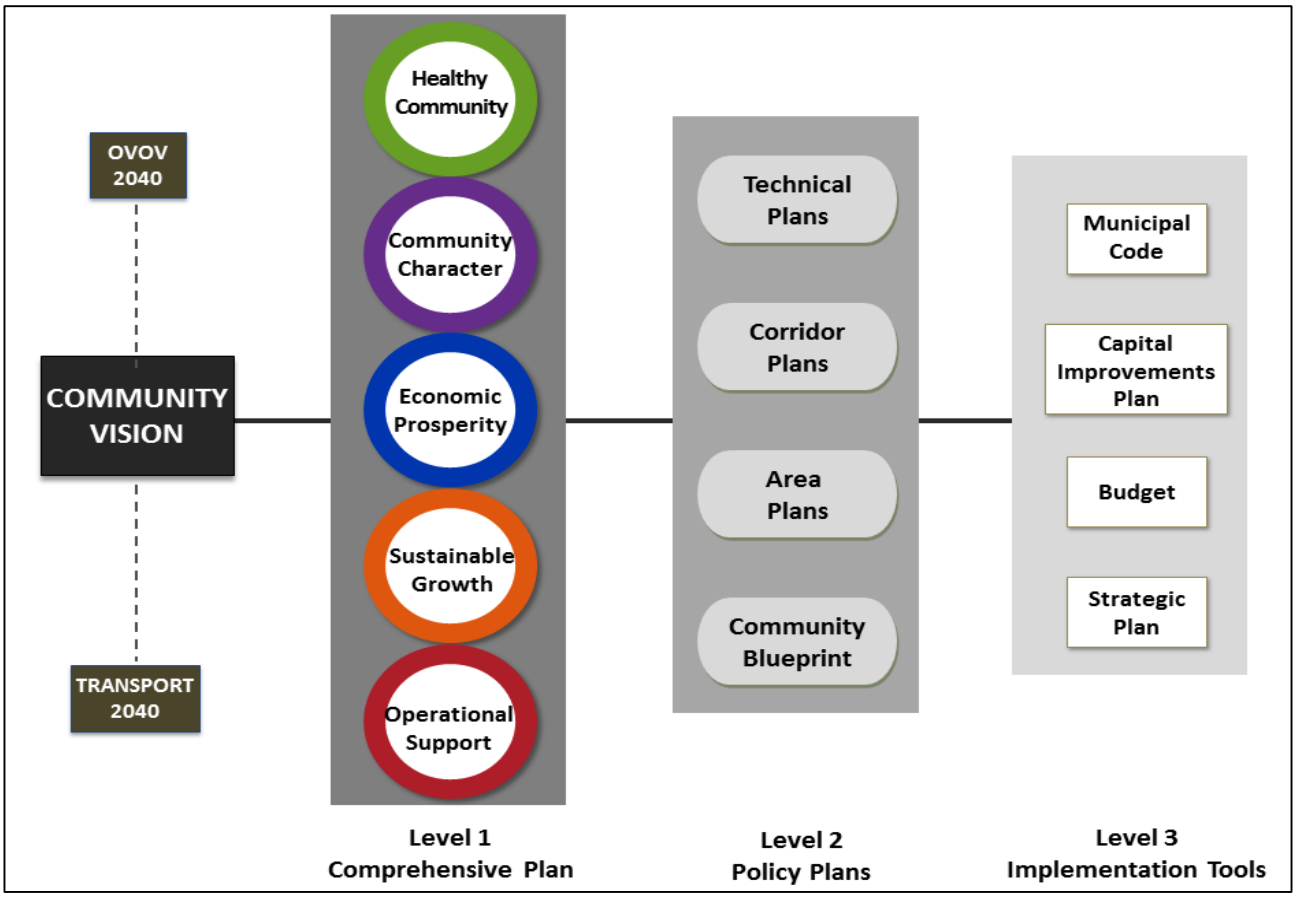
APPENDIX TWO
SPECIFIC GOALS AND POLICIES FROM OTHER PLANNING DOCUMENTS

The diagram below illustrates how the City's Comprehensive Plan guides subsequent, more specific planning documents and the ordinances which implement them. The Arroyo Management Plan is considered a Level 2 technical plan.

Figure 1. Comprehensive planning framework[1]



Goals and policies that are relevant to arroyo and open space protection, trails, alternative modes of transportation, stormwater management and other issues discussed in the Arroyo Management Plan (AMP) are found in all levels the planning process. They are listed below and are described in general terms in Chapter 2 of the AMP.

[1] "OVOV 2040" refers to One Valley One Vision 2040 Regional Plan, adopted by the City of Las Cruces in 2012. "TRANSPORT 2040" is the title of the Mesilla Valley Metropolitan Planning Organization's transportation plan, adopted by the City of Las Cruces in 2010. Both may be found at www.las-cruces.org

RULES AND REGULATIONS GOVERNING THE SUBDIVISION OF LAND WITHIN THE CITY OF LAS CRUCES (1956)

4.5—STORM DRAINAGE

4.51 General Design. Adequate provision shall be made for drainage of storm water subject to approval of the City Engineer.

A. Protection of Capacity. The developer shall provide adequate measures for the protection of open drainage channels by establishing drainage easements sufficiently wide (generally 20 ft.) to enable the working of the channel by motorized equipment or alternatively, where authorized by the Planning Commission, a center block park of a minimum width of 50 feet. All easements shall prohibit the erection of structures, the dumping of fill, or the alteration or obstruction of the watercourses without the written permission of the appropriate City official. Property lines shall be so designed as to follow drainage easements, except that drainage easements may be allowed to cross lots larger than one acre.

B. Appearance. The developer should keep in mind that natural watercourses can be an attractive asset to his subdivision as well as to the community and, where possible, should improve and beautify the watercourses to this end.

FLOOD CONTROL (1965)
NMSA ARTICLE 41 SECTIONS 3-41-1 THROUGH 3-41-5

To review the entire statute, search online for: **2011 New Mexico Statutes Chapter 3: Municipalities Article 41: Flood Control, 3-41-1 through 3-41-5.**
(http://law.justia.com/codes/new-mexico/2011/chapter3/article41/section3-41-2)

LAS CRUCES METROPOLITAN ARROYO FLOOD CONTROL (1968)
NMSA ARTICLE 17 SECTIONS 72-17-1 TO 72-17-103

To review the entire statute, search online for: **2006 New Mexico Statutes - Article 17 — Las Cruces Metropolitan Arroyo Flood Control, 72-17-1 through 72-17-103.** (http://law.justia.com/codes/new-mexico/2006/nmrc/jd_ch72art17-1974f.html)

CITY OF LAS CRUCES COMPREHENSIVE PLAN (1968)

PUBLIC UTILITIES
Storm Drainage

Even though Las Cruces is located in a semi-arid area with an average rainfall of only eight to nine inches a year, there is a very real flooding problem as evidenced by the floods of recent years. The system includes major drains and laterals developed for irrigation purposes and used to carry storm water, retention dams, collection basins, open ditches, storm drains and the major arroyos. The existing storm drainage facilities are not adequate.

Since there are so few storm drainage facilities, the major storm water flow must, of necessity, be a surface flow. This occasionally results in flooding of streets so that they become impassable, washing out of unpaved streets, and some property damage. The collection basins serve to hold water for a temporary period so that the limited existing facilities are able to remove the water more slowly. The small retention dams offer limited protection to those areas directly downstream from the arroyos leading to the dam. The open ditches and storm drains that are available offer some protection to the areas they serve, but even these facilities are generally inadequate or create problems where a ditch ends and the water must revert to surface flow.

The most serious problem facing the city is the large drainage area between Las Cruces and the Organ Mountains which can collect a terrific amount of water that ultimately enters the city in a few major arroyos. To somewhat oversimplify the problem, there is a need to slow down the flow of water entering the city and to speed up the flow of water leaving the city. Currently, facilities are not available to control the flow of water entering the city. The Park Drain and Las Cruces Lateral are the two most important facilities for ultimately removing storm water from the city.However, structures downstream from Las Cruces limit the capacity of these facilities so that they are not capable of removing storm water as fast as it enters the city.

Las Cruces, with the assistance of the Corps of Engineers, is in the process of taking initial steps necessary to build a major retention dam just east of Interstate Highway 25, between U.S. Highway 70 and Lohman Avenue. The outfall channel for this dam will generally follow the Country Club arroyo and parallel the Dona Ana Drain westward to the Rio Grande. There is a possibility that existing drains could be utilized as part of the outfall channel; however, this idea will require very careful analysis. In addition to the large retention dam, the Corps of Engineers proposed a smaller "campus dam" to be built in the area located in the northwest quadrant of the intersection of Interstate 25 and University Avenue. The provision of the Corps of Engineers assisted flood control facilities will solve the most serious flooding problems resulting from rainfall in the large drainage area east of town.

CAPITAL IMPROVEMENT PROGRAM

Storm Drainage

As indicated in a previous chapter of this report, the storm drainage in Las Cruces relies very heavily upon surface runoff. The need for an adequate storm sewer system is quite apparent. It is estimated that the total cost of the necessary storm sewer improvements would be approximately $3,000,000. With 50 percent matching federal funds, the cost to the city will be approximately $1,500,000. It is proposed that the basic elements of the system be constructed during the five-year improvement program, in view of other required improvements, and the remaining portion be added as possible. The estimated cost of the storm drainage system to be built during the five-year program is approximately $1,630,000, with the city's share at $815,000.

Flood Control

The city and Corps of Engineers have developed plans to build a major retention dam and outlet channel to protect a major portion of the city from flood water emanating from the large drainage area to the east of the city. The timing of the undertaking of this project is very critical. The expiration date of the Corps' assistance falls within the next two years. Although

the city has purchased most of the right-of-way necessary for the dam, there still remains a necessary expenditure on the city's part of approximately $527,000 for the outlet channel.

The provision of the storm drainage system improvements along with the retention dam and outlet channel will substantially reduce the problems Las Cruces has experienced in the past from excessive runoff of storm water.

CITY OF LAS CRUCES LAND SUBDIVISION REGULATIONS (1975)

SECTION III: Suitability of Land

A. GEOGRAPHIC SUITABILITY
1. With reference to the Comprehensive Plan and the Zoning Ordinance land shall be suited to the purpose for which it is to be subdivided.
2. Land which is not programmed to have adequate public or private water sanitary sewer service or flood control facilities within a reasonable time shall not be subdivided for purposes which require such services.
3. Possible environmental problems and the availability of adequate paved street access transit service fire protection police protection refuse service public schools parks and recreation facilities and individually provided utilities shall all be evaluated in considering the subdividing of land.
4. Land with the following types of problems may have subdivision approval withheld until it is demonstrated by means of an engineering analysis submitted by the developer that such hazards have been or will be eliminated.
   a. Special drainage conditions.
   b. Difficult topography.
   c. Soil conditions which are unusually limiting.
   d. Other geographic hazards to life health or property.

B. GRADING
1. No person shall proceed with any grading in relation to a proposed subdivision until the City has approved a drainage plan Such grading shall be consistent with the recommendation of an approved drainage plan as required by these regulations.
2. The subdivider shall give consideration to the preservation of trees, scenic points, historic places, and other community landmarks where feasible.
3. Subdivisions shall be laid put so as to match existing topography insofar as possible,
4. Grading shall be held to a minimum in subdivision preparation and shall be done only as needed for construction.

SECTION IV: Plats and Data for Preliminary Approval

B. STORM DRAINAGE ANALYSIS PLAN
1. A drainage report or plan shall be prepared by a Professional Engineer registered in New Mexico and submitted with the proposal.
2. The analysis plan shall include soil classification, silt and sediment erosion analysis, and infiltration and absorption tests.
3. Storm drainage computations for a 50-year frequency storm showing the estimated run-off

from the subdivision prior to and following completion of development shall be included in the plan.

4. The plan shall include a detailed scheme for controlling the increased run-off for a 50 year frequency storm such as catch basin or ponding area for controlled entry of water into natural drainage ways or storm sewers to insure that the increase does not overload the system or cause damage to property and areas at lower elevations.
5. The plan shall show that all property within the subdivision is developed in such a manner that flood damage will be minimized and that construction and substantial improvements are elevated to the 100-year flood level if the property lies in an area which has been designated a flood plain under the National Flood Insurance Program New water and sewer systems (including on-site systems) shall be located to avoid impairment or contamination during flooding.
6. Areas which will be inundated by run-off from a 50-year frequency storm shall not be divided into lots for sale in any proposed subdivision within the planning and platting jurisdiction of the City of Las Cruces.

SECTION VI: Design Standards

D. UTILITY IMPROVEMENTS

8. A storm drainage system adequate to serve the needs of the proposed new streets and the entire subdivision will be required in new sub divisions. Where an adequate public storm sewer main is available at the plat boundary the subdivider shall construct a storm drainage system and connect with such storm sewer main of adequate size. Drainage improvements shall maintain any natural water course insofar as practical and shall prevent the collection of water in any low spot unless it is to be specified as a ponding area in the drainage plan.

ORDINANCE 124 (1977)
AN ORDINANCE FOR THE PURPOSE OF FLOOD DAMAGE PREVENTION

ARTICLE I
SECTION C. STATEMENT OF PURPOSE
It is the purpose of this ordinance to promote the public health safety and general welfare and to minimize public harm and private losses in special flood hazard areas with provisions designed to:

1. Restrict or prohibit uses that are dangerous to health safety or property in times of flood or cause excessive increases in flood heights or velocities;
2. Require that uses vulnerable to floods including public facilities which serve such uses be protected against flood damage at the time of initial construction;
3. Control in the sense of providing authoritative guidance the alteration of natural flood plains their protective barriers and stream channels;
4. Prevent construction of barriers which will divert flood waters and subject other lands to greater flood hazards;
5. Control in the sense of authoritative guidance development which would cause greater erosion or potential flood damage such as grading dredging and excavation.

ORDINANCE 879
AN ORDINANCE FOR THE PURPOSE OF FLOOD DAMAGE PREVENTION (1987)

ARTICLE 1

SECTION C STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

1. Protect human life and health
2. Minimize expenditure of public money for costly flood control projects
3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public
4. Minimize prolonged business interruptions
5. Minimize damage to public facilities and utilities such as water and gas mains electric telephone and sewer lines streets and bridges located in floodplains
6. Help maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize future flood blight areas and
7. Insure that potential buyers are notified that property is in a flood area

SECTION D METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes this ordinance uses the following methods:

1. Restrict or prohibit uses that are dangerous to health safety or property in times of flood or cause excessive increases in flood heights or velocities
2. Require that uses vulnerable to floods including facilities which serve such uses be protected against flood damage at the time of initial construction
3. Control the alteration of natural floodplains stream channels and natural protective barriers which are involved in the accommodation of flood waters
4. Control filling grading dredging and other development which may increase flood damage
5. Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands.

ARTICLE 5 PROVISIONS FOR FLOOD HAZARD REDUCTION

SECTION A GENERAL STANDARDS

In all areas of special flood hazards the following provisions are required for all new construction and substantial improvements:

1. All new construction or substantial improvements shall be designed or modified and adequately anchored to prevent flotation collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads including the effects of buoyancy
2. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage
3. All new construction or substantial improvements shall be constructed with materials resistant to flood damage
4. All new construction or substantial improvements shall be constructed with electrical heating ventilation plumbing and air conditioning equipment and other service facilities that are designed and located so as to prevent water from entering or accumulating within the components during conditions of flooding
5. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system
6. On site waste disposal systems shall be located to avoid impairment to them or contamination

from them during flooding

SECTION D STANDARDS FOR AREAS OF SHALLOW FLOODING AO/AH ZONES

Located within the areas of special flood hazard established in Article 3 Section B are areas designated as shallow flooding These areas have special flood hazards associated with base flood depths of 1 to 3 feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and where velocity flow may be evident Such flooding is characterized by ponding or sheet flow therefore the following provisions apply:

1. All new construction and substantial improvements of residential structures have the lowest floor including basement elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community FIRM at least two feet if no depth number is specified
2. All new construction and substantial improvements of nonresidential structures
    i. have the lowest floor including basement elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community FIRM at least two feet if no depth number is specified or
    ii. together with attendant utility and sanitary facilities be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads of effects of buoyancy
3. A registered professional engineer or architect shall submit a certification to the Floodplain Administrator that the standards of this Section as proposed in Article 4 Section C1a are satisfied

Require within Zones AH or AO adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures

STORM WATER MANAGEMENT POLICY PLAN (1992)

Objective A: Establish a storage management system throughout the city of Las Cruces that utilizes a regional detention storm water system for greater coordination between development and "developed" areas of the city.

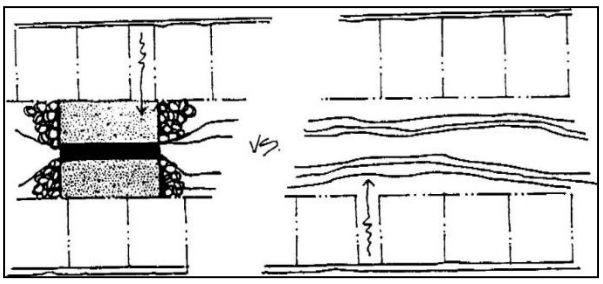
Policy 6: Developers and/or subdividers shall be required to design their storm drainage systems to ensure that historic flows are achieved after development of a project.

Objective B: Establish a conveyance storm water system that connects project-scaled detention facilities, arroyos, and regional detention/storm water systems together in a logical, economical and safe manner.

Policy 1: Unless specifically identified within this policy plan, the City encourages flexibility in design when channelizing storm water to enhance the environment and promote public safety.

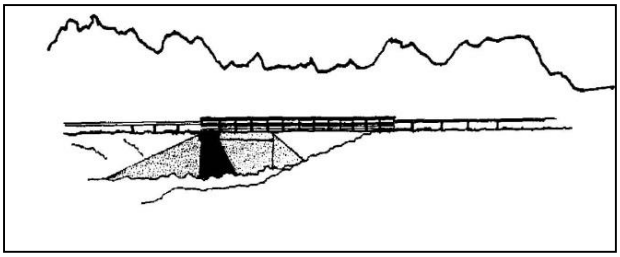
Policy 2: The City encourages asphalt-lined channels used for conveyance of storm water in cases where City utilities are placed beneath the surface the channel.

Policy 3: Channelization design of storm water shall be compatible with the adjacent channelized systems where possible.



Policy 4: "Natural" arroyos may be used for conveyance of water only when maintaining the existing velocity and rate of the arroyo and in designated areas as specified by this policy plan or the Las Cruces Major Arroyo Plan.

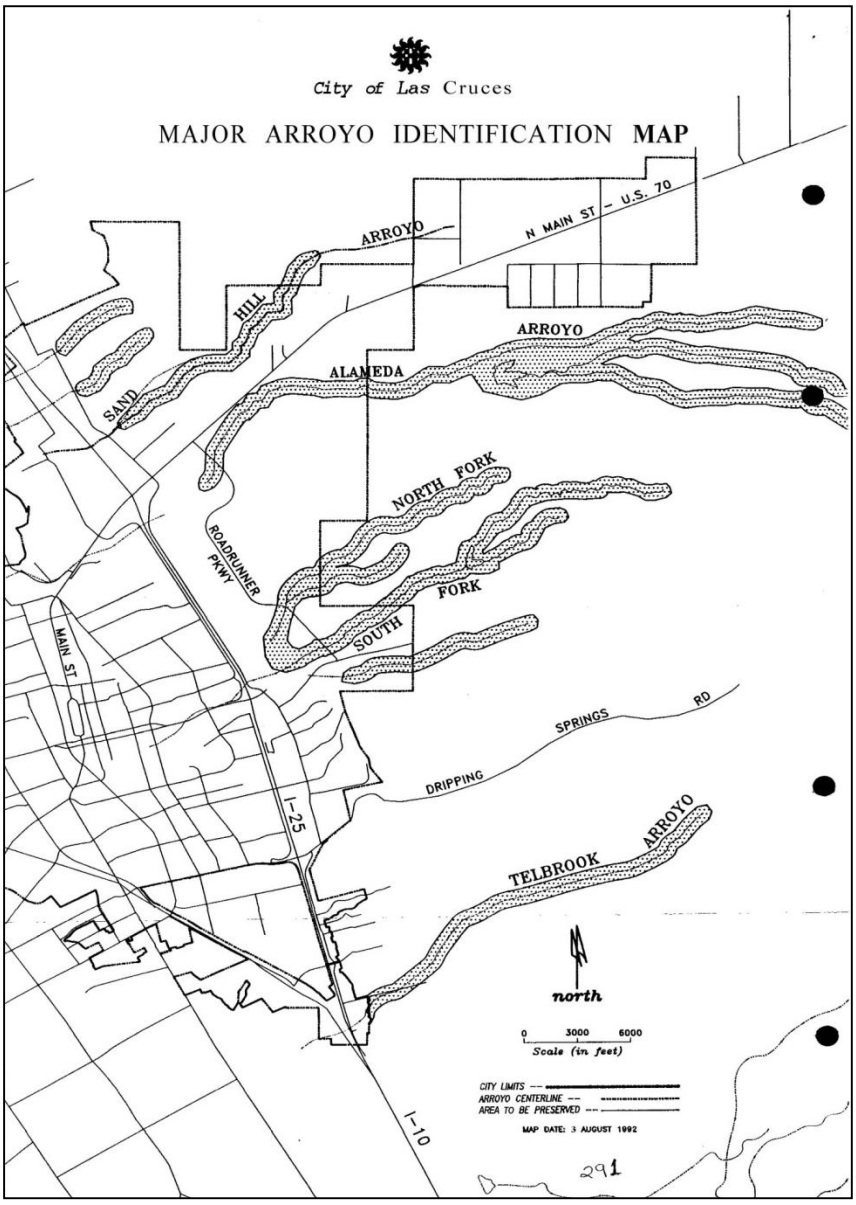
Policy 7: The City supports the use box culverts or concrete pipe culverts as the primary mechanism used to convey water beneath major and minor arterial roadways, major collector streets, and primary access to a subdivision.



GOAL: Develop an overall City water system that promotes aesthetics and multiple-use activities through the use of “natural” arroyos or linear park systems, preservation of open space, and visual enhancement.

OBJECTIVE A: Establish a major arroyo drainage system that encourages both recreation and open space uses.

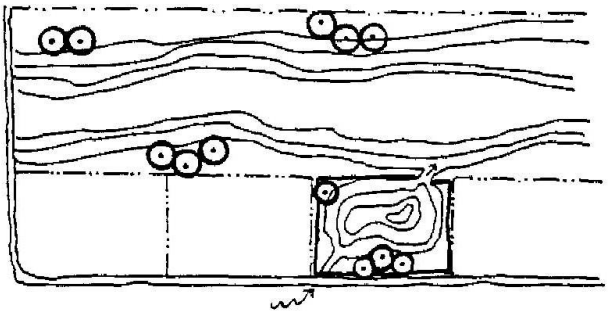
Policy 1: The City will encourage the preservation of open space corridors along major arroyos within the East Mesa. Such major arroyos shall include the Fillmore Arroyo, Telbrook Arroyo, segments of the Little Dam Arroyo, South Fork Arroyo, Las Cruces Arroyo, Alameda Arroyo, a segment of the Sandhill Arroyo and unnamed major arroyos as identified on the Major Arroyo Corridor Identification Map. Land use, transportation, recreation, and drainage characteristics shall be identified via the Arroyo Plan.



Policy 2: The City will encourage the preservation and utilization of major tributaries that feed designated major arroyo corridors.

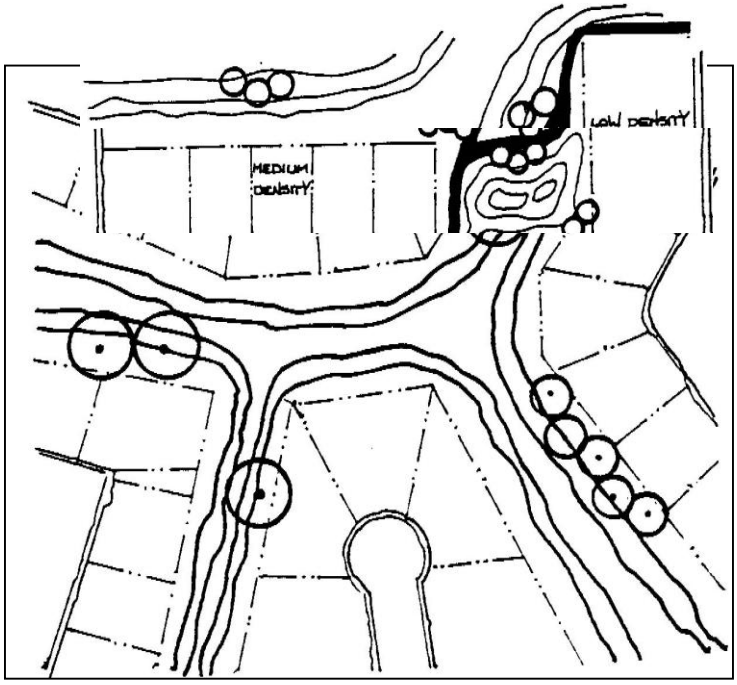
Policy 3: The City promotes flexible design standards when channelizing and storing storm water for development that is adjacent to designated major arroyo corridors to encourage enhancement of a natural system.

Policy 4: Park fees may be waived for development that provides open space and recreational opportunities in accordance with the Major Arroyo Plan.



Objective B: Establish requirements that facilitate multiple uses for storm water basins.

Policy 4: Project-scaled detention facilities should be coordinated with open space areas to ensure multiple uses and linkages between different land uses. Such linkages maybe include bike paths, pedestrian trails or buffer areas between land uses.



Policy 6: Connect project-scaled detention facilities or on-site retention basin vegetation to existing natural drainage channels and washes to enhance a natural open environment.

GOAL: Develop a city-wide Storm Water Management Policy Plan that will facilitate coordination with other governmental entities that are impacted by analogous drainage systems.

Objective A: Encourage the facilitation of a consistent, regional storm water management program for the Las Cruces urban area.

Policy 1: The City will submit the adopted Storm Water Management Policy Plan to the ETZ Commission to encourage the development and implementation of a Las Cruces urban area Flood Control Management Program.

Policy 2: The City will submit the adopted Storm Water Management Policy Plan to the Town of Mesilla and Dona Ana County to encourage acceptance and implementation of a Las Cruces Urban Area Flood Control Management Program.

Policy 3: The City will submit the adopted Storm Water Management Policy Plan to the Las Cruces Flood Control Authority to encourage the process of development and

implementation of an urban area management program.

Policy 4: The City will encourage the Town of Mesilla and Dona Ana County to participate with Las Cruces in converting storm drainage responsibility to the Las Cruces Flood Control Authority.

STORM WATER MANAGEMENT PLAN (SWMP) (2009)

The EPA has identified six minimum control measures which must be specifically addressed within this plan. By following these six minimum control measures, the City of Las Cruces will benefit from significant reductions in pollutants being discharged. They are:

1. Public Education and Outreach on Storm Water Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Construction Site Storm Water Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

Part 1 Public Education and Outreach

1.2 Best Management Practices

BMP 1-6 Construction General Permit Education

Developers and construction personnel are the target audience for this BMP. The City of Las Cruces will identify local building organizations, contractor groups, engineering organizations, and other construction related associations to educate them on storm water pollution prevention for construction sites. The City will contact these associations and will offer presentations relating to storm water and the construction general permit.

Educational information such as posters, information sheets, and brochures on storm water pollution prevention for construction sites will be made available at the City of Las Cruces Office Center or other sites where construction permits are issued. This information will be accessible to developers and contractors obtaining a building permit. The information will include, but not be limited to, requirements for storm water runoff from construction sites, erosion control plans, and pollution prevention BMPs.

Las Cruces Municipal Code, Chapter 16 - Licenses, Taxation and Miscellaneous Business Regulations, Article IV - Business Registration and Licensing requires contractors operating within the City limits to secure a business license or registration from the City of Las Cruces. New contractors will be given storm water information related to construction when they receive their business registration. The Director of Community Development is responsible for implementing this portion of the BMP using information provided by the Program Coordinator.

BMP 1-7 Brochure Dispensers at Public Facilities

The City of Las Cruces currently has brochure dispensers at the City of Las Cruces Office Center while a new City Hall is being constructed. In future years, the City will make informational material about storm water pollution prevention accessible to the general public (resident and visitors) at the public library and the new City Hall. Educational material may address storm water runoff, storm water management, and methods to prevent pollution from entering storm water systems.

Part 2 Public Participation and Involvement

2.2 Best Management Practices

BMP2-4 Community Clean-Up Activities

The City of Las Cruces will sponsor community clean-up activities to involve citizens in removing pollutants from the watershed. Advertising material for the activities will include information about the connection to storm water quality. Clean-up activities will focus on street rights-of-way and arroyos that are part of the storm drainage system. Examples of community clean-up activities that the City may sponsor and participate in are Keep Las Cruces Beautiful, the Toss No Mas highway clean-up campaign, and the Great American Clean-up.

Part 4 Construction Site Runoff Control

4.2 Best Management Practices

BMP4-1 Plan Review

The City of Las Cruces recognizes that construction sites can discharge a significant amount of sediment in a short period of time. The City has adopted an ordinance to control erosion and reduce sediment and other pollutants in storm water runoff from construction sites. Las Cruces Municipal Code Chapter 34 – Drainage and Flood Control, Article III - Storm Water Management requires the operators of a land disturbance of one or more acres to submit an Erosion and Sediment Control Plan (ESCP) to the City for review. Operators disturbing less than one acre are also required to submit an ESCP if the site is part of a common plan of development.

The City's Design Standards require that all construction plans for subdivision (residential) and commercial permits comply with the requirements of Las Cruces Municipal Code Chapter 34 – Drainage and Flood Control, Article III - Storm Water Management. The ESCP is reviewed by the Public Works Engineering Services Section and stamped as the "Permit Set" prior to Issuance of a subdivision or commercial permit for construction. The City's ordinance gives it the authority to deny permits if the ESCP is not acceptable. The City's plan reviewers were trained in review of erosion and sediment controls during the first permit year.

Part 5 Post-Construction Storm Water Management

5.2 Best Management Practices

BMP 5-1 Structural BMPs

The City has already implemented an ordinance that addresses drainage design for development and redevelopment. Las Cruces Municipal Code, Chapter 32 - Design Standards, Article III - Drainage Design Standards includes the following requirements:

- On-site retention or detention of the 1% chance rainfall allowing the pre-developed flow or less to flow off the development (i.e. no increase in runoff);
- Erosion control on the side slopes of ponding areas;
- Low maintenance landscaping for a perimeter buffer on ponding areas;
- Drainage outfalls designed in such a manner that it will not increase erosion downstream;
- Riprap for erosion control downstream of culverts; and
- Velocity limits and lining protect channels from erosion.

Ponding areas are the primary structural BMPs used by the City. Las Cruces Municipal Code, Chapter 32 - Design Standards requires grading and drainage plans be submitted to the City for review before starting construction. During review, the City confirms that ponding areas are designed according to the Design Standards and are protective of the drainage system and any downstream natural features, such as

arroyos. Construction is not authorized until the City stamps the plans as the "Permit Set." The City has the authority to deny a permit if the construction plans do not meet the Design Standards. The Engineering Services Administrator and Street Systems Administrator in the Public Works Department and the Director of Facilities are responsible for implementing this BMP.

BMP 5-2 Open Space Program (Non-Structural BMP)
The open space program seeks to reduce the amount of impervious cover by increasing natural land set-asides for conservation and by using pervious areas for more effective storm water management. The program includes several initiatives to reduce pervious area in new development and remove pervious area from existing development.

The City of Las Cruces Public Works Department has looked at ways to reduce the amount of runoff in new subdivisions. One such way has been the recent re-evaluation of the drainage design standards to encourage regional ponds and parks. This will provide additional pervious area and native flora and fauna. The net increase of scenic features will positively impact the neighborhood's aesthetic and increase residential property values.

Las Cruces Municipal Code, Chapter 34 - Drainage and Flood Control, Article III – Storm Water Management authorizes the Director of Public Works to require more than minimum storm water standards if arroyos on a site to be developed or immediately downstream of the site show evidence of increased flooding, accelerated erosion, channel erosion of sedimentation, as a direct result of conditions on the site. These additional requirements may include open space such as buffer zones, re-vegetation of highly eroded areas, and arroyo restoration or other erosion control measures within highly eroded channels.

The City has developed a Draft Arroyo Plan to guide the preservation and restoration of arroyos. After the plan is finalized, the Public Works Engineering Services Section will develop arroyo design standards that will emphasize preserving arroyos as open space.

Part 6 Municipal Pollution Prevention/Good Housekeeping
6.2 Best Management Practices
BMP 6-1 Good Housekeeping Procedures
The City of Las Cruces will review operations and facilities within the departments listed in Part 6.1. Each department will prepare a list of outdoor activities and material storage that is exposed to storm water. These operations have the potential to negatively impact storm water quality. For each activity or storage area, the potential pollutants and waste streams will be listed. The City will then develop written Good Housekeeping Procedures and BMPs for the potential pollutant and waste streams.

Written procedures will decrease the potential for activities to result in storm water pollution and will ensure proper disposal of wastes. Written procedures will also aid consistency in pollution prevention and facilitate knowledge transfer when employees performing an activity change. The Good Housekeeping Procedures will be revised when activities or facilities are modified.

MESILLA VALLEY METROPOLITAN PLANNING ORGANIZATION TRANSPORT 2040 (2010)

Goal 2: Balance the built and natural environments to promote physical activity, social interaction, and the sustainable use of resources.

This goal entails a balance between built and natural environments that promote physical activity, social interaction, and the sustainable use of resources. The goal can be achieved through land use and transportation integration and design that enhance the unique characteristics of communities, and by investing in safe, healthy, and walkable neighborhoods. Application of this goal can minimize negative impacts to natural resources and help improve quality of life.

Goal 3: Provide a variety of transportation choices that serve all users through developing safe, reliable, and convenient transportation modes.

This goal is focused on providing a variety of transportation choices that serve all users through developing safe, reliable, and convenient transportation modes. Different areas of the region will be served with a variety of transportation options based on their range of needs while endeavoring to maintain system efficiency.

Transportation Principles:

3. Preserve natural, cultural, historical, and agricultural resources -- Exploring new methods for addressing environmental and cultural impacts are essential. This includes consulting with state and federal land use agencies and stakeholder organizations before projects are designed and implemented. For example, well designed projects can sustainably integrate aspects of the existing natural environment with the built environment while lessening the disruption of natural habitats or existing water flows. Encouraging more sustainable and energy efficient designs and applications are important parts of preserving natural, cultural, historical, and agricultural resources.
4. Promote and design healthy and livable communities -- Transportation infrastructure can be an integral part of supporting physical activity and social interaction and therefore improving the overall health of our communities. A livable community means the creation of sustainable urban and rural environments that foster walking, biking, and transit, while reducing dependency on the private automobile.

Green Opportunities

Associated Policies:

- Support development that contributes to reduced storm water volume and velocity and fewer storm water overflow events

Planning and Environmental Linkages

Associated Policies:

- Support the National Environmental Protection Agency (NEPA) process through well-coordinated land use and transportation planning and the five core MPO functions

Associated Tasks:

- Develop a map that illustrates historical, cultural, and environmental areas of importance and their relationship to the transportation system
- Cooperate with Vision 2040 efforts on a view shed analysis

Trail System Priorities Plan

The Trail System Priorities Plan is a map that identifies current and potential future trail locations within the MPO area. The plan prioritizes trail facilities into three levels, or tiers, that will create a trail network across the region. Tier 1 trail routes will be the trail arterial network that will connect major destinations and provide continuous routes across the region. Tier 2 trail routes will act as minor trail arterials to

complete the network of intra-regional travel. Tier 3 trail routes will round out the network as collectors between neighborhoods and the trail arterial network. The trails outlined in this plan are intended to augment the roadway transportation system by providing additional networks for bicyclists and pedestrians.

The governing boards of each member jurisdiction have passed resolutions in support of a loop trail system around central Las Cruces and extending into Mesilla and Doña Ana County. The proposed loop trail includes the following routes: Triviz Multi-use Path, the Outfall Channel, La Llorona Trail, Calle del Norte, New Mexico Highway 28, and University Avenue. Improvements needed to create this loop include paving, trail amenities, and shoulders along well-traveled roadways.

Many of these trails are located along arroyos and Elephant Butte Irrigation District (EBID) facilities. Use of EBID facilities require a Special Use permit by the local jurisdiction and a willingness to provide for liability insurance. The plan prioritizes trails that the residents and stakeholders would prefer to be improved or left unimproved. The MPO encourages the local jurisdictions to utilize these existing networks for a comprehensive regional trail system that connects important destinations for pedestrians, bicyclists, and equestrian use.
Associated Tasks:

- Increase access to regional recreational activities
- Protect the natural environment of Arroyos and enhance them with trail development
- Support Loop Trail resolution

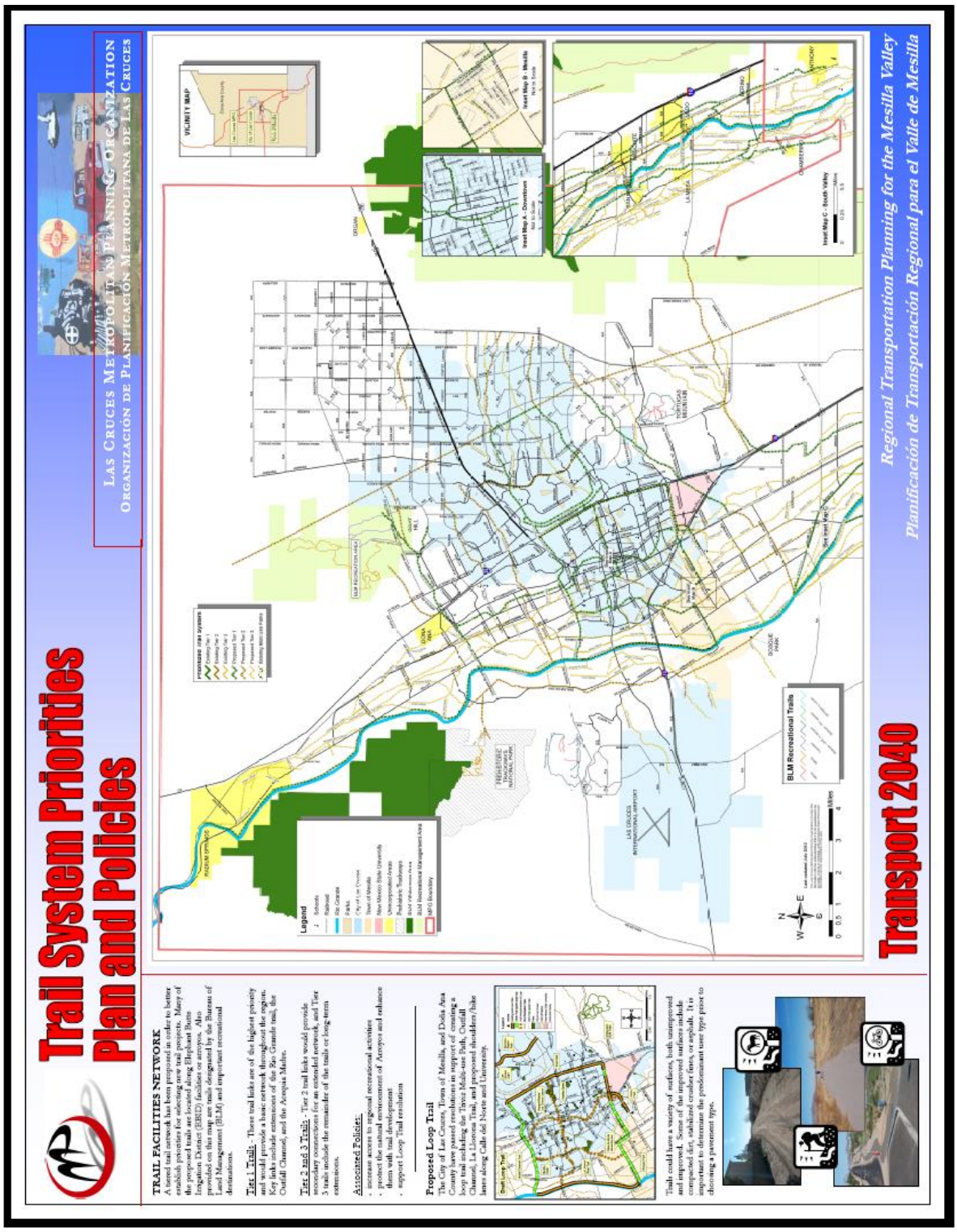
On the Map:
The Trail System Priorities Plan map contains text on the identified tiered network (the loop and spoke system), examples of improved and unimproved trail facilities, and a discussion of potential pavement types.

Trail Improvements
The trail system priorities consist of first a central loop system and then an extended loop and spoke system. These loop systems connect some important destinations and neighborhoods to provide a complete network around the City of Las Cruces and into Doña Ana County and Mesilla. A trail connection may include a roadway or multi-use path. The following are comments from the public and MPO committees on critical connections and area attractions.

Project lists organized by Status:

Connections		
Location	**Issue/Improvement**	**Status**
Alameda arroyo	Designated trail	Proposed Tier 1 Trail System Priorities Plan; CLC RTP application submitted
Outfall Channel	Connectivity; part of central loop	MPO unfunded illustrative list
Over Las Cruces Flood Control Dam	Connectivity	Proposed Tier 1 Trail System Priorities Plan
Connection to Bosque Park	Improve Calle del Norte bridge crossing	Proposed Tier 1 Trail System Priorities Plan
La Llorona Trail extension (North to Doña Ana School Rd and South to Pajaro Rd)	Connectivity; part of extended loop	Proposed Tier 1 Trail System Priorities Plan
Las Cruces Arroyo South Fork	Designated trail	Proposed Tier 1 Trail System Priorities Plan
Hadley Street (Triviz to Downtown)	Bicycle Boulevard	Proposed Tier 1 Trail System Priorities Plan
Las Cruces Drain (Outfall Channel to Calle de Norte)	Connectivity within central loop	Proposed Tier 1 Trail System Priorities Plan
Acequia Madre (Downtown to NMSU near El Paseo)	Overall pedestrian connectivity and access per Downtown Main Street Master Plan; Paved path along EBID ROW	Proposed Tier 1 Trail System Priorities Plan
South side of Tortugas Hill (A Mountain)	Multi-use path	On BLM land

The MPO Trail Systems Priority Plan and Policies Map may be viewed in more detail at:
http:// www.las-cruces.org/en/Departments/Community%20Development/ Sections/MPO/Maps.aspx#



ONE VALLEY ONE VISION 2040 REGIONAL PLAN (2012)

6.1 Land Use

Goal 6-1-8: Encourage retention of open space, scenic aspects of rural areas, entranceways to urban areas, and transition areas between urban areas.

Strategies

• Prepare an assessment of the open space, scenic aspects of rural areas, entranceways to urban areas, and transition areas between urban areas that significantly contribute to the region's character.

• Work with property owners to determine the most appropriate methods to balancing public purposes with individual property rights, which may include such means as providing design flexibility, easements, and purchase or transfer of development rights.

• Use incentives or public acquisition of property rights, as appropriate, instead of regulations.

• Offer zoning districts (e.g., cluster zoning) that encourage developers to provide open space, allow access to public areas, protect scenic elements, emphasize key entranceways, and are sensitive to transition areas.

6.2 Water

Goal 6-2-1: Ensure the availability of a safe, dependable, affordable, and sustainable water supply to meet or exceed the needs of all reasonable beneficial uses.

Strategy

Plan and create additional water supplies in ways that do not adversely affect existing water users or the environment. Some possible methods include thinning or removal of invasive plant species within water recharge areas; preservation and restoration of arroyos to assist in water recharge; using desalination, water reclamation, or other technologies to make lower quality water supplies usable; storing surface and stormwater for later use, expanding water lease/transfer programs, and importing water from other basins.

Goal 6-2-2: Protect existing surface and groundwater from pollution and ensure it meets or exceeds water quality standards.

Strategies

- Continue participation in the National Pollutant Discharge Elimination System (NPDES) permit program to help control water pollution carried by stormwater runoff.
- Develop ways to better enforce and control illegal dumping through reasonable and equitable funding mechanisms, particularly within key arroyos and other sensitive water recharge areas.
- Identify and map sensitive water recharge areas.
- Coordinate with other local jurisdictions and state and federal agencies to ensure a safe water supply.
- Include water-conserving stormwater management techniques such as green infrastructure and low-impact development as part of a comprehensive stormwater and water-quality improvement strategy by adopting them into land use development and building codes where appropriate.
- Support planning and analysis of the local Rio Grande watershed that will provide recommendations of best management practices in managing pollutant loads, such as E. coli bacteria, to meet state water quality standards.

6.4 Environmental Resources

Goal 6-4-1: Make land use decisions that protect and enhance the natural environment.

Strategies

- Investigate the use of tools such as conservation easements, transfer or purchase of development rights, and other similar programs.
- Direct new development to already developed areas in order to protect critical wildlife habitat, help prevent erosion and flooding, reduce demand for water, and preserve open space.
- Prohibit development in designated environmentally sensitive areas in a manner that reasonably compensates, provides incentives, maintains similar existing property rights, or in another similar manner balances the public and property owner interests.
- Work with landowners and stakeholders to develop a map of critical and sensitive natural areas in the county.

Goal 6-4-2: Protect and maintain natural habitat and wildlife connectivity to the greatest extent possible and mitigate damage that may result from development.

Strategies

- Work cooperatively with entities engaged in open-space conservation to enhance these valued resources as the region grows.
- Identify areas of natural, historical, architectural, or cultural significance and protect them by providing incentives for property owners to maintain them, or by acquiring an appropriate public interest in the property.
- Provide an adequate network of corridors for wildlife (e.g., buffer zones adjacent to arroyos or wildlife over/under passes) in a manner that reasonably compensates or incentivizes, maintains similar existing property rights, or in some way balances the public and property owner interests.

Goal 6-4-3: Minimize impacts created by development and human activities to realize the full potential of the environmental resources as a community asset.

Strategies

- Develop plans that allow for low-impact and passive recreational uses along arroyo buffers where feasible.
- Assess the implementation of an environmental impact fee for development that encroaches upon sensitive areas based upon a comprehensive environmental or pollution control plan that would balance the public and property owner interests.
- Protect arroyos, open spaces and sensitive areas by adopting an Arroyo and Open Space Management Plan.

6.5 <u>Hazards</u>

Goal 6-5-2: Protect people and property from the negative effects of stormwater.

Strategies

- Coordinate stormwater management policies with water-management agencies to aid in better response, allow for improved funding opportunities, and have better protection of property from flooding erosion.
- Encourage communities to adopt and implement storm drainage master plans.
- Prepare an assessment of the arroyos and man-made stormwater systems of regional

significance to develop policies for minimizing impact to natural arroyos, provide appropriate drainage, retention, and detention functions, and allow for regular maintenance.

- Develop regulations requiring adequate flood and drainage control systems and maintenance for new and redevelopment.
- Install weather stations and telemetry systems to aid in advanced warning of potential flood conditions.
- Implement existing stormwater management plans.
- Identify factors that increase the likelihood of flooding and develop mitigation plans accordingly. These plans would integrate wildlife protection and other goals found in Section 6.4, "Environmental Resources."

6.6 Transportation

Goal 6-6-3: Increase access to non-motorized transportation options to promote healthy living and provide mobility alternatives.

Strategies

- Incorporate bicycle lanes, sidewalks, multi-use paths, and trails with roadways.
- Use alternative options for non-motorized transportation routes where necessary, Solano Road Multi-Modal Access, Las Cruces including, but not limited to, areas adjacent to irrigation ditches or arroyo channels, connections between cul-de-sacs, and utility corridors.
- Coordinate non-motorized improvements to minimize or avoid discontinuous connections.
- Design safe, efficient non-motorized transportation systems and use educational programs to reduce or eliminate conflicts with motorized transportation systems.
- Develop non-motorized routes that maximize direct travel trips.
- Ensure non-motorized systems meet or exceed standards for use by persons with disabilities.

6.7. Community Facilities & Services

Goal 6-7-2: Meet the existing and projected needs of residents through location, access, extent and timing, staffing, and category of community facilities and services.

Strategy

Develop stormwater basins, stormwater management dams, and arroyos to serve multiple uses, including passive and active open spaces that provide habitat for plants and animals and recreational opportunities.

Actions

Action 3

Preserve BLM and State Land outside the proposed future service boundary through actions, including and not limited to:

Maintaining and enhancing dialogue with the BLM and State Land Trust

Expressing that land located outside the proposed future service boundary should be given priority for preservation as disposal plans are prepared and released.

Associated Goals: 6-1-8

Primary Responsible Entities: ETA, DAC and municipalities, BLM, NMSLO

Action 14
Work to identify critical and sensitive natural areas and wildlife corridors, and protect these areas from development in a manner that reasonably compensates, provides incentives, maintains similar existing property rights, or in another similar manner that balances the public and property owner interests.
Associated Goals: 6-1-8; 6-4-1; 6-4-2; 6-4-3; 6-10-4; 6-11-1
Primary Responsible Entities: ETA, DAC and municipalities, BLM, NMSU, U.S. Fish& Wildlife Service, NM Department of Game& Fish, NMSLO, WSMR, and USDA.

Action 16
Draft and adopt arroyo, trail, and open-space management plans which balance the public and property owner interests.
Associated Goals: 6-4-2; 6-4-3; 6-5-2; 6-6-3; 6-7-2; 6-7-5
Primary Responsible Entities: ETA, DAC and municipalities, BLM, NMSLO, WSMR, USDA, and NMSU

Action 17
Evaluate the possibility of environmental impact fees for development that encroaches on sensitive environmental areas.
Associated Goals: 6-4-3
Primary Responsible Entities: ETA, DAC and municipalities

PARKS & RECREATION MASTER PLAN (2013)

Community Engagement & Information

1.3 Prepare, publish and promote a comprehensive park and trail facilities map for online and print distribution to highlight existing and proposed sites and routes, while promoting Las Cruces as an active-lifestyles community.

Recreation Programming

2.13 Continue to promote and expand family-oriented programming, special events, festivals and concerts, such as The Whole Enchilada Festival and Spring Fest, to enhance community identity, activity and education. Utilize the City's parks, trails and recreation

Parks & Park Maintenance

Goal 3: Acquire and develop a high-quality, diversified system of parks, recreation facilities and open spaces that provides equitable access to all residents.

3.5 Continue to examine, identify and prioritize lands that have potential value for inclusion in the open space system based on factors such as level of service, connectivity, preservation, scenic and recreational opportunities to residents.

3.9 Actively plan and coordinate with Doña Ana County for the acquisition of parks and open space within or in close proximity to the ETZ.

3.10 Pursue low-cost and/or non-purchase options to preserve open space, including the use of conservation easements and development covenants.

3.13 Create regional development and conservation guidelines for resources that cross jurisdictional boundaries, such as an Arroyo Protection Plan, a Hillside and Escarpment Protection Plan, a Wildlife Conservation Plan and a Farmland Conservation Plan.

4.2 Design and maintain parks and facilities to offer universal accessibility for residents of all physical capabilities, skill levels and age; Assess planned and existing parks and trails for compliance with the newly adopted ADA Standards for Accessible Design (*effective March 15, 2012*) for requisite upgrades.

Parks – Construction & ROW Maintenance

Goal 5: Provide high-quality care for play structures and surfaces and maintenance of trails, medians, parkways and ROW's throughout the City.

5.6 Recognize that designating private property for open space uses does not establish or promote any public access rights to such property.

Trails

Goal 7: Support and promote the efforts of the MPO to create a network of interconnected trail opportunities including hard- and soft-surfaced trails and right-of-way trails and bikeways.

7.1 Acknowledge and support the trail planning policies of the Las Cruces Metropolitan Planning Organization as outlined in Transport 2040.

7.2 Coordinate with the Metropolitan Planning Organization and Doña Ana County for the joint planning, development and maintenance of priority trail corridors.

7.3 Foster the development and capacity of local volunteer trail advocates to help with trails planning efforts, garner community support, leverage community resources and play a role in stewardship and maintenance of trail facilities.

Goal 8: Develop a high-quality system of shared-use recreational trails and bicycle & pedestrian corridors that connect significant local landscapes, public facilities, neighborhoods and the downtown core.

8.1 Expand the network of shared-use recreational trails for walking, hiking and cycling to promote connectivity between parks, neighborhoods and public amenities.

8.2 Provide a recreational trails service standard of 0.25 miles per 1,000 persons.

8.3 Integrate the siting of proposed trail segments into the development review process; Require development projects along designated trail routes to be designed to incorporate the trail as part of the project.

8.5 Coordinate with the Bureau of Land Management and others to identify and provide for trails along arroyos.

8.6 Work with local agencies, utilities and private landholders to secure trail easements and access to open space for trail connections; Assist and support the work of local agencies to secure trail easements and access to open space for trail connections.

8.7 Provide trailhead accommodations, as appropriate, to include parking, wayfinding signage, restrooms and other amenities.

Administration & Management

10.3 Maximize the multiple-use aspects of arroyos, detention ponds, utility easements, by preserving and enhancing the natural and ecological value of these lands.

LAS CRUCES COMPREHENSIVE PLAN 2040 (2013)

The following are general guiding policies from Las Cruces Comprehensive Plan 2040 for Healthy Community, Community Character, Sustainable Growth and Operational Support that are relevant to the Arroyo Preservation Plan:

Chapter 4 Healthy Community

Great Parks & Recreation

GOAL 4: Enhance the quantity and quality of parks, programs, and associated facilities to satisfy the recreational, cultural, and educational needs of residents.

4.5.1 Establish standards and policies for trails, pocket, neighborhood, and community parks.
f. Provide a combined trail service standard of 0.25 miles per 1,000 persons.

GOAL 5: Provide a comprehensive, attractive, cost- and resource-efficient system of parks and recreation facilities responsive to the needs and desires of the community.

5.1 Encourage parks and multi-use activity/recreational fields (functional open space) in conveniently located areas.

5.10 Use water conservation methods as illustrated below in parks, trails, and other types of open space.

a. Use drought tolerant and native plantings where feasible.
b. Leave native vegetation in its natural state, where feasible.
c. Employ timed drip irrigation systems, mulches, and other such methods/techniques as a means of controlling water usage.

Multiple Mobility Options & Connections

GOAL 10: Provide multiple mobility options and connections to move within and outside Las Cruces.

10.1 Encourage a comprehensive trail system which provides linkage between parks, recreational facilities, and other activity centers. Trails should be multi-purpose and allow all citizens an opportunity to use them. Trails should be easily accessible and well maintained.

a. Continue to work with Elephant Butte Irrigation District, Bureau of Land Management, Bureau of Reclamation and other state and federal agencies so that the lateral and drainage way trail network may be expanded and improved.
b. Collaborate efforts with local governments to link facilities in order to provide connectivity between facilities for a more regional approach toward recreational planning.
c. Utilize arroyo buffers as trails.
d. Develop trails within existing easements.
e. Incorporate maintenance and safety strategies, such as lighting, landscaping and signage, into trail design.

Healthy and Safe Environment

GOAL 12: Protect environmentally-sensitive areas, habitats, and valuable features of the existing natural environment.

12.4 Encourage urban residential cluster development along major arroyos where such development lends to the preservation of arroyos in their natural state.

12.5 Identify, map and characterize arroyos, hillsides and escarpments within the ETZ and the city limits, and prepare a plan to address protection of environmentally-sensitive areas or the types of development allowed given the specific characteristics of the subject area. The Plan should address, but not be limited to:

a. Determination of appropriate degree of slope
b. Stability requirements
c. Fire protection and emergency access
d. Stormwater run-off and erosion controls
e. Wildlife protection, connectivity and interaction
f. Habitat protection or mitigation
g. Aesthetics, urban design, and visual quality guidelines
h. Open space protection
i. Infrastructure and roadway development standards
j. Allowed land uses and density restrictions
k. Development standards related to lot size, setbacks, and building heights.

Flexible Design & Positive Image

GOAL 19: Encourage development that is context-sensitive and compatible to the surrounding area.

19.20 When located within or adjacent to a residential neighborhood, design public/quasi-public facilities so they are compatible with the neighborhood's character. The following criteria shall be observed in establishing neighborhood compatibility:

b. Facility design and siting shall insure proper screening from an adjacent neighborhood. Traffic, noise, vehicle headlights and facility exterior lighting shall not spill over into the neighborhood. Setbacks, open space, rock walls, and organic landscaping are some recommended buffering techniques.

GOAL 20: Enhance Las Cruces' natural environment, physical environment, and character through inspiring quality design.

20.3 Encourage creative and sustainable site planning for all new development and redevelopment through a variety of means not limited to the following:

a..... Maintain the topography and slope of a site in its natural state.
b..... Encourage a balance between open space and built space in developments.
c..... Develop standards to prevent monotony.

Chapter 5 Community Character

Open Space Connectivity

GOAL 22: Protect those natural resources and features unique to the region.

22.1 Encourage the preservation and provide a system of open space on the mesas and in the valley in order to provide a desirable environment and quality of life in the urban area as well as perpetuating the unique natural and rural environments of the region.

22.2 Encourage acquiring land and planning for open space networks.

22.3 Encourage the dedication of undeveloped open space. Undeveloped open space shall include all types of scenic areas, environmentally sensitive areas, wildlife habitat areas and land that may serve as part of the non-motorized transportation network.

22.4 Consider offering density bonuses, conservation easements, development covenants, waivers to park fees, or similar mechanisms for development in exchange for dedications of land for open space.

22.5 Protect arroyos and arroyo buffers in urban and rural areas from development where such arroyos lend positively to an open space network, with preservation consistent with the Storm Water Management Policy Plan and the Arroyo Preservation Plan.

22.6 Protect irrigation channels in urban and rural areas from development encroachment to preserve their open character and establish their role as pedestrian and bicycle trails linking open spaces in urban and rural settings.

22.7 Establish urban and rural open space networks in the area.

22.8 Advocate an appropriate balance between physical development and open space that will provide a desirable environment and quality of life in the urban area as well as preserving the unique natural and rural environments of the region.

22.9 Develop standards that assist in the expansion of open space networks as part of new development. Open space should be linked with parks and recreational trails so that any open space areas may be considered "usable" space. Develop incentives for developers to create and/or maintain additional open space.

22.10 Develop standards that protect arroyo systems and other sensitive lands from development so that they remain in their natural state especially where such areas lend to an open space network.

22.11 Work with Doña Ana County, the Bureau of Land Management, and the New Mexico State Land Office to continue to preserve the designated buffer around the Organ Mountains. Encourage the acquisition of remaining private land and the development of park/open space as a natural buffer between the urban area and the Organ Mountains.

22.12 Discourage hillside development along Picacho Peak, Tortugas Mountain, the West Mesa escarpment and the other desert mountains which surround Las Cruces.

22.13 Protect views and vistas for the community through appropriate standards and techniques.

Aesthetics & Maintenance

GOAL 23: Establish high maintenance standards for all properties for safe and sanitary living conditions and enhancement of the city's image.

23.6.1 Require any private land within open space networks such as arroyos, channels, canals or any drainage ways to be properly maintained, left in a natural state, and not impede or manipulate historic stormwater flows by means of development or alterations.

Chapter 6 Economic Prosperity

Ready Workforce & Environment

Goal 26: Enhance the infrastructure network to help attract, retain, and bolster economic vitality for Las Cruces.

26.1 Enhance pedestrian pathways in areas frequented by citizens and tourists through standardized designs, landscaping, signage, signals, lighting, and paint.

Business & Industry Support

27.1 Support annual, seasonal and special events such as the Whole Enchilada Fiesta, the Southern New Mexico State Fair, area Wine Festivals, and special sporting Events.

27.5 Strengthen tourism through the development and improvement of active and passive recreational opportunities.

Chapter 7 Sustainable Growth

Vibrant Planning Areas, Neighborhoods & Districts

GOAL 35: Create a Future Concept Map and planning process to reflect the desired development pattern for the city.

35.1 Establish Planning Area designations and map planning areas.

a. *Open Space:* consists of areas that permanently function as dedicated open space or civic space such as City parkland or the Las Cruces Dam.

b. *Conservation:* consists of areas of historical, cultural, environmental value or open areas that could become community assets and are worth conserving, such as arroyos.

Managed Growth

GOAL 36: Establish annexation policies that support and is consistent with this Comprehensive Plan.

36.2 Prioritize annexation of areas that close open spaces between irregular city boundaries.

Chapter 8 Operational Support

Active Cooperation & Engagement

GOAL 44: Strengthen communication and cooperation in guiding quality growth through conveying the City's policies.

44.6 Work with existing neighborhoods to identify neighborhood priorities and needs related to infrastructure improvement (i.e. street and utilities), provision of parks and open space, and other related concerns.

46.7 Strengthen the cooperative joint-use agreement with the school district involving the creation of playgrounds, parks and the use of auditoriums and classrooms as a means of conserving money, reducing the demand for open space and parks, and supporting outreach efforts regarding community issues.

Responsive Processes

GOAL 49: Establish procedural and development requirements.

49.11 Use the PUD's flexibility to create unique, quality developments that provide a meaningful benefit to the community.

b. Support deviations from typical requirements when the development provides a community benefit as illustrated below.

ii. Preservation of major arroyos

xi. Extension, connection or creation of multimodal and/or trail networks

49.13 Acquire easements or purchase major arroyos and their buffers for public uses as drainage, open space networks and alternate transportation modes.

a. Develop arroyo systems, rights-of-way and City-owned land as multi-use open spaces, stressing the development of recreational trails and other connections between parks and other public and private open spaces, maintenance of natural landscape and aesthetic drainage improvements.

b. Work with the Bureau of Land Management, the New Mexico State Land Office, and private developers to preserve arroyos on the east and west mesas as open space.

GOAL 50: Use Best Management Practices to address stormwater run-off.

50.1 Update as required the wastewater system's National Pollutant Discharge Elimination System (NPDES) permit.

50.2 Continue to update and implement the City's Storm Water Management Policy Plan (SWMPP) through Chapter 32, Design Standards, of the City Code, as amended, to reflect current and changing practices.

50.3 Identify and monitor businesses that could potentially contribute pollutants or contaminants into stormwater run-off.

50.4 Increase enforcement activities that retain existing on-lot ponding facilities, specifically in residential properties.

a. Allow the movement of on-lot ponds but not their elimination.
b. Inform about the negative impacts of altering or eliminating on-lot ponds and the benefits of xeriscaping, stormwater capture and use, and green infrastructure.

50.5 Encourage shared stormwater ponding facilities

Chapter 10 Implementation

10.2 Actions

Item Number	Action	Healthy Communities	Community Character	Economic Prosperity	Sustainable Growth	Operational Support
5	Establish a process for the purposes of acquiring land and assisting in planning for open space networks.	√	√	√	√	√
28	Complete the implementation of the Storm Water Management Plan (SWMPP) • Adopt an Arroyo Preservation Plan to identify major arroyos that impact the city and offers policy recommendations regarding drainage, open space, recreation, and land use requirements. • Include provisions to address soil erosion, hillside, and/or escarpment issues. • Address the amounts and types of cut and fill activity allowed adjacent to and surrounding identified arroyos and drainage facilities.	√	√	√	√	√
31	Develop a viable long-term plan for the old landfill off of Lohman Avenue for future use, such as dedicated park land or open space.	√				√

APPENDIX 3
Flood Control Dams within the Extra-Territorial Zone (ETZ)

According to the New Mexico Office of the State Engineer, dams have a Hazard Potential Classification. This is a rating for a dam based on the potential consequences of failure. The rating is based on loss of life, damage to property and environmental damage that is likely to occur in the event of dam failure. No allowances for evacuation or other emergency actions by the population are considered. The hazard potential classification is not a reflection of the condition of the dam.[1]

A. Low hazard potential: Dams assigned the low hazard potential classification are those dams where failure or mis-operation results in no probable loss of life and low economic or environmental losses. Losses are principally limited to the dam owner's property.

B. Significant hazard potential: Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in populated areas with significant infrastructure.

C. High hazard potential: Dams assigned the high hazard potential classification are those dams where failure or mis-operation will probably cause loss of human life.

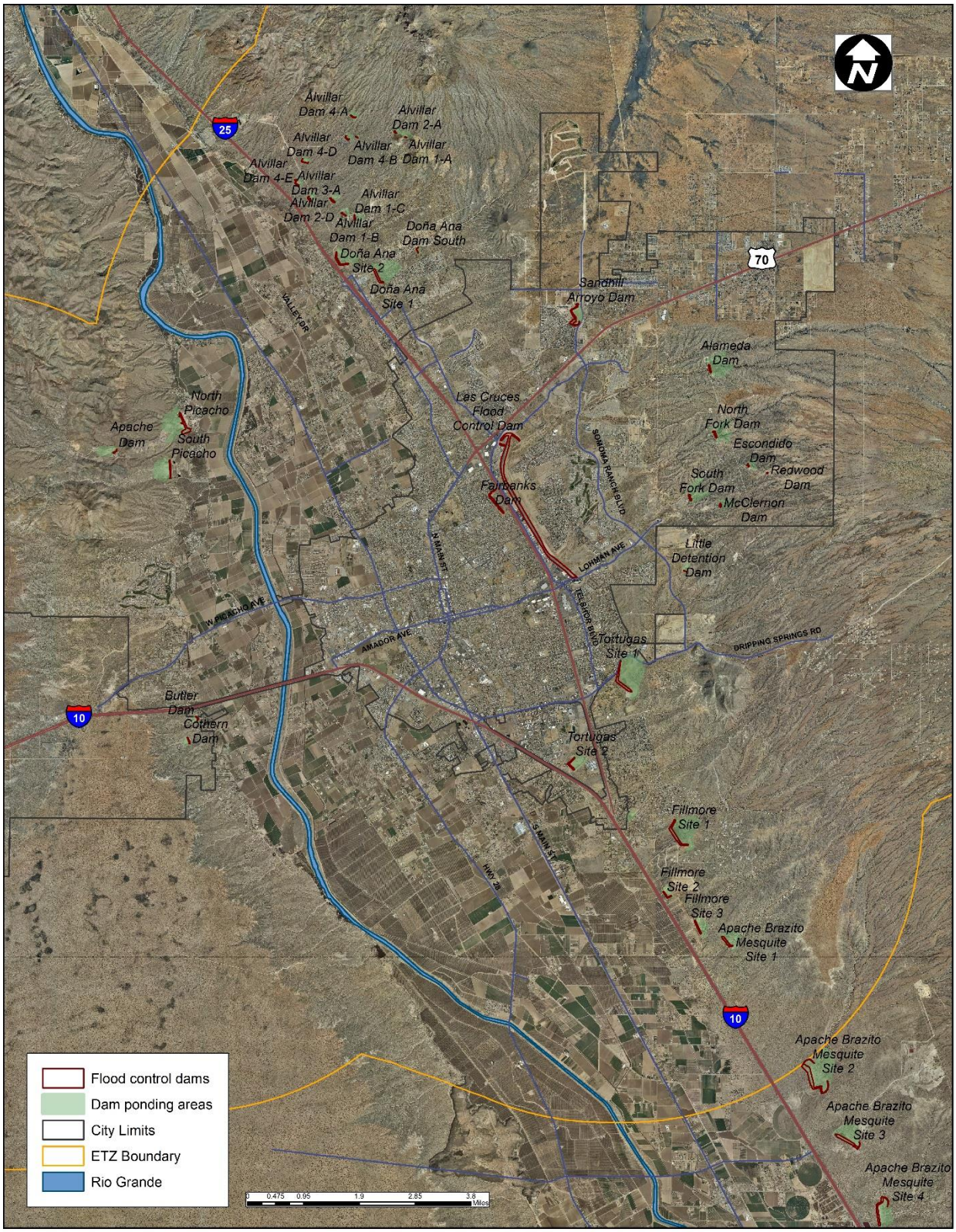
East Mesa Dams

Alameda Dam. The Alameda dam is an earthen structure operated by the City of Las Cruces. This dam is located on BLM property to the east of the Las Cruces Dam within an easement owned by the City. It was built by Soil Conservation Service (SCS) in the 1930's to protect the community of Las Cruces and is classified as a Class A.

Alvillar Dams. The Alvillar Dams are earthen dams located northeast of the city in the Doña Ana area. The La Union Soil and Water Conservation District owns the easements on which these structures reside, but ownership varies from private property to BLM land. The dams were constructed by the NRCS in the mid 1970's and were classified as Type C dams at the time of construction. The original purpose of these 11 structures was to provide flood control for agriculture up to the 50-year storm. These structures are maintained by the Doña Ana County Flood Commission.

[1] New Mexico Office of the State Engineer, 2005. http://www.ose.state.nm.us/water_info_dam_safety_info.html.

Map 3 Flood Control Dams
(May be enlarged for details)



Apache Arroyo Dam. The official name of this structure is Apache Brazito Mesquite Site 1 Dam but is more commonly referred to as Apache Arroyo Dam. The dam is an earthen structure designed by NRCS, owned and operated by EBID, and situated on BLM land south of Las Cruces. It was constructed in 1965 and primarily provides protection to the Mesquite area south of Las Cruces. The original purpose of the dam was to protect agricultural facilities. The dam was classified as a Class A structure but is now listed as a Class C due to downstream development.

Escondido Dam. Escondido Dam was built by the SCS during the same timeframe as the Alameda Dam to protect the City of Las Cruces from damaging floods and is classified as a Class A.

Fairbanks Dam. Fairbanks Dam is located west of N. Triviz and east of Fairbanks. The Flood Commission does not have information on this structure.

Fillmore Dam. The Fillmore Dam is officially named the Fillmore Site 1 Dam. This structure is located north of the Salopek Dam on the east side of I-10. Similar to the Site 2 and 3 Fillmore Dams, it is owned and operated by EBID, and was constructed to protect agricultural infrastructure in the valley. It was also built in 1962 to protect against the 50-year design storm. The dam is classified as a Class A dam.

Las Cruces Dam. The Las Cruces Dam, a flood control pass-through dam, was constructed by the U.S. Army Corps of Engineers (Corps) in 1975 to protect development in Las Cruces by controlling flood flows from the Alameda and Las Cruces Arroyos. It is currently classified as a Class C dam.

Little Detention Dam. These structures were built by the SCS during the same timeframe as the Alameda Dam to protect Las Cruces from damaging floods and are classified as a Class A.

Lower Fillmore Dam. The Lower Fillmore Dam is officially known as the Fillmore Site 3 Dam. It is an earthen structure located just north of the Apache Arroyo Dam on the east side of I-10. The Lower Fillmore was constructed in 1962 for agricultural purposes and is operated by EBID. The structure is classified as a Class A dam. The structure is capable of containing the 50-year design storm.

McClernon Dam. McClernon Dam was built by the SCS during the same timeframe as the Alameda Dam to protect the City of Las Cruces from damaging floods and is classified as a Class A.

North and South Fork Dams. These structures were built by the SCS during the same timeframe as the Alameda Dam to protect the City of Las Cruces from damaging floods and are classified as a Class A. (On the north and south forks of the Las Cruces Arroyo.)

North Doña Ana Dam. North Doña Ana Dam is officially known as Doña Ana Site 2 Dam. This structure is located just north of the Doña Ana Site 1 Dam. This dam detains flows from the North Doña Ana Arroyo and outfalls into the Doña Ana Lateral. The dam was constructed in 1957 and is operated by EBID. It is currently classified as a Class C dam and provides protection up to the 50-year storm.

Redwood Dam. Redwood Dam was built by the SCS during the same timeframe as the Alameda Dam to protect the City of Las Cruces from damaging floods and is classified as a Class A.

Salopek Dam. Salopek Dam is located just north of the Lower Fillmore Dam and is officially named the Fillmore Site 2 Dam. This dam is an earthen structure built in 1962 for agricultural purposes. The dam is owned and operated by EBID and is classified as a Class A structure. The structure is capable of containing the 50-year design storm.

Sandill Arroyo Dam. The Sandhill Arroyo Dam is located north of Highway 70 and immediately west of Sonoma Ranch Boulevard. The earthen dam was constructed in 1956 and rehabilitated in 1974 to protect the city from floodwaters produced by the Sandhill Arroyo. This dam is classified as a high hazard (Class C) dam due to the large amount of highly developed land downstream of the structure. The dam outfalls into the historic arroyo which continues west of I-25 until it reaches the valley floor.

South Doña Ana Dam. South Doña Ana Dam is officially known as the Doña Ana Site 1 Dam. The structure is located northeast of I-25 near the intersection of Thorpe Road and I-25. This dam detains flows from the South Doña Ana Arroyo and outfalls into the Doña Ana Lateral. The dam was constructed in 1958 and is operated by EBID. It is currently classified as a Class C dam and provides protection up to the 50-year storm.

Tortugas Dam Sites 1& 2. The dams constructed on the Tortugas Arroyo southeast of Las Cruces were constructed in 1962 as part of a plan for watershed protection and flood prevention within the Tortugas watershed. The plan was proposed by the Elephant Butte Irrigation District, with assistance from the Natural Resources Conservation Service (NRCS), in 1959 in response to reoccurring floods that had repeatedly caused damage to the Las Cruces Lateral and surrounding farmland, as well as nearby roads and the rail lines. The dams were designed to the 50-year design storm. Both dams are maintained by the Elephant Butte Irrigation District and both are classified as Class B dams.

West Mesa Dams

Apache Dam. Apache Dam is also known as the Apache Canyon Dam and is located west of the North and South Picacho Dams. The structure was constructed in1937 by the Civil Conservation Corps. Maintenance responsibility and classification information is not available at the Flood Commission.

Box Canyon Dam. Box Canyon Dam is located approximately two and half (2.5) miles north of the Las Cruces Airport and west of Picacho Peak. The structure was constructed in 1937 by the Civil Conservation Corps. Maintenance responsibility and classification information is not available at the Flood Commission.

Butler Dam. The Butler Dam is located immediately south of I-10 as it drops off the escarpment. The dam was constructed in 1974 to protect agricultural infrastructure from the 50-year design storm. The easement associated with this structure is owned by the La Union Soil and Water Conservation District and maintenance of the dam is sponsored by the Doña Ana County Flood Commission. This dam is classified as a Class B.

Cothern Dam. The Cothern Dam is located immediately south Butler Dam. Like Butler Dam, this dam was constructed in 1974 to protect agricultural infrastructure from the 50-year design storm. The easement associated with this structure is owned by the La Union Soil and Water Conservation District and maintenance of the dam is sponsored by the Doña Ana County Flood Commission. This dam is classified as a Class B.

North & South Picacho Dams. The North and South Picacho Dams are located west of the Rio Grande and north of Picacho Mountain on the Apache and Box Canyon Arroyos. These dams provide protection, predominantly to agricultural lands, up to the 50-year design storm. Both dams are sponsored and maintained by EBID. The outfalls of both structures merge where they intersect Shalem Colony Road and are routed through existing farmland to the Rio Grande. These dams are classified as a Class B.

APPENDIX 4 ARROYO MODELING

The existing HEC-HMS model can serve as a baseline for further development and analysis of major arroyos in the city. The model would need to be updated and expanded to consider areas upstream of the flood control dams. Data sets that would be needed to complete this task include, but are not limited to, topography, land use, rainfall, and soil type. It is important to carefully define the boundaries of the major arroyo under analysis, and to use 2-foot contour lines where possible. Contour lines aid in the determination of flow patterns by defining the behavior of crest points that separate flow directions within the watershed. Contour maps that are then projected onto soils maps provide important information about infiltration and runoff behavior, and can be used for informed decision-making about development adjacent to major arroyo systems. Soils are also a determining factor for vegetation, which also is a factor for hydrologic behavior as well as sediment transport and erosion control.

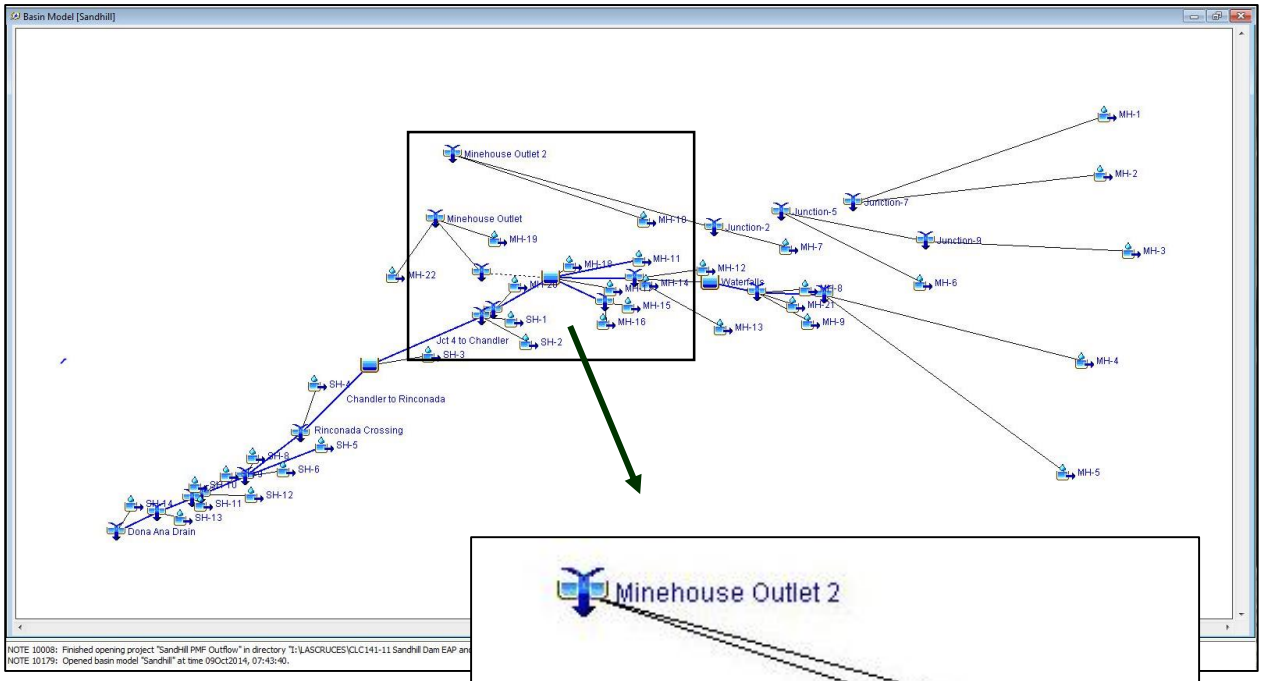
The hydrologic model can be tightly coupled with a hydraulic model that would take the 100-year or 500-year storm hydrograph from the hydrologic model and map the extent of the water surface for such events. A model that has been used to a limited extent for this purpose in Las Cruces is the HEC-River Analysis System (HEC-RAS) model. Again, a new or expanded model would need to be built upstream of the flood control dams. The output water surfaces from this model would then be imported into a GIS system. The USACE has built tools to facilitate data transfer from HEC-HMS and HEC-RAS to ArcGIS, although other GIS systems could be used. Sediment transport functions within hydraulic models or other sedimentation models could also be generated to predict erosion along arroyos and adjacent areas. Erosion control strategies could include natural-based materials such as rocks/boulders and drought-tolerant vegetation as opposed to concrete where applicable.

Using GIS mapping software, the aerial extent of water at the 100-year and 500-year storm could be evaluated for the presence of wildlife, proximity of a parcel to other identified open space, existing infrastructure like roads, power lines, water lines, gas, etc., and proximity to existing developments and privately owned parcels within the 100-year flood zone. Existing and proposed zoning may also be evaluated. Although HEC-HMS and HEC-RAS are free software tools that are publically available and frequently used in this type of work, there are many other available software packages that can perform the same analysis.

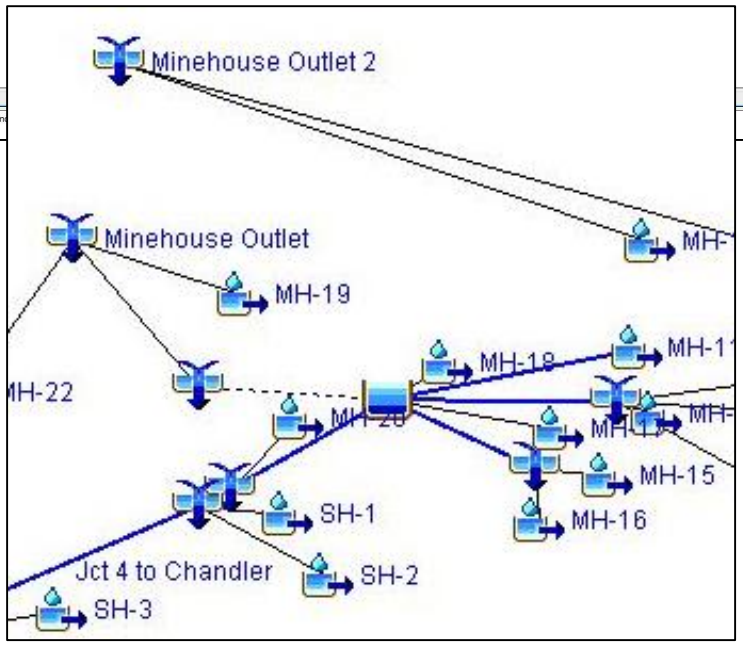
The Sandhill Arroyo area is used in the following example.

This image shows part of a watershed basin map for the Sandhill Arroyo in Las Cruces. A watershed basin map utilizes the best contour data available to map the entire watershed associated for a particular arroyo. Two-foot contours are used in this model.

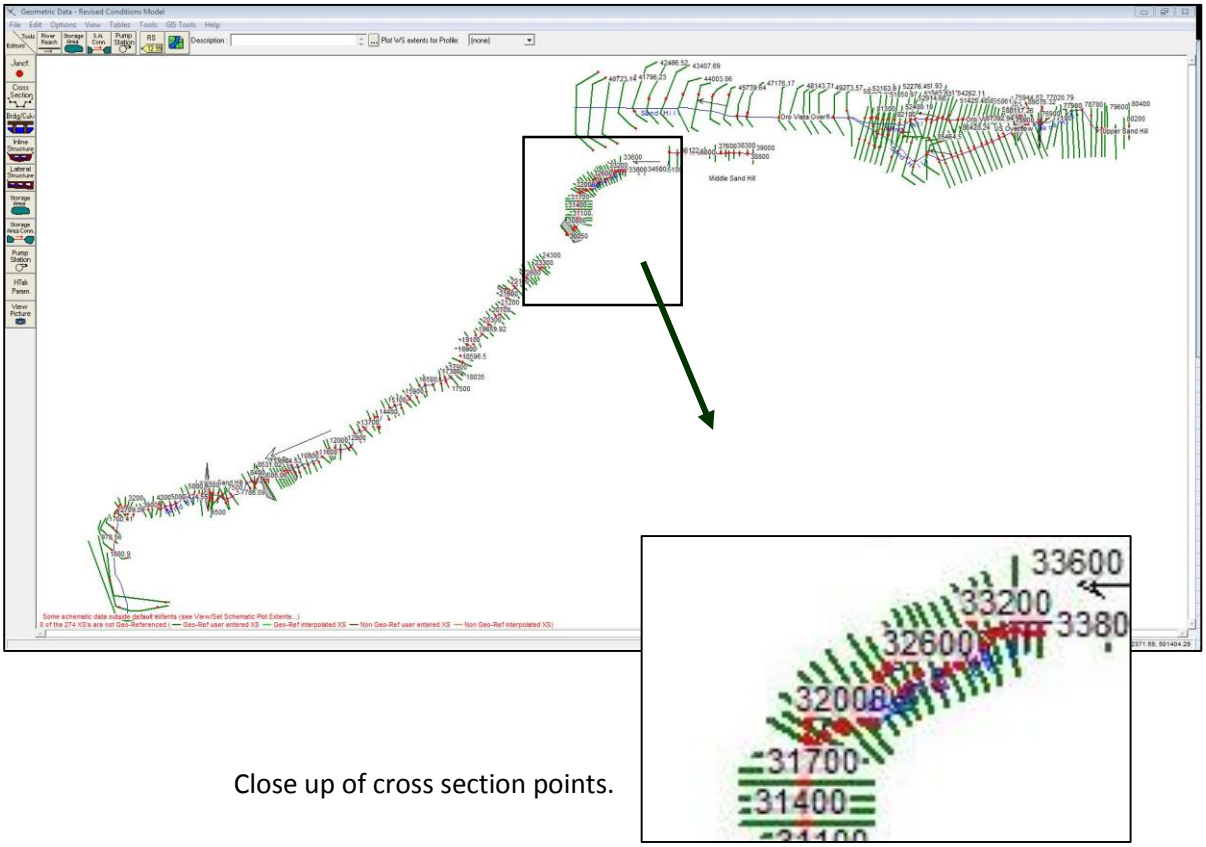
The watershed is a drainage basin and its topography dictates the direction of stormwater flows and ultimately where the arroyo stormwater eventually reaches. The red lines represent the sub-basin boundaries which are individual basins isolated based on contour data. The blue lines represent the flow line within that sub-basin.



Close-up of locations of interest

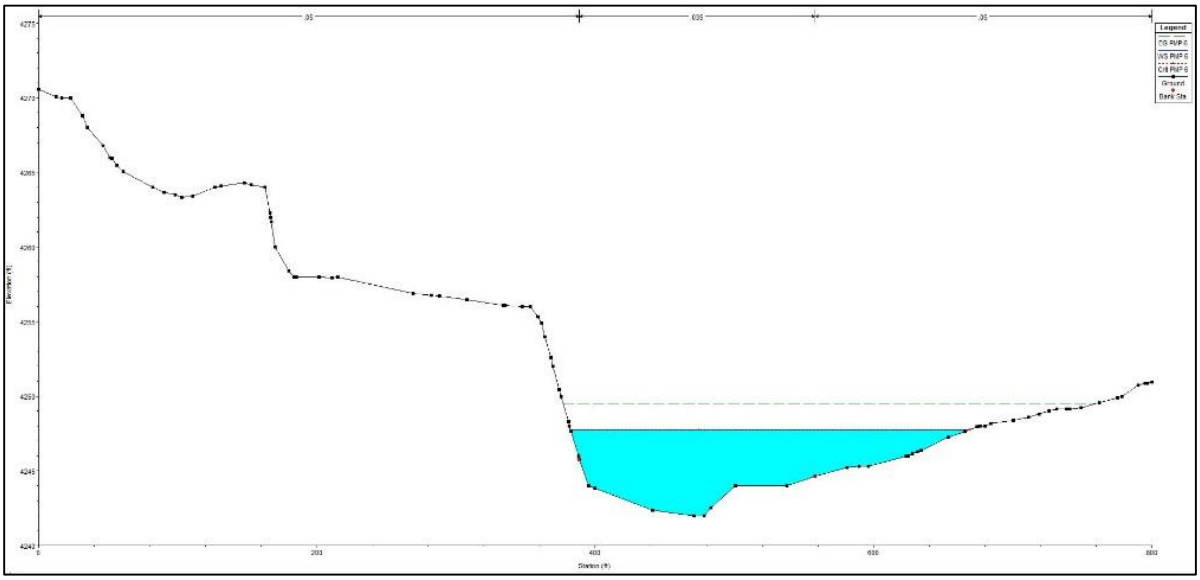


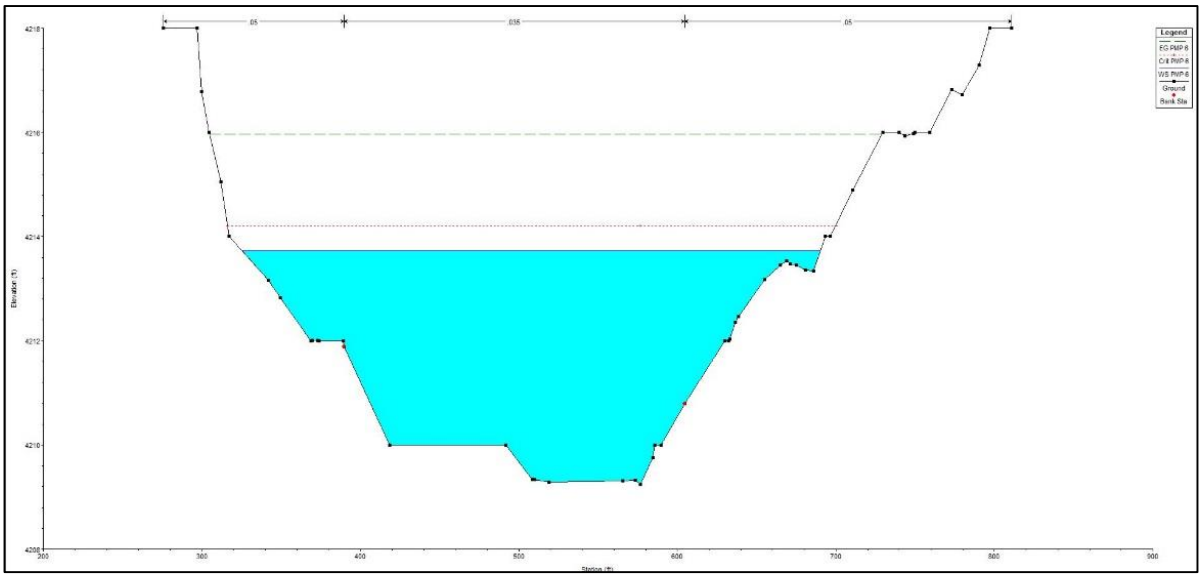
A model can be developed to represent the arroyo being analyzed. This allows engineers to use different values to determine the peak runoff rates and volumes of stormwater at different locations of interest along an arroyo. The engineer can analyze for different storm events based on storm data available, and can compare different storm analysis methods if desired. Elements are added to the model to represent a sub-basin, dam, pond, junction etc.



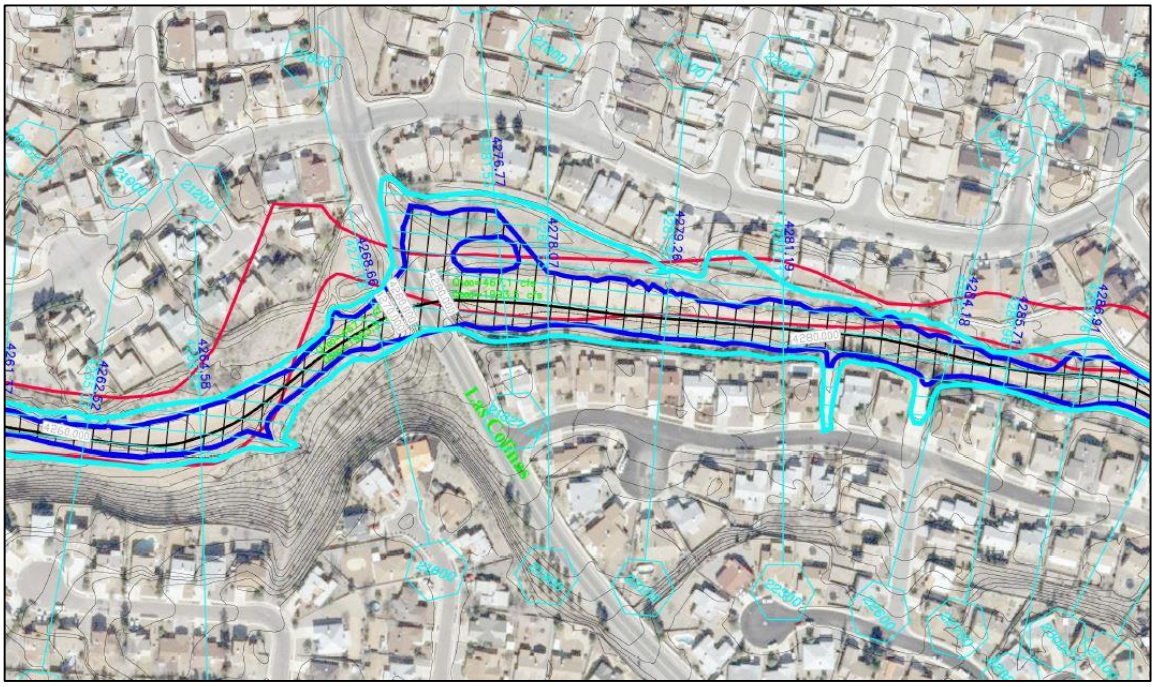
Close up of cross section points.

Evaluating the characteristics of runoff is the next step towards determining a flood zone boundary after the flow rates are determined. This image shows the cross sections that are inputted into the model. Each green line represents a cross-section of the arroyo, while the red line represents the arroyo flow path. A cross-section basically shows what the arroyo would look like if you were to stand in the arroyo and look either upstream or downstream. This information is needed so the flow limits can be modeled.





These images show the flow limit results in the model. The blue is an illustration of what the water level would theoretically look like if the arroyo carries flow as a result of the hypothetical storm analyzed in the model. Each one of the cross sections will have its own water level determination. These cross sections are plotted on a graph showing the lengths horizontally and vertically, to give the viewer an idea of the amount of water in the arroyo. The edges of the blue would be considered the flood zone boundary for that specific storm.



These images show the flood zone determination. The arroyo peak flow rates at different points along the arroyo determined for the 100-year storm are inputted into the model along with cross-section data to determine the flood zone boundary. Once the flow is modeled, the results for the flood limits are traced onto the aerial photo to determine the flood zone. The red lines represent the old 100-year flood zone. The dark blue lines represent the new 100-year flood zone based on the study. The light blue lines represent the 500-year flood zone as a result of the study.