further stabilize existing vegetation adjacent to the main channel. Checks can also be constructed so as to spread and pool the base flow, and create water features, mainly along Bear Creek. Siting of checks and drops should be done so as to limit disturbances to existing vegetation.

The materials for the construction of drops range from sheet piling to concrete. Boulder drops offer a possible alternative within park areas so that the structures blend better with the surroundings. Check structures can be constructed using either concrete or timber, however, concrete checks should be installed where City or County maintenance will be provided along Bear Creek and Constellation Gulch. Rock facings can be applied to the crests of the checks to blend the structures with the surroundings. Timber checks are practical for use along the natural ravines within the private residential areas below Gold Camp Road, where access to the flow path is limited by structures or by inadequate easements.

Floodplains

The future 100-year floodplain for Bear Creek has been presented on the preliminary design plans. Above the proposed Motor City Drive extension, 100-year flooding on the north and south overbanks will occur. The siting of future structures should take into account the potential for flooding and appropriate flood protection measures followed. Below the Motor City Drive extension, the existing and future condition floodplain will be contained within the drainageway banks.

Upon construction of the drainageway improvements or bridges shown in this plan, revisions to the Colorado Springs Flood Insurance Study should be processed through the Federal Emergency Management Agency (FEMA). In most cases within the existing park areas, construction within the low flow area will have little or no impact upon base flood elevations.

Trails

As previously presented, the Bear Creek Trail is a primary trail corridor in the area. Linkage to the proposed Fountain Creek trail can be accomplished once the channel is reconstructed between 8th Street and I-25. It is suggested that the trail be sited on the south side of Bear Creek from I-25 to upstream of the proposed 8th Street bridge. From this point, trail systems exist to allow a trail user to pass through Bear Creek Park, and eventually to the Bear Creek Nature Center.

In reaches where a trail is needed adjacent to the low flow area, the trail mat should be constructed to withstand maintenance equipment typically used by public works and parks forces. In most cases, Bear Creek is accessible via existing trails, natural benches, or parking areas with Bear Creek Park, and therefore a formal trail mat is not required. Above 21st Street, accesses to the creek (such as a maintenance bench) should be limited to specific locations. Formal trails should be constructed of gravel or other stabilized material, however, a concrete wearing surface will be required where the trail elevation is below the 10-year water surface profile, such as at the roadway crossings.

Maintenance and Revegetation

Maintenance of drainageway facilities is essential in preventing long term degradation of the creek and its environs. Within the park areas, clearing of debris and dead vegetation should be considered within the low flow area. Trimming and thinning of shrubs and trees should be carried out if greater visual and physical access to the creek is desired. On the overbanks, limited maintenance of the existing vegetative cover is sufficient. Yearly clearing of trash and debris at roadway crossings is also recommended to ensure the design capacity of the crossing, and to enhance the crossings for trail users.

Initially, selective clearing and thinning of trees and other vegetation will be required in order to construct the recommended drainageway facilities. Drops and checks should be

sited to limit the disturbance to large trees, and in some cases to better preserve existing vegetation. Where large trees cannot be avoided, replacement of trees lost due to construction is recommended. Areas disturbed during drainageway and/or trail construction should be revegetated to prevent erosion and sedimentation. In areas of particularly dense vegetation, construction access plans should be developed as part of the final design development which would limit the disturbance to existing vegetation.

Along Constellation Gulch, a ten-foot maintenance trail is recommended. Existing drainage easements and road right-of-ways should be sufficiently wide to allow for the construction of the stabilized channel section, drops, checks, and maintenance trail. Below Cresta Drive, the Constellation Gulch drainageway has been the site of trash and debris dumping. This debris eventually ends up in Bear Creek and at road crossings downstream of Cresta Drive. Vehicle access to the maintenance trail should therefore be limited to City vehicles, and access points barricaded accordingly. The City and the County cannot provide maintenance wherever access is not provided to the facilities. The City will not accept these facilities for reimbursement or maintenance.

Right-of-Way

The majority of Bear Creek is currently within City or County jurisdiction, and therefore acquisition of a formal right-of-way is not necessary for the construction of drainageway improvements. The exception to this is below 8th Street, and within the "Pinello" property, west of 21st Street. It is recommended that a contiguous 100-foot wide right-of-way or easement be acquired from 8th Street to I-25. A portion of this property is currently owned by the City of Colorado Springs, however, two privately-owned parcels currently exist which span the proposed drainageway, east of 8th Street. Where storm sewers cross City or County park land, developers should be required to obtain drainage easements for such outfall facilities.

Lower Constellation Gulch is currently within a public right-of-way, easement or dedicated tract of land, or City ownership, therefore, no acquisition of property is envisioned. Above Parkview Boulevard, an existing platted road and drainage easement exists, however, the gulch has meandered outside of these areas at several locations. Upon development of the land adjacent to the Gulch above Parkview Boulevard, a storm sewer of 100-year capacity will be required within the platted street or drainage right-of-way, which will outfall to the proposed culvert under Parkview Boulevard.

Within the Skyway Northwest, Skyway Heights and Top of Skyway developments, the natural ravines and "meander belts" have been shown as open space areas, with the responsibility for maintenance lying with the homeowners abutting these areas. These "meander belts" must be established during the platting of new developments. These belts must be sufficiently wide enough to protect future residential structures from the erosive action along the drainageways. Access to these areas are limited to the side lot easements between the platted lots, and many times have been blocked by structures, landscaping, or are simply too steep to drive equipment over. No property acquisition is recommended in such areas for the purposes of drainageway construction. Impact of "public" waters off of streets has been addressed by the siting of outlet structures (refer to Drawings) at the outfall of roadway culverts. Easements for the maintenance of the outlet structures will be required since many of the culvert outlets extend outside of the road right-of-way.

Roadway Bridge and Culvert Replacements

Along reaches 1 through 5 of Bear Creek, the existing structures at Eighth Street and 21st Street over Bear Creek are of insufficient capacity to convey the 100-year developed flow without overtopping the roadway. Both of these roads are key arterials within the City and be criteria should not be overtopped in the 100-year event. New structures have been sized at these locations. At Bear Creek and the High Drive Road (at

the terminus of Reach 5), a new culvert has been sized. This culvert will prevent flows exceeding the 10-year frequency from flowing down Bear Creek Road. No roadway crossings have been specified in this Plan for the reaminder of the reaches in the basin.

Erosion and Sedimentation Control

Soils in the Bear Creek Basin vary widely and because of this, areas within the basin are subject to varying degrees of hazard resulting from sediment being transported to the drainageway(s). During the collection of field and drainage inventory data, numerous areas were noted which were being impacted by either erosion (of one form or another), or sediment deposition. The areas impacted ranged from localized bank failures to roadway embankments and slopes thousands of square feet in area. The soil make up of the basin is generally highly erodible, and this is particularly the case in the residential areas of Skyway Northwest, Skyway Heights and Top of Skyway. The disturbance of the native vegetation and failure to properly revegetate areas impacted by site development, utility, roadway and landscape construction activities has in some cases negatively affected downstream portions of the basin.

The City of Colorado Springs has enacted an erosion control ordinance to address these problems. In general, it is the responsibility of the entity conducting any land disturbance activity to properly control surface runoff, erosion and sedimentation during and after the activity. Technical criteria identifying measures which help mitigate the impacts of erosion and sedimentation is available and being used throughout the Front Range area. Minimum requirements must be developed to properly control erosion, as described in the following discussion.

General

Erosion control is necessary to prevent environmental degradation caused by wind or water-borne soil. The following

minimum criteria and standards are intended to prevent excessive erosion. The City of Colorado Springs as well as other effected agencies reserve the right to enforce the Clean Water Act standards if the planned erosion control measures fail to perform satisfactorily. Evidence of visual erosion will determine the effectiveness (or lack of) of erosion control measures. Proper installation and maintenance is necessary to achieve the desired function of erosion control measures. By paying attention to quality, reinstallation can be avoided. The general requirements for erosion control are as follows:

1. Any land disturbing activity shall be conducted so as to effectively reduce unacceptable erosion and resulting sedimentation.

2. All land disturbing activities shall be designed, constructed, and completed in such a manner that the exposure time of disturbed land shall be limited to the shortest possible period of time.

3. Sediment caused by accelerated soil erosion and runoff shall be intercepted by sediment traps and contained within the site.

4. Any facility designed and constructed to convey storm runoff shall be designed to be non-erosive.

5. Erosion control measures will be used prior to and during construction. Temporary erosion control measures are required during construction, and permanent erosion control measures are required for all developments. Maintenance of erosion control measures is the responsibility of the property owner.

Various structures have been proposed in this plan to control localized erosion and sedimentation problems. It is important that the erosion control plan for any land disturbing activity be strictly adhered to, and maintained so that the above minimum criteria can be achieved in the Bear Creek Basin.

VII. PLAN IMPLEMENTATION

General

Many of the channel sections shown may be modified to fit specific site conditions with the exception of the Bear Creek channel below the proposed Motor City Drive extension. Drop and check locations are approximate and may be moved to minimize disturbances to existing vegetation, roads, trails, and utilities. Improvements within the Skyway and Top of Skyway will be highly dependent upon future road locations and residential development next to the existing flow paths.

Improvements along Bear Creek within the park areas should be completed with two goals in mind: (1) to provide a more stable drainageway, (2) to maintain and enhance the visual setting of the creek, and (3) preserve the natural setting of the creek. Construction of drops or checks could be combined with trail crossings of the creek. Low flow boulder linings could be constructed adjacent to park activity and picnic areas in order to make the creek more visually pleasing. Localized creek improvements will be necessary as trails transition at roadway crossings, or at stream crossings.

Construction of checks and culvert outfall structures within the Skyway Heights and Top of Skyway developments should be completed at the time of roadway grading. In areas in need of immediate stabilization, local homeowner groups should consider sharing the cost of the timber check within the private preservation areas, with the recognition that damages to the existing flow paths can negatively impact a much wider area, due to bank sloughing and sedimentation.

In existing areas where the drainage facilities are inadequate, capital improvement projects will be necessary. This will be particularly true within the existing Skyway, Parkview, developments, and existing residential areas adjacent to Constellation Gulch. Runoff from streets has caused damage to private residences in some locations.

Cost Estimate

Presented on Table 11 (at the conclusion of this Chapter) is a cost estimate for the drainageway improvements shown on the preliminary design plans. The cost estimate has been based upon the unit costs shown on Table 10. The total cost of the improvements have been broken down by potential funding sources. Costs listed as "reimbursable" would be subject to the drainage and bridge fee calculation presented in this section. Costs associated with utility relocation have been estimated, but not included in the total costs. Utility costs are considered to be contained within the contingency shown in the cost estimates. Presented on Table 12 are the costs for bridge improvements within the Lower Bear Creek Basin. The reimbursable bridge costs have been calculated in accordance with the City/County Drainage Criteria Manual and related City codes. Finally, the costs for habitat mitigation have not been included since there were no areas judged to be lost as a result of the construction of the facilities recommended in this plan. The cost of protection and/or replacement of habitat impacted by the construction of the facilities has been included within the unit construction costs for each specific item.

Certain improvements within the Bear Creek Basin are considered to be shown as capital improvement costs. This type of funding will be required where existing systems are either non-existent or inadequate, or where the area tributary to such systems are either fully developed or have no unplatted developable acreage draining to the system. For existing systems in need of upgrade to handle the future condition design discharges, the total costs have been prorated between reimbursable and non-reimbursable costs using the area of unplatted versus platted land tributary to such systems. The policy of prorating systems in need of upgrade between reimbursable and non-reimbursable costs using acreage (or flow rate), has been recently developed by the City and the City/County Drainage Board in an effort to more equitably distribute the costs of major drainage improvements within the

Table 10. Unit Construction Costs.

Item	Unit	Unit Cost
CHANNEL AND HYDRAULIC STRUCTURES		
Excavation Channel	C.Y.	$ 7.50
Excavation Detention	C.Y.	2.00
Filter Material	Ton	25.00
Concrete	C.Y.	350.00
Seeding and Mulching	S.F.	0.15
Riprap, Type H	C.Y.	30.00
Riprap, Type M	C.Y.	24.00
Maintenance Trail	L.F.	16.00
Erosion Netting and Topsoil	S.Y.	1.75
STORM SEWERS		
(RCP-III) 18-inches	L.F.	20.00
(RCP-III) 21-inches	L.F.	22.00
(RCP-III) 24-inches	L.F.	25.00
(RCP-III) 27-inches	L.F.	36.00
(RCP-III) 30-inches	L.F.	42.00
(RCP-III) 36-inches	L.F.	58.00
(RCP-III) 42-inches	L.F.	67.00
(RCP-III) 48-inches	L.F.	80.00
(RCP-III) 60-inches	L.F.	120.00
(HERCP) 29-inches by 45-inches	L.F.	70.00
(CMP) 24-inches	L.F.	25.00
(CMP) 36-inches	L.F.	50.00
(ACMP) 36-inches by 24-inches	L.F.	35.00
REINFORCED CONCRETE BOX CULVERTS		
4 ft. x 12 ft.	L.F.	240.00
5 ft. x 12 ft.	L.F.	260.00
4 ft. x 7 ft.	L.F.	200.00
Three Sided Box Culverts (with channel transitions)	S.F. of deck	65.75
INLETS AND MANHOLES		
5 ft. D10 R		1500.00
10 ft D10R		2000.00
15 ft. D10R		2500.00
20 ft. D10R		3000.00
25 ft. D10R		3500.00
30 ft. D10R		4000.00
10 ft. Radial		2500.00
15 ft. Radial		3000.00
25 ft. Radial		4200.00
5 ft. Manhole, 6 ft. average height		2000.00
BRIDGES	S.F. (Deck Area)	125.00
Contingencies	5% of Construction Cost	
Engineering	10% of Construction Cost	

City of Colorado Springs. No effort was made to further distribute the total costs of upgraded systems by taking into account land uses since each of the upgraded systems had singular land uses tributary to them. Systems in need of upgrade in the Bear Creek basin occur in the Constellation Gulch, Skyway Gulch, Scorpio Gulch, Gardiner Gulch, Orion Drive North and Gold Camp Road sub-basins. The storm sewer systems proposed for Eighth Street and 21st Street were also prorated with respect to unplatted and platted tributary area.

Unplatted Acreage

Using El Paso County Tax Assessor maps, plats, and ownership records, the amount of unplatted acreage was estimated. From these records a total of 717 acres is unplatted, and subject to future development. Park areas have been excluded from the unplatted acreage total. It should be noted that the County Correctional facility property has been excluded form the acreage shown above.

Drainage and Bridge Fee Calculations

Presented on Tables 13 and 14 (at the conclusion of this Chapter) are the drainage and bridge fees calculated for the Bear Creek Basin. Drainage basin fund deficits have been included in the fee calculation, and are current as of December, 1989.

Construction Phasing

For Bear Creek drainage basin, the initial construction effort should be focused at the roadway crossings. For Bear Creek itself, the 8th Street and 21st Street roadway bridge crossings need to be constructed initially so that the 100-year floodplain can be reduced and its potential for damage to the roadways mitigated. Construction of these crossings will also facilitate trail linkage from Fountain Creek to the Bear Creek Nature Center. For Constellation Gulch, the construction of the Cresta Road and Parkview Boulevard box culverts should be considered.

Improvements for Bear Creek within the park areas must be a cooperative effort between the City of Colorado Springs and El Paso County. It is suggested that the grade stabilization and drop/check structures shown on the drawings be constructed where bank sloughing is degrading the adjacent park lands. This is particularly true in the Penrose Stadium area, and extending east to 8th Street. Funds for this construction should come from a combination of capital improvement funds and the drainage basin fee system, if possible. Above 21st Street, the improvements shown in this plan should be constructed in conjunction with storm sewer outfall projects, trail projects, or other park projects which involve the enhancement or stabilization of the creek in order to protect a proposed park activity area. Improvements to Bear Creek above Gold Camp Road are not needed at this time. Improvements above Gold Camp Road should be considered only if greater vehicular access if contemplated for the Bear Creek Canyon Park property owned by the City, or if localized damages occur as a result of flooding. Improvements within Bear Creek Park shown in this plan which are installed by either City, County, or developer forces are reimbursable through the fee system. Improvements not shown in this plan which are constructed within the Park areas must be funded through capital improvement programs.

Storm sewers for the proposed developing areas should be constructed as part of the development draining to the particular outfall system. These systems are all of 100-year capacity. Stabilization of the outlet of the storm sewers in Bear Creek is required, and should be considered part of the storm system. Storm sewers proposed to serve existing residential areas should be considered for construction as soon as possible, with capital improvement project funding (i.e., 21st Street System, Orion Drive System, etc.).

Construction of culvert structures within the Skyway and Top of Skyway areas should be completed at the time of roadway construction. Construction of outlet structures for existing

culverts should be initiated, beginning with the largest diameter, or at locations which are currently degraded.

The construction of all drainage facilities identified in this Plan must be conducted so as to avoid or minimize the impact to environmentally sensitive areas along the drainageways and within the Basin in general. The work should be conducted in conformance with the Section 404 and/or the LOP requirements. In general this Plan has been prepared with the assumption that disturbances to the majority of all sensitive habitat zones can be avoided altogether, and that only temporary impacts should result from the construction of the channels, bridges, storm sewers, grade controls and related structures shown in this Plan.

TABLE 11: PRELIMINARY DESIGN COST ESTIMATE
DRAINAGE FACILITIES
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	CAP. IMP. COSTS (1)	REIMB. COSTS (2)	NON-REIMB. COSTS (3)	REMARKS
BEAR CREEK (REACH 1-5)								
STATION 2+00 TO 21+00								
RIPRAP CHANNEL (1 side)	1050	LF	$150	$157,500	$0	$157,500		
RIPRAP CHANNEL	400	LF	$260	$104,000	$0	$104,000		
DROP STRUCTURES	3	EA	$6,500	$19,500	$0	$19,500		
CHECK STRUCTURES	1	EA	$1,350	$1,350	$0	$1,350		
OUTLET STRUCTURE STA 0+00	1	EA	$15,000	$15,000	$15,000	$0		STRUCTURE WITHIN CDoT ROW
STATION 21+00 TO 54+00								
SELECT BANK & INV. CONST.	2800	LF	$175	$490,000	$490,000	$0		SEGMENT ACROSS PENROSE STADIUM AREA CITY OWNERSHIP. COSTS TO BE BORNE BY
DROP STRUCTURES	6	EA	$6,500	$39,000	$39,000	$0		COUNTY AS PER 1975 AGREEMENT.
CHECK STRUCTURES	1	EA	$1,350	$1,350	$1,350	$0		
STATION 54+00 TO 87+00								WITHIN BEAR CK REG. PARK PROPERTY
SELECT BANK & INV. CONST.	1250	LF	$125	$156,250	$0	$156,250		
BOULDER TRICKLE CHANNEL	500	LF	$50	$25,000	$0	$25,000		
DROP STRUCTURES	3	EA	$8,000	$24,000	$0	$24,000		
TWIN 36-INCH CMP	30	LF	$100	$3,000	$3,000	$0		TRAIL CROSSING WITHIN PARK
STATION 87+00 TO 166+50								WITHIN BEAR CREEK REG. PARK PROPERTY
SELECT BANK & INV. CONST.	2450	LF	$125	$306,250	$0	$306,250		INCLUDES THE PINELLO PROPERTY
DROP STRUCTURES	2	EA	$8,000	$16,000	$0	$16,000		
CHECK STRUCTURES	3	EA	$3,000	$9,000	$0	$9,000		
STATION 166+50 TO 190+00								
RIPRAP BANK LININGS	1900	LF	$175	$332,500	$0	$332,500		
CHECK STRUCTURES	2	EA	$1,350	$2,700	$0	$2,700		
CONSTELLATION GULCH (REACH 6)								
STATION 0+00 TO 26+50								
STABILIZED CHANNEL	1000	LF	$125	$125,000	$0	$125,000		
DROP STRUCTURES	6	EA	$6,500	$39,000	$0	$39,000		
STATION 26+50 TO 56+00								
STABILIZED CHANNEL	2150	LF	$125	$268,750	$0	$268,750		
DROP STRUCTURES	12	EA	$6,500	$78,000	$0	$78,000		
CHECK STRUCTURES	4	EA	$1,350	$5,400	$0	$5,400		
12'W x 5'H CBC(PARKVIEW)	80	LF	$300	$24,000	$8,880	$15,120		
REACH 7 156+00 TO END								FACILITIES PRORATED BASED UPON AREA
18" RCP	1520	LF	$20	$30,400	$11,248	$19,152		63% UNPLATTED (2); 37% PLATTED (1)
24" RCP	930	LF	$22	$20,460	$7,570	$12,890		"
30" RCP	870	LF	$42	$36,540	$13,520	$23,020		"
48" RCP	140	LF	$80	$11,200	$4,144	$7,056		"
60" RCP	150	LF	$120	$18,000	$6,660	$11,340		"
24"X36" ACMP	50	LF	$35	$1,750	$648	$1,103		"
5' D10R	1	EA	$1,500	$1,500	$555	$945		"
10' D10R	2	EA	$2,000	$4,000	$1,480	$2,520		"
15' D10R	1	EA	$2,500	$2,500	$925	$1,575		"
30' D10R	2	EA	$4,000	$8,000	$2,960	$5,040		"
10' RADIAL INLET	4	EA	$2,500	$10,000	$3,700	$6,300		"
20' RADIAL INLET	2	EA	$3,600	$7,200	$2,664	$4,536		"
5' MANHOLES	10	EA	$2,000	$20,000	$7,400	$12,600		"
18" CMP	240	LF	20	$4,800	$1,776	$3,024		"
CHECK STRUCTURES	4	EA	$1,350	$5,400	$1,998	$3,402		"
OUTLET STRUCTURES	2	EA	$900	$1,800	$666	$1,134		"

TABLE 11: PRELIMINARY DESIGN COST ESTIMATE
DRAINAGE FACILITIES
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	CAP. IMP. COSTS (1)	REIMB. COSTS (2)	NON-REIMB. COSTS (3)	REMARKS
SKYWAY GULCH (REACH 12)								
TIMBER CHECKS	3	EA	$700	$2,100	$0	$0	$2,100	THESE FACILITIES LIE WITHIN PRIVATELY
OUTLET STRUCTURES	3	EA	$900	$2,700	$0	$0	$2,700	OWNED LOTS. NO PUBLIC EASEMENTS EXIST
RIPRAP SWALE	250	LF	$30	$7,500	$0	$0	$7,500	IN THIS AREA OF THE BASIN.
18" RCP	340	LF	$20	$6,800	$0	$0	$6,800	"
24" RCP	390	LF	$25	$9,750	$8,385	$1,365		FACILITIES PRORATED BASED UPON AREA
30" RCP	680	LF	$42	$28,560	$24,562	$3,998		14% UNPLATTED (2); 86% PLATTED (1)
36" RCP	180	LF	$58	$10,440	$8,978	$1,462		"
18" CMP	10	LF	$20	$200	$172	$28		"
36" CMP	80	LF	$50	$4,000	$0	$4,000	$4,000	"
10' D10R	1	EA	$2,000	$2,000	$1,720	$280		"
10' RADIAL INLET	2	EA	$2,500	$5,000	$4,300	$700		"
15' RADIAL INLET	1	EA	$3,000	$3,000	$2,580	$420		"
5' MANHOLES	4	EA	$2,000	$8,000	$6,880	$1,120		"
SCORPIO GULCH (REACH 8)								
4'H x 12'W CBC (21ST STREET)	70	LF	$280	$19,600	$0	$19,600		
CHECK STRUCTURES	6	EA	$1,350	$8,100	$0	$8,100		
RIPRAP CULVERT TRANS.	1	EA	$5,000	$5,000	$0	$5,000		
OUTLET STRUCTURES	4	EA	$900	$3,600	$0	$3,600		
18" RCP	1050	LF	$20	$21,000	$15,750	$5,250		FACILITIES PRORATED BASED UPON AREA
21" RCP	300	LF	$28	$8,400	$6,300	$2,100		25% UNPLATTED (2); 75% PLATTED (1)
27" RCP	410	LF	$36	$14,760	$11,070	$3,690		"
36" RCP	130	LF	$58	$7,540	$5,655	$1,885		"
42" RCP	500	LF	$67	$33,500	$25,125	$8,375		"
5' D10R	2	EA	$1,500	$3,000	$2,250	$750		"
10' D10R	6	EA	$2,000	$12,000	$9,000	$3,000		"
15' D10R	1	EA	$2,500	$2,500	$1,875	$625		"
20' D10R	1	EA	$3,000	$3,000	$2,250	$750		"
30' D10R	1	EA	$4,000	$4,000	$3,000	$1,000		"
5' MANHOLES	10	EA	$2,000	$20,000	$15,000	$5,000		"
CUL-DE-SAC INLET	1	EA	$2,000	$2,000	$1,500	$500		"
GARDINER GULCH (REACH 10)								
24" RCP	350	LF	$25	$8,750	$7,175	$1,575		FACILITIES PRORATED BASED UPON AREA
OUTLET STRUCTURES	5	EA	$900	$4,500	$3,690	$810		18% UNPLATTED (2); 82% PLATTED (1)
20' D10R	2	EA	$3,000	$6,000	$4,920	$1,080		"
5' MANHOLES	2	EA	$2,000	$4,000	$3,280	$720		"

TABLE 11: PRELIMINARY DESIGN COST ESTIMATE
DRAINAGE FACILITIES
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	CAP. IMP. COSTS (1)	REIMB. COSTS (2)	NON-REIMB. COSTS (3)	REMARKS
GOLD CAMP RD SYSTEM (REACH 13)								
CHANNEL SECTION SEG 1	930	LF	$18	$16,740	$11,383	$5,357		FACILITIES PRORATED BASED UPON AREA
CHANNEL SECTION SEG 2	1260	LF	$23	$28,980	$19,706	$9,274		32% UNPLATTED (2); 68% PLATTED (1)
CHANNEL SECTION SEG 3	1150	LF	$18	$20,700	$14,076	$6,624		"
CHANNEL SECTION SEG 4	730	LF	$23	$16,790	$11,417	$5,373		"
CHANNEL SECTION SEG 6	1970	LF	$30	$59,100	$40,188	$18,912		"
DROP STRUCTURES	4	EA	$6,500	$26,000	$17,680	$8,320		"
CONCRETE CHECKS	4	EA	$700	$2,800	$1,904	$896		"
4'H x 7'W CBC	60	LF	$200	$12,000	$8,160	$3,840		"
30" RCP	410	LF	$42	$17,220	$11,710	$5,510		"
36" RCP	480	LF	$58	$27,840	$18,931	$8,909		"
42" RCP	650	LF	$67	$43,550	$29,614	$13,936		"
48" RCP	40	LF	$80	$3,200	$2,176	$1,024		"
TYPE 'D' INLET	4	EA	$1,500	$6,000	$4,080	$1,920		"
OUTLET STRUCTURE	5	EA	$900	$4,500	$3,060	$1,440		"
ORION DRIVE SOUTH (REACH 10)								
TIMBER CHECKS	1	EA	$700	$700	$0	$0	$700	
OUTLET STRUCTURES	2	EA	$900	$1,800	$0	$1,800		
CUL-DE-SAC INLETS	1	EA	$2,000	$2,000	$0	$2,000		
ORION DRIVE NORTH (REACH 11)								
18" CSP	260	LF	$20	$5,200	$2,496	$2,704		FACILITIES PRORATED BASED UPON AREA
24" CSP	200	LF	$25	$5,000	$2,400	$2,600		48% UNPLATTED (2); 52% PLATTED (1)
30" CSP	220	LF	$32	$7,040	$3,379	$3,661		"
18" RCP	250	LF	$42	$10,500	$5,040	$5,460		"
24" RCP	1290	LF	$58	$74,820	$35,914	$38,906		"
30" RCP	620	LF	$67	$41,540	$19,939	$21,601		"
42" RCP	860	LF	$80	$68,800	$33,024	$35,776		"
48" RCP	630	LF	$80	$50,400	$24,192	$26,208		"
INLETS	12	EA	$2,500	$30,000	$14,400	$15,600		"
MANHOLES	14	EA	$2,000	$28,000	$13,440	$14,560		"
TYPE 'D' INLET	1	EA	$1,500	$1,500	$720	$780		"
5'D10R	1	EA	$1,500	$1,500	$720	$780		"

TABLE 11: PRELIMINARY DESIGN COST ESTIMATE
DRAINAGE FACILITIES
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	CAP. IMP. COSTS (1)	REIMB. COSTS (2)	NON-REIMB. COSTS (3)	REMARKS
OUTFALL STORM SEWERS								
RIO GRANDE #1								
42" RCP	530	LF	$67	$35,510	$0	$35,510		
10'D10R	1	EA	$2,000	$2,000	$0	$2,000		
OUTLET STRUCTURES	1	EA	$900	$900	$0	$900		
RIO GRANDE #2								
36" RCP	1860	LF	$58	$107,880	$0	$107,880		
5' MANHOLES	3	EA	$2,000	$6,000	$0	$6,000		
OUTLET STRUCTURES	1	EA	$900	$900	$0	$900		
RIO GRANDE #3								
36" RCP	1020	LF	$58	$59,160	$0	$59,160		
5'D10R	1	EA	$1,500	$1,500	$0	$1,500		
5' MANHOLES	3	EA	$2,000	$6,000	$0	$6,000		
OUTLET STRUCTURES	1	EA	$900	$900	$0	$900		
8TH STREET SYSTEM								
18" RCP	260	LF	$20	$5,200	$4,004	$1,196		FACILITIES PRORATED BASED UPON AREA
21" RCP	20	LF	$22	$440	$339	$101		23% UNPLATTED (2); 77% PLATTED (1)
24" RCP	150	LF	$25	$3,750	$2,888	$863		"
27" RCP	220	LF	$36	$7,920	$6,098	$1,822		"
30" RCP	900	LF	$42	$37,800	$29,106	$8,694		"
36" RCP	780	LF	$58	$45,240	$34,835	$10,405		"
42" RCP	125	LF	$67	$8,375	$6,449	$1,926		"
48" RCP	250	LF	$80	$20,000	$15,400	$4,600		"
29x45 HERCP	110	LF	$70	$7,700	$5,929	$1,771		"
5'D10R	1	EA	$1,500	$1,500	$1,155	$345		"
15'D10R	4	EA	$2,500	$10,000	$7,700	$2,300		"
20'D10R	3	EA	$3,000	$9,000	$6,930	$2,070		"
10' RADIAL INLET	2	EA	$2,500	$5,000	$3,850	$1,150		"
20' RADIAL INLET	1	EA	$3,000	$3,000	$2,310	$690		"
25' RADIAL INLET	1	EA	$4,200	$4,200	$3,234	$966		"
5' MANHOLES	8	EA	$2,000	$16,000	$12,320	$3,680		"
21ST STREET SYSTEM								
24" RCP	480	LF	$25	$12,000	$7,920	$4,080		FACILITIES PRORATED BASED UPON AREA
30" RCP	790	LF	$42	$33,180	$21,899	$11,281		34% UNPLATTED (2); 66% PLATTED (1)
36" RCP	360	LF	$58	$20,880	$13,781	$7,099		"
16'D10R	1	EA	$2,700	$2,700	$1,782	$918		"
20' D10R	1	EA	$3,000	$3,000	$1,980	$1,020		"
10' RADIAL INLET	1	EA	$2,000	$2,000	$1,320	$680		"
22' RADIAL INLET	1	EA	$4,000	$4,000	$2,640	$1,360		"
5' MANHOLES	4	EA	$2,000	$8,000	$5,280	$2,720		"

TABLE 11: PRELIMINARY DESIGN COST ESTIMATE
DRAINAGE FACILITIES
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	CAP. IMP. COSTS (1)	REIMB. COSTS (2)	NON-REIMB. COSTS (3)	REMARKS
CRESTA DRIVE, SOUTH OF CONSTELLATION GULCH								"
18" RCP	920	LF	$20	$18,400	$0	$18,400		
24" RCP	660	LF	$25	$16,500	$0	$16,500		
36" RCP	450	LF	$58	$26,100	$0	$26,100		
42" RCP	450	LF	$67	$30,150	$0	$30,150		
10'D10R	1	EA	$2,000	$2,000	$0	$2,000		
15'D10R	4	EA	$2,500	$10,000	$0	$10,000		
5' MANHOLES	6	EA	$2,000	$12,000	$0	$12,000		
MISCELLANEOUS								
24" CMP (AUTO CENTER DR)	380	LF	$25	$9,500	$0	$9,500		
SUBTOTAL				$3,937,905	$1,349,458	$2,568,647	$23,800	
10% ENGINEEERING				$393,791	$134,946	$256,865	$2,380	
5% CONTINGENCY				$196,895	$67,473	$128,432	$1,190	
TOTAL				$4,528,591	$1,551,877	$2,953,944	$27,370	

NOTES:

(1) Capital improvement costs would be budgeted for by the City, the County, or other publically funded agencies.
(2) Reimbursable costs represent those costs which are for improvements made necessary because development within the basin and are therefore subject to reimbursement through the drainage basin fee system. Only those facilities identified in this Plan are subject to reimbursement.
(3) Private facilities shown in this Plan are not subject to reimbursement through the basin fee system.
(4) No costs for wetland or riparian area mitigation included in this plan for the major drainageways. Surface restoration included in the unit construction costs.
(5) Upgraded system costs prorated based upon acreage of platted (developed or undevelopable), and unplatted (developable)

TABLE 12: BRIDGE COSTS

BEAR CREEK DRAINAGE BASIN PLANNING STUDY

LOCATION	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	CITY COST SHARE (1)	REIMBURSABL COST	REMARKS
8TH STREET	50' CLEAR SPAN (100' ROW)	4250	SF	$125	$531,250	$472,813	$58,438	ARTERIAL ROAD (MAJOR)
MOTOR CITY DR.	100' CLEAR SPA (100' ROW)	8000	SF	$125	$1,000,000	$1,000,000	$0	ARTERIAL ROAD (2) (MAJOR)
21ST STREET	3-SIDED BOX (80' ROW)	2220	SF	$60	$133,200	$122,544	$10,656	ARTERIAL ROAD (MINOR)
PARKING LOT ENT PENROSE STADIUM	3-SIDED BOX (7'X17')	600	SF	$55	$33,000	$0	$0	PRIVATE
BEAR CREEK/GOLD CAMP ROAD	3-SIDED BOX (150LF)	4500	SF	$60	$270,000	$270,000	$0	NON-ART. ROAD
	SUBTOTAL				$1,967,450	$1,865,357	$69,094	
	10 % ENGINEERING				$196,745	$186,536	$6,909	
	5% CONTINGENCY				$98,373	$93,268	$3,455	
	TOTAL				$2,262,568	$2,145,160	$79,458	

(1) COST SHARE BASED UPON PERCENTAGE OF INCREASED FLOW (11% FOR 8TH STREET, 8% FOR 21ST STREET)

(2) BRIDGE TO BE CONSTRUCTED USING CAPITAL IMPROVEMENT FUNDS FOR FOUNTAIN BOULEVARD EXTENSION.

TABLE 13: DRAINAGE BASIN FEE CALCULATION
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

TOTAL REIMBURSABLE DRAINAGE COSTS	$2,953,944
DRAINAGE BASIN PLANNING STUDY COSTS	$77,737
DRAINAGE BASIN FUND DEFICIT (09/16/91)	$341,060
TOTAL	$3,372,741
TOTAL UNPLATTED ACREAGE	717
DRAINAGE BASIN FEE ($/ACRE)	$4,704

TABLE 14: BRIDGE FEE CALCULATION
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

TOTAL REIMBURSABLE BRIDGE COSTS	$79,458
TOTAL UNPLATTED ACREAGE	717
BRIDGE FEE (&/ACRE)	$111

APPENDIX A

Preliminary Design Drawings
(8 Sheets)

PRELIMINARY DESIGN

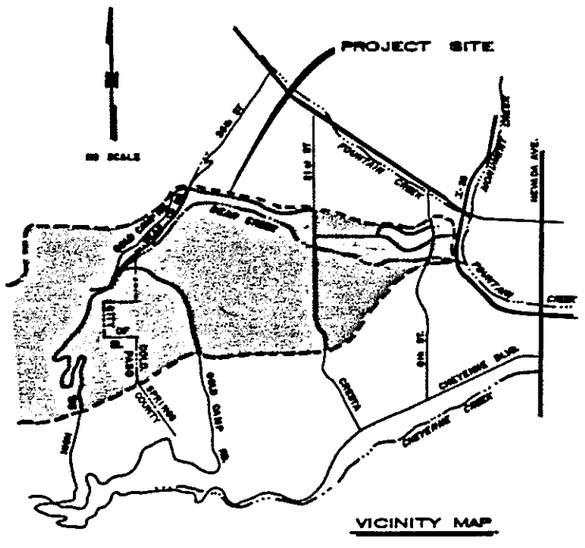
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

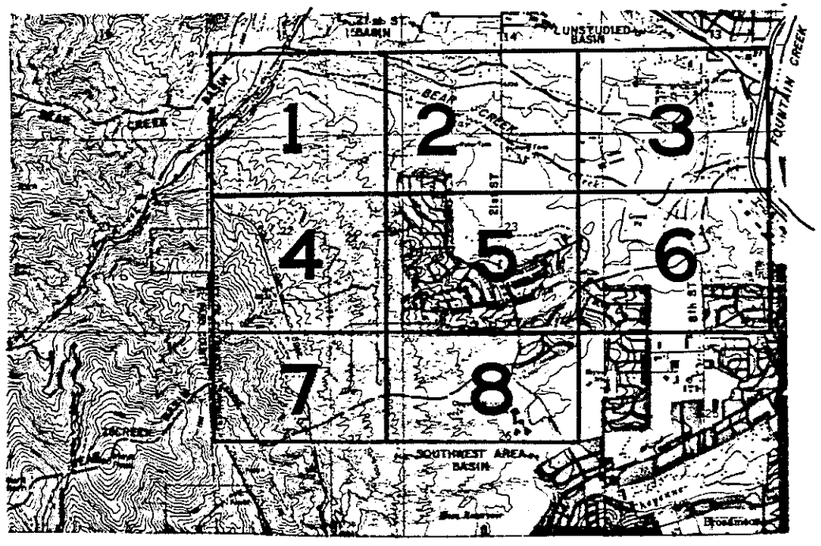
CITY OF COLORADO SPRINGS, COLORADO

DEPARTMENT OF PUBLIC WORKS

LEGEND

- BASIN BOUNDARY
- CHANNEL BASELINE & 100-YR. FLOODPLAIN (140)
- EXISTING PIPE, INLET & OUTFALL
- PROPOSED PIPE
- PROPOSED OUTLET STRUCTURE
- PROPOSED DROP STUCTURE
- PROPOSED AREA OF BANK INVERT STABILIZATION





INDEX OF SHEETS

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CITY OF COLORADO SPRINGS 1872

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

BEAR CREEK REACHES 4&5
PROFILE & SECTIONS
STA. 125+70 to STA. 177+30

Project No.	88.12.26
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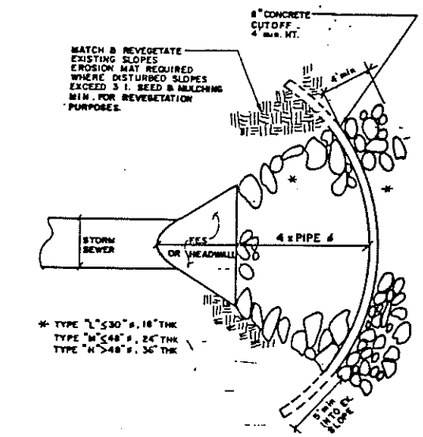
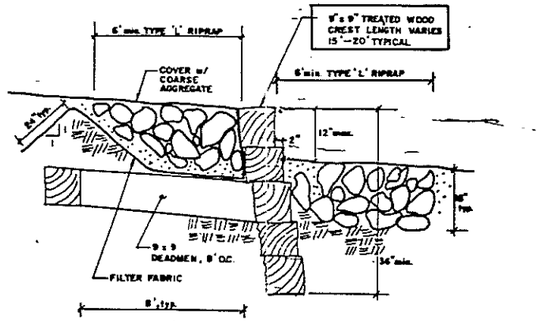


TYPICAL STORM SEWER / CULVERT OUTLET STRUCTURE

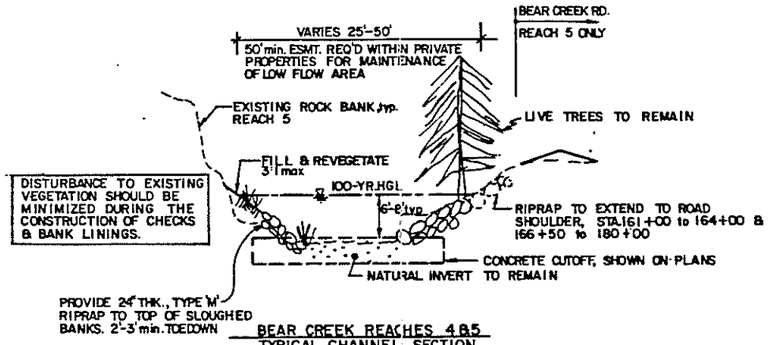
nts

NOTE: THIS DETAIL TO BE APPLIED ALONG DRAINAGEWAYS WHICH ARE CONTAINED WITHIN PRESERVATION EASEMENTS, & LOCATIONS WHERE CONSTRUCTION ACCESS IS LIMITED.

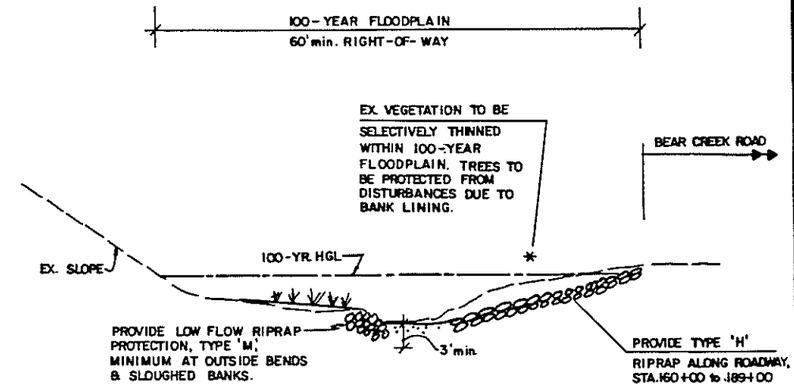


TIMBER CHECK STRUCTURE

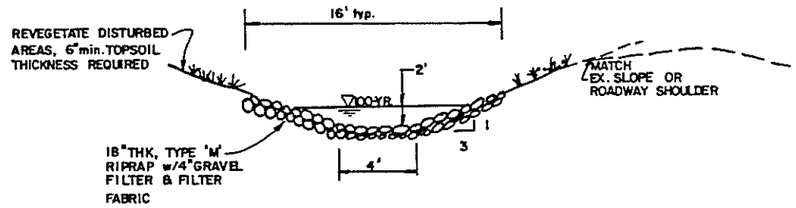
nts



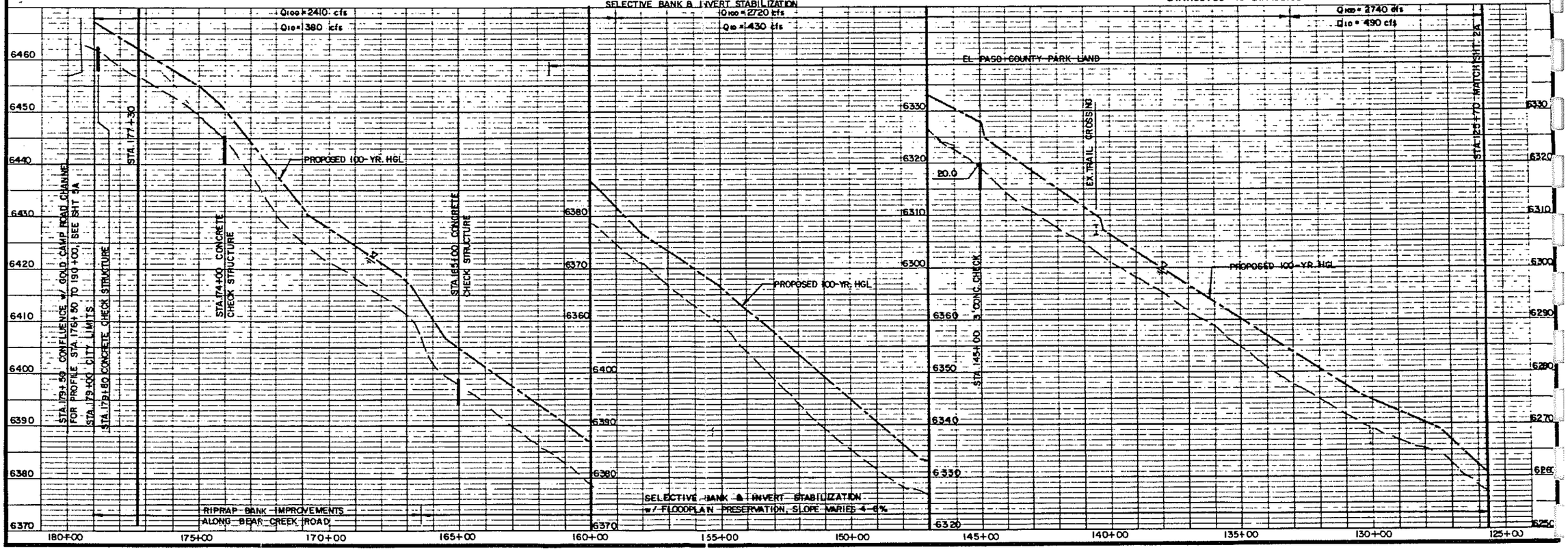
BEAR CREEK REACHES 4&5
TYPICAL CHANNEL SECTION
SELECTIVE BANK & INVERT STABILIZATION



SECTION 162+00



GOLD CAMP ROAD OUTFALL
CHANNEL SECTION SEGMENT 6
STA. 185+00 ± to STA. 190+00



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BEAR CREEK BASIN BOUNDARY

LOWER GOLD CAMP ROAD

WETLAND & RIPARIAN AREAS ALONG BEAR CREEK TO BE PRESERVED & PROTECTED FROM DAMAGES FROM CONSTRUCTION ACTIVITIES.

BEAR CREEK NATURE CENTER

UNIMPROVED CHANNEL

3'DONC. SHECK SEE DETAIL SHT 5A

100-YR. EX./FUTURE CONDITION FLOODPLAIN

STA. 125+70 REACH 4

E-21
E-22

E-21 / F-21
E-22 / F-22

FOR TYPICAL CHANNEL SECTION, BEAR CREEK REACHES 4 & 5, SEE SHEET 1A.

CONCRETE CHECK STRUCTURE

PRIVATE OWNERSHIP

N

0' 100' 200' 300' 400' 500'
SCALE IN FEET

5' MINIMUM WIDTH RIGHT-OF-WAY ACQUISITION REQ'D STA. 166+50 to STA. 175+50

RIPRAP ROADSIDE BANK STA. 166+50 TO STA. 180 ±00

EL PASO - COUNTY PARK BOUNDARY

APPROX. EX. SUBDIVISION

CITY PARK BOUNDARY

U.S.F.S. LIMITS

150 LF NEW 8'H x 30'W 3-SIDED BOX

SKYWAY NORTHWEST

CONCRETE CHECK STRUCTURE SEE DETAIL SHEET 5A

PROVIDE RIPRAP ALONG LOW FLOW AREA AT CONFLUENCE, EXTENDING DOWNSTREAM TO CHECK STRUCTURE

EX. CULVERTS TO REMAIN

TIMBER CHECK STRUCTURE S.SEE DETAIL SHT. 1A

END REACH 5 STA. 190+00

CONCRETE CHECK STRUCTURE SEE DETAIL SHT. 5A

PROVIDE OUTLET STRUCTURE SEE DETAIL SHT. 1A

350 LF 24" RCP @ 4.0%

EX. CMP TO REMAIN

CITY PARKLAND

RIPRAP CHANNEL PRESERVE EXISTING TREES

10' RADIAL INLET w/18" RCP OUT

PROVIDE OUTFALL STRUCTURE

TIMBER CHECK

580 LF 30" RCP @ 4.0%

180 LF 36" RCP @ 4.0%

15' RADIAL INLET w/18" OUT

10'-0"-R w/ TYP. RIPRAP 2 REAR

EX. 3.5' x 9' BRIDGES TO BE REMOVED

BEAR CREEK CANYON PARK (CITY)

CITY OF COLORADO SPRINGS

SEE TYPICAL SECTION SHT. 1A

PROVIDE 36" CMP w/OUTLET STRUCTURE (PRIVATE)

FUTURE ORION DRIVE TOP OF SKYWAY ±10

UNPLATTED

PROVIDE 180 LF, 18" CMP WITHIN DRAINAGE ESMT.

TO SKYWAY GULCH OUTFALL

570 LF 24" RCP @ 3.0%

5'D-10-R w/18" RCP OUT

NATURAL SWALE

MATCH LINE SHEET 2

MATCHLINE SHEET 4

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

BEAR CREEK STA. 125+70 to STA. 190+00

PRELIMINARY PLAN

Project No.	88.12.26
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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

BEAR CREEK REACHES 3 & 4
PROFILE & SECTIONS
STA. 63+90 to STA. 125+90

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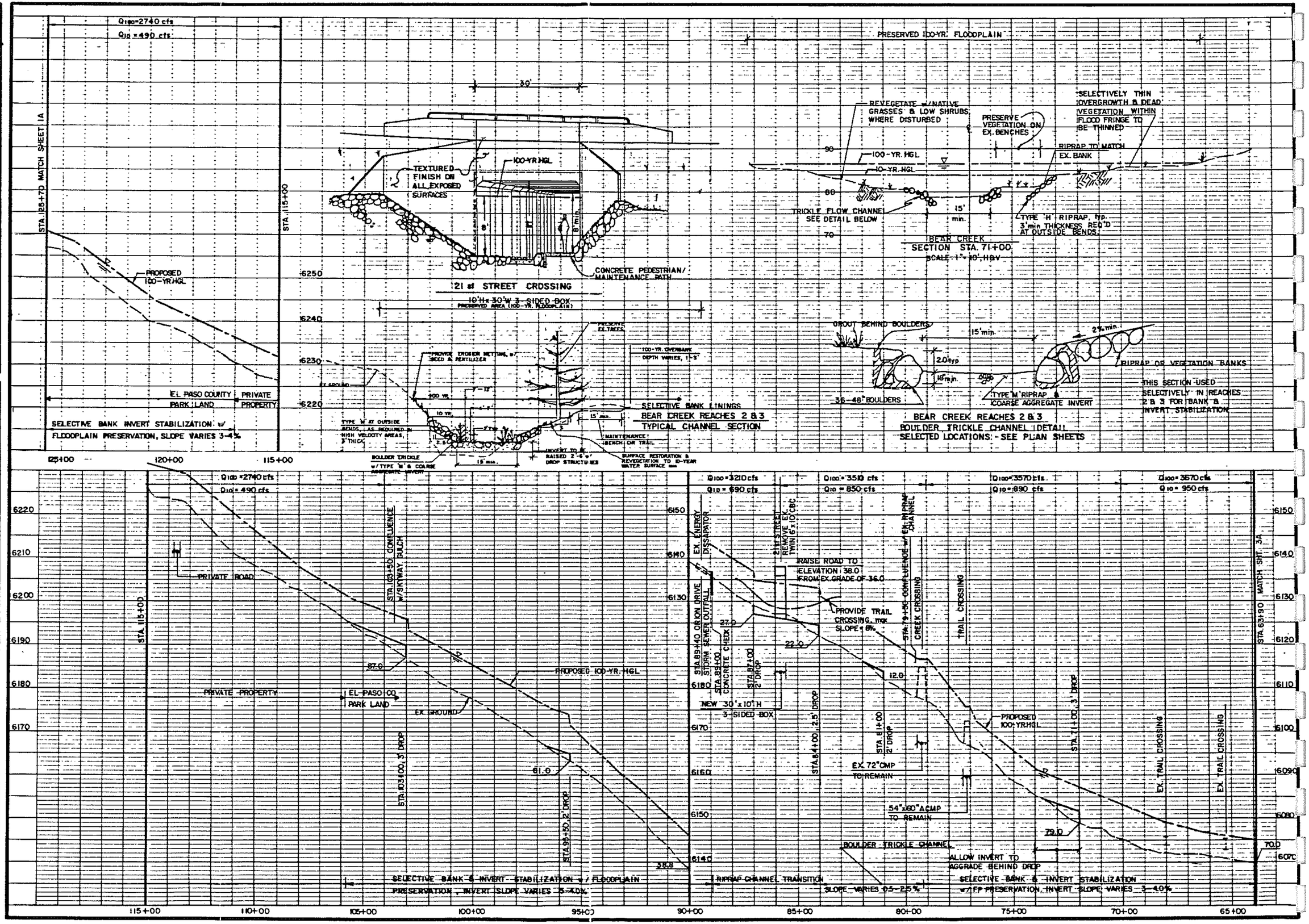
2A



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N

0' 100' 200' 300' 400' 500'
SCALE IN FEET

BEAR CREEK BASIN BOUNDARY

REACH 4
STA 125+70

MATCHLINE SHEET 1

MATCHLINE SHEET 3

MATCHLINE SHEET 5

WOLD CANYON ROAD

UNPLATTED

100 YR. EXISTING/FUTURE CONDITION FLOODPLAIN

WETLAND & RIPARIAN AREAS ALONG BEAR CREEK TO BE PRESERVED & PROTECTED FROM DAMAGES FROM CONSTRUCTION ACTIVITIES

PRIVATE CULVERT

PARK TRAILS

EL PASO COUNTY PARK BOUNDARY

PRIVATE OWNERSHIP

5' CONC. DROP SEE DETAIL SHT 5A

OUTLET OF 72" CMP

2' CONC DROP

210 LF 36" RCP @ 5.0%

FOR TYPICAL CHANNEL SECTION, BEAR CREEK REACH 4, SEE SHEET 1A

EXISTING CONC. BAFFLE ENERGY DISSIPATOR

CONC. CHECK

10' RADIAL INLET

FOUNTAIN BLVD.

480 LF 24" RCP @ 7.0%

EL PASO CO. PARK

SUBBASIN BOUNDARY TRIBUTARY TO PROPOSED STORM SEWER OUTFALL, RIO GRANDE & 5

20' D-10-R

16' D-10-R w/18" RCP OUT

FOR TYPICAL CHANNEL SECTION, BEAR CREEK REACH 3, SEE SHEET 2A

790 LF 30" RCP @ 7.0%

PROPOSED 21st ST. STORM SEWER SYSTEM

22' RADIAL INLET w/ 24" RCP OUT

UNPLATTED

PROVIDE 10' WIDE TRAIL CROSSING

RIO GRANDE

5' D-10-R

REMOVE 24" CMP

5' CONC DROP

EL PASO COUNTY PARK

REMOVE EX. 2-6ft x 10' W. BOX'S

NEW 10'H x 30'W 5-SIDED BOX w/ BRIDGE DRAINS

STA 85+50 END REACH 3

REMOVE EX. CONC. WALL

RIO GRANDE 1020 LF 36" RCP @ 4.0% Q100=180 cfs Q10=30 cfs

DRAINAGE ESMT. THROUGH PARK REQ'D FOR STORM SEWER

96" x 60" ACMP TO REMAIN

72" CSP

100-YR. FUTURE CONDITION FLOODPLAIN

3' CONC DROP

REACH 3
STA. 63+90

100-YEAR OVERFLOW TO BE ELIMINATED WITH CONSTRUCTION OF NEW BRIDGE AT 21st ST.

EX. CMP CULVERTS & FOOTERIDGES TO REMAIN

PROVIDE OUTLET STRUCTURE

EX. CONDITION SCORRIO GULCH 100-YR FLOODPLAIN

17-INL-50 5' INLET

17-INL-52 84" RCP

17-PIP-153 48" RCP

17-INL-160 10'D19

17-INL-19 10'D-10-R

17-PIP-125 66" CSP

PROP 24" RCP

PROP 30" RCP

PROP 42" RCP's

PROP 48" RCP's

ORION DRIVE NORTH OUTFALL SYSTEM

ORION DR.

PLUTO DR.

VESTA DR.

EASTMAN DR.

ARGUS DR.

SOUTHERN CROSS

COURT

21st ST.

F-21 G-21
F-22 G-22

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

BEAR CREEK STA. 63+90 to STA. 125+70

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

BEAR CREEK REACHES 1, 2 & 3
PROFILE & SECTIONS
STA. 0+00 to STA. 63+90

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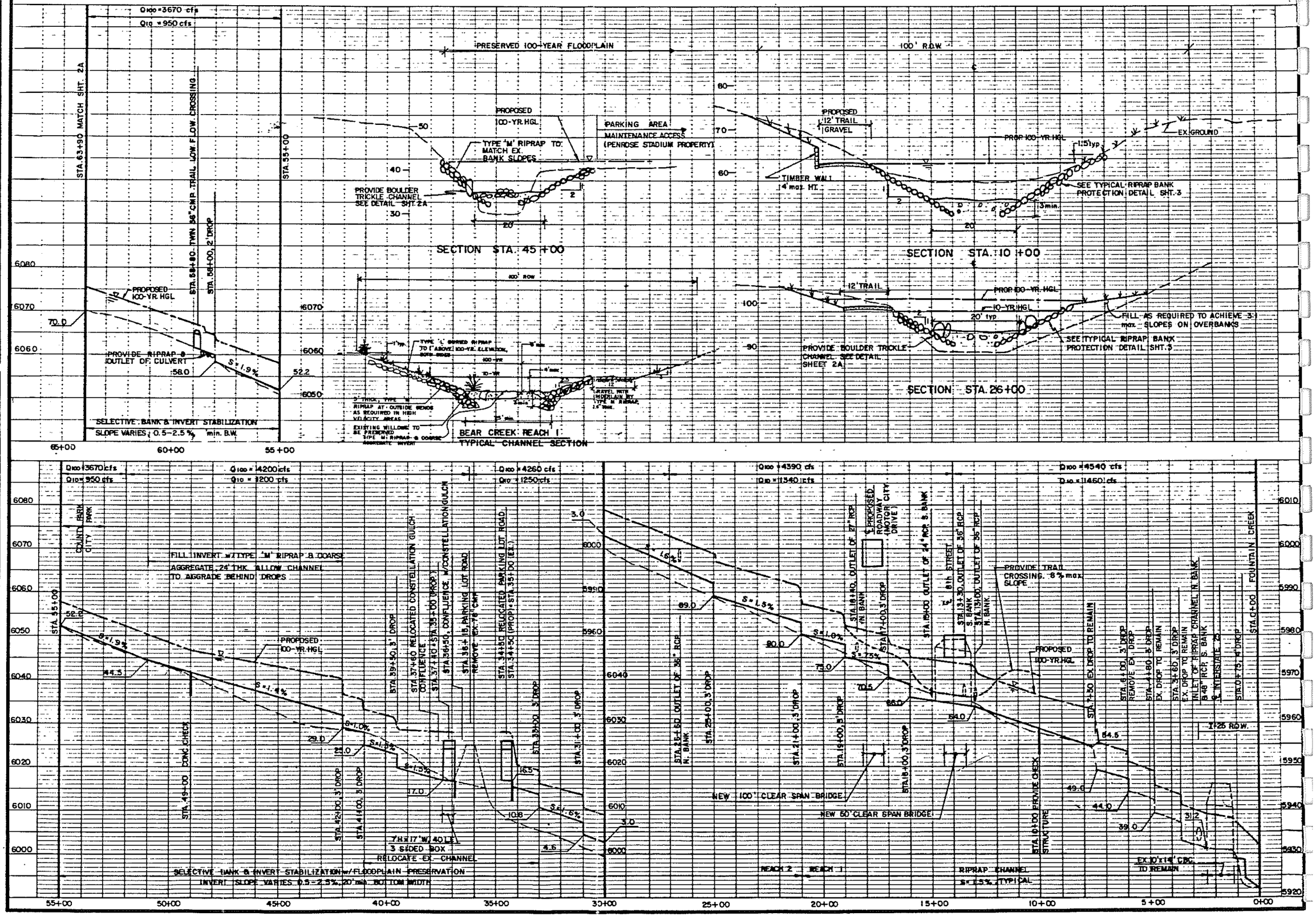
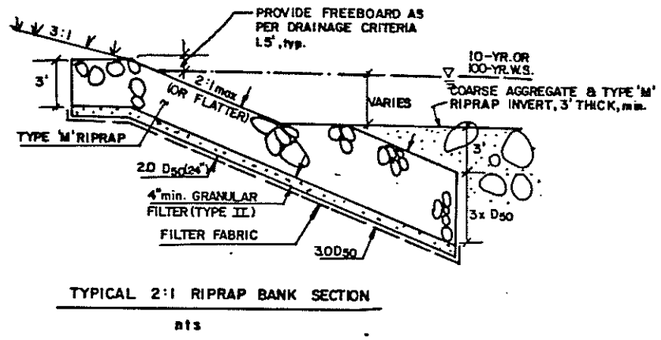
3A





TYPICAL 2:1 RIPRAP BANK SECTION

nts

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WETLAND & RIPARIAN AREAS ALONG BEAR CREEK TO BE PRESERVED & PROTECTED FROM DAMAGES FROM CONSTRUCTION ACTIVITIES.

100-YR. FLOODPLAIN FOR FUTURE CONDITION FLOWS CONTAINED WITHIN CHANNEL SECTION STA. 0+00 to STA. 21+00. OVERTOPPING AT 8th STREET TO BE ELIMINATED UPON CONSTRUCTION OF NEW BRIDGE.

MATCH SHEET 2

MATCH SHEET 6

G-21 H-21

G-22 H-22

19,000 N

SUB BASIN BOUNDARY TRIBUTARY TO PROP RIO GRANDE AVE. STORM SEWER # 2

BEAR CREEK BASIN BOUND.

MORENO

Qa = 78 cfs
Qrca = 115 cfs

REMOVE EX. CMP & INLET

RIO GRANDE # 2
1860 LF, 36" RCP @ 4.0%, Q=120 cfs

UNPLATTED

RIO GRANDE DR.

JUVENILE CORRECTIONS FACILITY

FOR TYPICAL CHANNEL SECTION, BEAR CREEK REACH 2 & 3, SEE SHEET 2A

SUB-BASIN BOUNDARY TRIBUTARY TO PROPOSED RIO GRANDE AVE STORM SEWER OUTFALL # 1

Qa = 115 cfs
Qrca = 175 cfs

COUNTY PARK OWNERSHIP

PENROSE STADIUM COMPLEX

REACH 3 STA. 63+90

100-YR. FUTURE CONDITION FLOODPLAIN

100-YEAR EXISTING / FUTURE FLOODPLAIN

3' CONC. DROP

BEAR CREEK

END REACH 2 STA. 21+00

UNIMPROVED CHANNEL

LOW FLOW TRAIL CROSSING 30 LF, 2-36" CMP @ 1.5%

OVERLAND FLOW FROM SCORPIO GULCH

CONCRETE CHECK

PUBLIC TRAIL

STA. 43+10

STA. 32+20

REMOVE EX. CMP & INLET

PROPOSED MOTOR CITY DRIVE EXTENSION RIO GRANDE # 1
230 LF, 42" RCP @ 3.0%, Q=175 cfs

CITY OWNERSHIP

PROVIDE RIPRAP HI-SLOPE PROTECTION AT OUTSIDE BENDS OF SLOUGHED BANKS

3' CONC. DROPS

17-CUL-135
36" CSP

PROVIDE OUTLET STRUCTURE

BASIN STAR-LOW FLOW CHANNEL & FLOOD PLAIN PRESERVATION

FILL SLOUGHED BANK

3' CONC. DROP SEE DETAIL SHT. 5A

EX. 8TH STREET

APPROXIMATE LOCATION OF FOUNTAIN CREEK 100-YR. FLOODPLAIN

POTENTIAL OVERFLOW AREA FROM FOUNTAIN CREEK

EXISTING 28' GRATED INLET w/24" RCP OUT

EX. 36" RCP TO REMAIN

EXISTING 42" RCP

20' RADIAL INLET w/60 LF 29"x45" HERCP @ -3.7% OUT

17-CHA-170 RIPRAP CHANNEL

EXISTING 20'D-10-R TO BE MODIFIED

225 LF, 42" RCP TO EX. INLET

20' INLET w/50 LF 29"x45" HERCP @ 2.0%

20'D-10-R w/ 100 LF 24" RCP

HUMANE SOCIETY

ABBOTT LN.

17-INL-36 BOX INLET

STORM SEWER SYSTEM IN 8th STREET TO BE PROVIDED AS PART OF 8th STREET IMPROVEMENT PROJECT

17-CUL-178

EXTEND 24" CMP TO RIPRAP CHANNEL

17-CHA-177 RIPRAP CHANNEL

NEW 50' CLEAR SPAN BRIDGE w/ BRIDGE DRAINS

AUTO CENTER DR.

660 LF 36" RCP @ 1.5%

17-CUL-136 18" CMP

15'D-10-R w/ 18" RCP OUT

120 LF, 36" RCP @ 1.5% w/ FES @ CREEK

EX. RIPRAP CHANNEL

17-CUL-179

PROTECT EX. POWER POLE ON N. BANK

EX. 100-YR. OVERFLOW AREA

15'D-10-R

15'D-10-R w/ 200 LF 18" RCP OUT

REMOVE EX. CMP & INLET

END REACH 1 STA. 10+00

2-10'H x 14'W CBC TO REMAIN

BEAR CREEK & FOUNTAIN CREEK CONFLUENCE, STA. 0+00

STA. 2+30

18,000 N

4' DROP w/ RIPRAP INVERT

3' CONC. DROP

DROP STRUCTURE TO REMAIN

17-PIP-2 48" RCP

250 LF, 48" RCP @ 3.0%

15'D-10-R w/ 21" RCP OUT

20'D-10-R w/ 24" RCP OUT

MOTOR CITY DR.

NEW 100' SPAN BRIDGE

400 LF, 42" RCP @ 3.0%

480 LF, 30" RCP @ 3.0%

FOR TYPICAL CHANNEL SECTION, BEAR CREEK REACH 1, SEE SHEET 3A.

17,000 N

N

0' 100' 200' 300' 400' 500'

SCALE IN FEET

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

BEAR CREEK STA. 0+00 to STA. 63+90

PRELIMINARY PLAN

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MATCHLINE SHEET 1

MATCHLINE SHEET 6

MATCHLINE SHEET 7

GOLD CAMP ROAD OUTFALL SEGMENT 5, SEE TYPICAL SECTION SHT. 7

CONCRETE CHECK

SEGMENT 5 Q100=60 cfs Q100=250cfs

PROVIDE 4'H x 7'W SBC w/ WINGWALLS @ 1.0% @ OUTLET STRUCTURE

650 L.F. 42" RCP @ 3.0% w/ OUTLET STRUCTURE

PROVIDE OUTLET STRUCTURE

GOLD CAMP ROAD OUTFALL SEGMENT 5 SEE TYPICAL SECTION SHT. 7, S = 3.0%

TYPE 'D' INLETS

SEGMENT 4 Q100=250cfs Q500=425cfs

CITY PARK BOUNDARY

GOLD CAMP ROAD OUTFALL SEGMENT 4, SEE TYPICAL DETAIL SHT. 7 S = 4.6%

3 DROP STRUCTURES SEE DETAIL SHT. 9A

PROVIDE OUTLET STRUCTURE

350 L.F. 36" RCP @ 4.0%

SEGMENT 3 Q100=250cfs Q500=425cfs

GOLD CAMP ROAD OUTFALL CHANNEL TYPE 'D' INLET

GOLD CAMP ROAD OUTFALL SEGMENT 3, SEE TYPICAL SECTION THIS SHEET S = 2.0%

UNPLATTED

TOP OF SKYWAY (UNPLATTED)

APPROXIMATE LOCATION OF FUTURE ORION DR.

UNPLATTED

PROVIDE OUTLET STRUCTURE SEE DETAIL SHEET 4A

17-CUL-68 @ INLET

PROVIDE OUTFALL STRUCTURE

17-CUL-68 @ INLET

PROVIDE OUTFALL STRUCTURE

SKYWAY HEIGHTS

PROVIDE OUTFALL STRUCTURE / SEE DETAIL SHT. 9A

GARDNER GULCH CHANNEL

UNIMPROVED

17-CUL-40 @ INLET

PROVIDE OUTLET STRUCTURE

PROVIDE OUTLET STRUCTURE & EX. CMP

17-CUL-181 @ INLET 30" RCP

PROVIDE 2-20' S-10-R INLETS (NEW EX.) 30" RCP & TYPE 'L' C&G FROM INLET TO GOLD CAMP ROAD

PROVIDE 350 L.F. 24" RCP @ 2.0%

PROVIDE 40 L.F. 48" RCP @ 10.0% w/ FES & OUTLET STRUCTURE

TALO LANE

SUBDIVISION BOUNDARY

SEGMENT 3 Q100=425cfs Q500=675cfs

FLOW SPLIT Q100=75 cfs Q500=95 cfs

PROVIDE OUTLET STRUCTURE

PROVIDE OUTLET STRUCTURE

30" RCP SEE SHEET 8

UNPLATTED

GOLD CAMP ROAD OUTFALL SEGMENT 2, SEE TYPICAL SECTION SHEET 7, S = 5.1%

PROVIDE OUTLET STRUCTURE

EL PASO COUNTY

CITY OF COLO. SPGS.

E-22
E-23
E-24

ROAD — SHOULDER, 4' typ. 16' — EX. SLOPE

1.6' — 2.0' — 100 YR WS — 1 — 3 — 4'

GRASS-LINED SLOPE w/ EROSION NETTING, SEE DETAIL THIS SHEET

TYPE 'L' INVERT

GOLD CAMP ROAD OUTFALL CHANNEL SECTION SEGMENT 3

ALL DRAINAGE/FACILITIES SHOWN ARE FOR PLANNING PURPOSES ONLY. THE DESIGNER IS RESPONSIBLE FOR VERIFICATION OF THE HYDROLOGY, THE HYDRAULICS, & THE REQUIRED LOCATIONS OF ALL FACILITIES DURING FINAL DESIGN.

N

0' 100' 200' 300' 400' 500'
SCALE IN FEET

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BEAR CREEK DRAINAGE
BASIN PLANNING STUDY

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BEAR CREEK DRAINAGE
BASIN PLANNING STUDY

CONSTELLATION GULCH–REACH 6
STA.36+60 to STA.55+80

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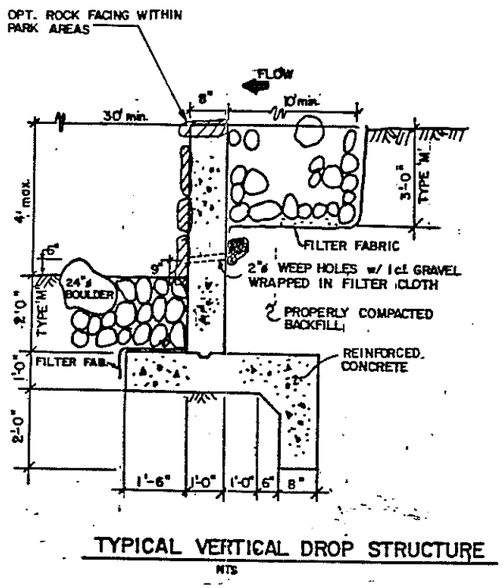
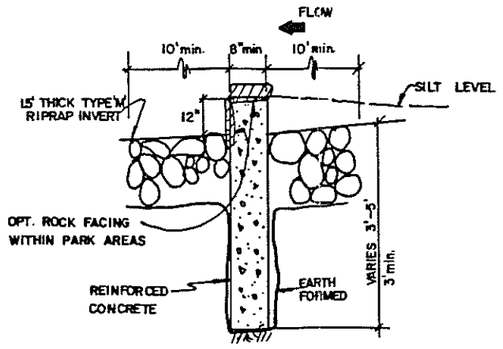
5A

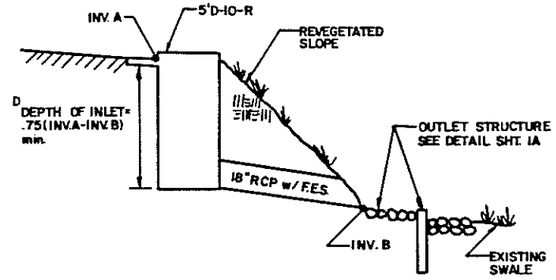


TYPICAL VERTICAL DROP STRUCTURE
NTS

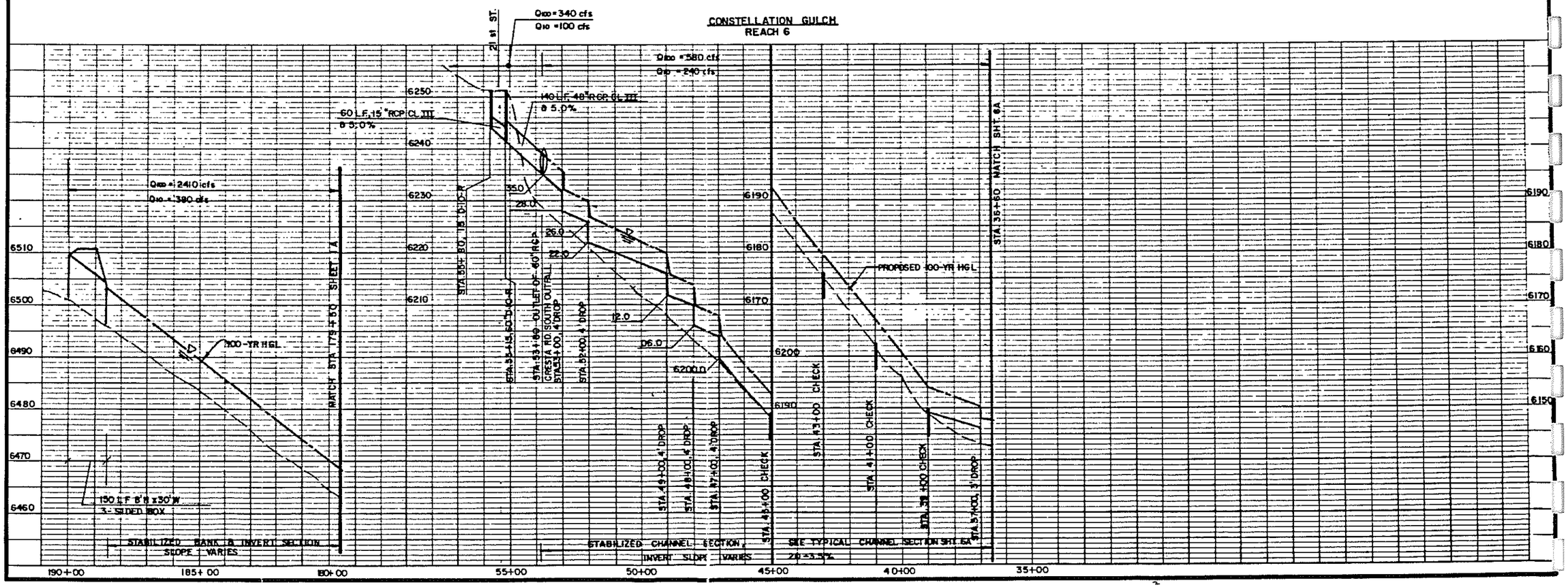


CONCRETE CHECK
nts

THIS DETAIL TO BE APPLIED WHERE STREET DRAINAGES OUTFALL INTO NATURAL SWALES WITHIN PRESERVATION EASEMENTS.



CUL-DE-SAC DETAIL



MATCHLINE SHEET 2

MATCHLINE SHEET 4

MATCHLINE SHEET 6

MATCHLINE SHEET 8

OVERTOPPING OF ROADWAYS DURING 100-YR. EVENT TO BE ELIMINATED w/ CONSTRUCTION OF CBC

40' RIPRAP TRANSITION

REMOVE EX. 5' SWC

40' LONG RIPRAP OUTLET PROTECTION: TRANSITION TO MEET EX. GRADE

PROVIDE 4'H x 12'W CBC, 70 LF @ 1.0% w/WINGWALLS & 5'D-10-R OVER CBC, W. SIDE OF 21st ST.

CONCRETE CHECK STRUCTURES

APPROX. EX./FUT. CONDITION 100-YR. FLOODPLAIN

3' CHECK STRUCTURE

WETLAND & RIPARIAN AREA TO BE PRESERVED

EL PASO COUNTY PARK

EL PASO CO. PARK

PROVIDE 400 LF STABILIZED CHANNEL SEE SECTION SHT. 6

CONCRETE CHECK STRUCTURE

500 L.F. 42" RCP @5.0% w/OUTLET STRUCTURE

UNPLATTED

PROVIDE OUTLET STRUCTURE. SEE DETAIL SHT. 1A

PROVIDE 5'D-10-R, 18" RCP & OUTLET STRUCTURE SEE TYP. DETAIL SHT. 5A

SUBDIVISION BOUNDARY

410 L.F. 30" RCP @ 4.0%

30' MODIFIED D-10-R w/12" THROAT

25' MODIFIED D-10-R w/12" THROAT

30 L.F. 18" RCP @ 4.0%

10' D-10-R & CROSSPAN

20' D-10-R

PROVIDE 5'D-10-R w/18" RCP & OUTLET STRUCTURE SEE DETAIL SHT. 5A

PROVIDE OUTLET STRUCTURE

PROVIDE OUTFALL STRUCTURE

PROVIDE OUTLET STRUCTURES

SUB-BASIN TRIBUTARY TO CRESTA DRIVE OUTFALL SYSTEM

ALTERNATIVE SYSTEM 66" RCP STORM SEWER/RECUTREN OPEN CONSTRUCTION OF CAPRICORN COURT STA. 36+00 to STA. 52+00

STA. 36+60 REACH 6

PROPOSED ALPHA COURT

CHECK STRUCTURES

APPROX. LOCATION OF PROP. CAPRICORN COURT ROW

CONSTELLATION REACH 6

APPROX. LOCATION OF PLATTED DRAINAGE ESMT.

2' DROPS 100' O.C. STA. 47+00 to STA. 50+00

DROPS 100' O.C. (TYP.) STA. 52+00 to STA. 54+00

CONSTELLATION GULCH REACH 5

CRESTA DRIVE SOUTH OUTFALL SYSTEM

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N

0' 100' 200' 300' 400' 500'
SCALE IN FEET

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

CONSTELLATION & SCORPIO GULCH

PRELIMINARY PLAN

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MATCHLINE SHEET 2

MATCHLINE SHEET 4

MATCHLINE SHEET 6

MATCHLINE SHEET 8

OVERTOPPING OF ROADWAYS DURING 100-YR. EVENT TO BE ELIMINATED w/ CONSTRUCTION OF CBC

40' RIPRAP TRANSITION

REMOVE EX. 5' SWC

40' LONG RIPRAP OUTLET PROTECTION: TRANSITION TO MEET EX. GRADE

PROVIDE 4'H x 12'W CBC, 70 LF @ 1.0% w/WINGWALLS & 5'D-10-R OVER CBC, W. SIDE OF 21st ST.

CONCRETE CHECK STRUCTURES

APPROX. EX./FUT. CONDITION 100-YR. FLOODPLAIN

3' CHECK STRUCTURE

WETLAND & RIPARIAN AREA TO BE PRESERVED

EL PASO COUNTY PARK

EL PASO CO. PARK

PROVIDE 400 LF STABILIZED CHANNEL SEE SECTION SHT. 6

CONCRETE CHECK STRUCTURE

500 L.F. 42" RCP @5.0% w/OUTLET STRUCTURE

UNPLATTED

PROVIDE OUTLET STRUCTURE. SEE DETAIL SHT. 1A

PROVIDE 5'D-10-R, 18" RCP & OUTLET STRUCTURE SEE TYP. DETAIL SHT. 5A

SUBDIVISION BOUNDARY

410 L.F. 30" RCP @ 4.0%

30' MODIFIED D-10-R w/12" THROAT

25' MODIFIED D-10-R w/12" THROAT

30 L.F. 18" RCP @ 4.0%

10' D-10-R & CROSSPAN

20' D-10-R

PROVIDE 5'D-10-R w/18" RCP & OUTLET STRUCTURE SEE DETAIL SHT. 5A

PROVIDE OUTLET STRUCTURE

PROVIDE OUTFALL STRUCTURE

PROVIDE OUTLET STRUCTURES

SUB-BASIN TRIBUTARY TO CRESTA DRIVE OUTFALL SYSTEM

ALTERNATIVE SYSTEM 66" RCP STORM SEWER/RECUTREN OPEN CONSTRUCTION OF CAPRICORN COURT STA. 36+00 to STA. 52+00

STA. 36+60 REACH 6

PROPOSED ALPHA COURT

CHECK STRUCTURES

APPROX. LOCATION OF PROP. CAPRICORN COURT ROW

CONSTELLATION REACH 6

APPROX. LOCATION OF PLATTED DRAINAGE ESMT.

2' DROPS 100' O.C. STA. 47+00 to STA. 50+00

DROPS 100' O.C. (TYP.) STA. 52+00 to STA. 54+00

CONSTELLATION GULCH REACH 5

CRESTA DRIVE SOUTH OUTFALL SYSTEM

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

CONSTELLATION & SCORPIO GULCH

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BEAR CREEK DRAINAGE
BASIN PLANNING STUDY

CONSTELLATION GULCH - REACH 6
STA. 0+00 to STA. 36+60

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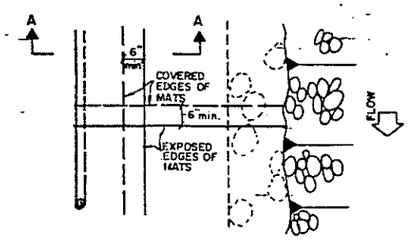
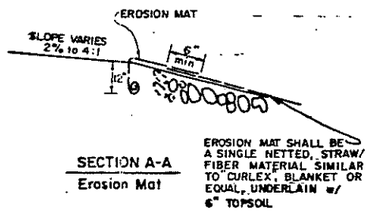
6A



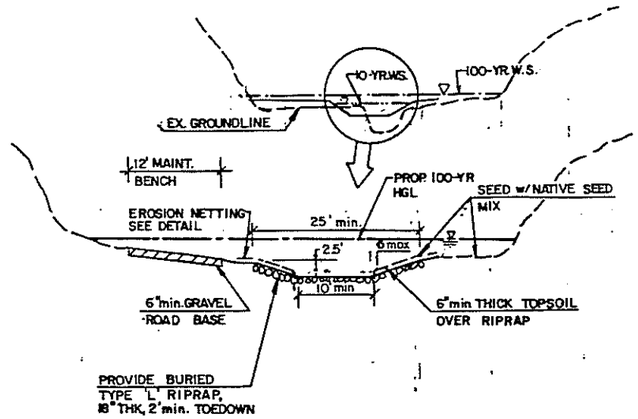
EROSION MAT LAP DETAIL
Plan View

EROSION NETTING TO BE USED IN ALL REVEGETATION OF SLOPES GREATER THAN OR EQUAL TO 3:1. NATIVE SEEDING & 6" min. TOPSOIL THICKNESS REQ'D.



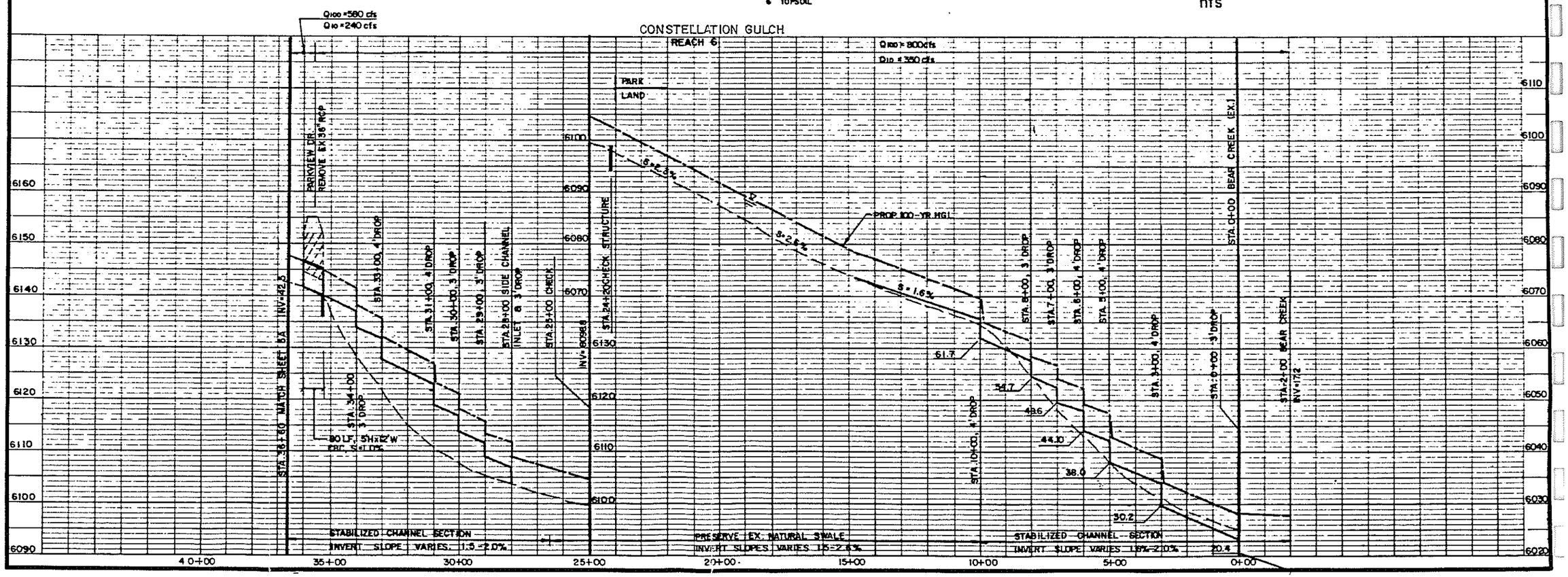
SECTION A-A
Erosion Mat

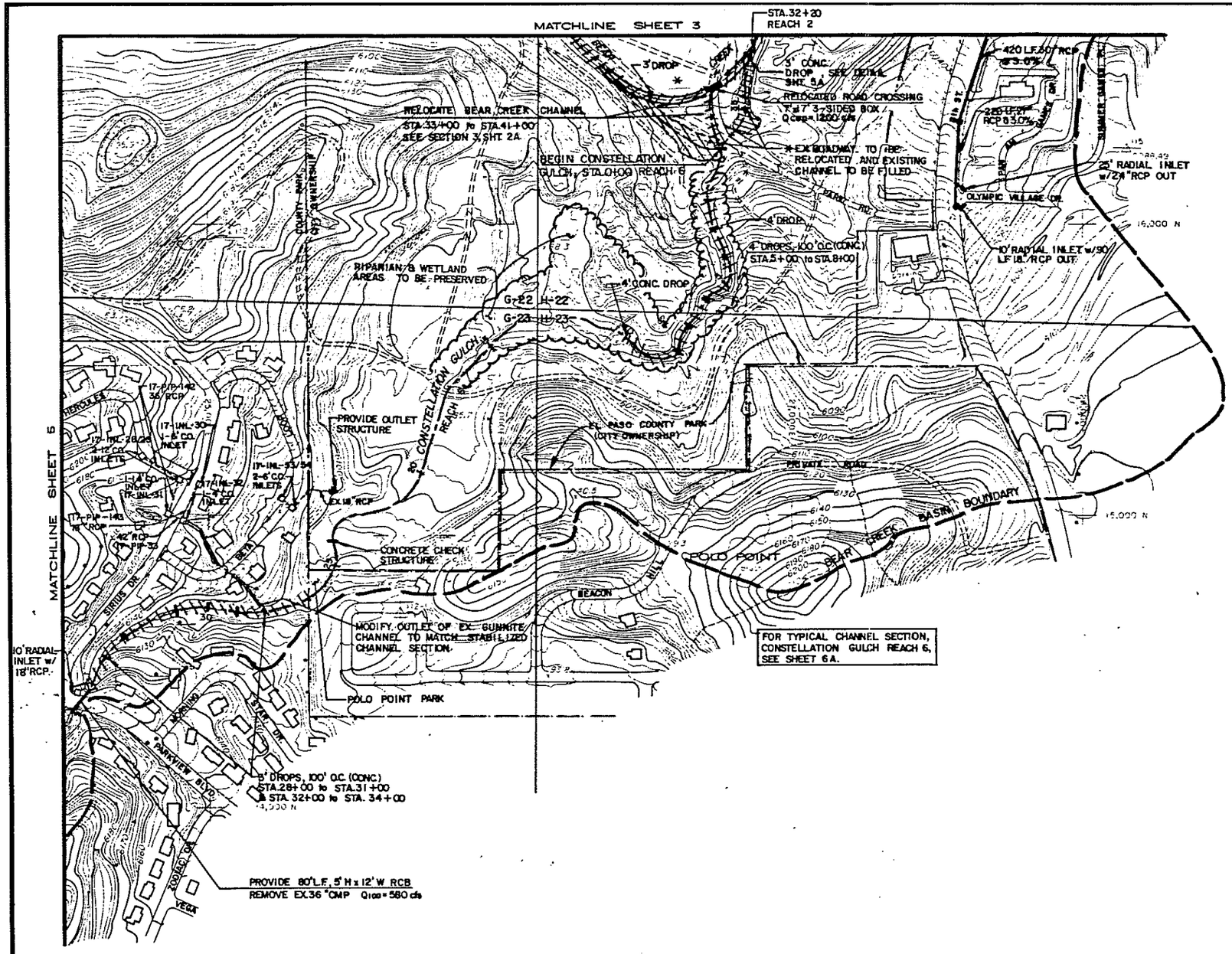
EROSION MAT SHALL BE A SINGLE NETTED, STRAW/FIBER MATERIAL SIMILAR TO "CURLEX", BLANKET OR EQUAL, UNDERLAIN w/ 6" TOPSOIL



CONSTELLATION GULCH REACH 6
STABILIZED CHANNEL SECTION

nts





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BEAR CREEK DRAINAGE BASIN PLANNING STUDY
CONSTELLATION GULCH-REACH 6
BEAR CREEK-REACH 2
PRELIMINARY PLAN

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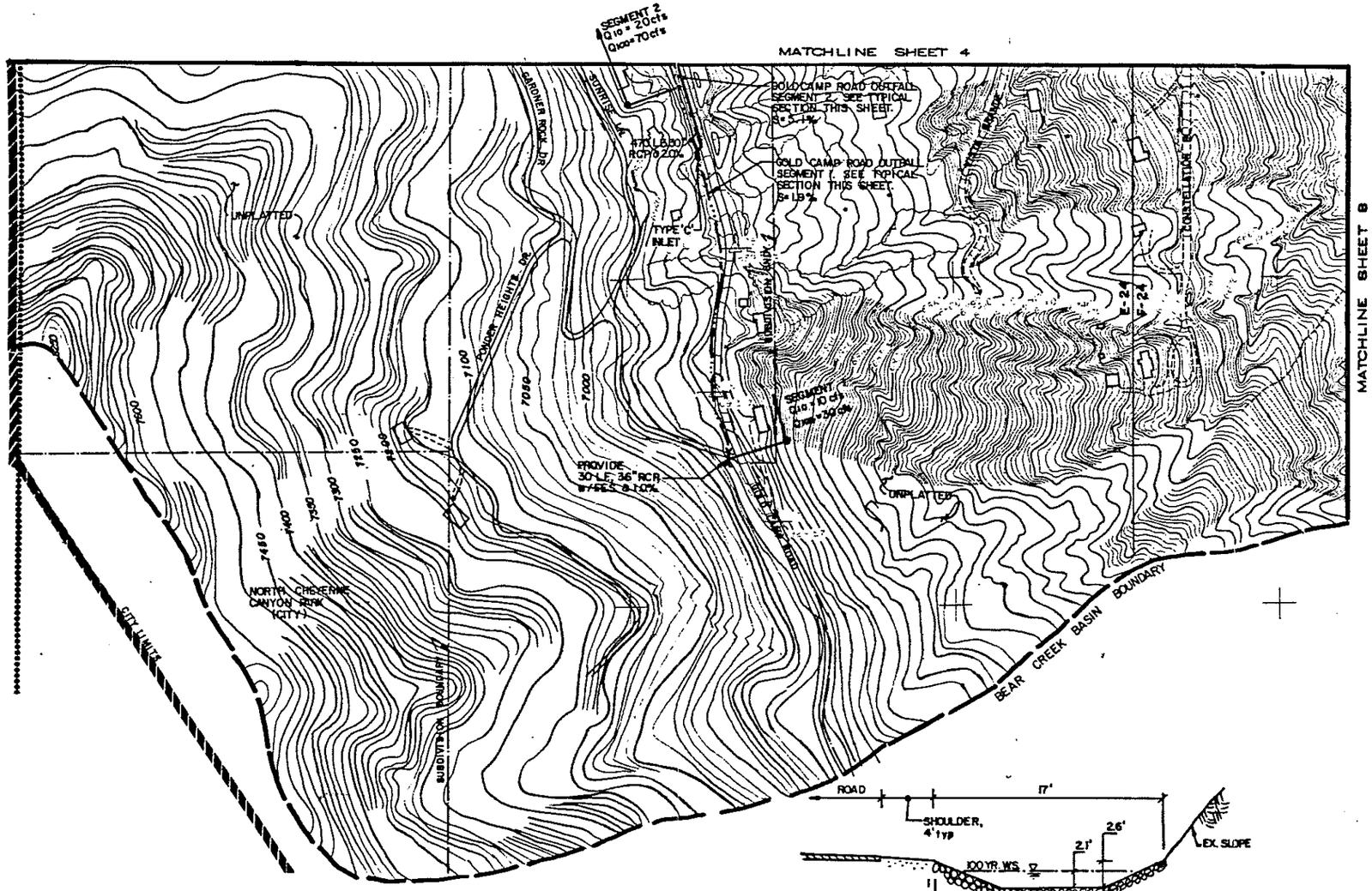
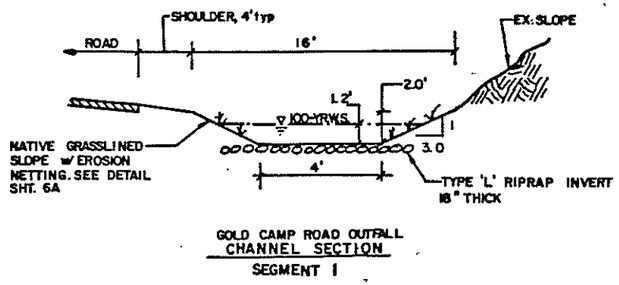
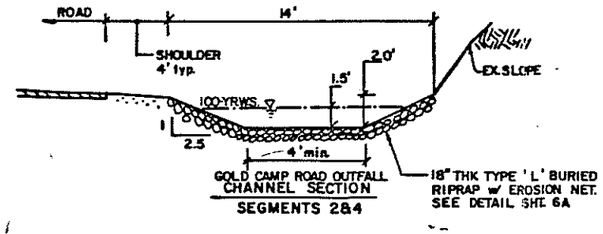




GOLD CAMP ROAD OUTFALL
CHANNEL SECTION
SEGMENT 1

GOLD CAMP ROAD OUTFALL
CHANNEL SECTION
SEGMENT 5



GOLD CAMP ROAD OUTFALL
CHANNEL SECTION
SEGMENTS 2&4

N

0' 100' 200' 300' 400' 500'
SCALE IN FEET

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BEAR CREEK DRAINAGE BASIN PLANNING STUDY

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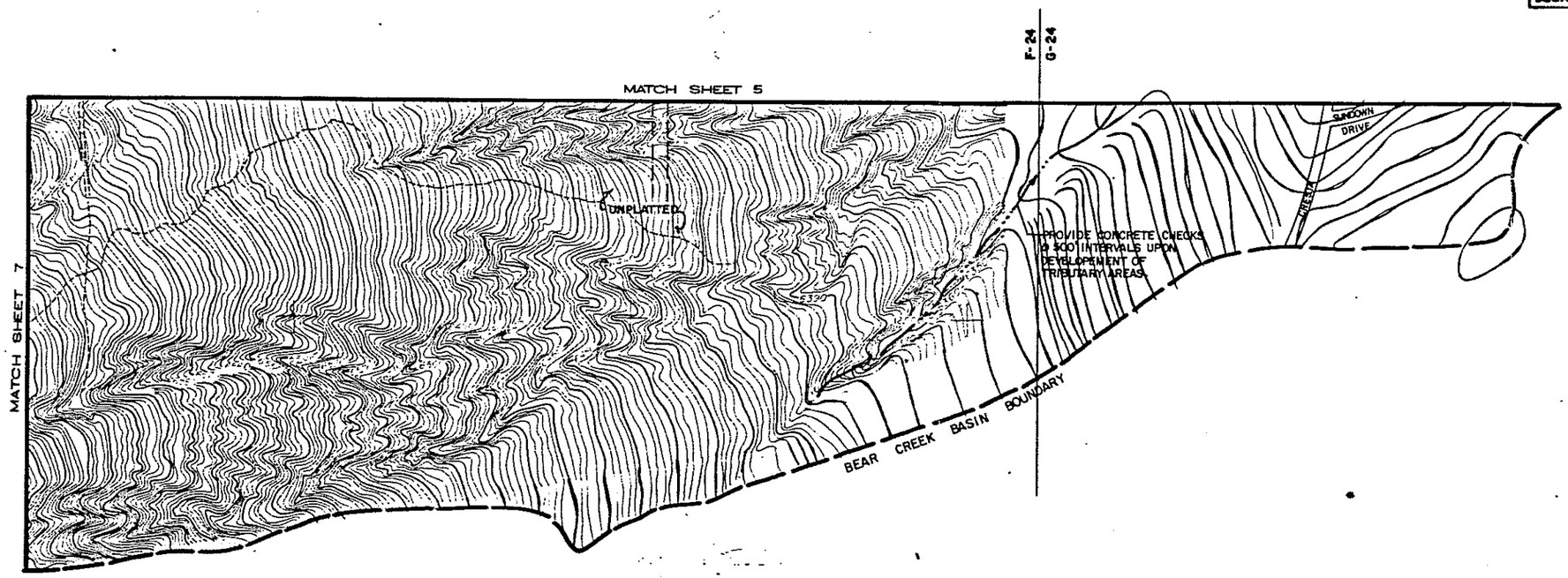

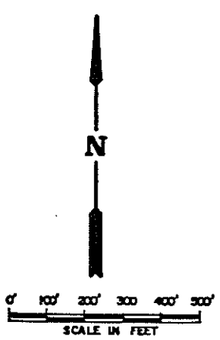

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BEAR CREEK DRAINAGE
BASIN PLANNING STUDY

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APPENDIX B

Drainage Structure Inventory Tabulation

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
17-CUL-1	H22	I-25 & BEAR CREEK	3 - 10' X 14'	CBC		120	C.D.O.H.			OUTLET HAS 5 FT. UNDERCUT	REPAIR OUTLET	
17-CUL-2	H22	8TH STREET & BEAR CK	2-150" (PLATE)	CSP		160	CITY			GOOD	STABILIZE INLET	
17-CUL-3	G22	21ST ST. & BEAR CK	2 - 6' X 10'	CBC		50	CITY			OUTLET HAS BLOCKAGE @ NORTH BAY	REMOVE BLOCKAGE	
17-XXX-4		NO ENTRY										
17-BRI-5	D22	BEAR CREEK ROAD @ GOLD CAMP ROAD	4.5' X 10'	BRIDGE			COUNTY			GOOD	90 DEGREE BEND IN FLOW @ INLET	
17-CUL-6	G23	PARKVIEW BOULEVARD BETWEEN SIRIUS AND MORNINGSTAR	36"	RCP			CITY			OUTLET NEEDS PROTECTION	HW = 18'	
17-CUL-7	G22	W. RIO GRANDE, 1300' E. OF 21ST ST.	24"	CSP		60	CITY			POOR	SILTED IN- HW=6'	
17-INL-8	H22	N.E. CORNER 8TH ST. @ BEAR CREEK	2' X 6'	GRATE	SUMP		CITY			GOOD		
17-INL-9	H22	N.W. CORNER 8TH ST. @ BEAR CREEK	2' X 2'	GRATE	SUMP		CITY			GOOD		
17-INL-10	H22	S.W.CORNER OF 8TH ST AND BEAR CREEK CULVERTS	24'	SWC	SUMP		CITY			GOOD		
17-CUL-11	H22	S.W. CORNER MORENO & 8TH ST.	18"	CSP			CITY			POOR	POSSIBLE TRAFFIC HAZARD, (HOLE)	
17-INL-12	H22	RIO GRANDE, 1000' W. OF 8TH ST.	18"	BOX INLET	ON GRADE		CITY			POOR	50% PLUGGED	
17-INL-13	G22	W. SIDE 21ST ST. @ BEAR CREEK	8' X 2.5'	GRATE	2%		CITY			GOOD		
17-INL-14	G22	E. SIDE 21ST @ BEAR CREEK	3'	D-10-R	2%		CITY			GOOD		
17-INL-15	G22	E. SIDE 21ST ST,900' N. OF ARGUS DR.	6' x 5'	61 W. SWC	SUMP		CITY	17-CUL-18		GOOD	SIDE WALL CHASE PARTIALLY PLUGGED	
17-INL-16	G22	E.SIDE 21ST ST,1000' N. OF ARGUS DR.	6'	SWC	SUMP		CITY			GOOD		
17-INL-17	G22	W. SIDE 21ST ST,900' N. OF ARGUS DR.	8'	D-10-R	SUMP		CITY			GOOD		
17-CUL-18	G22	W. SIDE 21ST ST,950' N. OF ARGUS DR.	36"	CSP	SUMP	60	CITY	17-CHA-146		GOOD	50% SILTED IN	
17-CUL-19	G22	W. SIDE 21ST ST, 200' S. OF ARGUS DR.	2 - 3' X 2'	ACMP	SUMP	70	CITY			GOOD	50% SILTED IN HW = 5'	
17-INL-20	G22	E. SIDE 21ST ST, 300' S. OF ARGUS DR.	5'	SWC	3%		CITY			OUTLET IS ERODING	ROCK OUTLET	
17-INL-21	G22	W. SIDE 21ST ST,450' S. OF ARGUS DRIVE	5'	SWC	4%		CITY			GOOD		
17-INL-22	G22	E. SIDE 21ST ST,550' S. OF ARGUS DRIVE	6'	SWC	4%		CITY			GOOD		

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
17-CUL-23	G23	N.E. CORNER 21ST ST. AND HERCULES DRIVE	18"	CSP		100	CITY			GOOD		
17-INL-24	G23	N.W. CORNER CRESTA RD. & PARKVIEW BLVD.	2' X 1.5'	GRATE	SUMP		CITY			GOOD	12" CSP BETWEEN INLET 24 & 25 (BUBBLER)	
17-INL-25	G23	S.W. CORNER CRESTA RD. & PARKVIEW BLVD.	2' X 1.5'	GRATE	8%		CITY			GOOD		
17-INL-26	G23	W.SIDE CRESTA RD. 100' N.CONSTELLATION	2' X 2'	GRATE	SUMP		CITY			PLUGGED		
17-INL-27	G23	E.SIDE CRESTA RD. 100' N.CONSTELLATION	2'W X 60'W	SWC	SUMP		CITY			GOOD		
17-INL-28	G23	S.SIDE HERCULES,150' W. OF SIRIUS DRIVE	12"	D-10-R	15%		CITY			GOOD		
17-INL-29	G23	S.SIDE HERCULES, 50' W. OF SIRIUS DRIVE	12"	D-10-R	10%		CITY			GOOD		
17-INL-30	G23	E. SIDE SIRIUS @ HERCULES DRIVE	6"	D-10-R	1		CITY			GOOD		
17-INL-31	G23	W. SIDE SIRIUS, 150' S. OF HERCULES DR.	14"	D-10-R	SUMP		CITY			GOOD	INL BACK IS OPEN TO DRAIN POND	
17-INL-32	G23	E. SIDE SIRIUS,150' S. OF HERCULES DR.	4'	D-10-R	SUMP		CITY			GOOD		
17-PIP-33	G23	INL 31 TO INL 32	42"	RCP		50	CITY	GUNITE CHAN		GOOD		
17-CHA-34	G23	SIRIUS DR. TO BETA LOOP	4' X 3' X 10'	CONC1		340	CITY			GOOD	GUNITE	
17-CUL-35	G23	BETA LOOP	36"	RCP		40	CITY	GUNITE CHAN		GOOD	MH=5.5'	
17-INL-36	H22	ON RIO GRANDE 1550' W OF 6TH ST	18"	BOX INLET	SUMP		CITY			POOR		
17-INL-37	H22	W. SIDE AUTO CNTR DR	0'	D-10-R	SUMP		CITY			GOOD		
17-PIP-38	F22	LT. BANK BEAR CREEK, 1000' S/O 21ST ST.	72"	CMP		1060	CITY	F.E.S. W/ SCREEN & RIPRAP		GOOD		
17-CUL-39	E23	VISTA GRANDE DR.	18"	CSP	4	153	CITY	F.E.S. W/ RIPRAP		NEW		
17-CUL-40	E23	VISTA GRANDE DR.	24"	CSP	2	70	CITY	F.E.S. W/ RIPRAP		NEW		
17-PIP-41	F22	ORION & COMET CT. TO 17-PIP-152	54"	RCP	1.4	230	CITY			NEW		
17-CUL-42	E22	ELECTRA DRIVE	36"	CSP	4	90	CITY	F.E.S. W/ RIPRAP		GOOD		
17-INL-43	F22	E. END HALLEY'S CT.	18"	D-10-R	SUMP		CITY			GOOD		
17-INL-44	F22	350' W. OF E. END OF HALLEYS CT.(N.SIDE)	18"	D-10-R	3		CITY			GOOD		
17-INL-45	F22	350' W. OF E. END OF HALLEYS CT.(S.SIDE)	18"	D-10-R	3		CITY			GOOD		
17-INL-46	F22	N.E. COR. PALOMAR LN	8"	D-10-R	7		CITY			GOOD		

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
		AND HALLEY'S CT.										
17-INL-47	F22	S.E. COR. PALOMAR LN AND HALLEY'S CT.	8'	D-10-R	7		CITY			GOOD		
17-INL-48	F22	50' W. OF PALOMAR ON ELECTRA DR. (N.SIDE)	11'	D-10-R	6		CITY			GOOD		
17-INL-49	F22	50' W. OF PALOMAR ON ELECTRA DR. (S.SIDE)	11'	D-10-R	6		CITY			GOOD		
17-INL-50	F22	E. END ELECTRA DR.	10'	D-10-R	SUMP		CITY			GOOD		
17-INL-51	G23	ON PARKVIEW BLVD. @ SIRIUS DR.(N. SIDE)	4' L X 2' W	COMBIN INLET	2		CITY			ADEQUATE	ASPHALT CURB IS DEGRADING	
17-INL-52	G23	ON PARKVIEW BLVD. @ SIRIUS DR.(S. SIDE)	4' L X 2' W	COMBIN INLET	2		CITY			ADEQUATE		
17-INL-53	G23	ON BETA LOOP(N.SIDE)	6'	D-10-R	SUMP		CITY			GOOD		
17-INL-54	G23	ON BETA LOOP(E.SIDE)	6'	D-10-R	SUMP		CITY			GOOD		
17-INL-55	G22	ON 21ST ST, 450' N. OF ARGUS DR.(W.SIDE)	5'	D-10-R	5		CITY			GOOD	APPEARS FULLY PLUGGED	
17-INL-56/57	E22	ON ELECTRA DR 550'W OF PALOMAR	2 - 10'	D-10-R	7		CITY			GOOD		
17-INL-58/59	E22	W. END ELECTRA DR.	2 - 4'	D-10-R	SUMP		CITY			GOOD		
17-INL-60	F23	ON ANDROMEDIA DR. 100' E. OF CARINA PL.	6'	D-10-R	7.0		CITY			GOOD		
17-INL-61	H22	E. SIDE AUTO CNTR. DR.	4'	D-10-R	SUMP		CITY			GOOD		
17-PIP-62	F23	FROM 17-INL-60	18"	CSP		18	CITY			GOOD		
17-CUL-63	F23	ON ANDROMEDIA DR. 100' E. OF CARINA PL.	42"	CSP	5	80	CITY			GOOD		
17-PND-64	F23	ON ANDROMEDIA DR. 100' E. OF CARINA PL.	.596 AC. FT.	POND			PRIVATE	42" CSP	OVERFLOWS TO ROAD	GOOD		NA
17-INL-65	F23	ENGLISH CT.	4'	D-10-R	SUMP		CITY			GOOD		
17-PIP-66	F23	ENGLISH CT. FROM INL-65	18"	CSP	16	30	CITY			GOOD		
17-CUL-67	F23	ENGLISH CT.	24"	CSP	6.7	75	CITY			GOOD		
17-PND-68	F23	ENGLISH CT.	.096 AC. FT.	POND			PRIVATE	24" CSP	OVERFLOWS TO ROAD	GOOD		NA
17-CUL-69	F23	SAGITTARIUS WAY	60"	CSP	12.6	53	CITY			GOOD		
17-INL-70	F23	SERPENS DR. N. SIDE	8'	D-10-R	7		CITY			GOOD		
17-INL-71	F23	SERPENS DR. S. SIDE	8'	D-10-R	7		CITY			GOOD		
17-PIP-72	F23	FROM INL-70 TO INL-71	18"	CSP	2.8	28	CITY			GOOD		
17-PIP-73	F23	BEHIND INL-71	18"	CSP			CITY			GOOD		
17-CUL-74	F23	ON PEGASUS DR. 50' S. OF SERPENS DR.	36"	CSP	9.2	115	CITY			GOOD		
17-CUL-75	F23	ON PEGASUS DR. 50' S. OF SERPENS DR.	24"	CSP	3.4	119	CITY			GOOD		
17-PND-76	F23	ON PEGASUS DR. 50' S. OF SERPENS DR.	.495 AC. FT.	POND			PRIVATE	24" & 30" CSP	OVERFLOWS TO ROAD	GOOD		NA
17-INL-77	F23	PEGASUS DR. @ BONNIE VISTA DR.	6'	D-10-R	4		CITY			GOOD		
17-PIP-78	F23	PEGASUS DR. @ BONNIE	18"	CSP		10	CITY			GOOD		

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
17-POND-79	F23	VISTA DR. BONNIE VISTA DR. 100' W. OF PEGASUS	.063 AC. FT.	POND			PRIVATE	18" CSP	OVERFLOWS TO ROAD	GOOD		
17-CUL-80	F23	BONNIE VISTA DR. 100' W. OF PEGASUS	18"	CSP	8.5	70	CITY			GOOD		
17-POND-81	F23	PEGASUS DR. @ BONNIE VISTA DR.	.091 AC. FT.	POND			PRIVATE	18" CSP	OVERFLOWS TO ROAD	GOOD		NA
17-CUL-82	F23	PEGASUS DR. @ BONNIE VISTA DR.	18"	CSP	14.5	83	CITY			GOOD		
17-INL-83	F23	CHARTWELL DR. E. END E. SIDE	6'	D-10-R	SUMP		CITY			GOOD		
17-INL-84	F23	CHARTWELL DR. E. END W. SIDE	6'	D-10-R	SUMP		CITY			GOOD		
17-PIP-85	F23	FROM INL-83 TO INL-84	18"	CSP	1.8	26	CITY			GOOD		
17-PIP-86	F23	FROM INL-84	18"	CSP		15	CITY			GOOD		
17-POND-87	F23	CHARTWELL DR. E. END	.472 AC. FT.	POND			PRIVATE	24" & 18" CSP	OVERFLOWS TO ROAD	GOOD		NA
17-CUL-88	F23	CHARTWELL DR. E. END	18"	CSP	2.7	75	CITY			GOOD		
17-CUL-89	F23	CHARTWELL DR. E. END	24"	CSP	5.7	70	CITY			GOOD		
17-INL-90	F23	CHARTWELL DR. 200' N. OF WHIMSEY CT. W. SIDE	6'	D-10-R	0		CITY			GOOD		
17-INL-91	F23	CHARTWELL DR. 200' N. OF WHIMSEY CT. E. SIDE	6'	D-10-R	0		CITY			GOOD		
17-PIP-92	F23	CHARTWELL DR. 200' N. OF WHIMSEY CT. W. SIDE	18"	CSP		6	CITY			GOOD		
17-PIP-93	F23	CHARTWELL DR. 200' N. OF WHIMSEY CT. E. SIDE	18"	CSP		0	CITY			GOOD		
17-POND-94	F23	CHARTWELL DR. 200' N. OF WHIMSEY CT.	.069 AC. FT.	POND			PRIVATE	42" CSP	OVERFLOWS TO ROAD	GOOD		NA
17-CUL-95	F23	CHARTWELL DR. 200' N. OF WHIMSEY CT.	42"	CSP	3	50	CITY			GOOD		
17-INL-96	F23	PEGASUS DR. 200' N. PHOENIX CT. W. SIDE	4'	D-10-R	SUMP		CITY			GOOD		
17-INL-97	F23	PEGASUS DR. 200' N. PHOENIX CT. E. SIDE	4'	D-10-R	SUMP		CITY			GOOD		
17-PIP-98	F23	PEGASUS DR. 200' N. PHOENIX CT. W. SIDE	18"	CSP		15	CITY			GOOD		
17-PIP-99	F23	PEGASUS DR. 200' N. PHOENIX CT. E. SIDE	18"	CSP		20	CITY			GOOD		
17-POND-100	F23	PEGASUS DR. 200' N. PHOENIX CT.	.567 AC. FT.	POND			PRIVATE	18"CSP	OVERFLOWS TO ROAD	GOOD		NA
17-CUL-101	F23	PEGASUS DR. 200' N. PHOENIX CT.	18"	CSP	9.2	130	CITY			GOOD		
17-CUL-102	F23	PEGASUS DR. 200' N. PHOENIX CT.	18"	CSP	0	130	CITY			GOOD		
17-INL-103	F23	PEGASUS DR. 200' S.	4'	D-10-R	SUMP		CITY			GOOD		

TABLE 6:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
17-INL-104	F23	PHOENIX CT. W. SIDE PEGASUS DR. 200' S. PHOENIX CT. E. SIDE	4'	D-10-R	SUMP		CITY			GOOD		
17-PIP-105	F23	FROM INL-103 TO INL-104	18"	CSP	1.6	32	CITY			GOOD		
17-PIP-106	F23	FROM INL-104	18"	CSP		20	CITY			GOOD		
17-PND-107	F23	PEGASUS DR. 200' S. PHOENIX CT.	.902 AC. FT.	POND			PRIVATE	24" & 18" CSP	OVERFLOWS TO ROAD	GOOD		NA
17-CUL-108	F23	PEGASUS DR. 200' S. PHOENIX CT.	24"	CSP	8.6	116	CITY			GOOD		
17-CUL-109	F23	PEGASUS DR. 200' S. PHOENIX CT.	18"	CSP	8.1	124	CITY			GOOD		
17-CUL-110	E22	PALOMAR LN. CUL.	18"	CSP		170	CITY			GOOD		
17-PIP-111	E22	ELECTRA DR. FROM INL-56	24"	CSP		35	CITY			GOOD		
17-PIP-112	E22	ELECTRA DR. FROM INL-57	24"	CSP		30	CITY			GOOD		
17-PIP-113	E22	ELECTRA DR. W. OF PALOMAR LN.	42"	CSP		260	CITY			GOOD		
17-PIP-114	E22	ELECTRA DR. FROM INL-48	24"	CSP		45	CITY			GOOD		
17-PIP-115	E22	ELECTRA DR. FROM INL-49	24"	CSP		20	CITY			GOOD		
17-PIP-116	E22	ELECTRA DR. THROUGH PALOMAR LN.	48"	CSP		80	CITY			GOOD		
17-PIP-117	F22	HALLEYS CT. FROM INL-46	24"	CSP		30	CITY			GOOD		
17-PIP-118	F22	HALLEYS CT. FROM INL-47	24"	CSP		20	CITY			GOOD		
17-PIP-119	F22	HALLEYS CT. 80' E. OF PALOMAR LN.	54"	CSP		360	CITY			GOOD		
17-PIP-120	F22	HALLEYS CT. FROM INL-44	24"	CSP		30	CITY			GOOD		
17-PIP-121	F22	HALLEYS CT. FROM INL-45	24"	CSP		20	CITY			GOOD		
17-PIP-122	F22	HALLEYS CT. 80' E. OF PALOMAR LN.	60"	CSP		360	CITY			GOOD		
17-PIP-123	F22	ELECTRA DR. FROM INL-50	18"	CSP		220	CITY			GOOD		
17-PIP-124	E22	ELECTRA DR. 150' W. OF TACO CT.	24"	CSP		60	CITY			GOOD		
17-PIP-125	F22	HALLEYS CT. TO PIP-35	60"	CSP		1090	CITY			GOOD		
17-CUL-126	H22	ON BEAR CREEK STA 36+50	72"	CSP	5	80	CO. PARK			FAIR	HW = 9.5' REPAIR OUTLET	
17-CUL-127	F23	ON TAURUS DR. 50' S. OF CONSTELLATION DR.	18"	CSP		60	CITY			GOOD	50% SILTED IN	
17-CUL-128	F23	ON TAURUS DR. 150' S. OF CONSTELLATION DR.	24"	CSP		85	CITY			GOOD	50% SILTED IN	
17-CUL-129	F23	ON CONSTELLATION DR. 50' E. OF TAURUS DR.	24"W X 30"H	CSPA		40	CITY			GOOD		
17-CHA-130	H22	ON BEAR CREEK FROM [illegible] TO 17-CUL-5	20' X 15' X 80'	RIP1		500	CITY			GOOD	S. BANK HAS 50% ROCK COVERAGE	
17-[illegible]	H22	600' [illegible] OF 17-5	10' X 8' X 34'	CONC1	100	30	CITY			GOOD		
17-CHA-132	H22	FROM CHA-131 TO 8TH ST.	10' X 15' X 85'	RIP1 & RIP2		600	CITY			GOOD	2:1 RIPRAP ON RT BANK & 3:1 GRASS ON LT BANK W/ SAND INV	

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
17-CUL-133	H22	INL 57 TO INL 61	24"	CSP		120	CITY	FES W/ROCK		GOOD		
17-CUL-134	H22	INL9 TO CUL2	18"	CSP		110	CITY	INTO CULVERT		FAIR		
17-CUL-135	H22	INL8 TO CUL2	24"	CSP		40	CITY	INTO CULVERT		FAIR		
17-CUL-136	H22	RIO GRANDE, 500' WEST OF 8TH STREET	18"	CSP		160	CITY			POOR	OUTLET BLOCKED	
17-CUL-137	H22	RIO GRANDE, 1000' WEST OF 8TH STREET	24"	CSP		140	CITY	FES		POOR	OUTLET BLOCKED	
17-INL-138	H22	RIO GRANDE, 250' WEST OF MORENO	24" X 30"	GRATE			CITY			POOR		
17-CUL-139	H22	RIO GRANDE, 250' WEST OF MORENO	24"	CSP			CITY			POOR	OUTLET BURIED	
17-CUL-140	G23	PARKVIEW BLVD. & CONSTELLATION GULCH	18"	CSP		40	CITY			FAIR	OUTLET DEGRADED	
17-CUL-141	G23	PARKVIEW BLVD. & CONSTELLATION GULCH	12"	CSP		30	CITY			FAIR	OUTLET DEGRADED	
17-PIP-142	G23	SIRIUS & HERCULES DR. INL 33 TO INL 31	36"	RCP		200	CITY	FES		GOOD		
17-PIP-143	G23	SIRIUS & HERCULES DR. INL 30 TO INL 32	18"	RCP		130	CITY			GOOD		
17-PIP-144	G23	BETA LOOP FROM INL 54	18"	RCP		200	CITY	FES		GOOD	OUTLET BLOCKED	
17-CUL-145	G23	CRESTA DR. AND CONSTELLATION GULCH	2-12"	CSP		60	CITY			POOR	OUTLET DEGRADED	
17-CHA-146	G22	700' WEST OF 21ST ST. IN PARK	3'X 2'X20'	FIF1			CO. PARK			FAIR	RIPRAP TO SMALL	
17-CUL-147	G22	ON DR. INTO PARK, CREEK STA 79+00	2-72"	CSP		35'	CO. PARK			GOOD	HW = 8'	
17-CUL-148	H22	300' N. OF BEAR CREEK STA 82+00	36"	CSP			CO. PARK			GOOD		
17-CUL-150	G22	ON DR. INTO PK. BLDG. CREEK STA 88+00, 100'S.	2-22"X28"	ACMP			CO. PARK			GOOD	HW = 8.5'	
17-CUL-151	G22	ON TRAIL X-ING CREEK STA 77+00	54" X 60"	ACMP			CO. PARK			GOOD	HW=5', ENT. CONSTRCTD TO 3'h x 4'w	
17-PIP-152	F22	BEAR CREEK TO ORION DR. (200' EAST)	84"	RCP	1-10	1450	CITY	IMPACT BASIN		NEW		
17-PIP-153	F22	17-PIP-152 TO 100' SOUTH OF ARGUS DR.	48"	RCP	5	420	CITY	84" RCP		NEW		
17-PIP-154	F22	17-PIP-153 TO ORION & RIGEL DRIVES	42"	RCP	6	1060	CITY			NEW		
17-PIP-155	F23	17-PIP-154 TO ANDROMEDA DRIVE	36"	RCP	6.5	395	CITY			NEW		
17-PIP-156	F23	17-PIP-155 TO CARINA PLACE	24"	RCP	10	600	CITY			NEW		
17-PIP-157	F23	17-PIP-156 TO 17-PIP-	21"	RCP	10	330	CITY			NEW		

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
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DATE: 12-Dec-89

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		-156										
17-PIP-158	F23	17-PIP-157 TO 17-INL-172	18"	RCP	6	200	CITY			NEW		
17-INL-159	F22	ARGUS DRIVE, 200' EAST NORTH FLOWLINE	10'	D19	SUMP		CITY	17-PIP-153		NEW		
17-INL-160	F22	ARGUS DRIVE, 200' EAST SOUTH FLOWLINE	10'	D19	SUMP		CITY	17-PIP-153		NEW		
17-INL-161	F23	100' SOUTH OF RIGEL AND ORION DRIVE	15'	D19	SUMP		CITY	17-PIP-154		NEW		
17-INL-162	F23	RIGEL DRIVE & ORION DRIVE	15'	D19	SUMP		CITY	17-PIP-154		NEW		
17-INL-163	F23	NW CORNER RIGEL & ORION DRIVE	15'	D19/D11 COMBO	CURB RETURN		CITY	17-PIP-154		NEW		
17-INL-164	F23	60' WEST OF RIGEL & ORION DRIVE	15'	D19	ON GRADE		CITY	17-PIP-165		NEW		
17-PIP-165	F23	17-INL-164 TO 17-INL-162	15"	RCP	6	80	CITY	17-INL-162		NEW		
17-INL-166	F23	ANDROMEDA & ORION DR.	15'	D19	SUMP		CITY	17-PIP-155		NEW		
17-INL-167	F23	NW CORNER ANDROMEDA & ORION DR.	15'	D19/D11 COMBO	CURB RETURN		CITY	17-PIP-155		NEW		
17-INL-168	F23	SE CORNER POLARIS & ANDROMEDA DRIVE	15'	D19/D11 COMBO	CURB RETURN		CITY	17-PIP-156		NEW		
17-INL-169	F23	POLARIS DRIVE AND ANDROMEDA DRIVE	15'	D19	ON GRADE		CITY	17-PIP-156		NEW		
17-INL-170	F23	CARINA PLACE & ANDROMEDA DR.	15'	D19	ON GRADE		CITY	17-PIP-156		NEW		
17-INL-171	F23	TERMINUS OF 17-PIP-157 NORTH FLOWLINE	5'	D19	SUMP		CITY	17-PIP-157		NEW	CHANNEL OUTFALLS TO BACKSIDE OF INLET	
17-INL-172	F23	TERMINUS OF 17-CUL-158 SOUTH FLOWLINE	5'	D19	SUMP		CITY	17-CUL-158		NEW	CHANNEL OUTFALLS TO BACKSIDE OF INLET	
17-INL-173	H21	NW CORNER MORENO & 8TH STREET	28"	D19/D11 COMBO	CURB RETURN		CITY	17-INL-174		NEW		
17-PIP-174	H21	17-INL-173 TO 17-INL-175	24"	RCP	2	155	CITY	17-INL-175		NEW		
17-INL-175	H21	SE CORNER 8TH STREET & MORENO	20'	D10P	SUMP		CITY	17-PIP-176		NEW		
17-PIP-176	H21	17-INL-175 TO 17-CHA-177	42"	RCP	1.6-5.0	770	CITY	17-CHA-177		NEW		
17-CHA-177	H21-H22	17-PIP-176 TO 17-CHA-30	8'X3.5'X20'	RIP2	0.5-1.5	1600	CITY	17-CHA-30		NEW		
17-CUL-178	H21	TERMINUS OF ABBOTT LANE	4'X8'	RCB	.5	55	CITY	17-CHA-177		NEW		
17-CUL-179	H21	200' N. OF 17-CHA-30	2- 54"	RCP	.6	60	CITY	17-CHA-177		NEW		
17-PIP-180	H21	WALMART CENTER NO. 1	24"	RCP	2.6	149	PRIVATE	17-PIP-176		NEW		

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
17-INL-181	H21	WALMART CENTER NO. 1	2.5' X 8'	GI	SUMP		PRIVATE	17-PIP-180		NEW		
17-PIP-182	H21	WALMART CENTER NO. 1	21"	RCP	10.5	63	PRIVATE	17-PIP-176		NEW		
17-INL-183	H21	WALMART CENTER NO. 1	8'	DIOR	SUMP		PRIVATE	17-PIP-182		NEW		
17-CHA-184	H21	450' & 700' N. OF BEAR CREEK	4'X2.5'X14'	CONC1	.4	155	CITY	17-CHA-177		NEW		
17-CUL-185	E23	BONNIE VISTA DR., 300' E. OF GOLD CAMP ROAD	30"	RCP	5	100	CITY	FES W/ RIPRAP		GOOD		
17-PIP-186	F22	ORION DRIVE AND CONET CT.	43"X68"	HERCP	3.1	38	CITY	17-PIP-41		NEW		
17-INL-187	F22	ORION DRIVE AND CONET CT.	25'	DI9	SUMP		CITY			NEW		
17-INL-188	F22	ORION DRIVE AND CONET CT.	25'	DI9	SUMP		CITY			NEW		
17-PIP-189	F22	ARGUS DRIVE	30"X60"	HERCP	3.8	50	CITY	17-PIP-153		NEW		
17-CUL-190	G23	21ST STREET, 200' N. OF HERCULES DRIVE	12" X 18"	ACMP	2	50	CITY			PLUGGED		
17-CUL-191	G22	21ST STREET, 500' N. OF BEAR CREEK	24"	CMP	1	40	CITY	17-CUL-79		FAIR		
17-INL-192	F23	ORION DR., 220' N. OF HERCULES CIRCLE	10" X 16"	GI	SUMP		CITY	17-CUL-193		POOR	OUTLET CHAN. DEGRADED	
17-CUL-193	F23	ORION DR., 220' N. OF HERCULES CIRCLE	12"	CMP	1	40	CITY	17-CUL-78		POOR	OUTFALLS TO FLATTED EAS.	
17-CUL-194	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	8' x 8'	CBC	2+	30	CITY - PARK			GOOD	OVER BEAR CREEK	
17-BRI-195	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	5' x 20'	BRIDGE	2+	30	CITY - PARK			GOOD	OVER BEAR CREEK	
17-CUL-196	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	1' x 2'	BOX INL	2+		CITY - PARK			GOOD	UNDER ROAD, INTO BEAR CREEK	
17-CUL-197	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	18"	CMP	2+	24	CITY - PARK			PLUGGED	SIDE DRAINAGE UNDER HIGH DRIVE	
17-CUL-198	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	18"	CMP	2+	24	CITY - PARK			PLUGGED	SIDE DRAINAGE UNDER HIGH DRIVE	
17-BRI-199	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	2.5' x 9'	BRIDGE	2+	30	CITY - PARK			GOOD	OVER BEAR CREEK	
17-CUL-200	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	21"	CMP	2+	24	CITY - PARK			GOOD	SIDE DRAINAGE UNDER HIGH DRIVE	
17-CUL-201	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	30"	CMP	2+	24	CITY - PARK			PLUGGED	SIDE DRAINAGE UNDER HIGH DRIVE	
17-BRI-202	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	3.5 x 7'	BRIDGE	2+	30	CITY - PARK			U/C PLUGGED	OVER BEAR CREEK	
17-BRI-203	NA	HIGH DRIVE WITHIN BEAR	3.5 x 9'	BRIDGE	2+	30	CITY - PARK			BLOCKED BY	STONE CONST. OVER BEAR CREEK	

TABLE 8:
BEAR CREEK DRAINAGE PLANNING STUDY
DRAINAGE STRUCTURE INVENTORY SHEET

DATE: 12-Dec-89

STRUCTURE NUMBER	MAP #	LOCATION DESCRIPTION	SIZE (H X W)	TYPE	SLOPE (%)	LENGTH (FT)	MAINTAIN RESPONSIBLE	OUTLET PIPE CHARACT.	SPILLWAY CHARACT.	CONDITION	REMARKS	STATE JURISDICT. NUMBER
17-INL-204	NA	CREEK CANON PARK HIGH DRIVE WITHIN BEAR CREEK CANON PARK	1.5' x 2.5'	BOX INL	2+		CITY - PARK			UTILITY LINE GOOD	STONE CONST. SIDE DRAINAGE UNDER HIGH DRIVE	
17-CUL-205	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	24"	CMP	2+	24	CITY - PARK			GOOD	SIDE DRAINAGE UNDER HIGH DRIVE	
17-INL-206	NA	HIGH DRIVE WITHIN BEAR CREEK CANON PARK	1.5' x 2.5'	BOX INL	2+	30	CITY - PARK			U/S PLUGGED	OVER BEAR CREEK STONE CONST.	

APPENDIX C

Project Correspondence

CITY OF COLORADO SPRINGS
The "America the Beautiful" City
DEPARTMENT OF PUBLIC WORKS CITY ENGINEERING DIVISION (719) 578-6606
30 S. NEVADA SUITE 403 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901

JYC - File

February 21, 1989

Lieutenant Colonel Kent Gonser
District Engineer
Corps of Engineers
P.O. Box 1580
Albuquerque, New Mexico 87103

Re: DRAINAGE BASIN MASTER PLAN RESTUDIES

Dear Colonel Gonser:

The City Council awarded contracts to three consulting firms in December, 1988 for the restudies of Cottonwood Creek, North Rockrimmon, and Bear Creek. The restudies have started with mapping and data inventory currently underway. The Consultants will be required to study the topography, existing drainage facilities, existing and proposed land uses, environmental and aesthetic issues, economic resources, and compute the amount of storm runoff in each of the drainage basins. They will then analyze and propose a plan for control of the runoff in accordance with city criteria, state laws, and federal laws.

The City Engineering Division has proposed a schedule of study events intended to gain input from citizens and state and federal agencies for the three studies. The Division believes that it is important to hear the input from citizens of the community regarding the treatment of drainageways and be able to respond to the citizens concerning the various options available for the control of storm runoff. We believe that the citizen input along with the input of state and federal agencies such as the Corps of Engineers will be very important to our master planning process. We are hopeful that at the conclusion of each master plan that a basin wide 404 permit can be granted to each drainage basin or combination of basins. This will greatly improve the permitting process in the Colorado Springs drainageways. The Engineering Division has contacted six citizens in the community who have previously expressed an interest to have input into the drainage basin planning studies. These six citizens will be the core group that I will work with in assembling citizen input and creating a dialogue with the citizens. Each citizen is a member of one or more citizen groups within the Colorado Springs region and will be able to transmit information from the restudy meetings to their respective groups and return with input from the groups.

b:gary11.26

The proposed schedule of study events is as follows:

1. Mapping
2. Data inventory
3. Prepare a data presentation drawing(s)
4. Meet with citizens
5. Meet with Corps of Engineers, EPA, Division of Wildlife, Land Developers, and citizens
6. Public meeting
7. Develop alternatives
8. Develop preferred solution(s)
9. Review with citizens, Corps of Engineers, EPA, Division of Wildlife, etc.
10. Drainage Board (Public Meeting)
11. City Council (Public Hearing)
12. Request basin wide 404 Permit

It is hoped that this process will satisfy some of your concerns regarding the issues that have been discussed recently with regard to the regional permit. I am available at your request to discuss any of the above.

Sincerely,

Gary R. Haynes

Gary R. Haynes
City Engineer

GRH/njh

cc: DeWitt Miller, Director of Public Works
Bruce A. Thorson, Assistant City Engineer
Chris Smith, Subdivision Administrator

b:gary11.26

CITY OF COLORADO SPRINGS
The "America the Beautiful" City
DEPARTMENT OF PUBLIC WORKS CITY ENGINEERING DIVISION (719) 578-6606
30 S. NEVADA SUITE 403 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901

86-12-26

May 30, 1989

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

Re: BEAR CREEK DRAINAGE BASIN PLANNING STUDY, GOVERNMENTAL AGENCY AND CITIZEN COORDINATION AND INFORMATIONAL MEETING

Dear Mr. Morrice:

The City of Colorado Springs Department of Public Works would like to take this opportunity to invite you to attend the first of a series of meetings to be held in regard to the above referenced City sponsored study. The meeting has been scheduled for Thursday, June 15, 1989, and will be held in the City Administration Building at 30 S. Nevada Street, Room 602 at 3:30 p.m.

The purpose of this meeting is to present the scope of the study, the technical information regarding the Basin, and discuss the planning process proposed for the various phases of the study.

All aspects of the of the basin planning study within the City and County are intended to reflect the recently revised drainage criteria and policy manual guidelines for stormwater management.

It is also the intent of this meeting to encourage input from the various agencies and the public so as to better incorporate the needs and concerns of the community in completing the study for this drainage basin. You will be invited to subsequent meetings of this type as required in the planning stages prior to adoption of the study.

Should you have any questions regarding this meeting, please contact the undersigned at 578-6613 or our consultant, Kiowa Engineering, at (719) 630-7342. We look forward to your participation in the Drainage Basin Planning Study effort.

Sincerely,

Robert T. Adamczyk
Senior Civil Engineer

RTA/mls

cc: DeWitt Miller, Director of Public Works
Gary Haynes, City Engineer
Bruce Thorson, Assistant City Engineer
Chris Smith, Subdivision Development Administrator
Richard Wray, Kiowa Engineering Corporation

BEAR CREEK DRAINAGE BASIN PLANNING STUDY

MAILING LIST

Ms. Debra Little
City Planning
30 S. Nevada Ave.
Colorado Springs, CO 80903
719-578-6613

Mr. Gene Fuhlrodt
Park and Recreation Department
401 Recreation Way
Colorado Springs, 80907
719-578-6640

Mr. Tom Woodbury
City Attorney's Office
30 S Nevada Ave.
Colorado Springs, CO 80903

Mr. Alan Morrice
El Paso County Dept. of Public Works
3105 N. Stone
Colorado Springs, CO 80907
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Mr. Dan Bunting
Regional Building Department
101 West Costilla
Colorado Springs, CO 80903
719-578-6230

Ms. Sue Johnson
El Paso County Parks
2002 Creek Crossing
Colorado Springs, Co 80906
719-520-6375

Mr. Butch Morgan
Penrose Stadium Equestrian Center
1045 W. Rio Grande
Colorado Springs, CO 80906
719-520-6710

Mr. John Fisher
El Paso County Planning Dept.
27 E. Vermijo St.
Colorado Springs, CO 80903

Mr. Larry Lang
Chief; Floodplain Section
Colorado Water Conservation Board
1313 Sherman St.
Denver, CO 80203

Mr. Ray Brown
Colorado Department of Highways
Pueblo District Office
905 N. Erie
Pueblo, CO 81002
719-546-5404

Mr. Bruce Goforth
Colorado Division of Wildlife
2126 N. Weber
Colorado Springs, CO 80907
719-473-2945

Mr. Ed Spence
USDA Soil Conservation Service
1826 E. Platte Ave.
Colorado Springs, CO 80909
719-473-7104

Mr. Vern Schmidt
U.S. Forest Service
601 S. Weber St.
Colorado Springs, CO 80903
719-633-7619

Ms. Anita Culp
U.S Army Corps of Engineers
P.O. Box 294
Pueblo, CO 81002
719-543-9459

Mr. Bill Noonan
U.S Fish and Wildlife Service
730 Simms St., Rm. 158
Golden, CO 80401

Ms. Sarah Fowler
Environmental Protection Agency
1 Denver Place
999 18th St.
Denver, CO 80225
303-293-1593

Dr. John Liou
FEMA- Region VIII
Denver Federal Center Bldg.710
Denver, CO 80225

Mr. Rudy Cross
David R. Sellon & Co.
225 E. Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906
719-576-4700

Ms. P.J. Wenham
Colo. Springs League of Women Voters
3801 Wesley Drive
Colorado Springs, CO 80907

Mr. A Esmiol Morris, Jr.
Top of Skyway Homeowners Assn.
3184 Electra Dr. South
Colorado Springs, CO 80906

Mr. James W. Armstrong Jr.
Top of Skyway Homeowners Assn.
2305 Parkview Blvd.
Colorado Springs, CO 80906

Mr. John Covert
916 Chambers Dr.
Colorado Springs, CO 80904

Mr. Thomas Huber
2711 Templeton Gap Road
Colorado Springs, CO 80907

Mr. John Maynard
1320 Indian Oaks Place
Manitou Springs, CO 80829

Ms. Nancy Avila
4835 Nightingale Drive
Colorado Springs, CO 80907

Mr. Kevin Walker
3219 W. Fontanero
Colorado Springs, CO 80904

CITY OF COLORADO SPRINGS
The "America the Beautiful" City
DEPARTMENT OF PUBLIC WORKS CITY ENGINEERING DIVISION (719) 578-6606
30 S. NEVADA SUITE 403 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901

July 5, 1989

Mr. Gene Fuhlrodt
Park and Recreation Department
401 Recreation Way
Colorado Springs, CO 80907

RE: BEAR CREEK DRAINAGE BASIN PLANNING STUDY, GOVERNMENTAL AGENCY AND CITIZEN COORDINATION AND INFORMATION MEETING

Dear Mr. Fuhlrodt:

The second in a series of meetings relative to the public's participation on the Drainage Basin Planning process will be held on July 19, 1989, in the City Administration Building, 30 S. Nevada Street at 3:00 p.m., Room #401.

As noted in the first meeting held on June 15th, the intent is to encourage input from the various governmental agencies and the public so as to incorporate the needs and concerns of the community in the preparation of this Study.

The meeting scheduled for July 19th, will evaluate the responses to the "Alternative Evaluations List" as requested by our Engineering Consultant. In addition, the conceptional alternatives for the overall Drainage Basin Improvements and various other Stormwater Management approaches will be discussed.

If there are any questions regarding the next meeting, please contact the undersigned at (719) 578-6613 or our Consultant, Kiowa Engineering at (719) 630-7342. We appreciate your continued attendance and participation in the Drainage Basin Planning Study.

Sincerely,

Robert T. Adamczyk
Senior Civil Engineer

RTA/le

cc: DeWitt Miller, Director of Public Works
Gary Haynes, City Engineer
Bruce Thorson, Assistant City Engineer
Chris Smith, Subdivision Development Administrator
Richard Wray, Kiowa Engineering Corporation

AGENCY/INDIVIDUAL COORDINATION MEETING NO 2: ALTERNAIVE EVALUATION
BEAR CREEK DRAINAGE BASIN PLANNING STUDY

JULY 19, 1989

MEETING AGENDA

I. Update of study progress.

   A. Hydrology
   B. Hydraulics
   C. Related Projects

II. Alternative Evaluation Process

   A. Evaluation parameter ranking and discussion.
      1. Major drainageways
      2. Tributary drainageways
   B. Drainageway alternatives
      1. channels
      2. crossings
      3. nonstructural measures

III. Key Design Considerations

   A. Bear Creek, Fountain Creek to 8th Street.
      1. Transportation
      2. Hydraulics
      3. Right-of-Way
      4. Utilities
   B. Bear Creek, 8th Street to new roadway
   C. Realignment Area
   D. Bear Creek and 21st Street
   E. Subtributaries
      1. Transportation
      2. Detention

IV. Upcoming Work

   A. Identification and refinement of preferred alternative(s).

   B. Alternative Evaluation Report

el paso county parks
Mickey Carter, Director

July 17, 1989

Richard N. Wray, P.E.
Kiowa Engineering Corporation
419 West Bijou Street
Colorado Springs, CO 80905-1308

Re: Bear Creek Drainage Basin Study

Dear Richard:

Attached is a copy of the ranking as the El Paso County Park Department staff feels the priorities should be set for the Bear Creek Drainage Basin Study. Obviously the Park Department is very concerned with the recommendations being proposed for the treatment of Bear Creek and how the City of Colorado Springs intends to control potential storm water. The City of Colorado Springs has made their "flow through" drainage policy very clear during past discussions concerning Bear Creek. The El Paso County Park Department strongly encourages the City of Colorado Springs and Kiowa Engineering to adopt a retention/detention philosophy in this drainage basin to minimize the effects of storm water to downstream property owners.

As the primary land owner and manager of a majority of the creek, the County Park Department should be given higher consideraton in its ranking and prioritization of the parameters than any non-property owners. Bear Creek's existing riparian habitat is critical to the character of Bear Creek Regional Park and its unique wildlife and recreational use, and should be preserved in its present state.

Please also be aware that your report for this drainage basin should not indicate or imply that the El Paso County Park Department should budget for any drainage improvements to Bear Creek or improvements through Bear Creek Regional Park. Our agency has very limited funding to provide county regional parks, not storm drainage improvements.

Respectfully,

Susan K. Johnson, Superintendent
Planning and Construction

SJ/cj

Attachment

• fax (719) 520-6389 •
• 2002 creek crossing, colorado springs, colorado 80906 • phone (719) 520-6375 •

BEAR CREEK DRAINAGE BASIN PLANNING STUDY

Drainage Planning Evaluation Parameters

9. Flood Control
8 Erosion Control
11 Construction Cost
7. Operations and Maintenance
5. Water Quality
2. Wildlife Habitat
10 Constructibility
4. Land Use/Open Space
1. Preserve Existing Vegetation
12 Administration/Implementation
6. Aesthetics
13 Transportation
3. Recreation/Open Space

Rank the parameters from 1 to 13, with 1 being the most important parameter and 13 the least. Please return to Kiowa Engineering by July 3, 1989.

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

REFER TO:

Southeast Regional Office
2126 North Weber
Colorado Springs, CO 80907

September 7, 1989

Robert E. Meehan, P.E.
Chief, Construction Operations Division
U.S. Army Corps of Engineers
P.O. Box 1580
Albuquerque, N. Mex. 87103-1580

Dear Mr Meehan:

I am writing in response to the U.S. Army Corps of Engineer proposal to handle the Colorado Springs City Drainage Basin Planning Study (DBPS), and related activities via individual Letters of Permission (LOP).

It appears that the LOP process has some promise as a feasible alternative to the individual 404 permitting process.

As you stated, a list of activities must first be developed and the Division looks forward to providing specific input as this list is developed. One point I would like to make at this time, however, is that mitigation activities as well as construction activities would be listed.

Getting back to the basic concept of this LOP process and that of the 404(b) permitting process, it must be understood that this program will allow necessary drainage related construction only as such construction is sensitive to the preservation of wetland-riparian habitats, as well as to other public interest factors. The concepts of water dependancy and selecting for the least environmentally damaging alternative must be central to the LOP process. For example, building set backs should be encouraged while building in floodplains should be avoided.

A process for anticipating any assessing cumulative environmental impacts must be developed to avoid piecemealed drainage basins.

Similarly, a process for review (annual) should be developed to allow for LOP process fine tuning and to ascertain the feasibility or success of this process.

-Continued-

Additionally, consideration of certain administrative processes such as periods of authorization, bonding, etc. must be addressed.

Shifting gears once again, the sequence by which the LOP process will mesh with the DBPS process is not clear. For this process to work, agency pre-application meetings, including field meetings, must occur in the initial stages of the alternative development process. Agency and public input should "guide" the development of alternatives as opposed to reacting to or commenting on alternatives already engineered and placed for bid. This should be a "full participated" process.

Substantial periods of time may pass between an initial environmental assessment or listing of activities and actual construction. A mechanism for considering "significant new information" must be addressed to provide process flexibility and proper decision making.

Finally, an understanding as to enforcement responsibilities and processes should be addressed so all parties understand what standards must be met and what penalties may be involved.

With the foregoing in mind, the Division will support efforts to implement the LOP process. We do so in good faith hoping to acheive a long standing goal of seeing environmentally sensitive drainage projects in the Colorado Springs area. We are confident that the wherewithal to acheive this goal is at hand, as long as the messages for change (Regional 404 permit process etc.) are acknowledged and acted on.

Sincerely,

Bruce Goforth
Sr. Wildlife Biologist

APPROVED: _____
Ronald P. Desilet, Southeast Regional Manager

BG/dsh

cc: Anita Culp, COE
Brad Miller, E.P.A
Bill Noonan, U.S. F.W.S
Gary Haynes, City of Colorado Springs

CESWA-CO-SC (1145b) 21 September 1989

MEMORANDUM THRU

Resident Engineer, Southern Colorado Resident Office

Chief, Regulatory Branch

FOR Regulatory Branch File

SUBJECT: Trip Report - Field Trips on Bear Creek DBPS and Rockrimmon North DBPS

1. On 18 September 1989, field trips for two drainage basin planning studies (DBPS) were held in Colorado Springs, El Paso County, Colorado. The Bear Creek drainage basin was looked at in the morning and the Rockrimmon North basin was viewed in the afternoon. The purpose of the trips was to give the Corps and Section 404 resource agencies an overview of each basin. Persons attending each trip are listed in the enclosure.

2. The Bear Creek DBPS is fairly advanced in the study progress. Alternatives have been formulated and are now being considered to decide on a preferred alternative. Items of discussion at the meeting included the Corps' proposed Letter of Permission process and how it would coincide with the DBPS, inclusion of environmental considerations and mitigation in the DBPS process, and consideration of alternatives which would preserve flood plain, wetland, and riparian values. A brief description of each site which we looked at is given below.

a. Bear Creek from I-25 upstream to 8th Street has been previously channelized and rock riprap placed along the north bank. The channel bottom contains shrub wetlands. An alternative which is being considered for this reach is the addition of gradient control structures and riprap on the south bank.

b. The large bend of Bear Creek at the Equestrian Center was previously relocated. The outside of the curve is badly eroded and has little or no vegetation. A very narrow fringe of trees and shrubs exists along the streambank on the inside of the curve. Alternatives which are being considered are widening of the floodway, selected riprap bank stabilization, grade control structures, or moving the stream away from the eroded bank.

c. Bear Creek below 21st Street is within the Bear Creek Park. The steam supports a moderately narrow riparian/wetland zone of trees and shrubs. The stream is presently downcutting

somewhat. An alternative being considered is use of small gradient control structures.

d. The upper reach of Bear Creek downstream of the National Forest is located in steep foothills. The stream supports a moderately narrow riparian zone of trees and shrubs.

3. The Rockrimmon North DBPS is still in the data gathering phase. The upper part of the basin is located in foothills and is residential with large lots. Much of the main stem of Rockrimmon Creek lies within an existing city park. Generally, the 100-year flood plain is contained within the channel or the adjacent parkland. Ordinary flows rather than flood flows are causing most of the present erosion found on drainages in the basin. Items of discussion included how the Corps' proposed Letter of Permission process will mesh with the DBPS, alternatives presently being formulated seem to involve environmental considerations, alternatives should encourage wildlife to use the flood plain instead of surrounding residential areas, costs of mitigation should be included in the comparison of alternative costs, and although the basin is mostly built-up, the flood plain has been largely preserved so this gives opportunities to consider a wide range of alternatives. A brief description of each site which we looked at is given below.

a. At the Allegheny Drive bridge near War Eagle Lane, Rockrimmon Creek has a sandy bottom with intermittent flows. A narrow riparian zone of shrubs and grass is found along the stream. In general, there is little erosion in this reach, although there had been some recent downcutting of the stream just below the bridge.

b. At Grey Eagle Circle (north), Rockrimmon Creek has a stretch of severely eroded banks below an old detention pond. The stream supports a relatively narrow zone of riparian shrubs.

c. A reach of Rockrimmon Creek at N. Rockrimmon Boulevard and Delmonico Drive has a dense willow shrub wetland along the banks.

d. Rockrimmon Creek at the crossing of Saddle Mountain Road, has a moderately wide willow shrub wetland above the road and below the road there is a large cattail wetland at the site of an old stockpond.

CESWA-CO-SC (1145b)
SUBJECT: Trip Report - Field Trips on Bear Creek DBPS and Rockrimmon North DBPS

e. Another stream in the DBPS area is the Golden Hills tributary which lies north of Rockrimmon Creek and flows into Monument Creek at the Corporate Centre. The stream has a sandy bed with perennial flows. A riparian zone of willow shrubs and Ponderosa pine trees is found along the entire length of the stream.

f. The South Fork of Rockrimmon Creek has some concrete-lined sections surrounded by grassland. Upstream of the S. Rockrimmon Boulevard and Delmonico Drive intersection, there is a short reach with bulrush wetlands in the bottom of a modified channel.

FOR THE COMMANDER:

Encl

ANITA E. CULP
Biologist

CF:
CESWA-CO-SC
All Attendees

CESWA-CO-SC (1145b)
SUBJECT: Trip Report - Field Trips on Bear Creek DBPS and Rockrimmon North DBPS

BEAR CREEK DBPS ATTENDEES

Bob Adamczyk (mail code 435)
Colorado Springs Engrg. Div.
P.O. Box 1575
Colo. Springs, CO 80901-1575

Richard Wray
Kiowa Engineering Corp.
419 W. Bijou
Colo. Springs, CO 80905-1308

Bruce Goforth
Colorado Division of Wildlife
2126 N. Weber
Colorado Springs, CO 80907

Brad Miller - 8WM-SP
Environ. Protection Agency
999-18th Street, Suite 500
Denver, CO 80202-2405

Sarah Fowler - 8WM-SP
Environ. Protection Agency
999-18th Street, Suite 500
Denver, CO 80202-2405

Anita Culp
Corps of Engineers
P.O. Box 294
Pueblo, CO 81002-0294

ROCKRIMMON NORTH DBPS ATTENDEES

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City Engineering Div.
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Colorado Springs, CO 80901

Jim Rees
Parks and Recreation Div.
P.O. Box 1575
Colorado Springs, CO 80901

Dave Zelenok
Street Div.
688 Geiger Court
Colo. Springs, CO 80915-3507

Steve Alexander
Street Div.
688 Geiger Court
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Dick Willis
KLH Engineering
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Bruce Goforth
Colorado Division of Wildlife
2126 N. Weber
Colorado Springs, CO 80907

Brad Miller (8WM-SP)
Environ. Protection Agency
999-18th Street, Suite 500
Denver, CO 80202-2405

Sarah Fowler (8WM-SP)
Environ. Protection Agency
999-18th Street, Suite 500
Denver, CO 80202-2405

Anita Culp
Corps of Engineers
P.O. Box 294
Pueblo, CO 81002-0294

CITY OF COLORADO SPRINGS
The "America the Beautiful" City
DEPARTMENT OF PUBLIC WORKS CITY ENGINEERING DIVISION (719) 578-6606
30 S. NEVADA SUITE 403 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901

October 17, 1989

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

Re: BEAR CREEK DRAINAGE BASIN PLANNING STUDY,
GOVERNMENTAL AGENCY COORDINATION AND CITIZEN
INFORMATIONAL MEETING

Dear Mr. Morrice:

The third in a series of meetings relative to the public's participation on the Drainage Basin Planning Process will be held on November 1, 1989, in the City Administration Building, 30 South Nevada Street, at 3:00 PM, in Room #303.

Based on the input and discussions of previous meetings, the alternatives to drainageway improvements and specific solutions to problem areas will be presented and evaluated. It is the intent to culminate the issues and concerns of individuals and agencies by this meeting so that the draft of the planning study can be assembled. After this point, reviews by the City staff and presentations to the Drainage Board, City Council and County Commissioners will be scheduled.

As always, we appreciate the submittal of pertinent comments and suggestions which may be beneficial to the completion of the study. If there are any questions in regard to the next meeting, please contact the undersigned at (719) 578-6613 or Richard Wray, our consultant Kiowa Engineering at (719) 630-7342.

Sincerely,

Robert T. Adamczyk
Senior Civil Engineer

RTA/mls

cc: DeWitt Miller, Director of Public Works
Gary Haynes, City Engineer
Bruce Thorson, Assistant City Engineer
Chris Smith, Subdivision Development Administrator
Richard Wray, Kiowa Engineering Corporation

BAL01-o

MORRIS A. ESMIOL, JR.
TOP OF SKYWAY HOMEOWNERS' ASSOCIATION
3184 ELECTRA DRIVE SOUTH
COLORADO SPRINGS, CO 80906

December 14, 1989

Mr. Gary Haynes
City Engineer
City of Colorado Springs
30 S. Nevada Ave.
Colorado Springs, CO 80903

Dear Mr. Haynes:

The purpose of this letter is to discuss three drainage/erosion related problems occurring in Top of Skyway Filing 7 and 1 that we believe requires the attention of the Engineering Department of Colorado Springs and remedial action.

Each case involves existing Top of Skyway filings that have been approved by your land development procedure, but that have or will have, actual on the ground problems that now need review with enforcement or modification as required. As I explain these problems, there may also be the possibility of liability that I am sure the City would like to avoid. I will now discuss three specific problems in descending priority from an engineering viewpoint.

FIRST PROBLEM

Pollux Drive as is now, a roughly 800' x 32' paved road, which carries a grade of at least 12% in several reaches, becomes a raging torrent during any cloudburst worthy of that name. We had several last summer that did not approach the 4" 100 year storm, but caused such volume and velocity that the run-off jumped the far curb of Electra Drive South where Pollux ties into it.

Coming soon, as the first phase of Filing 7 is paved, the water from about 1,048 feet of paved road (1,048' x 32') will be added as a drainage discharging into the high end of the existing Pollux Drive. In discussions with Bob Adamczyk of your department, a new additional flow of 15 cfs (for the 5 year storm) and 23 cfs (for the 100 year storm) was arrived at as the new additional drainage from above. Studying the drainage plan submitted for Filing 3 shows the existing flow at the bottom of Pollux as it is now at 7 cfs and 37 cfs. If my figures are correct, during the next big rain, the existing problem area will receive at least an 100% increase in run off water.

At this point, I have several questions. First, are my numbers correct? If they are, then when these filings were given engineering review, was the cumulative effect of adding upper Pollux to lower Pollux considered? If the cumulative effect was considered, what were the findings, conclusions and recommendations if there was anything beyond approval as submitted? If the cumulative effect was not considered, perhaps another result of incremental planning, why not? What should be done now?

RECOMMENDATION

Being well aware that the City has already approved Filing 7, and apprehensive of the coming problem that could degrade safety and access during a storm, we respectfully recommend that the City in connection with the Kiowa Engineering suggestions, extend the existing storm sewer in Electra Drive South to the intersection of Pollux and Electra Drive South and construct storm drains in that location. This would get rid of much of the run-off, prevent pooling and prevent a high velocity torrent flowing down Electra Drive South to the closest storm drain.

SECOND PROBLEM

Lot 15, Filing 1, at 2984 Electra Drive South has a drainage channel on two sides with considerable reach above it as shown on Filing 3 Drainage Plan. Mr. Sellon carefully required a 2' deep drainage channel toward the north of the lot and a 2.5' deep drainage channel along the east lot line to the street. Purchasers' contracts state these drainage channels were to be built by the home builder. They were not.

My concern in this case concerns the proper routing of run-off drainage and the responsibility and liability involved. It is alleged that the builder has left the area. If we get a cloudburst that floods this drainage with a developed flow of 64 cfs/205cfs, it comes very close to the uphill corner of the existing house. This run-off needs to be channeled so it does not endanger the house and to reduce and control erosion. The best solution would be to tie into the existing drain about 90' down the street from the property line.

Who is responsible for the construction of proper drainage? If the owner does not construct any proper drainage, does the City have any responsibility, interest or liability since the discharge of water and gravel, as built now, will flow into a city owned street?

THIRD PROBLEM

This concerns enforcement of the Hillside Erosion Control Ordinance and following the submitted Erosion Control Plan. In Filing 7, Grading and Erosion Control Plan, about station 12+ØØ on the southern extension of Pollux Drive is a large fill. The drawing shows and states a slope of 1 rise to 3 run (18.4 degrees) and indicates jute matting will be placed to reduce erosion. In fact, the slope towards the northeast is much steeper than 1 rise to 3 run, 3Ø degrees by hand held Bruton, and there is no attempt to control erosion which has already started. There will be serious slumping and erosion as soon as the fill material receives much moisture.

Here we recommend that the City enforce the Erosion Control Ordinance and/or require the Developer to follow the submitted and approved Grading and Erosion Control Plan.

The problem of winter access up Pollux Drive after a significant snowfall has not been addressed. Today, on the paved part of Pollux, at one or two MPH, when you apply brakes that lock the wheels, you slide down hill about one car length. Increase the snow and speed, then safety and access will be seriously degraded.

Our goal is to have these Top of Skyway filings completed, maintained and improved to provide a high quality subdivision for its residents and for the City.

Sincerely,

Morris A. Esmiol, Jr.
President
Top of Skyway
Homeowners' Association

Copy: Bob Adamczyk
Debra Little
Rich Wray, Kiowa Engineering Corp.
Rudy Cross, David R. Sellon & Co.

CITY OF COLORADO SPRINGS
The "America the Beautiful" City
DEPARTMENT OF PLANNING & DEVELOPMENT CITY ENGINEERING DIVISION (719) 578-6606
30 S. NEVADA SUITE 403 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901

December 11, 1990

U.S. Department of the Army
Corps of Engineers
Albuquerque District
P.O. Box 1530
Albuquerque, NM 87103-1580

ATTN: Mr. Robert E. Meehan, P.E.
Chief, Construction - Operations Division

RE: REQUEST TO INITIATE THE LETTER OF PERMISSION PROCESS AND SCHEDULE THE PUBLIC MEETING FOR THE BEAR CREEK DRAINAGE BASIN PLANNING STUDY

Dear Mr. Meehan:

The Planning and Development Department, Engineering Division, is requesting with this submittal that the Corps of Engineers initiate the Letter of Permission (LOP) procedures for the activities proposed in the Bear Creek Drainage Basin Planning Study presently being conducted by the City of Colorado Springs.

This request is based on the outline of recommended LOP procedures presented in your current letter to our division dated October 15, 1990.

The Bear Creek Drainage Basin Planning Study (DBPS) was initiated by the City December 1988, prior to the format for the LOP procedures being established. As a result, several of the required steps have been completed at this time. Various resource agencies, such as the EPA, FWS, and CDOH have been involved in several meetings with our division and our consultant to discuss the issues and develop the alternatives for the Bear Creek Drainage Basin Planning Study. A field visit was held on September 18, 1989 in order for representatives of these agencies to determine the current environmental conditions, and stream characteristics, erosion and flooding problems and other unique features along the major stream reaches.

Based on these group agency meetings which also included citizen neighborhood representatives, a consensus was reached on the types of alternatives to be pursued for the stream reached within the basin. Utilizing the information and results obtained from these meetings, our engineering consultant has prepared the attached data and spreadsheet listing the recommended improvements for each reach along with other pertinent information which would influence the LOP procedures. The selected alternative is noted for each reach of channel.

The proposed list of categories of activities which are described in the Cottonwood Creek Drainage Basin Planning Study are:

1) Stream bank stabilization
2) Low flow channel construction
3) Channelization
4) Drop structures and grade control Structures (checks)
5) Road crossings (bridges, culverts, and storm drains)
6) Maintenance roads and ramps
7) Wetland and riparian mitigation activities and placement of dredged or fill materials for achieving mitigations measures described in the Drainage Basin Planning Study
8) Temporary earthwork required for construction activities such as; cofferdams, stream crossings and ramps, access roads, construction pads, and storage areas.

Also attached are five copies of the Drainage Basin Planning Study report and related mapping for distribution to the resource agency.

Based on the previously held meetings with the resource agencies and interested parties, our division believes that the selected alternatives satisfy the Corps of Engineers requirements for the pre-application meeting with the resource agencies. Our division is hereby requesting that the Corps of Engineers prepare and issue a public notice and request comments on the Drainage Basin Planning Study alternatives and the proposed LOP permit procedures. The meeting can be scheduled for the City Council chambers if desirable.

Please contact Mr. Robert Adamczyk at (719) 578-6613 for scheduling of the public hearing and any questions you may have in regard to the Drainage Basin Planning Study.

Sincerely,

Gary R. Haynes
City Engineer

GRH/RA/bgl

Attachments

c: David Nickerson, Director of Planning and Development
Bruce Thorson, Assistant City Engineer
Chris Smith, Subdivision Administrator
Christine Lytle, Stormwater/Environmental Engineer
Tom Woodbury, Senior Corporate Attorney
Robert Adamczyk, Senior Civil Engineer
Alan Morrice, El Paso County Dept. of Transportation
Anita Culp, Biologist, Army Corps of Engineers
Richard Wray, Kiowa Engineers Inc.

no-12ra

US Army Corps
of Engineers
Albuquerque District
P.O. Box 1580
Albuquerque, NM 87103-1580
FAX No. 505-766-2770

Public Notice

Permit Application No: CO-OYT-0649
Date: February 21, 1991
Phone: (505)766-2776 or (719)543-9459
Suspense Date: March 29, 1991
In Reply Refer to: District Engineer, ATTN: CESWA-CO-R

JOINT PUBLIC NOTICE
U.S. ARMY CORPS OF ENGINEERS AND COLORADO DEPARTMENT OF HEALTH

PROPOSED ACTION

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 the City of Colorado Springs' Drainage Basin Planning Study for the Bear Creek basin. This proposal has been assigned Application No. CO-OYT-0649.

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 includes all Section 404 dredge or fill activities described in the Bear Creek Drainage Basin Planning Study (DBPS) dated January 1990 (revised February 1990, August 1990, and September 1990). 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, the Bear Creek DBPS was done which shows conduits, channels, natural drainage courses, 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.

NEWS RELEASE

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
Southeast Regional Office
2126 North Weber Street
Colorado Springs, CO 80907
Telephone: (719) 473-2945

REFER TO

*For Wildlife–
For People*

March 20, 1991

Lt. Colonel Steven M. Dougan
District Engineer
U.S. Army Corps of Engineers
Albuquerque, New Mexico 87108-1580

RE: Bear Creek Basin Planning Study and Letter of Permission (LOP), Application #CO-OYT-0649.

Dear Colonel Dougan,

I am providing Colorado Division of Wildlife comments regarding the above referenced documents as follows.

DRAINAGE BASIN DESCRIPTION - GENERAL COMMENTS

The Bear Creek Basin Planning Study is, unlike the others the Division has reviewed to date, largely a known quantity. Much of the drainage has been developed. Those areas not developed will remain as is or will be developed in a very predictable fashion. This being the case, drainage treatments recommended by Kiowa Engineering Corporation are quite specific by reach. Accordingly, one can determine what environmental impacts are likely to occur and how those impacts can be avoided, minimized or mitigated.

PREFERRED ALTERNATIVE

The proposed drainage treatment or alternative for this basin is to stabilize channel reaches through "spot" treatments which control or reverse continuing flooding, erosion and channel downcutting. Rather than uniformly line channels, the plan calls for intermittant use of low flow and benched channels in combination with drop or check structures. Stable, natural channel sections with or without bedrock, will be left unchanged. Where impacts to wetland and/or riparian vegetation taken place, similar vegetation will be used to mitigate losses and to augment structures for channel stabilization purposes. Recognizing and planning for the contributions of riparian vegetation to channel stability is new to El Paso County drainage studies, and the Division commends this approach. Further, this approach will lend well to multiuse drainage considerations.

-continued-

ALTERNATIVE DEFICIENCIES - SUGGESTED MODIFICATIONS

The primary deficiency in this study is the lack of an alternative selection discussion. We are well informed as to the preferred alternative, however those alternatives considered, but not selected, are not discussed. For instance, one assumes the no action alternative was rejected due to the desire of City and County officials to alleviate current flood and erosion problems. One also assumes that the hard lining of channels, on a uniform basis, was rejected as unnecessary and undesirable. Yet, in deference to the 404bl guidelines of the Clear Water Act, such discussion, complete with comparative impacts, mitigation, and cost estimations, is necessary as a matter of course for all drainage studies.

Along these lines, benefits to be realized via the selected alternative should be pointed out, e.g. minimal habitat destruction, improved water quality, enhanced aesthetics, and enhanced capabilities for multiple uses. Such discussion facilitates the decision making process by local and regulatory entities. It also makes more likely the acceptance of the alternative recommended.

MITIGATION

By using the "spot" treatment approach to addressing channel problems or needs, impacts to stream environments can be reduced significantly. Where shrubs and trees are displaced by structures, they should, as suggested, be replaced at the toe of structures or on slopes adjacent to riprap. Closed conduits should be avoided unless options for drainage structures are limited to road surfaces (or underneath those surfaces). Closed conduits eliminate other drainage values such as ground water recharge, water quality, and stabilized flows. Likewise, lowflow and benched channels should have porous bottom materials versus impervious surfaces to provide similar values.

Finally, because the basin is so adaptable to assigning specific construction criteria by channel reach, specific vegetation plans to accomplish hydrologic function, as well as provide mitigation, should be developed. Without such plans, proper revegetation/mitigation may not take place.

CONCLUSION

Bear Creek Basin requires channel treatments to rectify existing and full build out drainage problems. The selected alternative will provide these treatments with minimal environmental impact and with opportunities to mitigate habitat loses. Because hydrologic demands can be predicted by channel reach, specific channel treatments can be identified now. Likewise, specific vegetation/mitigation treatments can be identified. The Division recommends that this drainage basin plan be further revised to this level of specificity. We further recommend that a section on alternative comparison and selection be added to this study.

Please contact me at 719-473-2945 for questions or for further coordination.

Sincerely,

Bruce Goforth
Senior Wildlife Biologist

APPROVED BY:

Ronald P. Desilet
Regional Manager

xc: R. Wray, Kiowa Engineering
G. Haynes, City of Colorado Springs
S. Fowler, EPA
B. Noonan, USFWS
K. Lair, SCS
D. Clippinger, CDOW

4/10/91
9 Em

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

MAR 27 1991

Ref: 8WM-SP

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

RE: CO-OYT-0649
Bear Creek Drainage Plan

Dear Colonel Dougan:

We have reviewed the referenced public notice for the placement of fill material in Bear Creek and adjacent wetlands in conjunction with the construction of channel stabilization treatments for flood control purposes in El Paso County, Colorado.

The Environmental Protection Agency is concerned with the selection of a few channel treatment alternatives and recommends that the following concerns be addressed in the final selection of practicable, less damaging alternatives:

Reach 1

Additional buried or unburied riprap and vertical grade control structures are proposed for this reach. If riparian vegetation exists on the banks of this reach, we believe that buried riprap, with in-kind riparian revegetation, should be the recommended alternative. This treatment will ensure that unavoidable impacts are minimized and lost functions and values are adequately compensated. NOTE: Buried riprap should be recommended for all reaches where vegetated banks exist and are subject to disturbance for stabilization purposes.

Reach 2

Portions of this reach will be realigned and stabilized with a grouted boulder trickle channel. Because the public notice does not contain information describing the aquatic resource to be affected, we must assume that the worst case scenario exists (e.g., wetlands and riparian cover will be adversely impacted). Non-porous linings effectively isolate existing hydrology from the riparian growth and precludes subsequent revegetation or establishment of benthic habitat. In addition, significant indirect wetland impacts resulting from non-porous linings could

occur. Accordingly, we believe less damaging alternatives are available including the use of low flow, porous, riprap channels.

Wetlands described in the consultants submittal which occur in flat drainages and are "well developed in the areas just south and west of Penrose Stadium across Bear Creek" do not appear to be impacted by alternative channel treatments. Will these wetlands be indirectly impacted by the channel realignment? Are other wetland areas in the basin subject to impacts either directly or indirectly? This information is critical for use to make informed decisions and recommendations on compliance with the Section 404(b)(1) Guidelines. Similarly, the lack of detail on the proposed mitigation does not adequately support the conclusion that impacts to waters of the U.S. will be fully compensated.

Generally, the recommended channel stabilization treatments appear to minimize adverse impacts. However, we continue to have concerns on the level of detail proposed for inclusion in the LOP. If you have any questions concerning these comments or recommendations, please contact Sarah Fowler at (303) 293-1575 or FTS 330-1575.

Sincerely,

for

Dale Vodehnal, Chief
State Programs Branch
Water Management Division

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

United States Department of the Interior
FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE
730 SIMMS STREET
ROOM 292
GOLDEN, COLORADO 80401

IN REPLY REFER TO:

APR 4 1991

FWE/CO: 404-Albuq
PN0649.ltr

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

Re: Public Notice No. 0649, Bear Creek Drainage Basin Planning Study Letter of Permission, El Paso County, Colorado

Dear Colonel Dougan:

The U.S. Fish and Wildlife Service (Service) has reviewed the subject Public Notice and offers the following comments. These comments have been prepared under the authority of, and in accordance with, the provisions of the Endangered Species Act (16 U.S.C. 1531 et seq.) and the Fish and Wildlife Coordination Act (48 Stat. as amended; 16 U.S.C. 661 et seq.) and constitute the report of the Department of the Interior.

The Service has reviewed both the subject notice and Bear Creek Drainage Basin Planning Study (DBPS) prepared by Kiowa Engineering. Our most significant concern is the lack of discussion on impacts associated with the preferred DBPS alternative. Provided the following recommendations are incorporated as permit conditions, the Service will not object to issuance of an LOP for this DBPS.

Recommendation 1:

As with the Windmill Gulch LOP the Service recommends a detailed description of the proposed alternative including estimated impacts and mitigation methods be presented as the subject of this LOP. Given the amount of detail provided for itemized project costs, estimation of the impact area for proposed activities should be possible.

The level of channel work proposed appears to be excessive when compared to information contained in the DBPS regarding projected developed flows. Existing 100 year - 24 hour event flows are approximately 90 percent of modeled developed flows for the same event. Base flows for existing and developed conditions were apparently not modeled even though most invert degradation and bank erosion has been attributed to low flows. However, it does not seem likely that base flows would increase at a rate significantly different from flood flows. Bear Creek basin flows, storm and base, are

currently near their peak. Problem areas for lateral and invert erosion should already be identifiable. With this in mind the Service questions the need for the extensive riprap and low flow channel construction recommended. This is particularly true for reaches 1 through 3.

Recommendation 2:

The Service recommends the Corps have the applicant investigate the use of the approach discussed below to control downcutting and lateral erosion.

> Stabilize downcutting of the channel bed through use of grade control structures only. Minor lateral movement of the invert should not be considered a major problem. Where base flows are cutting into stream banks and causing sloughing, localized riprap protection can be used. No boulder riprap low flow channel should be constructed. If it is determined that control of invert lateral movement is required, a porous low flow channel should be constructed. This will allow base flows to help maintain local water table levels. Vertical stabilization of the channel will permit wetland and riparian vegetation to become established along the active channel.

Recommendation 3:

Channel work through Bear Creek Regional Park is of concern to the Service and the National Park Service. This park has received Land and Water Conservation Fund (L&WCF) assistance and is therefore subject to the provisions of Section 6(f) of the L&WCF Act, as amended. The provisions of the Act stipulate that changes from outdoor recreation uses be approved by the Secretary of the Interior and require the substitution of other properties of at least equal fair market value and reasonably equivalent usefulness and location for the recreation lands to be taken. Mr. Tom Kenyon, Acting Director, Colorado Division of Parks and Outdoor Recreation, Department of Natural Resources, 1313 Sherman Street, Room 618, Denver, Colorado 80203 should be contacted. He is responsible for administration of the L&WCF in Colorado and will need to contact El Paso County to determine if there will be any conversion of use. We are pleased to see that proposed channel work in Reach 4 is minimal. As recommended in No. 2 above, this approach should be carried as far downstream as possible.

The Service recommends channel work within the park be kept to an absolute minimum and coordinated closely with park managers. Of particular concern is the construction of channel maintenance access roads.

The DBPS discussion of detention ponds and their possible role warrants re-examination. Siltation of existing ponds is a maintenance issue and should not be used to discount potential benefits to the basin.

Recommendation 4:

The use of detention ponds in the upper portions of the basin should be re-evaluated.

We would like to acknowledge the DBPS efforts directed at minimizing modification of the existing floodplain and impacts to wetland and riparian vegetation. DBPS recommendations to maintain and encourage instream vegetation to promote stability and habitat values are also commendable. If the Service can be of further assistance, please contact Bill Noonan of this office at (303) 231-5280 or FTS 554-5280.

Sincerely,

LeRoy W. Carlson
Colorado State Supervisor

cc: CDOW, Colo. Springs
CDOPR, Denver (Attn: Tom Kenyon)
NPS,Denver (Attn: Richard Strait)
EPA, Denver (Attn: Sarah Fowler)
FWS/FWE, Salt Lake City
CDOH, Denver (Attn: John Farrow)
Official File
Reading File

Bernard Ewell Art Appraisals

318 E. Cache La Poudre, Colorado Springs, Colorado 80903, 719-632-5035
320 Aztec Street, Suite E, Santa Fe, New Mexico 87501, 505-989-8879

15 April, 1991

Mr. David R. Sellon
David R. Sellon & Company
225 East Cheyenne Mtn. Blvd.
Colorado Springs, Co. 80906

Dear Mr. Sellon:

This letter is intended to serve notice of a drainage problem that will need to be addressed in your plans for the further development of Top of Skyway. A copy is being sent to the Colorado Springs Planning Commission and I shall appreciate your attention to the matter at the appropriate time.

The area of concern is the intersection of Leo Drive and Southern Cross Drive and the problem is storm run-off and the gravel it carries down Leo Drive for deposition on Southern Cross. This occurrence is often also accompanied by the flooding of my property at 605 Southern Cross Drive and the deposition of gravel on my property. In one storm, the gravel was estimated at the time of removal at twelve tons.

The problem is caused by an intermittent stream above the current end of Leo Drive. That street was built in the stream bed and serves as a water route with each heavy rain. I believe that the extension of Leo or the development of land above Leo will exacerbate the problem and cause the flooding not only of my property, but also my home. If that happens, I shall immediately seek relief in the courts.

I am available to meet with your representative and discuss the matter at whatever time you may be planning the development of the property above Leo Drive. I appreciate your addressing this concern before it becomes a serious threat to me and my family.

Sincerely,

Bernard Ewell

cc Colorado Springs Planning Commission

Bernard Ewell, ASA
Senior Member,
American Society of Appraisers

Copy given to City Engineering 4-23-91

CESWA-DP-SC (1145b) 15 April 1991

MEMORANDUM THRU

Project Engineer, Southern Colorado Project Office

Chief, Regulatory Branch

FOR Regulatory Branch File

SUBJECT: Public Meeting, Section 404 Application No. CO-OYT-0649

1. The public meeting for the proposed Section 404 List of Categories of Activities (LCA), Application No. CO-OYT-0649 for the Bear Creek Drainage Basin Planning Study (DBPS) was scheduled for March 19, 1991. The meeting was to begin at 7:00 p.m. in the City of Colorado Springs Council Chambers, 30 South Nevada, Colorado Springs, Colorado.

2. Five people were present, all of which were meeting participants or otherwise directly involved in the administration of the DBPS or LCA. A list of the attendees is enclosed. At 7:20 p.m., after no one else came, the public meeting was cancelled.

3. 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 March 20, 1991.

b. Environmental Protection Agency letter dated March 27, 1991.

c. Fish and Wildlife Service letter dated April 4, 1991.

ANITA E. CULP
Project Manager

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

Enclosure 1

ATTENDANCE LIST
PUBLIC MEETING FOR CO-OYT-0649

Anita Culp
Corps of Engineers
P.O. Box 294
Pueblo, CO 81002-0294

Robert Adamczyk
C.S. City Engineering
P.O. Box 1575
Colorado Springs, CO 80901

Wes Tyson
C.S. City Attorney's Office
30 S. Nevada, Suite 501
Colorado Springs, CO 80901

Alan Morrice
El Paso County
Dept. of Public Works
3105 N. Stone
Colorado Springs, CO 80907

Richard Wray
Kiowa Engineering Corp.
419 W. Bijou
Colorado Springs, CO 80905

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1580
ALBUQUERQUE, NEW MEXICO 87103-1580
FAX (505) 766-2770

REPLY TO
ATTENTION OF:

April 24, 1991

Construction-Operations Division
Regulatory Branch

Mr. Robert T. Adamczyk
City Engineering Division
City of Colorado Springs (m.c. 435)
P.O. Box 1575
Colorado Springs, Colorado 80901-1575

Dear Mr. Adamczyk:

Enclosed is a copy of the meeting record for the proposed List of Categories of Activities, No. CO-OYT-0649, for the Bear Creek Drainage Basin Planning Study. The meeting was held on March 19, 1991.

If you have any questions, please feel free to contact Ms. Anita Culp at (719) 543-9459.

Sincerely,

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

Enclosure

Same Letter Sent To:

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

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P.O.BOX 1580
ALBUQUERQUE, NEW MEXICO 87103-1580
FAX (505) 766-2770

REPLY TO
ATTENTION OF:

June 10, 1991

Construction-Operations Division
Regulatory Branch

Mr. Robert T. Adamczyk
City Engineering Division
City of Colorado Springs
P.O. Box 1575 (m.c. 435)
Colorado Springs, Colorado 80901-1575

Dear Mr. Adamczyk:

A preliminary Section 404(b)(1) alternatives review has been completed for the Bear Creek Drainage Basin Planning Study (DBPS) and proposed List of Categories of Activities (LCA) for No. CO-OYT-0649. The enclosed table summarizes our review.

In order for the List of Categories of Activities to meet the 404(b)(1) Guidelines, the DBPS selected alternative must be either the least environmentally damaging alternative or other less environmentally damaging alternatives must be unavailable when considering cost, technology, and logistics in light of project purposes. The enclosure gives a ranking of drainageway alternatives by adverse environmental impact, a synopsis of the Corps conclusion at this point on availability or practicability of alternatives, and alternatives for which we have insufficient information for an evaluation.

Please provide us with additional data or explanations about alternatives so we can continue the guidelines review. 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,

Thomas J. Travelli for

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

Enclosure

Kiowa Engineering Corporation

July 12, 1991

Robert E. Meehan
U.S. Army Corps of Engineers
PO Box 1580
Albuquerque, NM 87103-1580

RE: Letter of Permission, CO-OYT-0649, Bear Creek Drainage Basin Planning Study
(Kiowa Project No. 88.12.26)

Dear Mr. Meehan:

Enclosed is a summary of additional information for the above referenced project. The additional information concerning the various alternatives examined by the City and the Corps was requested in your letter to Mr. Robert Adamczyk of the City of Colorado Spring Engineering Division, dated June 10, 1991.

I have taken the liberty to distribute this information to the individuals and agencies copied on the Corp's June 10th letter. Should you require any additional information please do not hesitate to contact me.

Sincerely yours,
KIOWA ENGINEERING CORPORATION

Richard N. Wray
Principal

cc: Bob Adamczyk, City Engineering
Sarah Fowler, EPA
Bruce Goforth, CDoW
Bill Noonan, USF & W

0712coe.doc

419 W. Bijou Street Colorado Springs, Colorado 80905-1308 (303) 630-7342

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P.O.BOX 1580
ALBUQUERQUE, NEW MEXICO 87103-1580
FAX (505) 766-2770

REPLY TO
ATTENTION OF:

September 11, 1991

Construction-Operations Division
Regulatory Branch

SEP 16 1991

Mr. Gary R. Haynes
City Engineering Division
City of Colorado Springs
P.O. Box 1575 (mc 435)
Colorado Springs, Colorado 80901-1575

Dear Mr. Haynes:

We have received your letter dated August 19, 1991, regarding our Letter of Permission (LOP) proposals for the Cottonwood Creek and Bear Creek Drainage Basin Planning Studies (DBPS).

We recognize that you have been very responsive to all our requests. Due to an exceptionally heavy workload, we have not made as much progress this summer on the LOP proposals as we had expected. We have made substantial advancements in collecting data and writing environmental assessments for six basin studies, including Bear Creek. We intend to provide you comments on the Cottonwood Creek DBPS draft report and mapping by October 4, 1991. Completion of the Bear Creek LOP is anticipated for October or November.

The Colorado Division of Wildlife had the lead on providing agency input to your proposed environmental section of the City/County Drainage Criteria Manual. However, their staff person working on the project was reassigned to other duties and the task fell to us. An outline of items for your manual will be provided to you on September 16, 1991.

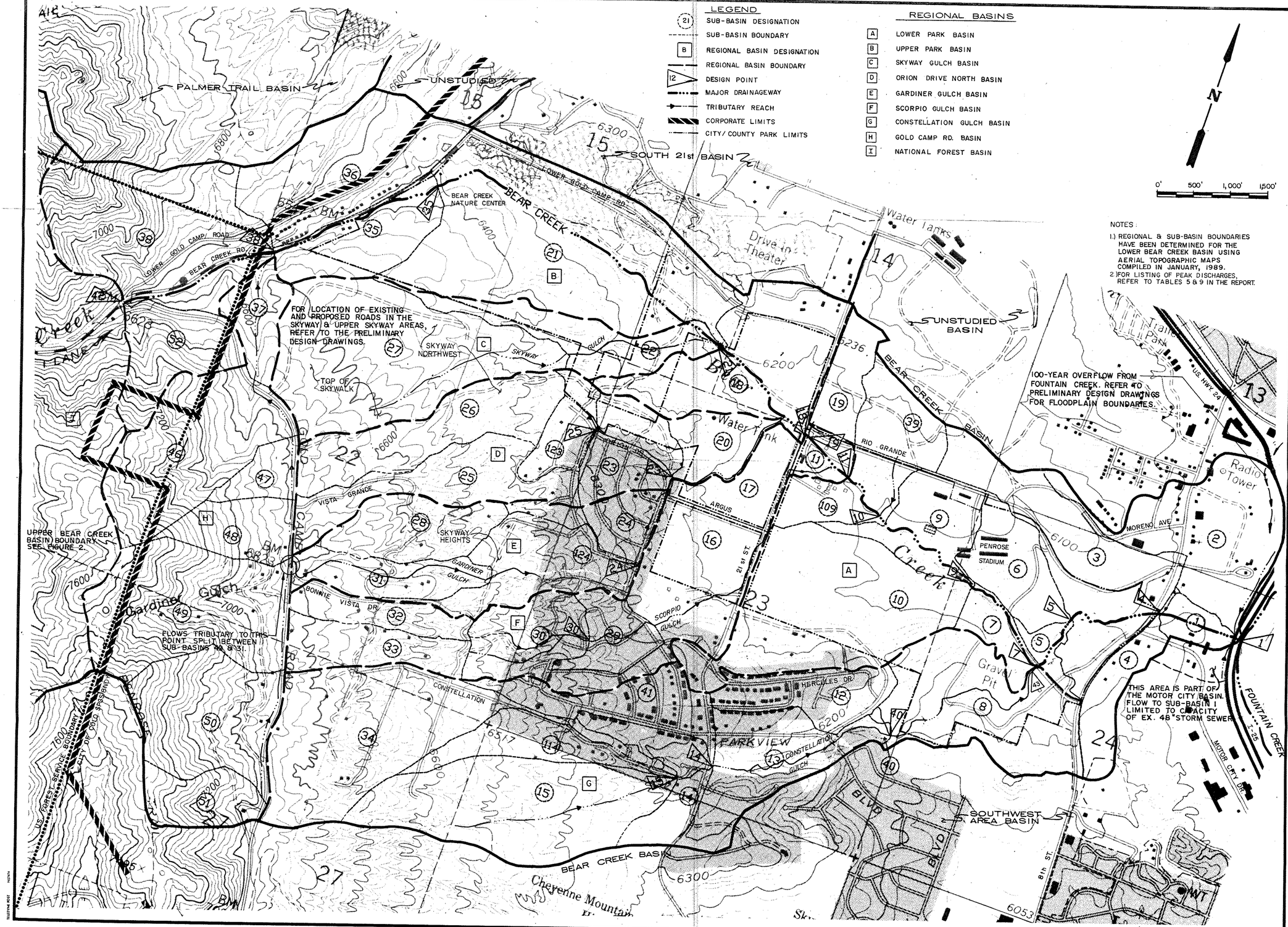
I apologize for the inconvenience and problems our delays have caused you.

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,

Leslie P. Arnold

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



Kiowa Engineering Corporation
419 W. Bijou Street
Colorado Springs, Colorado
80905-1308

BEAR CREEK DRAINAGE BASIN PLANNING STUDY
HYDROLOGIC BASIN MAP
LOWER BEAR CREEK BASIN

Project No.	88.12.26
Date:	5/89
Design:	
Drawn:	EAK
Check:	RNW
Revisions:	

EXHIBIT 1