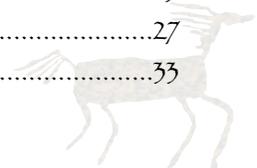
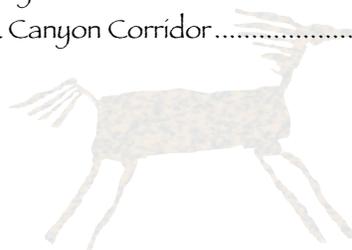


# TABLE of CONTENTS

INTRODUCTION .....	1
BACKGROUND .....	1
CURRENT LAND USE AND GENERAL PLAN .....	2
PLANNING GOALS, OBJECTIVES AND STRATEGIES .....	2
GOAL 1: PROMOTE THE CORRIDOR AS A REGIONAL EMPLOYMENT CENTER.....	2
GOAL 2: ACHIEVE A BALANCE BETWEEN EMPLOYMENT AND HOUSING .....	3
GOAL 3: CONCENTRATE GROWTH WITHIN A DEFINED CORRIDOR .....	3
GOAL 4: PRESERVE SONORAN DESERT AMENITIES .....	4
PROPOSED LAND USE MAP AND PLAN ELEMENTS .....	6
LAND USES .....	7
INFRASTRUCTURE LIMIT LINE.....	9
INFRASTRUCTURE PHASING OVERLAY .....	13
LINKING EMPLOYMENT GROWTH AND HOUSING GROWTH .....	14
TRANSPORTATION PLAN .....	20
INTERSTATE 17 TRAFFIC INTERCHANGE FUNDING AND TIMING.....	22
OPEN SPACE AND TRAILS PLAN .....	23
FLOOD PLAIN MANAGEMENT .....	27
INTRODUCTION.....	27
BACKGROUND.....	27
NATIONAL FLOOD INSURANCE PROGRAM .....	27
CONCLUSION AND RECOMMENDATIONS .....	33
SPECIFIC PLAN.....	33

## ILLUSTRATIONS and MAPS

FIGURE 1	View of Pyramid Peak .....	1
FIGURE 2	Planned Community Developments Map .....	5
FIGURE 3	Existing Land Use Plan .....	6
FIGURE 4	Infrastructure Limit Line & Infrastructure Phasing Overlay.....	9
FIGURE 5	Recreational Trails Map.....	24
FIGURE 6	View Bronco Butte and Bronco Tank .....	25
FIGURE 7	Skunk Creek-North Black Canyon Corridor .....	27
FIGURE 8	Sonoran Desert-North Black Canyon Corridor .....	33



# ACKNOWLEDGMENTS

## CITY COUNCIL

Skip Rimsza, Mayor

Dave Siebert, District 1	John Nelson, District 5
Tom Milton, District 2	Sal DiCiccio, District 6
Peggy A. Bilsten, District 3	Doug Lingner, District 7
Phil Gordon, District 4	Cody Williams, District 8

## CITY MANAGEMENT

Frank Fairbanks, City Manager

## PLANNING COMMISSION

Virgil Berry Jr., Chairman  
Morris Stein, Vice Chairman

Sandra Ferniza	Bob Ford
Martha Garcia	Robert Frank
Dr. Joan Kelchner	Don Keuth
John McComish	

## PROJECT TEAM

Lynn Favour, Planner II  
Jolene Ostler, Planner II  
Sally Heinrich, Planner I  
Richard Clewis, Principal Planner  
Tracy Sato, Planner II  
Charles Fitzhugh, Planner II  
Terri Newton, Planner II : Photography  
Judith J. Burke, Graphic Designer  
Steve Mocek, Graphic Supervisor

## SUPERVISION

David E. Richert, Planning Director  
Ray Quay, Assistant Planning Director  
Mark Steele, Principal Planner  
Jim Mathien, Planner III

## PLANNING COMMITTEE NORTH GATEWAY VILLAGE

Clancy Jayne, Chair  
Jesse Garcia, Vice-Chair  
Paul Hendricks  
William Foster  
Ray Griswold  
Edward Cramer  
Leanne Lonski  
Barbara Maroney

## AND LIBRARY DEPARTMENT CITY OF PHOENIX PARKS, RECREATION,

Jim Burke  
Bruce Swanson  
T.J. Newman

## TRANSPORTATION DEPARTMENT CITY OF PHOENIX STREET

Cliff Bedell  
John Siefert  
Jim Slaker

## CITY OF PHOENIX WATER DEPARTMENT

Mario Saldamando  
Paul Kinshella  
Keith Larson  
Madeline Goddard

Upon request this publication will be made available within a reasonable length of time through appropriate auxiliary aids or services to accommodate an individual with a disability. This publication may be made available through the following auxiliary aids or services: large print, Braille, or computer diskette. Contact Theresa Damiani 262-6368/v or 534-5500 TDD.

ADOPTED SEPTEMBER 1999

# INTRODUCTION

The North Black Canyon Corridor (NBCC) is one of the city's premier growth areas. Located along both the east and west sides of Interstate 17, the North Black Canyon Corridor stretches from Happy Valley Road to the northern city limits. Through the Strategic View of Growth and the North Black Canyon Corridor Concept Plan, the City Council identified a broad policy framework to guide development within the corridor. Recognizing the strategic employment needs in the northern parts of Phoenix, a new high quality regional employment center and a diversified residential area are proposed. These are to be integrated with a system of desert preserves, urban open spaces and parks in a new urban form with the intention of promoting a sense of community, achieving a sustainable transportation system, and producing high quality development, which both integrates with and preserves the natural desert environment. With its outstanding natural amenities, the NBCC has the potential to become one of the most highly competitive and emerging employment locations in the Valley. Providing a conducive land pattern and complimentary land policies, however, is critical to the successful establishment of a high quality employment center.

Responding to a variety of unusual development opportunities and constraints that exist within this area, the growth pattern and the management techniques proposed within this land use plan provide for the implementation of a managed growth strategy for the North Black Canyon Corridor. Of special note, air quality remains a significant quality of life issue for the Valley. Existing commuting patterns and the Valley's natural topography have both been found to contribute to adverse levels of air pollutants. Minimizing commuting time and the associated traffic congestion continues to play an important role in the city's strategy to improve air quality. The plan proposed for the NBCC with its emphasis on an urban village pattern where residents have the opportunity to both live and work within the corridor strongly supports citywide efforts to maintain and improve air quality for both existing and future residents.

To this end, the accompanying growth management concepts for the NBCC are submitted to keep development within a defined corridor, ensure a balance between jobs and housing, and preserve important desert features while providing adequate open space to meet the needs of future residents of the NBCC and the overall City of Phoenix.

## BACKGROUND

In 1994, the city began to guide its growth and redevelopment efforts under a common set of growth concepts called the Strategic View of Growth. The Strategic View of Growth suggested that Phoenix was becoming a family of subregional communities. Each of these subregional communities had unique redevelopment and growth issues and a unique role in the expanding regional economy. Within this changing environment, if Phoenix as a whole was going to successfully maintain and enhance the quality of life for all residents, it had to ensure that each community, regardless of location, could successfully tap into the region's economy.

Over the last five years a variety of planning and redevelopment efforts have been initiated following the directives of the Strategic View of Growth. One of these was within the North Black Canyon Corridor. In the fall of 1997, the City Council adopted the North Black Canyon Corridor Concept Plan. The concept plan proposed the development of a regional employment center and balanced residential community integrated with the surrounding desert environment. As a result, and in recognition of increasing development opportunities, a General Plan Amendment reflecting revised land uses with accompanying General Plan text was proposed and subsequently approved for the North Black Canyon Corridor. This General Plan Amendment (GPA-NG-1-97-1-2) served to revise land use designations for the areas east and west of Interstate 17, from south of the Central Arizona Project to the northern city limits.



FIGURE 1:  
View of Pyramid Peak from North Black Canyon Corridor

# CURRENT LAND USE and GENERAL PLAN

Currently, over 90% of the land area within the corridor is undeveloped Sonoran desert. Several major wash and river corridors traverse this desert country, including the New River corridor on the northwest edge, Dead Man's Wash, Skunk Creek Wash, Apache Wash, and the Cave Creek Wash on the far eastern edge. Approximately 80% of the land is owned by the Arizona State Land Department. Private ownership is concentrated in a north-south linear pattern east of Interstate 17 from Cloud Road south to the existing city. The entire subject area is without water and sewer infrastructure. Paved road access is limited to the Honda Bow interchange in the far north; the Pioneer interchange serving a small manufactured home community and a federal prison; and Carefree Highway where the state maintains the Ben Avery Shooting Range. An existing granite mine is active southeast of Carefree Highway and is accessed via a gravel road along the 23rd Avenue alignment. Both the shooting range and the mine are anticipated to remain as long term uses. Two large planned communities, Tramonto (I-17 and Carefree Highway) and Dynamite Mountain Ranch (north and south of the Central Arizona Project along the 23rd Avenue Alignment) have approved zoning, but have not initiated construction.

An additional pocket of development exists at the interchange of Honda Bow and Interstate 17 where an

outlet shopping center is located. Additional commerce park development is planned at the interchange by the Del Webb Corporation, as part of their larger planned residential community (Anthem) located in the county land east of I-17. One sand and gravel mine with an associated processing plant lies just west of this area; an additional mine has been proposed just northwest of the outlet.

The current General Plan reflects the 1987 Peripheral Areas C&D Plan. A large portion of the corridor area, formerly part of Area D, was designated mixed use in anticipation that it would be replanned at a future date. Since 1987, several significant changes have occurred. These formerly peripheral areas are now experiencing growth pressures. Renamed the Desert View Tri-Villages for a time, Areas C&D are now divided between three urban villages: (1) North Gateway, which encompasses the I-17 corridor; (2) Desert View, which encompasses Cave Creek Wash; and (3) northern portions of Deer Valley Village. The proposed Northwest and Northeast Outer Loop, to be located between the Lone Mountain and Dixileta alignments has been eliminated. As a result, much of the land use proposed in tandem with this roadway network must be adjusted and further refined. In addition, as noted by the ongoing planning for several large planned communities, development opportunities now exist in the

## PLANNING GOALS, OBJECTIVES, and STRATEGIES

The NBCC Concept Plan introduced general goals and policies and provided a strategic framework to create a highly desirable pattern of urban growth. The approved General Plan Amendment recommends implementation strategies based upon these established goals and the completion of additional land use, infrastructure, and transportation planning.

**GOAL 1:** Promote the North Black Canyon Corridor as a regional employment center.

### OBJECTIVE:

 A comprehensively planned village core with ancillary planned commercial nodes.

### STRATEGIES:

 Designate a linear urban village core along the anticipated Parkway "A" (at approximately the 27th Avenue alignment) on the eastern side of Skunk Creek; between the Dove Valley Road and Lone

 Mountain Road alignments, proximate to both Skunk Creek and the natural features of Bronco Butte and Bronco Tank.

 Designate the overall employment area as mixed commerce park/office on the General Plan to allow flexibility in the siting of the most intensive portion of the urban village.

 Plan the core area as a whole once the central core area or one or more large major employment centers at the edge of the core are designated through an initial user.

 Initiate a city effort to encourage cooperative planning efforts among the various owners of properties within the designated core area. This may include formation of an association and the initiation of a joint planning effort to plan core properties.

 Designate land areas for commercial development, to be comprehensively planned and sized to meet surrounding community needs.

 Initiate a **Specific Plan** to provide the following:

-  specific design guidelines to direct development within these village areas. A Specific Plan should include a more detailed framework of design criteria regarding the interrelationship between uses, the treatment of wash corridors, desert vegetation, pedestrian orientation within the village core and commercial nodes and opportunities for coordinated transit.

## GOAL 2: Achieve a balance between employment and housing.

### **OBJECTIVES:**

 Adopt a land use plan based on the urban village model that incorporates a range of housing densities to ensure a balanced community.

 Establish links between jobs and housing.

### **STRATEGIES:**

 Based on the urban village concept, maintain a high density village core with employment and commercial development surrounded by high to medium density residential graduating to low density residential adjacent to established residential patterns within the surrounding county.

 Adopt a North Gateway Village goal that the number of jobs should equal 75 percent of the resident population.

 Adopt a phased jobs to housing goal for the first part of village development (area within the infrastructure limit line) as follows:

-  15 percent when 25 percent of the residentially designated land is absorbed,
-  30 percent when 50 percent of the residentially designated land is absorbed,
-  50 percent when 75 percent of the residentially designated land is absorbed;

 Initiate a **Specific Plan** to further define the following plan elements:

 Identify the recommended goals and implementation strategies linking employment and housing growth including the following: define the review process; identify the methodology of the review and the steps of the implementation process; and assign the areas of responsibility within the city organization.

 Include a detailed economic development action plan for developing the employment center with the

Deer Valley Airport Employment Center included as a key feature.

## GOAL 3: Concentrate growth within a defined corridor.

### **OBJECTIVES:**

 Establish an Infrastructure Limit Line with the general boundaries of Interstate 17, Cloud Road, 7th Avenue, and the Central Arizona Project.

 Incorporate an Infrastructure Phasing Overlay which introduces a timing element to the General Plan to ensure that growth remains concentrated within a defined corridor until expansion of the growth corridor is needed.

 Plan a coordinated and efficient transportation system.

### **STRATEGIES:**

 Set a goal that the City Council will review the infrastructure boundary area when either (1) 10 years passes from Council adoption of the limits; or (2) 65% of the developable land within the infrastructure boundary is built upon (i.e. building permits issued).

 Initiate a **Specific Plan** to define the review process and identify the methodology for the review and adjustment of the Infrastructure Limit Line boundaries; and assign the areas of responsibility within the city organization.

 Work with ADOT to widen Interstate 17 at least to Carefree Hwy (to 6 lanes plus HOV lanes).

 Provide for one east-west roadway through the North Sonoran Desert Preserve. The design of this roadway should mitigate Preserve impacts while providing good capacity and a pleasant motoring experience.

 Study the feasibility of providing an additional access point to I-17 southward at approximately Jomax or Dynamite Road alignments.

 Explore the utilization of district and community park facility parking lots for transit park-and ride lots and possibly opportunities for cooperative funding.

 Initiate a **Specific Plan** to identify the recommended goals and implementation strategies to promote transit and pedestrian orientation within the corridor:

 Lone Mountain Road and Parkway "A" will function as the main streets within the core and should be designed with strong transit emphasis to accommodate future operations of multiple bus routes and transfers.

-  Buildings should be conveniently connected to the pedestrian system to promote usage.
-  Bike lanes are incorporated in the standard cross-sections of these streets. Access to the core by bicycle should be safe and efficient. Bicycle racks or lockers should be available to connect to the transit system, for core employees, and to promote the use of bicycles for intra-core trips.
-  Provide wider than standard 5' sidewalks in the core area to provide adequate capacity for increased pedestrian usage. A minimum width of 8' should be used.
-  Maintain the capacity of arterial streets through the corridor by minimizing driveways, intersections and signals. The Street Classification System General Policy Document and Technical Supplement should be considered as minimum requirements for these streets.

**GOAL 4:** Preserve North Sonoran desert amenities and use these features to define community form and identity.

**OBJECTIVES:**

-  Develop an integrated recreation and conservation plan to preserve fragile desert resources and to provide outdoor recreational opportunities.
-  Establish the village core near the desert features of Bronco Butte and Skunk Creek to provide character and identity to the village.

**STRATEGIES:**

-  Site a district park south of the Dove Valley Road alignment and extending approximately one-half mile south of the Lone Mountain Road alignment, adjacent to the east side of I-17. Provide major trailhead facilities within the park.
-  Site community parks within the initial growth corridor proximate to the proposed Sonoran Preserve but physically separated by roads to lessen the traffic and visitor impacts. Provide major trail connections from the parks to the Preserve.
-  Site neighborhood parks adjacent to major washes, which would serve as trail corridors and thereby provide a network of connectivity between all parks in the planning area, as well as access to the Preserve.
-  Develop a trails plan for the Preserve that will accommodate users with a wide range of interests and abilities. Use access points to link the Preserve trails to the existing recreational trails system to allow Phoenix residents to hike, bike, run or ride a horse from Peoria to Scottsdale and from South Mountain Park to the northern reaches of the city and beyond.

-  Locate multi-use trails along corridors formed by major washes and arterial and connector roadways. Use district and community parks as major trailheads when proximate to the Skunk Creek Wash system and the Sonoran Preserve. Use community parks as trailheads for the trail system within the Preserve, as well as for connecting multi-use trails.
-  Provide visual and physical links between Bronco Butte and the planned commercial core to Skunk Creek Wash and adjacent recreational areas.
-  Adopt an interim floodplain policy for wash corridors with 100-year flood flows reaching or exceeding 5,000 cfs. until a permanent floodplain policy is approved. Interim floodplain standards would include:
  -  No encroachment within the 100-year floodplain or 70 to 150 feet from the floodway edge based on the state planning standard defined in the Department of Water Resources Flood Warning and Dam Safety Standards (ARS 48-3605 Standard 5-96 Oct 1996), whichever is greater.
  -  The floodplain of applicable washes will remain undisturbed (e.g. no structural flood control devices, grading or filling) except for utility corridors, wash transitions to the floodplain, and major arterial and collector streets which bridge the wash. Limited recreational amenities will be allowed within the floodway fringe.
  -  Prepare a watercourse management plan that studies the impacts and benefits of floodplain management for applicable washes under the current city policy, a non-structural policy, and a limited encroachment policy.
  -  Initiate a *Specific Plan* to provide specific design guidelines to integrate urban development and desert amenities. A Specific Plan should include a more detailed framework of design criteria regarding (1) the treatment of wash corridors, including possible wash corridor setbacks, the retention of undisturbed wash areas, and the use of naturalistic flood control techniques where wash disturbance is warranted, and (2) the treatment of desert vegetation, including replacement and revegetation of areas with like plant species and plant densities.
  -  Adopt a *Specific Plan* to implement an approved floodplain management policy.

# LAND USE MAP and PLAN ELEMENTS

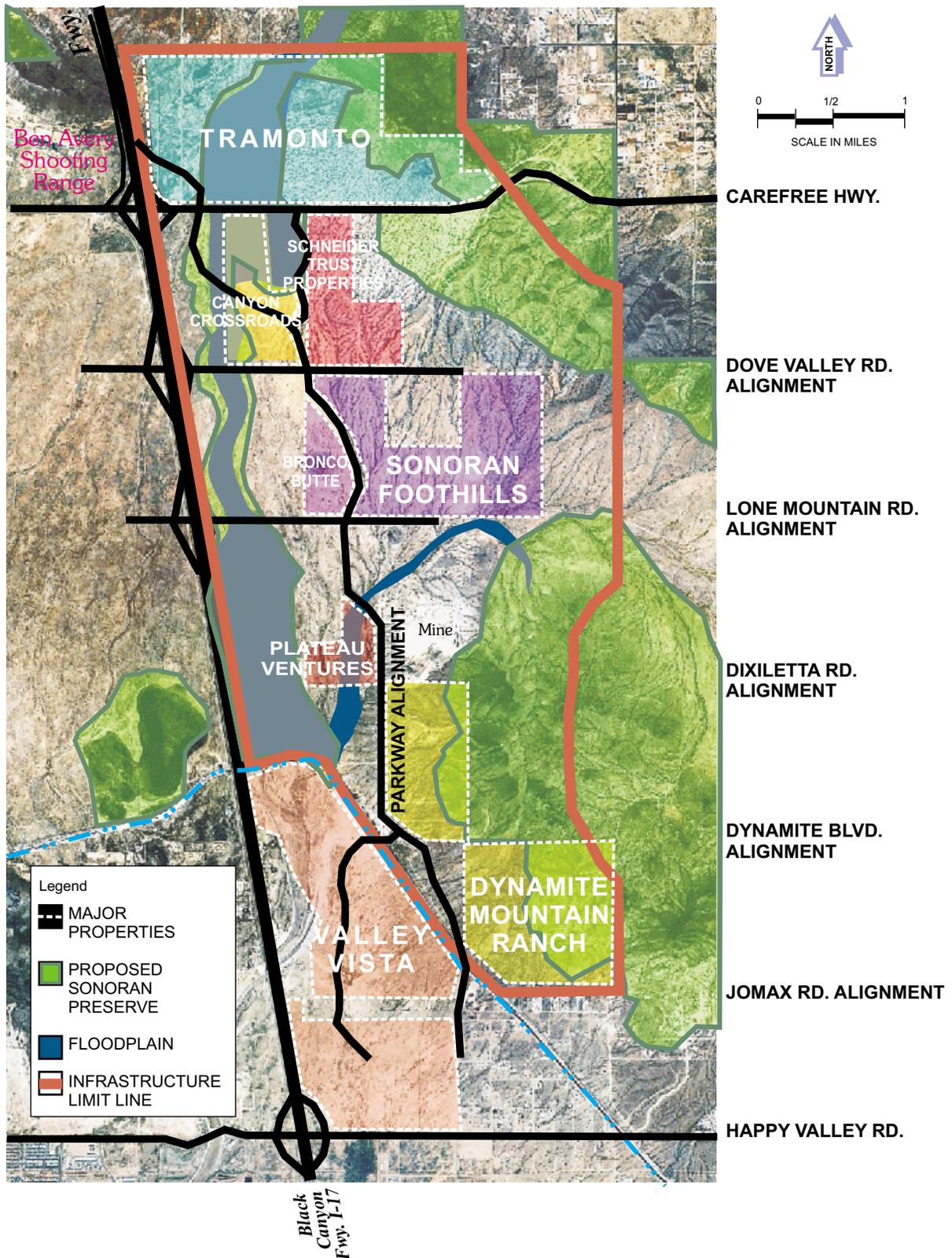
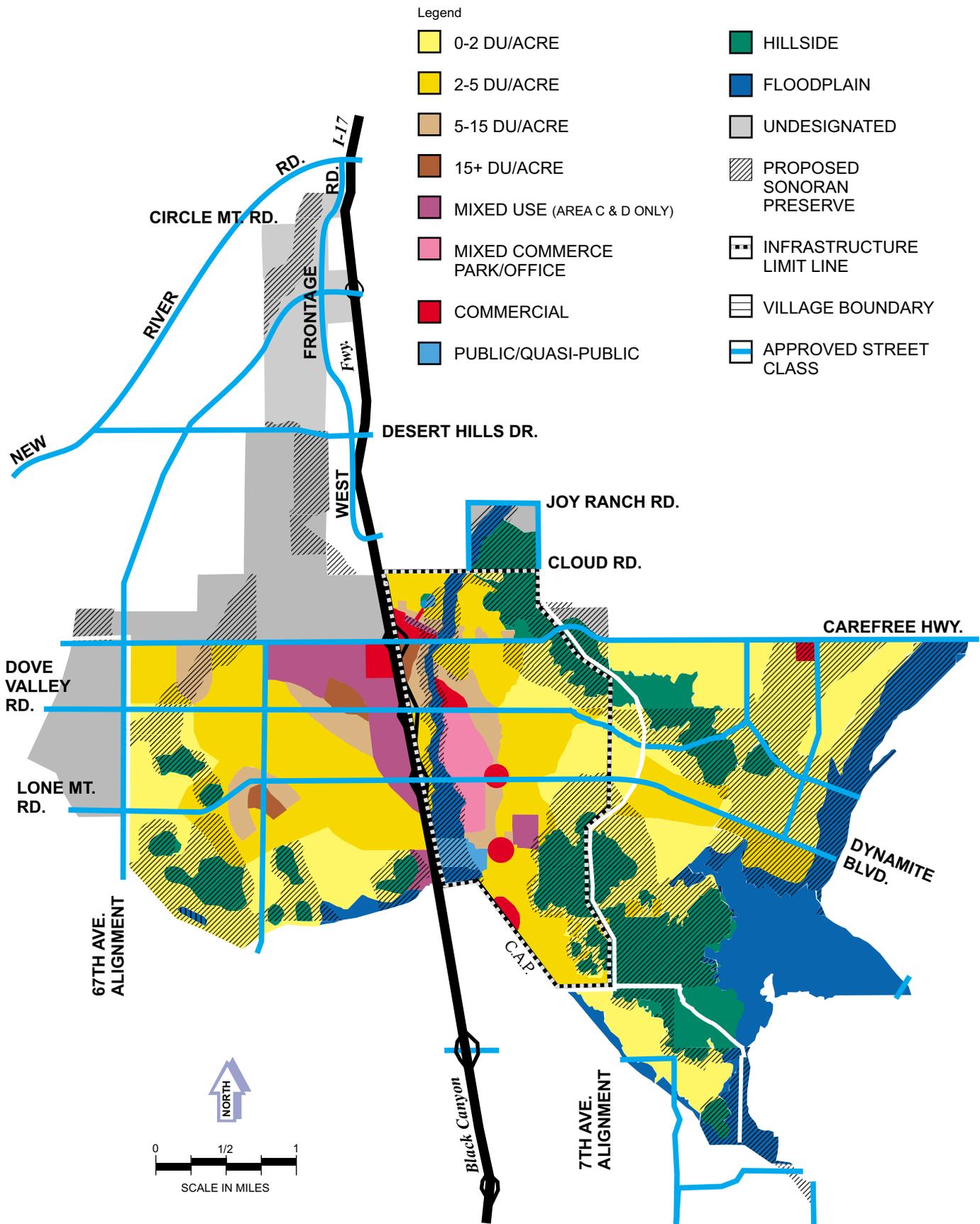


FIGURE 2: Planned Community Development-North Black Canyon Corridor



**FIGURE 3:**  
Existing Land Use Plan-North Gateway Village  
May 1999

## LAND USES

### REVISIONS TO THE GENERAL PLAN LAND USE MAP

Several significant changes have been implemented for the city's existing General Plan Land Use Map for this area, including (1) alternate land use designations; (2) a more conceptualized depiction of desired land uses; (3) and the introduction of a timing element to the General Plan to guide growth to an area where it can be most effectively served by infrastructure.

Specifically, changes in land use designations have been made for the land area bordered by the Central Arizona Project on the south, Interstate 17 on the west, Cloud Road on the north and the North Gateway Village boundary on the east. All other areas will retain their base land use designations until more detailed land use planning can be completed.

The General Plan is shown in a more generalized way for the NBCC than has previously been the case. Given that the intention of the Plan is to guide future development in an area where it may take one to two decades to build out, depending upon economic cycles, flexibility is critical to achieve the Council's Concept Plan goals. To accomplish the goal of a regional employment center, an approved plan must allow for the flexibility needed to accommodate change and future opportunities. Accordingly, the approved General Plan Amendment (GPA-NG-1-97-1-2) provides a more conceptualized depiction of land uses, indicating the goals that are envisioned for the area and the most logical and reasonable location of uses at the current time.

The mixed use designation shown surrounding the commercial area on the General Plan, which required the preparation and adoption of a Specific Plan, has been replaced with a commerce park/office designation to denote the anticipated employment center. The core is anticipated to encompass both a higher density employment center which, over the long term, would potentially support mid-rise office buildings, as well as areas of lower density employment with campus-style office development.

The General Plan Amendment recognized that the corridor encompasses both sides of the interstate and that, while the village core is envisioned within the initial growth area east of I-17, additional employment would be anticipated to locate west of I-17 in the village's subsequent development phases.

All residential development densities and all commercial and commercial office zoning designations within the current Zoning Ordinance are anticipated being used within the growth corridor. While commerce park/industrial park employment uses are envisioned, heavy industrial uses requiring A-1 or A-2 zoning are not

anticipated or recommended within this first phase of corridor development. Industrial park employment with ancillary A-1 uses similar to the Specific Plan in Desert Ridge, though, may be appropriate. The focus of the defined growth corridor is on providing a high quality employment center for the city; one which emphasizes office and commerce park development with associated support residential and commercial. Industrial land uses that may serve the area will be encouraged to locate south of the corridor within vacant and existing industrially-zoned land near the Deer Valley Airport area or in appropriate outlying areas of Maricopa County.

### VILLAGE CORE

A linear urban village core is proposed along the anticipated Parkway "A" (at approximately the 27th Avenue alignment) on the eastern side of Skunk Creek; between the Dove Valley Road and Lone Mountain Road alignments with the most intense portion of the core anticipated at the intersection of the 27 Avenue and Lone Mountain Road alignments, proximate to both Skunk Creek and the natural features of Bronco Butte and Bronco Tank. This location allows both physical and visual highway access. The area is currently heavily grazed, retains only modest desert vegetation, is flat with minimal wash corridors, and is situated proximate to Interstate 17. The core would encompass both a higher density employment area at its center, potentially supporting mid-rise office buildings over time, and areas of lower density employment with campus-style office development.

The core area is intentionally shown as mixed commerce park/office on the General Plan to allow flexibility in the siting of the most intensive portion of the urban village. While this central core area is envisioned for approximately 80 to 100 acres near Bronco Butte at the Lone Mountain Road alignment with campus-style office along the proposed Parkway "A" both north and south, the locational needs of individual users may alter the specific location. A specific plan for the core area is no longer required, however, given the critical nature of the core's development, comprehensive planning must be completed to detail the location, quantities, and interrelationships between core land uses. Accordingly, while the most intensive portion of the core might locate at several locations within the overall core area, once the central core area or one or more large major employment centers at the edge of the core are designated through an initial user, the area should be planned as a whole to ensure that corridor goals are met.

Integrated planning of the core is vital. Planning should encompass the core as a unit, with cooperative planning among individual property owners. Particular attention should be directed toward issues of (1) overall compatibility of land uses, including interrelationships between land uses and open spaces; (2) core transportation access, including transit opportunities for bus pullouts, etc.; (3) integration of land uses with Skunk Creek Wash

and Bronco Butte; and (4) amounts of commercial/office space including acreage and projected square footage. Individual zoning applications submitted by property owners should represent elements of a coordinated plan that includes adjacent properties.

The city will initiate an effort to encourage cooperative planning efforts among the various owners of properties within the core. This may include formation of an association and the initiation of a joint planning effort to plan all the core properties.

**RESIDENTIAL PLAN AND DENSITIES**

The following figures detail the number and percentage of residential densities and housing types envisioned for the corridor, based upon the proposed land use plan.

**RESIDENTIAL: 21,317 dwelling units (du) = 49,633 persons\***

#DU	%Type	
1,972	9.25	Low density residential
12,164	57	Single-family detached (NOTE: this figure includes low density housing)
6,851	32	Patio, single-family attached, low density multi-family (condo/rental)
<u>2,302</u>	<u>11</u>	Multi-family
21,317	100	TOTALS

\*Calculation based upon 2.88 persons/single-family housing unit and 1.8 persons/multi-family housing unit. Estimates based upon 1995 Census for developed areas of Deer Valley and Paradise Valley Villages.

Providing a balanced community through the provision of diverse housing types and residential densities will be essential to the corridor's success. In keeping with the city's urban village model, higher density residential is proposed near the village core with medium density residential surrounding and supporting those uses. Alternative housing designs not currently seen in the Valley, particularly those that may provide for higher density, higher amenity housing targeted toward single professionals are encouraged.

The existing active granite mine (approximately 100 acres), located to the northeast of the intersection of the proposed alignments of 23rd Avenue and Dixileta Road, is proposed for mixed use for the purpose of allowing further discussion at a later date. It is the intention of both the Planning Commission and the Planning Department that a residential use would ultimately be most desirable at that location. Until that time, the mine should be considered a long-term use and potential property owners in the area should be notified of such.

Low density residential, in keeping with the rural character of the outlying areas, is proposed for the areas adjacent to the county; proposed Sonoran Desert Preserve; and for more sensitive desert areas. These lower density, high natural amenity areas will provide opportunities for high

quality housing. Research by the Planning Department on the development of metropolitan cores indicated that the provision of high quality housing is critical to the establishment of high quality employment centers, as these residents are often the individuals who make decisions regarding corporate locations (see "Interstate 17 Corridor Growth in the 90's Draft Report," dated 10/30/95, for additional discussion on the formation of metro cores on the urban fringe).

**COMMERCIAL NODES**

Commercial development supporting the residential and employment base should be sited in a nodal fashion at key intersections along Parkway "A." Four such commercial nodes are shown within the corridor: (1) at the northeast corner of Carefree Highway and Interstate 17; (2) at the southwest corner of Parkway "A" and the Dove Valley alignment; (3) at the intersection of Dixileta alignment and Parkway "A"; and (4) just north of the CAP along Parkway "A" at approximately the Dynamite Road alignment. These centers are envisioned to range from approximately 100,000 sf. to 300,000 sf. and to serve community retail needs. The exact extent of commercial and residential land uses in these nodes is not depicted to allow further refinement as the corridor develops.

Prior to zoning, commercial nodes are to be comprehensively planned. Individual zoning applications submitted by property owners should represent elements of a coordinated plan for each node that addresses community needs. This should include an analysis of how much retail and service development is needed to meet the needs of the surrounding neighborhoods. It is envisioned that most of the retail and service needs of residents living in the corridor would be met by uses within these nodes.

Each node's plan should include a more detailed determination of the location and extent of commercial uses and their relationship to nearby residential uses. In keeping with the corridor goal of integrating development with existing desert amenities, commercial developments should demonstrate sensitivity to wash corridors and significant desert features. Whenever possible, commercial development should focus on site-specific desert attributes as amenities providing a unique identity and form to individual nodes and their surrounding residential community. Desert sensitivity, architectural consistency, provisions for effective transit, and pedestrian orientation are desired.

To direct development within these village areas, a *Specific Plan* should be initiated to provide specific design guidelines to assist individual planning efforts. A Specific Plan for the corridor should include a more detailed framework of design criteria regarding the treatment of wash corridors, desert vegetation, pedestrian orientation within the village core, and opportunities for coordinated transit.

## INFRASTRUCTURE LIMIT LINE

### PURPOSE

Seeking to establish a new urban form within the city's growing northern Interstate 17 corridor, the City Council approved a Concept Plan, based upon the city's Strategic View of Growth, for the North Black Canyon Corridor in September of 1997 that included the goal that *growth will be concentrated within a defined corridor*. Such a concentration of growth would provide the framework to accomplish four additional goals: (1) a more efficient and viable auto and transit circulation pattern; (2) a more cost effective expansion of infrastructure; (3) the reduction of suburban sprawl; and (4) the promotion of a stronger sense of community.

### BACKGROUND

The lack of basic infrastructure, including water, wastewater, and roads, among other services, to support development exists as the most significant limiting factor to the expansion of urban development north of the Central Arizona Project (CAP). While challenging, the lack of established infrastructure presents an unprecedented opportunity to guide both the timing and direction of development to meet citywide goals.

The most common form of infrastructure phasing is to extend infrastructure to development as it is required. In the North Black Canyon Corridor, sufficient capacity does not exist to allow the incremental extension of the current water and sewer facility network. To serve development south of the CAP as well as proposed corridor development, a new water plant and associated distribution network must be constructed. A new wastewater plant and facilities network is also required. Phasing the extension of and, in some cases, the connection to, this new infrastructure offers the opportunity to guide growth.

Accordingly, an Infrastructure Limit Line would affect both the extension and the connection to water and wastewater services. Such a boundary would encourage compact growth in the corridor's defined growth area and prohibit surrounding development until a concentrated urban development pattern is established.

An infrastructure limit line has been established within the North Gateway Village where water and sewer infrastructure will be extended and development encouraged. Outside of this growth area, development will be discouraged and significant infrastructure expansion prohibited. The infrastructure limit line will remain until a formal review of the boundary by the City Council is initiated by either (1) the development of 65% of the growth area, or (2) the passage of ten years from boundary adoption by the City Council. At that time, the City Council would determine whether the goals of the limit area have been achieved and the necessity for area adjustments.



### Infrastructure Limit Line Boundaries

The boundaries of the growth area are the Central Arizona Project on the south; Interstate 17 on the west; Cloud Road on the north; and 7th Avenue on the east (see Figure 4 map on the following page).



### Areas Outside of the Infrastructure Limit Line

The remainder of the North Gateway Village and far western portions of the Desert View Village are located outside of the defined growth corridor and no significant municipal infrastructure would be extended into these areas until such time as the boundary restrictions of the infrastructure limit area are lifted (see Figure 4 map on the following page).

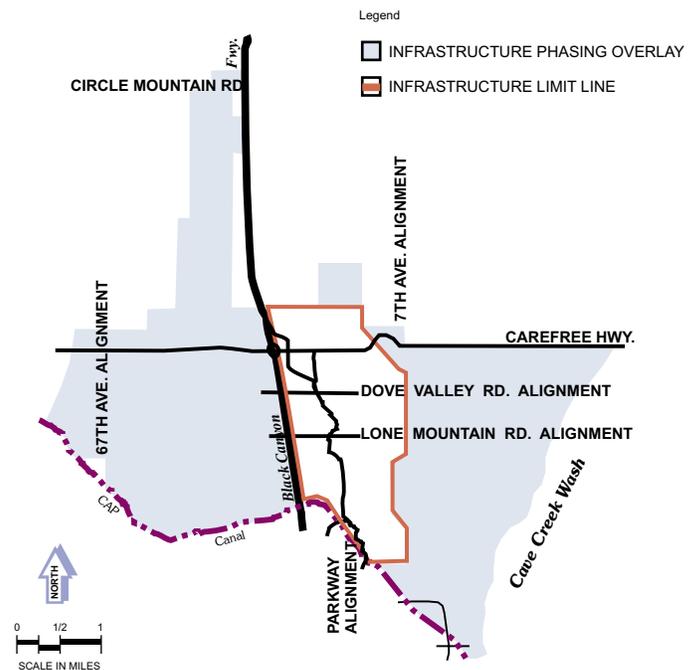


FIGURE 4:  
Infrastructure Limit Line and Phasing Overlay  
North Gateway Village

### Rationale:



The boundaries of the infrastructure service area are clearly discernible, following natural, political and man-made boundaries;



The infrastructure service area has sufficient developable land to provide for at least ten years of growth; and



Providing for review and adjustment of the boundaries based on either the percentage of development or the passage of time allows for the flexibility needed to accommodate development cycles.

## Physical Boundaries

The linear nature of the corridor with its natural topographic and man-made features presents clear and obvious demarcation lines for infrastructure expansion. Bounded by an interstate freeway corridor on the west; the limit of municipal jurisdiction at Cloud Road on the north; eastern proposed Sonoran Desert Preserve lands; and the Central Arizona Canal (CAP) on the south, the proposed growth corridor is both well-defined and logically contained to meet the stated goals of the Phoenix City Council.

## Growth Projections

Population projections for the year 2020 using a 2% growth rate show the City of Phoenix growing by 600,000 people. As part of the city's Strategic View of Growth, six emerging growth areas have been identified to absorb new population: Central Corridor, Estrella, Laveen, Baseline, Desert Ridge, and the North Black Canyon Corridor. Approximately 100,000 to 150,000 people could locate within the corridor.

Population projections, using Maricopa Association of Governments (MAG) land use categories to model proposed designations depicted on the recommended land use scenario, estimate approximately 50,000 persons residing in 21,000 dwelling units within the urban growth boundary. Nonresidential development is estimated at 6 million square feet within the area's designated employment "core."

## Developable Land

In a 1998 Planning Department report titled, "Desert Preserve Acquisition Strategic Analysis," two growth scenarios were explored. A "slow growth" rate, assuming growth would continue at about the same rate that has been experienced the past several years, projected approximately 3000 housing units over a five year period. A "fast growth" rate, doubling the slow growth rate for the area north of the CAP, projected 6000 housing units over a five year period assuming many of the units currently developing south of the CAP would move north, as land becomes developed.

Under a slow growth scenario, the corridor could be expected to absorb 6000 housing units over a ten year period. During a fast growth period, double the units, or 12,000 housing units could be anticipated over 10 years. Both of these projections are significantly less than the projected number of potential housing units possible in the corridor, based on modeling of designated land uses. If significant portions of the land areas designated in the computer modeling as proposed Sonoran Desert Preserve lands and floodplain are developed, the potential quantity of buildable land would be significantly higher.

Even at a rapid development rate, maintained over a ten-year period, the projected development of 12,000 housing

units would only be 57% of the projected absorption of 21,000 dwelling units for the corridor. The proposed infrastructure limit line would not only provide a sufficient quantity of developable land to meet projected demand, but would include a significant cushion to allow for unforeseen and unexpected development surges. Providing a sufficient supply of developable land within the infrastructure boundary should also serve to reduce land speculation.

## Land Constraints/Conditions

The land proposed for the future growth corridor has several unique characteristics that can be anticipated to affect the area's quantity of developable land.

### *Physical/Geographical Constraints*

One of the most attractive features of the Corridor is its natural topography of desert washes and mountainous hillsides. Steeply sloped lands are recognized both to present potential hazards and limitations to development as well as providing a unique natural asset to the city. The Zoning Ordinance seeks, through regulation, "...to preserve the visual integrity and character of hillside areas, while allowing reasonable development which is both safe and functional." To this end, development on hillsides slopes of ten (10%) percent or greater are subject to special yard, height, area coverage, and density requirements for all categories of development.

Many of these hillside areas within the corridor are envisioned for special protection through direct purchase by the city for the proposed Sonoran Desert Preserve. If not purchased, these areas are anticipated to provide opportunities for low-density residential development.

To ensure that corridor development proceeds in a manner that integrates the natural amenities of the desert environment, major and secondary wash corridors should be kept in as natural a state as possible. The Planning Department anticipates that wash corridor setbacks may be required to preserve natural desert vegetation and, in specific areas, to provide wildlife passages between portions of the proposed Preserve. The use of structural flood control measures and the structured channelization of washes is not recommended.

### *Land Ownership*

The corridor provides a unique opportunity to create a defined growth corridor and to develop infrastructure to serve it based upon the creation of public/private partnerships because the area is now almost entirely vacant, undeveloped desert land and the north-south private ownership pattern matches

the north-south alignments needed for future infrastructure expansion.

The Arizona State Land Department currently owns about 80% of the land within the corridor. Private ownership follows primarily a north-south linear pattern along Interstate 17 to south of the CAP. This pattern differs from northeast Phoenix where private ownership "leaped" over an east-west band of state land adjacent to the existing city and CAP canal. The north-south linear pattern of private ownership also differs from other parts of the Valley, where there was almost all private land with limited pockets of state land parcels. Almost all land within the North Gateway Village west of I-17 is owned by the state and federal government, the majority of which is state trust land with the exception of the State Fish and Game's Ben Avery Shooting Range and the federal government's prison facility.

Land ownership patterns within the corridor will substantially affect future urban form. Portions of this form have already been determined with recent zoning approvals for two large Planned Community Developments (PCDs), each over 1000 acres, which are currently in various stages of site plan development. In addition, a third large PCD totaling more than 800 acres, is in the process of obtaining zoning approval within the near future.

These large planned communities are anticipated to serve a critical role in providing necessary infrastructure. Currently, a development agreement involving these properties and the city is being forged to plan and finance the corridor's water and sewer infrastructure, with development paying for necessary infrastructure to serve the corridor and the city funding the over sizing of infrastructure to allow necessary service to municipal areas to the south and east. These planned communities will also either build or significantly contribute through the allocation of land to the construction of roadways, schools, and park areas needed to service the corridor.

While the rest of the land area is divided into smaller, individually-owned properties, a significant number of parcels have been undergoing assemblage or joint planning. The Novak family, owner operators of the Madison Granite mine located within the corridor, has assembled roughly 280 acres, almost 160 acres of which have established mining rights. The 19th Avenue and Dynamite Association is comprised of approximately 8 owners with total holdings exceeding 90 acres. Plateau Partners currently owns approximately 120 acres.

### **Existing Infrastructure Limitations**

The corridor currently lacks water and sewer services. The Lake Pleasant Water Treatment

Facility is planned to be located adjacent to Lake Pleasant. Projected costs of the first phase of plant construction, including associated water lines, is approximated at more than \$200M. The city has purchased the land for the plant, with projected plant completion around 2004. This water plant is necessary to meet the needs of northern portions of Phoenix, regardless of corridor growth. The water lines for the plant are to utilize gravity flow, running south from the plant, east along Carefree Highway, and turning south of Carefree Highway toward the CAP on the eastern side of Interstate 17; connecting into the existing water network south of the CAP along the 19th Avenue alignment.

Wastewater services are projected to be met by the North Gateway Water Reclamation Plant to be located east of Interstate 17, just east of Skunk Creek wash, on the Dixileta alignment north of the CAP, on the west side of the 23rd Avenue alignment. Utilizing gravity flow to serve the proposed growth corridor, the plant will process wastewater. Water Services has initiated efforts to buy the appropriate parcels and the first phase of the plant is expected to be on-line in 2004, depending on growth pressures in the corridor. Recycled water will be delivered to large turf areas for irrigation uses.

The plant will be expanded in the future to serve all areas of the corridor, both east and west of Interstate 17. The proposed growth boundary would not eliminate growth in the corridor, but rather phase growth so that these infrastructure facilities may be constructed in an orderly manner that maximizes available capital and provides a logical build-out for the area.

While the water line is expected to extend from west to east along Carefree Highway once the Lake Pleasant plant is online, initial water will have to come from the existing city system south of the CAP. Construction of the proposed 54-inch water main for the corridor is anticipated to be built from the south to the north, using water service from the Union Hills Plant.

### **Interim Water Capacity Issues**

Prior to full water service from the anticipated Lake Pleasant Plant, interim water would be provided from the Union Hills Plant south of the CAP. Water would be pumped north via the new water line until the service lines for the new plant are available. This provision of water on an interim basis from existing supplies south of the CAP presents capacity concerns. New development would be dependent on a single water supply to meet both daily usage and emergency fire needs.

Current Water Service plans are to extend water service north to serve areas within the growth corridor from Interstate 17 on the west, Cloud Road on the north, and 7th Avenue on the east. Planned pumping stations for the corridor have a capacity of 23 mgd. until the Lake Pleasant Water Treatment Plant comes on-line. Limiting the eastern expansion of infrastructure to 7th Avenue will ensure that interim supplies are sufficient to service the growing demands and fire safety needs of the growth corridor.

Water service extension east of 7th Avenue from the Lake Pleasant Water Treatment Plant will be built only when needed to serve the Cave Creek Road corridor. Until such time as these additional capital improvements can be accommodated, 7th Avenue provides a logical eastern demarcation for the initial phase of infrastructure service.

### **Wastewater Cost Considerations**

As with water service, the cost to provide wastewater service is similarly impacted by physical constraints within the corridor. The natural barrier of Skunk Creek and the man-made barrier of Interstate 17 present fiscal challenges to the provision of wastewater service outside of the proposed growth corridor. Crossing these significant barriers entails substantial additional expense.

### **Regional Considerations**

Defined infrastructure service areas nationwide have been most effective when coordinated with the land use plans of adjacent jurisdictions. In this instance, the infrastructure boundary lies adjacent to Maricopa County. In the 4/07/99 adopted, "New River Land Use Plan," the county proposes to retain the low-density, rural lifestyle and densities of 0 to 1.0 du/acre currently seen in the adjacent Desert Hills area. These densities compliment the proposed City of Phoenix plan as the most intense land uses for the corridor are planned for land adjacent to Interstate 17, with lower densities radiating outward toward the lower density areas of the county. Parkway "A" will provide alternate access from I-17 into the core employment area for both city and county residents. Higher density residential and office development along the Parkway "A" will allow the area to be planned as a transportation destination area, enabling opportunities for commuter vans, rideshare programs, and buses.

### **Implementation**

#### **Infrastructure Limit Line Review and Adjustment**

Procedures for the review and adjustment of the infrastructure boundary are vital to ensure that development is being concentrated within the corridor while, at the same time, sufficient quantities

of developable land remain available for development. To allow for the flexibility needed to accommodate development cycles, both a timing and a development mechanism are proposed to initiate a formal, public review of the boundary.

A formal review of the boundary by the City Council would be initiated by either (1) the development of 65% of the growth area, or (2) the passage of ten years from boundary adoption by the City Council. At that time, the City Council would determine whether the goals of the boundary area have been achieved and the necessity for area adjustments. The infrastructure limit line could be expanded by the City Council at this review time. Outside of this review process, the boundary could also be altered through the general plan amendment process.

Given the vagaries of economic cycles, time limits cannot be expected to adequately estimate development. The focus area may develop more rapidly or more slowly than expected depending upon national, state, regional, and municipal economic factors. Rather than relying solely on time limits to foster compact growth, a more realistic approach is to link the sequencing of development to percentages of build-out. To effectively utilize infrastructure and to meet transit goals, a proposed 65% infill rate of the corridor's developable land is proposed prior to the extension of wastewater services west of Interstate 17 and the authority to connect significant infrastructure to the existing water line. Placing the percentage at 65% ensures that the majority of the growth area has developed prior to the opening of additional developable land. Sufficient inventory would remain, allowing continued construction while new areas are planned and brought into development. Setting a time limit and a percentage for the initiation of further review will provide the flexibility to meet corridor goals while accommodating the fluctuating nature of development cycles.

#### **Measuring Infill**

Infill rates can be measured several ways. One way is to estimate build-out at existing zoning designations. A second manner would be to base rates on unit and square footage counts of approved site plans; a third, through the number of building permits issued; a fourth, through the number of units or square footage actually constructed. These methods differ in their level of certainty and element of time. If new land areas are opened to development too early in the process, the new areas could negatively affect existing approvals; preventing desired growth

concentrations. Since impact fees are collected when the building permits are issued, basing the percentage of development on the number of building permits issued would ensure that the majority of impact fee payments are processed prior to the development of new areas; maximizing the return on infrastructure investments. As a result, setting the build-out rate based on the number of building permits issued is recommended.

## INFRASTRUCTURE PHASING OVERLAY

### TIME AS AN ELEMENT OF THE GENERAL PLAN

Limiting the density of development outside of the infrastructure limit line is critical to meet corridor goals. Allowing the expansion of infrastructure outside of the infrastructure service area would preclude the ability to foster a compact development pattern necessary for a regional employment center; to recoup initial infrastructure costs; to avoid undue traffic congestion; and to minimize strains on municipal services such as fire and police. However, since water will be extended past land targeted for development subsequent to development envisioned east of I-17 within the infrastructure boundary, an additional mechanism to phase development is necessary.

The Phoenix General Plan serves as a general guide for the future form and focus of municipal development. The Plan includes goals, policies, and recommendations that provide a framework for the City Council, Planning Commission, city staff, and village planning committees in the implementation of more detailed planning for the city. Many of the goals for future development, however, are intended to assist the city in achieving balanced growth and the preservation of the unique character of each village. These goals are often predicated on the orderly progression of development over time. Currently, the General Plan does not provide a timing element indicating the most desirable progression of development. An infrastructure phasing overlay is hereby proposed to establish a timing element for the development of corridor lands. This overlay would compliment phasing initiatives east of I-17. Land areas covered by the phasing overlay on the General Plan would retain their existing General Plan designations, but would not be supported for rezoning to those designations until the City Council determines, pending a formal review, that the goals outlined in the approved Corridor Plan have been reached. A formal review of the infrastructure limit area, as noted earlier, would be triggered by either the ten year anniversary of the adoption of the General Plan Amendment or the construction of 65% of projected development within the infrastructure limit line.

During the time period that the infrastructure phasing overlay is in place, property owners could build on their property based upon their existing zoning, but the city would not extend significant infrastructure to serve properties outside of the infrastructure area, encompassed

within the infrastructure limit line. Current developments within this area which have their own infrastructure and vested zoning rights would not be affected. For example, Del Webb Corporation's Anthem project within the City of Phoenix, located at the southwest corner of Interstate 17 and Anthem Way and west of the factory outlet mall, has existing zoning and will be serviced by infrastructure extended from the county portion of Anthem located on the east side of Interstate 17 and, as such, would not be affected by the Plan.

As an alternative, property owners who want to rezone property within the infrastructure phasing overlay area prior to the lifting of the infrastructure limit line may file a general plan amendment to remove the overlay designation from their property. As part of the formal amendment process, the applicant would be required to include information demonstrating that (1) the rezoning would not require the extension of significant infrastructure; and (2) the proposed use(s) would not adversely impact the city's ability to recoup its infrastructure costs to serve the designated growth corridor bounded by the infrastructure limit line. Applicants would also have the opportunity, as they do today, to petition the City Council for the opportunity to file for a rezoning without first filing for a general plan amendment.

"Significant infrastructure" is defined for these purposes to be the financing, construction and/or allocation of city services, including water, sewer, waste disposal, fire, and police, above and beyond that which would be necessary to serve density populations of 0 to 2 dwelling units an acre. In other words, development above and beyond low density rural development would not be supported until such time as the boundaries of the urban growth area are lifted. Access to water to serve low density development would be considered as long as the infrastructure necessary to serve it does not require the extension of municipal services beyond existing service levels or, by its development, preclude the city's future ability to service the area at designated General Plan densities, i.e. requiring the city to retrofit or replace undersized pipes.

### SUMMARY

The adoption of an infrastructure limit line within the North Gateway Village will help guide where water and sewer infrastructure will be extended and development encouraged. The boundaries of the defined service area are proposed to be the Central Arizona Project on the south; Interstate 17 on the west; Cloud Road on the north; and 7th Avenue on the east.

The remainder of the North Gateway Village and far western portions of the Desert View Village would be outside of the defined infrastructure service area and no significant municipal infrastructure would be extended into these areas until such time as the boundary restrictions of the infrastructure service area are lifted. The infrastructure limit line will remain until a formal review of the boundary by the City Council is initiated by either (1)

the development of 65% of the growth area, or (2) the passage of ten years from boundary adoption by the City Council. At that time, the City Council would determine whether the goals of the infrastructure boundary area have been achieved and the necessity for area adjustments.

**Rationale:**

-  The boundaries of the infrastructure limit line are clearly discernible, following natural, political and man-made boundaries;
-  The infrastructure service area has sufficient developable land to provide for at least ten years of growth; and
-  Providing for review and adjustment of the boundaries based on either the percentage of development or the passage of time allows for the flexibility needed to accommodate development cycles.

**LINKING EMPLOYMENT GROWTH AND HOUSING GROWTH**

**BACKGROUND**

The North Black Canyon Corridor Concept Plan, adopted by City Council in 1997, identified the goals of promoting the North Black Canyon Corridor as a regional employment center and achieving a balance between employment and housing. Policy action steps included the aim to regulate a jobs-to-housing ratio. This goal and policies are reinforced by the General Plan for Phoenix goal of distributing employment and housing in a balanced way by striving to provide in each village the number of jobs equal to 45 to 55 percent of the resident population.

In planning the North Black Canyon Corridor, the goal is to create a balanced community in terms of where people live and work. The City does not want to create another bedroom community at the edge of Phoenix' urban area. If this were to occur, this would have two major negative impacts on the existing urban portions of Phoenix. First, the commute trips from this area to centrally located employment centers would increase traffic congestion on central city facilities. Even without these trips, central city facilities will be at capacity for the foreseeable future. Second, the commute trips from these northern areas to central employment areas would be longer than existing average commute trips. Thus these future work trips will have a greater impact on central city air quality than existing work trips.

However, if a balanced community could be created, this could have a positive impact on central city congestion and air quality. A balanced community could have a net regional affect of moving trips off central city facilities. The key to this moving the employment location closer to where new residential growth is occurring. Even if new employment were to locate in existing employment

centers, and new residential growth were to occur in more central areas, this would add additional trips to central City facilities. Creating a balanced community at the edge of the current urban area would not only keep these trips within the corridor, but will attract some trips from central urban areas as well.

Further without a balanced community, commute trips from this area to existing employment centers in Phoenix would cause peak hour trips of the existing and future transportation infrastructure within and outside the corridor to operate at a poor level of service. Peak hour trips would not be balanced. Rather they would overload the transportation infrastructure in the direction of existing employment centers in the AM peak hours and the reverse during the PM peak hours. This infrastructure would function poorly with an unsatisfactory level of service detrimental to the area. It would impact the corridor's long term development potential as development would skip over the area when the transportation infrastructure could no longer support the number of vehicle trips.

It could also have a net positive effect on air quality. If work trips can be kept within the corridor, the average length of these work trips will be less than the current average work trip. This would mean that these future work trips would have less impact on air quality than current work trips.

**CURRENT RATIO OF JOBS TO POPULATION IN PHOENIX**

Based upon current data, the existing total City of Phoenix relationship between number of jobs and population is 58

**TABLE 1: Villages with high jobs-to-population ratios.**

Village	Number of Jobs	Population	Ratio
Central City	124,000	60,000	206%
Camelback East	110,000	129,000	85%
Encanto	76,000	63,000	121%

Other villages that have achieved some level of balance between employment and housing are as follows.

**TABLE 2: Villages with jobs-to-population ratios at the city standard.**

Village	Number of Jobs	Population	Ratio
Alhambra	46,000	116,000	40%
Deer Valley	48,000	119,000	40%
North Mountain	75,000	164,000	45%
South Mountain	47,000	84,000	56%

Villages which are relatively new, having been created within the last ten years, have a significantly lower ratio.

**TABLE 3: Villages with low jobs-to-population ratios.**

Village	Number of Jobs	Population	Ratio
Ahwatukee	9,500	62,800	15%
Desert View	800	7,400	10%

**Discussion**

The villages which have become regional employment centers have far exceeded the citywide goal of providing the number of jobs equal to 45 to 55 percent of the resident population. Villages which have achieved some level of maturity may approach or exceed the citywide goal. And villages which are in their early years fall far short of the goal.

The establishment of a specific jobs-to-housing ratio for the North Black Canyon Corridor must recognize the following factors. First, a regional employment center far exceeds the city recommended balance between number of jobs and population. Second, a mature village left only to market development forces may only meet the citywide goal. Third, the length of time the village is in existence is a critical factor in achieving the goal, and fourth, market conditions may accelerate the growth of residential uses without the development of employment uses, as has occurred in Ahwatukee.

**SETTING A JOBS TO POPULATION GOAL**

**Analysis**

To establish the North Black Canyon Corridor as a regional employment center, the goal for the number of jobs to the resident population must be higher than 45 to 55 percent. Current regional employment centers within the city provided a minimum ratio of 85 percent. Because time is required to achieve an appropriate employment to population relationship, the goal needs to be time sensitive reflecting development cycles and patterns. But further, the goal will require implementation strategies to ensure that it is reached. To be dependent on just time and the market place may only achieve proximity to the citywide balance which is far below the relationship between jobs and population of regional employment centers.

For these reasons, it would be practical to phase the goals for jobs to population in the North Black Canyon Corridor over short, mid and long term development. It would be unrealistic to expect that

whatever ultimate level of balance desired will be achieved in the initial stages of corridor development. Some period of time or amount of development will have to be allowed to transpire before it will be reasonable to begin expecting a desired balance to be achieved.

Since development is cyclical and development cycles vary in length of time, it is unrealistic to assign a development year time to the short, mid and long term jobs to population goals. Rather, the relationship should relate to the amount of residential land that is being absorbed within the corridor. This would allow for both "bear" and "bull" development cycles.

Further, since development will occur in phases within the North Black Canyon Corridor (North Gateway Village), any goal needs to reflect a long term village goal as well as a goal for the first phase of corridor development within the infrastructure limit line. The North Gateway Village is planned over the long term to be much bigger than the phase of the corridor under consideration. Other portions of the village, as it develops over time, should also contribute to the regional employment base.

**RECOMMENDATION**

 **Long Term Goal.**

Staff proposes the following overall jobs to population goal for the North Gateway Village.

- That the number of jobs should equal 75 percent of the resident population in the North Gateway Village.

 **Short Term Goal.**

Further, staff proposes that for development within the infrastructure limit line the number of jobs to population should be phased to the absorption of residential land.

**TABLE 4: Phased Jobs to Resident Population Goal at Percent of Residential Land Absorption**

	Goal (%)	Rate of Residential Land Absorption (%)
Short Term	15	25
Mid Term	30	50
Long Term	50	75

**Rationale:**

 A village goal with the number of jobs equal to 75 percent of the resident population is consistent with the performance of other villages serving as regional employment centers.

-  Phasing the goal within the infrastructure limit line provides for the flexibility that occurs within development cycles.
-  Maintaining a modest phasing sequence within the infrastructure limit line provides for the probability of success based upon the recommended land use designations, and the varying levels of intensity of employment development that may occur during the area's maturation.
-  Employment opportunities in other areas of the village, once the area within the infrastructure limit line is built out, will assist in providing employment uses to achieve the overall village goal.

## IMPLEMENTATION STRATEGIES

### *Analysis*

It is apparent that implementation strategies will be necessary to link the development of employment uses with the development of residential uses in order to reach the phased goal within the infrastructure limit line. These techniques could both encourage employment growth within the corridor and limit residential growth to the identified relationship between jobs and population established for each phase.

*Techniques to encourage employment fall into two basic categories.*

-  Creating and marketing a physical and cultural environment which meets the needs of potential business that would locate in the area, and
-  Attracting businesses by improving their financial performance if they locate in the area as opposed to other locations.

While it may be desirable to pursue these techniques to help meet corridor goals, their lack of certainty will not be effective alone.

*There are a variety of techniques that could be used to limit residential growth to identified phase goal.* These basically fall into two categories, **policy** and **regulation**.

A policy approach to establishing the linkage between residential and employment uses essentially means that discretion as to how and when a linkage will be made can be used on a case by case basis. Regulatory techniques offer more certainty. A range of regulatory techniques could include rezoning, zoning standard enforcement, subdivision approval, and the granting of building permits.

### **Limit Rezoning of Residentially Designated Land.**

It may be possible to adopt an ordinance that would limit the rezoning of land to higher residential densities based upon a ratio of employment to population. Such a technique would basically prohibit or limit the rezoning of higher densities at any time that a specified ratio of housing units to employment was exceeded. For example, a rezoning from S-1 to R1-10 would not be permitted.

### **Limited Permitted Densities Within Zoning Districts.**

Another technique would be to limit the permitted densities that would be allowed in the zoning district when the desired goal is unmet. This would be implemented through the site planning review process and the densities permitted would be lower than the standard or bonus densities for each zoning district. For example, within the R1-6 zoning district the standard dwelling unit density of 5 may be limited to 3.

### **Limit the Subdivision of Residentially Zoned Land.**

Another possible technique would be to restrict the approval of residential lot subdivisions. If at any time that a specified ratio of housing units to employment was exceeded, platting of residential lots could be denied or limited to a certain percentage of the original lot.

### **Limit the Issuance of Building Permits.**

A final technique would be to establish a moratorium on new building permits if the specified ratio is unmet. This could be an automatic moratorium or a special Council action triggered by a regular estimate of the population to jobs ratio.

Each of these techniques has good and bad points as well as differing levels of certainty and lag time. Certainty means both the likelihood of actually meeting the community goal of creating a regional employment center and it means the certainty of a property owner's development rights. Lag time means the lag of time between when such a technique was applied and housing growth would actually be limited.

Depending on which techniques are implemented to link employment and residential uses will effect the time required to achieve an identified employment to population goal. At one extreme is the rezoning technique. Under this technique it is likely that at any point in time significant reserves of vacant but zoned land will exist. Even after the rezoning of residential land is limited, development of residential units can continue, in some cases for many years. This means that the actual limits on growth may take a long time to occur and may not occur fast enough to avoid creating a bedroom community. Yet under this technique property owners will be aware of their potential rights in advance of when they may choose to exercise those rights.

At the other extreme would be the building permit moratorium. Under this technique once implemented, the only new residential development that would occur would be for housing units that had obtained a building permit prior to the moratorium. In this case housing growth would slow down rapidly over a six month period; at the end of which there would be no new residential growth. Yet under this technique, property owners will not know

what rights they have until the last step in the process of utilizing those rights.

Depending on which technique is used to achieve the goal will determine which office within the City will be responsible for implementing the mechanism. For example, a delay in further residential rezoning would be implemented through the legislative process with Planning Department recommendation and City Council action on a case by case basis. Limiting density within a particular

zoning district would require a single legislative action and then by administrative approval of the Development Services Department (DSD) Team. This would also be true for restricting the further platting of residential lots. A building permit moratorium would be implemented through the legislative process with a City Council action and DSD Team and permit counter curtailing issuance of permits.

The following table summarizes the various techniques, their level of certainty, and the likely responsible department for implementing the action on a day-to-day basis.

**TABLE 5: Implementation**

Technique	Impacts	Action Type	Developer Certainty	City Certainty	Implementing Department
Rezoning	Limits further higher residential densities	Legislative	Most	Least	Planning
Density limit w/in zoning district	Limit density w/in zoning district to a low du/ac	Administrative	Some	Some	DSD Team*
Limit subdivision approval	Limit on residential lot platting	Administrative	Some	Some	DSD Team*
Building Permit Moratorium	Stops issuance of residential permits	Legislative	None	Most	DSD Team* and Permit Counter

\* Proposed DSD Team will include representatives of plan review, civil engineering, and building safety. Team coordinator may be from any member discipline.

Staff proposes the following method to implement the jobs to population goal within the infrastructure limit line of the North Black Canyon Corridor.

-  That the rezoning to higher residential densities be limited once 50% of the residentially designated land is rezoned.
-  That through an ordinance mechanism, the residential development of land be required to be reviewed at the time 25, 50 and 75 percent of the residentially designated land is absorbed. If the review determines that the jobs to population ratio is unmet:
  -  the subdivision of land (through a limit on lot platting) would be prohibited or limited at the short term (25% absorption) review,
  -  the further residential rezoning to higher densities and the subdivision of land (through a limit on residential lot platting) would be

prohibited or limited at the mid term (50% absorption) review, and

-  the residential rezoning, the subdivision of land and the issuance of residential building permits would be prohibited or limited at the long-term (75% absorption) review.

The following table on page 18 illustrates this recommendation.

**TABLE 6: Recommendation**

Goal (%) (Jobs: Pop)	Review	Developer Certainty	Method	City Certainty
NA	50% Residential land rezoned to higher densities	Limit Residential Rezoning		
15	25% Absorption (Short Term)		Limit Residential Subdivision	
30	50% Absorption (Mid Term)	Limit Residential Rezoning	Limit Residential Subdivision	
50	75% Absorption (Long Term)	Limit Residential Rezoning	Limit Residential Subdivision	Building Moratorium

**Rationale:**

-  The discretionary aspect of a policy technique creates uncertainty as to the effectiveness of implementing the jobs to population ratio. Only some regulatory method may assure the reality of achieving the desired goal.
-  Limiting residential rezoning to higher densities as soon as 50% of the designated residential land is rezoned will prevent the "wholesale onrush" of rezoning applications that may occur in an attempt to avoid implementation of the linkage techniques. Further, this limitation will enable the City to halt development in the corridor (and village) at a fairly early stage if employment uses do not develop.
-  Phasing the regulatory techniques of residential rezoning, subdivision approval and building permit moratorium provides the property owner the most certainty in the early years and the City the most certainty in later years where it is most critical that an employment base be provided.
-  Limiting the density of units within residential zoning districts is an ineffective mechanism. It could hinder the City in providing a mix of housing type. Requiring fewer units per acre would have also an impact on affordable housing and it would still result in housing production. The benefit of this mechanism in implementing the goal is negligible. It would still result in housing production, most at lower densities.

For any technique to be implemented at any stage, it will be necessary to monitor development conditions. This will insure that once the prescribed goal is attained, the technique can be curtailed and residential development reinstated. Further, at some review periods more than one technique may be implemented. As part of each review, it

will be necessary to determine which is the most appropriate of the prescribed techniques to implement at the time. This will require review, analysis and recommendation of an action plan. This action plan would be reviewed through the public hearing process and City Council would direct which implementation steps to proceed with, if any.

**RECOMMENDATION**

A Specific Plan be initiated which will identify the recommended goals and implementation strategies; define the review process; identify the methodology of the review and steps of the implementation process; and assign the areas of responsibility within the City organization. The Specific Plan would consider the following review periods and implementation mechanisms.

-  That the rezoning to higher residential densities be limited once 50% of the residentially designated land is rezoned.
-  That through an ordinance mechanism, the residential development of land be required to be reviewed at the time 25, 50 and 75 percent of the residentially designated land is absorbed. If the review determines that the jobs to population ratio is unmet:
  -  the subdivision of land (through a limit on lot platting) would be prohibited or limited at the short term (25% absorption) review,
  -  The further residential rezoning to higher densities and the subdivision of land (through a limit on residential lot platting) would be prohibited or limited at the mid term (50% absorption) review, and

- The residential rezoning, the subdivision of land and the issuance of residential building permits would be prohibited or limited at the long-term (75% absorption) review.

***How can we measure the employment and resident labor force?***

There are two basic ways to estimate employment or labor force, one is to directly survey employers and residents, the other is to indirectly estimate them from the amount of built commercial and industrial space and houses. The former technique though more accurate, is expensive and time consuming. The later is less accurate but can be done from information collected as part of normal City business activities so is less expensive.

Though the space per employee varies from business to business, the average space per employee among all businesses only varies slightly within classes of business, such as retail, office, and industrial. If the amount of built space for each class of business is known; fairly accurate estimates of total employment can be obtained. The same is true for labor force. Though the number of people per household in the labor force varies from family to family, the average number per household varies only slightly in the aggregate, thus estimates of labor force size, given the number of housing units, is fairly easy to estimate. It is recommended that these estimating techniques be used to measure both the employment and labor force of built projects and residences within the infrastructure limit line area.

***Conclusion***

Establishing a North Gateway Village goal for jobs to population at 75 percent clearly establishes the aim to create the village as a regional employment center. Providing realistically phased goals within the area inside the infrastructure limit line will allow for start up time and maturation of the employment center to complement the area's recommended land uses.

Using regulatory tools to implement the goal will provide a level of certainty that the goal will be achieved. Limiting the rezoning to higher residential zoning districts as soon as 50 percent of the residentially designated land has been rezoned to higher densities will provide the property owner the highest level of certainty and assist the City in preventing an unacceptable development mix. Limiting the subdivision of residential lots at the various reviews will provide some level of certainty to the City that development will be a mix of employment and residential uses. Providing for the opportunity to limit residential building permits at the long term review will provide the City the maximum certainty when it is imperative that the link between housing and employment land uses be established.

In order to implement these goals, an ordinance will be required. It is recommended that a Specific Plan be initiated. The Plan shall identify the recommended goals and implementation strategy ; define the review process; identify the methodology of the review and the steps of the implementation process; and assign the areas of responsibility within the City organization.

**RECOMMENDATION SUMMARY**

 The number of jobs should equal 75 percent of the resident population in the North Gateway Village.

 Within the area inside the infrastructure limit line, the number of jobs to population should be 15 percent when 25 percent of the residentially designated land is absorbed; 30 percent when 50 percent of the residentially designated land is absorbed; and 50 percent when 75 percent of the residentially designated land is absorbed.

 A ***Specific Plan*** be initiated which will identify the recommended goals and implementation strategy; define the review process; identify the methodology of the review and the steps of the implementation process; and assign the areas of responsibility within the City organization. The Specific Plan would consider the following review periods and implementation mechanisms.

- That the rezoning to higher residential densities be limited once 50% of the residentially designated land is rezoned.

- That through an ordinance mechanism, the residential development of land be required to be reviewed at the time 25, 50 and 75 percent of the residentially designated land is absorbed. If the review determines that the jobs to population ratio is unmet:

- the subdivision of land (through a limit on lot platting) would be prohibited or limited at the short term (25% absorption) review,

- the further residential rezoning to higher densities and the subdivision of land (through a limit on residential lot platting) would be prohibited or limited at the mid term (50% absorption) review, and

- The residential rezoning, the subdivision of land and the issuance of residential building permits would be prohibited or limited at the long-term (75% absorption) review.

 As part of a Specific Plan, prepare a detailed, comprehensive, economic development plan which includes the Deer Valley Airport Employment

Center as a key element as well as analysis of the ratio of jobs to housing with final calculations.

## TRANSPORTATION PLAN

The transportation plan is designed to safely and efficiently move people and goods within the North Black Canyon Corridor study area. This is a refinement of the currently approved transportation plan (Street Classification Map), not a total redesign of the system as was done in 1987.

### PLAN ELEMENTS

-  Avenue C (Lone Mountain Road alignment) and Parkway A will function as the main streets within the core and should become streets with strong transit emphasis. This would provide for good access to the heart of the core and allow for transfers between routes. The ultimate design of these streets in the core area should accommodate future operations of multiple bus routes and transfers.
-  Buildings should be conveniently connected to the pedestrian system to promote usage.
-  Bike lanes are incorporated in the standard cross-sections of these streets. Access to the core by bicycle should be safe and efficient. Bicycle racks or lockers should be available to connect to the transit system, for core employees, and to promote the use of bicycles for intra-core trips.
-  Provide wider than standard 5' sidewalks in the core area to provide adequate capacity for increased pedestrian usage. A minimum width of 8' should be used.
-  Maintain the capacity of Parkway A and Avenue C through the corridor by minimizing driveways, intersections and signals. The Street Classification System General Policy Document and Technical Supplement should be considered as minimum requirements for these streets.
-  Provide an additional access point to I-17 southward at approximately Jomax or Dynamite Road alignments.
-  Work with the ADOT to widen I-17 at least to Carefree Highway to 6 lanes plus HOV lanes.
-  Provide for one east-west roadway through the North Sonoran Desert preserves. The design of this roadway should mitigate the impacts to the Preserves while providing good capacity and a pleasant motoring experience.
-  Restrict truck traffic on Parkway A to local business operations only. Through trucks would remain on I-17 that would minimize wear and tear on this city street and leave additional capacity for commuters.

## BACKGROUND

The currently adopted Phoenix Street Classification Map shows the generalized locations and ultimate sizing for the arterial street system for the City of Phoenix including the study area. The street system in northern Phoenix came about as a result of a study approved in July 1987 and updated several times since then.

At the time of the original study all of the study area was sparsely populated. The study was based on the 1985 Phoenix General Plan land uses. A single development scenario that represented a level between the City's then "medium" and "high" density alternatives was used for the purpose of the travel demand analyses and comparison of alternative roadway concepts.

The recommended transportation plan that came out of this study was incorporated into the City's General Plan and Street Classification Map. This map is updated annually to reflect changes and refine the planned roadway network.

### EXISTING CONDITIONS

The North Black Canyon Corridor is currently served by a limited number of paved roadway facilities. The existing roadway system includes Carefree Highway, located near the northern boundary of the study area, I-17 (Black Canyon Freeway) including 2-way frontage roads north of Happy Valley Road, and Happy Valley Road. Maricopa County Department of Transportation is currently widening Carefree Highway to 4 lanes.

### STUDY PROCESS

City staff from Street Transportation and the Planning Department worked with the Maricopa Association of Governments Transportation Planning Office (MAGTPO) for several months on updating the computer traffic model. The MAG model is used for traffic and air quality studies in the MAG region. This model attempts to simulate human behavior based on quantified observations and allow future scenarios to be tested.

The base case for this study is the General Plan land uses with the North Black Canyon Corridor and Desert Preserve assumptions added. The currently approved Street Classification roadway network was used. This roadway network deviates somewhat from the typical one-mile grid pattern of streets to accommodate drainage patterns and topographic features. Build-out land use forecasts were used to size the ultimate roadways needed to serve the area. The streets system will be built in phases as growth occurs and many of the streets will not be built at their ultimate width initially.

At least one of the planned traffic interchanges with I-17 should be constructed before the interchanges at Carefree Highway and Happy Valley Road are overloaded. The timing on this depends on the pace and location of development and should be monitored. It will take several years lead-time to secure funding, design and build these

interchanges so traffic and development in the area needs to be monitored.

## ANALYSIS

One way to examine the need for capacity in a corridor is through a screenline analysis. A screenline is a line drawn across a corridor at locations where it is desired to study traffic volumes. Screenline locations were chosen and forecast build out volumes and the total capacity of the through streets in the corridor were summed at these lines.

For this exercise, LOS D was used as the planned capacity. While this is less than the ultimate capacity, it is a more desirable LOS goal and also provides a more conservative number for making such long-range decisions. Accordingly the City has a policy to plan for LOS D. This works out to approximately 32,000 vehicles per day for a 4 lane arterial street and 48,000 vehicles per day for a 6 lane arterial street. For comparison, volumes of over 60,000 vehicles per day have been recorded on some Phoenix arterial streets. This results in LOS F for at least some peak traffic times of the day and represents near the maximum capacity of the road. The table below shows forecast build-out volumes for scenario A, B, C.

To study the effects of arterials through the Preserves, arterials that paralleled these streets and provide alternate routes must be examined. For this analysis these parallel arterials include: Carefree Highway, and Happy Valley Road/Pinnacle Peak Road, and Deer Valley.

In order to determine the number and size of roadways, the traffic volumes being carried on the streets through the planned preserve must be able to be accommodated by the remaining arterial street system. Assuming no change in land uses, the number of trips being generated is the same and the travel demand between the various land uses will be the same. Traffic will generally go the shortest route from its origin to its destination in terms of time. What the traffic model simulates, which happens in reality, is the

balancing of traffic volumes over the alternative streets until each street is operating at approximately the same LOS. The traffic estimated to be carried on the freeways would seek alternatives on the remaining arterial street network.

Below are tables that show the sum of projected 24 hour average weekday traffic volumes on arterial streets plus the freeways under study and the sum of LOS D capacity of the arterial streets in the corridor.

In the case of 43rd Avenue, the volumes between 43rd Avenue and I-17 are higher than planned capacity due to the strong attraction for trips to get onto the freeway. This is representative of conditions in close proximity to freeway access points and illustrates the importance of maintaining good roadway capacity at these locations through design.

The over capacity condition at 16th Street in scenario A indicates there is sufficient east-west travel demand to warrant more capacity in this area. Capacity of any street through the planned preserves would likely be significantly higher than the 48,000 typically used due to the design of the roadway. There would likely be little or no access to adjacent land uses through the preserves making the capacity through this area somewhere between a standard arterial and a freeway which can accommodate closer to 20,000 vehicles per day per lane. If a single roadway scenario were chosen, the key consideration to providing good functionality would be to design adequate capacity at the intersections/interchanges on either side of the preserves where the single roadway splits into two roadways.

While some roadway segments are over capacity, this analysis gives a good indication that the arterial streets are sized to handle the projected traffic based on the proposed land use. Providing too much capacity can result in pressure to change land uses. Too little capacity can inhibit

**TABLE 7:**  
North Black Canyon  
East-west Study Area Corridor  
Projected Volume and Capacity

Scenario Volume	Screenline Location			
	67th Ave	43rd Ave	27th Ave	16th St
A	132,000	238,000	223,000	166,000
B	136,000	245,000	225,000	213,000
C	135,000	244,000	217,000	233,000
<b>Scenario Capacity</b>				
A	176,000	224,000	192,000	144,000
B	176,000	224,000	224,000	192,000
C	176,000	224,000	224,000	240,000

LOS D: 4 lane arterial = 32,000  
6 lane arterial = 48,000

the ultimate planned development of the area. Where needed, some additional capacity on the arterial street system can be gained through design such as widening intersections and minimizing driveways and traffic signals.

Parkway A is the major north-south street in this corridor and is critical to the ultimate development of the area. This street not only provides for traffic within the corridor but also serves an important regional role for traffic coming to or leaving the corridor. Also, this street provides a needed alternative for traffic on I-17 in the event of emergencies. Additionally, a corridor is needed to run necessary water and sewer lines and the street right-of-way provides this corridor. Because of the cost of bridging Skunk Creek south of Carefree Highway, a roadway approximately on the 27th Avenue alignment connecting Parkway A to Carefree Highway could be built. This roadway should be built to collector street standards (4 lanes) and would serve to open up the corridor for initial development and become part of the ultimate circulation system.

Highway, a roadway approximately on the 27th Avenue alignment connecting Parkway A to Carefree Highway could be built. This roadway should be built to collector street standards (4 lanes) and would serve to open up the corridor for initial development and become part of the ultimate circulation system.

Parkway A is planned to be built as a 6 lane, landscaped median divided major arterial. Initially, only 4 of the ultimate 6 lanes may be built to minimize initial construction costs. This would provide access to the area and enough capacity for initial development.

In our study, Parkway A between Lone Mountain Road and Happy Valley Road experiences high volumes for an arterial street. Part of this is due to the demand of traffic to get onto I-17. There is a 4 mile distance between the planned interchange at Lone Mountain Road and Happy Valley Road. This is significantly more than the typical 1 mile spacing found in metropolitan Phoenix. This results in traffic using Parkway A for several miles to get to an interchange as well as placing increased traffic demands on the planned interchanges. All of this indicates that an additional interchange (additional to Dove Valley and Happy Valley locations) with I-17 within this 4 mile segment would prove beneficial to transportation system. Because the demand for travel to and from the south is significantly higher than to the north, a partial interchange providing access to and from the south would yield substantial results. This would also be substantially less expensive than a full interchange and given some of the geographical constraints already existing, likely would prove much easier to implement.

The two best locations for this partial interchange would be approximately Jomax Road or Dynamite Boulevard alignments. The Dynamite Boulevard location even splits the 4 mile distance between the other interchanges and could also tie into the existing bridge over the CAP east of

I-17. This connection would have to bear the additional cost of a bridge over Skunk Creek. The Dynamite location would also be able to serve the area west of the I-17 south of the CAP and east of the hills. The location at Jomax would not have to bridge the Skunk Creek, as the creek would be west of this location. The Jomax location would likely only serve traffic east of I-17, not to the west due to Skunk Creek's location.

## INTERSTATE 17 TRAFFIC INTERCHANGE FUNDING AND TIMING

In the North Black Canyon Corridor there are plans for two new traffic interchanges (TI) on I-17 at approximately Dove Valley and Lone Mountain Roads. These facilities are presently unfunded but will be vital to the transportation system for the planned development of the area. Another transportation issue which ADOT is studying is the need to widen I-17 to accommodate the traffic volumes which are already beginning to burden the existing facility.

Once development begins in this corridor, the need for a new connection to I-17 will occur quickly. The existing TI's at Carefree Highway and Happy Valley Road are not built to accommodate significant additional traffic. Although some improvements are planned for the Happy Valley TI, traffic volumes will grow on this road and Carefree Highway over the next several years absorbing much of this additional capacity. Some number of houses could be built and occupied with access only to an interim Parkway A connecting from Happy Valley to Carefree Highway. Estimating how many units is difficult given timing of these projects and traffic growth rate projections. Any significant commercial traffic will want to have more direct access to the freeway and so it is important for the core to have at least one TI built in time to meet this demand. An added benefit to constructing a TI would be to provide access for truck traffic to I-17 as an alternative to Parkway A.

The freeway system in Arizona is typically built and maintained by the Arizona Department of Transportation. There are some exceptions to this general rule such as the portion of the Squaw Peak Parkway which was constructed by the City of Phoenix and later turned over to ADOT for maintenance, and the traffic interchange at the Arizona Mills mall which was a funded by city of Tempe and private sources.

The discussion below addressed potential funding sources and approximate timing for the funds to be available. Each TI would cost approximately \$12 million. Added to the time to acquire funding and gain necessary approvals, would be about 3 years to design acquired right-of-way and construct the facilities. In addition to the TI's, Skunk Creek Wash will need to be bridged to provide access to the corridor. The plan to keep this wash in place as a non-structural drainage facility means the length of the bridges and the cost of bridges will be substantial although there is

some cost saving in not channeling the wash. The rough estimates for costs of these bridges are roughly \$10 million dollars each.

## **ADOT**

No new construction of I-17 in this area is programmed in the 5 year Capital Improvement Program. The City of Phoenix works with ADOT each year to advance projects which benefit our citizens. Of course, other cities are doing likewise and we compete with the other cities for the available funding. It is unlikely that projects this far from a developed area of the region would score high in priority compared with projects to handle traffic for existing development. Assuming that a new TI were programmed just outside the 5 year CIP, it could be completed in about 2008.

## **CITY OF PHOENIX**

The City of Phoenix could provide funding for TI's in the NBCC from several sources including bonds, Arizona Highway User Funds (gas tax share back from state), Federal Aid, and infrastructure fees.

**Bonds:** The 1988 bond funds have been expended. There are plans for a new bond election in the fall of 2000. All projects will have to be weighed in priority against all other projects in the city. These projects are not likely to be high priority with voters compared with other projects closer to where they live. Assuming bond funds came available for a TI in the NBCC, the project could be completed in about 2004. **AHUR/Federal Aid:** These funds are what the city primarily uses for its 5 year CIP. The city currently expends about \$25 million per year on road construction. The two TI's in the NBCC represent approximately one full year of funding. Roadway projects are prioritized each year and adjustments made. It is unlikely that a new project would rank high enough to be placed in next years CIP. Assuming that a new project could be added to the CIP in 2001, a TI could be built by 2004.

**Infrastructure fees:** Can only pay a portion attributable to new development in the fee areas. That portion could be as high as about 90% of total cost. Under the current system, this would take a long time to collect enough fees to build the TI. One possibility to provide funds sooner would be to establish an infrastructure fee "bank" with other fund sources such as bonds. This has the advantage of providing funds for construction early which are repaid by fees as the area develops. If the bank concept is approved and sufficiently funded, a TI could be built by about 2004.

## **PRIVATE DEVELOPMENT**

The interchanges could be paid for directly by private development. This gets the interchanges built when they are needed and has growth paying for itself. Part of the cost would be credited against infrastructure fees. The additional cost would be passed on to homes and buildings constructed or in the cost of the land in subsequent sales. TI's could be built as soon as late 2002. The Anthem

project will be constructing two new TI's as part of their development.

**Improvement Districts:** The city provides low interest 10 year loans for capital construction. The funds come from private development. The ID process has statutory requirements which take a minimum of 1 year to go through. TI's could be built as soon as 2004.

## **CONCLUSION**

No single funding method stands out as the best way to ensure these facilities are provided in a time frame necessary to serve the planned development. The final solution will likely be a combination of 2 or more methods. The city will need to continue to explore these options and work with the ADOT, property owners, and developers to make this happen.

## **OPEN SPACE AND TRAILS PLAN**

The North Black Canyon Concept Plan proposes the development of a new high quality regional employment center with a special emphasis on the area's opportunity to use its spectacular desert amenities to define community identity. Unique circumstances and possibilities exist in this corridor. Integrating the urban environment with the desert and the planned Sonoran Preserve can attract both the high quality companies and executive housing desired for this urban growth area.

Open space increases the livability of the urban environment, providing relief from the more intense urban pattern by balancing high concentrations of people in either workplace or residential settings. Examples are seen by the existing Phoenix Mountain Preserves, Indian Bend Wash, and South Mountain Park. Three distinct open space components are planned for the corridor, each meeting different recreational needs. These components are (1) the proposed Sonoran Preserve; (2) city parks at the district, community and neighborhood levels; and (3) trails.

## **SONORAN PRESERVE**

The proposed Sonoran Preserve, approved in concept by the Phoenix City Council, generally lies north of the CAP canal between New River and Cave Creek and encompasses approximately 20,000 acres of hillside, washes and open desert. The North Black Canyon Corridor runs north to south through the central third of the land which includes much of the planned preserve. The Union Hills and Skunk Creek Wash are two major features in this planning area which are designated for preserve land. Because the proposed Sonoran Preserve lands will constitute a large portion of this area, they are included in the general plan designations for the NBCC.

Phoenix lies within some of the most beautiful and biologically rich desert in the world. The City of Phoenix Parks & Recreation and Library Department (PRLD) worked in cooperation with the Phoenix Sonoran Desert Preserve Committee on the Sonoran Preserve Master Plan,

which was approved by the City Council on February 17, 1998. The PRLD believes that with sensitive planning, a commitment to maintaining our quality of outdoor recreation, and quick action, both population increases and preservation of the Sonoran Desert can be accommodated.

The PRLD combined traditional planning techniques of inventory and analysis with public input and landscape ecological theory to design a preserve based on a system that functions biologically and provides a recreational resource tailored to the needs of the public.

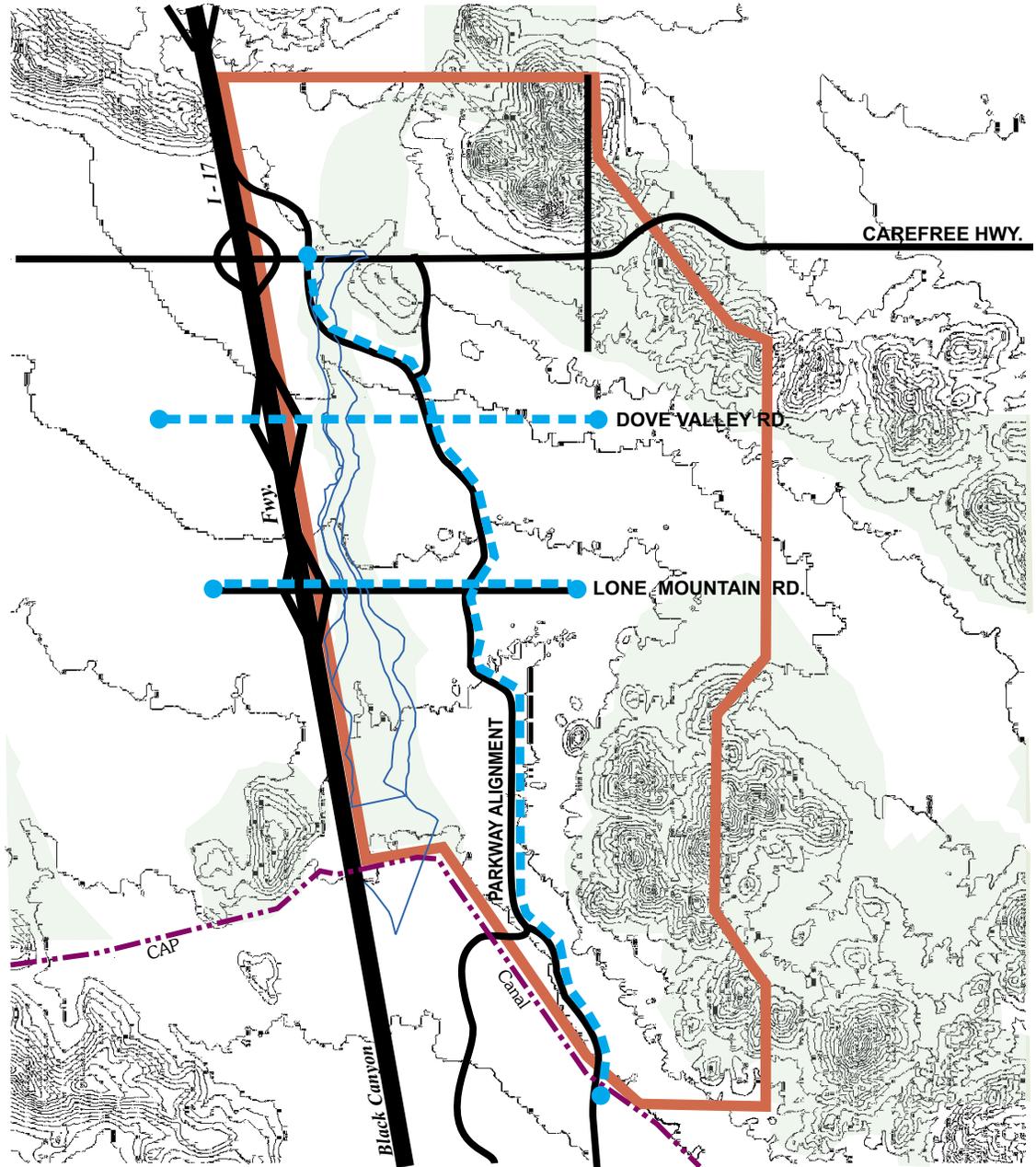


FIGURE 5: Recreational Trails Map-North Black Canyon Corridor





**FIGURE 6: View of Bronco Tank and Bronco Butte-North Black Canyon Corridor**

The master plan for the Sonoran Preserve calls for land for recreation and trails, open space, environmental education and preservation of native species. The recreation element recommends three major access points where the NBCC is adjacent to the preserve land that will include parking, trails, picnicking, outdoor recreation and visitor services. At least eight secondary entry points in the NBCC will consist of trailhead parking lots on the perimeter of the preserve linking to the neighboring community. Multiple minor access points are recommended to direct walk-in use to designated trails and alleviate congestion and degradation of preserved lands.

The planned Sonoran desert preserve will encompass mountains and washes. Other areas may be included for wildlife habitat or which have significant vegetation. A design concept learned from other mountain preserve areas will be incorporated by placing neighborhood and possibly community level parks adjacent to the preserves. This provides an access point. Past experience has shown gated subdivisions near mountain preserves limit public access. Conversely, ungated subdivisions near an access point tend to have problems with parking. Any park which has trailhead and parking area functions will solve both problems.

One other site in the subject area, Bronco Butte, rises above the relatively flat land. The butte serves both as a landmark and viewpoint. A clear line of site provides a view of Pyramid Peak, to the west. A trail from this small site can tie the planned commercial core to the recreational areas directly west both physically and visually.

### **CITY PARKS**

The assumed population in the corridor is 49,633 persons within the infrastructure limit line area, 106,614 total outside the infrastructure limit line, a total of 156,247 for the overall area.

**District parks** are 100 acres or larger in size, serving 100,000 people or more within a radius of about 5 miles. They provide both resource based and user-oriented recreation for an entire region of the city. They may

include special facilities such as a golf course, sport complex, natural areas, or an amphitheater. They require large areas for parking and should be located adjacent to arterial roadways. They may be buffered from surrounding residential areas by commercial developments.

The site proposed for the recommended district park lies south of the Dove Valley Road alignment and extends approximately one-half mile south of the Lone Mountain Road alignment, adjacent to the east side of I-17. Both Dove Valley Road and Lone Mountain Road are planned as major arterial streets. I-17 forms the west boundary, allowing high visibility into the future planned park site. This park is conceived to be an intensely developed recreation complex similar to the Rose Mofford Sports Complex. This site would be able to serve the current area under study and eventually, the area west of I-17, as well. Skunk Creek Wash is adjacent on the east boundary and would be a natural buffer between the park and the commercial areas to the east, and will serve as the vital principal trail corridor for the area. An important secondary function of the district park would be to provide major trailhead facilities.

**Community parks** would be required to serve the projected population. One potential site is shown located north of the Lone Mountain Road alignment, north of the Union Hills around the 7th Avenue alignment; another is located just south of the Carefree Highway near the 19th Avenue alignment. These locations are centrally located within the area and would serve a radius of approximately 1<sup>1/2</sup> miles. The locations are not ideal, being influenced by existing approved developments, primarily Dynamite Mountain Ranch. But in conjunction with a district park, the provision of large active facilities would be fairly well distributed. These parks would be separated from the Sonoran Preserve by roads to lessen the physical impact of large numbers of visitors and traffic, lighting and noise that are typically generated by such parks. There would be major trail connections to the Preserve.

**Neighborhood parks** are designed to serve a population of 4,000 to 7,000 within a 1/2 mile radius. There should be more neighborhood parks in higher density residential areas. An effort has been made by the Parks, Recreation and Library Department to plan these parks adjacent to major washes, which would serve as trail corridors and thereby provide a network of connectivity between all parks in the planning area, as well as access to the Preserve. The effort to connect parks via trails is also reflected in the proposed location of several of the parks adjacent to the Preserve. The user levels of neighborhood parks will be relatively low and park development can be designed to concentrate intense activity away from the Preserve boundary to reduce impact. However, access to the Preserve could still be provided.

## TRAILS

Some trails are noted in concept on the Desert View Tri-Village Recreational Trail Plan to implement the General Plan Trails Plan. The conceptual location notes trails in Skunk Creek Wash, along the CAP Canal, along major roadways, as well as at other locations. Many of these will need further definition, for example, exact roadway alignments are not set and a trail will be located next to the roadway after the alignment is determined. Others generally follow washes, but there are several branches from which to choose. Because this is ambiguous, a developer could easily argue the trail is not on the site under development, and a trail connection could be lost. A definite location would do more to assure the eventual trail system.

The PRLD is developing a trails plan for the Preserve. The plan will accommodate users with a wide range of interests and abilities. All the proposed access points will link the Preserve trails to the existing recreational trails system that will allow users to hike, bike, run or ride a horse from Peoria to Scottsdale and from South Mountain Park to the northern reaches of the city and beyond.

In the North Black Canyon Corridor area multi-use trails are intended to be located along corridors formed by major washes and arterial and connector roadways. The district and community parks will function as major trailheads due to their locations proximate to the Skunk Creek Wash system and the Sonoran Preserve. The community parks will serve as important trailheads for the trail system within the Preserve, as well as for connecting multi-use trails. This function will be supplemented by 8 primary trailhead facilities, 6 secondary trailheads and 15 neighborhood walk-in facilities. The distribution of trail access is to provide manageable and reasonable trail access to the Preserve and to the park system located along the multi-use trails.

An important feature of the trails system as a part of a total transportation program within the planning area is the utilization of the district and community parks along with appropriate primary and secondary trailheads as locations for transit park-and-ride lots. Park-and-ride lots are nothing more than trailheads for buses, and the potential of cooperative funding should not be ignored.

Parkway A and segments of the major east-west arterials may be among the first roadways to be built and the trails located adjacent to these roadways should be adopted so the opportunity for these trails is not lost. Additional right-of-way may be required for these trails. A trail adjacent to Parkway A will provide a major north-south linkage. The proposed trail on the Desert Tri-Village Recreational Trail Plan along the Dove Valley Road alignment should be extended west of Skunk Creek to west of I-17, requiring an overpass to accommodate the trails when the freeway interchange is constructed. An overpass is currently shown at the Lone Mountain Road alignment, but no trail continues east from that site because it was previously

designated for the Outer Loop Freeway. The freeway has been removed and a major arterial roadway proposed instead, so a trail should be located adjacent to the roadway at the Lone Mountain alignment also.

## CONCLUSION

The Parks, Recreation and Library Department has studied the North Black Canyon Corridor area ahead of development occurring to provide for the best possible synergy among recreational uses. It is difficult to site park facilities and trails once an area is built. It is more efficient in land use and economic terms to plan them prior to development. The comprehensive plan designed by PRLD provides the most benefit to the area. However, the General Plan land use designation needs to be placed well in advance of development plans to have the most effect for insuring eventual development of parks and trails.

## RECOMMENDATION

1. That the following two maps be included in the North Black Canyon Corridor Plan:

-  a map showing the Sonoran Preserves and
-  A map showing trails adjacent to Parkway A and the major east-west arterial streets which are at approximately the Dove Valley Road and Lone Mountain Road alignments. These trails should be clearly indicated to continue west so that it is understood that trail crossings over I-17 must be provided when the freeway interchanges are built. The text of the amendment should state that additional right-of-way may be required for these trails.

2. The trails along Parkway A and the east-west major street alignments, with indication that the east-west trails cross the Black Canyon Freeway (I-17) be added as proposed trails to the Existing Recreational Trails map on page 28 of the General Plan text with this amendment (as shown on the Proposed Recreational Trails map on [page 24](#)).
3. The Open Space and Trails Plan, and the Public Facilities Plan, with their associated maps on pages 23 and 24 of the General Plan for Peripheral Areas C and D, should be updated to reflect the current efforts of the Park, Recreation and Library Department's planning for this northern area. The Parks, Recreation and Library Department is currently conducting a study which will produce information which ought to be included in this amendment. Therefore, staff recommends that these updates be in the next General Plan Amendment cycle, beginning September 1999.
4. Both the Desert Tri-Village Recreational Trail Plan and the Existing Recreational Trails Map (page 28) of the General Plan text should be updated in the next General Plan amendment cycle and include additional trails to those recommended above. This

will provide the opportunity to locate more trail along the wash corridors. Waiting until the General Plan amendment cycle will allow the Parks, Recreation and Library Department time to review these trails with advisory boards and to consider how Americans with Disabilities Act (ADA) guidelines will be applied to the trails system. Maps should also be updated to reflect the Sonoran Preserves as approved by Council.

5. Include in a Specific Plan for the North Black Canyon Corridor, one portion to specifically address

the Sonoran Preserves, Trails, and all levels of parks planned for this area. This section should provide development guidelines, for example, trail width, materials and access.

These efforts should be coordinated with the Parks, Recreation and Library and Planning Departments to produce the best possible synergy between land uses and recreational elements in the North Black Canyon Corridor and to give these plans the weight of an adopted policy.

## FLOODPLAIN MANAGEMENT



FIGURE 7: Skunk Creek-North Black Canyon Corridor

### INTRODUCTION

Washes are a major feature of the north Sonoran desert areas of Phoenix. The types of washes in these desert areas range from small washes that rarely have flowing water, to the alluvial fan washes southeast of Phoenix' northern Sonoran deserts, to the well-defined major washes and the large washes such as Skunk Creek and Cave Creek Wash. Phoenix over the last 10 years has identified these washes in numerous studies and adopted plans as being important to the desert character of north Phoenix. The City has adopted several policies for the northeast part of Phoenix requiring minimal impact on these natural washes. This is also true of the North Black Canyon Corridor. This plan for the corridor includes numerous policies related to the washes in the area and the importance of retaining their natural state.

In addition to these design standards, Phoenix recognizes the importance these washes play in floodplain management within these desert locations. The North Black Canyon Corridor Plan has proposed several new policies related to management of the washes in the corridor that would be in addition to existing flood management policies.

### BACKGROUND

Currently Phoenix has two basic flood control related development requirements, those required for Phoenix to participate in the National Flood Insurance Program (NFIP) and a "pre equals post" site development requirement.

### NATIONAL FLOOD INSURANCE PROGRAM

For decades, the national response to flood disasters was generally limited to constructing flood control works such as dams, levees, sea walls, and the like and providing disaster relief to flood victims. This approach did not reduce losses or discourage unwise development and, in some instances, may have actually encouraged additional development. To compound the problem, the public could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs to the general taxpayers of disaster relief, in 1968 Congress created the National Flood Insurance Program through passage of the National Flood Insurance Act, which was subsequently amended by the Flood Disaster Protection Act of 1973. The intent of this program was to mitigate future damage and provide protection for property owners against potential losses through an insurance mechanism that allows a premium to be paid for the protection by those most in need of this protection.

The NFIP is a federal program that allows property owners to purchase insurance protection against losses from flooding provided that the community in which they live agrees to implement and enforce measures to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHA). Special Flood Hazard Areas are identified by FEMA through a flood boundary mapping program.

Though participation by communities in NFIP is voluntary, the reality is that it would be a great financial

burden to the community if it did not. Once a Special Flood Hazard Area (SFHA) has been identified by FEMA in a community, under the NFIP regulations federal agencies such as FHA, SBA, VA and others can not make or guarantee a loan secured for a building in a SFHA unless flood insurance has been purchased. Since flood insurance is not available from private insurance companies in such areas, if a community does not participate, flood insurance is not available and federal assistance can not be provided. In addition to this restriction, after a flood has occurred, federal disaster assistance for damage and losses within a SFHA will not be available within communities not participating in the NFIP.

Today, National Flood Insurance is available in more than 18,000 communities across the United States. Phoenix has participated in NFIP since 1979 and has adopted the standard NFIP requirements. The City of Phoenix standards require that residential buildings located in a SFHA be elevated to one foot above the base flood elevation (BFE), which is defined as the elevation of the flood that has a 1% chance of occurring in any given year (also called the 100-year flood). In addition, development may only fill or otherwise develop within this 100-year floodplain to the extent that the water surface elevation of the 100-year flood is raised no more than one foot within the floodplain adjacent to the proposed project. The combination of these two requirements protects buildings from a 100-year flood and any increase in the 100-year flood caused by the project.

## RESULTS OF NFIP

The NFIP has had mixed results and has been criticized by a variety of groups for a number of years. Since its inception, the NFIP has been successful in requiring new buildings to be protected from damage by the 100-year flood and it has raised the public knowledge of flood hazards. Also as a result of NFIP thousands of communities now have in place at least some regulations concerning development within the floodplain that may have otherwise not addressed the issue. NFIP in its own publications states: "The NFIP, through partnerships with communities, the insurance industry, and the lending industry, helps reduce flood damage by nearly \$800 million a year. Further, buildings constructed in compliance with NFIP building standards suffer 77 percent less damage annually than those not built in compliance. And, every \$3 paid in flood insurance claims saves \$1 in disaster assistance payments."

However the fact remains that dollar losses as a result of flooding have continued to increase in terms of constant dollars and though the insurance program is currently self financing, some projects of future losses indicate that the program may not be able to remain self sufficient with out some subsidy or restructuring of insurance rates.

One area of criticism addressed at the local level is that NFIP and local regulation requirements are specific to the site where encroachment in the floodplain is requested and

do not take a watershed view of the encroachment or the future potential impact of watershed wide alteration of the floodplain. In fact in some communities this approach has aggravated downstream problems.

Downstream problems can occur from the cumulative impact of individual project approvals. Though buildings on a site are protected from any increases in the 100-year flood caused by a project, this increase is passed on downstream. In some cases, as each project along a watershed increase the flood level, the cumulative impact gets greater and greater. Eventually this can result in a substantial increase the 100-year flood downstream.

## RESPONSE TO NFIP AND FLOODPLAIN MANAGEMENT

As a result of concern over the effectiveness of the NFIP approach to floodplain management, initiatives at the national and local level have been proposed and adopted to begin to resolve issues not fully or adequately addressed by NFIP requirements.

In the fall of 1993, the White House's floodplain management task force created an Interagency Floodplain Management Review Committee and instructed it to assess the causes and consequences of the floods, as well as to recommend policy changes to avoid similar devastation in the future.

In June 1994, the committee released Sharing the Challenge: Floodplain Management into the 21st Century, more commonly referred to as the Galloway report. The report calls for significant changes in federal flood policy. Specifically, it proposes replacing reliance on structural solutions with a strategy that would seek first to avoid the flood risk as much as possible, minimize the risk if it cannot be avoided, and mitigate the impacts when floods occur. In addition, the new strategy focuses on sharing responsibility for flood-damage reduction among federal, state, and local governments, the private sector, and individuals.

The report concludes that a top-down, single-purpose program of flood control is no longer affordable or desirable and that preservation and enhancement of the natural resources and functions of floodplains must be as important a goal as reducing human vulnerability to flood damage.

There have also been local responses to a increased awareness of floodplain management and the limited nature of NFIP floodplain management. One classic example is the Trinity River watershed in the Dallas/Fort Worth area.

The Trinity River on its course from north Texas runs through the Dallas/Fort Worth region, including edges of downtown Fort Worth and downtown Dallas. In Dallas, a significant system of levees was constructed to protect parts of Dallas including parts of Downtown Dallas. In the early 1980s growth was beginning to encroach at an accelerated pace into the floodplain of the Trinity River

and its tributaries. At the same time the Army Corps of Engineers initiated a study of the Trinity River watershed, in part to examine the adequacy of the existing levee system. Because of the results from this study and other study's of tributaries to the Trinity, concern was raise that the potential cumulative impacts of urban development could not be adequately assessed through individual permit reviews. In response to this concern, the Fort Worth District of the U. S. Army Corps of Engineers, the North Central Texas Council of Governments and its member local governments launched a regional initiative that began to take a regional view of the Trinity River.

This study identified that even with continued enforcement of the standard NFIP requirements, urbanization of the watershed would result in significant flooding impact to the lower portions of the Trinity and threaten the Dallas levees. The results of this study prompted the local communities to develop the Trinity River Common Vision and the Corridor Development Certificate Process (CDCP) which was jointly adopted by all the areas local governments. This Vision and the permitting requirements of the CDCP call for floodplain management standards that go beyond the NFIP requirements and include:

-  no rise in the 100-year flood elevation,
-  a maximum allowable loss of valley storage in the 100-year Flood of 0%
-  a maximum allowable loss of valley storage in the Standard Project Flood discharges of 5% and
-  no increases in erosive water velocity on-site or off-site.

## **PHOENIX CURRENT ENHANCED FLOODPLAIN MANAGEMENT POLICY**

Phoenix has also initiated approaches to floodplain management that use flood control standards more stringent than the NFIP requirements. These new policies address site specific flood control issues, but take more of a watershed approach to flood management.

### **"Pre Equals Post"**

City wide Phoenix has initiated a policy of "pre equals post" for all new construction. Essentially, this policy requires that 100-year stormwater flows into drainage systems and washes from a project after it is built must equal the flows that existed before the project was built. This policy attempts to minimize increases in flooding that can result as streets and buildings are built. This standard is normally met through the use of "onsite" retention or retention basins. Essentially the increases in storm flows resulting from streets and buildings is retained on the project and released later at a rate similar to what it was before the project was built. The theory behind this policy is that by minimizing increased stormwater flows from projects into existing or

planned drainage systems, downstream cumulative flooding impacts can be minimized.

In the urban areas of Phoenix where historically flood control in major drainage and wash systems was accomplished with structural solutions, encroachment into existing floodplain is still allowed under the standard NFIP based requirements. However, the City has begun to explore another approach to floodplain management in the areas north of the CAP.

### **Cave Creek Wash Watercourse Master Plan - "Non-Structural" Approach**

The city, working with the Maricopa County Flood Control District, has initiated a study of Cave Creek Wash and Apache Wash to study a "non-structural" floodplain management policy for this area. This is not a policy unique to Phoenix. This is becoming a major tool for floodplain management at a national and local level. Scottsdale, as part of its Environmentally Sensitive Lands Ordinance, implements a non-structural approach to some parts of Scottsdale. Peoria and Glendale are now working on such a policy within their communities. This has also become a focus of the Maricopa County Flood Control District, who is evaluating non-structural approaches to floodplain management in various parts of the county.

The concept behind a non-structural management program is basically that it is cheaper to leave the floodplain in a natural state than it is to build stormwater protection facilities to protect it from flooding. Nationally the Army Corps of Engineers has begun to find that purchase of flood-threatened properties in some cases is cheaper than building facilities to protect such property. This has been evaluated in regards to levee and dam construction projects. The Trinity River Vision is an example of where this is being applied at a local level. In Phoenix, such a policy complements the city's current "growth pays for itself" policy and its proposed policies to leave major desert washes in a natural state. Under this policy in Phoenix, development within flood areas that would increase flood levels would not be considered appropriate in areas where the city does not plan to fund the construction of flood control structures within a watershed.

### **Past North Black Canyon Floodplain Management**

There have been several zoning cases approved and city projects designed within the North Black Canyon Corridor. The projects have been reviewed under the city's current policies and the general policies adopted by the City Council through the North Black Canyon Concept Plan.

The City of Phoenix has begun the design of a water reclamation plant located in the southern part of the corridor between Skunk Creek and a major tributary to Skunk Creek. This plant has been initially sited to be located outside the existing 100-year floodplain.

The Tramonto project, located north of Carefree Highway on either side of Skunk Creek, was approved by the City Council in 1997. When the zoning was approved, a stipulation was included which limits the downstream impact that can occur as a result of alterations to Skunk Creek on the project site. This proposed project is now being reviewed with this stipulation.

The Dynamite Mountain Ranch project, located north of the CAP and west of Skunk Creek, was approved by the City Council in 1998. This project is not located within the 100-year floodplain of Skunk Creek or the major tributary of Skunk Creek north of the CAP. It is adjacent to the 100-year floodplain south of the CAP, however the wash in this area has already been substantially altered where the creek is consolidated to flow under I-17.

#### **ADDRESSING THE TAKING ISSUE WITH NON-STRUCTURAL FLOODPLAIN MANAGEMENT**

The issue of property rights "takings" in regards to floodplain management is not a new one and not a hard one to understand. Existing NFIP-based requirements as well as standards such as Phoenix' "pre equals post" have similar impacts on property rights as a zero floodplain impact standard would have on property rights. The issue is really a balance between property rights of multiple property owners. In such cases government standards act to assure an equitable balance between such rights.

On one side of the balance is the right of a property owner not to be adversely impacted by increased flooding caused by another property owner. Local governments under their state-enabled police powers routinely regulate private property rights in order to avoid actions which would result in an adverse impact on others. Flooding is one such adverse impact. Phoenix' current flood management standards act to prevent property owners from altering the drainage of their property in such a manner that it would adversely impact other people's property. Under current understanding of floodplain management, we realize that encroachment into a floodplain can have an adverse impact on downstream and upstream properties. Under current policies, Phoenix and Maricopa County have taken three basic approaches to protect people from increased flooding that could result from development within floodplains. First they have limited the amount of land that can be developed within the floodplain using NFIP based standards. Second, they do not allow new development to increase stormwater flows off their property. Third, they use property taxes to build flood control structures where flooding is projected to occur as a result of increased urban runoff.

On the other side of the balance is the individual right of a property owner to make reasonable use of his property. The key factor within this right is "reasonable use." In most cases, as the city and county enforce their flood control regulations, reasonable use of a property can be achieved under the imposed regulations. But in some cases enforcement of such regulations renders no reasonable use of the property. An example would be a property located wholly within the floodplain that is zoned for single-family use. It may be possible that on this property a single-family building could not be built without raising the floodplain more than one foot. For such a property, it would be reasonable for the property owner to expect to be able to build a house, and if he could not do so, this could be considered a denial of reasonable use of his property. The opposite example would be a property located partially in the floodplain, zoned for single-family use, and which included land outside the floodplain suitable for a single-family house. In this case, even though he may be restricted from building within the floodplain, he could still build a house somewhere else on his property. In this case he is able to make reasonable use of his property. Such situations should also be reviewed under the community's police power to protect the public from harm. For example, even if a property owner had property in the floodplain zoned for a single-family use, if construction of a single-family house would endanger or adversely impact other people, denial of such a use may not be considered unreasonable.

If the city proceeds forward with a "non-structural" floodplain management approach, it will have to be vigilant in its efforts to balance the need to protect people from serious harm or adverse impact and the rights of property owners. This should occur during the zoning and site plan review process as well as during development of a management plan. The zoning process for properties in or near floodplain areas should include a careful analysis of what uses are appropriate for a specific property given the need to provide flood protection and meet other city land use goals and reasonable use of property. The site plan review process for properties in or near floodplain areas should include a careful analysis of how individual properties are affected to determine whether there is a potential for takings. During the development of a management program for different watersheds the issues related to takings and the balance between safety, avoiding adverse impacts, and property rights should be a major consideration.

#### **NORTH BLACK CANYON CORRIDOR FLOODPLAIN MANAGEMENT POLICY**

Currently neither the City of Phoenix nor Maricopa County have a floodplain management plan for Skunk Creek or the tributaries of Skunk Creek within the North Black Canyon Corridor planning area. Though it is known that potential flood hazards exist within the corridor, they remain undefined for much of the corridor. Although flood hazards along Skunk Creek have been mapped, the flood

hazards from tributaries to Skunk Creek have not yet been mapped. Flows within these washes range from less than 1,000 cfs to in excess of 25,000 cfs. Surrounded by large areas of vacant mountains and deserts, these washes today remain in a relatively undisturbed natural state.

The North Black Canyon Corridor Concept Plan and the North Sonoran Desert Preserve Plan, both adopted by the City Council, contain goals concerning the desire to preserve desert washes in their natural states. In both plans Skunk Creek is identified as a major wash which should remain in a natural state. Based on these plans, the City of Phoenix has requested the Maricopa County Flood Control District to develop a floodplain management plan for Skunk Creek and its tributaries north of the CAP. The District has tentatively agreed to prepare such a plan.

**INTERIM FLOODPLAIN MANAGEMENT POLICY**

A watercourse management study would examine a range of management policies and their implications. The policies examined would include structural and non-structural policies as well as alternate hybrid policies as proposed by the development community. Such a study is anticipated to take 12 to 18 months. Based on the results of this study, a watercourse management policy would be adopted by the City Council and a plan prepared which would reflect standards and/or infrastructure needed to implement the policy. In order to preserve the ability to implement such a plan, the Council would adopt a policy to limit development within the floodplain which would apply in the interim before the study is complete. During the 18-month interim period, area property may be planned and rezoned.

The County Flood Control District has recommended an interim policy based on a current state planning standard (ARS 48-3605 Standard 5-96 Oct 1996). This state standard is part of the Department of Water Resources Flood Warning and Dam Safety standards used for planning purposes to identify how far back from the floodway encroachment should be discouraged to avoid flood and erosion hazards in areas where detailed watercourse master plans have not been conducted. The standard is based on the flood flow rates within the wash. The following provides an estimate of what such setbacks would be for different flow rates.

**TABLE 8:  
Interim Floodplain Management Setbacks**

Flow Rate (cfs)	Setback
5,000	71 ft
10,000	100 ft
25,000	158 ft

The alteration of the floodplain regime may have the potential to significantly and adversely affect the natural ecosystem of the wash and its value as community open space. Given the city's goal for leaving these washes in a natural state, the watercourse master plan must include an assessment of potential natural resource impacts. Regulation of development within the floodplain may also have a significant and adverse impact on individual property owners ability to develop their property. The watercourse master plan should also include an assessment of the impact on development potential of various properties. Thus, evaluation of the different flood management options should include, but not be limited to, the evaluation of the costs of public flood control structures, the costs of private flood control structures, the value of land reclaimed and not reclaimed, the impact on washes and natural ecosystems, and the impact on city's goals for natural wash systems and open space.

Implementation would include the following standards and actions:

**Standards**

 **Interim Standards:**

- (1.) The interim floodplain policy will be applied to washes with 100-yr flood flows of 5,000 cfs.
- (2.) No encroachment within 100-year floodplain or 70 to 150 feet from the floodway edge based on the state planning standard defined in the Department of Water Resources Flood Warning and Dam Safety Standards (ARS 48-3605 Standard 5-96 Oct 1996), whichever is greater.
- (3.) These standards will be implemented through the rezoning process.
- (4.) The 100-year floodplain for washes this standard applies to will remain undisturbed (for example no structural flood control devices, grading or filling) except for utility corridors, wash transitions to the floodplain, and major arterial and collector streets which bridge the wash. Limited recreational amenities will be allowed in the floodway fringe.
- (5.) A Watercourse Master Plan shall be developed by the Flood Control District of Maricopa County (FDC) working in conjunction with the city.
  - (a.) These interim standards shall apply until October 1st, 2000 or 18 months from the date the City Council adopts these interim standards, whichever is longer.
  - (b.) A minimum of four (4) Watercourse Master Plan alternatives shall be

developed based on the following floodplain management policies: one nonstructural alternative, two partial structural alternatives, and one structural alternative.

- (c.) A Watercourse Management Plan Task Force will be established to work with the City of Phoenix and the FCD. The members of the task force shall include, but not be limited to, area property owners or their designees, private sector engineers and land use planners.

**Final Standards:**

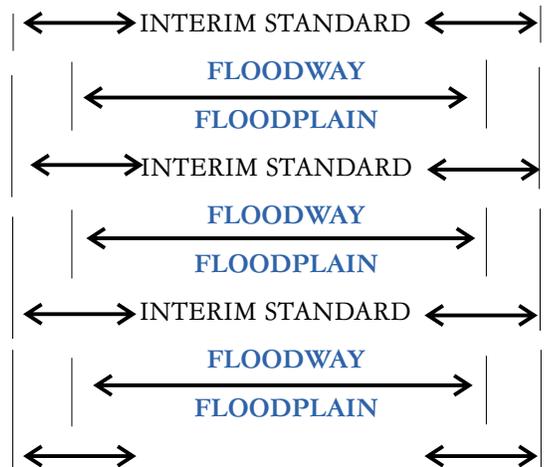
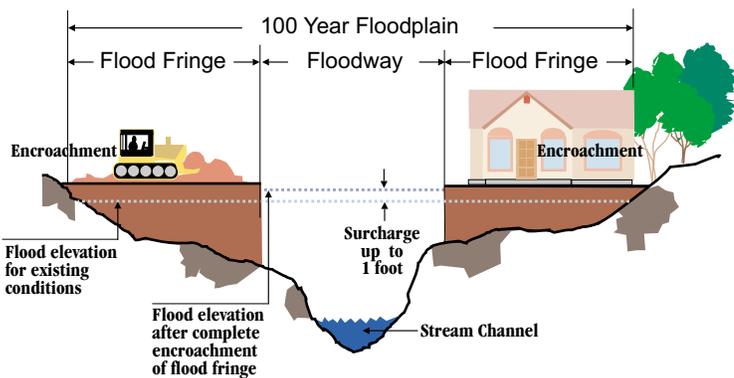
Policy to be determined by the City Council after the review of a watercourse management study which explores alternative floodplain management policies.

**Actions**

- Prepare a watercourse management plan that studies the impacts and benefits of floodplain management under the current city policy, a non-structural policy, and a limited encroachment policy. A committee of private sector engineers and property owners would be formed to comment on the scope of work, suggest alternatives to be studied, and review and comment on study results throughout the study.
- Public review and City Council decision on a floodplain management policy.
- Adopt a specific plan that implements the approved floodplain policy.

**FLOODPLAIN TERMS**

- FLOODPLAIN** - Any land area susceptible to inundation by floodwaters from any source.
- 100-YEAR FLOOD** - The flood having a one percent chance of being equal to or exceeded in magnitude in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years.
- 100-YEAR FLOODPLAIN** - The area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood.
- FLOODWAY** - The channel of a river or watercourse and the adjacent areas that must be reserved in order to discharge the 100-year flood without cumulatively increasing the water surface elevation more than one foot.
- FLOOD FRINGE** - That portion of the floodplain outside the floodway that is inundated by flood waters in which encroachment is permissible.
- ENCROACHMENT** - Any man-made obstruction in the floodplain which displaces the natural passage of flood waters.
- SURCHARGE** - An increase in flood elevation due to destruction of the floodplain that reduces its conveyance capacity.



# CONCLUSION and RECOMMENDATIONS

Through the **Strategic View of Growth** and the **North Black Canyon Corridor Concept Plan**, the City Council identified a broad policy framework to guide development along the northern Interstate 17 corridor. Recognizing the strategic employment needs in the northern parts of Phoenix, a new high quality regional employment center and a diverse residential area are proposed. These are to be integrated with a system of desert preserves, urban open spaces and parks in a new urban form with the intention of promoting a sense of community, achieving a sustainable transportation system, and producing high quality development, which both integrates with and preserves the natural desert environment.

With its outstanding natural amenities, the NBCC has the potential to become one of the most highly competitive emerging employment locations in the Valley. Providing a conducive land pattern and complimentary land policies, however, is critical. Responding to a variety of unusual development opportunities and constraints that exist within this area, management concepts are submitted to keep development within a defined corridor, ensure a balance between jobs and housing, and preserve important desert features. The proposed growth pattern and the management techniques proposed within this land use plan provide for the implementation of a managed growth strategy for the North Black Canyon Corridor.



FIGURE 8: Sonoran Desert-North Black Canyon Corridor

## REQUESTED ACTION ITEMS

### *Specific Plan:*

*Initiate a Specific Plan to accomplish the following:*

- (1) **Detail the review and adjustment of the boundaries of the Infrastructure Limit Line**

Define the review process and identify the methodology for the adjustment of the

infrastructure boundary and assign the areas of responsibility within the city organization.

- (2) **Identify specific design criteria to guide development with the village core and commercial nodes**

Establish specific design guidelines to direct development within the village core and commercial nodes, including a more detailed framework of design criteria regarding the interrelationship between uses, the treatment of wash corridors, desert vegetation, pedestrian orientation, and opportunities for coordinated transit.

- (3) **Identify the recommended goals and implementation strategies to promote transit and pedestrian orientation within the corridor**

Establish specific guidelines to ensure that future streets maintain a strong transit emphasis that enables multiple bus routes and transfers; promotes bicycle use; and is pedestrian oriented while retaining needed capacity.

- (4) **Identify specific design guidelines to integrate urban development and desert amenities**

Establish design criteria regarding (1) the treatment of wash corridors, including possible wash corridor setbacks, the retention of undisturbed wash areas, and the use of naturalistic flood control techniques where wash disturbance is warranted, and (2) the treatment of desert vegetation, including replacement and revegetation of areas with like plant species and plant densities.

- (5) **Implement an approved floodplain policy**

In cooperation with the Flood Control District of Maricopa County, prepare a watercourse management plan that studies the impacts and benefits of floodplain management for washes with 100-year flood flows reaching or exceeding 5,000 cfs. under the current city policy, a non-structural policy, and a limited encroachment policy.

- (6) **Prepare a detailed, comprehensive, economic development plan which will include an action plan to develop a regional employment center.**

The economic development plan will include the Deer Valley Airport Employment Center as a key element as well as an analysis of the ratio of jobs to housing with final calculations.

