

# **INITIAL DRAFT**

## **GRAND AVENUE MIS PHASE II**

### **WORKING PAPER #4**

#### **ISSUES AND NEEDS IDENTIFICATION, AND PRELIMINARY EVALUATION CRITERIA**

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## EXECUTIVE SUMMARY

This working paper covers two areas: (1) Issues and Needs Identification and (2) Preliminary Evaluation Criteria.

Issues were identified in the scope of work for the project, through consultation and through technical analyses. Consultation included discussions with the Agency Steering Group and stakeholders for the corridor, input received at the public meeting, and review of the previous 23 studies or reports identified that relate to the Grand Avenue corridor. From this review, 14 issues were identified:

- 1) Connectivity to I-10, I-17, and Loop 101
- 2) Route Transfer
- 3) Ultimate Concepts (roadway, transit including rail, bicycle, and pedestrian)
- 4) Grade Separations
- 5) Intersection Improvements (including skewed & offset intersections)
- 6) Intelligent Transportation Systems (ITS) and signals
- 7) Bottlenecks
- 8) Access Management (including medians and local access needs)
- 9) Safety
- 10) Bicycle and Pedestrian Requirements
- 11) Transit Requirements
- 12) Goods Movement
- 13) Beautification
- 14) Drainage

The paper also includes a discussion of the 2030 traffic forecast for the corridor. The projections were used to identify potential problem areas such as bottlenecks for further consideration for possible improvements in the next phase of the study. The forecasts will also be considered in the analysis of alternatives in the next task in the study.

The paper concludes with a list of service, impact, and implementation evaluation criteria that, following discussion and concurrence from the ASG, will be used to evaluate corridor alternatives. The preliminary evaluation criteria were brought forward from the 1999 Grand Avenue Major Investment Study and reviewed in light of the input received from the Agency Steering Group, stakeholders in the corridor, and at the public meeting. Following discussion with the ASG, a set of recommended evaluation criteria to be used to evaluate alternatives in this MIS will be identified. This set may be updated as potential improvements are identified in the next task and specific needs are better known.

## **4.0 INTRODUCTION**

This chapter seeks to identify transportation issues and needs based on input received during consultation with the general public, other stakeholders, and local and other agencies, technical analyses, and reviews of previous and related studies. The issues and needs identified through this process will inform the development of alternatives for transportation improvement projects in the next step of the study process. Preliminary evaluation criteria are also identified in this paper, which will be used to assess the identified alternative transportation improvement projects.

### **4.1 ISSUES AND NEEDS IDENTIFICATION**

To develop as comprehensive a listing as possible of the issues and needs along the Grand Avenue corridor, input from two key groups was solicited. These groups include 1) the general public and other stakeholders, and 2) local, state and federal agencies. Public and stakeholder input was obtained through a public meeting held early in the study process. Local, state and federal agency representatives participate in the Agency Steering Group (ASG) established for the study and are coordinated with on an ongoing basis. Additionally, representatives of the Burlington Northern Santa Fe (BNSF) railroad attended ASG meetings throughout the study process as a key stakeholder. In addition, the major issues and needs that were identified in the reports reviewed in Working Paper No. 1, *Related Studies, Plans, and Programs*, are included.

Other issues such as potential bottlenecks were identified through field reviews and analyses of results of traffic forecasting developed for the study. Findings from the traffic forecasting analysis are included in **Section 4.2**.

#### **General Public and Other Stakeholders**

Project stakeholders are those individuals and public and private entities that have an interest in the project and are not otherwise represented on the Agency Steering Group. They include property owners or tenants along or near Grand Avenue; persons or entities that depend on the portion of Grand Avenue within the Study Area for their livelihood, welfare, or other reasons; or other entities or persons.

On March 30, 2004, a Public Meeting for the Grand Avenue MIS Phase II project was held at the Peoria Civic Center in the City of Peoria. The objective of this meeting was to gather input on corridor issues. The meeting was attended by approximately 50 members of the public and other stakeholders. Also in attendance to answer questions were representatives from each of the three cities within the Study Area (Peoria, Glendale and Phoenix) as well as the Maricopa Association of Governments (MAG), the Arizona Department of Transportation (ADOT) and the Federal Highways Administration (FHWA).

#### **Agency Steering Group and Other Participating Agency Representatives**

The Agency Steering Group (ASG) includes representation from the three municipal jurisdictions through which this portion of Grand Avenue passes, ADOT, FHWA, and

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Valley Metro. Meetings of the ASG were open to the public and other stakeholders, and were consistently attended by representatives of the BNSF Railroad. The Maricopa County Department of Transportation (MCDOT) also participated later in the project, following their decision to join with the Cities of Glendale and Peoria for the RTP funded Northern Avenue improvement project, which intersects with Grand Avenue.

In order to gain more input to the study from local agencies, interviews of elected representatives and others for each agency were solicited. The following interviews were conducted:

Councilmembers Mattox and Simplot (Phoenix) Meeting	August 12, 2004
Councilmember Lingner (Phoenix) Meeting	August 26, 2004
Village Planners (Phoenix) Meeting	September 1, 2004
Maryvale Village Planning Committee (Phoenix) Meeting	September 14, 2004
Encanto Village Planning Committee (Phoenix) Meeting	October 4, 2004
Planning Department (Peoria) Meeting	October 6, 2004
Central City Village Planning Committee (Phoenix) Meeting	October 11, 2004
Councilmember Dennis (Peoria) Meeting	October 12, 2004
Councilmember Hunt (Peoria) Meeting	October 14, 2004
Alhambra Village Planning Committee (Phoenix) Meeting	October 26, 2004

The City of Glendale provided all of their input via their designated senior staff representative on the Agency Steering Group. Most meetings of the Agency Steering Group were held at City of Glendale offices, as this was a central location on the corridor that helped to minimize travel time for study participants. Meeting at this location also provided additional opportunities for other City of Glendale staff and representatives to participate in the study if they so wished.

**Previous Studies**

Working Paper No. 1, *Related Studies, Plans, and Programs*, provides a review of the major studies that have been undertaken recently along Grand Avenue. In total, twenty-three reports were reviewed.

**Corridor Issues**

To date, 14 corridor issues have been identified. (During the course of this study it is possible this list may grow larger, but it will not decrease in size.) Discussions of each of these are presented below. The input received from each of the sources – the general public and other stakeholders, the Agency Steering Group and other participating agency representatives, and the review of previous studies – is presented.

**4.1.1 Connectivity to I-10, I-17 and Loop 101**

When roadways of varying capacity (collectors, arterials and freeways) cross one another, a junction between the two is typically formed. For local roadways, these junctions are referred to as intersections. When a major arterial intersects with a freeway or expressway, a service interchange is typically provided. And when a major freeway or expressway crosses another major freeway or expressway, a system interchange is

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typically provided. These connections allow for the movement of traffic from one route to another route, with the ease of movement increasing as the capacity along the routes increases.

On its diagonal path through the central and western portions of the region, Grand Avenue crosses three major freeway corridors within the Study Area: I-10, I-17 and Loop 101.

Grand Avenue currently passes underneath I-10 between 17<sup>th</sup> Avenue and 16<sup>th</sup> Drive in the southeastern end of the Study Area. There is no access provided directly to Grand Avenue from I-10. Service interchange access is available at 7<sup>th</sup> Avenue in the form of a Single Point Urban Interchange (SPUI) and at 19<sup>th</sup> Avenue in the form of a half-diamond interchange. The location of the Grand Avenue underpass is approximately 3/4-mile east of the I-10 / I-17 system interchange and one-mile west of the Margaret T. Hance Park tunnel (Deck Park Tunnel) along I-10.

Grand Avenue currently passes over I-17 between Encanto Boulevard and Thomas Road in the southeastern end of the Study Area. There is no local access provided to Grand Avenue from I-17. Full diamond service interchanges are provided at McDowell Road (3/4-mile south of the Grand Avenue overpass) and at Thomas Road (1/4-mile north of the Grand Avenue overpass). In this location, Grand Avenue has been reconstructed as a grade-separation over Thomas Road and 27<sup>th</sup> Avenue.

Grand Avenue currently passes over Loop 101 between 91<sup>st</sup> Avenue and 99<sup>th</sup> Avenue in the northwestern end of the Study Area. A half-diamond service interchange on Grand Avenue provides direct access in the form of a southbound Loop 101 entrance ramp and a northbound Loop 101 exit ramp. The other two movements, a northbound Loop 101 entrance ramp and a southbound Loop 101 exit ramp, are provided along 91<sup>st</sup> Avenue in the form of direct connection ramps (no traffic signals). 91<sup>st</sup> Avenue currently terminates/begins with these access ramps to Loop 101.

Comments related to connectivity of Grand Avenue to the major freeway corridors within the Study Area, I-10, I-17 and Loop 101, are detailed below.

### **General Public and Other Stakeholders**

The following comments related to roadway connectivity were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Connections to I-10 and I-17 were identified on a comment form when asked about “major issues and challenges for the corridor”.

### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to roadway connectivity were documented:

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- ADOT stated that maintaining Grand Avenue as a state highway would require improvements in both functionality and connectivity.
- ADOT does not think a connection to I-17 should be considered in detail as part of this study, as it has been studied before and rejected based on preliminary cost. Also, the Regional Transportation Plan includes funding for I-17 improvements that have not yet been defined. A Grand Avenue/I-17 connection should be considered as part of the I-17 study.
- ADOT does think a connection to I-10 should be considered, possibly along 19<sup>th</sup> Avenue.
- The ASG agreed to address potential connections to both I-10 and I-17 to some degree in the MIS. Given that the RTP includes \$1 billion in funding for improvements to the neighboring section of I-17, for which design studies will be needed, the MIS should make recommendations for a connection or alternative connections for the I-17 DCR to assess in more detail.
- Traffic along Grand Avenue wishing to travel on SB I-17 (to EB I-10) should be on a separate lane and connect with I-17 south of I-10. Traffic on Grand Avenue at 19<sup>th</sup> Avenue destined for downtown Phoenix should be distributed along McDowell Road, 19<sup>th</sup> Avenue, and Grand Avenue.
- Is it even possible to connect Grand Avenue to either I-10 or I-17?
- Identify, cost, evaluate and make recommendations for connections to I-10 and I-17 (Scope).

### Previous Studies

The following comments related to roadway connectivity were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- The *Grand Avenue Corridor Study; Beardsley Canal to 7<sup>th</sup> Avenue / Van Buren Street* (MAG, 1998) considered freeway connections to Loop 101 and I-17. It did not consider enhanced arterial or expressway connections to these facilities.

### 4.1.2 Route Transfer

Arizona statutes give the State Transportation Board authority to accept, revise and remove routes on the state highway system and describe procedures to remove (abandon) routes no longer serving a state function. (ARS 28-304 and 28-7201 through 28-7215).

Comments related to the transfer of roadway routes from one jurisdiction to another along Grand Avenue within the Study Area are detailed below.

### General Public and Other Stakeholders

The following comments related to route transfer were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Addressing the question of long-term responsibility for Grand Avenue (local jurisdiction or ADOT?) was identified on one comment form when asked about “major issues and challenges for the corridor

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- That Grand Avenue would become a local street and ignored by state and local officials was identified by one commenter as their “worst fear”.

### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to route transfer were documented:

- ADOT Comment: Highways within the state system that do not contribute to the mission and purpose of the system create problems for ADOT and for transportation in Arizona for the following reasons:
  1. They use resources that could be going to meet statewide transportation needs.
  2. They generate administrative and liability costs that are disproportionate to their contribution to the state highway system.
  3. Local jurisdictions often have different objectives from those of the state in terms of how these roads are developed and used.
  4. Their presence on the state system sometimes prevents appropriate treatments as part of local road functions.
- ADOT is interested in investigating the possibility of transferring Grand Avenue south of Loop 101 to local jurisdictions based on a lack of functionality and connectivity to the state system.
- ADOT does not want any discretionary funds allocated to the Grand Avenue corridor and recommends that RARF funds that would stay with the corridor following a transfer be used instead.
- The City of Glendale suggested that Northern Avenue be transferred to the state so that the combined Northern Avenue / Grand Avenue facility would be a state highway.
- No consensus has been reached on route transfer. The study will review options for improving Grand Avenue, addressing both functionality and connectivity.
- The City of Phoenix is open to having the issue of route transfer addressed in this study. They are however not open to having Maricopa County take over Grand Avenue, an option suggested by the City of Glendale.
- The City of Glendale has suggested that a consortium involving Glendale, Peoria and either the County or the State be used to manage the construction of Northern Avenue and Grand Avenue.
- The transfer of Grand Avenue from the State to the cities is not supported.
- If Grand Avenue is converted to a controlled-access facility, and money is made available for maintenance, Grand Avenue could possibly be transferred to the municipalities.
- Controlled-access facilities function as state highways and should remain under ADOT’s jurisdiction.
- Route transfer has benefits and drawbacks. If the City has jurisdiction over Grand Avenue, it would control access, landscaping, etc. But there are concerns about operations and maintenance.

- One issue that must be addressed is route transfer in the event that future plans for this section of Grand Avenue do not provide for better functionality and connectivity to the state highway system (Scope).

### **Previous Studies**

No comments related to route transfer were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*.

### **4.1.3 Ultimate Concepts (Roadway, Transit including rail, Bicycle / Pedestrian, other as needed)**

The purpose of the Grand Avenue MIS Phase II is to provide recommendations for transportation infrastructure improvements both along and across Grand Avenue within the Study Area. Recommendations might include (but are not limited to) expanded transit (including rail) service, improved pedestrian and bicycle facilities, additional grade-separations and/or aesthetic treatments consistent with land uses prescribed in local general plans. These recommendations will be made with the assumption they will be incorporated into local, regional, or state TIPs for implementation in the near future.

Comments related to ultimate concepts that will be considered in the analysis are detailed below.

### **General Public and Other Stakeholders**

The following comments related to ultimate transportation concepts were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Grand Avenue should be considered as an elevated expressway.
- Providing commuter rail along BNSF could alleviate traffic congestion.
- Consider leasing air rights over BNSF and build elevated transit.
- Consider providing a masonry wall (four to six feet tall) along the BNSF that blocks the railroad with landscaping in front of it.
- The decision as to whether Grand Avenue is going to be an expressway or a limited expressway was identified on comment forms when asked about “major issues and challenges for the corridor”.
- The determination of Grand Avenue as either an expressway or not in the long term, along with providing Grand Avenue as an express route with priority over north-south and east-west arterials at intersections were identified on three comment forms when asked about one’s “greatest hope for the corridor”.
- It was suggested that Grand Avenue be double-decked with the upper level carrying through traffic and the lower level being maintained for business access.
- That nothing will be done to Grand Avenue was identified by one commenter as their “worst fear”.

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### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to the ultimate transportation concept were documented:

- Northern Avenue should be considered for modeling and alternative purposes as a “super-street”, resulting in capacity improvements and higher travel speeds.
- Grand Avenue was identified in the scope of work as developed with the ASG as a partially controlled access facility (expressway or limited expressway) including selected grade separations and beautification.
- In the future, commuter rail will likely be needed in the Grand Avenue corridor from Wickenburg to Phoenix. If commuter rail is put into the corridor, light rail will not be necessary. Commuter and light rail would probably intersect at a station in Glendale.
- In lieu of commuter rail, Grand Avenue will likely need to be widened.
- If possible, use the BNSF railroad tracks for public transportation.
- It is important that all proposed improvements to Grand Avenue not only accommodate potential future commuter rail, but also do not preclude commuter rail in the corridor.
- Grand Avenue should be an express route for its ultimate concept. Reduced access along Grand Avenue is acceptable so long as good access is provided at the grade separations.
- If commuter rail is recommended along the BNSF tracks, parking and pedestrian needs will have to be considered. A transit center that accommodates auto / bus / rail / pedestrians should be considered.
- Grand Avenue should be a non-stop roadway, with access to local businesses in downtown Peoria provided via the planned bypass, which would connect with Grand Avenue at Monroe Street / 81<sup>st</sup> Avenue.
- Grand Avenue is a major artery that should be fully developed with moderate speed and access.
- Since Grand Avenue is a state highway, why is rubberized asphalt not being used to mitigate against noise?
- Gateways indicating entrance into different cities are crucial and included in future City plans. How and where will gateways along Grand Avenue occur?
- Previous and current improvements along Grand Avenue have made commuting to downtown Phoenix much faster. However, signing could be improved to better locate arterials.
- Established businesses along 83<sup>rd</sup> Avenue may make improvements to 83<sup>rd</sup> Avenue difficult.
- Review high capacity transit options as part of the ultimate concept (Scope).
- The BRT service specified in the RTP will be detailed in this study, along with a transition program as needed to the ultimate concept (Scope).
- The RTP identifies the Grand Avenue corridor as eligible for high capacity transit service, using unspecified technology, as part of its ultimate concept (Scope).

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- This study will detail the BRT service funded in the RTP as well as review high capacity transit options and their detailed transition program (Scope).

### **Previous Studies**

The following comments related to ultimate transportation concepts were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- The upgrading of Northern Avenue to Northern Parkway, and its median-to-median flyover ramp connections were recommended in the *Final Design Concept Report for Northern Parkway* (City of Glendale, 2003). Grand Avenue would need to be widened and substantial right-of-way would need to be acquired.
- The *Northwest Area Transportation Study, Final Report* (MAG, 2003) included the recommendation to upgrade Northern Avenue to a “super-street” that would enhance east-west capacity. Grand Avenue was identified as an arterial roadway corridor.

### **4.1.4 Grade Separations**

Comments related to grade separations along Grand Avenue within the Study Area are detailed below.

#### **General Public and Other Stakeholders**

The following comments related to grade separations were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- At grade-separations, ADOT should secure access rights for parcels prior to turning them back / selling them.
- In construction areas along Grand Avenue where grade-separations are being constructed, provide more and better advanced notice of one-lane restrictions.

#### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to grade separations were documented:

- Why was Camelback Road constructed as the arterial overpass when the other two arterials (Grand Avenue and 43<sup>rd</sup> Avenue) have more traffic on them?
- Landscaping, as well as art, aesthetics, and sculpture could alleviate the visual impacts along Grand Avenue, particularly at grade separations.
- Grade separations make it harder for bicycle traffic to get to where it needs to go.
- The City of Peoria requested that the impacts of an overpass, both on 83<sup>rd</sup> Avenue and Peoria Avenue, at the 83<sup>rd</sup> Avenue / Peoria Avenue / Grand Avenue intersection be assessed as part of this study.
- Give special consideration to the connections between Grand Avenue and local arterials where new grade separations are programmed (Scope).

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- On future grade separations, take the arterials that cross the railroad tracks on the grade separation. It doesn't make any sense to have Grand Avenue as the grade separation when the railroad tracks cause the delay.
- The Cactus Road / 91<sup>st</sup> Avenue / Grand Avenue intersections are very congested on all legs. The existing signals are either too close together or the timing needs to be improved. Consider the possibility of an overpass or constructing Cactus Road as a through street.
- A grade separation at 83<sup>rd</sup> Avenue is supported, which is consistent with the upgrading of Grand Avenue to an expressway through Peoria.
- A grade separation should be considered at the "north crossing" as opposed to the "south crossing" at 83<sup>rd</sup> Avenue / Peoria Avenue / Grand Avenue as the north crossing carries more traffic.
- An underpass in downtown Peoria would be preferred to an overpass as businesses are sometimes put off by the aesthetics of an overpass.
- If Grand Avenue is being planned as a major traffic carrier, all overpasses should be on Grand Avenue.
- Residents in neighborhoods surrounding grade separations have complained about increased noise levels as a result of the elevated traffic, a concern that did not exist before. Noise walls, tall vegetation or rubberized asphalt could help mitigate (the City does put rubberized asphalt on arterial streets).
- If Grand Avenue is being planned as a major traffic carrier, why do only three of the eight overpasses carry Grand Avenue?
- Identify potential locations, cost and access options for grade separations and make recommendations (Scope).
- Potential grade separations at Northern Avenue, Bethany Home Road, Indian School Road and 19<sup>th</sup> Avenue should specifically be addressed (Scope).

### Previous Studies

The following comments related to grade separations were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- The closure of various intersecting streets, alleys and unused driveways along Grand Avenue was proposed in *Grand Avenue Limited Expressway Design Concept Study for the Glendale Area, Final Report* (City of Glendale, 2003). It also noted that the proposed Grand Avenue overpass at 59<sup>th</sup> Avenue and Glendale Avenue would alter the manner in which vehicles enter downtown Glendale.
- The *Regional Transportation Plan* includes \$147 million of improvements on Grand Avenue: \$53 million for unspecified widening, access control, and beautification (\$30M in phase I, \$20M in phase II, and \$3M in phase IV); \$17 million for additional ramps at the 51<sup>st</sup> Avenue grade separation (phase IV); \$38.5 million for additional ramps at the 35<sup>th</sup> Avenue grade separation (phase IV); and \$38.5 million for a new 19<sup>th</sup> Avenue grade separation (phase IV).
- The *Grand Avenue Limited Expressway Design Concept Study for the Glendale Area, Final Report* (City of Glendale, 2003) recommended a three-level crossing at Bethany Home Road and 51<sup>st</sup> Avenue, with Grand Avenue remaining at-grade.

Through the use of collector roads, these routes would be connected. The six-legged signalized intersection would be removed.

- Eight intersections were recommended for grade-separations in the *Grand Avenue Major Investment Study* (ADOT, 1999). The recommendations eliminated all six-legged intersections within the Study Area except for 19<sup>th</sup> Avenue / McDowell Road / Grand Avenue. The current study is a continuation of this report.

**4.1.5 Intersection Improvements (including skewed and offset intersections)**

Within the Study Area, Grand Avenue is host to over 60 three-, four-, five- and six-legged intersections that are either stop controlled or signal controlled. A majority of these intersections are stop controlled along the minor roadway, allowing Grand Avenue traffic to flow freely.

The original Grand Avenue MIS (ADOT, 1999) identified a total of 148 traffic signals in its Study Area. Of these, 20 were located on Grand Avenue between Loop 101 and McDowell Road. The remainder were located within one mile of Grand Avenue along city arterials and collectors. A field review was conducted on January 20, 2004 to confirm the location of previously identified traffic signals as well as document any changes in traffic control within the Study Area. All signalized intersections present during the writing of the 1999 MIS remain in their previously identified location. No new signalized intersections exist along Grand Avenue within the Study Area.

As Grand Avenue runs diagonally across the one-mile grid system of arterial streets that make up the roadway network in Phoenix’s greater metropolitan area, skewed intersections, where an intersecting road connects at an angle other than 90 degrees, exist at majority of the intersections. Of the 60-plus intersections along Grand Avenue in the Study Area, approximately 65% are skewed. The remaining intersections have been reconstructed into perpendicular intersection (such as those in downtown Peoria) or as grade-separations.

Refer to **Section 3.1.3 and Exhibit 3.9** of Working Paper No. 3 – *Existing, Programmed and Planned Facilities and Conditions* for more detailed information on signalized and unsignalized intersections within the Study Area. The table below includes a complete listing of all intersections along Grand Avenue within the Study Area, including the type of intersection and whether or not it is signalized.

Cross-street Names	Intersection Type	Traffic Control
15 <sup>th</sup> Avenue / Roosevelt Road / Grand Avenue	Skewed	Signalized
Laurel Avenue / Linden Street / Grand Avenue	Skewed	Unsignalized
Latham Street / 16 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
Moreland Street / Grand Avenue	Skewed	Unsignalized
17 <sup>th</sup> Avenue / Spruce Street / Grand Avenue	Skewed	Unsignalized
17 <sup>th</sup> Drive / Culver Street / Grand Avenue	Skewed	Unsignalized
18 <sup>th</sup> Avenue / Willetta Street / Grand Avenue	Skewed	Unsignalized
19 <sup>th</sup> Avenue / McDowell Road / Grand Avenue	Skewed	Signalized

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<b>Cross-street Names</b>	<b>Intersection Type</b>	<b>Traffic Control</b>
20 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
21 <sup>st</sup> Avenue / Grand Avenue	Skewed	Unsignalized
22 <sup>nd</sup> Avenue / Monte Vista Road / Grand Avenue	Skewed	Unsignalized
23 <sup>rd</sup> Avenue / Encanto Boulevard / Grand Avenue	Skewed	Signalized
24 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
24 <sup>th</sup> Drive / Grand Avenue	Skewed	Unsignalized
27 <sup>th</sup> Avenue / Thomas Road (Grand Avenue over)	Grade-separated	Signalized
29 <sup>th</sup> Drive / Grand Avenue	Closed	Unsignalized
Cherry Lynn / Grand Avenue	Closed	Unsignalized
Osborn Road / Grand Avenue	Perpendicular	Signalized
31 <sup>st</sup> Avenue / Osborn Road / Grand Avenue	Skewed	Signalized
Weldon Avenue / Grand Avenue	Perpendicular	Unsignalized
33 <sup>rd</sup> Avenue / Grand Avenue	Skewed	Signalized
35 <sup>th</sup> Avenue / Grand Avenue (Indian School Road over)	Grade-separated	Signalized
37 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
39 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
42 <sup>nd</sup> Avenue / Grand Avenue	Skewed	Unsignalized
43 <sup>rd</sup> Avenue / Camelback Road (Grand Avenue over)	Grade-separated	Signalized
Missouri Avenue / Grand Avenue	Skewed	Unsignalized
Bethany Home Road / Grand Avenue (51 <sup>st</sup> Avenue over)	Grade-separated	Signalized
53 <sup>rd</sup> Avenue / Grand Avenue	Skewed	Unsignalized
55 <sup>th</sup> Avenue / Grand Avenue (Maryland Avenue over)	Grade-separated	Signalized
56 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
57 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
Ocotillo Road / Grand Avenue	Skewed	Unsignalized
57 <sup>th</sup> Drive / Grand Avenue	Skewed	Unsignalized
Lamar Road / 58 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
58 <sup>th</sup> Drive / Grand Avenue	Skewed	Unsignalized
59 <sup>th</sup> Avenue / Glendale Avenue / Grand Avenue	Skewed	Signalized
59 <sup>th</sup> Drive / Grand Avenue	Skewed	Unsignalized
Glenn Drive / Grand Avenue	Skewed	Unsignalized
60 <sup>th</sup> Avenue / Grand Avenue	Skewed	Unsignalized
Palmaire Avenue / Grand Avenue	Skewed	Unsignalized
61 <sup>st</sup> Avenue / Myrtle Avenue / Grand Avenue	Skewed	Signalized
Orangewood Avenue / Grand Avenue	Skewed	Unsignalized
63 <sup>rd</sup> Avenue / Grand Avenue	Skewed	Unsignalized
67 <sup>th</sup> Avenue / Northern Avenue / Grand Avenue	Skewed	Signalized
Butler Drive / Grand Avenue	Under Construction	
71 <sup>st</sup> Avenue / Grand Avenue	Under Construction	
75 <sup>th</sup> Avenue / Grand Avenue (Olive Avenue over)	Grade-separated	Signalized
Monroe Street / 81 <sup>st</sup> Avenue / Grand Avenue	Perpendicular	Unsignalized
82 <sup>nd</sup> Avenue / Jefferson Street / Grand Avenue	Skewed	Unsignalized
83 <sup>rd</sup> Avenue / Grand Avenue	Perpendicular	Signalized

Cross-street Names	Intersection Type	Traffic Control
Peoria Avenue / Grand Avenue	Perpendicular	Signalized
84 <sup>th</sup> Avenue / Grand Avenue	Perpendicular	Unsignalized
85 <sup>th</sup> Avenue / Grand Avenue	Perpendicular	Signalized
87 <sup>th</sup> Avenue / Grand Avenue	Perpendicular	Unsignalized
88 <sup>th</sup> Drive / Grand Avenue	Perpendicular	Unsignalized
91 <sup>st</sup> Avenue / Grand Avenue	Skewed	Signalized
92 <sup>nd</sup> Drive / Grand Avenue	Perpendicular	Unsignalized
Loop 101 Exit Ramp / Grand Avenue	Perpendicular	Signalized
Loop 101 Entrance Ramp / Grand Avenue	Perpendicular	Signalized
99 <sup>th</sup> Avenue / Grand Avenue	Perpendicular	Signalized

Comments related to skewed intersections along Grand Avenue within the Study Area are detailed below.

**General Public and Other Stakeholders**

The following comments related to intersections were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- The intersection of 91<sup>st</sup> Avenue / Grand Avenue is very congested during both the AM and PM peaks.
- Cactus Road will be widened in the future which will likely put more traffic on Grand Avenue.
- The intersection of Loop 101 / Grand Avenue is very dangerous because of vehicles making U-turns. In addition, the traffic signal needs to stay green longer along Grand Avenue.
- The intersection of Frontage Road / Grand Avenue needs improvements, as does the intersection of 83<sup>rd</sup> Avenue / Grand Avenue.
- The six-legged intersection near downtown Glendale (59<sup>th</sup> Avenue / Grand Avenue) and access across Grand Avenue were identified on comment forms when asked about “major issues and challenges for the corridor”.
- The odd angles at intersections were identified as one’s “worst fear”.

**Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to intersections were documented:

- The City of Phoenix and ADOT have requested that the realignment of skewed and offset intersections be included in the alternatives analysis portion of this study.
- Identify turning lane needs at all intersections along Grand Avenue (Scope).

- Identify, evaluate and cost potential improvements and make recommendations (Scope).
- Realign skewed or offset intersections (Scope).
- Address street access and capacity needs to, from and across Grand Avenue (Scope).

### **Previous Studies**

No comments related to intersections were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*, that have not been included in other sections of this Working Paper (i.e. Grade Separations).

### **4.1.6 Intelligent Transportation Systems (ITS) and Signals**

Based on the *MAG ITS Strategic Update* (MAG, 2001), Grand Avenue within the limits of this study has been identified as a “SMART” Corridor; a systematically managed arterial. SMART Corridors are key arterial links that span the urban area and pass through multiple jurisdictions. They include the implementation of closed-circuit television (CCTV) cameras, variable message signs (VMS) and detection as well as the coordination of traffic signals across multiple jurisdictional boundaries. In addition to Grand Avenue, many other major arterials within the Study Area have also been designated as SMART Corridors.

Refer to **Section 3.5** of Working Paper No. 3 – *Existing, Programmed and Planned Facilities and Conditions* for more detailed information on ITS.

Comments related to ITS and traffic signals along Grand Avenue within the Study Area are detailed below.

### **General Public and Other Stakeholders**

The following comments related to ITS and traffic signals were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms, or were submitted at another time:

- Traffic signals along Grand Avenue should be synchronized and timed to discourage speeding.
- Smooth, steady traffic, timed traffic signals, traffic flow, traffic control and progression of signals were identified on comment forms when asked about “major issues and challenges for the corridor”.
- More traffic signals, particularly at every intersection, were identified as their “worst fear” by three commenters.
- Will a traffic light be installed on the north side of Grand Avenue at 67<sup>th</sup> Avenue?

### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to ITS and traffic signals were documented:

## DRAFT

- ADOT asked if the City of Phoenix has any plans to alter the signal timing along Grand Avenue. The City manages all signals along Grand Avenue through Phoenix.
- The City of Glendale confirmed that ADOT manages all signals along Grand Avenue through Glendale.
- ADOT manages the signals along Grand Avenue through Peoria.
- Due to signals at I-17 ramps, Indian School Road between 27<sup>th</sup> Avenue and I-17 gets very congested
- Signal spacing between 27<sup>th</sup> Avenue and I-17 does not function well.
- Traffic signal synchronization is very important. Phoenix's signals are all synchronized, but the City has no control over interchange signals.
- Signal coordination needs to be improved. Traffic flow along north-south and east-west arterials across Grand Avenue could be improved through signal coordination, not just grade separations.
- Signal coordination crossing the freeway is a problem (not specifically referring to Grand Avenue).
- The existing intersection at 27<sup>th</sup> Avenue and Thomas Road is confusing. Vehicles have a difficult time determining what lane to be in to make various movements, or simply cannot navigate the lanes necessary to make certain movements.
- Identify needs consistent with the MAG ITS Strategic Plan, options to address the identified needs, and evaluate and cost the potential improvements (Scope).
- Address options for reducing the number of signals (Scope).
- Identify, evaluate and cost all signal changes and make recommendations (Scope).

### Previous Studies

The following comments related to ITS and traffic signals were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- Grand Avenue was identified as a potential commuter rail corridor in the *Grand Avenue Northwest Corridor Study; SR 303L to SR 101L* (MAG, 2003). ITS implementation along Grand Avenue as a SMART Corridor within the Study Area was also recommended.
- The possibility of improved travel along Grand Avenue through the use of signal coordination was presented in the *Grand Avenue Corridor BNSF Relocation Analysis and Commuter Rail Study* (BNSF, 2003). The study noted a benefit to this could be the reduced need for expensive grade-separations.
- The *MAG ITS Strategic Plan Update* (MAG, 2001) identifies Grand Avenue within the Study Area as a SMART Corridor.
- The *Regional Transportation Plan* (MAG, 2003) also identified Grand Avenue within the Study Area as a SMART Corridor. The *Regional Transportation Plan* sites the *MAG ITS Strategic Plan Update* repeatedly and endorses again its recommendations.

#### **4.1.7 Bottlenecks**

Transportation networks are made up of many different elements, including roadways (arterials, highways, etc), bike routes and lanes, pedestrian facilities, and mass transit facilities. In order for a transportation network to function optimally, all elements of the network must work together, in unison. When a bus breaks down along an arterial roadway with no bus pull-out, thereby blocking one of the through lanes, the capacity of that roadway has been reduced as the number of through lanes have been reduced. When the delay at a stop-controlled intersection results in excessive queuing along the minor roadway, the level of service along that minor roadway has been diminished by use of an inappropriate traffic control device.

Often referred to as “bottlenecks”, these locations have a profound affect on the greater transportation system by not only affecting the route directly served, but many of the routes and modes that intersect it as well. Whether it is capacity, level of service or some other factor that measures a facility’s congestion, bottlenecks can affect an area beyond that in which the bottleneck is located.

Comments related to roadway bottlenecks along Grand Avenue within the Study Area are detailed below.

#### **General Public and Other Stakeholders**

The following comments related to bottlenecks were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Railroad conflicts and traffic control were identified on comment forms when asked about “major issues and challenges for the corridor”.

#### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to bottlenecks were documented:

- The ASG identified issues relating to bottlenecks to be addressed in the study, e.g. grade separations, intersection improvements, signals, and ITS.
- The intersections of 83<sup>rd</sup> Avenue and Peoria Avenue with Grand Avenue received a lot of complaints from residents and merchants. This location creates a bottleneck in downtown Peoria.

#### **Previous Studies**

The following comments related to bottlenecks were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- Both I-10 and I-17 at the east end of the Grand Avenue corridor were identified as bottleneck locations in the *MAG Regional Freeway Bottleneck Study, Draft*

(MAG, 2003). Re-stripping was suggested for I-10. General widening, possibly through double-decking was suggested for I-17.

#### 4.1.8 Access Management

Based on the ADOT Roadway Design Guidelines (ADOT, 1996), “access control is achieved by regulating public access rights to and from properties abutting highways”. Two types of access control exist, full access control and partial access control.

Full access control “gives preference to through traffic by providing access only through selected public roads and by prohibiting at-grade crossings or direct access from abutting property” (ADOT, 1996). In other words, along a route with full access control, ingress and egress from the facility are provided only at service or system interchanges.

Partial access control “still gives preference to through traffic but permits some crossings at grade and some private driveway connections” (ADOT, 1996). Within the Study Area, Grand Avenue currently exists as a partial access controlled facility over much of its length.

Access management is achieved by implementing the types of access control detailed above. It involves managing “access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed” (AASHTO, 2001). Access management incorporates all types of roadways and views major highways and their surrounding activities and roadway networks as a single system.

Based on the AASHTO “Green Book” (AASHTO, 2001), the following principals define access management techniques:

- *Classify the road system by the primary function of each roadway.* Freeways emphasize movement and provide complete access control. Local streets emphasize property access rather than traffic movement. Arterial and collector streets must serve a combination of both property access and traffic movement.
- *Limit direct access to roads with higher functional classification.* Direct property access should be denied or limited along higher class roadways, wherever reasonable access can be provided to a lower class roadway.
- *Locate traffic signals to emphasize through traffic movements.* Signalized access points should fit into the overall signal coordination plan for traffic progression.
- *Locate driveways and major entrances to minimize interference with traffic operations.* Driveways and entrances should be located away from other intersections to minimize crashes, to reduce traffic interference, and to provide for adequate storage length for vehicles turning into entrances.
- *Use curbed medians and locate median openings to manage access movements and minimize conflicts.*

All five points detailed in the “Green Book” will be applied, where appropriate and when feasible, to Grand Avenue within the Study Area.

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Comments related to access management along Grand Avenue within the Study Area are detailed below.

### **General Public and Other Stakeholders**

The following comments related to access management were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms, or were submitted at another time:

- The smaller the building, the more of them, and thus, the more access points along Grand Avenue.
- Some properties along Grand Avenue only have access to Grand Avenue (no rear access). Consider combining parcels to allow for rear access off Grand Avenue.
- Smooth, steady traffic, limited ingress and egress, lights and access, traffic flow, access across Grand Avenue, and reduction in individual access were identified on comment forms when asked about “major issues and challenges for the corridor”.
- How will my customers be able to turn around and head back to the City safely (if medians are closed)?
- Some of the proposed median closings could prevent emergency crews from accessing property and people in the case of an actual emergency.
- Closing the median in front of my property could pose a hardship for our business since it will prevent large trucks from accessing our business.

### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to access management were documented:

- The term “partially controlled access facility (expressway or limited expressway)” will be used for Grand Avenue south of Loop 101 unless and until the study gains consensus on a new terminology.
- The City of Glendale has set aside money for right-of-way acquisition in support of access control efforts.
- The concept of Grand Avenue as a limited access expressway with access only at the mile arterials was supported.
- East of I-17, Grand Avenue should maintain its current level of access, as any reduction would hurt adjoining businesses and wouldn’t fit with the neighborhood’s character. West of I-17, limited access along Grand Avenue could be possible.
- Consider frontage roads for access to businesses along Grand Avenue.
- Analyze approaches to reducing direct access to Grand Avenue including the use of: right turn lanes, frontage roads, road closures, alternative points of access, removal of activities and combining curb cuts. Special consideration will be given to combining access control with redevelopment opportunities (Scope).

## DRAFT

- Identify all median openings and identify, evaluate and cost opportunities to close medians not located at signalized intersections (Scope).

### **Previous Studies**

The following comments related to access management were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- The closure of various intersecting streets, alleys and unused driveways along Grand Avenue was proposed in *Grand Avenue Limited Expressway Design Concept Study for the Glendale Area, Final Report* (City of Glendale, 2003). 57<sup>th</sup> Drive and Myrtle Avenue were proposed as access routes to and from Grand Avenue. Eight existing median openings along Grand Avenue were also identified for closure.
- The *Regional Transportation Plan* (MAG, 2003) stated that the section of Grand Avenue “south of Loop 101 is a partially controlled access facility (expressway or limited expressway) and may be further defined” following completion of this study.

### **4.1.9 Safety**

One of the most important issues along Grand Avenue, as stated by the general public as well as government / municipal officials, is safety. In addition to vehicular safety along and across Grand Avenue, bicycle and pedestrian safety also require a thorough investigation.

Based on the crash analysis conducted as part of Working Paper No. 3 – *Existing, Programmed and Planned Facilities and Conditions*, over 1,300 crashes occurred along Grand Avenue within the Study Area between November 1, 2000 and October 31, 2003. Of these crashes, more than half occurred at intersections.

Based on the crash analysis, the two intersections with the highest number of crashes were:

- 51<sup>st</sup> Avenue / Bethany Home Road / Grand Avenue (130 crashes)
- 59<sup>th</sup> Avenue / Glendale Avenue / Grand Avenue (121 crashes).

Based on the crash analysis, the three segments with the highest number of crashes were:

- 27<sup>th</sup> Avenue – 35<sup>th</sup> Avenue (101 crashes)
- 35<sup>th</sup> Avenue – 43<sup>rd</sup> Avenue (100 crashes)
- 59<sup>th</sup> Avenue – 67<sup>th</sup> Avenue (97 crashes)

Comments related to safety along Grand Avenue within the Study Area are detailed below.

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### **General Public and Other Stakeholders**

The following comments related to safety were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Speed limits are poorly enforced along Grand Avenue.
- Traffic lights along Grand Avenue are not visible when tall vehicles are in front of you.
- Two intersections were identified as being “bad” (unsafe): 91<sup>st</sup> Avenue at Grand Avenue and 91<sup>st</sup> Avenue at Cactus Road.
- The intersection of 39<sup>th</sup> Avenue and Grand Avenue was identified as being unsafe. It was also noted that “legal right turns” are not possible and that a traffic signal or realignment is necessary.
- Medians save lives.
- Right turns lanes (deceleration lanes) are needed along Grand Avenue to access businesses.
- Smooth, steady traffic, lights and access, railroad conflicts, and safety were identified on comment forms when asked about “major issues and challenges for the corridor”.
- Pedestrian walkways over Grand Avenue near schools were identified on comment forms when asked about one’s “greatest hope for the corridor”.
  - A child being killed while crossing Grand Avenue on the way to school was identified by one individual as their “worst fear”.

### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to safety were documented:

- Safety was identified in the scope of work as a key issue to be addressed in the study.
- Pedestrian safety must be considered, especially with the potential of additional transit services within the Grand Avenue corridor.
- Many students who attend Peoria High School jump the BNSF railroad tracks and cross Grand Avenue at locations not signed for pedestrian crossings.
- Decorative walls that have been proposed to shield peoples’ view of the railroad tracks should be less than four feet tall, and therefore may not shield much. Taller walls may create Crime Prevention Through Environmental Design (CPTED) concerns, as would tall vegetation. In addition, any size wall may become a “canvas” for local gangs and taggers.
- Identify, evaluate and cost options for making safety improvements and make recommendations (Scope).

### **Previous Studies**

The following comments related to safety were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

## DRAFT

- The *Grand Avenue Limited Expressway Design Concept Study for the Glendale Area, Final Report* (City of Glendale, 2003) recommended the addition of dedicated right-turn lanes along westbound Grand Avenue and limiting movements or streets that intersect Grand Avenue to right-in / right-out only.
- The Grand Avenue Corridor BNSF Relocation Analysis and Commuter Rail Study (BNSF, 2003) presented the possible solution of relocating both BNSF yards within the Study Area northwest of their current locations. Based on this relocation, the BNSF would be able to eliminate all inbound and outbound trains along Grand Avenue during the AM and PM peak periods. The study also noted a reduction in the amount of vehicle / trains crashes.

### **4.1.10 Bicycle / Pedestrian Requirements**

Comments related to bicycle and pedestrian needs along Grand Avenue within the Study Area are detailed below.

#### **General Public and Other Stakeholders**

The following comments related to bicycle and pedestrian facilities were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Improve bicycle access across Grand Avenue, not necessarily along it, particularly at 61<sup>st</sup> Avenue.
- Improved lighting and shading is needed along Grand Avenue for both bicycles and pedestrians.
- Pedestrian access across Grand Avenue is needed between Peoria High School and Cheyenne Elementary School either in the form of a bridge or tunnel. Students have been hit in this location crossing Grand Avenue. A pedestrian walkway is also needed at 81<sup>st</sup> / 82<sup>nd</sup> Avenue and Grand Avenue.
- Without pedestrian and bicycle improvements, it will be difficult to limit access points along Grand Avenue and people need to be able to move along the corridor.
- Building setbacks along Grand Avenue are too small, resulting in poor sight distance for cars to see pedestrians and cyclists.
- Pedestrian crossings, pedestrian enhancements, alternative methods of transportation, and access to bus lines were identified on comment forms when asked about “major issues and challenges for the corridor”.
- Pedestrian walkways over Grand Avenue near schools were identified on comment forms as one’s “greatest hope for the corridor”.
- A child being killed while crossing Grand Avenue on the way to school was identified as one’s “worst fear”.

#### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to bicycle and pedestrian facilities were documented:

## DRAFT

- The ASG identified bicycle and pedestrian facilities as an issue to be addressed in the study.
- Even though their cost will be high, consider below grade bicycle / pedestrian crossings of Grand Avenue.
- How bicycles and pedestrians cross Grand Avenue will need to be looked at.
- Pedestrian facilities bordering and crossing Grand Avenue will be necessary in the area west of Grand Avenue between Peoria Avenue and Washington Avenue to service the redevelopment park.
- CMAQ funding is in place to enhance pedestrian crossings at Grand Avenue and Peoria Avenue. Enhancements include crosswalk pavers and landscaping along Grand Avenue.
- The Peoria Planning Department would rather see Grand Avenue near Peoria Avenue converted to an enhanced pedestrian corridor that would link their future transit center (east of Grand Avenue, south of Peoria Avenue) with their future park (west of Grand Avenue) and the historic downtown area.
- Pedestrian facilities are supported both along and across Grand Avenue where feasible.
- More right-of-way along Grand Avenue may be needed to adequately provide pedestrian facilities as well as landscaping. Currently, sidewalks are adjacent to the roadway, within the clear zone, and landscaping is provided for outside the sidewalks.
- A pedestrian overpass may be useful at 87<sup>th</sup> Avenue to provide access across Grand Avenue for the high school and elementary school.
- A pedestrian overpass or underpass should also be considered in the downtown area near 83<sup>rd</sup> Avenue.
- Sidewalks should not be precluded along Grand Avenue. Taking into account the eight-foot clear zone along Grand Avenue, how much available right-of-way is there for beautification?
- The study will address bicycle and pedestrian needs (Scope).
- Pedestrian and bicycle access across Grand Avenue and to transit stops will need to be addressed (Scope).
- The inclusion of pedestrian and bicycle facilities must be consistent with the ultimate concept for the corridor. Conflicts with roadway and transit vehicles that could decrease the safety of pedestrians and cyclists should be avoided (Scope).

### **Previous Studies**

The following comments related to bicycle and pedestrian facilities were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- *The Grand Vision: Grand Avenue Image Improvement Study, Final Report* (City of Glendale, 2001) recommended constructing a larger bridge (or deck) at 59<sup>th</sup> Avenue and Glendale Avenue to provide greater pedestrian connections across Grand Avenue to the east and west sides of Glendale. The study also recommended providing a continuous detached sidewalk along the north side of Grand Avenue that would enhance convenience, comfort, safety and accessibility.

The construction of pedestrian overpasses at strategic locations along Grand Avenue, possibly at Palmaire and Lamar, was also recommended.

- By providing more functional pedestrian facilities, such as walkable routes to work and school, as well as better access to transit, the *Pedestrian Area Policies and Design Guidelines* (MAG, 1995) stated it was possible to achieve better air quality by reducing trips and cold starts. It also recommended providing walkways adjacent to roadways but separated by landscaping or a bike lane.

#### **4.1.11 Transit Requirements**

Comments related to transit along Grand Avenue within the Study Area are detailed below.

##### **General Public and Other Stakeholders**

The following comments related to transit were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Extreme heat could hinder public transportation as people do not want to wait in the heat. Consider having public transportation stations inside buildings along the route, not outside, such as City Halls, MetroCenter, etc.
- People would pay more for public transportation (in fares) for climate controlled waiting areas.
- Make sure rail transit is tied to the bus system.
- Grand Avenue is a natural high-capacity corridor, and RAPID transit should be implemented.
- The Yellow Line (bus route) should be brought back.
- Alternative methods of transportation, “good” bus service (not just RAPID) and access to bus lines / covered bus stops were identified on comment forms when asked about “major issues and challenges for the corridor”.
- Light rail service and additional bus routes were identified on one comment form as their “greatest hope for the corridor”.

##### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to transit were documented:

- Following discussion at the ASG, the study will detail the BRT service funded in the RTP as well as review high capacity transit options (bus, light rail, heavy rail, and commuter rail) as part of the ultimate concept for the corridor. It will also detail a transition program as needed from the BRT service to the ultimate concept. This includes any roadway provisions needed to accommodate the transit service, including an initial consideration of potential station/stop locations. The implications of rail transit service options as part of the ultimate concept on bus transit service will be considered.

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- The BNSF has indicated they are serious about discussing commuter rail in the corridor. It is unclear if a relocation of mainline freight activity is a prerequisite for commuter rail operations. Options such as moving freight off the line, changing freight schedules and double tracking exist. While there is currently no set schedule for railroad operations (and thus no possible way to know when a train will travel the Grand Avenue corridor), in the future, if in fact commuter rail becomes a reality in the corridor, the trains would follow a specified schedule. How wide is the railroad right-of-way in the Grand Avenue corridor? Is there the potential for putting light rail on new track within the BNSF right-of-way?
- Light rail transit and commuter rail are not huge issues, but greater bus service within the city, between the downtown Peoria area (Grand Avenue and Peoria Avenue) and the main business area (Bell Road and 83<sup>rd</sup> Avenue) is needed.
- The bus service that used to exist along Grand Avenue should be returned. Peoria currently has one park-and-ride lot located in downtown Peoria south of Grand Avenue.
- Roadway provisions need to accommodate transit service (Scope).
- The transit focus is on upgrading local bus service to regional service, including limited stop, express bus, and bus rapid transit (Scope).
- Connections to local buses at cross streets should be considered (Scope).
- A major focus of this project will be locating and costing capital projects including bus pull outs, bus access ramps, transit stations, queue hoppers, and park and ride facilities (Scope).
- The selected option should provide regional service and include facilities so transit vehicles do not stop in through lanes and block traffic (Scope).
- Close attention will be given to the integration and connectivity of transit service including dial-a-ride, shuttles, neighborhood circulators, local buses, bus rapid transit and rail (Scope).

### Previous Studies

The following comments related to transit were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- The *Northwest Area Transportation Study, Final Report* (MAG, 2003) identified several key projects for further study including the potential for commuter rail / bus rapid transit along the BNSF corridor, a light rail extension along Glendale Avenue, and a possible light rail extension or rapid bus transit line along 59<sup>th</sup> Avenue.
- A need for additional transit by 2030 within the Study Area was documented in the *Regional Transit System Study* (Valley Metro, 2003), particularly in the cities of Glendale and Phoenix. Within this study, Grand Avenue was identified as a regional expressway route both within and outside the Study Area.
- The *Grand Avenue Corridor BNSF Relocation Analysis and Commuter Rail Study* (BNSF, 2003) identifies the potential to provide a corridor for commuter rail as one of its benefits.
- Making all bus stops ADA accessible and providing permanent shade, seating and trash containers was one of the recommendations included in *The Grand Vision*:

*Grand Avenue Image Improvement Study, Final Report* (City of Glendale, 2001). The *Pedestrian Area Policies and Design Guidelines* (MAG, 1995) also stated that shade and sufficient seating should be provided at transit stops.

- Two future park-and-ride facilities were identified near Grand Avenue in the MAG Park-and-Ride Study, Final Report (MAG, 2001). The first is at 91<sup>st</sup> Avenue and Olive Avenue, and is programmed for the near-term. The second is at 59<sup>th</sup> Avenue and Myrtle Avenue, and is programmed for the long-term.
- The *Regional Transportation Plan* includes \$147 million of improvements on Grand Avenue: \$53 million for unspecified widening, access control, and beautification (\$30M in phase I, \$20M in phase II, and \$3M in phase IV); \$17 million for additional ramps at the 51<sup>st</sup> Avenue grade separation (phase IV); \$38.5 million for additional ramps at the 35<sup>th</sup> Avenue grade separation (phase IV); and \$38.5 million for a new 19<sup>th</sup> Avenue grade separation (phase IV).

#### **4.1.12 Goods Movement**

As noted previously, Grand Avenue was originally constructed in the late 1800s to connect the agricultural communities of the West Valley with downtown Phoenix. This connection expanded with the introduction of the BNSF Railway adjacent to Grand Avenue. Since its beginning, Grand Avenue has served as a major facility for the importation and exportation of goods from the Phoenix metropolitan area. Today, Grand Avenue, and the BNSF Railway, continue to be used for the movement of goods, although increases in traffic congestion along Grand Avenue and its intersecting arterials have resulted in a reduction in their levels of service.

Comments related to the movement of goods along Grand Avenue within the Study Area are detailed below.

#### **General Public and Other Stakeholders**

The following comments related to the movement of goods were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- Railroad conflicts were identified on one comment form when asked about “major issues and challenges for the corridor”.

#### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to the movement of goods were documented:

- The BNSF has confirmed that there is no set schedule for railroad operations along Grand Avenue. The schedule is set by factors outside the greater Phoenix metropolitan area, thus it is not possible to state that a train will travel the Grand Avenue corridor at a specified time on a specified day.
- Review and address identified issues with goods movements, including rail and truck modes (Scope).

- Identify, evaluate and cost options and make recommendations (Scope).

### **Previous Studies**

The following comments related to the movement of goods were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- The *High Capacity Transit Plan* (MAG, 2003) notes that the BNSF has been considering the relocation and consolidation of several freight rail facilities in downtown Phoenix to sites north of the Study Area.

### **4.1.13 Beautification**

During its infancy, in the late 1800s, Grand Avenue served to connect the agricultural centers of the West Valley to downtown Phoenix. With the introduction of rail activity parallel to Grand Avenue, the West Valley continued to develop and began to transform from an agriculture-centered region to an industrial/agriculture-centered region. As the population continued to grow and the area became more industrial, the aesthetics of Grand Avenue became less and less people oriented. Now, with the redevelopment of Grand Avenue in such areas as downtown Peoria and Glendale, as well as portions in Phoenix, the overall beautification of Grand Avenue is a higher profile issue than it has been in the past.

Comments related to beautification along Grand Avenue within the Study Area are detailed below.

### **General Public and Other Stakeholders**

The following comments related to beautification were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms, or were submitted at another time:

- Beautification can lead to better development
- Initiate policies such as CPTED.
- Announce cities along Grand Avenue so people know where they are.
- Most billboards along Grand Avenue exist on private property, including the railroad. The billboards are dangerous.
- The undergrounding of utilities should be considered to enhance future development options.
- Spot beautification, perhaps only in non-industrial areas, is better than along the entire corridor.
- Portions of Grand Avenue in the City of Phoenix have been improved.
- The best beautification along Grand Avenue would be to pick up the trash, perhaps through an Adopt-a-Street program. Trash along Grand Avenue brings down the pride of ownership.
- Add more trees and color along Grand Avenue.
- Find some way to reduce or eliminate embarrassing establishments along Grand Avenue.

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- The need for beautification and land use improvements, particularly next to the railroad, improved shading and landscaping, removing “bad” businesses and improving the overall appearance of Grand Avenue were identified on comment forms when asked about “major issues and challenges for the corridor”.
- To beautify Grand Avenue was identified on a comment form as one’s “greatest hope for the corridor”.
- Need more information on the beautification aspects presented.
- The frontage road south of Grand Avenue and east of Loop 101 is within ADOT right-of-way. How can the City fix up the area to improve the image, parking, access and landscaping?

### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to beautification were documented:

- The City of Phoenix would like the study to inventory billboards along the route and compile background information in order to assess options to remove the billboards as part of the beautification process.
- The City of Peoria has been in discussion with ADOT regarding landscaping along Grand Avenue within city limits. The City of Peoria would like to plant trees between the curb and the sidewalk. ADOT prefers to maintain a clear zone consistent with AASHTO standards behind the vertical curb to minimize liability, thus preferring that the sidewalk be located immediately adjacent to the curb. This study will research the issue of liability and determine if cities could accept the liability for Grand Avenue as they do with other streets in their city.
- The potential for trees (and other landscaping) blocking sightlines was raised.
- Beautification was a key issue identified in the scope of work to be addressed in the study.
- Part of the beautification process is to figure out what type of facility Grand Avenue should be and fully fund it.
- Beautification along Grand Avenue is supported. Beautification should also include the railroad right-of-way as the railroad creates a visual division in the city.
- The railroad creates a visual nuisance.
- Beautification along the corridor is a must.
- The Pima Freeway in Scottsdale was mentioned as an excellent example of beautification.
- Landscaping is key along Grand Avenue and at abutting developments. It should be done within ADOT’s right-of-way.
- A tiny triangle of land northwest of McDowell Road / 19<sup>th</sup> Avenue is an historic district (Villa Verde Historic District).

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- Consider all elements of beautification including landscaping, hardscaping, lighting, signage, screening walls, structural enhancements and elimination of unsightly land uses (Scope).
- Identify and asses options for removing billboards (Scope).
- Look for opportunities to relocate overhead utilities underground (Scope).

### **Previous Studies**

The following comments related to beautification were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*:

- Beautification and landscaping along Grand Avenue medians and the railroad right-of-way, the purchase of billboards along Grand Avenue for their removal, the undergrounding of existing electrical lines that run along the north side of Grand Avenue and the installation of new street lighting along Grand Avenue were all recommendations included in the *Grand Avenue Limited Expressway Design Concept Study for the Glendale Area, Final Report* (City of Glendale, 2003).
- *The Grand Vision: Grand Avenue Image Improvement Study, Final Report* (City of Glendale, 2001) identified a number of policy, program and physical improvements that could be made along Grand Avenue including adopting a public art master plan, scheduling regular trash and debris pickup, collaborating with ADOT to visually enhance roadway improvements and overpasses, and installing landscaping along the edges and median of Grand Avenue.

### **4.1.14 Drainage**

Comments related to drainage along Grand Avenue within the Study Area are detailed below.

#### **General Public and Other Stakeholders**

The following comments related to drainage were documented at the March 30, 2004 Public Meeting either from comments made during the oral discussion or written comments submitted on comment forms:

- To improve the water retention basins near Bethany Home Road, a walkway should be provided between the basins and landscaping should be added.

#### **Agency Steering Group and Other Participating Agency Representatives**

Based on discussion that has occurred at the ASG meetings and meetings attended by agency representatives, the following comments related to drainage were documented:

- The ASG identified drainage as a key issue to be addressed in the study.
- Major drainage utilities within the area will need to be identified and potential impacts discussed, including drainage patterns, however detailed mapping do not need to be completed for this study (Scope).
- Review and address drainage issues. Identify, evaluate and cost options for improvements and make recommendations (Scope).

### **Previous Studies**

No comments related to drainage were documented in Working Paper No. 1 – *Related Studies, Plans, and Programs*.

## **4.2 TRAFFIC ANALYSIS**

*This section will be completed following an analysis of the traffic assignment data and upon completion of the VISSIM analysis*

## **4.3 PRELIMINARY EVALUATION CRITERIA**

The preliminary evaluation criteria presented below were brought forward from the 1999 Grand Avenue Major Investment Study. The 1999 criteria were reviewed in light of the issues presented in the first section of this paper. Criteria that relate to comments received are shown below in regular type. Those shown in italics may be important but do not relate to issues that have been raised in this current study. All will be reviewed with the ASG to determine the criteria that will be used to evaluate alternatives in this MIS.

### **4.3.1 Service Evaluation**

1. Eliminate six-legged intersections and underperforming intersections
  - a. Change in intersection complexity
  - b. Change in number of traffic signals
  - c. Number of remaining intersection bottlenecks?
2. Eliminate railroad crossings
  - a. Number of grade separated railroad crossings
  - b. Amount of delay due to railroad operations
3. Improve regional mobility and serve the statewide function of US 60
  - a. Number of signals remaining on Grand Avenue
  - b. Travel time on Grand Avenue
  - c. Access control on Grand Avenue
  - d. Connectivity (L101, Northern Avenue, I-17, I-10, Light rail?)
4. *Promote development opportunities*
  - a. *Street frontage gains and losses*
  - b. *Quantity of redevelopable property acquired*
  - c. *Accessibility to developable or redevelopable land*
5. Improve aesthetics of the corridor
  - a. Amount of unattractive land uses removed
  - b. Amount of land available for landscaping
  - c. Number of billboards removed or potentially removed
6. Promote multi-modal uses in the corridor

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- a. Promotion of local bus service
- b. Promotion of express bus service
- c. Promotion of non-motorized travel
- d. Compatibility with proposed LRT alignment
  - i. Maintain existing access (especially right-turn)
  - ii. Maximize LRT operating speed and convenience to riders
  - iii. Minimize construction costs
  - iv. Minimize impacts on vehicular traffic operations
  - v. Avoid acquisition of additional right-of-way for LRT
7. Accommodate projected travel demand in the corridor
  - a. Intersection level of service
  - b. Intersection total delay
  - c. Safety
  - d. Amount of 2030 traffic with unimpeded flow through intersection
  - e. 2030 daily weekday volumes served by Grand Avenue (by segment)
  - f. Number of bottlenecks remaining

### 4.3.2 Impact Evaluation

1. Residences taken or impacted
  - a. Number of residential units taken
    - i. Single Family
    - ii. Multi- Family
2. Businesses taken or impacted
  - a. Number of businesses taken
    - i. Commercial businesses
    - ii. Industrial businesses
3. Neighborhoods impacted
  - a. Environmental impacts of overpass on neighborhood residential areas
    - i. Visual Impacts
    - ii. Air quality impacts
  - b. Number of community services taken
  - c. Accessibility impacts
  - d. Increased traffic volumes
  - e. Title VI/Environmental Justice Populations Impacted
4. Hazardous materials
  - a. Number of sites potentially impacted
5. Cultural resources
  - a. Number of sites potentially impacted
6. Section 4(f) Properties
  - a. Number of sites potentially impacted

7. 100-Year floodplain
  - a. Number of sites potentially impacted
8. Acreage of new right-of-way needed
  - a. Acreage needed for right-of-way

### **4.3.3 Implementation Evaluation**

1. Cost of construction and right-of-way
  - a. 2005 cost estimate
2. Engineering issues and uncertainties
  - a. Major utility conflicts
  - b. Drainage features
  - c. Design complexity
3. *Phased construction opportunities*
  - a. *Provide finished roadway project with consistent roadway design features*
4. *Future expansion potential*
  - a. *Footage needed to obtain full access control*
  - b. *Number of signals that cannot be removed from Grand Avenue*