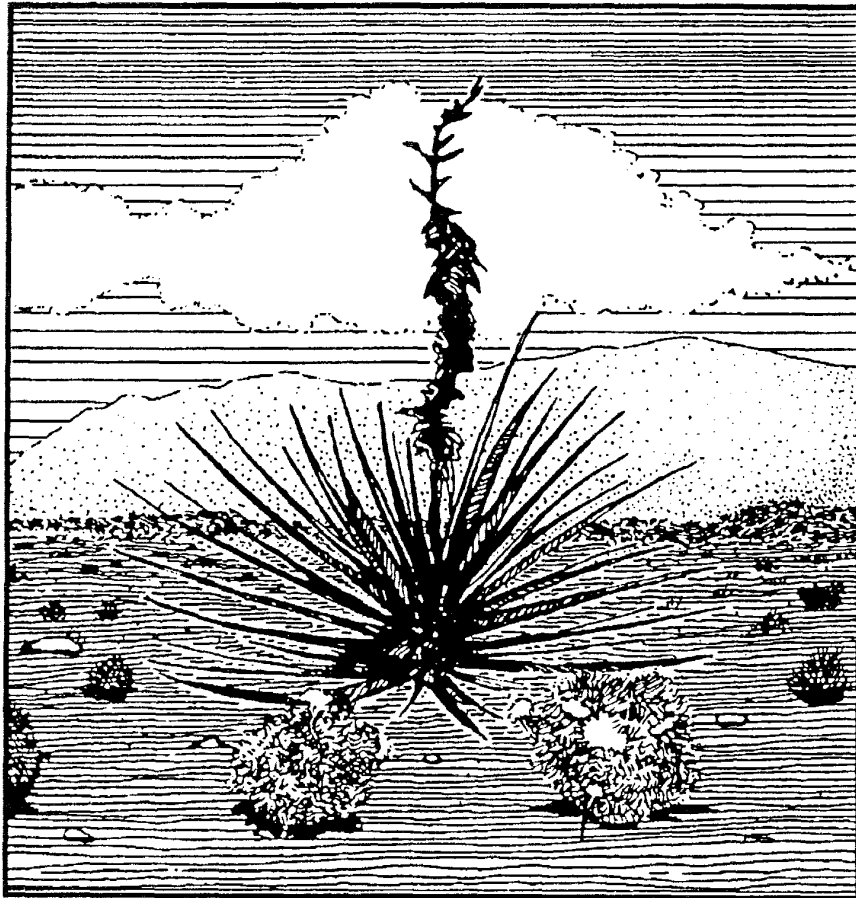


The  
AMOLE  
ARROYO



CORRIDOR PLAN

As Adopted by the City Council on October 21, 1991  
& the Bernalillo County Commission on April 28, 1992

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CITY of ALBUQUERQUE  
NINTH COUNCIL

COUNCIL BILL NO. R-385

ENACTMENT NO. 165-1991

SPONSORED BY: Alan B. Armijo

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RESOLUTION

ADOPTING THE RANK THREE AMOLE ARROYO CORRIDOR PLAN.

WHEREAS, the City Council, the governing body of the City of Albuquerque, has the authority to adopt plans for physical development within their jurisdiction; and

WHEREAS, the Council recognizes the need for Rank Three plans consistent with the Rank One Albuquerque/Bernalillo County Comprehensive Plan and the Rank Two Facility Plan for Arroyos to guide the City, other agencies, property owners and other individuals to ensure orderly development and effective use of resources; and

WHEREAS, the Facility Plan for Arroyos, adopted by the City in 1986, calls for corridor plans to further detail and implement its concepts; and

WHEREAS, corridor plans are Rank Three plans; and

WHEREAS, the Council recognizes the need for design regulations and guidelines for the Amole Arroyo Corridor and lands adjacent to it; and

WHEREAS, the Council recognizes the need for public projects to improve the arroyo corridor for trail use and for related recreational facilities; and

WHEREAS, the Amole Arroyo Corridor Plan has been developed with the assistance of citizens, property owners and the official planning bodies having jurisdiction over the plan area in accordance with the Facility Plan for Arroyos; and

WHEREAS, the Environmental Planning Commission, in its advisory role on all matters related to planning, zoning and environmental protection recommended the adoption of the Amole Arroyo Corridor Plan at a public hearing March 14, 1991, finding the plan consistent with the provisions of the Albuquerque/Bernalillo County Comprehensive Plan and the Facility Plan for

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1 Arroyos; and

2 WHEREAS, "trail corridor" in the attached plan means the existing and proposed  
3 rights of way, easements and licensed lands within which trails are authorized to be  
4 constructed, as illustrated and defined in the plan; thus, planned trail locations are well  
5 clarified.

6 BE IT RESOLVED BY THE COUNCIL, THE GOVERNING BODY OF THE CITY OF  
7 ALBUQUERQUE:

8 Section 1. That the Amole Arroyo Corridor Plan, attached hereto and made part  
9 of this Resolution is hereby adopted as a Rank Three Plan. All development and  
10 improvement activities within the corridor and the adjacent design overlay zone shall  
11 be guided by this plan.

12 Section 2. That the Design Overlay Zone is hereby mapped as an amendment  
13 to the City of Albuquerque Zone map with the boundary specified on the attached  
14 "Amole Arroyo Corridor Plan" pocket map.

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1 PASSED AND ADOPTED THIS 21st DAY OF October, 1991.

2 BY A VOTE OF 6 FOR AND 0 AGAINST.

3 Yes: 6  
Excused: Chapman, Gallegos, Griego

4 Michael Brasher  
5 Michael Brasher, President  
6 City Council

7  
8 APPROVED THIS 25<sup>th</sup> DAY OF October, 1991.

9  
10 Louis E. Saavedra  
11 Louis E. Saavedra, Mayor  
12 City of Albuquerque

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13 ATTEST  
14 Karen Acuna  
15 City Clerk

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RESOLUTION #30-92

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2\_\_ ADOPTING THE RANK THREE AMOLE ARROYO CORRIDOR PLAN

3\_\_ WHEREAS, the Board of County Commissioners, the governing body of the  
4\_\_ County of Bernalillo, has the authority to adopt plans for physical  
5\_\_ development within their jurisdiction; and

6\_\_ WHEREAS, the Board recognizes the need for plans consistent with the Rank  
7\_\_ One Albuquerque/Bernalillo County Comprehensive Plan and the Rank Two Facility  
8\_\_ Plan for Arroyos to guide the County, other agencies, property owners and  
9\_\_ other individuals to ensure orderly development and effective use of  
10\_\_ resources; and

11\_\_ WHEREAS, the Facility Plan for Arroyos, adopted by the County in 1986,  
12\_\_ calls for corridor plans to further detail and implement its concepts; and

13\_\_ WHEREAS, corridor plans are Rank Three plans; and

14\_\_ WHEREAS, the Board recognizes the need for public projects to improve the  
15\_\_ arroyo corridor for trail use and for related recreational facilities; and

16\_\_ WHEREAS, the Amole Arroyo Corridor Plan has been developed with the  
17\_\_ assistance of citizens, property owners and the official planning bodies  
18\_\_ having jurisdiction over the plan area in accordance with the Facility Plan  
19\_\_ for Arroyos; and

20\_\_ WHEREAS, the County Planning Commission, in its advisory role on all  
21\_\_ matters related to planning, zoning and environmental protection recommend the  
22\_\_ adoption of the Amole Arroyo Corridor Plan at a public hearing on March 4,  
23\_\_ 1992, finding the plan consistent with the provisions of the  
24\_\_ Albuquerque/Bernalillo County Comprehensive Plan and the Facility Plan for  
25\_\_ Arroyos.

26\_\_ BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS, THE GOVERNING BODY OF THE  
27\_\_ COUNTY OF BERNALILLO, NEW MEXICO:

28\_\_ Section 1. The Amole Arroyo Corridor Plan, attached hereto and made

1 PAGE 2

2 RESOLUTION #30-92

3 ADOPTING THE AMOLE ARROYO CORRIDOR PLAN

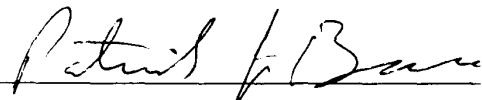
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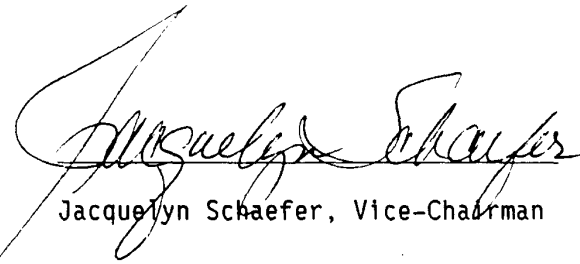
5 part of this Resolution is hereby adopted as a Rank Three Plan. All  
6 development and improvement activities within the corridor shall be guided by  
7 this plan.

8

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Patrick J. Baca, Chairman


  
Jacquelyn Schaefer, Vice-Chairman

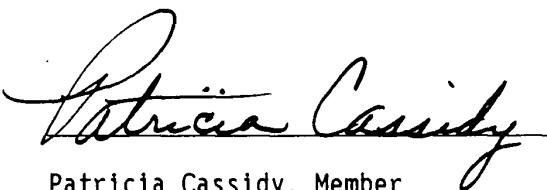
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Eugene M. Gilbert, Member

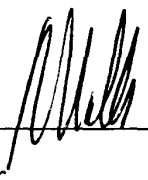
  
Patricia Cassidy, Member

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Al Valdez, Member

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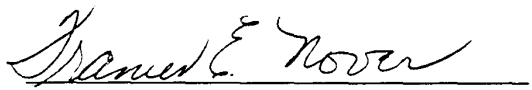
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ATTEST:

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Gladys M. Davis, County Clerk

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## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	1
<b>I. GENERAL INTRODUCTION</b> .....	2
Planning Framework .....	2
Participatory Planning Process .....	3
<b>II. EXISTING CONDITIONS</b> .....	4
Environmental Characteristics .....	4
Land Form and Geology .....	4
Soils .....	4
Vegetation .....	5
Animal Life .....	6
Archaeological Resources .....	6
Visual Resources.....	7
Arroyo Characteristics .....	8
Drainage Basin Characteristics.....	9
Study Area Limits .....	9
Drainage Basin Boundaries .....	9
Arroyo Description .....	9
Sediment Yield and Transport .....	9
Detention Basin Descriptions.....	10
Westgate Detention Basin .....	10
Amole Detention Basin.....	10
Hubbell Lake Detention Facility.....	11
Development Characteristics .....	12
General Platting and Land Ownership.....	12
Land-Use and Zoning .....	12
Parks and Open Space .....	12
Long Range Major Street Plan .....	13
Bikeways Master Plan .....	13
Right-of-Way/Ownership Status .....	14
Easements / Utility Corridors / R.O.W. Ownership.....	14
Available R.O.W. ....	14
Channel Treatments .....	15
Socioeconomic Factors .....	16
Demographics .....	16
Existing Subzones .....	16
Projections .....	17
Housing Characteristics .....	17



**III. AMOLE ARROYO PLAN GOALS & POLICIES..... 19**  
**PLAN GOALS..... 19**  
**PLAN POLICIES..... 19**  
    Drainage and Arroyo Treatment ..... 20  
    Trail Design ..... 23  
    Road Crossing Design ..... 27  
    Park Facilities, Open Space and Resource Management ..... 28  
    Design Overlay Zone ..... 30  
**IV. IMPLEMENTATION ..... 40**  
    General ..... 40  
    Implementation Schedule ..... 41

**SELECTED BIBLIOGRAPHY**

APPENDIX A- Existing Policies ..... A1-12  
APPENDIX B- Trail Design and Cost Estimates ..... B1-20  
APPENDIX C- Trail Alternatives ..... C1-11  
APPENDIX D- Trail Standards ..... D1-16  
APPENDIX E- Plant List ..... E1-4

## LIST OF TABLES AND FIGURES

### TABLES

1	-	Soil Characteristics .....	4
2	-	Native Plant Community Characteristics .....	5
3	-	Native Plant Species by Plant Community .....	5
4	-	Summary of Hydrologic Data .....	9
5	-	Right-of-Way / Ownership Status.....	14
6	-	Existing, Proposed Channel Treatments.....	15
7	-	DASZ and Land Use Stats .....	16
8	-	Housing Characteristics .....	17

### FIGURES

1	-	Context Map .....	before text & rear pocket
2	-	Arroyo Sections .....	8
3	-	Bikeways Master Plan.....	13
4	-	Data Analysis Zones.....	18
5	-	Amole Arroyo Watershed .....	20
6	-	Amole Arroyo Stilling Basin .....	22
7	-	Trail Access Control .....	26
8	-	Preferred Road Crossing Alternative .....	27
9	-	Parking Lot Screening.....	33
10	-	Open Areas Adjacent to the Arroyo .....	35
11	-	Wall Alignments.....	37
12	-	Conceptual Rendering of Continuous Trail System .....	38
13	-	Illustration of Density Bonus.....	39
15	-	Low Flow Channel Design .....	C-4
16	-	Trail Alternative 1 .....	C-5
17	-	Trail Alternative 2 .....	C-5
18	-	Trail Alternative 3 .....	C-5
19	-	Preferred Trail Alternative 2 .....	C-6
20	-	Gun Club Lateral -Section View Looking North.....	C-8
21	-	Road Crossing Alternative 1.....	C-10
22	-	Road Crossing Alternative 2.....	C-10
23	-	Road Crossing Alternative 3.....	C-11

# THE AMOLIE ARROYO CORRIDOR PLAN

## UPPER SECTION OVERVIEW

**DEVELOPMENTAL CHARACTERISTICS** - A general map of the area with the Amolie Arroyo Corridor Plan overlaid. The map shows the location of the Amolie Arroyo Corridor Plan in relation to the surrounding area. The map is oriented with North at the top.

**LEGEND**  
 - Amolie Arroyo Corridor Plan  
 - Other Development  
 - Other Features  
 - Other Landmarks

## INTERMEDIATE SECTION OVERVIEW

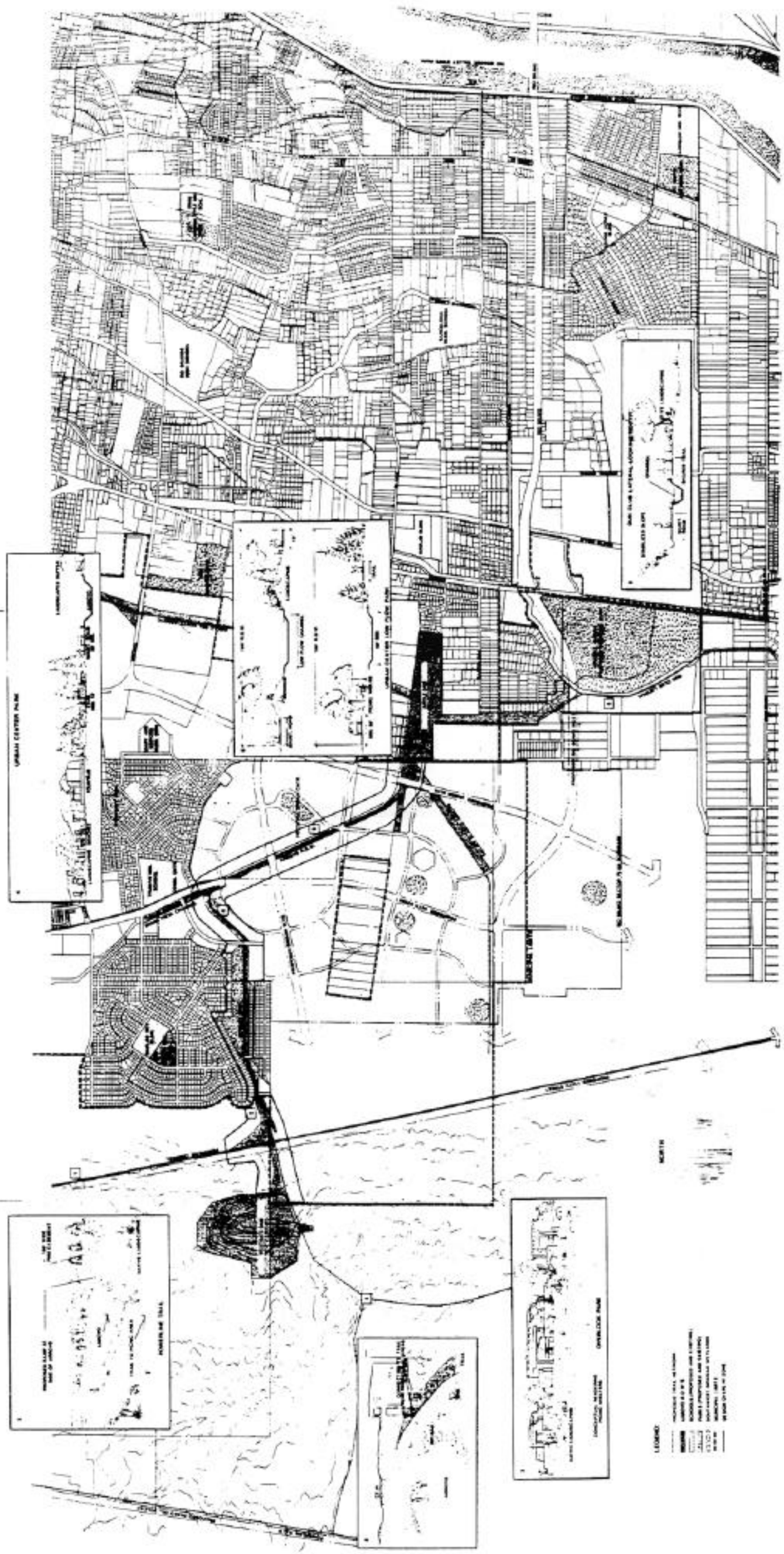
**DEVELOPMENTAL CHARACTERISTICS** - This map shows the Amolie Arroyo Corridor Plan in more detail, including the location of the Amolie Arroyo Corridor Plan and the surrounding area. The map is oriented with North at the top.

**LEGEND**  
 - Amolie Arroyo Corridor Plan  
 - Other Development  
 - Other Features  
 - Other Landmarks

## LOWER SECTION OVERVIEW

**DEVELOPMENTAL CHARACTERISTICS** - This map shows the Amolie Arroyo Corridor Plan in even more detail, including the location of the Amolie Arroyo Corridor Plan and the surrounding area. The map is oriented with North at the top.

**LEGEND**  
 - Amolie Arroyo Corridor Plan  
 - Other Development  
 - Other Features  
 - Other Landmarks



**LEGEND**  
 - AMOLIE ARROYO CORRIDOR PLAN  
 - OTHER DEVELOPMENT  
 - OTHER FEATURES  
 - OTHER LANDMARKS

## **EXECUTIVE SUMMARY**

The Amole Arroyo Corridor Plan is a Rank III plan which specifies design guidelines, standards and policies for the development of major open space linkages. As defined in the Facility Plan for Arroyos, major open space link arroyos are those arroyos which contain recreational trails within their rights-of-way providing continuous connections between major public open space. The Amole Arroyo will accommodate a continuous trail system from the Ceja (mesa edge) on the west to the Rio Grande Bosque to the east. This plan implements the Rank I 1988 Albuquerque/Bernalillo County Comprehensive Plan and the Rank II Facility Plan for Arroyos.

Plan goals were established through discussions with a Citizens Advisory Group/(C.A.G.) and a Technical Team comprised of representatives of various agencies. Goals of this plan include: maintaining the natural character of the arroyo where possible; assuring the primacy of the drainage function; providing compatible development adjacent to the arroyo corridor and establishing a continuous trail that effectively serves the needs of the residents and the open space system. The plan presents a conceptual recreational network, recommends a drainage management approach for the Amole Arroyo, and sets design standards and regulations for adjacent development through a Design Overlay Zone (D.O.Z.).

The trail will begin at the Ceja (mesa edge) and travel eastward to the Westgate Dam with the arroyo remaining in essentially its natural state unless further study demonstrates that channelization is necessary. From the Westgate Dam the trail will continue eastward following an improved channel through Atrisco Village and Park to the Snow Vista Channel, where it will connect to the Snow Vista trail running north. The trail will then continue southwest to the Amole Dam and southward, connecting with the Hubbell Dam which serves as open space and a wildlife habitat. The trail will finally connect with the Pajarito trail system (to the south) along Gun Club lateral continuing northward to Rio Bravo where it will connect eastward towards the Rio Grande Riverside Drain and the Bosque( see Context Map).

Implementation of the plan will be through a multi-jurisdictional process with Bernalillo County, the City of Albuquerque, the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), and the Middle Rio Grande Conservancy District (MRGCD) participating at various phases as development occurs adjacent to the arroyo corridor.

The Amole Arroyo will form an important link in the trail network proposed in the Rank II Southwest Area Plan (SWAP) and the Rank II, Facility Plan for Arroyos. When completed, the Amole Arroyo trail system will connect to those trails coming north from the Pajarito Arroyo and existing trails and/or those being proposed along the Ceja and the Rio Grande. Drainage ditches and channels will be used to connect the trails to one another along with the arroyo trails.

## **I. GENERAL INTRODUCTION**

The Amole Arroyo watershed is located south of Central Avenue and west of Coors Boulevard in an area primarily designated Developing Urban by the Comprehensive Plan. The Amole System includes the Westgate Dam, the Amole Del Norte Channel, the Amole Dam and the Hubbell Diversion Channel and Dam. The upper reaches of the arroyo exist in a natural state with channelization in place south of Westgate Heights. The arroyo is somewhat obscure at eye level, but becomes a predominant geographical feature when viewed from the top of the escarpment. The arroyo bed is deeply incised, narrow and well-defined in some areas and fairly broad, shallow and difficult to discern in others. The Amole Arroyo traverses predominantly sandy, highly erodible and sparsely vegetated soils. Due to the level of proposed development, it is likely that only the upper reaches of the arroyo will remain in its natural state.

The Amole Corridor has the potential to link the southern reaches of the West Mesa Escarpment with Hubbell Oxbow and the Mead property, (which is designated Proposed Major Open Space in the Comprehensive Plan) and developing Rio Grande Valley State Park. The Ceja commands tremendous views in all directions and the Hubbell Dam retains strong bosque characteristics, with thick stands of cottonwoods, shrubbery and tall grasses resulting from the ponding of storm water runoff. Extension of the arroyo trail system along the ditches and drains located in the South Valley will provide a direct link to the Rio Grande Valley State Park.

The study area includes an area approximately one-half mile on each side of the arroyo beginning at the upper reaches of the western escarpment edge and ending at the Atrisco Riverside Drain. From the Westgate Dam to the Amole Dam, the arroyo will accommodate a multi-recreational trail system that will run through the middle of the proposed Rio Bravo Urban Center. From the Amole Dam the trail will continue south where it will intersect the Pajarito Arroyo Trail System and Hubbell Oxbow where a regional park is planned. Figure 1 shows the location of the study area within the south valley and identifies the relevant features appropriate to the plan.

## PLANNING FRAMEWORK

The Amole Arroyo is designated as a Major Open Space Link by the Rank II Facility Plan for Arroyos: Multiple Use of Albuquerque's Arroyos and their Floodplains. Recreational trails designed along the arroyo will form continuous east/west linkages between peripheral Major Public Open Space. The Amole Arroyo Corridor Plan is a Rank III Plan, containing standards, design guidelines, and policies that will preserve the drainage characteristics of the arroyo while establishing a trail network that will allow for compatible development next to the arroyo corridor. This plan provides policy direction in accordance with the Rank II Facility Plan For Arroyos, the Rank I 1988 Albuquerque / Bernalillo County Comprehensive Plan and the Rank II Southwest Area Plan.

## PARTICIPATORY PLANNING PROCESS

The Amole Arroyo Corridor Plan has been prepared with the help of a Citizens Advisory Group (C.A.G.) and a technical team made up of City/County staff. Adjacent residents and property owners, conservation groups, and property owners were invited to attend a series of 3 public information meetings to discuss issues and options concerning the Amole Arroyo. Development needs and trail designs were among a few of the topics discussed at those meetings. Group field trips were held to familiarize the technical team and the citizens with the area and demonstrate issues of developing the arroyo. The technical team then discussed the merits and feasibility of the design alternatives proposed by the Citizens Advisory group.

AMOLE ARROYO- LOOKING EAST FROM CEJA



## **II. EXISTING CONDITIONS**

### **ENVIRONMENTAL CHARACTERISTICS**

#### **Land Form and Geology**

The study area lies within the east slope of the Southwest Mesa beginning at the Ceja (mesa edge) located 300-400 feet above the Rio Grande Floodplain. The Amole Arroyo watershed extends above the escarpment and northerly across I-25 proceeding east from the Ceja. The arroyo dissects the sand and gravel terraces that make up the gently rolling hills of the mesa slopes, then runs eastward towards the Hubbell Dam. The topography in the vicinity of the Ceja is fairly steep with slopes in excess of nine percent (9%). The environmental balance is sensitive and easily disrupted. Trail placement and construction should be done carefully to ensure that extensive erosion does not result .

#### **Soils**

There are three primary soil associations found in the study area. As mapped by the United States Soil Conservation Service(SCS) and shown on table 1,they are: Bluepoint-Kokan(BKD), Bluepoint Loamy Fine Sand(BCC), and Latene Sandy Loam (LtB) . The soils within the study area are predominantly sandy loams and are suitable for range, wildlife habitat, and development. The erosion potential is moderate to severe depending upon the slope(s) and additional hard surface conditions and/or additional run-off.

**TABLE 1-SOIL CHARACTERISTICS**

<b>SOIL TYPE SYMBOL</b>	<b>SOIL COMPOSITION</b>	<b>SLOPES (RANGE)</b>	<b>SOIL GROUP</b>	<b>PLANT COMM.</b>
Bluepoint-Kokan BKD	50% Bluepoint loamy fine sand 40% Kokan gravelly sand	5-15%	A	2
Latene Sandy Loam LtB	10% Loamy Sand 15% Fine Sandy Loam	1-5%	B	4
Bluepoint Loamy Fine Sand BCC	10% Sand	1-9%	A	2

Vegetation

The soils in the Amole Arroyo study area support two plant communities as defined by the SCS and characterized in Table 2. The plant species that comprise the area are shown in Table 3.(Source: Summarized from Hacker, 1977 ( Tables 1, 2, 3 ))

With the exception of the Hubbell Oxbow area, the prevalence of Broom Snakeweed and the sparse vegetation are signs of overgrazing (possibly by rabbits). Re-seeding and the re-establishment of natural grasses should be simultaneous with trail construction to reduce erosion potential and begin to rebuild the damage caused by poor range management. This will enhance the natural character of the study area and reduce the impact of the recreational trails.

TABLE 2-NATIVE PLANT COMMUNITY CHARACTERISTICS

PLANT COMM.	MAJOR COMPONENTS	SUPPORTING SOILS	SURFACE COVERAGE	CONDITIONS - IF DISTURBED
2	Grasses, shrubs, and annuals	Bluepoint	15%	Erosion is severe blow out areas and shrubs increase
4	Grasses, shrubs, and annuals	Madurez-Wink, and Latene	15%	Sand Dropseed becomes dominant and Broom Snakeweed increases

TABLE 3 - NATIVE PLANT SPECIES BY PLANT COMMUNITY

PLANT COMMUNITY	GRASSES	SHRUBS	ANNUALS
No. 2	Indian Ricegrass Black Grama, Blue Grama Glan Dropseed, Galleta Sand Bluestem Sand/Mesa Dropseed Three-awn	Sand sagebrush Fourwing Saltbush Mormom Tea Wolfberry Rubber Winter Fat Broom Snakeweed	Jimsonweed Fiddleneck Daisy Verbena Aster Six-weeks Grama
No. 4	Fluffgrass, Galleta Black Grama Sand/Mesa Dropseed Broom Dalea, Three-awn Bush Muhly, Alkali Sacton Indian Ricegrass Broom Snakeweed	Small Soapweed Apache Plume Winterfat Cholla cactus Catclaw Mimosa	Woolly Indian Wheat Tansy Mustard Indian Paintbrush Lambsquarters Russian-thistle Bladderpod



## Animal Wildlife

The wildlife species inhabiting the study area are classified as follows:

### Mammals

Black-tailed jack rabbit, desert cottontail, banner-tailed kangaroo rat, silky pocket mouse, white-footed mouse, hispid pocket mouse, spotted ground squirrel, and northern grasshopper mouse.

### Reptiles

Collared lizard, round-tailed horned lizard, western diamond, mexican black-tailed, and prairie rattlesnake.

### Birds

Scaled and gambels quail, mourning dove, horned lark, western meadowlark, prairie falcon, Coopers hawk, red-tailed hawk, black-throated sparrow, ringneck pheasant, and roadrunner.

### Insects

Grasshopper, wolf spider, bombardier beetle, robber fly, and the desert millipede.

Urbanization of the area will have a detrimental impact on wildlife. Therefore, the corridor plan should provide areas that will serve as forage and habitat for wildlife.

## Archaeological Resources

Based on information available from the State Historic Preservation Office regarding the Amole Arroyo study area, it is probable that the mesa above the valley and land adjacent to the arroyo had a moderate site density. An archaeological survey of this area prior to future planning is critical. An archaeological study done for the Rio Bravo Sector Development Plan lists eleven archaeological sites within the boundaries of the plan, five of which are considered significant .

## Visual Resources

The Amole Arroyo study corridor offers a wide range of views and wide open vistas in all directions. However, as development occurs, many of these views will be lost or significantly reduced with the encroachment of structures and utilities. The best views exist at the top of the escarpment and along the Westgate Dam. Visual landmarks seen from these two areas include the Jemez, Sandia, Manzano, and Magdalena Mountains, the Rio Grande Bosque, Wind Mesa, Ladron Peak, the City and the volcanic cones. ( Figure 1).

The Hubbell Oxbow area offers the trail user views of the southwestern riparian environment including a multitude of accompanying flora and fauna. Old growth cottonwoods and russian olives provide a canopy for thickets of willows and other shrubbery. Nesting areas of birds and small game can be found within the oxbow along with a number of other reptiles and insects. This unique area should be conserved and attempts at re-seeding should be made in areas where off-road vehicles have damaged the natural flora.

#### HUBBELL OXBOW RIPARIAN ENVIRONMENT



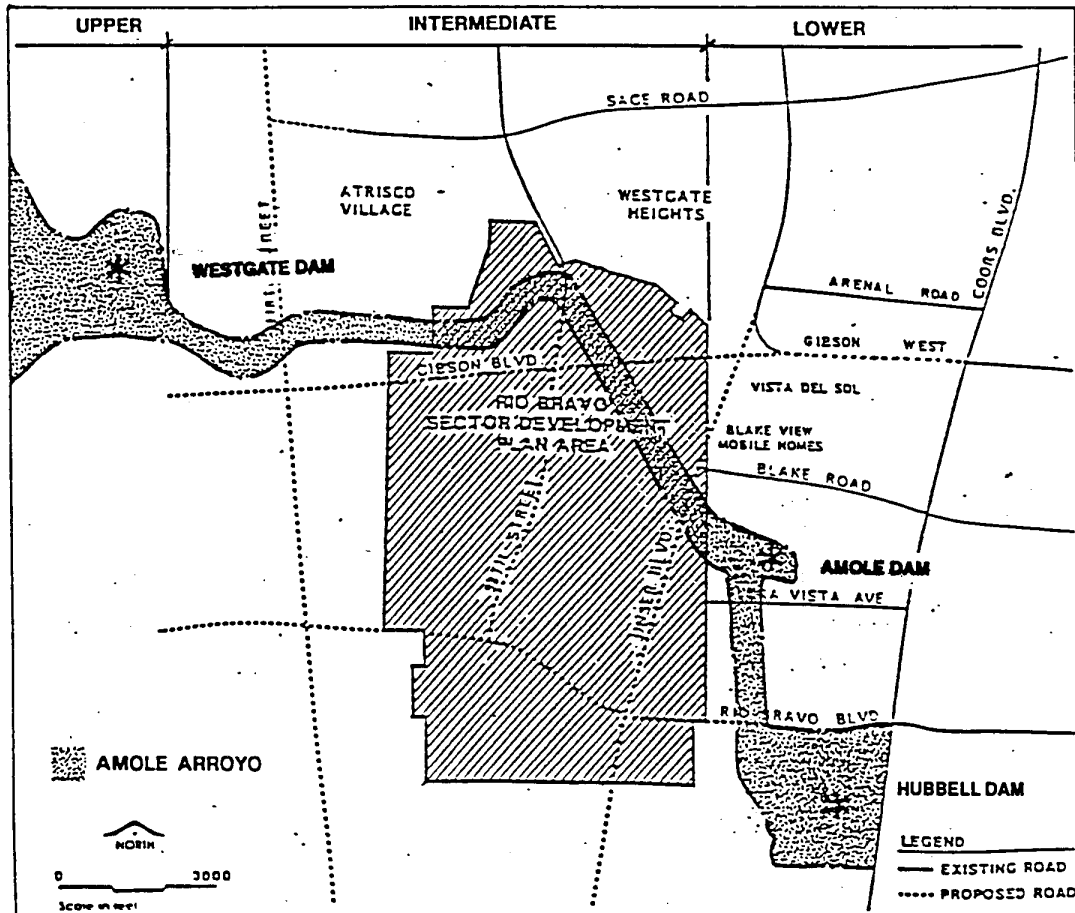
Arroyo Characteristics

The Amole Arroyo can be divided into 3 distinct sections based on drainage and visual characteristics (figure 2). The upper reaches of the arroyo west of Westgate Detention Basin are open and undeveloped with rolling topography and many side channels; this plan defines this upper area as "natural" in character.

The intermediate section of the arroyo has been platted with a large portion of the land being zoned as SU-2, C-1 and C-2 and is defined as developing urban in the Comprehensive Plan. This section of the arroyo will be referred to as "urban" in this plan. The intermediate section begins approximately one-half mile below the Westgate Detention Basin and continues on its course eastward through the Atrisco Village and park, where it connects to the Snow Vista Drainage Channel. From this point the arroyo travels through a proposed Urban Center to the Amole Arroyo Detention Basin. Adopted plans propose the arroyo to be reconstructed and stabilized with concrete throughout this section.

The lower section of the arroyo begins at the Amole Detention Basin and terminates at the Rio Grande Valley State Park. This section of the arroyo is defined as "rural" in character due to the large amounts of R-1 (City) and A-1 (County) zoning in place. The lifestyles of those living along this section of the arroyo tend to be fairly consistent with those most often associated with a rural lifestyle and there is a great deal of equestrian and pedestrian activity associated along ditch banks and drainages.

FIGURE 2 - ARROYO SECTIONS



## DRAINAGE BASIN CHARACTERISTICS

### Study Area Limits

The Amole Arroyo encompasses a 4.2 square mile drainage corridor. The general boundaries of the study area are the area south of Central Avenue, west of the Rio Grande, north of Gun Club Road, and east of the Ceja.

### Drainage Basin Boundaries

The Amole watershed is bounded on the north and the east by the Amole Del Norte Drainage Basin, on the south by the northern boundary of the Sacate Blanco Drainage Basin and on the west by a natural drainage divide between the Amole Watershed and the Westgate Dam Drainage Basin (figure 5, pg. 20).

### Arroyo Description

The arroyo geometry and drainage basin characteristics vary along the length of the arroyo. Table 4 summarizes the physical and hydrological characteristics of the arroyo.

### Sediment Yield and Transport

Wind and water erosion in the unconsolidated sandy soils within the basin are classified as moderate-to-severe. These soils are easily dislodged by rainfall and transported down stream. The amount of sediment displaced and transported depends on the frequency, duration, and intensity of the rainfall in the arroyo basin. Sediment is trapped in the Amole Dam.

**TABLE 4 - SUMMARY OF HYDROLOGICAL DATA**

#### Amole Arroyo

Total Watershed Area including all diversions = 4.2 sq. mi. (2640 acres)

Arroyo Length (Westgate to Hubbell) = 7.6 mi.

#### Westgate Dam

Total Contributing Watershed = 7.28 mi.

6 hr. 100 yr. peak flow = 2,418 cfs.

100 yr. runoff volume = 425 ac. ft.

#### Amole Dam

6 hr. 100 yr. peak flow = 4,235 cfs.

6 hr. 100 yr. runoff volume = 735 ac. ft.

6 hr. 100 yr. peak inflow (including Westgate Detention Spillway) = 1722 cfs.

#### Hubbell Dam

Storage Capacity = 5,411 ac. ft.

Discharge Capacity = 19,854 cfs.

Source: Amole Watershed Drainage Management plan; Holmes and Narver, Inc. 1985

## DETENTION BASIN DESCRIPTIONS

### Westgate Dam

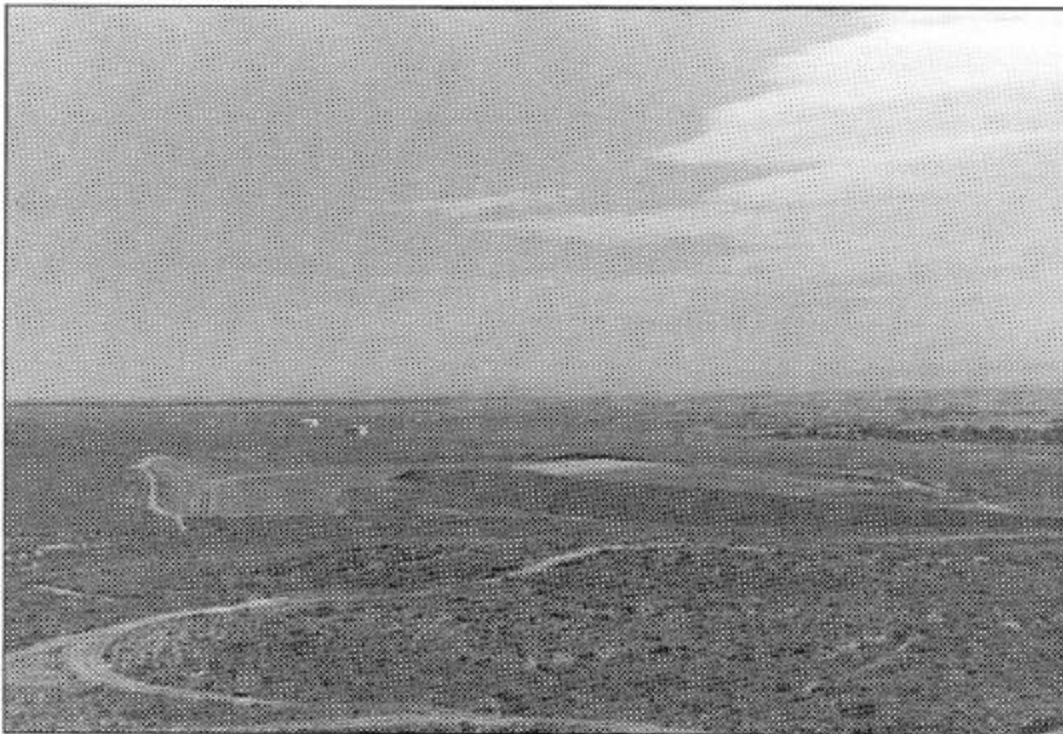
The drainage area of the Westgate Dam forms the western boundary of the Amole watershed. The Westgate Dam is an earthen structure which is located to the west of Westgate Heights subdivision. The detention basin was designed to detain a run-off of 425 acre-feet from a 100-year storm. Beyond that, the principal spillway consists of a concrete inlet tower with a 24" cylinder outfall pipe and a baffled outlet structure that will convey a peak flow of 80 cubic feet per second if needed.

### Amole Dam

The Amole watershed drains to the Amole Arroyo Detention basin via the Amole Arroyo Diversion Channel. The Amole Dam basin was constructed within an existing gravel pit and was expanded and enclosed with an earthfill embankment. This detention area serves as a sedimentation basin for a major portion of the Amole Arroyo. The Amole Del Norte, Snow Vista and Sacate Blanco Channels also flow into the Amole Arroyo and then to the Amole Dam.

The peak inflow during a 100-year flood will be 4,235 cubic feet per second. The total runoff volume from a 100-year flood will be 735 acre-feet. Peak flow from the Amole Watershed including the discharge from the Westgate Detention Basin principal spillway is 1,722 cubic feet per second. The channel exiting the Amole Dam extends 2,800 feet west of the Amole Dam and enters the Hubbell Dam.

## WESTGATE DETENTION BASIN AND THE UPPER REACHES OF THE AMOLE



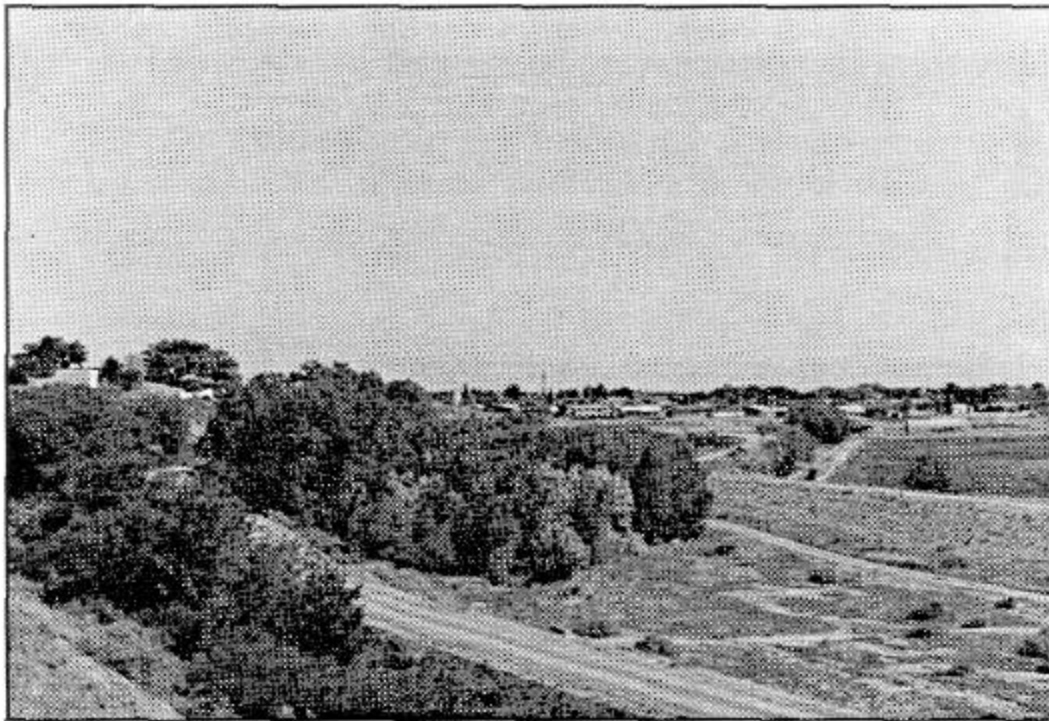
### Hubbell Dam

The Hubbell Dam was formerly an oxbow created by a meander of the Rio Grande. When the river was channelized in the 1930's this area dried up and became a natural catch basin for flood waters in the area. In 1977-78, AMAFCA reconstructed the area to contain runoff from areas generally west of the facility.

The Hubbell Dam has been constructed to handle flows from the Borrego Diversion Channel and its tributaries. The Amole Dam has been designed to handle all upstream flows up to 492 acre-feet. This quantity is slightly less than the runoff anticipated from a 25-year flood. The total runoff from the Amole Dam for a 100-year flood is 735 acre-feet leaving 243 acre-feet diverted to the Hubbell Dam.

The Hubbell Dam was constructed to provide a storage capacity of 5,411 acre-feet which will prevent flooding of low lying farmland to the north. The Hubbell Dam has been constructed with a piped discharge system that will transport all excess flow to the Arenal Canal due east of the Hubbell Dam. If there is ever a severe flood that the piped discharge cannot handle or if this discharge pipe becomes blocked, the spillway constructed on the northern end of the Hubbell Dam is designed to overflow into the low lying farmland to the north. Discharge capacity of the spillway has been designed for 19,854 cubic feet per second.

### HUBBELL DAM



## DEVELOPMENT CHARACTERISTICS

### General Platting and Land Ownership

The majority of the arroyo is within Albuquerque city limits and is currently held in private ownership. Effective 1989, Bellamah Community Development (541 acres) was the principle landowner. Atrisco Joint Venture (365 acres) and Albuquerque South Ltd. (258 acres) were also major landowners. The remaining portion of the plan area is comprised of small private ownerships with the exception of AMAFCA properties. The City of Albuquerque has planning and platting jurisdiction within the entire study area.

### Land Use and Zoning

Development in the area is governed by the Rank I Comprehensive Plan and Rank II Southwest Area Plan (SWAP). As specified by the Comprehensive Plan, the western portion of the study area (west of Coors Blvd.) is defined as Developing Urban and the eastern portion of the study area (east of Coors Blvd.) is considered Semi-Urban. By definition, Developing Urban allows up to five(5) dwelling units per gross acre overall. Semi-Urban allows up to three(3) dwellings per gross acre overall.

The Southwest Area Plan breaks the study area into sub-areas with defined densities that, in the aggregate, conform with the Comprehensive Plan. SWAP allows for densities up to nine(9) dwelling units per net acre (medium-high density) in all areas except those closer to the Ceja. There is a zone of low density development located north of Rio Bravo and west of 118th Street which allows for three(3) dwelling units per net acre. Further west, SWAP recommends that development be restricted to one(1) dwelling unit per net acre. As stated in SWAP, the topography in this area begins to steepen to slopes greater than 9 percent and should be restricted to limited development.

The adopted Rio Bravo Sector Development Plan, which covers much of the plan area, proposes land uses and circulation patterns that will create a mixed use community providing a reasonable mix of housing close to what has been approved as a major urban center. Consistent with the scale recommended in SWAP, the urban center will feature a central plaza that will serve as the community's service and activity center. Retail facilities and office space will be adjacent to the urban plaza. The urban center will be linked to surrounding trail networks to provide connections between the existing communities and those proposed.

### Parks and Open Space

The Rio Bravo Sector Plan proposes an expansion of the Atrisco Village park (a neighborhood park consisting of 10.76 acres and landscaped with sod and some trees) by 5-7 acres. The Rio Bravo Sector Plan also calls for a 5 acre park to be located in the southwest section of the proposed Urban Center. A regional park for the Hubbell Oxbow north of the Hubbell Dam has also been proposed in the SWAP. These parks and Open Space facilities will provide destinations that should be linked by the recreational trail network ( Figure 1).

Long Range Major Street Plan

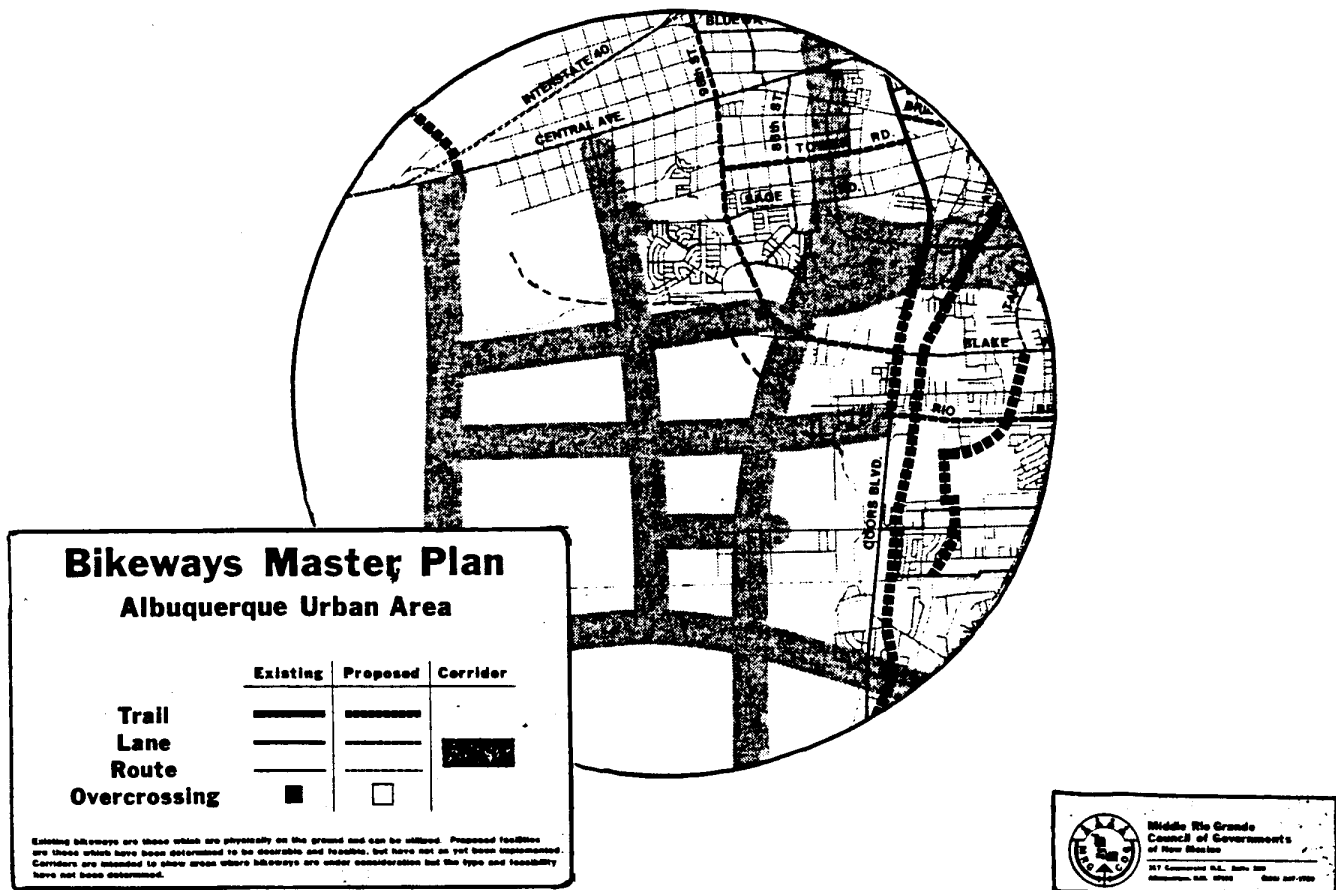
The major north-south transportation corridors crossing the study area are Unser Boulevard, 98th Street, and 118th Street. The major east-west corridors are Rio Bravo Boulevard and Gibson Boulevard. Unser Blvd., 98th Street, Gibson Blvd. and Rio Bravo Blvd. are proposed as 156 ft wide principal arterials and 118th Street is proposed as an 86-ft wide minor arterial.

Bikeways MasterPlan

An existing bike route is located along Coors Boulevard and Rio Bravo. The 1990 Bikeways Master Plan for the Albuquerque area identifies a number of proposed bikeways along the Amole Arroyo Corridor. Included are:

- \* Bike Trail on Coors Blvd. between Rio Bravo Blvd. and Arenal Road.
- \* Bike Trail adjacent to the Isleta Drain between Rio Bravo Boulevard and Arenal Road.
- \* Bike Route on Blake Road east and west of the Coors Blvd. intersection, becoming a bike lane on 98th Street.

FIGURE 3 - BIKEWAYS MASTER PLAN





## RIGHT-OF-WAY / OWNERSHIP STATUS

### Easements / Utility Corridors / Right-of-Way Ownership

Rights-of-way owned by AMAFCA include the Westgate Dam, the Amole Dam and a portion of the Hubbell Diversion Channel and Dam. Portions of the Amole Arroyo under private ownership include a section between Westgate Dam and Atrisco Village Park, and from Atrisco Village Park to the Amole Dam ( Table 5 ).

### Available Right of Way

The amount of available rights-of-way varies throughout the length of the arroyo. From the Westgate Dam to Atrisco Park, AMAFCA has designated 50-180' of R.O.W., with the channel left in its naturalized state. South of Atrisco Village Park there is a 100' public drainage easement. From Atrisco Village to the proposed Unser Blvd., the R.O.W. varies from 100-150'. From the proposed Unser Blvd. to the Amole Dam there is a 150' private R.O.W. From the Amole Dam to Hubbell Dam, there is a 200' AMAFCA R.O.W. The Gun Club Lateral has a 80-120' public R.O.W. Snow Vista Channel has a 100-130' R.O.W. The upper reaches of the Sacate Blanco Diversion have a 100' R.O.W. and the lower portion 130' R.O.W.( Table 5 ).

TABLE 5  
RIGHT-OF-WAY / OWNERSHIP STATUS

LOCATION	RIGHT- OF- WAY	OWNERSHIP
Westgate Dam to Atrisco Village	varies 50-180'	Public (AMAFCA)
South of Atrisco Village (Atrisco Village Park)	100' Drainage Easement	Public (AMAFCA)
Atrisco Village to Amole Dam	Varies, 100-150' common	Private
Amole Dam to Hubbell Dam	200' R.O.W	Public (AMAFCA)
Gun Club Lateral	80-120' R.O.W.	Public (MRGCD)
Snow Vista Channel	100-130' R.O.W.	Public (AMAFCA)

## CHANNEL TREATMENTS

Existing and proposed channel treatments (through previous plans) are summarized in Table 6 below.

TABLE 6  
EXISTING, PROPOSED CHANNEL TREATMENTS

LOCATION OF CHANNEL	EXISTING TREATMENT	PROPOSED TREATMENT
Westgate Dam to Atrisco Village	No Treatment	None Proposed
South of Atrisco Village (Atrisco Village Park)	Graded Earth	Tinted Concrete (100' R.O.W.) 65-80' Drainage Easement
Atrisco Village to Amole Arroyo Diversion Channel	No Treatment	Tinted Concrete(150' R.O.W.) 65-80' Drainage Easement
Amole Arroyo Diversion Channel to Amole Dam	Graded Earth, Rip-Rap, Concrete Lined	Tinted Concrete(150' R.O.W.) 75-90' Drainage Easement
Amole Dam to Hubbell Dam	Concrete Lined, Graded Earth	Tinted Concrete(200' R.O.W.) 115' Drainage Easement
<b>ADJACENT DRAINAGEWAYS</b>		
Powerline Channel	Graded Earth	Concrete Lined
Snow Vista Channel	Graded Earth	Concrete Lined
Sacate Blanco Channel	Graded Earth	Concrete Lined

\* Future treatments are based upon the recommendations from Improved Conditions Report for Amole Watershed and Drainage Management Plan, Holmes & Narver and Rio Bravo Sector Plan, Community Sciences Corp.

## SOCIOECONOMIC FACTORS

### Demographics

Demographic data for this study area are based on the following sources of information:

- \* 1980 Census of Population and Housing, United States Department of Commerce, Bureau of the Census
- \* 1985 Socioeconomic Estimates for Data Analysis Subzones in the Albuquerque Urban Area, Middle Rio Grande Council of Governments
- \* 1989 Albuquerque Data Book, City of Albuquerque Planning Department.

Demographic projections for the study area are based upon the Year 2010 Socioeconomic Forecasts for State Planning and Development District 3 by Data Analysis Subzones, Middle Rio Grande Council of Governments (MRGCOG).

### Existing Subzones

The MRGCOG divides the Albuquerque area into geographical areas called data analysis subzones (DASZs). The DASZs are analysis zones within larger regional areas referred to as superzones. The study area is in Superzone 9 and Data Analysis Subzones 5501, 5502, 5722, 5711, and 5712 (Figure4). Population and land area statistics for each DASZ are given in Table 7.

The estimated study area population is 2878 persons, (41.4%) located in the Atrisco Village area within DASZ 5722 .

TABLE 7 - BREAKDOWN OF STUDY AREA BY DASZ's.					
DASZ	5501	5502	5722	5711	5712
Total Area (Acres)	6138	732	1085	297	1399
Study Area w/in DASZ (Acres)	115	350	275	297	87
% Total Study Area (%)	2	48	25	100	6
Total DASZ population	7	1075	4770	1004	2780

Source: 1985 Socioeconomic Estimates for Data Analysis Subzones, Alb. MRGCOG

### Projections

Although the Rio Bravo Sector Plan has been approved, there is no specific time horizon for development. Given the current trend of development in the plan area it is safe to assume that this area will not be fully developed before the year 2010 .

The MRGCOG year 2010 projections for Superzone 9 estimate a total population of 43,390 persons. The 1985 population estimate for Superzone 9 was 11,229 persons. From this, an average annual growth rate of 5.4 percent is projected for Superzone 9. Using this projected annual growth rate, an exponential growth function, and assuming development densities of the SWAP will be adhered to at an average of 3.2 persons per dwelling unit, then the undeveloped acreage in the study area (approximately 2,000 acres) would not be fully developed until or after the year 2010.

Considering full development in this area will not occur for another 25-40 years and the likelihood that the development which does occur will be scattered, the plan must provide some mechanism for initiating development of the proposed trail and recreational facilities, especially in those areas where major roadways are to be constructed.

### Housing Characteristics and Property Values

Existing housing in the intermediate reaches of the study area can best be characterized as small lot housing with lots approximately one-quarter to one-third acre in size. Housing in the lower reaches of the study area may best be characterized as rural with average lot sizes being one-half to one acre in size.

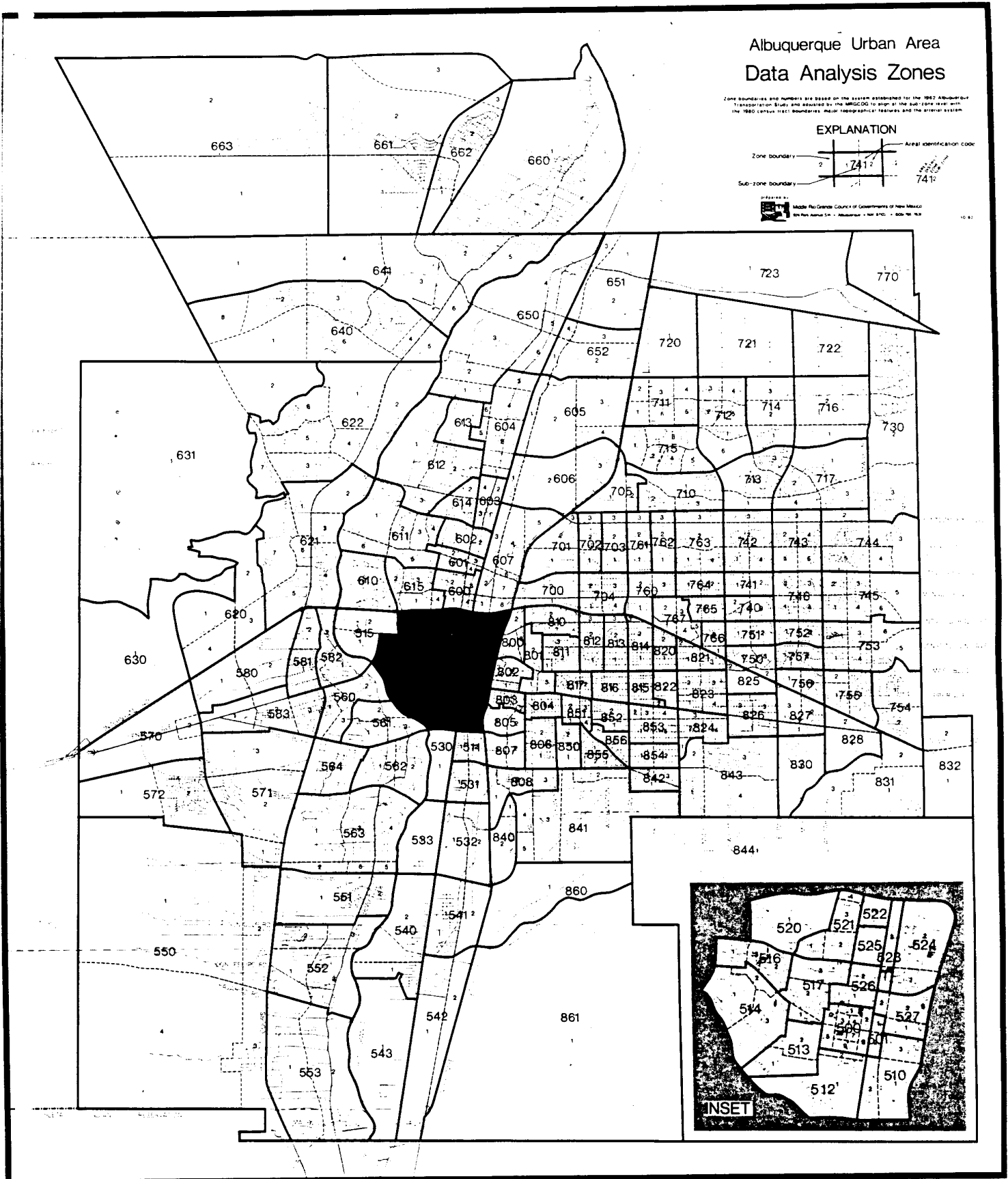
Land values in the study area as of 1987 list for \$6,000-\$25,000 per acre depending on improvements. In 1987, the average selling price of single family homes in the study area was \$52,926.

TABLE 8 - HOUSING CHARACTERISTICS

DASZ	5501	5502	5722	5711	5712
Population	7	1075	4770	1004	2780
Dwelling Units	2	353	1328	303	882
Single Family	2	265	1076	148	736
Multi-Family	0	11	63	13	21
Mobile Home	0	77	189	142	125
% Single Family	100	75	81	48	83
% Multi-Family	0	3	5	4	2
% Mobile Home	0	22	14	48	15

Source: 1985 Socioeconomic Estimates for Data Analysis Subzones, Alb. MRGCOG

# FIGURE 4 - DATA ANALYSIS ZONES



### III. AMOLE ARROYO CORRIDOR PLAN GOALS & POLICIES

The Amole Arroyo is located in Bernalillo County 's South Valley, running from the eastern Ceja (edge) of the Southwest Mesa to the Hubbell Dam. Pursuant to the Facility Plan for Arroyos, this rank three plan outlines development of a trail system linking open space areas, while maintaining the initial intentions of previously established drainage policy .

#### PLAN GOALS

The plan was developed through citizen involvement and technical team effort. Key goals cited, in summary form , are:

- Design a trail corridor which recognizes the primary drainage function of the arroyo.
- Channel treatment, where required, should be as natural in appearance as possible.
- The trail should link housing with designated facilities, including open space, parks and schools.
- Access to the trail and safe crossings of roadways should be provided.
- Native plant materials should be used in the design of the trail corridor.
- Adjacent development should be screened from the trail in some visually pleasing manner.

#### PLAN POLICIES

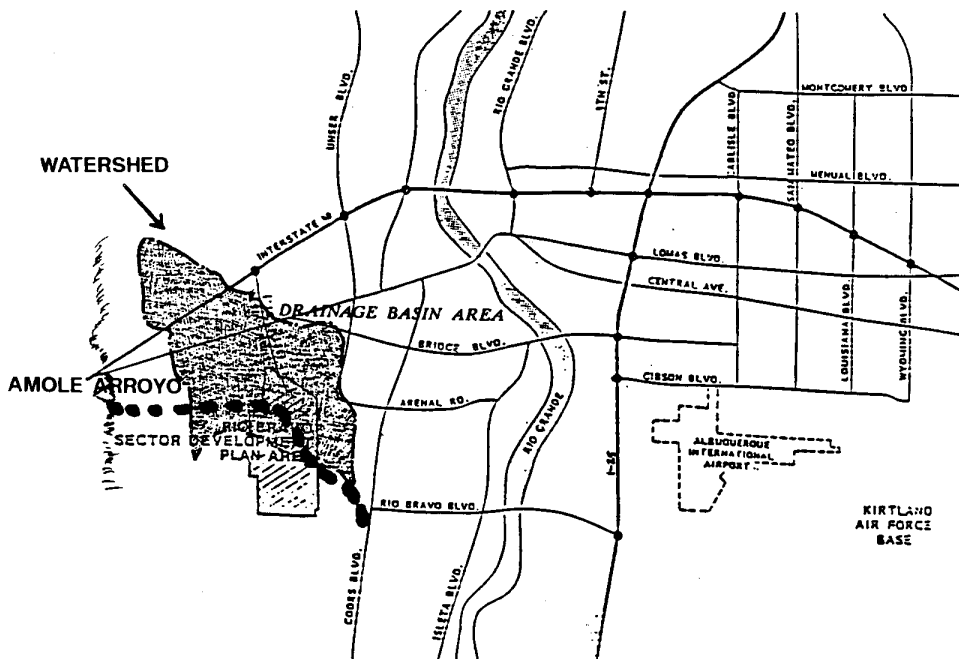
Plan policies guide government activities and approvals and establish the basis for regulations and design guidelines. The regulations which relate to design issues form a Design Overlay Zone, (D.O.Z) called for in the Facility Plan for Arroyos. Preceding the policies in each subject area is a brief discussion of the reasoning and analysis behind the policies. The map in the inside back cover, (the "Map"), can be used as a reference for many of the policies.

The study area is in Bernalillo County, primarily within the municipal limits of the City of Albuquerque, and within the City's planning and platting jurisdiction. Both entities have adopted the overall concept of arroyo corridor plans. All references to the County shall refer to the City in the event the City has jurisdiction at the time actions affected by this plan occur.

## DRAINAGE AND ARROYO TREATMENT

AMAFCA is conducting a study of the Amole watershed. Among other things, this study will make recommendations for handling storm water drainage in the Amole Arroyo. Regardless of the outcome of the study and subsequent drainage improvements by either AMAFCA or private property owners, this Plan requires that right-of-way be platted for a trail corridor by property owners as outlined in Policy 27 herein.

FIGURE 5 - AMOLE ARROYO WATERSHED



## **POLICY 1: DRAINAGE RECOMMENDATIONS**

**A range of treatment types will be considered for the Amole Arroyo, including but not limited to the prudent line, gabions, rip rap, soil cement and earth tone tinted concrete. The Amole Drainage Study will set drainage policy for the arroyo, and not this Plan, except that any visible concrete shall be earth-tone tinted.**

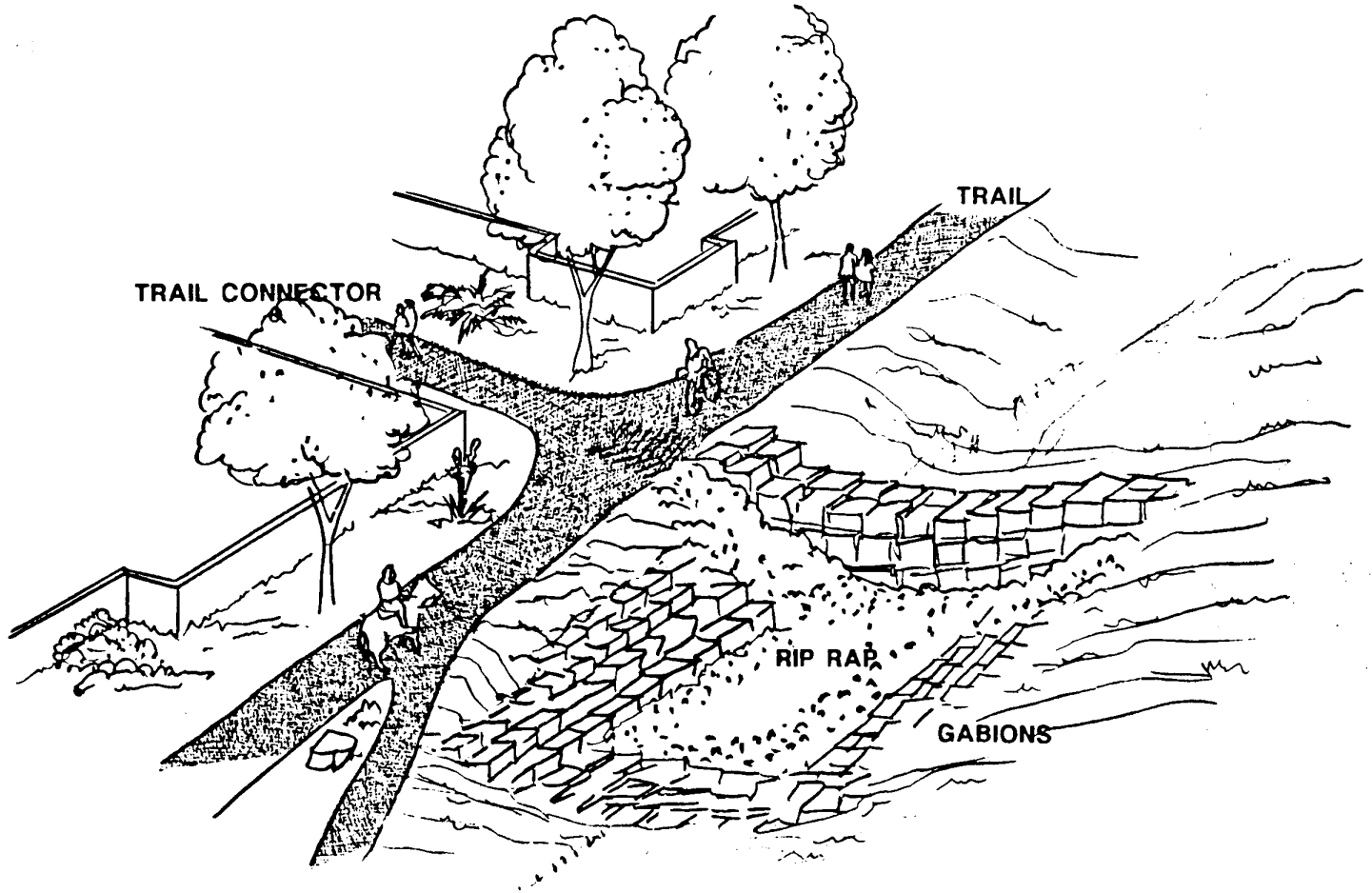
## **POLICY 2: TRAIL RIGHT-OF-WAY REQUIRED REGARDLESS OF TYPE OF ARROYO TREATMENT**

**At the time of platting, all property owners in the study area shall dedicate property in accordance with Policy 27 herein, even if they are outside the design overlay zone boundaries. If the property owner can show that the trail can more effectively be accommodated outside the arroyo right-of-way, the trail can be re-routed at the discretion of the Development Review Board. Re-routing the trail shall not result in the loss of trail continuity. Additionally, because routing the trail away from the arroyo may result in a narrower trail corridor, a wider trail right of way may be required in order to achieve the open corridor effect created by placing the trail next to the arroyo. The entire trail right of way segment which is not adjacent to the arroyo must be dedicated at the time the alternative route is approved.**

**NOTE: Bold print indicates required policy.**



FIGURE 6 - AMOLE ARROYO STILLING BASIN

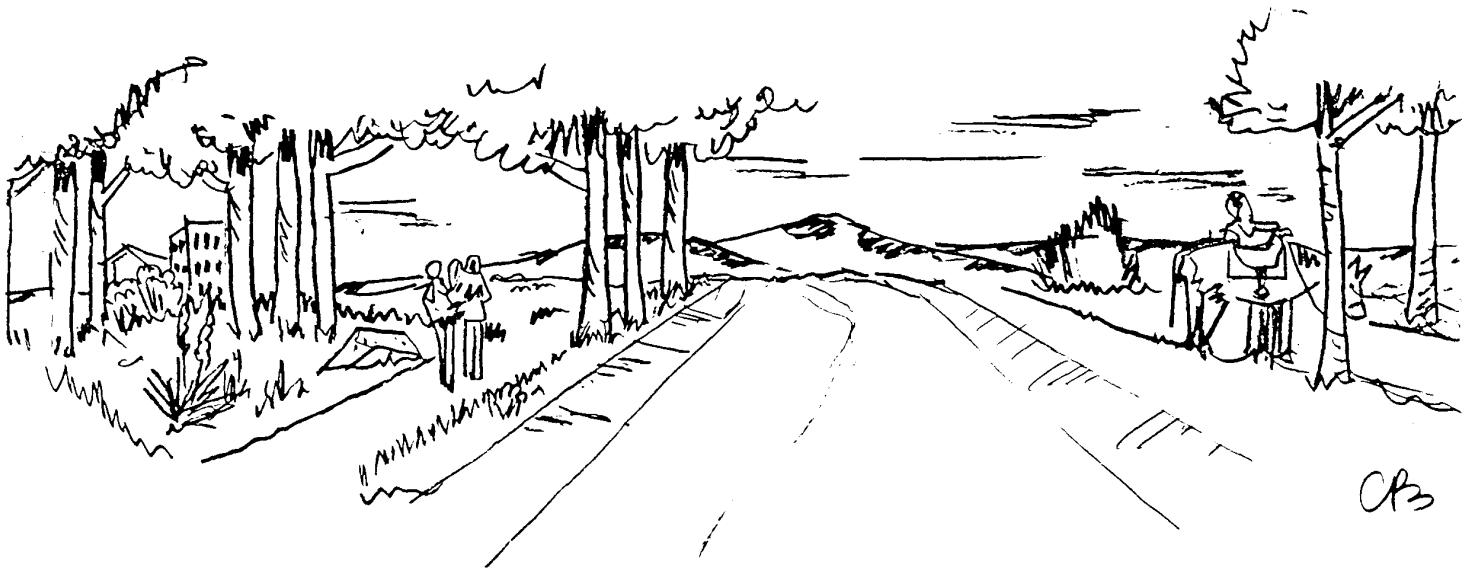


### **POLICY 3: WATERSHED BOUNDARIES**

Development outside of the natural watershed boundary of the Amole Arroyo will not be allowed to discharge storm water run off into the Amole, unless an engineering analysis can demonstrate that discharge from the additional watershed area will have minimal impact on the treatment called for in the drainage management plan described in Policy 1 and on the existing detention basins. Amendments to the drainage management plan will address whether flows from outside the watershed boundary are appropriately diverted to the arroyo.

### **POLICY 4: REVISION OF DRAINAGE POLICIES IF SUBSTANTIAL LAND USE POLICY CHANGES OCCUR**

Land use changes shall not occur unless consistent with adopted plans and the policies and objectives of this Plan. Should substantial land use policy changes in the Amole watershed area occur which, in the opinion of AMAFCA, render the adopted drainage management plan unworkable, AMAFCA will request the City Planning Department review the Amole Arroyo Corridor Plan for possible revisions.



### **POLICY 5: FLOOD WARNING SYSTEM**

The City of Albuquerque Fire Department, Planning Department, Hydrology Division of the City Public Works Department, and the Albuquerque Metropolitan Arroyo Flood Control Authority shall work together to coordinate the development and installation of a flood warning system that provides visual and audible warning to trail users entering below grade crossings located within the one hundred year floodplain. The device may also activate a warning device at the Fire Department Dispatch Center.

### **TRAIL DESIGN**

The Amole Arroyo corridor is to serve the recreational needs of the area and provide linkage for non-vehicular traffic. The Southwest Area Plan and Facility Plan for Arroyos establish broad policy with regard to the trail network and recreational uses in the area. The trail policies of the Amole Arroyo Corridor Plan implement those policies in more detail. The Map indicates the routes trails will follow and the types of trails recommended for various areas.

Meetings held with citizen groups in the area agreed that pedestrians and bicyclists could share the same trail if sufficient trail right-of-way is provided. If equestrians are to use the Amole trail system, the most probable area would be the soft unlined arroyo bottom. If EPA regulations preclude equestrian use of the arroyo in the future, equestrians could use the maintenance road. Motorized vehicular access must be restricted to ensure safety of other trail users and prevent further damage, vandalism, and dumping in the area. Access control elements should be constructed at all street crossings and access points along the trail. This will help to control vehicular traffic, slow cyclists and warn users of intersections and motor vehicle travel.

Signage for the Amole trail should consist of an easily recognizable symbol (yucca, see policy 8) and should be unique to the character of the arroyo and establish a sense of area identity and trail continuity. Other signage should be included to help users recognize potential dangers and warn users of hazards, identify trail access, amenities, and other interesting features.

## **POLICY 6: TRAIL TYPES, LOCATIONS, AND STANDARDS**

The City Parks and Recreation Department will develop trails as indicated on the attached map according to Trail Standards included in the Appendix and according to the following policies:

### **Arroyo Trail**

- a. A paved trail from the Hubbell Oxbow area to the Atrisco Village Park shall provide handicap access consistent with the design standards in the Trail Standards.
- b. If a roadway is contiguous to a paved trail, the trail can serve as a substitute for required sidewalks on the side adjacent to the arroyo, if the trail meets the standards of any requirements of any applicable sidewalk regulations and/or Trail Standards.
- c. Equestrians will be allowed on the arroyo floor due to the soft soil conditions of the arroyo bottom. If the arroyo bottom is lined, then equestrian traffic will be limited to the maintenance road. Signage and special embankment stabilization are needed in areas where equestrian traffic enters and exits the arroyo.
- d. If channel treatment is required or allowed by the drainage management plan, the combined bicycle/pedestrian trail shall be located in the trail easement area.
- e. Any paved trail will ideally be located outside the one hundred(100) year floodplain but location outside the ten (10) year floodplain is acceptable if necessary for trail continuity.

### **Connection to Ceja**

- f. The paved trail should end at the Atrisco Village Park and a compacted earthen trail should continue up to the Ceja along the Amole Arroyo to allow pedestrians and bicyclists to reach the Ceja trail. The paved portion of the trail should continue northward and southward along 118th Street (consistent with the Bikeways Master Plan.) This Corridor Plan does not govern the Amole Arroyo west of the Ceja.
- g. All plans for trail development on the east escarpment face in Zone 3 soils, as defined in the Southwest Area Plan, must be reviewed by the Ciudad Soil and Water Conservation District for slope, alignment and use of erosion control techniques.
- h. 118th Street is recommended to have an equestrian/bike trail to create a loop from the Amole trail to the Ceja trail down to the Pajarito trail system, then back up to 118th Street.

### **Gun Club Connection to Don Felipe**

- i. The Hubbell Dam is to remain a bird and wildlife sanctuary and no improved trails will traverse it. The Amole trail system will connect to the Gun Club Lateral portion of the Pajarito Trail and to the passive recreational uses in the Oxbow adjacent to the Hubbell Dam as described in the Southwest Area Plan.

- j. At the Hubbell Dam, due to right-of-way constraints, the trail will be diverted to a trail inside the Dam Facility at its narrowest point and continue along the levee until it reaches the Pajarito trail extension. The trail from Hubbell Dam to the Gun Club Road will be an earthen bicycle/pedestrian path.**
- k. Platting of the north end of the Hubbell Dam shall provide for a trail connection to Rio Bravo Blvd. and Coors Road. Use of the northern section of the Gun Club Lateral from the Oxbow to Coors Blvd. should be explored.**

**Connection to Bosque**

- l. In order to connect to the Rio Grande Valley State Park, the trail will cross Coors Blvd. and continue eastward on the Armijo Canal connecting to Barcelona Rd., Del Rio Rd. and the river. Lateral connectors at the Bennet Lateral, Isleta Drainage Canal, Pajarito Drainage Canal and Isleta Blvd. will also accommodate bicyclists and pedestrians wishing to intercept the trail and continue eastward toward the river.**
- m. A continuous trail system will provide a loop for the equestrian/pedestrian user. The area to be used for equestrian travel will begin at Hubbell Lake Facility and continue southward down Gun Club lateral where it will connect with the Pajarito Trail and continue eastward toward the State Park, then north along the Riverside Drain to the Amole system, and finally westward to the Hubbell Lake Facility to complete the loop.**

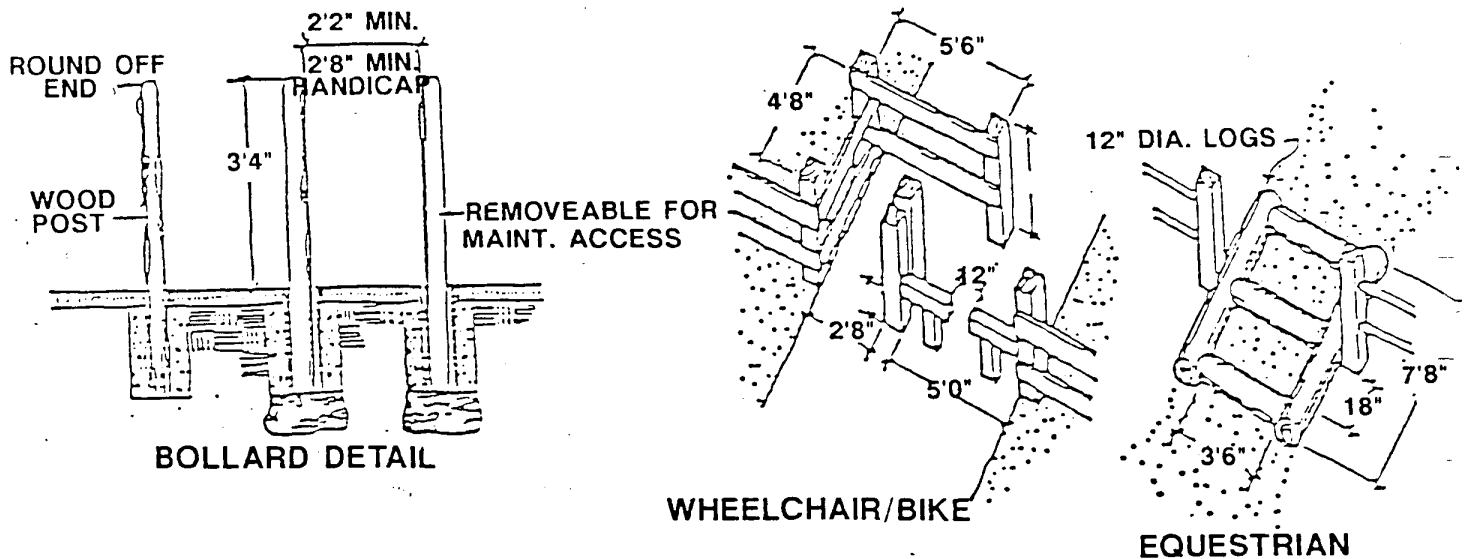
**Connections to Urban Center and Adjacent Neighborhoods**

- n. When possible, connections to adjacent neighborhoods should be designed into the trail system to ensure access and encourage use. Designs should incorporate trail connections into the development of the Rio Bravo Urban Center so that residents can easily use the trail system to travel to and from their residence to shop.**

## POLICY 7: TRAIL ACCESS CONTROL

Motorized vehicles except maintenance and emergency vehicles shall be excluded from the trail through signage and access control devices such as those shown in figure 7. Bollards and/or other control devices will be placed at all trail entrances and street crossings to prevent motor vehicle access while permitting passage of pedestrians, wheelchairs, bicycles, and horses.

FIGURE 7 - TRAIL ACCESS CONTROL



## POLICY 8: SIGNAGE

Signage along the trail system shall be provided by the City Parks and Recreation Department to regulate trail use and access, identify access points, direct users, warn users of unexpected conditions such as road crossings and flooding potential, as well as provide interpretive descriptions of significant features. The signage design for the Amole Arroyo and trail should be that of a recognizable symbol, such as a yucca similar to the image on the cover.

In selected areas such as the Hubbell Oxbow, Ceja edge and the naturalistic areas of the arroyo, signage shall be provided to help identify significant plant species, geological features, and cultural resources encountered along the trail. All interpretive signs shall be in English and Spanish.

## POLICY 9: TRAIL AMENITIES

Development of trail amenities (i.e. signage, lighting, benches, trash receptacles etc.) shall be compatible with the urban intensity of the arroyo as defined by the Plan Map. The upper section (natural) shall have trail amenities appropriate to a natural arroyo. The middle section (urban) shall have trail amenities appropriate to a more urban area such as lighting, benches, drinking fountains, and water features. The lower section (rural) shall have trail amenities that respect the existing neighborhoods and the character of the area and that impact adjacent residences as little as possible.

## ROAD CROSSING DESIGN

Roads crossing the arroyo should be kept to a minimum in order to preserve the continuity of the trail and the open space character of the arroyo. The type of road crossing structures will have a significant impact on the continuity and safety of the arroyo trails. Safe arroyo crossings are crucial to the successful implementation of the arroyo plan.

The most favorable means for crossing major streets are below-grade. The existing topography does not lend itself to below-grade crossings though this would be much safer than at-grade crossings. Below-grade crossings should also be consistent with the Southwest Area Plan which mandates that roads shall be constructed with all-weather arroyo crossings where needed.

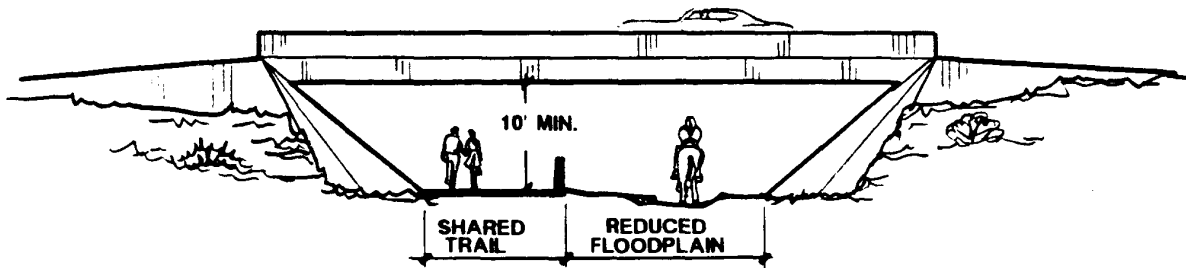
### POLICY 10: GENERAL CROSSING CRITERIA

Requests for local residential road crossings must clearly demonstrate that other transportation alternatives to crossing the arroyo have been explored and the requested crossing is essential. The road crossing structure must not result in the need for substantial additional bank stabilization downstream or substantial additional structures in the arroyo; the continuity of the trail must be maintained. Subdivision design should minimize the need for additional crossings.

### POLICY 11: CROSSING DESIGN

Trail crossings shall be provided at all roadways. Above-grade, below-grade and at-grade trail crossings shall comply with the Trail Standards, included in the Appendix. The Unser Boulevard, 98th Street and 118th Street arroyo crossings are recommended for below-grade trail crossings in order to ensure trail continuity and safe trail use. Figure 8 illustrates section views of these crossings. Depression of the channel in order to accommodate a more level roadway should be considered.

FIGURE 8 - PREFERRED ROAD CROSSING ALTERNATIVE



## **PARK FACILITIES, OPEN SPACE AND RESOURCE MANAGEMENT**

Southwest Area Plan policy mandates that Bernalillo County investigate requiring park and open space dedication at the time of development. Such a mechanism, or similar one, would be helpful for promotion of some of the policies in this Plan. In addition to its drainage function, the Prudent Line area serves an open space function by providing room for recreational trails and visual relief to urbanization.

Preservation of the existing vegetation is the most effective means of landscaping, therefore, interim measures are needed to protect the arroyo trail corridor prior to trail development. Re-establishment of disturbed areas will aid in soil stabilization on the mesa slopes. Where additional landscaping is desired, native or naturalized plants should be used. "Native or Naturalized" is intended to mean plants native to the southwest or those introduced species having water conservation properties and requiring low maintenance.

In accordance with the Southwest Area Plan, the Hubbell Oxbow is to be purchased by the County. A regional park facility here will provide South Valley communities with needed recreational facilities and serve as both a point of departure and destination for the trail. Recommended park uses are those suggested by the Southwest Area Plan, Policy 25.

Although the Southwest Area Plan proposes active recreational uses for the Hubbell Oxbow near the intersection of Coors and Rio Bravo, the Don Felipe Facility may be more suitable for development as a recreational park because its land is graded and without vegetation. The Hubbell Oxbow is adjacent to the AMAFCA detention facility (both w/in the Hubbell Oxbow) which contains lush vegetation, mature cottonwoods and is home to various species of wildlife. For that reason, the Oxbow may be more appropriate for passive uses. In the event the Oxbow is not purchased, the southern portion, at a minimum, should retain its current function as a wildlife forage area to serve the bird sanctuary at Hubbell Dam. Proposed private open space land within the greater than 9% slope segment is bisected by numerous gullies and highly erodible soils. This sensitive and fragile environment is appropriate only for very limited development and should be protected to prevent further degradation and erosion. Strict limitations on development in this area are necessary to provide trail users with a view of the escarpment, South Valley, and mountains from the Ceja.

References to the City Parks responsibility does not necessarily preclude future participation by the County Parks and Recreation Department in the development or operation of the trail or related park facilities. The City does develop and operate facilities outside the municipal limits. Parts of the trail and facility development proposed in the Plan could be sponsored cooperatively by the City and County.

### **POLICY 12: HUBBELL OXBOW PARK**

**A recreational park at the Hubbell Oxbow should be developed after a funding plan and a park development plan are developed. Recommended uses for the park include softball, football, soccer, tennis, playground, bicycle storage, as well as drinking fountains, restrooms, and a parking lot with provision for horse trailers.**

### **POLICY 13: AMAFCA HUBBELL LAKE FACILITY AND THE HUBBELL OXBOW**

**Any development which occurs in the Hubbell Oxbow north of the AMAFCA facility, even recreational use, should be located in the northern portion of the Oxbow and comply with the floodplain restrictions which exists on its use. It is recommended that the southern portion remain in agriculture to provide forage for the Hubbell Oxbow wildlife.**

The AMAFCA Hubbell Dam is a stormwater detention facility which shall also be preserved as a bosque and wildlife sanctuary. It should be a destination for storm drainage and limited foot traffic only. No park facilities such as picnic tables, barbeque pits, volley ball or other sports areas shall be allowed in the Hubbell Dam. The Ciudad Soil and Water Conservation District and the SCS will be available for assistance in the development of a resource management system addressing wildlife habitat, feeding grounds, and cropping systems.

### **POLICY 14: NODAL PARK**

**A nodal park, approximately one to two acres in size, shall be provided near the intersection of 118th Street and the arroyo. The nodal park will provide the community with passive recreation uses as well as rest facilities for trail users. Facilities for horse trailer parking are recommended to facilitate use of the upper Amole and Ceja Trails.**

### **POLICY 15: OVERLOOK PARK**

**An overlook park, approximately two to five acres in size, shall be provided for users on the southeasternmost point of the Ceja (adjoining the Amole ). The overlook park in this area will provide the users of the Amole and Ceja trail system with tremendous views in all directions and is quite suitable for such development. Included here will be picnic shelters, possible restroom facilities, naturalized landscaping, a drinking fountain, parking lot for trail users, and an unloading area for equestrians (see sketch, p.F-1)**

**Dedication of this area by the property owner to the County for park and open space purposes shall be accepted to meet regulatory obligations for development. Dedication shall be required by the County at the time of platting, replatting, change of zoning, special use permit, site or sector plan approval.**

### **POLICY 16: LANDSCAPE TREATMENT AND MAINTENANCE**

**The undeveloped land within the public right-of-way shall be maintained in a generally natural condition: grading for trail construction shall be minimized and revegetation done with native and/or naturalized plantings (if appropriate). The existing vegetative cover shall be enhanced by landscaping with additional trees, shrubs, and wildflowers, to provide shade, wildlife habitat, visual interest and seasonal color. Trees should be massed in areas where public open areas adjoin the rights-of-way. Clustering trees will soften the linearity of the drainage system. The Appendix provides a list of recommended plant materials.**

**Maintenance of the trail right-of-way, including trash removal, shall be performed by the City.**



## **POLICY 17: INTERIM ACCESS CONTROL**

**Prior to development of the trail and park network, off-road vehicle use and trash dumping shall be prohibited through the construction of barriers and signs at critical points of access by the City Parks and Recreation Department.**

## **DESIGN OVERLAY ZONE**

A Design Overlay Zone is authorized by the Bernalillo County Comprehensive Zoning Ordinance and by the City of Albuquerque Comprehensive Zoning Ordinance for areas containing at least 320 acres or of any size specified by a controlling Rank III Sector or Neighborhood Development Plan which meet at least two of the following three conditions:

- 1) contain highly scenic natural features or views;
- 2) have development potential which is likely to require unusually complex coordination of flood control, transportation, open space and urban land uses; and
- 3) have a strong role in the development of the form of the metropolitan area, such as arterial street corridors or critical areas near urban centers or historic zones.

The Amole Arroyo Corridor meets all three conditions for establishment of a Design Overlay Zone. The Design Overlay Zone regulations are mandatory. Guidelines shall be incorporated into development proposals unless they are clearly unworkable. Rationale for some of the design elements covered by the zone follow.

Continuous solid walls and fences form a physical, visual and psychological barrier between the arroyo and adjacent development. This condition is detrimental to visibility and access and fosters an unsafe and under-used public environment. Walls which are of limited height will help diminish these effects, especially if their aesthetic quality is enhanced by the type of materials used. Solid walls are allowed in residential areas for privacy. Parking and service areas must be visually screened from the arroyo corridor to ensure that they do not detract from the open space character of the recreational trail system. Planting will aid in softening the appearance of the screening device. Accessory buildings are limited in height, because the effectiveness of the wall height limitation would be negated if they were higher than the walls adjacent to the arroyo.

Whether or not the Amole Arroyo works as a neighborhood amenity depends to a large extent upon the orientation of development toward the arroyo, which will provide visibility and incentive for making the arroyo an attractive place. Access from adjacent development will encourage use of the trail. Since the land within the study area has been designated as "Developing Urban" or "Rural and Open", a substantial mix of land uses will probably occur. Within this mix, public facilities are particularly appropriate for location along the arroyo corridor in order to take advantage of pedestrian and bicycle trail access, thereby offering an alternative to increased vehicular traffic. Orientation of entries and landscaped open areas toward the arroyo in new developments will provide a public visual amenity and an extension of the public open space system. Finally, a density bonus is provided to encourage alternative drainage treatments and offset the land requirements for the recreational trail.

Access to the trail must be provided at convenient intervals in order for the trail to get maximum use and serve as a link between neighborhoods, schools, parks, libraries, community centers and open space. Access is also needed for emergency vehicular access. Use of drainage easements for such access furthers multiple use goals. Platting should maintain the continuity of the trail. A continuous trail with limited interference from motorized traffic is one of the key features of a safe trail system.

Finally, a density bonus is provided to encourage alternative drainage treatments and offset the land requirements for the recreational trail.

#### **POLICY 18: DESIGN OVERLAY ZONE ESTABLISHED; PROCEDURES FOR COMPLIANCE**

**The Design Overlay Zone is established which covers the Amole Arroyo and all property abutting the arroyo or trail right-of-way as shown on the map and includes Policies 18 -29. The Design Overlay Zone ends at Westgate Dam. If any property subject to the Design Overlay Zone is annexed to the City of Albuquerque, all policies, regulations and guidelines contained herein shall be enforced by the City and all references to the County contained herein shall thereafter refer to the City. All regulations are mandatory.**

**As mapped, the Design Overlay Zone is shown approximately 350' to either side of the arroyo in order to encompass a typical maximum commercial lot width. Regardless of future subdivision and/or platting, the Design Overlay Zone will only cover property abutting the arroyo or trail right-of-way.**

##### **Regulations**

- 18.a. All development within the Design Overlay Zone shall comply with the design regulations of this section under Policies 18-29).
- 18.b. The Albuquerque Planning Director may approve minor variances to this Plan on a site-by-site basis if consistent with the use, general scale and intensity as set forth in this Plan, and if the approving official finds that neither the County, City, AMAFCA nor any other person will be substantially aggrieved by the change. The Planning Director and AMAFCA should be notified of any proposed changes.

#### **POLICY 19: PRESERVING TOPSOIL AND EXISTING VEGETATION**

**The existing topsoil and vegetation cover within the existing rights-of-way, easements and other portions of the arroyo shall be preserved to the greatest extent feasible.**

##### **Regulations**

- 19a. Unless substantial grading is necessary to accommodate trails, prior to beginning construction on private land, the property owner shall construct a temporary barricade at the site boundary adjacent to the corridor public right-of-way to protect it from heavy equipment and to preserve the groundcover. Site development plans shall indicate all measures which will be undertaken during construction to comply with this provision. Any damage that does occur shall be mitigated by reseeded. The property owner shall maintain the revegetated area for two years according to a maintenance plan approved by the City Parks and Recreation Department.

- 19b. Grading plans for sites adjacent to the arroyo right-of-way shall demonstrate that cut and fill has been kept to a minimum.

## **POLICY 20: WALLS AND FENCES**

**Walls are generally discouraged adjacent to the arroyo right-of-way, however, where walls or fencing are required for privacy or security reasons, the following regulations shall apply:**

### Regulations

- 20.a. The maximum height for solid walls and fences is six feet and for see-through fences, eight feet.
- 20.b. Solid walls and fences are allowed in residentially zoned areas only, except as provided in 20.e. below.
- 20.c. Solid walls and fences shall consist of stucco over concrete block, brick, stone, split-faced or fluted block (split side facing arroyo), adobe, or wood.
- 20.d. See-through fences shall consist of wood, chainlink, painted, coated, or self-rusting pipe, wrought iron, or pasture fencing.
- 20.e. Low solid walls, not to exceed four feet in height, combined with one of the see-through treatments described in 20.d. above, are allowed in non-residential areas. The total height cannot exceed eight feet.

### Guidelines

- 20.f. Access gates are encouraged between adjacent development and the arroyo, particularly for townhouse, multi-family, office development and other public facilities.
- 20.g. Landscaping on the private side of see-through fencing should be provided. Recommended plant materials are provided in the Appendix.
- 20.h. Curvilinear walls are desirable adjacent to the arroyo right-of-way.
- 20.i. Chain link fences are encouraged to be vinyl-coated rather than galvanized. Good adjacent landscaping is important to making all chain link fences attractive.
- 20.j. Cinder block and adobe walls are not encouraged since they invite graffiti and their solid construction usually makes it easy to climb over them. Split-faced or fluted block is somewhat preferable to stuccoed block or adobe in discouraging graffiti.

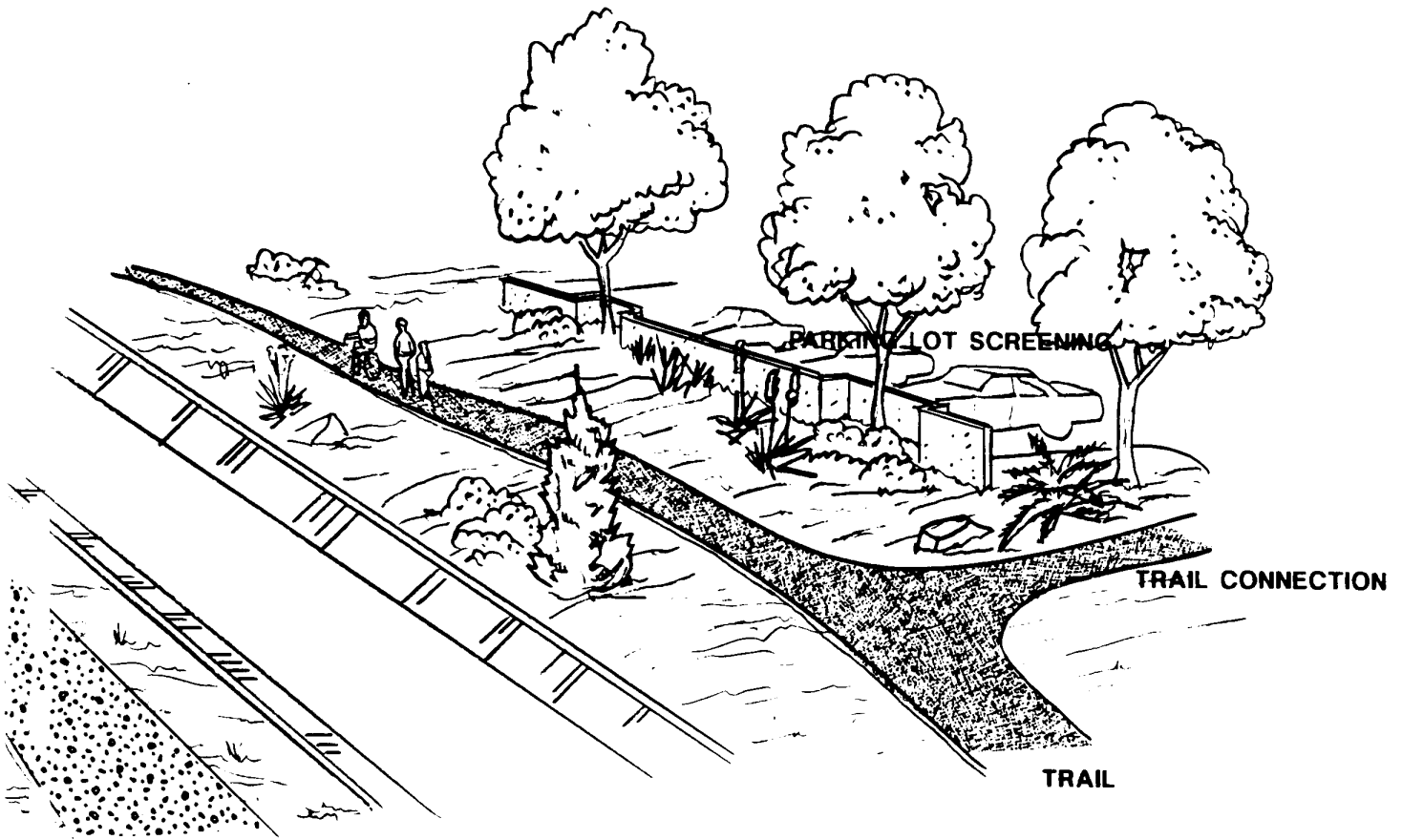
## **POLICY 21: PARKING AND SERVICE AREAS**

**Parking lots, service areas and open storage located adjacent to the arroyo shall be screened from view according to the following regulations: ( Figure 9 illustrates parking lot screening).**

Regulations

- 21. When a parking lot, service area or open storage is located adjacent to the arroyo right-of-way, screening shall be required with either:
  - 21.a. Walls or fencing a minimum of 4' in height which comply with Policy 20 above, except that see-through fencing will require additional landscaping, such as shrubs or vines, to form a reasonably opaque screen;
  - 21.b. Shrubs or trees sufficient to act as a screen of at least 4' in height; or
  - 21.c. Earth berms a minimum of 4' above the elevation of the parking, service area, or open storage to block the view of the parking, service area, or open storage from the trail.

FIGURE 9 - PARKING LOT SCREENING



**MAINT. ROAD  
POLICY 22: ACCESSORY BUILDING SETBACK REQUIREMENT**

**The following accessory building setback is established to comply with the height limitation for walls:**

Regulations

- 22. For lots abutting the arroyo right-of-way, buildings shall be set back from the lot line two (2) feet for each foot of building height in excess of six (6) feet, i.e. (building height - 6) X 2 = setback. For example, an eight foot accessory building would require a four foot setback from the lot line.

## **POLICY 23: HEIGHT LIMITATIONS**

**The Southwest Area Plan places a height limitation on structures located east of the Ceja. That policy is incorporated into this Design Overlay Zone.**

### Regulation

23. No structures built or placed east of the Ceja of the Southwest Mesa shall intrude above the reference line drawn straight out in an easterly direction from the Ceja as defined in Map 4, Southwest Area Plan, Policy 20.

## **POLICY 24: ADJACENT LAND USES**

**When development occurs, every effort shall be made to locate public facilities such as schools, parks, libraries, and community centers near the arroyo trail system.**

## **POLICY 25: OPEN AREAS AND BUILDING ORIENTATION**

**Site plans for multi-family residential and non-residential developments are encouraged to provide landscaped open areas directly adjacent to the arroyo right-of-way and orient recreational facilities associated with their development toward the arroyo.**

### Guidelines

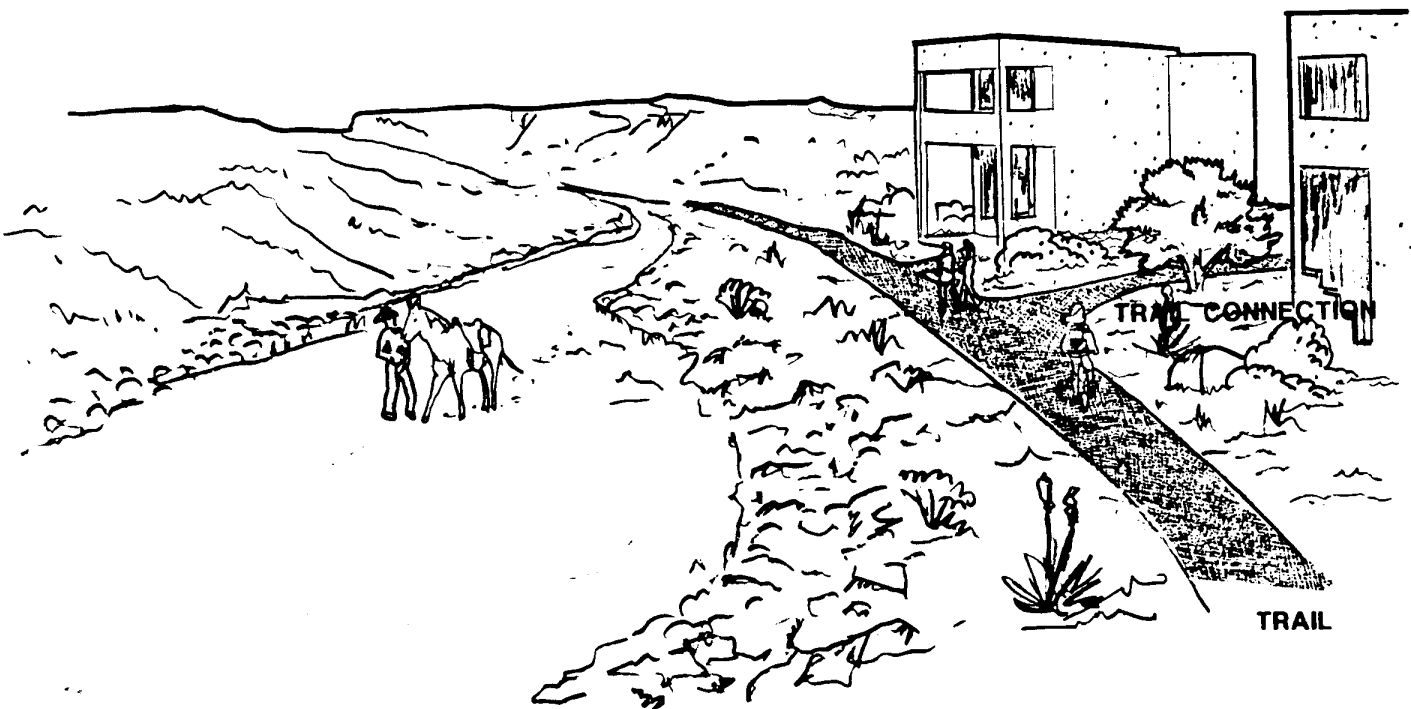
- 25.a. Access between the open areas and the arroyo right-of-way should be provided for pedestrians and cyclists as appropriate.
- 25.b. Open areas adjacent to the arroyo right-of-way should be landscaped with appropriate plant materials including native and naturalized trees and shrubs (included in the Appendix) to integrate the open areas with the arroyo right-of-way.
- 25.c. All multi-family and non-residential developments should be designed with windows facing onto the arroyo.
- 25.d. Multi-family and non-residential developments adjacent to the arroyo should orient entries toward, and place landscaped public open areas adjacent to the arroyo right-of-way. These entries may necessarily constitute minor or secondary entries with the main entry oriented toward the street. Figure 10 illustrates a multi-family development with entries and open areas oriented toward the arroyo.

**POLICY 26: DENSITY BONUS**

For parcels zoned County A-1, which lie within the arroyo corridor, a density bonus is available as follows:

When a property owner dedicates land for recreational use, open space or drainage (in excess of that required to concrete channel the 100 year flood plain and provide for one 15' maintenance road) the number of lots which may be platted will be calculated by taking the gross acreage less infrastructure dedications (such as roads and utility easements) divided by 43,560, so long as each lot will be usable, meet the minimum setback requirements of the County A-1 zoning, and comply with environmental regulations. Figure 13 illustrates the density bonus calculation.

FIGURE 10 - OPEN AREAS ADJACENT TO THE ARROYO



## **POLICY 27: REQUIRED DEDICATIONS FOR TRAIL RIGHT -OF-WAY**

**Granting of easements or dedication for drainage purposes shall be required in accordance with AMAFCA policy. Right-of-way for trail purposes shall be required by the City at the time of platting, replatting, change of zoning, special use permit, zoning variance, site or sector development plan approval. The following regulations address the trail right-of-way required under various drainage scenarios.**

### Regulations

#### Prudent Line Approach:

- 27.a. Right-of-way sufficient for trail development pursuant to the Trail Standards, included in the Appendix, shall be platted within the prudent line or adjacent to the prudent line if trail development within the prudent line is not feasible.

#### Channeled Arroyo:

- 27.b. Right-of-way for a trail and landscaping adjacent to the arroyo right-of-way in a width averaging 20 feet. The dedicated trail area may vary in accordance with the Trail Map, Trail Standards and the other policies of the Plan, so long as it averages 20 feet in width.

#### General Regulations:

- 27.c. Public access to the trail system shall be provided at all roadway intersections and adjacent public facilities, including parks, libraries, community centers and open space.
- 27.d. In areas where residential or commercial development is adjacent to the arroyo right-of-way, access to the trail system shall be provided at intervals of approximately one-fourth mile.
- 27.e. When land adjacent to barriers across the arroyo, such as dams, roads and culverts, is platted, space for a trail around the barrier to provide for a continuous trail system consistent with the Trail Standards shall be platted.
- 27.f. Open space and/or park dedication credit, if required, shall be allowed for trail right-of-way dedication.

#### Guidelines:

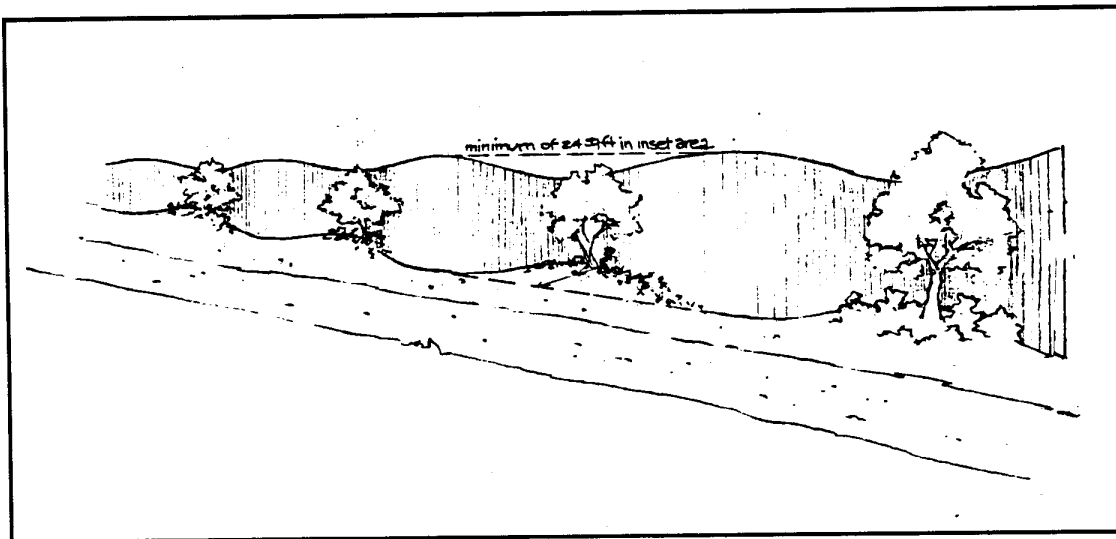
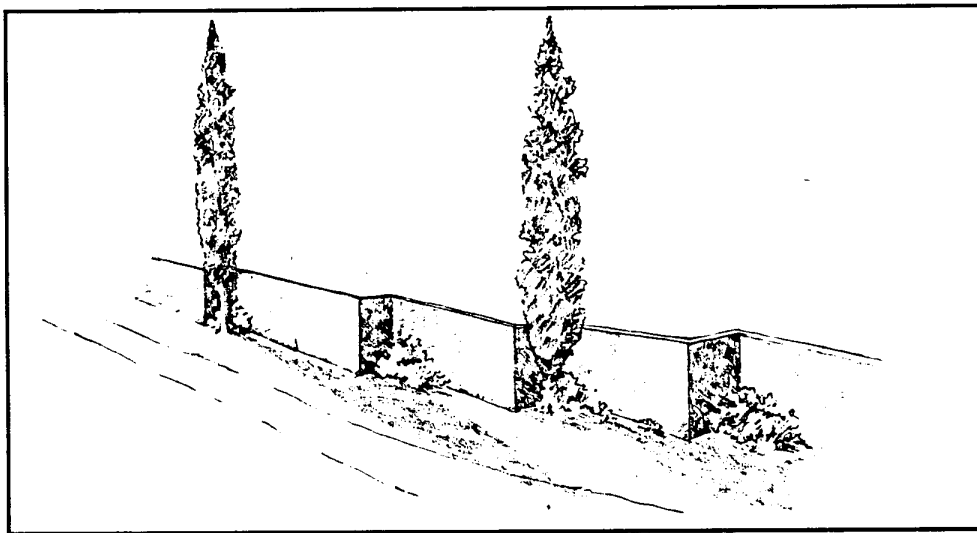
- 27.g. Where possible, trail system access shall occur within or adjacent to drainage easements for rundowns, so long as these access points meet the requirements of the Trail Standards.

**POLICY 28: WALL ALIGNMENTS**

**Walls and fences bounding the middle and lower portions of the corridor should avoid straight lines for long distances; where fencing is wanted for privacy or security, periodic setbacks are desirable to add visual interest, but care must be taken to avoid hiding places which compromise the safety of the corridor:**

Regulations

- 28.a. Gentle changes in alignment of walls and fences shall be installed wherever reasonable, adding visual interest but not providing hiding places.
- 28.b. Insets can be included in wall and fence lines, but only when the landscaping or other elements in the setbacks will make them safe by being forbidding to people who might hide there.





## POLICY 29: CONTINUOUS TRAIL

Provision for a continuous trail must be included in plats or site developments plans as required in the following regulation:

### Regulations

- 29.a. Land adjacent to barriers across the arroyo, such as dams, roads and culverts, shall be platted to allow space for a trail around the barrier, providing for a continuous trail system, and be consistent with the Trail Standards, included in the Appendix.

FIGURE 12- CONCEPTUAL RENDERING OF CONTINUOUS TRAIL SYSTEM

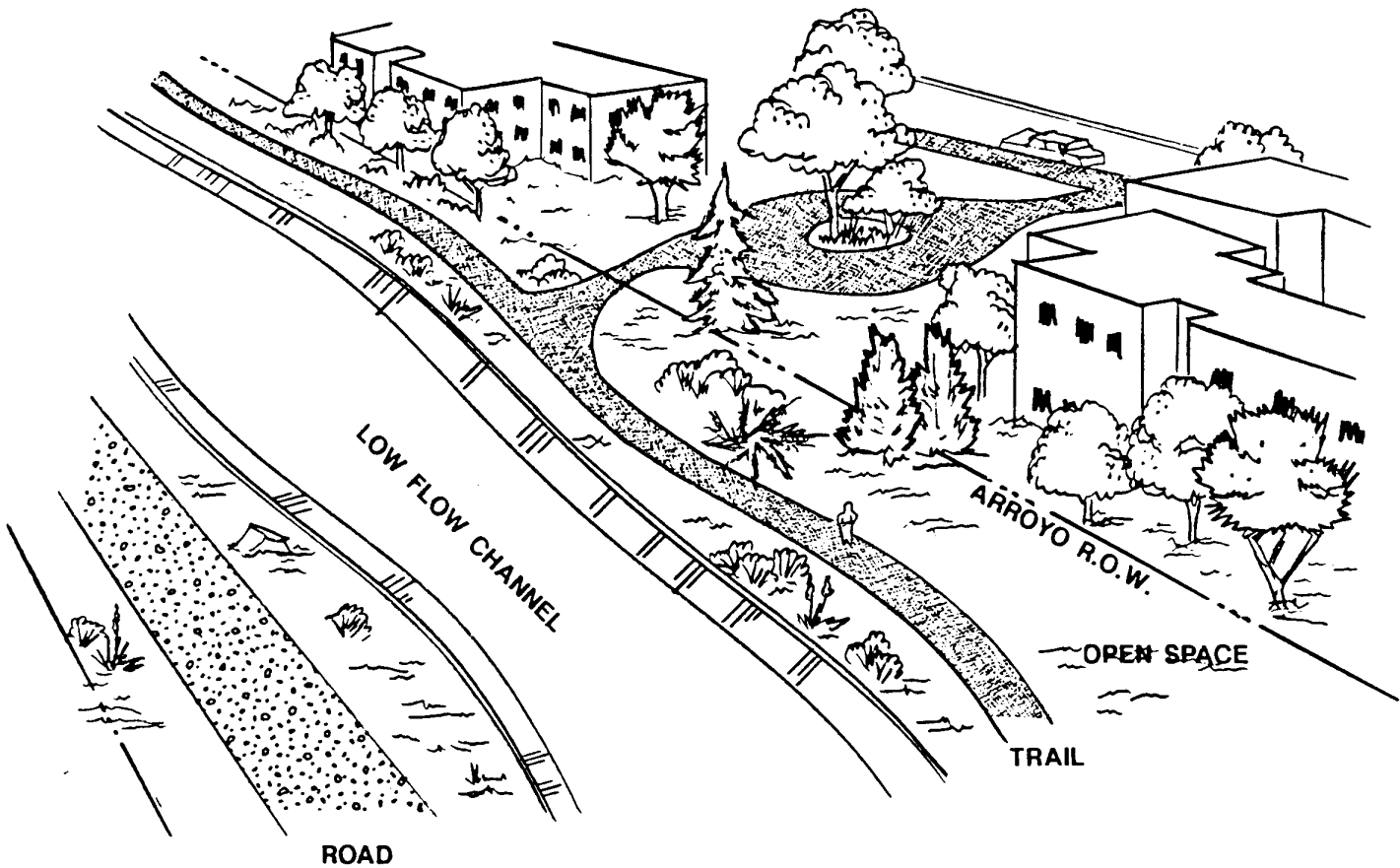
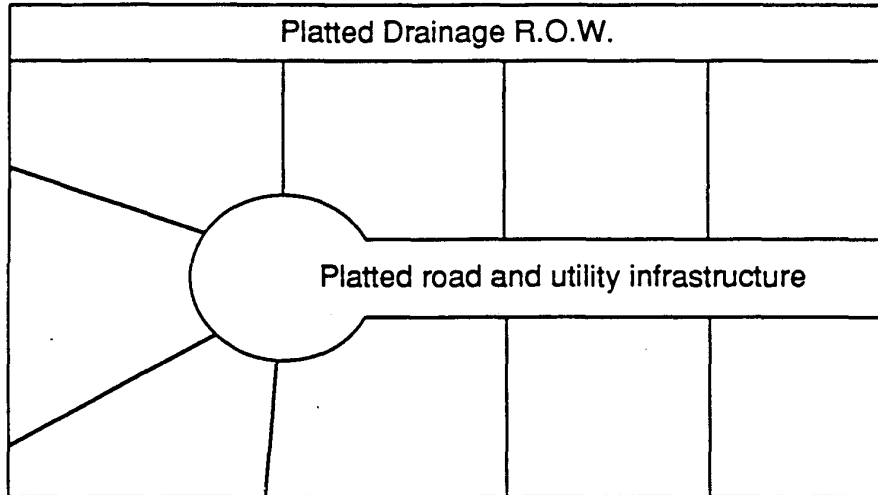
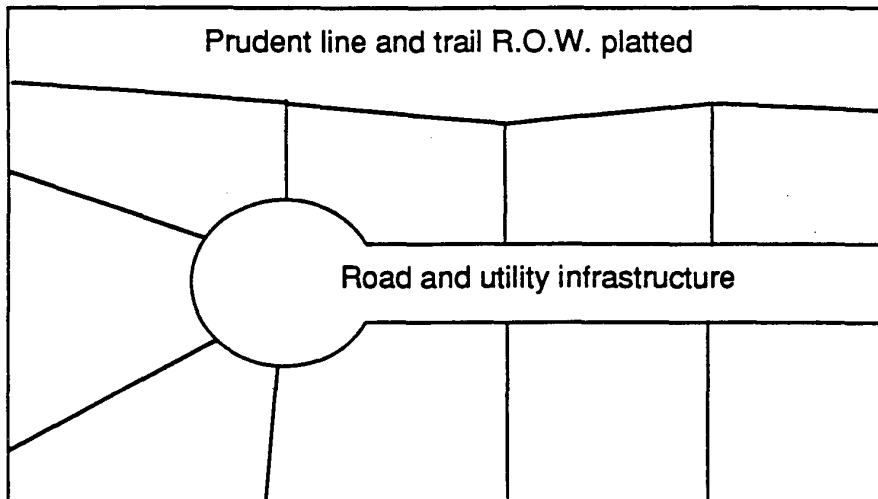


FIGURE 13 - ILLUSTRATION OF POLICY 24: DENSITY BONUS



10 acres platted with one acre minimum lot sizes.

Results in 9 lots after required infrastructure is dedicated.



10 acre platted reserving prudent line and dedicated trail.

Results in reduced sized lots after required infrastructure is dedicated

## IV. IMPLEMENTATION

### General

The purpose of the implementation plan is to identify specific actions that will be needed in order to establish the Amole Arroyo trail system in accordance with the guidelines presented in this plan. The following is a list of major tasks that must be completed in order to see this plan to fruition:

- \* Adoption of a Bernalillo County Parks and Open Space Dedication Policy or impact fee system.
- \* Negotiate for a joint-use and maintenance agreement with the MRGCD for improvements to the Gun Club Lateral and use of the existing MRGCD right-of-way for recreational trails.
- \* Amend the Development Process Manual to require compliance with the adopted drainage management plan and develop specifications for any treatment alternatives described herein which may not be included in the Development Process Manual.
- \* Amend Development Process Manual to include Trail Standards.
- \* Coordinate crossing structure designs at Unser Blvd., Rio Bravo Blvd., 98th Street, and 118th Street with City and County Public Works Departments.
- \* Enforce the plan dedication policies at the same time as sector plan approval, replatting or zoning change requests are made.
- \* Review of drainage management plans for adjacent development to ensure consistency with plan policies governing introduction of runoff into the arroyo to ensure it is done properly.
- \* Develop a Park Master Plan for the Hubbell Oxbow recreational facility.
- \* Acquire funding for the design and construction of the Amole Arroyo trail system and Gun Club Lateral as well as funding for the development of a recreational facility at the Hubbell Oxbow.
- \* Review of sector and subdivision plans for consistency with Design Overlay Zone guidelines.
- \* Review of site plans and building permit applications for single, multi-family and commercial buildings adjacent to the multi-purpose right-of-way for consistency with Arroyo Design Overlay Zone guidelines and requirements presented herein.

## Implementation Schedule

Since implementation of the Amole Arroyo Corridor Plan is contingent upon development within the study area and there is no specified time frame for development by the owners of the lands within the study area, there is no certain time frame established herein, with the exception of Phase I, which can proceed immediately. The suggested sequence for implementation is as follows.

Phase I - Adopt a County of Bernalillo Parks and Open Space Dedication Policy or a system of imposing impact fees. This should be undertaken immediately to ensure that needed open space is not lost and that community standards for open space are met. The County should take the lead in developing the necessary ordinances, or contract with the City Planning Department to do so.

Phase II - The following items can be undertaken during the present level of development within the study area.

- 1) The County Parks and Recreation Department will request funding from the County Commission to acquire the Hubbell Oxbow.
- 2) AMAFCA should develop a drainage policy for the Amole Arroyo and require that adjacent development comply with requirements for handling runoff.
- 3) Conduct an archeological survey within the study area.
- 4) Require dedications for drainage and/or trail purposes.
- 5) Coordinate crossing structure designs and bicycle trail designs for Unser Blvd., Rio Bravo Blvd., 98th Street, and 118th Street with the City and County Public Works Departments.
- 6) Amend the Bikeways Master Plan to propose bicycle lanes along the Rio Bravo and 118th Streets.
- 7) Negotiate a license with PNM and Plains Electric for the use of existing easements for trail development.
- 8) Prepare a City/ County Design Overlay Zone for Zone 3 soils areas pursuant to the SWAP mandate.

Phase III - The following items should be implemented when the study area is approximately twenty-five percent (25%) developed.

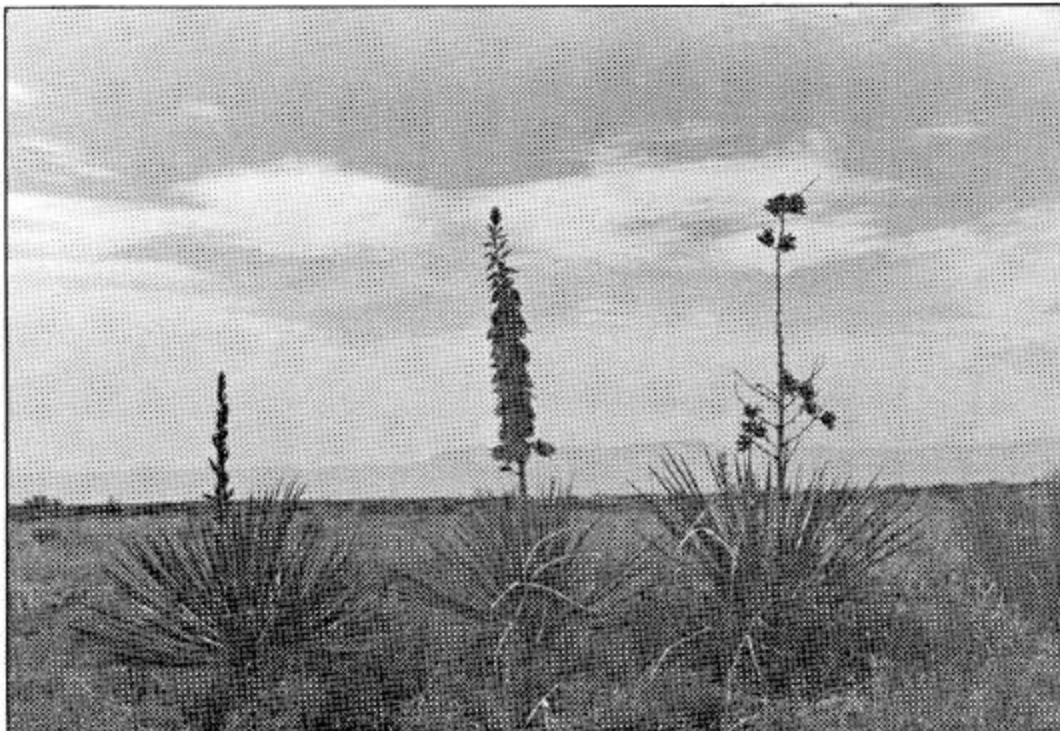
- 1) The County should develop a Park Master Plan for the Hubbell Oxbow Facility.
- 2) Negotiate a joint-use and maintenance agreement with MRGCD for use of right-of-way for recreational trails.

Phase IV - When approximately fifty percent (50%) of the study area is developed, the following items should be implemented.

- 1) Acquire land in the vicinity of 118th St. and the Amole Arroyo for a nodal park and parking lot/ unloading area for horses and riders.
- 2) The County should acquire funding and administer the design and construction of the recreational complex at the Hubbell Oxbow. Construction could be phased dependent on available funding.
- 3) The County should acquire funding for the landscaping and construction of the trail from Hubbell Oxbow to Unser Blvd.

Phase V - When approximately seventy -five percent (75%) of the study area is developed, the following items should be implemented.

- 1) Fund, design, and construct a nodal park in the vicinity of 118th St. and the Amole Arroyo.
- 2) Acquire proposed open space lands along the Southwest Mesa ceja. If this area is to be developed prior to the implementation of this plan, attempts should be made to preserve this portion of the site or acquire through dedication as part of an annexation or sector development plan.
- 3) Acquire the funding and administer the design and construction of the trail and landscaping improvements along the Amole Arroyo from the Hubbell Oxbow to the Rio Grande, and from 118th Street and the top of the Ceja.



## APPENDIX A EXISTING GOALS AND POLICIES

### INTRODUCTION

The Amole Arroyo Corridor Plan provides guidelines for the design and standards for the development of the arroyo corridor to integrate drainage management, recreational trails, development and transportation into the public rights-of-way. The following statements are excerpts from other plans (Ranks I & II) that have already been adopted and have helped formulate the Amole Arroyo Corridor Plan.

### COMPREHENSIVE PLAN GOALS

The following goals and implementation techniques were identified from the Rank I, 1988 Comprehensive Plan as those most applicable to the Amole Arroyo Corridor Plan.

#### Open Space

“The Open Space Network envisioned by the Plan embraces major features like mesas, mountains, volcanoes, and the river, and ties them together through a trail system following drainage easements.” (C. Plan, Section II, Summary, page 39).

“Trail corridors will connect open areas and link the open space network wherever feasible. Mesa and valley arroyo ditch systems serve drainage, flood control and irrigation needs, and also provide trail corridor rights-of-way. The arroyos identified in the Rank II Facility Plan for Arroyos present opportunities for recreational trail use. Native vegetation and special non-concrete stabilization techniques can provide a natural channel appearance that permits water infiltration. Trail corridor safety problems such as water safety and animal control are concerns that can be effectively addressed through subsequent planning efforts that involve public input and education.” (C. Plan, Section I.B.1, page 9).

“A multi-purpose network of open areas and trail corridors along arroyos and appropriate ditches shall be created. Trail corridors shall be acquired, regulated, or appropriately managed to protect natural features, views, drainage and other functions or to link other areas in the Open Space Network.

#### Possible Techniques:

- Incorporate a multi-purpose concept suitable for arroyos and ditches into corridor, sector, and site development plans.
- Control development that would inhibit drainage, or open space purposes of arroyos.

- Obtain adequate right-of-way for multiple use of designated arroyos in developing areas and coordinate design between public and private sector through plat and site development plan processes.
- Dedicate trail corridors through rank III corridor and sector development plans. Fund trails and associated public amenities through Capital Implementation Program bond issues, and other financing methods.
- Investigate use of ditch/acequia easements or rights-of-way for open space purposes. Coordinate planning efforts with property owners adjacent to ditch system and the Middle Rio Grande Conservancy District.
- Work with all public agencies and the State legislature to ensure that vacated ditch rights-of-way or easements are retained as part of the Open Space Network.
- Institute safety measures along irrigation ditches before inclusion in any multi-purpose network.
- Work with the private sector to establish motorized recreation vehicle areas separate from the pedestrian, equestrian, and bicycle-oriented trail corridors and Open Space Network. (Comp. Plan, Section II.B.1.f, page 46).

### Environmental and Heritage Conservation

“Natural features are very important in planning for any addition to the built environment. Such planning can create a distinctive whole that improves the overall appearance and function of the city.” (C. Plan, Section I.B.8, page 25).

“Plant native or naturalized trees along the recreational trail and open space system, utilizing natural irrigation along arroyos and irrigation ditches.” (C. Plan, Section II.C.8.d, page 95).

### Water Management

“Maximum absorption of rainfall shall be encouraged through use of arroyo channels designed to allow infiltration of water wherever possible.

#### Possible Techniques:

- Utilize on-site water detention and infiltration facilities in new development where feasible.
- Follow seeding, planting, and/or rip-rap guidelines outlined in the drainage ordinance.
- Insure easements and rights-of-way follow drainage ordinance guidelines.” (C. Plan, Section II.D.2.b, page 99).

### Transportation

“Pedestrianways and auto-free areas shall be promoted and integrated into development to create safe and pleasant non-motorized travel conditions.

#### Possible Techniques:

- Promote through plat review process, and acquisition of rights-of-way separate from streets.

- Coordinate with City/County Public Works and Parks and Recreation planning.” (C. Plan, Section II.D.4.h, page 108).

“A metropolitan area-wide bicycle and trail network shall be constructed and promoted.

Possible Techniques:

- Require new subdivision and planned unit developments to dedicate rights-of-way for bikeways, separate from streets where appropriate.
- Incorporate bikeways into arroyo trail system.
- Provide separation for bikeways and pedestrianways where feasible.” (C. Plan, Section II, D.4.i, page 108).

“Assess the feasibility and possible location of an equestrian trail system with an analysis of adjacent land use that will accommodate the boarding of horses.” (C. Plan, Section II.D.4.i, pp. 108-109).

“Street and highway projects shall include paralleling paths and crossings for bicycles, pedestrians, and equestrians where appropriate.

Possible Techniques:

- Coordinate policy with the Annual Transportation Improvement Program and the Long Range Major Street Plan, through the Urban transportation planning process.
- Examine specific project plans to determine whether pedestrian, bicycle and horse trails have been accommodated before approval.” (C. Plan, Section II.D.4.j, page 109).

## **SOUTHWEST AREA PLAN GOALS**

The following set of policies are excerpted from the Rank II, Southwest Area Plan (SWAP), Volume IV - THE PLAN. The policies are those which most strongly relate to the Amole Arroyo Corridor Plan.

### **Policy 2.**

“As development occurs in soil conservation service zones 3 & 4 provisions shall be made to ensure soil erosion is controlled during and after construction.

Implementation:

Upon Plan Adoption:

- The Development Review Board will require that measures to control soil erosion during and after construction, such as Top Soil Disturbance Permits and Dust Control Plans, are incorporated into the development proposals.”

### **Policy 3.**

“To conserve the use of water, protect the soils and avoid fertilizer build-up, native and naturalized landscaping shall be used in soil conservation service zones 3 & 4 whenever possible.”

### **Policy 4.**

“Roads and development in soil conservation service zones 2, 3, 4 and 5 shall generally follow the natural contours of the terrain, and roads shall be constructed with all-weather arroyo crossings where needed.



## Implementation

- County and City Public Works Departments will develop road alignments accordingly.”

### Policy 6.

“The residential densities contained in Table 2 shall be those controlling zoning in the plan area.” See the Existing Conditions portion of this plan for description of SWAP densities. SWAP also says with regard to densities, “The portion of Area 2 located within Zone 3 of the Soil Conservation Service Map should have development only on the ridges and slopes to escape the potential for flooding and avoid disrupting the fragile soils. If on-site wells and individual liquid waste disposal systems are used, a maximum density of one dwelling unit per two acres is recommended by the Soil Conservation Service.” (p. 15, SWAP).

### Policy 18.

“The County shall investigate requiring park and open space dedication at the time of development.

## Implementation

### In Fiscal Year 1:

- The County Zoning Administrator, with the assistance of the City Planning Department, will develop text amendments to the Bernalillo County Zoning and Subdivision Ordinances which will establish park and open space dedication requirements and present the proposed amendments to the County Planning Commission and County Commission for adoption.”

### Policy 19.

“All public and private development shall be prohibited within fifty to one hundred fifty feet west of the eastern edge of the Southwest Mesa (as defined on Map 4) from Central Avenue/Interstate 40 to the Isleta Pueblo within the exception of two open space recreational trails and small, nodal, scenic overlook parks.”

### Policy 20.

“No structure built or placed east of the east ceja of the Southwest Mesa shall intrude above the reference line drawn straight out in an easterly direction from the ceja as defined on Map 4.

## Implementation

### Upon Plan Adoption

- When the design overlay zone or hillside ordinance is developed as called for in Policy 6 Implementation, strong consideration will be given to developing criteria for ceja view preservation from the lower mesa slopes and valley east of the Southwest Mesa Ceja.”

### Policy 21.

“Erosion and water control treatment on the slopes below the Ceja shall be designed to blend into the environment.”

Policy 22.

“The County and City shall jointly develop the trail system shown in Table 3 through trail corridor plans.

Implementation

Beginning in Fiscal Year 1:

- These plans will be developed in cooperation with the City Planning Department, County and City Parks and Recreation Departments, County and City Public Works Departments, Albuquerque Metropolitan Arroyo Flood Control Authority, and the Middle Rio Grande Conservancy District, the latter two of which have property and/or irrigation or drainage facilities proposed as trail segments under their jurisdiction.
- The exact alignment, necessary right-of-way and design for each trail will be established as each trail corridor is developed.
- The County Zoning Administrator and City Planner will establish a City/County Trails Task Force to advise and assist with these plans. The Task Force shall include representatives of user groups and South Valley neighborhoods.”

Policy 23.

“Trails proposed adjacent to roadways shall be included as part of the roadway upgrading or construction project and funded, designed and constructed with roadway funds.”

Policy 24.

“Signing and access control necessary to prevent motorized vehicles from gaining access to trails and sensitive areas shall be included as part of the design and construction of trails. Access for handicapped persons shall be incorporated in the design and construction of trails whenever possible and appropriate. Safety measures shall be a prime consideration in location, design, and construction of trails.”

Policy 25.

“The Hubbell Oxbow Area may be acquired by the County for a regional park.

Implementation

In Fiscal Year 1:

- The County Parks and Recreation Departments will request funding from the County Commission.
- The County Parks and Recreation Department will approach the landowner and begin negotiating the purchase.
- The possibility of transferring development rights from the Oxbow to the property to the west under the same owner will be explored as one method to lower the purchase price.
- If it is not feasible to develop the park immediately after purchase, the possibility of leasing the land for farming until such time as development can occur will be explored by the purchasing public entity or entities.”

Policy 27.

“The City and County shall pursue acquisition and development of park sites near the elementary and middle schools in the plan area.”

Policy 34.

“All roads and road extensions proposed for the area shall be carefully designed to handle drainage and minimize erosion.”

Policy 38.

“East/west roads shall follow the drainage pattern of adjacent arroyos whenever possible to avoid unnecessary crossings and realignments of the arroyos.”

Policy 43.

“Separated bicycle paths shall be included in the design and construction of Paseo Del Volcan and Unser Boulevard and added adjacent to the north side of Los Padillas Road (to connect the proposed Southwest Mesa Ceja Open Space Trail to the Bosque) when improvements are made or funding is available.”

Policy 44.

“All roadways shall be planned, designed, constructed, and improved with the safety for pedestrians, equestrians, and bicyclists in mind.”

Policy 45.

“All future development shall be required to limit the level of water run-off so as not to exceed the capacity of downstream facilities.”

Policy 46.

“As development occurs and stabilization of arroyo channels become necessary. The channel treatments used shall be as naturalistic in appearance as possible, to blend in with the surrounding environment, especially in the area below Rio Bravo Boulevard.

Implementation:

- Agencies such as the Albuquerque Metropolitan Arroyo Flood Control Authority and the City Public Works Department responsible for arroyo channel treatments will include naturalistic alternates in their studies and designs and seriously consider them in selecting the final treatment, especially in the southern half of the plan area.”

Policy 48.

“A drainage management plan for the southwest mesa shall be developed.

Implementation

In Fiscal Year 2:

- The Albuquerque Metropolitan Arroyo Flood Control Authority will be requested by the Mayor to program the plan into its project schedule.”

## **FACILITY PLAN FOR ARROYOS**

### General Policies

The Amole Arroyo is designated as a Major Open Space Link, and as such the Amole Arroyo Corridor Plan must be consistent with the following general policies excerpted verbatim from the Rank II, Facility Plan For Arroyos (FPA). The general policies apply to Major Open Space Arroyos, Major Open Space Links, and Urban Recreational Arroyos which are designated as priorities by the Facility Plan for Arroyos.

### Drainage

#### Policy 1 - Primacy of Drainage Function

“Drainage and flood control are the most important functions of the City’s arroyos. Other uses within or adjacent to them should not interfere with these functions.”

### Multiple Use

#### Policy 1 - Encouraging Multiple Use

“Arroyos, whether in a natural or altered state, shall be used for purposes in addition to drainage whenever practicable, and whenever the utility of such multiple use is determined to outweigh the foreseeable risk of harm or injury from such use.”

“The City, County, and AMAFCA shall encourage the design of multiple use facilities, defined in the City’s Drainage Ordinance as “drainage control, flood control, or erosion control facilities in which other secondary uses are planned or allowed, including but not limited to recreation, open space, transportation, and utility location.”

#### Policy 2 - Right-of-Way Acquisition

“Future dedicated rights-of-way or recorded easements which allow for public uses other than drainage shall be publicly acquired, when appropriate based upon an adopted arroyo corridor plan. Acquisition shall take place during the process of zone change request, subdivision plat approval, site plan approval, and sector development plan approval.”

“Legal documents pertaining to right-of-way dedication for drainage and flood control shall be coordinated with legal documents which allow other public purposes, where appropriate, and shall be arranged between the landowner, AMAFCA, the City Parks and Recreation Department, and the Municipal Development Department.”

#### Policy 3 - Multiple Use Corridor Plans

“Multiple use arroyo corridor plans, integrating land-use and public facilities planning, shall be prepared for the arroyos designated by this facility plan as Major Open Space Arroyos, Major Open Space Links, or Urban Recreational Arroyos. These will be Rank Three plans, and will vary in their complexity depending upon the extent of development and/or platting already in place adjacent to the arroyo.”

#### Policy 4 - Interagency Coordination

“The City Department of Transportation, Water Resources, Parks and Recreation and Municipal Development, the County Roads and Park Department, the Middle Rio Grande Rio Grande Conservancy District, the electric, gas and telephone utilities, cable TV enterprises, and the Albuquerque Public Schools should be the coordinating agencies involved in plans and decisions affecting the arroyo corridors. The Planning Division shall be the lead agency in developing multiple use arroyo corridor plans and will form a study team composed of representatives of the public and private agencies.”

### Policy 5 - Land-Use Compatibility

“Public facilities such as parks, schools, libraries, community centers, etc. should be located adjacent to or within one quarter mile of arroyos to provide destinations for people using the trails. Commercial centers, employment centers, and high-density residential uses should also be located adjacent to or within one quarter mile of arroyos to maximize the usefulness of the trails.”

### Policy 6 - Appropriate Access

“Where drainage rights-of-way contain trails, at least one pedestrian and bicycle access point should be provided per one quarter mile.”

## Public Safety

### Policy 1 - Safety-Oriented Facility Design

“Consideration shall be given to designing the drainage and adjacent recreational and transportation facilities to reduce user risk.”

### Policy 2 - Programs Promoting Public Safety

“City staff shall investigate potential safety measures including public information, user education, regulation of use of hazardous areas, safety-oriented design, emergency warning systems, and patrolling, as part of the initial planning and periodic project review process required by the arroyo corridor plans.”

“The “Water Witch” public safety education program is an excellent example of the type of educational program which shall be continued and emphasized in areas adjacent to arroyos. This program was developed by the Mayor’s Office in conjunction with Albuquerque Public Schools, the Middle Rio Grande Conservancy District (MRGCD), AMAFCA, the U.S. Bureau of Reclamation, and the City Engineering Division to dramatize the risks presented by the arroyos, ditches, and drains within the metropolitan area.”

### Policy 3 - Joint Maintenance

“Maintenance shall be coordinated between AMAFCA, the City Parks and Recreation Department and the City Engineering Division. This facility plan recommends that the City Parks and Recreation Department maintain landscaping and trails located within the public right-of-way but outside of the drainage channel, and that the City Engineering Division or AMAFCA maintain the channel, except in cases where a specific channel treatment is required in concert with the recreational function of the drainageway. In such cases, the City Engineering Division and the Parks and Recreation Department shall negotiate a joint-maintenance agreement for the channel.”

## Open Space Link Arroyos

### Description

“Major Open Space Links — form continuous east-west linkages between Major Open Space areas. No specific channel treatment is required. However, where appropriate, a range of suitable treatment types and landscaping requirements will be developed by subsequent arroyo corridor plans for each Major Open Space Link. The ability to develop an uninterrupted trail system is critical. A recommended minimum width for trail development outside of the floodway is proposed. Acquisition and maintenance of land required for recreational purposes will be managed by the City. Design guidelines regarding orientation, access, and landscaping are established for adjacent development.”

## Amole Arroyo

“The Amole system has the potential to link the southern reaches of the West Mesa Escarpment with Hubbell Lake, a former oxbow of the Rio Grande which is designated Proposed Major Open Space in the Comprehensive Plan. Possible future extension of the arroyo trail system along the ditches and drains located in the South Valley could provide a direct link to the Rio Grande Bosque.”

### Specific Open Space Link Policies

#### Policy 1 - Drainage Facilities Within Open Space Links

“Wherever feasible, the design of drainage facilities within Major Open Space Links shall be sensitive to their function as an open space recreational arroyo, incorporating naturalistic channel stabilization treatments such as gabions and ungrouted riprap. Tinted concrete or soil cement may be used in limited applications such as in low-flow channels or as needed to control erosion at points where developed runoff enters the arroyo. Arroyo corridor plans developed for Major Open Space Links shall state a range of treatment types suitable for the individual arroyo which will complement the recreational function of the arroyo corridor, weighing the potential additional costs incurred against the potential benefit to be derived.”

#### Policy 2 - Trail Development

“Pedestrian and bicycle paths shall be provided along drainage channels of Major Open Space Links, where appropriate. Easements will be sought to allow the utilization of maintenance roads as bikeways where drainage rights-of-way can function as part of the City’s bikeway network. Where maintenance roads intersect arterials at grade, safe midblock bikeway crossings should be created. Bicycle and pedestrian facilities should be separate wherever feasible; however, they may be combined if trail width is at least eight feet.”

#### Policy 3 - Continuous Trail System

“Land adjacent to barriers across the right-of-way such as dams and culverts shall be platted to allow space for a trail around the barrier, providing for a continuous trail system.”

#### Policy 4 - Right-of-Way

“A minimum twenty-foot easement is recommended for trail development and possible landscaping on at least one side of the channel, outside of the 100-year floodplain. If dedicated to the City, this twenty-foot area shall be eligible for either open space credit in the Developing Urban area or for park dedication credit. The actual amount of land area to be credited as dedicated park land will be determined by the City on a case-by-case basis. Specific right-of-way requirements for each Major Open Space Link will be determined through the arroyo corridor planning process.”

#### Policy 5 - Landscaping within the Public Right-of-Way

“Landscaping of a portion of drainage rights-of-way including reseeding of disturbed land with low-maintenance native plant materials and native shrubs or trees and vegetative ground covers shall be encouraged.

Landscaping to enhance elements of topography, scenic views, and areas containing public amenities will be considered at the arroyo corridor plan level. In general, the construction and maintenance of landscaping associated with trails along Major Open Space Links will be the responsibility of the City, except as noted in ‘Policy 6: Open Space Dedication’.”

#### Policy 6 - Open Space Dedication

“In metropolitan areas designated Developing Urban, a portion of a development’s open space requirement should be aligned with drainage facilities associated with arroyos designated by this facility

plan as Major Open Space Links.

The entire 100-year floodplain of a Major Open Space Link, when left in a natural or semi-natural condition, shall be credited as open-space, less the amount of right-of-way that would be required for drainage control if a fully concrete lined 100-year channel were constructed. The landscaped portion of the arroyo right-of-way outside of a concrete channel shall be credited as open space. The developer will be responsible for reseeding any disturbed land in the public right-of-way outside of the floodway with native and/or naturalized plant materials, and for maintaining the landscaping for a period of three years, after which time maintenance becomes the responsibility of the City.”

#### Policy 7 - Programming for Recreational Amenities

“The decision of public amenities shall be planned and programmed as part of the arroyo corridor planning process, according to the policies and design guidelines set forth in this document. At a minimum, recreational programming for Major Open Space Links should include:

- recreational trails integrated with existing Bikeways Master Plan
- pedestrian pathways connecting arroyo corridor trails with adjacent public facilities and major activity areas
- shaded parking lots and secure bicycle parking areas, where appropriate, including possible joint-use of existing parking areas
- occasional shaded rest stops with benches, drinking fountains, and toilet facilities, where appropriate (due to potential vandalism, toilet facilities may be located only within developed park areas)
- coordination with mass transit planning to locate bus stops adjacent to recreational amenities, where appropriate
- access control to prohibit motorized vehicles from entering pedestrian and bicycle-oriented trails and open space”

#### Implementation Steps

##### 1. Development of Arroyo Corridor Plans

“Arroyo corridor plans are Rank Three plans which detail development standards for the specific arroyo channel and land adjacent to it. Corridor plans should be adopted jointly by AMAFCA, the City, and the County, when appropriate. Corridor plans will include at least the following elements:

- Planning context and rationale for channel treatment, including proposed and existing land uses within one half mile of the arroyo, existing and planned transportation and transit facilities (bikeways, transit stops) which could link to the arroyo trail, proposed and existing drainage facilities, and engineering design requirements. The planning context for corridor plans developed for Major Open Space Arroyos may be expanded to include land uses within the entire watershed of the arroyo.
- Channel treatment, both existing and proposed, incorporating drainage, flood control, aesthetic, and safety considerations. When drainage studies are in progress, they should be coordinated with and become the drainage element of the arroyo corridor plan.
- Status of land dedication for drainage and other public purposes, width of existing right-of-way.
- Required right-of-way or easements to accommodate drainage improvements, recreational facilities, and other facilities as appropriate (i.e. streets, utility easements).
- Recreational facilities, including trails, pedestrian or bicycle crossing structures, and adjacent parks or open space.  
Public amenities, including landscaping, signs, public parks, parking, rest stops.
- Design requirements in the form of a Design Overlay Zone, which adapt the general objectives described in Chapter II, to the specific arroyo. The Design Overlay Zone will establish design regulations and guidelines for sector development plans, subdivisions, and site plans within an arroyo corridor.
- Rough cost estimates, potential funding sources, recommended scheduling of public im-

provements.

- Any other special requirements for ensuring access, continuity, and safety.
- Citizen participation will be an essential ingredient in the arroyo corridor planning process. Representatives from adjacent neighborhood associations, and owners and residents of affected properties will be asked to serve on a study team for each arroyo corridor to ensure that issues such as security for adjacent properties, safety, and the design and location of amenities are addressed.
- Coordination with major transportation studies, the Middle Rio Grande Council of Governments, and the Long Range Major Street Plan.”

2. Designation of an Adequate Right-of-Way or Easement as part of the Major Public Open Space System, if Appropriate.

“Major Open Space Arroyos and Major Open Space Links should be designated formally as part of the Major Open Space system by inclusion on the Open Space Register. Specific right-of-way requirements shall be outlined in each arroyo corridor plan.”

3. Acquisition of Land

“Public acquisition or private dedication of suitable easements is necessary prior to extensive urban development to protect the ability of the entire length of designated arroyos to function as recreational amenities. The City may pursue several options to obtain an adequate right-of-way or easement. These include:

- Acceptance of an appropriate area as detached open space in Developing Urban areas. An appropriate area includes the entire width of the floodplain of a Major Open Space Arroyo or Major Open Space Link when left in a natural or semi-natural condition as defined in Chapter 11, less the amount of right-of-way that would be required for drainage control if a fully concrete lined 100-year channel were constructed. The landscaped area outside of a concrete channel of a Major Open Space Link is also appropriate for open space dedication.
- Acceptance of an appropriate area adjacent to a drainage channel as dedicated park land. An appropriate area includes the landscaped area outside of a lined channel. The City will evaluate park proposals on a case-by-case basis.
- Reservation of open space through site planning and open space easements, clustering development away from the arroyo with common open areas adjacent to it. Easements should be permanent and allow public access.
- Revision of existing easements or other agreements or development of supplementary agreements to allow permanent public recreational use.
- Purchase by the City of portions of land which cannot be obtained through dedication or easement. Potential sources of funds include the Open Space Acquisition Program and the Capital Improvement Program (CIP). However, the Open Space Trust Fund will not have additional funds available for the fee simple purchase of right-of-way until 1992. Right-of-way acquisition will be initiated upon adoption of an arroyo corridor plan, utilizing open space and park dedication procedures and/or the acquisition of recreational easements, until such time as funds are also available for the fee simple purchase of land.”

4. Implementation of Design Guidelines

“The design guidelines described in Chapter II will be implemented through specific design regulations established for individual arroyo corridor plans through Design Overlay Zones. Until arroyo corridor plans are adopted, the City Planning staff will review sector plans, subdivisions, and site plans against the design guidelines contained in this facility plan. Compliance with these guidelines is encouraged.”



## 5. Construction of Drainage Improvements

“On City-owned property, drainage improvements are the responsibility of the City. However, drainage improvements are typically constructed by the landowner in order to reclaim a portion of the floodplain for development prior to the construction of City improvements. Drainage improvements will be constructed in accordance with an adopted arroyo corridor plan, adopted drainage master plans, and City and AMAFCA policies on drainage improvements.

If the cost of the treatment selected by the arroyo corridor plan is significantly higher than a treatment type which would normally be allowed, the City will share in the cost of construction.”

## 6. Construction of Recreational Facilities and Other Public Improvements

“This facility plan recommends that the construction of recreational facilities as detailed in arroyo corridor plans shall be the responsibility of the Parks and Recreation Department. The Parks and Recreation Department will also oversee the installation of private improvements constructed in fulfillment of park dedication and development requirements.

If other public improvements such as streets or utility lines are required, a single, jointly-funded project shall be considered.”

## 7. Safety Programs

“Safety programs sponsored by the Mayor’s Office should be continued and expanded with emphasis on reaching schools which serve neighborhoods adjacent to arroyos and neighborhood organizations. Safety programs should promote awareness of the potential danger associated with arroyos, and what to do if someone is caught in a flooded arroyo. Neighborhood patrols during potential flood periods (late afternoons in July, August, September), as well as increased visibility promoted by design standards, can also increase safety.”

## 8. Maintenance

“Maintenance responsibilities will be shared by the MDD-Engineering Division, AMAFCA, and the City Parks and Recreation Department. This facility plan recommends that maintenance of recreational facilities, litter removal, and routine patrolling will be done by the Parks and Recreation Department, Open Space Division (Major Open Space Arroyos, Major Open Space Links, and arroyo segments within designated Open Space) or the Parks Management Division (Urban Recreational Arroyos). Drainage facilities should be maintained by the appropriate drainage authority — the Municipal Development Department or AMAFCA or in the case of drainage facilities specifically tailored to a park or open space design, the facility may be jointly maintained by the Municipal Development Department, AMAFCA, and the City Parks and Recreation Department according to a program which will be negotiated on a case-by-case basis.”

## 9. Modification to Existing Ordinances and Procedures

“To ensure that design objectives will be incorporated into sector development plans, subdivisions, and site plans, existing ordinances and administrative procedures should be modified to require that the policies contained in this facility plan be considered in the review process. This facility plan recommends that these modifications be completed by the Planning Division within six months after adoption of the plan.”

**APPENDIX B  
TRAIL DESCRIPTIONS , DESIGNS, AND COST ESTIMATES**

The purpose of this appendix is to provide the reader with a verbal and graphic representation of the Amole Arroyo Corridor Plan. All design elements crucial to the proper development of the Arroyo are included here. Immediately following the trail descriptions are estimated costs for the projects listed below.

**UPPER SEGMENT: CEJA TO 118TH STREET (NATURAL PORTION)**

**PROJECT:** 1. Overlook Park - A rest area and picnic facilities will be provided for users on the southeasternmost point of the Ceja (adjoining the Amole). This shelf provides the user with tremendous views in all directions and is quite suitable for such a facility. Included here will be picnic shelters, possible restroom facilities, naturalized land scaping, a drinking fountain, parking for trail users, and an unloading area for equestrians ( see sketch, p. F-1)

**PROJECT:** 2. Trails - From the rest area the trail will run north and south along the Ceja as well as follow the ridge line down toward the Westgate Detention Basin. The trail will be an unpaved bike/pedestrian/equestrian trail encompassing the existing road that traverses the ridgeline on the south side of the arroyo. The trail will need erosion control structures incorporated into the design to prevent further erosion of this fragile area.

Westgate Detention Basin - Due to the shape and topographical features of the Westgate Detention Basin, a number of uses could logically occur within the Dam. Any facility uses would have to be approved by AMAFCA. Parking along the perimeter could be easily accomplished for any authorized uses.

**PROJECT** 3. Nodal Park - Where the trail intercepts 118th Street, a nodal park will be provided for trail users that will also accommodate equestrians and horse trailers (6-10 trailers, 20 parking spots).

4. Road Crossings - A below-grade crossing will be provided when 118th Street is extended. This below -grade crossing will be a bike/pedestrian/ handicap accessible trail underpass. In addition, an at-grade crossing at the nearest signalized intersection will be provided and will include signed, striped cross-walks with pedestrian signals (located so that all users can reach it), landscaped median holding zones and signage indicating trail access points. At-grade crossings will occur at most collector streets and minor arterials.

INTERMEDIATE SEGMENT: WESTGATE DETENTION BASIN TO UNSER BLVD.  
(URBAN PORTION)

- PROJECT: 1. Atrisco Village Park - The Rio Bravo Sector Plan proposes an extension of the park eastward which will increase the park's size to roughly 10 acres. This may provide enough space for a junior league soccer field. Included in the expansion of the park could be restroom facilities, additional landscaping, park benches, and a sign displaying the arroyo trail and features of interest.
- PROJECT: 2. Urban Center Park - Where the Amole Arroyo intersects 98th Street, a nodal park should be provided. This will require dedication and will provide a rest area for trail users. Included should be a drinking fountain, park benches, shade trees, a kiosk, trail descriptions and maps, and possible restroom facilities. The park could focus on a large scale fountain constructed of quarried limestone or possibly precast concrete shapes (see sketch, p. F-2) that will be viewed by passing motorists.
- PROJECT: 3. Trails - From the Westgate Detention Basin to Delgado Drive there will be an unpaved pedestrian/bicycle trail (that will double as a maintenance road) on the south side of the arroyo. This portion of the arroyo should remain as natural as possible with rip-rap or gabions only where needed to control bank erosion and trail protection.
- PROJECT: 4. Trails - From Delgado Drive to 98th Street a paved bike/pedestrian/handicapped accessible trail 10-12' wide will be located on the south bank of the Amole within the existing dedicated open space easement. This trail will also be used for maintenance purposes by the City, County and AMAFCA as well as for rescue purposes, if necessary. The arroyo will be concreted and channelized, 35-45' in width.
- PROJECT: 5. Trails - From 98th Street to Unser Blvd. a paved, meandering bike/pedestrian/handicapped accessible trail 10-12' wide will be located on the east side of the Amole within the dedicated open space easement. This portion of the arroyo will have a low-flow design to accommodate a park like atmosphere through what is planned to be an Urban Center. There will be benches, trash receptacles, picnic tables and shade trees placed along the trail. The remaining R.O.W. will be sodded to soften the appearance of the arroyo channel and add to the park-like concept.

Connections - There will be trail connections at Delgado Drive to Carlos Rey Elementary School and the park, at Redondo Road and 98th Street to connect to Truman Middle School, the park, and adjoining neighborhoods, and at Blake Road to link neighborhoods to the east with the trail system.

6,7,8. Road Crossings - Below-grade crossings will be provided when Unser Blvd., Gibson Blvd., and 98th Streets are extended. Each of these below-grade crossings will be bike/pedestrian/ handicap accessible trail underpasses. In addition, at-grade crossings at the nearest signalized intersections will be provided and will include signed, striped cross-walks with pedestrian signals (located so that all users can reach it), landscaped median holding zones and signage indicating trail access points. At-grade crossings will occur at most collector streets and minor arterials.

6. Arroyo Crossings - A pedestrian/bicycle/handicapped accessible bridge crossing will be constructed over the arroyo channel at the north end of Messina Drive, providing access for the neighborhoods to the south of the arroyo to Atrisco Park .

7. Arroyo Design - From Delgado Drive to 98th Street, the arroyo will be channelized and concrete lined and will be a straight alignment design. From 98th Street to Unser Blvd., the arroyo will be channelized and concrete lined but will be a low-flow design and will meander through what is proposed as an Urban Center helping to create a park-like atmosphere. From Unser Blvd. to the Amole Detention Basin, the arroyo will be channelized and concrete lined and will be a straight alignment design.

LOWER SEGMENT: AMOLE DETENTION CENTER TO THE R.G.V.S.P. (RURAL PORTION)

Amole Detention Basin - The Amole Detention Facility could be used for a number of activities including a BMX track, skateboarding facility, graffiti competitions, etc. These activities are currently occurring in this area and could become part of the multiple use concept of Major Open Space Link Arroyos.

PROJECT: 1. Trails - From the Amole Detention Basin to the Gun Club Lateral a paved bike/pedestrian/handicapped accessible trail 10-12' wide will be located on the east and west bank of the arroyo. The trail will connect to the Gun Club Lateral and Pajarito trail system as well as intersect with Rio Bravo Blvd. where a trail is to be included when construction occurs.

PROJECT: 2. An unpaved equestrian/pedestrian/bike trail the width of the maintenance road along the east side of the Gun Club Lateral will continue southward from Rio Bravo Blvd. toward the Hubbell Oxbow and Pajarito trail system.

2.a. An unpaved equestrian/pedestrian/bike trail 10-12' wide will travel eastward along the southern edge of the Hubbell Oxbow Facility to Coors Blvd. where a mid-block crossing is to be constructed. The trail will continue eastward along the southern boundary of privately owned farmlands (east of Coors Blvd.) until it intercepts the Los Padillas Drain. This will require the dedication of R.O.W. through the private farmlands east of Coors Blvd. The trail will continue eastward down the Los Padillas Drain until it reaches the Pajarito Lateral. Traveling North-easterly, the trail then intercepts the Atrisco Riverside Drain and the R.G.V.S.P.

2.b. Alternative Trails - The primary trail alternative will begin where the Amole Arroyo meets Rio Bravo Blvd. A paved pedestrian/bike/handicap accessible trail 10-12' wide will travel easterly toward the intersection of Coors Blvd. and Rio Bravo Blvd. The trail will then cross over Coors Blvd. to the northeastern corner of the intersection where it will connect with the Arenal Canal. The trail will continue easterly until it reaches the Armijo Drain and follow the Armijo Drain to Del Rio Road. The trail will then proceed south and cross Rio Bravo Blvd. to Sausalito Road, then easterly until it intersects the Pajarito Drain. The trail will then follow the Pajarito Drain until reaching the Atrisco Riverside Drain and the R.G.V.S.P.

3. Road Crossings - There will be mid-block crossings where the trail intersects Coors Blvd. and Isleta Blvd.

4. Parking - There will be a parking facility at the intersection of Rio Bravo and Condershire Drive which will accomodate 15-20 vehicles.

5. AMAFCA Hubbell Oxbow - The Hubbell Lake Detention Facility was for mally an Oxbow created by the meandering character of the Rio Grande River. It now serves as a catch basin for run-off in the area and is rich with riparian flora and fauna. It is a very unique area and great care should be taken to preserve it in

its natural state. The Amole trail system will connect with the Pajarito trail system via the Gun Club Lateral giving trail users the opportunity to experience the Oxbow. An 8' wide pedestrian, bicycle, handicapped accessible trail will allow trail users to experience the Oxbow through visual and descriptive interpretations strategically placed along the trail. These descriptors will be used as an educational tool pointing out different vegetative and habitat features found along the trail's path. Attempts should be made to keep all vehicular traffic from entering this area. Picnic Areas should also be incorporated into the design of this area

6. Hubbell Farmlands - The farmlands to the north of the Hubbell Lake Detention Facility are in private ownership and have been targeted by Bernalillo County for the purchase and development of a regional recreational facility. The City of Albuquerque supports this concept and would be interested in working collectively with Bernalillo County in the development of this area.

Currently, these farmlands provide food and shelter for a wide range of animal life and attempts should be made to maintain an environment that is beneficial for the animal populations in and around the area.

6.a. The preferred alternative for development is a regional park. The park will incorporate softball fields, a little league field, soccer and football fields, a horse staging area and an arena for equestrian competitions. There will also be restroom facilities, parking areas, water fountains, and a large area dedicated for the propagation of trees, shrubs, and sod. The remainder of lands will be used for passive recreation purposes.

## CAPITAL PROJECT COST ESTIMATES

Starting in 1993, general obligation bonds, phased over several cycles will probably be the primary source of funding for Amole Arroyo Corridor projects. The Mayor's proposed General Obligation Program in the Decade Plan includes funds for recreational trail development in each two-year bond cycle. Urban Enhancement Trust Funds may also be available for some projects. Some trail landscaping and maintenance may be undertaken by adjacent neighborhoods or other groups interested in adopting trail segments.

Most of the following cost estimates were developed by the City of Albuquerque Parks and Recreation Department and the Open Space Division of the Land Resources and regulations Department. These two City departments will be primarily responsible for implementing corridor projects, although some interdepartmental and interagency coordination will be necessary for street crossings and connections through County Public Works projects.

Contingencies, design costs and indirect costs such as the 5.6% indirect overhead costs are not included in the estimated capital project costs. These items could add 25% or more to the cost estimates shown. Costs estimates are not developed for some individual items such as extraordinary grading and land acquisition.

The following assumptions apply to the estimated costs:

1) \$12 a linear foot is generally used for asphalt trails with a width of 10-12'. This cost includes minimal grading, access control at streets, minimal railings, and some revegetation for areas disturbed by trail development. This cost assumes that a majority of the trail development will take place in conjunction with the recommended drainage improvements in the area.

2) Sand seal cost estimates are old. The National Park Service expended \$5.54 per linear foot in an Arizona Park Project in the early 1980's. More detailed information on the costs for this treatment will be available as it becomes more readily used in Albuquerque.

3) Rest stops include costs for a simple shade structure and seating. Trees can be used for shade if a permanent irrigation system can be installed using adopt-a-park money or be extended from nearby park facilities.

4) Rough estimates made for the landscaping assume native or drought tolerant shrubs with a drip irrigation system that may be abandoned after a two year establishment period.

5) Extraordinary grading refers to anything more than leveling a trail with minimal cut and fill.

**Amole Arroyo Corridor Plan  
Fiscal Impact Analysis  
June 1991**

This brief fiscal impact analysis for the Amole Arroyo Corridor Plan includes estimated costs for capital projects and estimated annual operating costs for proposed trail segments. Annual operating costs are based on formulas supplied by the Parks and Recreating Department and the Open Space Division of the Land Resources and Regulation Department. Plan project implementation will probably be phased over several bond cycles and be funded primarily with general obligation bonds. Trail implementation is dependent upon drainage improvements and development of the area.

**CAPITAL COSTS**

**Parks and Recreating Department**

Westgate Detention Basin to the Gun Club Lateral.	1,001,235
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**Open Space Division, Land Resources and Regulations Department**

Westgate Detention Basin to the Overlook Park	<u>215,846</u>
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<b>Estimated Total Capital Costs:</b>	<b>1,217,081</b>
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**ANNUAL OPERATING COSTS**

**Parks and Recreation Department**

<p>Cost estimates assume \$2300 per acre per year for water, labor vehicle maintenance, etc. for approximately 7 acres (17,200 linear feet or 3.25 miles) of trail corridor.</p>	27,600
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Acreage is calculated by multiplying linear feet of proposed trails by 20 feet (for trail and landscaping).

This cost estimate does not include maintenance for Atrisco Village Park.

**Open Space Division**

<p>Cost estimates assume up to 68¢ a linear foot of trail for a 2,600' trail.</p>	<u>1,768</u>
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Costs include overhead, Open Space area protection, repairs, maintenance and other operating expenditures such as funding an outdoor education program.

<b>Estimated Total Annual Operating Costs:</b>	<b>29,368</b>
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## Summary of Roughly Estimated Capital Project Costs (1990 \$'s)

The following rough cost estimates are meant only to assist in decision making. Estimated total costs for the entire corridor may rise considerably when more detailed cost estimates including items like extraordinary grading are developed for engineering design and construction. The following corridor section subtotals include an additional 25% for contingencies, probable design costs and indirect costs. Costs include optional items or the upper range of costs per item.

### Upper Section

Project 1: Overlook Park	187,490
Project 2: Trail from Ceja to Westgate Detention Basin	28,356
Project 3: Nodal Park	<u>67,280</u>
<b>Estimated Total Cost for Upper Section:</b>	<b>\$283,126</b>

### Intermediate Section

Project 1: Atrisco Village Park Expansion	-----
Project 2: Urban Center Park	373,900
Project 3: Trail from Westgate Detention Basin to Delgado Drive	30,875
Project 4: Trail from Delgado Drive to 98th Street	139,470
Project 5: Trail from 98th Street to Unser Boulevard	<u>187,405</u>
<b>Estimated Total Cost for Intermediate Section:</b>	<b>\$731,650</b>

### Lower Section

Project 1: Trail from Amole Detention Basin to the Gun Club Lateral	202,305
Project 2: Trails from Amole Arroyo N. & S. Along Gun Club Lateral	-----
<b>Estimated Total Cost for Lower Section:</b>	<b><u>202,305</u></b>

<b>Estimated Total Cost for Entire Corridor</b>	<b>1,217,081</b>
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**Note:** The Amole Arroyo trail corridor will cross four roadways as shown on the Long Range Major Street Plan. At the time the roadways are developed, below grade trail crossings should be built to accommodate a continuous trail system. Costs for these trail crossings are not included in this plan because the timeframe for the roadways is uncertain and the costs may be incorporated into the roadway costs. The City and County Public Works departments will be responsible for the roadway projects.

UPPER SECTION-CEJA TO WESTGATE DETENTION BASIN (NATURAL)

PROJECT I OVERLOOK PARK (ESTIMATED AT 3.5 ACRES)

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
Landscaping		
Native Grass Seeding	3.5 Acres	\$ 30,492
Shrubs	400	10,000
Meters & UEC	Lump Sum	10,000
Irrigation		15,000
Mulch		<u>4,000</u>
Subtotal		\$ 69,492
Signs	1 Major & Miscellaneous	\$ 3,500
Picnic Shelters	6@\$7,500	45,000
Picnic Tables	6@\$ 600	3,600
Trash Receptacles	6@\$ 400	2,400
Restroom Facilities (Optional)		25,000
Drinking Fountain		1,000
Horse Unloading & Rest Area	Unknown	
Hitching Post	Unknown	
Shade Area	Unknown	
Parking Area	Unknown	<u>          </u>
Subtotal		\$ 80,500
Total for Project I:		\$149,992

UPPER SECTION-CEJA TO WESTGATE DETENTION BASIN (NATURAL)

PROJECT 2 - TRAIL FROM CEJA TO WESTGATE DETENTION BASIN

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
Unpaved Multi-purpose Trail	2600 L.F.	\$ 13,000
Pipe Gates with Removable Bollards	2@ \$700	1,400
Landscaping/Seeding	.59 Acre	1,285
Signs: Trailhead & Interpretive	2 Major & Miscellaneous	5,000
Extraordinary Grading		1,000
Erosion Control Structures		1,000
Total for Project 2:		<u>\$22,685</u>

UPPER SECTION - CEJA TO WESTGATE DETENTION BASIN (NATURAL)

PROJECT 3- NODAL PARK - 118TH STREET AND GIBSON BOULEVARD

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
Landscaping		
Native Grass Seeding	2 Acres	\$17,424
Shrubs	200	5,000
Meters and UEC	Lump Sum	6,400
Irrigation		7,500
Mulch		<u>3,500</u>
Subtotal		\$39,824
Signs		
	1 Major & Miscellaneous	\$ 3,500
Rest Stops	3 @ \$2,500	7,500
Horse Unloading & Rest Area	Unknown	
Hitching Post	Unknown	
Shade	Unknown	
Water spout/piping backflow		<u>3,000</u>
Subtotal		\$14,000
Total for Project 3:		\$53,824

\*Note: This Nodal Park is primarily intended to accommodate equestrians and horse trailers. The appropriateness of landscaping will have to be determined when the area develops.

INTERMEDIATE SECTION - WESTGATE DETENTION BASIN TO UNSER BOULEVARD  
(URBAN)

PROJECT 1: ATRISCO VILLAGE PARK EXPANSION

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
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NOTE: COSTS FOR THE ATRISCO VILLAGE PARK EXPANSION WILL BE DEVELOPED AS PART OF A MASTER PLAN FOR THE SITE BY THE PARKS AND RECREATION DEPARTMENT.

**INTERMEDIATE SECTION - WESTGATE DETENTION BASIN TO UNSER BOULEVARD  
(URBAN)**

**Project 2: URBAN CENTER PARK (ESTIMATED AT 4 ACRES)**

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
<b>Landscaping</b>		
Sod	4 Acres	\$87,120
Trees	60	6,000
Shrubs	400	10,000
Meters & UEC	Lump Sum	20,000
Irrigation		35,000
Mulch		10,000
<b>Subtotal</b>		<u>\$168,120</u>
Signs	2 Major & Miscellaneous	\$ 5,000
Rest Stops	6 @ \$3,500	21,000
Picnic Tables and Furniture		25,400
Trash Receptacles	9 @ \$ 400	3,600
Restroom Facilities (Optional)		25,000
Water Fountain (Optional)		50,000
Drinking Fountain		<u>1,000</u>
<b>Subtotal</b>		<b>\$131,000</b>
<b>Total Cost For Project 2:</b>		(*HIGH) \$299,120 (*LOW) \$224,120

\*Note: Costs do not include values for parking and roadways.

INTERMEDIATE SECTION - WESTGATE DETENTION BASIN TO UNSER BOULEVARD  
(URBAN)

PROJECT 3: TRAIL FROM WESTGATE DETENTION BASIN TO DELGADO DRIVE

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
Unpaved Multi-purpose Trail	3600 L.F.	\$18,000
Pipe Gates with Removable Bollards	2 @ 700	1,400
Landscaping/Seeding	.8 Acre	1,800
Signs:	1 Major & Miscellaneous	3,500
Extraordinary Grading	Unknown	<hr/>
Total For Project 3:		\$24,700

**INTERMEDIATE SECTION - WESTGATE DETENTION BASIN TO UNSER BOULEVARD  
(URBAN)**

**PROJECT 4: TRAIL FROM DELGADO DRIVE TO 98TH STREET**

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
Asphalt Trail	4400 L.F.	\$52,800
Sand (Optional)	4400 L.F.	24,376
Pipe Gates with Removable Bollards	2@\$700	1,400
Landscaping		
Shrubs	440	\$11,000
Meter with UEC	(3) 3/4"	7,500
Drip Irrigation	Lump Sum	10,000
Mulch		4,000
Subtotal		<u>\$32,500</u>
Extraordinary Grading		<u>\$ 500</u>
Total for Project 4:		(*High) \$111,576
		(*Low) \$87,200
		(*Low) \$87,200



**INTERMEDIATE SECTION - WESTGATE DETENTION BASIN TO UNSER BOULEVARD  
(URBAN)**

**PROJECT 5: TRAIL FROM 98TH STREET TO UNSER BOULEVARD**

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
Asphalt Trail	5600 L.F.	\$67,200
Sand (Optional)	5600 L.F.	31,024
Pipe Gates with Removable Bollards	6 @ \$ 700	4,200
Landscaping		
Shrubs	650	16,250
Meters with UEC	(3) 3/4"	7,500
Drip Irrigation	Lump Sum	10,000
Mulch		<u>4,000</u>
Subtotal		37,500
Signs	2 Major & Miscellaneous	5,000
Rest Stops	2 @ \$2,500	5,000
Extraordinary Grading	N/A	
		<hr/>
Total For Project 5:		(*HIGH) \$149,924 (*LOW) \$118,900

LOWER SECTION: AMOLE DETENTION BASIN TO R.G.V.S.P.  
(Rural)

PROJECT 1: TRAIL FROM AMOLE DETENTION TO THE GUN CLUB LATERAL

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
Asphalt Trail	3600 L.F.	\$43,200
Sand (Optional)	3500 L.F.	19,944
Pipe Gates with Removable Bollards	4 @ 700	\$ 2,800
Landscaping		
Shrubs	620	15,500
Meters with UEC	(3) 3/4"	7,500
Drip irrigation	Lump Suim	10,000
Mulch		<u>4,000</u>
Subtotal		\$37,400
Signs	1 Major & Miscellaneous	\$ 3,500
Rest Stops	1 @ 2500	2,500
Extraordinary Grading		2,500
Bridge over Amole		\$50,000
		<hr/>
Total for Project 1:		
	(*HIGH) \$161,844	
		(*LOW) \$141,900

LOWER SECTION - AMOLE DETENTION BASIN TO R.G.V.S.P.  
(RURAL PORTION)

PROJECT 2: TRAILS FROM AMOLE ARROYO N. AND S.ALONG GUN CLUB LATERAL

<u>ITEM</u>	<u>QUANTITY</u>	<u>COST</u>
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Unpaved trail northeast to Coors Blvd. Grading & Maintenance	4,100 L.F.	
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Cost

Unpaved trail South to Gun Club Rd. Grading and Maintenance	3,100 L.F.	
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Total for Project 2:

Note: Prior to any use of the Gun Club Lateral Rights-of-Ways, joint-use agreements will not have to be negotiated with MRGCD. Costs have not been developed for this section as the appropriate design for a trail has not been finalized.

## APPENDIX C ALTERNATIVE ARROYO DESIGN TREATMENTS

### Introduction

This section of the plan reviews alternative design solutions for channel treatment, trails, and road crossings presented to the Citizens Advisory Group and the Technical Team during the planning process. Appropriate alternatives will be discussed to help in the selection of the most feasible and acceptable way(s) to achieve the goals identified in the previous sections of this plan.

### **CHANNEL TREATMENT ALTERNATIVES**

As explained in the existing conditions of this plan, the Amole Arroyo and its drainage basin are currently undeveloped. As development occurs, the characteristics of the drainage basin will be altered. Decreased volumes of sediment and increased volumes of water will be introduced into the drainage channel forcing the design of the arroyo to better control erosion and protect infrastructure improvements adjacent to the arroyo. There are several channel treatments that can be used on the Amole Arroyo.

### Grade Control Structures

This type of channel treatment would reduce the slope of the arroyo bed. The advantages and disadvantages of this alternative are presented:

#### Advantages;

- a) Reduces discharge velocities and erosion
- b) Allows re-establishment of vegetation
- c) Provides for wildlife habitat
- d) Moderate construction costs

#### Disadvantages;

- a) Requires extensive grading of arroyo bed which would destroy existing vegetation and damage the natural character of the arroyo.
- b) If check dams are improperly designed, the arroyo will begin to meander or possibly undercut the structures.
- c) Run-off from low -flow occurrences tend to infiltrate behind the riprap or gabions and undermine the subgrade.
- d) The check dams would increase the cost of a trail network in the bottom of the arroyo by creating the need for bypass routes.
- e) Maintenance in and around these areas would increase.
- f) Additional right-of-way would be required.
- g) Highly erosive conditions of the arroyo negate the use of this treatment.

### Concrete Channel Lining

As proposed in the Rio Bravo Sector Plan, the arroyo will be relocated, channelized and concrete lined. The size of the trapezoidal channel required has not yet been determined but would require approximately 50 feet of right-of-way and a depth of 5-10 feet depending on allowable introduced flows in the area. The advantages and disadvantages of concrete channel lining are as follows:

#### Advantages;

- a) Reduces right-of-way requirements.
- b) Reduces maintenance costs.
- c) Eliminates erosion potential in channel.
- d) Hydraulic design is more predictable.
- e) Eliminates the possibility of bank cave-ins.
- f) Minimizes floodplain width, making access by rescue personnel easier.

#### Disadvantages;

- a) Destroys natural character of the arroyo.
- b) Requires the construction of energy dissipation structures at channel outfall locations.
- c) Cost of construction substantially increases.
- d) Attracts skateboarding and graffiti.

### Prudent Line

The prudent line approach consists of designating a no-development zone immediately adjacent to the arroyo through analysis of sedimentation and erosion. This will allow the arroyo to maintain its natural vertical and lateral migration without threatening public or private property. This type of approach has already been implemented in the Calabacillas Arroyo by AMAFCA. The no-development zone boundary is termed the "prudent line".

The prudent line is an erosion risk and/or floodplain boundary on both sides of the arroyo where development would not be prudent. It is defined as follows: ' The boundary of that area within which development is not prudent because of potential flood and erosion damage due to long term cumulative lateral erosion of channel banks over a 50 year period and due to a single 100 year flood event which occurs at any time during that 50 year period'.

The established methods used to determine the prudent line include quantitative and qualitative analyses of the arroyo. The qualitative analysis is based on knowledge and application of geomorphic principles. The quantitative analysis is based on more complex hydraulic and geomorphic relationships and basic engineering relationships, specifically sediment yield and transport capacity, hydraulics, hydrology, and statistics.

There has been no prudent line study done for the Amole Arroyo, but given the limited area that the prudent line approach will be applied to, a qualitative analysis has been done by studying historical geometrical changes through the analysis of aerial photographs, field observations, reviewing existing FEMA floodplain, and estimating potential channel re-alignment and erosion limits. These are the techniques used to assess the qualitative aspects of prudent line development. A quantitative analysis will be required to more accurately define the prudent line in the future.

The advantages and disadvantages of the prudent line are:

Advantages;

- a) Maintains the natural character of the arroyo.
- b) Allows for continued growth and development of natural vegetation.
- c) Preserves habitat for wildlife.
- d) Provides wide corridor for trail development.
- e) Allows for unimproved trail in arroyo bottom for equestrians.
- f) Provides flood protection for frequencies in excess of the 100 year flood.
- g) Because of reduced velocities, vegetated banks, and frequent meanders, exit from the flowing arroyo or rescue would be made easier.
- h) Minimal construction costs.
- i) Natural groundwater recharge.
- j) Minimal topographic disturbance.
- l) Eliminates the potential for graffiti

Disadvantages;

- a) Requires substantial right-of-way.
- b) Requires outfall structures where urban run-off is introduced.
- c) Maintenance required exceeds what is required for concrete channel.
- d) Requires extensive engineering analysis and judgement to determine prudent line.

## Drainage Recommendations

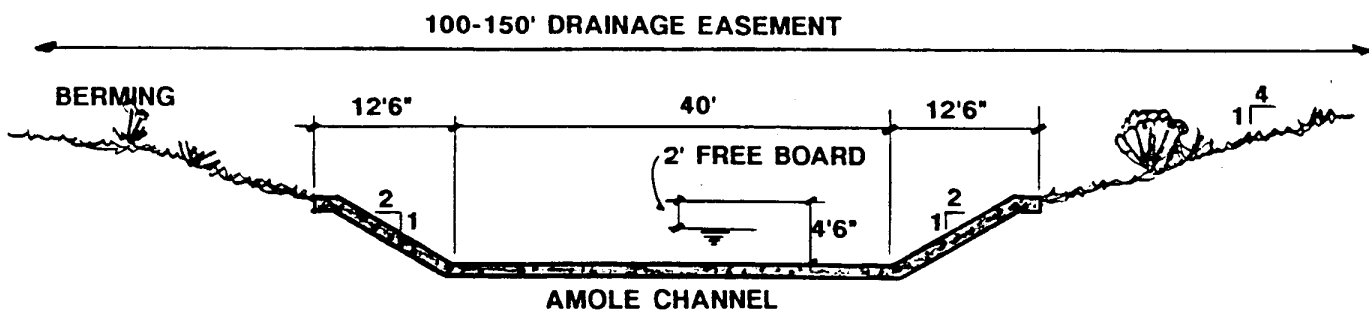
The upper reaches of the arroyo still remain in a natural state and offer the user a unique opportunity to experience the natural characteristics and geological formations of the arroyo and Ceja area. The slopes in the upper reaches of the arroyo are in excess of nine percent (9%) and should not be disturbed. It is for these reasons that the prudent line alternative is preferred on the upper reaches of the arroyo. The goal of keeping part of the arroyo in its natural state is achieved while also serving the primary function of flood control. In addition, a cost comparison shows that the prudent line approach is the least expensive alternative available.

The least acceptable alternative is the concrete channel lining primarily because of the destruction of the natural character of the arroyo and the narrow, aesthetically unattractive corridor this alternative creates. However, The Rio Bravo Sector Plan calls for the relocation and concrete channelization of the Amole Arroyo from Atrisco Park to the Amole Detention Facility. If channelization and concrete lining are to occur, a low-flow channel design would be preferred with additional right-of-way dedicated for the creation of a park-like appearance along the arroyo (see figure 12).

It is important that there be design and engineering consideration given to the re-entry of channelized flows into soft lined areas downstream to prevent substantial maintenance, clean-up, and possibly the costs of hardlining the channel or otherwise handling downstream flows. These capital costs are normally borne by the private sector, but where downstream development is not ready to proceed, the public sector may have to pay for the needed improvements.

The drainage management plans recommended here are reasonable from both the public and private sector points of view. The value of the property required for the prudent line approach will be offset by the reduced capital cost for construction of a concrete arroyo channel. Treatments should be required in the adoption of a drainage management plan that does not cost landowners substantially more than a concrete channel to accommodate the 100-year flood with associated right-of-way requirements in either land or capital costs, unless either AMAFCA, the City, or County chooses to fund the difference.

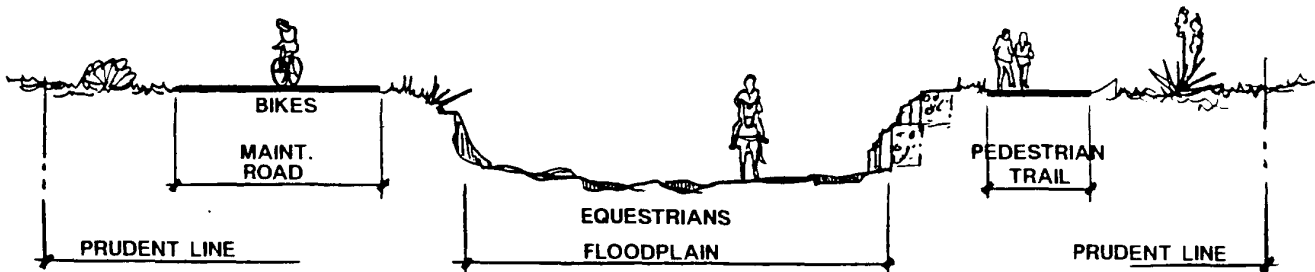
FIGURE 15-LOW FLOW CHANNEL DESIGN



## AMOLE ARROYO TRAIL ALTERNATIVES

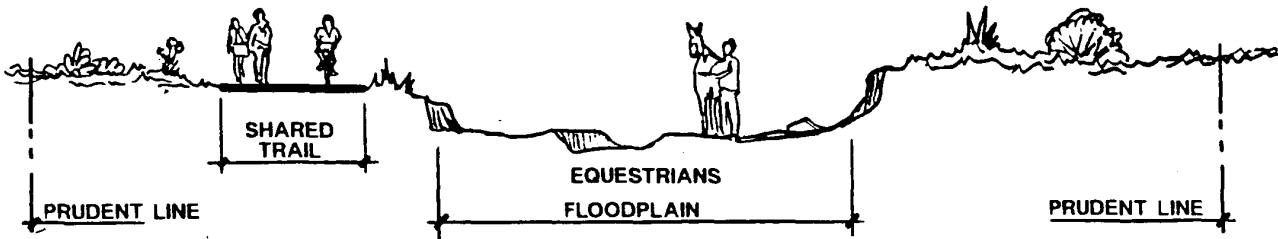
Trail alternative 1 as shown in figure 16 has three separate trails for pedestrians, bicyclists, and equestrians. The pedestrian trail would have a surface of crushed gravel with a compacted earth sub-grade. The bicycle trail would be a porous pavement or asphalt surface and the equestrian trail would be confined to the unimproved bottom of the arroyo. This trail design should be limited to the upper reaches of the arroyo but is not the preferred trail because of the separate trail design that would allow greater disturbance of the sensitive areas in the upper reaches of the arroyo.

FIGURE 16-TRAIL ALTERNATIVE 1



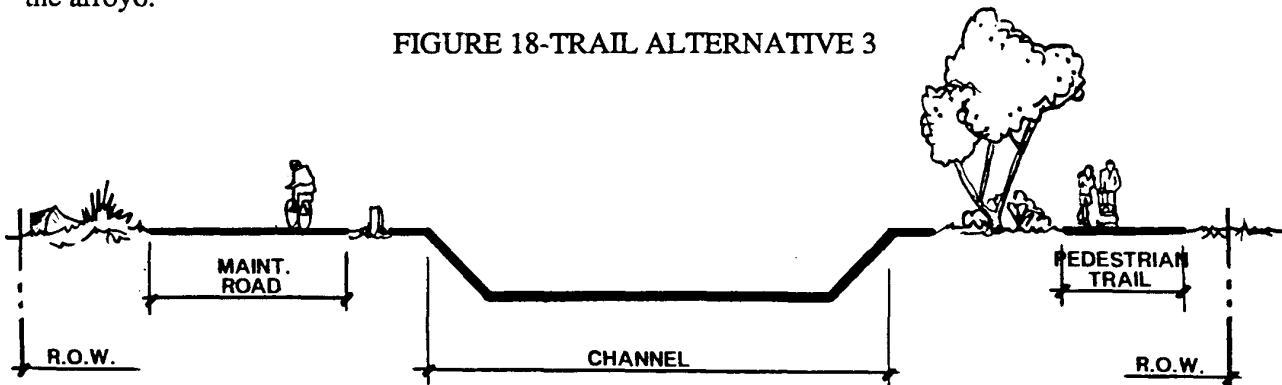
Trail alternative 2 as shown in figure 17 consists of one trail, 10-12 feet wide and would accommodate both pedestrians and bicyclists on the arroyo bank, above the 100-year flood. The combination trail would be of porous asphalt or pavement. The equestrian trail would be in the undeveloped bottom of the arroyo. This trail is the preferred trail for the upper reaches of the Amole Arroyo where the prudent line approach is recommended.

FIGURE 17-TRAIL ALTERNATIVE 2



Trail alternative 3 as shown in figure 18 also contains two trails, one for bicyclists and pedestrians and a second, unimproved maintenance road, both out of the arroyo floodplain. The maintenance road would be compacted earth covered with crushed gravel and would be located opposite the pedestrian/bicyclist trail on the other side of the arroyo. This is the preferred trail for the intermediate and lower portions of the arroyo.

FIGURE 18-TRAIL ALTERNATIVE 3





Trail 2 is the preferred trail for the following reasons:

- a) The equestrians did not feel the need for a separate trail along the rim of the arroyo.
- b) There was a general consensus that if the equestrians use the arroyo bottom, the potential erosion damage will be minimized.
- c) Pedestrians and bicyclists did not feel it necessary to have separate trails.
- d) The equestrians felt that the unpaved maintenance road required could be used by them if they so choose.

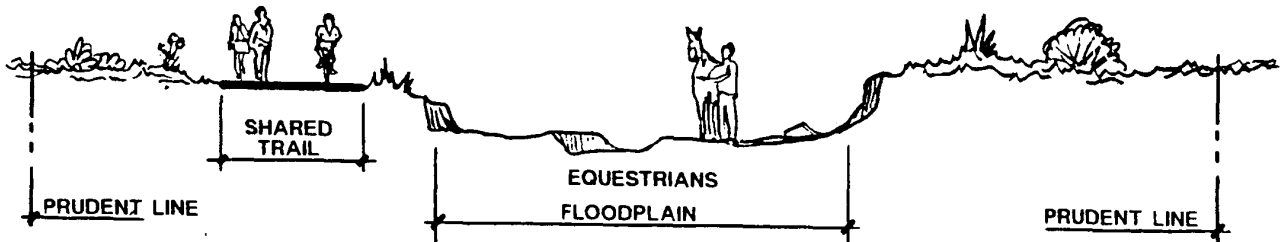
The plan requires a 32' easement be dedicated for trail development if the arroyo is channeled. The following methodology was used to arrive at this figure:

For safety reasons, traffic engineers require a 10-12' bicycle path. An additional 10' is needed on each side of the trail for;

- 1) setback from the channel for safety of trail users;
- 2) development of a landscaped buffer\*
- 3) privacy of adjacent development, i.e. setback of trail from adjoining private property.

\* Tractors, mowers, seeders, etc. require widths in the neighborhood of 8-10'. These equipment types will be needed to develop and maintain public trail corridors. Also, certain varieties of native trees have root and crown requirements which necessitate rights-of-way of these widths.

FIGURE 19-TRAIL ALTERNATIVE 2



## **GUN CLUB LATERAL IMPROVEMENTS**

The specific design problems and concerns that must be resolved in order to develop trails along the Gun Club Lateral are:

- 1) that the trails provide a reasonable degree of safety for trail users.
- 2) that the design preserves or enhances the rural character of the lateral.
- 3) that the design reduces or is compatible with MRGCD maintenance practices.

Physical conditions vary along the length of the Gun Club Lateral from the Amole Diversion Channel to Gun Club Road. There are several segments where the service road is narrow and the side slopes are very steep. These segments could be widened by grading the lateral embankment within the existing right-of-way to provide a minimum separation of five feet between the trail and the lateral and also between the trail and the embankment edge. In addition, there is only one service road along the east side of the lateral from approximately Gun Club Road to the Amole Diversion Channel. In this segment the invert of the lateral is approximately ten to fifteen feet below the service road and the side slopes going down into the Hubbell Lake Detention Basin drop twenty to twenty-five feet in elevation almost vertically. In this segment the service road should be widened, the slope should be decreased and the width between the lateral and the trail increased. However, this segment is lined by a row of mature cottonwoods that should be preserved and any grading should not disturb them.

Every few years the MRGCD removes sediments from the lateral by dredging. Typically the sediments are spread out along the top of the lateral embankment. Coordination with the County must occur in order to allow the County to keep the trail free from debris after dredging. MRGCD mows the vegetation that grows along the lateral during the irrigation season with a tractor equipped with a bush hog and hauls the debris away.

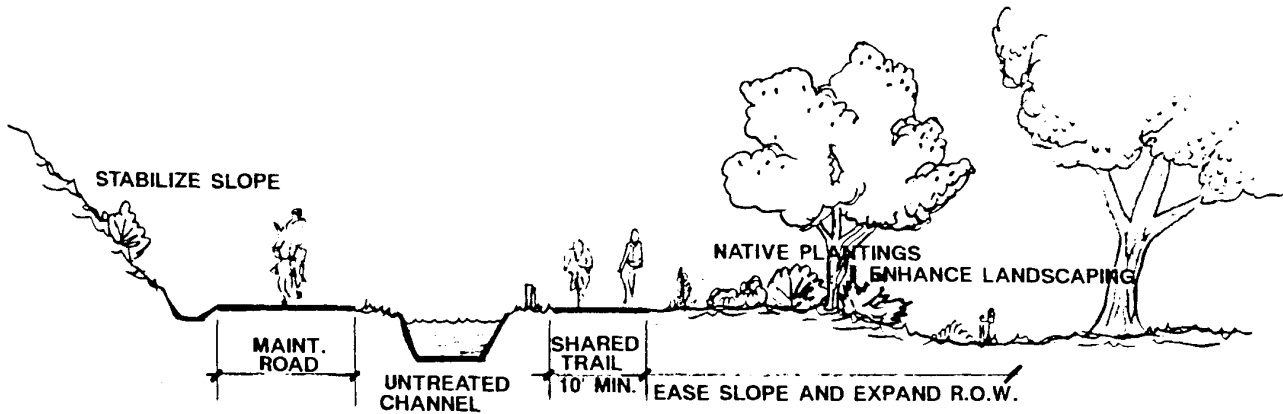
Options for improvements to the Gun Club Lateral were presented to the Citizens Advisory Group and Technical Team. These improvements are intended to resolve trail placement, safety and maintenance issues at different locations along the lateral.

One option consisted of the following:

- 1) a paved combination pedestrian/bicyclist trail, with an equestrian trail either between the combination trail and the channel or on the service road;
- 2) a mowing-strip/curb or native landscaping separating the trails and the channel;
- 3) a four inch thick un-reinforced concrete channel lining that will:
  - a). increase the hydraulic efficiency of the channel, thereby reducing the deposition of sediments;
  - b) reduce channel width;
  - c) reduce or eliminate need for mowing vegetation along the ditch bank;
  - d) facilitate rescue or exit from the ditch by providing gentle side slopes and access ladders.

The problem with this option is that it requires hardlining the lateral which is a big expense and detracts substantially from the rural character of the trail. Instead it is recommended that the County and MRGCD coordinate lateral maintenance with trail maintenance. A paved bike/pedestrian trail should be developed to connect the Pajarito system to the Amole system and Hubbell Oxbow park facilities. Paved trails should not enter the Hubbell Lake Basin. North of Gun Club where the service road is only on one side of the lateral, the equestrian trail should drop down to the Hubbell Lake Basin and run adjacent to the bike trail next to the Gun Club service road embankment.

**FIGURE 20-GUN CLUB LATERAL  
SECTION VIEW LOOKING NORTH**



**GUN CLUB LATERAL-LOOKING NORTH**

## **ROAD CROSSING ALTERNATIVES**

### **INTRODUCTION**

To ensure trail use the Amole trail system will provide pedestrians, bicyclists, and equestrians with a safe means of crossing roadways including local streets and minor or major arterials while remaining sensitive to traffic needs.

The basic alternatives for road crossings are at-grade street crossings, below-grade (underpass) and above-grade (overpass). The road crossing alternatives were discussed with both the Citizens Advisory Group and the Technical Team. The advantages and disadvantages of each road crossing type and the issues identified are discussed in the following paragraphs. Assessments were made for each road crossing type with the Trail Standards as a design guide.

### **AT-GRADE**

#### **Advantages**

- a) Low capital construction costs for medians and signage.

#### **Disadvantages**

- a) At-grade signalized crossings on major arterials at locations other than street intersections are not desirable because of the interruption of traffic flow and signal progressions.

- b) Limiting of at-grade signalized crossings to street intersections would require the trail to be diverted from the arroyo to the nearest street intersection, thereby interrupting the continuity of the trail.
- c) Equestrians expressed a preference for grade-separated crossings for major arterials to avoid potential conflicts with traffic.

#### ABOVE-GRADE

##### Advantages

- a) Increased safety for pedestrians and bicyclists due to separation of the traffic from trail users.
- b) Continuity of the trail is maintained.

##### Disadvantages

- a) High capital construction costs for bridge structure.
- b) Not preferred by equestrians if other solutions are possible since use requires special training for horses.
- c) Less direct and convenient route than at-grade or below-grade.

#### BELOW-GRADE

##### Advantages

- a) Increased safety for pedestrians, bicyclists, and equestrians due to separation of traffic and trail users.
- b) Continuity of trail is maintained.

##### Disadvantages

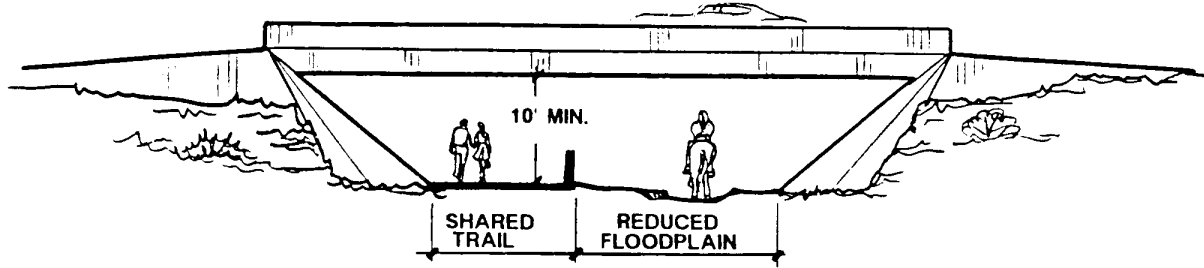
- a) Higher capital construction costs for bridge structure.
- b) Potential higher annual maintenance costs to control sediment and debris.

#### PREFERRED ALTERNATIVE

The Citizens Advisory Group identified the below-grade crossing as the most desirable alternative for crossing arterial streets because it provides the safest and most convenient means of road crossings for all three types of trail users. Three below-grade road crossing alternatives were presented to the Citizens Advisory Group and Technical Team and are described as follows:

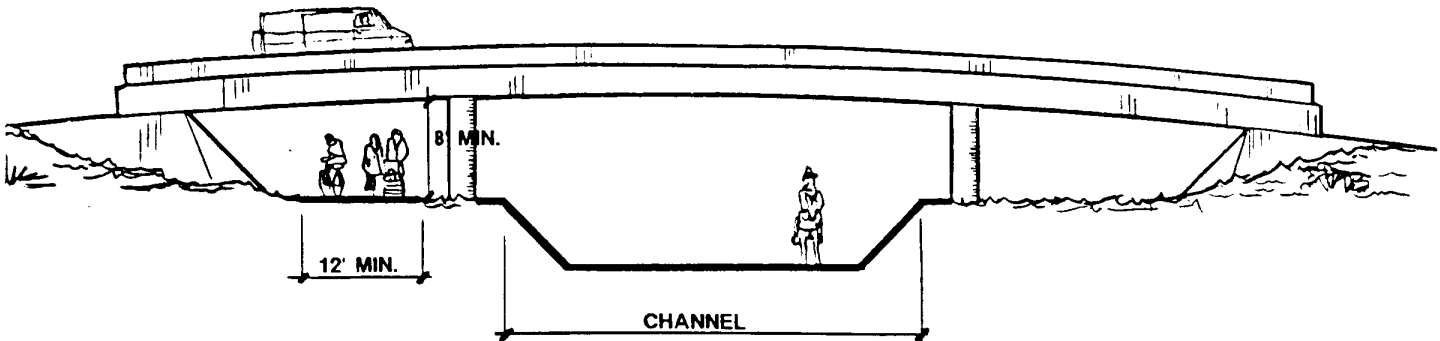
Alternative 1 as shown in Figure 21 consists of a modest bridge structure combined with a floodwall. The floodwall is provided to reduce the clearance height requirement for the bridge and to protect trail users from floodwaters. An access trail within the arroyo would be provided to allow access by equestrians. A drop structure and stilling basin would be provided downstream from the bridge to reduce exit velocities and to allow site drainage of the underpass. This alternative was viewed as the most desirable.

**FIGURE 21- ROAD CROSSING ALTERNATIVE 1**



Alternative 2 as shown in Figure 22 consists of a large bridge structure with sufficient width to span the entire prudent line and sufficient height for the trail to continue underneath unaltered. No erosion protection or stilling basin would be required since adequate protection is provided by the land within the prudent line. This alternative was acceptable, however it was generally considered cost prohibitive.

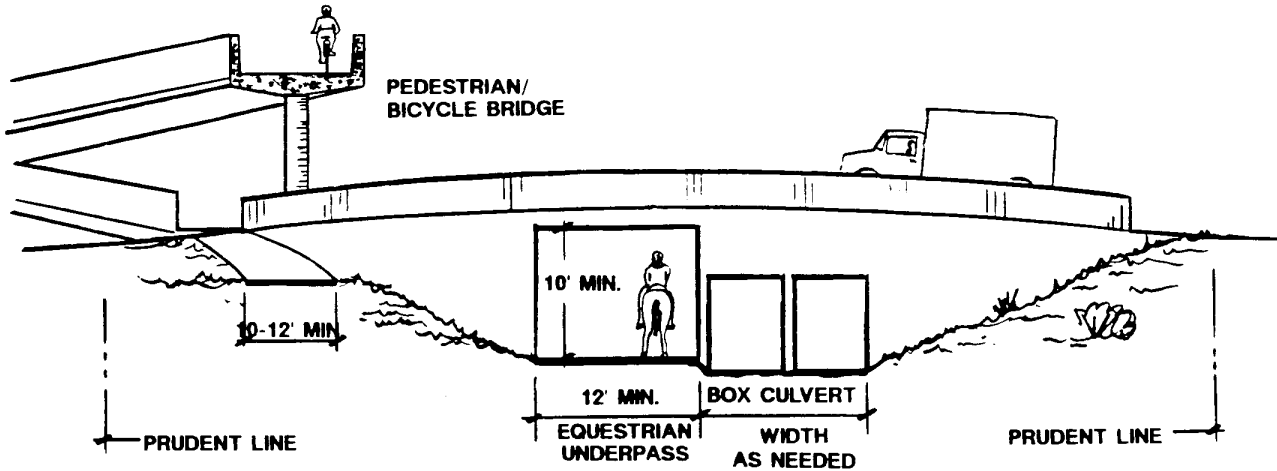
**FIGURE 22 - ROAD CROSSING ALTERNATIVE 2**



Alternative 3 as shown in Figure 23 consists of concrete box culverts to convey the arroyo discharge and a separate tunnel to provide an underpass for equestrians. A pedestrian and bicyclist overpass would also be provided as an alternative to the underpass. A drop structure and stilling basin would be provided downstream of the bridge to reduce exit velocities and to allow for site drainage of the underpass. This alternative was determined as the least desirable, and unacceptable in cases where the tunnel length exceeds seventy five (75) feet due to the following reasons:

- a) Artificial lighting would be required.
- b) The unattractive, dark, confined tunnel would be a threatening and uninviting environment that neither horses nor humans would be comfortable in using.
- c) Because of the threatening nature of the tunnel, pedestrians, equestrians and bicyclists would seek alternative means of crossing the road, therefore making the tunnel an expensive and un-used facility.

**FIGURE 23 - ROAD CROSSING ALTERNATIVE 3**



The preferred alternative is alternative 1 which was judged to be the best option in terms of safety, cost and maintaining a continuous trail by the Citizens Advisory Group and the Technical Team.

## **APPENDIX D**

Albuquerque Planning Department/ Planning Division

### **TRAIL DESIGN STANDARDS AND OBJECTIVES**

DRAFT - AUGUST 1990

#### **PURPOSE**

The purpose of these standards is to identify ideal right-of-way conditions and establish design consistency for off-road recreational trails. The guidelines were developed by the Albuquerque Planning Department/Planning Division based on interviews with other cities and advice from local citizen groups and technical staff.

## OBJECTIVES

The trail standards represent a range of acceptable design solutions. Objectives are included here to aid in determining the appropriate standard to apply.

### I. Landscaping/Buffers

Landscaped buffers along trail corridors address the following objectives:

1. To prevent accidental falls into an arroyo or drainageway by establishing adequate spatial separation as a more aesthetic alternative to constructing a barrier adjacent to the channel.
2. To provide spatial separation from traffic lanes.
3. To limit potential user conflicts by providing adequate spatial separation between trails.
4. To limit trail maintenance by:
  - a. generally relying on revegetation with native or naturalized plant species that do not require irrigation to maintain.
  - b. concentrating intensive (irrigated and/or mowed) landscaping in a limited number of nodal parks .
5. To provide shaded rest areas, seasonal color and visual diversity.
6. To soften the visual impact of hard surfaces — such as paved trails, drainage channels, walls and buildings.
7. To soften the linear character of the corridor by providing clusters of trees and shrubs.
8. To provide screening for parking and service areas.
9. To provide privacy screening for adjacent residential development.
10. To prevent erosion.
11. To provide wildlife habitat.



## II. Trails in Urban Areas

Trail segments through urban areas will meet the following general objectives:

1. To provide an off-road, recreational trail system incorporating native landscaping, small parks and trail-related amenities along drainage rights-of-way, linking urban areas with peripheral open space.
2. To provide an alternative to use of the private automobile within the urban area by linking activity centers (such as retail, employment and institutional uses) with residential development.
3. To accommodate a variety of user groups — including the commuter cyclist — and a heavy volume of trail traffic.
4. To provide accessible outdoor recreation to a variety of user groups, including the very young, the elderly and the handicapped.
5. To complement adjacent urban development through the use of color, materials and landscaping.
6. To provide a sense of enclosure, safety, and human scale in the urban area through landscaping and architectural elements.

## III. Trails in Open Space and Rural Areas

Trail segments in open space and rural areas will meet the following general objectives:

1. To provide controlled, limited access to rural areas and to nature and open space preserves.
2. To accommodate primarily recreational users, including equestrians, where desirable.
3. To incorporate educational/interpretive elements and identify cultural and natural features found along the trail.
4. To prevent adverse environmental impacts and maximize the contrast with urban development by minimizing trail widths, paved surfaces, and initial disturbance to topsoil and vegetation.
5. To preserve a sense of openness through selection of landscaping and architectural elements that blend visually with surrounding open space.

## Summary

Trails located in urban areas will choose from the higher end of the ranges proposed regarding trail width and surface durability due to the anticipated number and diversity of users. In contrast, trail design in open space areas will draw from the lower range of trail width, minimize paved surfaces, and accommodate equestrian users where deemed appropriate.

Trails for commuter bicycle traffic will generally provide hard, durable surfaces, straighter alignments, wider trails and fewer rest stops. Trails designed to accommodate recreational users will provide for slower speeds, a greater number of educational/interpretive elements, shade, rest areas and landscaping to add visual interest and variety.

Landscape maintenance will be limited through the design of nodal parks and use of native and naturalized plants.

## TRAIL DESIGN GUIDELINES

### PEDESTRIAN ONLY

1. Trail Width	1. 3'-6'
2. Ideal Grade	2. $\leq 5\%$
3. Maximum Sustained Grade	3. 8-10%
4. Maximum Grade, Short Distance	4. $\leq 15\%$
5. Vertical Clearance	5. 8-9'
6. Horizontal Clearance	6. 0'
7. Surface Requirements	7. dirt, compacted surfaces, paved surfaces optional
8. Separation from other trails	8. optional
9. Separation from bank edge*	9. $\geq 10'$ preferred — varies with edge conditions, use of railings.
10. Separation from walls and buildings	10. 10'-15' recommended for privacy and landscaping
11. Separation from streets**	11.a. 6'-12' preferred, or b. raised curb and sidewalk

---

#### KEY

$\leq$  "less than, or equal to"

$\geq$  "greater than, or equal to"

\* Source: A 10' safety buffer has been used in the design of Wildflower Park to prevent accidental falls into the drainage channel. 10' accommodate a typical landscaping equipment. Trails could meander within the standard right-of-way, if so desired.

\*\* The Development Process Manual recommends a 12' buffer between curb and sidewalk on major arterials. 6' is adequate on less heavily traveled streets. A raised curb and sidewalk provides minimal separation where limited right-of-way is available.

## JOGGING TRAILS\*

- |  |   |
|--|---|
| 1.a. Trail Width                                 | 1.a. 9'-12' (9' allows 3 pedestrian lanes, i.e. - jogging in pairs with ability to pass)                                      |
| b. cross-pitch                                   | b. 2-3% preferred, 4% maximum   |
| 2. Ideal Grade                                   | 2. $\leq 5\%$   |
| 3. Maximum Sustained Grade                       | 3. 8-10%  |
| 4. Maximum Grade, Short Distance                 | 4. $\leq 15\%$  |
| 5. Vertical clearance                            | 5. 8-9'   |
| 6. Horizontal clearance                          | 6. 0'   |
| 7. Surface Requirements                          | 7. unpaved: ground bark or wood chips over crushed rock base  |
| 8. Separation from bank edge, other trails, etc. | 8. See Pedestrian Standards   |
| 9. Other   | 9.a. Must be well drained, side ditches recommended   |
|  | b. Provide signed and measured distances. Recommend: 1500 meters, 440 yards, 1/2 mile, 1 mile                                 |
|  | c. avoid cross traffic, especially bicycles and cars  |
|  | d. provide stretching stations at beginning points, i.e. a wood rail (4" x 4" x 8" orig.) set horizontally at 30" above grade |

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\* Source: City of Eugene, Oregon, Parks and Recreation Planning Development Division, 210 Cheshire Street, Eugene, Oregon 9740.

## BIKE ONLY

- |  |  |
|--|--|
| 1. Trail Width (two-way traffic)   | 1.a. 8'-10' paved width<br>b. 1'-1.5' shoulders  |
| 2. Ideal Grade   | 2. $\leq 3\%$  |
| 3. Maximum Sustained Grade   | 3. 6-10%   |
| 4. Maximum grade for less than 50 yds.   | 4. $\leq 15\%$   |
| 5. Vertical Clearance  | 5. 8'-12'  |
| 6. Horizontal Clearance  | 6. 1.5'-3'   |
| 7. Surface Requirements  | 7. porous asphalt* and soil cement, compacted surfaces   |
| 8. Separation from other trails  | 8. 3' buffer with minimum 3'6" high railing, or 6' landscaping, or use opposite sides of a channel |
| a. equestrians   | a. separate trails required  |
| b. pedestrians/handicapped   | b. separation preferred on high-speed bike trails  |
| 9. Recommended Turning Radius (to reduce speeds to 10 mph for joint- use sections) | 9. 15'-20'   |
| 10. Separation from bank edge, walls, buildings and streets                        | 10. See Pedestrian Standards   |

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\* Porous pavement is specifically listed here in order to avoid drainage and erosion problems associated with paved surfaces. The issue is especially pertinent to drainage corridors. The New Mexico State Highway Department routinely installs porous pavement in new construction. See US Environmental Protection Agency report #600-2-80-135, "Porous Pavement Phase One, Design and Operational Criteria", by Elvidio Dineez. Contact the EPA, Municipal Environmental Research Laboratory, Cincinnati, Ohio, for copies of the report.

## MOUNTAIN BIKES

- |  |                             |
|--|-----------------------------|
| 1. Trail Width                               | 1. 3'-4'                    |
| 2. Ideal Grade                               | 2. $\leq 10\%$              |
| 3. Maximum Sustained Grade                   | 3. 20-30%                   |
| 4. Maximum Grade for Less than 50 Yds.       | 4.a. $\leq 45\%$            |
| 5. Vertical Clearance                        | 5. $\geq 7'$                |
| 6. Horizontal Clearance                      | 6. $\geq 3'$                |
| 7. Surface Requirements                      | 7. unpaved                  |
| 8. Separation from Other Trails              | 8. not required             |
| 9. Separation from bank edge, walls, streets | 9. See Pedestrian Standards |

## HANDICAPPED ACCESSIBLE DESIGN\*

- |                                     |  |
|-------------------------------------|--|
| 1. Trail Width                      | 1.a. One-way -- 3' minimum<br>b. Two-way -- 5'4" - 6' minimum<br>c. 1' - 1.5' shoulders<br>d. level passing bay/landing every 200' (5'x5') |
| 2. Ideal Grade                      | 2. 0-2%  |
| 3. Maximum Sustained Grade Distance | 3. $\leq 5\%$  |
| 4. Cross grade                      | 4. $\leq 2\%$  |
| 5. Ramps (Grades, short distance)   | 5. $\leq 8\%$ for maximum rise of 30"  |
| 6. Vertical Clearance               | 6. $\geq 9'$ preferred, 6'8" minimum   |
| 7. Horizontal Clearance             | 7. $\geq 3'$   |
| 8. Surface Requirements             | 8. Stable, firm and nonslip in all weather (concrete asphalt, etc) free of any openings larger than 1/2"                                   |
| 9. Separation from other trails     |  |
| a. pedestrians                      | 9.a. none  |
| b. bikes/equestrians                | 9.b. preferred - see Bike and Equestrian Standards   |
| 10. Separation from bank edge       | 10. See Pedestrian Standards   |

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\* These standards were compiled from the American National Standards Institute, Inc., (ANSI-A117.1-1986) with advice from the Governor's Committee on Concerns of the Handicapped. Some people with physical disabilities may be able to use trails with less ideal conditions if they are forewarned about the level of difficulty they may encounter. Additional recommendations can be found on pages A-19 and A-20.

## EQUESTRIAN \*

- |                                     |   |
|-------------------------------------|---|
| 1. Trail Width                      | 1. 5'-8' (18"-30" tread width in the center of a 5' clear trail)  |
| 2. Ideal Grade                      | 2. ≤ 5%   |
| 3. Maximum Sustained Grade          | 3. 8-10%  |
| 4. Maximum Grade, short distance    | 4. ≤ 15%  |
| 5. Vertical Clearance               | 5. 10'-12'  |
| 6. Horizontal Clearance             | 6. see item 1 above   |
| 7. Surface Requirements             | 7. dirt, crushed aggregate, bark, gravel, oil coat  |
| 8. Separation from other trails     | 8.a. optional   |
| a. Pedestrian:                      | b. 3' buffer with minimum 3'6" high fencing, 6' landscaping, or opposite sides of a channel             |
| b. Bike and handicapped             | c. Trails may converge for distances up to 1/4 mile where inadequate right-of-way exists for separation |
| c. All:                             |   |
| 9. Separation from parallel street* | 9.a. 4' from driving lane   |
| a. Local street                     | b. Without barrier - min. 9' from shoulder  |
| b. Collector                        | c. Without barrier - min. 15' from shoulder   |
| c. Arterials                        | d. Without barrier - 25' from shoulder  |
| d. 6-8 lane expressways             | e. Where multiple trails are parallel to the roadway, equestrians should be farthest from traffic       |
| e. All                              |   |

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\* Recommended by Horseways, Inc., a local equestrian organization, based on interviews with other cities. For more detailed design of trails and structures see A Trail Manual for the East Bay Regional Park District. Prepared by Jana Olson and Hanson Hom. October 5, 1976; and Bikeways and Horse Trails. Section 8. Design Procedures and Criteria, City of Scottsdale, Arizona, Revised July 1985, City of Scottsdale Community Development Department. Loan copies available from the Planning library.



**EQUESTRIAN (Continued)**

- 10. Suggested Fencing/Barriers
  - a. Other trails
  - b. Streets
  - c. All
- 10.a. minimum 3'6"high post and rail fence
- b. minimum 3'6"high post and rail fence or concrete "jersey" barrier
- c. no barbed wire or sharp edges on guard rails
- 11. Terrace Steps Up Slopes
- 11. Railroad ties w/ 3'-4' minimum tread width, 3' minimum depth, 16" maximum height
- 12. Separation from bank edge, walls and buildings
- 12.  $\geq 10'$  preferred

## LANDSCAPING

1. Native Grasses Buffer Strip
2. Width of Area for Tree Planting:
  - 2.a. 15' for individual trees or a row of trees; provides for adequate crown space for native species.
  - 2.b. 30'-40' for tree clusters.
  - 2.c. maintain  $\geq 4'$  distance from trails, walls — for root space
3. Width of Area for Screening Hedge
4. Nodal Parks
  - 4.a. Prefer 3 acre minimum if turfed
  - 4.b. In parks  $< 3$  acres in size, use irrigated groundcovers (other than turf and native landscaping) that do not require mowing

## SHARED TRAILS

### BICYCLE/PEDESTRIAN SHARED

- |  |   |
|--|---|
| 1. Trail Width   | 1.a. 10'-12' paved<br>b. 1'-1.5' shoulders  |
| 2. Ideal Grade   | 2. $\leq 5\%$   |
| 3. Maximum Sustained Grade   | 3. 8-10%  |
| 4. Maximum grade for less than 50 yds                                    | 4. $\leq 15\%$  |
| 5. Vertical Clearance  | 5. 8'-12'   |
| 6. Horizontal Clearance  | 6. 1.5'-3'  |
| 7. Surface Requirements  | 7. asphalt, soil cement, concrete, compacted surfaces   |
| 8. Design Speed for bikes  | 8. 10-15 mph maximum  |
| 9. Recommended Turning Radius<br>(To limit speeds to 10mph design speed) | 9. 15'-20'  |
| 10. Other  | 10. may stripe at curves, use rough paving to slow down bikes. Signage should indicate faster traffic passes on the left and yields to slower traffic |
| 11. Separation from bank edge, walls, streets                            | 11. $\geq 10'$ preferred. See Pedestrian Standards  |

## **OTHER SHARED TRAILS**

1. **BICYCLE/HANDICAPPED SHARED**

Design to Handicapped Standards, with at least 12' pavement width and signage to indicate bikes must yield to slower traffic and pass on the left.

2. **PEDESTRIAN/HANDICAPPED SHARED**

Design to Handicapped Standards.

3. **BICYCLE/EQUESTRIAN SHARED**

Except for short distances, these users should not share the same trail.

4. **EQUESTRIAN/PEDESTRIAN SHARED**

These users may share the same trail designed to Equestrian Standards.

5. **EQUESTRIAN/HANDICAPPED SHARED**

Except for short distances, these users should not share the same trail.

## ROAD CROSSINGS

Pedestrians, bikes, and equestrians may converge at road crossings. All trail crossings should offer an unobstructed view of oncoming vehicular and trail traffic.

Trail users will be of all ages and physical abilities. Therefore, a major objective is to provide safe, convenient road crossings that will minimize the trail user's exposure to vehicular traffic. Grade-separated or signalized crossings are preferred for arterial streets. Mid-block at-grade crossings are adequate for collector streets, although signalized crossings are preferred. Unsignalized crossings are more appropriate for local streets which are planned to carry considerably less traffic at slower speeds.

### L ARTERIALS

A. AT GRADE CROSSINGS are most feasible when a signalized intersection is located within 300'\* of the trail, or when a signalized, mid-block crossing can be provided. Unsignalized mid-block crossings are the least desirable option for recreational trails.

- |                                |   |
|--------------------------------|---|
| 1. Minimum Crossing Width      | 1. 12'-15' (if shared with equestrians) with curb ramps, tactile warnings   |
| 2. Surface Treatment           | 2. textured pavement or other non-slip surfacing for equestrians  |
| 3. Waiting Bay for equestrians | 3. 20' x 10' with 10' setback from road   |
| 4. Hand Activated Signals      | 4. 6' for equestrians, 4' for handicapped   |
| 5. Separation of Uses          | 5. all trail uses may be combined at crossing   |
| 6. Median Holding Zone         | 6. $\geq 10'$ ; 20' median width preferred, with curb ramps and tactile warnings. Note that "holding" equestrians in median is undesirable from a safety standpoint |

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\* 300' is based on walking distance and is the length of a typical City block in the downtown area. Up to 600' is considered reasonable by the State of Wisconsin/Highway Department.

## CROSSINGS (Continued)

### I. ARTERIALS (Continued)

B. BELOW GRADE CROSSINGS: are the preferred crossing for convenience and safety reasons, where there is a sufficient clearance. Bridges are preferable to culverts, since they provide greater visibility and aesthetic quality.

- |                                   |   |
|-----------------------------------|---|
| 1. Trail Width                    | 1. 9'-14'   |
| 2. Surface                        | 2. Trail Standards. For equestrians, consider dirt, pea gravel, wood, roughened concrete — in order of priority   |
| 3. Grade                          | 3. Trail Standards  |
| 4. Trail Location (re-floodway)   | 4. Paved trails should be located outside the 10 year floodway; locating all trails outside of the 100 year floodway is optimum; however, if necessary, paved trails may be located up to the 2 year floodway |
| 5. Culverts or Tunnels            |   |
| a. Optimum clearance/max. length* | a. $\geq 9'4''w \times 13'3''h$ /156' length with median opening for daylight (height provides clearance for equestrians, length is suitable for 4 lane road)   |
|                                   | b. 8'w x 8'h/156' (height is suitable for bikes, pedestrians and handicapped uses), with median opening for daylight  |
| 6. Bridges                        | 6. Use vertical clearance standards based on trail use. Length should be minimized, $\leq 250'$ preferred.  |

---

\* Culvert size recommended by the Open Space Task Force to accommodate equestrians. Compares favorably with the standard (10'hx12'w) from the City of Scottsdale, Arizona. The 8'x8' culvert dimension is based on field inspection by the Planning Division, and is also recommended by the State of Wisconsin/Highway Department. Median openings should be used to provide daylight to culverts in excess of 156' in height.

## CROSSINGS (Continued)

### I. ARTERIALS (Continued)

#### C. ABOVE-GRADE CROSSINGS

Past experience in Albuquerque indicates that above-grade structures tend to be used less than at-grade crossings, unless traffic volumes exceed 20,000 vehicles per day with speeds of 35 mph or greater.

#### CROSSING STRUCTURES

- |                           |  |
|---------------------------|--|
| 1. Trail Width            | 1. $\geq 10'$  |
| 2. Grade                  | 2. See applicable Trail Standards  |
| 3. Surface                | 3. Textured concrete or wood, non-slip surfacing   |
| 4. Side Treatment         | 4. For equestrians: solid-sided barrier along bottom 3', chain link or similar fencing up to 6'-8' total height              |
| 5. Separation of Uses     | 5. See River Crossings, below, however not recommended for handicapped or equestrian uses if other crossings can be provided |
| 6. Structure Width        | 6. 20' is typical  |
| 7. Roadway Clearance      | 7. 17'-22'   |
| 8. Intersection Clearance | 8. Locate outside of "clearsight triangle" as defined by Zoning Code   |

#### RIVER CROSSINGS

Totally separate bridges for non-motorized traffic are preferred per the Development Process Manual.

- |                       |   |
|-----------------------|---|
| 1. Trail Width        | 1. 10'-12' (with equestrians)   |
| 2. Grade              | 2. trail standards  |
| 3. Surface            | 3. textured concrete or other non-slip surfacing  |
| 4. Side Treatment     | 4. For equestrians: solid-sided barrier along bottom 3', chain link or similar fencing up to 6'-8' total height   |
| 5. Separation of Uses | 5. Post YIELD TO SLOWER TRAFFIC signs for trail users. Separate equestrians from bikes with railings or fences $\geq 3'$ -6" high. Separate trails from vehicular traffic with similar railings |

## CROSSINGS (Continued)

### **II. LOCAL AND COLLECTOR STREETS**

At-Grade crossings are feasible either at mid-block or at intersections. Signalized crossings are preferred for Collector Streets.

#### At Grade

- |                           |  |
|---------------------------|--|
| 1. Minimum Crossing Width | 1. 12'-15' (with equestrians)  |
| 2. Surface Treatment      | 2. Textured pavement or other non-slip surfacing for equestrians   |
| 3. Waiting Bay            | 3. Flared trail width at street  |
| 4. Hand Activated Signals | 4. 6' for equestrians, 4' for handicapped  |
| 5. Separation of Uses     | 5. Use YIELD TO SLOWER TRAF-FIC signage  |
| 6. Median Holding Zone    | 6. $\geq 10'$ , with 20' median width preferred, and curb ramps with tactile warnings for handicap accessibility |



## ADDITIONAL HANDICAPPED STANDARDS

1. Shelter and Seating: Every 1/8 mile
2. Accessibility: Using standards on page 9, ensure access to and from adjacent parking lots, streets and sidewalks, and public facilities such as restrooms and drinking fountains.
3. Parking Areas: Refer to Albuquerque Comprehensive Zoning Code. Section 40.A for more detail
  - Lot Cross Slope: 2% or 1:50 maximum
  - Handicap Accessible Spaces: One space for every 25 total spaces (preferably one van and one car space per every 25 spaces or less).
    - 12'6" wide or 8'6" wide with a 5' aisle, 24' long
  - Place sign and ground graphics at each accessible space.
4. Restrooms, Drinking Fountains and Park Furniture: Refer to ANSI handicap accessibility standards.
5. Vegetation: Avoid thorny plants next to trail. Select plants with a variety of textures and fragrances.
6. Signage: Braille and incised sign surfaces with simple, bold typefaces and symbols.
  - Sharp color contrast.
  - Texture trail surface to indicate the presence of a sign.
  - Either shade braille signs or spray with swimming pool decking surface to keep cool.
  - (Refer to ANSI standards for more detail)
7. Railings: 30 - 34" above ground level with a

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## ACKNOWLEDGEMENTS

The Planning Division would like to thank the following individuals for participating in developing the Trail Standards.

Floyd Thompson, John Barksdale, U.S. Forest Service  
Judy Myers, Director, Governors Committee on Concerns of the Handicapped  
Cliff Anderson, AMAFCA, OSAB  
Joe David Montano, Transportation Planning, PWD  
Dan Hogan, Hydrology Planning, PWD  
Pat Westbrook, Diane Scena, Parks and Recreation, Design  
Janet Saiers, Parks and Recreation, Management  
Barbara Baca, Parks and Recreation, Open Space  
Bill Coleman, Traffic Engineering, PWD  
Subhas Shah, MRGCD  
Jim Lewis, OSTF, Bikeways Committee  
Vicky McGill, Horseways, Inc.  
Phil Dugan, County Parks and Recreation  
Al Pistone, Mayor's Office, Handicapped Affairs  
Bob Cole, Planning Division  
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Jessie Ortiz, Design Engineering, PWD  
Hope Reed, Coordinator, Barrier Free Programs  
Mil Flage, Landscape Architect  
Larry Caudill, Environmental Health Department  
Julia Berman, Plants of the Southwest  
Sallie Pennybacker, Horseways, Inc.  
Judith Phillips, Bernardo Beach Native Plants

The Planning Division gathered information from the following cities and states to establish a common range of trail widths, grades, clearances, road crossing and landscaping requirements.

Scottsdale, Arizona  
Tucson, Arizona  
Davis, California  
Monterey, California  
San Diego, California  
Boulder, Colorado  
Fort Collins, Colorado  
Minneapolis, Minnesota  
Santa Fe, New Mexico  
Eugene, Oregon  
State of California, Bay Area Rapid Transit System  
State of California, East Bay Regional Park District  
State of Oregon, Highway Department  
State of Wisconsin, Governor's Office of Highway Safety

## **APPENDIX E**

Albuquerque Planning Department/Planning Division

### **RECOMMENDED PLANT MATERIALS**

DRAFT-AUGUST 1990

#### PURPOSE

The purpose of these standards is to identify ideal plantings and establish landscape consistencies for the Amole Arroyo and adjacent development. The guidelines were developed by the City of Albuquerque Planning Department/Planning Division with the help of Judith Phillips, author of Southwest Landscaping with Native Plants, Museum of New Mexico Press.

## APPENDIX E PLANT LIST

### KEY

<u>WATER USE</u>	<u>COLOR</u>	<u>BLOOM SEASON</u>	<u>SHADE</u>
L = LOW	B = BLUE	PP = PURPLE	ltd = LIMITED
M = MODERATE	MX = MIXED	R = RED	
H = HEAVY	O = ORANGE	W = WHITE	
	P = PINK	Y = YELLOW	
		SP = SPRING	
		SU = SUMMER	
		AU = AUTUMN	

\* TOLERATES OR PREFERS SHADE

\*\* CAN BE AN ALLERGEN

#### RECOMMENDED TREES

	<u>SCREEN- SHADE</u>	<u>WINDBREAK</u>	<u>ACCENT- EMPHASIS</u>	<u>FORM</u>	<u>FLOWER</u>	<u>EVER- GREEN</u>	<u>WATER USE</u>
FALSE INDIGO/LEADPLANT <i>Amorpha fruticosa</i>		X	X		X		M
CURLLEAF MOUNTAIN MAHOGANY <i>Cercocarpus ledifolius</i>		X	X	X		X	L-M
MONTANE MOUNTAIN MAHOGANY <i>Cercocarpus montanus</i>		X	X	X			L-M
DESERT WILLOW <i>Chilopsis linearis</i>	ltd	X	X	X	X		L
*DESERT OLIVE <i>Forestiera neomexicana</i>	ltd	X	X	X			L
ASH (NATIVE SPECIES AND CULTIVARS INCLUDING "RIO GRANDE" AND "RAYWOOD") <i>Fraxinus</i>	X						M-H
CHINESE PISTACHE <i>Pistacia chinensis</i>	X						L-M
VALLEY COTTONWOOD <i>Populus fremontii</i> **	X						H
IDAHO LOCUST <i>Robinia idahoensis</i>	X		X		X		M
ROSE LOCUST <i>Robinia neomexicana</i>	X	X	X		X		M
BLACK LOCUST <i>Robinia pseudoacacia</i>	X	X			X		M
GAMBEL'S OAK <i>Quercus gambelii</i>	X		X	X			M
SILVER BUFFALOBERRY <i>Shepherdia argentea</i>	X		X				M
JUJUBE <i>Zizyphus jujuba</i>	ltd	X	X	X			L-M
INCENSE CEDAR <i>Calocedrus decurrens</i>	X		X	X		X	M
LEYLAND CYPRESS <i>Cupressocyparis leylandii</i>	X					X	M
ARIZONA CYPRESS <i>Cupressus arizonica</i>	X					X	L-M
JUNIPER (NATIVE SPECIES AND CULTIVARS) **	X		X	X		X	L-M
PINYON <i>Pinus edulis</i> **	X		X	X		X	L-M

#### RECOMMENDED SHRUBS

	<u>SCREEN- WINDBREAK</u>	<u>ACCENT- EMPHASIS</u>	<u>MASS PLANTING</u>	<u>FLOWER</u>	<u>FOL- IAGE</u>	<u>EVER- GREEN</u>	<u>WATER USE</u>
THREADLEAF SAGE <i>Artemisia filifolia</i> **			X		X		L
BIG LEAF SAGE <i>Artemisia tridentata</i> **		X	X		X	X	L
SALTBUSH <i>Atriplex canescens</i> **	X		X				L
DWARF COYOTE BUSH <i>Baccharis pilularis</i>			X		X	X	L
BIRD OF PARADISE <i>Caesalpinia gilliesii</i>	X	X	X	X	X		L
BLUE MIST <i>Caryopteris clandonensis</i>		X	X	X			L-M
WINTERFAT <i>Ceratoides lanata</i> **			X		X		L
FERNBUSH <i>Chamaebatia millefolium</i>		X	X	X	X		L
RABBITBUSH CHAMISA <i>Chrysothamnus</i> sp. **	X	X	X	X	X		L
COTONEASTER (SEVERAL WELL-ADAPTED SPECIES INCLUDING PARNEY'S, GRAYLEAF, "CORAL BEAUTY")	X	X	X	X	X		L
CLIFFROSE <i>Cowania mexicana</i>	X	X	X	X	X	X	M
BROOM DALEA <i>Dalea scoparia</i>			X	X			L
APACHE PLUME <i>Fallugia paradoxa</i>	X	X	X	X	X	X	L
*CLIFF FENDLERBUSH <i>Fendlera rupicola</i>	X	X	X	X			L-M
RED YUCCA <i>Hesperaloe parviflora</i>		X	X	X		X	L
JUNIPER (MANY VARIATIONS IN SIZE, FORM, COLOR)**	X	X	X		X	X	L-M
CREOSOTE BUSH <i>Larrea tridentata</i>	X	X	X		X	X	L
BEARGRASS <i>Nolina microcarpa</i>		X	X	X	X	X	L
PRICKLY PEAR/CHOLLA <i>Opuntia</i> species		X	X	X		X	L
*LITTLELEAF MOCKORANGE <i>Philadelphus microphyllus</i>	X	X	X	X			L-M
MEXICAN OREGANO <i>Poliomenantha incana</i>		X	X	X	X	X	L
*SHRUBBY CINQUEFOIL <i>Potentilla fruticosa</i>			X	X			M
WESTERN SANDCHERRY <i>Prunus besseyi</i>		X	X	X	X		M
DWARF SMOOTH SUMAC <i>Rhus glabra cismontana</i>	X	X	X		X		M
THREELEAF SUMAC <i>Rhus trilobata</i>	X		X		X		L

RECOMMENDED SHRUBS (Continued)

	<u>SCREEN- WINDBREAK</u>	<u>ACCENT- EMPHASIS</u>	<u>MASS PLANTING</u>	<u>FOL- FLOWER IAGE</u>	<u>EVER- GREEN</u>	<u>WATER USE</u>
PROSTRATE THREELEAF SUMAC <i>Rhus trilobata prostrata</i>			X	X		L
*GOLDEN CURRANT <i>Ribes aureum</i>	X		X	X	X	M
LADY BANK'S ROSE <i>Rosa banksia lutea</i>		X	X	X	X	M
AUSTRIAN COPPER ROSE <i>Rosa foetida bicolor</i>	X	X	X	X		M
PERSIAN YELLOW ROSE <i>Rosa foetida Lutea</i>	X	X	X	X		M
WOOD'S ROSE <i>Rosa woodsii</i>	X		X	X		L
DESERT SAGE <i>Salvia dorrii</i>		X	X	X	X	L
CHERRY/AUTUMN SAGE <i>Salvia greggii</i>		X	X	X		L
SANTOLINA <i>S. chamaecyparissus and virens</i>		X	X	X	X	L
SPANISH BROOM <i>Spartium junceum</i>	X	X	X	X	X	L-M
CHASTE TREE <i>Vitex agnus castus</i>	X	X	X	X	X	L-M
YUCCA/SPANISH DAGGER/DATIL <i>Yucca species</i>		X		X	X	L

FLOWERS/ANNUAL AND BIENNIAL

	<u>COLOR</u>	<u>BLOOM SEASON</u>	<u>HEIGHT</u>	<u>SPREAD</u>	<u>EVER- GREEN</u>	<u>WATER USE</u>
DESERT MARIGOLD <i>Baileya multiradiata</i>	Y	SP-AU	18"	12"		L
CALIFORNIA POPPY <i>Eschscholzia californica</i>	O	SP-AU	12"	12"		L
GAZANIA <i>Gazania rigens</i>	OY	SU-AU	12"	12"		L
PHLOX HELIOTROPE <i>Heliotropium convolvulaceum</i>	W	SU-AU	10"	24"		L
PURPLE ASTER <i>Machaeranthera bigelovii</i>	PP	AU	36"	36"		L
TAHOKA DAISY <i>Machaeranthera tanacetifolia</i>	PP	AU-AU	18"	18"		L
MOSSROSE <i>Portulaca hybrids</i>	MX	SU-AU	6"	10"		L
SAND VERBENA <i>Tripterocalyx wootonii</i>	P	SP-AU	18"	36"		L

FLOWERS/PERENNIAL

YARROW <i>Achillea millefolium et al</i>	WPY	SU	18"	24"	X	M-H
*GIANT HYSSOP <i>Agastache cana</i>	P	SU-AU	36"	36"		L-M
PUSSYTOES <i>Antennaria parvifolia</i>	WP	SP	10"	18"	X	L
FRINGE SAGE <i>Artemisia frigida</i>		SU	18"	24"	X	L
PRAIRIE SAGE <i>Artemisia ludovichiana</i>		SU	24"	24"		L
BUTTERFLYWEED <i>Asclepias tuberosa</i>	O	SU	18"	12"		L-M
CHOCOLATE FLOWER <i>Berlandiera lyrata</i>	Y	SP-AU	18"	18"		L
SNOW IN SUMMER <i>Cerastium tomentosum</i>	W	SU	10"	12"	X	L
PURPLE ICEPLANT <i>Delosperma cooperii</i>	PP	SU	6"	24"		L
YELLOW ICEPLANT <i>Delosperma nubigenum</i>	Y	SU	3"	24"	X	L
WILD MARIGOLD <i>Dyssodia papposa</i>	Y	SP-AU	12"	12"	X	L
PURPLE CONEFLOWER <i>Echinacea purpurea</i>	P	SU	24"	12"		M
BLANKETFLOWER <i>Gaillardia aristata hybrids</i>	RY	SP-AU	24"	24"		L-M
BABIESBREATH <i>Gypsophila paniculata</i>	W	SU	24"	24"		L-M
CREEPING BABIES BREATH <i>Gypsophila repens</i>	WP	SP-SU	4"	18"		L
SUNROSE <i>Helianthemum nummularium</i>	WPY	SP-SU	12"	18"	X	L-M
BUSH MORNINGGLORY <i>Ipomoea leptophylla</i>	P	SU	36"	36"		L
TORCH LILY <i>Kniphofia uvaria</i>	YR	SU	36"	24"		L
GAYFEATHER <i>Liatris punctata</i>	PP	AU	18"	24"		L
BLUE FLAX <i>Linum lewisii</i>	B	SP	18"	18"		M
BLACKFOOT DAISY <i>Melampodium leucanthemum</i>	W	SP-AU	12"	12"		L
GIANT FOUR O'CLOCK <i>Mirabilis multiflora</i>	P	SP-AU	18"	36"		L-M
MEXICAN EVENING PRIMROSE <i>Oenothera speciosa</i>	P	SP	12"	24"		L
TUFTED EVENING PRIMROSE <i>Oenothera caespitosa</i>	W	SP-AU	12"	18"		L
BUSH PENSTEMON <i>Penstemon ambiguus</i>	P	SP-SU	24"	24"		L
FIRECRACKER PENSTEMON <i>P. barbatus</i>	R	SU	24"	12"		L-M
PINELEAF PENSTEMON <i>P. pinifolius</i>	R	SP-SU	10"	18"	X	L-M
DESERT PENSTEMON <i>P. pseudospectabilis</i>	P	SP	36"	36"	X	L
ROCKY MOUNTAIN PENSTEMON <i>P. strictus</i>	B	SU	18"	18"	X	L
PURPLE PRAIRIE CLOVER <i>Petalostemon purpureum</i>	P	SU	18"	24"		L
PAPERFLOWER <i>Psilostrophe cooperii</i>	Y	SP-AU	12"	18"		L
CONEFLOWER <i>Ratibida columnaris</i>	RY	SP-AU	18"	18"		L-M
BLACK EYED SUSAN <i>Rudbeckia fulgida</i>	Y	SU	24"	24"		M
PITCHER'S SAGE <i>Salvia azurea grandiflora</i>	B	SU-AU	36"	24"		L-M
SOAPWORT <i>Saponaria ocymoides</i>	P	SP	12"	24"		L-M
STONECROP <i>Sedum telephium</i>	RP	AU	12"	18"		L-M
SCARLET GLOBEMALLOW <i>Sphaeralcea coccinea</i>	R	SP-AU	12"	18"		L
SCARLET MINT <i>Stachys coccinea</i>	R	SU	18"	24"		M-H
LAMB'S EARS <i>Stachys lanata</i>	PP	SP	18"	18"		m
FLAME FLOWER <i>Talinum species</i>	P	SU	12"	12"		L
GERMANDER <i>Teucrium chamaedrys</i>	P	SU	12"	18"	X	M
VERBENA <i>V. bipinnatifida and rigida</i>	PP	SP-AU	12"	18"		L
DESERT ZINNIA <i>Zinnia grandiflora</i>	Y	SU-AU	4"	10"		L

NOTE: SIZES AND BLOOM TIMES ARE GREATLY EFFECTED BY AVAILABLE MOISTURE, SUNLIGHT AND EXPOSURE.

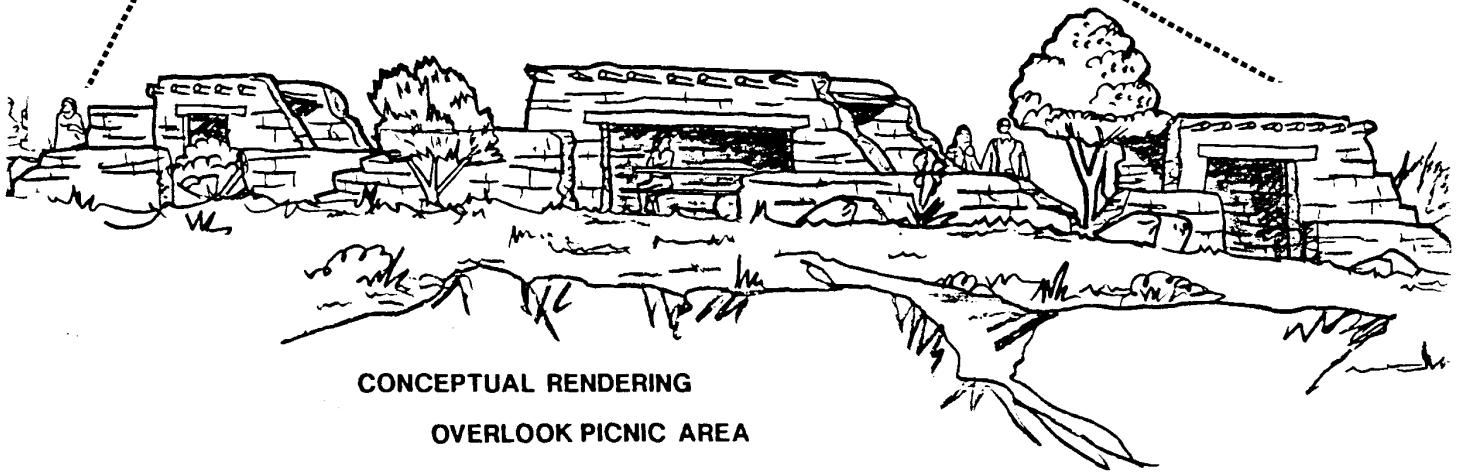
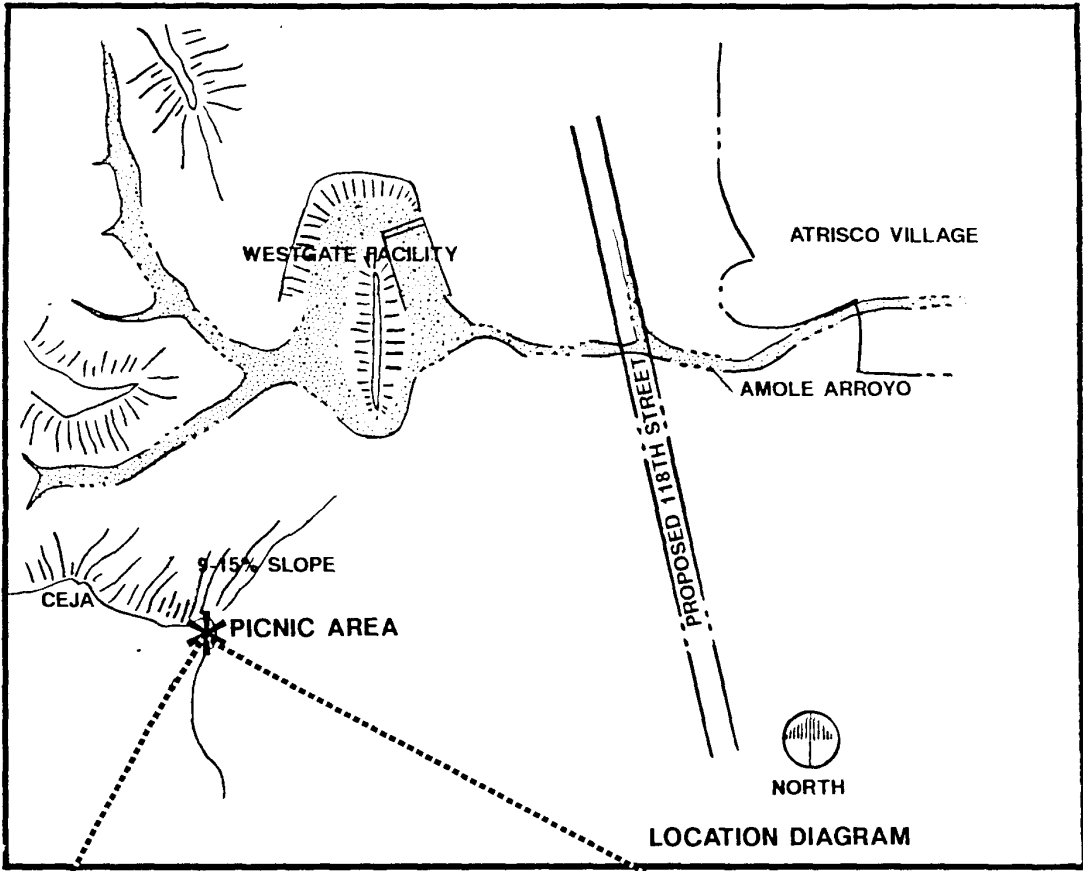
GRASSES \*\*

WESTERN WHEAT *Agropyron smithii*  
BLUE AVENA *Avena sempervirens*  
SIDEOATS *Bouteloua Curtipendula*  
BLUE GRAMA *Bouteloua gracilis*  
BUFFALOGRASS *Buchloe dactyloides*  
BLUE SHEEP FESCUE *Festuca ovina glauca*  
GALLETA *Hilaria jamesii*  
INDIAN RICEGRASS *Oryzopsis hymenoides*  
LITTLE BLUESTEM *Schizachyrium scoparium*  
ALKALI SACATON *Sporobolis airoides*

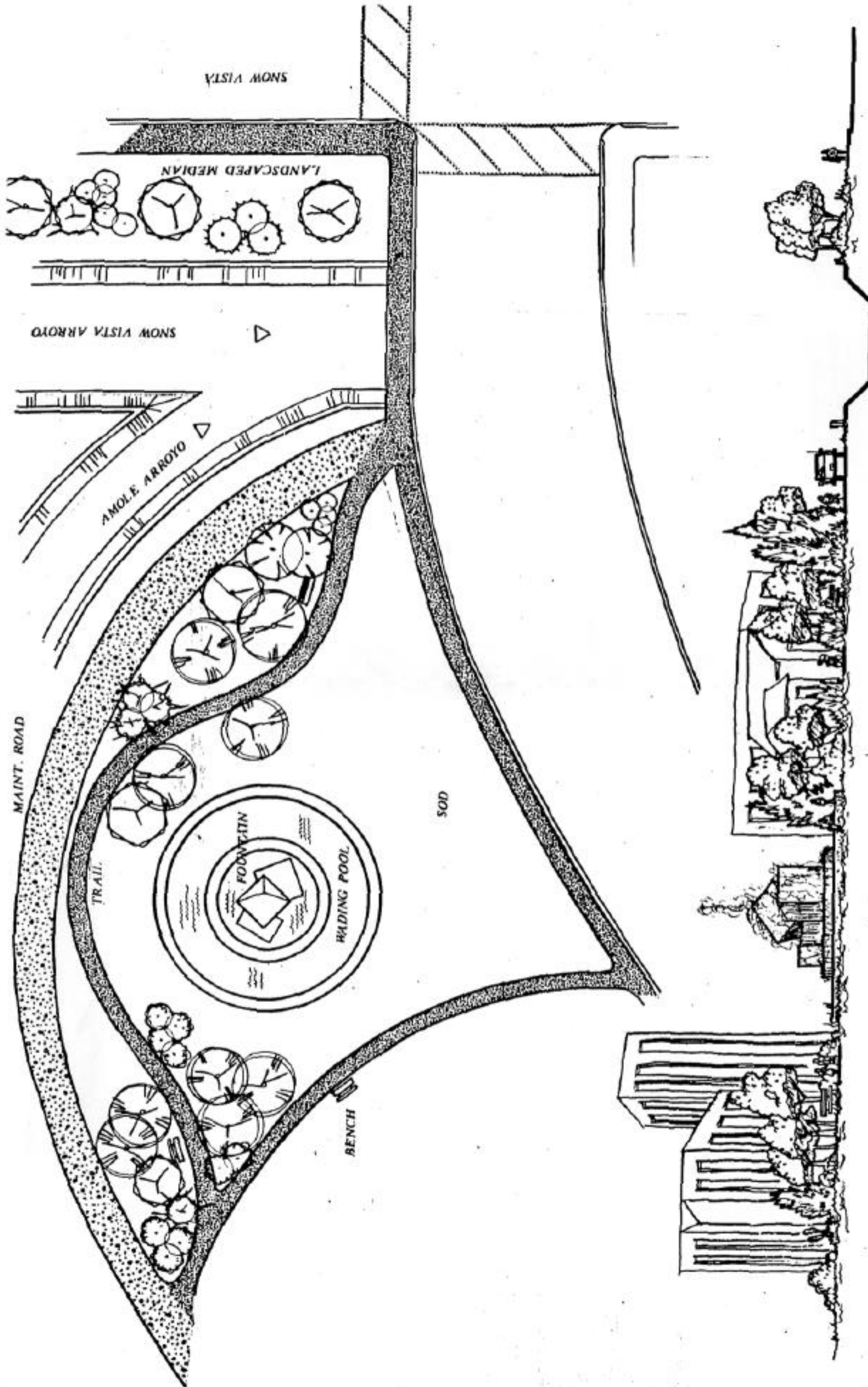
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Plant list courtesy of Judith Phillips, author of Southwestern Lanscaping with Native Plants, Museum of New Mexico Press.

Tamarisk, though not recommended on this plant list, is a potential accent plant for the area east of Golf Course Road and outside of the Rio Grande Bosque State Park, for the purposes of this plan.







NODAL PARK CONCEPT PLAN  
F-2

**THANKS TO;**

Cliff Anderson;  
Open Space Advisory Board  
Jak Beeswy;  
Greater Albuquerque Bikeways Advisory Committee  
Cliff Spirock;  
Community Sciences

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