

of maintenance is somewhat undeterminable and dependent upon the degree of disturbance to upstream areas and the amount of runoff producing rainfall. It is recommended that a more rigid liner be placed in the invert of the forebay to provide a stabilized working surface from which maintenance equipment can clear sediment. Riprap and soil cement are possible examples of liner materials. Further design must be undertaken to identify the type of materials and construction techniques to best suit the water quality design constraints and the sites. An annual maintenance program must be established and a mechanism identified to provide maintenance funding.

Various other improvements at Big Johnson Reservoir include the enlargement of the existing spillway to meet the State Engineer's requirements, regrading of the dam embankment road, and an inlet structure for the 36-inch stormwater outlet pipe. Maintenance access to all water quality pond embankments and inverts have been shown on the drawings. With the exception of the spillway enlargement and outlet pipe construction, the improvements proposed for Big Johnson can be completed without prior approval of the State Engineer's Office.

Upstream of Big Johnson Reservoir, riprap-lined channels and closed conduits are proposed. The actual channel section(s) to be constructed should be designed taking into account the land use adjacent to a drainageway. Current plans for the Waterview Property call for a commercial-business use for the land. As an alternative to the riprap bank and natural invert section proposed herein, concrete swales could be considered which would lessen the need for drop structures. Major road crossings have been considered and box culverts sized to convey the 100-year design frequency. The extension of New Bradley Road and one other proposed arterial have been assumed herein for preliminary design cost estimation purposes.

North of Powers Boulevard, the drainage area is within the City of Colorado Springs, and more specifically, part of the Colorado Springs Municipal Airport property. In earlier correspondence with the City of Colorado Springs, the City

expressed their intent to maintain developed flows from this area to existing conditions. Accordingly, detention basins have been sited north of Powers Boulevard. It has been assumed that these structures would be funded by the City with no reimbursement from the basin drainage fee system. Accordingly, the cost of these facilities and acreage lying within the City of Colorado Springs has been omitted from the drainage basin fee calculation. The ponds should incorporate water quality control features into their design, similar in concept to those proposed south of Powers Boulevard within Reach 5.

Right-of-way and/or easements acquisition is required for the water quality control ponds which are sited within the Big Johnson Reservoir property. Right-of-way for the public drainage facilities within the Waterview Property can be obtained through plat dedication as the property develops.

(Each of the water quality basins upstream of Big Johnson Reservoir have been designed with an overflow spillway to allow future 100-year pond inflow to enter the Reservoir.) The low-flow outlet shown for Big Johnson Reservoir has been sized to release the runoff for the 100-year storm within 48 hours. It is recommended that this outlet be kept separate from the existing irrigation outlet which feeds the Fountain Mutual Canal downstream of the Reservoir.

Preliminary Cost Estimate

Presented on Tables 15 and 16 are the cost estimates for the preliminary design improvements. The costs have been separated for roadways and drainageways, and by reach. Unit costs used in developing the preliminary estimate were determined from Table 12, and using bid tabulation data from recent drainageway construction projects in the area. Costs for initial systems are not included in Tables 15 and 16. These systems must be constructed by the property owner, as part of the development process. It is recommended that no reimbursement via the basin drainage fund be allowed for minor systems in this basin.

TABLE 1B

SIS JOHNSON RESERVOIR DRAWS GULCH DRAINAGE PLANNING STUDY DRAINAGEWAY COSTS
 PRELIMINARY DESIGN COST ESTIMATE

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NON-REIMBURSABLE COSTS	REIMBURSABLE COSTS
REACH 1 CHANNEL LINING STA 7+00 TO STA 11+00	400	LF	\$115	\$46,000	\$0	\$46,000
STA 14+00 CHANNEL LINING STA 12+50 TO STA 15+00	250	LF	\$115	\$28,750	\$0	\$28,750
STA 22+40 RIPRAP CHANNEL STA 22+30 TO STA 30+50	850	LF	\$165	\$140,250	\$0	\$140,250
CHANNEL REHAB. STA 30+50 TO STA 33+50	300	LF	\$157	\$47,100	\$0	\$47,100
CONCRETE CHANNEL STA 35+40 TO 37+00	180	LF	\$360	\$64,800	\$0	\$64,800
RIPRAP CHANNEL STA 37+00 TO STA 39+40	240	LF	\$105	\$24,720	\$0	\$24,720
CHECK STRUCTURE STA 35+40	50	LF	\$88	\$4,400	\$4,400	\$0
DROP STRUCTURES STA 30+50 & 31+50	180	LF	\$336	\$60,480	\$60,480	\$0
FLOW CONTROL STRUCTURE STA 12+50	180	LF	\$135	\$20,250	\$20,250	\$0
TWIN 4'x12' CBO. STA 31+50 WITH NW & SW	36	LF	\$1,040	\$37,440	\$37,440	\$0
OVERFLOW STRUCTURE AT CERESA PARK	1	LS	\$25,000	\$25,000	\$25,000	\$0
EARTHWORK STA 35+00	2700	CY	\$3	\$8,100	\$8,100	\$0
42" CMP W/FES, SOUTHWOOD DRIVE	220	LF	\$100	\$22,000	\$22,000	\$0
36" RCP W/FES (HARVARD & WIDEFIELD)	90	LF	\$75	\$6,750	\$6,750	\$0
36" RCP (OVERFLOW PAN (ALLEGRE CIRCLE)	75	LF	\$60	\$4,500	\$4,500	\$0
14" RCP (HARVARD & WIDEFIELD)	80	LF	\$40	\$3,200	\$3,200	\$0
10" CC INLET (ALLEGRE STREET AND HARVARD ST	3	LS	\$3,000	\$9,000	\$9,000	\$0
SUBTOTAL REACH 1				\$545,540	\$201,120	\$344,420
REACH 2 RIPRAP CHANNEL STA 39+00 TO STA 51+50	1165	LF	\$109	\$125,820	\$0	\$125,820
ST 39+40 BOULDER LOW FLOW STA 51+50 TO STA 62+50	1100	LF	\$58	\$63,800	\$0	\$63,800
TO 63+00 GRADE CONTROL STRUCTURES (7 TOTAL)	140	LF	\$88	\$12,320	\$12,320	\$0
DROP STRUCTURE STA 51+50	50	LF	\$336	\$16,800	\$16,800	\$0
THREE-FOOT BERM STA 63+50	350	LF	\$20	\$7,000	\$7,000	\$0
SUBTOTAL REACH 2				\$225,740	\$36,120	\$189,620
REACH 3 BOULDER LOW FLOW STA 64+00 TO STA 82+85	895	LF	\$59	\$51,910	\$0	\$51,910
ST 64+00 GRADE CONTROL STRUCTURES (5 TOTAL)	125	LF	\$88	\$11,000	\$11,000	\$0
TO 82+85 DROP STRUCTURES STA 64+00, 65+00	80	LF	\$336	\$26,880	\$26,880	\$0
EARTHWORK	1	LS	\$10,000	\$10,000	\$0	\$10,000
36" CMP W/FES	250	LF	\$40	\$10,000	\$10,000	\$0
SUBTOTAL REACH 3				\$109,790	\$47,880	\$61,910

TABLE 15

BIG JOHNSON RESERVOIR/DREWS GULCH DRAINAGE PLANNING STUDY DRAINAGEWAY COSTS
PRELIMINARY DESIGN COST ESTIMATE

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NON- REIMBURSABLE COSTS	REIMBURSABLE COSTS
REACH 4 BOULDER LOW FLOW STA 96+00 TO 122+20	4180	LF	\$58	\$242,440	\$0	\$242,440
ST 92+85 GRADE CONTROL STRUCTURES (2 TOTAL)	100	LF	\$88	\$8,800	\$0	\$8,800
- 141-15 DROP STRUCTURES STA 109+25, 112-25, 117+25	120	LF	\$336	\$40,320	\$0	\$40,320
ENERGY DISSIPATOR STA 82+85	1	LS	\$80,000	\$80,000	\$40,000	\$40,000
2.5'x8' CBO, STA 106+75	50	LF	\$380	\$19,000	\$19,000	\$0
36" POCP AND HEADWALL	520	LF	\$150	\$78,000	\$0	\$78,000
PRESSURE MANHOLE	1	LS	\$5,000	\$5,000	\$0	\$5,000
MC RAE RESERVOIR IMPROVEMENTS						
SHEET PILE WALL	27900	SF	\$20	\$558,000	\$279,000	\$279,000
OUTLET RECONSTRUCTION (18" CSP)	1	LS	\$8,000	\$8,000	\$8,000	\$0
TWIN 48" INCH REHABILITATION	1	LS	\$10,000	\$10,000	\$0	\$10,000
20' MAINTENANCE BENCH	570	LF	\$30	\$26,100	\$0	\$26,100
RIPRAP EMBANKMENT PROTECT. FONTAINE BLVD	820	CY	\$24	\$19,680	\$0	\$19,680
EARTHWORK	2000	CY	\$3	\$6,000	\$0	\$6,000
BIG JOHNSON RESERVOIR IMPROVEMENTS						
WATER QUALITY PONDS	67.0	AC-FT	\$10,000	\$670,000	\$0	\$670,000
EMBANKMENT ROAD RECONSTRUCTION	1500	LF	\$25	\$37,500	\$0	\$37,500
RIPRAP SPILLWAY CREST PROTECTION	1960	CY	\$24	\$47,040	\$0	\$47,040
DROP INLET AND TRASH RACK	1	LS	\$7,000	\$7,000	\$0	\$7,000
3' FOOT HIGH CONTOUR BERMS	4400	LF	\$15	\$66,000	\$0	\$66,000
SUBTOTAL REACH 4				\$1,926,880	\$346,000	\$1,580,880

TABLE 15

318 JOHNSON RESERVOIR/DREWE GULCH DRAINAGE PLANNING STUDY DRAINAGEWAY COSTS
PRELIMINARY DESIGN COST ESTIMATE

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL	NON- REIMBURSABLE COSTS	REIMBURSABLE COSTS
REACH 5							
RIPRAP CHANNEL SECTION 1		1000	LF	\$133	\$133,000	\$0	\$133,000
RIPRAP CHANNEL SECTION 2-2		950	LF	\$133	\$127,350	\$0	\$127,350
RIPRAP CHANNEL SECTION 3-3		900	LF	\$115	\$103,500	\$0	\$103,500
RIPRAP CHANNEL SECTION 3-2		1450	LF	\$133	\$192,850	\$0	\$192,850
RIPRAP CHANNEL SECTION 3-3		1700	LF	\$115	\$195,500	\$0	\$195,500
RIPRAP CHANNEL SECTION 4		1000	LF	\$133	\$133,000	\$0	\$133,000
RIPRAP CHANNEL SECTION 5		1750	LF	\$133	\$232,750	\$0	\$232,750
RIPRAP CHANNEL SECTION 6		450	LF	\$115	\$51,750	\$0	\$51,750
RIPRAP CHANNEL SECTION 7		1000	LF	\$133	\$133,000	\$0	\$133,000
DETENTION/WATER QUALITY PONDS (CS AIRPORT)		120	AC-FT	\$8,000	\$960,000	\$960,000	\$0
DDPP STRUCTURES		1414	LF	\$336	\$475,104	\$0	\$475,104
30" RCP W/FES		1200	LF	\$50	\$60,000	\$0	\$60,000
48" RCP W/FES		2500	LF	\$100	\$250,000	\$0	\$250,000
34" RCP W/FES		300	LF	\$120	\$36,000	\$0	\$36,000
60" RCP W/FES		800	LF	\$145	\$116,000	\$0	\$116,000
5' DIA. MANHOLES		2	EA	\$2,500	\$20,000	\$0	\$20,000
SUBTOTAL REACH 5					\$3,209,404	\$960,000	\$2,249,404

TABLE 15

ELI JOHNSON RESERVOIR/CRENS GULCH DRAINAGE PLANNING STUDY DRAINAGEWAY COSTS
PRELIMINARY DESIGN COST ESTIMATE

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NON-	
					REIMBURSABLE COSTS	REIMBURSABLE COSTS
REACH 3A STABILIZED CHANNEL W/ TRAIL STA 7+05 TO STA	3845	LF	\$28	\$107,660	\$49,985	\$57,675
GRADE CONTROL STRUCTURES (6 TOTAL)	120	LF	\$88	\$10,560	\$10,560	\$0
DROP STRUCTURES (8 TOTAL)	160	LF	\$336	\$53,760	\$53,760	\$0
HEADWALL IN WIDEFIELD PARK	1	LS	\$5,000	\$5,000	\$0	\$5,000
DETENTION POND STA 58+65	13	AC-FT	\$7,000	\$91,000	\$0	\$91,000
CONCRETE FLUME AT FMI CANAL	125	LF	\$210	\$26,250	\$0	\$26,250
FMI IRRIGATION CANAL 4'X7' CBS W/WW	28	LF	\$415	\$11,620	\$0	\$11,620
48" RCP	500	LF	\$100	\$50,000	\$40,000	\$10,000
60" RCP W/FES (FONTAINE, GOLDFIELD & PROPCS	320	LF	\$145	\$46,400	\$0	\$46,400
60" CMP W/FES (FONTAINE S. FLOW LINE)	180	LF	\$120	\$21,600	\$21,600	\$0
20" CD INLET @ DRURY LANE	1	LS	\$4,000	\$4,000	\$4,000	\$0
AUGMENTATION LINE RELOCATION	1	LS	\$2,500	\$2,500	\$2,500	\$0
SUBTOTAL REACH 3A				\$430,350	\$182,405	\$247,945
TOTAL DRAINAGEWAY IMPROVEMENTS				\$6,448,704	\$1,773,505	\$4,675,179
5% CONTINGENCY				\$322,435	\$88,676	\$233,759
10% ENGINEERING AND CONTINGENCY				\$677,114	\$186,220	\$490,894
GRAND TOTAL DRAINAGEWAYS				\$7,448,253	\$2,046,421	\$5,399,832

TABLE 16

E13 JOHNSON RESERVOIR/CRENS GULCH DRAINAGE BASIN PLANNING STUDY
PRELIMINARY DESIGN COST ESTIMATE

ROADWAY CROSSING COSTS
REACHES 1 - 5

ROADWAY	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NON-REIMBURSABLE COSTS	
						NON-REIMBURSABLE COSTS	REIMBURSABLE COST
REACH 2 HARVARD STREET	8'Hx7-12-F CBO	45	LF	\$1,675	\$84,375	\$78,688	\$35,687
REACH 3 QUEBEC STREET	TWIN 6'Hx14'W CBO	40	LF	\$1,445	\$57,800	\$56,644	\$1,156
REACH 4 FONTAINE BOULEVARD	8'Hx12'W CBO	135	LF	\$710	\$95,850	\$54,635	\$41,215
REACH 5 BRADLEY RD (PROPOSED)	8'Hx12-12 CBO (5A)	120	LF	\$1,350	\$162,000	\$0	\$162,000
PROPOSED ARTERIAL	8'Hx9'-9' CBO (5B)	120	LF	\$720	\$86,400	\$0	\$86,400
PROPOSED ARTERIAL	8'Hx9' CBO (5B 55')	120	LF	\$540	\$64,800	\$0	\$64,800
REACH 3A BRURY LANE	4'Hx12' CBO	60	LF	\$655	\$39,300	\$32,228	\$7,072
BELLE VISTA	TWIN 4'Hx7'W CBO	60	LF	\$850	\$51,000	\$47,940	\$3,060
METROPOLITAN DRIVE	TWIN 4'Hx7'W CBO	50	LF	\$790	\$39,500	\$31,195	\$8,305
SUBTOTAL ROADWAY CROSSING IMPROVEMENTS					\$681,025	\$252,133	\$428,892
5% CONTINGENCY					\$34,051	\$12,806	\$21,245
10% ENGINEERING & CONTINGENCY					\$71,508	\$26,473	\$45,034
GRAND TOTAL ROADWAY CROSSING IMPROVEMENTS					\$786,584	\$291,008	\$495,576

NOTE: NONREIMBURSABLE COSTS ARE BASED UPON THE COUNTY PARTICIPATION FORMULA AS DEFINED IN RESOLUTION NO. 89-31, TRANSPORTATION - 2.

Basin Fee Determination

Table 17 is a summary for the ownerships of the unplatted acreage within the Big Johnson/Crews Gulch Basin. This table has been developed using El Paso County Tax Assessor's maps. The total acreage used in the fee determination was 977.3 acres. The unplatted land within the Fountain Valley School and Colorado Springs Municipal Airport properties has not been included in the calculations for drainage and bridge fees. The owners (or developers) of this property will be responsible for providing their own stormwater management facilities which will maintain runoff to the flows presented in this report. Accordingly, no reimbursement would be made for drainage facilities constructed within such properties. Another option, at the discretion of the County, would be to make the adjustments to the drainage basin planning study facilities and fees to address any changed conditions.

Table 17. Summary of Unplatted Acreage -
Big Johnson/Crews Gulch Drainage Basin.

Description	Total Acreage	Acreage Subject to Fee Assessment
Waterview Property	901.9	901.9
Big Johnson Reservoir	427.0	
Fountain Valley School	937.1	
McRae Reservoir	10.0	
Colorado Springs Municipal Airport	656.7	
Miscellaneous Unplatted	<u>75.4</u>	<u>75.4</u>
TOTAL	3008.1	977.3

Previously presented on Tables 15 and 16 were the costs of the preliminary design improvements. Also shown were the cost of facilities which would be required to accommodate land development in the basin (reimbursable costs). The balance of the drainageway and bridge facility costs are attributable to

correcting existing deficiencies within the basin (non-reimbursable costs). Construction funding for these facilities will have to be provided through other funding mechanisms. A suggested allocation of the non-reimbursable cost has been presented on Table 18. The construction of initial systems within the basin will not be reimbursable, and shall be the responsibility of the property owner or developer.

Table 19 presents the fee calculation for the Big Johnson/Crews Gulch Basin. Drainage fees have been calculated using the reimbursable costs shown on Table 15. Reimbursable road crossing replacement costs at locations where there is an existing inadequacy have been calculated using the bridge cost-sharing formula, as per Resolution number 89-31. The land fee has been estimated without the acreage associated with channel right-of-ways, McRae Reservoir, and the detention/water quality ponds above Powers Boulevard. Easements establishing long-term construction and maintenance access for the channels crossing the Fountain Valley School property and for the water quality ponds at Big Johnson Reservoir, as well as for all public facilities, will be needed.

Implementation

The proposed plan separates the basin into three distinct systems, namely, the Crews Gulch system (Reaches 1 through 4), the Big Johnson system (Reach 5), and the Fountain Mesa Tributary system (Reach 3A). These systems will be impacted differently by land development, and therefore, the prioritization of improvements is dependent upon differing factors in each of these basins. A discussion of implementation follows:

Crews Gulch: Of primary importance in this basin are the improvements to McRae Reservoir. Substantial park improvements exist downstream of McRae Reservoir, and more are proposed at Fountain Creek Regional Park. Adjacent to Harvard Street the potential for flood damages to residences exists for the 100-year event. McRae Reservoir's flood history is well documented, and

TABLE 15

JOHNSON RESERVOIR/CREWS GULCH DRAINAGE PLANNING STUDY
 REQUESTED ALLOCATION OF NON-REIMBURSABLE COSTS

DESCRIPTION	NON- REIMBURSABLE COSTS	EL PASO COUNTY	CITY OF FOUNTAIN	CDCH	WIDEFIELD HOMES	OTHER
REACH 1 CHECK STRUCTURE STA 30+40	\$4,400	\$4,400	\$0	\$0	\$0	\$0
30+40 CROP STRUCTURES STA 30+50 & 31+50	\$60,480	\$0	\$0	\$60,480	\$0	\$0
34+40 FLOW CONTROL STRUCTURE STA 12+50	\$20,250	\$13,500	\$6,750	\$0	\$0	\$0
TWIN 4'x12' CRO, STA 21+50 WITH GW & TW	\$37,440	\$25,000	\$12,350	\$0	\$0	\$0
OVERFLOW STRUCTURE AT CERESA PARK	\$25,000	\$16,750	\$8,250	\$0	\$0	\$0
PAVEMENT STA 35+00	\$8,100	\$0	\$0	\$0	\$0	\$8,100
48" RCP W/FEB, SOUTHWOOD DRIVE	\$22,000	\$0	\$22,000	\$0	\$0	\$0
36" RCP W/FEB (HARVARD & WIDEFIELD)	\$6,750	\$6,750	\$0	\$0	\$0	\$0
24" RCP & OVERFLOW PAN (ALLEGRE CIRCLE)	\$4,500	\$0	\$4,500	\$0	\$0	\$0
24" RCP & (HARVARD & WIDEFIELD)	\$3,200	\$3,200	\$0	\$0	\$0	\$0
10" CS INLET (ALLEGRE STREET AND HARVARD ST)	\$9,000	\$6,000	\$3,000	\$0	\$0	\$0
SUBTOTAL REACH 1	\$201,120	\$75,690	\$56,850	\$60,480	\$0	\$8,100
REACH 2 GRADE CONTROL STRUCTURES (7 TOTAL)	\$12,320	\$0	\$12,320	\$0	\$0	\$0
34+40 CROP STRUCTURE STA 51+50	\$16,800	\$0	\$16,800	\$0	\$0	\$0
37+34 & THREE-FOOT BERM STA 63+50	\$7,000	\$7,000	\$0	\$0	\$0	\$0
SUBTOTAL REACH 2	\$36,120	\$7,000	\$29,120	\$0	\$0	\$0
REACH 3 GRADE CONTROL STRUCTURES (5 TOTAL)	\$11,000	\$11,000	\$0	\$0	\$0	\$0
34+40 CROP STRUCTURES STA 64+00, 65+00	\$26,880	\$26,880	\$0	\$0	\$0	\$0
37+34 & 38+45 10" CMP W/FEB	\$10,000	\$10,000	\$0	\$0	\$0	\$0
SUBTOTAL REACH 3	\$47,880	\$47,880	\$0	\$0	\$0	\$0
REACH 4 ENERGY DISSIPATOR ST- 82+85	\$40,000	\$40,000	\$0	\$0	\$0	\$0
37+34 2.0 WE CRO, STA 106+75	\$19,000	\$0	\$0	\$0	\$0	\$19,000
4.0 MG P&E RESERVOIR IMPROVEMENTS	\$279,000	\$279,000	\$0	\$0	\$0	\$0
1-FEET PILE WALL	\$8,000	\$0	\$0	\$0	\$0	\$8,000
OUTLET RECONSTRUCTION (18" CRO)	\$0	\$0	\$0	\$0	\$0	\$0
JOHNSON RESERVOIR IMPROVEMENTS	\$0	\$0	\$0	\$0	\$0	\$0
BRILLWAY REHABILITATION	\$0	\$0	\$0	\$0	\$0	\$0
CREWSPERT ROAD REHABILITATION	\$0	\$0	\$0	\$0	\$0	\$0
SUBTOTAL REACH 4	\$346,000	\$319,000	\$0	\$0	\$0	\$27,000

TABLE 3

JOHNSON RESERVOIR/CRENS GULCH DRAINAGE PLANNING STUDY
 PROPOSED ALLOCATION OF NON-REIMBURSABLE COSTS

DESCRIPTION	NON- REIMBURSABLE COSTS	EL PASO COUNTY	CITY OF FOUNTAIN	COOP	WIDEFIELD HOMES	OTHER
REACH 5 DETENTION PONDS (CB MUNICIPAL AIRPORT)	\$960,000	\$960,000	\$0	\$0	\$0	\$1,080,000
SUBTOTAL REACH 5	\$960,000	\$960,000	\$0	\$0	\$0	\$1,080,000
REACH 3A GRADE CONTROL STRUCTURES (8 TOTAL)	\$10,860	\$2,210	\$0	\$0	\$8,350	\$0
DROP STRUCTURES (8 TOTAL)	\$53,760	\$11,230	\$0	\$0	\$42,530	\$0
CHANNEL STABILIZATION	\$49,985	\$0	\$0	\$0	\$24,993	\$24,992
45' RCP	\$40,000	\$18,570	\$0	\$0	\$18,570	\$2,360
30" CMP W/PEB (FOUNTAIN S. FLOW LINE)	\$21,600	\$21,600	\$0	\$0	\$0	\$0
24" CC INLET @ BRURY LANE	\$4,000	\$4,000	\$0	\$0	\$0	\$0
AUGMENTATION LINE RELOCATION	\$2,500	\$0	\$0	\$0	\$0	\$2,500
SUBTOTAL REACH 3A	\$182,405	\$57,610	\$0	\$0	\$94,443	\$30,352
TOTAL DRAINAGEWAY IMPROVEMENTS	\$1,773,525	\$1,467,180	\$85,970	\$60,480	\$94,443	\$1,110,402
5% CONTINGENCY	\$88,676	\$73,359	\$4,299	\$3,024	\$4,722	\$57,273
10% ENGINEERING & CONTINGENCY	\$186,220	\$154,054	\$9,027	\$6,360	\$9,517	\$120,273
GRAND TOTAL DRAINAGEWAYS	\$2,048,421	\$1,694,593	\$99,295	\$69,864	\$108,682	\$1,327,947

TABLE 19

BIG JOHNSON RESERVOIR/CREWS GULCH DRAINAGE BASIN PLANNING STUDY
BASIN FEE CALCULATIONS

	FEE	REIMBURSABLE COSTS	UNPLATTED ACREAGE	FEE (\$/ACRE)
DRAINAGE FEE				
IMPROVEMENT COST		\$5,399,832		
STUDY COST		\$61,267		
ANTICIPATED OUTSTANDING CLAIMS		\$577,000		
TOTAL		<u>\$6,038,099</u>	977.3	\$6,178
BRIDGE FEE		\$495,376	977.3	\$507
LAND FEE		\$42,000	977.3	\$43
3.0 ACRES AT \$14,000/ACRE				

the existing outlet facilities are inadequate for a 10-year flow. Uncontrolled low-flow discharge from McRae Reservoir has degraded the channel through Widefield Park. It is, therefore, recommended that the improvements be phased as follows:

1. Install stormwater management facilities at McRae Reservoir, including the sheet pile wall, inlet and outlet structures, maintenance trails, and the emergency spillway provisions.
2. Provide low-flow channel stabilization through Widefield Park.
3. Reconstruct Harvard Street and Quebec Street crossings.
4. Provide embankment protection in Fountain Creek Regional Park.
5. Construct overflow structure at Ceresa Park once Little Johnson/Security Creek improvements are in place.
6. Construct balance of improvements.

Big Johnson Drainage Basin: The phasing for this Basin is most dependent upon the rate of land development activities within the watershed. Once land development activities commence, the detention/water quality basins which would receive the runoff from the upstream areas must be constructed. The major drainageways and drop structures must be constructed in concurrence with these pond(s) so as to prevent stream degradation and erosion. Within the Colorado Springs Municipal Airport, detention/water quality basins will be necessary to control runoff to existing levels upon the start of land development activities. These ponds should be designed to provide for water quality and erosion control protection in addition to the on-site measures which are required of land development construction activities. Outfalls of all initial systems must be protected so that localized soil erosion does not occur. The construction of the stormwater improvements at Big Johnson Reservoir can begin as the need for such improvements becomes evident. As an initial phasing plan, the following prioritized steps are recommended:

1. Develop agreements with Fountain Mutual Irrigation Company (et.al.), to provide for the review, implementation, funding responsibilities, and operation and maintenance responsibilities of the facilities proposed at Big Johnson Reservoir.
2. Construct detention/water quality basins as part of land development activities.
3. Construct Big Johnson Reservoir stormwater outlet pipe prior to the basin reaching approximately 25 percent full development (exclusive of airport property).
4. Reconstruct emergency spillway and dam embankment road, and low-flow channel within Reach 4.

Fountain Mesa Tributary: This drainage will be impacted by land development, however, the existing drainageway is in need of immediate improvement. The area through which the drainageway passes could be enhanced for open space purposes as a result of the drainageway construction. The prioritization for this area follows:

1. Reconstruct Metropolitan Drive culverts and stormwater/irrigation separation structure at the Fountain Mutual Canal.
2. Construct 48-inch culvert within Widefield Park, inlet at Drury Lane, and the Drury Lane box culvert.
3. Stabilize existing channel from Drury Lane to Fontaine Boulevard.
4. Construct culvert at Belle Vista Lane.
5. Construct Goldfield Drive detention pond and stabilize channel from Goldfield Drive to Fontaine Boulevard, upon land development beginning with the Waterview Property.
6. Construct balance of improvements, as required.

As was briefly discussed in earlier sections of this report, facilities that provide for stormwater conveyance as well as irrigation water conveyance may involve a shared maintenance responsibility. For the purpose of establishing design guidelines for this drainage basin and based upon discussions between the FMIC and El Paso County staffs, it is recommended

that an agreement be pursued between the Board of County Commissioners and the FMIC Board regarding shared maintenance responsibilities. Such an agreement would pertain to the improvements proposed herein and responsibilities established commensurate with specific facility uses and benefits. Should such an agreement not be reached between the appropriate approval bodies, modifications to the improvements presented herein would likely be required.

Funding

The majority of the proposed improvements will be funded via the basin fee system. These costs were defined on Tables 14 and 15 as the Reimbursable Costs. This is a system of drainage, bridge, and land fees assessed upon platting of property within the basin. No reimbursement for initial storm drainage systems is proposed in the Big Johnson/Crews Gulch Basin. Because no reimbursement is given for initial systems, drainage fees may build up in the basin fund, which could be used to construct major drainageway facilities detailed herein. Should substantial land development activity occur, large portions of the major drainageway could be constructed as part of the development process.

The non-reimbursable fee costs presented on Tables 14 and 15 will have to be funded through other mechanisms. It is recommended that the County focus on capital improvement projects for storm drainage in this basin with areas where the potential for flood damage exists, and where joint or multiple-use objectives can be achieved by the construction of channel or detention facilities. Multiple-use projects may broaden the funding sources which might otherwise not be available.

The establishment of local improvement districts do not present a strong mechanism in this basin primarily because of the relatively low cost of capital improvements which are proposed, and the limited amount of developable acreage within the Basin. Most of the existing residential areas are not severely impacted by urban drainage and, therefore, a broad acceptance of an

improvement district may not be obtainable. Local block grants may provide a potential source of funding for those existing residential areas which have been identified as flood prone. The area adjacent to Harvard Street is an example.

Probably the best single source of funding for the non-reimbursable costs will be through multi-jurisdictional projects collectively funded by the improvement beneficiary or affected drainageway owner(s). As an example, the construction of the Harvard Street and Quebec Street culverts by the El Paso County Department of Public Works, the construction of grade controls and drop structures by the City of Fountain, and the construction of the riprap low flow channels using basin fee funds, can all be combined to complete a substantial portion of the Crews Gulch drainageway, where flooding has occurred in the past. Potential flood damages as well as decreased operations and maintenance would benefit all residents of the County.

APPENDIX A

SUPPLEMENT: Water Quality Volume Methodology and Results

BIG JOHNSON RESERVOIR/CREWS GULCH DRAINAGE BASIN PLANNING STUDY

SUPPLEMENT

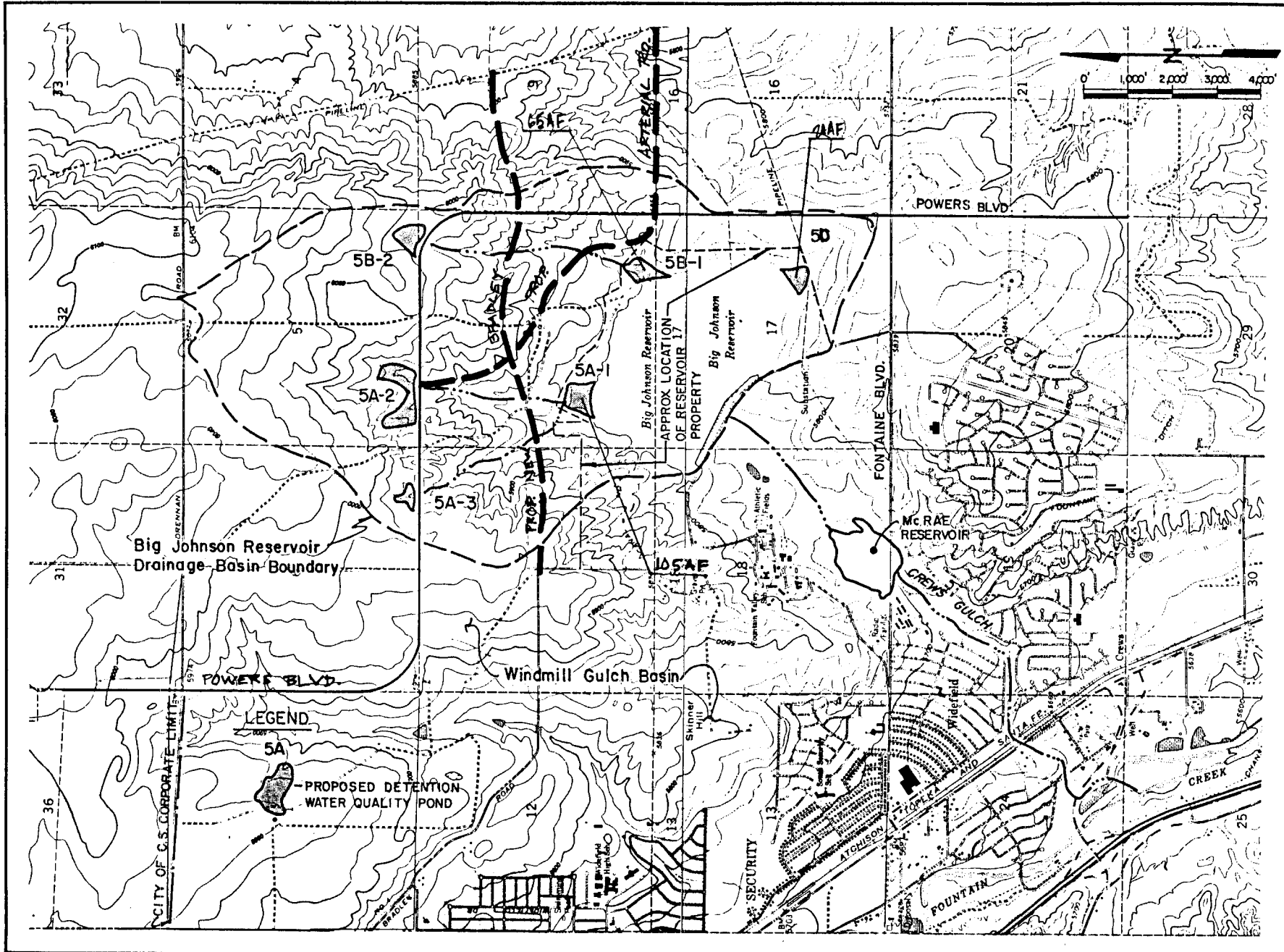
The purpose of this report is to supplement the Big Johnson Reservoir/Crews Gulch Drainage Basin Planning Study with additional technical information regarding the proposed drainage improvements for the areas tributary to the Reservoir. The area under study is shown on Figure 1A and 1B. This area has been predicted to experience development in the future. The development types will range from single-family residential to commercial/industrial uses. The development of the "Big Johnson" basin will change the relationships between rainfall and runoff quantity and quality from current conditions. These changes cause concern with respect to operations and maintenance, sedimentation, and storage within a reservoir which has historically been used as an irrigation facility. This area has also been referred to as "Reach 5" in the Drainage Basin Planning Study.

The alternative schemes which were developed for Reach 5 were referred to as Alternates 1, 1-1 and 1-2. These alternates involved the establishment of detention and/or water quality ponds upstream of Big Johnson Reservoir. These ponds would also be designed to incorporate stormwater quality enhancement facilities. The primary difference between alternates 1-1 and 1-2 is that in Alternate 1-1 the site for the detention basin(s) would be on Big Johnson Reservoir property, while Alternate 1-2 would feature detention ponds on the Waterview property which lies north of the Reservoir. Alternate 1 features only water quality ponds at Big Johnson Reservoir, with the Reservoir itself providing storage of the future runoff. In all alternates, detention ponds north of Powers Boulevard have been included into the conceptual design analysis. The comparison made in this supplement pertain primarily to Alternates 1-1 and 1-2.

Background

During the preparation of the Drainage Basin Planning Study, several concerns were brought forth by the Fountain Mutual Irrigation Company (FMIC). Specifically, these concerns were:

1. Clarification of areas projected to drain to the reservoir, specifically the Colorado Springs Municipal Airport area.
2. Changes in peak discharge and volume of stormwater discharges into Big Johnson Reservoir.
3. Sedimentation of the reservoir resulting from urbanization in the areas tributary to the reservoir.

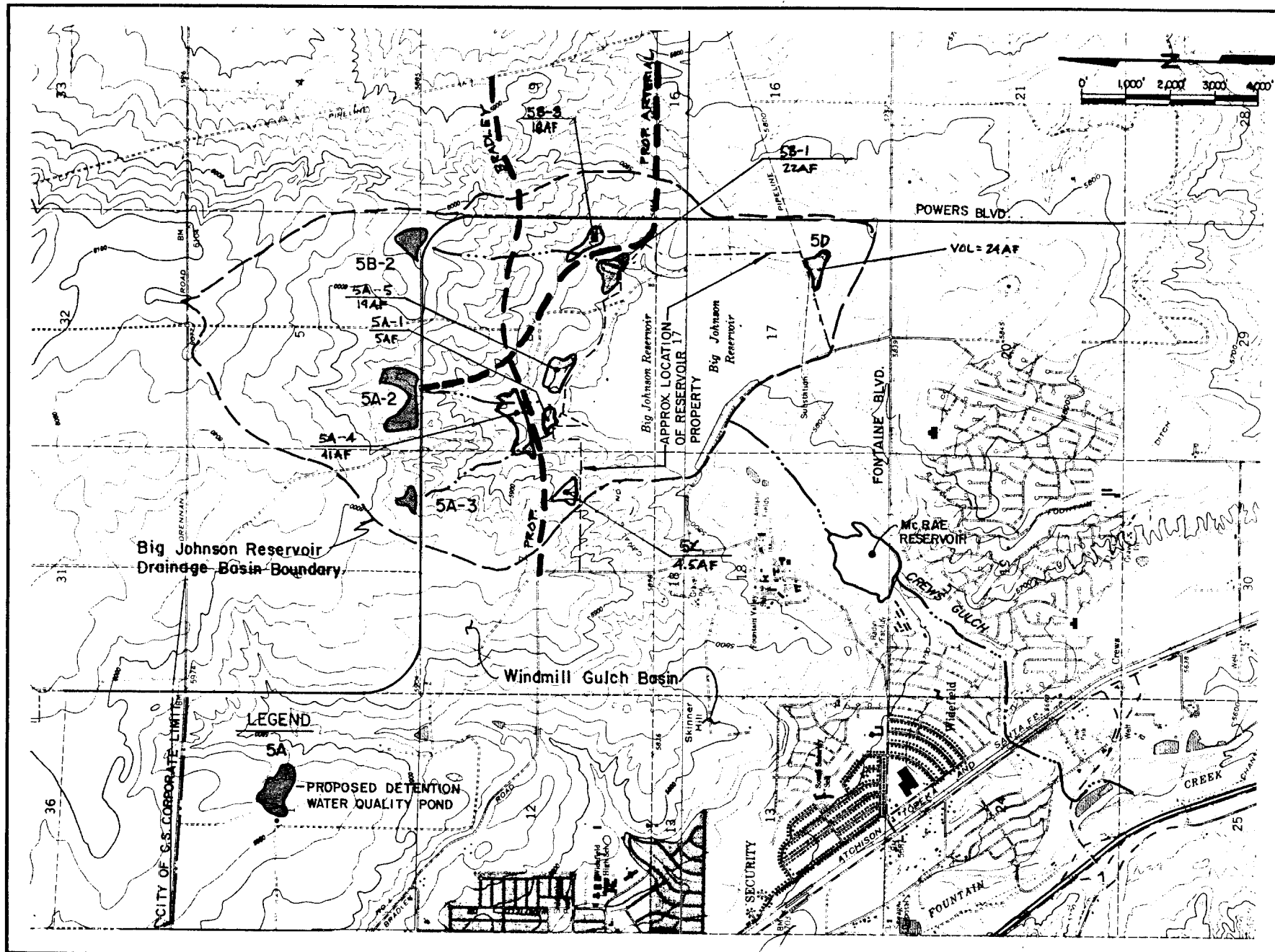


Kiowa Engineering Corporation
 419 W. Bijou Street
 Colorado Springs, Colorado
 80905-1308

BIG JOHNSON RESERVOIR/CREWS GULCH
 DRAINAGE BASIN PLANNING STUDY
DETENTION ALT 1-1
 BIG JOHNSON RESERVOIR BASIN

Project No.	08-05-09
Date:	2/91
Design:	RNW
Drawn:	EAK
Checked:	
Reviewed:	

SUPP
 FIG. 1A



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

BIG JOHNSON RESERVOIR / CREWS GULCH
 DRAINAGE BASIN PLANNING STUDY
 PETITION ACT. 1-2
 BIG JOHNSON RESERVOIR BASIN

Project No.	88-05-08
Date	2/91
Design	RNW
Drawn	EAK
Checked	
Reviewed	

SUPP.
 FIG. 1B

4. Quality of the stormwater runoff entering the reservoir.
5. Sizing of water quality facilities.

These concerns have been reviewed and additional technical analyses completed. The results of these analyses will be integrated into the Drainage Basin Planning Study report upon review and approval of El Paso County and FMIC.

Hydrology

As presented on Figure 1, the total area draining to Big Johnson Reservoir consists of 3.1 square miles of agricultural and undeveloped land. The area draining to Big Johnson Reservoir lies within the City of Colorado Springs and El Paso County. The area is projected to develop in the future with single-family residential, commercial, and industrial uses. Presented on Table 1 is a summary of the 2-hour storm peak flow data at key locations within the Big Johnson Reservoir basin. Presented on Table 2 is a summary of runoff data for the 24-hour rainfall event.

As could be expected, the peak flows increase in the future condition. This situation has been addressed in the Drainage Basin Planning Study. Presented on Sheets 12-1 through 14-1 of the preliminary design (contained in the Technical Addendum), is alternative 1-1 for the Big Johnson Reservoir basin. The effect of this plan is to limit the 10- and 100-year peak discharges to the existing condition for the 24-hour duration storm. Peak discharge data for this detention concept is presented on Table 3. Note that six detention basins have been proposed; three lying within the City of Colorado Springs Municipal Airport property and three just upstream of Big Johnson Reservoir. Essentially, peak discharges would be maintained to existing levels at the Colorado Springs corporate limits and at each of the inflow points to Big Johnson Reservoir. Alternative 1-2 has been presented on Figure 12-2 through 14-2 (contained in the Technical Addendum).

As with the peak discharges, the runoff volume increases for the future condition, however, unlike the peak discharges, the detention basins will have no impact upon limiting future volume to existing levels. Retention basins which could limit volumes to existing levels were evaluated during the alternative planning process, however, this option was rejected because of water rights implications. The Big Johnson Reservoir has approximately 3950 acre-foot of storage (according to State records), and had a water surface acreage at the time of aerial surveying (May 1988) of approximately 270 acres. It has been estimated that if the full 100-year volume was to enter Big Johnson Reservoir, the water surface would rise between 12 to 18 inches. At normal operating water surface elevations, the 100-year volume can be stored within Big Johnson Reservoir and still maintain two- to three-feet of storage below the emergency spillway. Shown on Sheet 12 of the drawings is a stormwater outlet for Big Johnson Reservoir. This outlet has been sized to drain the 100-year volume in 48 hours, and would relieve

Table 1. Summary of Peak Discharges Big Johnson Reservoir Basin.
2-Hour Storm (No Detention)

Design Point	Area (SM)		Peak Discharges (cfs)			
			Existing		Future	
			10-Year	100-Year	10-Year	100-Year
31	3.07	Total Inflow Big Johnson Reservoir	500	1350	2500	4340
36	1.66	Reach 5A	150	600	1210	2120
63	0.61	Reach 5B	100	350	800	1410
61	.07		10	40	130	210
32	0.79		70	300	1870	2360
62	.08		10	50	160	250

Table 2. Summary of Peak Discharges Big Johnson Reservoir Basin.
24-Hour Storm (No Detention)

Design Point	Area (SM)	Peak Discharges (cfs)			
		Existing		Future	
		10-Year	100-Year	10-Year	100-Year
31	3.07	310	800	2790	4850
36	1.66	30	200	1290	2230
63	0.61	70	220	870	1500
61	.07	5	25	130	220
32	0.79	10	85	1300	2140
62	.08	5	20	170	270

Table 3a. Summary of Peak Discharges Big Johnson Reservoir Basin.(1)
24-Hour Storm - With Detention (Alternative 1-1)

Design Point	Area (SM)	Location	Peak Discharges (cfs)	
			10-Year	100-Year
31	3.07	Total Inflow to Big Johnson Reservoir	420	715
36	1.66	Outflow Pond 5A-1	90	140
36	1.66	Inflow Pond 5A-1	1210	2110
63	0.61	Outflow Pond 5B-1	50	110
63	0.61	Inflow to Pond 5B-1	800	1400
61	.07	Outflow Pond 5B-2	20	35
32	0.79	Outflow Pond 5A-2	85	85
62	.08	Outflow Pond 5A-3	25	45

(1) Total Inflow Discharge Limited to Historic Condition 100-Year, 24-Hour Storm.

Table 3b. Summary of Peak Discharges Big Johnson Reservoir Basin.(1)
24-Hour Storm - With Detention (Alternative 1-2)

Design Point	Area (SM)	Location	Peak Discharges (cfs)	
			10-Year	100-Year
31	3.07	Total Inflow to Big Johnson Reservoir	420	750
36	1.66	Outflow Pond 5A-1		600
36	1.66	Inflow Pond 5A-1		110
63	0.61	Outflow Pond 5B-1		110
63	0.61	Inflow to Pond 5B-1		750
61	.07	Outflow Pond 5B-2	20	35
32	0.79	Outflow Pond 5A-2	85	85
62	.08	Outflow Pond 5A-3	25	45
SB55	.18	Outflow Pone 5A-5		610
SB55	.18	Inflow Pond 5A-5		50

(1) Total Inflow Discharge Limit to Historic Condition, 100-Year, 24-Hour Storm.

temporarily stored stormwater runoff within Big Johnson Reservoir by passing it downstream to the Crews Gulch drainageway. The drainageway (Reach 4) below Big Johnson Reservoir has had improvements suggested to handle this type of flow without damaging the drainageway and adjacent areas within the Fountain Valley School property. This outlet should be constructed separate from the outlet to the Fountain Mutual Canal.

It should be noted that no additional area would be drained to Big Johnson Reservoir then compared to the existing condition. The proposed detention facilities must be designed to work in combination with the water quality features discussed in later sections of this supplement. Siting of the individual facilities may vary from what is shown in the Drainage Basin Planning Study, however, adequate storage volume exists at each of the detention basin sites without constructing embankments in excess of ten-feet high. Costs and implementation aspects of the selected detention concept are discussed in the body of the Drainage Basin Planning Study report.

Another alternative to the detention in the Big Johnson Reservoir Basin is diversion around the Reservoir. This option was examined in detail during the Drainage Basin Planning Study. The diversion scheme involves the construction of contour channels so that developed flow would not be conveyed around the Reservoir. Design frequencies of 10- and 100-year were analyzed. The primary reasons for rejecting the diversion scheme were:

1. diversion of runoff from historic path has unacceptable legal implications,
2. diversion increases the historic flow to the Fountain Valley School property;
3. flood control concerns due to the potential for contour channel overtopping;
4. erosion control and sedimentation along the contour channels resulting from overtopping;
5. right-of-way constraints; and
6. unfavorable total construction costs.

Several improvements have been identified as necessary at the Reservoir should a detention concept presented be selected for implementation. The existing spillway is in need of upgrading, and a stormwater outlet is needed to pass any future stored runoff to the downstream reaches. The roadway and existing riprap along the embankment is also in need of repair and upgrading. These improvements could be funded through the basin fee system. No improvements to the Reservoir are considered necessary if the diversion concept were to be implemented.

Sedimentation

The existing Big Johnson Reservoir drainage basin is in generally good condition with respect to vegetative cover. Over the years, the area south of Powers Boulevard has been used for grazing, which has altered the vegetative cover from time to time. During the completion of the Drainage Basin Planning Study, the Soil Conservation Service (SCS) universal soil loss equation was applied in order to assess the annual sediment yield for the area tributary to the Reservoir. The vegetative cover was assumed to be erosion resistant, which is a reasonable assumption in light of the condition of the existing native grasses. The basin was also assumed to slope uniformly at 3.0 percent. Using these assumptions, the annual soil loss was estimated to be .8 tons per acre, which equals 0.6 acre-feet/year for the Big Johnson Reservoir basin. This estimate does not account for gully or channel bank erosion, neither of which are apparent now within the basin.

Estimates of soil loss in 10- and 100-year event were also made. Future condition flows were assumed for the purposes of the soil loss calculations. During a 100-year event, approximately 13 acre-feet of soil could be eroded with the soil cover as currently exists. The 10-year soil loss was calculated to be 5.5 acre-feet.

From conversations with FMIC and others related to the current condition of Big Johnson Reservoir, it has been estimated that the 50 to 70 percent of the storage volume has been lost to sediment deposition. If a 50 percent loss is assumed, this represents about 2000 acre-feet of sediment which has settled out within the Reservoir. It is probably not likely that erosion from the tributary watershed has been solely responsible for the sedimentation within the Reservoir, since there is little evidence of past or on-going erosion in the watershed. The only other source of sediment to the Reservoir is from silt imported by the Fountain Mutual Canal. In any event, sedimentation within the Reservoir has been a slow but steady process and probably has not been significantly impacted by erosion within the watershed of the Reservoir.

By regulation, the City and the County require erosion control for disturbed sites. This is a critical management issue for the Drainage Basin Planning Study. The planning study approach has been to assume that erosion from disturbed sites will be of minimal impact to downstream receiving drainageways and detention basins. Having made this assumption, the other primary source of sediment is from channel invert and bank erosion. Channel improvements shown in the Drainage Basin Planning Study within Reach 5 have been designed to be non-erosive. This has been done by using riprap bank and invert protection, drop structures, check structures, and revegetation of channel overbank areas so that no sediment supply is available for transport to the Reservoir. As development proceeds, the sources of sediment may become fewer simply because of the extent of landscaping and paving which will be associated with land uses assumed in the planning study.

In summary, with the watershed in its current condition, the annual sediment yield to the Reservoir is not of detrimental levels with respect to further loss of storage volume. Annual sediment yields would be increased significantly should development proceed without adequate on-site management and if drainageway stabilization is not provided prior to or concurrently with the development of the land. The 100-year sediment yield though significant in volume is not as critical of a design parameter since it may never occur. Control of annual sediment loading will be of more concern over an extended period of time, say 10 to 25 years. The amount of sediment on an annual basis is related to the water quality design aspects, which is discussed in the next section.

Water Quality Design

Urbanization will not only increase the amount of runoff to Big Johnson Reservoir, but it will also alter the quality of the runoff. Sediment deposition resulting from earth disturbing activities, street sanding, and windblown soil will be picked up by storm sewer collection systems and will eventually find their way to the major drainageways. A methodology has been developed as part of the Drainage Basin Planning Study effort to estimate the storage volumes required to adequately settle out and store sediments before they can be deposited in Big Johnson Reservoir. The methodology has been developed similarly to the method currently being applied by the UDFCD when sizing stormwater quality ponding facilities. A complete report has been attached herewith.

As mentioned earlier, a detention scheme was recommended to reduce developed flows to existing levels. At each of these sites, water quality features should be incorporated. Specifically, a water quality storage pool(s) and outlet must be provided which would detain and release a certain volume of stormwater runoff over a 48 hour period. This time period is sufficient to drop out most sediment greater than .005 millimeter in particle size. This particle size is representative of the sandy loams which can be found throughout the watershed surficial soils. The methodology detailed herein was used to determine the volume required to capture approximately 87 percent of all runoff which would occur for the developed condition. Presented on Table 4 is a summary of the water quality volume required at each of the detention basin sites shown on Sheets 12 through 14 of the preliminary design plans. A sample calculation showing how the methodology has been applied has been included with this supplement.

As shown on Tables 4a and 4b, the cumulative water quality volume storage for Alternates 1-1 and 1-2 is far greater than volumes estimated for the annual and 100-year soil loss events. The total water quality volume for Alternate 1 is the same as in Alternate 1-1. The greater volume is needed to settle the finer suspended solids typically found in urban runoff over the 48-hour period used in the design. Using this data, a typical detention/water quality basin

Table 4a. Summary of Water Quality Volume
Big Johnson Reservoir Basin (Alternative 1 and 1-1).

Detention Basin Site	Location	Tributary Area (AC)	Runoff Coefficient (C)	Volume (ac.ft.)
5A-1	Outlet of Reach 5A into Big Johnson Reservoir	576	0.9	42.0
5B-1	Outlet of Reach 5B into Big Johnson Reservoir	192	0.9	14.0
5D	Southeast Corner Big Johnson Reservoir	154	0.9	11.0
5A-2	Powers Boulevard and Reach 5A	505	0.9	37.0
5A-3	Powers Boulevard and Reach 5A-1	51	0.9	4.0
5B-2	Powers Boulevard and Reach 5B	45	0.9	3.5
TOTAL WATER QUALITY VOLUME IN BASIN				111.5

Table 4b. Summary of Water Quality Volume
Big Johnson Reservoir Basin (Alternative 1-2).

Detention Basin Site	Location	Tributary Area (AC)	Runoff Coefficient (C)	Volume (ac.ft.)
5A-1,4,5	Outlet of Reach 5A into Big Johnson Reservoir	525	0.9	29.0
5B-1,3	Outlet of Reach 5B into Big Johnson Reservoir	175	0.9	17.8
5C	SB63 at Big Johnson Reservoir Property Line	100	0.9	2.0
5D	Southeast Corner Big Johnson Reservoir	125	0.9	11.0
5A-2	Powers Boulevard and Reach 5A	505	0.9	37.0
5A-3	Powers Boulevard and Reach 5A-1	51	0.9	4.0
5B-2	Powers Boulevard and Reach 5B	45	0.9	3.5
TOTAL WATER QUALITY VOLUME IN BASIN				104.3

layout has been provided. The facility represented on the typical layout is Basin 5A-1, at the outlet of Reach 5A into Big Johnson Reservoir. The water quality calculations have also used the assumption that the water quality pools would normally be dry, which has led to a greater conservativeness in the volume estimates. The basins at the perimeter of the Reservoir may develop over time permanent pools which will lead to greater capture efficiencies as compared to a dry basin of equal volume. Wet ponds require a shorter retention time in comparison to dry ponds.

The basins have been designed to be easily maintained by creating various bays within the water quality pool. The "forebay" areas will be subject to the most active operation and maintenance efforts. It is recommended that the forebays be cleared of sediment at least twice yearly, and also after any single storm event which causes the forebay to become one-half full or greater. Routine monitoring of the sediment levels can be done by staff gauges within the forebay. Wetland vegetation may develop within the water quality pool, which should be left undisturbed to the greatest extent possible, since this vegetation will enhance the quality of outflow by treating organic pollutants and fertilizers which might be contained in the stormwater runoff.

Sample Water Quality Volume Calculations

A sample water quality volume calculation is presented. The calculations presented represent the steps taken to size the water quality storage volume needed at design point 77, Alternative 1-1. This design point is located at the outfall of Reach 5A into Big Johnson Reservoir. The methodology was developed at the University of Colorado at Denver in cooperation with the Urban Drainage and Flood Control District. The method requires that rainfall data be collected and statistically analyzed. In the case of the Drainage Basin Planning Study, the gage located at Peterson Air Force Base was used to supply the rainfall data required of the methodology. The results of the rainfall analysis are explained in the attached report.

For the purposes of these water quality volume calculations in this supplement, the following assumptions were made:

1. Water Quality Detention Time -- 48 hours
2. Commercial/Industrial Land Uses
3. Rational Method Runoff Coefficient 'C' 0.9

Presented on Figure 2 is the relationship between runoff coefficient and required storage volume developed for the Colorado Springs area, and for various detention times. Using a runoff coefficient of 0.9, and a 48 hour detention time, an optimal pond size would be required to store .873 inches of runoff from the tributary of drainage area can be estimated, (this result is also tabulated in the attached report).

OPTIMAL POND SIZE

COLORADO SPRINGS

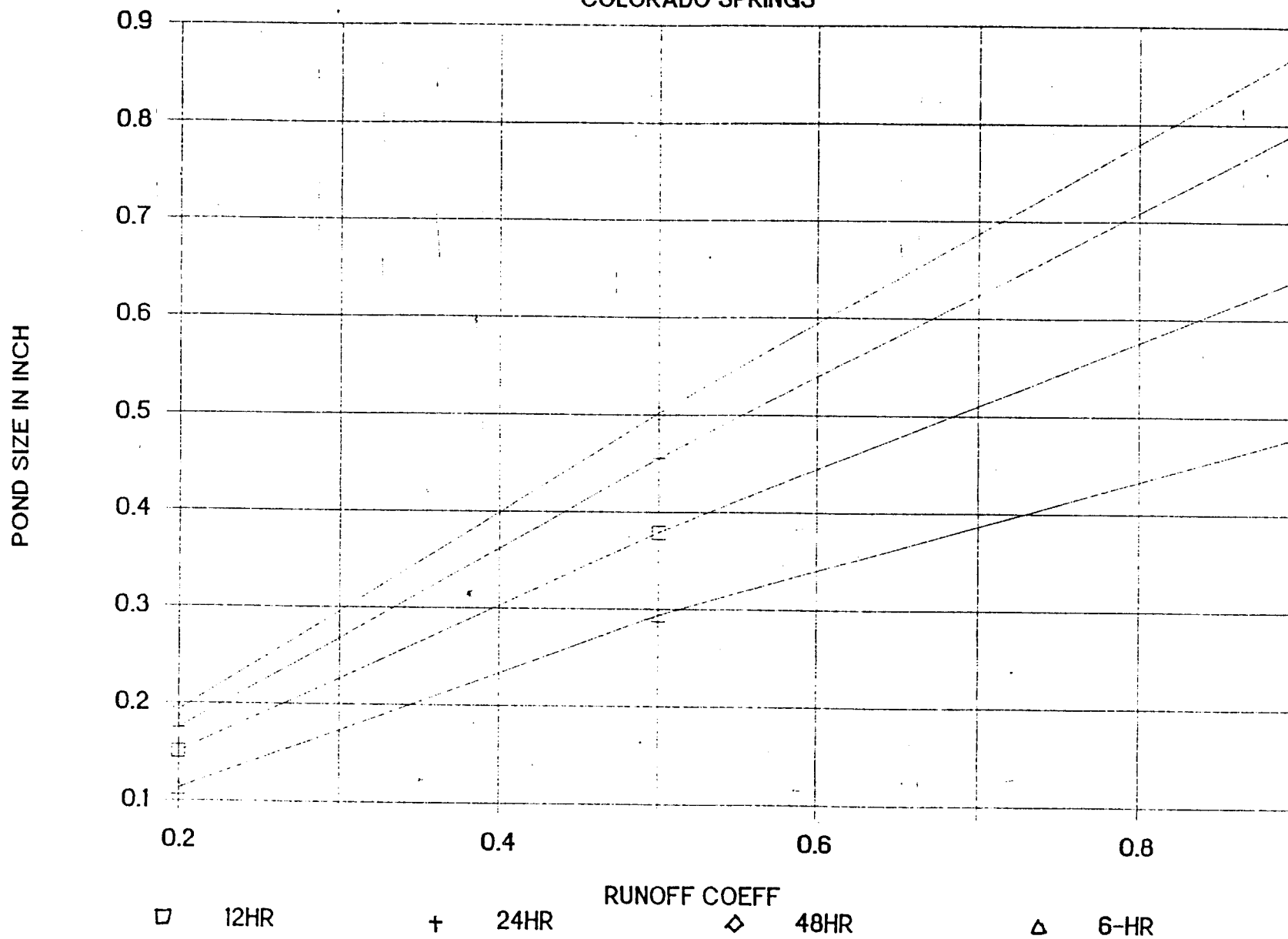


FIGURE 2

Water quality calculation:

1. drainage area tributary to detention basin 5A = 576 acres
2. optimal pond size = .873 inches = .073 ft. runoff
3. water quality volume = .073 ft. x 576 acres = 47.0 acre-feet
4. average release rate = 47.0 AF/48 hours = 11.9 cfs

Summary

The issue of stormwater runoff impacting the operation and maintenance of Big Johnson Reservoir has been addressed by evaluating alternative stormwater management plans for the Big Johnson Reservoir Basin. The evaluation of relative advantages and disadvantages of a given alternative plan was made taking into consideration water quality, implementation, operations and maintenance, and relative costs.

As part of the planning process a methodology for sizing water quality pond volumes was developed specifically for the metropolitan Colorado Springs area.

As a result of this planning, a system of detention basins designed to incorporate water quality features has been suggested for eventual implementation. These facilities would be constructed upon the initiation of development within the particular drainage sub-basin(s) tributary to one or more of the detention basins shown on the plans. These facilities would be funded primarily through the drainage basin fee system. Once constructed, the system would provide for enhanced water quality in the developed condition. The system would be capable of reducing the volume of sedimentation reaching Big Johnson Reservoir compared to the existing situation.

Operations and maintenance of the detention system would be the primary responsibility of El Paso County. The detention basins within the municipal airport property would be maintained by the City of Colorado Springs. The frequency of maintenance would be dependent upon the volume of sediment reaching the detention basins. A minimum of two general cleanings per year is recommended wherein sediment and trash would be cleared from the forebays. Some minor repair of erosion or other drainage related problems should also be conducted at a similar frequency.

APPENDIX B

Project Correspondence

CITY OF COLORADO SPRINGS

DEPARTMENT OF PUBLIC WORKS

ADMINISTRATION (719) 578-6660

30 S. NEVADA SUITE 402 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901-1575

October 13, 1988

Richard Wray
Kiowa Engineering Corporation
419 West Bijou
Colorado Springs, Colorado 80903

RE: Big Johnson Drainage Basin Planning Study

This letter is addressed to you as the study contractor for the above referenced Drainage Study which is being prepared for El Paso County Department of Public Works, Stormwater Division. Upon review of the preliminary basin boundary map it appears that approximately 600 acres of the Big Johnson basin lies within the City limits, all of which is owned by the City of Colorado Springs. This portion of the basin includes all the land lying north of Powers Boulevard.

This property is under the jurisdiction of the Municipal Airport. At this time there are no plans available for future development of this portion of the airport property.

The policy of the Municipal Airport is to provide stormwater detention facilities for all new development so that the runoff onto downstream properties does not exceed historic peak flows. This detention policy should be reflected in the Big Johnson Drainage Basin Planning Study.

The City of Colorado Springs airport property must be exempted from the fee structure of the Big Johnson Basin. This is consistent with Drainage Board policies and other recent Master Studies involving airport property.

The City Engineering Division will continue to participate in the review process of your study. Feel free to address any questions to our representative, David Lethbridge.

Sincerely,



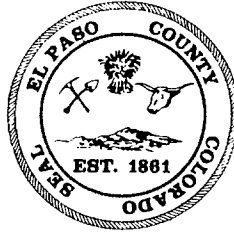
DeWitt Miller
Director of Public Works

DM/DRL/rcm
DRL

cc: Max Rothschild, Public Works Director, E.P.C.
Alan Morice, Stormwater Division, E.P.C.
Gary Haynes, City Engineer
Gary Green, Aviation Director

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EL PASO COUNTY
DEPT. OF PUBLIC WORKS
ENGINEERING DIVISION
1988 OCT 20 PM 3:14

*RICH WRAY
FOR YOUR INFO*

To: Alan Morrice, Storm Water Manager,
Department of Public Works

From: Patrick Wheeler, Assistant County Attorney

Date: October 19, 1988

Re: Big Johnson Drainage Basin Planning Study

I was pleased to learn at the October 12th meeting on the Big Johnson Drainage Basin Planning Study that Kiowa was including alternatives that involved and avoided the Big Johnson Reservoir. I was likewise pleased to learn that Fountain Mutual Irrigation Company is amenable to the use of Big Johnson Reservoir for the routing of drainage flows, provided that water quality and rates of flow are reasonably controlled. I believe that a vigorous effort should be undertaken with Fountain Mutual Irrigation Company to see if some written accommodation could be reached whereby alternate #1 for reaches 4 and 5 could be employed in a final drainage basin planning study such that it was mutually beneficial for all involved parties. I would like to be kept updated on any negotiations conducted on this matter and given a substantial advanced opportunity to review any written agreement.

It is clear that all of the proposed alternatives involve some use of McRae Reservoir. Since Fountain Mutual Irrigation Company and Fountain Valley School apparently own this reservoir and are presently in litigation with the County regarding Fountain Valley Ranch Subdivision's use of this reservoir, I can not see the drainage basin planning study for the Big Johnson Basin being completed until some settlement, including the litigation matters, is reached regarding the ownership, use, and development of McRae Reservoir. Coincidentally, the District Court recently sent notice to Fountain Mutual Irrigation Company's attorney, Robert Warren, that he must resume prosecution of the FMI case against the County within thirty days or have his case dismissed. I expect to see either new litigation or new settlement efforts within the next couple of weeks. Any such settlement negotiations should be expanded to take in the issues presented by the Big Johnson Drainage Basin Planning Study. If you or Kiowa have any

Alan Morrice
October 19, 1988
Page Two

ideas or suggestions regarding this matter, please let me know.

Much like we had with the Little Johnson Drainage Basin Planning Study, it appears that there will be significant construction costs, especially for bridges, in already developed areas of the County. I need to know how many of these construction improvements are needed presently, with or without any future drainage development upstream. If many of these improvements are a "precondition" to any future upstream development of drainage flows, then I believe we need to take a serious look at the various legal mechanisms and timing for financing these improvements. We should not put it off to the future like it was done with Little Johnson. Maybe it is advisable to have a meeting on this matter with Max Rothschild, Don Smith, Frank Barber, yourself, and me. Again, this will all depend on how high a priority these construction improvements, especially the bridges, have in reaches 1-3.

They
are
needed
w or w/o

No matter how the evaluation parameters are ranked by the various interested parties, the County must certainly place "operation and maintenance" at or near the top of our list. As you are well aware, issues involving questions of responsibility, liabilities, and cost (the basics of "o & m") are always high on my list in regard to infrastructure the County accepts. I would like to see the Kiowa research include a complete analysis of the alternatives as to the burdens that would be put upon the County in regard to operation and maintenance.

It's
will be
done

Despite my apparent nagging, I believe that you and Kiowa are doing a very good job on this matter. However, because of the potential liability that I see arising out of this study, I am very concerned that all of the legal holes are plugged in this study before its completion and acceptance by the Board of County Commissioners. Once the study is accepted by the Board, I believe it is legally binding in many ways. If it calls for the use of Fountain Mutual Irrigation Company's property without their written consent for such use, we may well have engaged in a form of inverse condemnation. If the study calls for certain improvements that involve substantial operation and maintenance costs but provides no new means for conducting such operation and maintenance, the County may well be "on the hook" to cover all such operation and maintenance costs. I believe you understand the gravity of this situation and will keep this office duly informed as to any legal issues that may arise in context to this study.

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, Colorado 80907
Telephone: (719) 473-2945

April 5, 1989

Mr. Richard Wray
419 W. Bijou Street
Colorado Springs, Colorado 80905-1308

RE: Big Johnson Reservoir/Crew Gulch Drainage
Basin Planning Study

Dear Richard,

In response to your request for comments on the above referenced study, I am providing the following based on review by Colorado Division of Wildlife personnel.

Division personnel appreciate the opportunity to participate in the planning process throughout the Big Johnson/Crew Gulch Drainage Study planning period. Although minimizing environmental impacts is not mentioned as a goal in the list of items under Purpose and Scope of this study, we feel a significant effort was made for this purpose and is evident throughout the recommendation of this study. Kiowa Engineering and El Paso County are to be commended for this effort.

On the whole, we support your approach to managing this drainage basin for the numerous purposes listed. Analyzing this basin through its numerous reaches and recommending treatments based on criteria unique to each reach allows for maximum flexibility in channel treatments. The use of meanders, drop structures, detention ponds, sodded berms, flood plain preservation, stabilized grasslined channels etc. would not be possible or as likely to occur otherwise.

As we have discussed, detention ponds which remain wet and which filter those waters entering Big Johnson Reservoir are desirable. Big Johnson by accepting these "filtered" waters will provide a valuable flood control function without experiencing undue water quality or siltation problems. And, the detention ponds will serve as valuable wildlife habitat if properly designed.

-continued-

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

WILDLIFE COMMISSION, George VanDenBerg, Chairman • Robert L. Freidenberger, Vice Chairman • William R. Hegberg, Secretary
Edward W. Cooper, Member • Rebecca L. Frank, Member • Dennis Luttrell, Member • Gene B. Peterson, Member • Larry M. Wright, Member

Page 2
Letter to Richard Wray
April 5, 1989

The wetland and riparian habitat between Big Johnson and McRae Reservoirs (Reach 4) is indeed..."the most significant area for wildlife habitat preservation and possible enhancement." We strongly recommend a low flow channel treatment with flood plain preservation for this section to reduce loss of prime wildlife habitat.

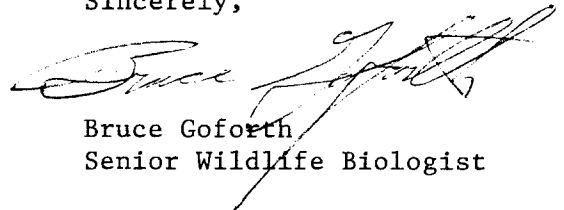
Likewise, we would like to see McRae Reservoir managed to preserve existing wetland values. Control of sediment and water quality is a necessity for existing habitat and flood control values to continue. Also, problems may occur by conveying incoming waters to McRae via one low flow or rip rap lined channel. Such a channel may result in a loss of water to wetlands either side of the channel if the spreading of water is prevented and/or channel down cutting occurs. It may be necessary to devise water dispersing techniques, e.g. multiple channels, meanders, or benching to assure that wetlands continue in their existing condition.



Briefly, we support the use of grasslined channels, ungrouted rip-rap channels with natural bottoms, and similar channel treatment through the county park stretches of the drainage. These treatments will preserve aesthetic and natural values important to the "park" concept.

Finally, where heavier flows are anticipated, e.g. densely developed areas above Johnson Reservoir, we recommend the use of rip-rap versus concrete or soil cement where hard lining of channel segments is necessary. Such lining, especially where channel bottoms are left natural, provides more opportunities for implementing in channel controls and aesthetic/habitat related treatments.

Please call me if clarification is desired for any of the foregoing.

Sincerely,


Bruce Goforth
Senior Wildlife Biologist

APPROVED BY: 
 Ronald P. Desilet, Regional Manager

BG/cas

xc: Allan Morrice, ECDOT
John Fisher, ECPD



DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1580
ALBUQUERQUE, NEW MEXICO 87103-1580

REPLY TO
ATTENTION OF:

April 5, 1989

Kiowa
APR 11 1989

Construction-Operations Division
Regulatory Branch

Mr. Richard Wray
Kiowa Engineering Corporation
419 West Bijou Street
Colorado Springs, Colorado 80905-1398

Dear Mr. Wray:

El Paso County's draft Big Johnson Reservoir/Crews Gulch Drainage Basin Planning Study (DBPS) dated February 1989 has been reviewed for aspects of Section 404 of the Clean Water Act. The DBPS area is located near Fountain in El Paso County, Colorado.

Many of the waterway modifications would require a Section 404 permit. It is assumed that the basin plan will be implemented in phases, and permits will be sought for each phase. The following comments are offered as a result of our review.

a. The DBPS contains valuable information that would be useful to the Corps during permitting processes. The section entitled "Environmental Review of Basin" gives a good description of present features and their values. The discussions on the potential of various sites for environmental enhancement would be very important if mitigation were needed in the future.

b. The section entitled "Development of Alternative Plans" gives concise reasons for alternatives which were ruled out from further consideration in the DBPS. Good descriptions of the analysis that was used in formulating and evaluating alternatives in the DBPS are also given. This information can be critical for permit alternative evaluation and will provide future DBPS users knowledge of the original process.

c. Table 7, entitled "Preliminary Matrix of Alternatives", gives a good overview of the pros and cons of alternatives considered in the DBPS. However, the phrase "not feasible in this reach" is used several times, and it is unclear why that alternative is not feasible.

cc. Alan Morrill

Thank you for the opportunity to have been involved in this DBPS process. Should you have any questions, please feel free to write or call Ms. Anita Culp at (719) 543-9459 or Mr. Andrew Rosenau at (505) 766-2776.

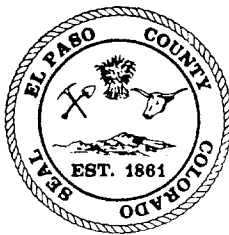
Sincerely,

Thomas J Farrell
for

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

MAX L. ROTHSCHILD, P.E.
DIRECTOR OF PUBLIC WORKS

ALAN B. MORRICE
MGR. STORM WATER MGMT. DIV.



PHONE (719) 520-6460

EL PASO COUNTY
DEPARTMENT OF PUBLIC WORKS

STORM WATER MANAGEMENT DIVISION
3105 N. STONE AVE.
COLORADO SPRINGS, COLORADO 80907

EL PASO COUNTY PORTION

DRAINAGE BOARD MINUTES

FOR MARCH 16, 1989

The City of Colorado Springs/El Paso County Drainage Board held its regularly scheduled meeting at 2:00 P.M. on March 16, 1989 in the City Council Chambers, City Administration Building, 30 South Nevada Avenue.

MEMBERS PRESENT

Roland Obering,
Chairman
Chuck Donley
Mike Mallon
Guenther Polok
Ron Waldthausen
Richard Dailey

MEMBERS ABSENT

None

OTHERS PRESENT

Alan Morrice
Gary Haynes
Chris Smith

PROCEEDINGS:

Chairman Obering called the meeting to order at 2:01 p.m.

ITEM 1: APPROVAL OF THE MINUTES OF THE FEBRUARY 16, 1989 BOARD MEETING: There being no corrections, additions or deletions, Mr. Waldthausen moved to approve the minutes as mailed. Mr. Polok seconded and the motion carried unanimously.

ITEM 2: PRESENTATION OF THE BLACK FOREST DRAINAGE BASIN PLANNING STUDY BY WILSON & COMPANY AS PREPARED FOR EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS:

Mr. Morrice stated that the County is continuing with efforts to improve the drainage basin planning study status and the two studies presented at this meeting are examples of this effort. The County entered into contracts with Wilson & Company for Black Forest Basin and with Kiowa Engineering for the Big Johnson/Crews Gulch Basin.

Mr. Morrice introduced Mr. Mike Bartusek, of Wilson & Company, who will make the presentation of the Black Forest Drainage Basin study, stating that this is a presentation only today with no action requested by the Board.

Drainage Board Minutes
March 16, 1989 - Page 4

review the budget two days ago. There is a concern with the \$5000 per acre figure and they would like to see some sort of equitable approach used to distribute these costs.

After further discussion, Mr. Morrice stated that this presentation is to acquaint the Board with the study and that work will continue on specific issues. This item is scheduled to be presented again at the April, 1989, meeting for action by the Board.

ITEM 3: PRESENTATION OF THE BIG JOHNSON/CREWS GULCH DRAINAGE BASIN PLANNING STUDY BY KIOWA ENGINEERING CORPORATION AS PREPARED FOR EL PASO COUNTY DEPARTMENT OF PUBLIC WORKS:

Mr. Morrice stated that the County contracted last year to have this planning study done by Kiowa Engineering. He introduced Mr. Richard Wray, of Kiowa Engineering, to make the presentation.

Mr. Wray began by stating that the Big Johnson/Crews Gulch Drainage Basin Study was authorized by the Board of County Commissioners and started in July of 1988. The scope of the study basically included the assessment of the existing basin conditions in terms of hydrology and environmental setting, and the development of alternative plans for handling the results of a proposed urbanized situation in the basin.

During the course of this study there were six general meetings, including a public meeting, to select the preferred alternative to present to the Board. It is felt that a reasonable consensus between the property owners and various agencies has been established at this time.

Mr. Wray continued by stating that the Big Johnson/Crews Gulch Basin is approximately 5.4 square miles, bounded by Windmill Gulch, Jimmy Camp Creek and Little Johnson/Security Creek Basin, with a direct flow area to Fountain Creek on the south. A major feature in the basin is the existence of irrigation facilities, such as Big Johnson and McRae Reservoirs. The basin was subdivided into approximately 64 small sub-basins in order to delineate the future and existing land use conditions modeled into the hydrology.

Mr. Wray explained that three alternatives were developed for the areas that were called "reaches" 1-4, and three alternatives were developed for the areas above Big Johnson. The distinction between above and below Big Johnson is important because Big Johnson hydrologically separates the rest of the basin from the lower portions. For reaches 1-4, the preferred alternative was a modification to McRae Reservoir, which had the net affect of keeping flows in all downstream areas to present or historic conditions. The preferred alternative would use the Big Johnson

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March 16, 1989 - Page 5

Reservoir, providing water quality control measures. The current spillway to Big Johnson would be improved and a storm water outlet above the irrigation level installed, which would drain the reservoir of a 100 year volume in less than a 48 hour period.

After further explanation of how the study was developed, Mr. Wray explained that the cost analysis provided the Board, shown as Table 15, represents a total cost, a non-reimbursable cost and a reimbursable cost. Table 16 of the report outlines the bridge cost within the basin and Table 18 reflects how non-reimbursable costs could be allocated. Table 19 shows the actual calculation of the drainage basin fees. If the report were to be approved in it's current form, the majority of the funding would come from the basin fee system. The balance of the funds would need to come from public and private agencies.

Mr. Donley asked if the City concurs with the detention pond concept on the airport property mentioned in the study.

Mr. Chris Smith answered that this was done at the City's request.

Mr. Waldthausen asked if discussions have taken place regarding the transfer of ownership of the McRae Reservoir to the County, as is recommended by the report.

Mr. Morrice stated that he is not sure of the status regarding discussion of a transfer at this point, or under what conditions such a transfer would take place.

Mr. Obering stated that in order for an implementation of this report, the non-reimbursable figures would need to be provided, as there is a large portion of this basin that would need to be funded by monies other than the drainage fees.

Mr. Morrice stated that with the suggested allocations that were included in the report, this funding would be directed primarily to property owners that will be receiving benefits by the facilities on their properties.

Mr. Wray stated that, of the non-reimbursable grand total shown on Table 18, the detention ponds on the airport property account for nearly half of that figure.

After further discussion, Mr. Morrice stated that, as with the planning study previously heard, the Big Johnson/Crews Gulch study is presented as information only for the Board at this meeting. Presentation for a recommendation on adoption of the study and fees involved is scheduled to come before the Board for action at the April, 1989, meeting.

Drainage Board Minutes
March 16, 1989 - Page 6

ITEM 4: OPEN FOR DISCUSSION

There being no further items to be brought before the Board, the meeting adjourned at 3:55 p.m.



Alan B. Morrice
Manager, Stormwater Division

ABM/pc

HECOX, TOLLEY, KEENE & BELTZ, P.C.

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STUART W. MCKINLAY
H. WILLIAM MAHAFFEY
THOMAS L. KENNEDY
ANN S. IRWIN

CYNTHIA MACE DUDE
GILBERT G. WEISKOPF
JOLENE L. CARMAN
MARK E. STEINKE
CHRISTOPHER E. ACKER
MARY W. EVANS

April 19, 1989

APR 19 1989

City and County Drainage Board
City Engineering Division
30 South Nevada
Colorado Springs, CO 80903

APR 19 1989

Gentlemen:

The following constitutes input concerning the Big Johnson Reservoir/Crews Gulch Drainage Basin Planning Study submitted by Kiowa Engineering dated March 29, 1989.

I represent Fountain Valley School and am immediate past president of Fountain Mutual Irrigation Company.

A policy which has taken some time to fully understand and accept is that except under most unusual circumstances it is inadvisable to mix drainage projects with irrigation waters. There is risk to the public if an irrigation facility not specifically designed to contain 100 year flood waters becomes overloaded. We have all seen the unfortunate results of siltration when drainage water is conveyed in an irrigation ditch. Not the least of the problems is the inevitable confusion about who is responsible for repairs, maintainance or to compensate loss when a problem surfaces. The private ditch owner, the several developers and the city and county all become involved in finger pointing.

It is with this background that I approach the Big Johnson/Crews plan.

First, it seems to me that despite the general policy referred to above, the Big Johnson/Crews project as planned as a joint use of an irrigation facility may make sense in this instance. I am aware of the other alternatives studied by Kiowa Engineering. I believe the cost of these other possibilities and perhaps more importantly, the environmental disruptions involved makes other alternatives unacceptable.

City and County Drainage Board
April 19, 1989
Page two

Secondly, it seems to me that despite the finest engineering in the world every project is subject to the possibility of failure because engineering assumptions may not be accurate, or because execution of the plan may be faulty or because there are conditions which none of us recognize today. In brief, I have a concern that despite the best efforts of engineers and planners, and despite the best intentions of prospective developers, there is in my view a real possibility that Big Johnson Reservoir will be accepting silt and sediment in an amount which will cause severe economic harm.

A word needs to be said about Big Johnson and its relationship to Fountain Mutual and to the community. Fountain Mutual is a mutual ditch company which is in transition. Fifteen years ago it was almost entirely devoted to conveying agricultural waters to its shareholder irrigators. Today a substantial number of its shares are devoted to augmentation programs. What this means in relation to the Big Johnson is that a shareholder seeking to augment through use of Fountain Mutual shares must have a storage facility. The concept is that the water which historically was used only during irrigation season must be stored during irrigation season and released all during the year to compensate for water taken for domestic or industrial uses from the augmented well. Domestic or industrial use requires year long use and must be compensated by appropriate releases of the augmentation water.

What this means is that Big Johnson becomes an extremely valuable and necessary storage facility for those Fountain Mutual shareholders who convert their shares to augmentation plans. If Big Johnson is less available or should be substantially silted up, the economic harm will be immense, as each shareholder seeking to subject his shares to an augmentation plan will be forced to purchase or create storage facilities.

It seems to me that if such siltration should occur despite the efforts of our planners and engineers to provide siltration ponds, it will not be effective for Fountain Mutual, the County, the engineers and the several developers to appear before the courts to then fashion a remedy. To the contrary, I believe a funded fail-safe plan needs to be adopted now. The alternative is to ignore a problem which (at least in my view) has a substantial chance of becoming reality.

*

I would suggest the following outline:

1. Studies should be undertaken now to determine the present rate of siltration of the Big Johnson.

Rationale. Fountain Mutual should not look to the county or future developers to improve its present position. It is only with respect to future siltration in excess of the present rate that a problem would exist. The studies must be for at least one year as different rates of siltration may be expected during different seasons.

2. A fund must be created by basin developer contributions calculated to provide sufficient funds to dredge Big Johnson to remove excess silt periodically and to return it to the condition which studies conducted under paragraph 1 above would predict in the absence of development.

Rationale. The problem i.e. increased siltration can only be a developer problem. Certainly neither Fountain Mutual nor the county should be responsible for remedying the problem.

3. The fund must be administered as a county fund much in the same manner as drainage fees are now administered. Cost analysis must be undertaken to fully recognize the cost of dredging including the cost to transport dredged material elsewhere and the fund size must be sufficient to fully compensate these costs.

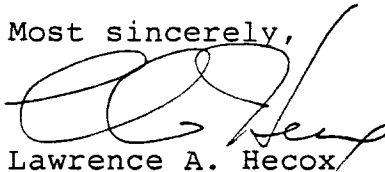
Rationale. Mechanisms are now in place and have been tested whereby funding for drainage facilities are provided by a fee structure applicable to each basin. There is a modest difference in that this proposal calls for funding against a cost which might not occur if all the planning works, is executed properly, and Murphy's law is temporarily suspended. There should therefor be a mechanism for refunding unused monies to developers together with interest which may have accrued. Perhaps refunds could be tied to a percentage of basin development. When the basin is 90% developed and if no substantial needs for the fund are then apparent, refunds of unused monies could then be made.

City and County Drainage Board
April 19, 1989
Page Four

On a second topic, I have separate concerns about McRae Reservoir. The plan as I understand it is to increase the water height giving rise to the possibility that substantial school lands may be inundated for periods of time. Studies must be completed to demonstrate the extent of such periodic inundation and a clear mechanism evolved for early release of these excess waters to the end that sterile mud flats must not be created. Such would be totally unacceptable to the School.

I apologize for the length of this letter. The concept needs some illumination however, and if accepted, obviously needs greater study.

Most sincerely,

A handwritten signature in black ink, appearing to read 'L. Hecox', is written over the typed name. The signature is fluid and cursive.

Lawrence A. Hecox

LAH:ggs
cc: Mr. Philip Blum
Kiowa Engineering
Donald Lohrmeier

MAX L. ROTHSCHILD, P.E.
DIRECTOR OF PUBLIC WORKS

ALAN B. MORRICE
MGR. STORM WATER MGMT. DIV.



PHONE (719) 520-6460

EL PASO COUNTY
DEPARTMENT OF PUBLIC WORKS

STORM WATER MANAGEMENT DIVISION
3105 N. STONE AVE.
COLORADO SPRINGS, COLORADO 80907

M I N U T E S

EL PASO COUNTY PORTION

DRAINAGE BOARD

for April 20, 1989

The City of Colorado Springs/El Paso County Drainage Board held its regularly scheduled meeting at 2:00 p.m. on April 20, 1989, in the City Council Chambers, City Administration Building, 30 South Nevada Avenue.

MEMBERS PRESENT

Roland Obering,
Chairman
Chuck Donley
Mike Mallon
Guenther Polok
Ron Waldthausen

MEMBERS ABSENT

Richard Dailey

OTHERS PRESENT

Alan Morrice
Gary Haynes
Chris Smith

ITEM 1: APPROVAL OF THE MINUTES OF THE MARCH 16, 1989 BOARD MEETING:

Mr. Mallon asked that the minutes be corrected to reflect that he was absent, not present. Mr. Waldthausen moved to approve the minutes as amended. Mr. Donley seconded and the motion carried unanimously.

ITEMS 2 & 3: City Items.

ITEM 4: PRESENTATION OF THE REVISED BLACK FOREST DRAINAGE BASIN PLANNING STUDY BY WILSON AND COMPANY:

Mr. Morrice stated that the studies that are shown on the agenda were shown for action, however, they will be continued and a status report only will be given at this time. Mr. Morrice introduced Mr. Mike Bartusek, of Wilson and Company, to briefly review the work that has been done in the past month.

Mr. Bartusek stated that after last month's meeting there were comments received that regarded the fee as being too high and due to these comments the costs were all reviewed. The areas where there seem to be existing deficiencies were also reviewed and then

Drainage Board Minutes
April 20, 1989 - Page 3

not occur. There seems to be no rational behind the formula for determining the basin fees. Mr. Wynert stated that he understood that this issue would not be voted on at this meeting, but he did want it made clear that he, and those he represents, are strongly opposed to this course of action.

Mr. Morrice stated that one of the efforts in the drainage basin planning study is to look at ultimate development using development trends, sketch plans, etc. If there are inaccurate assumptions made at this time, when future development does occur, then the drainage basin planning study is updated and modified to fit the revised development plan. In the case presented by Mr. Wynert, there were some sketch plans proposed to the east, roughly 1/2 acre lot sizes, some development plans to the south that shows commercial/retail, 1/3 acre lots and even some 1/4 or 1/5 acre lot sizes even further to the south. In an attempt to get a handle on the overall development it was the intent of all involved to buffer between the rural upper areas of Kingswood and the lower more dense development that would occur.

After further discussion of the Kingswood area in this basin, Mr. Donley suggested that the Board needs more information as to where exactly the Kingswood area is located within the basin and how it will be affected by the planning study, prior to the next meeting.

ITEM 5: PRESENTATION OF THE REVISED BIG JOHNSON/CREWS GULCH DRAINAGE BASIN PLANNING STUDY, BY KIOWA ENGINEERING:

Mr. Morrice stated that this planning study is also being presented as a status report only, not requiring any action at this time.

Mr. Richard Wray, of Kiowa Engineering, was present and stated that comments have been received from the Corp. of Engineers, Division of Wildlife, City of Colorado Springs, Fountain Mutual Irrigation, the Fountain Valley School and El Paso County Parks Department. The majority of the comments have been largely editorial in nature. There has been a slight change in the basin fee of only a few dollars, reflecting some modifications of improvements in, and around, McRae Reservoir and the park itself. Total costs in the basin are relatively unchanged. As of this time, there is nothing pending that will drastically change the concept of the plan or the associated costs with the fee.

Mr. Obering asked if there were any further comments from the audience.

Mr. Larry Hecox, President of the Fountain Valley School, was present and stated that he is also the Past President of Fountain Mutual Irrigation, and is at this meeting to speak for both of these organizations. A letter has been submitted to El Paso

Drainage Board Minutes
April 20, 1989 - Page 4

County, the City of Colorado Springs and the consultant, and the concept of this letter is that drainage water and irrigation water should not be mixed. When drainage water and irrigation water is mixed, problems often arise with siltration and engineering. A problem concerning both the Fountain Valley School and Fountain Mutual Irrigation is that the use of the Big Johnson Reservoir may be based on invalid assumptions. It has been suggested that a fail safe method to protect the share holders of Fountain Mutual be derived prior to the drainage basin planning study going into effect. Perhaps a County administrated fund, tied to development, could be instituted.

Mr. Hecox also mentioned that there is concern regarding damage that could occur to Fountain Valley School property if increased flows are channeled into McRae Reservoir. There is also a trail shown on the drawings and the school would like assurances that this trail will not be open to the public.

Mr. Waldthausen asked Mr. Hecox what methods are currently used to determine siltration rates, and would Fountain Mutual be contributing to the costs involved in studying the situation.

Mr. Hecox stated that currently there are no real methods used to measure and control siltration and that Fountain Mutual feels that any additional problems will be brought on by new developers, and therefore they should pay the costs of studying and preventing further siltration.

Mr. Morrice stated that the concerns that Mr. Hecox has raised are valid ones. The establishment of a fund such as Mr. Hecox has suggested is something that can be done, however, County staff will need to discuss the issue with the County Attorney to work out the mechanisms and the best way to administer such a fund. This issue, however, is somewhat independent of the planning study guidelines that are set forth and would be more in the implementation aspect. The County Attorney has already received a copy of the letter sent by Mr. Hecox and a report can be presented to the Board at the next meeting as to her comments and recommendations.

Mr. Wray commented on the issues raised by Mr. Hecox. With respect to the inundation of the Fountain Valley School property, right now 100 year floodplains have been depicted on the drawings. Based upon the existing conditions the increase in the 100 year water surface from the current condition to what would be proposed is approximately 1'. This would be an infrequent effect and the mean level of the pond has been proposed to be kept where it is now. Mr. Wray further mentioned that the trail that is shown on the drawings is for maintenance use only and can be noted as such.

After further discussion, Mr. Waldthausen commented that last

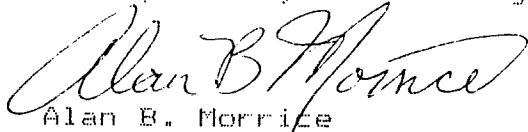
Drainage Board Minutes
April 20, 1989 - Page 5

month's minutes reflect the fact that there had been six meetings of all parties involved and that there had been a consensus of all the property owners involved. It appears to be evident at this time that there is not a true consensus and that more interaction between the public and the private property owners will need to take place to reach some sort of agreement on this issue.

Mr. Morrice stated that he felt that it was presented correctly last month, in that it was felt that what had been achieved was a consensus of the basin as a whole. The County and the consultant will continue to get a stronger consensus and to work on the issues raised at this meeting, prior to the planning study coming before the Board for their consideration.

ITEM 6: OPEN FOR DISCUSSION

As there were no additional comments from the City staff or the County staff, the meeting was adjourned at 3:19 p.m.



Alan B. Morrice
Manager, Stormwater Division

ABM/pc

cc: Chris Smith
Mike Koken
Howard Cloud
Phil Weinert
Lawrence Hecox

THE FOUNTAIN MUTUAL IRRIGATION COMPANY

**11235 Green Spring Rd.
Colorado Springs, CO 80925
(719) 382-5042**

** Need to discuss w/ MTE*

May 17, 1989

Kiowa Engineering Corporation
419 W. Bijou St.
Colorado Springs, CO 80905

ATTENTION MR. RICHARD WRAY

RE: Kiowa Engineering letter of May 5, 1989

Dear Mr. Wray

Fountain Mutual Irrigation Co. is submitting this letter as a follow-up to our letter dated April 19, 1989. We still support the Big Johnson, Crews Gulch Drainage Study with the following conditions:

#1. Fountain Mutual is still concerned with the sizing of the proposed water quality ponds. We still must be assured of no damage to Big Johnson because of inadequate protection from siltation. We therefore believe that the water quality ponds must be sized to handle the 100 year runoff event. *

#2. Fountain Mutual has always been led to believe that the airport property would not discharge any drainage into the Big Johnson Reservoir. In your letter of May 5, 1989 it is stated that we will be getting historic runoff from this property. Fountain Mutual understands that we have to accept historic runoff but we reserve the right to approve the plans in that we are concerned about the quality, location of release, and rate of discharge. *

#3. Fountain Mutual insists that all water quality ponds, other erosion control measures, the enlarged spillway and the outlet pipe be in place prior to any activity occurring upstream of the Big Johnson Reservoir. *

#4. The MacRae Reservoir issue must be resolved. *

If we can be of any further assistance, please don't hesitate contacting us.

Sincerely

Donald C. Lohrmeyer
Don Lohrmeyer, President

Warren, Mundt, and Martin, P.C.

ATTORNEYS AT LAW
523 N. NEVADA
COLORADO SPRINGS, CO 80903
(719) 578-1152
FAX (719) 578-9496

ROBERT B. WARREN
JAMES A. MUNDT
THOMAS G. MARTIN

June 19, 1991

REID B. KELLY
GARTH J. NICHOLLS

Mr. Alan Morrise
Department of Transportation
3105 N. Stone Street
Colorado Springs, CO 80907

Re: Big Johnson Drainage Study

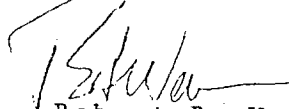
Dear Mr. Morrise:

I have had an opportunity to review the Big Johnson Drainage Study, prepared by Kiowa Engineering, with Gary Steen. Mr. Steen has had an opportunity to discuss the Study with the Board of Directors of Fountain Mutual Irrigation Company.

Fountain Mutual is in substantial agreement with the concepts and proposals outlined in the Study. We realize that this is a Study and that further implementation is needed. We also recognize that there will be a need for the County and Fountain Mutual to cooperate with the cost-sharing and maintenance agreements and other mutual obligations outlined in the Study.

However, the Company is in substantial agreement with the concepts contained in the Study and we look forward to working with the County, on a amicable basis, in the future.

Sincerely,



Robert B. Warren

RBW/vhl

By ^{H381} **RECEIVED** 10/2 For: Aiken

GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903-1074

JUL 16 1991
El Paso County
Planning Department

EDWARD D. MEYER, P.E.
ROGER J. SAMS, P.E.
KIM K. KOCK, P.E.
GREGORY R. WORDEN, P.E.

July 16, 1991

TELEPHONE (719) 475-2935
TELECOPY (719) 475-2938

Mr. Rick O'Conner
El Paso County Planning Department
27 E. Vermijo Avenue
Colorado Springs, CO 80903

Dear Mr. O'Conner:

On July 15, the City of Fountain provided a copy of the Big Johnson Reservoir/Crews Gulch Drainage Basin Planning Study for our review and comment on behalf of the City. It is our understanding that the El Paso County Planning Commission will be considering this plan for a recommendation to the Board of County Commissioners at their meeting of today, July 16. The City of Fountain administration has not had an opportunity to review this document with the City Council and desires to do that and provide comments to the Board of County Commissioners at a later date prior to consideration for adoption.

The City of Fountain has specific interests in the plan in Reach 1 west of U.S. Highway 85-87 along Crews Gulch. The City has expended a considerable effort in providing drainage facilities on Crews Gulch to accommodate the expected flood flows by constructing a new culvert and channel improvements on the drainageway. It is our understanding that channel improvements similar to that constructed by the City are proposed from U.S. Highway 85-87 downstream to the new channel. The plan indicates that the costs for the proposed channel improvements would be "reimbursable," that is they are included in the drainage basin fee calculation. The City of Fountain desires that the appropriate mechanisms be set in place so it may participate in the administration of the drainage basin fee fund and assist in coordinating the construction and financing of those improvements with drainage fees collected from assessable land in the basin. The plan is not clear as to whether or not land in the corporate limits of the City west of U.S. Highway 85-87 has been included in the assessable area in the basin. If it has, it is imperative that the City of Fountain be included in the mechanisms for drainage basin fee administration.

The other major area of interest by the City of Fountain is the reach of Crews Gulch near Colorado Highway 16 bridge. At this location the plan proposes to split the flood flows and convey a portion through the Fountain Creek Regional Park and the remaining part of the flow through the City's Ceresa Park. The flow through the county park channel is proposed to be limited to that which would occur under present conditions. The plan states that this is roughly equivalent to the runoff from a 10 year precipitation event. It is our understanding that, theoretically, 90% of the runoff events in any given year would be conveyed in the channel through the county's regional park. Overflow and flow control structures are proposed upstream of the Highway 16 bridge to effect this flow split.

RECEIVED

By

20/2

JUL 16 1991

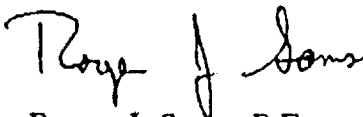
El Paso County
Planning DepartmentMr. Rick O'Conner
July 16, 1991
Page 2

Although it is undesirable to subject the City's Ceresa Park to flood flows, it is recognized that the area subject to inundation by overflows from Crews Gulch is presently subject to flooding by Fountain Creek. The City of Fountain will be reviewing this proposal in greater detail prior to consideration of this plan by the Board of County Commissioners. Because the facilities to control the flow through the County and City parks is a "nonreimbursable" cost as portrayed in the plan, it is most important that the necessary improvements be coordinated among the various interested agencies. It is noted that the City of Fountain is proposed to participate to the extent of one-third the cost of the flow control facilities upstream of the Highway 16 bridge.

In summary, we believe the overall approach to management of storm runoff in the basin in a logical, cost-effective system, particularly in the upper reaches of the basin where more intense development is likely to occur. It is most important that the necessary mechanisms be set in place to effectively administer the development of the drainage systems and the appurtenant fee structure as the downstream "owner," the City of Fountain, is impacted by all activities in the upper reaches of the basin.

As previously indicated in this letter, the City of Fountain will be submitting additional comments to El Paso County on this drainage basin planning study prior to consideration by the Board of County Commissioners. We look forward to continuing our work with the many agencies involved in the development of this plan.

Sincerely,



Roger J. Sams, P.E.

RJS/rn

cc: Mr. Louis Edmonds, Acting City Manager, City of Fountain
Mr. David Smedsrud, Planning Director, City of Fountain



REPLY TO
ATTENTION OF:

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

September 16, 1991

Construction-Operations Division
Regulatory Branch

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

Dear Mr. Morrice:

This letter is sent to inform you of our intent to establish a Section 404 List of Categories of Activities and Letter of Permission (LOP) procedures for your Crews Gulch Drainage Basin Planning Study in El Paso County, Colorado. We anticipate starting the evaluation procedures in 1991 to establish a List and LOP procedures.

The List of Categories of Activities is intended to include all Section 404 activities involved in implementing the recommended preliminary design of the basin study. Any activity on the List would then be eligible for a Letter of Permission authorization and project applicants applying for an LOP authorization would use abbreviated processing procedures.

For information about the status of the List of Categories of Activities or to apply for a Letter of Permission Authorization, please contact one of the following Corps of Engineers offices:

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

ATTN: CESWA-CO-R
Albuquerque District
517 Gold Ave. SW, Room 8419
P.O. Box 1580
Albuquerque, NM 87103-1580
(505) 766-2776

Sincerely,

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

BIG JOHNSON RESERVOIR / CREWS GULCH

DRAINAGE BASIN PLANNING STUDY

PRELIMINARY DESIGN



Kiowa Engineering Corporation

419 West Bijou Street
Colorado Springs, Colorado
80905-1308

(719) 630-7342



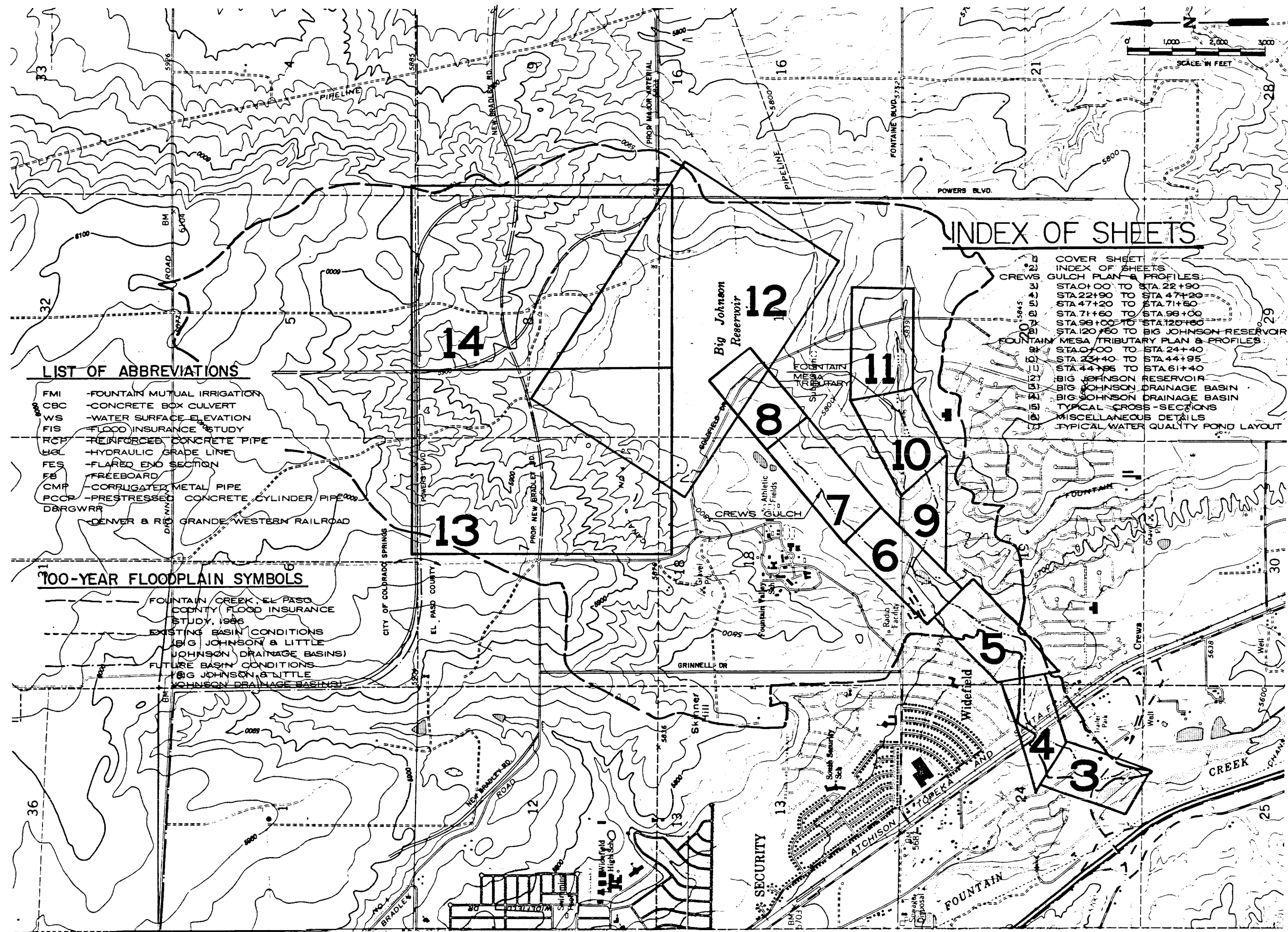
EL PASO COUNTY

DEPARTMENT OF PUBLIC WORKS

STORM WATER MANAGEMENT DIVISION

3105 N. STONE AVE.

COLORADO SPRINGS, COLORADO 80907



LIST OF ABBREVIATIONS

FMI	-FOUNTAIN MUTUAL IRRIGATION
CBC	-CONCRETE BOX CULVERT
WS	-WATER SURFACE ELEVATION
FIS	-FLOOD INSURANCE STUDY
RCP	-REINFORCED CONCRETE PIPE
HGL	-HYDRAULIC GRADE LINE
FES	-FLARED END SECTION
FB	-FREEBOARD
CMP	-CORRUGATED METAL PIPE
PCCP	-PRESTRESSED CONCRETE CYLINDER PIPE
D&GWR	-DENVER & RIO GRANDE WESTERN RAILROAD

100-YEAR FLOODPLAIN SYMBOLS

---	FOUNTAIN CREEK, EL PASO COUNTY FLOOD INSURANCE STUDY, 1986
---	EXISTING BASIN CONDITIONS (BIG JOHNSON & LITTLE JOHNSON DRAINAGE BASINS)
---	FUTURE BASIN CONDITIONS (BIG JOHNSON & LITTLE JOHNSON DRAINAGE BASINS)

INDEX OF SHEETS

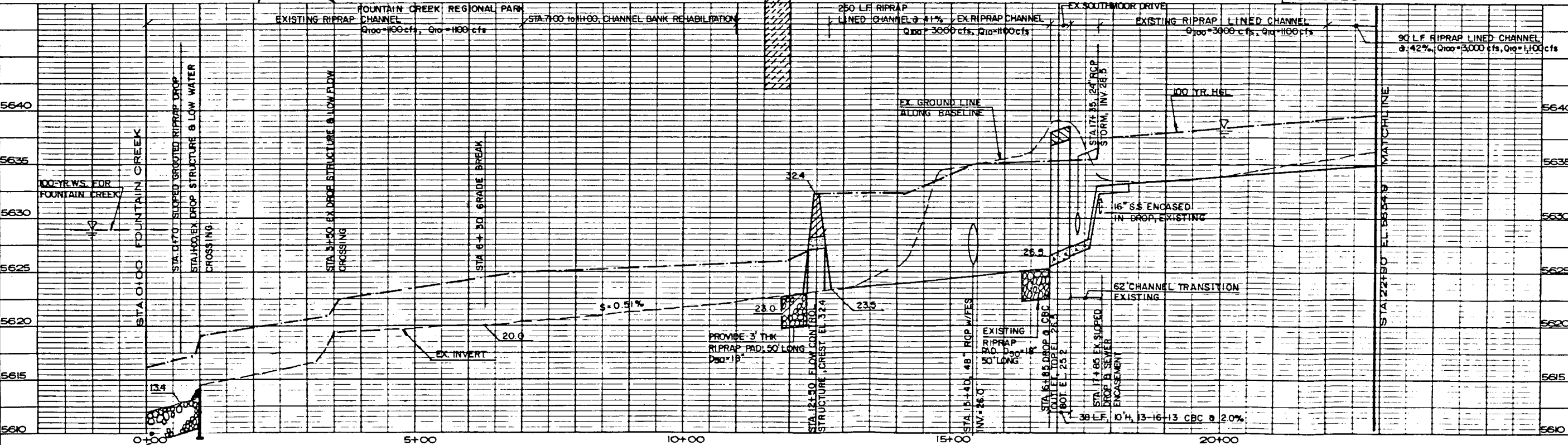
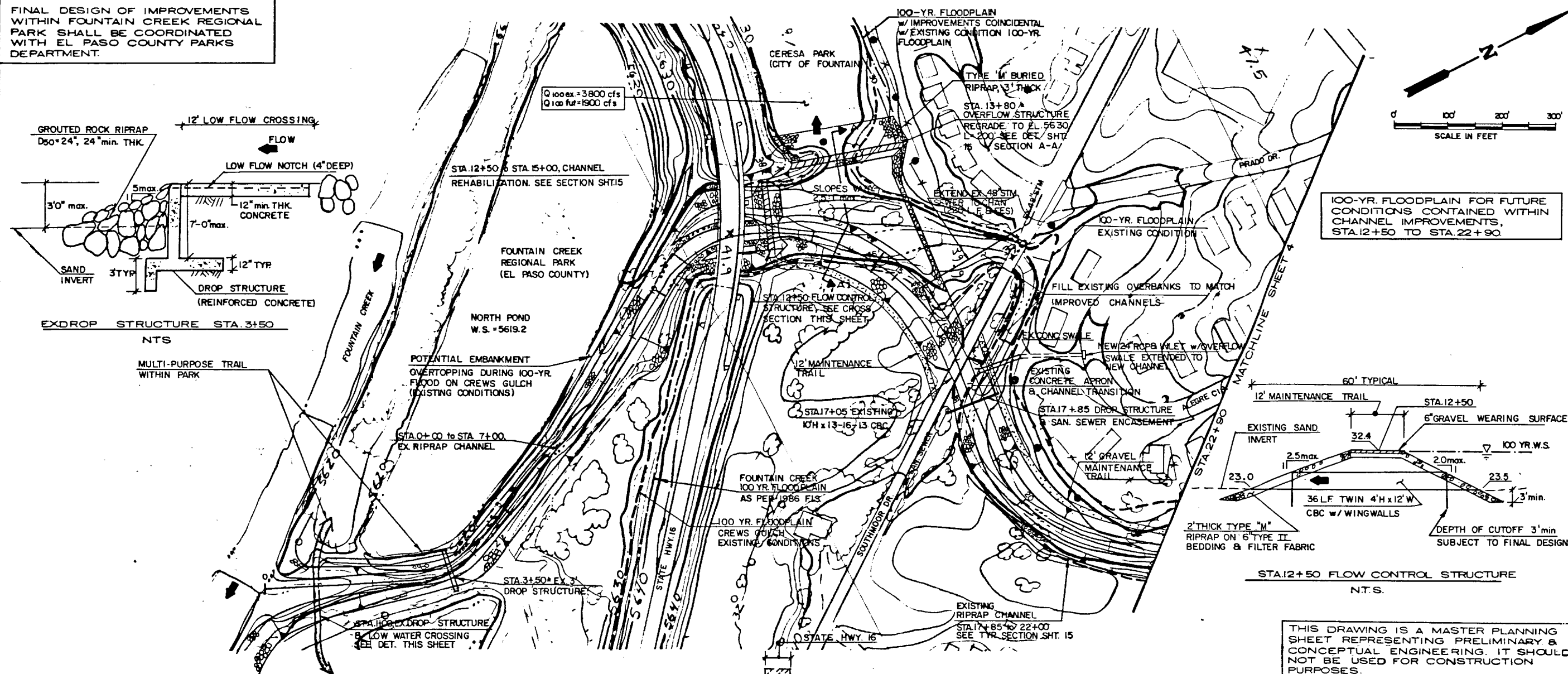
2	COVER SHEET
3	INDEX OF SHEETS
4	CREWS GULCH PLAN & PROFILES:
5	STA 0+00 TO STA 22+90
6	STA 22+90 TO STA 47+20
7	STA 47+20 TO STA 71+60
8	STA 71+60 TO STA 98+00
9	STA 98+00 TO STA 120+60
10	STA 120+60 TO BIG JOHNSON RESERVOIR
11	FOUNTAIN MESA TRIBUTARY PLAN & PROFILES:
12	STA 0+00 TO STA 24+40
13	STA 24+40 TO STA 44+95
14	STA 44+95 TO STA 61+40
15	BIG JOHNSON RESERVOIR
16	BIG JOHNSON DRAINAGE BASIN
17	BIG JOHNSON DRAINAGE BASIN
18	TYPICAL CROSS-SECTIONS
19	MISCELLANEOUS DETAILS
20	TYPICAL WATER QUALITY POND LAYOUT

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

BIG JOHNSON RESERVOIR / CREWS GULCH
DRAINAGE BASIN PLANNING STUDY
INDEX MAP

Project No.	88.05.09
Date:	1/89
Design:	EAK
Draft:	EAK
Check:	RNW
Revisions:	
5/91 WATER QUALITY	REACHES 183

FINAL DESIGN OF IMPROVEMENTS
WITHIN FOUNTAIN CREEK REGIONAL
PARK SHALL BE COORDINATED
WITH EL PASO COUNTY PARKS
DEPARTMENT.

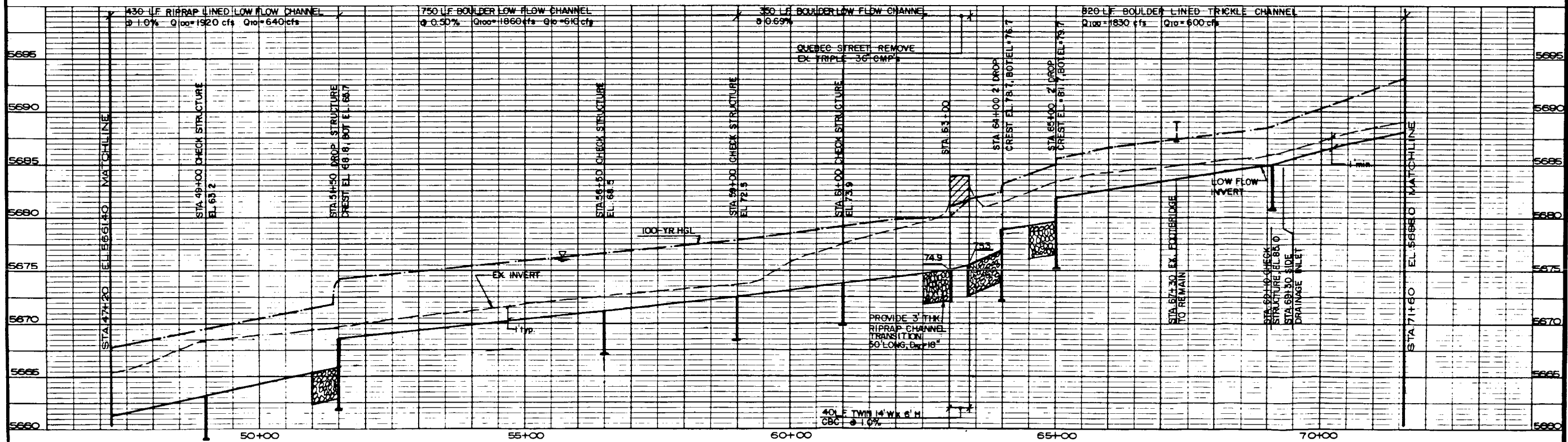
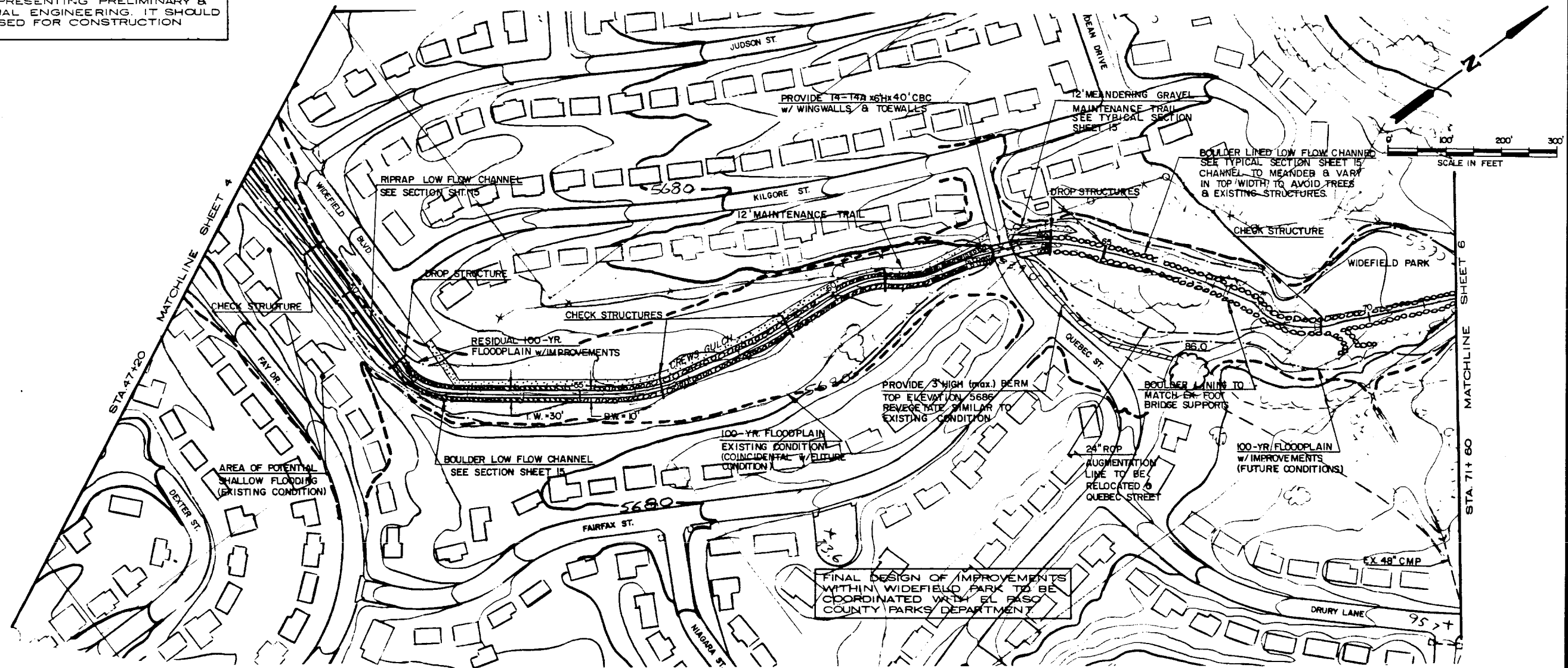


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419 West Bijou Street
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80905-1308

BIG JOHNSON RESERVOIR/CREWS GULCH
DRAINAGE BASIN PLANNING STUDY
CREWS GULCH
STA. 0+00 TO STA. 22+90
PRELIMINARY DESIGN DRAWINGS

Project No. 88.05.09
Date: 1/89
Design: RNW
Drawn: EAK
Check: TCF
Revisions: 6/91

THIS DRAWING IS A MASTER PLANNING SHEET REPRESENTING PRELIMINARY & CONCEPTUAL ENGINEERING. IT SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.



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BIG JOHNSON RESERVOIR/CREWS GULCH
DRAINAGE BASIN PLANNING STUDY

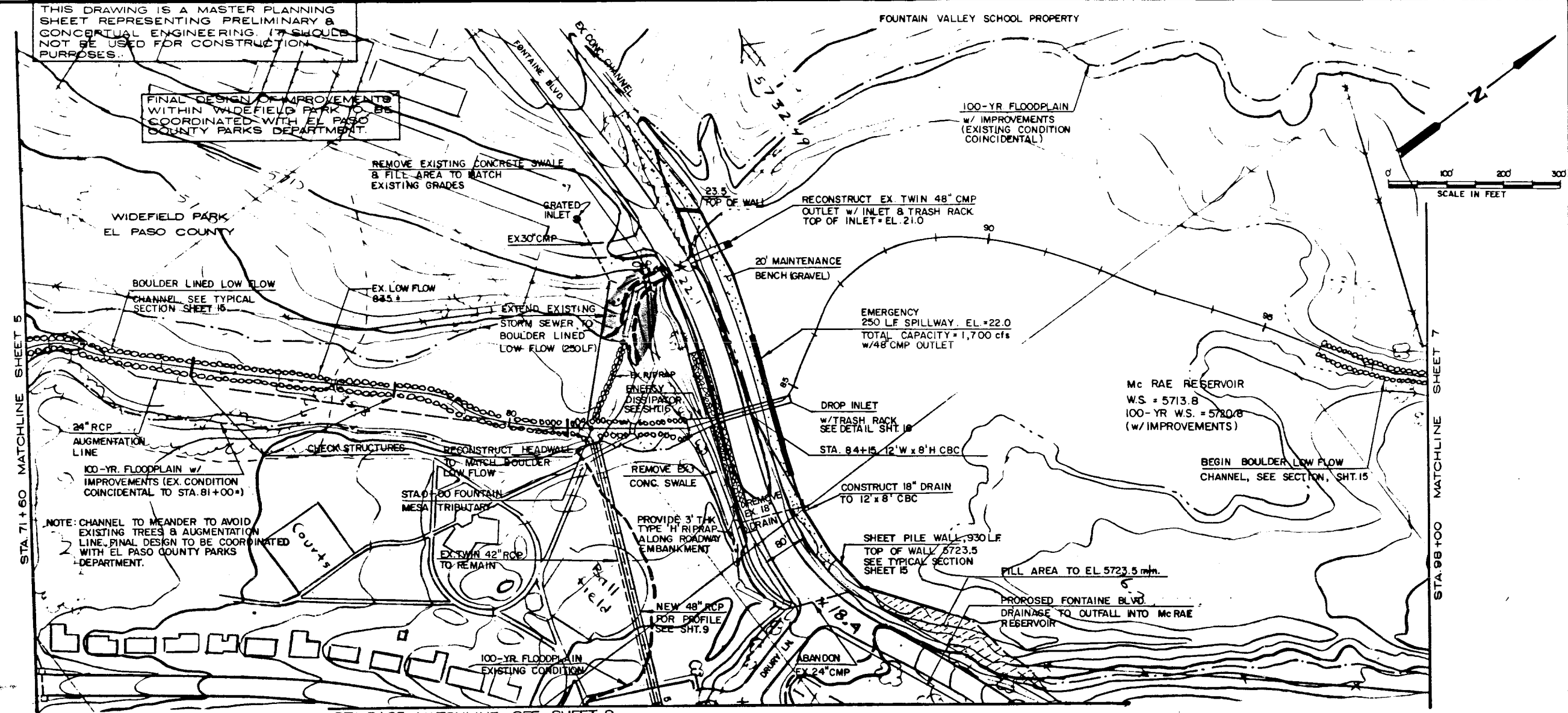
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STA 47+20 TO STA 71+60

PRELIMINARY DESIGN DRAWINGS

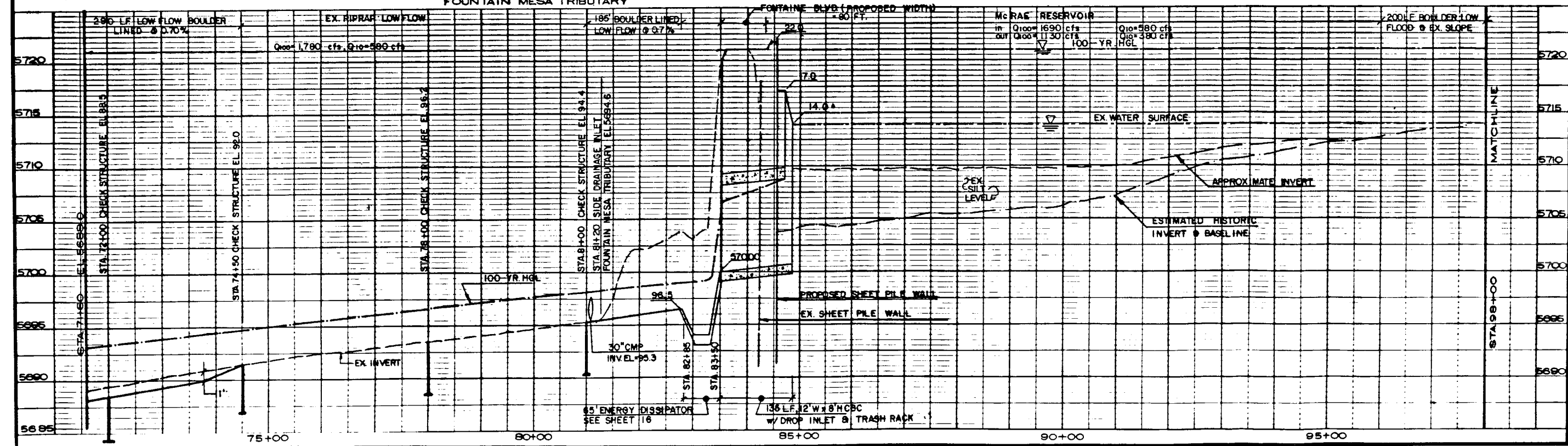
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Check: TCF
Revisions:

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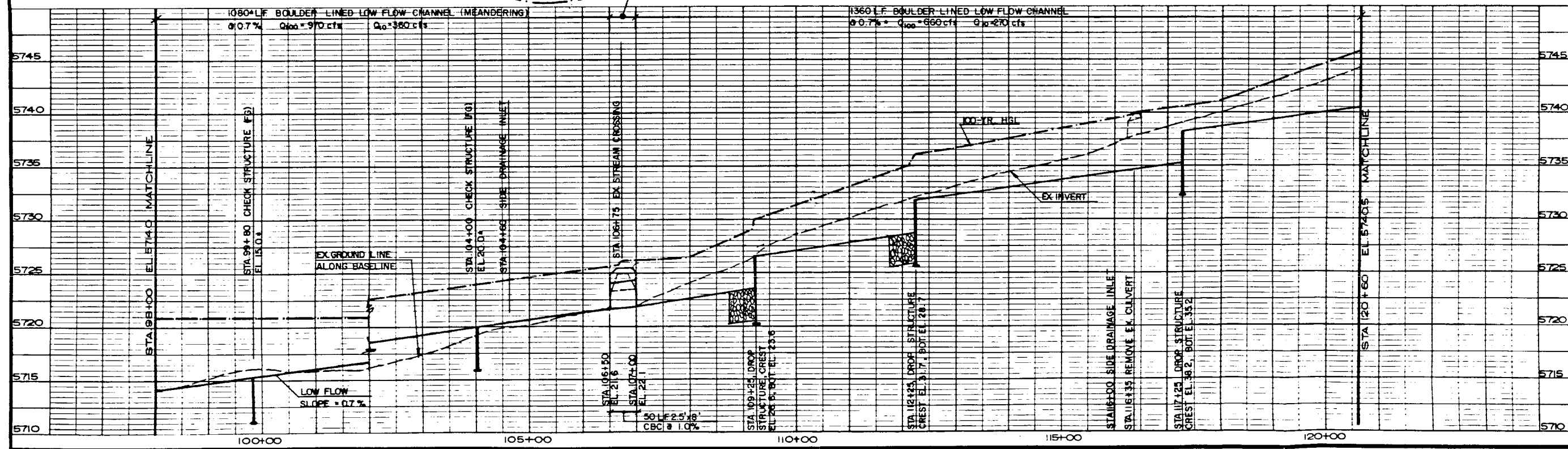
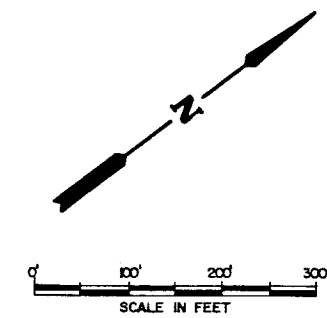
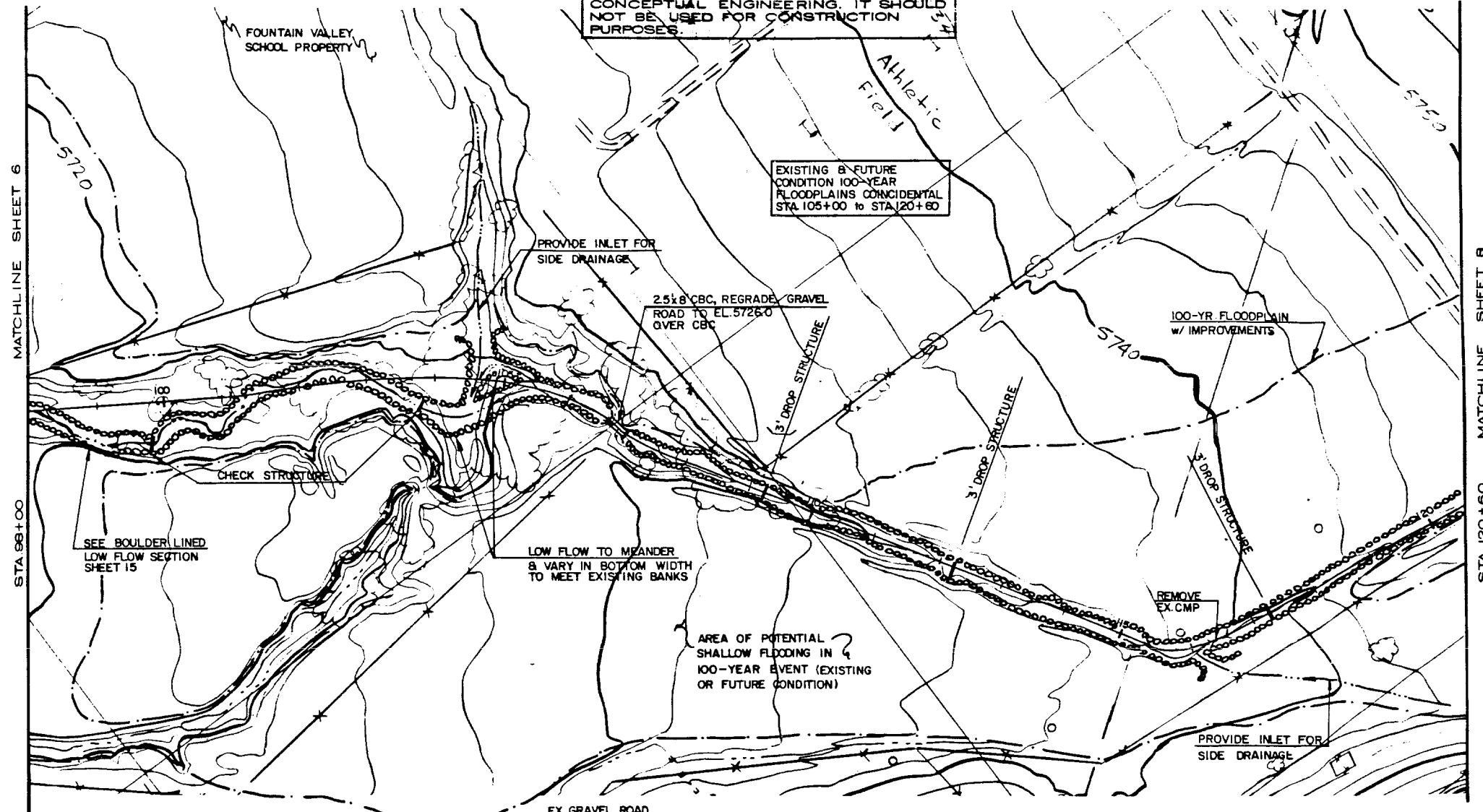
STA 5+05 MATCHLINE SEE SHEET 9
FOUNTAIN MESA TRIBUTARY



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BIG JOHNSON RESERVOIR/CREWS GULCH
DRAINAGE BASIN PLANNING STUDY
CREWS GULCH
STA 7+160 TO STA 98+00
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Revisions: 5/91

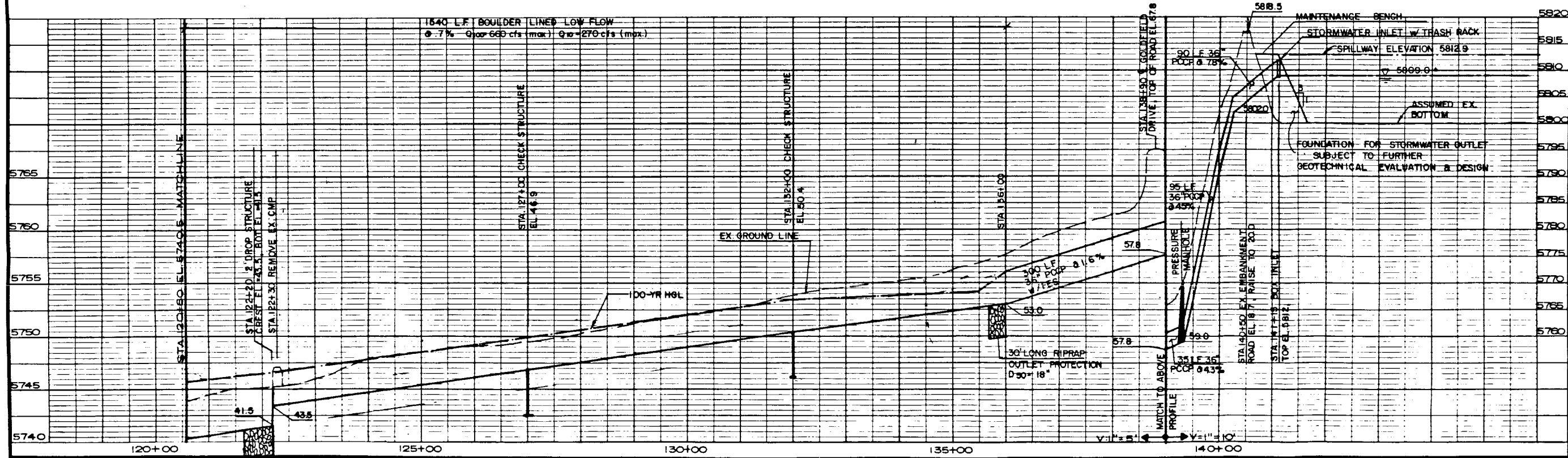
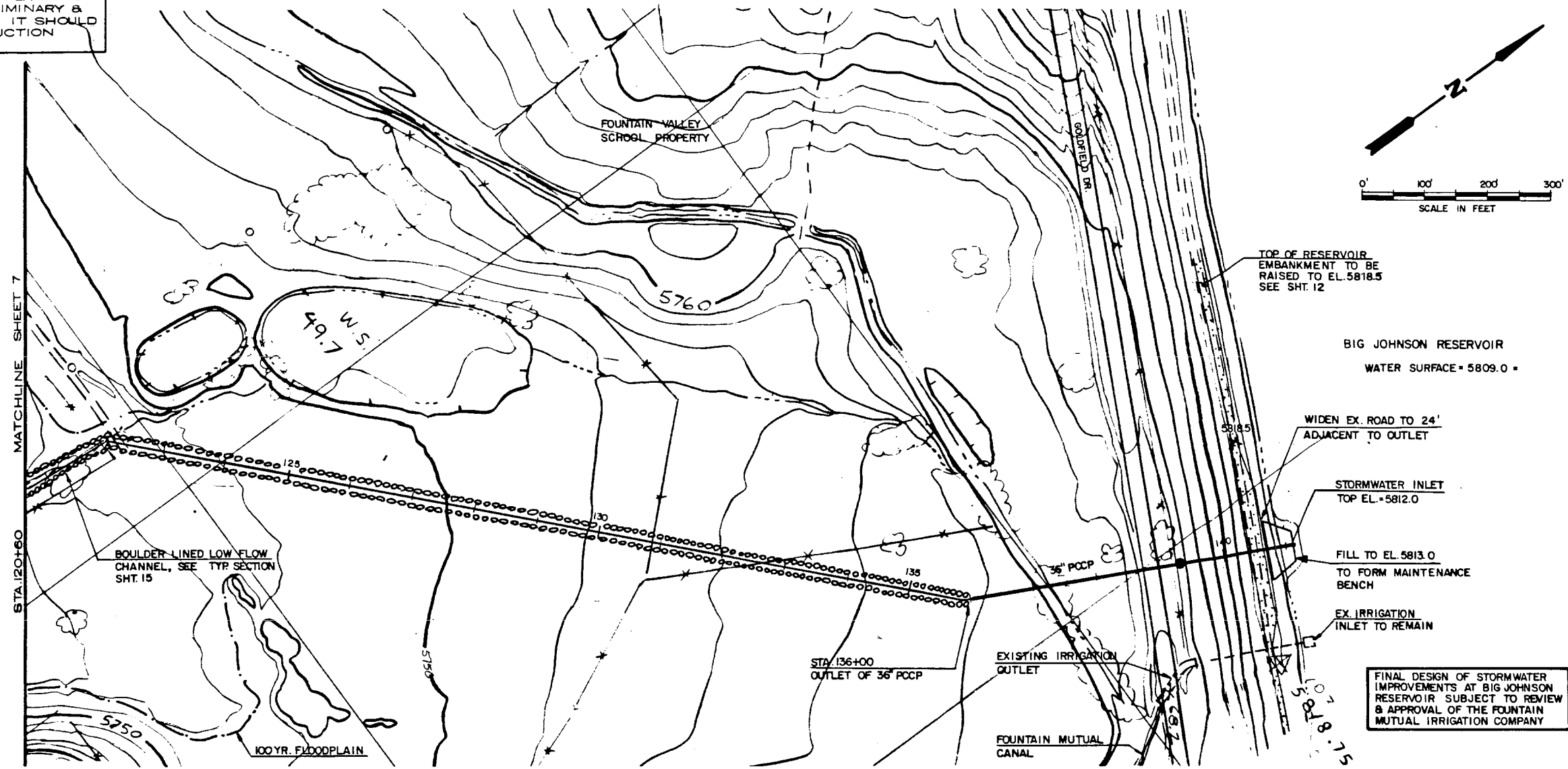


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 Colorado Springs, Colorado
 80905-1308

BIG JOHNSON RESERVOIR/CREWS GULCH
 DRAINAGE BASIN PLANNING STUDY
 CREWS GULCH
 STA 98+00 TO STA 120+60
 PRELIMINARY DESIGN DRAWINGS

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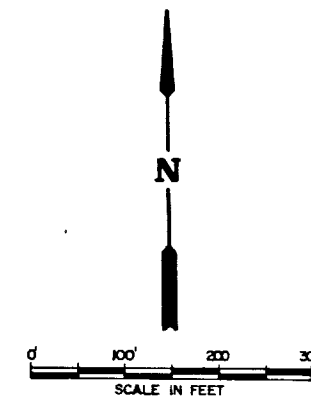
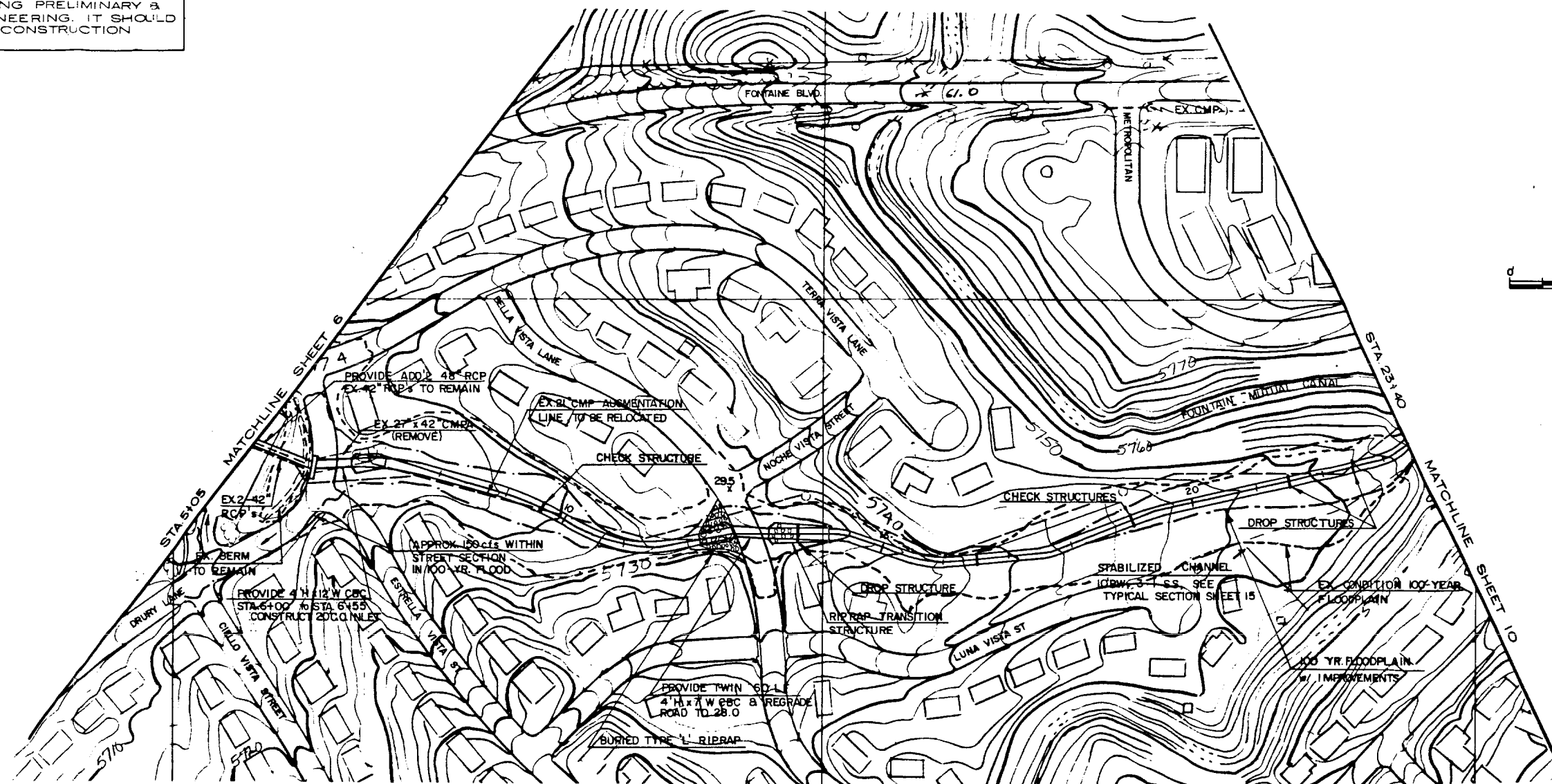


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BIG JOHNSON RESERVOIR / CREWS GULCH
DRAINAGE BASIN PLANNING STUDY
CREWS GULCH
STA 120+60 TO BIG JOHNSON RESERVOIR
PRELIMINARY DESIGN DRAWINGS

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Revisions:

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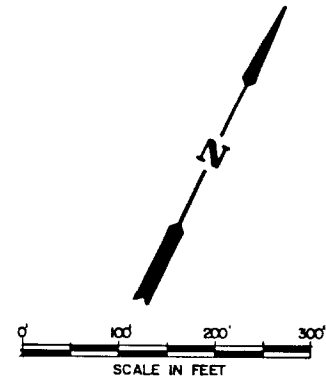
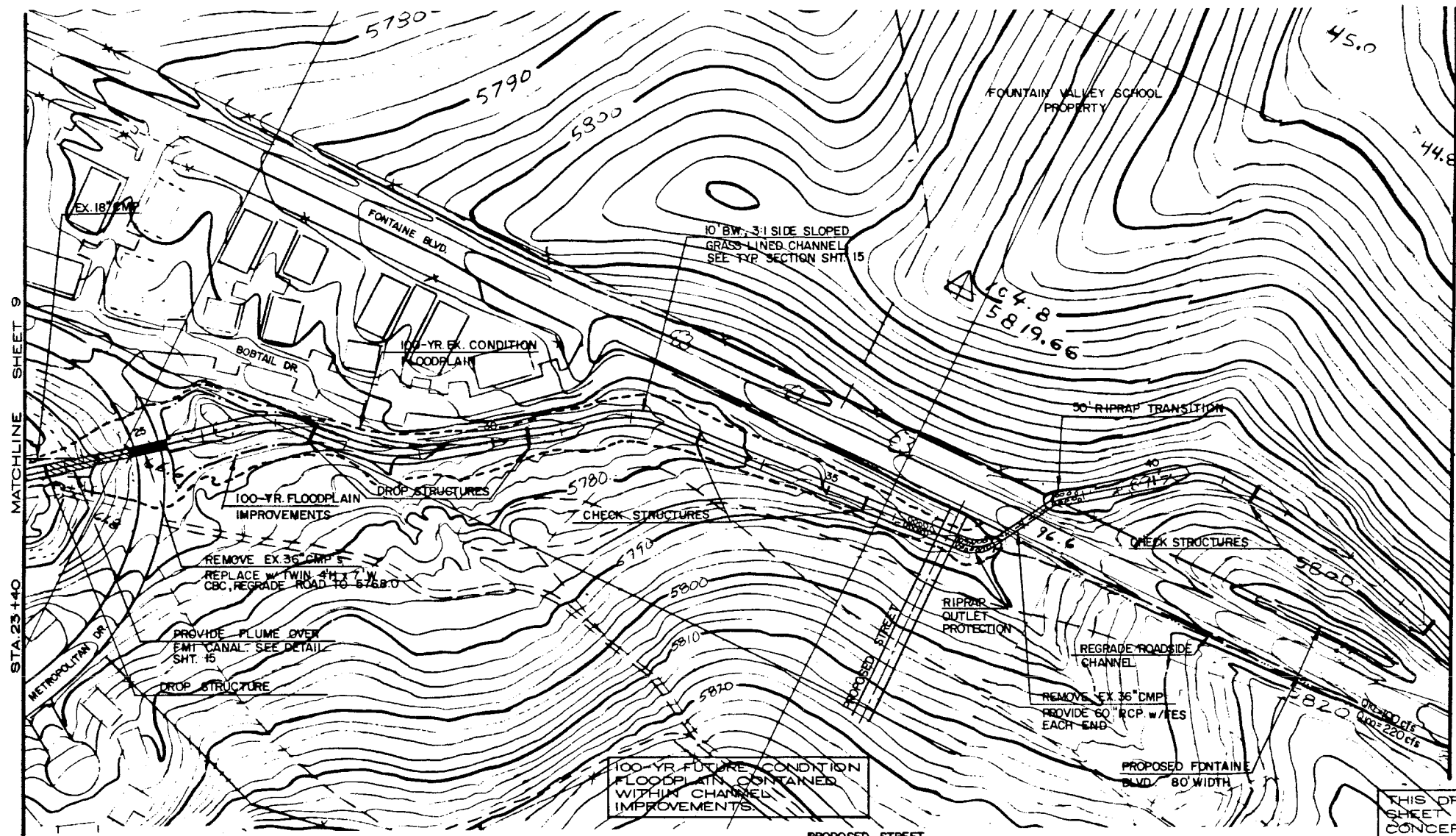
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Colorado Springs, Colorado
80905-1308

BIG JOHNSON RESERVOIR/CREWS GULCH
DRAINAGE BASIN PLANNING STUDY

FOUNTAIN MESA TRIBUTARY
STA. 0+00 TO STA. 23+40

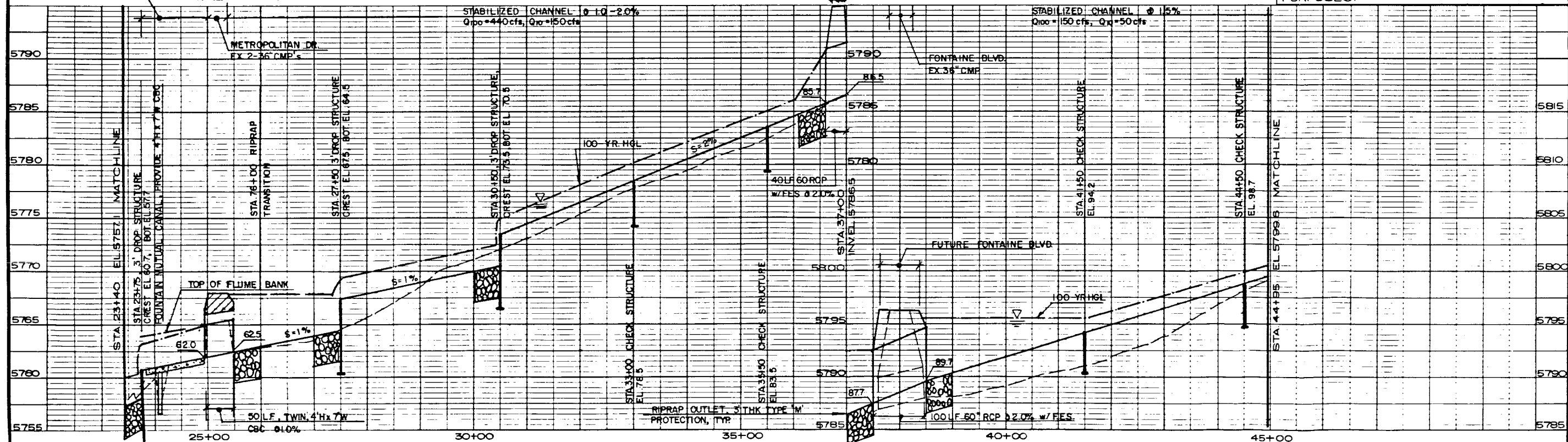
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125 L.F. CONCRETE FLUME @ 1.0%

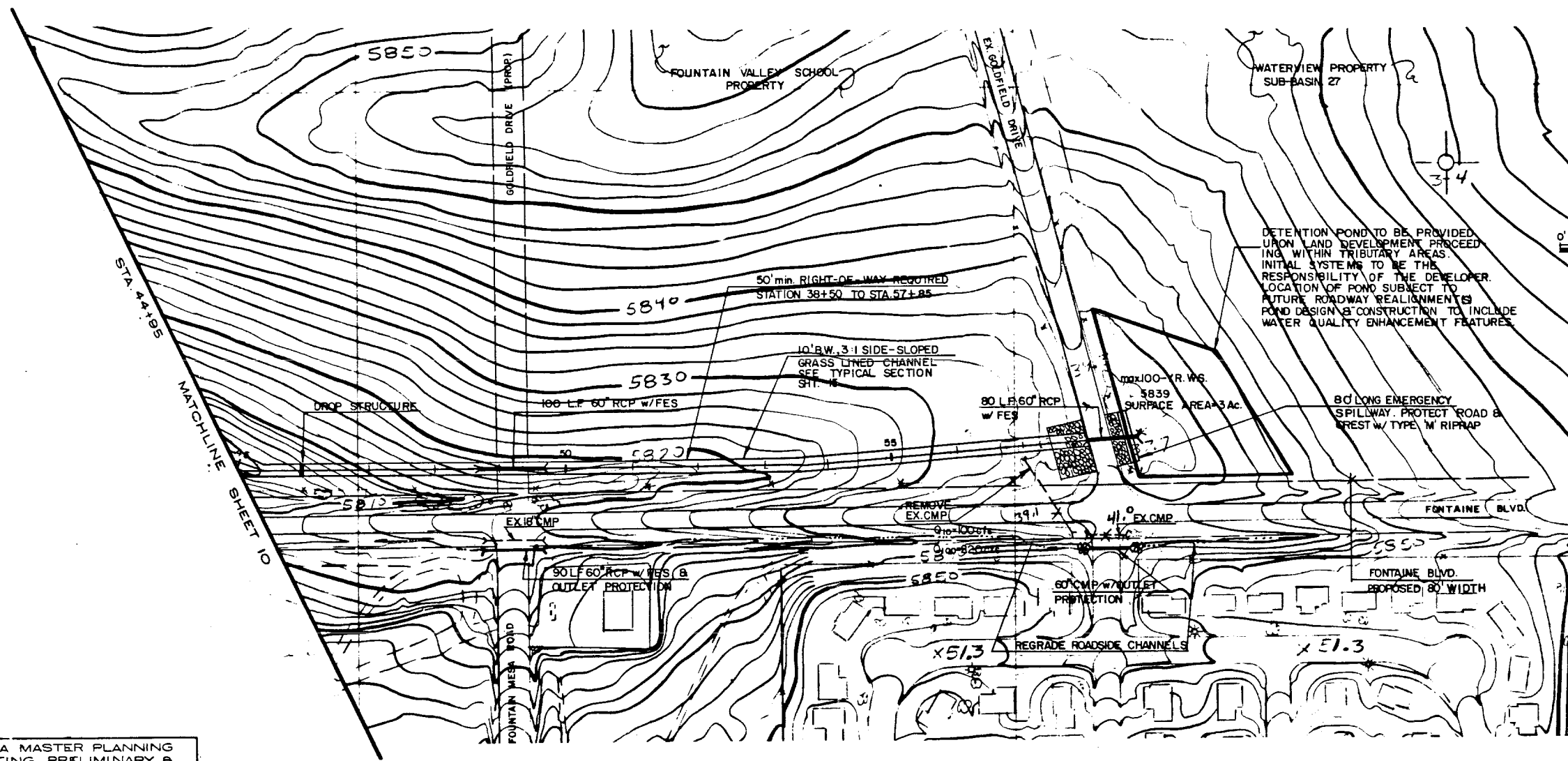


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BIG JOHNSON RESERVOIR/CREWS GULCH
DRAINAGE BASIN PLANNING STUDY
FOUNTAIN MESA TRIBUTARY
STA. 23+40 TO STA. 44+95

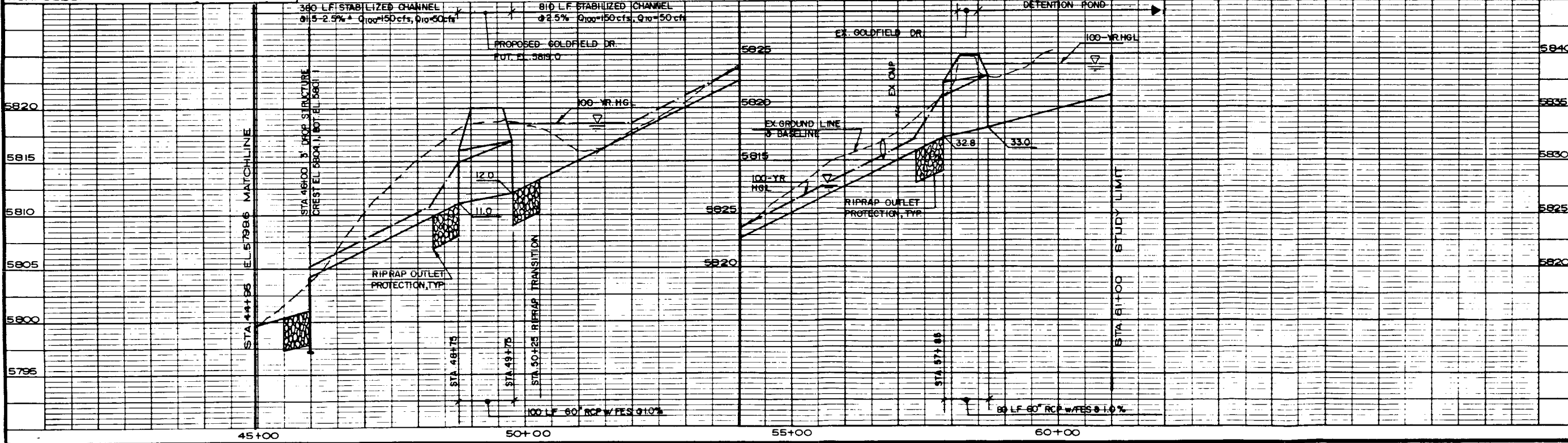
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Project No. 88.05.09
Date: 1/89
Design: RNW
Drawn: EAK
Check: TCF
Revisions:



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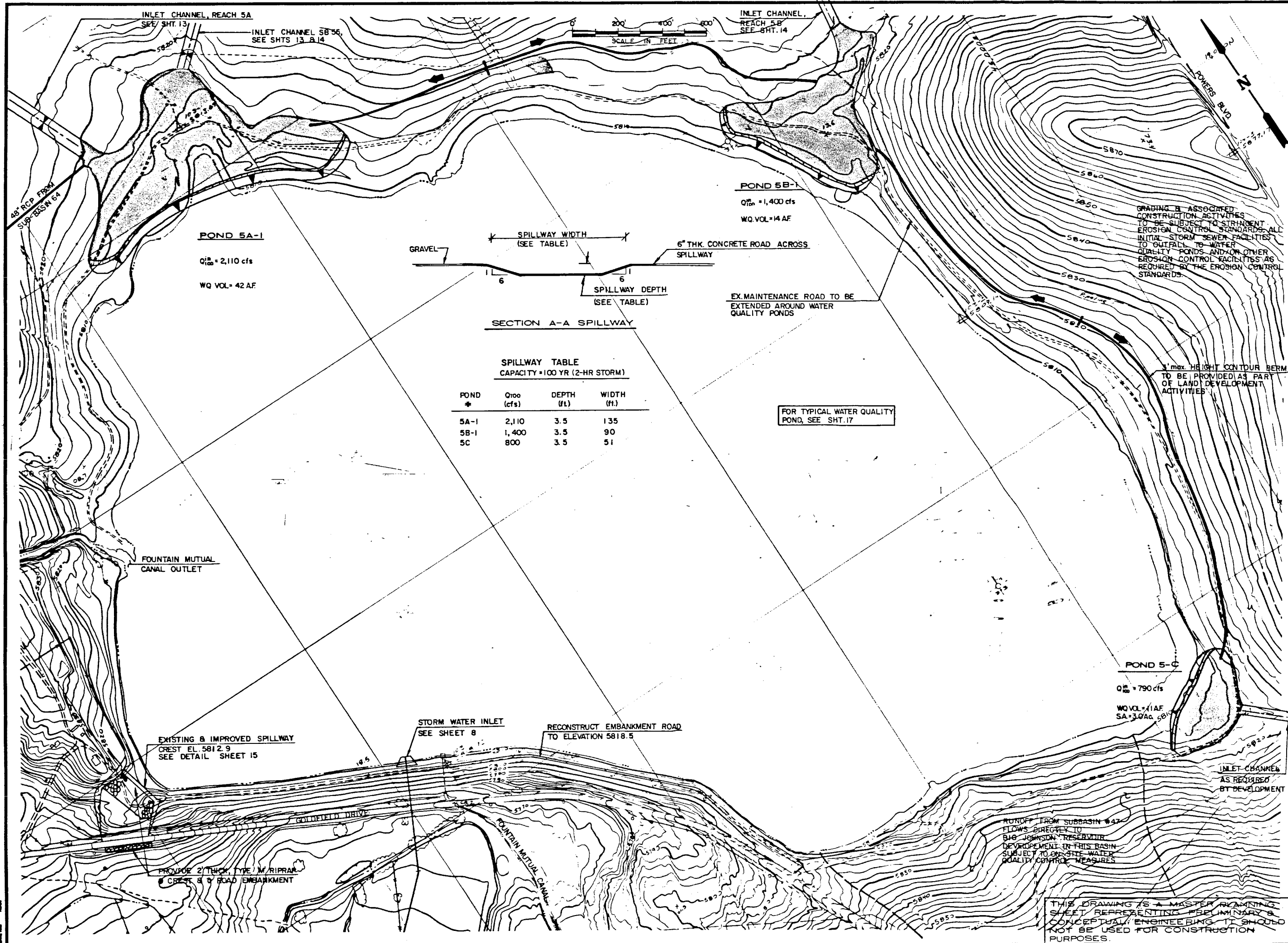
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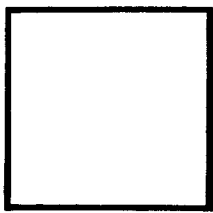
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Colorado Springs, Colorado
80905-1308

BIG JOHNSON RESERVOIR / CREWS GULCH
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FOUNTAIN MESA TRIBUTARY
STA 44+95 TO STA 61+00
PRELIMINARY DESIGN DRAWINGS

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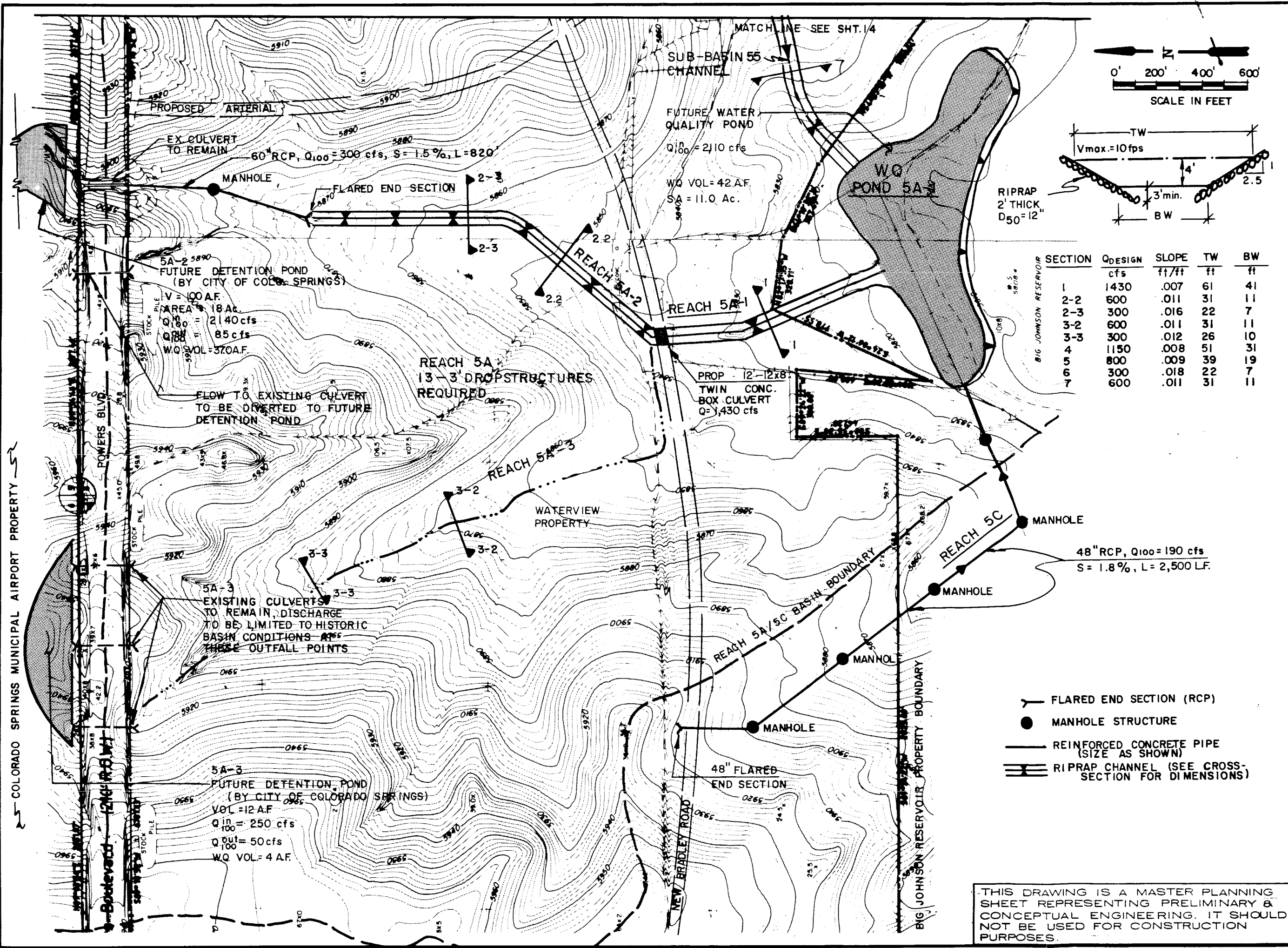


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Colorado Springs, Colorado
80905-1308



BIG JOHNSON RESERVOIR/CREWS GULCH
DRAINAGE BASIN PLANNING STUDY
BIG JOHNSON RESERVOIR

Project No. 88-05-09
Date: 1/89
Design: TCF
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Revisions:



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419 W. Bijou Street

Colorado Springs, Colorado

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BIG JOHNSON RESERVOIR / CREWS GULCH

DRAINAGE BASIN PLANNING STUDY

DRAINAGEWAYS 5A & 5B

Project No. 88.05.09

Date: 1/89

Design: TCF

Drawn: EAK

Check: RNW

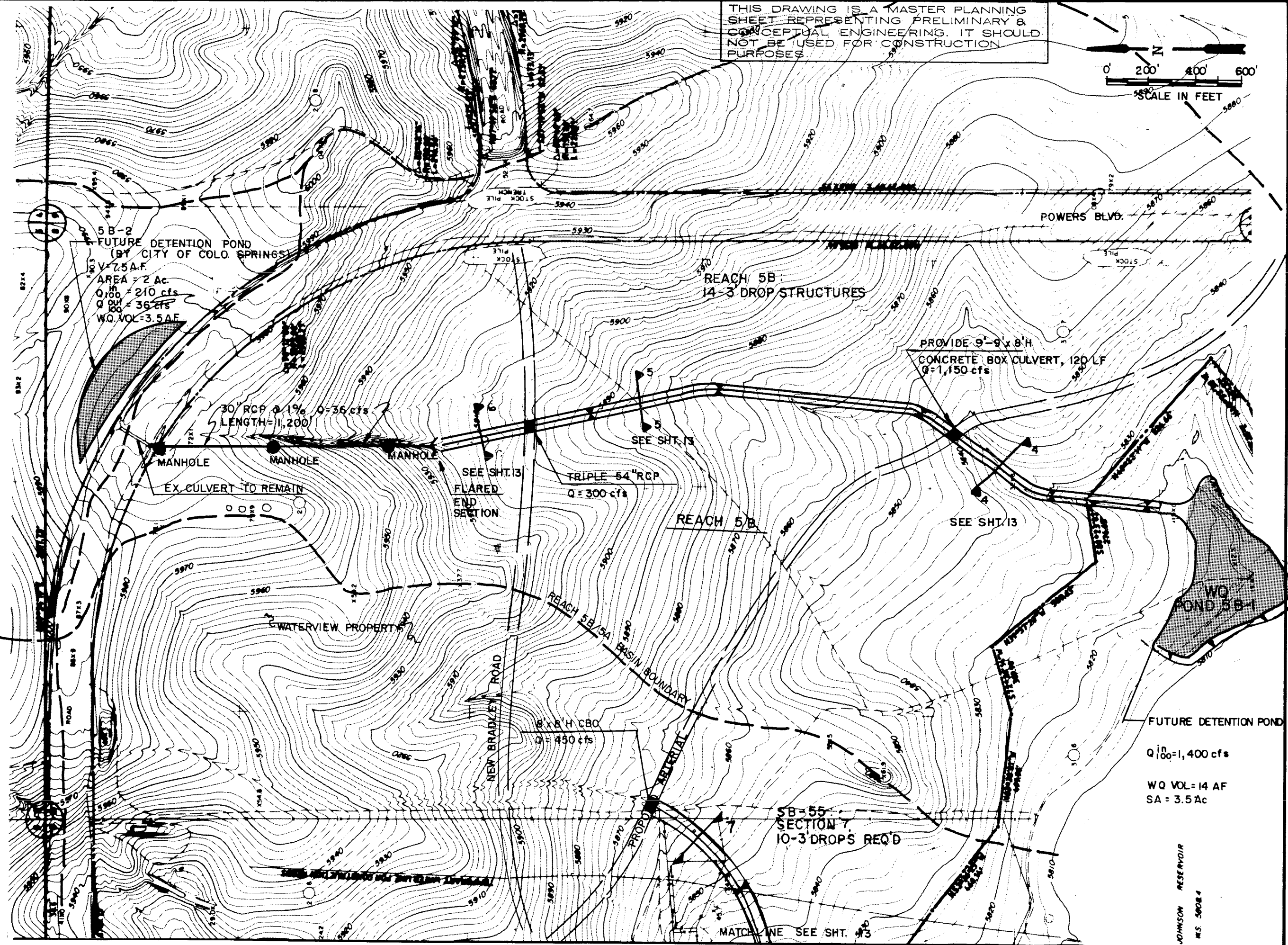
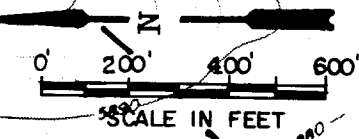
Revisions:

6/91 WQ PONDS

13

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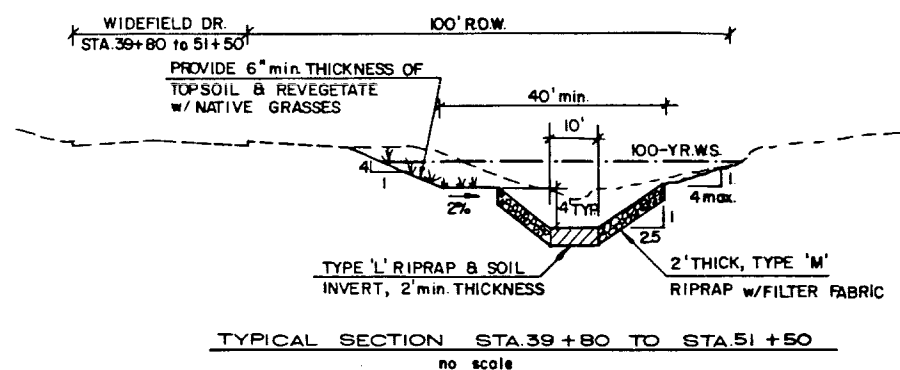
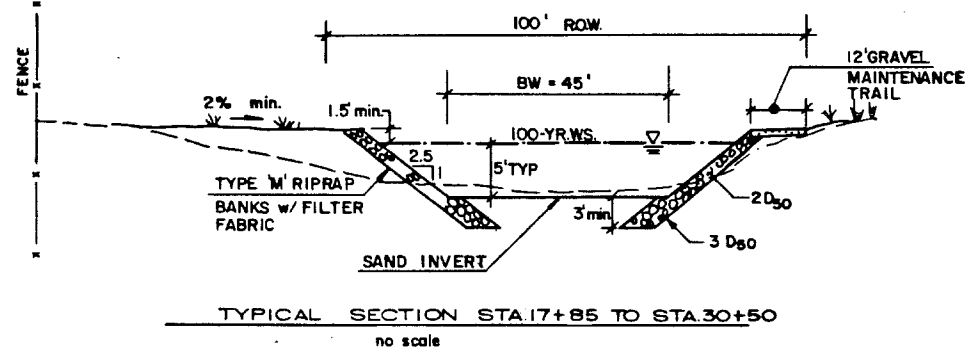
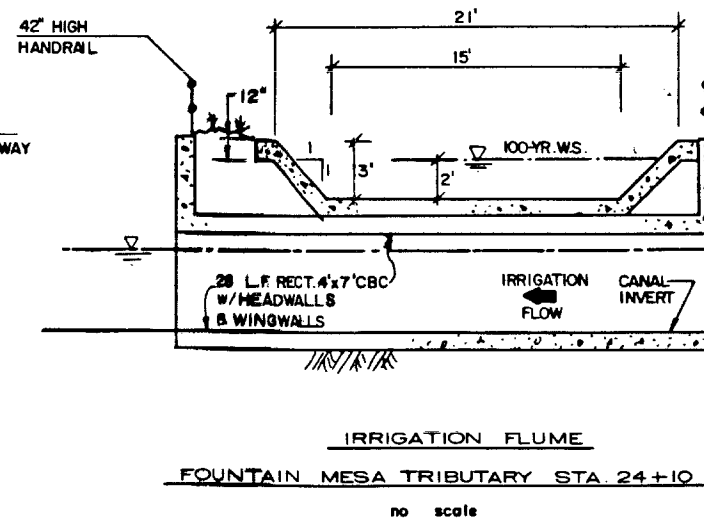
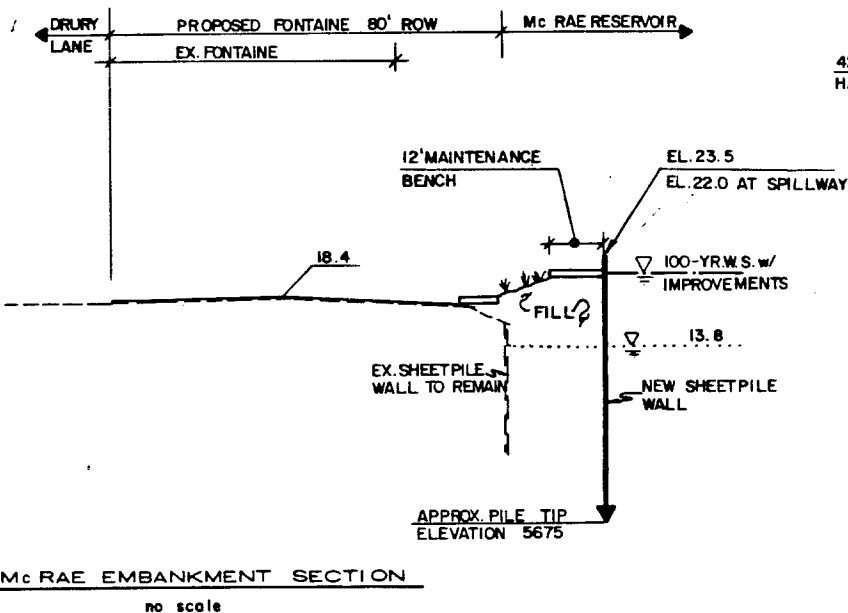
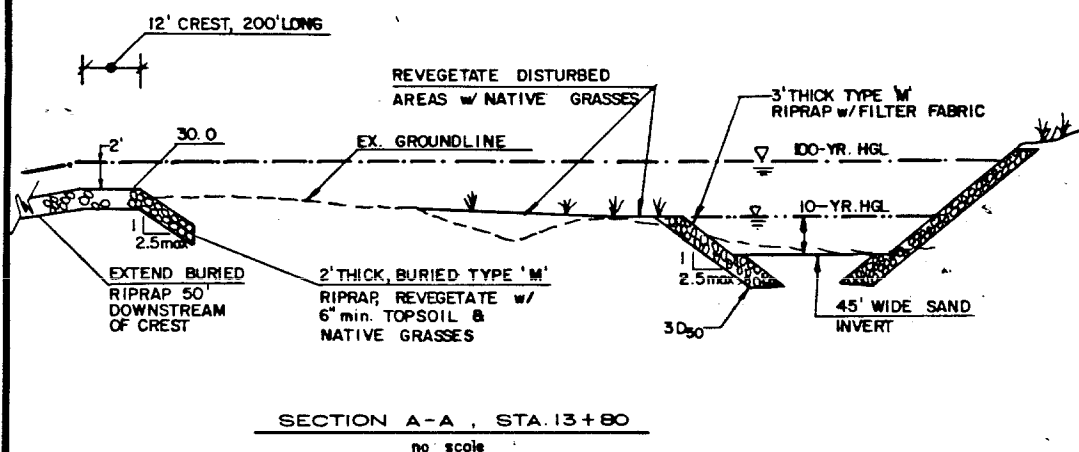
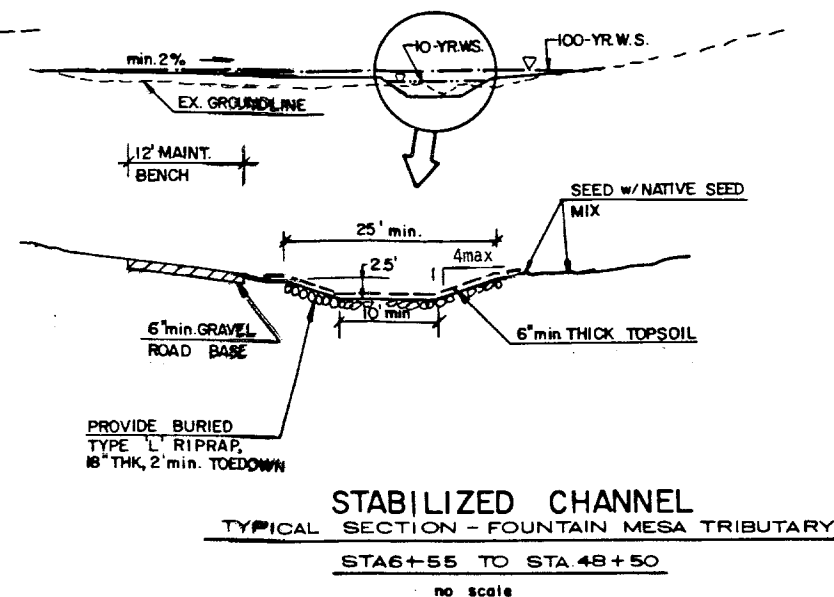
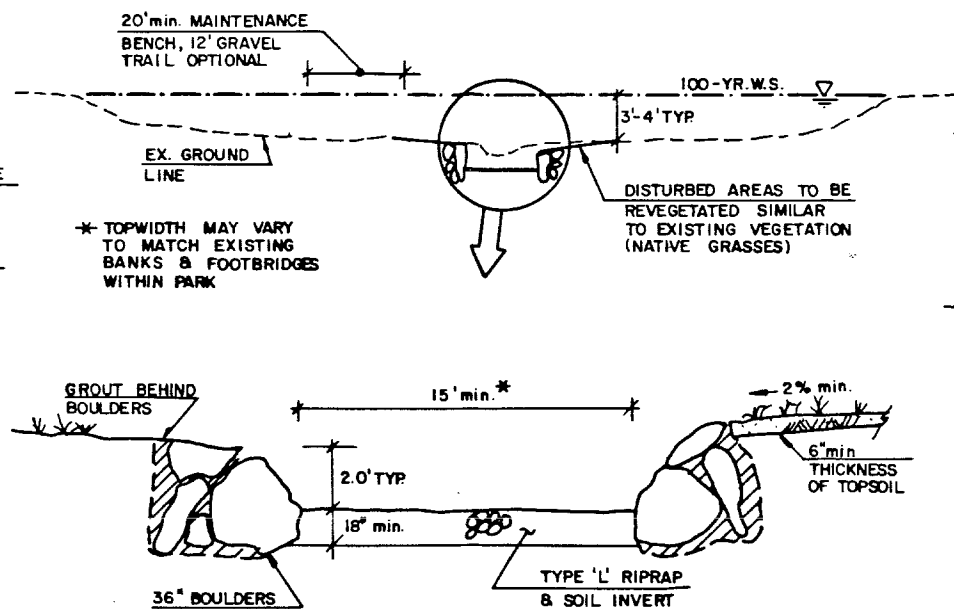
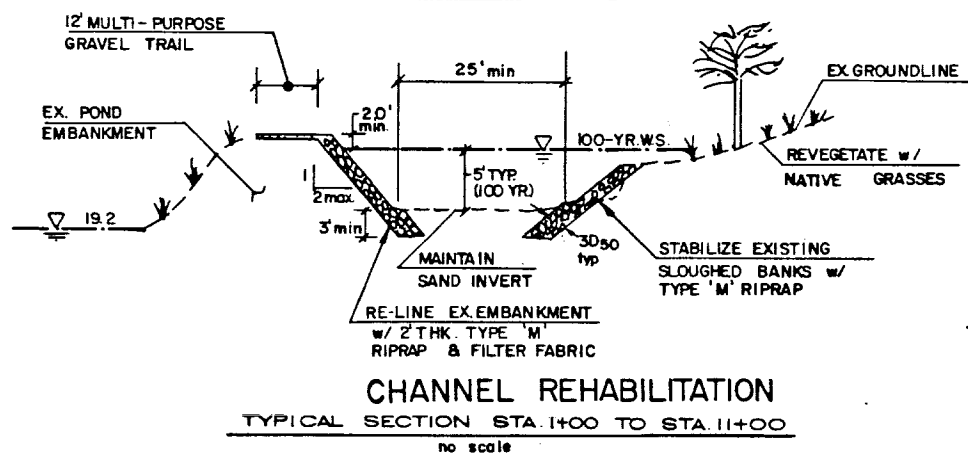


Kiowa Engineering Corporation
419 W. Bijou Street
Colorado Springs, Colorado
80905-1308

BIG JOHNSON RESERVOIR / CREWS GULCH
DRAINAGE BASIN PLANNING STUDY
DRAINAGEWAY 5B

Project No. 88.05.09
Date: 1/89
Design: TCF
Drawn: EAK
Check: RNW
Revisions:
6/91 WQ PONDS

FINAL DESIGN OF IMPROVEMENTS
WITHIN FOUNTAIN CREEK REGIONAL
PARK IS SUBJECT TO APPROVAL OF
EL PASO COUNTY PARKS DEPT.

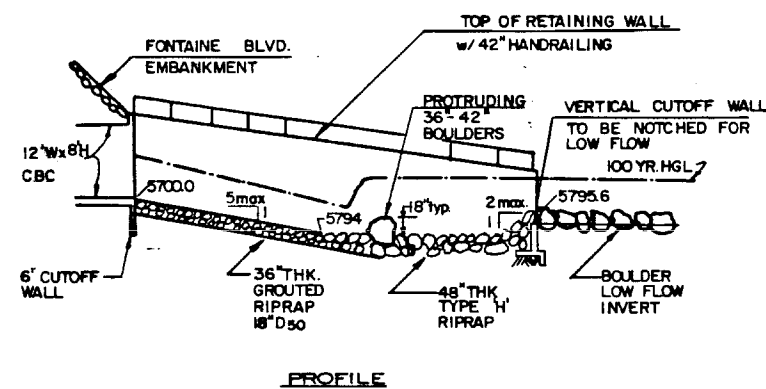
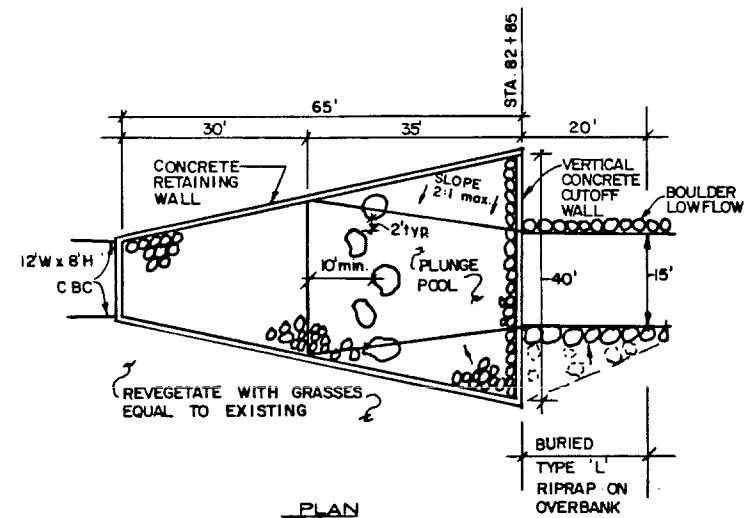


Kiowa Engineering Corporation
419 W. Bijou Street
Colorado Springs, Colorado
80905-1308

BIBIG JOHNSON RESERVOIR / CREWS GULCH
DRAINAGE BASIN PLANNING STUDY

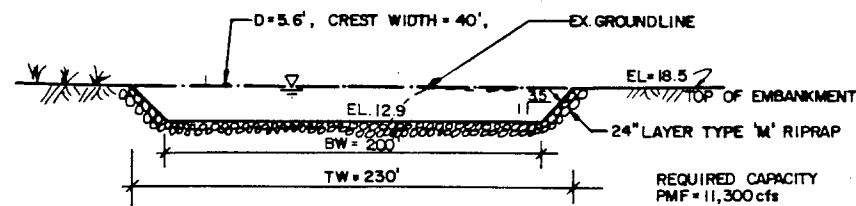
TYPICAL SECTIONS

Project No.	88.05.09
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Check:	
Reviewed:	

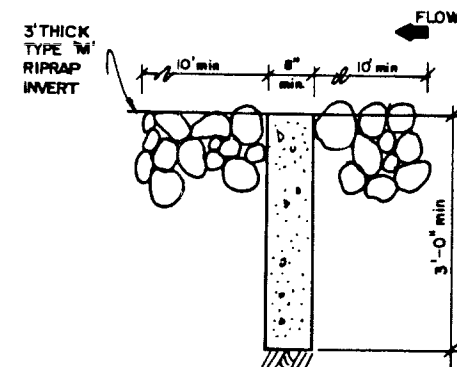
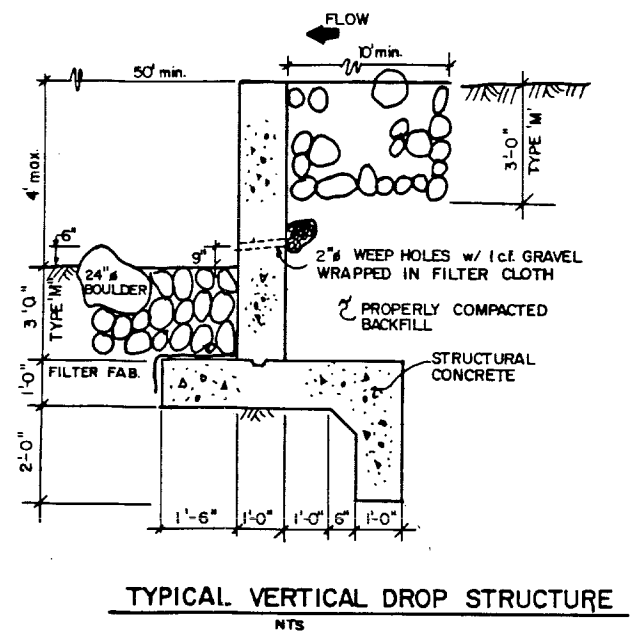
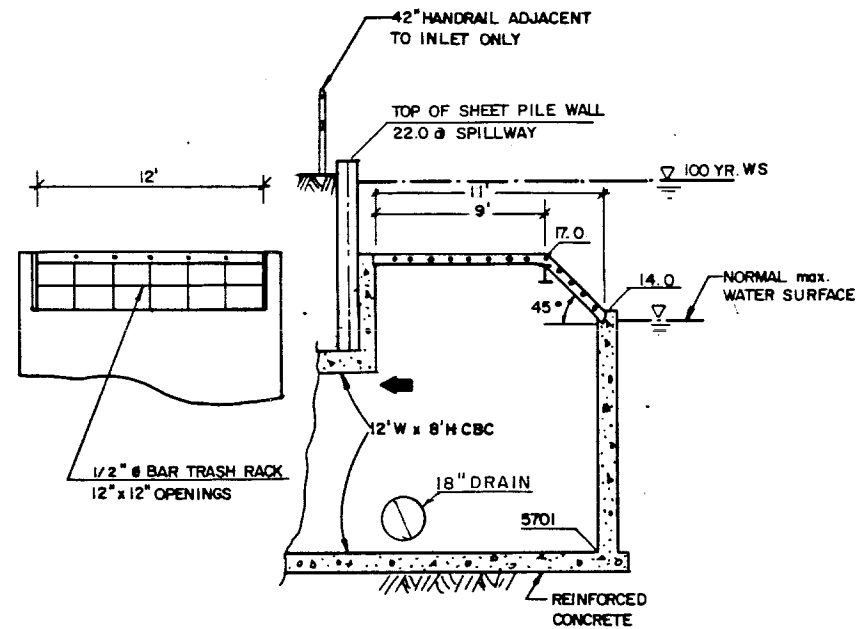


ROCK ENERGY DISSIPATOR STA. 82+85

no scale



no scale



Riprap Designation	3 Smaller Than Given Size By Weight	Intermediate Rock Dimension (Inches)	d ₅₀ (Inches)
Type L	70-100 50-70 35-50 2-10	15 12 9 3	9
Type M	70-100 50-70 35-50 2-10	21 18 12 4	12
Type H	100 50-70 35-50 2-10	30 24 18 6	18

RIPRAP GRADATIONS

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

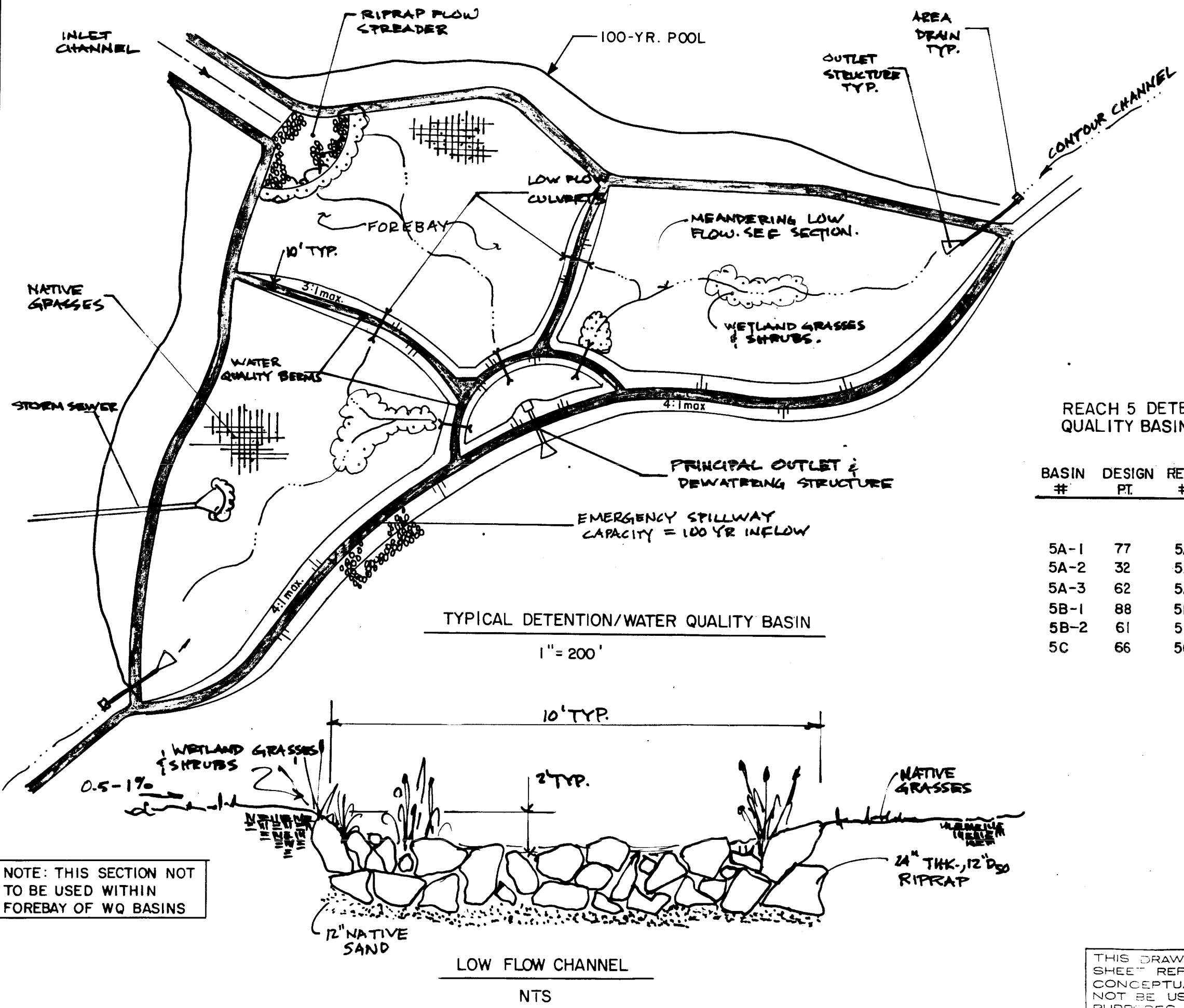
BIG JOHNSON RESERVOIR/CREWSGULCH
DRAINAGE BASIN PLANNING STUDY

MISCELLANEOUS DETAILS

Project No.	88.05.09
Date	1/89
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Drawn	EAK
Check	TCF
Revisions	

REACH 5 DETENTION & WATER
QUALITY BASIN DESIGN DATA

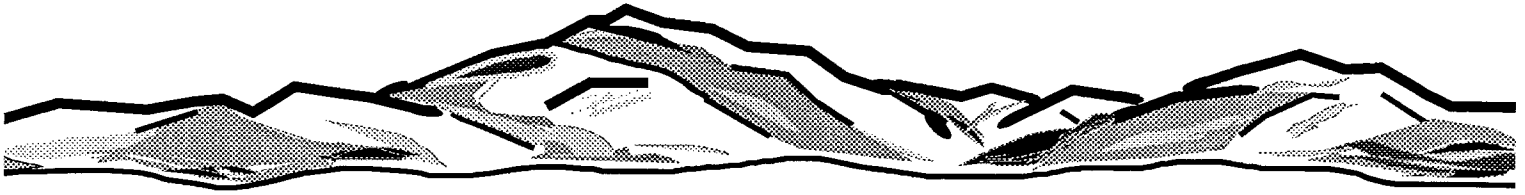
BASIN #	DESIGN PT.	REACH #	100-YR.VOL. (AF)	AREA (Ac.)	W.Q.VOL. (AF)
5A-1	77	5A	N/A	11.0	42
5A-2	32	5A	100	16.0	37
5A-3	62	5A	12	4.0	4
5B-1	88	5B	N/A	3.5	14
5B-2	61	5B	7.5	3.0	3.5
5C	66	5C	N/A	3.0	11



NOTE: THIS SECTION NOT
TO BE USED WITHIN
FOREBAY OF WQ BASINS

THIS DRAWING IS A MASTER PLANNING
SHEET REPRESENTING PRELIMINARY &
CONCEPTUAL ENGINEERING. IT SHOULD
NOT BE USED FOR CONSTRUCTION
PURPOSES.

El Paso County Planning Department



January 22, 1992

City of Colorado Springs
Planning Commission
P. O. Box 1575
Colorado Springs, Colorado 80901

Transmitted herewith is a copy of an amendment to the El Paso County Master Plan, consisting of the **Big Johnson Reservoir/Crews Gulch Drainage Basin Planning Study** and related documents.

In order for our office to verify your receipt, please sign both copies of the Receipt and return one of them to our office. You may retain the other as a cover letter for the attachments.

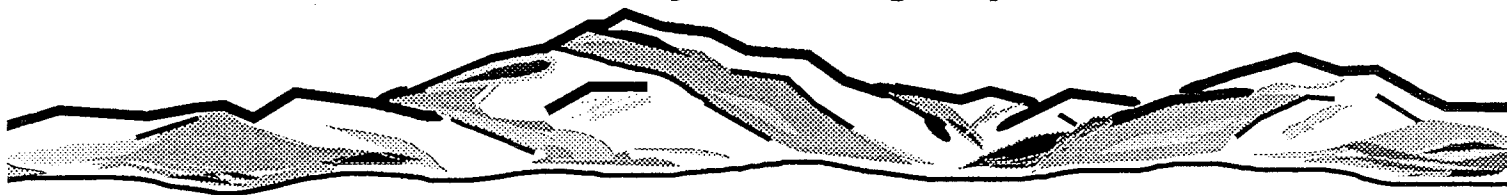
Should you have any questions or if I can be of further assistance, please contact our office at (719) 520-6300.

Sincerely,

Rick O'Connor
Principal Planner

Enclosures

El Paso County Planning Department



TO: City of Colorado Springs
Planning Commission
P. O. Box 1575
Colorado Springs, Colorado 80901

DATE: _____

This is to certify that the following items were received on the above-referenced date:

Amendment to the El Paso County Master Plan - Big Johnson Reservoir/Crews
Gulch Drainage Basin Planning Study
Resolution No. MP-91-003 dated July 16, 1991.

The enclosures pertain to the requirements set forth in Section 30-28-109, Colorado Revised Statutes, which state, in part:

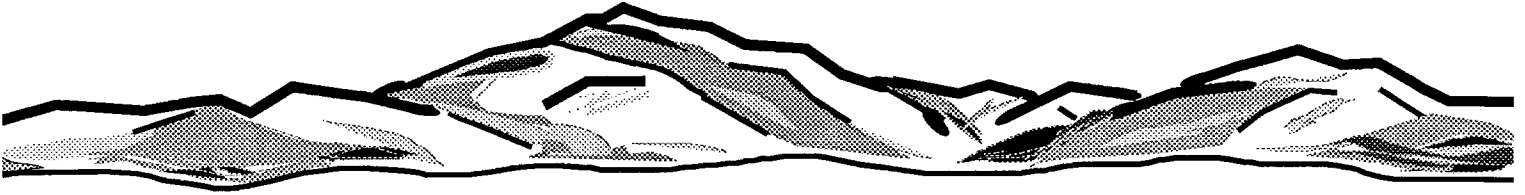
"The County Planning Commission shall certify a copy of its master plan, or any adopted part or amendment thereof or addition thereto, to the Board of County Commissioners of the County.

"The County or regional planning commission shall certify such copies to the planning commission of all municipalities within the County or region."



Signature of Recipient

El Paso County Planning Department



TO: City of Colorado Springs
Planning Commission
P. O. Box 1575
Colorado Springs, Colorado 80901

DATE: _____

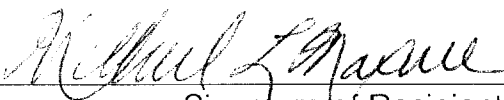
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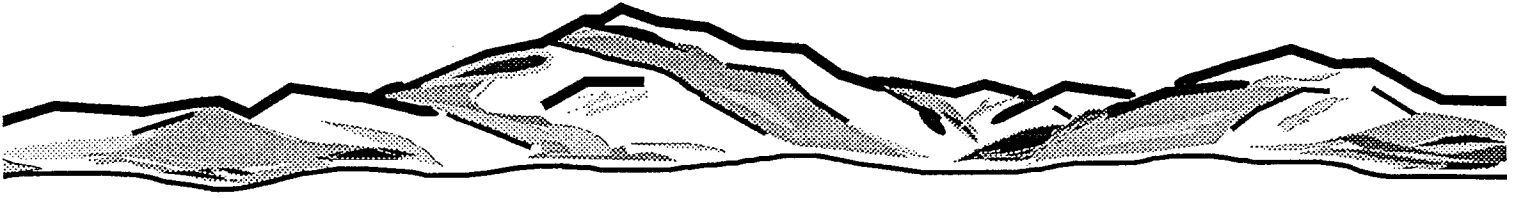
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"The County or regional planning commission shall certify such copies to the planning commission of all municipalities within the County or region."



Signature of Recipient

El Paso County Planning Department



I hereby certify that the enclosed **Big Johnson Reservoir/
Crews Gulch Drainage Basin Planning Study**, as well as
the descriptive materials, is a duly adopted amendment to
the County Master Plan of El Paso County, Colorado.

A handwritten signature in cursive script, appearing to read "Elaine Wilson".

Secretary to the El Paso County
Planning Commission

Approved

El Paso County

Planning Commission

AMENDMENT TO THE COUNTY PLAN (Approved)

1/4th of July 19 91

Commissioner Steele moved that the following Resolution be adopted:

Clare Nelson, Secretary

BEFORE THE PLANNING COMMISSION

OF THE COUNTY OF EL PASO

STATE OF COLORADO

RESOLUTION NO. MP-91-003



WHEREAS, the El Paso County Department of Public Works requests approval of and amendment to the Master Plan by adoption of the Big Johnson/Crews Gulch Drainage Basin Planning Study, within the designated areas of the unincorporated area of El Paso County; and

WHEREAS, a public hearing was held by this Commission on July 16, 1991; and

WHEREAS, based on the evidence, testimony, exhibits, study of the master plan for the unincorporated area of the county, comments of the El Paso County Planning Department, comments of public officials and agencies, and comments from all interested parties, this Commission finds as follows:

1. That proper ~~posting, publication and~~ public notice was provided as required by law for the hearing of the Planning Commission.

NOTE: The Planning Commission modified the foregoing Finding.

2. That the hearing before the Planning Commission was extensive and complete, that all pertinent facts, matters and issues were submitted and that all interested parties were heard at that meeting
3. That all data, surveys, analyses studies, plans, and designs as are required by the State of Colorado and El Paso County have been submitted, reviewed and found to meet all sound planning and engineering requirements of the El Paso County Subdivision Regulations.
4. That the proposal shall amend the Master Plan for El Paso County.

5. That for the above-stated and other reasons, the proposal is in the best interests of the health, safety, morals, convenience, order, prosperity and welfare of the citizens of El Paso Count .

WHEREAS, Section 30-28-108 C.R.S. provides that a county planning commission may adopt, amend, extend, or add to the County Master Plan.

NOW, THEREFORE, BE IT RESOLVED that the Amendment to the Master Plan for El Paso County be approved by the adoption of the Big Johnson/Crews Gulch Drainage Basin Planning Study for the following described unincorporated area of El Paso County :

Parts of: Sections 5, SW4 of Section 6, West2 of Section 9, Section 7, NW4 NW4 Section 16, North2 Section 20, North2 Section 19; All of Sections 8, 17, 18; all located within Township 15 South, Range 65 West; Part of Section 4, Section 24, NE4 Section 25, Township 15 South, Range 66 West of the 6th P.M., El Paso County, Colorado.

BE IT FURTHER RESOLVED that the following condition shall be placed upon this approval:

1. Section 30-28-109, C.R.S. requires the Planning Commission to certify a copy of the Master Plan, or any adopted part or amendment thereof or addition thereto, to the Board of County Commissioners and to the Planning Commission of all municipalities within the County. The Planning Commission's action to amend the Master Plan shall not be considered final until the applicant submits a minimum of ten (10) complete sets of the final documents and maps to the Planning Department and such documents and maps are certified by the Chairman of the Planning Commission and distributed as required by law.

Commissioner Smith seconded the adoption of the foregoing Resolution. The roll having been called, the vote was as follows:

Commissioner Shapiro	aye
Commissioner Lohse	aye
Commissioner Smith	aye
Commissioner Steele	aye
Commissioner Eskanos	aye
Commissioner Esmiol	aye
Commissioner Gilland	aye
Commissioner Breuning	aye

The Resolution was adopted by a unanimous vote of 8 to 0 by the Planning Commission of the County of El Paso, State of Colorado.

DATED: July 16, 1991.