



Santa Fe River

Corridor Master Plan

Prepared for the
City of Santa Fe

September 1995

Santa Fe River

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Prepared for the
City of Santa Fe

Prepared by the
The Santa Fe River Task Force
Recreation Engineering and Planning

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Santa Fe River Corridor Master Plan

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Introduction

The Santa Fe River Corridor Master Plan is a comprehensive plan to develop a system connecting public parks and natural preserves along the Santa Fe River corridor. The Santa Fe River Plan is based on three fundamental beliefs:

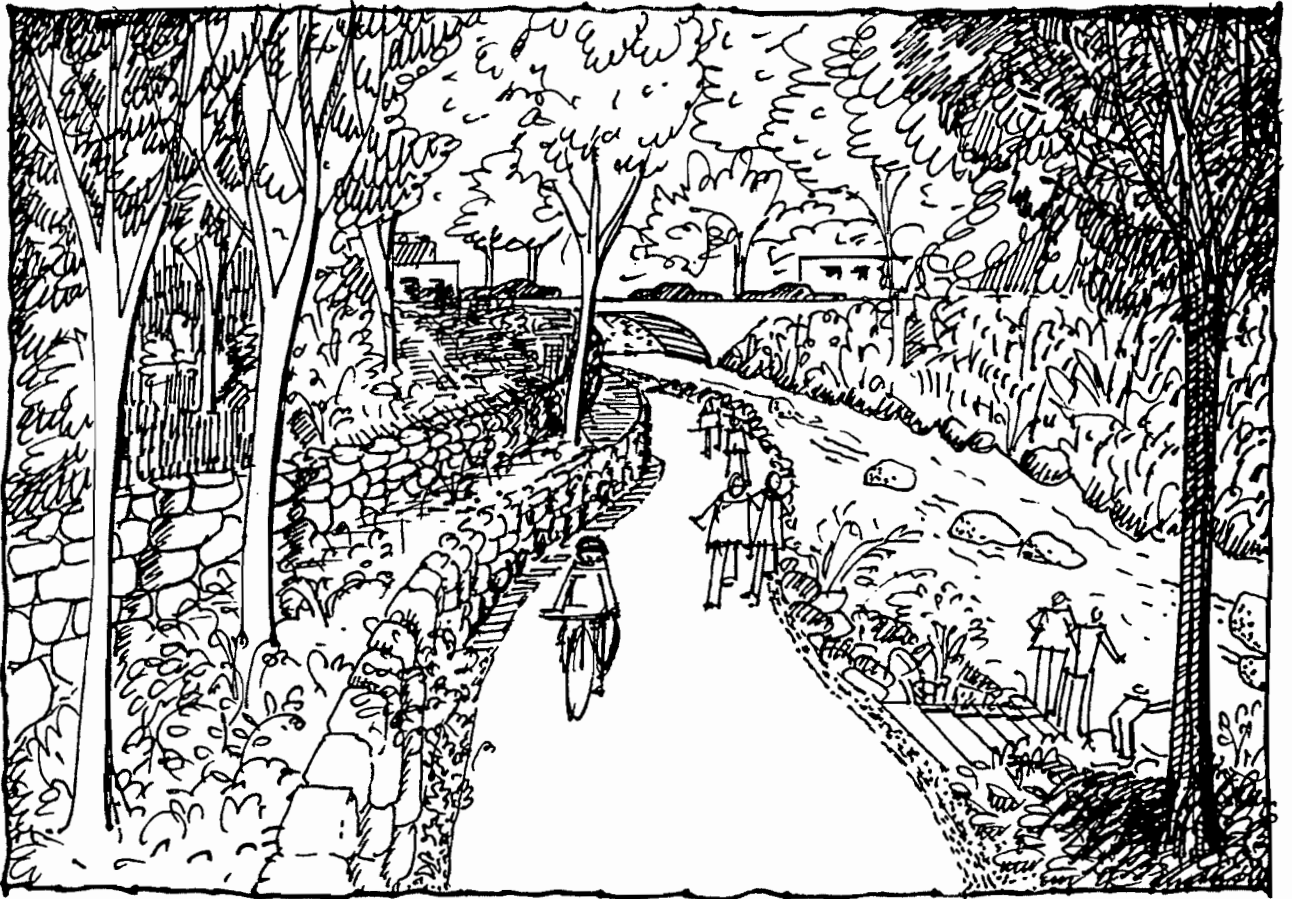
- An adequate amount of continuously flowing water to maintain a reasonable and steady level in the river is absolutely essential.
- The entire river corridor is to be planned and developed as a connected greenway system of public parks and natural preserves.
- The design of the Santa Fe River Corridor Master (Restoration) Plan must combine riparian protection, trails, recreation, and flood protection with the aesthetics of a natural stream.

The object of the Plan is to develop a diverse and aesthetically pleasing corridor along the Santa Fe River from Two Mile Reservoir to the wastewater treatment plant. Initially, a continuous off-street pedestrian and bicycle trail is proposed from Monsignor Patrick Smith Park to Frenchy's Field. The City's intention is to respect and restore, where appropriate, the river corridor ecology. The guiding principles are riparian restoration, flood protection, erosion control, aesthetic design considerations, recreational and community uses, sound engineering, public safety, and cost effectiveness.

The contents of this report include: a vision of the Santa Fe River as collected from the people of Santa Fe, goals with corresponding recommendations, implementation recommendations, detailed design guidelines, maps, a cost estimate, and excerpts from related reports.

The River Task Force reviewed and adopted the original 1985 Santa Fe River Committee report as a starting point for its work. The current document represents an extension of the concepts presented in the 1985 plan (See 1985 SF River Committee Report.)

Vision



Nocturno

by Conrado Nalé Roxlo the Argentine b.1878

El bosque se duerme y sueña
el río no duerme, canta.
Por entre las sombras verdes
el agua sonora pasa,
dejando en la orilla oscura
manojas de espuma blanca.

Llenos los ojos de estrellas,
en el fondo de una barca
yo voy, como una emoción
por la música del agua
y llevo el río en los labios
y llevo el bosque en el alma.

Ask people what they envision for the Santa Fe River. Words, ideas and dreams come bubbling from them like water flowing from its source. "Our river lives as crystalline water with meadows along its banks and natural springs sustaining the jarral reeds and willows" in the memories of many. Many perceive the river as the "lifeblood of the community coming down from the mountains, connecting neighborhoods, and feeding the acequias. Farmers and fishers provided for their families from the river while their children splashed along the banks in the shade of ancient cottonwoods". These are both the memories and the dreams for the Rio de Santa Fe.

Repairing the fabric of the watershed is essential. Imagine natural meanders of water running through an enhanced riparian corridor. Animals, birds and fish will thrive as the area is re-vegetated. Large rocks and boulder dams will encourage ponds, riffles and backwater. Numerous check dams and increased vegetation in the tributaries and arroyos replenishing the aquifer through infiltration will help to heal the watershed.

The establishment of a formal riverside garden with a bandstand would provide an area for official ceremonial occasions and weddings, as well as places for storytellers, sculptures and historical documentation of the river. From there one wanders into demonstration gardens and finally on to nature trails where the sound of running water draws attention to the river again.

Promotion of an annual river festival with celebrations, tree plantings and river walks would encourage the community to continue its involvement with the river. The downtown river park becomes an alternate place for festivals, families and young people. Contemplative spaces and art installations allow for reflection on the relationship of nature and culture.

In a related effort, the Santa Fe Arts Commission has sponsored efforts to create a native American monument called Po'é Gae, which means "the watering place." At a recent symposium, the participants agreed the most appropriate monument to Native peoples would be to restore the Santa Fe River to a living, flowing river. (See Po'e Gae Report.)

Goals and Recommendations

Goal 1: Establish a minimum in-stream flow in the river.

The Santa Fe River has meant “water is life” for four centuries. Without a reliable flow in the river, the City would not have been established. The Native American people called it Po’e Gae -- “the watering place”. The 1985 River Committee report emphasized the historical importance of water in the river. There are no accounts of the river being dry prior to the construction of the water supply reservoir in 1947. There is no river if there is no water.

Assuring a minimum in-stream flow is also crucial to maintaining wildlife habitats and sustaining the riparian ecosystem, thereby stabilizing the river banks through vegetation and making the river a more delightful experience for all.

Recommendations:

- A) Conduct research to determine the minimum in-stream flow necessary to sustain the river ecosystem. Define quantity and quality of flow.

Potential methods to achieve minimum in-stream flow:

- recapturing run-off below the city in a city reservoir,
- direct storage and release from a reconstructed Two Mile Reservoir,
- controlled release from existing city reservoirs,
- reclaiming treated effluent,
- acquiring water rights for in-stream flows,
- pumping Rio Grande water, or
- a combination of the above.

- B) Develop a model of water diversions from the Santa Fe River. The modeling would include all claims to river water (their seniority, amount, seasonality, and any other restrictions to the right), and when completed would help clarify the amount and seasonality required of rights to be dedicated to in-stream use.

- C) Measure the quantity and quality of existing flow and provide additional data on river bottom leakage to the ground water table. Flow monitoring stations should be installed.
- D) Restore the riparian environment for fish, wildlife, people and erosion control.
- E) Increase ground water and aquifer recharge from the river.
- F) Develop a treated effluent management plan.

Goal 2: Reduce storm water discharge into the river.

Currently, all run-off from impervious surfaces within the basin not detained on site enters the river. The river serves as a storm sewer for a large portion of the city. With ongoing development, water from roofs, roads and parking lots can no longer infiltrate the ground, creating a demand for a greater carrying capacity of the river channel. While the quantity of run-off during storm events increases, water quality decreases due to pollution.

Recommendations:

- A) Expand the requirements for on-site detention ponding of new and existing major impervious areas.
- B) Require use of porous paving materials, reducing impervious surfaces city wide.
- C) Use right-of-way of city streets for water harvesting and detention.
- D) Construct numerous wetland/detention areas within the tributary arroyos using bio-filtration methods to improve water quality.

Goal 3: Decrease erosion in the river and in the contributing arroyos.

Increased run-off combined with the channelization of the river due to the loss of much of the natural flood plain has dramatically increased erosion and the potential for flooding. The movement of storm waters in the tributary arroyos needs to be slowed down to prevent flood damage to the community and further erosion. Slowing the rate of run-off from the arroyos will also increase infiltration and aquifer recharge.

Recommendations:

- A) Build regional detention ponds in arroyos, such as the Arroyo de las Mascaras, Arroyo Saiz and the Cañada Ancha, to reduce peak discharges.
- B) Consider the management of McClure and Nichols reservoir operations for attenuation of peak flows in the river.
- C) Require temporary run-off controls for construction projects such as silt fences and sedimentation ponds.
- D) Prevent down cutting and stream bank erosion through numerous grade-control structures.
- E) Keep channels free of impervious materials, like concrete lining, using biotechnical methods.
- F) Repair existing degradation of the river and arroyo channel beds by raising the channel bottoms to historical levels wherever consistent with adequate flood protection (i.e., the St. Francis Drive to Camino Alire section).

Goal 4: Integrate and coordinate flood protection improvements with projects proposed within this plan.

Floods are unpredictable but naturally occurring events. The city has neither total responsibility nor complete ability to prevent catastrophic flooding. However, it is important to establish the level of protection possible and desirable. The flood carrying capacity of the river should not be reduced and where possible, should be increased when this can be accomplished without altering the character of the river.

Improvements made to the river should be consistent with good flood engineering practice as well as the goals of this plan. In the 1930's, the Civilian Conservation Corps constructed many gabions and check dams in the arroyos around Santa Fe. Many of these still exist after 60 years and have been effective in minimizing erosion.

Recommendations:

- A) Investigate rebuilding Two Mile Reservoir in an environmentally and structurally sound way for flood control, minimum stream flow and recreation.
- B) Thoroughly pursue upstream measures, as outlined in Goal 3, to reduce peak run-off. (See 1985 SF River Committee Report, pp. 35-37.)
- C) Increase channel capacity and reduce velocities through meandering where possible.
- D) Evaluate current levels of protection in each segment of the river.
- E) Balance possible protection levels with associated costs and impacts on the riparian ecosystem.
- F) Coordinate Flood Drainage Master Plan improvements and goals with this plan.
- G) Create ways for people to get out of the danger zone (especially in areas with steep banks).
- H) Prohibit residential or urban development within the 100 year flood zone and consider selective acquisitions of private parcels within this zone.

Goal 5: Restore and preserve the riparian ecosystem.

The ecological requirements of a natural river system must be balanced with the impact of human uses. A wide range of river-related experiences within the urban setting should be encouraged. Ultimately, the Santa Fe River can be reestablished as a focal point of the community. Relatively intact areas of the river which support disturbed ecosystems should be identified with the goal of preserving them.

Undeveloped but disturbed areas of the river should be considered for preservation and improvement of fish and wildlife habitat, as well as for development of passive park areas. The restoration of the natural elements of the river corridor would be the priority at these sites, although some transition from natural areas to developed irrigated areas will be planned. Developed areas of the river will continue to be a mix of formal park land and activity centers, providing recreation opportunities for the community.

Recommendations:

- A) Retain and strengthen the character and feeling of a natural river.
- B) Protect, restore and create riparian plant and animal habitat. Identify ecologically sensitive areas and design the trails to direct use away from these areas.
- C) Implement a vegetation and planting program for the Santa Fe River Corridor. Recognize the need for a sustainable vegetation management and planting program in order to maintain and enhance the river ecology. Conduct research to ensure the selection of appropriate and diverse species, as well as siting and protection of replacement vegetation.
- D) Identify river bank restoration areas. These are areas that have been disturbed by construction or previous attempts to channel the river, and will require individual attention and restoration plans.
- E) Consider the site specific character when planning improvements.
- F) Provide public education to increase environmental awareness about the river restoration and park projects.

- G) Survey and quantify the amount of habitat (river length, acreage of bosque, occurring species)
- H) Create fish passages.
- I) Lengthen river with meanders where possible.
- J) Develop an integrated pest management plan for the riparian corridor.
- K) Coordinate with future tree ordinance (regarding treatment of non-native species in the riparian corridor).

Goal 6: Provide for a wide variety of public uses.

The Santa Fe River is currently one of the most under used public spaces in the city (with possible exception of some stretches downtown). Increases in population and continuing development of vacant land result in fewer natural areas and diminished access to open space for many people inside the city. Tourism related economic factors have altered the character of downtown to a point where many locals feel alienated as the civic spaces lose some of their socializing functions. A well-connected river corridor with continuous trails would be a desirable feature the community. The river corridor should be a beautiful, inviting and safe environment for residents and visitors of all ages. In order to be successful, it must allow for a wide range of activities and experiences to occur along the banks of the river. Improvements should increase opportunities for social interaction and community building. Human uses must be appropriate to the character of the respective river section and the needs of the adjacent neighborhoods. Special and non-compatible uses should be limited to designated locations along the river.

Recommendations:

- A) Include a process in designing specific projects to determine the appropriate public use for the area.
- B) Connect existing parks with trails allowing parks to serve as destinations along the river. This plan does not preclude further development and improvement of existing parks.
- C) Increase visual and physical access to identified locations along the river.

Goal 7: Establish continuous, safe, and well-connected trails along the river.

The river corridor has great potential for alternate modes of transportation as recognized in the Bikeways Master plan of 1993 (adopted by City Council March 10, 1993, see 1993 SF Bikeways Master Plan). It must be recognized that pedestrians and cyclists are more sensitive to their environment than automobile drivers. Existing and proposed trails and bikeways are an important planning consideration and should be accommodated in or near to the river corridor.

Recommendations:

- A) Develop a continuous system of walking and biking trails.
- B) Route trails underneath cross bridges.
- C) Create separate soft surface walking trails where appropriate.
- D) Buffer trails from vehicular traffic.
- E) Integrate design guidelines with existing standards for trails.
- F) Develop trail lighting system (design to prevent light pollution).
- G) Design connections from residential and commercial areas to trails.
- H) Coordinate with public transit.
- I) Provide logical entrance and exit points for access and safety.
- J) Design river corridor improvements to be accessible to the handicapped where such access is reasonable. All major facilities will be accessible to those in wheelchairs.

Goal 8: Integrate the river with its surroundings.

In order for the river to have a unifying function throughout the entire corridor, it is important to recognize a number of significant relationships during the planning and implementation stages. Proposed uses and improvements should take into account the historical, cultural and social aspects of the adjacent areas. They should adequately address the environmental and legal concerns of adjoining neighborhoods and property owners. Except for protected or otherwise designated areas, the river front should be publicly accessible. Selective acquisitions or interests in property along the river should be pursued.

Recommendations:

- A) Map property ownership and describe areas bordering the river. Identify areas for acquisition based on the following considerations about the property:
 - includes a unique or sensitive ecological area,
 - provides a necessary trail linkage or an entry to the river trail system,
 - contributes to flood hazard management, or
 - provides a scenic amenity or buffer area.
- B) Negotiate and cooperate with affected parties during planning and implementation phases.
- C) Establish an easement of adequate size to protect the river edge when property with river frontage is developed or redeveloped. Regardless of acquisitions required for ecological reasons, for a trail linkage or entry, or for flood hazard management, it is recognized that any development along the river could impact the stability of the riverside ecology.
- D) Build storm water detention basins as multiple use facilities (parks/open space).
- E) Create agricultural restoration areas adjacent to the river.
- F) Restore acequias in or along the river corridor.

Goal 9: Improve the quality of life of the people of Santa Fe through river projects.

The restoration and development of the Santa Fe River offers significant opportunities to involve the community in the planning and implementation stages with numerous benefits to the local people. Educational, economic and intercultural aspects can be addressed if projects are designed and implemented in such a way as to allow for citizen participation at every step of the process.

Recommendations:

- A) Involve the public in the planning process.
- B) Celebrate the entire planning and implementation process by seizing all opportunities for public involvement at every ground breaking and every tree planting.
- C) Allow for and encourage the participation of smaller local businesses and community groups during the project implementation.
- D) Involve schools in meaningful ways.
- E) Develop community involvement programs involving:
 - volunteers,
 - nonprofit organizations,
 - environmental groups,
 - garden clubs,
 - schools,
 - Santa Fe Community College,
 - Youth Ecology Corps and
 - Local subcontractors/work force.

F) Possible programs could achieve:

- apprenticeship and job training in landscaping and stone masonry,
- community workshops in trail building, erosion control, tree planting etc.,
- design competitions for facilities/special features,
- art in public places,
- Adopt-a-..... programs,
- memorial parks, walkways, etc.,
- awards, festivals, events, and special activities along the river and
- curricular activities in schools.

Goal 10: Develop a coordinated management program for the maintenance of land and improvements along the river.

It should be recognized at the outset that successful Santa Fe River Corridor projects will require an on-going maintenance budget, in addition to capital expenditures. The range of maintenance responsibility would possibly include sweeping the trail, removing debris and trash, pruning branches, reporting any dumping or damage to improvements along the river, monitoring the stream flow quality and quantity and assisting users of the trail system.

Recommendations:

- A) Research existing models for such a program used by other cities.
- B) Determine ongoing costs for repair and replacement of improvements. These costs, initially small, will need to be included in the capital budgets of affected departments.
- C) Identify and coordinate maintenance activities with other agencies, districts and individuals.

Implementation

Successful implementation of the Santa Fe River Master Plan calls for addressing four general areas. These are:

- acquisition of right-of-way and permits;
- funding;
- effective project management and coordination; and
- realistic and expeditious phasing over a three to four year time frame.

Acquisition of Right-of-Way and Permits

This is a very critical step in the process. Some areas of the corridor are in private ownership. In addition, there are a number of non-trail uses occurring on public properties including ballfields, picnicking, swimming pools, etc. Therefore, coordination with users and park managers to assure compatibility and minimize conflicts is also a vital part of "right-of-way negotiation."

Since securing of right-of-ways and permits can be a time consuming process, it is strongly recommended that work in this area begin immediately and proceed as expeditiously as possible. It is important that each individual property owner, as well as affected home owner groups, be contacted and the project carefully explained to them. Some discussions with individual property owners have already occurred and certain trail easement agreements are in place. Finally, there is the need to secure appropriate approvals and permits under local, regional, state and federal laws.

Funding

The estimated cost of the Santa Fe River Corridor project is \$8 million. The City of Santa Fe has committed close to \$2 million for 1996, leaving a remainder of \$6 million dollars to be raised from 1997 to the end of 1999, approximately \$2 million per year. By leveraging, as explained in this section, an annual commitment of \$1 - 1.5 million from the City of Santa Fe (per year, for three years) would be enough to complete the Santa Fe River Corridor by the year 2000. Most federal and corporate sources require matching funds, therefore, local support is a requirement for the completion of this plan. The best source of local funds is the gross receipts tax which is scheduled for renewal in 1997. Action should be taken in 1996 to secure these funds. The remainder of this section details funding strategies and potential funding sources.

In the age of partnerships, "leveraging" is the rule for funding recreation and trail projects. Broad, intergovernmental and public-private partnerships can leverage more funding than single- or few-sponsor projects. The most successful projects begin with local support from government and private sources and use that support to leverage state, federal, foundation and corporate funds. Financing can be packaged in an endless number of combinations. In most cases, however, federal dollars cannot be matched with federal funds, nor state dollars with state funds.

Greenways present an extremely rich palette of resources and funding opportunities. With the spine trail as the connector, plans should reflect the maximum amount of natural, cultural and recreation resources that can be developed and interpreted in phases over a period of years. Demonstrating how they integrate can provide a basis for attracting a wide range of users, including recreators, heritage and eco-tourists, and recipients of outdoor education. Projecting such a colorful array of amenities and uses, fires imaginations and generates more opportunities for enlisting partners, funders and user groups.

Keys to building successful funding packages:

Leverage the Resources - Begin by enlisting a maximum number of partners based on all the resources in or connecting to the project.

Organize the Home Team - Demonstrate broad local support backed first by commitments for dollars, and second by in-kind goods and services.

Organize the Home Team - Demonstrate broad local support backed first by commitments for dollars, and second by in-kind goods and services.

Work with Your Neighbors - Expand local support to a regional level to increase funding potential exponentially.

Think Long Term - Create a funding scheme that projects which partners and outside sources will be asked to fund any combination of resources in specific years.

Show a Return on Investment - Document in real terms the users and related returns on previous funding to support future requests.

Sources of funding and financing usually fall under eight broad categories of activity or improvement;

- A) riverscape improvements and restoration (funding mechanisms identified under this broad category may also apply to specific facilities in other categories of improvement, listed below),
- B) pedestrian and bicycle facilities,
- C) parks,
- D) river restoration (fish and wildlife habitats and improvements to water quality),
- E) flood control,
- F) land acquisition,
- G) private development adjacent to the river and
- H) maintenance and operation.

Funding and financing sources include grants and technical assistance from federal, state and local agencies, land transfer and assessments from benefiting property owners, and assistance from non-profit and volunteer entities. Funding for new, private, river-compatible projects may occur through the normal private development process, guided by appropriate governmental regulations and possible financial contributions by agencies. Funding and financing programs for which the project would be eligible are listed below.

State and Federal Funding

- The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
- National Recreation Trails Fund Act (The Symms Act)
- Community Development Block Grants (Department of Housing and Urban Development)
- New Mexico Lottery Funds
- U. S. Corps of Engineers
 - ⇒ Section 14 Funds
 - ⇒ Floodplain Management Services
 - ⇒ Small Flood Control Projects
- Department of the Interior
 - ⇒ Watershed Protection and Flood Prevention (Soil Conservation Service)
 - ⇒ Federal Land and Water Conservation Funds (National Park Service)
 - ⇒ Urban Park and Recreation Recovery Program (National Park Service)
 - ⇒ Small Reclamation Projects (Bureau of Reclamation)

Local Funding

- Reallocation of Existing Resources
 - ⇒ income from Santa Fe Estates
 - ⇒ local government general funds and parks, public works, engineering, public utilities, and community development funds
 - ⇒ land and trail acquisition through subdivision development approval process
 - ⇒ land trades for City-owned land
 - ⇒ recreational use easements

- ⇒ General Fund Revenues
- ⇒ Lodgers Tax
- Special Assessments and Taxes
 - ⇒ special improvements districts, bond issues, and optional sales tax
 - ⇒ developer land and trail dedications
 - ⇒ adverse impact mitigation improvements
 - ⇒ impact fees
 - ⇒ park dedication requirements -- cash in lieu of land provisions
 - ⇒ Gross Receipts Tax (1/4%) (Note: reapproval of 1/4% portion up for renewal under municipal purpose "and quality of life").
 - ⇒ tax increment financing
- Capital Improvement Programs
- Wetlands Mitigation Site
- Special events to benefit river projects

Private Sources

- donations of cash
- fund raising rides and similar events
- Rails to Trails Conservancy and other conservation groups
- corporate sponsors
- non-profit foundations (local, state, and national)
- volunteer and service organizations
- land acquisition through donations, conservation easements, and shared use agreements

Project Management

The Santa Fe River affects the interests of a number of agencies, groups and individuals. Given the multi-objective and multi-jurisdictional nature of the project and the desire to implement the plan within 3-4 years, an effective project management structure is essential to assure a coordinated, expeditious effort. The following are recommendations for managing the implementation effort.

Recommendations:

- A) Have one project coordinator/contact person at the City who is responsible for all aspects of the plan. This person must oversee and coordinate the other affected city departments and staff, as well as act as overall contact person for the City. Other duties would include: managing the designers of individual projects, creating an annual coordinated work plan and budget, leveraging city funds with outside sources of funds, reporting to the City Council and the River Commission (refer to recommendation C) on progress and approval of individual projects, and keeping the overall plan on schedule. It is critical that this person be given adequate time to handle the job and not be given other conflicting duties.
- B) Hire a multi-disciplinary design team to creatively plan and design each segment of the Santa Fe River Project. This team may be any combination of City staff or outside consultants that work together to create the most cost effective design incorporating the goals of the Santa Fe River Plan. This team could be hired on an annual or project-by-project basis and should report to the City project coordinator. This team should consist of qualified professionals in fields such as: riparian and aquatic biology, landscape architecture and design, trail design, civil and hydraulic engineering, art and others as appropriate.
- C) Create a City Council appointed citizen River Commission of not more than six members who will coordinate with a watershed commission and help oversee the implementation of the Santa Fe River Corridor Master Plan and act as the public forum for the project approval. This commission would aide and direct the staff and design team as projects are designed. They should be used to

review and approve project designs and allow for public input. The purpose would be to allow for adequate public input and create an efficient process for project approval.

Project Phasing

The overall project (Frenchy's Field to Patrick Smith Park) could be realistically completed within a four year timeframe if adequate resources are dedicated to the project, including staff time and construction funds. General Phasing is recommended as follows:

1. Complete Camino Alire, Section 14 project immediately, include all trail and greenway improvements by end of 1996.
2. Complete overall project between St. Francis and Camino Alire by end of 1996.
3. Plan, in 1996, for continuous flow of water in the river.
4. Construct, in 1997, for continuous flow of water in the river.
5. Plan and design projects upstream of St. Francis and downstream of Camino Alire and St. Francis underpass in 1997.
6. Construct St. Francis underpass in 1998 and major trail restoration and projects for Camino Alire to one half way to Frenchy's Field.
7. Construct trail and flood improvements through town from St. Francis to Paseo de Peralta in 1999.
8. Complete trail and improvements to Frenchy's Field and Patrick Smith Park in 1999.

Appendix A - Design Guidelines

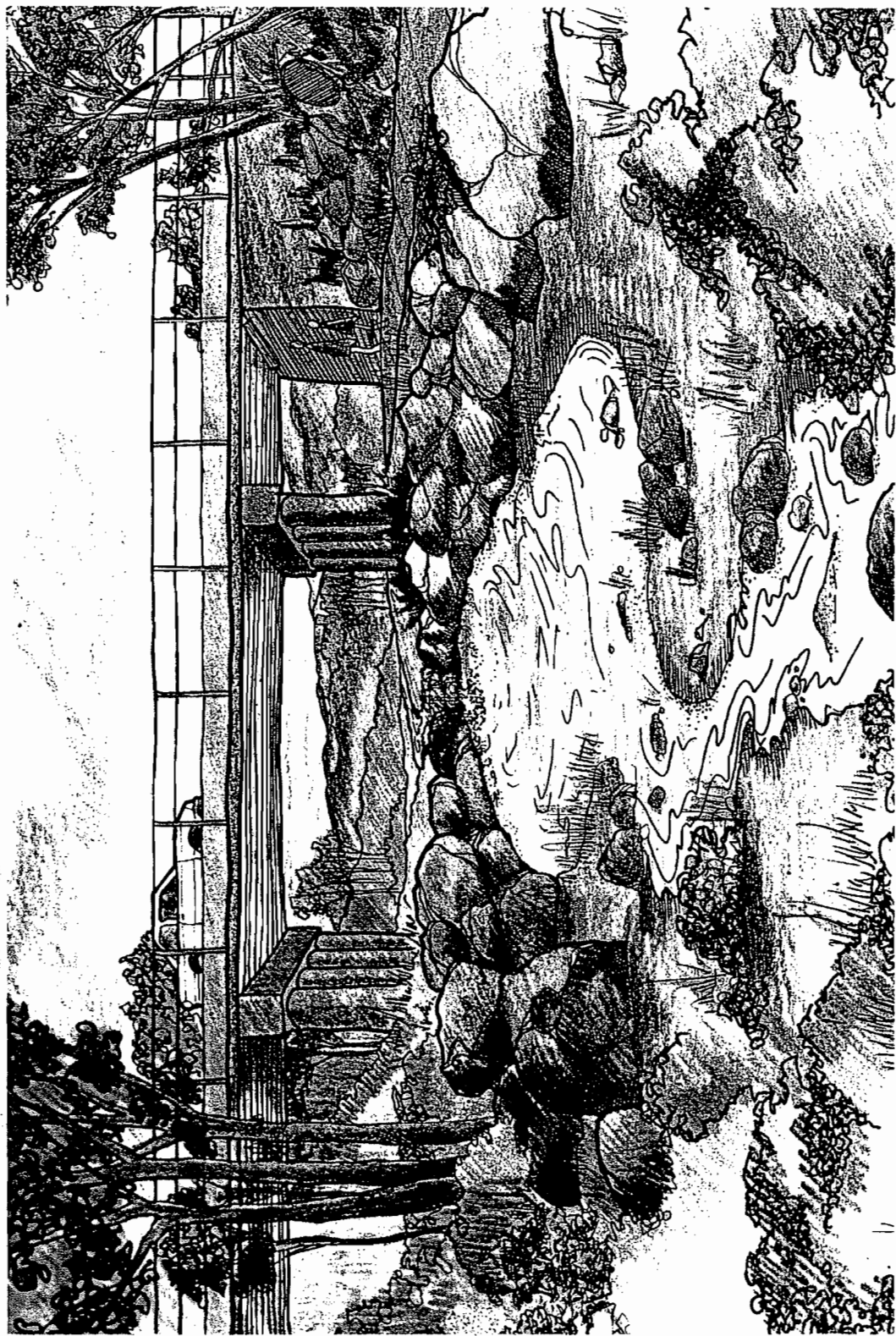


ILLUSTRATION BY CATHERINE CLEMENS

Santa Fe River

Corridor Design Guidelines

Prepared for the
City of Santa Fe

Prepared by
**Recreation Engineering and
Planning**

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introduction

The Santa Fe River Corridor has the potential to be a monument to the community in its concern for the health of the environment and quality of life. It can provide the central element in a larger open space system with the potential to link the entire community through its tributaries. These tributary drainages can be creatively developed to function as storm drainage and flood channels, efficient pedestrian and bicycle transportation systems, open space and wildlife corridors, and attractive recreation areas.

Why design guidelines?

The guidelines presented in this manual are intended to ensure an overall harmony of appearance and function as individual projects are undertaken along the river corridor. While stressing continuity, the guidelines provide a good deal of latitude for individual projects. They are intended to direct and inspire good design, not to stagnate creativity. Most suggest minimum standards of performance while a few provide standard details for consistency and / or ease of maintenance, etc..

Using this manual

The river corridor guidelines begin with an introduction to the appropriate design process. They are then categorized primarily by landscape elements described in the Table of Contents. Within each category, the guidelines are organized in a descending order of detail as described here:

- design goals / concepts
 - considerations for good design
 - optional details
- design standards
 - mandatory design criteria
 - mandatory construction methods and materials

Although any given design may incorporate only a few of the elements, it is recommended the user first skim the entire book to become familiar with the general policies and philosophies it presents. Finally, determine which sections are pertinent and study those in detail.

The City of Santa Fe will rely on these design guidelines and other applicable codes and standards as a basis for evaluation of stream corridor designs.

The following is a list of items not referenced in the design guidelines. However, it is recommended that they be included in the Santa Fe River Corridor as it develops. These include:

- Signage:
 - informational
 - regulatory
 - mileage markers
 - identification
- Site Furniture:
 - picnic tables
 - benches
 - trash barrels
 - dog "pooper-scoopers"
- Lighting:
 - restrooms
 - information kiosks
 - drinking fountains

These items should be designed to be:

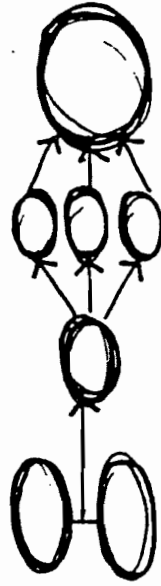
- functional
- attractive
- vandal resistant
- cost effective

A coordinating theme should be used throughout the river corridor. The items listed previously can be purchased from suppliers or constructed locally.

Design Intent

The basic criteria for all elements of design include:

- appropriateness and excellence of design
- environmental fit
- functional quality
- aesthetic sensitivity
- consistency and continuity of design
- durability and strength of structures
- ease of maintenance
- resistance to vandalism
- availability / replaceability
- handicap access wherever reasonable



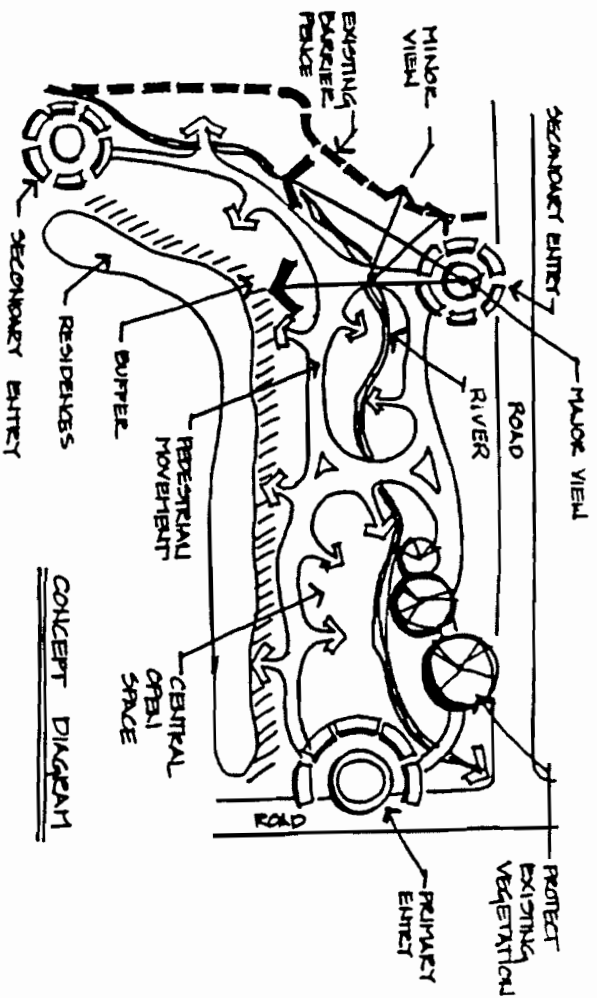
design process

The primary consideration in designing the river corridor is to design for multiple uses to maximize all the opportunities it presents. Consider the unique interaction of:

- floodplain management
- recreation
- transportation
- habitat improvement
- water quality improvement
- aesthetic amenity

Begin the design process by studying all the characteristics of the site and site users:

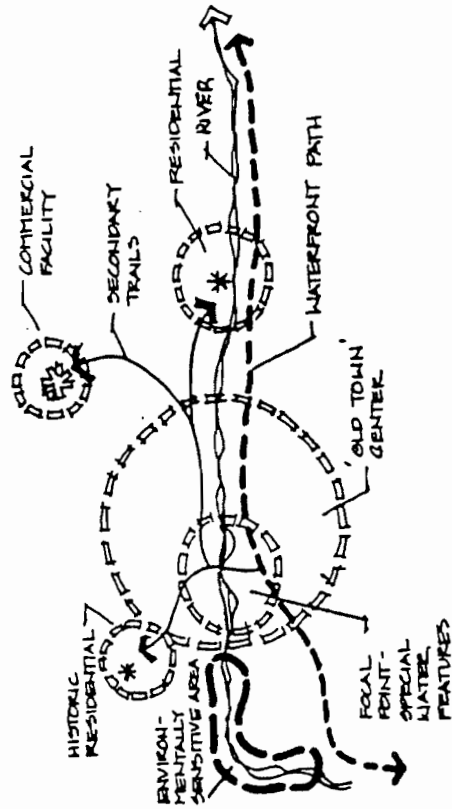
- site context
- adjacent uses
- environmental qualities
- character of area
- major and minor views
- primary users / user conflicts
- circulation patterns
- activity areas
- unique features



Respect the type of land use the stream encounters:

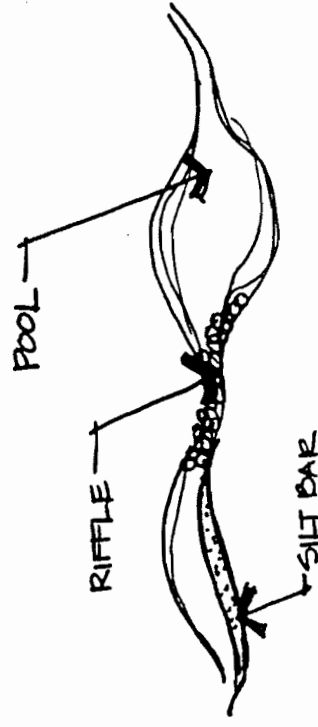
- residential neighborhoods require a design that is sensitive to the character, forms, materials, colors, etc. of the development and one that involves the residents in the design process. Consider carefully the character of the public / private interface.
- commercial areas can be lively, colorful places. Consider linking paths to commercial destinations and activities such as shopping, eating, and playing near the water's edge. Provide more structured amenities such as seating areas at natural focal points, water features, gathering places, etc.

- environmentally sensitive areas require a careful balance between the need for recreation and protection of natural resources. Determine the appropriate use level and site any path system carefully.



While designs which emphasize the unique character of an area are encouraged, the user travelling the length of the corridor perceives the river as one unified linear feature. Therefore, each design should respect the overall harmony, integrity and identity of the entire river corridor as well.

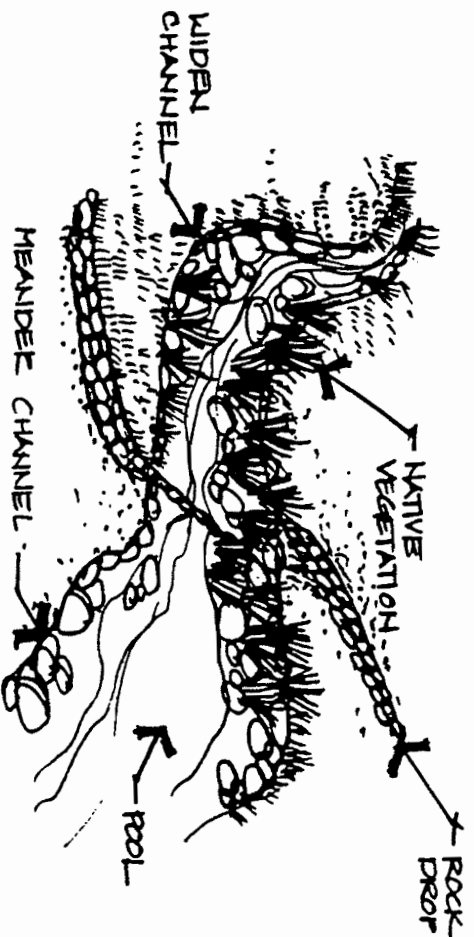
Respect existing landforms in site planning, and to the greatest extent possible, utilize materials native to the area.



channel design

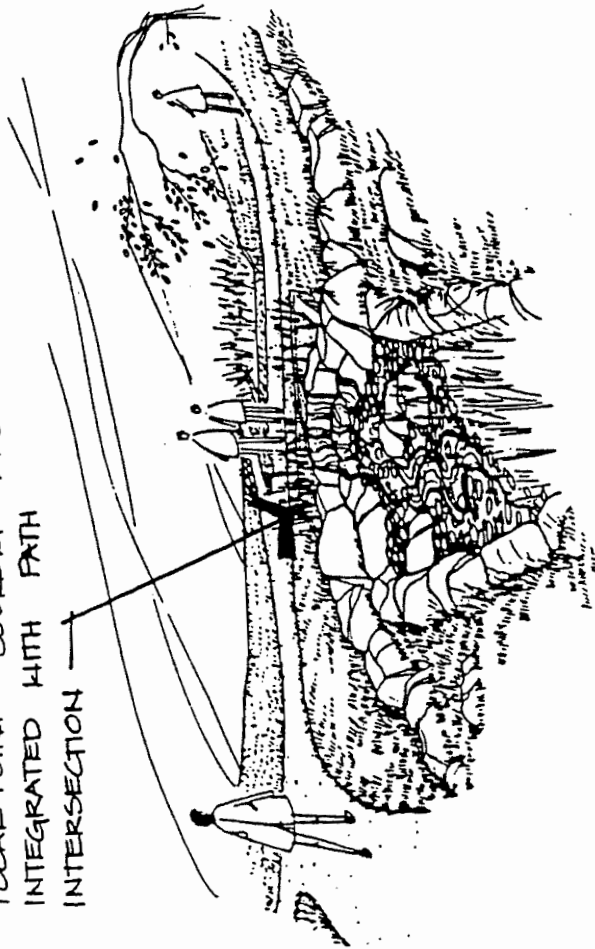
design goals / concepts

- As the first priority in planning for a drainageway is to attempt to maintain natural channels and natural channel configurations
- As create river beds with natural features for visual interest and habitat enhancement where possible, ie. meanders, pools, riffles, small drops of native materials, etc. At the same time, maintain constant velocities to minimize scour and deposition.
- As allow natural vegetation in trickle channel for the benefit of wildlife and runoff quality control. Wetlands can provide important discovery areas for children and adults as well.

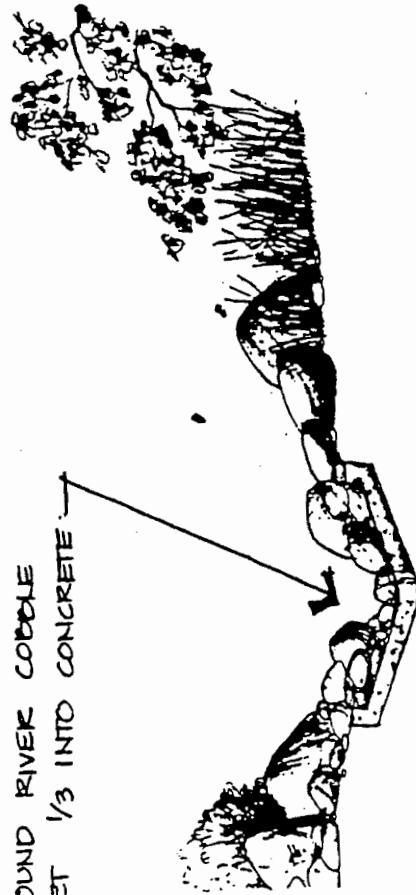


design goals / concepts

FOCAL POINT - BOULDER DROP
INTEGRATED WITH PATH
INTERSECTION



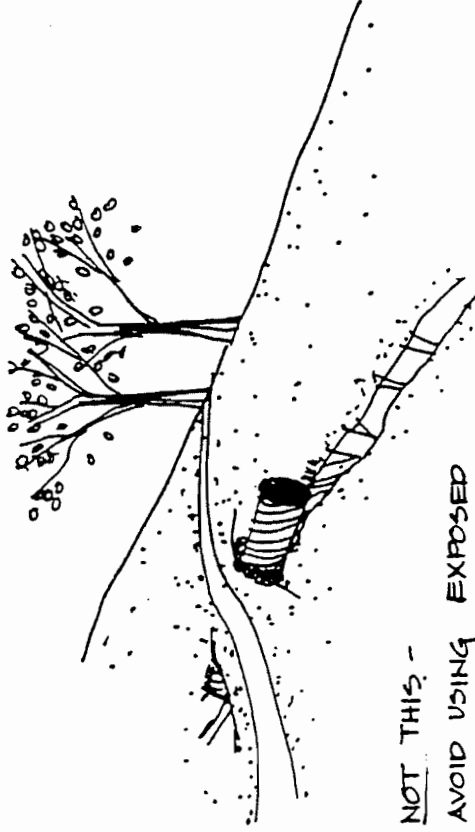
ROUND RIVER COBBLE
SET 1/3 INTO CONCRETE



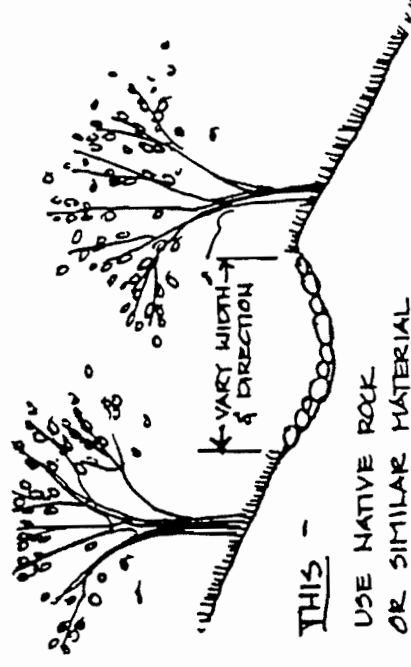
- all elements required for channel function, such as culverts, drops, bridges, edges, etc shall be considered important landscape elements. They shall be designed as integral features in the overall recreation, transportation, visual and environmental scheme of the project.
- utilize native boulders in channel design, or integrate sensitively with materials in adjacent development
- avoid visible concrete where possible. If concrete must be used, provide textures and forms with visual interest for the pedestrian, or screen with vegetation
- design a maintainable channel bed. If anchoring the bottom for maintainability, utilize natural appearing materials, ie. round river boulders set 1/3 into concrete with no visible concrete
- minimize the use of angular riprap in channel beds. If used, consider burying.
- seize the opportunity for more water features in stream.

design concepts / goals

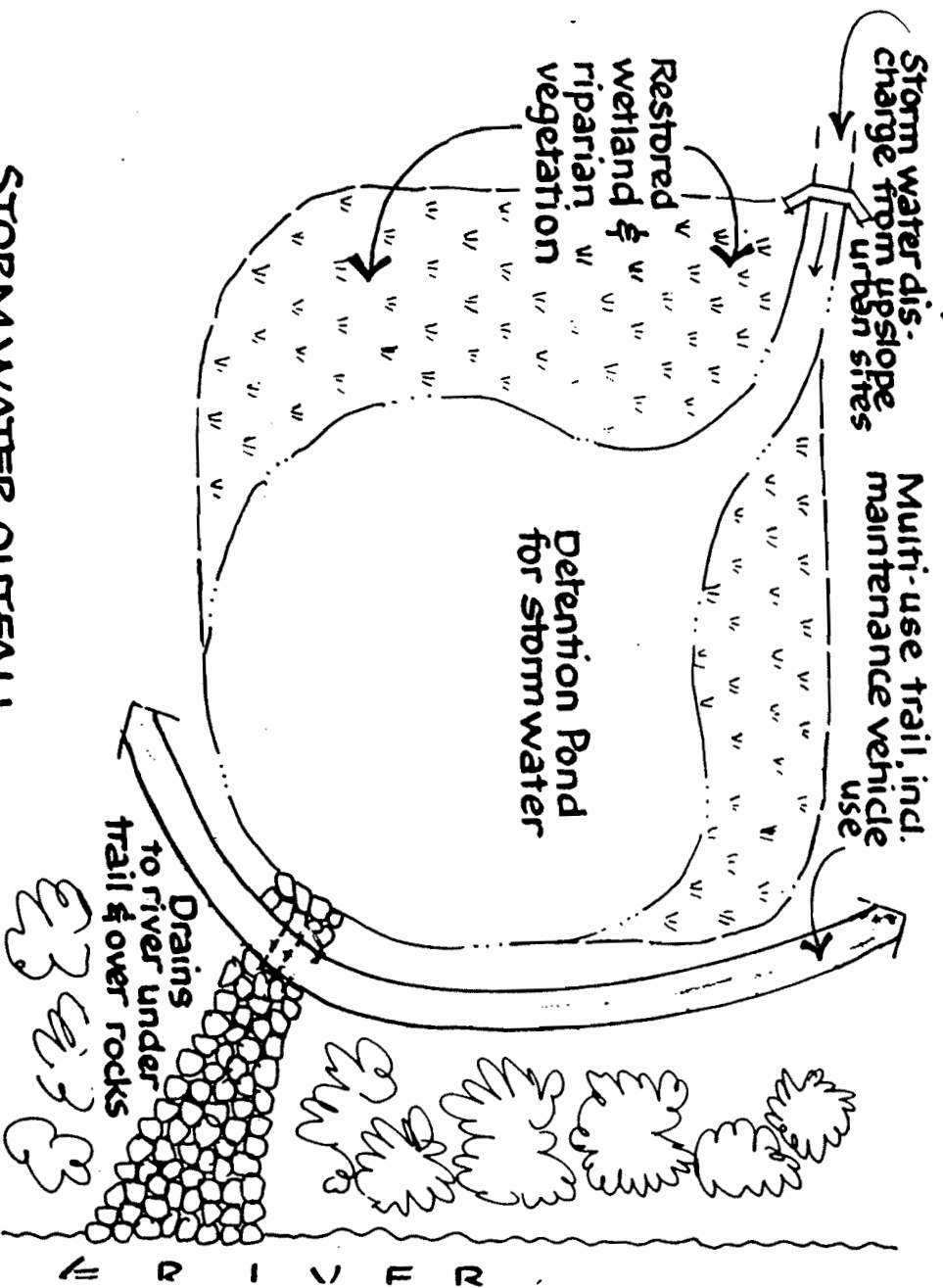
- drainage swales interrupted by site improvements shall be constructed of natural materials placed for proper function of the drainage system



NOT THIS -
 AVOID USING EXPOSED
 DRAIN PIPE OR IMPERVIOUS
 MAN-MADE SWALE LINING
 MATERIAL



THIS -
 USE NATIVE ROCK
 OR SIMILAR MATERIAL
 TO LINE SWALE,
 FOLLOW NATURAL
 COURSE OF TERRAIN



STORM WATER OUTFALL
DETENTION POND (TYP.)

no scale

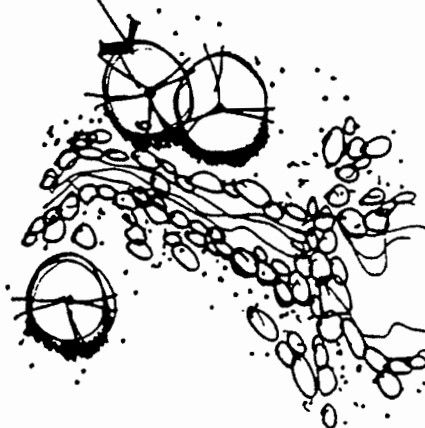
design goals / concepts

- the first priority in planning for a drainage way is to attempt to maintain natural channels and natural channel configurations
- vary channel widths and side slopes if possible. Mowed side slopes must remain at 3:1 of shallower
- consider special landscape treatments at area boundaries to emphasize a sense of entry
- In more urban areas, utilize mowing edges or other clear transition to natural vegetation in channel bottom
- retain existing mature trees. If removal is required, replace with appropriate species.

CONSIDER NATIVE VEGETATION
IN CHANNEL BOTTOM



MAINTAIN AND
PROTECT EXISTING
TREES

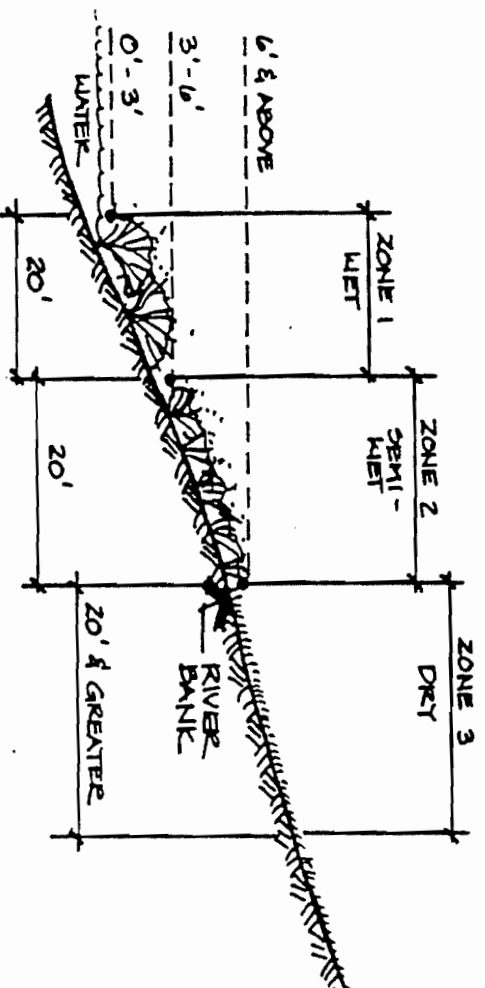


bank stabilization

design goals / concepts

banks are naturally stabilized by the interaction of rock, soil, and vegetative roots. A designer can choose from and combine several methods which follow nature's example to stabilize slopes and create an aesthetically pleasing design.

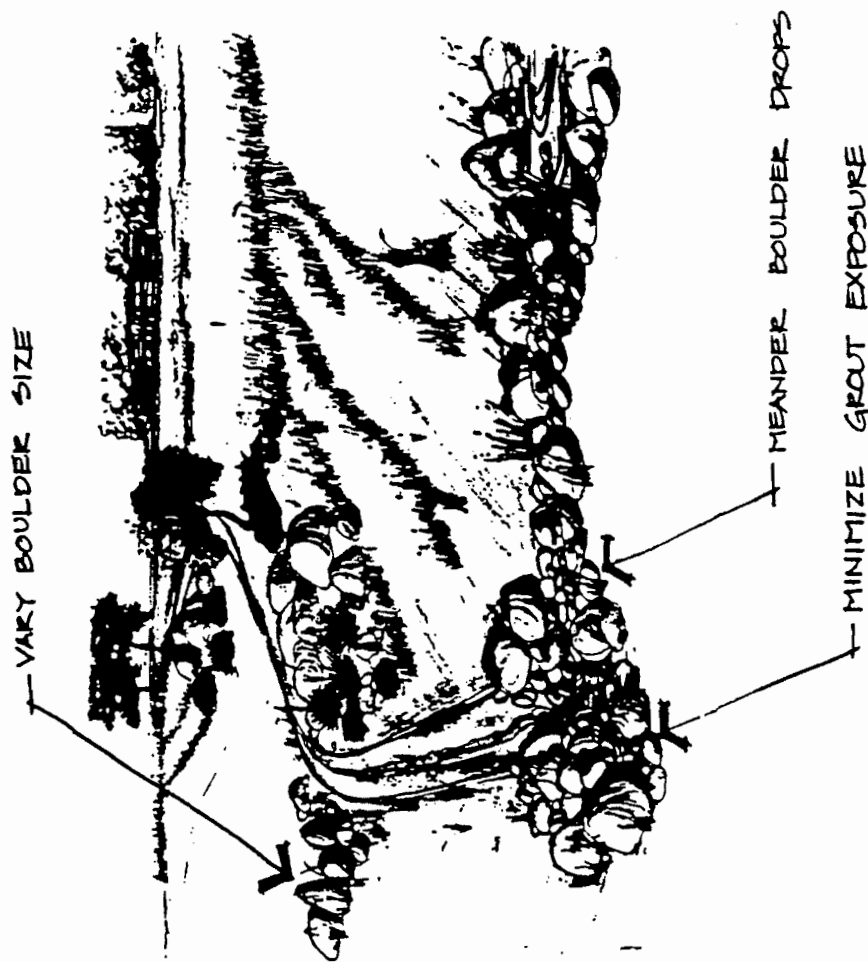
- grass - native, drought-tolerant grass mixes recommended.
- vegetation - maintain existing vegetation or plant appropriate vegetation to create a stable slope.
- rock - use only in areas where steep grades and erosion potential require it. Minimize negative visual impact - ie. hand-place rock, minimize grout exposure, screen with vegetation or bury and plant with grasses.

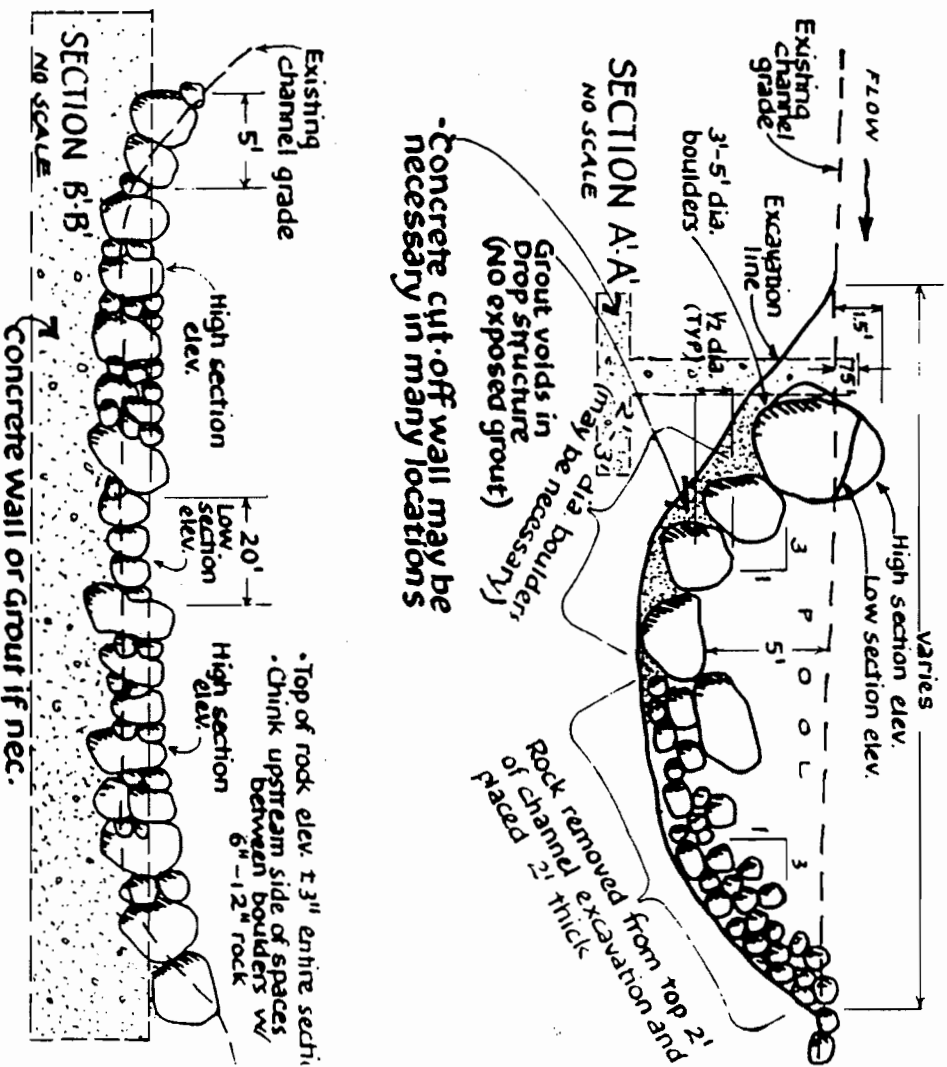
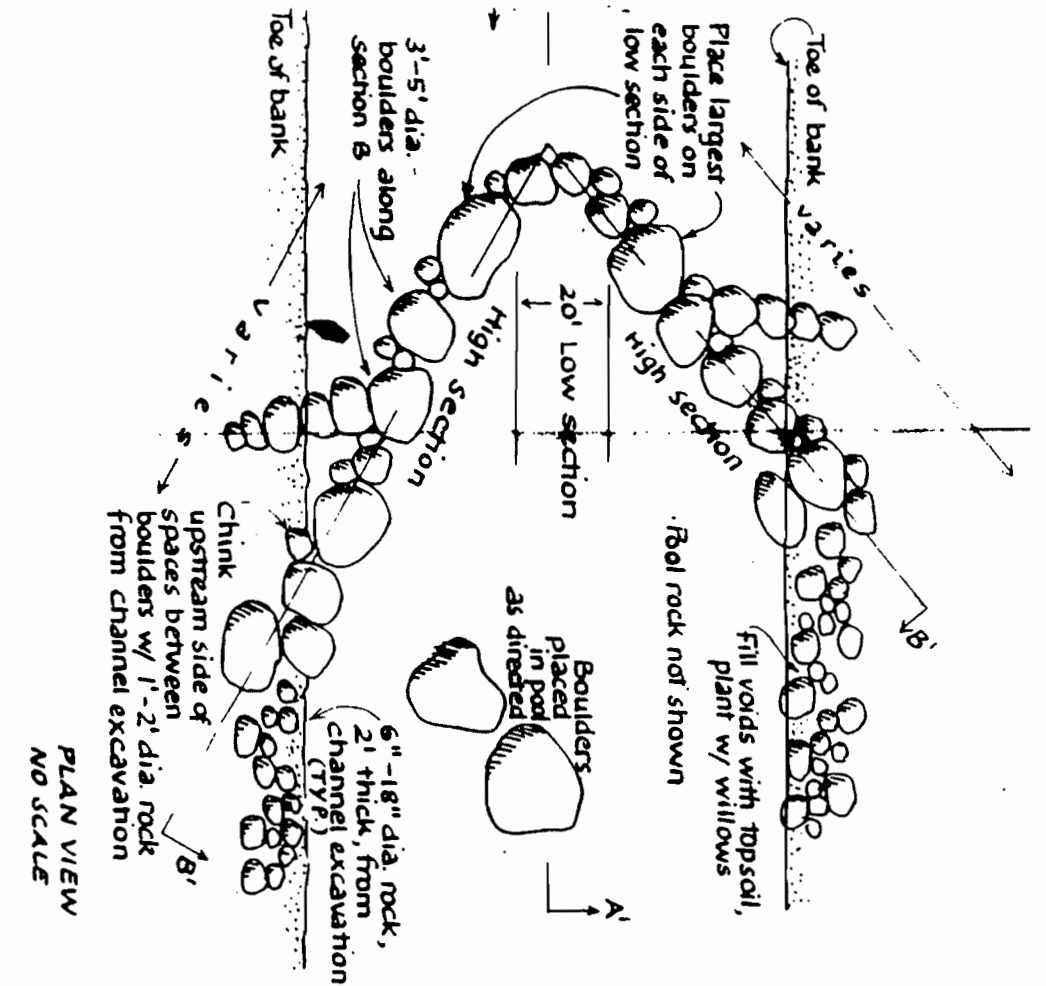


drop structures

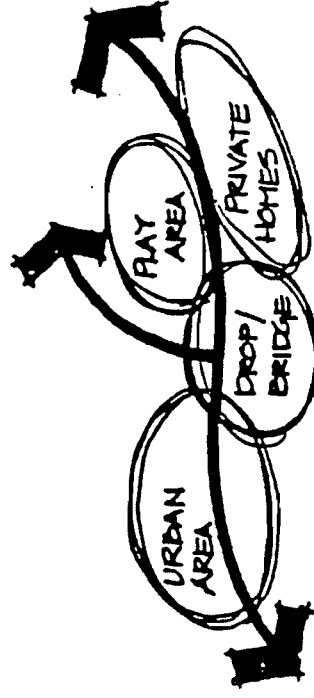
design goals / concepts

- ↳ drops required for flood control are also important aesthetic elements in the landscape. Designs should maximize their potential as 'people attractors' with the sights and sounds of falling water.
- ↳ Integrate drop structures with existing or proposed focal points where possible
- ↳ create natural appearing waterfalls or coordinate with surrounding architectural forms and materials
- ↳ meandering forms across the channel appear more natural than linear forms. Always avoid hazardous linear drops across channels used for water recreation.
- ↳ utilize round river rock in a variety of sizes for a naturally appearing drop. Minimize grout exposure.
- ↳ minimize the visible vertical and horizontal mass of the drop structure, ie. terrace steep vertical drops, design creative energy dissipators, etc.





DROP STRUCTURE TYPICAL



paths

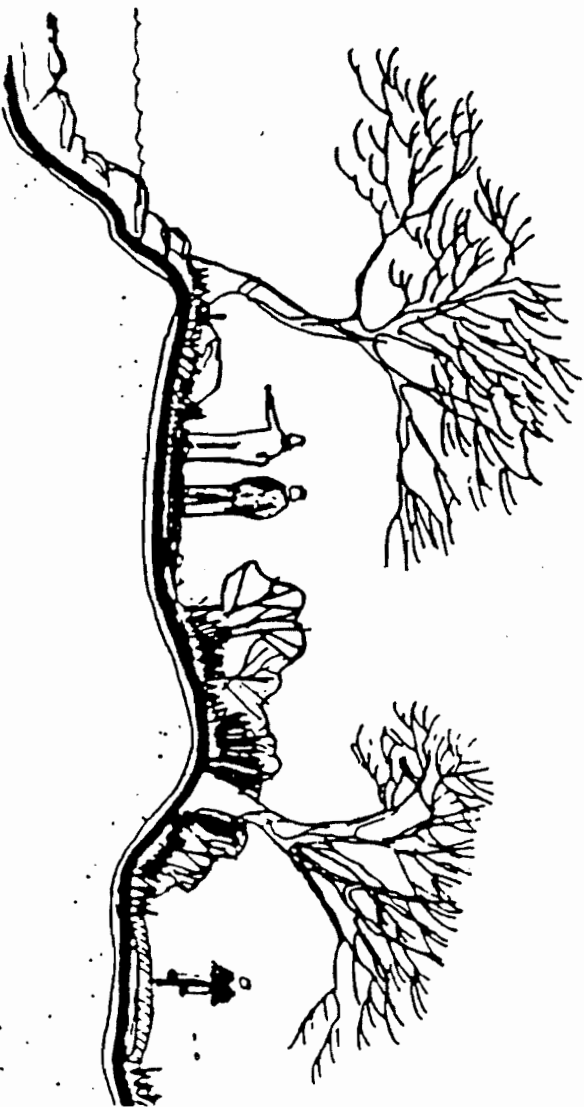
active paths

A design goals / concepts

- A* the major objectives of trail location are to design a trail that produces a minimum impact on the land and nearby landowners, to choose an alignment that is visually pleasing and provides a variety of views and experiences, to take advantage of the natural terrain and vegetation, and to provide a trail that requires minimum maintenance.
- A* the alignment should follow the contours of the land and the natural drainage patterns. A trail should not appear to be carved out of a hillside.
- A* meanders should appear to have a purpose, not be placed haphazardly or regularly throughout the channel length
- A* create functional, efficient circulation patterns
- A* site path intersections at natural focal points and convenient access points
- A* gradients up to 6% are preferable. Walks with grades exceeding 9% are considered ramps and are not recommended unless necessary.

- A* integrate channel maintenance access with multi-use paths where possible
- A* where active and passive paths both occur, place passive path nearer the water to allow closer contact of pedestrians to water
- A* integrate subtle, attractive buffers where necessary to protect privacy

- A* consider providing occasional rest areas along the path for the elderly and handicapped populations. Integrate these with focal points, water features, public areas, etc.
- A* path layout establishes the relationship of the user to the water. Bring the path to the water at natural attractors, ie. sound of falling water, important views, etc.



design goals / concepts

The following detail is provided for your information. Use of this construction method is optional.

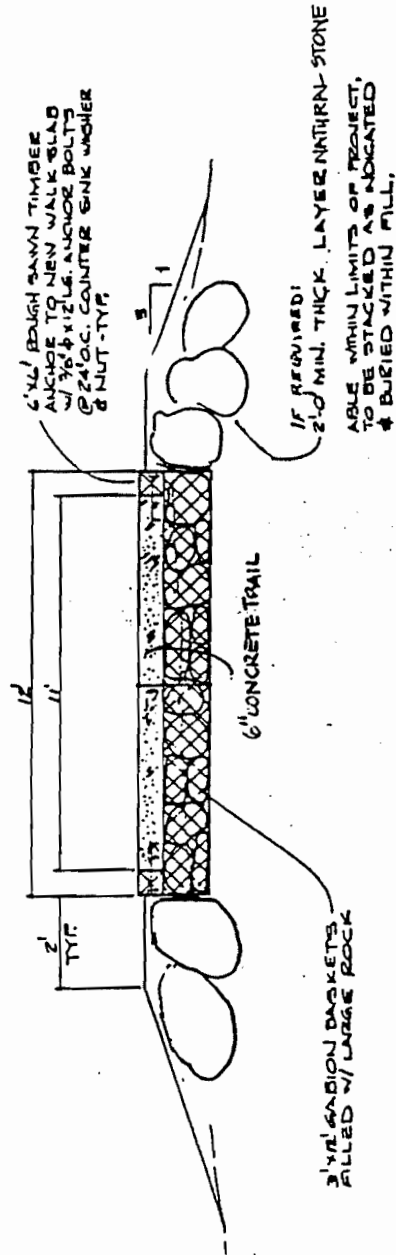


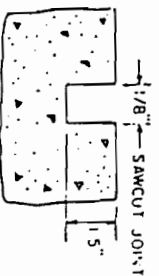
FIG. 1 SAMPLE FLOOD RESISTANT PATH SECTION

active paths

design standards

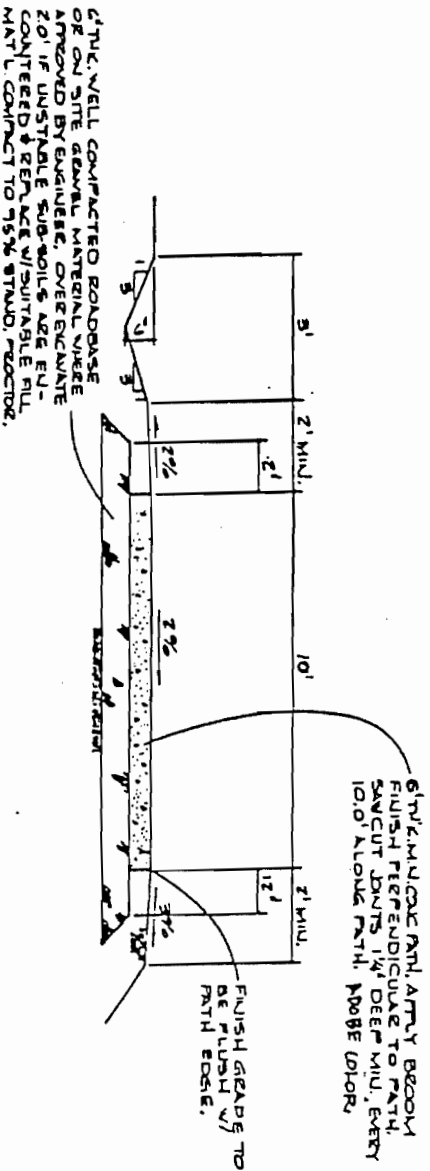
- 10' min. path width where bicyclists and pedestrians share path
- landscape treatment within 3' adjacent to paths must conform to the following standards:
 - new plant material shall not be woody or bear thorns
 - existing thorny plants shall be trimmed back
 - nearby irrigation systems shall be designed (where possible) to avoid spraying path

The following detail is standard for all active path construction.



CONCRETE JOINT DETAIL

N.T.S.

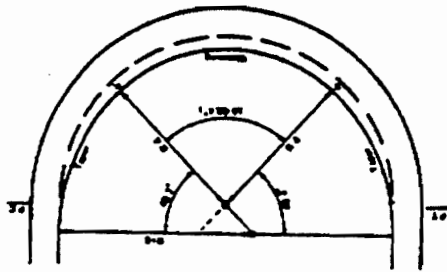


TYPICAL CONCRETE PATH SECTION 1" = 2'

active paths

design standards

where the radius of curvature is less than 100 feet, it is advisable to widen the bikeway in order to increase the lateral space required by the cyclist as he leans to the inside of a turn. The first figure shows the methodology used in determining the necessary widening to compensate for lean. The amount of widening should be limited to a maximum of 4 feet.

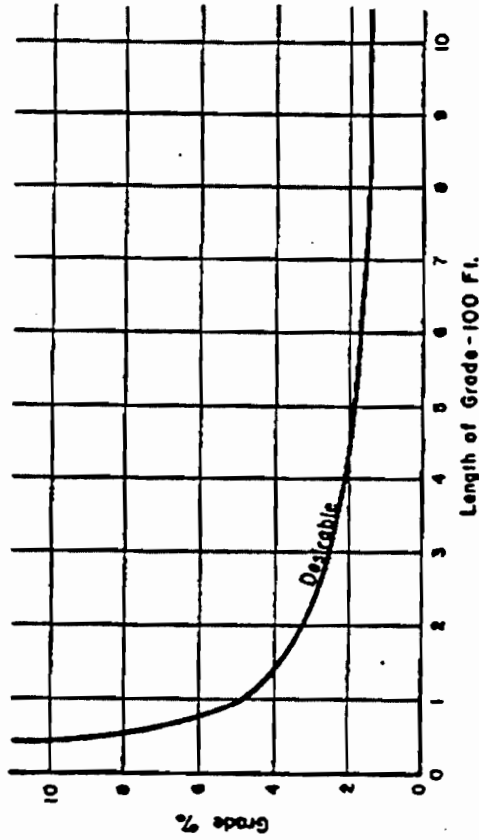


R = Radius of curvature (from Figure 4)
 W = Width of bikeway
 Δ = Central angle of the curve or the deflection between tangents

Maximum widening shall be limited to 4 feet.

When widening reaches 4 ft. ($\Delta > 90.0^\circ$), that width shall be carried on a radius of $R/4$ through the central portion of the curve ($\Delta < 90.0^\circ$) as shown on the right.

CURVE WIDENING

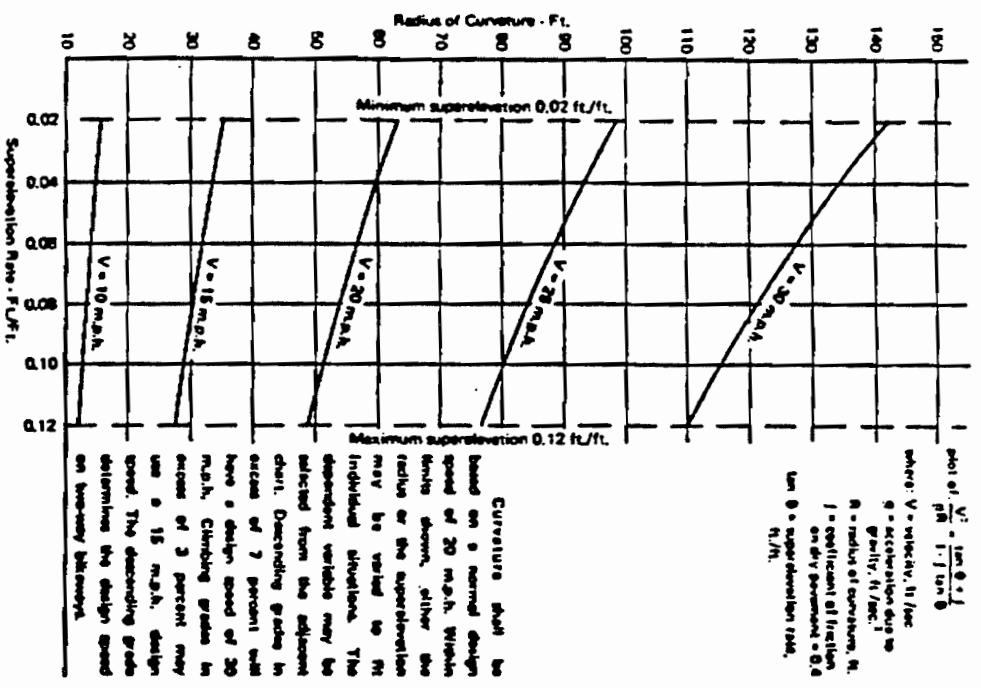


DESIRABLE GRADIENT

the amount of energy a cyclist expends in using a bikeway will affect the usage of the bikeway. The grades, therefore, should be kept to a minimum. A bikeway grade should not exceed 9%. The second figure shows the desirable gradients for various lengths of grade.

design standards

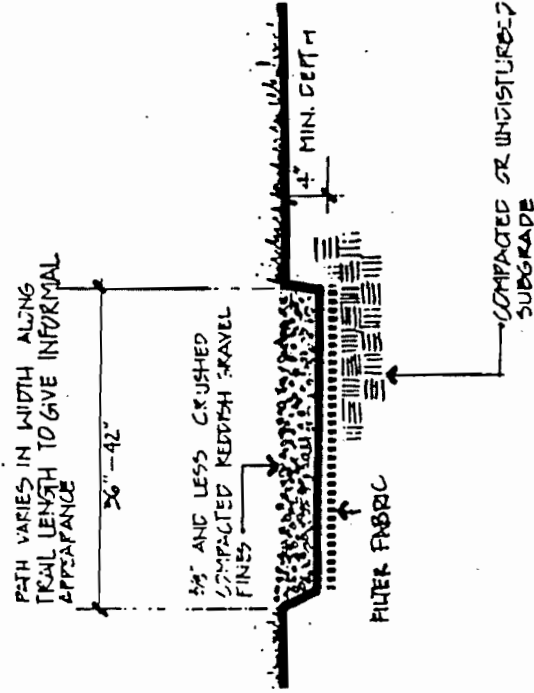
design speeds for bicyclists should be 15 mph and on long downgrades, speeds of 20 mph or more may be considered. In determining the design speed of a bikeway, the geometric features of curvature, superelevation, grade and width of travelled way are used to produce a travelling speed that is at least as high as the preferred speed of the faster travelers. For a given design speed of a bikeway, consideration should be given to the minimum radius of curvature to permit unbraked turns at the design speed. The following graph is standard for determining the curvature and superelevation for various bikeway design speeds. It should be noted that the superelevation should never exceed 0.12 feet per foot.



STANDARD SUPERELEVATION FOR BIKEWAYS

design goals / concepts

The following detail is provided for your information. Use of this construction method is optional.



CRUSHED ROCK PATH SECTION N.T.S.

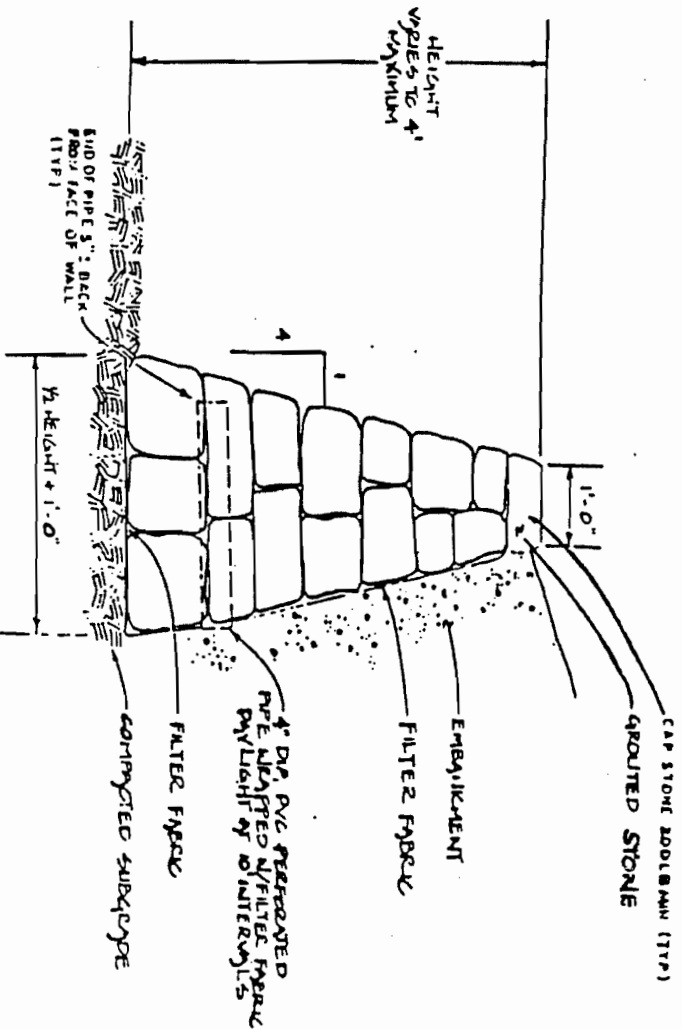
- materials should provide stable surface and remain relatively dry
- color should blend with the natural environment to minimize visual impact
- design for wheelchair accessibility wherever reasonable (min 36" width)
- minimize erosion of surface material ie. provide concrete pans at side drainage locations to limit washing
- gradients less than 3% are preferable
- create meanders with gentle curves which conform to the natural topography
- consider providing occasional viewing and seating areas along the path to accomodate passive recreation activities
- path layout establishes the relationship of the user to the water. Bring the path to the water at natural attractors, ie. sound of falling water, important views, etc.

retaining walls

design goals / concepts

- walls should be effective visually and functionally at the scale of the pedestrian
 - provide interest in texture and detail
 - break up massive walls over 4' tall by terracing
 - minimize the length of a continuous wall to avoid 'channelized' feeling
- stepped, tiered or terraced walls may provide seating, viewing, a separation of path from adjacent development, etc. Consider all potential uses in design and treat it as an important architectural element
- walls which provide seating should be separated from the mainstream of traffic flow for the comfort of the user. Site seating areas at points of visual interest.
- select materials harmonious with the character of the area or those native.

The following detail is provided for your information. Use of this construction method is optional.

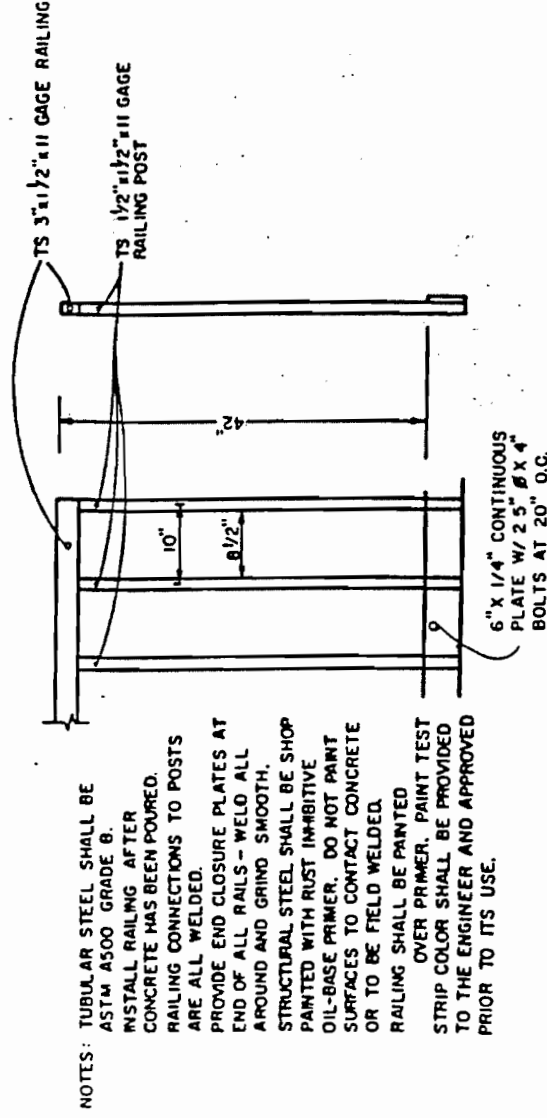


MASONRY WALL DETAIL N.T.S.

design goals / concepts

- ✎ railings shall be free of splinters and provide a smooth, clean surface to the touch
- ✎ railings shall be sturdy, vandal-resistant, and easily maintained
- ✎ ends of handrail shall be designed for maximum safety to the pedestrian and the bicyclist, ie. angle ends to meet grade for a smooth transition to rail height
- ✎ rail color should blend with the natural environment or tie into color scheme of adjacent development.
- ✎ design railings which are harmonious with other elements throughout the corridor

The following detail is provided for your information. Use of this construction method is optional



SAFETY RAILING DETAIL

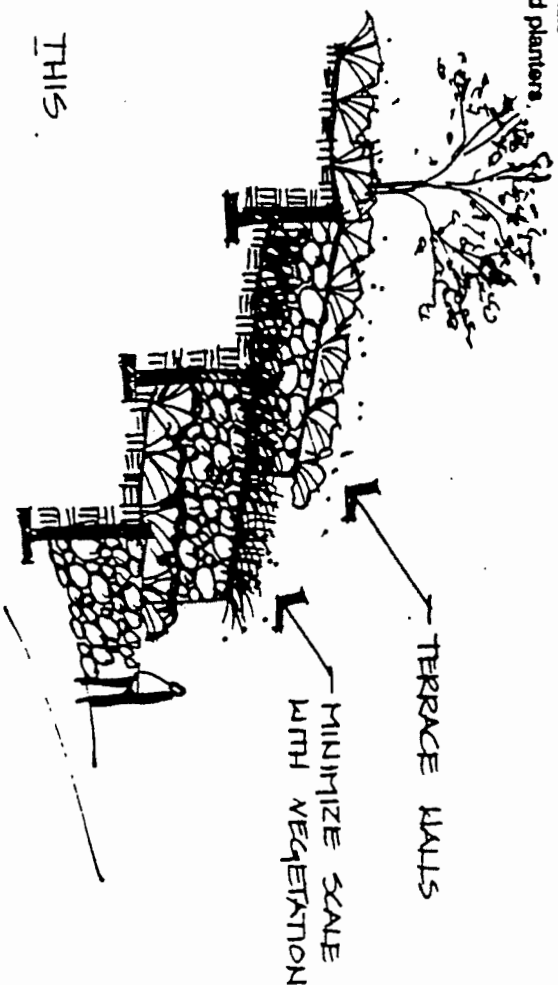
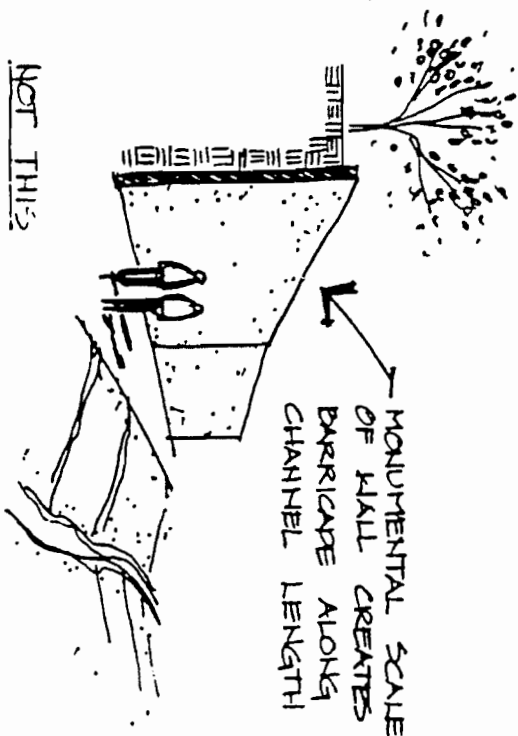
SCALE 3/4"=1'

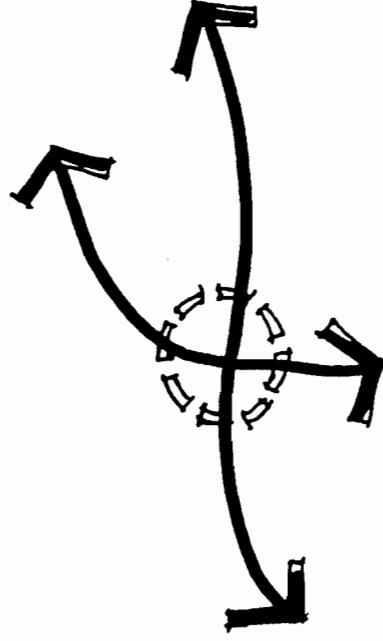
✎ TYPICAL SAFETY RAILING DETAIL

barriers

design goals / concepts

- the interface between open space and adjacent development should be a gradual one, not an abrupt delineation
- a sensitively designed circulation system minimizes the need for barriers.
- occasionally barriers may be necessary to separate vehicular and pedestrian traffic for safety, privacy, or to restrict access for security. The number of barriers used should be kept to a minimum. Where required, plan barriers as an attractive, integral part of the overall site design.
- minimize chain-link fencing. Where it is required, design for visual transparency, i.e. black is the most invisible color in the environment, reflective metallic colors the most obtrusive
- avoid 'channelized' feeling created by barricade fencing, walls or vegetation along the corridor.
 - alternate enclosed and open spaces along the length of the corridor
 - barriers should be designed at a scale comfortable for the pedestrian
 - delineate private and public areas creatively. Consider softened adobe-styled walls; natural coyote fencing with vines added and stacked moss rock or alternative subtle cues:
 - low vegetation masses
 - naturalistic berms
 - separation in grade
 - low walls
 - raised planters

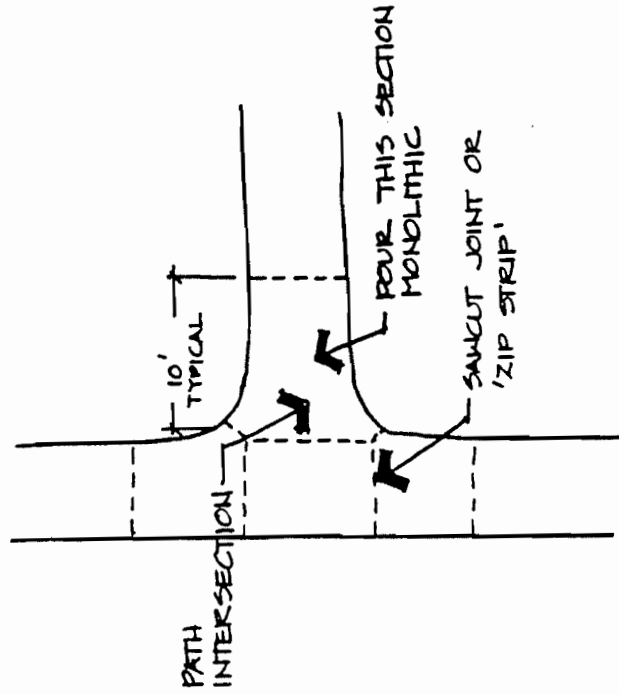
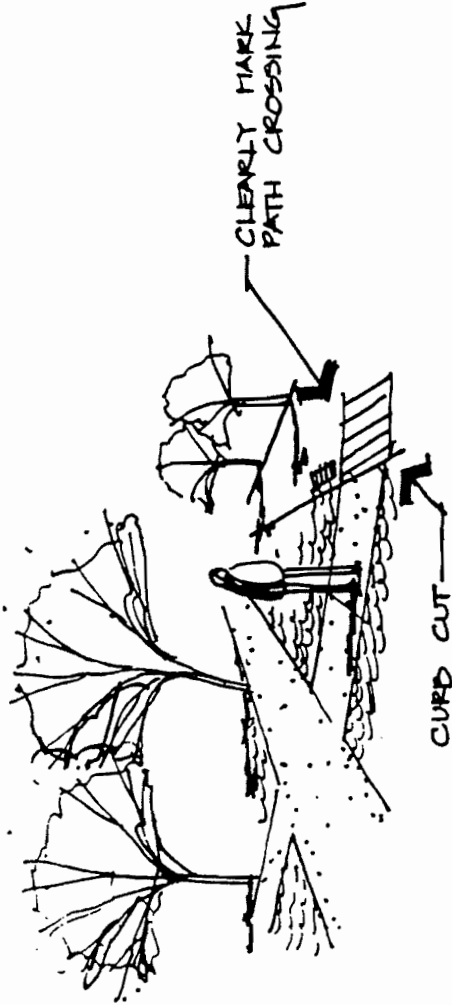




intersections

design standards

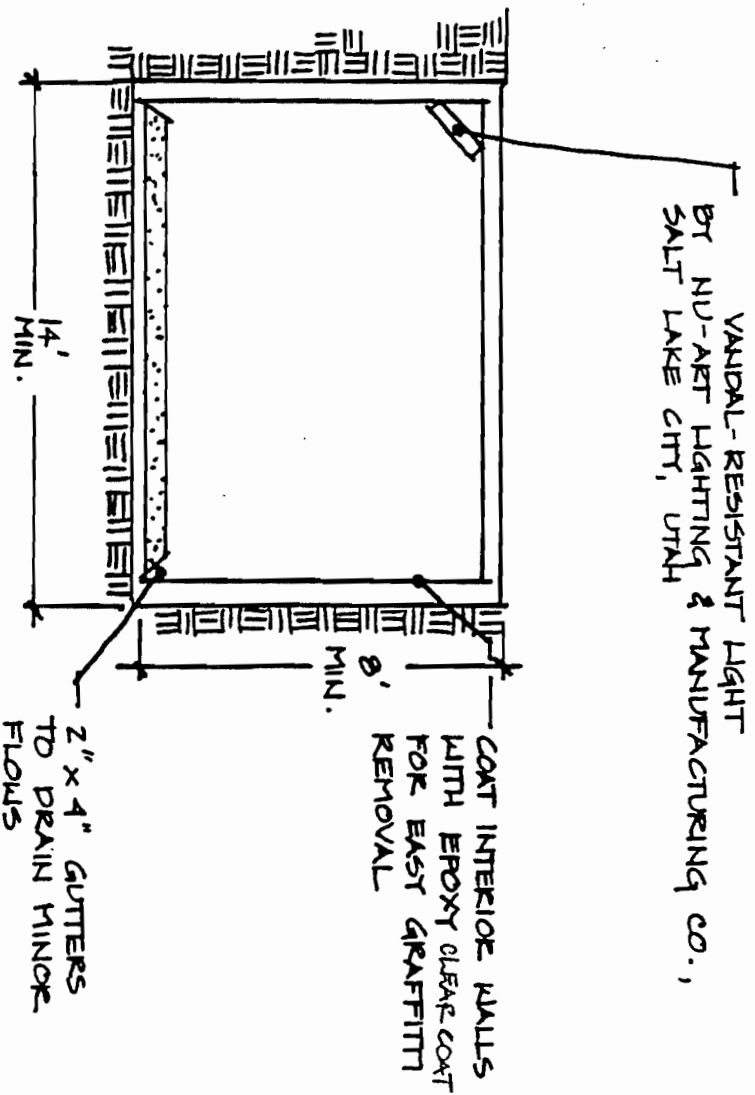
- site crossings at intersections or nearest reasonable location
- all paths shall be perpendicular to road at intersection
- path crossings shall be clearly visible, ie. stripe or alternative paving material in keeping with materials, colors, etc. of area
- to facilitate wheeled movement, curb cuts should be provided at all intersections and entries. Create a non-slip surface other than grooved, as grooves may fill with water, freeze and cause slipping.
- provide four signs at each intersection: two for bikes and pedestrians and two for automobiles



underpasses

design standards

The following detail is standard for all underpass construction in which a path is proposed.



UNDERPASS SECTION



bridges

mixed-use bridges

design goals / concepts

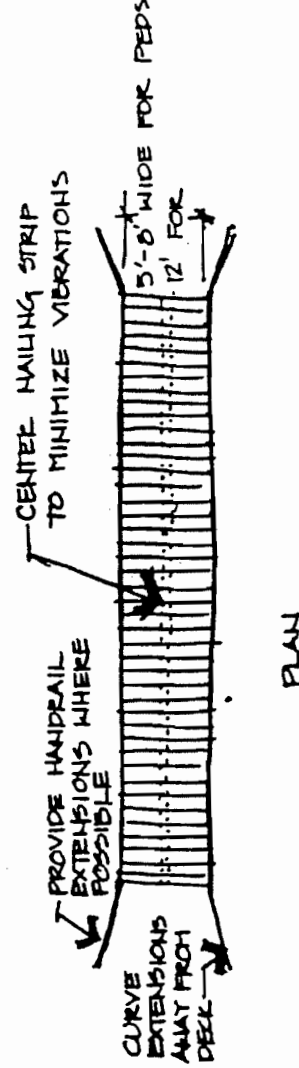
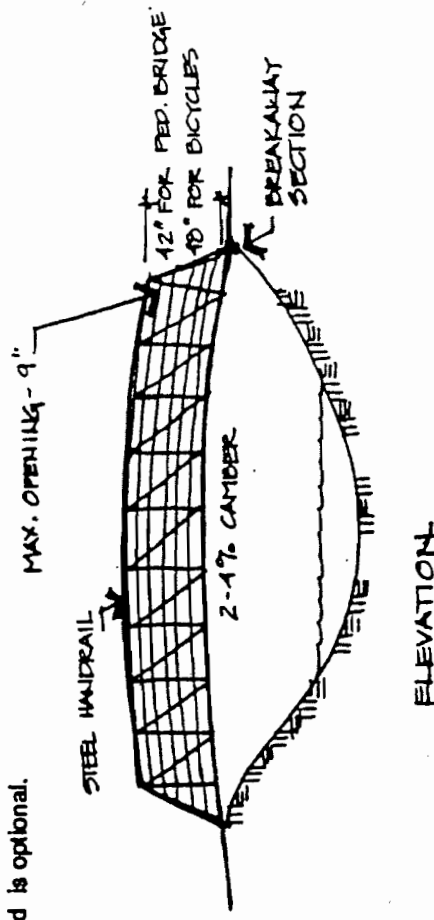
- consider breakaway capability to minimize flood obstruction

- design bridges that are sturdy, safe, vandal-resistant, and easily maintained
 - deck with good skid-resistance
 - stabilize deck to minimize vibrations
 - railings shall be free of splinters and provide a smooth, clean surface to the touch
 - railings should allow view to the river for all heights, yet prevent anyone falling through
 - scale of bridge should be in keeping with its surroundings

- bridge color shall blend with the natural environment or tie into color scheme of adjacent development. Black is the least reflective and most invisible color in the landscape.

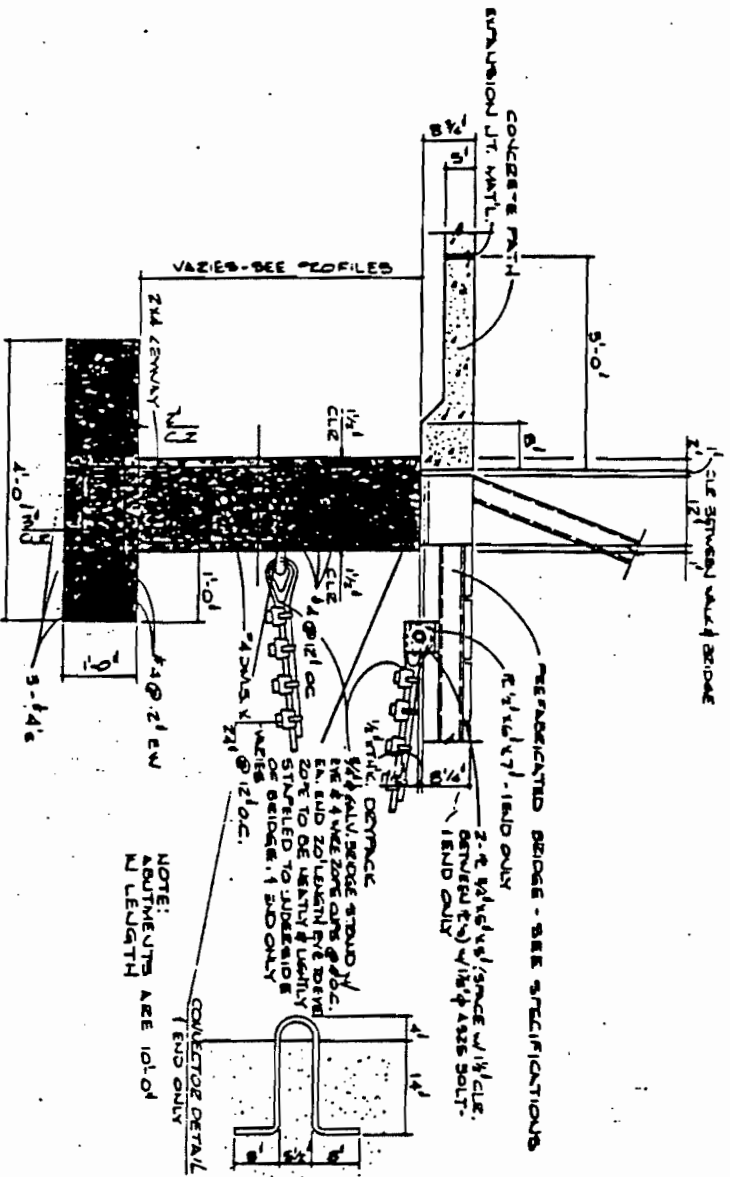
- integrate design with other elements throughout the corridor and preserve existing historical stone bridges.

- The following detail is provided for your information. Use of this construction method is optional.



TYPICAL BRIDGE

NOTE - DO NOT BOLT DOWN BRIDGE AT ABUTMENTS.
INSTALL RESTRAINING CABLE AT UPSTREAM
ABUTMENT.



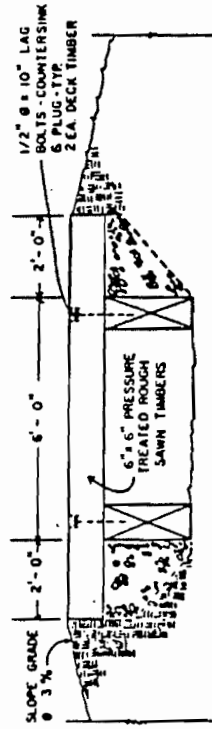
Typical Bridge Abutment Section

N.T.S.

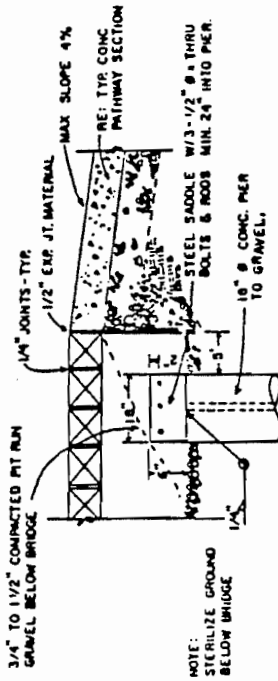
pedestrian bridges

design goals / concepts

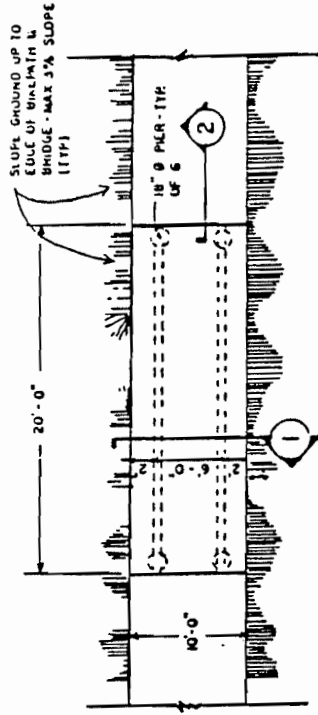
The following detail is provided for your information. Use of this construction method is optional.



1 BRIDGE CROSS SECTION
NO SCALE



2 BRIDGE BEARING DETAIL
NO SCALE

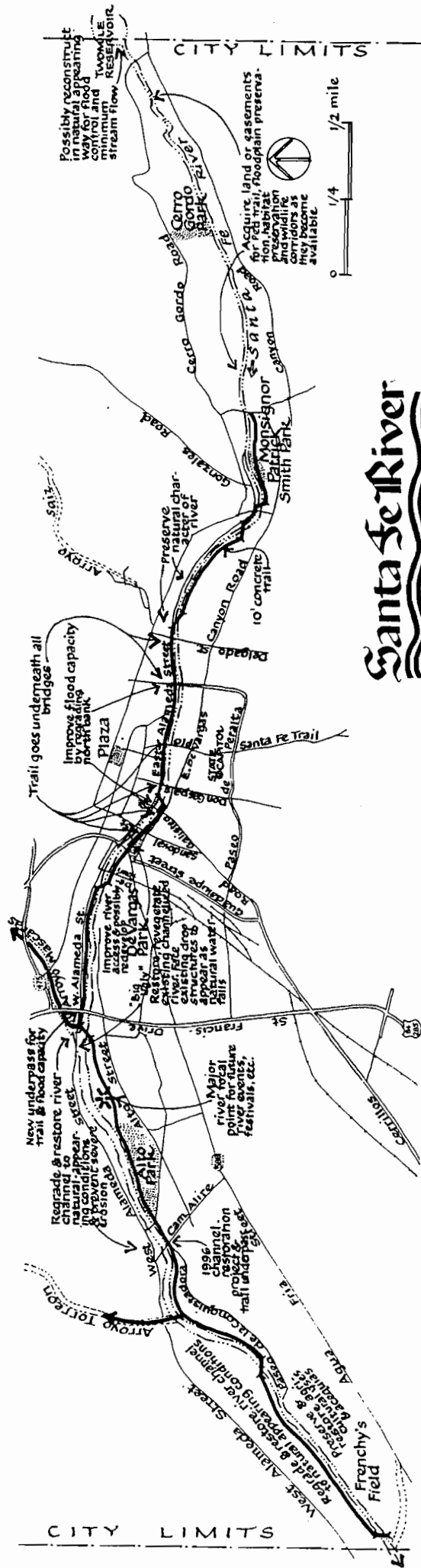


BRIDGE DETAIL
NO SCALE

NOTES:
TUBULAR STEEL SHALL BE ASTM A500 GRADE B. AFTER RAILING AFTER CONCRETE RAILING SHALL BE POURED. RAILING CONNECTIONS TO POSTS ARE ALL WELDED. PROVIDE END CLOSURE PLATES AT END OF ALL RAILS - WELD ALL AROUND AND GRIND SMOOTH. SHALL BE SUPPLIED WITH RUST INHIBITIVE OR-BASE PRIMER, DO NOT PAINT SURFACES TO CONTACT CONCRETE OR TO BE FIELD WELDED. RAILING SHALL BE PAINTED "FLAT BLACK" OVER EXISTING PAINT. SHALL BE PROVIDED TO THE ENGINEER AND APPROVED PRIOR TO ITS USE.

TYPICAL PEDESTRIAN BRIDGE

Appendix B - Maps



Santa Fe River

Corridor Master Plan

Appendix C - Cost Estimate

Santa Fe River Corridor Cost Estimate

1996	St. Francis Drive Camino Alire	\$1,848,234
	Camino Alire - COE Project	Funding in place
	Total 1996	\$1,848,234
1997	St. Francis Drive Underpass	\$50,000
	Camino Alire to Ricardo Rd	\$1,105,325
	Total 1997	\$1,155,325
1998	Paseo de Peralta Underpass	\$85,933
	Paseo de Peralta to Old Santa Fe Trail	\$224,851
	Santa Fe Trail Underpass	\$92,267
	Santa Fe Trail to Don Gaspar Ave	\$400,448
	Don Gaspar Underpass	\$89,684
	Don Gaspar to Galisteo St	\$230,961
	Galisteo St Underpass	89,684
	Galisteo St to DeFour St	\$626,962
	DeFour St Underpass	\$141,353
	DeFour St to St. Francis Drive	\$476,555
	Ricardo Rd to Frenchy's Field	\$1,788,080
	Total 1998	\$4,246,778
1999	Camino Cabra Underpass	\$81,530
	Camino Cabra to E. Palace Ave	\$164,121
	E. Palace Ave Underpass	\$82,952
	E. Palace Ave to Delgado St	\$402,698
	Delgado St Underpass	\$77,637
	Delgado St to Paseo de Peralta	\$54,400
	Total 1999	\$863,338
Total 1996 -1999		\$8,113,675

Costs not included:

- Instream flow costs
- Major park construction (i.e. redevelopment of DeVargas Park and Alto Park)
- C.O.E. project at Camino Alire
- St. Francis Drive underpass cost assumes project to be done as part of a bridge replacement or flood control improvement project

Appendix D - Recommendations for Stormwater Master Plan

SANTA FE RIVER TASK FORCE

August 28, 1995

Santa Fe City Council

Dear Mayor Jaramillo and Council Members;

The following are comments related to the Storm Drainage Management Plan. These comments were generated after reviewing the proposed plan and meetings with City Staff and consultants to discuss the project as it relates to the Santa Fe River Plan.

1. We request that further analysis be conducted to determine if the peak discharge to the Santa Fe River can be lessened by using Nichols and McClure reservoirs for some storage.
2. We support the concept of constructing a multi-purpose reservoir at the old Two Mile site to provide some flood storage as well as storage to maintain a minimum instream flow for the Santa Fe River during dry weather. We request analysis of this concept.
3. We also request that additional investigation go into using numerous small detention facilities on the tributary arroyos to reduce peak discharges from 100 year and more frequent floods. Design of all pending drainage improvements including Cerrillos Road, the Rufina Drain and the Arroyo Chamiso drainage projects should incorporate upstream detention basins to lower peak flows.
4. Recognizing the extent and severity of a 100 year event, we suggest the City immediately develop an ordinance prohibiting new construction within the 100 year flood plain. The issues of existing development and uses within the floodplain need to be addressed. We question the City's responsibility to protect structures that have been built within the floodplain.
5. We support replacement of bridges and other structures which block the channel, particularly the bridge at the Santa Fe River and St. Francis Drive. Engineering for all bridge replacements should be coordinated with the recommendations of the General Plan and the Santa Fe River Plan, to provide trail underpasses and greenway improvements as a part of the projects.
6. We recommend that the Santa Fe River channel from the Alameda bridge to Guadalupe St., the area identified with potential flooding, be creatively designed to increase capacity while following the Design Guidelines of the Santa Fe River Plan. This additional capacity could possibly be achieved by methods such as:
 - channel widening and tailoring to allow room for trails and flood capacity,

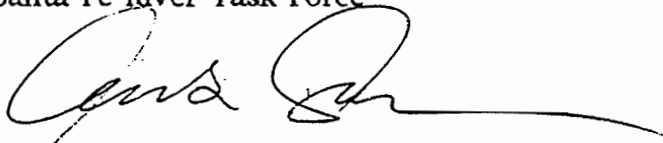
- grading to add capacity as well as create attractive park areas, and
- selective acquisition of key parcels of flood prone land as they become available (pre-flood acquisition program).

In conclusion we would like to stress the need to coordinate the General Plan, the Santa Fe River Plan and the Storm Drainage Management Plan. All should mesh to provide cost effective and environmentally sound solutions to Santa Fe's drainage and flood problems.

We appreciate your listening to our input and request that the River Task Force be a part of the approval process for this plan.

Sincerely,

Santa Fe River Task Force

A handwritten signature in black ink, appearing to read 'Anita Sanders', with a long horizontal flourish extending to the right.

Anita Sanders, Chair