



City of Tucson Major Transit Investment Study

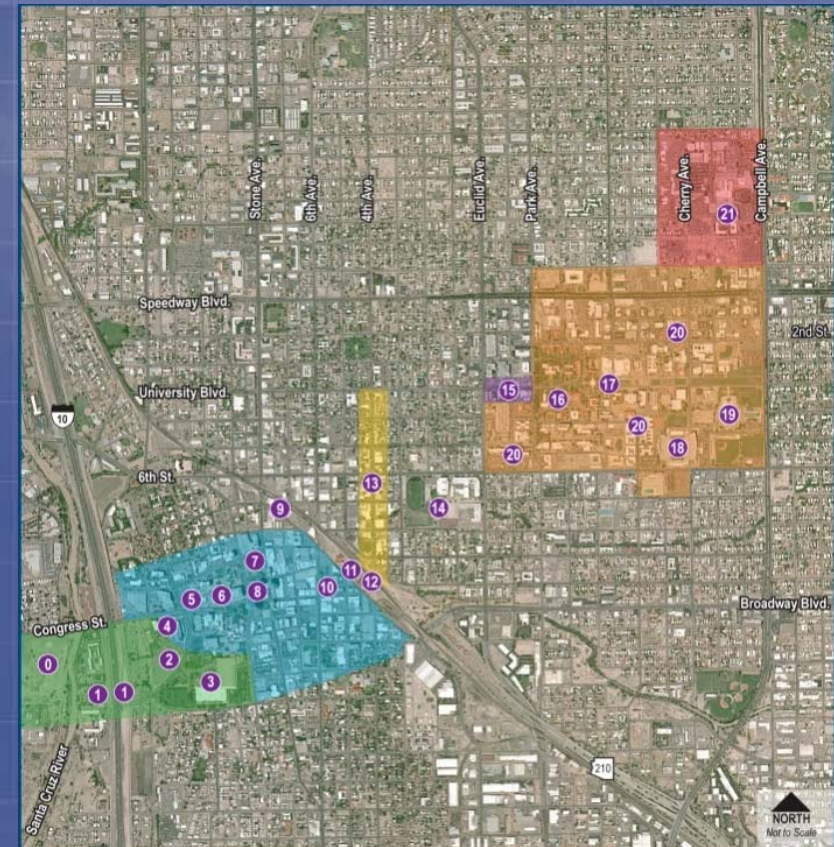
Technical Advisory Committee / Community Liaison Group
October 6, 2005





Why Is This Project Being Considered?

- Connect major activity centers
- Economic development
- Serve population and employment growth
- Improve transit service throughout the region
- Support UA growth and development
- Alternative to parking constraints
- Preserve neighborhoods



LEGEND

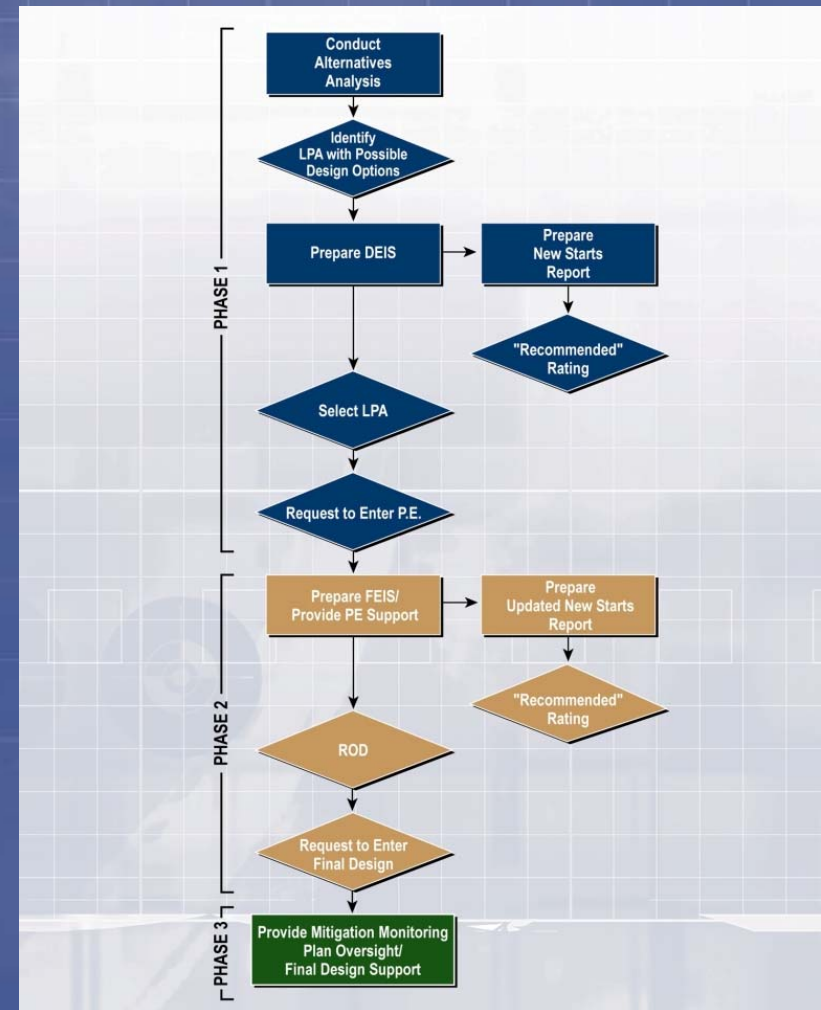
- Rio Nuevo Master Plan Area
- Downtown
- 4th Avenue Business District
- Main Gate Business District
- University of Arizona
- Arizona Health Science Center

- 0 El Mercado
- 1 University of Arizona Science Center
- 2 Civic Plaza / Civic Arena
- 3 Tucson Convention Center
- 4 Federal Courthouse
- 5 Tucson City Hall
- 6 Pima County Government Center
- 7 Main Public Library
- 8 Fox Theater
- 9 Warehouse Arts District
- 10 Ronstadt Transit Center
- 11 Historic Train Depot
- 12 New Fourth Avenue Underpass
- 13 Fourth Avenue Business District
- 14 Tucson High School
- 15 Main Gate Business District
- 16 Centennial Hall
- 17 University of Arizona
- 18 Arizona Stadium
- 19 McKale Center
- 20 University of Arizona Student Housing
- 21 Arizona Health Sciences Center



FTA Project Development Process

- Phase 1 – Alternatives Analysis / Draft Environmental Impact Statement (AA/DEIS)
- Phase 2 – Final Environmental Impact Statement / Preliminary Engineering (FEIS/PE)
- Final Design
- Construction
- Operation





Alternatives Evaluation

- **Tier 1 - Conceptual Screening**
 - Completed in April 2005
 - Analyzed a “long list” of transit alternatives
 - Eliminated alternatives that had fatal flaws

- **Tier 2 - Detailed Evaluation**
 - Analyzes “short list” of transit alternatives
 - Includes a schematic design evaluation that identifies plans/cross-sections, ROW, major utilities, transit stops, maintenance facility, bus service, and operating/capital costs
 - Identifies a recommended alternative



Evaluation Schedule

- Evaluation Methodology
 - November 2004
- Tier 1 - Conceptual Screening
 - January – April 2005
- Tier 2 - Detailed Evaluation
 - April – October 2005
- Recommendation to Mayor and Council
 - Fall 2005
- LPA
 - Winter 2005





Tier 1 - Technology Recommendations

- Advance:
 - Rapid Bus Circulator
 - Modern Streetcar
- Do not advance:
 - Historic Trolley*



- TAC and CLG approved this recommendation in March 2005

* *Historic trolley will be considered for operation in conjunction with modern streetcar but will no longer be considered as a primary technology.*



Tier 1 - Alignment Recommendations

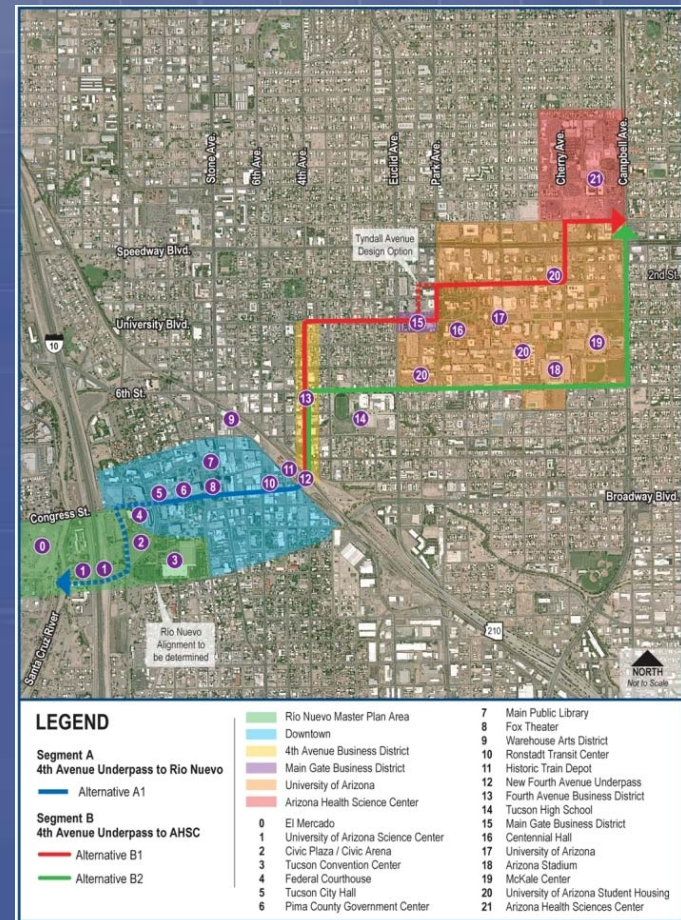
- **Advance:**
 - Segment A: Congress (two-way)
 - Segment B: University/2nd and 6th/Campbell
- **Do not advance:**
 - Segment A: Congress/Pennington
 - Segment B: Helen
- TAC and CLG approved this recommendation in March 2005





Tier 2 – Detailed Evaluation

- Transit Alternatives
 - Modern Streetcar A1/B1
 - Modern Streetcar A1/B2
 - Rapid Bus Circulator A1/B1
 - Rapid Bus Circulator A1/B2





Tier 2 Recommendation

- Evaluation Results

<u>Rank</u>	<u>Alternative</u>
1	Modern Streetcar A1/B1
2	Rapid Bus Circulator A1/B1
3	Modern Streetcar A1/B2
4	Rapid Bus Circulator A1/B2



Tier 2 Evaluation Criteria

- Rider benefits
- Land use
- Traffic issues
- Economic development
- Populations served
- Environmental issues
- Design issues
- Costs (Capital and Operating)



Rider Benefits

- **Modeling of Alternatives**
 - Model and validate existing transit trips
 - 2004 On-Board Bus Survey:
 - Transit operators (Sun Tran, Cat Tran, TICET)
 - Travel market (origins and destination)
 - Route level ridership volumes
 - Mode of access and time of day
 - Validation elements:
 - Bus route times
 - Bus boardings by route
 - Boardings / trip



Rider Benefits (cont.)

■ Modeling Procedure

- New model being developed
- Incremental logit – alternative approach developed with FTA
- Uses trips from survey as the basis
- Forecasts future transit use based on service changes
- Project transit technology



Rider Benefits (cont.)

- Alternatives Evaluated with Model
 - No-Build
 - Transportation System Management (TSM)
 - A1/B1*
 - A1/B2*

**Model does not differentiate between technologies*



Rider Benefits (cont.)

- **Future Growth**
 - Households, employment, and daily person trips

	2005	2030	Difference	
Households	363,601	610,630	247,029	68%
Employment	389,678	688,699	299,021	77%
Daily Trips	370,3212	6,322,253	2,619,041	71%
Daily Trips with Transit Access	2,187,086	2,554,357	367,271	17%
% Trips with Transit Access	59%	40%	-	-



Rider Benefits (cont.)

■ Ridership Results

- A1/B1 has more boardings per mile than Route 8 (5.4 vs. 3.3)
- A1/B1 ridership is almost 40 percent higher than A1/B2
- Does not include special event, visitor, direct demand markets
- These ridership estimates do not have capacity constraints

Alternative	Daily Boardings	Daily Service Miles	Boardings/Mile
A1/B1	4,217	778	5.4
A1/B2	3,423	799	4.3
Route 8	9,289	2816	3.3
Route 4	5,247	1656	3.2



Rider Benefits (cont.)

■ Next Steps

- Phase II use of the newly calibrated PAG Model
- Full travel forecasting model will provide information on all modes of travel and travelers characteristics
- What if scenarios? (fare increases, decreased highway capacity, and land use intensification)
- FTA user benefits information
- Special events modeling



Traffic Issues

- **A1 (Downtown/Río Nuevo)**
 - Substantial peak hour delay on two-way Congress Street
- **B1 (University/2nd)**
 - Low volume streets; no major roadway capacity issues
- **B2 (6th/Campbell)**
 - Substantial peak hour delay on 6th Street and Campbell
 - 25% increase in delay per vehicle in westbound direction
 - Left turn restrictions on 6th Street and Campbell



Economic Development

■ Opportunities

- Technology travel times are similar, so recommendation related to economic development
- Modern streetcar takes advantage of increased foot traffic, reduced parking, and mixed use development
- Buses can suffer from negative stereotypes (16th Street Mall in Denver is an exception)
- Development related to Portland Streetcar:
 - \$1.4 billion in private construction costs
 - 5,000 residential units; 3.7 million sq. feet. of non-residential

■ Modern streetcar documented to have more economic development potential



Environmental Issues

- **No environmental “fatal flaws”**
 - Minor property acquisitions for modern streetcar, including maintenance base
 - Almost entire study area is located within current or eligible National Register Historic Districts
 - Much of the study area is located within the 100 year floodplain
 - Noise and vibration analysis will be completed during the EIS
 - Maintenance facility sites likely contaminated given existing uses



Intangibles

- **Modern Streetcar vs. Rapid Bus Circulator**
 - User friendly
 - Creates new trips (Tacoma / San Francisco)
 - Heavily used for midday, entertainment, and special events
 - Fosters economic development
 - More sustainable operation





Costs

■ Capital Costs

- Modern streetcar is higher because it requires track and power infrastructure and utility relocation
- Modern streetcar uses OPT infrastructure for cost savings

Transit Alternative	Total Capital Cost (2005 dollars in millions)	Total Length (Miles)	Cost Per Mile (in millions)
Modern Streetcar A1/B1	\$89.2	3.61	\$24.7
Modern Streetcar A1/B2	\$92.7	3.40	\$27.3
Rapid Bus Circulator A1/B1	\$28.4	3.61	\$7.9
Rapid Bus Circulator A1/B2	\$28.9	3.40	\$8.5



Costs (cont.)

- **Operation and Maintenance (O&M) Costs**
 - Frequency: 10 minutes peak / 20 minutes off-peak
 - Hours of operation: 5 a.m. to 1 a.m. (Peak 6 a.m. to 6 p.m.)
 - O&M cost estimates do not include potential farebox recovery

Transit Alternative	First-Year O&M Costs (in millions)		20-Year O&M Costs (in millions)	
Modern Streetcar A1/B1	\$3.3		\$66.0	
Modern Streetcar A1/B2	\$3.3		\$66.0	
Rapid Bus Circulator A1/B1	\$1.3	\$2.5	\$33.9	\$67.8
Rapid Bus Circulator A1/B2	\$1.2	\$2.4	\$32.4	\$64.7



Tier 2 Evaluation Results

- **Modern Streetcar A1/B1 (2nd/University)**
 - Pro
 - Highest ridership potential
 - Most people carrying capacity
 - Better access to UA and 4th Avenue
 - Least impact on traffic of modern streetcar alternatives
 - Lower operating cost over the long term
 - Greatest economic development potential
 - Integrates well with Sun Tran
 - Enhances Old Pueblo Trolley
 - Con
 - Higher operating cost in the short term
 - Second highest capital cost





Tier 2 Evaluation Results (cont.)

- Modern Streetcar A1/B2 (6th/Campbell)
 - Pro
 - Most people carrying capacity
 - Lower operating cost over the long term
 - Enhances Old Pueblo Trolley
 - Con
 - Lowest ridership
 - Impacts on 6th Street and Campbell Avenue
 - Highest capital cost
 - Misses major activity centers (Main Gate, central UA campus)
 - No central UA transfer point





Tier 2 Evaluation Results (cont.)

■ Rapid Bus Circulator A1/B1 (2nd/University)

• Pro

- Highest ridership
- Lowest capital cost
- Better access to UA and 4th Avenue
- Least impact on traffic
- Integrates well with Sun Tran

• Con

- Less people carrying capacity
- Higher operating cost in the long term
- Less economic development potential
- No enhancement to Old Pueblo Trolley





Tier 2 Evaluation Results (cont.)

- Rapid Bus Circulator A1/B2 (6th/Campbell)
 - Pro
 - Second lowest capital cost
 - Con
 - Lowest ridership
 - Impacts on 6th Street and Campbell Avenue
 - Misses Main Gate and UA
 - No central UA transfer point
 - Less people carrying capacity
 - Higher operating cost in the long term
 - Lowest economic development potential
 - No enhancement to Old Pueblo Trolley





Tier 2 Recommendation

- Evaluation Results

<u>Rank</u>	<u>Alternative</u>
1	Modern Streetcar A1/B1
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3	Modern Streetcar A1/B2
4	Rapid Bus Circulator A1/B2



Next Steps

- Feedback from TAC and CLG
- Incorporate comments into Tier 2 Report
- Present the recommended alternative to Mayor and Council