TRAFFIC ANALYSIS PROCESS

INPUT DATA
- -- Traffic counts
- -- Bus ridership data
- -- Bicycle counts
- -- Pedestrian counts
- -- Accident data

GROWTH PROJECTIONS
- -- Population projections
- -- Adopted land use plans
- -- Regional traffic projections
- -- Other programmed improvements

ANALYSIS PROCESS

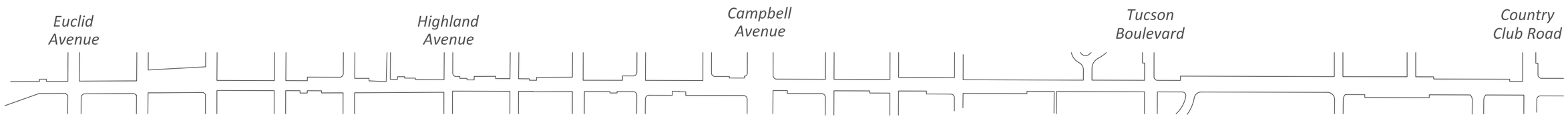
Based on procedures developed by the Transportation Research Board
- -- 2010 Highway Capacity Manual
- -- Synchro 7 intersection analysis software
- -- VISSIM micro-simulation traffic modeling software

These are industry-wide procedures typically used by municipalities and other transportation agencies nation-wide.

OUTPUT

Anticipated performance of various transportation modes
- -- Vehicular traffic
- -- Transit (bus) system
- -- Level of Service for bicyclists
- -- Level of Service for pedestrians

MULITIMODAL TRANSPORTATION STUDIES RESULTS TO DATE



SIGNALIZED INTERSECTION DELAY

Delays (Seconds)	Euclid Avenue Intersection Average	Euclid Avenue Worst Movement	Highland Avenue Intersection Average	Highland Avenue Worst Movement	Campbell Avenue Intersection Average	Campbell Avenue Worst Movement	Tucson Boulevard Intersection Average	Tucson Boulevard Worst Movement	Country Club Road Intersection Average	Country Club Road Worst Movement
Existing Conditions	45	n/a	11	n/a	48	n/a	24	n/a	42	n/a
Six Lane Section PAG 2040 Growth Projection	34	46	13	48	54	115	22	52	74	221
Four Lane Section PAG 2040 Growth Projection	64	126	17	61	104	254	56	95	106	389
Four Lane Section Lowered Growth Projection	45	83	14	48	93	244	46	76	92	374

Design Standard

Very Good	Less than 35
Design Target	35 to 55
Acceptable in certain circumstances	55 - 80
Unacceptable	Over 80

GENERAL CORRIDOR PERFORMANCE

Based on Synchro results for two-mile length from Euclid to Country Club during PM peak hour	Travel Time (mins)	Average Speed (mph)
Existing Conditions	6.5	25.6
Six Lane Section -- Regional Growth Projection	6.7	18.9
Four Lane Section -- Regional Growth Projection	13.8	9.1
Four Lane Section -- Lowered Growth Projection	12.4	10.2

CONCLUSIONS TO DATE

1. Broadway will function acceptably with six lanes except for some turn movements under current PAG 2040 traffic growth projections. It will not, however, function as well as currently.
2. Broadway will not function acceptably with just four travel lanes.
3. Providing dedicated transit lanes will marginally improve bus and arterial performance (15% ±)

EFFECT OF ELIMINATING TRANSIT LANES

Micro-Simulation of roadway extending from just west of Cherry to just east of Tucson Blvd	Arterial Traffic: With Transit Lanes (8-Lane Section)	Arterial Traffic: Without Transit Lanes (6-Lane Section)	Arterial Traffic: Percent Change	Buses: Transit Lanes (8-Lane Section)	Buses: Without Transit Lanes (6-Lane Section)	Buses: Percent Change
Average Delay Time (seconds)	78.8	79.3	0.6%	92.6	103.3	11.6%
Average Number of Stops	2.12	2.16	1.9%	1.37	1.58	15.3%
Average Speed (mph)	17.3	17.1	-0.2%	16.3	15.3	-6.1%
Average EB Travel Time (secs)	160	170	6.3%	262	263	--
Average WB Travel Time (secs)	142	161	13.4%	230	255	10.9%

Note that this simulation is based on PM peak hour traffic. An analysis for AM peak hour has not been performed but would be expected to produce an average EB travel time similar to the WB travel time shown here.

INITIAL EXPERIMENTAL APPLICATION EPA PERFORMANCE MEASURES (1)

	Number of 11' Travel Lanes	Bike Lane Width	Sidewalk/Buffer Width	Traffic Score (LOS)	Transit Score (LOS)	Bicycle Score (LOS)	Pedestrian Score (LOS)
Six-Lane Section, 5' Bike Lane	6	5'	6' / 1'	2.65 (C)	1.27 (A)	4.45 (E)	3.20 (C)
Six-Lane Section, 6' Bike Lane	6	6'	6' / 1'	2.65 (C)	1.27 (A)	4.34 (E)	3.19 (C)
Eight-Lane Section	6	12' (2)	6' / 1'	2.58 (C)	0.25 (A)	2.58 (C)	3.12 (C)

(1) Scores and levels of service calculated using procedures of the Transportation Research Board's *2010 Highway Capacity Manual* as referenced by EPA 's "Guide to Sustainable Transportation Performance Measures"

(2) Mimics effect of bikes separated from traffic by an outside transit lane.

CTF COMMENTS, SUGGESTIONS, AND CONCERNS TO DATE

REMARK	RESPONSE
Disagree with project traffic volumes.	Evaluate effect of lower growth rate to determine if lane requirements would be reduced. Analysis results presented above suggest that they would not for the configurations considered to date. (See following remark). See also accompanying board "TRAFFIC PROJECTIONS".
Try 6-lane section through intersections but narrow to four lanes elsewhere.	Project team to evaluate. See "TRAFFIC PROJECTIONS" board.
Questions the use of traditional "Level of Service" to measure roadway performance.	Other performance measures including those referenced by the EPA "Guide to Sustainable Transportation Performance Measures" are also being considered with some initial results shown above. See accompanying board.

TRAFFIC PROJECTIONS

	Current Avreage Daily Trips (ADT)	PAG Current Growth Projection			Lowered Growth Projection		
		2040 ADT	Change	Annual Increase	2040 ADT	Change	Annual Increase
West of Euclid	35,000	39,000	4,000	0.4%	37,500	2,500	0.2%
Euclid to Highland	34,000	41,000	7,000	0.7%	38,500	4,500	0.4%
Highland to Campbell	34,000	46,000	12,000	1.2%	42,000	8,000	0.8%
Campbell to Tucson Blvd	40,000	56,000	16,000	1.3%	50,500	10,500	0.9%
Tucson Blvd to Country Club	40,000	47,000	7,000	0.6%	44,500	4,500	0.4%
East of Country Club	41,000	53,000	12,000	1.0%	49,000	8,000	0.7%

Notes:

1. Current ADT (Average Daily Trips) based on most recent traffic counts available.
2. "PAG Current Growth Projection" is based on regional planning models currently in effect.
3. "Annual Increase" is based on equal annual rate increments over a 30-year period.
4. "Lowered Growth Projection" assumes that only 20-year projected volumes are reached in 30 years.

APPROXIMATE ADT THRESHOLDS FOR FOUR AND SIX LANE SECTIONS

Roadway Section	ADT Threshold
Four-lanes	34,000
Six-lanes	51,000

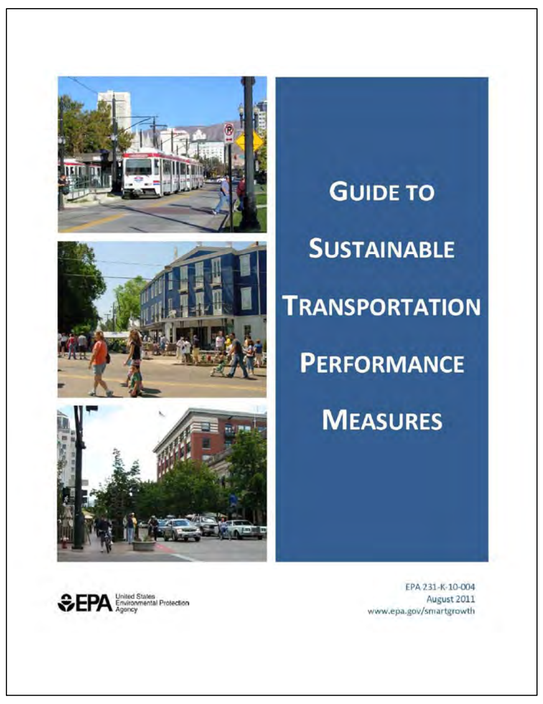
Lane requirements based on PAG experience in Pima County

CTF COMMENTS, SUGGESTIONS, AND CONCERNS TO DATE

REMARK	RESPONSE
Disagree with project traffic volumes.	Evaluating the effect of lower growth rate indicates that a four-lane option would still not provide acceptable performance. A four-lane section widened to six lanes through major intersections is still to be evaluated.

EPA GUIDE TO SUSTAINABLE TRANSPORTATION PERFORMANCE MEASURES

Reference: *Guide to Sustainable Transportation Performance Measures*, U.S. Environmental Protection Agency publication EPA 231-K-10-004; August, 2011



Purpose: *" . . . plan, build, and operate transportation systems that -- in addition to achieving the important goals of mobility and safety -- support a variety of environmental, economic, and social objectives."*

(Page 3 of reference)

EPA Performance Measure	Description	Suggested Evaluation Metrics	Plausible Policy and Design Measures
1. Transit Accessibility	Reflects the relative convenience of transit as a mode choice	Distance to transit stops Destinations accessible by transit	Focus on transit-promoting policies when considering density and mix of jobs, housing, and commercial activity in developing land use planning
2. Bicycle and PEdestrian Mode Share	Bicycling and walking are core elements of a sustainable transportation system	Proportion of trips taken by bicycle and walking mode	Provide land use mix and density conductive to bicycle activity Consider separation from traffic, number of driveways and unsignalized crossings of the bike path, and other elements that influence bicycle level of service
3. Vehicle Miles Traveled (VMT) per Capita	VTM contributes to congestion and air pollution	VMT per capita	Identified by EPA as a regional issue not applicable to individual projects. Choices regarding development of the Broadway corridor are not likely to affect VMT.
4. Carbon Intensity	CO_2 is the primary greenhouse gas emitted by transportation	Annual CO_2 produced by vehicles using Broadway	Approaches that reduce congestion will produce less greenhouse gass and other tailpipe emissions.
5. Mixed Land Uses	Conventional zoning often segregates residential from commercial land uses necessitating longer commutes to and from work	Ratio of jobs to housing -- should be as close to 1:1 as possible	Develop land use plan and roadway design to support mix of uses, reduce commute
6. Transportation Affordability	The ability of transportation system users to pat for transportation based on cost and income level	Annual cost of transportation relative to annual income.	Provide viable transportation and residential options.
7. Benefits by Income Group	The transportation system should not disproportionately burden low-income and minority communities.	Factors supporting viability transit system such as -- Distance to nearest transit stop -- Travel time to work and other destinations -- Availability of nighttime service -- Available low-cost transit options -- Frequency of service -- Degree of crowding -- Number and quality of bus shelters	Plan the corridor to support a viable transit system
8. Land Consumption	Compact development patterns and transportation investments that support these patters use land more efficiently.	Net loss of residential property Net loss of commercial property Net loss of historic structures Net loss of significant structures	Consider innovative approaches such as combining streetside improvements with private sidewalks and landscaping EPA focuses on open space, natural habitat, and so forth, and does not consider this criterion applicable to corridor studies
9. Bicycle and Pedestrian Activity/Safety	Primarily used to determine where bicycle and pedestrian improvements are justified.	Bicycles per day Pedestrian per day	Utilize landscaping, buffering, sufficiently wide sidewalks and bike lanes street furniture, and other element to create an appealing streetside design
10. Bicycle and Pedestrian Level of Service (LOS)	Historically level of service measures for bicycles and pedestrians focused on speed and minimizing delay. The Transportation Research Board's *2010 Highway Capacity Manual* significantly revises the approach to reflect comfort, safety and other factors that reflect the users' perspective.	Factors affecting bicycle LOS -- Traffic volume -- Directional and peak hour factors -- Number of through lanes -- Speed limit -- Percentage of trucks -- Surface condition -- Width of outside lane -- On-street parking -- Distance to outside travel lane -- Parking width (to right of bike lanes) Factors affecting pedestrian LOS -- Traffic volume -- Directional and peak hour factors -- Number of through lanes -- Traffic speed -- Buffer widths -- Sidewalk width -- Outside lane width -- On-street parking permitted -- Distance to outside travel lane -- Existence and spacing of trees	Utilize landscaping, buffering, sufficiently wide sidewalks and bike lanes street furniture, and other element to create an appealing streetside design
11. Average Vehicle Occupancy	Higher occupancy rates result in fewer vehicle on the roadway, reducing congestion.	Number of passengers per vehicle	Primarily depends on regional rather than individual project decisions and policies. Examples include car pooling programs, high-occupance vehicle (HOV) lanes, tools, and preferential parking.
12. Transit Productivity	Measures the return on investment in the transit system	Passenger miles traveled per vehicle revenue mile and other similar measures.	Plan the corridor to support a viable transit system (Same as 7 above)

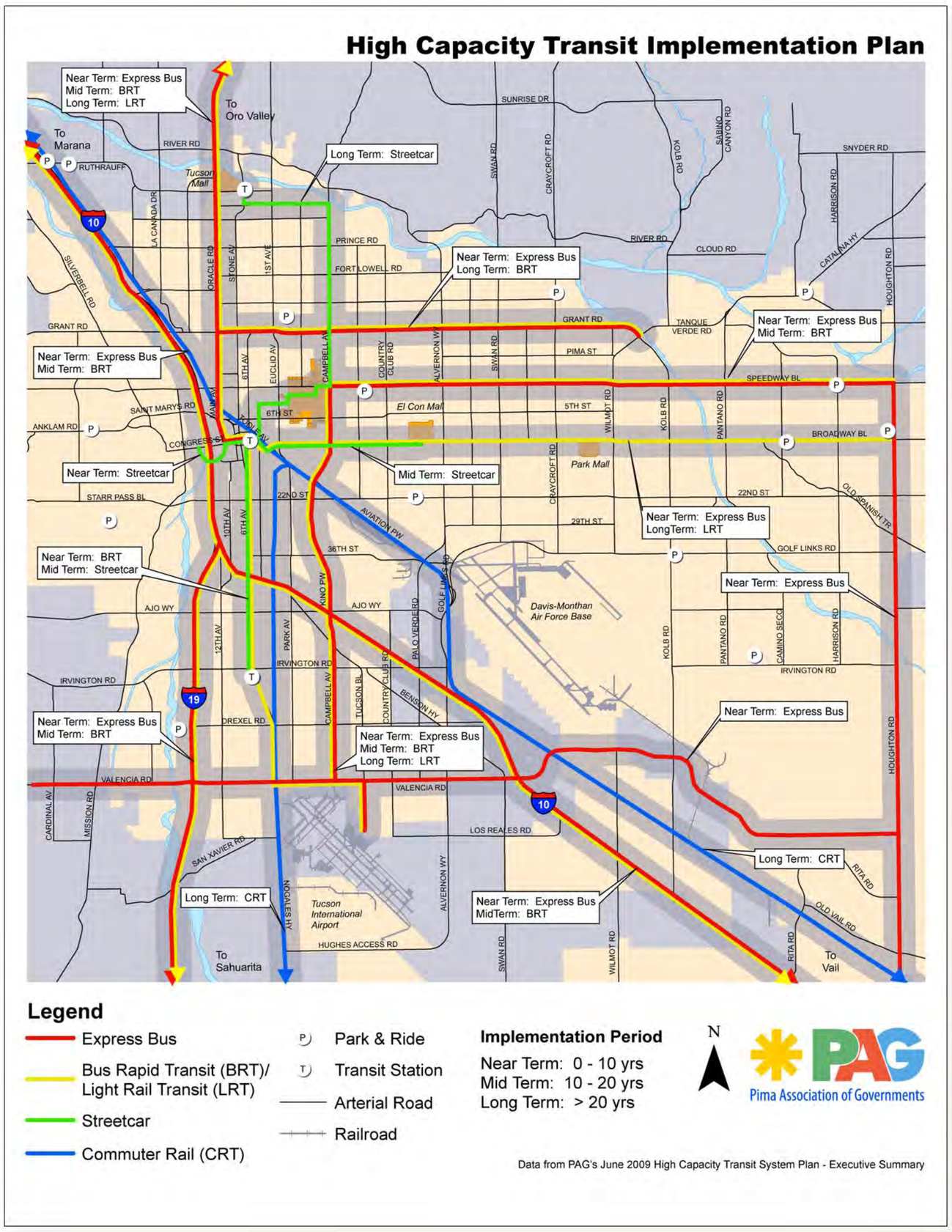
Transportation performance measures applicable for this project:

Transportation performance measures not applicable for this project:

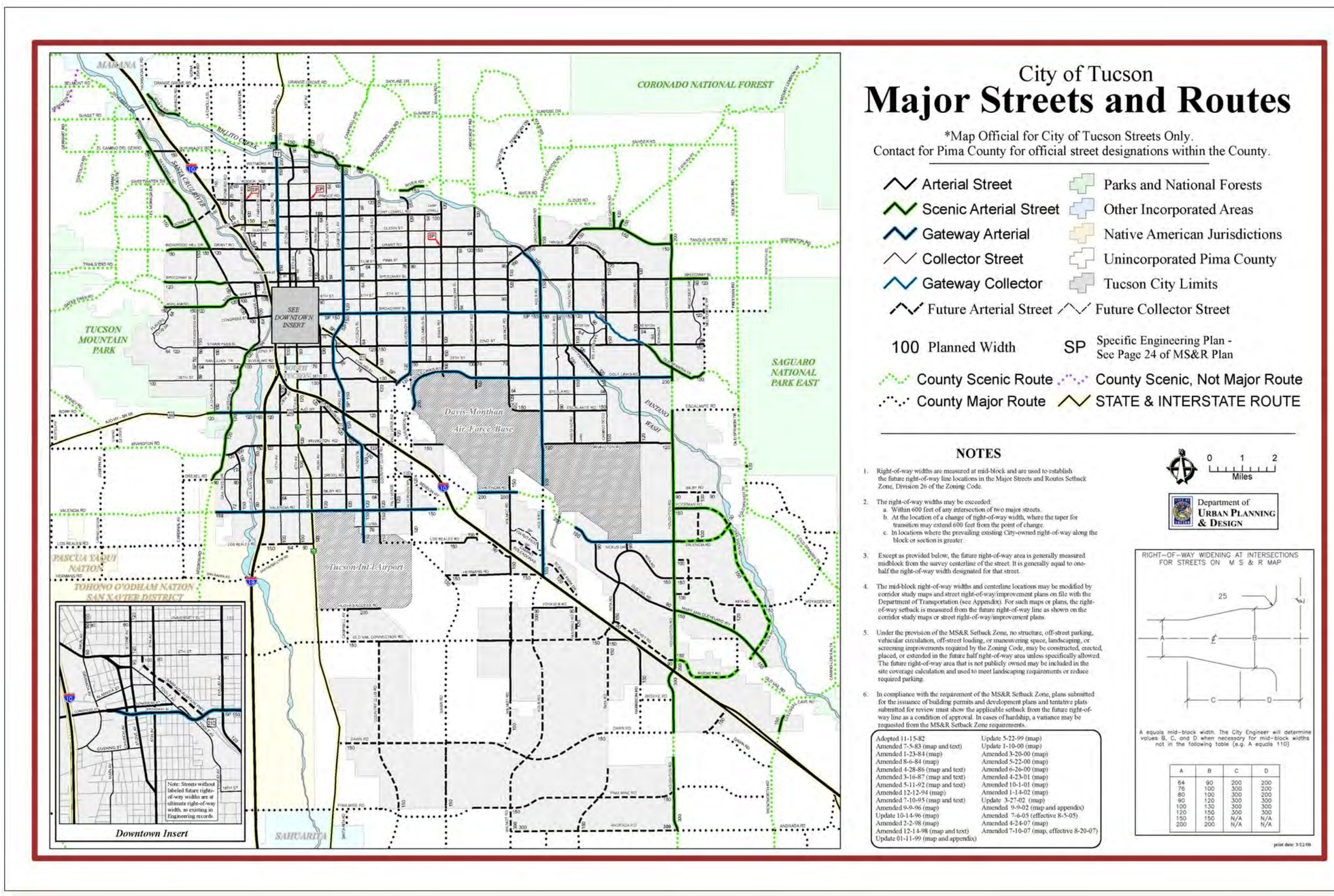
Non-transportation measures applicable for this project:

CTF COMMENTS, SUGGESTIONS, AND CONCERNS TO DATE

REMARK	RESPONSE
Questions the use of traditional "Level of Service" to measure roadway performance.	Follow recommendations of EPA's "Guide to Sustainable Transportation Performance Measures" as indicated above. Note that the guidelines of that document supplement rather than replace standard capacity considerations.



Various transportation improvement plans and studies exist for the region. The maps above depict different planned improvement projects and studies for the transportation network for the City of Tucson, Pima Association of Governments, and the Regional Transportation Authority that relate to or are near the Broadway project area.



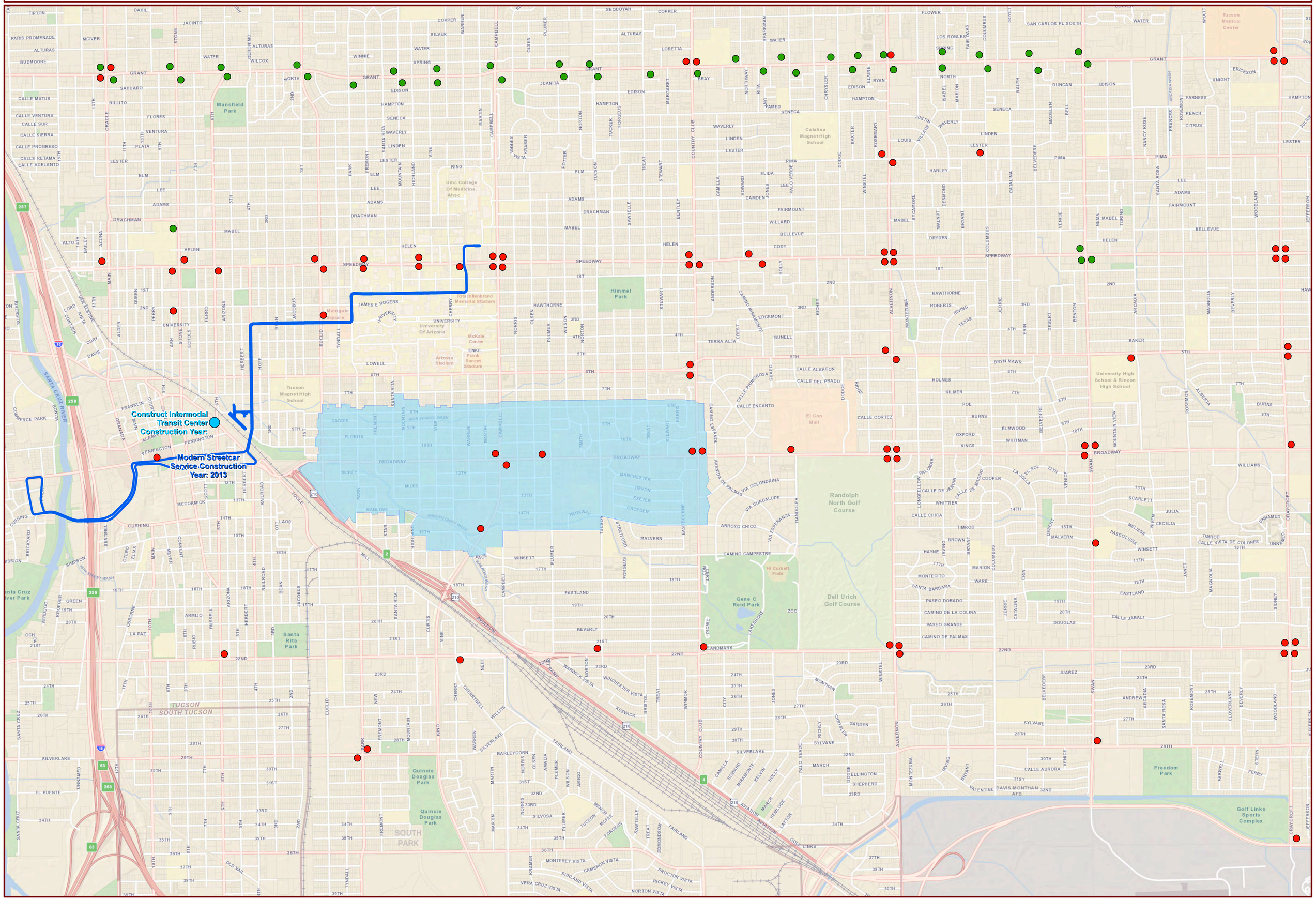
CITY OF TUCSON

DRAFT

Transit Improvements - I-10 to Swan Road

DRAFT

Planned / Programmed Improvement Projects



PAG/RTA Transportation Improvement Projects

Modern Streetcar & Maintenance Facility

PAG/RTA Intersection - Over/Underpass Improvement Projects

Construct Intermodal Transit Center

Bus Pullout / Pulloffs

Status

Planned

Constructed

Broadway Project Study Area

0 0.25 0.5 1 1.5 2 Miles

Date: 2/26/2013

Document Path: H:\Jim\Projects\JenBurdick\BroadwayOtherConstruction\Transit.mxd

CITY OF TUCSON

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Roadway Improvements - I-10 to Swan Road

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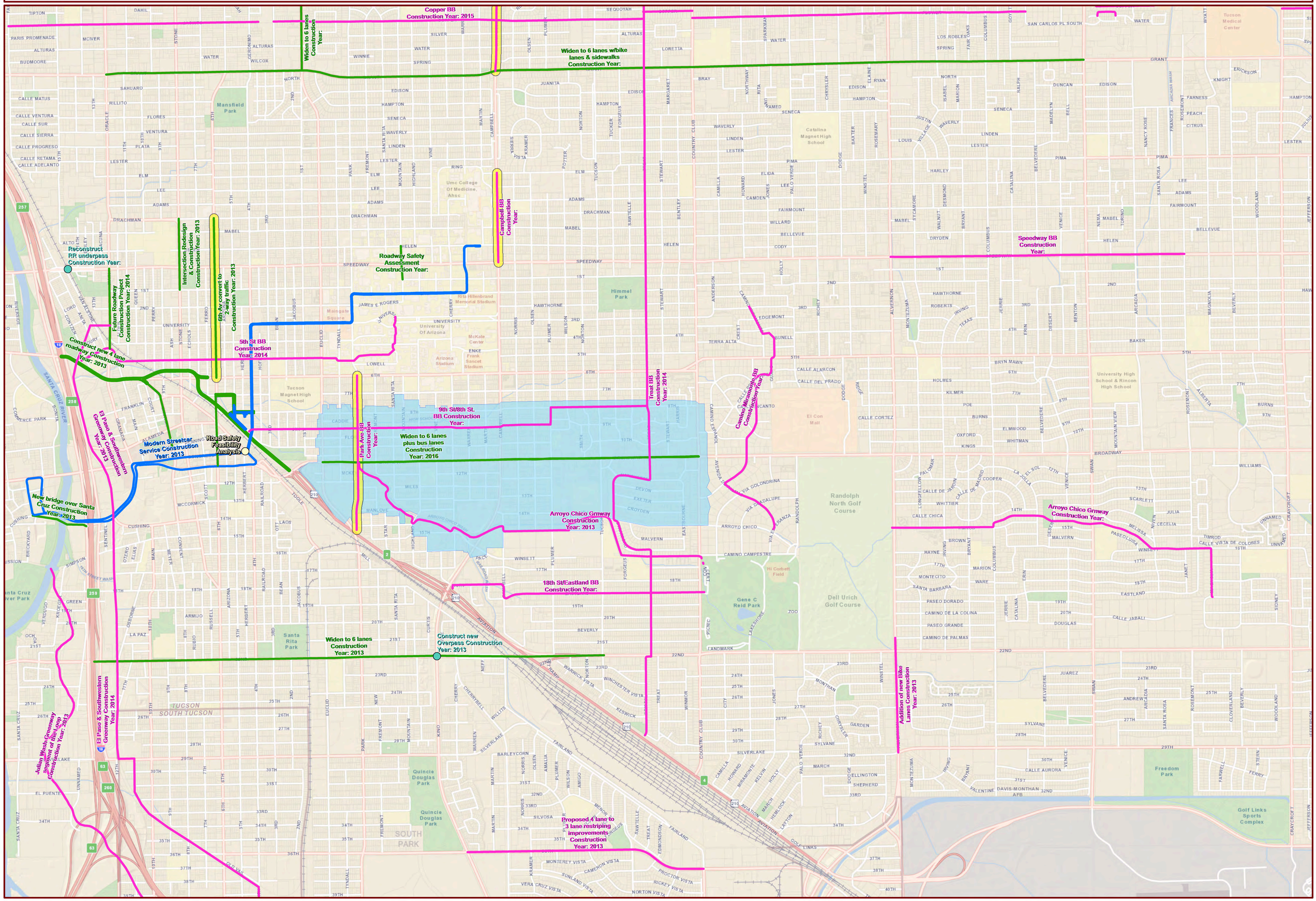
Planned / Programmed Improvement Projects



PAG/RTA Intersection - Over/Underpass Improvement Projects

- Overpass / Underpass Construction & Improvements
- Road Safety Feasibility Analysis

PAG/RTA Transportation Improvement Projects

- Bike/PED Construction & Improvement Projects
- PAG/RTA Transportation Improvement Projects
- Modern Streetcar & Maintenance Facility; Modern Streetcar Service

- Project Funding Secured
- Broadway Project Study Area

0 0.25 0.5 1 1.5 2 Miles

Date: 2/26/2013

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CITY OF TUCSON

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Bike & Pedestrian Improvements - I-10 to Swan Road

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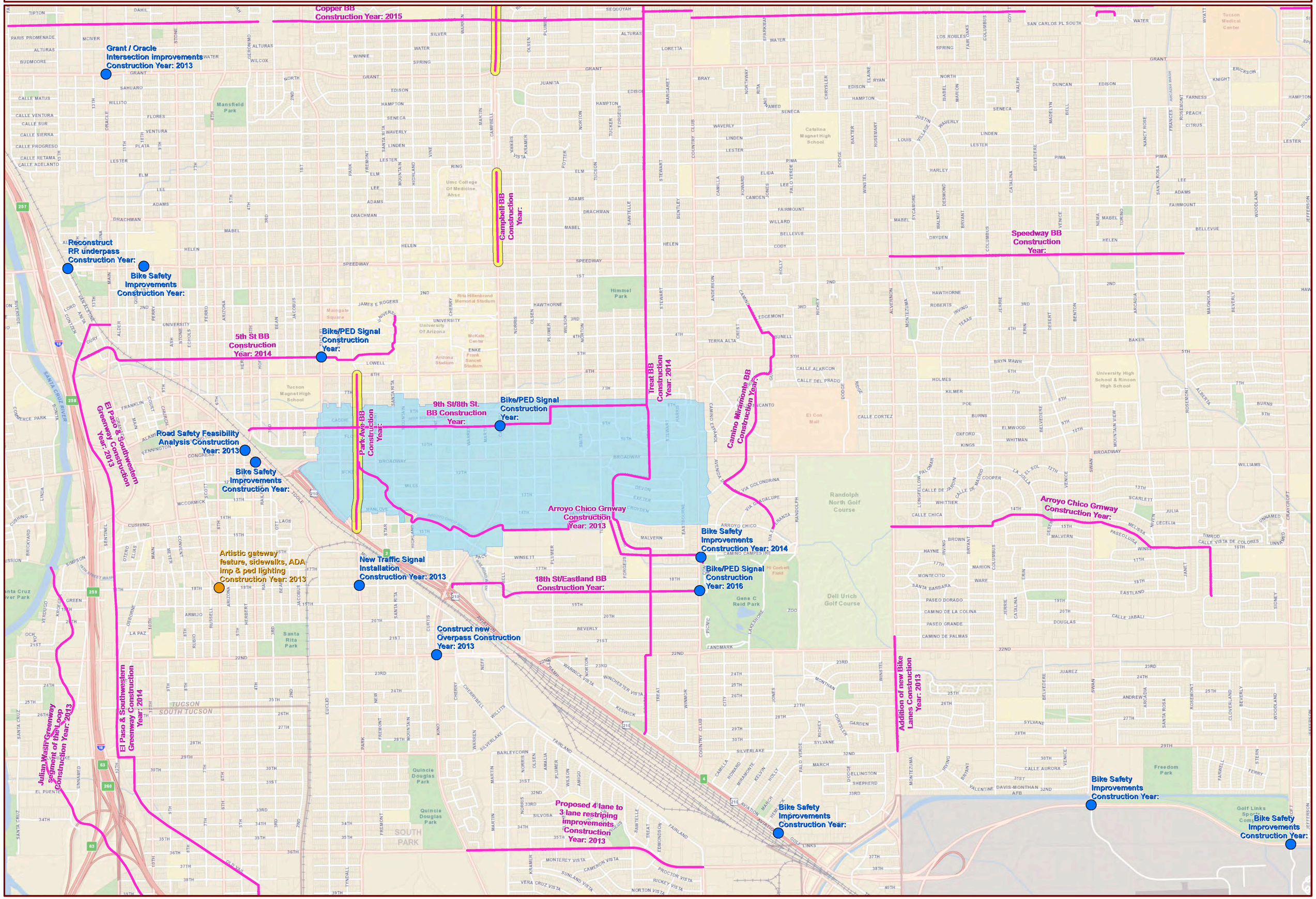
Planned / Programmed Improvement Projects

N W E S



PAG/RTA Intersection - Over/Underpass Improvement Projects

- Artistic gateway feature, Sidewalks, ADA improvements & Lighting
- Bike Safety / Intersection Improvements

PAG/RTA Transportation Improvement Projects

- Bike/PED Construction & Improvement Projects
- Funding Secured - Construction within 5 years
- Broadway Project Study Area

0 0.25 0.5 1 1.5 2 Miles

Date: 2/26/2013

Document Path: H:\Jim\Projects\JenBurdick\BroadwayOtherConstruction\BikePed.mxd

Multi-Modal Street Design

Public Input Received to Date

"I would like to know if you have considered the possibility of creating an overpass that goes from Country Club to Euclid Ave? This would allow traffic to continue underneath and prevent business loss."

"Forwarding City of Portland's Request for Proposal for developing an alternative to traditional Level of Service measures of their transportation system."

Comments collected through Call to the Audience

BROADWAY COALITION

TRANSPORTATION RESEARCH SUMMARIES

The enclosed sampling of transportation research and reports, all from 2012, reflect how current demographic and economic trends are affecting the transportation choices people make.

An aging population, rising fuel prices, increasing urbanization, economic constraints, increasing health and environmental concerns, etc. are reducing automobile travel demand and increasing demands for alternatives. Although automobile travel will not disappear, many people would prefer to drive less and rely more on walking, cycling, public transport and telework, provided those options are convenient, comfortable and affordable.

The Broadway Boulevard Citizens Task Force should consider the trends and conclusions presented in the attached reports when evaluating the validity of traffic studies and deliberating future design options.

1. AZDOT Study – Compact, Mixed –use Development Leads to Less Traffic (May 2012) http://dc.streetsblog.org/2012/05/18/arizona-dot-study-compact-mixed-use-development-leads-to-less-traffic/
2. Has the US Reached Peak Car (Scientific American, July 2012) http://www.scientificamerican.com/article.cfm?id=has-us-reached-peak-car-americans-driving-less
3. Americans Support New Transit Twice As Much As New Roads (Natural Resources Defense Council Poll, September 2012) http://dc.streetsblog.org/2012/09/12/nrdc-poll-twice-as-many-americans-want-transit-as-new-roads/
4. Public Transportation Ridership Use Surged in First Quarter 2012 (American Public Transportation Association, June 2012) http://www.apta.com/mediacenter/pressreleases/2012/Pages/120604_Ridership.aspx
5. Toward More Comprehensive Understanding of Traffic Congestion (September 2012) http://www.planetizen.com/node/58429
6. The Future Isn't What It Used To Be; Changing Trends and Their Implications for Transport Planning (Abstract, Victoria Transport Policy Institute, July 2012) *abstract and table of contents only – copies of full report can be obtained at* http://www.vtpi.org/future.pdf
7. Transportation and the New Generation; Why Young People are Driving Less and What it Means for Transportation Policy (Executive Summary, Frontier Group/US PIRG Education Fund, April 2012) *executive summary only – copies of full report can be obtained at* http://www.uspirg.org/reports/usp/transportation-and-new-generation

Received on 9/26/2012; links added by TDOT on 10/23/2012

Comments Related to the Broadway Meeting at August 30, 2012 CTF Meeting
(Spoken during Call to the Audience by Marc Fink, submitted 10/02/12 electronically)

1. The issue of functionality is the most important one. Before anything else, what the function of the Broadway Corridor needs to be determined. Is the corridor to be merely a transportation corridor for the movement of cars and other travelers OR is it to be a destination that also accommodates vehicular travel. It is clear from the input of the listening session in June that the overwhelming majority of people want Broadway to function as a place and destination (and many stated that they did not want any widening), so I would suggest that this is what the goal should be (i.e. make Broadway a destination). This also conforms to the language of the 1997 Bond, which calls Broadway Tucson's **Main Street** (capitalized in the bond language) which means that Broadway is something more than just a movement corridor.

2. According to Mr. DeGrood, the pledge to functionality is only a policy of the RTA, not a legal requirement; and functionality has not been defined, thereby leaving it up to the committee to decide. Further, RTA is legally required to consider changes in community desires. Also, RTA has a fiduciary responsibility to the taxpayers, which means that it needs to do a comprehensive cost-benefit analysis on various alternatives and to consider alternatives that are not as expensive, in terms of capital and acquisition costs, operations and maintenance costs, and the loss of property and tax revenues.

3. Regarding traffic studies:
   a) A report on Phoenix by the Arizona Department of Transportation ("Land Use and Congestion," Final Report 618, March 2012) states that smart growth will reduce congestion both locally and regionally. This means that by using Smart Growth principles, we can reduce congestion more than by just widening roads and that smart growth needs to be incorporated into the project. This reinforces the need to define functionality in terms of creating places and destinations.
   b) There have been numerous studies showing the impacts of induced demand; basically the idea of build it and they will drive. What these studies show is that widening roads can often create a greater demand and use of those facilities, thereby creating more congestion and the need to continually widen roads and thus creating a downward vicious cycle. Three such studies are: 1) from the European Journal of Transport and Infrastructure Research (Volume 12, Issue 3); 2) a 2011 study out of the University of Toronto, which looked at both US and Canadian roads; and 3) an article by Todd Litman, a leading transportation planner for the last several years, entitled "Generated Traffic: Implications for Transportation Planning" in the April, 2001 issue of the ITE (Institute of Traffic Engineers) Journal.
   c) Recent studies have shown that people are driving less and that this trend has been occurring over the last 6-10 years. This means that historical assumptions of driving behavior no longer applies and that the demand for increased transportation facilities is declining.
   d) Most transportation models do a poor job of incorporating changes in use of alternate modes, biking, walking and transit. These modes will see increased use with a greater use of Smart Growth. What this means for Broadway is that if it becomes a destination more people will use alternate modes and there will be less use of the individual auto. Therefore, it is important that the assumptions used in the PAG models be reviewed to insure that these changes are incorporated.

4. The use of Levels of Service (LOS) is not a good tool to use to evaluate transportation planning. Firstly, LOS does not work well in evaluating alternate modes. Secondly, LOS gets used as if it is a grading system; A is good and F is bad (just like in school). However, an A level of service actually means that the road (or other infrastructure) is being used inefficiently. Reliance on LOS will invariably bias planning to provide more roads and not look at other options.

Comments on 2012 Traffic Engineering Study posted on Broadway Project website

Ironically, the logo for the project depicts a bus bearing down on a bicyclist with nary a car in sight. This in itself is deceptive, as the report admits the expenditure of $74 million and destruction of $43.7 million worth of property will only marginally improve bus times and worsen conditions for bicyclists. Curiously, no pedestrians are depicted: perhaps the pedestrian has expired while standing on the center median trying to cross the street. This is because the main deficiency in this Traffic Study, indeed, is its continuing advocacy for adding traffic lanes for such minimal benefit, and in some cases active harm to other users of the street.

AGGRAVATING CONGESTION

1. p.1: reports traffic volumes ranging between 36,00 and 41,000 vehicles per day. This in itself is deceptive, since volumes of 41,000 were found only east of Country Club, that is, outside the study area. (p.15 Exhibit 10). Between Euclid & Country Club volumes remain between 30,000 and 40,000, as in the 1980s.
2. The report admits, also on p.1, that due to the bottleneck at Country Club created by Broadway Village on the south and the Chase Bank on the north, the Country Club intersection is expected to fail within 7-10 years from the completion of this $74 million project.

   Quote: At Country Club Road, dual left turn lanes and right-turn lanes are required to serve projected future turning demand, however due to constrained right-of-way, it is likely that only single left-turn lanes can be provided. As such, it is expected that this intersection will become congested during the evening peak traffic period based on 7-10 years of projected traffic growth.

The report contains other dubious observations about traffic volumes, but--What about other users of the street?

WORSE FOR PEDESTRIANS

3. The report admits the "improved" roadway will be worse for pedestrians, by forcing them to wait through 2 changes of lights to get across the street: existing pedestrian crossings at Cherry and Plumer will be redesigned as "2-stage crossings" pp. 2, 23, 29.

As a pedestrian, I am continually amazed that Tucson traffic engineers think it is just awful for a motorist comfortably seated in a climate-controlled vehicle to have to wait through 2 changes of lights to get across an intersection–but as for a pedestrian--an elderly person, a child, a disabled person in a wheelchair-- it's just fine for them to get halfway across the street in one change of lights, and then have to to hang around on a sunbaked median while traffic whizzes all around them belching exhaust, waiting for another change of lights to get to the other side of the same intersection. That's what spending $74 million of our money is expected to do for pedestrians.

MARGINAL IMPROVEMENT FOR BUS RIDERS

What about bus riders? Page 2 of the report projects a 12%-15% improvement in bus delays and

received on 10/18/2012 at CTF meeting from Laura Tabili, Broadway Coalition

A 6% improvement in bus travel times over this 2-mile stretch. After the expenditure of $74 million!

LIP SERVICE TO IMPROVED TRANSIT

You may have observed that the transit study on the website dates from 1990. The COT's failure to revisit the issue in over 2 decades suggests the demand for transit lanes is merely a stalking horse for more lanes for cars.

WORSE FOR BICYCLISTS

The report finally gets around to bicyclists on p.27, and this is what it says:

> The results, provided in Exhibit 19, indicate that a 6-lane roadway with 5-ft or 6-ft bike lanes will provide good level of service for transit users and pedestrians, however bicyclists will experience poor level of service (LOS E). The primary factors affecting bicycle level of service are high traffic volumes and high density of driveways and side streets. Wider multi-use lanes may improve bicycle level of service simply based on a more lateral clearance between a cyclist and adjacent traffic, however the effects of conflicting transit vehicles and right-turn traffic using the same lane could very well make it a worse condition for cyclists.

That's what the expenditure of $74 million is expected to do for bicyclists.

CONGESTION?

Let's get back to cars, shall we? If I'm reading the table on p.6 correctly, 7% of Broadway traffic occurs during morning rush hour, 7:30-8:30 am, and 8% during evening rush hour, 4:30-5:30 p.m. This just confirms the observation of anyone familiar with the street that "rush hour" on Broadway is not all that congested, and is hardly worthy of the name. Further, delay times in this 4-5 minute drive amount to a whopping 27 seconds during eastbound morning rush hour to 80 seconds in westbound evening rush hour–perhaps due to pedestrians crossing.
[Readers are directed to section 3.2.4 on HAWK signals & traffic flow which is missing from the report] But, the framers of the report might object, that's because I am failing to consider the 30%-50% rise in traffic in the next 30 years (p.14). And I repeat: if traffic has not risen on this stretch of Broadway since 1984, 28 years ago, why should it rise in the next 28 years? Never mind that the cross-streets such as Euclid, Highland and Campbell will not feed enough traffic to produce these volumes (p.14) or that accidents, another justification for widening, are actually higher on the "improved" cross-streets.(p.10)

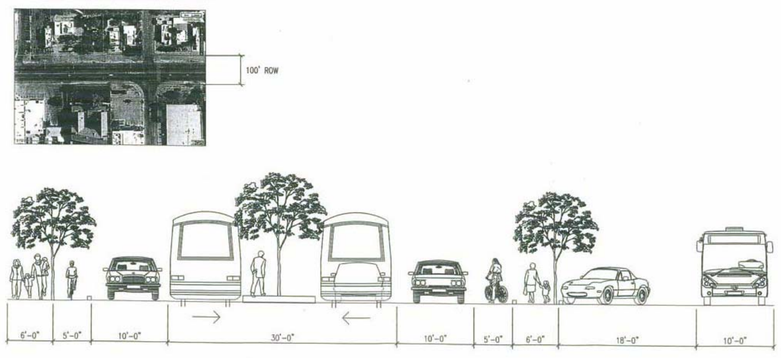
This is just a sample of the unfounded assumptions contained in this report.

The only conclusion to be reached is that the evidence contained in the 2012 Traffic study cannot justify widening the street.

Cross-sections submitted to the Task Force for consideration

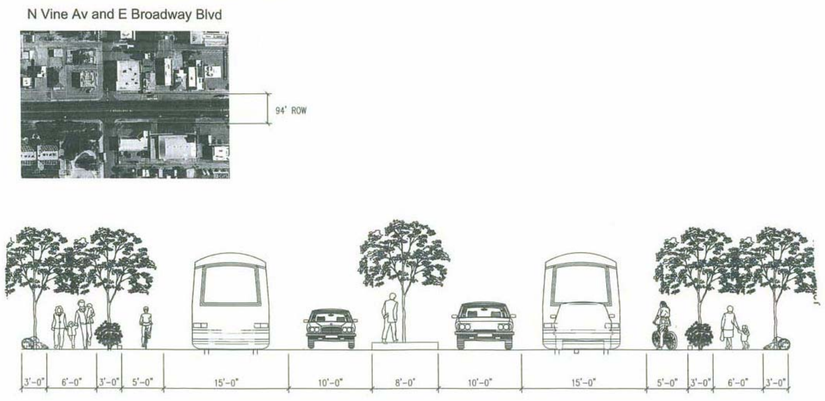
100 ft ROW with bus pullout
No disruption to current fronts of businesses

N Treat Av and E Broadway Blvd



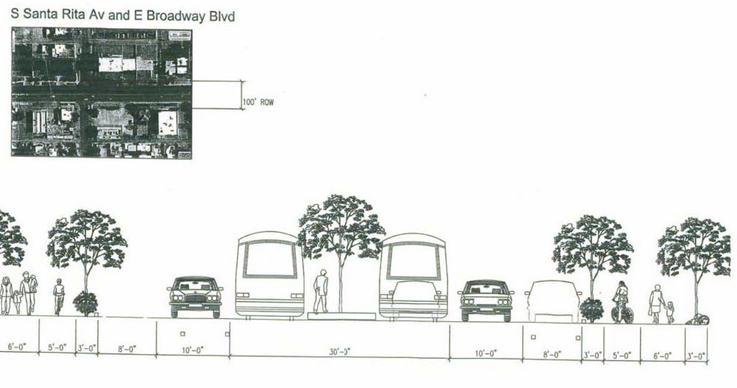
94 ft ROW
No disruption to current fronts of businesses

N Vine Av and E Broadway Blvd



100 ft ROW
No disruption to current fronts of businesses
Two lines of parallel parking

S Santa Rita Av and E Broadway Blvd



Multi-Modal Street Design

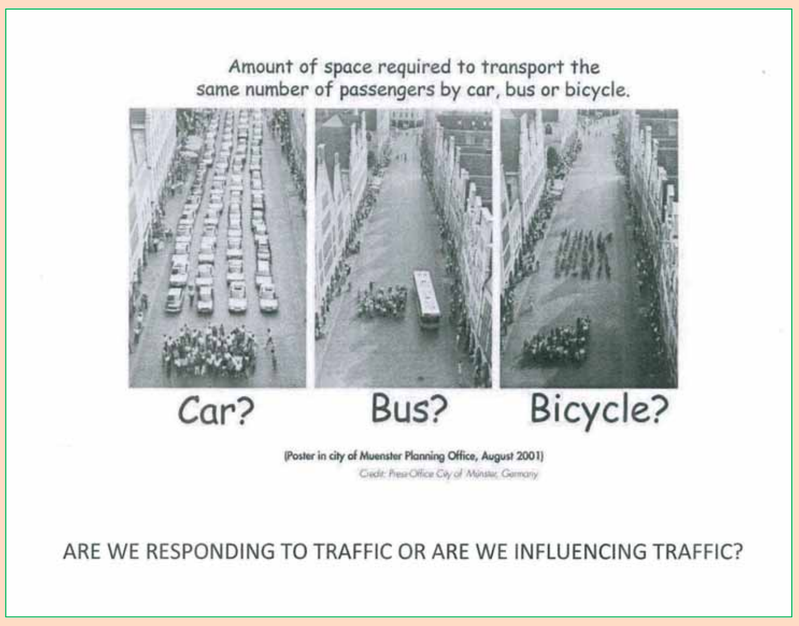
Representative Task Force Comments and Issues Raised to Date

These and other issues and concerns that have been raised during the on-going planning dialogue, and that will continue to be raised through the public input process, will be addressed through further planning, design, and evaluation of alternatives as the Broadway Boulevard project moves forward.

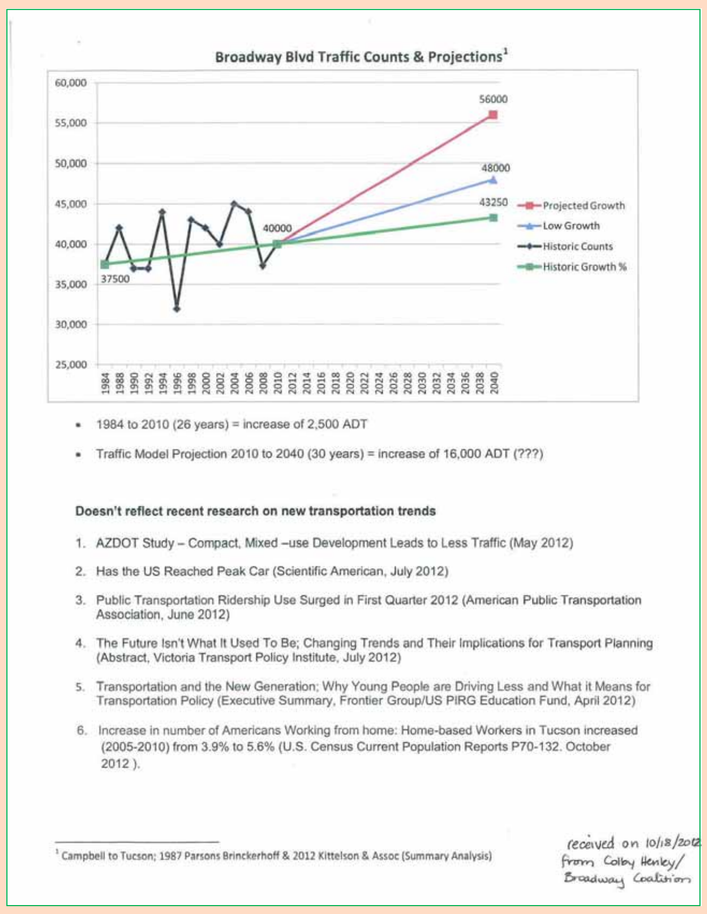
TRAFFIC PROJECTIONS / TRAVEL BEHAVIORS AND CHOICES

"Community Plans cite we are an aging population, and transportation patterns are going to change. We want to be a multi-modal community with transit, density, transit-oriented development; we are not designing our roadways in a conducive manner. Why assume we will drive the same way we do now? Even if we do, how do we get 56,000 vehicle trips per day in corridor? Look at how models are developed for projected growth trends. Plans do not assume multi-modal travel; rather model used to design roads leads us to do the same thing we have been doing. How do these models arrive at numbers and assumptions behind them?

Challenge these assumptions and reverse the order to start by saying what we want from the corridor and designing our roadways based off of this. Even if we assume that 56,000 people want to travel down the corridor every day, challenge the assumption that 98 percent of them will be using cars. " *Handout was provided to address this information.*



"The focus on the level of traffic in the corridor could misrepresent the situation as people being uninterested in improving it. It is surprising how much traffic there is given how hard it Is to use the corridor. There is interest in making improvements."



INTERSECTION ENHANCEMENTS

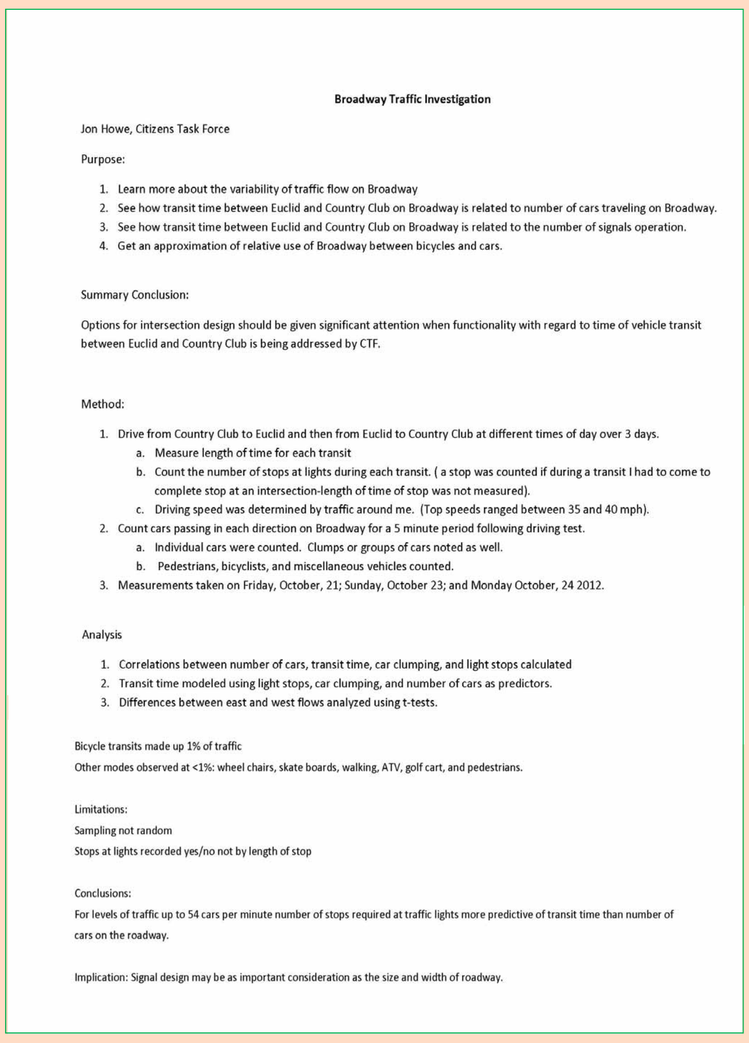
"For intersection movements with LOS level F – would like to see modeling with intersection widening, but not widening throughout the entire corridor."

SIGNALIZATION

Based on quick study conducted by Task Force member *(to the right)*:
"Conclusions: For levels of traffic up to 54 cars per minute number of stops required at traffic lights more predictive of transit time than number of cars on the roadway.

Implication: Signal design may be as important consideration as the size and width of roadway."

"Seems like intersections will be important for regulating traffic in corridor. Are there things we can look at for this information? Would like to know how intersection design affects traffic."



Broadway Traffic Investigation

Jon Howe, Citizens Task Force

Purpose:

1. Learn more about the variability of traffic flow on Broadway
2. See how transit time between Euclid and Country Club on Broadway is related to number of cars traveling on Broadway.
3. See how transit time between Euclid and Country Club on Broadway is related to the number of signals operation.
4. Get an approximation of relative use of Broadway between bicycles and cars.

Summary Conclusion:

Options for intersection design should be given significant attention when functionality with regard to time of vehicle transit between Euclid and Country Club is being addressed by CTF.

Method:

1. Drive from Country Club to Euclid and then from Euclid to Country Club at different times of day over 3 days.
   a. Measure length of time for each transit
   b. Count the number of stops at lights during each transit. (a stop was counted if during a transit I had to come to complete stop at an intersection-length of time of stop was not measured).
   c. Driving speed was determined by traffic around me. (Top speeds ranged between 35 and 40 mph).
2. Count cars passing in each direction on Broadway for a 5 minute period following driving test.
   a. Individual cars were counted. Clumps or groups of cars noted as well.
   b. Pedestrians, bicyclists, and miscellaneous vehicles counted.
3. Measurements taken on Friday, October, 21; Sunday, October 23; and Monday October, 24 2012.

Analysis

1. Correlations between number of cars, transit time, car clumping, and light stops calculated
2. Transit time modeled using light stops, car clumping, and number of cars as predictors.
3. Differences between east and west flows analyzed using t-tests.

Bicycle transits made up 1% of traffic

Other modes observed at <1%: wheel chairs, skate boards, walking, ATV, golf cart, and pedestrians.

Limitations:

Sampling not random

Stops at lights recorded yes/no not by length of stop

Conclusions:

For levels of traffic up to 54 cars per minute number of stops required at traffic lights more predictive of transit time than number of cars on the roadway.

Implication: Signal design may be as important consideration as the size and width of roadway.

LEVEL OF SERVICE

"There are two jurisdictions that allow for **LOS** Level E. Would TDOT allow this? Would they allow a Level E just in urban areas?"

SAFETY

"Or sidewalk widths - people in wheelchairs certainly notice the difference in widths of sidewalks. The public does think about such issues."

"Living Streets Alliance website lets you report near misses between vehicles and bikes specifically relates to the modern streetcar tracks. However, bike crash reports are analyzed on Collin Forbes' excellent site: bikecolli.info (no www. preceding)."

"There is also an issue of shared use of lanes now that seems unsafe – for example, motorized wheelchairs using the bike lane because there are no sidewalks."

TRANSIT

"We need to know the alternatives for transit lanes."

"Transit lanes may not be on the same side of the road and may not be the same size for the entire alignment."

"Size of the bus pullouts unknown for Bus Rapid Transit vehicles. Would like to know this information."

BICYCLE / PEDESTRIAN

"A lot of pedestrians use the alley as walkway because it is not safe to walk along the roadway, so counting pedestrian numbers just on Broadway is not an accurate reflection of the amount of pedestrian activity in the corridor."

"The bike facilities on Broadway are not ideal. We may want to look into allocating resources to create Bike Boulevards in the surrounding neighborhoods."

"You are going to tend to have more experienced bicyclists on Broadway who want 5 to 7 foot widths for the bike lanes. Cycle tracks and shared use lanes do not make sense with so many access points to businesses and residences along Broadway."

"Would funding be provided if we designed parallel bike lanes to the neighborhoods or 6th Street? Would this be considered as part of the project?"

"Highland Avenue is used as a frequent crossing. Is there any way to identify it as a key gateway to the University of Arizona?"

" Area in between Campbell and Tucson Boulevard is horrible for bicyclists. Too many access points. This needs to be addressed."

"The 2010 Census map from the existing conditions report shows a pent up demand for alternative modes of transportation even with poor infrastructure. If we improve the conditions, it would increase the demand or at least capture the current demand."

ADA / UNIVERSAL DESIGN

"My focus during the field trip was paying attention to how the built environment would impact the vision, hearing, mobility, and cognitively challenged individuals. There are opportunities for improvement, people with impairments are negatively impacted by the current conditions; it is not intuitive or safe to get from place to place."

Sustainability

Representative Task Force Comments and Issues Raised to Date

These and other issues and concerns that have been raised during the on-going planning dialogue, and that will continue to be raised through the public input process, will be addressed through further planning, design, and evaluation of alternatives as the Broadway Boulevard project moves forward.

ENVIRONMENTAL SUSTAINABILITY

"Arroyo Chico Improvements—Have hazard areas been identified where water pools? Can water harvesting be used to help with flooding? Need to look at various sources for water harvesting."

"Will discuss water harvesting and how to utilize drainage to benefit landscaping. Generally speaking, Broadway has good drainage. Water harvesting in medians can be diverted to the roadway. Don't have a great number of washes that cross Broadway – Arroyo Chico is one. Will have to look at what is feasible and what is not. James MacAdam, Mayor's office, is working on policy for green infrastructure, which would result in early consideration of how to implement it in the design process. Green streets policy presents an opportunity to look at various aspects of landscaping: water harvesting, maintenance, etc."

"Avoid utility conflicts and make the best use of them."

"Emphasize appropriate type and height of signage so non- motorists can see them as well."

"Would be so nice, at least block between Campbell and Country Club, utilities placed underground. They are visually obtrusive."

ECONOMIC SUSTAINABILITY / PROJECT FUNDING

"Would like a list of properties acquired by the City."

"Can RTA funds be used for consolidated parking?"

ECONOMIC SUSTAINABILITY / ECONOMIC DEVELOPMENT

"What is the viability of businesses before and after construction?"

"The continuum does not seem valid. New and affordable do not go together. Older tenants don't see new businesses as enhancing. New buildings that are only affordable and available for new startups with deep pockets may switch the character of the corridor from small local business to big franchises."

"Campbell to Country Club versus the rest of the corridor presents a dichotomy. The rest of the corridor may provide greater opportunity for new development that will increase the value of this section of Broadway. We need to think in those terms, there are different areas along the corridor that could present infill and redevelopment opportunities."

"There are many investment properties for rent along Broadway; could be turned into commercial properties and add to the continuum of the eastern portion."

PUBLIC HEALTH

"Add public health as a goal, promoting physical activity in the corridor."

"Add another column for public health— the bike and pedestrian score would be high."