "Jughandle" Sidewalk Configuration
# Bicycle Access and Mobility

## 2f. Bike Network Connections

<table>
<thead>
<tr>
<th>Description</th>
<th>• Convenience and safety of access to surrounding bike network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>• Number, length, and quality of connections to bike network</td>
</tr>
</tbody>
</table>
| Factors     | • Allowing bikes through any side street closures for vehicles  
|             | • Provision of bike crossings and proximity to bike network |
| Ability to Effect | • High |
| Ability to Evaluate | • Low at this level of design  
| | • Quality of environment along Broadway and crossings are measured through #2a, #2b, and #2h  
| | • Other factors require alignment and crossing design |
## 2g. Corridor Travel Time

<table>
<thead>
<tr>
<th>Description</th>
<th>The time it takes for average and advanced riders to travel the length of Broadway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>VISSIM analysis of travel time and signal delay</td>
</tr>
<tr>
<td>Factors</td>
<td>Signal timing</td>
</tr>
<tr>
<td></td>
<td>#2b Bike Conflicts with Crossing Vehicles</td>
</tr>
<tr>
<td>Ability to Effect</td>
<td>High</td>
</tr>
<tr>
<td>Ability to Evaluate</td>
<td>Not viable at current level of design and requires alignment and intersection design</td>
</tr>
</tbody>
</table>
# Bicycle Access and Mobility

## 2h. Bike Crossings

| Description | • Convenience and safety of bike crossings will support bike use |
| Measurement | • Frequency and length of crossings  
• Average signal delay at crossings (VISSIM analysis) |
| Factors | • Width and number of lanes (through and turn)  
• Width and number of medians  
• Level of bicycle comfort in medians  
• Frequency of crossings  
• Signal timing design (VISSIM analysis) |
| Ability to Effect | • High |
| Ability to Evaluate | • Moderate at this phase – several factors are directly related to cross section design, several are not |
Transit Access and Mobility

3a. Distance to Transit Stops
3b. Transit Stop Facilities
3c. Corridor Travel Time
3d. Schedule Adherence
3e. Frequency and Hours of Service
3f. Accommodation of Future High Capacity Transit
3g. Riders per Vehicle
# Transit Access and Mobility

## 3a. Distance to Transit

<table>
<thead>
<tr>
<th>Description</th>
<th>Number and location of transit stops and the number of households, jobs, and services within walking distance has an relationship to transit ridership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>Number of households, jobs, and square feet of commercial use within walking distance of transit stops</td>
</tr>
</tbody>
</table>
| Factors     | 1d. Walkable Network/Neighborhood Connections  
              1h. Walkable Destinations  
              Several non-transportation performance measures |
| Ability to Effect | Low to Moderate |
| Ability to Evaluate | Low to None  
                       Other factors require alignment and crossing design  
                       Land use policies related to non-transportation measures are not part of this project |
### 3b. Transit Stop Facilities

| Description | • Design qualities of transit stops can support transit use |
| Measurement | • % shade, lighting levels and consistency, number/frequency of other design features  
• Qualitative evaluation by designers and users |
| Factors | • Provision for and increase in number of features |
| Ability to Effect | • High |
| Ability to Evaluate | • Low at this level of design, right of way could be increased at transit stops to provide space for facilities  
• Design does not currently include details for streetscape design, but lower cost cross section concepts may allow more budget to be spent on transit facilities |
## 3c. Corridor Travel Time

<table>
<thead>
<tr>
<th>Description</th>
<th>Time for traveling the length of the corridor affects transit ridership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>VISSIM results accounting for signal timing, transit priority treatments, traffic delay, merges, and boarding time at transit stops</td>
</tr>
<tr>
<td>Factors</td>
<td>Dedicated lanes, transit priority treatments at intersections, level boarding, off-vehicle ticketing, and other measures</td>
</tr>
<tr>
<td>Ability to Effect</td>
<td>Moderate to High</td>
</tr>
</tbody>
</table>
| Ability to Evaluate | Low to Moderate at current level of design (presence of transit only lanes)  
Other factors require higher level of design and commitments from Sun Tran |
## Transit Access and Mobility

<table>
<thead>
<tr>
<th>3d. Schedule Adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Measurement</strong></td>
</tr>
<tr>
<td><strong>Factors</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Ability to Effect</strong></td>
</tr>
<tr>
<td><strong>Ability to Evaluate</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
## Transit Access and Mobility

### 3e. Frequency and Hours of Service

<table>
<thead>
<tr>
<th>Description</th>
<th>How frequently transit vehicles arrive at a stop and the hours of service can affect transit ridership levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement</td>
<td>This is a Sun Trans operations issue for the most part • Potential service efficiencies related to other transit performance measures could provide Sun Trans the opportunity to increase service levels along Broadway</td>
</tr>
<tr>
<td>Factors</td>
<td>Service efficiencies related to other transit performance measures</td>
</tr>
<tr>
<td>Ability to Effect</td>
<td>Low</td>
</tr>
<tr>
<td>Ability to Evaluate</td>
<td>None</td>
</tr>
</tbody>
</table>
# 3f. Accommodation of Future High Capacity Transit

| Description | • The ability of the roadway and roadside design to accommodate future high capacity transit can ultimately improve performance of design concepts in relation to other transit performance measures  
• Also affects long term viability of the design concept, see 5g Certainty |
| Measurement | • Provision of dedicated transit lanes  
• Roadside or median width allows for future transit improvements |
| Factors | • Provision of dedicated transit lanes  
• Roadside or median width allows for future transit improvements |
| Ability to Effect | • High |
| Ability to Evaluate | • Low to Moderate at this level of design  
• Provision of dedicated lanes  
• Right of way could be increased at transit stops to provide space for facilities  
• Design does not currently include details of intersection design |
# Transit Access and Mobility

## 3g. Riders per Vehicle

| Description | • Efficiencies in number of riders per vehicle, while avoiding overcrowded, improve cost performance of service and potentially cost to riders (also can reduce pollution per person trip) |
| Measurement | • Average daily rider per transit vehicle  
• Average riders per peak hour transit vehicle  
• Using transportation model and transit service assumptions |
| Factors | • Other transit performance measures that effect transit ridership and service efficiencies  
• Service planning by Sun Trans |
| Ability to Effect | • Low to Moderate |
| Ability to Evaluate | • Cannot be measured at current level of design |
Vehicular Access and Mobility

4a. Movement of Through Traffic
4b. Intersection Delay – Overall Intersection Performance
4c. Intersection Delay – Worst Movement
4d. Accident Potential
4e. Lane Continuity
4f. Persons per Vehicle or Person Trips
4a. Movement of Through Traffic

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A range of corridor and intersection evaluations can measure effectiveness</td>
<td>of moving through traffic which can have an affect on a variety of</td>
<td>other transportation, environment, and economic factors.</td>
</tr>
<tr>
<td>Number of traffic lanes</td>
<td>Number of traffic lanes</td>
<td>Number of traffic lanes</td>
</tr>
<tr>
<td>Signal design</td>
<td>Signal design</td>
<td>Signal design</td>
</tr>
<tr>
<td>Intersection design</td>
<td>Intersection design</td>
<td>Intersection design</td>
</tr>
<tr>
<td>Access management</td>
<td>Access management</td>
<td>Access management</td>
</tr>
<tr>
<td>Transit service design</td>
<td>Transit service design</td>
<td>Transit service design</td>
</tr>
<tr>
<td>Ability to Effect</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Ability to Evaluate</td>
<td>Moderate at current level of design as only number of traffic</td>
<td>Moderate at current level of design as only number of traffic</td>
</tr>
<tr>
<td></td>
<td>lanes and presence of transit only lanes are defined</td>
<td>lanes and presence of transit only lanes are defined</td>
</tr>
</tbody>
</table>
## Vehicular Access and Mobility

### 4b. Intersection Delay – Overall Intersection Performance

<table>
<thead>
<tr>
<th>Description</th>
<th>• Intersection delay for both Broadway and cross street traffic has an effect on the overall street network in the project area (and potentially beyond)</th>
</tr>
</thead>
</table>
| Measurement                                                                 | • Traffic modeling  
  - Average 95 percentile queue length  
  - Average delay  
  - Volume to Capacity Ratio (V/C) |
| Factors                                                                      | • Number of through and turn lanes  
  • Length of turn lanes  
  • Signal design, including crossing time considerations for pedestrians and bicycles  
  • Transit priority treatments  
  • Other intersection design features |
| Ability to Effect                                                           | • High |
| Ability to Evaluate                                                         | • Low to None  
  • Intersection design is not a part of current design concepts |
# Vehicular Access and Mobility

## 4b. Intersection Delay – Worst Movement

<table>
<thead>
<tr>
<th>Description</th>
<th>• Intersection delay for worst movement at intersections has an effect on the overall street network in the project area (and potentially beyond)</th>
</tr>
</thead>
</table>
| Measurement | • Traffic modeling  
• Average 95 percentile queue length  
• Average delay  
• Volume to Capacity Ratio (V/C) |
| Factors     | • Number of through and turn lanes  
• Length of turn lanes  
• Signal design, including crossing time considerations for pedestrians and bicycles  
• Transit priority treatments  
• Other intersection design features |
| Ability to Effect | • High |
| Ability to Evaluate | • Low to None  
• Intersection design is not a part of current design concepts |
# Vehicular Access and Mobility

## 4d. Accident Potential

| Description | • Certain factors have been identified in the literature as contributing to higher accident rates and severity of accidents |
| Measurement | • Based on review of the literature quantitatively and qualitatively evaluate certain design features and design criteria |
| Factors | • Number of access points to adjacent properties  
• Number of side street access points  
• 4e Lane continuity  
• Amount of bike lane cross over length  
• Others? |
| Ability to Effect | • High |
| Ability to Evaluate | • Low to None at current level of design |
### 4e. Lane Continuity

<table>
<thead>
<tr>
<th>Description</th>
<th>• Merging the number of lanes in the roadway cross section following an intersection or for other reasons decreases roadway capacity and increases potential for crashes</th>
</tr>
</thead>
</table>
| Measurement                                      | • Analyze performance of lane reductions using VISSIM  
• Compare with performance of similar lane reductions in Tucson |
| Factors                                          | • Number and design of lane drop locations |
| Ability to Effect                                | • High |
| Ability to Evaluate                              | • Low to None, currently design concepts do not propose additional through lanes at intersections |
## Vehicular Access and Mobility

### 4f. Persons-per-Vehicle-or Person Trips for multiple measures

<table>
<thead>
<tr>
<th>Description</th>
<th>Multi-modal measures allowing evaluations on a per person basis</th>
</tr>
</thead>
</table>
| Measurement | Convert vehicle, transit, and bicycle trips to person trips for the corridor  
Use traffic model and VISSIM to assess different modal performance for:  
- Corridor travel time  
- Average delay  
- Travel time reliability  
- Other measures as appropriate |
| Factors | Number of traffic lanes  
Signal design/timing  
Intersection design  
Access management  
Transit service design  
#2b Bike Conflicts with Crossing Vehicles  
Dedicated transit lanes, transit priority treatments at intersections, level boarding, off-vehicle ticketing, and other measures |
| Ability to Effect | High |
| Ability to Evaluate | Not viable at current level of design  
Requires alignment and intersection design |
CTF Discussion

• Overall summary discussion of potential additional measures, refinements, etc.
Initial Cross Section Concepts

Phil Erickson
Community Design + Architecture

Mike Johnson
HDR Engineering
Initial Cross Section Concepts

• Exploring range of potential design solutions based on community input to date
• Five “families” of concepts based on number and function of travel lanes
• Range of types and widths of roadway, roadside, and landscape element “cards”
• To be used in initial evaluations and next round of public and stakeholder agency review and comment
Initial Cross Section Concepts

• Agenda for this item:
  – Overview of section cards
  – CTF discussion of section cards
  – Overview of initial concepts
  – CTF discussion of other options, issues, etc.
Cross Section Cards

- Roadway lanes
- Sidewalk and associated landscaping
- Medians
- Local access lane, sidewalk, and landscaping
Sidewalks & Associated Landscaping
Medians

- 9' MEDIAN
- 13' MEDIAN (WITH TURN POCKET)
- 20' MEDIAN (TURN POCKET and PEDESTRIAN REFUGE BEYOND)
- 24' MEDIAN (TURN POCKET and PEDESTRIAN REFUGE BEYOND)

9' MEDIAN
13' MEDIAN with EUCALYPTUS
20' CENTER MEDIAN with eucalyptus
24' MEDIAN with Sonoran Desert shade tree

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BROADWAY BOULEVARD EUCLID to COUNTRY CLUB
Local Access Lane
“Families” of Cross Sections

- Four lane
- Four lane plus transit lanes
- Six lane
- Six lane plus transit lanes
- Local access lanes
“Families” of Cross Sections

• Dimension range for Cross Section Families

  – Four lane 92 to 130 feet
  – Four lane plus transit lanes 116 to 154 feet
  – Six lane 114 to 152 feet
  – Six lane plus transit lanes 138 to 172 feet
  – Local access lanes 118 to 166 feet
Four Lane
Potential R.O.W. Range – 92 to 130 feet

Option A: 97’ Right-of-Way
Four Lane

Potential R.O.W. Range – 92 to 130 feet

Option B: 119’ Right-of-Way
Four Lane plus Transit Lanes

Potential R.O.W. Range – 116 to 154 feet

Option A: 121’ Right-of-Way
Four Lane plus Transit Lanes

Potential R.O.W. Range – 116 to 154 feet

Option B: 150’ Right-of-Way
Six Lane
Potential R.O.W. Range – 114 to 152 feet

Option A: 125’ Right-of-Way
Six Lane
Potential R.O.W. Range – 114 to 152 feet

Option B: 152’ Right-of-Way
Six Lane plus Transit Lanes

Potential R.O.W. Range – 138 to 172 feet

Option A: 143’ Right-of-Way
Six Lane plus Transit Lanes

Potential R.O.W. Range – 138 to 172 feet

Option B: 172’ Right-of-Way
Local Access Lane

Potential R.O.W. Range – 118 to 166 feet

Option A: 4 Lane with Local Access Lane - 119’ Right-of-Way
Local Access Lane
Potential R.O.W. Range – 118 to 166 feet

Option B: 6 Lane with Local Access Lane - 141’ Right-of-Way
CTF Discussion

• Are there additional “Families” of design approaches to add?

• Are there additional cross section options we should illustrate?

• Are there cross section options we should eliminate?

• Other issues to discuss?
Call to the Audience

10 Minutes

Please limit comments to 3 minutes

• Called forward in order received
• CTF members cannot discuss matters raised
• CTF cannot take action on matters raised
• CTF members can ask project team to review an item
Next Steps/Roundtable

Jenn Toothaker Burdick

- Next CTF Meeting: Thursday, 5/23/2013
  5:30-8:30 p.m., Child & Family Resources

- Proposed Agenda:
  - Call to Order/Agenda Review
  - Call to the Audience
  - Draft “Non-Transportation Performance Measures
  - Discussion of Updated Initial Cross Section Examples
  - Discussion of Updated Transportation Performance Measures
  - Call to the Audience
  - Next Steps/CTF Roundtable
  - Adjourn
Thank You for Coming – Please Stay in Touch!

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Email: broadway@tucsonaz.gov
Info Line: 520.622.0815

RTA Plan
www.rtamobility.com