

Approved
El Paso County
Planning Commission
This 16th day of July 19 91

Paul L. Lupis
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Chaine W. Jones, Secretary

MULLER

Fishers Canyon
Drainage Basin Planning Study

FINAL DESIGN REPORT

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City Engineering/Stormwater

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CITY OF COLORADO SPRINGS
STORM WATER & SUBDIVISION
101 W. COSTILLA . SUITE 113
COLORADO SPRINGS, CO 80903,
(719) 578-6212

Prepared For:

El Paso County
Department of Public Works

Prepared By:

Muller Engineering Company

September, 1991

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City Engr. Div.

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**FISHERS CANYON
DRAINAGE BASIN PLANNING STUDY**

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SECTION I

EXECUTIVE SUMMARY

A drainage basin planning study was undertaken for the 6.5 square mile Fishers Canyon basin, located in the southern portion of the Colorado Springs metropolitan area, directly north of the Fort Carson Military Reservation. The study tasks included collection of watershed information regarding existing drainage facilities, soils, future land use, utilities, and property ownership, review of environmental resources and existing drainage concerns, hydrologic, hydraulic, and alternative analyses, preliminary design of a selected plan of drainage improvements, and calculation of drainage basin fees.

Primary drainage concerns in the basin include insufficient initial drainage systems (street conveyance, inlets and storm sewers) in the Stratmoor Hills and Stratmoor Valley areas and channel bed and bank erosion in the Fishers Canyon Drainageway and Tributary. The selected plan addresses these concerns by identifying storm sewer improvements in Stratmoor Hills and Stratmoor Valley and channel stabilization measures in Fishers Canyon Drainageway and Tributary. The selected plan is shown in Figures VIII-1 through VIII-6. The probable cost of the selected plan and basin fees recommended for the Fishers Canyon Basin are summarized below:

PROBABLE COSTS OF SELECTED PLAN

Drainage Improvement Cost	\$ 3,752,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	178,000.00
Construction Cost	<u>\$ 3,930,000.00</u>
Contingencies (5% of Construction Cost)	\$ 196,500.00
Engineering (10% of Construction Cost and Contingencies)	412,650.00
Property Costs for Drainage Improvements	0.00
Detention Land Costs	56,000.00
TOTAL IMPROVEMENT COSTS	<u><u>\$ 4,595,150.00</u></u>

No cost is included for land for the drainage improvements as it is anticipated that the necessary right-of-way will be dedicated to the County at no cost.

DRAINAGE BASIN FEES

Unplatted County Area Assumed to Develop: 260 acres

Drainage Fee: $\$1,345,530/260 \text{ ac} = \$5,176/\text{acre}$

Bridge Fee: $\$0/\text{acre}$

Detention Land Fee: $\$56,000/260 \text{ ac} = \$215/\text{acre}$

SECTION II

INTRODUCTION

Authorization

On January 8, 1990, El Paso County, Colorado contracted with Muller Engineering Company (Muller) for the provision of engineering services for a Drainage Basin Planning Study for the Fishers Canyon Basin. Muller assembled a team of sub-consultants and assigned work for the project as follows:

Hydrologic Analyses and Hydraulic Design:	Muller Engineering Co.
Environmental Review and Land Use Analysis:	Thomas and Thomas
Surveying and Mapping:	Reid's Aerial Mapping

A technical committee was established to review the progress of the study and to provide input and guidance. The technical committee included the following individuals:

Alan Morrice:	El Paso County Department of Public Works
Anita Culp: Phil Boawn	U.S. Army Corps of Engineers
Sarah Fowler:	U.S. Environmental Protection Agency
Bruce GoForth: Ruth Carlson David Lovell	Colorado Department of Wildlife
Bob Adamczyk: Chris Smith	City of Colorado Springs
Ray Brown: Gary Johnson	Colorado Department of Highways
Roy Heald:	Stratmoor Hills Water and Sanitation District
Bill Walters:	Stratmoor Hills Homeowners Association
Keith Martin:	Gates Land Company
Bob Svejksky:	Drexel, Barrel and Company

This Design Report documents the hydrologic, environmental, hydraulic and alternative analyses that have been completed and presents the selected drainage plan for the Fishers Canyon Basin. Design drawings of the plan are included in Appendix B of this report.

Letter of Permission Process

This project is one of the first drainage basin planning studies contracted by El Paso County to incorporate a Letter of Permission (LOP) process. The LOP process was developed by the U.S. Army Corps of Engineers in cooperation with local governments to provide for early consideration of 404 permit issues. The following paragraph, appearing in a public notice for the project, describes the purpose of Letters of Permission in more detail.

Letters of Permission (LOP) are a type of permit issued through an abbreviated processing procedure described later in this public notice. The list of categories of activities which are proposed for authorization under these LOP procedures include all Section 404 dredge or fill activities described in the Drainage Basin Planning Study (DBPS). The purpose of the LOP is to streamline the permitting process; to protect or enhance existing environmental values while providing for health, safety, and general welfare; to encourage cross-disciplinary, basin-wide planning and management of basins; to encourage permit consideration at an early stage of project planning; to encourage local participation in the permit program; and to provide for ongoing review and enforcement of authorized activities and the permitting process.

Agencies involved in the LOP process include the U.S. Army Corps of Engineers, EPA, Colorado Division of Wildlife, U.S. Fish and Wildlife Service, and the Water Quality Control Commission. During the course of this project a number of these agencies provided review comments regarding alternative plans and, in general, promoted the consideration of environmental issues during the drainage planning process.

Project Objectives

The Drainage Criteria Manual for the City of Colorado Springs and El Paso County, dated October 1987, states that the provision of adequate drainage is needed to minimize flood losses and disruption, enhance the general health and welfare, and help assure optimum economic and social benefits for the community. To this end, drainage basin planning studies are undertaken which identify existing drainage problems and proposed solutions.

The objectives of this project are to evaluate the existing drainage concerns in the Fishers Canyon Basin and to develop a plan to provide for the conveyance of stormwater runoff with a minimal risk of loss of life and major damage. As in all drainage basin planning studies related objectives include economic efficiency, regional scope, environmental preservation and enhancement, social and recreational enhancement, responsible funding and implementation policy, and health, safety, and welfare of the citizenry.

Previous Studies

The hydrology of the Fishers Canyon Basin was the subject of several previous studies, including:

1. "Final Drainage Report for Portions of Broadmoor Bluffs and Cheyenne Meadows South at Cheyenne Mountain Ranch" (Cheyenne Mountain Ranch Report) prepared by Drexel, Barrell and Company for the Gates Land Company.
2. "FEMA Map Revision for Spring Run, Cheyenne Meadows Drainage Channel" (Cheyenne Meadows Report), prepared by Drexel, Barrell and Company for the Gates Land Company.

3. "Hydrologic Study for Structures Nos. I-17-IK and I-17-IL" (100-year culverts under Interstate 25 and Maxwell Street), prepared by Colorado Department of Highways.
4. "Flood Insurance Study for City of Colorado Springs and El Paso County, Colorado" (for selected streams including the Fishers Canyon drainageway), prepared by Resource Consultants, Inc.

Sub-basin information from previous studies was checked for reasonableness and, where appropriate, was used in the current analysis. Using existing information avoided unnecessary differences in basin modelling and facilitated the comparison of hydrologic results.

SECTION III

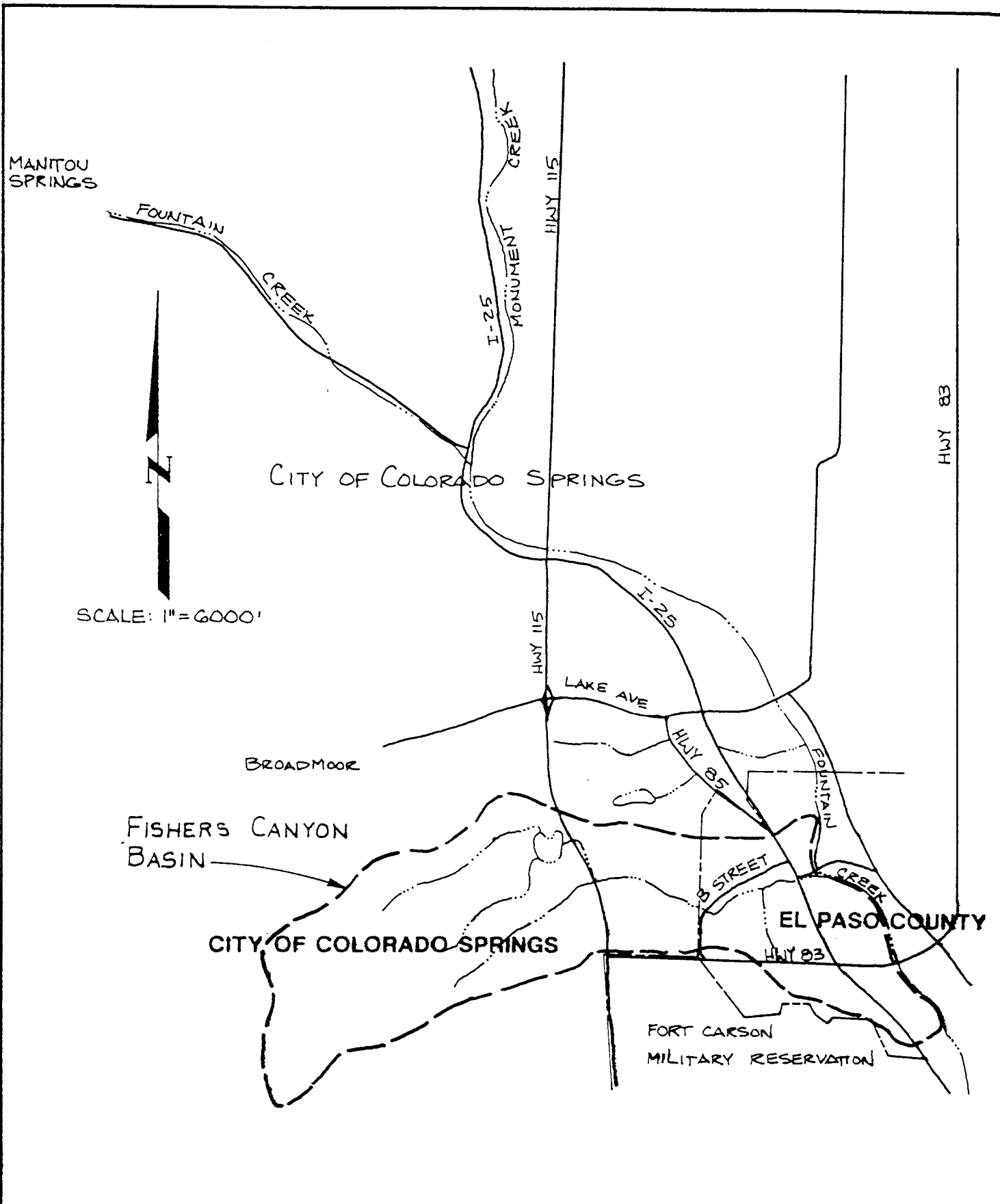
WATERSHED DESCRIPTION

Location

The Fishers Canyon Basin is located approximately nine miles south of downtown Colorado Springs, directly north of the Fort Carson Military Reservation. Figure III-1 depicts a location map for the basin. The basin drains from steep western slopes eastward across Interstate 25 to Fountain Creek. Of the total basin area of 6.5 square miles, the western three quarters lies within the jurisdiction of the City of Colorado Springs and the eastern one-quarter lies within the jurisdiction of El Paso County. Identification of environmental resources, land use, and soils information, as well as hydrologic modeling, was accomplished for the entire watershed area. However, the evaluation of existing drainage concerns and development of alternative plans focused on the downstream portion of the basin under the jurisdiction of El Paso County.

Topography

The western ridge line of the basin is located on Cheyenne Mountain near the eastern boundary of the Pike National Forest. Landmarks on the ridge include the Cheyenne Mountain Lodge at an elevation of 9,212 feet above sea level and several radio towers at elevation 9,440 feet. The Cheyenne Mountain Zoo and the Broadmoor Ski Area are located on the steep, forested slopes of Cheyenne Mountain. Gradients of these slopes approach 55 percent. From a point west of Highway 115 to the eastern limits of the City of Colorado Springs, the watershed slope decreases to 1.5 to 3 percent. This central portion of the basin is known as Cheyenne Meadows. Gates Land Company is the principal landowner and developer of the central portion of the basin. Within the downstream basin area



**FISHERS CANYON
DRAINAGE BASIN PLANNING STUDY**

LOCATION MAP

**FIGURE
III-1**

in El Paso County, tributary areas slope toward the central drainageway at two to five percent. The elevation of Fountain Creek the eastern limit of the basin is 5,720 to 5,770 feet above sea level.

Major Drainageways

From just downstream of Highway 115 to the east end of the basin, a central stream known as the Fishers Canyon Drainageway, serves to drain stormwater runoff from the watershed. Upstream from Highway 115, a number of small, parallel streams in two main sub-basins drain the steep western slopes of the watershed. The flow paths of these streams are described in the following paragraphs, appearing in the summary report for the FEMA Flood Insurance Study.

The western area of the watershed can be recognized as two distinct subbasins north and south. All of the flow for the north subbasin collects at Curr Reservoir which is northwest of the intersection of State Highway 115 and Cheyenne Meadows Road. The south subbasin comprises what is known as Fishers Canyon and is a narrower, deeper drainage course. It opens out onto flatter terrain about 3,000 feet west of State Highway 115 and flows northeast toward the intersection of Highway 115 and Cheyenne Meadows Road. It enters a concrete-lined channel which directs it to a crossing under the highway before reaching Cheyenne Meadows Road.

Outflow from Curr Reservoir enters a grassed waterway running southwest along State Highway 115 for several hundred feet before crossing under the highway. It continues parallel to this road until it crosses under Cheyenne Meadows Road and intersects with the channel from Fishers Canyon. At this point, the combined flow is directed east into the improved channel of the Cheyenne Meadows Subdivision. This channel continues down to Eastmeadow Drive; it consists of a wide grass-lined trapezoidal section with a riprapped low flow section in the middle. From Eastmeadow Drive to Loomis Avenue, flow is in a concrete-lined channel.

After crossing under Loomis Avenue, the stream enters a deeply-incised natural channel that flows under a railroad bridge and B Street before bending toward the northeast. This channel continues another 2,000 feet and then enters the grounds of the former Stratmoor Golf Club. At this point there used to be a series of ponds the rest of the way to Interstate 25. The dams have all been breached and the channel is somewhat meandering as it flows through these old structures. There is no storage remaining in these failed structures.

After crossing under Interstate 25, a straight natural channel carries the flow the remaining 1,200 feet to the confluence with Fountain Creek. The full length of the drainage channel from Curr Reservoir to Fountain Creek is 2.6 miles at an average slope of 1.5%.

SECTION IV

ENVIRONMENTAL RESOURCES AND DRAINAGE CONCERNS

An evaluation of the watershed was undertaken to inventory environmental and recreational resources and identify existing drainage concerns. Figure IV-1 depicts environmental resources and drainage concerns.

Recreational Resources

The Fishers Canyon Basin offers a number of recreational resources. The upper portion of the basin includes two eighteen hole golf courses. These are the Broadmoor South Golf Course and the Country Club of Colorado. Both golf courses contain small areas of wetlands which are not threatened by development. The Broadmoor Ski Area is also in the upper reaches of the Basin.

The middle portion of the Basin contains two city parks. These are the Broadmoor Valley Park and Cheyenne Meadows Park. In addition, Stratmoor Hills Park is located within El Paso County in a residential area north of B Street. A trail system along the west side of Fountain Creek is planned to connect to areas north and south of the basin.

Open Water

Within the basin there is one large open body of water, known as Curr Reservoir. Curr Reservoir is formed by a State Engineer controlled dam and is located upstream of Highway 115 on the Country Club of Colorado Golf Course. The reservoir is owned by the Country Club of Colorado. The reservoir provides desirable habitat for fish and water fowl.

Herbaceous Wetlands

The term herbaceous wetlands applies to areas where the dominant vegetation includes herbaceous plants such as gramnoides, forbs, ferns, fern allies, herbaceous vines, cattails, and wetland grasses. An area of herbaceous wetlands has been designated in a low area upstream of Catalina Drive in the Stratmoor Hills subdivision. Herbaceous wetlands are also found throughout the basin in areas associated with open water, riparian forest and upland forest.

Shrub Wetlands

Shrub wetlands include areas that are dominated by willows and other bushy shrubs along flowing streams or open water. Herbaceous plants may be found in shrub wetlands as well. Two areas of shrub wetlands are depicted on Figure IV-1. One area is in Stratmoor Hills adjoining the herbaceous wetland. Above Curr Reservoir in the City of Colorado Springs is an area of shrub wetlands that is a part of the adjoining Broadmoor Valley Park. A trail along the wetland area provides public access to the area.

Riparian Forest

Areas designated as riparian forest include cottonwoods, large willow trees, and occasional conifers as the dominant vegetation along flowing streams or open water. Shrubs and herbaceous plants may also be found as understory vegetation. One large area of riparian forest along Fountain Creek is shown in Figure IV-1. The dominant vegetation in the Fountain Creek floodplain is a canopy of cottonwood and large willow trees. Lower strata contain hydrophytic vegetation including wetland grasses, herbaceous wetlands, and shrub wetlands. The flood plain area provides natural, diverse vegetation and desirable habitat for wildlife.

Upland Forest

The term upland forest refers to upland slopes where conifers and deciduous trees are the dominant vegetation. The upper drainage areas at the western end of the Fishers Canyon Basin are prime upland forest areas. These steep slopes are characterized by a Ponderosa Pine overstory, a Scrub Oak middlestory, and grasses as the understory. These areas provide habitat for wildlife. There are a few pockets of wetlands within these areas along drainageways.

Environmental Review of Major Drainageways

The current condition or status of various reaches of major drainageways in the Fishers Canyon Basin has been reviewed and indicated on Figure IV-1. The following designations have been used.

Grass-lined Channel. A grass lined channel is a constructed channel which is typically straight and has 2:1 to 4:1 grass side slopes. Rock or concrete low flow channels may be present. The Fishers Canyon Drainageway has been constructed as a grass-lined channel in the middle portion of the basin between Highway 115 and a point 700 feet upstream of Loomis Avenue. The grasses are generally left unmowed.

Concrete-lined Channel. Concrete-lined channels are constructed channels which are typically straight and have steep 1:1 to 2:1 side slopes. The Fishers Canyon Drainageway contains sections of concrete lined channel upstream of Loomis Avenue and upstream of Highway 115.

Eroding Channel. Eroding channels are earth or grassed drainageways, which were constructed or natural and are currently experiencing bed or bank erosion. Occasional pockets of wetlands may be found along eroding channels, but the dominate characteristic is the presence of steep earth side slopes created by channel erosion. In some areas, utilities crossing the channels are exposed. The condition of the Fishers Canyon Drainageway between B Street and Interstate 25 is that of an eroding channel. Adjacent to the eroding active channel in this area are zones of desirable riparian vegetation.

Natural Channel. Natural channels are vegetated natural drainageways currently experiencing no significant erosion and containing occasional pockets of wetland vegetation. The natural channels shown on Figure IV-1 are in the western slopes of the basin in currently undeveloped areas near the Broadmoor South Golf Course. Natural channels provide important habitat for wildlife.

Existing Drainage Concerns

Besides offering environmental and recreational resources, the Fishers Canyon Basin is beset by a number of drainage concerns which diminish public welfare and environmental value. The drainage concerns, which are also shown on Figure IV-1, are summarized as follows:

Insufficient Initial Drainage System. Two large residential subdivisions, Stratmoor Hills (north of B Street) and Stratmoor Valley (east of Interstate 25) have an insufficient initial drainage system. When these subdivision were developed in the 1950's and 1960's, few or no systems of street inlets, storm sewers and drainageways were constructed to capture and convey stormwater

runoff. As a result, ponding of water in streets and basement and yard flooding can occur even during relatively small, frequent rainfall events. Special drainage concerns exist in each subdivision. In Stratmoor Hills, the presence of Clover Ditch, an abandoned irrigation canal, exacerbates drainage problems. The ditch intercepts runoff from a large upstream area and, since it has insufficient capacity to convey drainage out of the area, the ditch spills the ponded water toward downstream properties. In Stratmoor Valley, north of Highway 83, a large sump area collects runoff from a series of seven streets aligned in a north-south direction. However, no east-west street was planned at the low area to convey accumulated runoff to Fountain Creek; therefore, stormwater ponds in streets and flows between houses when the capacity of the small existing storm sewer system is exceeded.

Channel Bed and Bank Erosion. A problem that is detracting from the potential environmental value of the Fishers Canyon Drainageway is channel bed and bank erosion. Channel degradation is a consequence of urbanization, which increases the quantity and frequency of runoff. Channel degradation causes bank destabilization as a result of loss of support from the eroding bed, leading to bank sloughing into the channel and the eroded bank material being transported downstream. Because the bed and banks of the drainageway consist of relatively small particles (i.e., mostly sand and silt sizes) no significant armoring is expected to occur and there would be nothing to prevent the slope of the channel bed from becoming progressively flatter. Without improvements to stabilize the drainageway and its steep tributary to the south, the bed and banks would be expected to continue to erode, disturbing the natural character of the stream.

Lack of Defined Drainage Outfall. A portion of Stratmoor Valley south of Highway 83 and a sub-basin area south of the Fishers Canyon Drainageway and west of Loomis Avenue (directly north of Fort Carson) lack any kind of defined drainage outfall, such as a storm sewer or open channel. A "two direction" storm sewer outfall is planned for the latter area when developement occurs. Historic 100-year flows would be conveyed through Fort Carson after a 60 inch diameter culvert is installed under Highway 83. Excess 100-year runoff would be conveyed to the north to the Fishers Canyon Drainageway.

Insufficient 100-Year Culvert and Channel Capacity. The reach of the Fishers Canyon Drainageway from Interstate 25 to Fountain Creek, including two culvert crossings, does not have adequate capacity to convey 100-year future development flows. As a result, some overtopping of Interstate 25 and structure flooding in Stratmoor Valley would be expected in a future 100-year event.

Structures in 100-Year Flood Plain. Much of Stratmoor Valley north of Highway 83 is located in the Fountain Creek 100-year flood plain. Estimated flood plain depths would be as much as ten feet. In addition, the lower floor of a commercial structure on the west side of Chamberlin Street north of the Fishers Canyon Drainageway would be expected to be inundated during a 100-year flood event.

SECTION V

HYDROLOGIC ANALYSIS

Methodology

Storm runoff hydrographs for the Fishers Canyon Basin were generated using the Soil Conservation Service Technical Release 20 Computer Program (TR-20). Use of the TR-20 model is in compliance with the El Paso County and City of Colorado Springs Drainage Criteria Manual (Criteria). Several sub-basins which did not require the generation of hydrographs for design purposes, and which were under 90 acres in area, were modelled using the Rational Method.

Hydrographs were developed for existing and future development conditions, with an initial storm recurrence interval of 10 years and a major storm recurrence interval of 100-years. Storms of both 2-hour and 24-hour rainfall duration were modelled, in accordance with the Criteria.

Previous Studies

The Fishers Canyon Basin was the subject of previous hydrologic analyses. Portions of the Fishers Canyon Basin were studied by Drexel, Barrell and Company for the Gates Land Company. The summary reports were entitled "Final Drainage Report for Portions of Broadmoor Bluffs and Cheyenne Meadows South at Cheyenne Mountain Ranch " (Cheyenne Mountain Ranch Report) and "FEMA Map Revision for Spring Run, Cheyenne Meadows Drainage Channel (Cheyenne Meadows Report). The Colorado Department of Highways recently performed a hydrologic analysis of the Fishers Canyon Basin to size a culvert under Interstate 25. More recently, Resource Consultants has investigated Fishers Canyon basin hydrology under contract to the Federal Emergency Management Agency (FEMA Report).

Basin information from the previous studies was checked for reasonableness and, where appropriate, was used in the current hydrologic analysis. Using existing information avoided unnecessary differences in basin modelling and facilitated the comparison of model results.

Sub-Basin Delineation

The Fishers Canyon Basin includes twenty-one sub-basins. Sub-basins and flow paths are indicated in Figure V-1. The sub-basins west of the City/County boundary were modelled as shown in the FEMA Report and the Cheyenne Mountain Ranch Report. The basin designation system used in the FEMA Report was utilized, and extended to include those sub-basins located east of the City/County boundary and south of Academy Boulevard.

Portions of the drainage basin within the City, which is primarily the Gates Land Company annexation, were not included in the detailed study area, as that area is not a part of the drainage fee system and are not reimbursed for drainage project construction. No evaluation was made of the adequacy of hydraulic structures within the City.

USGS quadrangle maps, in combination with basin maps from the Cheyenne Mountain Center Report, were used to verify the sub-basin boundaries of the FEMA Report. Additional sub-basins were delineated within El Paso County based on one-inch equals 200 feet, 2-foot contour interval mapping dated February 9, 1990.

Sub-basins 1 through 4D, 6A through 6D, and SH2 were modelled using TR-20. Runoff from sub-basins 5A through 5D, 6E, and 7A through 7C was calculated using the Rational Method.

Curr Reservoir, a large existing detention facility in the Fishers Canyon basin, was included in the TR-20 model. Stage/storage/discharge information was referenced from the FEMA report and verified using record drawings for Curr Reservoir. The future basin condition model included a diversion of historic flow rates from sub-basin 3A into Fort Carson, in accordance with the Cheyenne Mountain Ranch Report. This diversion is part of a future development plan by the Gates Land Company as approved by the City and Ft. Carson, and is not a part of this drainage basin master plan.

Land Use

Existing land use was determined using aerial photography of the basin dated November 10, 1989. The basin is currently about two thirds developed. At the time of this study approximately twenty percent of the total basin area, more or less, could expect to be developed in the immediate future. Future land use was estimated based on City and County zoning maps and land use planning information. Future land use information is shown in Figure V-2.

Soils Information

Soils types were identified using the SCS "Soil Survey of El Paso County Area, Colorado", dated 1981. Soils for the basin are categorized as loamy, but with significant percentages of clay in some areas. Substantial rock outcrops exist at the highest elevations up on the mountain side. In general, the steep upper sections of the basin are type "C" soils. The remainder of the basin falls in either the type B or type C category of soils. Soils information is shown in Figure V-2.

SCS Curve Numbers

SCS curve numbers representative of sub-basin land use and soils types were interpolated from Table 5-5 (24-hour storm) and Table 5-7 (2-hour storm) of the City/County Criteria. Curve number calculations and other TR-20 input data are shown in the technical appendix.

TABLE 5-5
 RUNOFF CURVE NUMBERS
 FOR HYDROLOGIC SOIL-COVER COMPLEXES
 URBAN AND SUBURBAN CONDITIONS¹
 (For Antecedent Moisture Condition II)
 (From: U.S. Department of Agriculture,
 Soil Conservation Service, 1977)

NOTE: THIS TABLE TO BE USED FOR 24-HOUR STORM ONLY.

<u>Land Use</u>		<u>Hydrologic Soil Group</u>			
		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
Open spaces, lawns, parks, golf courses, cemeteries, etc.					
Good condition: Grass cover on 75% or more of the area		39*	61	74	80
Fair condition: Grass cover on 50% to 75% of the area		49*	69	79	84
Commercial and business areas (85% impervious)		89*	92	94	95
Industrial districts (72% impervious)		81*	88	91	93
Residential: ²					
<u>Acres per Dwelling Unit</u>	<u>Average % impervious³</u>				
1/8 acre or less	65	77*	85	90	92
1/4 acre	38	61*	75	83	87
1/3 acre	30	57*	72	81	86
1/2 acre	25	54*	70	80	85
1 acre	20	51*	68	79	84
Paved parking lots, roofs, driveways, etc.		98	98	98	98
Streets and roads:					
paved with curbs and storm sewers		98	98	98	98
gravel		76*	85	89	91
dirt		72*	82	87	89

¹ For a more detailed description of agricultural land use curve numbers, refer to in the National Engineering Handbook (U.S. Dept. of Agriculture, Soil Conservation Service, 1972).

² Curve numbers are computed assuming the runoff from the house and driveway is directed towards the street with a minimum of roof water directed to lawns where additional infiltration could occur.

³ The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers.

* Not to be used wherever overlot grading or filling is to occur.

TABLE 5-7
 RUNOFF CURVE NUMBERS
 FOR HYDROLOGIC SOIL-COVER COMPLEXES
 URBAN AND SUBURBAN CONDITIONS¹
 (For Antecedent Moisture Condition III)
 (From: U.S. Department of Agriculture,
 Soil Conservation Service, 1977)

NOTE: THIS TABLE TO BE USED FOR 24-HOUR STORM ONLY.

<u>Land Use</u>	<u>Hydrologic Soil Group</u>			
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
Open spaces, lawns, parks, golf courses, cemeteries, etc.				
Good condition: Grass cover on 75% or more of the area	59*	78	88	91
Fair condition: Grass cover on 50% to 75% of the area	69*	84	91	93
Commercial and business areas (85% impervious)	96*	97	98	98
Industrial districts (72% impervious)	92*	95	97	98
Residential: ²				
<u>Acres per Dwelling Unit</u>	<u>Average % impervious³</u>			
1/8 acre or less	65	89*	94	96
1/4 acre	38	78*	88	93
1/3 acre	30	75*	86	92
1/2 acre	25	73*	85	91
1 acre	20	70*	84	91
Paved parking lots, roofs, driveways, etc.	99	99	99	99
Streets and roads:				
paved with curbs and storm sewers	99	99	99	99
gravel	89*	94	96	97
dirt	86*	92	95	96

¹ For a more detailed description of agricultural land use curve numbers, refer to in the National Engineering Handbook (U.S. Dept. of Agriculture, Soil Conservation Service, 1972).

² Curve numbers are computed assuming the runoff from the house and driveway is directed towards the street with a minimum of roof water directed to lawns where additional infiltration could occur.

³ The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers.

* Not to be used wherever overlot grading or filling is to occur.

Rainfall

Ten-year and 100-year recurrence interval hyetographs were developed for 2-hour and 24-hour storm durations. Figures 5-4a to 5-4e of the Criteria were used to derive the following rainfall depths:

	2-Hour		24-Hour	
	<u>10-year</u>	<u>100-year</u>	<u>10-year</u>	<u>100-year</u>
Rainfall Depth, inches	2.06	3.05	3.20	4.50

Estimates of Peak Discharge

Table V-1 provides a comparison between 100-year existing condition flow rates estimated in the FEMA Report and existing and future development condition flow rates estimated in the current study. The flow rates in Table 2 are generated from the 2-hour storm, which in all cases creates higher peaks than the 24-hour storm. Peak flow rates are indicated at Design Points shown on Figure V-1.

TABLE V-1
FISHERS CANYON BASIN 100-YEAR PEAK FLOW COMPARISON
(all flows in cfs)

<u>Design Point</u>	<u>FEMA Report (Existing Conditions)</u>	<u>Current Study (Existing Conditions)</u>	<u>Current Study (Future Conditions)</u>
6	1,640	1,640	1,640
7	2,490	2,690	2,590
8	2,870	3,000	3,020
9	3,090	3,090	3,170

Design Point 7 represents the Fishers Canyon drainageway at the City/County boundary. The peak flow estimated at Design Point 7 in the current study is slightly greater than the flow estimated in the FEMA Report. The difference in peak flow is attributed to the inclusion of Sub-basin 3A in the current study, but not in the FEMA Report. The future condition flow rate is lower than the

existing condition flow at Design Point 7 due to the planned diversion of "historic" flows from Sub-basin 3A into Fort Carson, in accordance with the Cheyenne Mountain Ranch Report for the Gates Land Company. At present, the culvert under Highway 83, which is necessary to divert historic flows into Fort Carson, has not been constructed. Therefore the existing condition case does not reflect the diversion. Design Point 9 represents the Fishers Canyon drainageway at Interstate 25. The FEMA Report and the current study correlate well at Design Point 9, with each analysis predicting a 100-year peak flow of 3090 cfs for existing development conditions.

Design peak discharges for storm sewer systems are shown on Figure VIII-1 through VIII-4. These discharges have been calculated at each inlet using the Rational method.

SECTION VI

HYDRAULIC ANALYSIS

Evaluation of Existing Drainage Facilities

The locations, sizes, and capacities of culverts, storm sewers and curb and gutter sections in the basin were identified in order to evaluate the adequacy of existing drainage facilities. This evaluation was based on a field reconnaissance, examination of topographic mapping, review of developer drainage reports, and hydraulic calculations.

The evaluation of existing drainage facilities showed that, in general, few areas of the basin are adequately served by facilities designed to convey storm runoff. The evaluation confirmed the drainage concerns identified in Section IV of this report, shown on Figure VI-1. These concerns include insufficient initial drainage systems (street conveyance, inlets and storm sewers), channel bed and bank erosion, lack of defined drainage outfalls, insufficient 100-year culvert and channel capacity, and structures in the 100-year flood plain.

No detailed evaluations were made of drainage structures in the City portion of the basin. As well, no significant deficiencies in hydraulic capacity were noted for those facilities, as part of the hydrologic analysis.

Flood Plain Delineation

The 100-year flood plain for the Fishers Canyon Drainageway has been delineated between B Street and Fountain Creek. This reach is the downstream channel segment within El Paso County. The flood plain was delineated for existing

development condition flow rates by Resource Consultants as part of a Flood Insurance Study for El Paso County and the City of Colorado Springs. The flood plain was delineated using the U.S. Army Corps of Engineers HEC-2 Water Surface Profile Program. Channel cross section and length information was obtained from the same aerial mapping as utilized in this project. The flood plain based on the slightly increased flow rates representative of future development conditions does not differ significantly from the existing condition flood plain. The flood plain is shown in plan view on Figure VIII-2 and in profile on Figure VIII-5. Flow within the 100-year flood plain on the Fishers Canyon Drainageway would be characterized by high velocities (up to 15 feet per second), turbulence and instability (critical flow is indicated in the HEC-2 model at a number of cross sections). Without improvements to stabilize the channel, significant bed and bank erosion and loss of existing vegetation would be expected during large runoff events in the Fishers Canyon Drainageway.

SECTION VII

DESCRIPTION OF ALTERNATIVE PLANS

Initial Alternative Formulation

The alternative formulation process started with brainstorming possible solutions to the drainage concerns existing in the basin. The objective of this phase was to approach the existing problems in a broad, complete manner to ensure that all types of possible solutions were considered. Ideas considered for Stratmoor Hills and Stratmoor Valley included various configurations of detention, development of open channel conveyances, acquisition of residential structures, regrading streets, and installation of various sizes of storm sewer systems. Concepts examined for the Fishers Canyon Drainageway and Fishers Canyon Tributary included conveying flows in a closed conduit, constructing concrete lined, riprap lined, or grass-lined channel sections, adding a limited number or a large number of drop structures, constructing small check structures and expecting some erosion when their capacity is exceeded, and installing rock low flow channels of various sizes. The do-nothing alternative was also considered throughout the basin.

After the initial formulation of alternatives, the least favorable concepts were eliminated based on negative impressions regarding cost, adverse environmental impact, effectiveness and maintenance requirements. The remaining alternative concepts were refined into two general plans.

Description of Alternative 1 and Alternative 2

Stratmoor Hills: Alternative 1 - Storm Sewer Improvements with No Detention.

The residential area north of B Street has experienced frequent nuisance flooding during storm events. The area is developed on a hillside, with runoff typically being conveyed down slopes between houses instead of remaining in streets and gutters. The presence of Clover Ditch, no longer in use for irrigation purposes, exacerbates flooding problems by collecting stormwater runoff and releasing it over low banks toward houses below. The ditch has too flat of a longitudinal slope to be useful in conveying runoff out of the area.

A system of storm sewer improvements is proposed to collect runoff in Stratmoor Hills and minimize flooding problems. The plan is shown in Figure VII-1. The plan generally consists of storm sewers sized for a 10-year return period upstream of Clover Ditch and for a 100-year return period downstream of the ditch. This sizing strategy satisfies design criteria promulgated in the City of Colorado Springs/El Paso County Drainage Criteria Manual. The ditch itself is proposed to be graded toward inlets near each road crossing which would be designed to drain the ditch and eliminate overtopping in the 100-year storm. Additional information regarding Alternative 1, including quantification of areas of riparian vegetation potentially impacted, is shown in Table VII-1.

Stratmoor Hills: Alternative 2 - Storm Sewer Improvements with Detention.

Alternative 2 is similar to Alternative 1, but incorporates a detention facility upstream in the basin in order to reduce flows and required pipe sizes. The plan is depicted in Figure VII-1. Additional information is shown in Table VII-1.

TABLE VII-1
STRATMOOR HILLS ALTERNATIVE COMPARISON

<u>Consideration</u>	<u>Alternative 1</u> <u>Storm Sewer Improvements</u> <u>With No Detention</u>	<u>Alternative 2</u> <u>Storm Sewer Improvements</u> <u>With Detention</u>
1. Probable Cost (including construction, R.O.W., engineering)	\$2.15 Million	\$ 2.22 Million
2. Existing Wetland/Riparian Vegetation	1 acre* of herbaceous/shrub wetlands on side tributary. 5 acres (2,800 l.f.) of grass overbank with shrubs and trees along Fisher's Canyon.	1 acre* of herbaceous/shrub wetlands on side tributary. 5 acres (2,800 l.f.) of grass overbank with shrubs and trees along Fisher's Canyon
3. Wetland/Riparian Impacts	Preserves wetlands on side tributary at location of detention pond. Minor loss of grass/shrub/tree riparian overbank at isolated outfalls on Fisher's Canyon.	Loss of wetlands on side tributary at location of detention pond. Minor loss of grass/shrub/tree riparian overbank at isolated outfalls on Fisher's Canyon.
4. Compensation Mitigation Opportunities	Opportunity for on-site replacement of grass/shrub overbank.	Opportunity for on-site wetland replacement at location of detention pond. Opportunity for on-site grass/shrub overbank.
5. Maintenance Requirements	Periodic maintenance is required to keep Clover Ditch inlets clear.	Periodic maintenance is required to keep Clover Ditch inlets clear. Periodic maintenance of detention pond is required.
6. Right-of-Way Requirements	Easement is required for Crestridge Avenue outfall to Fishers Canyon drainageway.	Easement is required for Crestridge Avenue outfall to Fishers Canyon drainageway. R.O.W. is required for detention pond.
7. Constructability	Three pipe crossings of railroad are required. Outfalls to Fishers Canyon drainageway require adequate scour protection.	Three pipe crossings of railroad are required. Outfall to Fishers Canyon drainageway require adequate scour protection.
	*all acreages of vegetation are estimates	

Stratmoor Valley: Alternative 1 - Storm Sewer Improvements with No Detention.

Like Stratmoor Hills, Stratmoor Valley was developed without an adequate initial drainage system. A plan of storm sewer improvements is proposed and is shown in Figure VII-1. Proposed storm sewers are sized to convey 10-year flows from the currently developed area and 100-year flows from upstream areas that may develop in the future. Table VII-2 shows additional information regarding Alternative 1.

Stratmoor Valley: Alternative 2 - Storm Sewer Improvements with Detention.

Alternative 2 is similar to Alternative 1, but proposes detention ponds to limit runoff from future upstream developing areas to historic levels. The plan is depicted in Figure VII-1. Additional information is shown in Table VII-2.

Fishers Canyon Drainageway and Tributary: Alternative 1 - Vegetated Channel with a Rock Low Flow Channel.

The Fishers Canyon drainageway and its tributaries between B Street and Interstate 25 are currently experiencing significant bed and bank erosion. The erosion discourages the establishment of wetland vegetation along the channel and is contributing to sediment deposition in the culvert under Interstate 25 and in the downstream channel.

Alternative 1 consists of a system of stabilization improvements including a rock low flow channel, a number of drop structures, selected riprap bank protection, and widening of constricted areas. The plan is shown in Figure VII-1. Typical cross sections and details are shown in Figure VII-2. The improvements would encourage the formation of wetland vegetation along the channel. Additional information regarding Alternative 1 improvements is shown in Table VII-3.

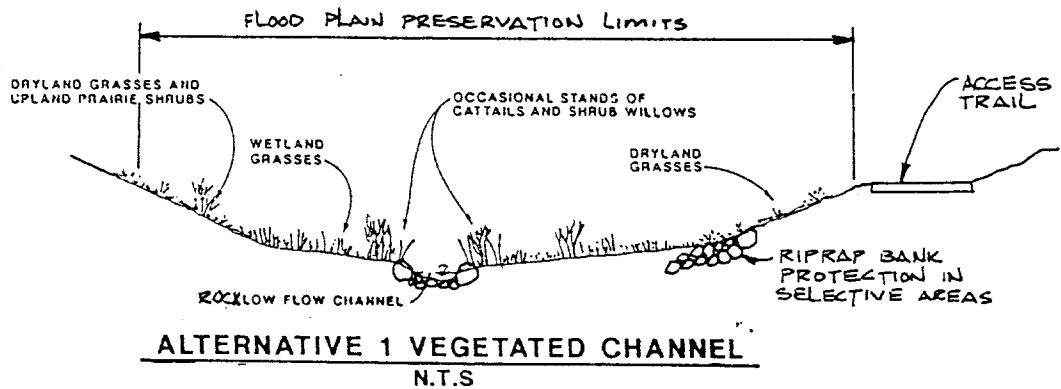
TABLE VII-2
STRATMOOR VALLEY ALTERNATIVE COMPARISON

<u>Consideration</u>	<u>Alternative 1 Storm Sewer Improvements With No Detention</u>	<u>Alternative 2 Storm Sewer Improvements With Detention</u>
1. Probable Cost (including construction, R.O.W., engineering)	\$1.35 Million	\$1.42 Million
2. Existing Wetland/Riparian Vegetation	110 acres (8,000 l.f.) of riparian woodland along Fountain Creek.	110 acres (8,000 l.f.) of riparian woodland along Fountain Creek.
3. Wetland/Riparian Impacts	Disturbance/loss of riparian woodland at isolated locations for pipeline and outfall structure within riparian area.	Disturbance/loss of riparian woodland at isolated locations for pipeline and outfall structure within riparian area.
4. Compensation Mitigation Opportunities	On-site replacement of riparian woodland.	On-site replacement of riparian woodland.
5. Maintenance Requirements	Periodic clearing of inlets may be required.	Periodic clearing of inlet may be required. Periodic maintenance of detention pond is required.
6. Right-of-Way Requirements	Easement is required for Kensington Drive outfall.	Easement is required for Kensington Drive outfall. R.O.W. is required for detention pond.
7. Constructability	Outfalls to Fountain Creek require adequate scour protection.	Outfalls to Fountain Creek require adequate scour protection

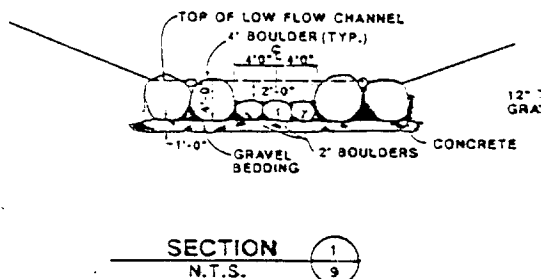
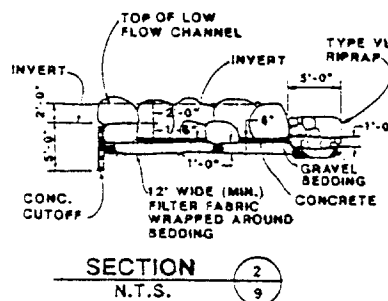
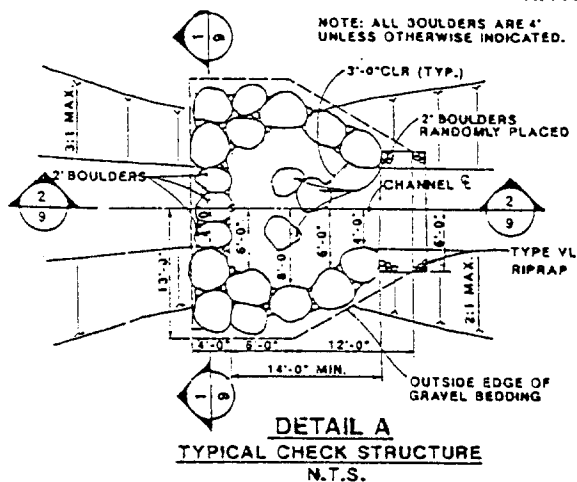
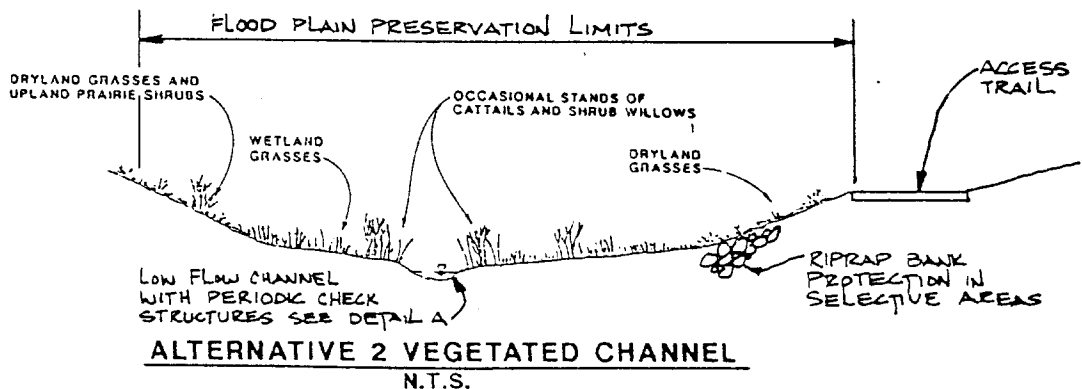
TABLE VII-3
FISHERS CANYON DRAINAGEWAY
ALTERNATIVE COMPARISON

<u>Consideration</u>	<u>Alternative 1 Vegetated Channel with Rock Low Flow Channel</u>	<u>Alternative 2 Vegetated Channel with Periodic Check Structures</u>
1. Probable Cost (including construction, R.O.W., engineering)	\$ 2.74 Million	\$2.64 Million
2. Existing Wetland/Riparian Vegetation	5 acres (2,800 l.f.) of grass overbank with shrubs and trees along portions of Fisher's Canyon.	5 acres (2,800 l.f.) of grass overbank with shrubs and trees along portions of Fisher's Canyon.
3. Wetland/Riparian Impacts	Proposed improvements stabilize eroding channel and promote growth of wetland vegetation. Loss of minimal grass/shrub/tree riparian overbank.	Proposed improvements stabilize eroding channel and promote growth of wetland vegetation. Loss of significant grass/shrub/tree riparian overbank.
4. Compensation Mitigation Opportunities	On-site replacement of riparian grass and shrubs within grass-lined channel.	On-site replacement of riparian grass and shrubs within grass-lined channel.
5. Maintenance Requirements	Periodic channel maintenance is required	"Soft" low flow channel requires greater maintenance effort than rock low flow channel
6. Right-of-Way Requirements	Management of regulatory flood plain is recommended	Management of regulatory flood plain is recommended
7. Constructability	Control of water is required during construction	Control of water is required during construction. May require regrading of eroded low flow channel banks.

NOTE: PERIODIC CHANNEL DROP STRUCTURES MAY BE REQUIRED.



NOTE: PERIODIC CHANNEL DROP STRUCTURES MAY BE REQUIRED.



Fishers Canyon Drainageway and Tributary: Alternative 2 - Vegetated Channel with Periodic Check Structures. This concept is similar to Alternative 1 but proposes the use of small periodic check structures instead of a continuous rock low flow channel. Between check structures the low flow channel would be unlined and would be allowed to erode and flatten over time to a stable equilibrium slope. Additional information comparing Alternative 2 to Alternative 1 is shown in Table VII-3.

Public Comments Regarding Alternative Plans

Review comments regarding the Alternative 1 and Alternative 2 plans were solicited from various public agencies. Written comments were received from the EPA, Colorado Division of Wildlife, and Colorado Department of Highways. In addition, a public meeting was held near the study area on September 18, 1990 to explain the alternative plans to interested citizens and to seek feedback. In general, support was expressed for constructing a system of drainage improvements in the basin to address existing concerns. Specific comments regarding Alternative 1 and Alternative 2 were varied, although the Alternative 1 plans were generally favored over the Alternative 2 plans. A summary of comments made at the public meeting, as well as copies of written comments received from public agencies, appear in Appendix A.

SECTION VIII
SUMMARY OF SELECTED PLAN

Plan Refinements

After a review of the public comments received concerning the alternative plans, as well as an evaluation based on County objectives such as constructibility and long term maintenance, El Paso County staff provided direction regarding the selected alternative to undergo preliminary design. This direction is summarized below:

Stratmoor Hills and Stratmoor Valley. Alternative 1, storm sewer improvements with no detention was selected with the one modification; namely, that downsizing or elimination of some of the less critical storm sewer laterals be considered in order to optimize the system and reduce the total cost of the improvements relative to benefits received.

Fishers Canyon Drainageway and Tributaries. Alternative 1, vegetated channel with a rock low flow channel was selected with several modifications. First, an attempt was to be made to lay out the rock lining in the incised, eroding channel in such a way that disturbance to the adjacent natural riparian vegetation would be minimized. Second, consideration was to be given to a detention facility upstream of Interstate 25 to reduce the anticipated 100-year discharge to the capacity of the existing box culvert under the highway.

The selected plan was to address a number of concerns expressed by public agencies associated with the Letter of Permission (LOP) process, including the Environmental Protection Agency (EPA), and the Colorado Division of Wildlife (CDOW). These concerns and the actions recommended in the selected plan to respond to the concerns are summarized below:

1. Stratmoor Hills and Stratmoor Valley

<u>LOP Agency Input</u>	<u>Action</u>
A. Storm sewer outfalls to Fishers Canyon Drainageway and Fountain Creek create potential for serious local scour and bank erosion problems.	Plan will identify measures to provide adequate scour protection at outfalls and to avoid or mitigate impacts to riparian habitats.
B. (From CDOW) Detention is recommended to reduce peak storm water discharges at outfalls to Fishers Canyon Drainageway and Fountain Creek.	In these specific applications, there would be no peak flow reduction from detention by the time the Stratmoor Hills storm sewer reaches the Fishers Canyon Drainageway and little reduction by the time the Stratmoor Valley system reaches Fountain Creek. Consequently, detention is not an effective way to reduce impacts to downstream receiving waters. For the detention alternative the cost advantages of smaller pipes immediately downstream of the detention ponds are outweighed by the costs of the ponds themselves. In addition, avoiding the construction of these small detention ponds avoids disturbance to the existing Stratmoor Hills wetland (avoidance is preferred to mitigation) and minimizes ongoing maintenance requirements. Energy dissipation structures are proposed at the storm sewer outfalls to protect downstream receiving waters.

2. Fishers Canyon Drainageway and Tributaries

<u>LOP Agency Input</u>	<u>Action</u>
A. Existing riparian vegetation along the drainageway should be protected.	The existing riparian vegetation is located on overbanks adjacent to an incised channel which is actively eroding and is generally devoid of vegetation. The selected alternative is designed to stabilize the incised channel through the construction of a rock lining and to avoid, as much as possible, disturbance to the adjacent riparian vegetation between B Street and Interstate 25. Because of the steep gradient of the existing drainageway (as high as 1.6 percent), maintaining an unlined bottom would require significant channel regrading between frequent check structures. The unlined approach would cause more disturbance to the riparian vegetation and be more costly to construct and maintain than the selected alternative.
B. Impacted areas of wetland and riparian vegetation should be quantified.	The summary report for the drainage basin planning study includes estimates of impacted areas of wetland and riparian vegetation (shown in Tables VII-2 through VII-3 for alternative concepts and in this section for the selected plan).

3. General

Both the EPA and CDOW have expressed concerns regarding the procedural aspects of the Letter of Permission process. These concerns are not specifically addressed by the Fishers Canyon Drainage Basin Planning Study; however, it is expected that future communications among the LOP agencies will lead toward the goal of an effective and efficient 404 process.

Preliminary Design

Preliminary design drawings of the selected drainage plan for the Fishers Canyon Basin are shown in Figures VIII-1 through VIII-4. The selected plan is depicted on aerial photography of the basin at a scale of 1-inch equals 200 feet superimposed with 2 foot contour interval topographic information. The

photography for the mapping was taken on February 9, 1990. A legend for the preliminary design depiction is shown on Figure VIII-3. Sheet indexing is indicated on Figure VII-2. Profiles of the selected plan improvements are shown on Figures VIII-5 and VIII-6.

Storm sewer profiles shown on Figure VIII-6 in Stratmoor Hills, Westmark, and Stratmoor Valley are preliminary in nature. Refinements to the profiles will be required during the final design phase to avoid conflicts with the sanitary sewer system and other major utilities. The existing sanitary sewer system is shown in plan view in the vicinity of proposed storm sewer improvements. This information was transferred from mapping obtained from Stratmoor Hills Water and Sanitation District. Sanitary sewer crossings are indicated in profile on Figure VIII-6; however, the depths of the sanitary sewers are unknown at this time.

At the encouragement of the County, proposed storm sewer improvements in Stratmoor Hills and Stratmoor Valley reflect some downsizing of laterals from the 10-year level of protection shown in Alternative 1. This downsizing reflects a shift in strategy from meeting standard drainage design criteria for new developments to installing the minimum system necessary to eliminate, as much as possible, the inundation of houses during the 100-year event. The approximate design recurrence interval of these downsized laterals, which would function in large runoff events in combination with a certain amount of sheet flow between houses, is 2 years. The maximum quantity of sheet flow assumed to pass between houses during a 100-year event is 1.0 cubic feet per second per foot of width. Flows in excess of this amount would be designed to be conveyed in the proposed storm sewer.

Typical channel sections of Fishers Canyon Drainageway and Fishers Canyon Tributary are shown on Figure VIII-5. The selected plan for Fishers Canyon Drainageway is designed to stabilize the bed and banks of the eroding active channel in a manner which preserves, as much as possible, the adjacent riparian vegetation. Six drop structures are proposed to reduce the steep existing stream gradient and decrease flood velocities. A side channel detention pond is proposed upstream of Interstate 25 to reduce the estimated future development condition 100-year flow from 3170 cfs to 2900 cfs, which is the design capacity of the culverts under Interstate 25 and Maxwell Street. A drop structure and channel enlargement downstream of Maxwell Street, in conjunction with fill placed south of the channel between Interstate 25 and Maxwell Street, would enable the Fishers Canyon 100-year flood plain to be confined to the channel instead of spilling south to inundate houses in Stratmoor Valley.

The selected plan for Fishers Canyon Tributary would fill and stabilize the steep, deeply incised channel. A rock low flow channel and three drop structures are proposed.

Environmental Impact Mitigation Guidelines

The Fishers Canyon Drainageway, although in a deteriorating condition, has the potential to be a valued local resource providing natural beauty and a diversity of vegetation and wildlife habitat. The proposed improvements, while necessary to address serious erosion problems and flood hazards, must not in themselves alter the stream from a natural to an "engineered" character. The proposed improvements are intended to be designed to blend in with the natural stream environment.

In developing the selected plan for Fishers Canyon Drainageway and Tributary, the following objectives were considered. The first priority was to minimize if not avoid disturbance to the existing riparian vegetation adjacent to the eroding active channel. Accordingly, the proposed improvements would leave much of the existing overbank vegetation intact. Preserving the existing vegetation maintains the stream's hydraulic roughness and resistance to erosion provided by vegetal root structures, and minimizes disturbance to existing wildlife habitat. Where avoidance was not possible, the next priority was to minimize disturbance to existing riparian vegetation. The selected plan minimizes disturbance to adjacent riparian vegetation by confining the width of rock stabilization improvements to approximately the same width as the active channel, which is eroding and generally devoid of vegetation. It is recommended that relatively narrow construction limits be specified during the final design of channel improvements to minimize disturbance to overbank vegetation. Zones where disturbance to vegetation is unavoidable are to be replanted with riparian species selected for their habitat value and suitability to local conditions.

Positive environmental impacts are planned as part of the proposed improvements. The crests of proposed drop structures could be extended above the existing channel invert to encourage the formation of new backwater wetland areas. The rock low flow channel would be designed to be pervious to allow lateral passage of water for support of adjacent vegetation. The improvements would stabilize the channel against bed and bank erosion which is currently hindering the establishment of channel vegetation.

Of the estimated five acres of riparian vegetation along Fishers Canyon Drainageway, made up primarily of dryland grasses, shrubs and trees, approximately 60 percent, or three acres, are to be left undisturbed. Approximately thirty percent, or 1.5 acres, are estimated to be disturbed during construction and subsequently replanted for no net loss of vegetation. Approximately ten percent of the dryland vegetation, or 0.5 acres, is estimated to be lost due to the installation of a gravel trail along the drainageway for maintenance and pedestrian access.

SECTION IX

DESIGN CONSIDERATIONS, IMPLEMENTATION, AND PROJECT COSTS

This section describes the criteria used in the preliminary design of the Fishers Canyon improvements with the intention that the same criteria be applied in final design. Addressed are issues of water quality enhancement, property acquisition, operations and maintenance, floodplain management, and plan implementation. Cost data for the selected plan are summarized and basin fees are calculated.

Water Quality Enhancement

In recent years, the concern over the quality of urban stormwater runoff has gained much attention. National recognition of the problem of non-point source pollutants from stormwater runoff was first identified in the 1964 U.S. Public Health Service's publication on the "Pollutional Effects of Stormwater and Overflows from Combined Sewer Systems". Congress, in recognizing this problem, authorized funds under the Federal Water Pollution Control Act of 1965 and following legislation for the research, development, and demonstration of techniques for controlling this source of pollution. The 1972 amendments to the Federal Water Pollution Control Act, referred to as the Clean Water Act, placed new and stronger emphasis on urban runoff as a source of pollution.

During the years 1978 through 1983, the Environmental Protection Agency (EPA) funded the Nationwide Urban Runoff Program (NURP) to gain a better understanding of the pollutant loads in urban stormwater. The NURP study indicated the following regarding runoff from residential, commercial, and light industrial areas.

1. Suspended solids loadings are an order of magnitude or more greater than effluent from secondary sewage treatment plants.
2. Chemical oxygen demand (COD) loadings are on average comparable in magnitude to effluent from secondary sewage treatment plants, and may in the short term have shock loading effects on receiving waters.
3. Fecal coliform counts are typically in the tens to hundreds of thousand per 100 ml of runoff during warm weather conditions.
4. Twenty-four priority pollutants, including lead, zinc, copper, chromium, arsenic, and various pesticides and hydrocarbons, were detected in at least ten percent of the NURP samples.

Although not directly evaluated in the NURP program, other studies have shown that additional sources of adverse water quality impacts include oil and grease, construction site erosion, industrial site runoff, illicit connections, and illegal dumping.

On October 31, 1990 the EPA published its final rule for National Pollutant Discharge Elimination System (NPDES) Permit Application Regulations for Storm Water Discharges. The impact of the rule is currently being assessed by states, local governments, and industries nationwide. The final rule will shape the programs used by local governments and industries to mitigate adverse impacts to receiving waters from stormwater runoff.

For the present, this drainage basin planning study recognizes the positive impacts on water quality of minimizing the disturbance to natural channel vegetation and stabilizing streams using drop structures, rock low flow channels, bank protection, and enhanced vegetation. The proposed improvements to the Fishers Canyon Drainageway focus on decreasing flow velocities and stabilizing the bed and banks so that the stream would not continue to be a source of sediment to downstream areas. These improvements are planned to go hand in hand

with effective construction erosion control and other basin management practices intended to minimize the sources of runoff pollution. It is recommended that the local governments work toward the adoption of effective source control management programs in the Fishers Canyon Basin, which is expected to undergo development in the future.

Floodplain Management

The term floodplain management, as it is commonly used today, refers to the implementation of non-structural solutions in dealing with flood hazards. Non-structural solutions include such items as:

1. The enactment of comprehensive floodplain management regulations to control and protect future floodplain development.
2. The purchase of flood insurance by property owners affected by flood hazards.
3. Floodproofing of existing structures and contents to eliminate or reduce the flood damage potential.
4. Development of a flood warning system and evacuation plans.

Floodplain regulations have become familiar to many communities since Congress passed the Flood Disaster Protection Act of 1973 (P.L. 93-234). The federal lending restrictions associated with the Act forced many communities to enroll in the National Flood Insurance Program and to begin enforcing, to some degree, floodplain management regulations. The Act also prohibited use of federal disaster assistance in non-participating communities, should a flood disaster occur. The basic intent of most floodplain regulations is to require that new construction be protected from the 100-year flood and that such construction not increase flood levels significantly.

The City of Colorado Springs and El Paso County are currently participating in the National Flood Insurance Program. Flood insurance is available to all property owners in and adjacent to identified floodplains on the Fishers Canyon Drainageway and Fountain Creek. An individual does not have to be located in a "floodplain" in order to purchase insurance. Many flood-related damages occur in areas which are not designated as special flood hazard areas by the federal government. The purchase of flood insurance will not reduce the flood hazard but will protect the property owner from personal financial disaster should a major flood loss occur. Property owners should be aware that standard casualty insurance policies do not cover flood losses and that flood insurance policies cover losses to the structure and contents separately.

Floodproofing can be classified in four major categories:

1. Temporary or permanent closures for openings in existing structures.
2. Raising existing structures.
3. Constructing landscaped levees or small floodwalls around structures.
4. Relocating or protecting contents of significant value.

Floodproofing measures need to be planned individually and will vary considerably from structure to structure, depending on the special circumstances involved.

This drainage basin planning study recommends that El Paso County and the City of Colorado Springs continue participating in the National Flood Insurance Program and continue enforcing floodplain regulations utilizing the most current floodplain information available. In addition, private property owners within designated flood hazard areas, or in other areas which have experienced past flood-related damage, should be encouraged to purchase flood insurance.

In several locations base flood elevations are proposed to be increased. According to Section 60.3 of the National Flood Insurance Program, increasing base flood elevations is acceptable provided a community first applies for conditional map revisions, fulfills the requirements for such revisions as established under the provisions of Section 65.12 and receives the approval of the Flood Program Administrator. This process would need to be followed in order to implement the recommended plan.

Right-of-Way

Where planned improvements fall within private property limits, property acquisition is required. Key property acquisitions for the selected plan include the following:

1. In Stratmoor Hills, the strip of land where Clover Ditch is located, owned by Stratmoor Hills Water and Sanitation District, would need to be acquired. An outfall easement would also need to be acquired for the Stratmoor Hills (east) storm sewer.
2. For the proposed improvements to the Fishers Canyon Drainageway, right-of-way or easements would need to be acquired from the following property owners from B Street eastward to Fountain Creek.

<u>Property Owner</u>	<u>Schedule No.</u>
A. Stratmoor Gardens	65054-03-018
B. Randle W. Case	65043-00-029
C. Patricia L. Erickson	65054-00-019
D. Apostolic Church of Jesus, Inc.	65043-00-035
E. Marigold Development	65043-00-001

F. Sandia Federal Savings & Loan 65043-00-042
65043-00-043
65044-00-007
65044-00-008
65044-00-009
65041-00-010

G. Stratmoor Valley 65041-00-006
65041-00-015

H. Stratmoor Valley Mobile 65041-00-040
Home Park Condos 65041-00-041
65041-00-042
65041-00-043

3. For the proposed storm sewer improvements to Stratmoor Valley south of Highway 83, an easement on right-of-way would need to be acquired from Randle W. Case for Schedule No. 65101-00-003.
4. For various locations along Fountain Creek easements would need to be acquired from El Paso County Parks Department for at least Schedule Nos. 65032-00-021 and 65033-00-039.

Operation and Maintenance

Routine maintenance of natural streams and improved drainageways is of key importance and consists of trash and debris cleanups, weed control, and revegetation efforts. One to two cleanup operations are recommended in the spring and summer months to keep channels clear of accumulation of trash and debris. Weed control and revegetation operations should be scheduled as required, based on visual inspection of the drainageways.

Restoration and rehabilitative work is also considered as normal operation and maintenance. Examples of restoration work include trashrack cleaning, rebuilding steep rundowns, tree thinning and cleaning, erosion repairs, and local channel

grading and shaping. Examples of rehabilitative work include rebuilding drop structures, placement of riprap, establishing maintenance access, and providing protection for box culverts, retaining walls or road crossings.

Implementation Priorities

In implementing the proposed drainage improvements, the following prioritized recommendations are made:

1. Construct the Stratmoor Hills (West) and (East) storm sewers up to and including the Clover Ditch improvements.
2. Construct the channel improvements on Fishers Canyon Drainageway between Interstate 25 and Fountain Creek to confine the 100-year flood plain to the channel.
3. Construct the upstream portions of the Stratmoor Hills (West) and (East) storm sewers.
4. Construct the channel improvements on Fishers Canyon Drainageway between B Street and Station 40+00.
5. Implement the following portions of the selected plan, if possible, as part of future development in the basin.
 - A. Stratmoor Valley (North) Storm Sewers
 - B. Westmark Storm Sewer
 - C. Fishers Canyon Drainageway from Interstate 25 to Station 40+00
 - D. Fishers Canyon Tributary
 - E. Stratmoor Valley (South) Storm Sewer

In general, it is recommended that the improvements take place in conjunction with planned development and that right-of-way be deeded and improvements constructed by the developer.

Project Costs

For the proposed improvements presented in this report, the costs for constructing the respective facilities have been estimated using current material prices and labor rates. No costs have been included for property acquisition as needed land is anticipated to be donated to the County at no cost. The unit costs used for preparing the opinions of probable cost are listed in Table IX-1. Costs for storm sewer systems are based on unit costs according to pipe diameter and include pipe, manholes, inlets, inlet laterals, energy dissipation structures, mobilization, and excavation and backfill. In areas where storm sewers are located within streets, additional unit costs by pipe diameter apply to pavement removal and replacement and traffic control. The probable costs of the proposed improvements were itemized in the categories of drainage improvement costs, street crossing costs, utility relocation costs, and property costs. A five percent contingency was added to probable construction costs and a ten percent factor was added to account for engineering design.

Table IX-2 through IX-4 summarize the probable costs of the selected plan.

TABLE IX-1

UNIT COSTS

	<u>Unit</u>	<u>Unit Cost</u>
<u>DRAINAGE IMPROVEMENT COSTS</u>		
Clearing	Ac	\$5,000.00
Excavation (includes hauling off-site)	CY	5.00
Embankment (includes on-site excavation)	CY	4.00
Riprap	CY	35.00
Boulders	CY	45.00
Grout for Boulders	CY	120.00
Gravel Filter	CY	25.00
Grouted Boulder Drop Structures	(See Fig. IX-1)	
Wetland/Riparian Revegetation	Ac	6,500.00
Native Grass Revegetation	Ac	2,500.00
10' Gravel Access Path	LF	10.00
<u>STORM SEWER PIPE, MANHOLE, LATERAL, INLET, & MOBILIZATION</u>		
18 Inch	LF	63.00
21 Inch	LF	75.00
24 Inch	LF	88.00
27 Inch	LF	100.00
30 Inch	LF	113.00
33 Inch	LF	119.00
36 Inch	LF	125.00
39 Inch	LF	138.00
42 Inch	LF	150.00
48 Inch	LF	175.00
54 Inch	LF	200.00
60 Inch	LF	225.00
<u>STORM SEWER ASPHALT REMOVAL AND REPLACEMENT, TRAFFIC CONTROL</u>		
18 Inch	LF	7.00
21 Inch	LF	8.00
24 Inch	LF	10.00
27 Inch	LF	11.00
30 Inch	LF	13.00
33 Inch	LF	14.00
36 Inch	LF	14.00
39 Inch	LF	15.00
42 Inch	LF	17.00
48 Inch	LF	20.00
54 Inch	LF	22.00
60 Inch	LF	25.00
<u>UTILITY RELOCATION COSTS</u>		
Assumed as ten percent of storm sewer construction costs		

COST DATA DERIVED FROM
"DROP STRUCTURES IN THE
DENVER METROPOLITAN AREA"
PREPARED FOR UDFCD, DEC., 1986.

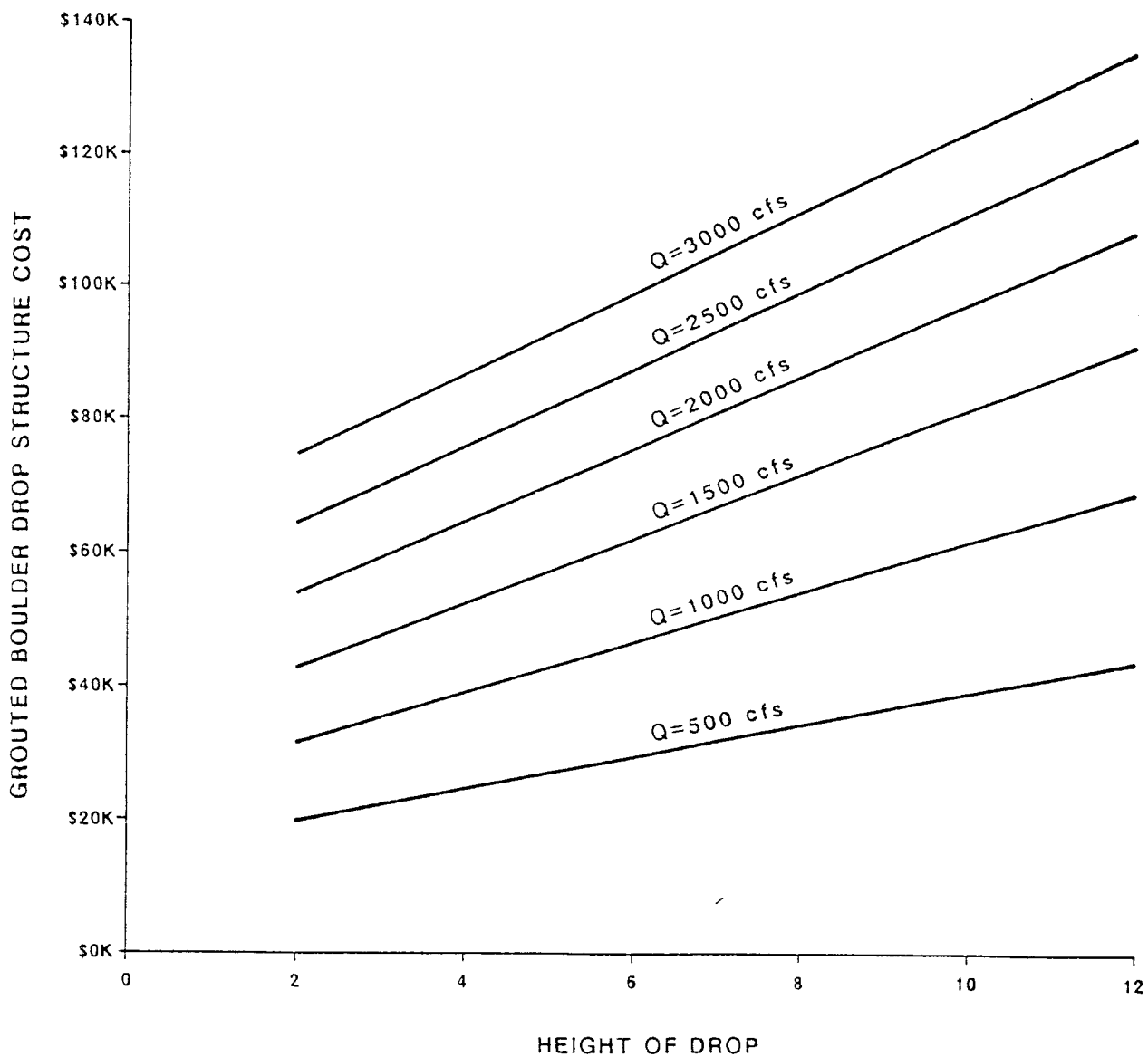


FIGURE IX-1
GROUTED BOULDER
DROP STRUCTURE COSTS

TABLE IX-2
OPINION OF PROBABLE COSTS
STRATMOOR HILLS AREA

STRATMOOR HILLS (WEST) STORM SEWER

Drainage Improvement Costs	\$ 754,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	<u>75,000.00</u>
Construction Cost	829,000.00
Contingencies (5% of Construction Cost)	41,500.00
Engineering (10% of Construction Cost and Contingencies)	87,045.00
Property Costs	<u>0.00</u>
TOTAL IMPROVEMENT COSTS	<u>\$ 957,495.00</u>

STRATMOOR HILLS (EAST) STORM SEWER

Drainage Improvement Costs	\$ 241,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	<u>24,000.00</u>
Construction Cost	265,000.00
Contingencies (5% of Construction Cost)	13,250.00
Engineering (10% of Construction Cost and Contingencies)	27,825.00
Property Costs*	<u>0.00</u>
TOTAL IMPROVEMENT COSTS	<u>\$ 306,075.00</u>

WESTMARK STORM SEWER

Drainage Improvement Costs	\$ 159,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	<u>16,000.00</u>
Construction Cost	175,000.00
Contingencies (5% of Construction Cost)	8,750.00
Engineering (10% of Construction Cost and Contingencies)	18,375.00
Property Costs	<u>0.00</u>
TOTAL IMPROVEMENT COSTS	<u>\$ 202,125.00</u>
TOTAL IMPROVEMENT COSTS, STRATMOOR HILLS AREA	<u>\$ 1,465,695.00</u>

*An easement or right-of-way is required for this improvement. Land dedication is anticipated at no cost to the County.

TABLE IX-3

OPINION OF PROBABLE COSTS
STRATMOOR VALLEY AREA

STRATMOOR VALLEY (NORTH) STORM SEWER

Drainage Improvement Costs	\$ 401,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	40,000.00
Construction Cost	<u>441,000.00</u>

Contingencies (5% of Construction Cost)	22,050.00
Engineering (10% of Construction Cost and Contingencies)	46,305.00
Property Costs	<u>0.00</u>

TOTAL IMPROVEMENT COSTS	<u>\$ 509,355.00</u>
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STRATMOOR VALLEY (SOUTH) STORM SEWER

Drainage Improvement Costs	\$ 228,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	23,000.00
Construction Cost	<u>251,000.00</u>

Contingencies (5% of Construction Cost)	12,550.00
Engineering (10% of Construction Cost and Contingencies)	26,355.00
Property Costs	<u>0.00</u>

TOTAL IMPROVEMENT COSTS	<u>\$ 289,905.00</u>
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TOTAL IMPROVEMENT COSTS, STRATMOOR VALLEY AREA	<u>\$ 799,260.00</u>
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TABLE IX-4

OPINION OF PROBABLE COSTS FISHERS CANYON DRAINAGEWAY AND TRIBUTARY

FISHERS CANYON DRAINAGEWAY

Drainage Improvement Costs	\$ 1,657,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	<u>0.00</u>
Construction Cost	1,657,000.00

Contingencies (5% of Construction Cost)	82,850.00
Engineering (10% of Construction Cost and Contingencies)	173,985.00
Property Costs for Channel (16 acres)*	0.00
Property Costs for Detention (4 acres)	<u>56,000.00</u>

TOTAL IMPROVEMENT COSTS	<u>\$ 1,969,835.00</u>
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FISHERS CANYON TRIBUTARY

Drainage Improvement Costs	\$ 312,000.00
Street Crossing Costs	0.00
Utility Relocation Costs	<u>0.00</u>
Construction Cost	312,000.00

Contingencies (5% of Construction Cost)	15,600.00
Engineering (10% of Construction Cost and Contingencies)	32,760.00
Property Costs (3.5 acres)*	<u>0.00</u>

TOTAL IMPROVEMENT COSTS	<u>\$ 360,360.00</u>
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TOTAL IMPROVEMENT COSTS, FISHERS CANYON DRAINAGEWAY AND TRIBUTARY	<u>\$ 2,330,195.00</u>
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*An easement or right-of-way is required for this improvement. Land dedication is anticipated at no cost to the County.

Drainage Basin Fees

Drainage Basin Fees are one time charges to developers which are collected at the time of final plat recording. Developers may provide drainage improvements which are creditable toward the Drainage Basin Fees. The required fees are those in effect at the time of the final plat approval and/or bid opening. Drainage Basin Fees are comprised of a Drainage Fee, a Bridge Fee, and a Detention Land Fee. The Detention Land Fee is to apply towards the acquisition of private property for planned regional detention facilities. The Bridge Fee pertains to the construction or enlargement of bridges located on arterial roadways where the 100-year discharge is 1,600 cfs or greater. For these bridges, the developer's share of bridge construction cost is the difference between the total cost and the County's share of the cost, as calculated according to the following formula:

$$\text{County cost} = [(\text{Improvement or Replacement cost})] \times [\text{Existing Flow} - \text{Existing Bridge Capacity}] / (\text{Ultimate Developed Flow})$$

The Drainage Fee applies to major drainage improvements in the basin, which ordinarily are interpreted to be facilities which have an upstream basin area of one hundred acres or more.

Of the drainage improvements proposed in this drainage basin planning study, only the improvements to the Fishers Canyon Drainageway are interpreted as major drainage facilities (i.e., serving a basin area of one hundred acres or more). Total major drainage costs used as a basis of calculating the Drainage Fee for this basin are those applying to the reach of Fishers Canyon Drainageway serving future development in the basin, specifically, from Station 47+00 downstream to Fountain Creek. Table IX-5 indicates the probable costs associated with this reach, including costs for drop structures, channel improvements, and a detention facility.

TABLE IX-5
DRAINAGE BASIN FEES

MAJOR DRAINAGE IMPROVEMENT COSTS

(Fishers Canyon Drainageway, Station 0+00 to Station 47+00)

Drop Structure Improvements	\$ 446,000.00
Channel Improvements	495,000.00
Detention Facility	<u>120,000.00</u>
Construction Cost	1,061,000.00
Contingencies (5% of Construction Cost)	53,050.00
Engineering (10% of Construction Cost and Contingencies)	111,405.00
Drainage Basin Planning Study	60,675.00
Outstanding Drainage Claims	<u>59,400.00</u>
 TOTAL	 <u>\$ 1,345,530.00</u>
Bridge Costs	0.00
Detention Land Costs (4 acres @ \$14,000/ac)	56,000.00

BASIN FEES

Unplatted County Area Assumed to Develop: 260 acres

Drainage Fee: $\$1,345,530 / 260 \text{ ac} = \$5,176/\text{acre}$

Bridge Fee: \$0/acre

Detention Land Fee: $\$56,000 / 260 \text{ ac} = \$215/\text{acre}$

Fees are calculated by dividing total costs by the unplatted basin area within the County assumed to develop. For the Fishers Canyon Basin, the total unplatted area of the County assumed to develop in the future is 260 acres. This area is shown on Figure VII-1.

The total fee contribution for an individual development is to be calculated based on the product of the basin fee and the area of development.

The Drainage Fee contribution for an individual development is to be calculated based on the following formula:

$$\text{Developers Drainage Fee} = (\text{DF}) \times (\text{A})$$

where
DF = drainage fee (dollars per acre)
A = area of development (acres)

The Bridge Fee contribution for an individual development is to be calculated based on the following formula:

$$\text{Developer's Bridge Fee} = (\text{BF}) \times (\text{A})$$

where
BF = bridge fee (dollars per acre)
A = area of development (acres)

The Detention Land Fee contribution for an individual development is to be calculated based on the following formula:

$$\text{Developer's Detention Land Fee} = (\text{DLF}) \times (\text{A})$$

where
DLF = detention land fee (dollars per acre)
A = area of development (acres)

A formal explanation of the Drainage Basin Fees, as well as the adopted procedure for calculating the Fees, is outlined in the Drainage Criteria Manual for the City of Colorado Springs and El Paso County.

Alternative Funding Mechanisms

Many of the proposed improvements are located on streams which are not major drainageways (i.e. in sub-basins which are less than 100 acres in area) and as such do not qualify for reimbursement under the drainage fee system. The proposed improvements in Stratmoor Hills, the Westmark Subdivision, Stratmoor Valley, and in the upper portion of the Fishers Canyon Drainageway are primarily "retrofit" systems designed to address existing drainage concerns. Possible funding mechanisms for these improvements include local improvement districts, the formation of a drainage utility, and County capital improvement programs. It is recommended that future development projects adjacent to the Stratmoor Valley (North and South) and Westmark Subdivision, contribute to the construction of the proposed improvements which are not included in the basin fee improvements. Based on the ratio of stormwater runoff from areas of future development to the total design flow in the systems, it is recommended that future development projects contribute the following percentages of the costs of downstream outfall systems:

Stratmoor Valley (North)	60 percent
Stratmoor Valley (South)	75 percent
Westmark Subdivision	50 percent

APPENDIX A
PUBLIC COMMENTS REGARDING ALTERNATIVE PLANS



US Army Corps
of Engineers

Albuquerque District

P.O. Box 1880

Albuquerque, NM 87103-1880

Public Notice

File 8933

Permit Application No:

CO-OYT-0618

Date:

August 28, 1990

Phone: (505) 766-2776 or

(719) 543-9459

Suspense Date:

September 28, 1990

In Reply Refer to:

District Engineer, ATTN: CESWA-CO-R

JOINT PUBLIC NOTICE

U.S. ARMY CORPS OF ENGINEERS AND
COLORADO DEPARTMENT OF HEALTH

Interested parties are notified in accordance with Section 404 of the Clean Water Act (33 USC 1344), the District Engineer proposes to use Letter of Permission procedures to authorize certain discharges of dredged or fill material in association with El Paso County's Drainage Basin Planning Study for the Fisher's Canyon basin. This proposal has been assigned Application No. CO-OYT-0618.

Purpose of Letters of Permission: Letters of Permission (LOP) are a type of permit issued through an abbreviated processing procedure described later in this public notice. The list of categories of activities which are proposed for authorization under these LOP procedures include all Section 404 dredge or fill activities described in the Drainage Basin Planning Study (DBPS). The purpose of the LOP is to streamline the permitting process; to protect or enhance existing environmental values while providing for health, safety, and general welfare; to encourage cross-disciplinary, basin-wide planning and management of basins; to encourage permit consideration at an early stage of project planning; to encourage local participation in the permit program; and to provide for ongoing review and enforcement of authorized activities and the permitting process.

Purpose of the Drainage Basin Planning Study: The Drainage Criteria Manual for the City of Colorado Springs and El Paso County, dated October 1987, states that the provision of adequate drainage is needed to minimize flood losses and disruption, enhance the general health and welfare, and help assure optimum economic and social benefits for the community. To this end, a Drainage Basin Planning Study is done which shows conduits, channels, natural drainage courses, detention reservoirs, easements, culverts, and all other hydraulic facilities required to control initial and major drainage. Initial drainage provisions must convey storm runoff from the 10-year event and major drainage provisions provide for transport of the 100-year event with prevention of loss of life and major damage. The DBPS broad framework of goals are: economic efficiency, regional scope, environmental preservation and enhancement, social and recreational enhancement, responsible funding and implementation policy, and health, safety, and welfare of the citizenry.

Location: This LOP would be applicable to waters of the United States located within the boundaries of the Fisher's Canyon drainage basin in and near Colorado Springs, El Paso County, Colorado, as shown on the enclosed drawing.

NEWS RELEASE

Expiration of the List of Categories of Activities: The List of Categories of Activities and the LOP procedures are proposed for expiration 10 years from date of issuance of the list.

Public Meeting: A joint public meeting will be held on the LOP proposal at the place and time given below. The meeting will give an explanation of the proposed List of Categories of Activities and the LOP, present data about the basin, describe the alternatives being studied in the DBPS, and ask for comments on the alternatives, including environmental impacts and the proposed LOP permitting procedures. The meeting will be sponsored by the Corps of Engineers, the Colorado Department of Health, and El Paso County.

Public Meeting: 7:00 p.m.
September 18, 1990
Harrison High School Auditorium
2755 Janitell Road
Colorado Springs, Colorado

DBPS ALTERNATIVES: The following alternatives are being examined in the DBPS. From these alternatives, one or a combination of the alternatives will be chosen as the selected alternative. The selected alternative will be described in the final DBPS and is proposed for authorization under the Letter of Permission procedures described later in this notice. The basin was divided into three areas and two alternatives for each area are described.

Basin above Highway 115 - No Action - No action is proposed for the basin above Highway 115. Several concrete-lined channel sections and grass-lined channel sections already exist and appear to adequately handle drainage.

Stratmoor Hills Alternative 1 - Storm Sewer Improvements with No Detention - The residential area north of B Street has experienced frequent nuisance flooding during storm events. The area is on a hillside, with runoff typically being conveyed down slopes between houses instead of remaining in streets and gutters. The presence of Clover Ditch, no longer used for irrigation purposes, makes the flooding problems worse by collecting stormwater runoff and releasing it over low banks toward houses below. The ditch has too flat of a longitudinal slope to be useful in conveying runoff out of the area.

A system of storm sewer improvements is proposed to collect runoff in Stratmoor Hills and minimize flooding problems. The plan is shown in Figure 2. The plan generally consists of storm sewers sized for a 10-year return period upstream of Clover Ditch and for a 100-year return period downstream of the ditch. This sizing strategy is judged to be necessary in order to try to generally eliminate flooding of houses in the 100-year storm event. The ditch itself is proposed to be graded toward inlets near each road crossing which would be designed to drain the ditch and eliminate overtopping in the 100-year storm. Additional information about the alternative is shown in Table 1.

Stratmoor Hills Alternative 2 - Storm Sewer Improvements with Detention - This alternative is similar to Stratmoor Hills Alternative 1, but incorporates a detention facility upstream in the basin in order to reduce flows and required pipe sizes. The plan is depicted in Figure 3 and additional information is shown in Table 1.

Stratmoor Hills No Action Alternative - The residential area presently experiences flooding. No action would not alleviate the flooding problems, so it would not meet the project purpose of providing for adequate drainage.

Fisher's Canyon and Tributaries Alternative 1 - Vegetated Channel with a Rock Low Flow Channel - The Fisher's Canyon drainageway and its tributaries between B Street and Interstate 25 are currently experiencing significant bed and bank erosion. The erosion prevents the establishment of wetland vegetation along the channel and is contributing to sediment deposition in the culvert under I-25 and in the downstream channel.

This alternative consists of a system of stabilization improvements, including a grass-lined channel, rock low flow channel, a number of drop structures, selected riprap bank protection, and widening of constricted areas. The plan is shown in Figure 2. Typical cross sections and details are shown in Figure 4. The modifications would encourage the growth of wetland vegetation along the channel. Additional information regarding this alternative is shown in Table 2.

Fisher's Canyon and Tributaries Alternative 2 - Vegetated Channel with a Rock Low Flow Channel - This alternative is similar to the Fisher's Canyon Alternative 1 but proposes the use of periodic check structures instead of a continuous rock low flow channel. Between check structures the low flow channel would be unlined and would be allowed to flatten over time to a stable equilibrium slope. Additional information on the alternative is shown in Table 2.

Fisher's Canyon and Tributaries No Action Alternative - The stream is experiencing significant bed and bank erosion which in some reaches has eliminated streamside vegetation. No action is not being considered as an alternative, since it would not address the erosion problems and meet the project purpose of providing for adequate drainage.

Stratmoor Valley Alternative 1 - Storm Sewer Improvements with No Detention - Like Stratmoor Hills, Stratmoor Valley was developed without an adequate initial drainage system. A plan of storm sewer improvements is proposed and is shown in Figure 2. Proposed storm sewers would be sized to convey 10-year flows from both the currently developed area and upstream areas that may develop in the future. Table 3 shows additional information about this alternative.

Stratmoor Valley Alternative 2 - Storm Sewer Improvements with Detention - This alternative is similar to the Stratmoor Valley Alternative 1, but with proposed detention ponds to limit runoff from future upstream developing areas to historic levels. The plan is shown in Figure 3 and additional information is shown in Table 3.

Stratmoor Valley No Action Alternative - As stated earlier, the area has inadequate drainage. No action is not being considered as an alternative since it would not address the drainage problems and meet the project purpose of providing for adequate drainage.

TABLE 1

Consideration	Stratmoor Hills Alternative 1 Storm Sewer Improvements With No Detention	Stratmoor Hills Alternative 2 Storm Sewer Improvements With Detention
1. Probable Cost (including construction, R.O.W., engineering)	\$ 2.15 million	\$ 2.22 million
2. Existing Wetland/ Riparian Vegetation	1 acre* of herbaceous/shrub wetlands on side tributary. 5 acres (2,800 l.f.) of grass overbank with shrubs and trees along Fisher's Canyon.	1 acre of herbaceous/shrub wetlands on side tributary. 5 acres (2,800 l.f.) of grass overbank with shrubs and trees along Fisher's Canyon.
3. Wetland/Riparian Impacts	Preserves wetlands on side tributary at location of detention pond. Minor loss of grass/shrub/tree riparian overbank at isolated outfalls on Fisher's Canyon.	Loss of wetlands on side tributary at location of detention pond. Minor loss of grass/shrub/tree riparian overbank at isolated outfalls on Fisher's Canyon.
4. Compensation Mitigation Opportunities	Opportunity for on-site replacement of grass/shrub overbank.	Opportunity for on-site wetland replacement at location of detention pond. Opportunity for on-site grass/shrub overbank.
5. Maintenance Requirements	Periodic maintenance is required to keep Clover Ditch inlets clear.	Periodic maintenance is required to keep Clover Ditch inlets clear. Periodic maintenance of detention pond is required.
6. Right-of-Way Requirements	Easement is required for Crestridge Avenue outfall to Fisher's Canyon drainageway.	Easement is required for Crestridge Avenue outfall to Fisher's Canyon drainageway. R.O.W. is required for detention pond.
7. Constructability	Three pipe crossings of railroad are required. Outfalls to Fisher's Canyon drainageway require adequate scour protection.	Three pipe crossings of railroad are required. Outfall to Fisher's Canyon drainageway require adequate scour protection.

* all acreages of vegetation are rough estimates

TABLE 2

<u>Consideration</u>	<u>Fisher's Canyon & Tribs Alternative 1 Vegetated Channel with Rock Low Flow Channel</u>	<u>Fisher's Canyon & Tribs Alternative 2 Vegetated Channel with Periodic Check Structures</u>
1. Probable Cost (including construction, R.O.W., engineering)	\$ 2.74 million	\$ 2.64 million
2. Existing Wetland/ Riparian Vegetation	5 acres (2,800 l.f.) of grass overbank with shrubs and tress along portions of Fisher's Canyon.	5 acres (2,800 l.f.) of grass overbank with shrubs and tress along portions of Fisher's Canyon.
3. Wetland/Riparian Impacts	Proposed improvements stabilize eroding channel and promote growth of wetland vegetation. Loss of grass/shrub/tree riparian overbank.	Proposed improvements stabilize eroding channel and promote growth of wetland vegetation. Loss of grass/shrub/tree ripairan overbank.
4. Compensation Mitigation Opportunities	On-site replacement of riparian grass and shrubs within grass-lined channel.	On-site replacement of riparian grass and shrubs within grass-lined channel.
5. Maintenance Requirements	Periodic channel maintenance is required.	"Soft" low flow channel requires greater maintenance effort than rock low flow channel.
6. Right-of-Way Requirements	Management of regulatory flood plain is recommended.	Management of regulatory flood plain is recommended.
7. Constructability	Control of water is required during construction.	Control of water is required during construction. May require regrading of eroded low flow channel banks.

TABLE 3

Consideration	Stratmoor Valley Alternative 1 Storm Sewer Improvements With No Detention	Stratmoor Valley Alternative 2 Storm Sewer Improvements With Detention
1. Probable Cost (including construction, R.O.W., engineering)	\$ 1.35 million	\$ 1.42 million
2. Existing Wetland/ Riparian Vegetation	110 acres (8,000 l.f.) of riparian woodland along Fountain Creek.	110 acres (8,000 l.f.) of riparian woodland along Fountain Creek.
3. Wetland/Riparian Impacts	Disturbance/loss of riparian woodland at isolated locations for pipeline and outfall structure within riparian area.	Disturbance/loss of riparian woodland at isolated locations for pipeline and outfall structure within riparian area.
4. Compensation Mitigation Opportunities	On-site replacement of riparian woodland.	On-site replacement of riparian woodland.
5. Maintenance Requirements	Periodic clearing of inlets may be required.	Periodic clearing of inlets may be required. Periodic maintenance of detention pond is required.
6. Right-of-Way Requirements	Easement is required for Kensington Drive outfall.	Easement is required for Kensington Drive outfall. R.O.W. is required for detention pond.
7. Constructability	Outfalls to Fountain Creek require adequate scour protection.	Outfalls to Fountain Creek require adequate scour protection.

LIST OF CATEGORIES OF ACTIVITIES: The following categories of dredge and fill activities are proposed for authorization by a Letter of Permission:

- a. Channel features as described in the DBPS.
[a full list of channel features for the selected alternative will appear in the final LOP]
- b. Road crossings as described in the DBPS.
- c. Wetland construction or replacement as described in the DBPS.
- d. Riparian habitat construction or replacement as described in the DBPS.
- e. Aquatic habitat construction or replacement as described in the DBPS.
- f. The placement of dredged or fill material for mitigation measures needed to meet the environmental or mitigation goals as described in the DBPS.
- g. Temporary fills needed for construction of activities described in the DBPS. The placement of dredged or fill material will be authorized for

construction of temporary road crossings, access roads, construction pads, construction ramps, and cofferdams. (Any structure or fill remaining in place more than one year is not considered to be temporary.) The structure or fill must be culverted or otherwise designed to not restrict low streamflows, to allow passage of ordinary high water, and to not restrict or impede flows into or out of wetlands to be preserved. Fish passage will be allowed on perennial streams. Temporary fills will be removed as soon as practical, the original streambed contours restored or post-project contours completed, and pre-existing streambed riffles and pools in perennial streams restored.

SPECIAL CONDITIONS: The following special conditions are proposed for the LOP.

To qualify for the LOP, the above activities must meet the following special conditions:

- (1) Maintenance of revegetation or mitigation will be for two years which should include two growing seasons. [General Condition 2 of the standard permit requires maintenance of the activity authorized by the permit in good condition and in conformance with the terms and conditions of the permit.]
- (2) The activity will consist of suitable material free from toxic pollutants in toxic amounts. (Some common materials which contain toxic pollutants are bituminous surfacing materials (asphalt), fly ash, creosote, etc.)
- (3) Other materials not authorized include refuse and/or garbage, car or vehicle tires, demolition or other debris, construction waste, and waste metal, including car or vehicle bodies.
- (4) All disturbed or unprotected areas will have soils restored and will be revegetated using erosion-controlling native species or equivalent cultivars. The use of native species is preferred.
- (5) Riparian areas disturbed by construction activities will be restored by: restoring the soils to at least original conditions, using plant types and composition similar to what originally existed, and using native species.
- (6) If the State Historic Preservation Officer determines that an archaeological survey is required, you must coordinate the survey with the Corps of Engineers for their review, complete the required cultural resources work, and allow the Corps to complete its Section 106 consultation before starting construction.
- (7) Any special conditions of the water quality certification.

SPECIAL PROCEDURES/REQUIREMENT WHEN APPLYING FOR A LETTER OF PERMISSION AUTHORIZATION: The following special procedures and requirements are proposed for individual activities applying under the LOP.

a. Application: A completed application (2 copies) will be sent to the Corps of Engineers. Application will include:

- (1) Completed Application for Department of the Army Permit (ENG FORM 4345), including all permanent and temporary work.
- (2) Estimated start and completion dates.
- (3) Drawings (8-1/2" x 11" or no larger than 18" x 24") including: vicinity map; plan or site view showing stream, wetlands, ordinary high water mark, dimensions of activity, scale, and north arrow; and elevation or cross sections views.
- (4) Vegetation plan including species, planting rates, and planting times.
- (5) A written statement that the State Historic Preservation Office has been contacted and that the proposed project will comply with provisions of the National Historic Preservation Act of 1966 as amended, the State Antiquities Act of 1973, and the State Register of Historic Places Act of 1975.

b. Preliminary Determination: The Corps of Engineers will make a preliminary determination on whether or not the proposed project could be authorized by the Letter of Permission. Determination will include whether or not the project is significantly different from the DBPS's recommended action and mitigation, or will have more than minor additional adverse environmental impacts.

c. Coordination: The Corps of Engineers will coordinate the application with the City of Colorado Springs (when applicable), Colorado Division of Wildlife, Colorado Water Quality Control Division, El Paso County, the Environmental Protection Agency, and the U.S. Fish and Wildlife Service. A copy of the application and drawings will be telefaxed to the coordinating agencies within 5 days of receipt of completed application. Comments within 15 days will be requested. A 7-day extension of the comment period may be granted if a valid request is received during the comment period. Comments will be requested on the following:

- (1) Major changes to the existing environment at the project site or in the basin since the initial Environmental Assessment (EA) was written.
- (2) Changes in threatened and endangered species status since the initial EA was written.
- (3) Changes in stream standards or other water quality factors since the initial EA was written and the 401 water quality certification was issued.
- (4) Major changes in the project proposal from the DBPS's recommended action and mitigation.
- (5) Whether the work will have more than minor additional adverse environmental impacts than that recognized in the initial EA.

d. Public Interest Review: The Corps of Engineers will prepare a supplemental public interest review, including a supplemental environmental assessment and supplemental 404(b)(1) guidelines review.

e. Permit Decision: The Corps of Engineers will make a decision on issuance of a Letter of Permission for the work within 45 days of receipt of a completed application unless there are extenuating circumstances. If a decision is made to issue a permit, an LOP will be issued using ENG FORM 1721 (standard permit form), which includes standard general conditions on completion of work, maintenance of the activity and mitigation, cultural resources, transfer of authorization, project inspections, limits of authorization, reevaluation of the permit decision, and extensions of the permit.

f. Review and Enforcement: The Corps of Engineers will prepare an annual report listing each activity under the DBPS permitted by the LOP procedures, the status of each activity, and a synopsis of any Corps inspections. A copy of the report will be sent to the City of Colorado Springs, Colorado Division of Wildlife, Colorado Water Quality Control Division, El Paso County, the Environmental Protection Agency, and the U.S. Fish and Wildlife Service. The report will be available to other interested parties at the Corps offices listed below. The Corps of Engineers will enforce all requirements and conditions of a LOP permit in coordination with El Paso County and its authority requiring construction of drainage facilities.

Additional Information: Drawings showing the location of the Fisher's Canyon basin, typical stream sections of alternatives, and other data are enclosed with this notice. If additional information is desired, you can get it from the U.S. Army Corps of Engineers offices at:

Ms. Anita Culp, Project Manager
Southern Colorado Project Office
421 N. Main Street, Suite 416
P.O. Box 294
Pueblo, CO 81002-0294
(719) 543-9459

or Albuquerque District
517 Gold Ave. SW, Rm. 8419
P.O. Box 1580
Albuquerque, NM 87103-1580
(505) 766-2776

Water Quality Certification: The Colorado Department of Health will review the List of Categories of Activities with an intent to certify in accordance with Section 401 of the Clean Water Act. The Department also reviews each project with respect to the antidegradation provisions in state regulations. The Department has preliminarily determined that this proposed project is not located on waters that require an antidegradation review. Any comments regarding water quality impacts should be sent to:

Colorado Department of Health
Water Quality Control Division
Permits and Enforcement Section
4210 East 11th Avenue
Denver, CO 80220
(303) 331-4575

Statement of Findings: Each LOP applicant will be responsible for obtaining all other required Federal, state and local authorizations for this work.

In accordance with the National Environmental Policy Act of 1969, an environmental assessment will be prepared for this action. Upon completion, the assessment may be seen at either the Southern Colorado Project Office or the Albuquerque District Office at the addresses given earlier.

Comments: Any comments concerning this proposal must be received by the District Engineer no later than September 28, 1990. Comments received after the end of the Public Notice comment period will not be considered. However, more time may be given if a request, with a valid reason, is received before the above date. The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposal. Any comments received will be considered by the Corps of Engineers to determine whether to issue a List of Categories of Activities. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interests of the proposed activity.

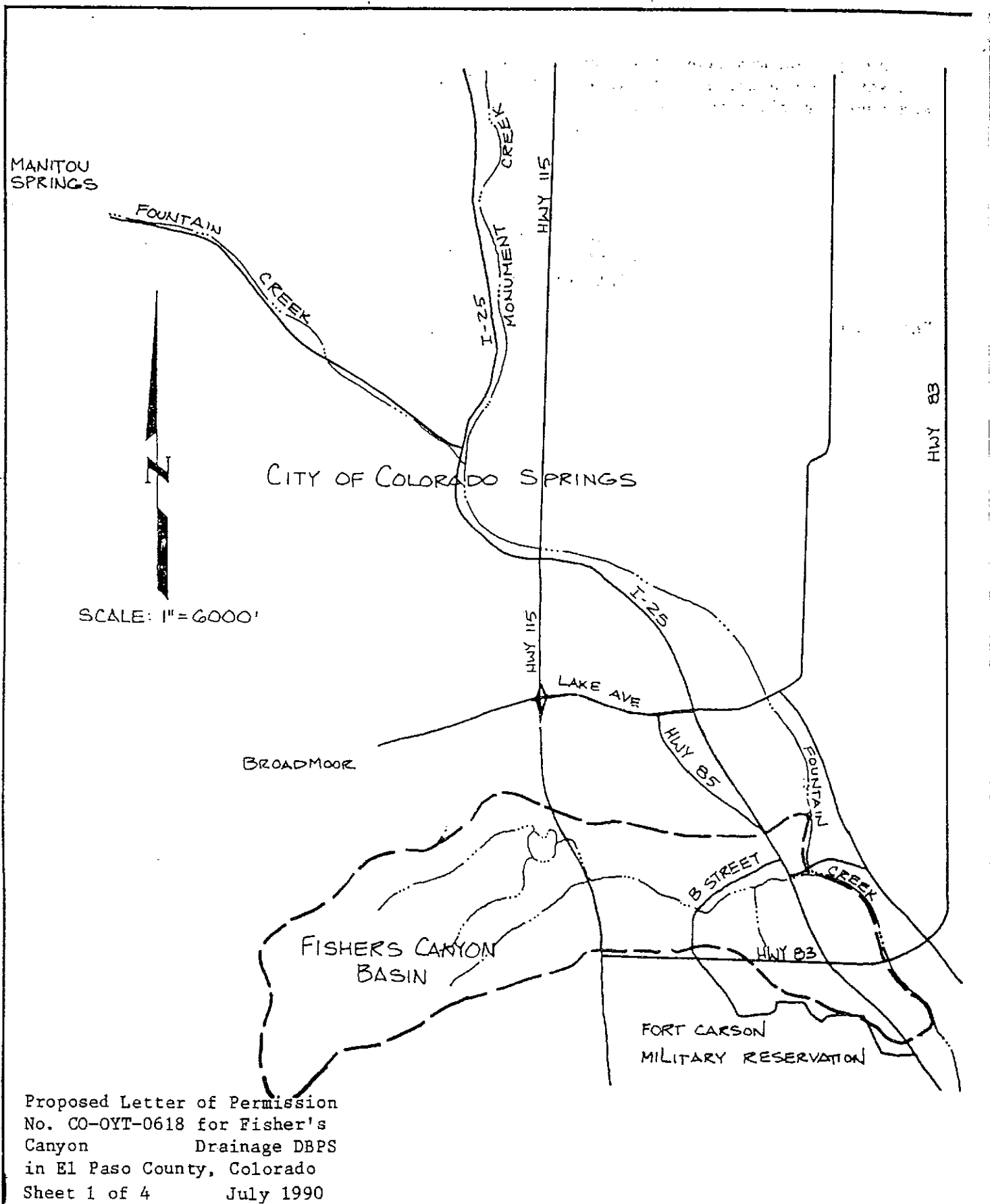
The decision whether to issue a List of Categories of Activities and LOP procedures will be based on an evaluation of the probable impact, including cumulative impacts of the proposed categories of activities on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal will be balanced against its reasonably foreseeable detriments. The evaluation of activity impacts will include application of the EPA's guidelines under Section 404(b)(1) of the Clean Water Act. In accordance with these guidelines, alternatives for the basin will be considered in light of project purposes and in the sequence of avoiding Section 404 fills first, then minimizing fills, and lastly mitigating impacts of unavoidable fills. All factors relevant to the proposal and the cumulative effects will be considered and among these are:

- | | |
|-----------------------------|---|
| - conservation | - general environmental concerns |
| - aesthetics | - fish and wildlife values |
| - navigation | - historic properties |
| - safety | - flood plain values |
| - wetlands | - flood hazards |
| - economics | - shoreline erosion and accretion |
| - land use | - water supply and conservation |
| - recreation | - consideration of property ownership |
| - energy needs | - minerals needs |
| - food and fiber production | - general needs and welfare of the people |
| - water quality | |

Any person may request a public hearing. The request must be in writing and sent to the District Engineer within 30 days of the date of this notice and must clearly give reason(s) for holding a public hearing.

Steven M. Dougan
Lieutenant Colonel, EN
District Engineer

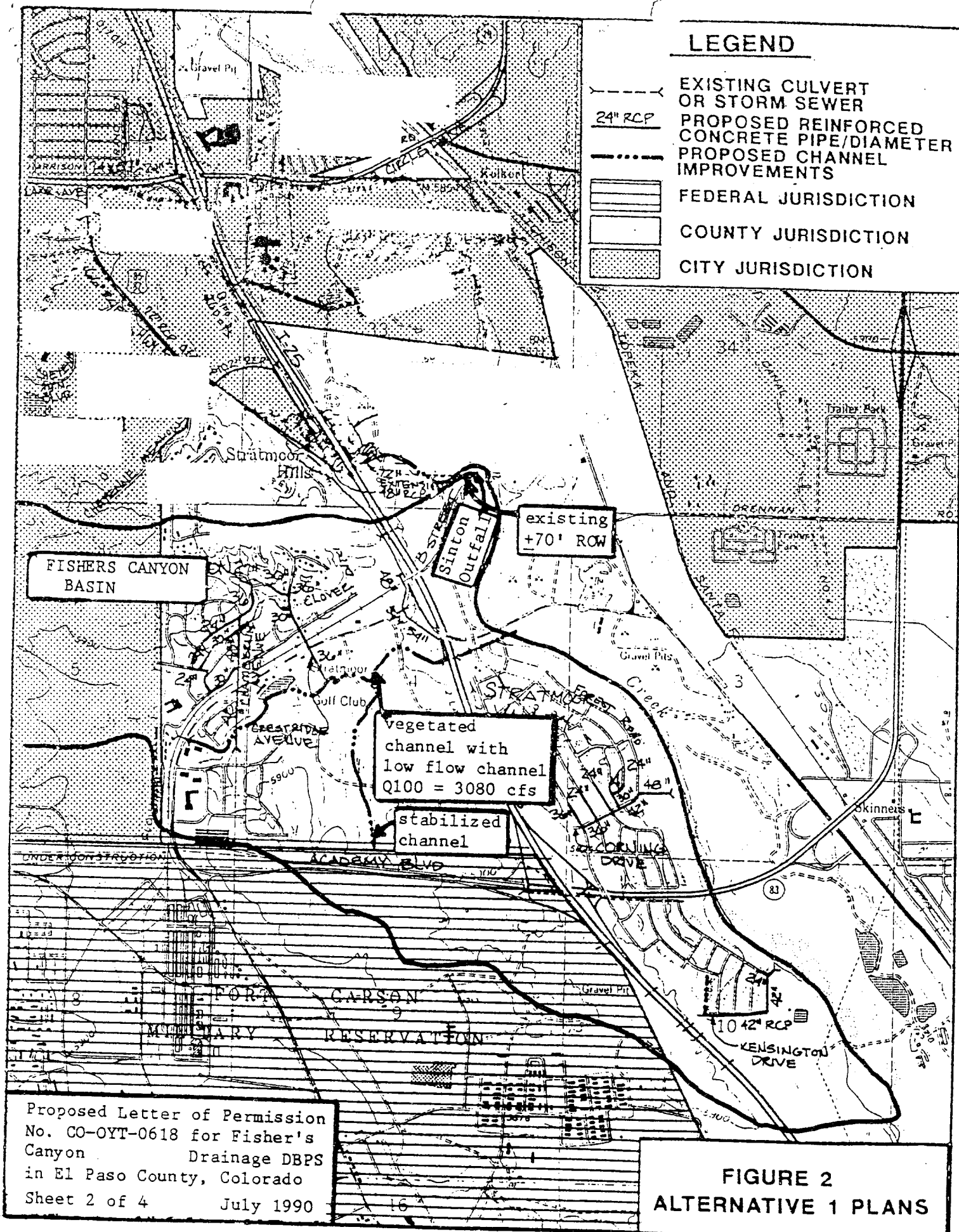
Enclosure



**FISHERS CANYON
DRAINAGE BASIN PLANNING STUDY**

LOCATION MAP

**FIGURE
1**



LEGEND

- EXISTING CULVERT OR STORM SEWER
- 24" RCP
- PROPOSED REINFORCED CONCRETE PIPE/DIAMETER
- PROPOSED CHANNEL IMPROVEMENTS
- FEDERAL JURISDICTION
- COUNTY JURISDICTION
- CITY JURISDICTION

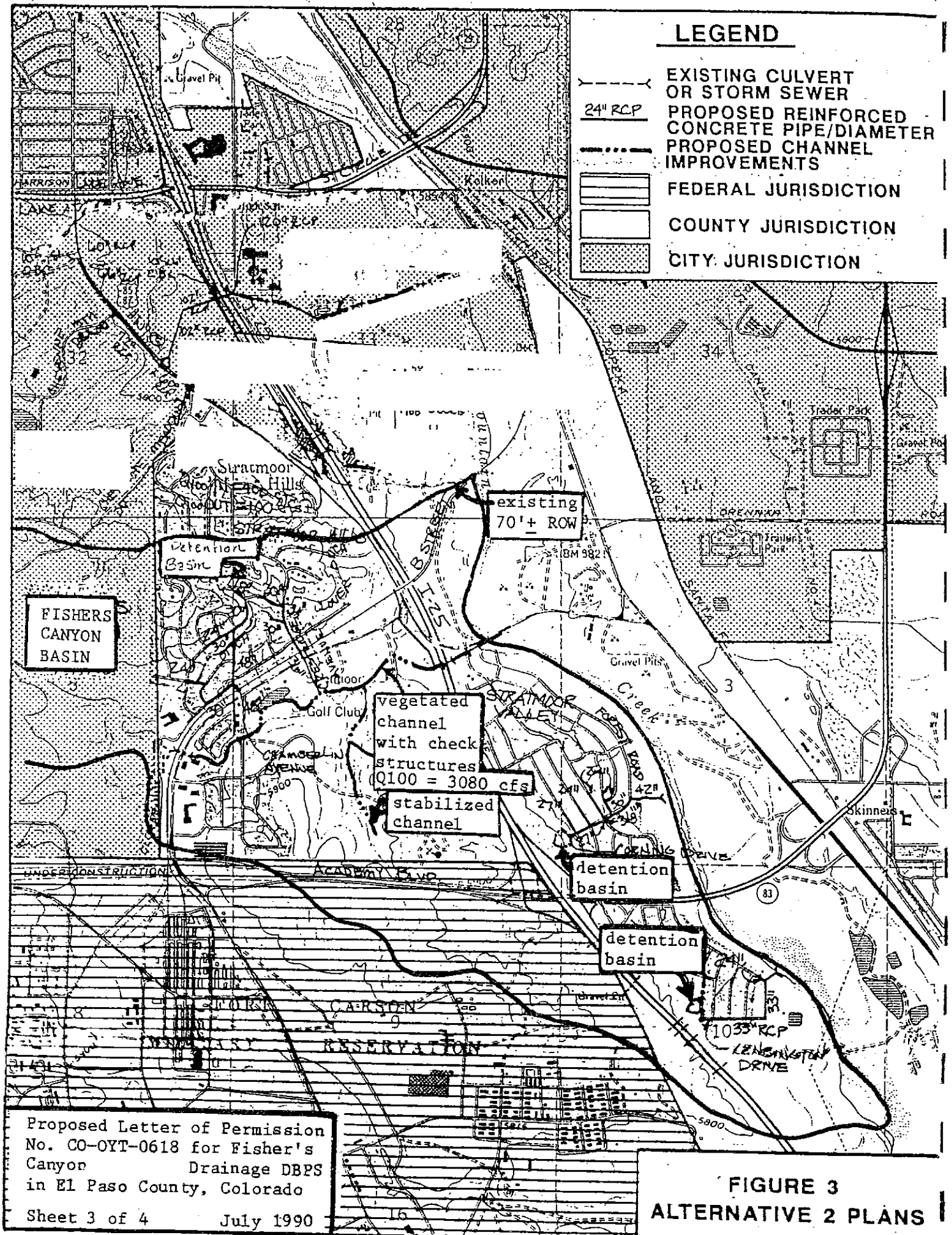
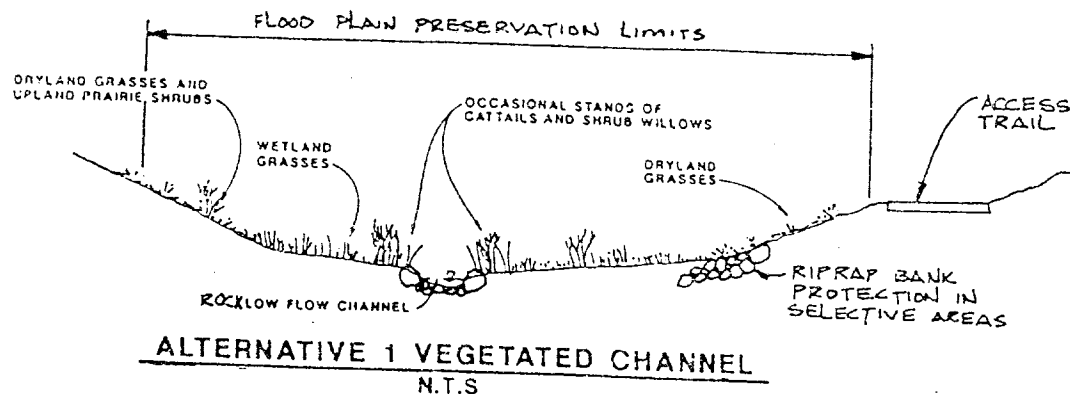
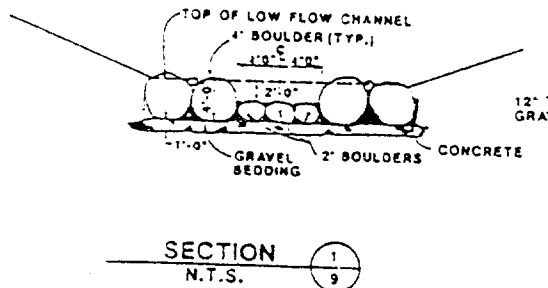
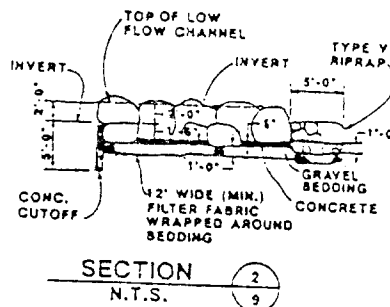
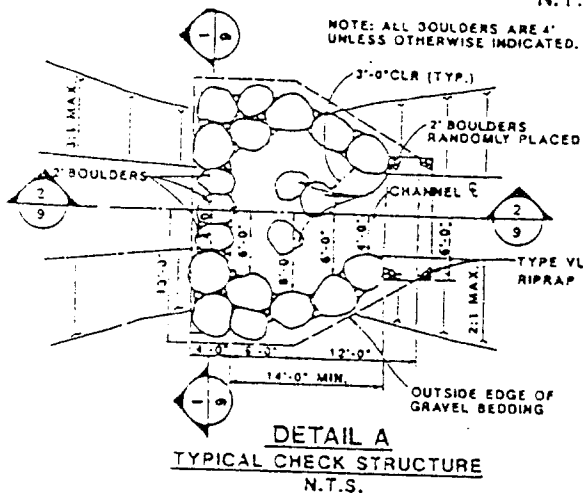
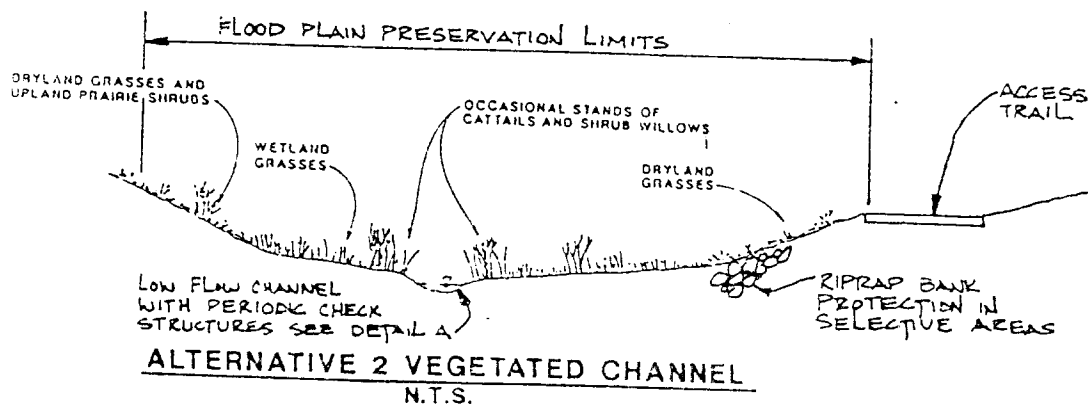


FIGURE 3
ALTERNATIVE 2 PLANS

NOTE: PERIODIC
CHANNEL DROP
STRUCTURES MAY
BE REQUIRED.



NOTE: PERIODIC
CHANNEL DROP
STRUCTURES MAY
BE REQUIRED



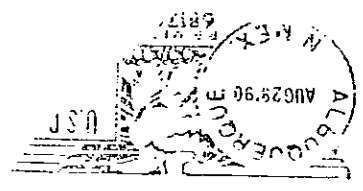
Proposed Letter of Permission
No. CO-OYT-0618 for Fisher's
Canyon Drainage DBPS
in El Paso County, Colorado
Sheet 4 of 4 July 1990

MULLER ENGINEERING CO., INC.
SEP 01 1990

JAMES T. MULLIMAN
MULLER ENGINEERING CO., INC.
7000 WEST 14TH AVENUE
LAKEWOOD, CO 80215

PUBLIC NOTICE

0.41



AN EQUAL OPPORTUNITY EMPLOYER

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1580
ALBUQUERQUE, NEW MEXICO 87103-1580
OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300
SWACO-R

STATE OF COLORADO
Roy Romer, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE

AN EQUAL OPPORTUNITY EMPLOYER

Perry D. Olson, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192

12/190
leg -
REFER TO



*For Wildlife-
For People*

September 20, 1990

Lt. Colonel Steven M. Dougan
Albuquerque District
U.S. Army Corps of Engineers
P.O. Box 1580
Albuquerque, N Mex 87103-1580

RE: LOP Application or Fisher's Canyon Basin, # CO-OYT-0618

Dear Colonel Dougan:

Division personnel have reviewed the above referenced Letter of Permission (LOP) permit application and have attended public meetings regarding this proposal. I am providing Division of Wildlife comments based on observations expressed by our personnel, and based on communications with other parties of interest.

LOP Process

This process continues to be flawed since it will be applied throughout the Colorado Springs/El Paso County area with potential significant effect on the human and natural environment, but without proper public review, disclosure of impacts or determination of appropriate mitigation. Furthermore, this process has not been finalized in form and continues to be applied in an arbitrary and capricious fashion unmindful of the need to balance public works projects with environmentally sensitive designing and planning.

To date, as is true of the Windmill Gulch and Cottonwood Gulch drainage basin planning study LOP's, the Fisher's Canyon LOP fails to disclose, by alternative, total wetland resources present, impacts to wetland resources, or required mitigation. As such, one cannot select for the least damaging alternative, assess cumulative impacts, or recommend appropriate mitigation. In essence, the 404b1 guidelines of the Clean Water Act cannot be productively applied or enforced as required by law.

DEPARTMENT OF NATURAL RESOURCES, Hamlet J. Barry, Executive Director

WILDLIFE COMMISSION, William R. Hegberg, Chairman • Dennis Luttrell, Vice Chairman • Eldon W. Cooper, Secretary
Felix Chavez, Member • Rebecca L. Frank, Member • Louis F. Swift, Member • George VanDenBerg, Member • Larry M. Wright, Member

If the Colorado Springs-El Paso County Drainage Basin Planning Study (1987) is to be used as basis for LOP procedures, it must be revised to address selection for least damaging alternatives, and to provide mitigation criteria for wetland impacts (individual and cumulative).

Finally, this LOP process, once whole, should be open to public review and comment consistent with NEPA.

Fisher's Canyon DBPS Alternatives

Basin above Highway 115 - Little to no information has been supplied on this part of the basin. If no action is proposed, it is assumed that the existing channel sections are adequate.

Stratmoor Hills - The Division recommends that Alternative 2 be implemented. This alternative will make use of a detention pond to reduce flows created by ongoing development and will require storm sewers with smaller sized pipes. Wetland destruction due to detention pond creation can be mitigated by oversizing the pond. Wetlands can be allowed to establish and persist in size commensurate to wetland acreage lost. Flows moving into the Fisher's Canyon segment of the drainage will be more manageable and require less channel engineering due to the maintenance of normal flows.

Fisher's Canyon Tributaries - The Division recommends that Alternative 2 be modified and selected. The Fisher's Canyon segment between B Street and Interstate 25 supports rich riparian and wetland vegetation which should be protected and enhanced. The channel bottom in this stretch should be left in a natural state. However, check structures, as proposed, should be used to control undesired gradient changes and to encourage the growth of wetland vegetation. Selected bank stabilization may be needed on a spot basis, but a grass lined channel throughout is unnecessary. Tributaries should be treated in a similar fashion.

Stratmoor Valley - The Division recommends the use of detention ponds in this stretch to avoid greater than historic flows impacting the outfall into Fountain Creek and erosion forces downstream. Impacts to riparian habitats should be mitigated.

General

Impacts, due to the installation of drainage structures and/or sewer lines, should be mitigated at the time of construction. Mitigation at the time of construction completion should be a condition of any permit issued.

Please contact me at 719-473-2945 if I can be of further assistance.

Sincerely,

Bruce Goforth
Senior Wildlife Biologist

Approved by:

Ry *Desilet*
Ronald P. Desilet
Regional Manager

cc: S. Fowler. EPA
B. Noonan. USFWS
A. Morrice. ELPCDOT
D. Clippinger. CDOW

RECEIVED
25 Sep 90
REGULATORY BR.
CORPS OF ENGINEERS



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

10/3/90
J

SEP 28 1990

Ref: 8WM-SP

Lt. Colonel Steven M. Dougan
District Engineer, COE
Albuquerque District
P.O. Box 1580
Albuquerque, NM 87103-1580

RE: CO-OYT-0618
El Paso County
Fisher Canyon LOP

Dear Colonel Dougan:

We have reviewed the referenced public notice for the placement of fill material in Fisher Canyon, its tributaries, and adjacent wetlands in conjunction with the construction of channel stabilization treatments in El Paso County, Colorado.

Our review has included a site visit and meeting with the consultants, resource agencies and Corps' representative. It is our understanding that the tributaries west of B Street have retained some beneficial riparian values despite residential growth in the area. We recommend that these areas be preserved through the authorization of the identified alternatives which would least likely impose adverse impacts to these areas. In addition, if wetlands are found in any of the tributaries, the channel stabilization treatment should avoid and minimize impacts to these special aquatic sites through realignment of the channel to avoid both direct or indirect impacts from construction activities.

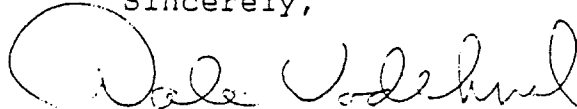
We continue to have serious concerns regarding the procedural aspects of the Letter of Permission process despite recent Corps correspondence on the Windmill Gulch LOP (letter dated August 24, 1990). We request a meeting with the Corps to

RECEIVED
3 Oct 90

REGULATORY BR
DIVISION OF ENGINEERS

clarify these concerns and to resolve issues before elevation deadlines are imposed. Please be advised of our intent to organize a meeting as we will be contacting your staff within the next two weeks. If you have any questions concerning these comments or recommendations, please contact Sarah Fowler at (303) 293-1575 or FTS 330-1575.

Sincerely,



Dale Vodehnal, Chief
State Programs Branch
Water Management Division

cc: Bruce Goforth, CDOW
John Farrow, CWQCD
Bill Noonan, USFWS
Anita Culp, COE Pueblo

From: B.MILLER (EPA9878) Delivered: Fri 28-Sep-90 16:58 EDT Sys 163
To: CSWA (ACE2043)
Subject: CO-OYT-0618
Mail Id: IPM-163-900928-152800400

October 9, 1990

b. Your agency's letter inferred that the LOP process does not adhere to environmental laws and regulations. The Corps of Engineers alone is responsible for reaching a decision on the merits of an application, determining 404(b)(1) Guidelines

compliance, and determining whether a permit action is contrary to the public interest. The Corps' permit evaluation process complies with all pertinent laws and regulations including the National Environmental Policy Act. Your agency's purview and focus in commenting on proposed permit actions is bounded by the Fish and Wildlife Coordination Act for the conservation of wildlife resources.

c. In my letter dated August 24, 1990 to Mr. Bruce Goforth of your staff, I explained the process we are using, the reasons for using the particular steps, and how your agency's previous comments were considered. We remain committed to the Section 404 LOP process, although we recognize your agency's general opposition. We have tried to meet your specific concerns and a number of changes reflected in the public notice for CO-OYT-0618 resulted directly from positive recommendations by your staff.

We value your agency's expert opinions on the local wildlife resource and will continue to try to address your agency's concerns about the overall process. Should you have any questions please feel free to write or call Ms. Anita Culp at (719) 543-9459 or Ms. Jean Manger at (505) 766-2776.

Sincerely,

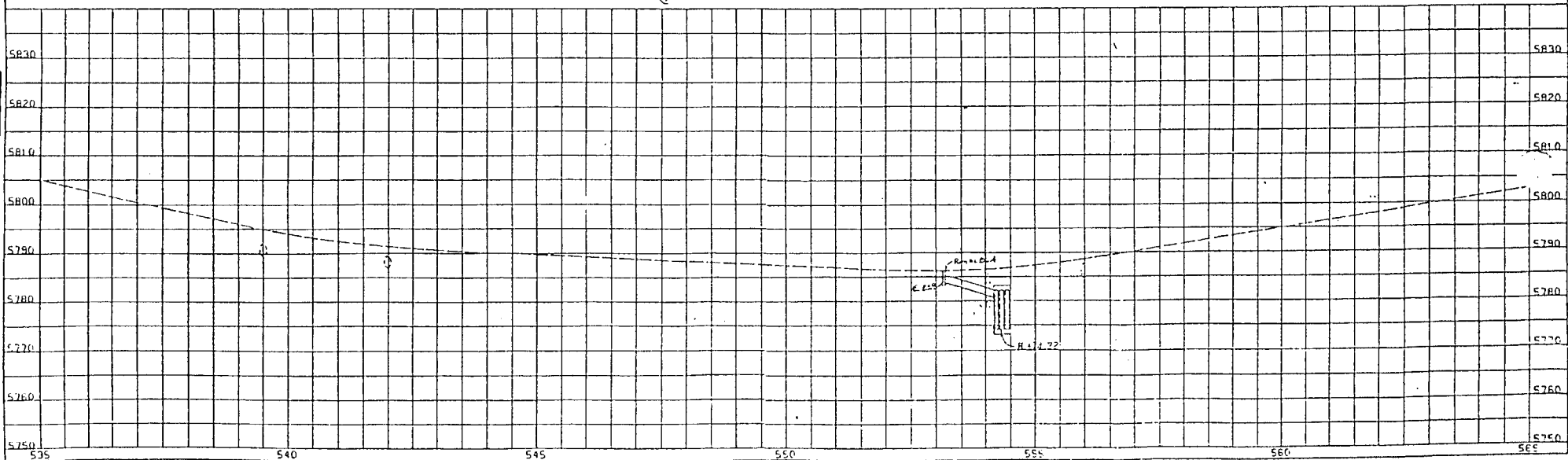
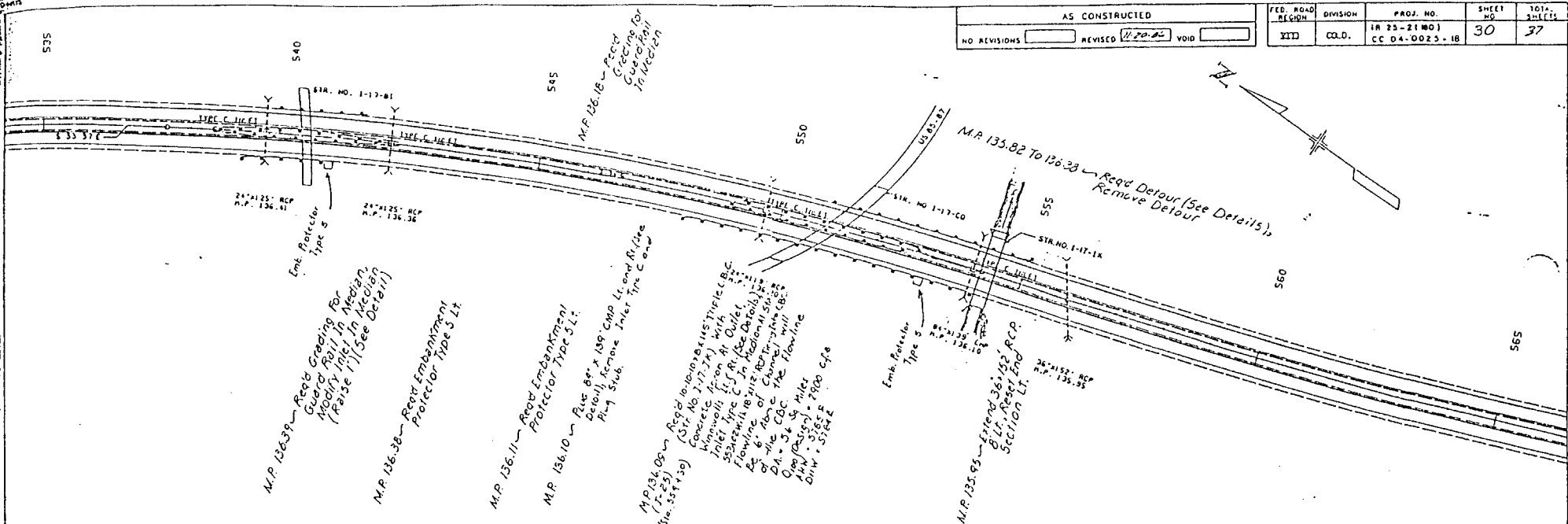
Robert E. Meehan, P.E.
Chief, Construction-Operations
Division

Copy furnished:

✓ Mr. Alan Morrice
El Paso County
Department of Public Works
3105 North Stone
Colorado Springs, CO 80907

AS CONSTRUCTED	
NO REVISIONS	REVISED <u>11-20-82</u> VOID

FED. ROAD DISTRICT	DIVISION	PROJ. NO.	SHEET NO.	TOTAL SHEETS
XII	CO.D.	IR 23-21(MO)	30	37
CC 04-0023-1B				

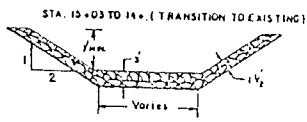
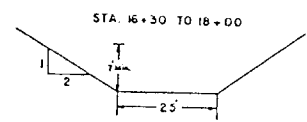
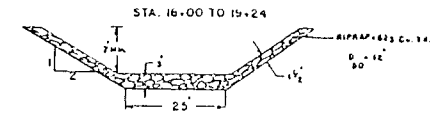


AS CONSTRUCTED		
NO REVISIONS	REVISED	VOID
11-20-65		

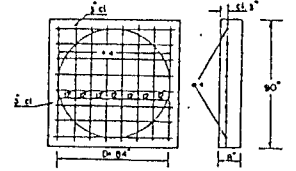
FED. ROAD DISTRICT	DIVISION	PROJ. NO.	SHEET NO.	SHEET TOTALS
VIII	CDL	IR 25-21(80) CC 04-0025-16	17	37

DETAILS OF CBC'S AND CHANNEL AT MAXWELL STREET

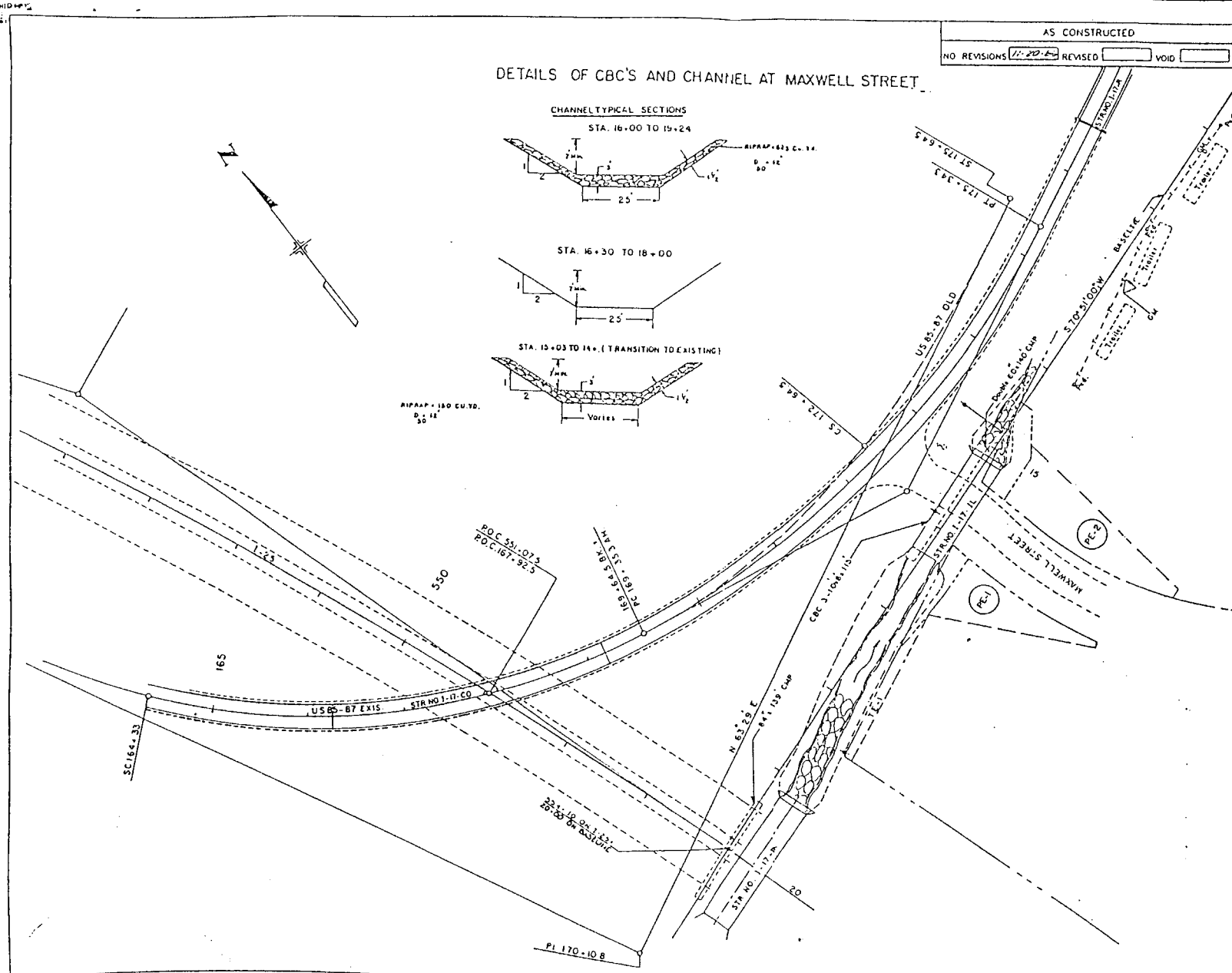
CHANNEL TYPICAL SECTIONS



DETAILS OF PLUG CULVERT (M.P. 136.1 ON I-25) STA. 554+30



REMOVE 60' X 140' DOUBLE
CMP. REED 100' X 100' IS TRIPLE
CBC (STR. NO. 1-17-11)
WITH CONCRETE APRON
AT OUTLET, WIDENING L.T. B
RT (SEE DETAILS), CHANNEL
IMPROVEMENT L.T. B RT.
(SEE DETAILS), FLOW LINE
OF THE CHANNEL WILL BE 6'
ABOVE THE FLOWLINE OF
THE CBC.
D.A. 5.6 SO MILES
C/OO (DESIGN) = 2900 CFS
ANW = 5785 S
DNW = 5780 S





REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
SOUTHERN COLORADO PROJECT OFFICE
P.O. BOX 294, PUEBLO, COLORADO 81002

October 19, 1990

Construction-Operations Division
Regulatory Branch

RECEIVED
NOV 05 1990
Muller Engineering Co., Inc.

Mr. James T. Wulliman
Muller Engineering Company, Inc.
7000 West 14th Avenue
Lakewood, Colorado 80215

Dear Mr. Wulliman:

Enclosed is a copy of the meeting record for the public meeting held on September 18, 1990 for the Letter of Permission Application, No. CO-OYT-0618, Fisher's Canyon Drainage Basin Planning Study.

Should you have any questions please feel free to write or call me at (719) 543-9459.

Sincerely,

Anita E. Culp
Project Manager

Enclosure

Same Letter Sent To:

Mr. Alan Morrice
El Paso County
Department of Public Works
3105 North Stone
Colorado Springs, Colorado 80907

Mr. Jon Scherschligt
Water Quality Control Division
Colorado Department of Health
4210 East 11th Avenue, Room 300
Denver, Colorado 80220

11 October 1990

MEMORANDUM THRU

Project Engineer, Southern Colorado Project Office
Chief, Regulatory Branch

FOR Regulatory Branch File

SUBJECT: Public Meeting, Section 404 Application No. CO-OYT-0618

1. The public meeting for the proposed Section 404 Letter of Permission (LOP) List of Categories of Activities, Application No. CO-OYT-0618 for the Fisher's Canyon Drainage Basin Planning Study (DBPS) was held on September 18, 1990. The meeting began at 7:15 p.m. in the Harrison High School Auditorium located at 2755 Janitell Road, Colorado Springs, Colorado.

2. The meeting was attended by 24 people. An attendance list is enclosed.

3. The entire meeting was audio recorded and the comment/statement section of the meeting has been transcribed verbatim from the tape and is given in paragraph 4 of this report. The order of speakers and subjects for the public meeting were:

a. Introduction and purpose of meeting by Alan Morrice of El Paso County Department of Public Works.

b. Explanation of proposed Letter of Permission Procedures and List of Categories of Activities by Anita Culp of Corps of Engineers.

c. Questions and answers on 3b by Anita Culp and several speakers from the audience.

d. Introduction of DBPS alternatives presentation by Alan Morrice.

e. Explanation of basin study by Jim Wulliman of Muller Engineering Company, Inc.

f. Presentation of environmental and recreational resources in the basin by Parry Thomas of Thomas & Thomas. During the presentation, several questions about the boundaries of the study and LOP were asked from the audience and answered by Thomas, Wulliman, and Culp.

g. Presentation of DBPS alternatives by Jim Wulliman. During the presentation, several questions were asked from the audience and answered by Wulliman.

h. Taking of comments and statements by Anita Culp.

i. Statement by Jim Alice Scott of the Stratmoor Neighborhood Assoc.

j. Statement by Bill Walters.

k. Closing statements by Anita Culp and Alan Morrice.

4. The verbatim transcript for paragraphs 3h - 3k follows.

a. ANITA CULP: "Is there anyone who wants to make a statement? If you'd just come up to the mike up here and state your name and if you are representing someone, state who you represent."

b. JIM ALICE SCOTT: "I'm Jim Alice Scott and I'm the vice president of the Stratmoor Neighborhood Association. And we appreciate the opportunity to have a review of this information and have been invited to send a representative to the meetings that you've been holding. And we would like to work with you on this and feel like that maybe some of the interim steps that you suggested might be very beneficial. Particularly for the area that would come right over in here on the drainage. And I think that's probably, as you all consider, one of the most effective first steps that we could take to try to solve some of the problems which we face. Those problems include: one, having difficulty with flooding of houses and adjacent lands. Particularly that south of the ditch itself, Clover Ditch. And then also standing water from time to time within that area. And those are the two problems that have been brought to our attention most frequently. So we would like very much to work with the County in terms of trying to determine the most effective way to make that scenic and beautiful as far as a parkway. And at the same time not risk any of the concerns that neighborhood might have who live right adjacent to it. So do you have some comments? Thank you."

c. ANITA CULP: "Anyone else who would like to make a statement or a comment? [Question and answer from audience.]

d. BILL WALTERS: "I'm Bill Walters, resident of Stratmoor Hills. This idea of filling the ditch so it's not quite as much of an infestation of a mosquito pond is good. And having the

points that will be drained with a large enough diameter culvert to larger culverts going down the two street to this main drainage appeals to me. The only concern I have is that it has safety features do not allow children to get into these things. Because a 3-foot pipe would allow a small child to walk down into a 4-foot culvert. By the time he got through it, if he found his way through, he would be in the main ditch. Not that this would be anything that we're talking about in the flood time but it could be something that existed all the time. So it should be some safety thought on that. The walkway going down is excellent for the aesthetic value of the scenery. There's a lot of people that, well, desirable ones and undesirable ones. And of course, if it's made easy for the desirable ones, it's also made easy for the undesirable ones that like to race down with motorcycles or whatever it is they happen to want to do. And I think this is some concern there. I don't know how to address that particular problem."

e. "I think that is... is there anything else?" [Question from audience.] "On how it should be divided up on cost?" [Statement from audience.] "Well, is this 2 million dollars including work to be done on that main Fisher drainage?" [Answer from audience.] "It's just for Stratmoor Hills alone? So what you're saying is that these two large 4-foot-diameter culverts going down Chamberlain and Crestridge and the pipe system on the Clover ditch is 2 million dollars, is what you're saying." [Statement from audience.] "Well, no, I don't know how you could...what concerns me is that if you put in a minor type of thing, something less expensive, if we have a good flood, you may not have that less expensive system left. It may go out with it and you'd be starting all over again. So it's kind of like if you're going to do the job, do it right the first time. Or at least do it stable enough so it's going to hold together. There's been many a structure built in this state and saved a lot of money and it deteriorated within one year's time. And I know about these things and it's too bad. Because it's a tremendous waste of money. So I can't tell you that I have any ideas at all on what could be done less than what you described. This is why I was hoping that you were including part of the 2 million for addressing at least one side of that ditch. I'd say, 'well let that one side go and we'll cut the 2 million back.' But since you're not even including that ditch, I'm stuck with the 2 million it looks like. But don't quote me. Thank you."

f. ANITA CULP: "Anyone else who'd like to make a statement or comment on the record?" [Comment from audience.] "If you want it officially on the record, it needs to be up here at the mike." [Comment from audience.] "Okay. Anyone else who wants to make a statement? All right, I'd like to remind you that the comment period will be open until September the 28th. So you... if you have written comments or think of additional things you would like on the record you can either mail or drop them off at our

Pueblo office in the public notice. Or mail them to the Albuquerque office. Copies will be sent to the County. Alan do you have anything else? [Comments from audience.] Well, thank you for coming tonight and your participation. I saw notes being taken, so even the unofficial comments I think are being considered. This meeting is adjourned."

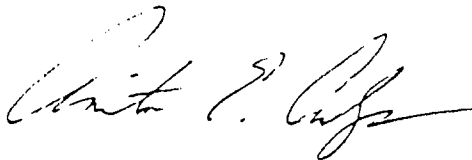
5. The meeting adjourned at 9:15 p.m.

6. The enclosed written comments were provided after the public meeting and within the comment period and are part of the meeting record.

a. Colorado Division of Wildlife letter dated September 20, 1990.

b. Environmental Protection Agency letter dated September 28, 1990.

FOR THE COMMANDER:



ANITA E. CULP
Project Manager

- 4 Encl:
1. Attendance List
2. Ltr - CDOW
3. Ltr - EPA
4. Tape