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APPENDIX B Form 3: Hydrologic Analysis Data

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APPENDIX F

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Phase 1-B-1 (Academy Road) Storm Drain

1. Excerpts from Phase 1-B-1 (Academy) Storm Drain Design Report
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2. As-Built Figures for the Phase 1-B-1 Storm Drain and Desiltation Ponds

APPENDIX F: Section 1

Excerpts from Phase 1-B-1 (Academy) Storm Drain Design Report

FINAL
HIGH DESERT SUBDIVISION
ACADEMY STORM DRAIN
DESIGN REPORT

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I. INTRODUCTION

The purpose of this report is to provide the necessary hydrologic and hydraulic information for the design of the Academy Boulevard Storm Drain System within the High Desert Subdivision. This report is based on the final drainage report for the High Desert Subdivision entitled "High Desert Drainage Management Master Plan," December 1993, Bohannan-Huston Inc. In November 1993, Bohannan-Huston Inc. prepared the "High Desert Subdivision Drainage Issues - Letter of Understanding and Tract Development" to enable the City to, among other things, determine what drainage infrastructure needed to be in place prior to the development of each tract within the High Desert Subdivision. In that document the Academy Storm Drain System was referred to as the Bear Tributary Permanent Desiltation Ponds and Storm Drain. In accordance with that tract development plan the completion of the Academy Storm Drain marks the completion of all of the drainage infrastructure required for the Tract 11. Additionally, it completes all of the infrastructure required for the south half of Tracts 4, 9, and 15. (Please reference Plate 2 enclosed in the back pocket and the original "High Desert Subdivision Drainage Issues - Letter of Understanding and Tract Development" for additional information.)

The Academy Storm Drain System as defined in this report and accompanying design project is shown in Figure 1, page 2, and includes the following:

- Construction of storm drain along the north side of Academy Boulevard. The storm drain will run from the intersection of Tramway Boulevard and Academy Boulevard east approximately 2600'. At this point, the storm drain will split into two main lines. The first will continue east to the proposed North Bear Tributary Desiltation Pond while the second storm drain will run southeasterly to the proposed South Bear Tributary Desiltation Pond. This storm drain work includes connection to the existing 96" storm drain line at Tramway, connection to existing stub-outs

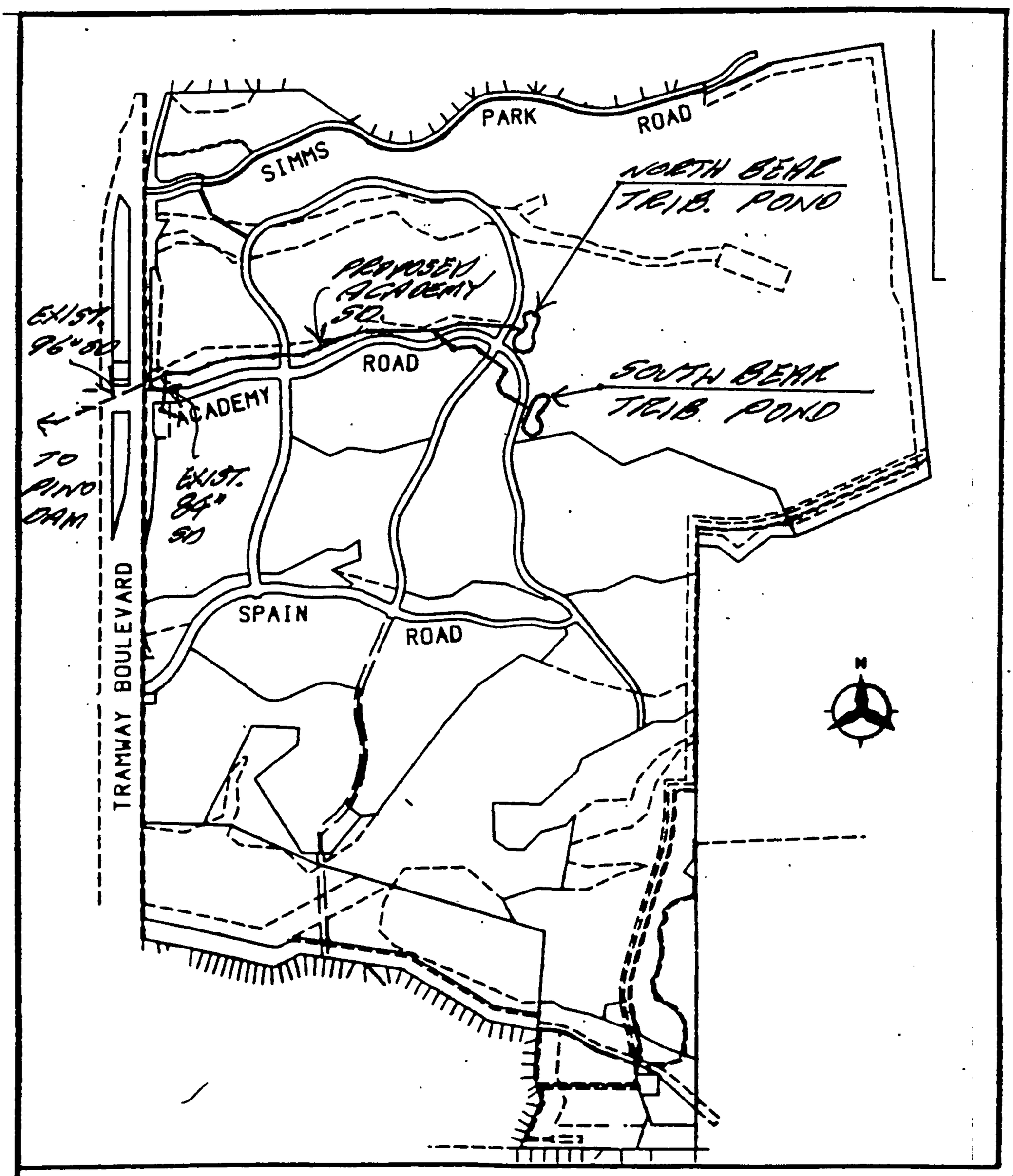


FIGURE 1 - VICINITY MAP

from the south along Academy Boulevard and stub-outs to the north for future development. Also, the two existing ponds at Tramway on the north and south sides will be filled in with provisions for local flows and stub-outs for future pipe-to-pipe connections.

- Construction of the permanent North Bear Desiltation Pond at the northeast corner of Academy Boulevard and Imperata Street.

- Construction of the permanent South Bear Desiltation Pond east of High Desert Street approximately 800' southeast of the intersection of Academy Boulevard and Imperata Street.

The key elements of this report include the following:

- Hydrological model of the two watersheds contributing to the Academy Storm Drain System. These watersheds are referenced in this report as the North and South Bear Tributary Arroyo Watersheds.

- Sediment analysis and design calculations for the North and South Tributary Desiltation Ponds.

- Hydraulic analysis of the proposed Academy Storm Drain System including the two permanent desiltation ponds.

II. HYDROLOGY

A. General

The hydrology presented in this report is taken from the "High Desert Drainage Management Plan," December 1993, BHI, and is based on the City of Albuquerque's

Development Process Manual (DPM), Chapter 22, as revised January 1993. This report has been approved by both the City of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA). For purposes of this study, only proposed development conditions are modeled. (Please reference the above report for existing conditions hydrologic information.) The hydrologic computer program (HYMO) as modified for the AMAFCA/Albuquerque region (AHYMO) was used for the determination of storm runoff volumes and flow rates.

B. Watersheds and Basins

Two watersheds, the North and South Bear Tributary Arroyo Watersheds, lie within or impact the High Desert site and contribute to the Academy Storm Drain System. The basins within these two watersheds, as used in this report, are the same as those identified by the "High Desert Drainage Management Master Plan" with the following exceptions:

- Basins NBT-1 and SBT-2 have been subdivided into basins NBT-1A and NBT-1B, and SBT-2A and SBT-2B, respectively. This modification was made to allow determination of runoff volumes and flow rates at each entry point to the two desiltation ponds. Land use values for each subdivided basin were assumed to be the same as the original single basins.

(Please refer to the watershed and basin map shown in Plate 1.)

Appendix A provides a summary of the basin land uses and time of concentration values as taken from the "High Desert Drainage Management Master Plan," with the above modifications to Basins NBT-1 and SBT-2. (See Table 1 for a summary of basin runoff flow rates.)

TABLE 1

BASIN HYDROLOGY SUMMARY
FULLY DEVELOPED CONDITIONS 100 YEAR STORM

BASIN NO.	BASIN ID	AREA (ACRES)	DISCHARGES TO	UNBULKED Q (cfs)	BULKED Q (cfs)
20	SBT-1	88.7	Basin 21A	243.1	267.4
21A	SBT-2A	16.6	South Bear Trib. Desiltation Pond - 84" SD	52.3	57.5
21B	SBT-2B	44.8	South Bear Trib. Desiltation Pond - 84" SD	141.0	155.1
22	SBT-3	23.7	Existing 42" SD	93.9	95.7
23	SBT-4	15.4	Proposed 36" SD/Existing 84" Culvert	64.7	66.0
24A	NBT-1A	13.4	North Bear Trib. Desiltation Pond - 48" SD	36.2	39.9
24B	NBT-1B	31.4	North Bear Trib. Desiltation Pond - 48" SD	82.0	90.2
25	NBT-2A	14.7	Existing 24" SD	41.9	45.2
26	NBT-2B	21.1	66" SD	88.1	89.8
27	NBT-3A	9.0	Existing 96" Culvert	26.6	28.5
28	NBT-3B	17.3	Existing 96" Culvert	72.6	74.1
29	NBT-4	1.9	Existing 96" Culvert	5.6	6.2

C. Rainfall

The Academy Storm Drain System is designed to convey the 100 -year, 24 hour storm event. Rainfall values for the two watersheds contributing to the Academy Storm Drain System were taken from isopluvials provided in the DPM as implemented in the "High Desert Drainage Management Master Plan." The rainfall values used in the AHYMO model for the 100-year, 24-hour storm event are as follows:

Rain One (1 hour - 100 year)	2.23 inches
Rain Six (6 hour - 100 year)	2.90 inches
Rain Day (24 hour - 100 year)	3.65 inches

To estimate more frequent storm events, such as the 2-year storm used to estimate average annual sediment loads, DPM Table A-3 "Return Period Factors" may be used. No area reduction factors were applied since the overall combined area of the watersheds, 0.47 square miles, is less than 5 square miles. Appendix B provides a summary of the AHYMO input and output files for:

- The 100-year storm - fully developed conditions with sediment bulking for storm drain design.

- The 100-year storm - fully developed conditions with sediment bulking and desiltation ponds for desiltation pond design.

- The 10-year storm - fully developed conditions with sediment bulking and desiltation ponds for desiltation pond design.

- The 2-year storm - fully developed conditions without sediment bulking for average annual sediment estimation.

Please refer to Section III for further information on desiltation pond design.

D. Sediment Bulking

Based on the "High Desert Drainage Management Master Plan," the following sediment bulking factors were used.

Land Use or Development Type	Bulking Factor
Undeveloped Areas and Estate Development	10%
Conventional Development	2%

Estate development, as used in this report, applies to the areas within Tract 15. Tract 15, which is commonly referred to as the "Highlands," is planned to have a density of 1 du/acre and no mass grading. The remainder of the basins contributing to the Academy Storm Drain System, those not within Tract 15, are considered conventional development, which includes mass grading and has densities ranging from 3 du to 5 du/acre. (Please refer to Plate 1 for Tract locations and the "High Desert Drainage Management Master Plan" for additional land use and sediment bulking information.)

III. DESILTATION POND DESIGN

A. General

As part of the Academy Storm Drain System two permanent desiltation ponds are required at the inlet of each branch of the storm drain system. These two ponds are referred to as the North and South Bear Tributary Desiltation Ponds. The North Bear Tributary Pond is located at the northwest corner of the intersection of Academy

Boulevard and Imperata Street. The South Bear Tributary Pond is located approximately 800' southeast of the north pond along the east side of High Desert Street. These ponds are designed to remove sediment prior to the introduction of runoff to the closed pipe portion of the storm drain system. The ponds have also been designed to minimize their visual impact within the development. The following sections provide the design criteria for the ponds and a summary of the design calculations. Complete calculations are provided in Appendices C and D.

B. Design Criteria

The North and South Bear Tributary Arroyo Desiltation Ponds were designed based on the following criteria:

- Minimum 2.5' freeboard from the 100-year fully developed conditions water surface to the top of the pond or berm.

- The inlet and outlet structures were designed to convey the 100-year fully developed conditions storm with a minimum freeboard of 2'.

- Minimum sediment storage volume equal to 5 times the average annual sediment volume plus the 100-year sediment volume. The 2-year storm is considered equivalent to the average annual storm events. The average annual sediment volume was based on average bulking factor applied to the 2-year runoff volume. The average bulking factor was taken from the "High Desert Prudent Line Study."

- The pond configuration and settling pool dimensions were sized for the worst case of either the 2-year storm event with 100% of very fine sand (0.06 millimeters particle size) being trapped or the 10-year storm with 100% of fine sand (0.075 millimeters particle size) being trapped. This is

equivalent to 100% of the total sediment load for the 10-year storm event. (Please reference Appendix C for a copy of the sieve analysis results for test holes upstream of the ponds.)

C. Summary of Hydrologic and Sediment Design Calculations

For each pond the flow entering the pond is divided among two existing swales and thus enters the pond from two distinct locations. Consequently, there are also two inlet drop structures associated with each pond. A summary of the flow rates and volumes entering each pond for the 2-year and 100-year storms is as follows:

North Bear Tributary Pond

Storm Event	North Inlet	South Inlet
2-year Peak Discharge*	5.0 cfs	11.4 cfs
2-year Volume*	0.182 ac-ft.	0.424 ac-ft.
100-year Peak Discharge**	39.9 cfs	90.2 cfs
100-year Volume**	1.330 ac-ft.	3.104 ac-ft.

South Bear Tributary Pond

Storm Event	North Inlet	South Inlet
2-year Peak Discharge*	35.2 cfs	29.9 cfs
2-year Volume*	1.486 ac-ft.	1.099 ac-ft.
100-year Peak Discharge**	313.6 cfs	155.1 cfs
100-year Volume**	10.977 ac-ft.	5.480 ac-ft.

*Clear water

**Bulked water

Based on these flow rates and average sediment bulking factors developed in the Prudent Line Study, the total sediment storage volume was calculated. The

average annual sediment bulking factor for the North and South Bear Tributary Arroyos, upstream of the proposed ponds, was estimated at 3.71% in the Prudent Line Study. This value was multiplied by the clear water (no sediment bulking) runoff volumes generated for the 2-year storm from the AHYMO model, resulting in the average annual sediment yield. These resulting average annual sediment volumes are summarized below. (See Appendix C for detailed calculations.)

North Bear Tributary Pond

	Average Annual Sediment
North Inlet	0.0068 ac-ft.
South Inlet	0.0158 ac-ft.
Total	0.0226 ac-ft.
5x Avg. Annual	0.113 ac-ft.

South Bear Tributary Pond

	Average Annual Sediment
North Inlet	0.0552 ac-ft.
South Inlet	0.0408 ac-ft.
Total	0.0960 ac-ft.
5 x Avg. Annual	0.480 ac-ft.

The 100-year storm sediment load was estimated through the use of sediment bulking internal to the AHYMO model. As noted previously, a conservative bulking factor of 10% was used. The ponds were sized using the Route Reservoir command within AHYMO by subtracting 5 times the average annual sediment volume from the actual pond storage volume and then routing the 100-year bulked flow through the pond. (See Appendix B for AHYMO input and output listings.)

IV. STORM DRAIN DESIGN

A. General

The Academy Storm Drain System represents the second of three major storm drain trunks planned for the High Desert Subdivision. The first trunk along Spain Road is currently under construction and will be completed in the fall of 1994. As previously noted, the Academy Storm Drain will run from the outlet of each desiltation pond to a point of confluence approximately 2600' east of Tramway Boulevard. From this point a single storm drain will continue downstream to the west to its terminus at the point of connection with the existing 96" storm drain at the northeast corner of the intersection of Tramway Boulevard and Academy Boulevard. The construction of the Academy Storm Drain along with the construction of the North and South Bear Tributary Desiltation ponds, will complete the drainage infrastructure for the Bear Tributary Arroyo Watersheds.

B. Design Criteria

The design of the storm drain system included in this report is based on the preliminary storm drain design provided in the "High Desert Drainage Management Plan," December 1993, BHI. The two primary design criteria for the storm drain are as follows:

- Position the storm drain vertically and horizontally to allow for future water-harvesting system to the north in Tracts 4 and 9. (See Plate 1 for Tract locations.)

- Utilize pipe sizes and slopes from the "High Desert Drainage Management Plan" to obtain non-pressure flow conditions wherever possible to provide an additional factor of safety in the storm drain design.

Based on the first criteria, enabling water-harvesting for the Bear Tributary Dry Arroyo, the storm drain line is required to have approximately 10'-13' of cover. The above normal depth of the main is necessary to enable the crossing of the dry arroyo with small storm drain laterals as part of the water harvesting system. It should be noted that no reduction in flow rates has been credited for any water-harvesting. The design flow rates represent the total fully developed 100-year runoff flow rate.

C. Design Summary

In Appendix E, a copy of the design spreadsheet used to set the profile grades to enable future water-harvesting to north is provided. This spreadsheet checks the storm drain horizontal and vertical locations with respect to the back of curb along the north side of Academy and the flowline elevation of the existing Bear Tributary Arroyo at projected future water-harvesting locations. The spreadsheet then provides minimum offset locations from the back of curb to insure OSHA trenching requirements are met and it provides minimum storm drain invert elevations to insure future water-harvesting is possible. (Please reference Appendix E for specific invert and offset distances at key stations along the storm drain.)

As previously noted, the storm drain sizes were obtained from the second criteria above. A summary of the design flow rates at key analysis points and the corresponding minimum downstream non-pressure flow pipe capacity is shown in Table 2 below. Table 2 shows that storm drain has been designed in accordance with the above criteria, with the exception of flow downstream of the South Bear Tributary Desiltation Pond (AP19). Additionally, the connection to the existing storm drain at Tramway Boulevard for a short reach non-pressure flow will exist. However, as can be seen in Plate 3 - Academy Storm Drain Plan and Profile Sheets, for both of these reaches, where the flow is under pressure, the HGL is below finished grade. (Please refer to Appendix F for copies of the HGL spreadsheet calculations for each reach of pipe that is under pressure flow conditions.)

V. CONCLUSION

From this report, the following conclusions can be drawn.

- With the construction of the Academy Storm Drain all of the drainage infrastructure for the Bear Tributary Arroyo will be completed. This in turn will satisfy the drainage infrastructure requirements for Tract 11 and the south half of Tracts 4, 9, and 15.

- The storm drain system has been designed to safely convey the 100-year storm, with an additional factor of safety being gained by designing the majority of the storm drain lines to function under non-pressure flow conditions.

- The permanent North and South Bear Tributary Arroyo Desiltation Ponds are designed to capture 100% of the all sediment equal to or larger in size than very fine sand for the 2-year storm and 100% of fine sand (or 80% of all sediment) for the 10-year storm. The ponds are also designed to safely convey the 100-year storm into the storm drain system, while maintaining a minimum freeboard of 2.5'.

Finally, the design criteria and calculations provided herein support the infrastructure design for the Academy Storm Drain Project.

TABLE 2
STORM DRAIN HYDRAULICS

ANALYSIS POINT	CONTRIB. BASINS	COMBINED Q (100) (cfs)	STORM DRAIN SIZE	MIN. PIPE SLOPE (%)	STORM DRAIN CAPACITY *	COMMENTS
AP18	20	268	N/A	N/A	N/A	Flow from basin 20.
AP19	21	465	84"	1.73	840	Flow in storm drain below South Bear Trib. Desiltation Pond
AP20	24	130	48"	1.38	169	Flow in storm drain below North Bear Trib. Desiltation Pond
AP20A	20,21,24	590	66"	4.5	712	Total flow in storm drain at confluence of storm drains from pond #'s 3 & 4.
AP21	20-22,24-26	798	78"	3.4	967	Total flow in storm drain at Academy and Cordateria.
AP22	21-29	957	Ex. 96" Culvert	1.94	** 1269	Total flow at Tramway. Pipe to pipe connection required.

*Capacity based on Manning's Equation for non-pressure full pipe conditions - n=0.014.
**n=0.013

```
*NOINPUT
*NOOUTPUT
LAND FACTORS                TYPE=1
                            TREATMENT A IA=0.65    INF=1.67
                            TREATMENT B IA=0.50    INF=1.25
                            TREATMENT C IA=0.35    INF=0.83
                            TREATMENT D IA=0.10    INF=0.04
*               HIGH DESERT SUBDIVISION ACADEMY STORM DRAIN
*                         FINAL HYDROLOGY MODEL
*                           INPUT=ACADSD.HYM
*                        PROPOSED CONDTIONS MODEL
*                            100-YEAR STORM
*                         NO DESILTATION PONDS
*                       SEDIMENT BULKING INCLUDED
*****************************************************************
*
*  PINO DAM - CONTRIBUTING WATERSHEDS
*    1. SOUTH BEAR TRIBUTARY ARROYO
*    2. NORTH BEAR TRIBUTARY ARROYO
*    3. SOUTH PINO TRIBUTARY ARROYO (NOT INCLUDED IN THIS MODEL)
*    4. PINO ARROYO (NOT INCLUDED IN THIS MODEL)
*
*****************************************************************
*
*   THE PURPOSE OF THIS HYMO RUN IS TO EVALUATE THE TRAMWAY
*   HYDROLOGY BASED ON THE LATEST VERSION OF THE DPM SECTION
*   22.2, DATED JANUARY 1993.
*
*
*****************************************************************
*
SUMMARY                     1
*
*
RAINFALL                    TYPE=1    RAIN QUARTER=0.0      RAIN ONE=2.23
                            RAIN SIX=2.90     RAIN DAY=3.65     DT=0.033333
*
*****************************
* BEGIN PINO DAM WATERSHEDS *
*****************************
*
*
*****************************************
* SOUTH AND NORTH BEAR TRIBUTRAY ARROYOS *
*****************************************
*
*
*       BASIN SBT-1 (BASIN 20)
SEDIMENT BULK                TYPE=1  BULKING FACTOR=1.10
* 50% OF BASIN NO DEVELOPMENT - BULKING FACTOR OF 10%
* 50% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
*
COMPUTE NM HYD              ID=1          HYD=SBT1    DA=.1386 SQ MI
                            PER A=53.38    PER B=27.73    PER C=8.83   PER D=10.06
                            TP=-.145      MASS RAIN=-1.0
*
**********************
* TOTAL FLOW AT AP18 *
**********************
*
PRINT HYD                    ID=1           CODE=10
*
*****************************************************************
* ROUTE 15
```

FULLY DEVELOPED CONDITIONS

NO DESILTATION PONDS

```
COMPUTE RATING CURVE  RC=1        VS NO=1      NSEGS=1
                      ELMIN=6152               MAX ELEV=6160
                      CH SLP=.039              FP SLOPE=.039
                      N =.034      DIST=92
                      DIST    ELEV    DIST     ELEV    DIST    ELEV
                      0.      6160    20       6158    30      6152
                      65      6152    72       6158    92      6160
*
COMPUTE TRAVEL TIME   ID=2        REACH=1      NO VS=1
                      L=1250      SLP=.039
ROUTE                 ID=2        HYD=RSBT1  INFLOW ID=1  DT=0.03333
PRINT HYD             ID=2        CODE=10
*
**************************************************************
*
*       BASIN SBT-2A  (BASIN 21A)
*
SEDIMENT BULK           TYPE=1  BULKING FACTOR=1.1
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD        ID=3          HYD=SBT2A    DA=.026 SQ MI
                      PER A=60.03   PER B=6.45 PER C=7.23    PER D=26.29
                      TP=-.1333     MASS RAIN=-1.0
*
PRINT HYD             ID=3          CODE=10
*
*       BASIN SBT-2B  (BASIN 21B)
*
SEDIMENT BULK           TYPE=1  BULKING FACTOR=1.1
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD        ID=4          HYD=SBT2B    DA=.070 SQ MI
                      PER A=60.03   PER B=6.45 PER C=7.23    PER D=26.29
                      TP=-.1333     MASS RAIN=-1.0
*
PRINT HYD             ID=4          CODE=10
*
* COMBINE BASINS SBT-1A AND SBT-2A
ADD HYD               ID=3          HYD=PONDINA
                      ID=2          ID=3
PRINT HYD             ID=3          CODE=10
*
ADD HYD               ID=4          HYD=AP19
                      ID=4          ID=3
*
**********************
* TOTAL FLOW AT AP19 *
**********************
*
PRINT HYD             ID=4          CODE=10
*
**************************************************************************
* ROUTE 16
* ROUTE FLOW FROM AP19 THROUGH BASIN SBT-3 TO AP20A
* 66" SD                                  (#22)
*
COMPUTE RATING CURVE  ID=1          VS NO=1  NSEGS=-1
                      SLP=.035      DIA=66   N=.014
COMPUTE TRAVEL TIME   ID=5          VS NO=1  REACH NO=1
                      L=1230        SLP=0.035
ROUTE                 ID=5          HYD=RAP19   INFLOW ID=4   DT=0.03333
PRINT HYD             ID=5          CODE=10
*
**************************************************************************
*

*
```

N NE (BASIN 24A)

```
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.10
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD         ID=6       HYD=NBT1A     DA=.021 SQ MI
                       PER A=81.44 PER B=0     PER C=4.43    PER D=14.13
                       TP=-.133    MASS RAIN=-1
PRINT HYD              ID=6           CODE=5
*
*
*       BASIN NBT-1B (BASIN 24B)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.10
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD         ID=7       HYD=NBT1B     DA=.049 SQ MI
                       PER A=81.44 PER B=0     PER C=4.43    PER D=14.13
                       TP=-.138    MASS RAIN=-1
PRINT HYD              ID=7           CODE=5
*
ADD HYD                ID=6         HYD=AP20
                       ID=7         ID=6
*
**********************
* TOTAL FLOW AT AP20 *
**********************
PRINT HYD              ID=6           CODE=5
*
*************************************************************************
* ROUTE 16A
* ROUTE FLOW FROM AP20 THROUGH BASIN NBT-2A TO AP20A
* 42" SD
*
COMPUTE RATING CURVE   ID=1         VS NO=1   NSEGS=-1
                       SLP=.0413    DIA=42    N=.014
COMPUTE TRAVEL TIME    ID=7         VS NO=1   REACH NO=1
                       L=600        SLP=0.0413
ROUTE                  ID=7         HYD=RAP19    INFLOW ID=6    DT=0.03333
PRINT HYD              ID=7         CODE=10
*
*************************************************************************
*
ADD HYD                ID=7         HYD=AP20A
                       ID=7         ID=5
*
************************
* TOTAL FLOW AT AP20A *
************************
*
PRINT HYD              ID=7         CODE=10
*
*************************************************************************
* ROUTE 17
* ROUTE FLOW FROM AP20A THROUGH BASIN NBT-2A TO AP21
* 66" SD
*
COMPUTE RATING CURVE   ID=1         VS NO=1   NSEGS=-1
                       SLP=.046     DIA=66    N=.014
COMPUTE TRAVEL TIME    ID=8         VS NO=1   REACH NO=1
                       L=1792       SLP=.046
ROUTE                  ID=8         HYD=RAP20    INFLOW ID=7     DT=0.03333
PRINT HYD              ID=8         CODE=10
*
*************************************************************************

*
*
```

```
                                                    (BASIN 25)
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.08
* 80% OF BASIN OPEN SPACE NO DEVELOPMENT - BULKING FACTOR 10%
* 20% OF BASIN ROADWAY - BULKING FACTOR 0%
COMPUTE NM HYD       ID=9       HYD=NBT2A     DA=.023SQ MI
                     PER A=75   PER B=5        PER C=0       PER D=20
                     TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD            ID=9           CODE=10
*
ADD HYD              ID=10        HYD=NBT2A+
                     ID=8         ID=9
PRINT HYD            ID=10        CODE=10
*
*
*       BASIN NBT-2B (BASIN 26)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.02
* 100% OF BASIN CONVENTIONAL TYPE DEVELOPMENT - BULKING FACTOR 2%
COMPUTE NM HYD       ID=1       HYD=NBT2B     DA=.033 SQ MI
                     PER A=0    PER B=36.14    PER C=12.14   PER D=47.58
                     TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD            ID=1           CODE=10
*
ADD HYD              ID=2         HYD=NBT2B+
                     ID=1         ID=10
PRINT HYD            ID=2         CODE=10
*
*
*       BASIN SBT-3 (BASIN 22)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.02
* 100% OF BASIN CONVENTIONAL TYPE DEVELOPMENT - BULKING FACTOR 2%
COMPUTE NM HYD       ID=3       HYD=SBT3       DA=.037SQ MI
                     PER A=0    PER B=48.68      PER C=9.46    PER D=41.86
                     TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD            ID=3           CODE=10
*
*
ADD HYD              ID=4         HYD=AP21
                     ID=2         ID=3
*
**********************
* TOTAL FLOW AT AP21 *
**********************
*
PRINT HYD            ID=4         CODE=10
*
*
*************************************************************************
* ROUTE 18
* ROUTE FLOW FROM AP21 THROUGH BASIN NBT-3A TO AP22
* 72" SD
*
COMPUTE RATING CURVE  ID=1        VS NO=1   NSEGS=-1
                      SLP=.0377   DIA=78    N=.014
COMPUTE TRAVEL TIME   ID=5        VS NO=1   REACH NO=1
                      L=1226.26    SLP=.0377
ROUTE                 ID=5        HYD=RAP21    INFLOW ID=4     DT=0.03333

PRINT HYD             ID=5        CODE=10
*
*       BASIN SBT-4 (BASIN 23)
```

```
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.02
* 100% OF BASIN CONVENTIONAL TYPE DEVELOPMENT - BULKING FACTOR 2%
COMPUTE NM HYD      ID=6       HYD=SBT4       DA=.024 SQ MI
                    PER A=0    PER B=36.30    PER C=12.10   PER D=51.60
                    TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD           ID=6           CODE=10
*
*
**********************************************************************
* ROUTE 18A
* ROUTE FLOW FROM BASIN SBT-4 THROUGH 84" PIPE FROM SOUTH SIDE OF
* ACADEMY TO NORTH SIDE TO AP22
* 84" SD
*
COMPUTE RATING CURVE  ID=1        VS NO=1  NSEGS=-1
                      SLP=.01985 DIA=84    N=.013
COMPUTE TRAVEL TIME   ID=1        VS NO=1  REACH NO=1
                      L=202       SLP=.01985
ROUTE                 ID=1        HYD=RSBT4    INFLOW ID=6     DT=0.03333
PRINT HYD             ID=1        CODE=10
*
**********************************************************************
*
ADD HYD               ID=7        HYD=WYE
                      ID=1        ID=5
PRINT HYD             ID=7          CODE=10
*
*
*       BASIN NBT-4 (BASIN 29)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.10
* 100% OF BASIN LANDSCAPED DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD      ID=8       HYD=NBT4     DA=.003 SQ MI
                    PER A=0    PER B=100   PER C=0 PER D=0
                    TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD           ID=8           CODE=10
*
*
*       BASIN NBT-3A (BASIN 27)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.075
* 75% OF BASIN OPEN SPACE NO DEVELOPMENT - BULKING FACTOR 10%
* 25% OF BASIN ROADWAY - BULKING FACTOR 0%
COMPUTE NM HYD      ID=9       HYD=NBT3A     DA=.014 SQ MI
                    PER A=75   PER B=0       PER C=0       PER D=25
                    TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD           ID=9           CODE=10
*
ADD HYD             ID=10        HYD=NBT3A&4
                    ID=8         ID=9
PRINT HYD           ID=10         CODE=10
*
ADD HYD             ID=11        HYD=BEEHIVE
                    ID=7         ID=10
PRINT HYD           ID=11        CODE=10
*
*       BASIN NBT-3B (BASIN 28)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.02
* 100% OF BASIN CONVENTIONAL TYPE DEVELOPMENT - BULKING FACTOR 2%
COMPUTE NM HYD      ID=12      HYD=NBT3B     DA=.027SQ MI
```

```
                    PER       PI    36.      PER       .20      D=5
                    TP=-.1333     MASS RAIN=-1.0
*
PRINT HYD           ID=12         CODE=10
*
ADD HYD             ID=13         HYD=AP22
                    ID=11         ID=12
*
*
**********************
* TOTAL FLOW AT AP22 *
**********************
*
PRINT HYD           ID=13         CODE=10
FINISH
```

1

OUTPUT FOR 100 YR FULLY DEVELOPED CONDITION NO DESILTATION PONDS

HYMO SUMMARY TABLE

0 DESCRIPTION	HYDROGRAPH LABEL	FROM ID NO	TO ID NO	AREA SQ MI	DISCHARGE CFS	CURVE NO	TIME TO PEAK HR	CFS PER ACRE
HYDROGRAPH AT	SBT1	1	-	0.1386	267.4	NA	1.53	3.01
ROUTED		1	2					
	SBT1	1		0.1386	267.4		1.53	
	RSBT1	2		0.1386	261.5		1.57	
HYDROGRAPH AT	SBT2A	3	-	0.0260	57.5	NA	1.50	3.46
HYDROGRAPH AT	SBT2B	4	-	0.0700	155.1	NA	1.50	3.46
COMBINED FLOW AT	PONDINA	2& 3	3	0.1646	313.6		1.53	
COMBINED FLOW AT	AP19	4& 3	4	0.2346	464.3		1.53	
ROUTED 66"		4	5					
	AP19	4		0.2346	464.3		1.53	
	RAP19	5		0.2346	459.7		1.53	
HYDROGRAPH AT	NBT1A	6	-	0.0210	39.9	NA	1.50	2.97
HYDROGRAPH AT	NBT1B	7	-	0.0490	90.2	NA	1.50	2.88
COMBINED FLOW AT	AP20	7& 6	6	0.0700	130.1		1.50	
ROUTED 42"		6	7					
	AP20	6		0.0700	130.1		1.50	
	RAP19	7		0.0700	129.9		1.53	
COMBINED FLOW AT	AP20A	7& 5	7	0.3046	589.6		1.53	
ROUTED 66"		7	8					
	AP20A	7		0.3046	589.6		1.53	
	RAP20	8		0.3046	585.6		1.57	
HYDROGRAPH AT	NBT2A	9	-	0.0230	45.2	NA	1.50	3.07
COMBINED FLOW AT	NBT2A+	8& 9	10	0.3276	625.4		1.57	
HYDROGRAPH AT	NBT2B	1	-	0.0330	89.8	NA	1.50	4.25
COMBINED FLOW AT	NBT2B+	1&10	2	0.3606	705.4		1.53	
HYDROGRAPH AT	SBT3	3	-	0.0370	95.7	NA	1.50	4.04
COMBINED FLOW AT	AP21	2& 3	4	0.3976	797.5		1.53	
ROUTED 78"		4	5					
	AP21	4		0.3976	797.5		1.53	
	RAP21	5		0.3976	793.2		1.57	
HYDROGRAPH AT	SBT4	6	-	0.0240	66.0	NA	1.50	4.30
ROUTED 84"		6	1					
	SBT4	6		0.0240	66.0		1.50	
	RSBT4	1		0.0240	65.8		1.50	
COMBINED FLOW AT	WYE	1& 5	7	0.4216	851.9		1.53	
HYDROGRAPH AT	NBT4	8	-	0.0030	6.2	NA	1.50	3.22
HYDROGRAPH AT	NBT3A	9	-	0.0140	28.5	NA	1.50	3.19
COMBINED FLOW AT	NBT3A&4	8& 9	10	0.0170	34.7		1.50	
COMBINED FLOW AT	BEEHIVE	7&10	11	0.4386	885.7		1.53	
HYDROGRAPH AT	NBT3B	12	-	0.0270	74.1	NA	1.50	4.29
COMBINED FLOW AT	AP22	11&12	13	0.4656	956.8		1.53	

```
*NOINP
*NOOUTPUT
LAND FACTORS              TYPE=1
                          TREATMENT A IA=0.65    INF=1.67
                          TREATMENT B IA=0.50    INF=1.25
                          TREATMENT C IA=0.35    INF=0.83
                          TREATMENT D IA=0.10    INF=0.04
*
*               HIGH DESERT SUBDIVISION ACADEMY STORM DRAIN
*                         FINAL HYDROLOGY MODEL
*                 (INCLUDES NBT & SBT DESILTATION PONDS)
*                        INPUT=ACADSD_POND.HYM
*                      PROPOSED CONDTIONS MODEL
*                          100-YEAR STORM
*                     SEDIMENT BULKING INCLUDED
**************************************************************************
*
*  PINO DAM - CONTRIBUTING WATERSHEDS
*    1. SOUTH BEAR TRIBUTARY ARROYO
*    2. NORTH BEAR TRIBUTARY ARROYO
*    3. SOUTH PINO TRIBUTARY ARROYO (NOT INCLUDED IN THIS MODEL)
*    4. PINO ARROYO (NOT INCLUDED IN THIS MODEL)
*
**************************************************************************
*
*   THE PURPOSE OF THIS HYMO RUN IS TO EVALUATE THE TRAMWAY
*   HYDROLOGY BASED ON THE LATEST VERSION OF THE DPM SECTION
*   22.2, DATED JANUARY 1993.
*
*
**************************************************************************
*
SUMMARY                1
*
*
*****************************************
* SOUTH AND NORTH BEAR TRIBUTRAY ARROYOS *
*****************************************
*
*
*       BASIN SBT-1 (BASIN 20)
*
RAINFALL               TYPE=1   RAIN QUARTER=0.0   RAIN ONE=2.23
                       RAIN SIX=2.90  RAIN DAY=3.65  DT=0.033333
*
SEDIMENT BULK            TYPE=1  BULKING FACTOR=1.1
* 50% OF BASIN NO DEVELOPMENT - BULKING FACTOR OF 10%
* 50% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
*
COMPUTE NM HYD         ID=1         HYD=SBT1    DA=.1386 SQ MI
                       PER A=53.38    PER B=27.73    PER C=8.83   PER D=10.06
                       TP=-.145     MASS RAIN=-1.0
*
***********************
* TOTAL FLOW AT AP18 *
***********************
*
PRINT HYD               ID=1          CODE=10
*
**************************************************************
* ROUTE 15
*    ROUTE BASIN SBT-1 THROUGH BASIN SBT-2A TO AP 19
COMPUTE RATING CURVE   RC=1       VS NO=1      NSEGS=1
                       ELMIN=6152              MAX ELEV=6160
```

FULLY DEVELOPED CONDITIONS

WITH DESILTATION PONDS

```
                    CHP=.0        FHPE=
                    N =.034      DIST=92
                    DIST    ELEV    DIST    ELEV    DIST    ELEV
                    0.      6160    20      6158    30      6152
                    65      6152    72      6158    92      6160
*
COMPUTE TRAVEL TIME  ID=2      REACH=1     NO VS=1
                     L=1250    SLP=.039
ROUTE                ID=2      HYD=RSBT1   INFLOW ID=1   DT=0.03333
PRINT HYD            ID=2      CODE=10
*
**********************************************************************
*
*       BASIN SBT-2A (21A)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.1
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD       ID=3        HYD=SBT2A    DA=.026 SQ MI
                     PER A=60.03  PER B=6.45 PER C=7.23    PER D=26.29
                     TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD            ID=3         CODE=10
*
*       BASIN SBT-2B (21B)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.1
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD       ID=4        HYD=SBT2B    DA=.070 SQ MI
                     PER A=60.03  PER B=6.45 PER C=7.23    PER D=26.29
                     TP=-.1333    MASS RAIN=-1.0
*
PRINT HYD            ID=4         CODE=10
*
* COMBINE BASINS SBT-1A AND SBT-2A (21A + 21B)
ADD HYD              ID=3        HYD=PONDINA
                     ID=2        ID=3
PRINT HYD            ID=3        CODE=10
*
ADD HYD              ID=4        HYD=AP19
                     ID=4        ID=3
*
**********************
* TOTAL FLOW AT AP19 *
**********************
*
PRINT HYD            ID=4        CODE=10
*
* FINAL POND VOLUME REVISED 8/17/94      S. Bear Trib. Desiltation Pond
* 84" DIA OUTLET PIPE
ROUTE RESERVOIR      ID=14       HYD=SBTPONDOUT    INFLOW ID=4   CODE=10
                     OUTFLOW(CFS)     STORAGE(AC FT)    ELEV(FT)
                       0.0              0.0               6139.0
                      28.0              0.113             6140.0
                      54.0              0.752             6141.0
                      90.0              1.439             6142.0
                     148.0              2.173             6143.0
                     216.0              2.954             6144.0
          21B ->     280.0              3.783             6145.0
                     349.0              4.658             6146.0
                     400.0              5.443             6147.0
                     640.0              6.553             6148.0
**********************************************************************
PRINT HYD            ID=14       CODE=10
* ROUTE 16

* ROUTE FLOW FROM AP19 THROUGH BASIN SBT-3 TO AP20A
```

```
*
COMPUTE RATING CURVE  ID=1        VS NO=1   NSEGS=-1
                      SLP=.035    DIA=66    N=.014
COMPUTE TRAVEL TIME   ID=5        VS NO=1   REACH NO=1
                      L=1230      SLP=0.035
ROUTE                 ID=5        HYD=RAP19    INFLOW ID=14    DT=0.03333
PRINT HYD             ID=5        CODE=10
*
**************************************************************************
*
*
*       BASIN NBT-1A (2-1A)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.10
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD       ID=6      HYD=NBT1A     DA=.021 SQ MI
                     PER A=81.44 PER B=0     PER C=4.43    PER D=14.13
                     TP=-.133    MASS RAIN=-1
PRINT HYD            ID=6          CODE=5
*
*
*       BASIN NBT-1B (2-1B)
*
SEDIMENT BULK          TYPE=1  BULKING FACTOR=1.10
* 100% OF BASIN ESTATE TYPE DEVELOPMENT - BULKING FACTOR 10%
COMPUTE NM HYD       ID=7      HYD=NBT1B     DA=.049 SQ MI
                     PER A=81.44 PER B=0     PER C=4.43    PER D=14.13
                     TP=-.138    MASS RAIN=-1
PRINT HYD            ID=7          CODE=5
*
ADD HYD              ID=6        HYD=AP20
                     ID=7        ID=6
*
**********************
* TOTAL FLOW AT AP20 *
**********************
PRINT HYD            ID=6          CODE=5
*
* 48" DIA OUTLET PIPE (W/CONCRETE HEADWALL)        N. Bear Trib. Desiltation Pond
ROUTE RESERVOIR      ID=14       HYD=NBTPONDOUT    INFLOW ID=6    CODE=5
                     OUTFLOW(CFS)      STORAGE(AC FT)     ELEV(FT)
                       0                   0                6139.0
                      10.5                 0.123            6140.0
                      28.0                 0.392            6141.0
                      53.0                 0.694            6142.0
                      80.0                 1.029            6143.0
                     101.0                 1.396            6144.0
                     121.0                 1.797            6145.0
                     138.0                 2.231            6146.0
**************************************************************************
PRINT HYD            ID=14         CODE=5
FINISH
```

HYMO SUMMARY TABLE

0 DESCRIPTION	HYDROGRAPH LABEL	FROM ID NO	TO ID NO	AREA SQ MI	DISCHARGE CFS	CURVE NO	TIME TO PEAK HR	CFS PER ACRE
HYDROGRAPH AT	SBT1	1	-	0.1386	267.4	NA	1.53	3.01
ROUTED		1	2					
	SBT1	1		0.1386	267.4		1.53	
	RSBT1	2		0.1386	261.5		1.57	
HYDROGRAPH AT	SBT2A	3	-	0.0260	57.5	NA	1.50	3.46
HYDROGRAPH AT	SBT2B	4	-	0.0700	155.1	NA	1.50	3.46
COMBINED FLOW AT	PONDINA	2& 3	3	0.1646	313.6		1.53	
COMBINED FLOW AT	AP19	4& 3	4	0.2346	464.3		1.53	
RESERVOIR HYD	SBTPONDO	4	14	0.2346	313.8		1.67	
ROUTED 66"		14	5					
	SBTPONDO	14		0.2346	313.8		1.67	
	RAP19	5		0.2346	313.4		1.67	
HYDROGRAPH AT	NBT1A	6	-	0.0210	39.9	NA	1.50	2.97
HYDROGRAPH AT	NBT1B	7	-	0.0490	90.2	NA	1.50	2.88
COMBINED FLOW AT	AP20	7& 6	6	0.0700	130.1		1.50	
RESERVOIR HYD	NBTPONDO	6	14	0.0700	87.5		1.63	

COMP FOR:
- 100 YR STORM
- FULLY DEVELOPED CONDITIONS
- WITH DETENTION PONDS

SOUTH GEAR TRIBUTARY POND - SEDIMENT VOLUME

1. DETERMINE AVERAGE ANNUAL SEDIMENT

From AHYMO:

2 Yr Clear Water Volumes

North Swale 1.486 ac-ft

South Swale 1.099 ac-ft

From the "High Desert Prudent Line Study" the average annual sediment building factor is 3.71 % (See Sheets 2-4 Following)

∴ The average annual sediment volumes are:

North Swale (1.486)(0.0371) = 0.0551 ac-ft

South Swale (1.099)(0.0371) = 0.0407 ac-ft

NORTH GEAR TRIB. POND - SEDIMENT VOLUME

1. DETERMINE AVERAGE ANNUAL SEDIMENT

From AHYMO

2 Year Clear Water Volumes:

North Swale: 0.182 ac-ft

South Swale: 0.424 ac-ft

⇒ Average Annual Sediment Volume:

North Swale (0.182)(0.0371) = 0.0068 ac-ft

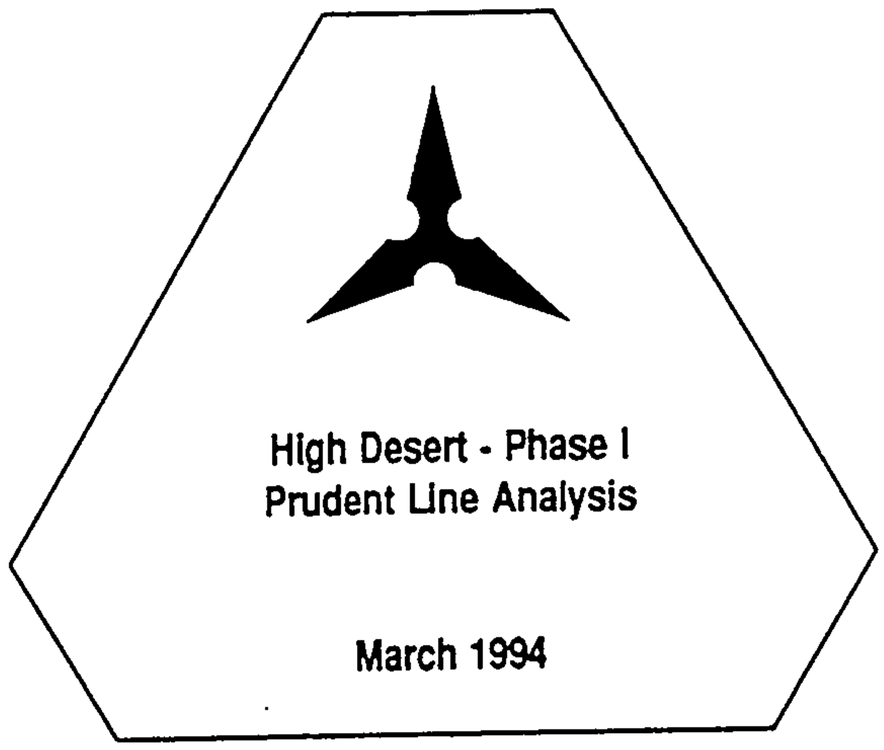
South Swale (0.424)(0.0371) = 0.0158 ac-ft

BOHANNAN-HUSTON INC.

PROJECT NAME ACCIDENT STORM DRAIN SHEET 1 OF 4

PROJECT NO. 9215.20 BY CWH DATE 9/26/94

SUBJECT DESILTATION POND CALCS CH'D _____ DATE _____



HIGH DESERT - PHASE I
PRUDENT LINE ANALYSIS

Prepared for:

High Desert Investment Corporation
6400 Wyoming Boulevard, NE
Albuquerque, NM 87109

Prepared by:

BOHANNAN-HUSTON INC.
ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS SURVEYORS
COURTYARD I, 7500 JEFFERSON NE ALBUQUERQUE, NM 87109 TEL (505) 823-1000 FAX (505) 821-0892

SHT 1 of 14

```
AP...K PROGRAM (HYMO93)  AMA...R VERSION OF HYMO - SEPTEMBER, 1993
        RUN DATE (MON/DAY/YR) = 02/16/1994
        START TIME (HR:MIN:SEC) = 08:51:04      USER NO.= M_CONNOL.S93
        INPUT FILE = spt_p1.hym

*SOUTH PINO TRIBUTARY @ THE TRAINING DIKE input=spt_p1 PHASE1 REACHES
*SEDIMENT TRANSPORT ANALYSIS - 100 YEAR DISCAHRGE
RECALL HYD          ID=10  HYD= AP23       DT= 0.033330 HRS DA=   0.733 SQ MI
                    PEAK=  1206.CFS   RO=     2.46       NO PTS=213
                    FLOW RATES
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      1.      8.     35.    107.
                       253.    496.    779.   1015.   1162.   1206.   1167.
                      1085.    974.    861.    755.    657.    573.    501.
                       438.    384.    341.    304.    270.    239.    211.
                       187.    166.    150.    135.    122.    112.    102.
                        93.     85.     79.     73.     67.     62.     58.
                        53.     49.     45.     42.     39.     36.     34.
                        31.     29.     27.     26.     24.     23.     21.
                        20.     19.     17.     16.     15.     15.     14.
                        13.     12.     11.     11.     10.     10.      9.
                         8.      8.      7.      7.      7.      6.      6.
                         6.      5.      5.      5.      4.      4.      4.
                         4.      4.      3.      3.      3.      3.      2.
                         2.      2.      2.      2.      2.      2.      2.
                         1.      1.      1.      1.      1.      1.      1.
                         1.      1.      1.      1.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.      0.      0.      0.      0.
                         0.      0.      0.
*CROSS SECTION 34+00 FROM SPT.HEC
SEDIMENT TRANS      ID=10 IDS=2  CODE=10
                    A FACT=0.00000173 B EXP=5.81
                    C EXP=-0.65 D EXP=-2.02   NUMBER WASH=1
                    WAS CONC=50000
                    NUMBER SECTIONS=6
                    FLOW          VELOCITY      WIDTH
                    (CFS)         (FEET/SEC)    (FT)
                     140           4.71          61.53
                     435           5.66         119.80
                     602           6.10         130.26
                     854           6.56         144.03
                    1033           6.83         152.53
                    1208           7.04         160.38

  * * * * * * * * * * * * * * * * *

    TIME    WATER FLOW   VELOCITY   HYD. DEPTH   WIDTH   WASHLOAD CONC.   BED MAT. TRANSPORT   BED CONC.   TOTAL CONC.   BULKING FACTOR   ACCUM. SEDIMENT
    (HRS)   (CFS)        (FT/SEC)   (FT)         (FT)    (PPM-W)          (CFS)                (PPM-W)     (PPM-W)                        (TONS)

    .000        .00        .000       .000        .00     50000.             .00                  0.        50000.          1.0000             .00
    .333        .00        .000       .000        .00     50000.             .00                  0.        50000.          1.0000             .00
    .667        .00        .000       .000        .00     50000.             .00                  0.        50000.          1.0000             .00
```

2.000	270.00	5.316	.582	87.21	50000.	3.91	[illegible].	149.	.0039	11.80	[illegible]
[illegible]333	93.00	4.593	.465	43.52	50000.	.97	[illegible]2.	83388.	1.0343	5127.63	
[illegible]666	42.00	4.242	.413	23.97	50000.	.36	22339.	74194.	1.0302	5606.74	
3.000	21.00	3.787	.348	15.92	50000.	.14	17222.	70183.	1.0285	5785.75	
3.333	11.00	3.264	.279	12.09	50000.	.05	12237.	65556.	1.0265	5864.84	
3.666	6.00	2.744	.215	10.18	50000.	.02	8195.	61050.	1.0245	5903.35	
4.000	4.00	2.408	.177	9.41	50000.	.01	6050.	57399.	1.0230	5922.98	
4.333	2.00	1.888	.123	8.64	50000.	.00	3437.	55462.	1.0222	5933.47	
4.666	1.00	1.457	.083	8.26	50000.	.00	1880.	53103.	1.0212	5938.57	
								51697.	1.0206	5941.04	

AT PEAK FLOW OF 1206.000 WITH TIME AT 1.57 HOURS: BEDMAT = 962.71 (TONS) = .4420 (AC-FT bulked)
TOTAL SED = 1960.09 (TONS) = .8999 (AC-FT bulked)
PEAK BULKING FACTOR = 1.040342 = 96582. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3174.79	.8815	1.4577	50000.	
BEDMAT =	2766.86	.7682	1.2704	43857.	
TOTAL SEDIMENT =	5941.66	1.6498	2.7280	89668.	1.037170

SEDIMENT TRANSPORT CAPACITY: 3.72174 AC-FT/SQ MI (bulked) = 12.6655 TONS/ACRE (at Porosity=0.395)

*CROSS SECTION 33+00 FROM SPT.HEC
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.00000173 B EXP=5.81
C EXP=-0.65 D EXP=-2.02 NUMBER WASH=1
WAS CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
140	3.81	86.34
435	4.73	136.51
602	5.12	152.21
854	5.69	154.12
1033	6.03	155.36
1208	6.30	156.54

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	35.00	3.282	.340	31.35	50000.	.12	9066.	58186.	1.0233	9.99
1.667	974.00	5.923	1.061	154.95	50000.	8.80	23395.	71139.	1.0289	2367.23
2.000	270.00	4.365	.570	108.45	50000.	1.57	15142.	63676.	1.0257	3738.24
2.333	93.00	3.700	.407	61.72	50000.	.42	11959.	60800.	1.0244	4114.00
2.666	42.00	3.377	.355	35.01	50000.	.16	9688.	58748.	1.0236	4260.09
3.000	21.00	2.976	.294	24.01	50000.	.06	7229.	56527.	1.0226	4326.49
3.333	11.00	2.536	.231	18.78	50000.	.02	4984.	54499.	1.0218	4359.96
3.666	6.00	2.113	.176	16.16	50000.	.01	3261.	52944.	1.0211	4377.62
4.000	4.00	1.845	.143	15.11	50000.	.00	2380.	52148.	1.0208	4387.37
4.333	2.00	1.439	.099	14.06	50000.	.00	1333.	51203.	1.0204	4392.24
4.666	1.00	1.107	.067	13.54	50000.	.00	724.	50653.	1.0201	4394.65

SOUTH BEAR TRIB. DESILTATION POND

1. Size Pond Based on Settling Velocity

⇒ Design Particle: Very Fine Sand (D=0.06mm)

⇒ 100% Removal of Design Particle

⇒ V_s = Settling Velocity = 0.009 fps (very fine Sand)

Surface Area = SA = (1.2)(Q_2) / V_s

where Q_2 = 2 yr Peak Flowrate (cfs)

a. North Swale

Q_2 = 35.2 cfs

⇒ SA = (1.2)(35.2) / 0.009 = 4693.33 sf

Assume Pond Length = 3 x width

3W · W = 4693.33 ⇒ W = 39.6 FT

USE W = 40'

L = 3 · W ⇒ USE L = 120'

b. South Swale

Q_2 = 29.9 cfs

⇒ SA = (1.2)(29.9) / 0.009 = 3986.7 sf

Assume Pond Length = 3 x width

3W · W = 3986.7 ⇒ W = 36.4

USE W = 37'

USE L = 111'

BOHANNAN-HUSTON INC.

PROJECT NAME ACADEMY STORM DRAIN SHEET 1 OF

PROJECT NO. 9215.20 BY EWH DATE 8/3/94

SUBJECT NORTH BEAR TRIB POND DESIGN CALC'S CH'D DATE

2. Check Pond For 10-Year Storm

⇒ Design For 80% Trap Efficiency

⇒ Based on High Desert Geo Technical Report this will mean trapping everything greater than #200 (0.075 mm)

⇒ Settling Velocity (d = 0.075mm) = 0.0146 fps

a. North Swale

$Q_{10} = 132.3$ cfs

⇒ SA = (1.2)(132.3)/0.0146 = 10874

Assume $L = 3 \times W$ ⇒ $3W \cdot W = SA$

⇒ $W = \underline{60.2'}$ and $L = \underline{180.6'}$

NOTE: FOR DESIGN CONFIGURATION SHOWN ON NEXT SHEET, THIS WILL REQUIRE A DEFLECTING BAFFLE TO INCREASE THE SETTLING LENGTH (L).

b. South Swale

$Q_{10} = 79.7$ cfs ⇒ SA = (1.2)(79.7)/0.0146 = 6551 sf

$3W \cdot W = SA$ ⇒ ⇒ $\underline{W = 46.7'}$ $\underline{L = 140.2'}$

NOTE: NO BAFFLE REQUIRED

BOHANNAN-HUSTON INC.

PROJECT NAME Academy Storm Drain SHEET 2 OF

PROJECT NO. 99215.20 BY CWH DATE 8/31/99

SUBJECT CH'D DATE

NORTH BEAR TRIB. DESILTATION POND

1. Surface Area = $SA = (1.2)(Q_2)/V_s$

a. North Swale

$Q_2 = 5.0$ cfs

$SA = 1.2(5.0 \text{ cfs})/0.009 = 666.67$ SF

Assume Pond Length is 3 times larger than the width.

$3W \cdot W = 666.67 \Rightarrow W = 14.91'$

USE $W = 15.0'$

$L = 3 \cdot W$ $\quad L = 45.0'$

b. South Swale

$Q_2 = 11.4$ cfs

$SA = 1.2(11.4 \text{ cfs})/0.009 = 1520$ SF

Assume Pond length is 3 times larger than the width

$3W \cdot W = 1520 \Rightarrow W = 22.5$

USE $W = 23'$

$L = 3 \cdot W$ $\quad W = 69.0'$

2. Check Pond For 10-year Storm

a. North Swale

$Q_{10} = 18.1$ cfs

$SA = (1.2)(18.1)/0.0146 = 1487.67$

Assume $L = 3 \times W \Rightarrow 3W \cdot W = 1487.67$

$W = 22.3'$ USE $W = 23'$

$L = 3 \cdot W$ $\quad L = 69'$

NOTE: FOR DESIGN CONFIGURATION SHOWN ON NEXT SHEET, THIS WILL REQUIRE A DEFLECTING BAFFLE TO INCREASE THE SETTLING LENGTH (L).

b. South Swale

$Q_{10} = 40.7$ cfs

$SA = (1.2)(40.7)/0.0146 = 3345.21$

Assume $L = 3 * W \Rightarrow 3 \cdot W \cdot W = 3345.21$

$W = 33.39'$ USE $W = 34$

$L = 3 \cdot W$ $\quad L = 102$

NOTE: FOR DESIGN CONFIGURATION SHOWN ON NEXT SHEET, THIS WILL REQUIRE A DEFLECTING BAFFLE TO INCREASE THE SETTLING LENGTH (L).

BOHANNAN-HUSTON INC.

PROJECT NAME Academy Storm Drain SHEET 3 OF

PROJECT NO. 14215.20 BY DFB DATE 1/16/24

SUBJECT South Bear Trib. Pond CH'D DATE

ACADEMY STORM DRAIN - BHI JOB NO. 94215.20
DESILTATION POND VOLUME CALCULATIONS
5/94

SOUTH BEAR TRIBUTARY POND

ELEVATION	AREA (ac)	VOLUME (ac-ft)	CUM. VOL. (ac-ft)	REQUIRED SEDIMENT STORAGE VOL. (ac-ft)	NET STORAGE VOLUME (ac-ft)
Trial #1					
6139	0.569				
6140	0.616	0.593	0.593	0.480	0.113
6141	0.663	0.640	1.232	0.480	0.752
6142	0.710	0.687	1.919	0.480	1.439
6143	0.758	0.734	2.653	0.480	2.173
6144	0.805	0.781	3.434	0.480	2.954
6145	0.852	0.828	4.263	0.480	3.783
6146	0.899	0.875	5.138	0.480	4.658
6147	1.067	0.983	6.121	0.480	5.641
6148	1.155	1.111	7.232	0.480	6.752

NOTE: REQUIRED SEDIMENT STORAGE VOLUME IS EQUAL TO 5 TIMES THE AVG. ANNUAL SEDIMENT VOLUME. THE 100 YEAR SEDIMENT VOLUME IS INCLUDED IN THE INFLOW BULKED INFLOW HYDROGRAPH.

ORTH BEAR TRIBUTARY POND

ELEVATION	AREA (ac)	VOLUME (ac-ft)	CUM. VOL. (ac-ft)	REQUIRED SEDIMENT STORAGE VOL. (ac-ft)	NET STORAGE VOLUME (ac-ft)
Trial #1					
6139	0.220				
6140	0.252	0.236	0.236	0.113	0.123
6141	0.285	0.269	0.505	0.113	0.392
6142	0.318	0.302	0.807	0.113	0.694
6143	0.351	0.335	1.142	0.113	1.029
6144	0.384	0.368	1.509	0.113	1.396
6145	0.417	0.401	1.910	0.113	1.797
6146	0.450	0.434	2.344	0.113	2.231

NOTE: REQUIRED SEDIMENT STORAGE VOLUME IS EQUAL TO 5 TIMES THE AVG. ANNUAL SEDIMENT VOLUME. THE 100 YEAR SEDIMENT VOLUME IS INCLUDED IN THE INFLOW BULKED INFLOW HYDROGRAPH.

SOUTH BEAR TRIBUTARY POND

1. OUTLET PIPE RATING CURVE

· Assume "Groove End w/ Headwall for Inlet" For 84" RCP

DEPTH	Q (cfs)	ELEV	
0'	0	6139	
1'	28	6140	
2'	54	6141	
3'	90	6142	
4'	148	6143	
5'	216	6144	
6'	280	6145	
7'	349	6146	
8'	400	6147	
9'	430	6148	Top of Pond

See Attached Nomograph

NORTH BEAR TRIBUTARY POND

1. OUTLET PIPE RATING CURVE

For 48" RCP w/ groove and w/ headwall

DEPTH	Q	ELEV.	
0	0	6139	
1	10.5	6140	
2	28	6141	
3	53	6142	
4	80	6143	
5	101	6144	
6	121	6145	
7	138	6146	Top of Pond

BOHANNAN-HUSTON INC.

PROJECT NAME ACADEMY STORM DRAIN SHEET 1 OF 2

PROJECT NO. 9215.20 BY GWH DATE

SUBJECT POND OUTLET PIPE RATING CURVES CH'D DATE

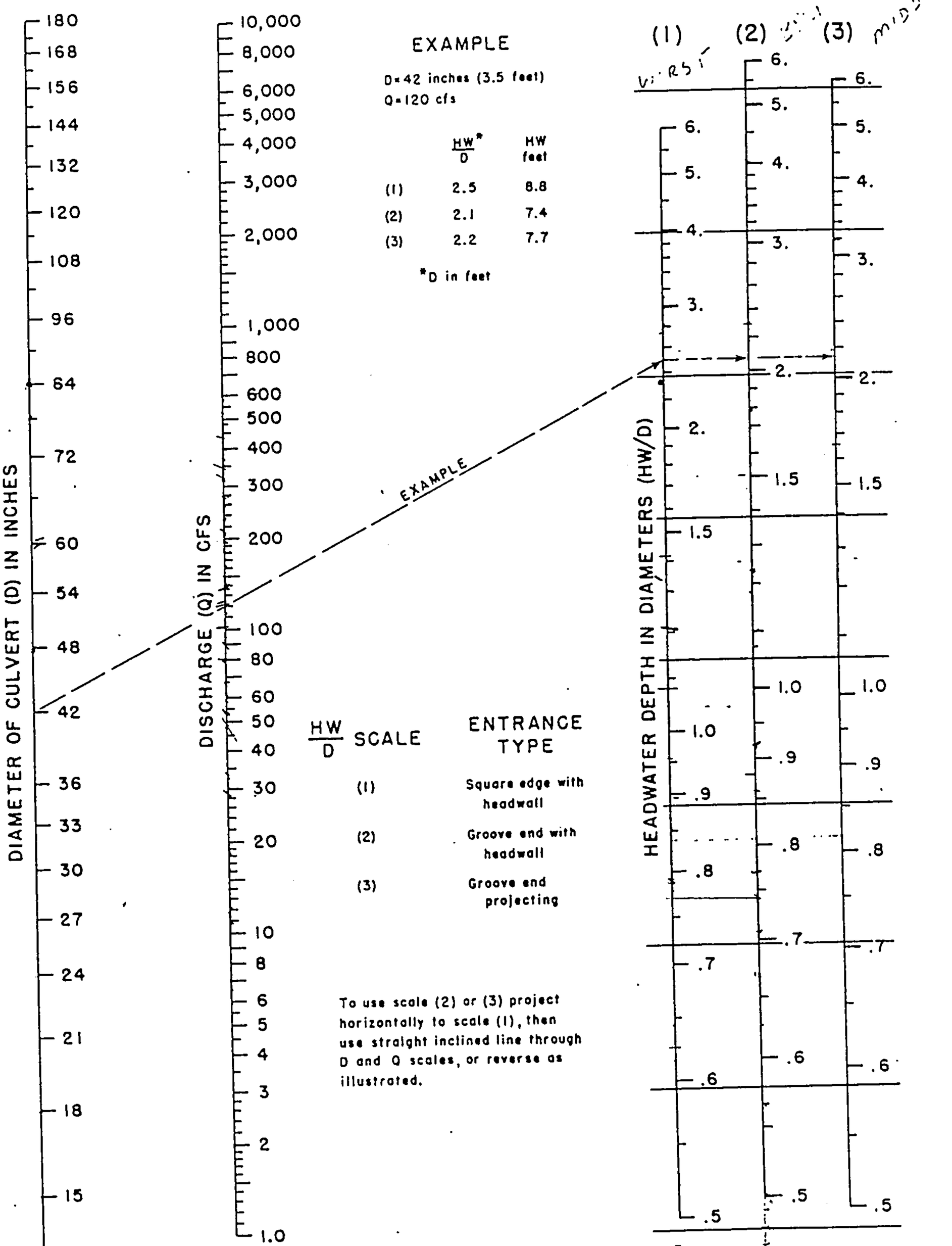
CHART 2

EXAMPLE

D = 42 inches (3.5 feet)
Q = 120 cfs

	HW/D*	HW feet
(1)	2.5	8.8
(2)	2.1	7.4
(3)	2.2	7.7

*D in feet



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

5-22

SHEET 2 OF 2

HIGH DESERT STORM DRAIN DESIGN SPREAD SHEET
6/4/93
REVISED 7/18/94 (D.B.)
REVISED 7/13/93 TO INCLUDE PINO STORM DRAIN
REVISED 7/15/93
JOB NO. 94215.20
REVISED

STREET SECTION	CUL-DE-SAC NUMBER	ROADWAY CONNECT. STATION	PLAN SD CONNECT. STATION	ARROYO FLOWLINE	LENGTH ARROYC TO SD	MAX. SD SOFFIT ELEV.	SD SIZE (IN)	MAX. SD INV. ELEV.	STREET PROFILE GRADE	STREET WIDTH (FT)	STREET TC	SD BURY (FT)	SD MIN. OFFSET (FT)	DESIGN OFFSET (FT)	MIN. SD SOFFIT ELEV.	MIN. SD INV. ELEV.
ACADEMY																
A	1	8150.00	3250.00	6137.00	70.00	6132.60	36.00	6129.60	6141.75	24.00	6141.27	8.67	38.13	42.59	6129.63	6126.63
A	2	7975.00	3050.00	6130.00	70.00	6125.60	36.00	6122.60	6132.49	24.00	6132.01	6.41	34.74	42.32	6120.55	6117.55
A	3	7750.00	2712.00	6118.00	80.00	6113.40	36.00	6110.40	6121.63	24.00	6121.15	7.75	36.75	42.07	6109.85	6106.85
A	4	7350.00	2443.00	6103.00	90.00	6098.20	66.00	6092.70	6106.26	24.00	6105.78	7.58	41.49	45.35	6095.63	6090.13
A	5	7180.00	2260.00	6094.00	110.00	6088.80	66.00	6083.30	6097.54	24.00	6097.06	8.26	42.51	45.35	6086.91	6081.41
A	6	6990.00	2053.00	6083.00	50.00	6079.00	66.00	6073.50	6086.90	25.55	6086.39	7.39	42.76	46.75	6076.34	6070.84
A	7	6800.00	1865.00	6073.00	120.00	6067.60	66.00	6062.10	6079.63	30.97	6079.01	11.41	54.21	56.60	6066.01	6060.51
A	8	6540.00	1615.00	6062.00	200.00	6055.00	66.00	6049.50	6068.23	33.50	6067.56	12.56	58.47	62.00	6052.64	6047.14
A	9	6150.00	1250.00	6047.00	220.00	6039.60	78.00	6033.10	6054.67	33.50	6054.00	14.40	63.22	62.00	6040.42	6033.92
A	10	5905.00	988.00	6036.00	220.00	6028.60	78.00	6022.10	6042.93	33.50	6042.26	13.66	62.11	63.86	6027.44	6020.94
A	11	5650.00	723.00	6026.00	270.00	6017.60	78.00	6011.10	6030.48	33.50	6029.81	12.21	59.94	60.00	6017.56	6011.06

WEST DESERT - ACADEMY STORM DRAIN

Storm Drain Line Design

WORST CASE: 78" RCP 7'15' COVER

TYPE "B" BEDDING - Trench Material

$\gamma_s = 110 \text{ lb/ft}^3$

Trench Width = 78" + 4' =

FROM CONCRETE PIPE DESIGN MANUAL

1. EARTH LOAD (W_E)

Table 30A $\Rightarrow W_E = 15890$

Adjust for soil unit wt in excess of 110 lb/ft^3

$\Rightarrow W_E (15890)(1.10) = 18579 \text{ lbs/ft}^3$

2. LIVE LOAD (W_L)

From Table 45 for cover > 10' Truck Load is negligible

3. BEDDING

Figure 227 - Type "B"

4. BEDDING FACTOR

Figure 227 - $B_f = 1.9$

5. FACTOR OF SAFETY

A factor of safety of 1.0 will be applied based on the 0.01" crack.

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 1 OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

6. SELECTION OF PIPE STRENGTH

Eqn 33

$$D_{0.01} = \frac{W_L + W_E}{(B_f)(D)} \times F.S.$$

$$= \frac{0.18572}{(1.9)(6.5)} \times 1.0$$

$D_{0.01}$ = 1504.4 lb/ft/ft inside diameter

7. SELECT CLASS

ASTM CLASS

I	800
II	1000
III	1350
IV	2000
V	3000

USE CLASS III

USING SAME CALCULATIONS FOR 78" PIPE

DEPTH COVER	$D_{0.01}$	CLASS
10'	887	II or III
11'	1002	III
12'	1122	III
13'	1249	III or IV
14'	1391	IV
15'	1524	IV
16'	1610	IV

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 2 OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

SIMILARLY FOR 66" PIPE

DEPTH COVER	OD	CLASS
10'	933	II or III
11'	1059	III
12'	1192	III
13'	1309	IV
14'	1415	IV
15'	1521	IV
16'	1625	IV

BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET 3 OF _____

PROJECT NO. _____ BY _____ DATE _____

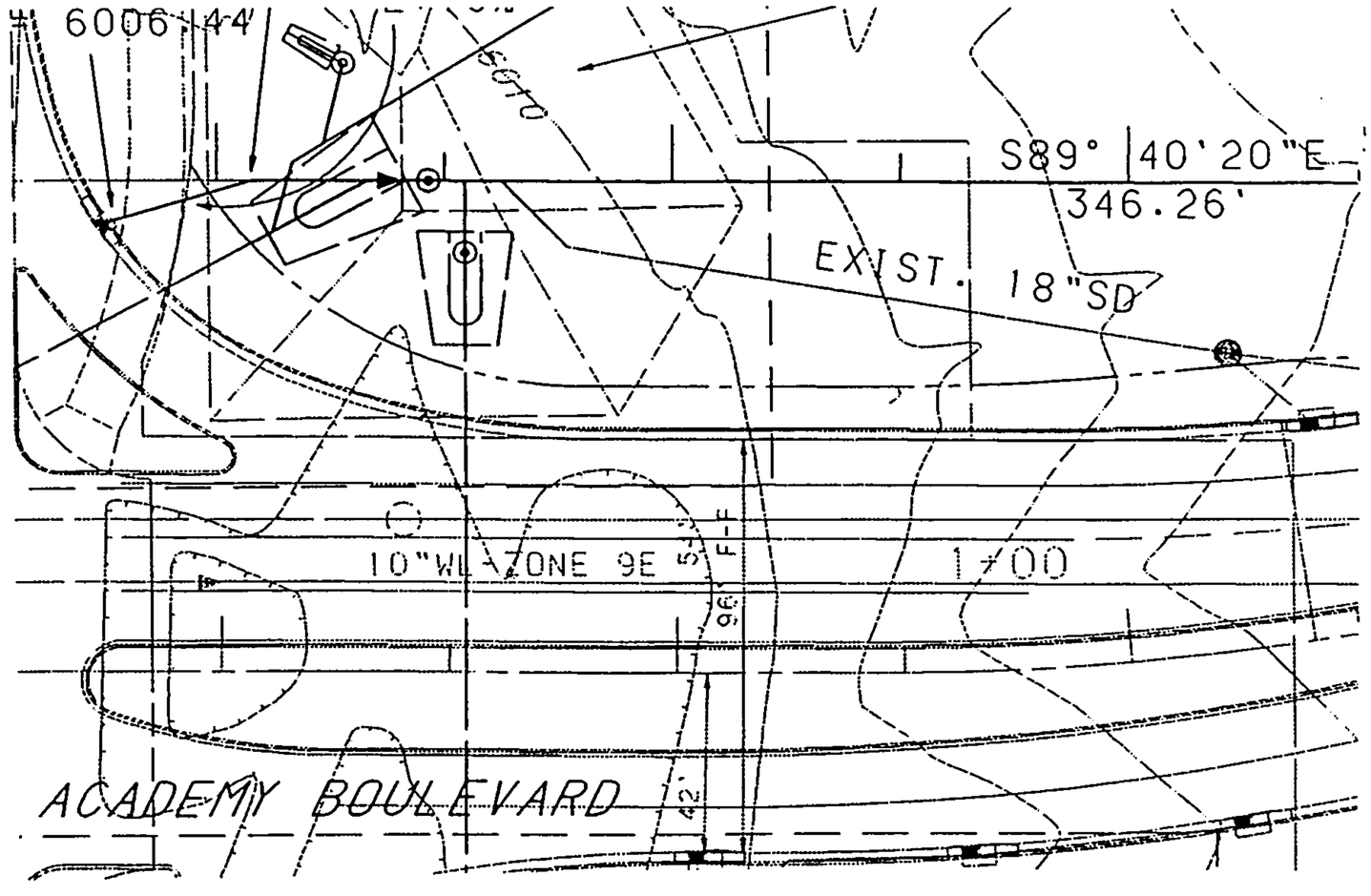
SUBJECT _____ CH'D _____ DATE _____

ACADEMY STORM DRAIN
***** HYDRAULIC GRADE LINE CALCULATIONS *****

96" SD to Type "A" Inlet on North side of Academy

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	MH Dia.	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
2+00	CON								0.00	0.00		0.00	0.00	0.00	0.00	0.00	6001.39	6001.39	6001.39	5.64	6007.03	6007.03
		96	958.0	50.27	19.06	9121	0.0110	8.00			0.09					0.09						
2+04	WYE								0.00	0.00		0.00	0.67	0.00	0.00	0.67	6001.48	6002.95	6002.96	4.84	6007.12	6007.79
		96	887.0	50.27	17.65	9121	0.0095	24.00			0.23					0.23						
2+32	BEND								0.00	30.00		0.84	0.00	0.00	0.20	1.04	6003.18	5998.80	5998.81	10.26	6008.01	6009.06
		78	853.0	33.18	25.71	5243	0.0265	8.00			0.21					0.21						
2+48	BEE H.								0.00	30.00		1.18	0.00	0.51	0.00	1.70	5999.01	6000.71	6009.00	10.26	6009.27	6010.97
		78	853.0	33.18	25.71	5243	0.0265	8.00			0.21					0.21						
2+55	SPC T								0.00	0.00		0.00	1.28	0.00	0.00	1.28	5999.01	6001.57	6009.50	8.98	6009.27	6010.55
		78	798.0	33.18	24.05	5243	0.0232	8.00			0.19					0.19						
2+65	WYE								0.00	0.00		0.00	1.53	0.00	1.31	2.84	6001.75	6013.39	6013.63	0.19	6010.73	6013.58
		18	6.2	1.77	3.51	105	0.0035	36.00			0.13					0.13						
2+93	BEND								0.00	25.00		0.02	0.00	0.01	0.00	0.03	6013.51	6013.54	6013.78	0.19	6013.70	6013.73
		18	6.2	1.77	3.51	105	0.0035	132.00			0.46					0.46						
4+25	MH								6.00	30.00		0.02	0.31	0.01	0.00	0.34	6013.51	6013.85	6015.40	0.19	6013.70	6014.04
		18	6.2	1.77	3.51	105	0.0035	23.00			0.08					0.08						
4+48	GRATE								0.00	0.00		0.00	0.00	0.00	0.00	0.00	6013.93	6014.12	6014.87	0.00	6014.12	6014.12
		18	0.0	1.77	0.00	105	0.0000	1.00			0.00					0.00						

Manning's n = 0.013 for pipe

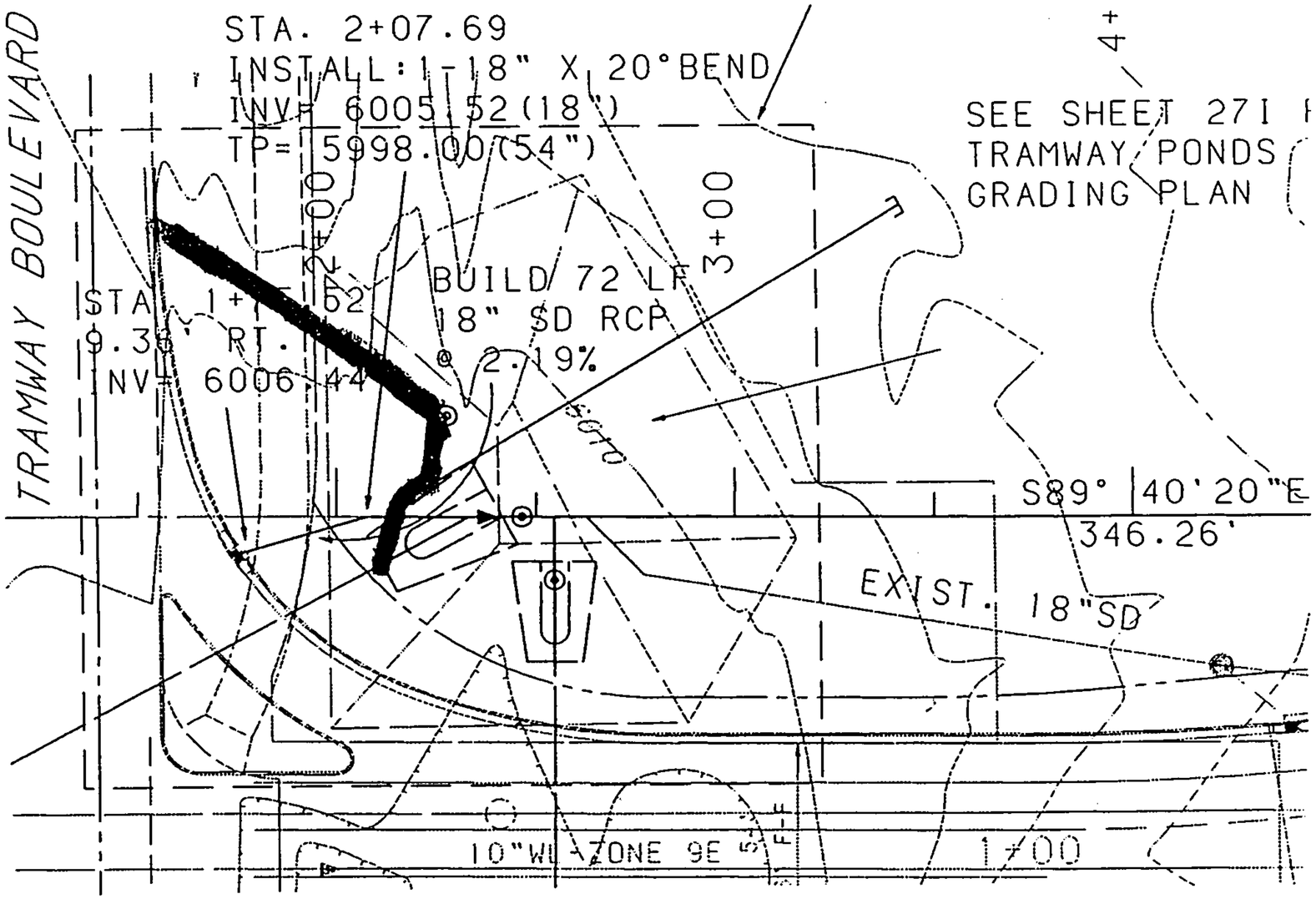


ACADEMY STORM DRAIN
***** HYDRAULIC GRADE LINE CALCULATIONS *****

96" to Inlet on East side of Tramway

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	MH Dia.	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
0+00									0.00	0.00		0.00	0.00	0.00	0.00	0.00	6001.39	6001.39	6001.50	5.19	6006.58	6006.58
		98	958.0	52.38	18.29	9636	0.0099	4.00			0.04					0.04						
2+10	WYE								0.00	0.00		0.00	1.37	0.00	0.45	1.81	6001.43	6007.82	6009.00	0.61	6006.62	6008.44
		54	100.0	15.90	6.29	1966	0.0026	16.00			0.04					0.04						
2+32	BEND								0.00	40.00		0.08	0.00	0.03	0.00	0.11	6007.86	6007.98	6009.40	0.61	6008.48	6008.59
		54	100.0	15.90	6.29	1966	0.0026	12.00			0.03					0.03						
2+49	WYE								0.00	0.00		0.00	0.48	0.00	0.00	0.48	6008.01	6008.47	6009.90	0.63	6008.62	6009.10
		24	20.0	3.14	6.37	226	0.0078	18.00			0.14					0.14						
3+00	MH								4.00	60.00		0.10	0.00	0.03	0.00	0.13	6008.61	6008.74	6009.00	0.63	6009.24	6009.37
		24	20.0	3.14	6.37	226	0.0078	12.00			0.09					0.09						
4+00	GRATE								0.00	0.00		0.00	0.00	0.03	0.00	0.03	6008.84	6008.87	6010.00	0.63	6009.47	6009.50
		24	20.0	3.14	6.37	226	0.0078	66.00			0.52					0.52						
4+66	INLET								0.00	0.00		0.00	0.00	0.00	0.13	0.13	6009.38	6010.14	6010.98	0.00	6010.01	6010.14
		1	0.0	0.00	0.00	0	0.0000	0.00			0.00					0.00						

Manning's n = for pipe 0.013

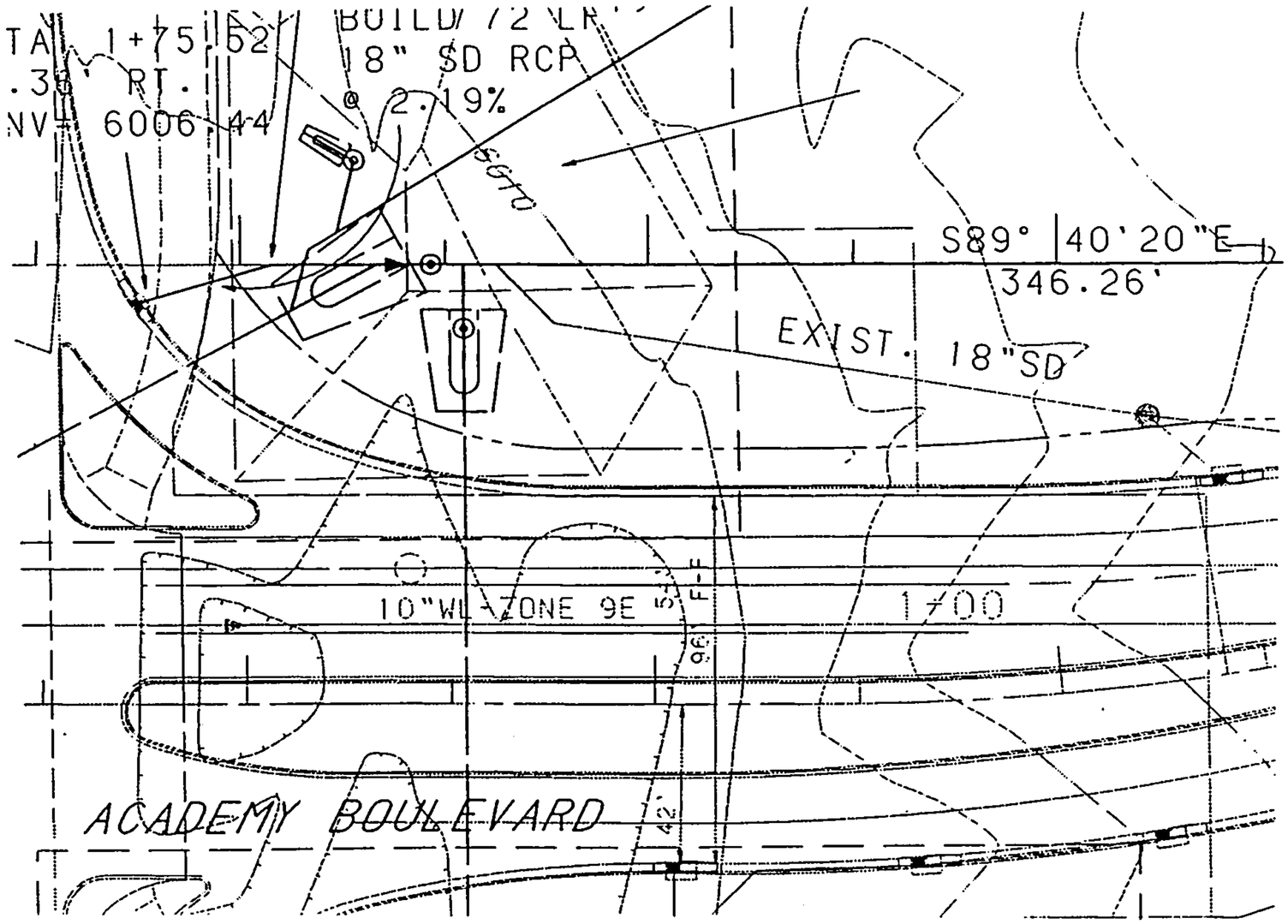


ACADEMY STORM DRAIN
***** HYDRAULIC GRADE LINE CALCULATIONS *****

Main Trunk to Manhole at Sta 6+18

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	MH Dia.	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
0+00	CON								0.00	0.00		0.00	0.00	0.00	0.00	0.00	6001.39	6001.39	6002.55	5.64	6007.03	6007.03
		96	958.0	50.27	19.06	9121	0.0110	8.00			0.09					0.09						
2+10	WYE								0.00	0.00		0.00	0.67	0.00	0.00	0.67	6001.48	6002.95	6002.95	4.84	6007.12	6007.79
		96	887.0	50.27	17.65	9121	0.0095	24.00			0.23					0.23						
2+32	BEND								0.00	45.00		1.03	0.00	0.00	0.20	1.23	6003.18	5998.98	6002.75	10.26	6008.01	6009.25
		78	853.0	33.18	25.71	5243	0.0265	8.00			0.21					0.21						
2+48	BEE H.								4.00	0.00		0.00	0.00	0.51	0.00	0.51	5999.20	5999.71	6009.00	10.26	6009.46	6009.97
		78	853.0	33.18	25.71	5243	0.0265	8.00			0.21					0.21						
2+55	WYE								0.00	0.00		0.00	1.26	0.00	0.00	1.26	5999.20	6001.74	6001.95	8.98	6009.46	6010.72
		78	798.0	33.18	24.05	5243	0.0232	8.00			0.19					0.19						
2+65	WYE								0.00	0.00		0.00	0.00	0.45	0.00	0.45	6001.92	6002.37	6002.80	8.98	6010.90	6011.35
		78	798.0	33.18	24.05	5243	0.0232	325.00			7.53					7.53						
4+00	BEND								0.00	20.00		0.85	0.00	0.45	0.00	1.30	6009.90	6011.20	6012.56	8.98	6018.88	6020.18
		78	798.0	33.18	24.05	5243	0.0232	32.00			0.74					0.74						
5+99	MH								4.00	0.00		0.00	0.00	0.45	0.00	0.45	6011.94	6012.39	6024.77	8.98	6020.92	6021.37
		78	798.0	33.18	24.05	5243	0.0232	1.00			0.02					0.02						

Manning's n = 0.013
for pipe

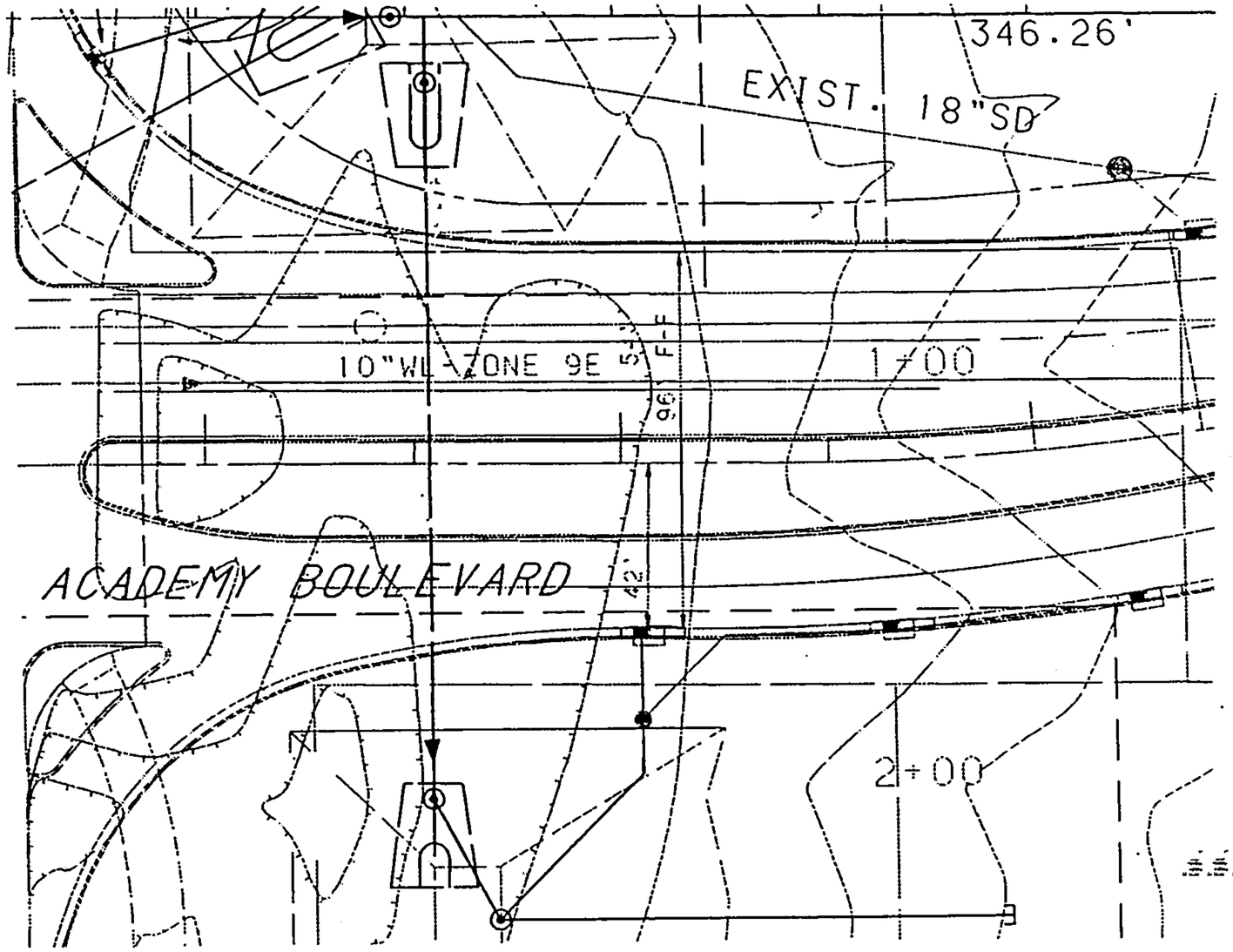


ACADEMY STORM DRAIN
***** HYDRAULIC GRADE LINE CALCULATIONS *****

84" to Inlet on South side of Academy STA. 52+04

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	MH Dia.	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
0+00									0.00	0.00		0.00	0.00	0.00	0.00	0.00	6005.00	6005.00	6005.00	0.06	6005.06	6005.06
		84	73.0	38.48	1.90	6388	0.0001	40.00			0.01					0.01						
0+40	MH								8.00	0.00		0.00	0.00	0.00	0.00	0.00	6005.01	6005.01	6008.50	0.06	6005.06	6005.06
		84	73.0	38.48	1.90	6388	0.0001	155.00			0.02					0.02						
2+54	MH								8.00	30.00		0.06	0.00	0.00	0.17	0.23	6005.03	6003.96	6008.50	1.35	6005.08	6005.31
		36	66.0	7.07	9.34	667	0.0098	32.00			0.31					0.31						
2+71	MH								4.00	60.00		0.02	0.17	0.00	0.01	0.21	6005.03	6005.06	6009.00	0.23	6005.08	6005.29
		18	6.8	1.77	3.85	105	0.0042	50.00			0.21					0.21						
3+05	BEND								0.00	45.00		0.03	0.00	0.01	0.00	0.04	6005.27	6005.31	6006.68	0.23	6005.50	6005.54
		18	6.8	1.77	3.85	105	0.0042	14.00			0.06					0.06						
3+05	MH								4.00	0.00		0.00	0.07	0.00	0.00	0.07	6005.37	6005.65	6009.00	0.02	6005.60	6005.67
		18	2.2	1.77	1.24	105	0.0004	21.00			0.01					0.01						
3+05	GRATE								0.00	0.00		0.00	0.00	0.00	0.00	0.00	6005.65	6005.66	6011.52	0.02	6005.68	6005.68
		18	2.2	1.77	1.24	105	0.0004	1.00			0.00					0.00						

Manning's n = 0.013
for pipe

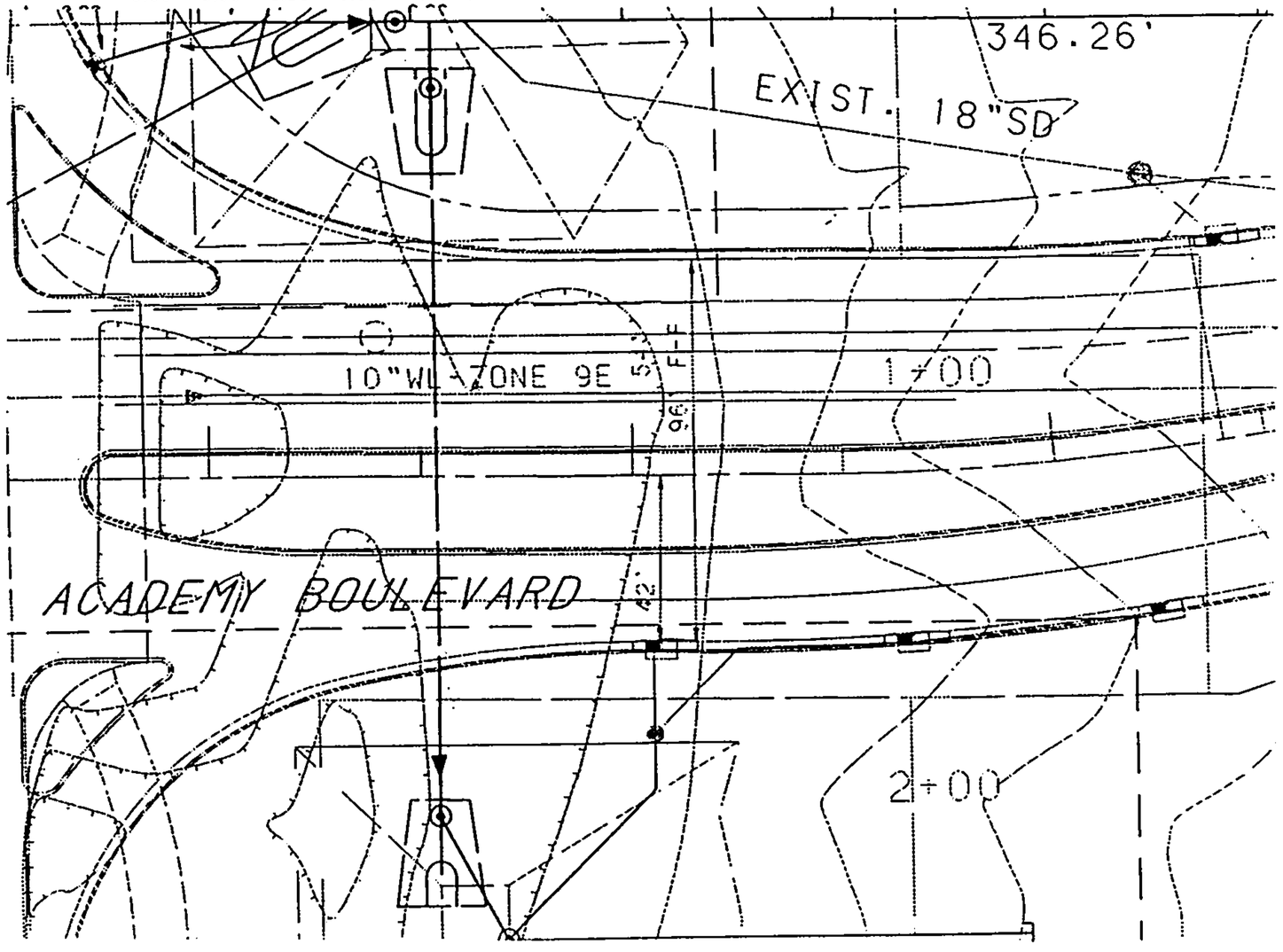


ACADEMY STORM DRAIN
***** HYDRAULIC GRADE LINE CALCULATIONS *****

84" to Inlets on South side of Academy STA. 53+20

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	MH Dia.	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
0+00									0.00	0.00		0.00	0.00	0.00	0.00	0.00	6005.00	6005.00	6005.00	0.06	6005.06	6005.06
		84	73.0	38.48	1.90	6388	0.0001	40.00			0.01					0.01						
0+40	MH								8.00	30.00		0.01	0.00	0.00	0.00	0.01	6005.01	6005.01	6008.50	0.06	6005.06	6005.07
		84	73.0	38.48	1.90	6388	0.0001	155.00			0.02					0.02						
2+54	MH								8.00	30.00		0.06	0.00	0.00	0.17	0.23	6005.03	6003.97	6008.50	1.35	6005.09	6005.32
		36	66.0	7.07	9.34	667	0.0098	32.00			0.31					0.31						
2+71	MH								4.00	60.00		0.02	0.17	0.00	0.01	0.21	6005.03	6005.07	6009.00	0.23	6005.09	6005.30
		18	6.8	1.77	3.85	105	0.0042	50.00			0.21					0.21						
3+05	BEND								0.00	45.00		0.03	0.00	0.01	0.00	0.04	6005.28	6005.32	6006.68	0.23	6005.51	6005.55
		18	6.8	1.77	3.85	105	0.0042	14.00			0.06					0.06						
3+05	MH								4.00	0.00		0.00	0.11	0.00	0.00	0.11	6005.38	6005.62	6009.00	0.10	6005.61	6005.71
		18	4.4	1.77	2.49	105	0.0018	26.57			0.05					0.05						
3+25	BEND								0.00	45.00		0.01	0.00	0.00	0.00	0.02	6005.66	6005.68	6007.00	0.10	6005.76	6005.78
		18	4.4	1.77	2.49	105	0.0018	38.00			0.07					0.07						
3+63	GRATE								0.00	0.00		0.00	0.02	0.00	0.00	0.02	6005.66	6005.76	6012.50	0.02	6005.76	6005.79
		18	2.2	1.77	1.24	105	0.0004	60.00			0.03					0.03						
4+23	GRATE								0.00	0.00		0.00	0.00	0.00	0.00	0.00	6005.66	6005.74	6013.92	0.02	6005.76	6005.76
		18	2.2	1.77	1.24	105	0.0004	1.00														

Manning's n = 0.013
for pipe



ACADEMY STORM DRAIN
***** HYDRAULIC GRADE LINE CALCULATIONS *****

Existing 66" to South Bear Trib. Pond

Station	Structure	Diam.	Q	Area	Vel.	K	Sf	Length	MH Dia.	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
39+00	CON								0.00	0.00		0.00	0.00	0.00	0.00	0.00	6110.61	6110.61	6115.83	5.97	6116.58	6116.58
		66	466.0	23.76	19.61	3358	0.0193	4.00			0.08					0.08						
39+04	WYE								0.00	0.00		0.00	0.00	0.30	0.00	0.30	6110.69	6110.99	6121.00	5.97	6116.66	6116.96
		66	466.0	23.76	19.61	3358	0.0193	146.00			2.81					2.81						
40+36	BEND								0.00	32.00		0.71	0.00	0.30	0.00	1.01	6113.80	6114.81	6124.00	5.97	6119.77	6120.78
		66	466.0	23.76	19.61	3358	0.0193	8.00			0.15					0.15						
40+44	MH								4.00	0.00		0.00	0.00	0.30	0.00	0.30	6114.96	6115.26	6124.15	5.97	6120.94	6121.23
		66	466.0	23.76	19.61	3358	0.0193	144.00			2.77					2.77						
41+87	BEND								0.00	25.00		0.63	0.00	0.30	0.00	0.93	6118.03	6118.96	6130.10	5.97	6124.01	6124.94
		66	466.0	23.76	19.61	3358	0.0193	151.64			2.92					2.92						
43+39	BEND								0.00	45.00		0.84	0.00	0.30	0.00	1.14	6121.88	6123.03	6140.00	5.97	6127.86	6129.00
		66	466.0	23.76	19.61	3358	0.0193	8.00			0.15					0.15						
43+47	MH								4.00	0.00		0.00	0.00	0.30	0.00	0.30	6123.18	6123.48	6140.50	5.97	6129.15	6129.45
		66	466.0	23.76	19.61	3358	0.0193	285.72			5.50					5.50						
46+33	BEND								0.00	26.62		0.65	0.00	0.30	0.00	0.95	6128.98	6129.93	6146.50	5.97	6134.95	6135.90
		66	466.0	23.76	19.61	3358	0.0193	21.43			0.41					0.41						
46+55	BEND								0.00	45.00		0.84	0.00	0.30	0.00	1.14	6130.34	6131.49	6146.10	5.97	6136.32	6137.46
		66	466.0	23.76	19.61	3358	0.0193	12.00			0.23					0.23						
46+67	MH								4.00	0.00		0.00	0.00	0.30	0.00	0.30	6131.72	6132.02	6140.00	5.97	6137.69	6137.99
		66	466.0	23.76	19.61	3358	0.0193	124.00			2.39					2.39						
47+91	BEND								0.00	45.00		0.84	0.00	0.30	0.00	1.14	6134.40	6135.55	6141.10	5.97	6140.38	6141.52
		66	466.0	23.76	19.61	3358	0.0193	40.00			0.77					0.77						
48+31	BEND								0.00	45.00		0.84	0.00	0.30	0.00	1.14	6136.32	6137.46	6141.50	5.97	6142.29	6143.43
		66	466.0	23.76	19.61	3358	0.0193	8.00			0.15					0.15						
48+39	MH								4.00	0.00		0.00	0.00	0.30	0.00	0.30	6137.61	6137.91	6143.00	5.97	6143.59	6143.89
		66	466.0	23.76	19.61	3358	0.0193	121.52			2.34					2.34						
49+60	REDUC								0.00	0.00		0.00	0.00	0.00	0.05	0.05	6140.25	6143.21	6143.50	3.06	6146.23	6146.28
		78	466.0	33.18	14.04	5243	0.0079	6.51			0.05					0.05						
49+67	BEND								0.00	22.50		0.44	0.00	0.15	0.00	0.59	6140.35	6143.86	6144.44	3.06	6146.33	6146.92
		78	466.0	33.18	14.04	5243	0.0079	86.62			0.68					0.68						
50+54	BEND								0.00	22.50		0.31	0.00	0.15	0.00	0.46	6144.54	6145.00	6145.44	3.06	6147.60	6148.06
		78	466.0	33.18	14.04	5243	0.0079	112.58			0.89					0.89						
51+66	REDUC								0.00	0.00		0.00	0.00	0.00	0.01	0.01	6143.26	6144.06	6145.20	2.28	6146.33	6146.33
		84	466.0	38.48	12.11	6388	0.0053	12.75			0.07					0.07						
51+79	BEND								0.00	24.68		0.28	0.00	0.00	0.01	0.28	6144.54	6145.61	6147.00	2.28	6147.60	6147.89
		84	466.0	38.48	12.11	6388	0.0053	54.75			0.29					0.29						
52+33	INLET								0.00	0.00		0.00	0.00	0.11	0.00	0.11	6144.12	6144.24	6146.14	2.28	6146.40	6146.51
		84	466.0	38.48	12.11	6388	0.0053	0.00			0.00					0.00						

Manning's n = 0.013
for pipe

APPENDIX F: Section 2

As-Built Figures for
Phase 1-B-1 Storm Drain and Desiltation Ponds

APPENDIX G

Appendix for Form 7.3
Bear Canyon Tributary Storm Drain

1. Excerpts from Bear Tributary Flow Analysis at Tramway Boulevard and Eubank Boulevard
    - Flow Documentation and Model Schematic.
    - Drainage Basin Map.
    - Capacity Calculations.

2. As-Built Figures for the Bear Canyon Tributary Storm Drain

APPENDIX G: Section 1

Excerpts from Bear Tributary Flow Analysis at Tramway Boulevard and Eubank Boulevard

Tom Mann Associates, Inc.
Engineers
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10078
May 26, 1983

BEAR TRIBUTARY FLOW ANALYSIS

100 year, 1 hour discharges in CFS:

Crossing	No Diversion	Diversion 1-Mile East Of Tramway	Diversion At Tramway
Tramway	1220	700	0
Lowell	1250	800	170
Eubank	1410	1280	830 ←

BEAR TRIBUTARY FLOW ANALYSIS
AT TRAMWAY BOULEVARD AND EUBANK BOULEVARD

INTRODUCTION

The purpose of this study was to determine 100-year flow rates along the Bear Arroyo Tributary at Tramway and Eubank, assuming different runoff conditions upstream of Tramway.

The first part of this analysis was to develop a rainfall-runoff model that matched the accepted flow rates developed by Leonard Rice. The second part of the analysis was to then evaluate the downstream effects of a diversion east of Tramway that reduced flow in the Bear Tributary to 700 cfs or less at Tramway.

PROCEDURES

The rainfall-runoff model HYMO was used for this analysis. The model uses the SCS curve number approach to develop runoff and also has routing capabilities. Drainage areas downstream of Tramway were defined by T. Mann Engineers. Upstream of Tramway the drainage areas were defined by Bohannan–Huston, Inc. within a study entitled "Drainage Evaluation of Albuquerque Academy Land East of Tramway," February, 1982. Curve numbers were based on standard SCS criteria assuming fully developed conditions with no on-site reduction of flow. Times of concentration for the sub-basins were based on average velocities for street flows taken from the Kent Whitman report.

The rainfall used for this analysis was the one hour, 100-year rainfall equal to 2.3 inches (K. Whitman). The rainfall distribution was based on the 10% probability, first quartile storm, typical of intense southwestern thunderstorms, from F.A. Huff, "Time Distribution of Rainfall in Heavy Storms," Water Resources Research, 3, No. 4, 1967.

The one hour storm was used because flooding problems in this area usually result from very intense, short duration thunderstorms. Six hour storms would add to the volume of runoff but would not add to the peak flow rate.

STUDY RESULTS

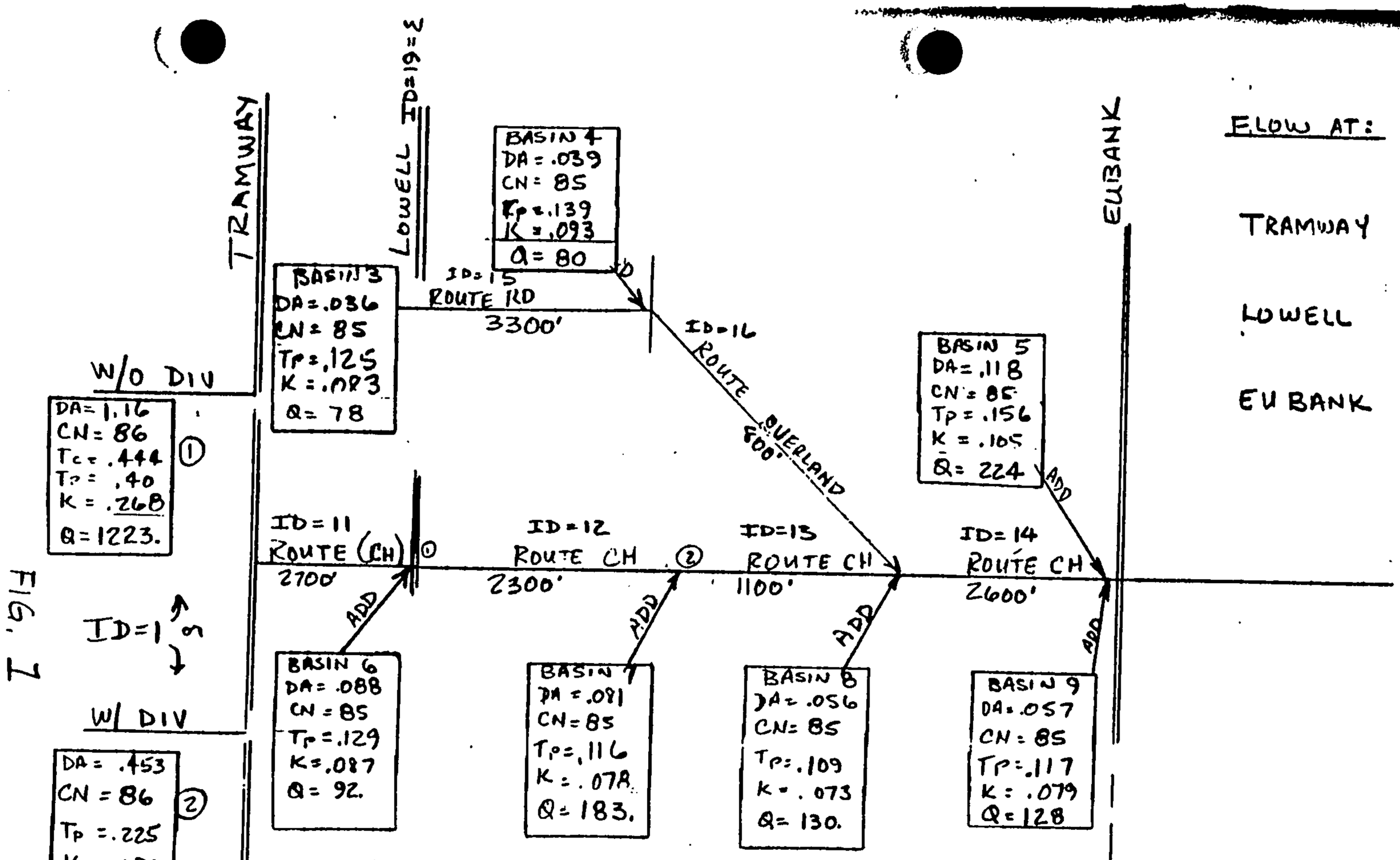
A schematic of the sub-basin characteristics and flow rates is shown on Figure 1. The hydrographs for the flows, at Tramway and Eubank, with and without the diversion are shown on Figure 2. A review of the attached computer runs indicates that without the diversion, the peak flow rate at Eubank is mostly dependent on the large flow from east of Tramway because the peak flows from intervening drainage basins west of Tramway occur earlier. With the diversion in place, the intervening sub-basins contribute more directly to the peak flow rate at Eubank.

The Leonard Rice peak flow rates for Bear Tributary at Tramway and Eubank are 1,206 cfs and 1,400 cfs respectively. Discharges generated by the rainfall-runoff model for those same locations, without an upstream diversion, yielded 1,220 cfs and 1,410 cfs. With the diversion in place (approximately one mile east of Tramway) flows at Tramway and Eubank were estimated to be 700 cfs and 1,280 cfs respectively.

There is only a small difference in peak flow at Eubank with and without the diversion. Again, this analysis was based on many assumptions and on fully developed conditions without on-site detention.

Additional information developed in this study are the expected flows at Lowell. The peak flow rate along Academy at Lowell is 80 cfs. The peak channel flow at Lowell is 760 cfs with the diversion and 1,240 cfs without the diversion. Total routed flow at Lowell (Academy flow and channel flow) is 800 cfs and 1,250 cfs with and without the upstream diversion.

One last computer run was made to determine the peak flow rate at Eubank assuming total diversion at Tramway. Assuming no flow at Tramway, total flow at Lowell (Academy and channel flow) would be 170 cfs and peak flow at Eubank would be 830 cfs.



FLOW AT:	WITHOUT DIVERSION (CFS)	WITH DIVERSION 1MI EAST OF TRAMWAY (CFS)	WITH DIVERSION AT TRAMWAY (CFS)
TRAMWAY	1220	700.	-0-
LOWELL	1250.	800.	170.
EU BANK	1410.	1280.	830

BASIN AREAS DEFINED BY T MANN ENGRS.

OVERLAND SECTION

n=.018 SLP=.03

STA.	ELEV
0	2
2	0
62	0
64	2

ROAD SECTION

n=.015 SLP=.03

0 - .67	
.1	0.0
30 - .47	
60 - 0.0	
60.1 - .67	

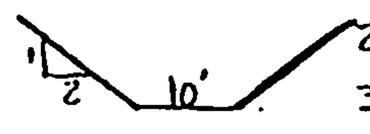
MIN	
0	.0
2	.33
4	.79
6	1.21
8	1.53

RAINFALL .0333HR: 2 MIN 1 HR = 2.3"

10	1.78	20	2.16
12	1.94	22	2.19
14	2.02	24	2.22
16	2.09	26	2.25
18	2.13	28	2.28
		30	2.30

1ST QUARTILE
10% PROBABILITY

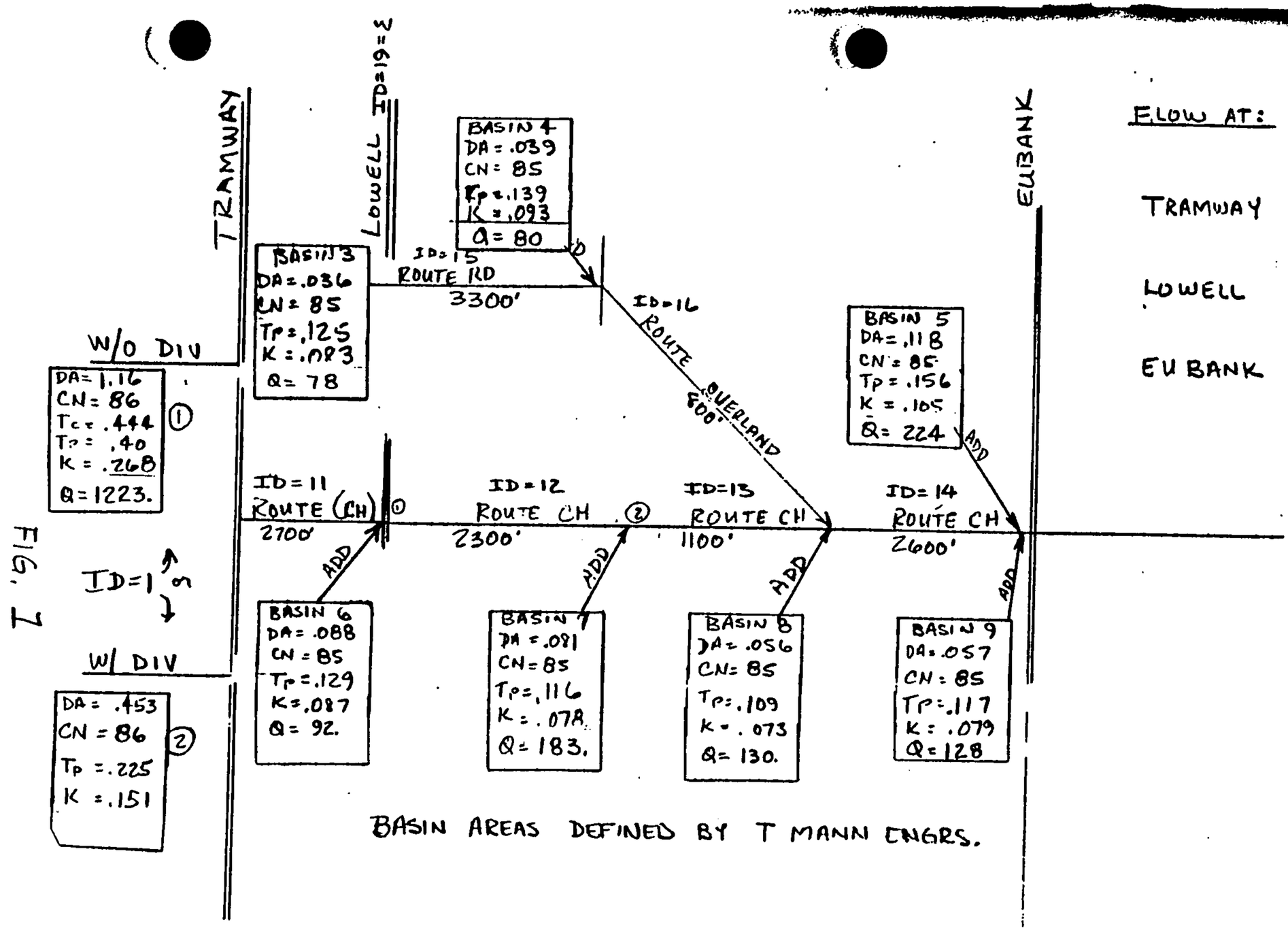
CHANNEL SECTION



0 - 5	
10 - 0	
20 - 0	
30 - 5	

n=.013 SLP=.03

A1-5



FLOW AT:	WITHOUT DIVERSION (CFS)	WITH DIVERSION 1MI EAST OF TRAMWAY (CFS)	WITH DIVERSION AT TRAMWAY (CFS)
TRAMWAY	1220	700.	-0-
LOWELL	1250.	800.	170.
EU BANK	1410.	1280.	830

BASIN AREAS DEFINED BY T MANN ENGRS.

OVERLAND SECTION

STA.	ELEV
0	2
2	0
62	0
64	2

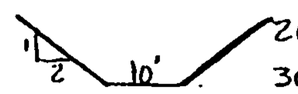
ROAD SECTION

STA.	ELEV
0	.67
.1	0.0
30	.47
60	0.0
60.1	.67

RAINFALL .0333HR: 2 MIN 1 HR = 2.3"
1ST QUARTILE
10% PROBABILITY

MIN		MIN		MIN	
0	.0	10	1.78	20	2.16
2	.33	12	1.94	22	2.19
4	.79	14	2.02	24	2.22
6	1.21	16	2.09	26	2.25
8	1.53	18	2.13	28	2.28
				30	2.30

CHANNEL SECTION



STA.	ELEV
0	5
10	0
20	0
30	5

A1-5

BEHR TRIB STORM DRAIN CAPACITY @ D/S END

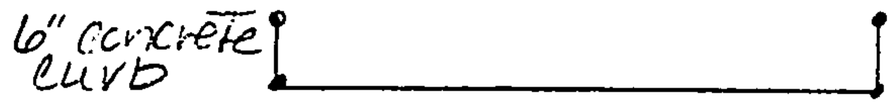
1. DOCUMENTED Q_{100} = 830 c/s

2. Capacity of 72" RCP @ 2.96%, n=0.013 = 728 c/s (flowing full) w/ Mannings eqn.

3. HGL on plans shows pipe NOT Under pressure & NOT quite flowing full.
   ∴ Flow in pipe < 728 c/s

4. Determine if 830 - 728 = 102 c/s can be carried in "roadway section above the pipe.

5. At end of storm drain, the storm drain runs through an apartment complex - Not under a road. Use apartment street section
   Say 40' wide (as scaled from Conceptual Drainage Plan for the Meadows)



From field observations, believe road has inverse crown in places. To be conservative assume a flat section.

6 From Stream.exe,
   Assume slope of street ≈ slope of pipe = 2.96%
   Capacity of the street section @ top of curb (0.50)
   = 186 c/s

7. 186 c/s > 102 c/s
   ∴ Remainder of flow that cannot fit in pipe flowing almost full can be carried in the street section w/o exceeding flood limits.
   — i.e. can be contained in roadway section."

BOHANNAN-HUSTON INC.

PROJECT NAME HIGH DESERT LCMF/ ACADEMY FLOODPLAIN SHEET 1 OF _____
PROJECT NO. 92281C4.01 BY BgM DATE 12-98
SUBJECT Storm drain Capacity CH'D _____ DATE _____

APARTMENT COMPLEX PARKING/STREET SECTION NEAR D/S END OF BEAR TRIB. STORM DRAIN

***** PC PROGRAM STREAM SEPTEMBER 1994 *****

look

MANNING'S N= .017 SLOPE= .0296

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.50	3	40.00	0.00			
2	0.00	0.00	4	40.00	0.50			

WSEL	DEPTH INC	FLOW AREA	FLOW RATE	WETTED PER	FLOW VEL	TOPWID	VEL HEAD	ENERGY HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.10	0.10	4.00	12.9	40.20	3.23	40.00	0.16	0.26
0.20	0.20	8.00	40.9	40.40	5.11	40.00	0.41	0.61
0.30	0.30	12.00	80.1	40.60	6.67	40.00	0.69	0.99
→ 0.40	0.40	16.00	128.9	40.80	8.06	40.00	1.01	1.41
0.50	0.50	20.00	186.4	41.00	9.32	40.00	1.35	1.85

Q_{100} For watershed = 830 c/s

Q_{100} in storm drain = 730 c/s

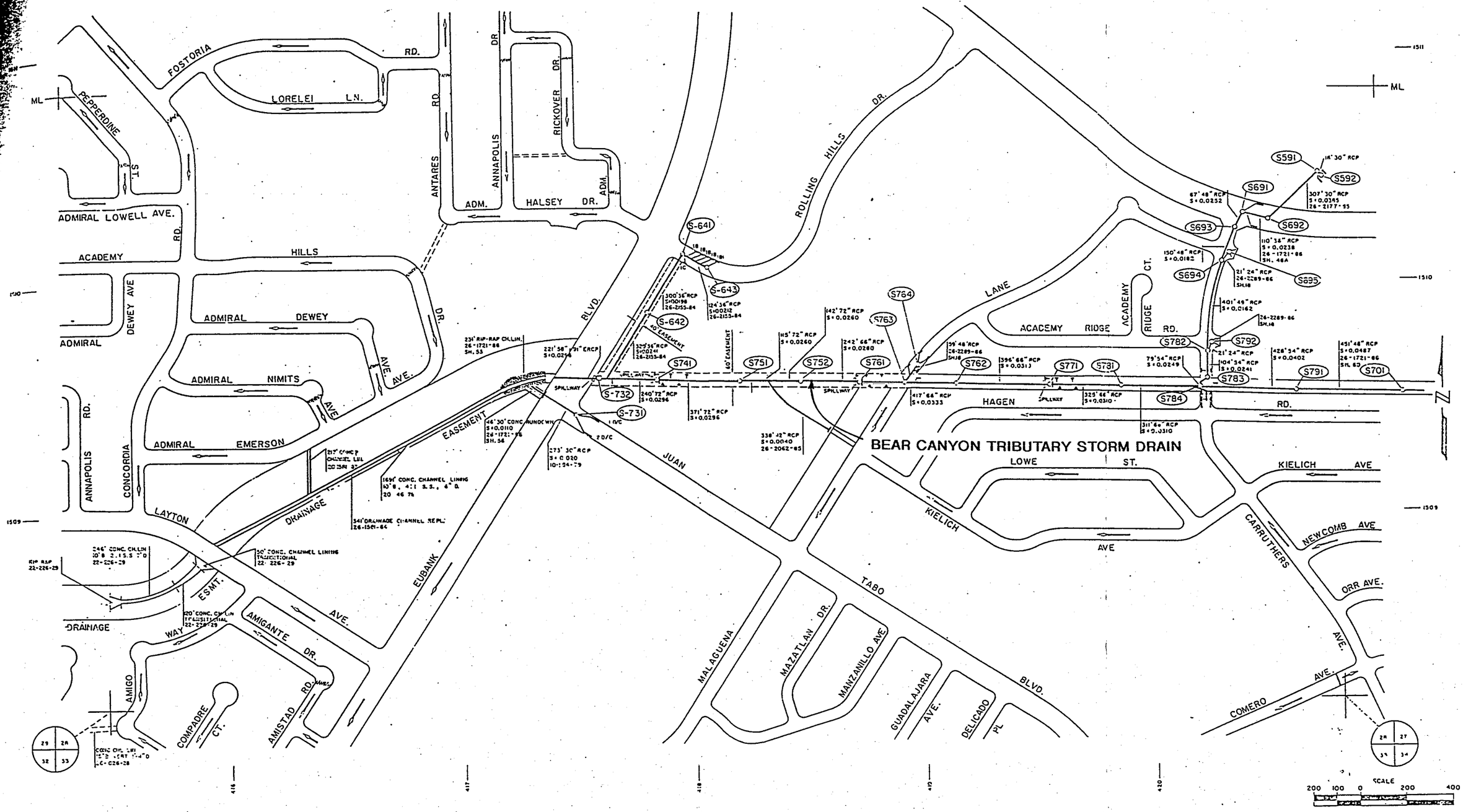
Δ = 100 c/s

Does the 'street 'section above storm drain have adequate capacity to carry the add'l 100 c/s?

YES.

@ Q = 100 c/s, d = 0.34' which is below top of curb.

NEXT SHEET No. E-20S



NEXT SHEET No. E-22S

NEXT SHEET No. F-21N

DRAINAGE FACILITIES MAP

LEGEND	NOTES	REVISIONS		MAP GRID
STORM SEWER LINE MANHOLE (S-112) MANHOLE NUMBER STORM INLET	1. MANHOLE IDENTIFICATION REQUIRES BOTH THE MAP GRID & MANHOLE No. 2. MANHOLL NUMBERS CARRIED FROM ADJACENT MAPS HAVE THE MAP GRID SHOWN.	DATE	REMARKS	E-21S
		1-2-96	DRAINAGE CHAN REPL. 25-581-54	
		1-15-63	STORM SEWER 26-2155-84	

BOHANNAN HUSTON JOB NO. 92281C4.01, 7-13-98

BEAR CANYON TRIBUTARY STORM DRAIN

FIGURE ~~7.11~~ SHEET 1-2
7.3.1

BEAR CANYON TRIBUTARY STORM DRAIN

ACADEMY RD. · MALAGUENA LANE · ACADEMY RIDGE DR. · ACADEMY RIDGE PL. · RIDGE RD. · HAGEN RD. · KIELICH · NASCI RD. · PLACER RD. · SAN VICTORIO AVE. · NEWCOMB AVE. · CARRUTHERS · CRR AVE. · CAMERO AVE. · BURGAN AVE. · FORTY-NINERS · VISTA BONITA · LOST DUTCHMAN ST. · NUGGET AVE. · NUGGET CT. · KLONDIKE ST. · WOODMAR LANE · LOWELL ST. · PEACHTREE PL. · PARKTREE PL N.E. · ROSETREE PL N.E. · SUMMERTREE RD · PERSIMMON AVE. · PAPAYA PLACE · HICKORY CT. · MIMOSA PL. · BALSA PL. · MAHOGANY PL. · PAPAYA CT. · TAMARAC · PEPPERTREE · SPAIN · TRAIL · ELDERBERRY COURT · TEAKWOOD COURT · ROYAL OAK AVE. · ROYAL OAK LOOP · ROYAL OAK PLACE · TRAMWAY · PRESS. RD. · RD. BLVD.

S431 · S481 · S641 · S631 · S722 · S721 · S791 · S701 · S711 · S712 · S651 · S654 · S655 · S657 · S656 · S652 · S653 · S954 · S952 · S951 · S43

CONCRETE HEADWALL 24-3001-87 · UTILITY EASEMENT · INLETS 26-3001-87 · EMERGENCY ACCESS AND PUBLIC DRAINAGE AND UTILITY EASEMENT · SPILLWAY · 62' EASEMENT

NEXT SHEET No. E-21S

NEXT SHEET No. E-23S

NEXT SHEET No. F-22N

SCALE 200 100 0 200 400

LEGEND	NOTES	REVISIONS		MAP GRID
STORM SEWER LINE MANHOLE S-112 MANHOLE NUMBER STORM INLET	1. MANHOLE IDENTIFICATION REQUIRES BOTH THE MAP GRID & MANHOLE No. 2. MANHOLE NUMBERS CARRIED FROM ADJACENT MAPS HAVE THE MAP GRID SHOWN.	DATE	REMARKS	E-22S
		9-11-84	DRAINAGE CHANNEL 26-1473-84	
		9-23-84	CHANNEL 26-1576-84	
		7-11-85	26-2146-85	
		11-10-86	26-2451-86	
		12-5-86	26-1721-86 (VAC CHANNEL)	

DRAINAGE FACILITIES MAP

BOHANNAN HUSTON JOB NO. 92281C4.01, 7-13-98

BEAR CANYON TRIBUTARY STORM DRAIN

FIGURE ~~7.4.1~~ 7.3.1 SHEET 2-2

APPENDIX G: Section 2

As-Built Figures for the Bear Canyon Tributary Storm Drain

APPENDIX H

Appendix for Form 8
Bear Tributary Arroyo Diversion

1. Excerpts from High Desert - Phase 1 Prudent Line Analysis

2. Excerpts from High Desert - Phase 2 Prudent Line Analysis

3. HEC-RAS Summary Output for South Pino Tributary

4. NMSHTD Standard Specification, Section 602, for Slope and Erosion Protection Structures

5. As-Built Figures for the Bear Tributary Arroyo Diversion

APPENDIX H: Section 1

Excerpts from High Desert Phase 1 Prudent Line Analysis

NOTE - DISCUSSES
THE BEAR TRIBUTARY
ARROYO DIVERSION.

High Desert - Phase I
Prudent Line Analysis

May 1994

HIGH DESERT - PHASE I
PRUDENT LINE ANALYSIS

Prepared for:

High Desert Investment Corporation
6400 Wyoming Boulevard, NE
Albuquerque, NM 87109

Prepared by:

BOHANNAN-HUSTON INC.
ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS SURVEYORS
COURTYARD I, 7500 JEFFERSON NE ALBUQUERQUE, NM 87109 TEL (505) 823-1000 FAX (505) 821-0892

INTRODUCTION

The purpose of this study is to establish the prudent lines for the proposed High Desert Subdivision project.

The concept of the "prudent line" was established by the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA). The Prudent Line represents the minimum setback necessary to provide protection for development from an active arroyo. The Prudent Line concept encompasses not only the floodplain necessary to pass the 100-yr storm but also represents the potential for natural arroyos to move laterally and degrade over time. The long-term effects are based on potential erosion associated from a "representative" annual event storm occurring for a 30-yr period.

The criteria for performing a prudent line analysis is based upon guidelines and procedures established by AMAFCA and Resource Consultants and Engineers, Inc. (RCE) of Fort Collins, Colorado. RCE, under contract to AMAFCA, is preparing an erosion and sediment manual. The draft of this manual, the "Sediment and Erosion Design Guide," is dated March 1992. Recent updates to the "Sediment and Erosion Design Guide" were provided by Mr. Cliff Anderson from AMAFCA, a copy of which can be found in the Appendices to this report.

STUDY PHASING

This Prudent Line report is divided into two phases. Phase I encompasses the prudent lines for the following areas within High Desert:

- South Pino Tributary Training Dike ≡ Bear Tributary Arroyo Diversion
- Bear Canyon Training Dike
- Embudito Arroyo at the Trail Head

- Local Arroyos in the Highlands Area (southern portion of Tract 15).

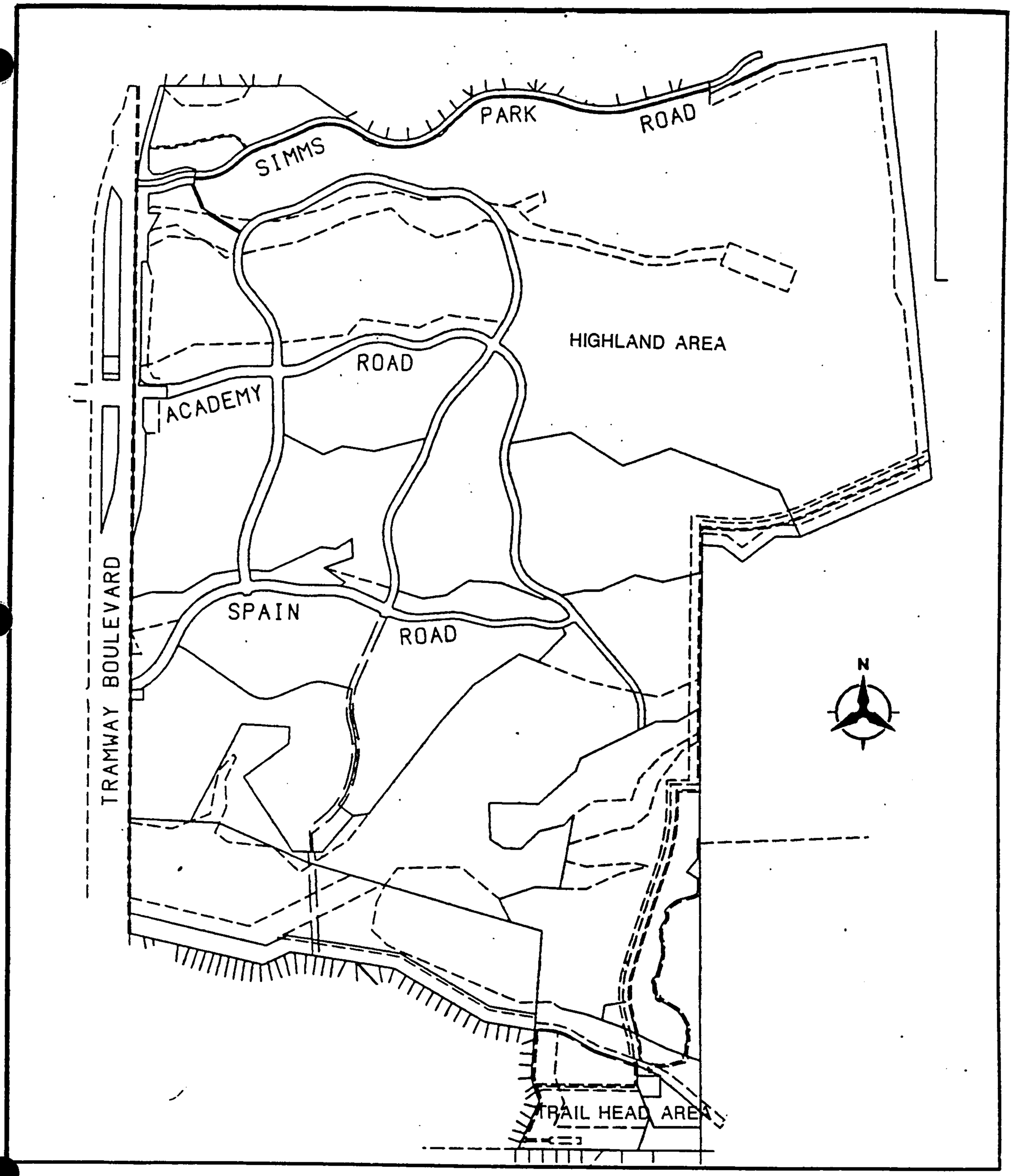
Phase II will complete the remaining portions of prudent line analysis in the High Desert subdivision which includes:

- Bear Canyon downstream of the Bear Canyon Training Dike
- South Pino Tributary Arroyo downstream of the South Pino Tributary Training Dike
- North Bank of the Embudito at the Trail Head
- North Bank of the South Pino Tributary Arroyo at the Training Dike
- North Pino Arroyo (south bank) east of Tramway Boulevard

A letter to AMAFCA dated December 7, 1993 outlines the two phases of the Prudent Line Study shown in the accompanying colored map. A copy of this map is enclosed with this report. Since mailing of the letter, the North Pino Arroyo was moved to Phase II of the Prudent Line Study.

STUDY AREA

The High Desert project is located in the northeast heights area of Albuquerque (see Figure 1, Location Map). It is bounded on the west by Tramway Boulevard, on the north by the Ellena Gallegos Land Grant boundary (Simms Park Road), Bear Canyon Arroyo on the south, and the Cibola National Forest on the east.



LOCATION MAP

ZONE ATLAS INDEX MAP NO. D-23, D-24, E-23, E-24, AND F-23

NOT TO SCALE

FIGURE 1

ANALYSIS CRITERIA

This Prudent Line Study involves both natural arroyos and constructed drainage structures. This section briefly outlines the analysis procedures and criteria used in the Prudent Line delineation and hydraulic capacity analysis.

FEMA Floodplains

The Federal Emergency Management Agency (FEMA) established the limits of flooding from the 100-yr storm for the major arroyos within the High Desert subdivision in the Flood Insurance Study (FIS) for the City of Albuquerque, 1983. The Flood Insurance Rate Map (FIRM), dated September 1983, shows that most of the areas within the High Desert project boundaries are Zone C. Those areas that are shown as having a Special Flood Hazard designation are mainly Zone AO, with flood depths between 1 to 2 feet.

As part of this study, detailed hydraulic analyses were performed to determine the limits of flooding for the 100-yr storm. This was necessary for two reasons:

- The existing FEMA floodplain did not extend all the way through the High Desert Development.

- Recent hydrology based on the latest City of Albuquerque Design Process Manual and the AHYMO computer program, developed by AMAFCA, produced flows higher than in the Flood Insurance Study (FIS) for Albuquerque. This necessitated reanalyzing hydraulic capacity of the existing drainage structures within the development.

Table 1 lists the arroyos that were studied in detail and the total reach lengths studied.

TABLE 1

DETAILED STUDY REACH LENGTHS

ARROYO NAME	REACH LENGTH
Embudito	1,600 ft.
Bear Canyon	10,000 ft.
South Bear Tributary	12,400 ft.
North Bear Tributary	1,600 ft.
South Pino Tributary	4,100 ft.
Pino	1,800 ft.

The Corps of Engineers' step-backwater computer program HEC-2 was used to perform the hydraulic analysis. The majority of the cross-sections used in the model were taken from a 1991 topographic map with 2-foot contour intervals at a nominal scale of 1"=100'. The Bear Canyon Arroyo HEC-2 model, in the vicinity of the training dike, was supplemented with the 1"=500' 1979 FEMA mapping and as-built construction plans because the training dike lies outside the 1"=100' mapping.

The 100-year discharges used in the HEC-2 models were based on the AHYMO model submitted to AMAFCA as part of the report entitled "High Desert Management Master Plan," December 1993. A summary printout from this model can be found in the Appendices. For this study, some drainage basins had to be further subdivided in order to establish the flows for the some of the smaller arroyos. The two arroyos which needed further subdividing were South Bear Tributary and North Bear Tributary (see Exhibit 1).

The results from the HEC-2 analysis served two purposes. Firstly, the HEC-2 output was used to determine the limits of flooding from the 100-yr storm for the arroyos studied in detail. Secondly, information from the hydraulic analysis was used

as input for the prudent line analysis. The HEC-2 input files and summary output can be found in the Appendices.

Prudent Line

AMAFCA has defined two different analysis techniques to establish the Prudent Line. The first analysis technique is referred to as the Erosion Envelope and is a less detailed method of analysis. The second method, herein referred to as the RCE Method, is a more detailed method of establishing the Prudent Line. The following presents a brief description of each method.

Erosion Envelope Method. The Erosion Envelope Method is based on a combination of concepts including those presented by Leopold and Wolman (1960). Fundamental assumptions used in developing the method are that a typical bend will have the approximate shape of a sine-generated curve, as proposed by Leopold and Wolman (1960) and the meander wavelength for natural channels (including arroyos) is usually in the range of 10 to 14 channel widths (Leopold et al., 1964; Leopold et al., 1966).

This method also is based on field observations that indicated the lateral erosion rate for a bend reduces markedly when the ratio of the radius of curvature (R_c) to width (W) (describes the bend geometric) reaches a value of 2 to 3, which corresponds to a sinuosity of 1.5. When this condition occurs, the energy loss through the bend increases causing upstream backwater increasing the likelihood of bank overtopping and channel avulsion. Several references to the phenomenon are cited in the AMAFCA Sediment on Erosion Design Guide. A general conclusion from these references are that the maximum offset from a straight channel will be 2.5 to 3.5 channel widths depending on the assumed meander wavelength.

The driving force for the channel meander phenomenon is the "dominant discharge." For ephemeral streams the dominant discharge over a 30-year period tends to be a 5- to 10-year flood peak. AMAFCA has suggested, and this study substantiated, that this "dominant discharge" can be approximated as 20% of the 100-year peak discharge (Cliff Anderson, personal comm.)

The determination of the erosion envelope is based on the following parameters:

Average Downvalley Direction - This is a line about which the arroyo is expected to meander in a sinusoidal pattern.

Dominant Discharge - Explained previously.

Meander Wave Length - The anticipated length of the sinusoidal wave.

Dominant Width - The top width of the flowing water based on the dominant discharge.

Centerline Setback (C.S.B.) - The total distance from the Average Valley Direction to the maximum expected lateral migration of the arroyo. The C.S.B. establishes the Prudent Line.

RCE Method. For this method more field data is required in order to perform the analysis. Soil samples are taken in the arroyo at select locations. A soil sieve analysis is then performed on the soil samples to determine the particle size and gradation.

A HEC-2 analysis is performed to determine the flow depth, velocity, and top width for a range of flows (2-yr to the 100-yr storm). Once the hydraulics have

been performed the transport capacity of representative reaches is determined using a sediment transport equation advanced by RCE (see the Appendices).

Once the channel sediment transport capacity has been established by reach, then a sediment balance by reach is performed. The result of this is a determination of the amount of sediment that is removed for each reach. The sediment that is either removed or deposited per reach comes from degradation of the arroyo bed and bank.

Further details of this method are described in the AMAFCA "Sediment and Erosion Design Guide."

Freeboard Criteria

In addition to the Prudent Line, an analysis of the freeboard requirements for drainage structures was also determined. The three structures analyzed to determine if they have adequate freeboard are: South Pino Tributary Training Dike, Bear Canyon Training Dike, and the Embudito South Bank Channel Lining.

The freeboard criteria discussed here come from the City of Albuquerque, AMAFCA, and FEMA.

City of Albuquerque Freeboard Requirements. The City of Albuquerque (COA) requires that adequate freeboard be provided above the 100-yr water surface to the top of the drainage structure. All flows in this study are supercritical. Freeboard requirements are stated on pages 61 and 61.1 of Section 22.3 of the Albuquerque DPM. For flows of 100 cfs or greater, the following equation is used to determine the required freeboard.

$$Freeboard\ (ft.) = 0.7*(2.0+.025V*d^{1/3})$$

Where: V = Flow velocity

d = flow depth

The freeboard equations presented in the DPM apply to constructed channels (vertical or trapezoidal) and are normally applied to the computed water surface. No guidance is provided in the City DPM for natural arroyos or for arroyos that are lined only on one side (Embudito Arroyo by the Trail Head).

Sequent Depth. It has been recognized that natural arroyos in steep slopes cannot sustain supercritical flow conditions. What is often observed is that the flow will on occasion jump to subcritical flow (milder flow) conditions and then return to the supercritical flow regime. The "jumping" to subcritical flow can be caused by a variety of conditions such as channel bends, drops, obstructions, and sediment scouring and deposition.

The potential to jump to subcritical flow can best be predicted by calculating sequent depth. The sequent depth formula presented here is advanced by AMAFCA and is expressed as follows:

$$D_{seq} = D+0.5*(A/W_T)*(\sqrt{(1+8*Fr^2)}-3)$$

Where D = Computed water surface elevation (from HEC-2)

A = Cross-sectional area of flow (from HEC-2)

W_T = Top width of the water surface (from HEC-2)

Fr = Froude Number from (HEC-2)

D_{seq} = Sequent Depth

FEMA Freeboard Requirements. FEMA presents two criteria for freeboard. The first criteria relates to berms. Where the flow is in the subcritical range (mild sloping arroyos) FEMA requires the berm be constructed 3 feet higher than the 100-yr water surface. Where the flow is in the supercritical range the berm must be constructed 3 feet higher than critical depth.

For structures within shallow flooding areas the floor elevation must be one foot above the water surface. And for structures located next to a floodplain, the floor elevation of the dwelling unit must be located above the 100-yr water surface (critical depth is used as the water surface in supercritical flow arroyos). FEMA does not advance any minimum freeboard criteria for arroyos or constructed channels. In these situations, local freeboard criteria will control.

Freeboard Recommendations. In discussions with AMAFCA, the following describes the freeboard criteria used in this study:

Constructed Channels	100-yr Water Surface + COA Freeboard
Natural Arroyos	100-yr Sequent Depth + COA Freeboard
Berms	100-yr Critical Depth + FEMA 3' Freeboard

STRUCTURE CAPACITY ANALYSIS

This section discusses the analysis procedure and results for the Bear Canyon Training Dike, South Pino Tributary Training Dike, and Embudito Channel. The two training dikes are owned and maintained by AMAFCA and the Embudito Channel Lining is owned and maintained by the City of Albuquerque.

freeboard to the critical water surface. This analysis shows that the berm needs to increase in height by approximately 2.0' in order to safely pass the 100-yr storm.

Figure 3 shows a typical cross-section for the Bear Canyon Training Dike. This figure also shows the proposed increase in berm height by adding additional compacted fill to the top and downstream face of the berm.

Table 2 also shows the anticipated scour that could occur at the toe of the structure. The scour depth was calculated using Equation 3.89 from the AMAFCA Sediment and Erosion Guide where:

$$ys/y=(.73+0.14\pi F^2)\cos\theta+4F^{.33}\sin\theta$$

The upper half of the structure is at a 45° angle to the 100-year flow. However, in light of the potential for the arroyo to meander, an angle of 71° was used. In the lower half, where the arroyo is confined, an angle of 45° was used. The scour depth, as shown on Table 2, varies from 5' to 9' along the toe of the structure.

The proposed solution to upgrade the Bear Canyon Training Dike requires installing toe protection and raising the top of the structure where required (see Table 2). The improvements will be constructed of wire-tied riprap with the toe protection at a slope of 1.5:1 and the top extension matching the existing riprap (2:1 to 3:1).

South Pino Tributary Arroyo Diversion = Bear Tributary Arroyo Diversion
*(This describes diversion before it was raised and lengthened)

In the mid 1980's, a diversion was built on the South Pino Tributary. The intent of the training dike was to prevent the possibility of flows diverting to the North Bear Tributary. This training dike is located northeast of the Highland area of the High Desert Project (see Exhibit 1). Since the dike's construction, it appears that sediment has accumulated within the channel upstream of the dike thereby reducing its flood carrying capacity. Overtopping of the dike would have a direct impact on the lots to

be developed downstream in the North Bear Tributary watershed and on the capacity of the Tramway Boulevard crossing structures. In order to determine whether the dike would be overtopped or freeboard requirements would be exceeded, an analysis was performed to determine the effect of accumulated sediment.

A 100-yr HEC-2 analysis was performed for the South Pino Tributary Arroyo. Figure 4 shows a profile of the South Pino Tributary Arroyo upstream and through the training dike. Critical depth for the 100-yr flow is plotted along with the existing left bank and top of berm.

The sediment transport capacity of the South Pino Tributary Arroyo was divided into two reaches upstream of the South Pino Tributary Training Dike. The first reach is located approximately 600 feet upstream of the berm and is represented by X-Section 134+00. This reach simulates the capacity of the arroyo to carry sediment in the upper steeper areas where the South Pino Tributary Arroyo is well incised and has a relatively narrow top width. The second reach is located just upstream of the training dike and is represented by X-Section 133+00. From a field inspection, Reach 2 shows evidence of aggrading in comparison to Reach 1.

In order to determine the transport capacity of both reaches a range of flows were analyzed in HEC-2. The HEC-2 computed velocity and top width information. This information was input into the AHYMO sediment model. The newly created Sediment Trans command was then used in AHYMO to determine the sediment transport capacity for the two reaches. The bed material transport capacity in AHYMO was determined for the 100-yr storm and the dominant discharge storm. The dominant discharge for this run was based on the peak flow being 20% of the 100-yr storm.

South Pino Tributary Training Dike

HEC-2 Profile

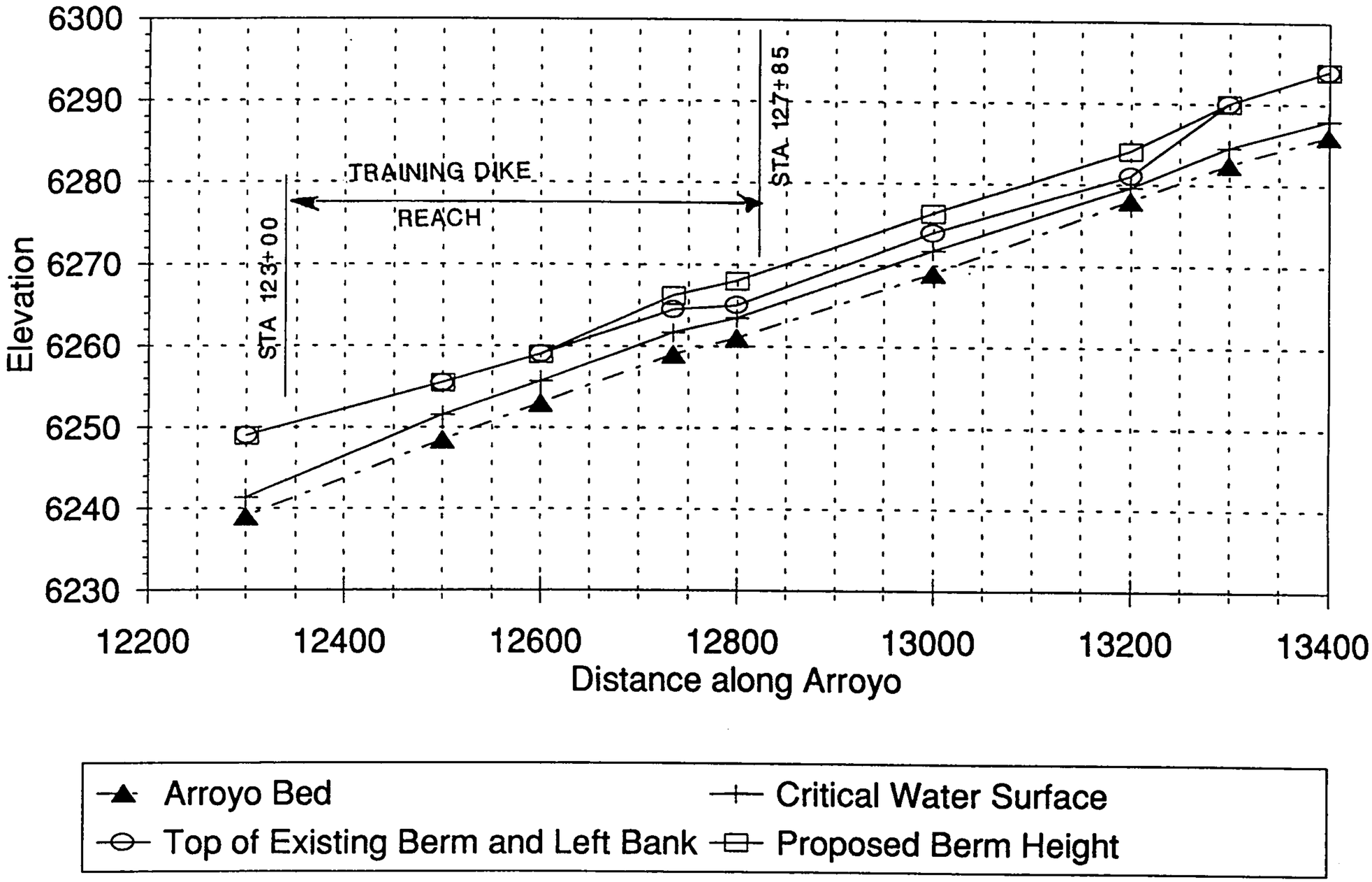


FIGURE 4

The output of the AHYMO model can be found in the Appendices. The results show that the bed load sediment carrying capacity of the upstream reach for the 100-yr event is approximately 1.25 acre-feet, while the sediment capacity of the downstream reach is approximately 0.49 acre-feet. This same trend of greater sediment capacity in the upstream reach is also present for the dominant discharge. The results of the analysis tend to provide additional evidence that substantiates the field investigation showing that Reach 2 is aggrading in comparison to Reach 1.

From the AHYMO sediment run a total volume of accumulated sediment in Reach 2 over a 30-yr period was determined. This analysis assumed that the 100-yr storm could occur at the end of the 30-yr period. This analysis also assumed that little if any removal of sediment was performed by AMAFCA over this 30-yr period. After determining the volume of sediment, the depth of accumulated sediment was determined. The aggradation reach (Reach 2) was assumed to occur between Sta. (STA. 15+00) 27+35 (approximately 50' downstream of the end of the (u/s R. end of dike (STA. dike) and Sta. 35+00. Below Sta. 27+35, the arroyo is assumed to be degrading. This was confirmed by the AHYMO program. Reach 2 is 765' long by 150' wide. The accumulation of sediment was spread out equally over the arroyo bottom. The results of the analysis showed that the depth of sediment was approximately 1.5 feet. The calculations for this are found in the Appendices.

Tables 3 and 4 summarizes the results of the analysis. Table 3 lists the critical water surface, existing berm elevation, sediment depth, required berm elevation. The required berm elevation is computed by adding the sediment depth plus the 3' FEMA freeboard to the critical water surface. Also included in Table 3 is the required berm height using sequent depth plus sediment depth plus the City DPM freeboard. In all cases the FEMA criteria controls for determining the required berm height. This analysis shows that the berm and left bank needs to increase in height from 0 to 3.1' in order to safely pass the 100-yr storm.

TABLE 3

SOUTH PINO TRIBUTARY DIVERSION
BERM HEIGHT AND SCOUR DEPTH REQUIREMENTS

Diversion Stationing	HEC-2 Section Number	Flow	Flow Area	Top Width	Velocity	Froude Number	Hydraulic Depth	100-yr Water Surface	Critical Water Surface
		cfs.	sq. ft.	ft.	fps.		ft.	ft.	ft.
24+20	13600	1328	158	151.3	8.4	1.45	1.0	6296.79	6297.009
22+90	13400	1328	195.0	169.0	6.8	1.12	1.2	6287.9	6288.0
21+10	13300	1328	194.0	156.7	6.8	1.08	1.2	6284.5	6284.6
19+80	13200	1328	192.0	151.0	6.9	1.08	1.3	6279.5	6279.6
17+75	13000	1328	166.0	88.2	8.0	1.03	1.9		
15+70	12800	1328	147.0	79.4	9.0	1.17	1.9		
13+70	12600	1328	126.0	69.9	10.5	1.38	1.8		
12+80	12500	1328	138.0	74.4	9.6	1.24	1.9		
	12300	1328	136.0	110.0	10.1	1.60	1.2		

Diversion Stationing	HEC-2 Section Number	Existing Ground at top of Berm	Proposed Top of Berm	Appox. Berm Height	Scour Depth	Thalweg Elevation	E at T
		ft.	ft.	ft.	ft.	ft.	
24+20	13600	6301.5	6301.5	0.0	5.0	6294.5	6
22+90	13400	6290.0	6292.5	2.5	5.0	6286.0	6
21+10	13300	6286.0	6289.1	3.1	5.2	6282.5	6
19+80	13200	6282.0	6284.1	2.1	5.3	6278.0	6
17+75	13000	6273.0	6276.4	3.4	7.5	6269.0	6
15+70	12800	6264.0	6268.0	4.0	7.0	6261.0	6253.96
13+70	12600	6259.0	6258.7	0.0	7.6	6253.0	6245.43
12+80	12500	6255.0	6254.6	0.0	7.0	6248.5	6241.45
	12300	-	6244.4	-	0	6239.0	6239.00

Notes:
1. Existing Berm extends from Sta. 11+76.27 to Sta. 15+50.
2. Scour Depth Calculations based on Fig. 3.31 of Design Guide.
3. Proposed Berm extends from Sta. 15+50 to Sta. 24+25.

TABLE 4

Scour Depth Calculations
Based on Figure 3.31 from Sediment Design Guide
Dominant Width = 42.9 feet

Diversion Stationing	HEC-2 Section Number	Froude Number	Hydraulic Depth ft.	Unconst-rained Width ft.	Unconst-rained/ Dominant Width	Fig. 3.31 Scour Depth/ Flow Depth	Scour Depth ft.
24+20	136+00	1.45	1.0	150	3.5	4.8	5.0
22+90	134+00	1.12	1.2	210	4.9	4.3	5.0
21+10	133+00	1.08	1.2	160	3.7	4.2	5.2
19+80	132+00	1.08	1.3	140	3.3	4.2	5.3
17+75	130+00	1.03	1.9	90	2.1	4.0	7.5
15+70	128+00	1.17	1.9	80	1.9	3.8	7.0
13+70	126+00	1.38	1.8	80	1.9	4.2	7.6
12+80	125+00	1.24	1.9	80	1.9	3.8	7.0
	123+00	1.60	1.2				

APPENDIX 2

SOUTH PINO TRIBUTARY ARROYO

A.) SedimentTransport Output (AHYMO)
B.) HEC-2 Summary Input and Output
C.) Fill Depth Calculations

1**********
* HEC-2 WATER SURFACE PROFILES *
* *
* Version 4.6.0; February 1991 *
* *
* RUN DATE 15DEC93 TIME 12:54:59 *
****

****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET, SUITE D *
* DAVIS, CALIFORNIA 95616-4687 *
* (916) 756-1104 *
****

```
X     X  XXXXXXX   XXXXX            XXXXX
X     X  X        X     X          X     X
X     X  X        X                      X
XXXXXXX  XXXX     X        XXXXX    XXXXX
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX            XXXXXXX
```

1
15DEC93 12:54:59 PAGE 1

THIS RUN EXECUTED 15DEC93 12:54:59

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

T1 SOUTH PINO TRIBUTARY - Flow for 100-YR FREQUENCY - 10 % BULKED
T2 JOB# H9324120 - DECEMBER 1993 -
T3

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	2		1	0.050				6299.0	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1	0.	-1.							

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	38	43	4	26	1	2				
QT	7	650								
NC	.045	.045	.045							
X1	14100	8	100	300	95	110	100			
GR	6322	100	6320	150	6318	152	6318	180	6318	205
GR	6320	230	6322	260	6324	300				
X1	14000	6	100	230	75	95	100			
GR	6316	100	6314	120	6313	155	6314	185	6316	188
GR	6318	230								
X1	13900	8	100	275	155	100	100			
GR	6312	100	6310	148	6308	180	6308	190	6310	235
GR	6310	245	6312	247	6314	275				

X1	13[illegible]	11	100	360	110	100	10[illegible]			
GR	63[illegible]	100	6306	120	6304	132	6304	160	6303	180
GR	6304	195	6304	215	6304	230	6306	238	6308	280
GR	6309	360								
QT	7	1328								
X1	13700	12	100	410	130	70	100			
GR	6310	100	6308	112	6306	123	6304	145	6302	172
GR	6300	188	6299	200	6300	225	6299	255	6300	290
GR	6302	300	6304	410						

1

15DEC93 12:54:59 PAGE 2

NC	.045	.045	.045	.1	.3					
X1	13600	12	100	370	210	185	200			
GR	6300	100	6298	130	6296	153	6294.5	165	6296	180
GR	6298	190	6296	214	6295	230	6296	270	6296	313
GR	6298	320	6300	370						
X1	13400	15	100	460	100	110	100			
GR	6294	100	6292	130	6290	190	6288	210	6287	255
GR	6286.5	310	6288	325	6290	335	6290	350	6288	360
GR	6286	365	6286	415	6288	420	6290	425	6292	460
X1	13300	9	100	413	100	100	100			
GR	6286	100	6284	108	6282.5	200	6284	260	6286	270
GR	6286	307	6288	330	6290	368	6292	413		
X1	13200	11	100	410	200	200	200			
GR	6283.5	100	6282	110	6280	115	6278.5	155	6278	190
GR	6278	270	6280	280	6282	300	6284	330	6286	370
GR	6288	410								
X1	13000	14	100	385	180	170	200			
GR	6274	100	6273.5	115	6274	125	6273	150	6272	190
GR	6270	210	6269.5	230	6270	245	6269	265	6270	275
GR	6272	280	6274	310	6276	345	6278	385		
X1	12800	9	100	295	200	190	200			
GR	6265	100	6264	120	6262	135	6261	160	6262	200
GR	6264	208	6266	221	6268	250	6270	295		
	12-13?									
X1	12600	10	100	215	110	100	100			
GR	6259	100	6258	110	6256	115	6254	122	6253	130
GR	6253	165	6254	180	6256	192	6258	200	6260	215
X1	12500	7	100	195	160	230	200			
GR	6255.5	100	6254	110	6252	118	6250	125	6248.5	130
GR	6250	190	6251	195						
QT	7	1373								
X1	12300	12	100	400	95	50	100			
GR	6249	100	6248	150	6246	163	6244	180	6242	190
GR	6240	212	6239	225	6240	300	6242	325	6244	355
GR	6246	376	6248	400						
X1	12200	10	100	270	100	100	100			
GR	6240	100	6236	130	6234	140	6232	155	6232	165
GR	6234	180	6234	210	6236	245	6238	255	6240	270
X1	12100	13	100	315	200	200	200			
GR	6240	100	6238	119	6236	136	6234	150	6232	175
GR	6231	205	6230	225	6228	235	6226	245	6228	260

X1	11900	14	100	345	100	70	90			
GR	6232	100	6230	140	6228	165	6226	187	6224	200
GR	6222	212	6220	215	6220	223	6222	248	6224	282
GR	6226	295	6228	307	6230	320	6232	345		
X1	11800	13	100	325	120	120	130			
GR	6228	100	6226	120	6224	145	6222	160	6220	179
GR	6218	210	6216	230	6218	245	6220	256	6222	280
GR	6224	298	6226	312	6228	325				
X1	11700	13	100	261	190	190	200			
GR	6222	100	6220	120	6218	135	6216	149	6214	162
GR	6212	185	6210.5	195	6212	208	6214	218	6216	229
GR	6218	238	6220	250	6221	261				
X1	11500	11	100	267	225	175	200			
GR	6212	100	6210	114	6208	128	6206	140	6204	165
GR	6203	190	6204	200	6206	218	6208	230	6210	248
GR	6212	267								
X1	11300	10	100	263	120	85	100			
GR	6202	100	6200	116	6198	131	6196	150	6194	175
GR	6193	190	6194	207	6196	225	6198	245	6200	263
X1	11200	11	100	253	70	100	100			
GR	6196	100	6194	120	6192	140	6190	162	6188	175
GR	6189.5	180	6188	190	6190	210	6192	225	6194	240
GR	6196	253								
X1	11100	12	100	340	70	130	100			
GR	6195	100	6194	150	6192	180	6190	200	6186	230
GR	6184	232	6184	245	6186	265	6188	290	6190	300
GR	6194	325	6196	340						
X1	11000	12	100	250	120	40	100			
GR	6190	100	6188	120	6186	140	6184	152	6182	168
GR	6180	185	6180	190	6182	200	6184	212	6186	224
GR	6188	236	6190	250						
X1	10900	12	100	280	120	100	100			
GR	6186	100	6184	123	6182	145	6180	162	6178	188
GR	6176.3	200	6178	218	6180	230	6182	242	6184	252
GR	6186	263	6188	280						
X1	10800	8	100	215	50	150	100			
GR	6180	100	6178	135	6174	150	6172	160	6174	175
GR	6176	185	6178	195	6180	215				

X1	10700	10	100	275	120	70	100			
GR	6180	100	6178	120	6176	140	6172	165	6170	183
GR	6168	210	6170	220	6174	240	6178	255	6180	275
X1	10600	7	100	255	100	50	100			
GR	6174	100	6172	120	6164	170	6166	200	6170	225
GR	6172	240	6174	255						
X1	10500	8	100	280	50	130	100			

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GR      6164      100      6166      265      6168      280
GR      6164      250      6166      265      6168      280

X1     10400        8       100      280        80       85       100
GR      6164      100      6162      120      6160      140      6158      200      6157      215
GR      6158      230      6162      255      6164      280

X1     10300       10       100      290       150       60       100
GR      6159      100      6158      110      6156      125      6154      142    6153.5      150
GR    6153.5      180      6154      190      6156      245      6158      265    6159.0      290

X1     10200        7       100      290       110       50       100
GR      6152      100      6150      135      6148      155      6147      160      6148      165
GR      6150      260      6152      290

X1     10100        7       100      350        70      170       100
GR      6150      100      6148      165      6146      205      6144      230      6146      250
GR      6148      290      6150      350

QT         7     1716
X1     10000       12       100      415       400      370       400
GR      6150      190      6148      220      6146      240      6144      255      6142      278
GR      6140      290      6140      300      6142      320      6144      350      6146      385
GR      6148      400      6150      415

X1      9600        9       100      510       430      300       350
GR      6132      100      6128      130    6127.5      150    6126.5      255      6128      300
GR    6129.5      355      6129      460      6130      490      6132      510

X1      9250       10       100      375       360      475       450
GR      6118      100      6116      120      6114      145    6112.5      190    6113.5      265
GR      6112      305      6110      310      6110      330      6114      345      6118      375

X1      8800       10       100      315       400      495       450
GR      6102      100      6098      150      6096      190      6095      200      6096      215
GR      6098      250      6097      275      6098      290      6100      300      6102      315

X1      8350       10       100      390       450      450       450
GR      6088      100      6082      170      6080      185      6077      200      6080      230
GR      6078      235    6078.5      310      6080      335      6086      370      6088      390
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THIS RUN EXECUTED 15DEC93 12:55:06

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**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0;  February 1991
**************************************
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUMMARY PRINTOUT

	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
	14100.000	650.00	70.67	8.03	6319.31	6319.55
	14000.000	650.00	73.82	7.58	6314.77	6314.94
	13900.000	650.00	80.36	7.87	6309.83	6310.11
	13800.000	650.00	105.52	6.91	6304.75	6304.91
*	13700.000	1328.00	117.04	7.47	6301.15	6301.22
*	13600.000	1328.00	151.34	8.40	6296.79	6297.09
	13400.000	1328.00	168.79	6.82	6287.90	6287.99
	13300.000	1328.00	156.69	6.83	6284.52	6284.58
*	13200.000	1328.00	141.05	9.13	6279.24	6279.63
*	13000.000	1328.00	88.26	7.98	6271.86	6271.86
*	12800.000	1328.00	79.00	11.05	6263.22	6263.79
*	12600.000	1328.00	72.98	8.87	6255.58	6255.70
*	12500.000	1328.00	73.68	10.91	6251.04	6251.56
	12300.000	1373.00	113.81	8.87	6241.11	6241.40
	12200.000	1373.00	92.16	10.57	6234.98	6235.50
	12100.000	1373.00	72.28	9.44	6230.75	6231.04
	11900.000	1373.00	76.62	9.57	6223.77	6224.07

	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
	11800.000	1373.00	72.71	10.42	6219.80	6220.27
	11700.000	1373.00	63.72	10.19	6214.65	6214.98
	11500.000	1373.00	77.83	10.57	6206.00	6206.47
	11300.000	1373.00	77.67	10.29	6196.14	6196.59
	11200.000	1373.00	72.08	10.57	6191.30	6191.79
	11100.000	1373.00	72.83	9.15	6187.89	6188.06
	11000.000	1373.00	59.86	10.69	6183.99	6184.43
	10900.000	1373.00	70.34	10.19	6180.16	6180.55
	10800.000	1373.00	50.37	10.23	6176.91	6177.09
*	10700.000	1373.00	56.49	13.45	6171.39	6172.27
*	10600.000	1373.00	65.94	9.52	6167.88	6168.08
	10500.000	1373.00	95.78	9.65	6164.03	6164.43

	10300.000	1373.00	107.01	9.37	6155.64	6156.02
	10200.000	1373.00	128.14	9.02	6150.10	6150.44
*	10100.000	1373.00	115.45	7.37	6147.76	6147.76
	10000.000	1716.00	90.73	9.86	6143.84	6144.20
	9600.000	1716.00	190.36	7.57	6128.46	6128.64
	9250.000	1716.00	189.87	7.62	6113.70	6113.88
	8800.000	1716.00	149.14	7.36	6098.51	6098.53
*	8350.000	1716.00	138.89	9.78	6079.68	6080.10

1

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 13700.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 13600.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 13200.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 13000.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13000.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13000.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 12800.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 12600.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 12500.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10700.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 10600.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 10100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 10100.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 10100.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 8350.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 AHYMO PROGRAM (AHYMO993) - AMAFCA VERSION OF HYMO - SEPTEMBER, 1993
      RUN DATE (MON/DAY/YR) = 02/16/1994
      START TIME (HR:MIN:SEC) = 08:51:04     USER NO.= M_CONN0L.S93
      INPUT FILE = spt_p1.hym

*SOUTH PINO TRIBUTARY @ THE TRAINING DIKE input=spt_p1 PHASE1 REACHES
*SEDIMENT TRANSPORT ANALYSIS - 100 YEAR DISCAHRGE
RECALL HYD            ID=10  HYD= AP23       DT= 0.033330 HRS DA=   0.733 SQ MI
                      PEAK=  1206.CFS   RO=     2.46       NO PTS=213
                      FLOW RATES
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      1.      8.     35.    107.
                        253.    496.    779.   1015.   1162.   1206.   1167.
                       1085.    974.    861.    755.    657.    573.    501.
                        438.    384.    341.    304.    270.    239.    211.
                        187.    166.    150.    135.    122.    112.    102.
                         93.     85.     79.     73.     67.     62.     58.
                         53.     49.     45.     42.     39.     36.     34.
                         31.     29.     27.     26.     24.     23.     21.
                         20.     19.     17.     16.     15.     15.     14.
                         13.     12.     11.     11.     10.     10.      9.
                          8.      8.      7.      7.      7.      6.      6.
                          6.      5.      5.      5.      4.      4.      4.
                          4.      4.      3.      3.      3.      3.      2.
                          2.      2.      2.      2.      2.      2.      2.
                          1.      1.      1.      1.      1.      1.      1.
                          1.      1.      1.      1.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          1.      1.      1.      1.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.      0.      0.      0.      0.
                          0.      0.      0.
*CROSS SECTION 34+00 FROM SPT.HEC
SEDIMENT TRANS        ID=10 IDS=2  CODE=10
                       A FACT=0.00000173 B EXP=5.81
                       C EXP=-0.65 D EXP=-2.02   NUMBER WASH=1
                       WAS CONC=50000
                       NUMBER SECTIONS=6
                       FLOW          VELOCITY      WIDTH
                       (CFS)         (FEET/SEC)     (FT)
                        140           4.71          61.53
                        435           5.66         119.80
                        602           6.10         130.26
                        854           6.56         144.03
                       1033           6.83         152.53
                       1208           7.04         160.38

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

                WATER                HYD.                 WASHLOAD  BED MAT.  BED       TOTAL     BULKING   ACCUM.
   TIME         FLOW      VELOCITY   DEPTH     WIDTH      CONC.     TRANSPORT CONC.     CONC.     FACTOR    SEDIMENT
   (HRS)        (CFS)     (FT/SEC)   (FT)      (FT)       (PPM-W)   (CFS)     (PPM-W)   (PPM-W)             (TONS)

    .000          .00       .000       .000       .00    50000.       .00         0.    50000.    1.0000       .00
    .333          .00       .000       .000       .00    50000.       .00         0.    50000.    1.0000       .00
```

1.[redacted]	.00	.000	.000	.00	50000.	.00	[redacted]	50000.	1.0000	.00
1.333	35.00	4.136	.397	21.29	50000.	.28	21077.	69042.	1.0280	11.80
1.667	974.00	6.747	.964	149.73	50000.	19.30	49902.	95149.	1.0397	3240.75
2.000	270.00	5.316	.582	87.21	50000.	3.91	36926.	83388.	1.0343	5127.63
2.333	93.00	4.593	.465	43.52	50000.	.97	26772.	74194.	1.0302	5606.74
2.666	42.00	4.242	.413	23.97	50000.	.36	22339.	70183.	1.0285	5785.75
3.000	21.00	3.787	.348	15.92	50000.	.14	17222.	65556.	1.0265	5864.84
3.333	11.00	3.264	.279	12.09	50000.	.05	12237.	61050.	1.0245	5903.35
3.666	6.00	2.744	.215	10.18	50000.	.02	8195.	57399.	1.0230	5922.98
4.000	4.00	2.408	.177	9.41	50000.	.01	6050.	55462.	1.0222	5933.47
4.333	2.00	1.888	.123	8.64	50000.	.00	3437.	53103.	1.0212	5938.57
4.666	1.00	1.457	.083	8.26	50000.	.00	1880.	51697.	1.0206	5941.04

AT PEAK FLOW OF 1206.000 WITH TIME AT 1.57 HOURS: BEDMAT = 962.71 (TONS) = .4420 (AC-FT bulked)
TOTAL SED = 1960.09 (TONS) = .8999 (AC-FT bulked)
PEAK BULKING FACTOR = 1.040342 = 96582. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3174.79	.8815	1.4577	50000.	
BEDMAT =	2766.86	.7682	1.2704	43857.	
TOTAL SEDIMENT =	5941.66	1.6498	2.7280	89668.	1.037170

SEDIMENT TRANSPORT CAPACITY: 3.72174 AC-FT/SQ MI (bulked) = 12.6655 TONS/ACRE (at Porosity=0.395)

*CROSS SECTION 33+00 FROM SPT.HEC
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.00000173 B EXP=5.81
C EXP=-0.65 D EXP=-2.02 NUMBER WASH=1
WAS CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
140	3.81	86.34
435	4.73	136.51
602	5.12	152.21
854	5.69	154.12
1033	6.03	155.36
1208	6.30	156.54

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	35.00	3.282	.340	31.35	50000.	.12	9066.	58186.	1.0233	9.99
1.667	974.00	5.923	1.061	154.95	50000.	8.80	23395.	71139.	1.0289	2367.23
2.000	270.00	4.365	.570	108.45	50000.	1.57	15142.	63676.	1.0257	3738.24
2.333	93.00	3.700	.407	61.72	50000.	.42	11959.	60800.	1.0244	4114.00
2.666	42.00	3.377	.355	35.01	50000.	.16	9688.	58748.	1.0236	4260.09
3.000	21.00	2.976	.294	24.01	50000.	.06	7229.	56527.	1.0226	4326.49
3.333	11.00	2.536	.231	18.78	50000.	.02	4984.	54499.	1.0218	4359.96
3.666	6.00	2.113	.176	16.16	50000.	.01	3261.	52944.	1.0211	4377.62
4.000	4.00	1.845	.143	15.11	50000.	.00	2380.	52148.	1.0208	4387.37
4.333	2.00	1.439	.099	14.06	50000.	.00	1333.	51203.	1.0204	4392.24
4.666	1.00	1.107	.067	13.54	50000.	.00	724.	50653.	1.0201	4394.65

AT PEAK FLOW OF 1206.000 WITH TIME AT 1.57 HOURS: BEDMAT = 435.88 (TONS) = .2001 (AC-FT bulked)
TOTAL SED = 1433.26 (TONS) = .6581 (AC-FT bulked)
PEAK BULKING FACTOR = 1.029462 = 72421. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3174.79	.8815	1.4577	50000.	
BEDMAT =	1220.45	.3389	.5604	19831.	
TOTAL SEDIMENT =	4395.25	1.2204	2.0180	67916.	1.027496

SEDIMENT TRANSPORT CAPACITY: 2.75310 AC-FT/SQ MI (bulked) = 9.3691 TONS/ACRE (at Porosity=0.395)

*CROSS SECTION 28+00 FROM SPT.HEC
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.00000173 B EXP=5.81
C EXP=-0.65 D EXP=-2.02 NUMBER WASH=1
WAS CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
140	4.44	58.09
435	6.07	67.64
602	6.61	70.86
854	7.28	74.98
1033	7.73	77.44
1208	8.12	79.64

* * * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	35.00	3.769	.424	21.88	50000.	.16	12204.	61021.	1.0245	10.45
1.667	974.00	7.589	1.675	76.63	50000.	13.67	35869.	82430.	1.0339	2813.47
2.000	270.00	5.337	.812	62.30	50000.	2.30	22081.	69950.	1.0284	4370.57
2.333	93.00	4.297	.517	41.88	50000.	.59	16504.	64908.	1.0262	4778.16
2.666	42.00	3.888	.445	24.29	50000.	.21	13110.	61839.	1.0249	4933.71
3.000	21.00	3.395	.363	17.05	50000.	.08	9585.	58654.	1.0235	5003.30
3.333	11.00	2.869	.282	13.60	50000.	.03	6491.	55860.	1.0223	5037.88
3.666	6.00	2.377	.213	11.88	50000.	.01	4192.	53784.	1.0214	5055.93
4.000	4.00	2.070	.173	11.19	50000.	.00	3039.	52743.	1.0210	5065.82
4.333	2.00	1.609	.118	10.50	50000.	.00	1690.	51526.	1.0205	5070.73
4.666	1.00	1.236	.080	10.15	50000.	.00	914.	50824.	1.0202	5073.15

AT PEAK FLOW OF 1206.000 WITH TIME AT 1.57 HOURS: BEDMAT = 698.79 (TONS) = .3208 (AC-FT bulked)
TOTAL SED = 1696.17 (TONS) = .7788 (AC-FT bulked)
PEAK BULKING FACTOR = 1.036070 = 87246. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3174.80	.8815	1.4577	50000.	
BEDMAT =	1898.95	.5273	.8719	30520.	

SEDIMENT TRANSPORT CAPACITY: 3.17810 AC-FT/SQ MI (bulked) = 10.8155 TONS/ACRE (at Porosity=0.395)

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 08:51:06

```
 A  PROGRAM (AHYMO993) - AMAFCA VERSION OF HYMO - SEPTEMBER, 1993
      RUN DATE (MON/DAY/YR) = 02/16/1994
      START TIME (HR:MIN:SEC) = 08:51:46      USER NO.= M_CONN0L.S93
      INPUT FILE = sptp1_qd.hym

*SOUTH PINO TRIBUTARY @ THE TRAINING DIKE input=sptp1_qd PHASE1 REACHES
*SEDIMENT TRANSPORT ANALYSIS - 100-YEAR DISCHRGE
RECALL HYD            ID=10  HYD= AP23       DT= 0.033330 HRS DA=   0.733 SQ MI
                      PEAK=  1206.CFS   RO=     2.46       NO PTS=213
                      FLOW RATES
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      1.      8.     35.    107.
                         253.    496.    779.   1015.   1162.   1206.   1167.
                        1085.    974.    861.    755.    657.    573.    501.
                         438.    384.    341.    304.    270.    239.    211.
                         187.    166.    150.    135.    122.    112.    102.
                          93.     85.     79.     73.     67.     62.     58.
                          53.     49.     45.     42.     39.     36.     34.
                          31.     29.     27.     26.     24.     23.     21.
                          20.     19.     17.     16.     15.     15.     14.
                          13.     12.     11.     11.     10.     10.      9.
                           8.      8.      7.      7.      7.      6.      6.
                           6.      5.      5.      5.      4.      4.      4.
                           4.      4.      3.      3.      3.      3.      2.
                           2.      2.      2.      2.      2.      2.      2.
                           1.      1.      1.      1.      1.      1.      1.
                           1.      1.      1.      1.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.      0.      0.      0.      0.
                           0.      0.      0.
DIVIDE HYD            ID=10   PER=-20  ID=10  HYD=AP23
                                       ID=11  HYD=100
*CROSS SECTION 34+00 FROM SPT.HEC
SEDIMENT TRANS        ID=10 IDS=2  CODE=10
                       A FACT=0.00000173 B EXP=5.81
                       C EXP=-0.65 D EXP=-2.02  NUMBER WASH=1
                       WAS CONC=50000
                       NUMBER SECTIONS=6
                       FLOW          VELOCITY      WIDTH
                       (CFS)         (FEET/SEC)     (FT)
                        140           4.71           61.53
                        435           5.66          119.80
                        602           6.10          130.26
                        854           6.56          144.03
                       1033           6.83          152.53
                       1208           7.04          160.38

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

    TIME      WATER FLOW     VELOCITY     HYD. DEPTH     WIDTH     WASHLOAD CONC.     BED MAT. TRANSPORT     BED CONC.     TOTAL CONC.     BULKING FACTOR     ACCUM. SEDIMENT
    (HRS)     (CFS)          (FT/SEC)     (FT)           (FT)      (PPM-w)            (CFS)                  (PPM-w)       (PPM-w)                            (TONS)

      .000          .00          .00          .00          .00      .....
```

Dominant Discharge

	.00	.000	.000	.00	50000.	.00		50000.	1.0000	.00
	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	7.00	2.876	.231	10.56	50000.	.02	9134.	58247.	1.0233	1.99
1.667	194.80	5.032	.535	72.35	50000.	2.49	32752.	79607.	1.0326	537.30
2.000	54.00	4.373	.432	28.57	50000.	.50	23939.	71631.	1.0291	846.20
2.333	18.60	3.694	.336	15.00	50000.	.12	16271.	64696.	1.0261	929.51
2.666	8.40	3.033	.250	11.10	50000.	.03	10328.	59325.	1.0238	959.84
3.000	4.20	2.447	.181	9.49	50000.	.01	6283.	55672.	1.0222	973.06
3.333	2.20	1.954	.129	8.72	50000.	.00	3725.	53363.	1.0213	979.62
3.666	1.20	1.561	.092	8.34	50000.	.00	2209.	51994.	1.0207	983.07
4.000	.80	1.378	.076	7.60	50000.	.00	1651.	51490.	1.0205	984.99
4.333	.40	1.159	.059	5.86	50000.	.00	1102.	50995.	1.0203	985.96
4.666	.20	.974	.045	4.52	50000.	.00	736.	50664.	1.0201	986.44

AT PEAK FLOW OF 241.200 WITH TIME AT 1.57 HOURS: BEDMAT = 125.49 (TONS) = .0576 (AC-FT bulked)
TOTAL SED = 324.96 (TONS) = .1492 (AC-FT bulked)
PEAK BULKING FACTOR = 1.033757 = 82111. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	634.96	.1763	.2915	50000.	
BEDMAT =	351.60	.0976	.1614	28319.	
TOTAL SEDIMENT =	986.56	.2739	.4530	75594.	1.030859

SEDIMENT TRANSPORT CAPACITY: 3.08981 AC-FT/SQ MI (bulked) = 10.5150 TONS/ACRE (at Porosity=0.395)

*CROSS SECTION 33+00 FROM SPT.HEC
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.00000173 B EXP=5.81
C EXP=-0.65 D EXP=-2.02 NUMBER WASH=1
WAS CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
140	3.81	86.34
435	4.73	136.51
602	5.12	152.21
854	5.69	154.12
1033	6.03	155.36
1208	6.30	156.54

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	7.00	2.219	.189	16.68	50000.	.01	3654.	53299.	1.0212	1.84
1.667	194.80	4.093	.498	95.66	50000.	1.04	13941.	62591.	1.0252	413.89
2.000	54.00	3.496	.374	41.30	50000.	.22	10492.	59474.	1.0239	661.64
2.333	18.60	2.897	.282	22.76	50000.	.05	6790.	56130.	1.0224	731.39
2.666	8.40	2.346	.206	17.41	50000.	.01	4160.	53755.	1.0214	758.06
3.000	4.20	1.877	.147	15.21	50000.	.00	2474.	52233.	1.0208	770.19
3.333	2.20	1.491	.104	14.17	50000.	.00	1447.	51306.	1.0204	776.40
3.666	1.20	1.188	.074	13.64	50000.	.00	852.	50769.	1.0202	779.75
4.000	.80	1.047	.061	12.45	50000.	.00	635.	50573.	1.0201	781.62
4.333	.40	.881	.047	9.60	50000	.00	424	50383	1.0200	782.50

.20	.741	.036	7.40	50000.	.00	.	50255.	1.0200	783.05

AT PEAK FLOW OF 241.200 WITH TIME AT 1.57 HOURS: BEDMAT = 52.22 (TONS) = .0240 (AC-FT bulked)
TOTAL SED = 251.70 (TONS) = .1156 (AC-FT bulked)
PEAK BULKING FACTOR = 1.025500 = 63297. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	634.96	.1763	.2915	50000.	
BEDMAT =	148.21	.0412	.0681	12136.	
TOTAL SEDIMENT =	783.17	.2175	.3596	60960.	1.024497

SEDIMENT TRANSPORT CAPACITY: 2.45282 AC-FT/SQ MI (bulked) = 8.3473 TONS/ACRE (at Porosity=0.395)

*CROSS SECTION 28+00 FROM SPT.HEC
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.00000173 B EXP=5.81
C EXP=-0.65 D EXP=-2.02 NUMBER WASH=1
WAS CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
140	4.44	58.09
435	6.07	67.64
602	6.61	70.86
854	7.28	74.98
1033	7.73	77.44
1208	8.12	79.64

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	7.00	2.499	.229	12.22	50000.	.01	4711.	54253.	1.0216	1.87
1.667	194.80	4.873	.668	59.86	50000.	1.48	19727.	67822.	1.0275	451.50
2.000	54.00	4.037	.471	28.43	50000.	.30	14295.	62911.	1.0253	717.87
2.333	18.60	3.299	.348	16.22	50000.	.06	8970.	58099.	1.0233	791.08
2.666	8.40	2.647	.250	12.70	50000.	.02	5384.	54860.	1.0219	818.53
3.000	4.20	2.105	.177	11.26	50000.	.01	3162.	52854.	1.0211	830.87
3.333	2.20	1.667	.125	10.57	50000.	.00	1836.	51657.	1.0206	837.14
3.666	1.20	1.326	.089	10.22	50000.	.00	1076.	50971.	1.0203	840.50
4.000	.80	1.169	.073	9.34	50000.	.00	802.	50724.	1.0202	842.39
4.333	.40	.983	.057	7.20	50000.	.00	535.	50483.	1.0201	843.34
4.666	.20	.826	.044	5.55	50000.	.00	357.	50322.	1.0200	843.82

AT PEAK FLOW OF 241.200 WITH TIME AT 1.57 HOURS: BEDMAT = 74.53 (TONS) = .0342 (AC-FT bulked)
TOTAL SED = 274.01 (TONS) = .1258 (AC-FT bulked)
PEAK BULKING FACTOR = 1.028041 = 69169. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR

```
BEDMAT  =          208.98      .0580      .0960      17028.
TOTAL SEDIMENT =   843.94      .2343      .3875      65380.      1.026398

     SEDIMENT TRANSPORT CAPACITY:     2.64314 AC-FT/SQ MI (bulked) =     8.9949 TONS/ACRE (at Porosity=0.395)

FINISH

 NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 08:51:47
```

South Pino Tributary - Fill Depth Calculation

- Sediment aggradation at the training dike.
- Input files : SPT_P1.HYM (100-year)
  SPTP1-QD.HYM (Dominant Discharge)

X-Section	(Ac-ft) 100 year	(Ac-ft) Q_D
34+00	0.1614	1.2704
33+00	0.0681	0.5604
28+00	0.0960	0.8719

100 YEAR $1.2704 - 0.5604 = 0.710$ Ac-ft
$= 30,928$ ft^3

Q_D $0.1614 - 0.0681 = 0.0933$ Ac-ft
$\times 30$ years $= 2.799$ Ac-ft
$= 121925$ ft^3

AREA BETWEEN SECTIONS 32+00 & 36+00

150' x 765' = 114,750 ft^2

"Average Width - Length"

Total : $= 121925 + 30928 = 152,853$ ft^3 Total Sediment

Depth of Sediment Deposit : $\frac{152,853}{114,750}$ ft $= 1.3'$

Use 1.5'

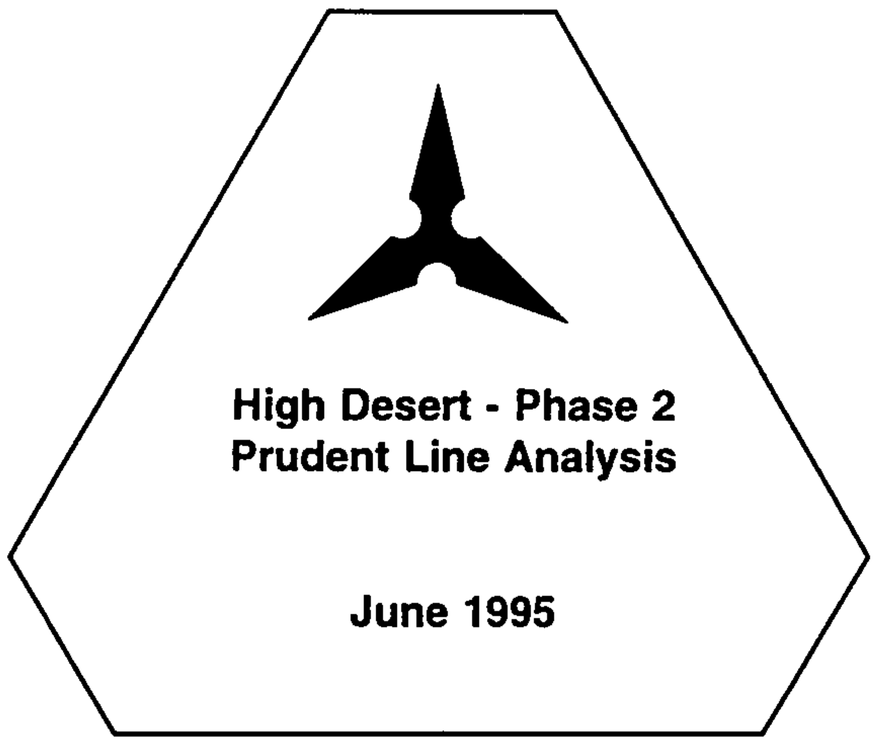
BOHANNAN-HUSTON INC.

PROJECT NO. High Desert SHEET 1 OF 1

BY HCJ DATE 2/15/94 4/20/94

APPENDIX H: Section 2

Excerpts from High Desert Phase 2 Prudent Line Analysis



HIGH DESERT - PHASE 2
PRUDENT LINE ANALYSIS

Prepared for:

Doug Collister
High Desert Investment Corporation
6400 Wyoming Boulevard NE
Albuquerque, NM 87109

Prepared by:

BOHANNAN-HUSTON INC.
ENGINEERS ARCHITECTS PHOTOGRAMMETRISTS SURVEYORS
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APPENDIX A AHYMO SUMMARY REPORT

APPENDIX B BEAR CANYON
- CURVCALC INPUT AND OUTPUT
- AHYMO SEDIMENT TRANSPORT CALCULATIONS
- MEAN ANNUAL SEDIMENT AND FLOW CALCULATIONS
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- ULTIMATE CSB CALCULATION
- HEC-2 SUMMARY OUTPUT

APPENDIX C SOUTH PINO TRIBUTARY
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- HEC-2 SUMMARY OUTPUT

APPENDIX D PINO ARROYO HEC-2 SUMMARY OUTPUT

EXHIBIT

EXHIBIT 1 PRUDENT LINE MAP

I. INTRODUCTION

This study determines the remaining prudent lines to be analyzed in the High Desert Development. This study, which is entitled Phase 2, is the follow-up study to the "High Desert - Phase 2 Prudent Line Analysis," May 1994.

The "prudent line" identified in this study was established by the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA). The prudent line represents the minimum setback necessary to provide protection for development from an active arroyo. The prudent line encompasses both the floodplain width necessary to pass the 100-year storm and the potential for natural arroyos to move laterally over time. The long-term effects are based on a potential erosion associated from a "representative" annual event storm occurring consecutively for a 30-year period compounded by the 100-year storm event occurring at the end of the 30-year period.

II. STUDY PHASING

The phasing is described in the Phase 1 report but is repeated for convenience.

Phase 1 encompasses the following arroyo reaches:

- South Pino Tributary Training Dike
- Bear Canyon Training Dike
- South Bank of the Embudito Arroyo at the Trailhead
- Local arroyos in the Highlands Area (southern portion of Tract 16).

Phase 2 completes the remaining arroyos within the development and consist of the following:

- ➢ Bear Canyon downstream of the Bear Canyon Training Dike
- ➢ South Pino Tributary Arroyo downstream of the South Pino Diversion to the North Bear Tributary
- ➢ North Bank of the Embudito Arroyo at the Trailhead Subdivision
- ➢ North Bank of the South Pino Tributary Arroyo at the Diversion
- ➢ North Pino Arroyo (south bank) east of Tramway Boulevard
- ➢ Lower Bear Arroyo

A. Study Area

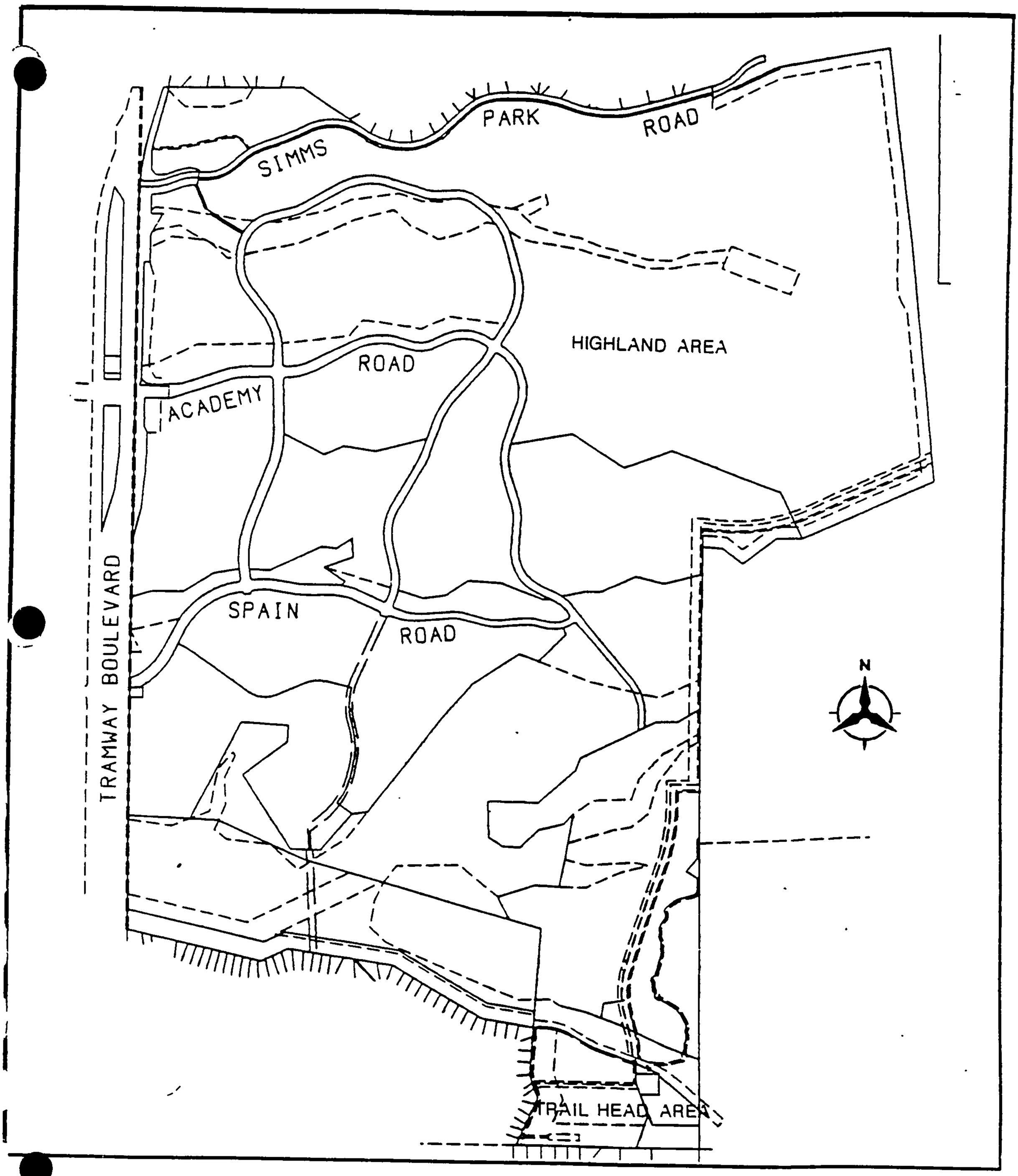
The High Desert project is located in the northeast heights area of Albuquerque (see Figure 1, Location Map). It is bounded on the west by Tramway, on the north by the Elena Gallegos Land Grant boundary (Simms Park Road), Bear Canyon Arroyo on the south, and the Cibola National Forest on the east.

B. Existing Floodplains

The Federal Emergency Management Agency (FEMA) established the limits of flooding from the 100-year storm for the major arroyos within the High Desert Subdivision. The Flood Insurance Rate Map (FIRM), dated September 1983, shows that most of the areas within the High Desert project boundaries are Zone C. The area that is shown as having a Special Flood Hazard designation is mainly Zone AO, with flood depths between 1 to 2 feet.

As part of this study, detailed hydraulic analyses were performed to determine the limits of flooding for the 100-year storm. This was necessary for two reasons:

- ➢ The existing FEMA floodplain did not extend all the way through the High Desert Development.



LOCATION MAP

ZONE ATLAS INDEX MAP NO. D-23, D-24, E-23, E-24, AND F-23

NOT TO SCALE

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FIGURE 1

- Recent hydrology based on the latest City of Albuquerque Design Process Manual and using the AHYMO computer program produced flows higher than in the Flood Insurance Study (FIS) for Albuquerque.

Table 1 lists the arroyos that were studied in detail and the approximate reach length studied.

TABLE 1

ARROYOS STUDIED IN DETAIL

Arroyo Name	Reach Length
Embudito	1,600 ft
Bear Canyon	10,000 ft
South Pino Tributary	4,100 ft
North Pino	1,800 ft

The Corps of Engineers' step-backwater computer program HEC-2 was used to perform the hydraulic analysis. Most cross-sections used in the model were taken from a 1991 topographic map that had 2-foot contour intervals at a nominal scale of 1"=100'. The Bear Canyon Arroyo model, in the vicinity of the training dike, needed to be supplemented with the 1"=500' 1979 FEMA mapping and from as-built plans for the Bear Canyon Diversion.

The 100-year discharges used in the HEC-2 models were based on the AHYMO model submitted to AMAFCA as part of the report entitled "High Desert Management Master Plan," December 1993. A summary printout from this model can be found in Appendix A. For this study some drainage basins had to be further subdivided in order to establish the flows for some of the smaller arroyos in the project

area. The arroyos that needed further subdividing included the Bear Canyon Arroyo and the South Pino Tributary.

The results from the HEC-2 analysis served three purposes. Firstly, the HEC-2 output was used to determine the limits of flooding from the 100-year storm for the arroyos studied in detail. Secondly, information from the hydraulic analysis was used as input for the prudent line analysis. And thirdly, in reaches where the sediment transport is aggradational, the HEC-2 analysis was used to help establish the prudent line. The HEC-2 input files and summary output can be found in the Appendices.

III. PRUDENT LINE ANALYSIS CRITERIA

A number of criteria were used to establish the prudent line and to determine the hydraulic capacity of the existing diversion. This section describes all of the criteria used in this analysis.

AMAFCA has defined two different analysis techniques used to establish the prudent line. The methods used in this study are defined in the AMAFCA publication "Sediment and Erosion Design Guide," March 1994 by RCE, Inc. The first analysis technique is referred to as the Approximate Maximum Erosion Method (Erosion Envelope), and is described on pages 3-68 to 3-75 of the Erosion Design Guide. The second method (herein referred to as the Erosion Rate Procedure) is a more detailed method of establishing the prudent line, and is described on pages 3-75 to 3-80 of the Erosion Design Guide. The following presents a brief description of each method.

A. Approximate Maximum Erosion Method

The Approximate Maximum Erosion Method is based on a combination of concepts including those presented by Leopold and Wolman (1960). Fundamental

assumptions used in developing the method are that a typical bend will have the approximate shape of a sine-generated curve, as proposed by Leopold and Wolman (1960) and the meander wavelength for natural channels (including arroyos) is usually in the range of 10 to 14 channel widths (Leopold et al., 1964; Leopold et al., 1966).

This method also is based on field observations that indicated the lateral erosion rate for a bend reduces markedly when the ratio of the radius of curvature (Rc) to width (W) (describes the bend geometric) reaches a value of 2 to 3, which corresponds to a sinuosity of 1.5. When this condition occurs, the energy loss through the bend increases, causing upstream backwater that increases the likelihood of bank overtopping and channel avulsion. Several references to the phenomenon are cited in the AMAFCA Sediment and Erosion Design Guide. A general conclusion from these references are that the maximum offset from a straight channel will be 2.5 to 3.5 channel widths depending on the assumed meander wavelength.

The driving force for the channel meander phenomenon is the "dominant discharge." For ephemeral streams the dominant discharge tends to be in the range of a 5- to 10-year flood peak. AMAFCA has suggested, and this study substantiated, that this "dominant discharge" can be approximated as 20% of the 100-year peak discharge (Cliff Anderson, personal comm.)

The determination of the erosion envelope is based on the following parameters:

Average Downvalley Direction - This is a line about which the arroyo is expected to meander in a sinusoidal pattern.

Dominant Discharge - Explained previously.

Meander Wave Length - The anticipated length of the sinusoidal wave.

Dominant Width - The top width of the flowing water based on the dominant discharge.

Bank Setback (B.S.B.) - The total distance from the clearly defined bank of the arroyo plus the maximum lateral migration of the arroyo.

Centerline Setback (C.S.B.) - The total distance from the Average Downvalley Direction to the maximum expected lateral migration of the arroyo. The C.S.B. or the B.S.B. establishes the prudent line.

B. Erosion Rate Method

For the Erosion Rate Procedure more field data is required in order to perform the analysis. Soil samples are taken in the arroyo at select locations. A soil sieve analysis is then performed on the soil samples to determine the particle size and gradation.

A HEC-2 analysis is performed to determine the flow depth, velocity, and top width for a range of flows (2-yr to the 100-yr storm). Once the hydraulics have been performed the transport capacity of representative reaches is determined using a sediment transport equation advanced by RCE (see AMAFCA Erosion and Sediment Design Guide).

Once the channel sediment transport capacity has been established per reach, then a sediment balance by reach is performed. The result of this is a determination of the amount of sediment that is either removed from or deposited in each reach. The sediment that is either removed or deposited per reach comes from degradation of the arroyo bed and bank erosion.

Further details of this method are described in the AMAFCA "Sediment and Erosion Design Guide."

IV. PRUDENT LINE ANALYSIS

This section describes the results for determining the prudent lines for both the Approximate Maximum Erosion Method and the Erosion Rate Method.

A. Approximate Maximum Erosion Method

The approximate method, which predicts the ultimate lateral movement of an arroyo, was applied for all of the smaller arroyos within the Phase 2 study area. Table 2 shows the arroyo reaches that were studied using the Approximate Maximum Erosion Method. Exhibit 1, in the Appendices, shows the location of all the prudent lines identified in Phase 2 of this study.

In some cases where the drainage basin was small the flow was estimated by multiplying the area by the cfs/acre rate taken from the AHYMO run. These 100-year flowrate estimates were only used as input to the Approximate Maximum Erosion Method.

For the approximate method, when 100-year discharges are less than 25 cfs, and the topographic map clearly showed a defined drainage channel, a 30-foot wide minimum drainage easement was established. In no cases was the prudent line defined as being inside an existing channel bank.

The prudent line for the north bank of the Embudito Arroyo, opposite the Trailhead Subdivision, was analyzed in Phase 2. Phase 1 analyzed the South Bank. The Approximate Maximum Erosion Method produced an unconfined prudent line that

TABLE 2

PHASE 2 - PRUDENT LINE ANALYSIS
APPROXIMATE MAXIMUM EROSION METHOD

Arroyo Stationing or Location	100-yr Discharge	Dominant Discharge	Dominant Width	Lambda	Delta Max	Setback from Bank	Setback from Centerline
ft.	cfs.	cfs.	ft.	ft.	ft.	ft.	ft.
SOUTH PINO TRIBUTARY							
Middle Branch of South Pino Tributary							
137+50	25.0	5.0	8.8	87.6	21.9	21.9	26.3
136+40	30.0	6.0	9.4	94.2	23.5	23.5	28.3
134+25	40.0	8.0	10.6	105.7	26.4	26.4	31.7
132+00	50.0	10.0	11.6	115.5	28.9	28.9	34.7
130+00	60.0	12.0	12.4	124.3	31.1	31.1	37.3
126+00	78.0	15.6	13.8	138.0	34.5	34.5	41.4
North Branch of South Pino Tributary							
136+50	83.0	16.6	14.2	141.5	35.4	35.4	42.5
134+35	103.0	20.6	15.4	154.3	38.6	38.6	46.3
129+00	153.0	30.6	18.1	180.7	45.2	45.2	54.2
123+60	203.0	40.6	20.2	202.4	50.6	50.6	60.7
118+25	253.0	50.6	22.1	221.0	55.3	55.3	66.3
115+10	330.0	66.0	24.6	245.8	61.4	61.4	73.7
105+00	360.0	72.0	25.5	254.5	63.6	63.6	76.4
Trib. #1 to North Branch of South Pino Tributary							
Confluence with North Branch	47.0	9.4	11.3	112.7	28.2	28.2	33.8
11+00	25.0	5.0	8.8	87.6	21.9	21.9	26.3
Trib. #2 to North Branch of South Pino Tributary							
Confluence with North Branch	42.0	8.4	10.8	107.8	26.9	26.9	32.3
10+00	28.0	5.6	9.2	91.6	22.9	22.9	27.5
12+00	25.0	5.0	8.8	87.6	21.9	21.9	26.3

Arroyo Stationing or Location ft.	100-yr Discharge cfs.	Dominant Discharge cfs.	Dominant Width ft.	Lambda ft.	Delta Max ft.	Setback from Bank ft.	Setback from - Centerline ft.
LOWER BEAR ARROYO							
North Branch of the North Arroyo							
Confluence with N. Branch	237.0	47.4	21.5	215.3	53.8	53.8	64.6
South Branch North Arroyo							
83+00	158.0	31.6	18.3	183.1	45.8	45.8	54.9
78+00	158.0	31.6	18.3	183.1	45.8	45.8	54.9
68+00	240.0	48.0	21.6	216.4	54.1	54.1	64.9
North Arroyo							0.0
Confluence with Middle Arroyo	480.0	96.0	28.6	285.5	71.4	71.4	85.7
North Branch Middle Arroyo							
Confluence with Middle Branch	117.0	23.4	16.2	162.3	40.6	40.6	48.7
Middle Arroyo							
Confluence with North Arroyo	167.0	33.4	18.7	187.2	46.8	46.8	56.2
Confluence with South Arroyo	655.0	131.0	32.3	338.5	80.8	80.8	97.0
South Arroyo							
Confluence with Middle Arroyo	62.0	12.4	12.6	125.9	31.5	31.5	37.8
11+60	25.0	5.0	8.8	87.6	21.9	21.9	26.3
EMBUDITO ARROYO AT TRAILHEAD							
North Branch of the North Arroyo							
Embudito at Trailhead	2330.0	466.0	53.7	680.8	154.1	154.1	180.9

was approximately 150 feet outside the 100-year floodplain (see Exhibit 1). Since the unconfined prudent line width is so wide in this reach, this study proposes the construction of a bank improvement on the north bank. Exhibit 1, therefore, in this reach, shows not only the unconfined prudent line but also the proposed bank stabilization line. The type of stabilization method is not proposed in this report but in high probability will match the improvements that have been constructed on the south bank of the Embudito Arroyo.

B. Erosion Rate Method

This section describes the methodology and results of the detailed sediment analysis using the Erosion Rate Procedure on the Bear Canyon Arroyo, South Pino Tributary Arroyo, and the Pino Arroyo.

1. Bear Canyon Arroyo

For the sediment transport analysis, the Bear Canyon was divided into four approximately equal length sediment transport reaches. The following describes the characteristics of each of the four reaches:

Reach 1 - Reach 1 is the supply reach for the other three reaches. This reach is upstream of the Bear Canyon Training Dike and is an aggradational zone with respect to the next reach upstream (see "Phase 1 High Desert Prudent Line Analysis"). The sediment capacity of this reach was used as the supply for Reach 2.

Reach 2 - Reach 2 is approximately 2,750 feet in length and begins at the downstream end of the Bear Canyon Training Dike. This reach is well incised largely due to the construction of the training dike. This

reach is largely confined by a fairly high ridge on both sides of the arroyo.

Reach 3 - Reach 3 is approximately 2,000 feet in length. This reach enters into the old wide floodplain of the Bear Canyon Arroyo. This reach, based on the topographical map and field inspection, is not incised and has a braided appearance. The sediment transport analysis performed in AHYMO showed this reach as aggradational with respect to Reach 2.

Reach 4 - Reach 4 is approximately 2,400 feet in length and begins approximately where the high north ridge ends and the Bear Canyon and Embudito Arroyos join. The sediment transport analysis performed in AHYMO showed this reach is aggradational with respect to Reaches 2 and 3. The prudent line for this reach was determined based on the 100-year floodplain and the existing high ridges on the north and south side of the Bear Canyon and Embudito Arroyos.

The Bear Canyon Arroyo prudent line was determined based on the Curvcalc program written by Dr. Bob Mussetter. The Curvcalc program requires a number of inputs in order to determine the rate of lateral migration of the stream bank. In addition to determining the inputs, it is also valuable to compare the results from Curvcalc to observed results.

Observations were performed by comparing the lateral migration of the arroyo between the contour maps dated from 1980 to the map dated 1992. A comparison of the mapping showed that very little lateral migration of the arroyo had occurred over this 12-year period. The only observable areas of bank cutting were largely confined to the end of the Bear Canyon Training Dike and where the Bear Canyon Arroyo takes a 90 degree turn prior to entering the

Tramway Boulevard Bridge. From this comparison, it was determined the arroyo bank may have moved no more than 10 feet laterally in this 12-year period.

The initial runs from the Curvcalc program gave results that were in excess of the observed rate of 10 feet in approximately 10 years. A number of parameters were then evaluated to determine their response and impact on the rate of lateral migration.

The driving force behind the rate of lateral migration is the dominant discharge. The dominant discharge is related to the flows determined from AHYMO for the small event storms (i.e. 2-yr, 5-yr, 10-yr and 25-yr storms). The 2-year storm flow determined by AHYMO using the DPM procedure was approximately 530 cfs. This would indicate that a 530 cfs flow has a 50% chance of occurring in any given year. The fact that a flow of this magnitude has not occurred for at least 10 years in the Bear Canyon Arroyo raises the question of whether or not the more frequent event flows calculated by AHYMO are being significantly over estimated.

The AHYMO flows were therefore adjusted using a 2-year storm of about 100 cfs, which appears closer to observed flows in the Bear Canyon Arroyo. The 100-year flow remained the same. Therefore, all flows were adjusted from the 2-year to 30-year based on plotting a straight line between the revised 2-year flow of 100 cfs to the 100-year flow of 4,052 cfs (see Appendix B - Revised Flood Frequency Curve). The adjusted flows used in AHYMO are shown in the following table.

TABLE 3

BEAR CANYON ARROYO
FLOW ADJUSTMENTS

Storm Event	Reach 1		Reach 2		Reach 3		Reach 4	
	Orig. Flow	Revised Flow	Orig. Flow	Revised Flow	Orig. Flow	Revised Flow	Orig. Flow	Revised Flow
2-Year	473	132	493	135	493	135	414	110
5-Year	1080	465	1120	474	1120	474	1012	420
10-Year	1650	841	1704	857	1704	857	1575	783
25-Year	2492	1894	2567	1929	2567	1929	2426	1809
50-Year	3143	2986	3234	3043	3234	3043	3092	2890
100-Year	3939	3939	4052	4052	4052	4052	3924	3924

Table 4 shows the results of the analysis of running the Curvcalc program for Reaches 1-4 in the Bear Canyon Arroyo. Appendix B provides the backup calculations along with the input and output to the Curvcalc program.

From the Curvcalc analysis it is clear Reach 2 is degradational with respect to Reach 1. In addition, the topographic mapping confirms this finding.

Reach 3 is mildly aggradational with respect to Reach 2. The topographic map also shows this reach is less well incised. However, it could become degradational over a long period of time. Therefore, this analysis has conservatively utilized the same lateral migration width of 180 feet for Reach 3 also.

Reach 4 is unquestionable aggradational and, therefore, the limits of lateral migration are based solely on the 100-year floodplain limits.

TABLE 4

PRUDENT LINE ANALYSIS - BEAR CANYON ARROYO
EROSION RATE PROCEDURE

Reach No.	100-yr Flow (cfs)	100-yr Peak Bulking Factor (percent)	Dominant Discharge (cfs)	Reach Length ft.	Sediment Capacity (mean annual) (cu-ft)	Sediment Capacity (100-yr) (cu-ft)	Calculated C.S.B. ft.	Ultimate C.S.B. ft.
1	3939	3.3%	463	2,270	24,685	348,267	--	228
2	4052	8.5%	475	2,750	36,437	566,402	180	261
3	4052	4.1%	540	2,000	32,233	491,535	--	251
4	3924	3.3%	507	2,400	25,732	422,872	--	228

Notes:
1. Ultimate C.S.B. represents maximum anticipated lateral migration of arroyo from down valley direction.
2. Reach 1 is the supply reach which is the reach just upstream of the Bear Canyon Training Dike.
3. Reach 4 is assumed to be aggradational. CSB is based on 100-yr floodplain and historical banks.

Exhibit 1 shows the downvalley direction line and the prudent lines for each of the four reaches described previously. Also plotted on Exhibit 1 is the FEMA 100-year floodplain boundaries for the Bear Canyon Arroyo.

A HEC-2 run was performed for this reach of the Bear Canyon Arroyo. This analysis was performed for two reasons:

- Since the 100-year peak flow has increased since the FEMA study, a new HEC-2 run was completed to see if the additional flows caused significantly different flooding. The HEC-2 run was most useful in Reach 4, which is an aggradational zone, where the Curvcalc principles do not apply.

- The channel cross-sections in HEC-2 were averaged by reach and then the hydraulic characteristics were inputted into the AHYMO sediment transport model.

2. South Pino Tributary Arroyo

Similar to the Bear Canyon erosion rate analysis, the South Pino Tributary study was divided into four approximately equal length sediment transport reaches. The following describes the characteristics of each of the four reaches:

Reach 1- Reach 1 is the supply reach for the other three reaches. This reach is upstream of the South Pino Diversion to the Bear Tributary and is an aggradational reach with respect to the next reach upstream (see "Phase 1 High Desert Prudent Line Analysis"). The sediment capacity of this reach was used as the supply for Reaches 2 and 3.

Reach 2 - Reach 2 is approximately 800 feet in length and begins at the downstream end of the South Pino Tributary Diversion. This reach has historically been well incised and the construction of the Diversion appears to have continued this process by diverting more flow to this arroyo than has historically occurred. This reach is confined by a fairly high ridge on both sides of the arroyo.

Reach 3 - Reach 3 is approximately 800 feet in length. In terms of hydraulic characteristics, this reach is nearly identical to Reach 2. Similar to Reach 2, Reach 3 is well incised and is a degradational zone.

Reach 4 - Reach 4 is approximately 850 feet in length and has very similar hydraulic and sediment transport capacity characteristics to both Reach 2 and Reach 3.

The prudent line for the Pino Tributary Arroyo was determined much the same way as described in the previous section on Bear Canyon Arroyo. The following describes the differences between the South Pino Tributary Analysis and the Bear Canyon Analysis.

- Since the hydraulic capacity of Reaches 2-4 are so similar, the results of the Sediment Transport Analysis in AHYMO (see Appendix B) were averaged and only one Curvcalc run was performed. Therefore, the final computed value for centerline setback is the same for Reaches 2-4.

- The results of the Curvcalc analysis gave a lateral migration of 10 feet laterally in the first 10 years. Table 5 shows the results of the analysis of running the Curvcalc program for Reaches 2-4 in the South Pino Tributary.

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TABLE 5

PRUDENT LINE ANALYSIS - SOUTH PINO TRIBUTARY
EROSION RATE PROCEDURE

Reach No.	100-yr Flow (cfs)	100-yr Peak Bulking Factor (percent)	Dominant Discharge (cfs)	Reach Length ft.	Sediment Capacity (mean annual) (cu-ft)	Sediment Capacity (100-yr) (cu-ft)	Calculated C.S.B. ft.	Ultimate C.S.B. ft.
1	1208	5.9%	288	950	5,867	50,521	--	135
2	1208	6.0%	284	800	7,333	59,060	94	135
3	1248	6.8%	264	800	9,937	75,106	94	134
4	1248	6.6%	257	850	8,254	66,277	96	134

Notes:
1. Ultimate C.S.B. represents maximum anticipated lateral migration of arroyo from down valley direction.
2. Reach 1 is the supply reach which is the reach just upstream of the South Pino Diversion to the Bear Tributary.
3. Reach 3 is at the South Pino Diversion.
4. Reaches 3-4 have fairly similar sediment transport capacities and therefore were averaged for Curvcalc.

Exhibit 1 shows the down valley direction line and the prudent lines for each of the four reaches described previously. Also plotted on Exhibit 1 is the FEMA 100-year floodplain boundaries for the Bear Canyon Arroyo.

A HEC-2 run was performed for this reach of the South Pino Tributary Arroyo. This analysis was performed for two reasons:

- Since the 100-year peak flow has increased since the FEMA study, a new HEC-2 run was completed to see if the additional flows caused significantly different flooding.

- The channel cross-sections in HEC-2 were averaged by reach and then the hydraulic characteristics were inputted into the AHYMO sediment transport model.

3. Pino Arroyo

The Pino Arroyo borders the High Desert Development for an approximate length of 2,000 feet from Tramway Boulevard. In this reach the Pino Arroyo has a broad floodplain of about 700 feet in width. The area shows evidence of multiple low flow arroyos having formed over time. From reviewing the mapping and site visits this reach clearly appears to be aggrading with respect to the upstream reaches.

This arroyo was analyzed with HEC-2 to determine the extent of the 100-year floodplain. In discussions with AMAFCA, it was decided the criteria for determining the floodplain in this reach would be the limits of the 100-year floodplain or 2 feet above the top of the Simms Park Road, whichever was greater. The Simms Park Road was determined to be a good boundary for the arroyo since any lateral migration of the arroyo next to the road would be

addressed by the City. Therefore, the remaining concern would be how far the arroyo could move laterally from a single event storm (i.e. 100-yr storm). The horizontal extent of 2 feet vertically above the top of road appeared to allow a safe distance for placement of the prudent line. Copies of the HEC-2 summary are located in Appendix D. However, as can be seen from Exhibit 1, in all cases the 2 feet vertical criteria above the top of road controls.

APPENDIX C

SOUTH PINO TRIBUTARY

- CURVCALC INPUT AND OUTPUT
- AHYMO SEDIMENT TRANSPORT CALCULATIONS
- MEAN ANNUAL SEDIMENT AND FLOW CALCULATIONS
- ULTIMATE CSB CALCULATION
- HEC-2 SUMMARY OUTPUT

" Run of S. [redacted]no,reach #2, High Desert for BHI"

6- 4-1995 20:42

Input File: pino2.dat

** THIS IS A TEST VERSION OF CURVCALC (2/24/94).
IT MAY STILL CONTAIN BUGS AND/OR ERRORS IN LOGIC.
If you encounter such problems in using the program,
please contact Bob Mussetter at (303)224-4612 or
RCE at (303)223-5556.

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The computational procedure used in this program was
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program.
Use of results obtained from this program and determination of
their applicability to a specific problem is entirely the
responsibility of the user.

Using this software indicates your acceptance of
these terms and conditions.

Initial Sinousity =	1.004
Initial Slope =	.04400
Equilibrium Slope =	.03926
Initial Bank Height (ft) =	4.00
Channel Width (ft) =	44.30
Bank Erosion Calibration Factor =	1.00
Average Overbank Slope (Horiz./Vert.)=	3.00
Uncontrolled Bend Length (ft) =	236.6
Porosity =	.30
Initial offset from downvalley direction =	9.31
Maximum additional erosion distance =	108.53

step	Vssup	Vscap	Leros	dzmax	Savg	Lbend	R/W	dlatm	Tlatm	Ymax	Tlatw	Hbavg
1	5867.	6651.	118.7	.6	.04162	236.7	12.8	.6	.6	.2	.0	4.3
2	5867.	6435.	150.8	.7	.04098	236.8	12.0	.7	1.2	.2	.0	4.6
3	5867.	6313.	171.1	.8	.04058	237.0	11.4	.7	1.9	.3	.0	4.9
4	5867.	6213.	185.2	.9	.04030	237.2	10.7	.8	2.8	.3	.1	5.2
5	5867.	6175.	196.2	.9	.04008	237.4	10.3	.9	3.6	.3	.1	5.3
6	5867.	6110.	204.4	1.0	.03992	237.7	9.7	.9	4.5	.3	.1	5.6
7	5867.	6063.	210.8	1.0	.03980	238.0	9.0	1.0	5.6	.3	.1	5.9
8	5867.	6026.	215.9	1.0	.03970	238.3	8.4	1.1	6.7	.4	.2	6.3
9	5867.	5998.	220.0	1.0	.03963	238.8	7.8	1.3	8.0	.4	.2	6.6
10	5867.	5977.	223.4	1.1	.03957	239.3	7.3	1.4	9.4	.4	.2	7.0
11	5867.	5960.	226.2	1.1	.03953	239.9	6.8	1.5	10.9	.5	.2	7.5
12	5867.	5947.	228.5	1.1	.03950	240.6	6.3	1.6	12.5	.5	.3	7.9
13	5867.	5937.	230.6	1.1	.03947	241.4	5.8	1.8	14.3	.5	.3	8.4
14	5867.	5929.	232.4	1.1	.03945	242.4	5.4	1.9	16.1	.6	.4	8.9
15	5867.	5924.	234.1	1.1	.03944	243.5	5.1	2.0	18.1	.6	.4	9.4
16	5867.	5920.	235.6	1.1	.03943	244.7	4.7	2.1	20.2	.7	.5	10.0
17	5867.	5918.	235.6	1.1	.03946	246.0	4.4	2.2	22.4	.7	.5	10.6
18	5867.	5926.	235.6	1.1	.03949	247.5	4.2	2.2	24.6	.8	.6	11.2
19	5867.	5934.	235.6	1.1	.03951	249.1	3.9	2.3	26.9	.8	.6	11.8
20	5867.	5942.	235.6	1.1	.03954	250.8	3.7	2.3	29.1	.9	.7	12.5

21	5867.	5951.	235.6	1.1	.03958	252.6	3.5	2.3	31.4	.9	.7	13.1
22	5867.	5960.	235.6	1.1	.03961	254.5	3.4	2.2	33.6	1.0	.8	13.8
23	5867.	5970.	235.6	1.1	.03964	256.4	3.3	2.2	35.9	1.0	.8	14.4
24	5867.	5980.	235.6	1.1	.03968	258.4	3.1	2.2	38.1	1.1	.9	15.1
25	5867.	5990.	235.6	1.1	.03971	260.4	3.0	2.2	40.2	1.1	.9	15.7
26	5867.	6000.	235.6	1.1	.03974	262.5	2.9	2.1	42.4	1.2	1.0	16.3
27	5867.	6010.	235.6	1.1	.03978	264.6	2.9	2.1	44.4	1.2	1.0	16.9
28	5867.	6020.	235.6	1.1	.03981	266.7	2.8	2.0	46.4	1.3	1.0	17.5
29	5867.	6030.	235.6	1.1	.03984	268.8	2.7	2.0	48.4	1.3	1.1	18.1
30	5867.	6039.	235.6	1.1	.03988	270.9	2.7	1.9	50.3	1.3	1.1	18.6
31	50521.	55027.	235.6	1.1	.04013	288.5	2.4	14.2	64.5	1.7	1.5	21.6

Definition of variables in output table.
- step = time step
- Vssup = sediment supply to the bend (ft^3)
- Vscap = transport capacity of channel through bend (ft^3)
- Leros = length of degradational wedge (feet)
- dzmax = maximum degradation depth (feet)
- Savg = average slope through bend
- Lbend = length of bend (feet)
- R/W = Ratio of radius of curvature to width
- dlatm = incremental lateral migration distance at apex of bend for this time step (feet)
- Tlatm = cumulative lateral migration distance (feet)
- Ymax = ratio of cumulative lateral migration offset from downvalley direction to channel width
- Tlatw = ratio of cumulative lateral migration distance from initial condition to width
- Hbavg = average bank height through the bend

****** NOTE: Maximum degradation depth is limited to the critical bank height less the initial bank height. **********

$$CSB = \frac{44.3}{2} + 9.3 + 6.45 = 42.2'$$

$$= 96.0'$$

" Run of S. Pino,reach #2, High Desert for EHI"
236.6 235.7 44.30 10.64 4 10.0 0.044 1.00 -1 3
1.60E-06 5.82 -0.7 .3 .3
5867 7333
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50521 66277

" fRun of S. Pino,reach #3 & #4 averaged, High Desert for BH

6- 4-1995 20:46

Input File: pino34.dat

** THIS IS A TEST VERSION OF CURVCALC (2/24/94).
IT MAY STILL CONTAIN BUGS AND/OR ERRORS IN LOGIC.
If you encounter such problems in using the program,
please contact Bob Mussetter at (303)224-4612 or
RCE at (303)223-5556.

CURVCALC (Version 1.0) - Copyright, 1994
Resource Consultants & Engineers, Inc. (RCE)

The computational procedure used in this program was
developed by Bob Mussetter at RCE using concepts presented
in the Erosion and Sediment Design Guide prepared for AMAFCA.
RCE accepts no liability or responsibility for the
consequences of any actions resulting from the use of this
program.
Use of results obtained from this program and determination of
their applicability to a specific problem is entirely the
responsibility of the user.

Using this software indicates your acceptance of
these terms and conditions.

Initial Sinousity = 1.004
Initial Slope = .04400
Equilibrium Slope = .03639
Initial Bank Height (ft) = 4.00
Channel Width (ft) = 44.30
Bank Erosion Calibration Factor = 1.00
Average Overbank Slope (Horiz./Vert.)= 3.00
Uncontrolled Bend Length (ft) = 236.6
Porosity = .30

Initial offset from downvalley direction = 9.31
Maximum additional erosion distance = 108.53

step	Vssup	Vscap	Leros	dzmax	Savg	Lbend	R/W	dlatm	Tlatm	Ymax	Tlatw	Hbavg
1	5867.	7170.	121.2	.9	.04010	236.8	12.3	1.0	1.0	.2	.0	4.5
2	5867.	6805.	154.3	1.2	.03904	237.0	11.4	.8	1.8	.3	.0	4.8
3	5867.	6579.	174.6	1.3	.03839	237.1	10.7	.8	2.6	.3	.1	5.2
4	5867.	6436.	188.8	1.4	.03794	237.4	10.1	.9	3.5	.3	.1	5.5
5	5867.	6311.	199.1	1.5	.03762	237.7	9.4	1.0	4.5	.3	.1	5.8
6	5867.	6221.	206.9	1.6	.03738	238.0	8.7	1.1	5.6	.3	.1	6.2
7	5867.	6153.	213.0	1.6	.03719	238.3	8.1	1.2	6.7	.4	.2	6.6
8	5867.	6125.	218.1	1.7	.03705	238.8	7.8	1.2	8.0	.4	.2	6.8
9	5867.	6077.	222.1	1.7	.03693	239.3	7.3	1.4	9.3	.4	.2	7.2
10	5867.	6040.	225.4	1.7	.03684	239.9	6.8	1.5	10.8	.5	.2	7.6
11	5867.	6013.	228.1	1.7	.03678	240.6	6.3	1.6	12.4	.5	.3	8.1
12	5867.	5992.	230.4	1.8	.03673	241.4	5.9	1.7	14.1	.5	.3	8.6
13	5867.	5976.	232.4	1.8	.03670	242.3	5.5	1.8	16.0	.6	.4	9.1
14	5867.	5965.	234.2	1.8	.03667	243.3	5.1	1.9	17.9	.6	.4	9.6
15	5867.	5957.	235.8	1.8	.03666	244.5	4.8	2.0	19.9	.7	.4	10.2
16	5867.	5952.	237.4	1.8	.03665	245.7	4.5	2.1	22.0	.7	.5	10.8
17	5867.	5949.	237.4	1.8	.03669	247.2	4.2	2.2	24.1	.8	.5	11.4
18	5867.	5963.	237.4	1.8	.03673	248.7	4.0	2.2	26.3	.8	.6	12.0
19	5867.	5977.	237.4	1.8	.03678	250.4	3.8	2.2	28.6	.9	.6	12.6
20	5867.	5993.	237.4	1.8	.03683	252.1	3.6	2.2	30.8	.9	.7	13.2

21	5867.	6008.	237.4	1.8	.03688	254.0	3.4	2.2	33.0	1.0	.7	13.9
22	5867.	6025.	237.4	1.8	.03694	255.9	3.3	2.2	35.3	1.0	.8	14.5
23	5867.	6042.	237.4	1.8	.03699	257.9	3.2	2.2	37.5	1.1	.8	15.2
24	5867.	6059.	237.4	1.8	.03705	259.9	3.1	2.2	39.7	1.1	.9	15.8
25	5867.	6077.	237.4	1.8	.03710	261.9	3.0	2.1	41.8	1.2	.9	16.4
26	5867.	6094.	237.4	1.8	.03715	264.0	2.9	2.1	43.9	1.2	1.0	17.0
27	5867.	6112.	237.4	1.8	.03721	266.1	2.8	2.0	45.9	1.2	1.0	17.6
28	5867.	6129.	237.4	1.8	.03726	268.3	2.7	2.0	47.8	1.3	1.1	18.2
29	5867.	6147.	237.4	1.8	.03732	270.4	2.7	1.9	49.8	1.3	1.1	18.8
30	5867.	6164.	237.4	1.8	.03737	272.5	2.6	1.9	51.7	1.4	1.2	19.4
31	50521.	48538.	237.4	1.8	.03768	286.0	2.6	11.0	62.6	1.6	1.4	19.9

Definition of variables in output table.
- step = time step
- Vssup = sediment supply to the bend (ft^3)
- Vscap = transport capacity of channel through bend (ft^3)
- Leros = length of degradational wedge (feet)
- dzmax = maximum degradation depth (feet)
- Savg = average slope through bend
- Lbend = length of bend (feet)
- R/W = Ratio of radius of curvature to width
- dlatm = incremental lateral migration distance at apex of bend for this time step (feet)
- Tlatm = cumulative lateral migration distance (feet)
- Ymax = ratio of cumulative lateral migration offset from downvalley direction to channel width
- Tlatw = ratio of cumulative lateral migration distance from initial condition to width
- Hbavg = average bank height through the bend

****** NOTE: Maximum degradation depth is limited to the critical bank height less the initial bank height. **********

$$CSB = \frac{44.3}{2} + 9.3 + 62.6$$

$$= 94.1'$$

" fRun of S. Pino,reach #3 & #4 averaged, High Desert for BHI"
236.6 235.7 44.30 10.64 4 10.0 0.044 1.00 -1 3
1.60E-06 5.82 -0.7 .3 .3
5867 8508
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 AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
      RUN DATE (MON/DAY/YR) = 10/23/1994
      START TIME (HR:MIN:SEC) = 13:26:51     USER NO.= BOHN_HNM.STE
      INPUT FILE = psed2.hym

************************************************************
*                    HIGH DESERT FINAL HYDROLOGY MODEL
*  ORIGINAL INPUT=HIGHD_P.HYM, JAN 6,1992  DOMINANT DISCHARGE
*   PROPOSED CONDITIONS MODEL _  PHASE 2, NO BULKING
*      INPUT = SPTP2_QD.HYM USED FOR MEANDER ANALYSIS OF SOUTH PINO
************************************************************************
*
*       TAKEN FROM
*       FILE: BC_P.IN/OUT
*       BHI JN'S 8911803, 9123302                        DATE: NOV,25 1993
*
*
* HYMO ANALYSIS USING NM HYMO, PER CITY DPM APPROVED AUGUST, 1991
* INPUT BASED ON MODIFIED ECI STUDY FOR JOHN ROBERTS DAM, DATED DEC. 1991.
* MODIFICATIONS INCLUDE:        1) INCREASE RAINFALL TO 3.00"/6HR.
*                               2) ADJUST AREAS USING NEW 1"=200' SCALE MAPS.
*                               3) MODEL OF EXISITING CONDITIONS AS OF 1/92
*                                  AND IMPROVEMENTS TO TRAMWAY BLVD.
*                               4) ESTIMATED 40% IMPERVIOUS AREA DEDUCTED
*                                  IN ACCORDANCE WITH THE EXISTING CONDITIONS.
*                               5) BEAR ARROYO BASINS DO NOT CONTRIBUTE TO
*                                  BEAR CANYON BASINS.
*                               6) DELETE BULKING FACTOR AND INSTALL SEDIMENT
*                                  TRANSPORT ANALYSIS.( RUN PC)
************************************************************************
*
**THE RECALL HYD'S WERE ADDED FROM THE OUTPUT OF FILE HD_P100.HYM
*** psed2.hym IS THE UNBULKED (CLEAN WATER) HYDROLOGY OF HIGH DESERT
************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
RECALL HYD          ID=10  HYD=AP23
                           DT=  .033330 HRS   DA=    .7330 SQ MI
                           PEAK=    140.043CFS  RO=  .1430 INCHES  NO PTS=242
                           FLOW RATES
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .003      .011      .026      .047
                                    .069      .090      .105      .112      .109
                                    .102      .100      .119      .168      .256
                                    .396      .931     3.664    15.217    39.332
                                  71.593    103.029   127.033   139.628   140.043
                                 131.735    119.426   106.115    93.224    81.536
                                  71.086     62.011    54.306    47.576    41.753
                                  36.851     32.855    29.707    27.179    25.063
                                  23.244     21.636    20.203    18.931    17.736
                                  16.612     15.593    14.690    13.890    13.163
                                  12.489     11.855    11.257    10.692    10.157
                                   9.649      9.156     8.677     8.223     7.787
                                   7.374      6.998     6.650     6.324     6.016
                                   5.726      5.455     5.200     4.958     4.728
                                   4.507      4.296     4.093     3.899     3.714
                                   3.536      3.366     3.204     3.048     2.900
                                   2.758      2.623     2.494     2.370     2.253
                                   2.141      2.034     1.933     1.836     1.744
```

1.657	1.574	1.494	1.41	1.347
1.279	1.214	1.152	1.093	1.037
.984	.933	.885	.840	.796
.755	.716	.680	.645	.612
.580	.550	.522	.495	.470
.446	.423	.402	.382	.362
.344	.327	.311	.295	.281
.267	.254	.242	.230	.219
.209	.199	.190	.181	.172
.165	.157	.150	.144	.137
.132	.126	.121	.116	.112
.107	.103	.099	.095	.092
.089	.086	.083	.080	.078
.075	.073	.070	.067	.061
.055	.049	.044	.039	.036
.033	.030	.028	.026	.024
.022	.021	.019	.018	.017
.016	.015	.014	.013	.012
.011	.011	.010	.009	.008
.008	.007	.007	.006	.005
.005	.004	.004	.004	.004
.004	.003	.003	.003	.003
.003	.003	.002	.002	.002
.002	.002	.002	.002	.002
.002	.001	.001	.001	.001
.001	.001			

```
**********************
* TOTAL FLOW AT AP23 *
**********************
*DIVIDE HYD            ID=10    PER=-20  ID=10  HYD=AP23
*                                       ID=11  HYD=100
*********************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                               #3  127+00 TO  119+00
*                               #2  118+00 TO  110+00
*                               #1  109+00 TO  100+00 @ AP26
*
*  REACH 4 - SPT AT DIVERSION - SOIL TEST SPT-3
SEDIMENT TRANS        ID=10    IDS=2   CODE=10
                                A FACT=0.0000018 B EXP=5.82
                                C EXP=-0.61 D EXP=-2.0   NUMBER WASH=1
                                WASH CONC=50000
                                NUMBER SECTIONS=6
                                FLOW          VELOCITY     WIDTH
                                (CFS)         (FEET/SEC)   (FT)
                                435            5.81        107.5
                                602            6.42        117.1
                                854            7.19        124.9
                               1033            7.67        128.9
                               1208            8.13        130.4
                               1400            8.57        132.0

  * * * * * * * * * * * * * * * * * *
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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.07	.631	.025	4.38	50000.	.00	219.	50198.	1.0199	.03
1.333	.40	.977	.048	8.43	50000.	.00	627.	50566.	1.0201	.34
1.667	131.74	5.312	.609	40.72	50000.	1.83	35492.	82088.	1.0337	252.34
2.000	36.85	4.256	.437	19.83	50000.	.30	21135.	69094.	1.0280	474.66
2.333	16.61	3.426	.315	15.37	50000.	.08	12654.	61428.	1.0247	535.09

2.[illegible]	9.65	2.876	.243	13.84	50000.	.03	8338.	57528.	1.0230	564.21
3.000	5.73	2.395	.184	12.97	50000.	.01	5386.	54862.	1.0219	580.43
3.333	3.54	2.005	.141	12.49	50000.	.00	3520.	53177.	1.0212	589.91
3.666	2.14	1.657	.106	12.18	50000.	.00	2228.	52011.	1.0207	595.55
4.000	1.28	1.357	.079	11.99	50000.	.00	1379.	51245.	1.0204	598.87
4.333	.76	1.149	.061	10.74	50000.	.00	924.	50834.	1.0202	600.82
4.666	.45	1.007	.050	8.82	50000.	.00	674.	50608.	1.0201	601.96
5.000	.27	.886	.041	7.27	50000.	.00	495.	50447.	1.0200	602.64
5.333	.17	.785	.035	6.07	50000.	.00	371.	50334.	1.0200	603.05
5.666	.11	.705	.029	5.16	50000.	.00	286.	50258.	1.0200	603.30
5.999	.08	.645	.026	4.52	50000.	.00	231.	50208.	1.0199	603.48
6.333	.03	.525	.019	3.32	50000.	.00	141.	50127.	1.0199	603.58
6.666	.02	.438	.014	2.53	50000.	.00	91.	50082.	1.0199	603.63
6.999	.01	.368	.011	1.95	50000.	.00	60.	50054.	1.0199	603.65
7.333	.00	.310	.009	1.50	50000.	.00	40.	50036.	1.0199	603.66
7.666	.00	.261	.007	1.16	50000.	.00	26.	50024.	1.0199	603.66
7.999	.00	.219	.005	.89	50000.	.00	17.	50016.	1.0199	603.67

AT PEAK FLOW OF 140.043 WITH TIME AT 1.63 HOURS: BEDMAT = 81.70 (TONS) = .0375 (AC-FT bulked)
TOTAL SED = 208.23 (TONS) = .0956 (AC-FT bulked)
PEAK BULKING FACTOR = 1.033979 = 82606. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	399.82	.1110	.1836	50000.	
BEDMAT =	203.85	.0566	.0936	26133.	
TOTAL SEDIMENT =	603.67	.1676	.2772	73616.	1.029987

SEDIMENT TRANSPORT CAPACITY: .37812 AC-FT/SQ MI (bulked) = 1.2868 TONS/ACRE (at Porosity=0.395)

2

* REACH 3 - SPT AT DIVERSION - SOIL TEST SPT4
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.0000016 B EXP=5.82
C EXP=-0.7 D EXP=-1.95 NUMBER=1
WAS CONC=50000 NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.0	63.03
610	7.76	67.50
872	8.85	73.39
1066	9.20	78.85
1248	9.46	81.24
1430	9.38	84.67

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.07	.746	.034	2.73	50000.	.00	358.	50323.	1.0200	.03
1.333	.40	1.154	.065	5.25	50000.	.00	963.	50870.	1.0202	.34
1.667	131.74	6.376	.849	24.33	50000.	2.32	44620.	90360.	1.0375	279.36
2.000	36.85	5.071	.602	12.06	50000.	.39	27025.	74423.	1.0303	524.06
2.333	16.61	4.066	.432	9.45	50000.	.11	16544.	64943.	1.0262	588.82
2.666	9.65	3.406	.331	8.55	50000.	.04	11125.	60046.	1.0241	619.49
3.000	5.73	2.832	.251	8.04	50000.	.02	7350.	56636.	1.0227	636.36
3.333	3.54	2.369	.192	7.76	50000.	.01	4914.	54436.	1.0217	646.12
3.666	2.14	1.957	.144	7.58	50000.	.00	3189.	52878.	1.0211	651.87

4.	1.28	1.602	.107	7.47	50000.	.00	202.	51829.	1.0206	655.24
4.333	.76	1.356	.083	6.69	50000.	.00	1389.	51254.	1.0204	657.21
4.666	.45	1.189	.068	5.49	50000.	.00	1031.	50930.	1.0203	658.37
5.000	.27	1.046	.056	4.53	50000.	.00	770.	50695.	1.0202	659.05
5.333	.17	.927	.047	3.78	50000.	.00	586.	50529.	1.0201	659.46
5.666	.11	.832	.040	3.21	50000.	.00	459.	50414.	1.0200	659.72
5.999	.08	.761	.035	2.81	50000.	.00	375.	50338.	1.0200	659.89
6.333	.03	.620	.026	2.07	50000.	00	235.	50212.	1.0199	660.00
6.666	.02	.517	.020	1.58	50000.	.00	156.	50141.	1.0199	660.04
6.999	.01	.435	.015	1.22	50000.	.00	105.	50095.	1.0199	660.06
7.333	.00	.366	.012	.94	50000.	.00	71.	50064.	1.0199	660.07
7.666	.00	.308	.009	.72	50000.	.00	48.	50043.	1.0199	660.08
7.999	.00	.259	.007	.56	50000.	.00	32.	50029.	1.0199	660.08

AT PEAK FLOW OF 140.043 WITH TIME AT 1.63 HOURS: BEDMAT = 103.84 (TONS) = .0477 (AC-FT bulked)
TOTAL SED = 230.37 (TONS) = .1058 (AC-FT bulked)
PEAK BULKING FACTOR = 1.037775 = 90995. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	399.82	.1110	.1836	50000.	
BEDMAT =	260.26	.0723	.1195	33126.	
TOTAL SEDIMENT =	660.08	.1833	.3031	79946.	1.032790

SEDIMENT TRANSPORT CAPACITY: .41346 AC-FT/SQ MI (bulked) = 1.4071 TONS/ACRE (at Porosity=0.395)

*
* READ A PUNCH HYD FORMAT AT AP 24
RECALL HYD ID= 3 HYD=AP24
DT= .033330 HRS DA= .7800 SQ MI
PEAK= 123.435CFS RO= .1445 INCHES NO PTS=245
FLOW RATES

.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.001	.014	.062	.149	.257
.365	.462	.531	.552	.525
.481	.482	.600	.889	1.371
2.062	3.015	4.545	8.496	16.733
30.284	48.954	70.785	92.839	111.359
121.647	123.435	119.239	111.848	103.192
94.320	85.719	77.838	70.777	64.211
58.137	52.695	47.770	43.271	39.211
35.612	32.447	29.684	27.275	25.158
23.279	21.598	20.093	18.745	17.537
16.448	15.463	14.564	13.739	12.978
12.273	11.615	10.996	10.413	9.860
9.337	8.843	8.380	7.946	7.539
7.157	6.798	6.462	6.146	5.849
5.567	5.301	5.049	4.810	4.582
4.365	4.159	3.962	3.774	3.595
3.424	3.261	3.105	2.956	2.814
2.678	2.548	2.425	2.308	2.197
2.091	1.990	1.894	1.803	1.716
1.633	1.553	1.478	1.407	1.339
1.276	1.215	1.157	1.102	1.049
.999	.952	.907	.865	.825
.787	.750	.716	.683	.653
.624	.597	.571	.547	.524
.502	.482	.462	.444	.427

.411	.396	.382	[illegible]	.356
.343	.332	.322	.312	.302
.293	.285	.278	.270	.264
.258	.253	.248	.243	.238
.233	.229	.224	.221	.218
.215	.213	.211	.209	.207
.205	.203	.199	.187	.167
.143	.120	.102	.087	.076
.067	.060	.054	.049	.045
.041	.037	.034	.031	.029
.027	.024	.023	.021	.019
.018	.017	.015	.014	.013
.012	.011	.010	.009	.008
.007	.006	.006	.005	.005
.005	.004	.004	.004	.004
.003	.003	.003	.003	.003
.003	.002	.002	.002	.002
.002	.002	.002	.002	.001
.001	.001	.001	.001	.001

****
* TOTAL FLOW AT AP24 *
****
*DIVIDE HYD ID=3 PER=-20 ID=3 HYD=AP24
* ID=11 HYD=100
****
* REACH 2 - SPT DOWNSTREAM OF DIVERSION - SOIL TEST SPT5
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.81	45.91
610	8.45	52.48
872	9.32	61.36
1066	9.65	64.72
1248	10.03	68.57
1430	10.38	71.92

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.37	1.331	.085	3.24	50000.	.00	1234.	51114.	1.0203	.17
1.333	2.06	2.269	.188	4.83	50000.	.00	4247.	53833.	1.0215	1.81
1.667	121.65	7.128	1.048	16.28	50000.	2.80	57565.	102102.	1.0429	202.05
2.000	58.14	6.397	.891	10.20	50000.	1.04	45337.	91009.	1.0378	573.11
2.333	23.28	5.198	.653	6.86	50000.	.26	28478.	75738.	1.0309	694.47
2.666	12.27	4.301	.491	5.81	50000.	.09	18524.	66734.	1.0270	741.09
3.000	7.16	3.591	.375	5.32	50000.	.03	12254.	61066.	1.0245	764.54
3.333	4.36	3.008	.287	5.05	50000.	.01	8151.	57359.	1.0230	777.45
3.666	2.68	2.506	.219	4.89	50000.	.01	5349.	54828.	1.0219	784.94
4.000	1.63	2.074	.164	4.79	50000.	.00	3449.	53113.	1.0212	789.33
4.333	1.00	1.713	.123	4.73	50000.	.00	2213.	51998.	1.0207	791.94
4.666	.62	1.522	.103	3.96	50000.	.00	1684.	51520.	1.0205	793.52
5.000	.41	1.372	.088	3.39	50000.	.00	1322.	51193.	1.0204	794.53
5.333	.29	1.260	.078	2.98	50000.	.00	1086.	50980.	1.0203	795.22
5.666	.23	1.190	.072	2.74	50000.	.00	951.	50858.	1.0202	795.73
5.999	.21	1.153	.068	2.61	50000.	.00	883.	50797.	1.0202	796.16
6.333	.07	.871	.045	1.72	50000.	.00	461.	50416.	1.0200	796.43

6.6	.03	.694	.032	1.22	50000.	.00	272.	50245.	1.0200	796.51
6.999	.01	.567	.024	.90	50000.	.00	170.	50153.	1.0199	796.55
7.333	.01	.456	.017	.65	50000.	.00	102.	50092.	1.0199	796.56
7.666	.00	.401	.014	.54	50000.	.00	76.	50068.	1.0199	796.57
7.999	.00	.305	.009	.35	50000.	.00	40.	50036.	1.0199	796.57

AT PEAK FLOW OF 123.435 WITH TIME AT 1.70 HOURS: BEDMAT = 128.42 (TONS) = .0590 (AC-FT bulked)
TOTAL SED = 254.70 (TONS) = .1169 (AC-FT bulked)
PEAK BULKING FACTOR = 1.042999 = 102292. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	430.09	.1194	.1975	50000.	
BEDMAT =	366.48	.1018	.1683	42922.	
TOTAL SEDIMENT =	796.57	.2212	.3657	88820.	1.036784

SEDIMENT TRANSPORT CAPACITY: .46889 AC-FT/SQ MI (bulked) = 1.5957 TONS/ACRE (at Porosity=0.395)

*
* REACH 4 SPT DOWNSTREAM OF DIVERSION
*

SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.12	58.38
610	7.76	66.44
872	8.54	75.66
1066	9.01	81.40
1248	9.40	85.95
1430	9.81	89.35

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.37	1.213	.073	4.13	50000.	.00	1008.	50910.	1.0202	.17
1.333	2.06	2.066	.162	6.16	50000.	.00	3472.	53134.	1.0212	1.80
1.667	121.65	6.497	.904	20.72	50000.	2.29	47601.	93063.	1.0387	183.84
2.000	58.14	5.829	.768	12.98	50000.	.85	37391.	83808.	1.0345	519.98
2.333	23.28	4.736	.562	8.74	50000.	.21	23402.	71145.	1.0289	632.03
2.666	12.27	3.918	.423	7.40	50000.	.07	15190.	63720.	1.0257	676.02
3.000	7.16	3.271	.323	6.78	50000.	.03	10035.	59061.	1.0237	698.50
3.333	4.36	2.740	.248	6.44	50000.	.01	6669.	56021.	1.0224	711.02
3.666	2.68	2.283	.188	6.23	50000.	.00	4374.	53948.	1.0215	718.35
4.000	1.63	1.889	.142	6.10	50000.	.00	2819.	52544.	1.0209	722.69
4.333	1.00	1.560	.106	6.02	50000.	.00	1809.	51632.	1.0205	725.27
4.666	.62	1.387	.089	5.05	50000.	.00	1376.	51242.	1.0204	726.85
5.000	.41	1.249	.076	4.32	50000.	.00	1080.	50975.	1.0203	727.85
5.333	.29	1.148	.067	3.80	50000.	.00	887.	50801.	1.0202	728.53
5.666	.23	1.084	.062	3.49	50000.	.00	777.	50701.	1.0202	729.05
5.999	.21	1.050	.059	3.33	50000.	.00	721.	50651.	1.0201	729.48
6.333	.07	.794	.039	2.19	50000.	.00	377.	50340.	1.0200	729.74
6.666	.03	.632	.027	1.56	50000.	.00	222.	50200.	1.0199	729.83

6.[redacted]	.01	.516	.020	1.15	50000.	.00	13[redacted]	50125.	1.0199	729.86
7.333	.01	.415	.015	.83	50000.	.00	83.	50075.	1.0199	729.87
7.666	.00	.365	.012	.68	50000.	.00	62.	50056.	1.0199	729.88
7.999	.00	.277	.008	.45	50000.	.00	33.	50030.	1.0199	729.88

AT PEAK FLOW OF 123.435 WITH TIME AT 1.70 HOURS: BEDMAT = 105.07 (TONS) = .0482 (AC-FT bulked)
TOTAL SED = 231.35 (TONS) = .1062 (AC-FT bulked)
PEAK BULKING FACTOR = 1.038794 = 93221. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	430.09	.1194	.1975	50000.	
BEDMAT =	299.79	.0832	.1376	35388.	
TOTAL SEDIMENT =	729.89	.2027	.3351	81994.	1.033705

SEDIMENT TRANSPORT CAPACITY: .42964 AC-FT/SQ MI (bulked) = 1.4621 TONS/ACRE (at Porosity=0.395)

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:26:54

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 AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
      RUN DATE (MON/DAY/YR) = 10/23/1994
      START TIME (HR:MIN:SEC) = 13:26:03     USER NO.= BOHN_HNM.STE
      INPUT FILE = psed5.hym


**************************************************************
*                  HIGH DESERT FINAL HYDROLOGY MODEL
*  ORIGINAL INPUT=HIGHD_P.HYM, JAN 6,1992  DOMINANT DISCHARGE
*   PROPOSED CONDTIONS MODEL _  PHASE 2, NO BULKING
*      INPUT = SPTP2_QD.HYM USED FOR MEANDER ANALYSIS OF SOUTH PINO
**********************************************************************
*
*       TAKEN FROM
*       FILE: BC_P.IN/OUT
*       BHI JN'S 8911803, 9123302                       DATE: NOV,25 1993
*
*
* HYMO ANALYSIS USING NM HYMO, PER CITY DPM APPROVED AUGUST, 1991
* INPUT BASED ON MODIFIED ECI STUDY FOR JOHN ROBERTS DAM, DATED DEC. 1991.
* MODIFICATIONS INCLUDE:        1) INCREASE RAINFALL TO 3.00"/6HR.
*                               2) ADJUST AREAS USING NEW 1"=200' SCALE MAPS.
*                               3) MODEL OF EXISITNG CONDITIONS AS OF 1/92
*                                  AND IMPROVEMENTS TO TRAMWAY BLVD.
*                               4) ESTIMATED 40% IMPERVIOUS AREA DEDUCTED
*                                  IN ACCORDANCE WITH THE EXISTING CONDITIONS.
*                               5) BEAR ARROYO BASINS DO NOT CONTRIBUTE TO
*                                  BEAR CANYON BASINS.
*                               6) DELETE BULKING FACTOR AND INSTALL SEDIMENT
*                                  TRANSPORT ANALYSIS.( RUN PC)
**********************************************************************
*
**THE RECALL HYD'S WERE ADDED FROM THE OUTPUT OF FILE HD_P100.HYM
*** psed5.hym IS THE UNBULKED (CLEAN WATER) HYDROLOGY OF HIGH DESERT
**********************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
RECALL HYD          ID=10  HYD=AP23
                           DT=  .033330 HRS  DA=    .7330 SQ MI
                           PEAK=    356.257CFS  RO=  .3272 INCHES  NO PTS=245
                           FLOW RATES
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .002      .010      .026      .047
                                    .070      .092      .109      .118      .118
                                    .114      .119      .150      .223      .352
                                    .824     3.407    18.814    61.739   133.978
                                 224.966   308.778   351.297   356.257   340.377
                                 311.491   277.257   241.821   206.326   175.617
                                 150.930   129.946   112.312    97.528    85.134
                                  75.063    67.169    60.962    55.740    51.031
                                  46.622    42.530    38.955    35.919    33.283
                                  30.972    28.921    27.078    25.400    23.816
                                  22.288    20.828    19.488    18.308    17.266
                                  16.318    15.438    14.613    13.836    13.103
                                  12.411    11.755    11.135    10.548     9.989
                                   9.442     8.917     8.421     7.949     7.513
                                   7.114     6.747     6.407     6.090     5.790
                                   5.504     5.232     4.972     4.724     4.487
                                   4.262     4.047     3.842     3.647     3.462
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3.285	3.117	2.957	2.8[illegible]	2.660
2.522	2.391	2.267	2.150	2.039
1.933	1.832	1.736	1.646	1.560
1.478	1.401	1.327	1.258	1.192
1.129	1.070	1.013	.960	.910
.862	.817	.774	.733	.695
.659	.625	.593	.562	.533
.506	.480	.455	.432	.410
.390	.370	.352	.335	.318
.303	.288	.274	.261	.248
.237	.225	.215	.205	.196
.187	.179	.171	.164	.157
.151	.145	.139	.133	.128
.123	.119	.114	.110	.107
.103	.100	.096	.090	.083
.075	.067	.060	.054	.049
.045	.041	.037	.034	.032
.030	.027	.025	.024	.023
.021	.020	.019	.018	.017
.016	.015	.014	.014	.013
.012	.011	.011	.010	.010
.009	.009	.008	.008	.007
.007	.007	.006	.006	.006
.005	.005	.005	.005	.004
.004	.004	.002	.002	.002
.002	.002	.002	.001	.001
.001	.001	.001	.001	.001

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**********************
* TOTAL FLOW AT AP23 *
**********************
*DIVIDE HYD            ID=10    PER=-20  ID=10  HYD=AP23
*                                       ID=11  HYD=100
*********************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
*
*  REACH  4 - SPT AT DIVERSION - SOIL TEST SPT-3
SEDIMENT TRANS         ID=10   IDS=2   CODE=10
                               A FACT=0.0000018 B EXP=5.82
                               C EXP=-0.61 D EXP=-2.0   NUMBER WASH=1
                               WASH CONC=50000
                               NUMBER SECTIONS=6
                               FLOW          VELOCITY      WIDTH
                               (CFS)         (FEET/SEC)    (FT)
                               435            5.81         107.5
                               602            6.42         117.1
                               854            7.19         124.9
                              1033            7.67         128.9
                              1208            8.13         130.4
                              1400            8.57         132.0

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.07	.634	.025	4.40	50000.	.00	221.	50200.	1.0199	.03
1.333	.82	1.174	.063	11.10	50000.	.00	974.	50879.	1.0202	.47
1.667	311.49	5.713	.679	80.30	50000.	5.15	41979.	87965.	1.0364	753.74
2.000	75.06	4.911	.541	28.24	50000.	.86	29559.	76716.	1.0314	1285.09

2.3	30.97	4.079	.410	18.53	50000.	.23	19120.	67272.	1.0272	1419.42
2.666	16.32	3.408	.313	15.31	50000.	.08	12491.	61281.	1.0246	1475.77
3.000	9.44	2.854	.240	13.79	50000.	.03	8193.	57397.	1.0230	1504.58
3.333	5.50	2.361	.180	12.92	50000.	.01	5205.	54699.	1.0218	1520.20
3.666	3.29	1.950	.135	12.44	50000.	.00	3294.	52973.	1.0211	1529.12
4.000	1.93	1.593	.100	12.14	50000.	.00	2027.	51829.	1.0206	1534.26
4.333	1.13	1.292	.073	11.96	50000.	.00	1226.	51107.	1.0203	1537.21
4.666	.66	1.110	.058	10.21	50000.	.00	852.	50769.	1.0202	1538.92
5.000	.39	.974	.048	8.38	50000.	.00	621.	50561.	1.0201	1539.92
5.333	.24	.860	.040	6.95	50000.	.00	461.	50416.	1.0200	1540.51
5.666	.15	.768	.033	5.87	50000.	.00	351.	50317.	1.0200	1540.88
5.999	.10	.698	.029	5.09	50000.	.00	279.	50252.	1.0200	1541.12
6.333	.05	.567	.021	3.73	50000.	.00	170.	50153.	1.0199	1541.26
6.666	.02	.469	.016	2.80	50000.	.00	107.	50097.	1.0199	1541.32
6.999	.01	.408	.013	2.27	50000.	.00	77.	50069.	1.0199	1541.35
7.333	.01	.356	.011	1.86	50000.	.00	55.	50050.	1.0199	1541.37
7.666	.00	.310	.009	1.50	50000.	.00	40.	50036.	1.0199	1541.38
7.999	.00	.219	.005	.89	50000.	.00	17.	50016.	1.0199	1541.38

AT PEAK FLOW OF 356.257 WITH TIME AT 1.60 HOURS: BEDMAT = 229.71 (TONS) = .1055 (AC-FT bulked)
TOTAL SED = 517.70 (TONS) = .2377 (AC-FT bulked)
PEAK BULKING FACTOR = 1.036693 = 88619. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	914.88	.2540	.4201	50000.	
BEDMAT =	626.51	.1740	.2877	34788.	
TOTAL SEDIMENT =	1541.38	.4280	.7077	81451.	1.033462

SEDIMENT TRANSPORT CAPACITY: .96549 AC-FT/SQ MI (bulked) = 3.2857 TONS/ACRE (at Porosity=0.395)

* REACH 3 - SPT AT DIVERSION - SOIL TEST SPT4
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.0000016 B EXP=5.82
C EXP=-0.7 D EXP=-1.95 NUMBER=1
WAS CONC=50000 NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.0	63.03
610	7.76	67.50
872	8.85	73.39
1066	9.20	78.85
1248	9.46	81.24
1430	9.38	84.67

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.07	.748	.034	2.74	50000.	.00	361.	50325.	1.0200	.03
1.333	.82	1.386	.086	6.91	50000.	.00	1459.	51317.	1.0204	.48
1.667	311.49	6.879	.952	47.58	50000.	6.52	52585.	97583.	1.0408	843.85
2.000	75.06	5.876	.751	17.01	50000.	1.10	37352.	83773.	1.0345	1435.74
2.333	30.97	4.855	.564	11.30	50000.	.29	24547.	72181.	1.0294	1582.17
2.666	16.32	4.044	.429	9.41	50000.	.10	16341.	64760.	1.0261	1642.44
3.000	9.44	3.380	.328	8.52	50000.	.04	10941.	59879.	1.0240	1672.79
3.333	5.50	2.792	.246	8.01	50000.	.01	7115.	56424.	1.0226	1689.02

3.[illegible]	3.29	2.305	.185	7.72	50000.	.01	4615	54166.	1.0216	1698.20
4.000	1.93	1.881	.136	7.55	50000.	.00	2916.	52632.	1.0210	1703.44
4.333	1.13	1.526	.099	7.45	50000.	.00	1814.	51638.	1.0205	1706.43
4.666	.66	1.311	.079	6.35	50000.	.00	1286.	51161.	1.0203	1708.15
5.000	.39	1.150	.065	5.22	50000.	.00	955.	50862.	1.0202	1709.16
5.333	.24	1.015	.054	4.33	50000.	.00	720.	50650.	1.0201	1709.76
5.666	.15	.907	.046	3.66	50000.	.00	558.	50503.	1.0201	1710.12
5.999	.10	.824	.039	3.17	50000.	.00	449.	50405.	1.0200	1710.37
6.333	.05	.670	.029	2.32	50000.	.00	281.	50253.	1.0200	1710.51
6.666	.02	.554	.022	1.74	50000.	.00	182.	50164.	1.0199	1710.57
6.999	.01	.481	.018	1.41	50000.	.00	133.	50120.	1.0199	1710.60
7.333	.01	.421	.014	1.16	50000.	.00	98.	50088.	1.0199	1710.62
7.666	.00	.366	.012	.94	50000.	.00	71.	50064.	1.0199	1710.63
7.999	.00	.259	.007	.56	50000.	.00	32.	50029.	1.0199	1710.63

AT PEAK FLOW OF 356.257 WITH TIME AT 1.60 HOURS: BEDMAT = 291.13 (TONS) = .1337 (AC-FT bulked)
TOTAL SED = 579.12 (TONS) = .2659 (AC-FT bulked)

PEAK BULKING FACTOR = 1.041179 = 98388. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	914.88	.2540	.4201	50000.	
BEDMAT =	795.76	.2209	.3654	43775.	
TOTAL SEDIMENT =	1710.63	.4750	.7854	89594.	1.037136

SEDIMENT TRANSPORT CAPACITY: 1.07151 AC-FT/SQ MI (bulked) = 3.6465 TONS/ACRE (at Porosity=0.395)

*

* READ A PUNCH HYD FORMAT AT AP 24

RECALL HYD ID= 3 HYD=AP24
DT= .033330 HRS DA= .7800 SQ MI
PEAK= 350.083CFS RO= .3280 INCHES NO PTS=248
FLOW RATES

.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.001	.014	.062	.149	.257
.367	.466	.541	.573	.563
.544	.585	.778	1.192	1.863
2.847	4.442	9.744	23.825	52.026
101.982	178.199	267.295	329.386	350.083
342.560	319.125	289.520	258.395	226.563
195.900	167.557	144.447	127.377	113.780
102.336	92.568	84.192	77.014	70.817
65.214	60.015	55.359	51.180	47.330
43.814	40.621	37.728	35.105	32.714
30.519	28.487	26.601	24.860	23.265
21.812	20.484	19.267	18.146	17.110
16.148	15.252	14.413	13.628	12.891
12.196	11.535	10.907	10.310	9.746
9.215	8.717	8.252	7.819	7.415
7.037	6.681	6.345	6.027	5.726
5.442	5.172	4.915	4.672	4.441
4.220	4.011	3.811	3.621	3.441
3.269	3.106	2.952	2.805	2.666
2.533	2.408	2.288	2.175	2.067
1.965	1.868	1.777	1.689	1.607
1.529	1.455	1.384	1.318	1.254
1.194	1.137	1.084	1.033	.985
.940	.897	.857	.819	.782

.748	.715	.685	.65	.629
.604	.579	.556	.535	.516
.497	.479	.462	.445	.430
.416	.402	.390	.379	.368
.357	.348	.339	.331	.323
.316	.309	.302	.296	.290
.285	.280	.275	.272	.268
.264	.261	.254	.239	.214
.184	.156	.133	.114	.099
.088	.079	.071	.065	.059
.054	.049	.045	.041	.038
.035	.032	.030	.028	.026
.024	.022	.021	.019	.018
.017	.016	.015	.014	.013
.011	.011	.010	.010	.009
.009	.008	.008	.007	.007
.007	.006	.006	.006	.005
.005	.005	.004	.004	.003
.003	.003	.002	.002	.002
.002	.002	.002	.001	.001
.001	.001	.001		

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**********************
* TOTAL FLOW AT AP24 *
**********************
*DIVIDE HYD            ID=3  PER=-20  ID=3  HYD=AP24
*                                    ID=11  HYD=100
**********************************************************************
*   REACH 2 - SPT DOWNSTREAM OF DIVERSION - SOIL TEST SPT5
SEDIMENT TRANS        ID=3 IDS=2   CODE=10
                              A FACT=0.0000018 B EXP=5.80
                              C EXP=-0.65  D EXP=-2.1  NUMBER=1
                              WASH CONC=50000
                              NUMBER SECTIONS=6
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FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.81	45.91
610	8.45	52.48
872	9.32	61.36
1066	9.65	64.72
1248	10.03	68.57
1430	10.38	71.92

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.37	1.333	.085	3.25	50000.	.00	1238.	51117.	1.0203	.17
1.333	2.85	2.565	.226	4.91	50000.	.01	5643.	55094.	1.0220	2.26
1.667	342.56	7.730	1.184	37.44	50000.	9.53	68686.	112203.	1.0477	761.60
2.000	102.34	6.981	1.016	14.43	50000.	2.25	54983.	99759.	1.0418	1641.25
2.333	43.81	6.052	.820	8.83	50000.	.69	40080.	86245.	1.0356	1890.25
2.666	21.81	5.106	.636	6.72	50000.	.23	27357.	74724.	1.0305	1988.90
3.000	12.20	4.293	.490	5.80	50000.	.09	18440.	66657.	1.0270	2034.14
3.333	7.04	3.570	.371	5.31	50000.	.03	12089.	60917.	1.0245	2057.25
3.666	4.22	2.971	.282	5.04	50000.	.01	7921.	57151.	1.0229	2069.82
4.000	2.53	2.454	.212	4.87	50000.	.00	5094.	54598.	1.0218	2076.94
4.333	1.53	2.021	.158	4.78	50000.	.00	3251.	52934.	1.0211	2081.05
4.666	.94	1.687	.121	4.62	50000.	.00	2136.	51928.	1.0207	2083.49
5.000	.60	1.510	.102	3.91	50000.	.00	1653.	51492.	1.0205	2085.00
5.333	.42	1.376	.089	3.40	50000.	.00	1331.	51201.	1.0204	2086.00
5.666	.32	1.284	.080	3.07	50000.	.00	1135.	51024.	1.0203	2086.71

5.9	.26	1.228	.075	2.87	50000.	.00	1022.	50923.	1.0202	2087.28
6.333	.09	.933	.050	1.90	50000.	.00	540.	50487.	1.0201	2087.63
6.666	.04	.741	.035	1.34	50000.	.00	316.	50285.	1.0200	2087.74
6.999	.02	.619	.027	1.03	50000.	.00	208.	50188.	1.0199	2087.79
7.333	.01	.528	.021	.81	50000.	.00	144.	50130.	1.0199	2087.81
7.666	.01	.456	.017	.65	50000.	.00	102.	50092.	1.0199	2087.82
7.999	.00	.362	.012	.46	50000.	.00	60.	50054.	1.0199	2087.83

AT PEAK FLOW OF 350.083 WITH TIME AT 1.63 HOURS: BEDMAT = 337.90 (TONS) = .1551 (AC-FT bulked)
TOTAL SED = 599.52 (TONS) = .2753 (AC-FT bulked)
PEAK BULKING FACTOR = 1.047761 = 112347. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	976.00	.2710	.4481	50000.	
BEDMAT =	1111.83	.3087	.5105	56565.	
TOTAL SEDIMENT =	2087.83	.5797	.9586	101194.	1.042486

SEDIMENT TRANSPORT CAPACITY: 1.22897 AC-FT/SQ MI (bulked) = 4.1824 TONS/ACRE (at Porosity=0.395)

*
* REACH 1 SPT DOWNSTREAM OF DIVERSION
*
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.12	58.38
610	7.76	66.44
872	8.54	75.66
1066	9.01	81.40
1248	9.40	85.95
1430	9.81	89.35

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.37	1.214	.073	4.14	50000.	.00	1011.	50913.	1.0202	.17
1.333	2.85	2.337	.195	6.25	50000.	.00	4615.	54166.	1.0216	2.23
1.667	342.56	7.047	1.021	47.61	50000.	7.80	56934.	101530.	1.0426	683.11
2.000	102.34	6.362	.876	18.36	50000.	1.84	45440.	91103.	1.0378	1472.63
2.333	43.81	5.515	.707	11.24	50000.	.56	33018.	79848.	1.0327	1699.53
2.666	21.81	4.652	.548	8.56	50000.	.19	22476.	70307.	1.0285	1791.03
3.000	12.20	3.911	.422	7.39	50000.	.07	15121.	63657.	1.0257	1833.75
3.333	7.04	3.252	.320	6.76	50000.	.03	9900.	58939.	1.0236	1855.91
3.666	4.22	2.706	.243	6.42	50000.	.01	6481.	55851.	1.0223	1868.11
4.000	2.53	2.235	.182	6.21	50000.	.00	4165.	53760.	1.0214	1875.09
4.333	1.53	1.841	.136	6.09	50000.	.00	2657.	52398.	1.0209	1879.15
4.666	.94	1.536	.104	5.89	50000.	.00	1746.	51576.	1.0205	1881.57
5.000	.60	1.375	.088	4.99	50000.	.00	1351.	51219.	1.0204	1883.07
5.333	.42	1.253	.077	4.34	50000.	.00	1088.	50982.	1.0203	1884.06
5.666	.32	1.170	.069	3.91	50000.	.00	927.	50837.	1.0202	1884.77
5.999	.26	1.118	.065	3.66	50000.	.00	835.	50754.	1.0202	1885.34

6.[illegible]	.09	.850	.043	2.42	50000.	.00	441[illegible]	50398.	1.0200	1885.69
6.666	.04	.675	.030	1.71	50000.	.00	258.	50233.	1.0200	1885.80
6.999	.02	.563	.023	1.31	50000.	.00	170.	50153.	1.0199	1885.84
7.333	.01	.481	.018	1.03	50000.	.00	117.	50106.	1.0199	1885.87
7.666	.01	.415	.015	.83	50000.	.00	83.	50075.	1.0199	1885.88
7.999	.00	.330	.010	.59	50000.	.00	49.	50044.	1.0199	1885.89

AT PEAK FLOW OF 350.083 WITH TIME AT 1.63 HOURS: BEDMAT = 276.57 (TONS) = .1270 (AC-FT bulked)
TOTAL SED = 538.19 (TONS) = .2471 (AC-FT bulked)
PEAK BULKING FACTOR = 1.042699 = 101651. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	976.00	.2710	.4481	50000.	
BEDMAT =	909.89	.2526	.4178	46771.	
TOTAL SEDIMENT =	1885.89	.5236	.8659	92310.	1.038377

SEDIMENT TRANSPORT CAPACITY: 1.11010 AC-FT/SQ MI (bulked) = 3.7778 TONS/ACRE (at Porosity=0.395)

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:26:04

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 AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
      RUN DATE (MON/DAY/YR) = 10/23/1994
      START TIME (HR:MIN:SEC) = 13:25:15     USER NO.= BOHN_HNM.STE
      INPUT FILE = psed10.hym


**************************************************************
*                  HIGH DESERT FINAL HYDROLOGY MODEL
*  ORIGINAL INPUT=HIGHD_P.HYM, JAN 6,1992  DOMINANT DISCHARGE
*   PROPOSED CONDITIONS MODEL _  PHASE 2, NO BULKING
*      INPUT = SPTP2_QD.HYM USED FOR MEANDER ANALYSIS OF SOUTH PINO
**************************************************************************
*
*       TAKEN FROM
*       FILE: BC_P.IN/OUT
*       BHI JN'S 8911803, 9123302                       DATE: NOV,25 1993
*
*
* HYMO ANALYSIS USING NM HYMO, PER CITY DPM APPROVED AUGUST, 1991
* INPUT BASED ON MODIFIED ECI STUDY FOR JOHN ROBERTS DAM, DATED DEC. 1991.
* MODIFICATIONS INCLUDE:        1) INCREASE RAINFALL TO 3.00"/6HR.
*                               2) ADJUST AREAS USING NEW 1"=200' SCALE MAPS.
*                               3) MODEL OF EXISITNG CONDITIONS AS OF 1/92
*                                  AND IMPROVEMENTS TO TRAMWAY BLVD.
*                               4) ESTIMATED 40% IMPERVIOUS AREA DEDUCTED
*                                  IN ACCORDANCE WITH THE EXISTING CONDITIONS.
*                               5) BEAR ARROYO BASINS DO NOT CONTRIBUTE TO
*                                  BEAR CANYON BASINS.
*                               6) DELETE BULKING FACTOR AND INSTALL SEDIMENT
*                                  TRANSPORT ANALYSIS.( RUN PC)
**********************************************************************
*
**THE RECALL HYD'S WERE ADDED FROM THE OUTPUT OF FILE HD_P100.HYM
*** psed10.hym IS THE UNBULKED (CLEAN WATER) HYDROLOGY OF HIGH DESERT
**********************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
RECALL HYD          ID=10  HYD=AP23
                           DT=  .033330 HRS   DA=    .7330 SQ MI
                           PEAK=    544.839CFS  RO=  .4925 INCHES  NO PTS=247
                           FLOW RATES
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .003
                                    .013      .030      .053      .077      .100
                                    .119      .136      .148      .154      .151
                                    .144      .149      .185      .271      .537
                                   1.933     11.430    47.115   125.423   251.138
                                 397.841    501.294   544.839   540.270   507.194
                                 458.024    404.548   353.890   307.134   264.692
                                 225.315    190.289   162.608   140.805   122.914
                                 108.605     96.895    86.880    78.354    71.102
                                  65.010     59.973    55.547    51.303    47.178
                                  43.325     39.913    36.945    34.343    32.031
                                  29.952     28.063    26.309    24.615    22.987
                                  21.483     20.135    18.940    17.856    16.855
                                  15.919     15.039    14.210    13.429    12.692
                                  11.996     11.340    10.721    10.122     9.543
                                   8.998      8.478     7.988     7.545     7.142
                                   6.770      6.421     6.092     5.780     5.484
                                   5.201      4.933     4.677     4.434     4.203
```

3.984	3.775	3.577	3.3	3.210
3.041	2.880	2.727	2.583	2.446
2.316	2.193	2.077	1.966	1.861
1.762	1.669	1.580	1.495	1.415
1.340	1.268	1.200	1.136	1.076
1.018	.964	.913	.864	.819
.775	.735	.696	.660	.625
.593	.562	.533	.506	.480
.455	.432	.410	.390	.370
.352	.335	.318	.303	.288
.275	.262	.250	.238	.227
.217	.207	.198	.190	.182
.174	.167	.160	.154	.148
.142	.136	.130	.125	.121
.116	.112	.108	.101	.092
.082	.073	.065	.058	.052
.048	.044	.041	.039	.036
.033	.031	.030	.028	.026
.025	.023	.022	.021	.020
.019	.018	.017	.016	.015
.014	.013	.013	.012	.011
.011	.010	.010	.009	.009
.008	.008	.007	.007	.006
.005	.003	.003	.003	.003
.003	.002	.002	.002	.002
.002	.002	.002	.002	.002
.001	.001	.001	.001	.001
.001	.001			

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**********************
* TOTAL FLOW AT AP23 *
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*DIVIDE HYD            ID=10    PER=-20  ID=10  HYD=AP23
*                                       ID=11  HYD=100
*****************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
*
*  REACH  4 - SPT AT DIVERSION - SOIL TEST SPT-3
SEDIMENT TRANS        ID=10   IDS=2   CODE=10
                              A FACT=0.0000018 B EXP=5.82
                              C EXP=-0.61 D EXP=-2.0   NUMBER WASH=1
                              WASH CONC=50000
                              NUMBER SECTIONS=6
                              FLOW          VELOCITY     WIDTH
                              (CFS)         (FEET/SEC)   (FT)
                              435            5.81        107.5
                              602            6.42        117.1
                              854            7.19        124.9
                             1033            7.67        128.9
                             1208            8.13        130.4
                             1400            8.57        132.0

  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.12	.724	.031	5.37	50000.	.00	304.	50275.	1.0200	.08
1.333	1.93	1.593	.100	12.14	50000.	.00	2027.	51829.	1.0206	.85
1.667	458.02	5.906	.713	108.82	50000.	8.23	45448.	91110.	1.0378	1293.86

2.[illegible]	108.61	5.188	.588	35.63	50000.	1.42	33585.	80362.	1.0330	2101.39
2.333	43.33	4.416	.462	21.25	50000.	.39	23054.	70831.	1.0288	2302.07
2.666	21.48	3.696	.353	16.44	50000.	.12	15149.	63682.	1.0257	2381.91
3.000	12.00	3.092	.270	14.35	50000.	.05	9909.	58947.	1.0236	2420.20
3.333	6.77	2.543	.202	13.20	50000.	.02	6216.	55612.	1.0222	2440.32
3.666	3.98	2.096	.151	12.59	50000.	.01	3917.	53535.	1.0213	2451.37
4.000	2.32	1.708	.111	12.22	50000.	.00	2395.	52162.	1.0208	2457.62
4.333	1.34	1.382	.081	12.01	50000.	.00	1441.	51300.	1.0204	2461.16
4.666	.78	1.156	.062	10.84	50000.	.00	939.	50847.	1.0202	2463.18
5.000	.46	1.012	.051	8.88	50000.	.00	682.	50615.	1.0201	2464.35
5.333	.28	.892	.042	7.35	50000.	.00	504.	50455.	1.0201	2465.04
5.666	.17	.796	.035	6.19	50000.	.00	383.	50345.	1.0200	2465.46
5.999	.12	.719	.030	5.32	50000.	.00	300.	50271.	1.0200	2465.74
6.333	.05	.577	.022	3.82	50000.	.00	176.	50159.	1.0199	2465.90
6.666	.03	.490	.017	2.99	50000.	.00	119.	50108.	1.0199	2465.96
6.999	.01	.424	.014	2.41	50000.	.00	84.	50076.	1.0199	2466.00
7.333	.01	.368	.011	1.95	50000.	.00	60.	50054.	1.0199	2466.02
7.666	.00	.288	.008	1.35	50000.	.00	33.	50030.	1.0199	2466.03
7.999	.00	.219	.005	.89	50000.	.00	17.	50016.	1.0199	2466.04

AT PEAK FLOW OF 544.839 WITH TIME AT 1.57 HOURS: BEDMAT = 336.56 (TONS) = .1545 (AC-FT bulked)
TOTAL SED = 707.63 (TONS) = .3249 (AC-FT bulked)
PEAK BULKING FACTOR = 1.040488 = 96896. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	1377.34	.3824	.6324	50000.	
BEDMAT =	1088.70	.3023	.4999	39940.	
TOTAL SEDIMENT =	2466.04	.6847	1.1322	86118.	1.035560

SEDIMENT TRANSPORT CAPACITY: 1.54468 AC-FT/SQ MI (bulked) = 5.2567 TONS/ACRE (at Porosity=0.395)

* REACH 3 - SPT AT DIVERSION - SOIL TEST SPT4
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.0000016 B EXP=5.82
C EXP=-0.7 D EXP=-1.95 NUMBER=1
WAS CONC=50000 NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.0	63.03
610	7.76	67.50
872	8.85	73.39
1066	9.20	78.85
1248	9.46	81.24
1430	9.38	84.67

* * * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.12	.854	.042	3.34	50000.	.00	487.	50440.	1.0200	.08
1.333	1.93	1.881	.136	7.55	50000.	.00	2916.	52632.	1.0210	.86
1.667	458.02	7.131	1.008	63.70	50000.	10.34	56432.	101074.	1.0424	1440.07
2.000	108.61	6.220	.818	21.34	50000.	1.81	42284.	88242.	1.0365	2343.32
2.333	43.33	5.267	.638	12.90	50000.	.49	29382.	76556.	1.0313	2563.69
2.666	21.48	4.392	.485	10.08	50000.	.16	19643.	67746.	1.0274	2649.76
3.000	12.00	3.664	.370	8.85	50000.	.06	13107.	61837.	1.0249	2690.35

3.3[illegible]	6.77	3.009	.275	8.18	50000.	.02	8420.	57602.	1.0231	2711.38
3.666	3.98	2.478	.206	7.82	50000.	.01	5436.	54907.	1.0219	2722.78
4.000	2.32	2.017	.151	7.60	50000.	.00	3414.	53082.	1.0212	2729.17
4.333	1.34	1.631	.110	7.47	50000.	.00	2112.	51906.	1.0207	2732.77
4.666	.78	1.365	.084	6.75	50000.	.00	1410.	51272.	1.0204	2734.81
5.000	.46	1.195	.069	5.53	50000.	.00	1042.	50941.	1.0203	2735.99
5.333	.28	1.053	.057	4.58	50000.	.00	783.	50707.	1.0202	2736.68
5.666	.17	.939	.048	3.86	50000.	.00	604.	50545.	1.0201	2737.11
5.999	.12	.849	.041	3.31	50000.	.00	480.	50433.	1.0200	2737.39
6.333	.05	.681	.030	2.38	50000.	.00	291.	50263.	1.0200	2737.55
6.666	.03	.578	.023	1.86	50000.	.00	201.	50181.	1.0199	2737.61
6.999	.01	.500	.019	1.50	50000.	.00	145.	50131.	1.0199	2737.65
7.333	.01	.435	.015	1.22	50000.	.00	105.	50095.	1.0199	2737.67
7.666	.00	.340	.010	.84	50000.	.00	60.	50054.	1.0199	2737.68
7.999	.00	.259	.007	.56	50000.	.00	32.	50029.	1.0199	2737.68

AT PEAK FLOW OF 544.839 WITH TIME AT 1.57 HOURS: BEDMAT = 416.45 (TONS) = .1912 (AC-FT bulked)
TOTAL SED = 787.52 (TONS) = .3616 (AC-FT bulked)
PEAK BULKING FACTOR = 1.044786 = 106091. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	1377.34	.3824	.6324	50000.	
BEDMAT =	1360.35	.3777	.6246	49414.	
TOTAL SEDIMENT =	2737.69	.7601	1.2570	94706.	1.039477

SEDIMENT TRANSPORT CAPACITY: 1.71483 AC-FT/SQ MI (bulked) = 5.8358 TONS/ACRE (at Porosity=0.395)

*
* READ A PUNCH HYD FORMAT AT AP 24
RECALL HYD ID= 3 HYD=AP24
DT= .033330 HRS DA= .7800 SQ MI
PEAK= 545.246CFS RO= .4927 INCHES NO PTS=250
FLOW RATES

.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.002	.020
.075	.170	.284	.398	.500
.588	.665	.724	.743	.720
.692	.739	.966	1.455	2.263
3.556	7.288	18.791	46.603	103.931
211.447	362.468	481.136	540.148	545.246
517.666	474.216	424.988	374.119	325.877
283.934	247.982	213.620	182.350	157.215
138.201	124.008	112.497	102.590	93.860
86.115	79.302	73.435	68.320	63.595
59.155	55.080	51.307	47.761	44.466
41.427	38.632	36.063	33.690	31.479
29.416	27.499	25.731	24.109	22.622
21.253	19.990	18.820	17.733	16.721
15.774	14.889	14.059	13.278	12.539
11.839	11.176	10.547	9.954	9.400
8.884	8.404	7.956	7.537	7.143
6.772	6.423	6.093	5.781	5.486
5.207	4.941	4.689	4.450	4.224
4.009	3.805	3.612	3.428	3.254
3.089	2.933	2.784	2.644	2.511
2.385	2.266	2.153	2.046	1.944
1.848	1.757	1.671	1.589	1.512
1.439	1.369	1.304	1.242	1.184

1.129	1.077	1.027	.98	.937
.896	.857	.820	.785	.752
.721	.692	.665	.639	.614
.591	.570	.549	.530	.512
.495	.478	.463	.449	.436
.423	.411	.400	.390	.380
.372	.364	.356	.348	.341
.334	.328	.322	.317	.312
.307	.303	.294	.275	.245
.209	.176	.149	.128	.112
.098	.088	.079	.072	.066
.060	.055	.051	.047	.043
.040	.037	.034	.032	.030
.028	.026	.024	.023	.021
.020	.019	.017	.016	.015
.014	.014	.012	.011	.011
.010	.009	.009	.008	.008
.007	.006	.006	.005	.004
.004	.004	.003	.003	.003
.003	.002	.002	.002	.002
.002	.002	.002	.002	.001
.001	.001	.001	.001	.001

****
* TOTAL FLOW AT AP24 *
****
*DIVIDE HYD ID=3 PER=-20 ID=3 HYD=AP24
* ID=11 HYD=100
****
* REACH 2 - SPT DOWNSTREAM OF DIVERSION - SOIL TEST SPT5
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.81	45.91
610	8.45	52.48
872	9.32	61.36
1066	9.65	64.72
1248	10.03	68.57
1430	10.38	71.92

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.59	1.500	.101	3.87	50000.	.00	1627.	51469.	1.0205	.41
1.333	3.56	2.788	.256	4.97	50000.	.01	6843.	56178.	1.0225	3.06
1.667	517.67	8.151	1.294	49.09	50000.	16.05	75935.	118792.	1.0509	1392.61
2.000	138.20	7.228	1.070	17.87	50000.	3.29	59339.	103713.	1.0437	2716.66
2.333	59.15	6.417	.895	10.30	50000.	1.07	45654.	91297.	1.0379	3065.90
2.666	29.42	5.523	.715	7.45	50000.	.37	32655.	79519.	1.0326	3209.05
3.000	15.77	4.650	.552	6.14	50000.	.13	22123.	69988.	1.0284	3272.39
3.333	8.88	3.868	.419	5.48	50000.	.05	14528.	63121.	1.0254	3303.41
3.666	5.21	3.208	.316	5.13	50000.	.02	9451.	58534.	1.0235	3319.55
4.000	3.09	2.645	.237	4.93	50000.	.01	6058.	55469.	1.0222	3328.47
4.333	1.85	2.175	.177	4.81	50000.	.00	3852.	53477.	1.0213	3333.53
4.666	1.13	1.796	.133	4.74	50000.	.00	2472.	52231.	1.0208	3336.49
5.000	.72	1.578	.109	4.18	50000.	.00	1832.	51653.	1.0206	3338.31
5.333	.50	1.437	.095	3.63	50000.	.00	1473.	51329.	1.0204	3339.50

5.	.37	1.338	.085	3.26	50000.	.00	1248.	51126.	1.0203	3340.35
5.999	.31	1.275	.079	3.04	50000.	.00	1116.	51007.	1.0203	3341.02
6.333	.10	.958	.052	1.98	50000.	.00	575.	50519.	1.0201	3341.42
6.666	.04	.766	.037	1.41	50000.	.00	342.	50308.	1.0200	3341.54
6.999	.02	.644	.028	1.09	50000.	.00	228.	50206.	1.0199	3341.59
7.333	.01	.542	.022	.84	50000.	.00	153.	50138.	1.0199	3341.62
7.666	.00	.431	.016	.60	50000.	.00	90.	50081.	1.0199	3341.63
7.999	.00	.362	.012	.46	50000.	.00	60.	50054.	1.0199	3341.64

AT PEAK FLOW OF 545.246 WITH TIME AT 1.63 HOURS: BEDMAT = 671.96 (TONS) = .3085 (AC-FT bulked)
TOTAL SED = 1131.36 (TONS) = .5195 (AC-FT bulked)
PEAK BULKING FACTOR = 1.051592 = 120275. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	1465.96	.4070	.6731	50000.	
BEDMAT =	1875.68	.5208	.8612	63093.	
TOTAL SEDIMENT =	3341.64	.9278	1.5343	107122.	1.045273

SEDIMENT TRANSPORT CAPACITY: 1.96701 AC-FT/SQ MI (bulked) = 6.6940 TONS/ACRE (at Porosity=0.395)

*
* REACH 1 SPT DOWNSTREAM OF DIVERSION
*

SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.12	58.38
610	7.76	66.44
872	8.54	75.66
1066	9.01	81.40
1248	9.40	85.95
1430	9.81	89.35

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.59	1.366	.087	4.94	50000.	.00	1330.	51200.	1.0204	.41
1.333	3.56	2.540	.221	6.34	50000.	.01	5597.	55053.	1.0220	3.03
1.667	517.67	7.461	1.114	62.28	50000.	13.43	64338.	108252.	1.0458	1254.01
2.000	138.20	6.588	.923	22.73	50000.	2.69	49087.	94410.	1.0393	2440.06
2.333	59.15	5.848	.772	13.11	50000.	.87	37655.	84047.	1.0346	2756.70
2.666	29.42	5.033	.616	9.49	50000.	.31	26859.	74272.	1.0303	2888.47
3.000	15.77	4.236	.476	7.82	50000.	.11	18155.	66400.	1.0268	2947.81
3.333	8.88	3.523	.361	6.99	50000.	.04	11904.	60749.	1.0244	2977.36
3.666	5.21	2.922	.273	6.54	50000.	.02	7735.	56984.	1.0228	2992.95
4.000	3.09	2.409	.204	6.28	50000.	.01	4955.	54473.	1.0217	3001.66
4.333	1.85	1.981	.152	6.13	50000.	.00	3149.	52842.	1.0211	3006.65
4.666	1.13	1.636	.114	6.04	50000.	.00	2020.	51824.	1.0206	3009.58
5.000	.72	1.438	.094	5.33	50000.	.00	1497.	51351.	1.0204	3011.38
5.333	.50	1.309	.082	4.63	50000.	.00	1203.	51086.	1.0203	3012.56
5.666	.37	1.218	.073	4.16	50000.	.00	1019.	50920.	1.0202	3013.41

5.[redacted]	.31	1.161	.068	3.87	50000.	.00	912[redacted]	50823.	1.0202	3014.07
6.333	.10	.873	.045	2.52	50000.	.00	470.	50424.	1.0200	3014.47
6.666	.04	.698	.032	1.80	50000.	.00	279.	50252.	1.0200	3014.59
6.999	.02	.587	.025	1.39	50000.	.00	187.	50168.	1.0199	3014.65
7.333	.01	.493	.019	1.07	50000.	.00	125.	50113.	1.0199	3014.67
7.666	.00	.392	.013	.76	50000.	.00	73.	50066.	1.0199	3014.69
7.999	.00	.330	.010	.59	50000.	.00	49.	50044.	1.0199	3014.69

AT PEAK FLOW OF 545.246 WITH TIME AT 1.63 HOURS: BEDMAT = 559.35 (TONS) = .2568 (AC-FT bulked)
TOTAL SED = 1018.75 (TONS) = .4677 (AC-FT bulked)
PEAK BULKING FACTOR = 1.046568 = 109850. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	1465.96	.4070	.6731	50000.	
BEDMAT =	1548.74	.4300	.7111	52675.	
TOTAL SEDIMENT =	3014.69	.8371	1.3842	97664.	1.040843

SEDIMENT TRANSPORT CAPACITY: 1.77456 AC-FT/SQ MI (bulked) = 6.0391 TONS/ACRE (at Porosity=0.395)

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:25:17

```
 AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
      RUN DATE (MON/DAY/YR) = 10/23/1994
      START TIME (HR:MIN:SEC) = 13:24:26     USER NO.= BOHN_HNM.STE
      INPUT FILE = psed25.hym

**********************************************************
*                  HIGH DESERT FINAL HYDROLOGY MODEL
*  ORIGINAL INPUT=HIGHD_P.HYM, JAN 6,1992  DOMINANT DISCHARGE
*   PROPOSED CONDITIONS MODEL _  PHASE 2, NO BULKING
*      INPUT = SPTP2_QD.HYM USED FOR MEANDER ANALYSIS OF SOUTH PINO
**********************************************************************
*
*       TAKEN FROM
*       FILE: BC_P.IN/OUT
*       BHI JN'S 8911803, 9123302                       DATE: NOV,25 1993
*
*
* HYMO ANALYSIS USING NM HYMO, PER CITY DPM APPROVED AUGUST, 1991
* INPUT BASED ON MODIFIED ECI STUDY FOR JOHN ROBERTS DAM, DATED DEC. 1991.
* MODIFICATIONS INCLUDE:          1) INCREASE RAINFALL TO 3.00"/6HR.
*                                 2) ADJUST AREAS USING NEW 1"=200' SCALE MAPS.
*                                 3) MODEL OF EXISITING CONDITIONS AS OF 1/92
*                                    AND IMPROVEMENTS TO TRAMWAY BLVD.
*                                 4) ESTIMATED 40% IMPERVIOUS AREA DEDUCTED
*                                    IN ACCORDANCE WITH THE EXISTING CONDITIONS.
*                                 5) BEAR ARROYO BASINS DO NOT CONTRIBUTE TO
*                                    BEAR CANYON BASINS.
*                                 6) DELETE BULKING FACTOR AND INSTALL SEDIMENT
*                                    TRANSPORT ANALYSIS.( RUN PC)
**********************************************************************
*
**THE RECALL HYD'S WERE ADDED FROM THE OUTPUT OF FILE HD_P100.HYM
*** psed25.hym IS THE UNBULKED (CLEAN WATER) HYDROLOGY OF HIGH DESERT
**********************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
RECALL HYD          ID=10  HYD=AP23
                           DT=  .033330 HRS   DA=    .7330 SQ MI
                           PEAK=    811.256CFS  RO=  .7345 INCHES  NO PTS=248
                           FLOW RATES
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .002      .009      .024      .047      .074
                                    .100      .123      .142      .159      .173
                                    .187      .200      .211      .214      .207
                                    .195      .197      .238      .411     1.401
                                   8.214    37.411   111.524   252.375   458.653
                                 648.930   766.418   811.256   792.787   734.330
                                 659.209   581.529   508.126   439.563   379.292
                                 328.870   285.052   246.818   211.895   182.534
                                 160.509   142.635   127.134   113.992   102.889
                                  93.222    84.856    77.629    71.392    66.052
                                  61.335    56.851    52.398    48.125    44.247
                                  40.844    37.884    35.268    32.922    30.792
                                  28.819    26.942    25.156    23.507    22.007
                                  20.638    19.392    18.250    17.191    16.202
                                  15.277    14.406    13.587    12.816    12.090
                                  11.406    10.754    10.121     9.523     8.956
                                   8.421     7.937     7.498     7.094     6.716
                                   6.359     6.022     5.702     5.399     5.111
                                   4.838     4.579     4.334     4.101     3.880
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3.671	3.473	3.285	3.107	2.938
2.779	2.628	2.486	2.351	2.224
2.103	1.989	1.881	1.779	1.682
1.591	1.505	1.423	1.346	1.273
1.204	1.139	1.077	1.020	.965
.913	.864	.818	.774	.733
.694	.658	.623	.591	.560
.532	.504	.479	.454	.432
.410	.390	.371	.353	.336
.320	.305	.291	.277	.265
.253	.242	.231	.221	.211
.201	.192	.184	.176	.169
.162	.154	.148	.142	.136
.132	.127	.123	.116	.107
.095	.084	.074	.067	.060
.055	.051	.047	.044	.042
.039	.036	.034	.032	.030
.028	.027	.025	.024	.022
.021	.020	.019	.018	.017
.016	.015	.014	.013	.012
.011	.008	.006	.006	.005
.005	.005	.004	.004	.004
.004	.004	.003	.003	.003
.003	.003	.003	.002	.002
.002	.002	.002	.002	.002
.002	.002	.001	.001	.001
.001	.001	.001		

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**********************
* TOTAL FLOW AT AP23 *
**********************
*DIVIDE HYD            ID=10    PER=-20  ID=10  HYD=AP23
*                                       ID=11  HYD=100
*********************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
*
*  REACH  4 - SPT AT DIVERSION - SOIL TEST SPT-3
SEDIMENT TRANS         ID=10   IDS=2   CODE=10
                               A FACT=0.0000018 B EXP=5.82
                               C EXP=-0.61 D EXP=-2.0   NUMBER WASH=1
                               WASH CONC=50000
                               NUMBER SECTIONS=6
                               FLOW          VELOCITY     WIDTH
                               (CFS)         (FEET/SEC)   (FT)
                               435            5.81        107.5
                               602            6.42        117.1
                               854            7.19        124.9
                              1033            7.67        128.9
                              1208            8.13        130.4
                              1400            8.57        132.0

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.261	.007	1.16	50000.	.00	26.	50024.	1.0199	.00
1.000	.19	.810	.036	6.36	50000.	.00	399.	50361.	1.0200	.21
1.333	8.21	2.721	.223	13.52	50000.	.02	7310.	56599.	1.0226	2.71
1.667	659.21	6.616	.838	118.87	50000.	15.76	59581.	103932.	1.0438	2325.50
2.000	160.51	5.426	.629	47.06	50000.	2.35	37277.	83705.	1.0345	3566.28

2.[illegible]	61.33	4.740	.513	25.22	50000.	.65	27205.	74586.	1.0304	3869.52
2.666	28.82	4.004	.399	18.06	50000.	.20	18305.	66536.	1.0269	3985.36
3.000	15.28	3.339	.303	15.08	50000.	.07	11902.	60748.	1.0244	4037.24
3.333	8.42	2.745	.226	13.57	50000.	.02	7461.	56736.	1.0227	4063.37
3.666	4.84	2.252	.168	12.78	50000.	.01	4651.	54198.	1.0216	4077.12
4.000	2.78	1.831	.123	12.32	50000.	.00	2830.	52554.	1.0209	4084.74
4.333	1.59	1.477	.089	12.06	50000.	.00	1691.	51527.	1.0205	4088.99
4.666	.91	1.204	.066	11.53	50000.	.00	1036.	50935.	1.0203	4091.39
5.000	.53	1.052	.054	9.42	50000.	.00	749.	50676.	1.0201	4092.76
5.333	.32	.927	.044	7.78	50000.	.00	552.	50498.	1.0201	4093.57
5.666	.20	.825	.037	6.54	50000.	.00	417.	50377.	1.0200	4094.07
5.999	.13	.743	.032	5.58	50000.	.00	324.	50292.	1.0200	4094.38
6.333	.06	.597	.023	4.02	50000.	.00	191.	50173.	1.0199	4094.56
6.666	.03	.504	.018	3.12	50000.	.00	128.	50115.	1.0199	4094.64
6.999	.02	.438	.014	2.53	50000.	.00	91.	50082.	1.0199	4094.68
7.333	.01	.328	.009	1.64	50000.	.00	45.	50041.	1.0199	4094.70
7.666	.00	.288	.008	1.35	50000.	.00	33.	50030.	1.0199	4094.71
7.999	.00	.261	.007	1.16	50000.	.00	26.	50024.	1.0199	4094.71

AT PEAK FLOW OF 811.256 WITH TIME AT 1.57 HOURS: BEDMAT = 721.70 (TONS) = .3314 (AC-FT bulked)
TOTAL SED = 1332.32 (TONS) = .6117 (AC-FT bulked)
PEAK BULKING FACTOR = 1.047897 = 112630. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2053.79	.5703	.9430	50000.	
BEDMAT =	2040.92	.5667	.9371	49702.	
TOTAL SEDIMENT =	4094.71	1.1369	1.8800	94968.	1.039598

SEDIMENT TRANSPORT CAPACITY: 2.56485 AC-FT/SQ MI (bulked) = 8.7285 TONS/ACRE (at Porosity=0.395)

* REACH 3 - SPT AT DIVERSION - SOIL TEST SPT4
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.0000016 B EXP=5.82
C EXP=-0.7 D EXP=-1.95 NUMBER=1
WAS CONC=50000 NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.0	63.03
610	7.76	67.50
872	8.85	73.39
1066	9.20	78.85
1248	9.46	81.24
1430	9.38	84.67

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.308	.009	.72	50000.	.00	48.	50043.	1.0199	.00
1.000	.19	.957	.049	3.96	50000.	.00	630.	50568.	1.0201	.21
1.333	8.21	3.221	.305	8.36	50000.	.03	9818.	58865.	1.0236	2.79
1.667	659.21	7.994	1.202	68.61	50000.	19.15	71466.	114729.	1.0489	2664.14
2.000	160.51	6.518	.878	28.05	50000.	2.97	46810.	92345.	1.0384	4048.15
2.333	61.33	5.664	.711	15.23	50000.	.83	34470.	81163.	1.0333	4383.38
2.666	28.82	4.765	.549	11.03	50000.	.26	23543.	71273.	1.0290	4509.25
3.000	15.28	3.961	.416	9.28	50000.	.09	15606.	64095.	1.0258	4564.64
3.333	8.42	3.249	.309	8.39	50000.	.03	10011.	59040.	1.0237	4592.11

3.[redacted]	4.84	2.663	.229	7.93	50000.	.01	6396	55774.	1.0223	4606.36
4.000	2.78	2.163	.168	7.66	50000.	.00	3998.	53609.	1.0214	4614.17
4.333	1.59	1.744	.122	7.51	50000.	.00	2458.	52218.	1.0208	4618.50
4.666	.91	1.422	.089	7.18	50000.	.00	1547.	51396.	1.0204	4620.93
5.000	.53	1.242	.073	5.86	50000.	.00	1139.	51028.	1.0203	4622.31
5.333	.32	1.094	.060	4.85	50000.	.00	854.	50771.	1.0202	4623.12
5.666	.20	.974	.051	4.07	50000.	.00	656.	50592.	1.0201	4623.62
5.999	.13	.877	.043	3.48	50000.	.00	517.	50466.	1.0201	4623.94
6.333	.06	.704	.031	2.50	50000.	.00	314.	50284.	1.0200	4624.12
6.666	.03	.595	.024	1.94	50000.	.00	214.	50193.	1.0199	4624.19
6.999	.02	.517	.020	1.58	50000.	.00	156.	50141.	1.0199	4624.24
7.333	.01	.387	.013	1.02	50000.	.00	81.	50073.	1.0199	4624.25
7.666	.00	.340	.010	.84	50000.	.00	60.	50054.	1.0199	4624.26
7.999	.00	.308	.009	.72	50000.	.00	48.	50043.	1.0199	4624.27

AT PEAK FLOW OF 811.256 WITH TIME AT 1.57 HOURS: BEDMAT = 914.34 (TONS) = .4198 (AC-FT bulked)
TOTAL SED = 1524.96 (TONS) = .7002 (AC-FT bulked)
PEAK BULKING FACTOR = 1.056316 = 129858. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2053.79	.5703	.9430	50000.	
BEDMAT =	2570.48	.7137	1.1802	61802.	
TOTAL SEDIMENT =	4624.27	1.2840	2.1232	105949.	1.044719

SEDIMENT TRANSPORT CAPACITY: 2.89655 AC-FT/SQ MI (bulked) = 9.8573 TONS/ACRE (at Porosity=0.395)

*
* READ A PUNCH HYD FORMAT AT AP 24
RECALL HYD ID= 3 HYD=AP24
DT= .033330 HRS DA= .7800 SQ MI
PEAK= 826.234CFS RO= .7337 INCHES NO PTS=251
FLOW RATES

.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.011	.053	.139	.259	.387
.506	.608	.696	.775	.847
.916	.984	1.035	1.041	.997
.947	.989	1.249	1.833	2.890
5.815	15.317	40.592	99.074	225.872
440.620	648.653	779.505	826.234	808.588
753.079	680.890	603.271	528.948	463.714
404.902	351.168	305.777	268.270	235.560
205.523	178.813	157.122	140.517	127.537
116.661	107.183	98.823	91.408	84.814
78.922	73.625	68.848	64.359	60.029
56.020	52.311	48.807	45.535	42.500
39.691	37.082	34.650	32.380	30.267
28.310	26.501	24.832	23.294	21.872
20.556	19.334	18.197	17.136	16.145
15.217	14.346	13.526	12.750	12.016
11.323	10.670	10.061	9.493	8.966
8.474	8.014	7.584	7.180	6.799
6.441	6.103	5.783	5.482	5.197
4.927	4.671	4.428	4.198	3.981
3.775	3.581	3.397	3.223	3.058
2.903	2.755	2.616	2.484	2.359
2.242	2.130	2.024	1.924	1.829
1.740	1.656	1.577	1.502	1.431
1.364	1.301	1.241	1.184	1.130

1.080	1.033	.989	.944	.908
.870	.835	.801	.770	.741
.713	.687	.662	.639	.618
.597	.578	.560	.543	.528
.512	.498	.484	.472	.460
.449	.438	.428	.419	.410
.402	.394	.386	.378	.370
.363	.357	.348	.325	.289
.248	.208	.176	.151	.131
.115	.103	.093	.085	.077
.071	.065	.059	.055	.050
.046	.043	.040	.037	.034
.032	.030	.028	.026	.024
.023	.021	.020	.019	.017
.016	.015	.013	.010	.009
.008	.007	.007	.006	.006
.005	.005	.004	.004	.004
.004	.003	.003	.003	.003
.003	.003	.002	.002	.002
.002	.002	.002	.002	.002
.001	.001	.001	.001	.001
.001				

****
* TOTAL FLOW AT AP24 *
****
*DIVIDE HYD ID=3 PER=-20 ID=3 HYD=AP24
* ID=11 HYD=100
****
* REACH 2 - SPT DOWNSTREAM OF DIVERSION - SOIL TEST SPT5
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.81	45.91
610	8.45	52.48
872	9.32	61.36
1066	9.65	64.72
1248	10.03	68.57
1430	10.38	71.92

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.01	.555	.023	.87	50000.	.00	161.	50146.	1.0199	.00
1.000	.92	1.676	.119	4.58	50000.	.00	2104.	51899.	1.0207	1.06
1.333	5.82	3.337	.336	5.19	50000.	.02	10355.	59350.	1.0238	4.94
1.667	753.08	8.971	1.464	57.33	50000.	30.15	95919.	136984.	1.0599	2670.17
2.000	205.52	7.489	1.129	24.32	50000.	5.31	64117.	108052.	1.0457	4695.01
2.333	78.92	6.731	.962	12.19	50000.	1.59	50749.	95918.	1.0400	5197.37
2.666	39.69	5.925	.794	8.43	50000.	.60	38224.	84563.	1.0349	5402.71
3.000	20.56	5.023	.620	6.60	50000.	.21	26355.	73817.	1.0301	5492.60
3.333	11.32	4.191	.473	5.72	50000.	.08	17460.	65772.	1.0266	5534.59
3.666	6.44	3.461	.355	5.25	50000.	.03	11256.	60164.	1.0242	5555.56
4.000	3.78	2.851	.265	4.99	50000.	.01	7203.	56503.	1.0226	5566.79
4.333	2.24	2.343	.197	4.85	50000.	.00	4574.	54129.	1.0216	5573.05
4.666	1.36	1.934	.148	4.76	50000.	.00	2933.	52648.	1.0210	5576.67
5.000	.87	1.654	.117	4.49	50000.	.00	2043.	51844.	1.0206	5578.87
5.333	.60	1.506	.102	3.90	50000.	.00	1642.	51482.	1.0205	5580.31

5.666	.45	1.402	.091	3.50	50000.	.00	1391.	51256.	1.0204	5581.34
5.999	.36	1.330	.084	3.23	50000.	.00	1230.	51110.	1.0203	5582.15
6.333	.12	.998	.055	2.10	50000.	.00	631.	50569.	1.0201	5582.62
6.666	.05	.793	.039	1.49	50000.	.00	370.	50334.	1.0200	5582.76
6.999	.02	.667	.030	1.15	50000.	.00	248.	50224.	1.0200	5582.82
7.333	.01	.512	.020	.77	50000.	.00	134.	50121.	1.0199	5582.85
7.666	.00	.431	.016	.60	50000.	.00	90.	50081.	1.0199	5582.86
7.999	.00	.362	.012	.46	50000.	.00	60.	50054.	1.0199	5582.87
8.333	.00	.305	.009	.35	50000.	.00	40.	50036.	1.0199	5582.87

AT PEAK FLOW OF 826.234 WITH TIME AT 1.60 HOURS: BEDMAT = 1112.59 (TONS) = .5108 (AC-FT bulked)
TOTAL SED = 1723.16 (TONS) = .7912 (AC-FT bulked)
PEAK BULKING FACTOR = 1.062999 = 143063. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2183.17	.6062	1.0024	50000.	
BEDMAT =	3399.70	.9440	1.5609	75751.	
TOTAL SEDIMENT =	5582.87	1.5501	2.5633	118625.	1.050789

SEDIMENT TRANSPORT CAPACITY: 3.28628 AC-FT/SQ MI (bulked) = 11.1836 TONS/ACRE (at Porosity=0.395)

*
* REACH 1 SPT DOWNSTREAM OF DIVERSION
*
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.12	58.38
610	7.76	66.44
872	8.54	75.66
1066	9.01	81.40
1248	9.40	85.95
1430	9.81	89.35

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.01	.505	.020	1.11	50000.	.00	132.	50119.	1.0199	.00
1.000	.92	1.526	.103	5.83	50000.	.00	1720.	51552.	1.0205	1.05
1.333	5.82	3.040	.289	6.61	50000.	.02	8476.	57653.	1.0231	4.86
1.667	753.08	8.224	1.281	71.48	50000.	24.75	80129.	122607.	1.0527	2352.91
2.000	205.52	6.827	.973	30.93	50000.	4.35	53095.	98046.	1.0410	4169.87
2.333	78.92	6.135	.829	15.51	50000.	1.30	41904.	87897.	1.0364	4623.24
2.666	39.69	5.399	.685	10.74	50000.	.49	31476.	78452.	1.0321	4810.99
3.000	20.56	4.576	.534	8.41	50000.	.17	21648.	69558.	1.0282	4894.54
3.333	11.32	3.818	.407	7.28	50000.	.06	14315.	62928.	1.0253	4934.26
3.666	6.44	3.152	.305	6.69	50000.	.02	9216.	58321.	1.0234	4954.41
4.000	3.78	2.597	.228	6.36	50000.	.01	5893.	55320.	1.0221	4965.33
4.333	2.24	2.134	.170	6.18	50000.	.00	3740.	53376.	1.0213	4971.48
4.666	1.36	1.761	.128	6.07	50000.	.00	2397.	52164.	1.0208	4975.06
5.000	.87	1.507	.101	5.72	50000.	.00	1669.	51507.	1.0205	4977.24
5.333	.60	1.371	.088	4.97	50000.	.00	1341.	51211.	1.0204	4978.67

5.666	.45	1.277	.079	4.46	50000.	.00	1137.	51026.	1.0203	4979.70
5.999	.36	1.211	.073	4.12	50000.	.00	1005.	50907.	1.0202	4980.50
6.333	.12	.909	.047	2.68	50000.	.00	515.	50465.	1.0201	4980.97
6.666	.05	.723	.034	1.90	50000.	.00	303.	50273.	1.0200	4981.11
6.999	.02	.608	.026	1.46	50000.	.00	202.	50183.	1.0199	4981.17
7.333	.01	.467	.017	.99	50000.	.00	110.	50099.	1.0199	4981.20
7.666	.00	.392	.013	.76	50000.	.00	73.	50066.	1.0199	4981.21
7.999	.00	.330	.010	.59	50000.	.00	49.	50044.	1.0199	4981.22
8.333	.00	.277	.008	.45	50000.	.00	33.	50030.	1.0199	4981.22

AT PEAK FLOW OF 826.234 WITH TIME AT 1.60 HOURS: BEDMAT = 912.68 (TONS) = .4190 (AC-FT bulked)
TOTAL SED = 1523.26 (TONS) = .6994 (AC-FT bulked)
PEAK BULKING FACTOR = 1.054799 = 126804. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2183.18	.6062	1.0024	50000.	
BEDMAT =	2798.04	.7769	1.2847	63192.	
TOTAL SEDIMENT =	4981.22	1.3831	2.2871	107212.	1.045316

SEDIMENT TRANSPORT CAPACITY: 2.93213 AC-FT/SQ MI (bulked) = 9.9784 TONS/ACRE (at Porosity=0.395)

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:24:28

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    AHYMD PROGRAM (AHYMD194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 10/23/1994
         START TIME (HR:MIN:SEC) = 13:23:16      USER NO.= BOHN_HNM.STE
         INPUT FILE = psed50.hym

************************************************************
*                    HIGH DESERT FINAL HYDROLOGY MODEL
*  ORIGINAL INPUT=HIGHD_P.HYM, JAN 6,1992  DOMINANT DISCHARGE
*   PROPOSED CONDITIONS MODEL _  PHASE 2, NO BULKING
*      INPUT = SPTP2_QD.HYM USED FOR MEANDER ANALYSIS OF SOUTH PINO
************************************************************************
*
*       TAKEN FROM
*       FILE: BC_P.IN/OUT
*       BHI JN'S 8911803, 9123302                          DATE: NOV,25 1993
*
*
* HYMO ANALYSIS USING NM HYMO, PER CITY DPM APPROVED AUGUST, 1991
* INPUT BASED ON MODIFIED ECI STUDY FOR JOHN ROBERTS DAM, DATED DEC. 1991.
* MODIFICATIONS INCLUDE:        1) INCREASE RAINFALL TO 3.00"/6HR.
*                               2) ADJUST AREAS USING NEW 1"=200' SCALE MAPS.
*                               3) MODEL OF EXISITNG CONDITIONS AS OF 1/92
*                                  AND IMPROVEMENTS TO TRAMWAY BLVD.
*                               4) ESTIMATED 40% IMPERVIOUS AREA DEDUCTED
*                                  IN ACCORDANCE WITH THE EXISTING CONDITIONS.
*                               5) BEAR ARROYO BASINS DO NOT CONTRIBUTE TO
*                                  BEAR CANYON BASINS.
*                               6) DELETE BULKING FACTOR AND INSTALL SEDIMENT
*                                  TRANSPORT ANALYSIS.( RUN PC)
************************************************************************
*
**THE RECALL HYD'S WERE ADDED FROM THE OUTPUT OF FILE HD_P100.HYM
*** HD_P50.HYM IS THE UNBULKED (CLEAN WATER) HYDROLOGY OF HIGH DESERT
************************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
RECALL HYD          ID=10  HYD=AP23
                           DT=  .033330 HRS   DA=    .7330 SQ MI
                           PEAK=   1033.276CFS  RO=  .9514 INCHES  NO PTS=250
                           FLOW RATES
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .000      .000      .000      .000
                                    .000      .001      .004      .015      .034
                                    .059      .085      .109      .130      .147
                                    .162      .176      .187      .193      .191
                                    .187      .199      .254      .498     1.981
                                  13.230    56.311    158.271   350.312   613.850
                                 841.928   983.595   1033.276  1009.425   936.301
                                 841.889   741.770   647.924   565.275    492.111
                                 426.694   371.454   326.113   287.067    253.307
                                 223.043   195.299   172.187   153.603    137.637
                                 123.903   112.324   102.293    93.276     85.237
                                  78.159    72.019    66.748    61.939     57.235
                                  52.654    48.384    44.545    41.165     38.201
                                  35.571    33.201    31.030    28.993     27.067
                                  25.277    23.635    22.125    20.731     19.454
                                  18.285    17.202    16.193    15.248     14.360
                                  13.526    12.742    12.005    11.311     10.645
                                  10.003     9.401     8.829     8.295      7.816
                                   7.380     6.976     6.597     6.239      5.901
                                   5.581     5.278     4.990     4.718      4.460
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4.216	3.985	3.767	3.5	3.364
3.178	3.003	2.837	2.681	2.533
2.394	2.262	2.137	2.019	1.908
1.803	1.704	1.610	1.521	1.438
1.358	1.284	1.213	1.147	1.084
1.025	.969	.916	.866	.819
.775	.733	.694	.657	.622
.590	.559	.530	.503	.477
.452	.430	.408	.388	.369
.351	.334	.318	.303	.288
.275	.261	.249	.237	.226
.215	.204	.193	.184	.176
.169	.162	.156	.151	.145
.140	.136	.131	.123	.113
.101	.090	.080	.071	.065
.059	.055	.051	.048	.045
.042	.039	.036	.034	.032
.030	.028	.027	.025	.024
.022	.021	.020	.018	.016
.013	.011	.010	.008	.008
.007	.007	.007	.006	.006
.006	.005	.005	.005	.004
.004	.004	.004	.004	.003
.003	.003	.003	.003	.003
.002	.002	.002	.002	.002
.002	.002	.002	.001	.001
.001	.001	.001	.001	.001

```
**********************
* TOTAL FLOW AT AP23 *
**********************
*DIVIDE HYD          ID=10   PER=-20  ID=10  HYD=AP23
*                             ID=11  HYD=100
*****************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
*
*  REACH  4 - SPT AT DIVERSION - SOIL TEST SPT-3
SEDIMENT TRANS       ID=10   IDS=2   CODE=10
                             A FACT=0.0000018 B EXP=5.82
                             C EXP=-0.61 D EXP=-2.0   NUMBER WASH=1
                             WASH CONC=50000
                             NUMBER SECTIONS=6
                             FLOW          VELOCITY     WIDTH
                             (CFS)         (FEET/SEC)   (FT)
                             435            5.81        107.5
                             602            6.42        117.1
                             854            7.19        124.9
                            1033            7.67        128.9
                            1208            8.13        130.4
                            1400            8.57        132.0

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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.16	.782	.034	6.03	50000.	.00	366.	50331.	1.0200	.15
1.333	13.23	3.191	.283	14.63	50000.	.05	10684.	59648.	1.0239	4.07
1.667	841.89	7.158	.945	124.53	50000.	24.27	70968.	114276.	1.0487	3354.24
2.000	223.04	5.585	.656	60.83	50000.	3.49	39857.	86042.	1.0355	5075.02

2.[illegible]	78.16	4.944	.547	28.92	50000.	.91	30020.	77133.	1.0315	5493.64
2.666	35.57	4.221	.431	19.55	50000.	.28	20720.	68719.	1.0278	5646.60
3.000	18.28	3.527	.329	15.74	50000.	.09	13553.	62240.	1.0250	5711.99
3.333	10.00	2.911	.247	13.92	50000.	.03	8583.	57750.	1.0231	5743.75
3.666	5.58	2.373	.182	12.94	50000.	.01	5268.	54755.	1.0219	5760.00
4.000	3.18	1.926	.133	12.41	50000.	.00	3197.	52886.	1.0211	5768.82
4.333	1.80	1.551	.096	12.11	50000.	.00	1900.	51715.	1.0206	5773.69
4.666	1.02	1.244	.069	11.94	50000.	.00	1120.	51011.	1.0203	5776.40
5.000	.59	1.080	.056	9.79	50000.	.00	797.	50719.	1.0202	5777.93
5.333	.35	.948	.046	8.06	50000.	.00	583.	50526.	1.0201	5778.83
5.666	.22	.839	.038	6.70	50000.	.00	434.	50392.	1.0200	5779.36
5.999	.14	.754	.033	5.71	50000.	.00	336.	50303.	1.0200	5779.70
6.333	.06	.607	.024	4.13	50000.	.00	200.	50180.	1.0199	5779.89
6.666	.03	.513	.018	3.20	50000.	.00	133.	50120.	1.0199	5779.97
6.999	.01	.416	.013	2.34	50000.	.00	80.	50073.	1.0199	5780.01
7.333	.01	.343	.010	1.75	50000.	.00	51.	50046.	1.0199	5780.03
7.666	.00	.288	.008	1.35	50000.	.00	33.	50030.	1.0199	5780.03
7.999	.00	.261	.007	1.16	50000.	.00	26.	50024.	1.0199	5780.04

AT PEAK FLOW OF 1033.276 WITH TIME AT 1.57 HOURS: BEDMAT = 1136.73 (TONS) = .5219 (AC-FT bulked)
TOTAL SED = 1935.77 (TONS) = .8888 (AC-FT bulked)
PEAK BULKING FACTOR = 1.054057 = 125301. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2660.52	.7387	1.2215	50000.	
BEDMAT =	3119.52	.8662	1.4323	58125.	
TOTAL SEDIMENT =	5780.04	1.6049	2.6538	102611.	1.043149

SEDIMENT TRANSPORT CAPACITY: 3.62050 AC-FT/SQ MI (bulked) = 12.3210 TONS/ACRE (at Porosity=0.395)

* REACH 3 - SPT AT DIVERSION - SOIL TEST SPT4
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.0000016 B EXP=5.82
C EXP=-0.7 D EXP=-1.95 NUMBER=1
WAS CONC=50000 NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.0	63.03
610	7.76	67.50
872	8.85	73.39
1066	9.20	78.85
1248	9.46	81.24
1430	9.38	84.67

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.16	.923	.047	3.75	50000.	.00	580.	50524.	1.0201	.15
1.333	13.23	3.783	.388	9.01	50000.	.07	14081.	62717.	1.0253	4.25
1.667	841.89	8.742	1.324	72.71	50000.	31.90	91259.	132739.	1.0578	3833.09
2.000	223.04	6.719	.919	36.14	50000.	4.43	49976.	95216.	1.0397	5764.65
2.333	78.16	5.916	.759	17.41	50000.	1.16	37916.	84284.	1.0347	6229.50
2.666	35.57	5.028	.595	11.90	50000.	.37	26515.	73962.	1.0301	6396.62
3.000	18.28	4.187	.452	9.66	50000.	.12	17663.	65955.	1.0266	6466.80
3.333	10.00	3.448	.338	8.59	50000.	.04	11435.	60326.	1.0242	6500.33

3.6	5.58	2.806	.248	8.02	50000.	.02	7197.	56498.	1.0226	6517.23
4.000	3.18	2.276	.181	7.71	50000.	.01	4486.	54050.	1.0216	6526.31
4.333	1.80	1.831	.131	7.53	50000.	.00	2744.	52476.	1.0209	6531.27
4.666	1.02	1.469	.094	7.43	50000.	.00	1665.	51503.	1.0205	6534.02
5.000	.59	1.275	.076	6.10	50000.	.00	1208.	51090.	1.0203	6535.56
5.333	.35	1.120	.062	5.02	50000.	.00	900.	50812.	1.0202	6536.46
5.666	.22	.991	.052	4.17	50000.	.00	681.	50615.	1.0201	6537.00
5.999	.14	.890	.044	3.55	50000.	.00	534.	50482.	1.0201	6537.33
6.333	.06	.717	.032	2.57	50000.	.00	327.	50295.	1.0200	6537.53
6.666	.03	.605	.025	1.99	50000.	.00	223.	50201.	1.0199	6537.61
6.999	.01	.491	.018	1.46	50000.	.00	139.	50125.	1.0199	6537.65
7.333	.01	.405	.014	1.09	50000.	.00	89.	50081.	1.0199	6537.67
7.666	.00	.340	.010	.84	50000.	.00	60.	50054.	1.0199	6537.67
7.999	.00	.308	.009	.72	50000.	.00	48.	50043.	1.0199	6537.68

AT PEAK FLOW OF 1033.276 WITH TIME AT 1.57 HOURS: BEDMAT = 1395.83 (TONS) = .6409 (AC-FT bulked)
TOTAL SED = 2194.87 (TONS) = 1.0077 (AC-FT bulked)
PEAK BULKING FACTOR = 1.060278 = 137734. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2660.52	.7387	1.2215	50000.	
BEDMAT =	3877.16	1.0765	1.7801	71236.	
TOTAL SEDIMENT =	6537.68	1.8152	3.0017	114520.	1.048804

SEDIMENT TRANSPORT CAPACITY: 4.09507 AC-FT/SQ MI (bulked) = 13.9360 TONS/ACRE (at Porosity=0.395)

*
* READ A PUNCH HYD FORMAT AT AP 24
*
RECALL HYD ID= 3 HYD=AP24
DT= .033330 HRS DA= .7800 SQ MI
PEAK= 1066.248CFS RO= .9494 INCHES NO PTS=253
FLOW RATES

.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.003	.026	.089	.192
.315	.436	.542	.634	.714
.789	.858	.914	.935	.920
.910	1.004	1.342	2.051	3.346
7.663	21.494	57.729	144.972	330.179
618.007	873.287	1022.027	1066.248	1035.360
960.041	862.814	764.388	673.523	589.591
515.476	452.954	397.900	348.334	307.038
273.539	244.699	217.095	191.333	168.579
149.989	135.956	124.688	115.006	106.361
98.554	91.503	85.158	79.413	74.132
69.316	64.802	60.449	56.434	52.730
49.226	45.949	42.899	40.064	37.422
34.958	32.662	30.530	28.551	26.718
25.024	23.458	22.010	20.668	19.421
18.260	17.178	16.167	15.221	14.334
13.499	12.711	11.966	11.263	10.603
9.989	9.418	8.887	8.393	7.930
7.497	7.091	6.708	6.348	6.009
5.689	5.388	5.103	4.833	4.578
4.336	4.108	3.892	3.689	3.496
3.314	3.143	2.980	2.827	2.682
2.545	2.415	2.293	2.178	2.068
1.965	1.867	1.776	1.689	1.607

1.530	1.456	1.387	1.32	1.261
1.204	1.149	1.097	1.049	1.003
.960	.920	.883	.847	.813
.781	.751	.723	.697	.672
.649	.627	.607	.588	.569
.551	.535	.520	.505	.491
.478	.465	.453	.442	.430
.419	.408	.400	.392	.385
.379	.374	.363	.340	.303
.260	.219	.185	.159	.138
.122	.109	.099	.090	.082
.075	.069	.063	.058	.053
.049	.046	.042	.039	.036
.034	.032	.029	.027	.025
.023	.021	.018	.016	.015
.013	.012	.011	.010	.008
.008	.007	.007	.006	.006
.005	.005	.005	.004	.004
.004	.004	.004	.003	.003
.003	.003	.003	.002	.002
.002	.002	.002	.002	.002
.002	.002	.001	.001	.001
.001	.001	.001		

****
* TOTAL FLOW AT AP24 *
****
*DIVIDE HYD ID=3 PER=-20 ID=3 HYD=AP24
* ID=11 HYD=100
****
* REACH 2 - SPT DOWNSTREAM OF DIVERSION - SOIL TEST SPT5
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.81	45.91
610	8.45	52.48
872	9.32	61.36
1066	9.65	64.72
1248	10.03	68.57
1430	10.38	71.92

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.79	1.614	.113	4.33	50000.	.00	1930.	51742.	1.0206	.76
1.333	7.66	3.677	.388	5.37	50000.	.04	12939.	61685.	1.0248	5.24
1.667	960.04	9.478	1.611	62.88	50000.	42.75	105545.	145759.	1.0644	3741.08
2.000	273.54	7.636	1.162	30.83	50000.	7.40	66879.	110561.	1.0469	6541.69
2.333	98.55	6.946	1.008	14.07	50000.	2.14	54394.	99225.	1.0416	7225.74
2.666	49.23	6.198	.850	9.35	50000.	.82	42261.	88221.	1.0365	7490.75
3.000	25.02	5.299	.672	7.03	50000.	.29	29745.	76885.	1.0314	7606.85
3.333	13.50	4.433	.514	5.93	50000.	.10	19840.	67923.	1.0275	7659.34
3.666	7.50	3.649	.384	5.35	50000.	.04	12716.	61484.	1.0247	7684.79
4.000	4.34	3.001	.286	5.05	50000.	.01	8105.	57318.	1.0229	7698.01
4.333	2.55	2.458	.212	4.88	50000.	.00	5115.	54617.	1.0218	7705.25
4.666	1.53	2.022	.158	4.78	50000.	.00	3253.	52936.	1.0211	7709.36
5.000	.96	1.696	.122	4.66	50000.	.00	2163.	51952.	1.0207	7711.82

5.	.65	1.537	.105	4.02	50000.	.00	1723	51555.	1.0205	7713.40
5.666	.48	1.424	.094	3.58	50000.	.00	1443.	51302.	1.0204	7714.51
5.999	.38	1.344	.086	3.29	50000.	.00	1261.	51138.	1.0203	7715.36
6.333	.12	1.012	.056	2.15	50000.	.00	653.	50589.	1.0201	7715.85
6.666	.05	.806	.040	1.53	50000.	.00	384.	50347.	1.0200	7716.00
6.999	.02	.667	.030	1.15	50000.	.00	248.	50224.	1.0200	7716.07
7.333	.01	.512	.020	.77	50000.	.00	134.	50121.	1.0199	7716.09
7.666	.00	.431	.016	.60	50000.	.00	90.	50081.	1.0199	7716.10
7.999	.00	.362	.012	.46	50000.	.00	60.	50054.	1.0199	7716.11
8.333	.00	.305	.009	.35	50000.	.00	40.	50036.	1.0199	7716.11

AT PEAK FLOW OF 1066.248 WITH TIME AT 1.60 HOURS: BEDMAT = 1650.35 (TONS) = .7577 (AC-FT bulked)
TOTAL SED = 2469.54 (TONS) = 1.1339 (AC-FT bulked)
PEAK BULKING FACTOR = 1.064826 = 146604. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2825.23	.7844	1.2972	50000.	
BEDMAT =	4890.88	1.3580	2.2456	83505.	
TOTAL SEDIMENT =	7716.11	2.1424	3.5428	125679.	1.054243

SEDIMENT TRANSPORT CAPACITY: 4.54199 AC-FT/SQ MI (bulked) = 15.4570 TONS/ACRE (at Porosity=0.395)

*
* REACH 1 SPT DOWNSTREAM OF DIVERSION
*
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.12	58.38
610	7.76	66.44
872	8.54	75.66
1066	9.01	81.40
1248	9.40	85.95
1430	9.81	89.35

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.79	1.470	.097	5.51	50000.	.00	1577.	51423.	1.0205	.76
1.333	7.66	3.350	.335	6.84	50000.	.03	10598.	59570.	1.0239	5.13
1.667	960.04	8.766	1.399	78.26	50000.	37.08	92846.	134185.	1.0585	3445.69
2.000	273.54	6.961	1.002	39.21	50000.	6.06	55415.	100151.	1.0420	5932.26
2.333	98.55	6.331	.869	17.90	50000.	1.75	44948.	90657.	1.0376	6547.62
2.666	49.23	5.648	.733	11.90	50000.	.67	34831.	81490.	1.0335	6788.90
3.000	25.02	4.828	.579	8.95	50000.	.24	24450.	72093.	1.0293	6896.22
3.333	13.50	4.038	.443	7.55	50000.	.08	16273.	64699.	1.0261	6945.60
3.666	7.50	3.324	.331	6.82	50000.	.03	10415.	59404.	1.0238	6969.95
4.000	4.34	2.733	.247	6.43	50000.	.01	6632.	55987.	1.0224	6982.78
4.333	2.55	2.239	.183	6.21	50000.	.00	4182.	53775.	1.0214	6989.87
4.666	1.53	1.842	.136	6.09	50000.	.00	2659.	52400.	1.0209	6993.93
5.000	.96	1.544	.105	5.93	50000.	.00	1767.	51595.	1.0205	6996.37

5.[redacted]	.65	1.400	.090	5.12	50000.	.00	1408[redacted]	51271.	1.0204	6997.94
5.666	.48	1.297	.081	4.57	50000.	.00	1179.	51064.	1.0203	6999.04
5.999	.38	1.224	.074	4.19	50000.	.00	1030.	50930.	1.0203	6999.88
6.333	.12	.922	.048	2.74	50000.	.00	533.	50481.	1.0201	7000.38
6.666	.05	.734	.034	1.94	50000.	.00	314.	50283.	1.0200	7000.52
6.999	.02	.608	.026	1.46	50000.	.00	202.	50183.	1.0199	7000.59
7.333	.01	.467	.017	.99	50000.	.00	110.	50099.	1.0199	7000.62
7.666	.00	.392	.013	.76	50000.	.00	73.	50066.	1.0199	7000.63
7.999	.00	.330	.010	.59	50000.	.00	49.	50044.	1.0199	7000.63
8.333	.00	.277	.008	.45	50000.	.00	33.	50030.	1.0199	7000.64

AT PEAK FLOW OF 1066.248 WITH TIME AT 1.60 HOURS: BEDMAT = 1448.45 (TONS) = .6650 (AC-FT bulked)
TOTAL SED = 2267.64 (TONS) = 1.0412 (AC-FT bulked)
PEAK BULKING FACTOR = 1.061244 = 139635. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	2825.23	.7844	1.2972	50000.	
BEDMAT =	4175.41	1.1593	1.9171	72171.	
TOTAL SEDIMENT =	7000.64	1.9438	3.2142	115370.	1.049214

SEDIMENT TRANSPORT CAPACITY: 4.12083 AC-FT/SQ MI (bulked) = 14.0237 TONS/ACRE (at Porosity=0.395)

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:23:19

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   AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
        RUN DATE (MON/DAY/YR) = 10/23/1994
        START TIME (HR:MIN:SEC) = 13:16:47     USER NO.= BOHN_HNM.STE
        INPUT FILE = psed100.hym

**************************************************************
*                   HIGH DESERT FINAL HYDROLOGY MODEL
*  ORIGINAL INPUT=HIGHD_P.HYM, JAN 6,1992  DOMINANT DISCHARGE
*   PROPOSED CONDITIONS MODEL _  PHASE 2, NO BULKING
*      INPUT = SPTP2_QD.HYM USED FOR MEANDER ANALYSIS OF SOUTH PINO
**************************************************************************
*
*       TAKEN FROM
*       FILE: BC_P.IN/OUT
*       BHI JN'S 8911803, 9123302                        DATE: NOV,25 1993
*
*
* HYMO ANALYSIS USING NM HYMO, PER CITY DPM APPROVED AUGUST, 1991
* INPUT BASED ON MODIFIED ECI STUDY FOR JOHN ROBERTS DAM, DATED DEC. 1991.
* MODIFICATIONS INCLUDE:        1) INCREASE RAINFALL TO 3.00"/6HR.
*                               2) ADJUST AREAS USING NEW 1"=200' SCALE MAPS.
*                               3) MODEL OF EXISITNG CONDITIONS AS OF 1/92
*                                  AND IMPROVEMENTS TO TRAMWAY BLVD.
*                               4) ESTIMATED 40% IMPERVIOUS AREA DEDUCTED
*                                  IN ACCORDANCE WITH THE EXISTING CONDITIONS.
*                               5) BEAR ARROYO BASINS DO NOT CONTRIBUTE TO
*                                  BEAR CANYON BASINS.
*                               6) DELETE BULKING FACTOR AND INSTALL SEDIMENT
*                                  TRANSPORT ANALYSIS.( RUN PC)
**************************************************************************
*
**THE RECALL HYD'S WERE ADDED FROM THE OUTPUT OF FILE HD_P100.HYM
*** PSED100.HYM IS THE UNBULKED (CLEAN WATER) HYDROLOGY OF HIGH DESERT
**************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
RECALL HYD          ID=10  HYD= AP23       DT= 0.033330 HRS DA=   0.733 SQ MI
                           PEAK=  1206.CFS   RO=     2.46       NO PTS=213
                           FLOW RATES
                                    0.      0.      0.      0.      0.      0.      0.
                                    0.      0.      0.      0.      0.      0.      0.
                                    0.      0.      0.      0.      0.      0.      0.
                                    0.      0.      0.      0.      0.      0.      0.
                                    0.      0.      0.      0.      0.      0.      0.
                                    0.      0.      0.      1.      8.     35.    107.
                                  253.    496.    779.   1015.   1162.   1206.   1167.
                         1085.    974.    861.    755.    657.    573.    501.
                                  438.    384.    341.    304.    270.    239.    211.
                                  187.    166.    150.    135.    122.    112.    102.
                                   93.     85.     79.     73.     67.     62.     58.
                                   53.     49.     45.     42.     39.     36.     34.
                                   31.     29.     27.     26.     24.     23.     21.
                                   20.     19.     17.     16.     15.     15.     14.
                                   13.     12.     11.     11.     10.     10.      9.
                                    8.      8.      7.      7.      7.      6.      6.
                                    6.      5.      5.      5.      4.      4.      4.
                                    4.      4.      3.      3.      3.      3.      2.
                                    2.      2.      2.      2.      2.      2.      2.
                                    1.      1.      1.      1.      1.      1.      1.
                                    1.      1.      1.      1.      0.      0.      0.
                                    0.      0.      0.      0.      0.      0.      0.
                                    0.      0.      0.      0.      0.      0.      0.
                                    0.      0.      0.      0.      0.      0.      0.
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0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.	0.	0.				

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**********************
* TOTAL FLOW AT AP23 *
**********************
*DIVIDE HYD          ID=10   PER=-20  ID=10  HYD=AP23
*                             ID=11  HYD=100
*********************************************************************
*  FOUR EQUIDISTANT REACHES,#4  136+00 TO  128+00
*                           #3  127+00 TO  119+00
*                           #2  118+00 TO  110+00
*                           #1  109+00 TO  100+00 @ AP26
*
*  REACH  4 - SPT AT DIVERSION - SOIL TEST SPT-3
SEDIMENT TRANS       ID=10   IDS=2   CODE=10
                             A FACT=0.0000018 B EXP=5.82
                             C EXP=-0.61 D EXP=-2.0   NUMBER WASH=1
                             WASH CONC=50000
                             NUMBER SECTIONS=6
                             FLOW          VELOCITY      WIDTH
                             (CFS)         (FEET/SEC)     (FT)
                             435            5.81          107.5
                             602            6.42          117.1
                             854            7.19          124.9
                            1033            7.67          128.9
                            1208            8.13          130.4
                            1400            8.57          132.0
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TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	35.00	4.204	.429	19.42	50000.	.28	20531.	68548.	1.0278	11.64
1.667	974.00	7.520	1.015	127.58	50000.	31.71	79426.	121968.	1.0524	4383.58
2.000	270.00	5.662	.670	71.17	50000.	4.37	41129.	87196.	1.0360	6497.69
2.333	93.00	5.077	.569	32.19	50000.	1.16	31948.	78880.	1.0323	7014.71
2.666	42.00	4.386	.457	20.96	50000.	.37	22684.	70496.	1.0286	7200.32
3.000	21.00	3.673	.350	16.34	50000.	.12	14918.	63473.	1.0256	7278.08
3.333	11.00	3.005	.259	14.13	50000.	.04	9258.	58359.	1.0234	7314.98
3.666	6.00	2.435	.189	13.03	50000.	.01	5607.	55062.	1.0220	7333.70
4.000	4.00	2.099	.151	12.59	50000.	.01	3931.	53548.	1.0214	7343.78
4.333	2.00	1.614	.102	12.15	50000.	.00	2092.	51888.	1.0207	7348.74
4.666	1.00	1.232	.068	11.93	50000.	.00	1094.	50987.	1.0203	7351.17

AT PEAK FLOW OF 1206.000 WITH TIME AT 1.57 HOURS: BEDMAT = 1609.35 (TONS) = .7389 (AC-FT bulked)
TOTAL SED = 2606.73 (TONS) = 1.1968 (AC-FT bulked)

PEAK BULKING FACTOR = 1.059174 = 135554. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3174.80	.8815	1.4577	50000.	

BEDMAT =	4176.98	1.1598	1.9178	64761.	
TOTAL SEDIMENT =	7351.77	2.0413	3.3755	108637.	1.045991

SEDIMENT TRANSPORT CAPACITY: 4.60501 AC-FT/SQ MI (bulked) = 15.6714 TONS/ACRE (at Porosity=0.395)

* REACH 3 - SPT AT DIVERSION - SOIL TEST SPT4
SEDIMENT TRANS ID=10 IDS=2 CODE=10
A FACT=0.0000016 B EXP=5.82
C EXP=-0.7 D EXP=-1.95 NUMBER=1
WAS CONC=50000 NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.0	63.03
610	7.76	67.50
872	8.85	73.39
1066	9.20	78.85
1248	9.46	81.24
1430	9.38	84.67

* * * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.333	35.00	5.008	.591	11.83	50000.	.36	26283.	73751.	1.0300	12.50
1.667	974.00	9.044	1.412	76.26	50000.	38.98	95883.	136951.	1.0599	4711.60
2.000	270.00	6.815	.938	42.21	50000.	5.54	51540.	96635.	1.0404	7117.06
2.333	93.00	6.082	.791	19.33	50000.	1.47	40279.	86425.	1.0357	7692.65
2.666	42.00	5.230	.631	12.73	50000.	.47	28927.	76144.	1.0311	7896.16
3.000	21.00	4.363	.481	10.02	50000.	.16	19357.	67486.	1.0273	7979.95
3.333	11.00	3.560	.354	8.72	50000.	.05	12288.	61096.	1.0246	8019.04
3.666	6.00	2.881	.258	8.08	50000.	.02	7636.	56894.	1.0228	8038.57
4.000	4.00	2.482	.206	7.82	50000.	.01	5454.	54924.	1.0219	8048.96
4.333	2.00	1.906	.139	7.56	50000.	.00	3004.	52712.	1.0210	8054.02
4.666	1.00	1.455	.093	7.43	50000.	.00	1629.	51470.	1.0205	8056.47

AT PEAK FLOW OF 1206.000 WITH TIME AT 1.57 HOURS: BEDMAT = 1795.84 (TONS) = .8245 (AC-FT bulked)
TOTAL SED = 2793.22 (TONS) = 1.2825 (AC-FT bulked)
PEAK BULKING FACTOR = 1.060318 = 137813. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3174.79	.8815	1.4577	50000.	
BEDMAT =	4882.29	1.3556	2.2416	74878.	
TOTAL SEDIMENT =	8057.08	2.2371	3.6993	117831.	1.050404

SEDIMENT TRANSPORT CAPACITY: 5.04680 AC-FT/SQ MI (bulked) = 17.1749 TONS/ACRE (at Porosity=0.395)

*
* READ A PUNCH HYD FORMAT AT AP 24
RECALL HYD ID= 3 HYD= AP24 DT= 0.033330 HRS DA= 0.780 SQ MI
PEAK= 1246.CFS RO= 5.71 NO PTS=220
FLOW RATES

0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.
0.	1.	1.	1.	1.	1.	1.

		1.	1.	1.	1.	1.	1.	1.
		1.	1.	2.	2.	5.	14.	39.
		98.	235.	496.	816.	1075.	1218.	1246.
1200.	1116.	1003.	884.	778.	684.	600.		
		526.	464.	411.	364.	324.	289.	260.
		233.	207.	183.	163.	147.	135.	124.
		114.	106.	98.	92.	85.	80.	74.
		70.	65.	61.	57.	53.	50.	46.
		43.	41.	38.	36.	33.	31.	29.
		27.	26.	24.	22.	21.	20.	19.
		18.	16.	16.	15.	14.	13.	12.
		12.	11.	10.	10.	9.	9.	8.
		8.	7.	7.	6.	6.	6.	6.
		5.	5.	5.	4.	4.	4.	4.
		3.	3.	3.	3.	3.	2.	2.
		2.	2.	2.	2.	2.	2.	2.
		2.	1.	1.	1.	1.	1.	1.
		1.	1.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.	0.	0.	0.	0.
		0.	0.	0.				

****
* TOTAL FLOW AT AP24 *
****

*DIVIDE HYD ID=3 PER=-20 ID=3 HYD=AP24
* ID=11 HYD=100

****
* REACH 2 - SPT DOWNSTREAM OF DIVERSION - SOIL TEST SPT5
SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.81	45.91
610	8.45	52.48
872	9.32	61.36
1066	9.65	64.72
1248	10.03	68.57
1430	10.38	71.92

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	1.00	1.713	.123	4.73	50000.	.00	2214.	51999.	1.0207	1.85
1.333	14.00	4.483	.523	5.97	50000.	.11	20359.	68393.	1.0277	8.94
1.667	1116.00	9.761	1.738	65.78	50000.	50.49	107053.	147135.	1.0651	4777.49
2.000	324.00	7.708	1.179	35.66	50000.	8.96	68267.	111822.	1.0475	8171.40
2.333	114.00	7.074	1.036	15.55	50000.	2.58	56619.	101243.	1.0425	9005.41
2.666	57.00	6.374	.886	10.09	50000.	1.01	44975.	90682.	1.0376	9319.08
3.000	29.00	5.504	.711	7.41	50000.	.37	32395.	79284.	1.0325	9458.23
3.333	16.00	4.670	.556	6.16	50000.	.14	22339.	70184.	1.0285	9521.11

3.6[illegible]	9.00	3.885	.422	5.49	50000.	.05	14675.	63254.	1.0255	9551.64
4.000	5.00	3.161	.309	5.11	50000.	.02	9137.	58250.	1.0233	9567.01
4.333	3.00	2.616	.233	4.92	50000.	.01	5906.	55332.	1.0221	9575.07
4.666	2.00	2.242	.185	4.82	50000.	.00	4133.	53731.	1.0214	9579.32

AT PEAK FLOW OF 1246.000 WITH TIME AT 1.60 HOURS: BEDMAT = 2223.81 (TONS) = 1.0210 (AC-FT bulked)
TOTAL SED = 3260.41 (TONS) = 1.4970 (AC-FT bulked)
PEAK BULKING FACTOR = 1.067829 = 152360. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3371.23	.9361	1.5479	50000.	
BEDMAT =	6209.72	1.7242	2.8511	88378.	
TOTAL SEDIMENT =	9580.96	2.6602	4.3990	130115.	1.056444

SEDIMENT TRANSPORT CAPACITY: 5.63971 AC-FT/SQ MI (bulked) = 19.1926 TONS/ACRE (at Porosity=0.395)

*
* REACH 1 SPT DOWNSTREAM OF DIVERSION
*

SEDIMENT TRANS ID=3 IDS=2 CODE=10
A FACT=0.0000018 B EXP=5.80
C EXP=-0.65 D EXP=-2.1 NUMBER=1
WASH CONC=50000
NUMBER SECTIONS=6

FLOW (CFS)	VELOCITY (FEET/SEC)	WIDTH (FT)
431	7.12	58.38
610	7.76	66.44
872	8.54	75.66
1066	9.01	81.40
1248	9.40	85.95
1430	9.81	89.35

* * * * * * * * * * * * * * * *

TIME (HRS)	WATER FLOW (CFS)	VELOCITY (FT/SEC)	HYD. DEPTH (FT)	WIDTH (FT)	WASHLOAD CONC. (PPM-w)	BED MAT. TRANSPORT (CFS)	BED CONC. (PPM-w)	TOTAL CONC. (PPM-w)	BULKING FACTOR	ACCUM. SEDIMENT (TONS)
.000	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.333	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
.667	.00	.000	.000	.00	50000.	.00	0.	50000.	1.0000	.00
1.000	1.00	1.560	.106	6.03	50000.	.00	1810.	51633.	1.0205	1.83
1.333	14.00	4.084	.450	7.61	50000.	.09	16702.	65086.	1.0263	8.67
1.667	1116.00	9.124	1.480	82.65	50000.	47.61	101568.	142133.	1.0625	4532.29
2.000	324.00	7.027	1.017	45.35	50000.	7.33	56582.	101210.	1.0425	7572.43
2.333	114.00	6.448	.894	19.78	50000.	2.11	46809.	92344.	1.0384	8321.37
2.666	57.00	5.808	.764	12.84	50000.	.83	37090.	83536.	1.0344	8606.23
3.000	29.00	5.015	.613	9.44	50000.	.30	26643.	74078.	1.0302	8734.38
3.333	16.00	4.254	.479	7.85	50000.	.11	18334.	66561.	1.0269	8793.30
3.666	9.00	3.539	.363	7.00	50000.	.04	12024.	60858.	1.0245	8822.39
4.000	5.00	2.879	.267	6.51	50000.	.01	7478.	56751.	1.0227	8837.25
4.333	3.00	2.383	.201	6.27	50000.	.01	4830.	54361.	1.0217	8845.14
4.666	2.00	2.042	.159	6.15	50000.	.00	3379.	53050.	1.0211	8849.33

AT PEAK FLOW OF 1246.000 WITH TIME AT 1.60 HOURS: BEDMAT = 2034.57 (TONS) = .9341 (AC-FT bulked)
TOTAL SED = 3071.16 (TONS) = 1.4101 (AC-FT bulked)
PEAK BULKING FACTOR = 1.065679 = 148247. (PPM-w)

	WEIGHT (TONS)	UNBULKED VOLUME (AC-FT)	BULKED VOLUME (AC-FT)	CONCETRATION BY WEIGHT (PPM)	AVERAGE BULKING FACTOR
WASHMAT =	3371.24	.9361	1.5479	50000.	
BEDMAT =	5479.73	1.5215	2.5159	78807.	
TOTAL SEDIMENT =	8850.97	2.4576	4.0638	121405.	1.052144

SEDIMENT TRANSPORT CAPACITY: 5.21001 AC-FT/SQ MI (bulked) = 17.7303 TONS/ACRE (at Porosity=0.395)

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:16:48

South Pino Tributary
Mean Annual Sediment Computation

Storm Event	Reach 1		Reach 2		Reach 3		Reach 4		Average Rch(2-4)
	ac-ft	cu-ft	ac-ft	cu-ft	ac-ft	cu-ft	ac-ft	cu-ft	
2-yr	0.0566	2,465	0.0723	3,149	0.1018	4,434	0.0832	3,624	
5-yr	0.174	7,579	0.2209	9,622	0.3087	13,447	0.2526	11,003	
10-yr	0.3023	13,168	0.3777	16,453	0.5208	22,686	0.43	18,731	
25-yr	0.5667	24,685	0.7137	31,089	0.944	41,121	0.7769	33,842	
50-yr	0.8662	37,732	1.0765	46,892	1.358	59,154	1.1593	50,499	
100-yr	1.1598	50,521	1.3556	59,050	1.7242	75,106	1.5215	66,277	66,811

	Flow cfs
2-yr	140
5-yr	356
10-yr	545
25-yr	811
50-yr	1033
100-yr	1208

	Reach 1		Reach 2		Reach 3		Reach 4		Rch (2-4)
	Aver. Ann. Sed.	Dominant Disch.	Aver. Ann. Sed.	Dominant Disch.	Aver. Ann. Sed.	Dominant Disch.	Aver. Ann. Sed.	Dominant Disch.	Aver. Ann. Sed.
	5,867	288	7,333	284	9,937	263	8,254	267	8,508

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1**********************************************
 *  HEC-2 WATER SURFACE PROFILES              *
 *                                            *
 *  Version   4.6.0;  February 1991           *
 *                                            *
 *  RUN DATE    28OCT94    TIME   04:01:02    *
 **********************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*        (916) 756-1104                 *
*****************************************
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X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX            XXXXXXX
```

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THIS RUN EXECUTED 28OCT94 04:01:02

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.0;  February 1991
************************************
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T1 SOUTH PINO TRIBUTARY - Flow for 2,5,10,25,50,100,PLUS YR FREQUENCY
T2 JOB# H9324120 -  DECEMBER 1993 - INPUT=HD_P'.HYM, NO BULKING
T3 INPUT= SPT.HEC OUTPUT VALUES TO SPTTRAN.HYM FOR SEDIMENT STUDY

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2                    1     0.050                                    6299.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1        0.       -1.

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43         4        26         1         2

J5  LPRNT     NUMSEC                      ********REQUESTED SECTION NUMBERS********

     -10       -10

QT        7       615       548       473       394       283       207        71
NC     .045      .045      .045
X1    14100         8       100       300        95       110       100
GR     6322       100      6320       150      6318       152      6318       180      6318       205
GR     6320       230      6322       260      6324       300

X1    14000         6       100       230        75        95       100
GR     6316       100      6314       120      6313       155      6314       185      6316       188
GR     6318       230
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X1	139	8	100	275	155	100	100			
GR	6312	100	6310	148	6308	180	6308	190	6310	235
GR	6310	245	6312	247	6314	275				
X1	13800	11	100	360	110	120	100			
GR	6308	100	6306	120	6304	132	6304	160	6303	180
GR	6304	195	6304	215	6304	230	6306	238	6308	280
GR	6309	360								
QT	7	1400	1208	1033	854	602	435	140		
X1	13700	11	100	320	135	50	100			
GR	6310	100	6308	110	6306	123	6304	145	6302	172
GR	6300	178	6299	200	6300	225	6298.5	250	6300	285
GR	6302	320								

1

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NC	.045	.045	.045	.1	.3					
X1	13600	12	100	370	210	185	200			
GR	6300	100	6298	130	6296	153	6294.5	165	6296	180
GR	6298	190	6296	214	6295	230	6296	270	6296	313
GR	6298	320	6300	370						
QT	7	1400	1208	1033	854	602	435	140		
X1	13400	15	100	460	100	110	100			
GR	6294	100	6292	130	6290	190	6288	210	6287	255
GR	6286.5	310	6288	325	6290	335	6290	350	6288	360
GR	6286	365	6286	415	6288	420	6290	425	6292	460
X1	13300	9	100	413	100	100	100			
GR	6286	100	6284	108	6282.5	200	6284	260	6286	270
GR	6286	307	6288	330	6290	368	6292	413		
X1	13200	11	100	410	200	200	200			
GR	6283.5	100	6282	110	6280	115	6278.5	155	6278	190
GR	6278	270	6280	280	6282	300	6284	330	6286	370
GR	6288	410								
X1	13000	14	100	385	85	80	80			
GR	6274	100	6273.5	115	6274	125	6273	150	6272	190
GR	6270	210	6269.5	230	6270	245	6269	265	6270	275
GR	6272	280	6274	310	6276	345	6278	385		
X1	12920	10	100	290	135	120	120			
GR	6269.5	100	6269	125	6268	145	6267	160	6266	220
GR	6266	238	6268	243	6270	246	6270.2	262	6272	290
X1	12800	10	100	295	65	65	65			
GR	6265	100	6264	120	6262	135	6261	142	6261	190
GR	6262	200	6264	208	6266	221	6268	250	6270	295
X1	12735	10	100	215	135	135	135		6.0	
GR	6259	100	6258	110	6256	115	6254	122	6253	130
GR	6253	165	6254	180	6256	192	6258	200	6260	215
X1	12600	10	100	215	110	100	100			
GR	6259	100	6258	110	6256	115	6254	122	6253	130
GR	6253	165	6254	180	6256	192	6258	200	6260	215
X1	12500	7	100	195	160	230	200			
GR	6255.5	100	6254	110	6252	118	6250	125	6248.5	130
GR	6250	190	6251	195						
QT	7	1430	1248	1066	872	610	431	123		

X1	123	12	100	400	95	50	100			
GR	6249	100	6248	150	6246	163	6244	180	6242	190
GR	6240	212	6239	225	6240	300	6242	325	6244	355
GR	6246	376	6248	400						

X1	12200	10	100	270	100	100	100			
GR	6240	100	6236	130	6234	140	6232	155	6232	165
GR	6234	180	6234	210	6236	245	6238	255	6240	270
X1	12100	13	100	315	200	200	200			
GR	6240	100	6238	119	6236	136	6234	150	6232	175
GR	6231	205	6230	225	6228	235	6226	245	6228	260
GR	6230	275	6232	295	6234	315				
X1	11900	14	100	345	100	70	90			
GR	6232	100	6230	140	6228	165	6226	187	6224	200
GR	6222	212	6220	215	6220	223	6222	248	6224	282
GR	6226	295	6228	307	6230	320	6232	345		
X1	11800	13	100	325	120	120	130			
GR	6228	100	6226	120	6224	145	6222	160	6220	179
GR	6218	210	6216	230	6218	245	6220	256	6222	280
GR	6224	298	6226	312	6228	325				
X1	11700	13	100	261	190	190	200			
GR	6222	100	6220	120	6218	135	6216	149	6214	162
GR	6212	185	6210.5	195	6212	208	6214	218	6216	229
GR	6218	238	6220	250	6221	261				
QT	7	1430	1248	1066	872	610	431	123		
X1	11500	11	100	267	225	175	200			
GR	6212	100	6210	114	6208	128	6206	140	6204	165
GR	6203	190	6204	200	6206	218	6208	230	6210	248
GR	6212	267								
X1	11300	10	100	263	120	85	100			
GR	6202	100	6200	116	6198	131	6196	150	6194	175
GR	6193	190	6194	207	6196	225	6198	245	6200	263
X1	11200	11	100	253	70	100	100			
GR	6196	100	6194	120	6192	140	6190	162	6188	175
GR	6189.5	180	6188	190	6190	210	6192	225	6194	240
GR	6196	253								
X1	11100	12	100	340	70	130	100			
GR	6195	100	6194	150	6192	180	6190	200	6186	230
GR	6184	232	6184	245	6186	265	6188	290	6190	300
GR	6194	325	6196	340						
X1	11000	12	100	250	120	40	100			
GR	6190	100	6188	120	6186	140	6184	152	6182	168
GR	6180	185	6180	190	6182	200	6184	212	6186	224
GR	6188	236	6190	250						

X1	10900	12	100	280	120	100	100			
GR	6186	100	6184	123	6182	145	6180	162	6178	188
GR	6176.3	200	6178	218	6180	230	6182	242	6184	252
GR	6186	263	6188	280						

X1	10800	8	100	215	50	150	100			
GR	6180	100	6178	135	6174	150	6172	160	6174	175
GR	6176	185	6178	195	6180	215				
X1	10700	10	100	275	120	70	100			
GR	6180	100	6178	120	6176	140	6172	165	6170	183
GR	6168	210	6170	220	6174	240	6178	255	6180	275
X1	10600	7	100	255	100	50	100			
GR	6174	100	6172	120	6164	170	6166	200	6170	225
GR	6172	240	6174	255						
X1	10500	8	100	280	50	130	100			
GR	6168	100	6164	155	6162	195	6161.5	220	6162	230
GR	6164	250	6166	265	6168	280				
X1	10400	8	100	280	80	85	100			
GR	6164	100	6162	120	6160	140	6158	200	6157	215
GR	6158	230	6162	255	6164	280				
X1	10300	10	100	290	150	60	100			
GR	6159	100	6158	110	6156	125	6154	142	6153.5	150
GR	6153.5	180	6154	190	6156	245	6158	265	6159.0	290
X1	10200	7	100	290	110	50	100			
GR	6152	100	6150	135	6148	155	6147	160	6148	165
GR	6150	260	6152	290						
X1	10100	7	100	350	70	170	100			
GR	6150	100	6148	165	6146	205	6144	230	6146	250
GR	6148	290	6150	350						
QT	7	1800	1560	1322	1060	720	490	136		
X1	10000	12	100	415	400	370	400			
GR	6150	190	6148	220	6146	240	6144	255	6142	278
GR	6140	290	6140	300	6142	320	6144	350	6146	385
GR	6148	400	6150	415						
X1	9600	9	100	510	430	300	350			
GR	6132	100	6128	130	6127.5	150	6126.5	255	6128	300
GR	6129.5	355	6129	460	6130	490	6132	510		
X1	9250	10	100	375	360	475	450			
GR	6118	100	6116	120	6114	145	6112.5	190	6113.5	265
GR	6112	305	6110	310	6110	330	6114	345	6118	375

1

X1	8800	10	100	315	400	495	450			
GR	6102	100	6098	150	6096	190	6095	200	6096	215
GR	6098	250	6097	275	6098	290	6100	300	6102	315
X1	8350	10	100	390	450	450	450			
GR	6088	100	6082	170	6080	185	6077	200	6080	230
GR	6078	235	6078.5	310	6080	335	6086	370	6088	390

1

T1 South Pino Tributary - Flow for the 100 Year
T2 JOB# H9324120 - OCTOBER 1993
T3

J1	ICHEC	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	3		1	0.050				6299.0	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2	0	-1	0	0	0	0			

1

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T1 South Pino Tributary - Flow for the 50 Year
T2 JOB# H9324120 - OCTOBER 1993
T3

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	4		1	0.050				6299.0	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3	0	-1	0	0	0	0			

1

28OCT94 04:01:02 PAGE 8

T1 South Pino Tributary - Flow for the 25 Year
T2 JOB# H9324120 - OCTOBER 1993
T3

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	5		1	0.050				6299.0	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	4	0	-1	0	0	0	0			

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T1 South Pino Tributary - Flow for the 10 Year
T2 JOB# H9324120 - OCTOBER 1993
T3

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	6		1	0.050				6299.0	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	5	0	-1	0	0	0	0			

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T1 South Pino Tributary - Flow for the 5 Year
T2 JOB# H9324120 - OCTOBER 1993
T3

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ

	0	7		1	0.050				.0
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	6	0	-1	0	0	0	0			

T1 South Pino Tributary - Flow for the 2 Year
T2 JOB# H9324120 - OCTOBER 1993
T3

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	8		1	0.050				6299.0	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15	0	-1	0	0	0	0			

THIS RUN EXECUTED 28OCT94 04:01:18

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

= SPT.HEC OUTPUT VALUES

SUMMARY PRINTOUT

SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
14100.000	615.00	70.11	7.88	6319.27	6319.50
14100.000	548.00	69.00	7.58	6319.19	6319.40
14100.000	473.00	67.69	7.20	6319.09	6319.27
14100.000	394.00	66.23	6.74	6318.98	6319.13
14100.000	283.00	63.90	6.00	6318.81	6318.92
14100.000	207.00	62.10	5.34	6318.67	6318.75
14100.000	71.00	57.81	3.60	6318.36	6318.37
14000.000	615.00	73.35	7.43	6314.72	6314.90
14000.000	548.00	72.43	7.13	6314.65	6314.80
14000.000	473.00	71.33	6.76	6314.55	6314.67
14000.000	394.00	70.08	6.32	6314.45	6314.54
14000.000	283.00	68.13	5.59	6314.28	6314.34
14000.000	207.00	66.57	4.99	6314.13	6314.18
14000.000	71.00	50.59	3.61	6313.78	6313.78
13900.000	615.00	78.80	7.75	6309.80	6310.07

	13900	548.00	75.50	7.54	6309.70	6309.96
	13900.000	473.00	71.55	7.26	6309.60	6309.81
	13900.000	394.00	66.87	6.94	6309.48	6309.68
	13900.000	283.00	59.20	6.40	6309.28	6309.44
	13900.000	207.00	52.94	5.90	6309.12	6309.25
	13900.000	71.00	35.90	4.60	6308.68	6308.75
	13800.000	615.00	105.22	6.77	6304.72	6304.87
	13800.000	548.00	104.65	6.46	6304.66	6304.79
	13800.000	473.00	103.96	6.09	6304.59	6304.70
	13800.000	394.00	103.20	5.64	6304.53	6304.61
	13800.000	283.00	102.00	4.92	6304.40	6304.46
	13800.000	207.00	101.05	4.32	6304.31	6304.33
	13800.000	71.00	34.90	4.08	6304.00	6304.06

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	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
*	13700.000	1400.00	127.72	7.48	6301.00	6301.09
*	13700.000	1208.00	124.58	7.20	6300.85	6300.93
*	13700.000	1033.00	121.62	6.88	6300.71	6300.78
*	13700.000	854.00	118.35	6.52	6300.55	6300.61
*	13700.000	602.00	113.33	5.87	6300.30	6300.36
*	13700.000	435.00	109.58	5.30	6300.13	6300.15
*	13700.000	140.00	72.85	4.22	6299.61	6299.64
	13600.000	1400.00	154.44	8.10	6296.89	6297.13
	13600.000	1208.00	151.55	7.60	6296.80	6297.00
	13600.000	1033.00	148.58	7.12	6296.71	6296.87
	13600.000	854.00	145.36	6.55	6296.61	6296.73
	13600.000	602.00	140.11	5.63	6296.44	6296.51
	13600.000	435.00	135.83	4.92	6296.31	6296.34
*	13600.000	140.00	69.67	4.06	6295.82	6295.82
	13400.000	1400.00	168.12	7.26	6287.89	6288.03
	13400.000	1208.00	160.23	7.05	6287.75	6287.91
	13400.000	1033.00	152.68	6.82	6287.63	6287.77
	13400.000	854.00	144.00	6.56	6287.48	6287.62
	13400.000	602.00	130.29	6.10	6287.26	6287.38
	13400.000	435.00	119.86	5.65	6287.08	6287.18
	13400.000	140.00	60.92	4.75	6286.57	6286.65
	13300.000	1400.00	157.50	6.71	6284.60	6284.63
*	13300.000	1208.00	156.54	6.30	6284.50	6284.50
*	13300.000	1033.00	155.34	6.04	6284.37	6284.37
*	13300.000	854.00	154.13	5.68	6284.24	6284.24
*	13300.000	602.00	152.22	5.11	6284.02	6284.02
*	13300.000	435.00	136.61	4.72	6283.85	6283.85
*	13300.000	140.00	86.69	3.78	6283.36	6283.36
*	13200.000	1400.00	140.82	9.69	6279.24	6279.68
*	13200.000	1208.00	137.20	9.39	6279.11	6279.54
*	13200.000	1033.00	134.76	8.75	6279.04	6279.40
*	13200.000	854.00	131.68	8.12	6278.94	6279.25
*	13200.000	602.00	127.06	6.98	6278.80	6279.02
*	13200.000	435.00	122.99	6.19	6278.68	6278.84
	13200.000	140.00	108.45	3.92	6278.38	6278.42
*	13000.000	1400.00	89.43	8.02	6271.95	6271.95
*	13000.000	1208.00	86.97	7.68	6271.76	6271.76
*	13000.000	1033.00	84.57	7.34	6271.57	6271.57
*	13000.000	854.00	81.86	6.96	6271.35	6271.35
*	13000.000	602.00	77.48	6.35	6271.00	6271.00

	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
*	13000.000	435.00	74.18	5.81	6270.73	6270.73
*	13000.000	140.00	66.90	4.15	6270.15	6270.15

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	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
*	12920.000	1400.00	96.30	10.85	6267.90	6268.46
*	12920.000	1208.00	94.10	10.31	6267.78	6268.28
*	12920.000	1033.00	91.97	9.77	6267.66	6268.09
*	12920.000	854.00	89.67	9.10	6267.52	6267.90
*	12920.000	602.00	86.30	7.83	6267.33	6267.59
	12920.000	435.00	83.70	6.77	6267.19	6267.36
	12920.000	140.00	66.00	4.34	6266.76	6266.80
*	12800.000	1400.00	81.97	8.49	6263.47	6263.54
*	12800.000	1208.00	79.69	8.11	6263.28	6263.33
*	12800.000	1033.00	77.47	7.72	6263.09	6263.12
*	12800.000	854.00	74.99	7.28	6262.87	6262.89
*	12800.000	602.00	70.84	6.62	6262.51	6262.54
	12800.000	435.00	67.63	6.07	6262.22	6262.25
	12800.000	140.00	58.09	4.45	6261.58	6261.62
	12735.000	1400.00	74.27	8.76	6261.71	6261.79
	12735.000	1208.00	72.21	8.39	6261.50	6261.56
	12735.000	1033.00	70.19	8.02	6261.28	6261.33
	12735.000	854.00	68.03	7.56	6261.05	6261.09
*	12735.000	602.00	64.67	6.72	6260.70	6260.70
*	12735.000	435.00	61.95	6.09	6260.42	6260.42
*	12735.000	140.00	51.68	4.46	6259.73	6259.73
*	12600.000	1400.00	68.16	12.29	6255.07	6255.78
*	12600.000	1208.00	66.62	11.72	6254.91	6255.55
*	12600.000	1033.00	65.16	11.12	6254.76	6255.33
*	12600.000	854.00	63.50	10.46	6254.58	6255.10
*	12600.000	602.00	60.86	9.35	6254.30	6254.71
*	12600.000	435.00	59.02	8.25	6254.11	6254.41
	12600.000	140.00	49.59	5.22	6253.63	6253.72
*	12500.000	1400.00	75.22	9.06	6251.49	6251.63
*	12500.000	1208.00	74.62	8.52	6251.32	6251.42
*	12500.000	1033.00	74.03	8.00	6251.15	6251.21
*	12500.000	854.00	73.21	7.40	6250.96	6251.00
*	12500.000	602.00	70.48	6.51	6250.64	6250.64
*	12500.000	435.00	68.14	5.93	6250.37	6250.37
*	12500.000	140.00	51.94	4.50	6249.70	6249.70
*	12300.000	1430.00	107.55	11.41	6240.83	6241.46
*	12300.000	1248.00	105.06	10.94	6240.73	6241.30
*	12300.000	1066.00	102.32	10.45	6240.61	6241.13
*	12300.000	872.00	99.02	9.93	6240.47	6240.94
*	12300.000	610.00	94.41	8.85	6240.27	6240.65
*	12300.000	431.00	91.37	7.58	6240.14	6240.41
*	12300.000	123.00	67.63	4.73	6239.77	6239.86

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	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
*	12200.000	1430.00	98.47	9.13	6235.27	6235.57
*	12200.000	1248.00	95.24	8.75	6235.12	6235.38
*	12200.000	1066.00	91.81	8.30	6234.97	6235.19

*	12200.000	872.00	87.90	7.73	6234.80	6234.96
*	12200.000	610.00	81.55	6.86	6234.52	6234.62
*	12200.000	431.00	75.83	6.25	6234.27	6234.38
	12200.000	123.00	26.06	6.37	6233.07	6233.22
	12100.000	1430.00	67.59	10.63	6230.59	6231.10
	12100.000	1248.00	59.61	10.62	6230.33	6230.83
	12100.000	1066.00	49.74	10.77	6229.97	6230.55
	12100.000	872.00	45.49	10.53	6229.64	6230.17
	12100.000	610.00	38.95	10.05	6229.13	6229.56
	12100.000	431.00	33.89	9.38	6228.72	6229.12
	12100.000	123.00	21.53	6.64	6227.72	6227.89
	11900.000	1430.00	81.89	8.85	6223.99	6224.13
	11900.000	1248.00	77.44	8.54	6223.80	6223.92
	11900.000	1066.00	72.73	8.15	6223.60	6223.68
	11900.000	872.00	67.63	7.57	6223.37	6223.39
*	11900.000	610.00	56.93	7.07	6222.91	6222.91
*	11900.000	431.00	47.28	6.69	6222.49	6222.49
*	11900.000	123.00	26.59	5.36	6221.33	6221.33
	11800.000	1430.00	71.81	11.12	6219.74	6220.33
	11800.000	1248.00	67.70	10.86	6219.55	6220.10
*	11800.000	1066.00	63.04	10.61	6219.33	6219.86
*	11800.000	872.00	57.14	10.43	6219.05	6219.57
*	11800.000	610.00	49.08	9.65	6218.67	6219.11
*	11800.000	431.00	42.39	8.86	6218.36	6218.72
	11800.000	123.00	26.37	6.19	6217.51	6217.64
	11700.000	1430.00	65.52	9.90	6214.80	6215.05
	11700.000	1248.00	63.08	9.50	6214.59	6214.81
	11700.000	1066.00	60.52	9.02	6214.38	6214.55
*	11700.000	872.00	57.65	8.38	6214.13	6214.24
*	11700.000	610.00	51.02	7.62	6213.70	6213.77
	11700.000	431.00	44.51	7.04	6213.30	6213.35
	11700.000	123.00	26.59	5.43	6212.22	6212.24
	11500.000	1430.00	77.45	11.13	6205.97	6206.53
	11500.000	1248.00	73.98	10.73	6205.81	6206.33
	11500.000	1066.00	70.04	10.34	6205.63	6206.12
*	11500.000	872.00	65.16	9.94	6205.40	6205.87
*	11500.000	610.00	58.14	9.02	6205.08	6205.45
*	11500.000	431.00	52.52	8.11	6204.82	6205.10
	11500.000	123.00	38.50	5.24	6204.17	6204.24

SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
11300.000	1430.00	79.80	10.07	6196.25	6196.65
11300.000	1248.00	76.48	9.69	6196.08	6196.45
11300.000	1066.00	72.71	9.26	6195.89	6196.22
11300.000	872.00	68.24	8.68	6195.69	6195.95
11300.000	610.00	60.52	7.88	6195.33	6195.53
11300.000	431.00	53.80	7.24	6195.01	6195.18
11300.000	123.00	36.20	5.43	6194.19	6194.29
11200.000	1430.00	72.47	10.88	6191.32	6191.85
11200.000	1248.00	69.10	10.53	6191.14	6191.63
11200.000	1066.00	65.38	10.15	6190.94	6191.39
11200.000	872.00	60.83	9.75	6190.69	6191.13
11200.000	610.00	54.02	8.93	6190.32	6190.68
11200.000	431.00	48.60	8.09	6190.04	6190.31
11200.000	123.00	34.85	5.37	6189.32	6189.39

11100.000	1430.00	74.67	9.12	6187.98	6188.13
11100.000	1248.00	70.40	8.83	6187.76	6187.91
11100.000	1066.00	65.74	8.50	6187.53	6187.65
11100.000	872.00	60.21	8.07	6187.26	6187.33
11100.000	610.00	50.59	7.50	6186.78	6186.82
11100.000	431.00	41.47	7.14	6186.32	6186.38
11100.000	123.00	25.49	5.63	6185.13	6185.18
11000.000	1430.00	60.56	10.85	6184.05	6184.51
11000.000	1248.00	57.38	10.58	6183.82	6184.26
11000.000	1066.00	53.73	10.30	6183.56	6183.98
11000.000	872.00	49.40	9.96	6183.25	6183.65
11000.000	610.00	42.81	9.26	6182.77	6183.12
11000.000	431.00	37.58	8.47	6182.40	6182.68
11000.000	123.00	24.59	5.73	6181.45	6181.50
10900.000	1430.00	71.16	10.31	6180.22	6180.61
10900.000	1248.00	68.86	9.78	6180.06	6180.40
10900.000	1066.00	65.79	9.21	6179.89	6180.15
10900.000	872.00	61.62	8.57	6179.67	6179.87
10900.000	610.00	54.46	7.64	6179.29	6179.41
10900.000	431.00	47.86	6.94	6178.94	6179.01
10900.000	123.00	28.49	5.35	6177.92	6177.94
10800.000	1430.00	51.16	10.30	6176.99	6177.18
10800.000	1248.00	48.43	10.12	6176.69	6176.89
10800.000	1066.00	45.37	9.97	6176.33	6176.56
10800.000	872.00	41.85	9.76	6175.93	6176.19
10800.000	610.00	36.48	9.33	6175.31	6175.59
10800.000	431.00	32.33	8.79	6174.84	6175.10
10800.000	123.00	22.00	6.35	6173.76	6173.88

	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
*	10700.000	1430.00	57.20	13.62	6171.44	6172.34
*	10700.000	1248.00	54.99	12.98	6171.28	6172.11
*	10700.000	1066.00	52.76	12.18	6171.13	6171.85
*	10700.000	872.00	50.06	11.23	6170.93	6171.54
	10700.000	610.00	45.79	9.68	6170.63	6171.05
	10700.000	431.00	42.09	8.39	6170.37	6170.64
	10700.000	123.00	28.43	5.63	6169.54	6169.61
*	10600.000	1430.00	66.74	9.64	6167.94	6168.15
*	10600.000	1248.00	64.09	9.27	6167.73	6167.90
*	10600.000	1066.00	61.11	8.91	6167.49	6167.65
*	10600.000	872.00	57.59	8.47	6167.21	6167.36
	10600.000	610.00	51.94	7.81	6166.76	6166.88
	10600.000	431.00	47.26	7.23	6166.38	6166.49
	10600.000	123.00	31.17	5.38	6165.46	6165.52
	10500.000	1430.00	96.58	9.80	6164.07	6164.49
	10500.000	1248.00	93.42	9.33	6163.94	6164.30
	10500.000	1066.00	89.48	8.75	6163.82	6164.11
	10500.000	872.00	84.70	8.08	6163.66	6163.89
	10500.000	610.00	77.32	6.93	6163.41	6163.52
	10500.000	431.00	70.95	5.97	6163.20	6163.22
*	10500.000	123.00	48.99	4.34	6162.47	6162.47
	10400.000	1430.00	106.17	8.36	6160.23	6160.40
	10400.000	1248.00	103.75	8.03	6160.08	6160.23
	10400.000	1066.00	98.54	7.81	6159.89	6160.05

	10400.000	872.00	90.29	7.58	6159.67	6159.83
	10400.000	610.00	76.53	7.32	6159.28	6159.46
	10400.000	431.00	64.85	7.11	6158.96	6159.16
	10400.000	123.00	39.42	5.12	6158.26	6158.33
	10300.000	1430.00	108.42	9.49	6155.68	6156.07
	10300.000	1248.00	103.78	9.10	6155.55	6155.91
	10300.000	1066.00	99.22	8.58	6155.43	6155.73
	10300.000	872.00	93.42	8.02	6155.27	6155.52
	10300.000	610.00	85.07	6.93	6155.04	6155.17
	10300.000	431.00	77.97	5.99	6154.82	6154.89
	10300.000	123.00	54.86	4.20	6154.19	6154.20
	10200.000	1430.00	129.25	9.13	6150.13	6150.48
	10200.000	1248.00	125.65	8.76	6150.02	6150.34
	10200.000	1066.00	117.90	8.53	6149.89	6150.18
	10200.000	872.00	108.52	8.19	6149.72	6150.00
	10200.000	610.00	92.04	7.84	6149.44	6149.72
*	10200.000	431.00	77.58	7.63	6149.17	6149.47
*	10200.000	123.00	44.48	5.77	6148.60	6148.76

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	SECNO	Q	TOPWID	VCH	CWSEL	CRIWS
*	10100.000	1430.00	117.62	7.42	6147.82	6147.82
*	10100.000	1248.00	110.68	7.22	6147.64	6147.64
*	10100.000	1066.00	102.68	7.04	6147.44	6147.44
*	10100.000	872.00	93.50	6.76	6147.21	6147.21
*	10100.000	610.00	77.93	6.38	6146.82	6146.82
*	10100.000	431.00	64.63	5.99	6146.49	6146.49
*	10100.000	123.00	33.46	4.94	6145.49	6145.49
	10000.000	1800.00	92.94	9.91	6143.92	6144.28
	10000.000	1560.00	86.63	9.73	6143.69	6144.04
	10000.000	1322.00	79.95	9.49	6143.43	6143.77
	10000.000	1060.00	71.26	9.26	6143.10	6143.44
	10000.000	720.00	57.89	8.79	6142.60	6142.91
	10000.000	490.00	45.38	8.51	6142.13	6142.44
	10000.000	136.00	28.28	6.22	6141.14	6141.28
	9600.000	1800.00	191.70	7.74	6128.50	6128.69
	9600.000	1560.00	187.60	7.26	6128.40	6128.55
	9600.000	1322.00	182.92	6.77	6128.30	6128.40
	9600.000	1060.00	177.42	6.13	6128.17	6128.23
	9600.000	720.00	167.50	5.23	6127.96	6127.97
*	9600.000	490.00	152.26	4.76	6127.75	6127.75
*	9600.000	136.00	102.50	3.49	6127.26	6127.26
	9250.000	1800.00	191.40	7.70	6113.75	6113.92
	9250.000	1560.00	187.03	7.45	6113.61	6113.78
	9250.000	1322.00	180.41	7.17	6113.48	6113.63
	9250.000	1060.00	149.07	7.25	6113.26	6113.48
	9250.000	720.00	80.90	8.15	6112.75	6113.11
	9250.000	490.00	31.99	9.82	6111.92	6112.40
	9250.000	136.00	25.76	6.45	6110.92	6111.06
	8800.000	1800.00	149.87	7.52	6098.55	6098.59
*	8800.000	1560.00	147.55	7.11	6098.43	6098.43
	8800.000	1322.00	145.28	6.59	6098.30	6098.32
*	8800.000	1060.00	142.03	6.10	6098.12	6098.12
*	8800.000	720.00	119.26	5.86	6097.73	6097.73
*	8800.000	490.00	93.83	5.58	6097.40	6097.40
*	8800.000	136.00	43.18	4.68	6096.48	6096.48

*	8350.000	1800.00	140.66	9.85	6079.73	6080.15
*	8350.000	1560.00	135.95	9.53	6079.59	6079.99
*	8350.000	1322.00	130.50	9.28	6079.43	6079.83
*	8350.000	1060.00	125.21	8.64	6079.28	6079.61
	8350.000	720.00	119.29	7.10	6079.10	6079.29
	8350.000	490.00	112.85	6.16	6078.91	6079.05
*	8350.000	136.00	98.83	3.76	6078.50	6078.50

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SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 13700.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 13700.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 13700.000 PROFILE= 3 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO= 13700.000 PROFILE= 6 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 13700.000 PROFILE= 7 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 13600.000 PROFILE= 7 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13600.000 PROFILE= 7 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13600.000 PROFILE= 7 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 13300.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13300.000 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13300.000 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13300.000 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13300.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13300.000 PROFILE= 3 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13300.000 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13300.000 PROFILE= 4 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13300.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13300.000 PROFILE= 5 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13300.000 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13300.000 PROFILE= 5 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13300.000 PROFILE= 6 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13300.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13300.000 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13300.000 PROFILE= 7 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13300.000 PROFILE= 7 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13300.000 PROFILE= 7 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 13200.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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CAUTION SECNO= 13000.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION SECNO= 13000.000 PROFILE= 4 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13000.000 PROFILE= 5 CRITICAL DEPTH ASSUMED

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CAUTION SECNO= 13000.000 PROFILE= 5 PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION SECNO= 13000.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 13000.000 PROFILE= 6 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 13000.000 PROFILE= 6 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 13000.000 PROFILE= 7 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13000.000 PROFILE= 7 PROBABLE MINIMUM SPECIFIC ENERGY
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WARNING SECNO= 12920.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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CAUTION SECNO= 12735.000 PROFILE= 6 PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION SECNO= 10500.000 PROFILE= 7 20 TRIALS ATTEMPTED TO BALANCE WSEL

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CAUTION SECNO= 10100.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 10100.000 PROFILE= 2 CRITICAL DEPTH ASSUMED
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CAUTION SECNO= 10100.000 PROFILE= 3 PROBABLE MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=  10100.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=  10100.000  PROFILE=  6  PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=  10100.000  PROFILE=  7  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=  10100.000  PROFILE=  7  20 TRIALS ATTEMPTED TO BALANCE WSEL

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CAUTION SECNO=   9600.000  PROFILE=  6  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   9600.000  PROFILE=  6  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   9600.000  PROFILE=  7  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   9600.000  PROFILE=  7  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   9600.000  PROFILE=  7  20 TRIALS ATTEMPTED TO BALANCE WSEL

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CAUTION SECNO=   8800.000  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   8800.000  PROFILE=  2  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=   8800.000  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
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CAUTION SECNO=   8800.000  PROFILE=  4  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   8800.000  PROFILE=  4  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   8800.000  PROFILE=  5  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   8800.000  PROFILE=  5  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   8800.000  PROFILE=  5  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   8800.000  PROFILE=  6  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   8800.000  PROFILE=  6  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   8800.000  PROFILE=  6  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=   8800.000  PROFILE=  7  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   8800.000  PROFILE=  7  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   8800.000  PROFILE=  7  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=   8350.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   8350.000  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   8350.000  PROFILE=  3  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=   8350.000  PROFILE=  4  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=   8350.000  PROFILE=  7  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   8350.000  PROFILE=  7  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   8350.000  PROFILE=  7  20 TRIALS ATTEMPTED TO BALANCE WSEL
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APPENDIX H: Section 3

HEC-RAS Summary Output for South Pino Tributary

SOUTH PINO TRIBUTARY ARROYO
100-YR HEC-RAS MODEL

HEC-RAS Plan: S. Pino Trib River: RIVER-1 Reach: Reach-1

Diversion Berm

Aggradational

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	Max Chl Dpth	L. Freeboard	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Cum Ch Len
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
Reach-1	3125.39	1328.00	6296.75	6299.19	6299.19	2.44	6.52	6299.85	0.027016	6.53	203.22	153.66	1.00	3164.00
Reach-1	3109	1328.00	6295.00	6297.13	6297.43	2.13	6.83	6298.23	0.056474	8.41	157.82	141.99	1.41	3089.00
Reach-1	3034	1328.00	6291.80	6292.88	6293.10	1.08	7.37	6293.75	0.059736	7.51	176.93	197.03	1.40	3014.00
Reach-1	2984	1328.00	6290.00	6291.81	6291.81	1.81	6.27	6292.43	0.028045	6.32	210.09	171.56	1.01	2964.00
Reach-1	2934	1328.00	6288.00	6289.78	6289.98	1.78	6.13	6290.65	0.047030	7.47	177.84	166.61	1.27	2914.00
Reach-1	2884	1328.00	6286.30	6288.42	6288.42	2.12	5.32	6289.07	0.028162	6.47	205.18	161.96	1.01	2864.00
Reach-1	2839	1328.00	6284.00	6286.23	6286.51	2.23	5.37	6287.30	0.057145	8.29	160.15	148.28	1.41	2819.00
Reach-1	2794	1328.00	6282.00	6284.35	6284.47	2.35	5.12	6285.22	0.035485	7.49	177.27	133.68	1.15	2774.00
Reach-1	2744	1328.00	6280.00	6281.71	6282.06	1.71	5.14	6282.95	0.058016	8.95	148.34	123.95	1.44	2724.00
Reach-1	2699	1328.00	6278.00	6280.24	6280.35	2.24	4.52	6281.08	0.035945	7.37	180.09	140.50	1.15	2679.00
Reach-1	2649	1328.00	6276.00	6278.18	6278.37	2.18	4.50	6279.16	0.040657	7.94	167.19	127.93	1.22	2629.00
Reach-1	2599	1328.00	6274.00	6276.03	6276.25	2.03	4.58	6277.11	0.039987	8.34	159.29	111.93	1.23	2579.00
Reach-1	2549	1328.00	6272.00	6273.99	6274.22	1.99	4.55	6275.20	0.036051	8.80	150.89	90.34	1.20	2529.00
Reach-1	2499	1328.00	6269.40	6271.99	6272.28	2.59	4.48	6273.36	0.037857	9.41	141.13	79.04	1.24	2479.00
Reach-1	2449	1328.00	6267.00	6269.54	6269.98	2.54	4.86	6271.27	0.044874	10.53	126.07	67.70	1.36	2429.00
Reach-1	2414	1328.00	6264.80	6266.53	6267.28	1.73	5.80	6269.02	0.091406	12.67	104.84	72.72	1.86	2394.00
Reach-1	2354	1328.00	6262.50	6265.13	6265.13	2.63	5.13	6266.14	0.023911	8.06	164.70	82.32	1.00	2334.00
Reach-1	2314	1328.00	6261.40	6263.55	6263.85	2.15	4.64	6264.89	0.041049	9.27	143.25	87.54	1.28	2294.00
Reach-1	2274	1328.00	6260.00	6262.26	6262.40	2.26	3.86	6263.41	0.029667	8.61	154.17	82.35	1.11	2254.00
Reach-1	2224	1328.00	6258.00	6260.47	6260.72	2.47	3.58	6261.79	0.036009	9.20	144.38	80.81	1.21	2204.00
Reach-1	2174	1328.00	6256.00	6258.88	6259.04	2.88	3.09	6260.15	0.029374	9.03	147.10	72.50	1.12	2154.00
Reach-1	2124	1328.00	6254.00	6256.39	6256.92	2.39	3.51	6258.28	0.045820	11.01	120.64	61.43	1.38	2104.00
Reach-1	2074	1328.00	6251.40	6254.31	6254.71	2.91	3.52	6255.94	0.043217	10.27	129.35	70.28	1.33	2054.00
Reach-1	2024	1328.00	6249.00	6251.84	6252.33	2.84	3.92	6253.61	0.048893	10.70	124.12	69.37	1.41	2004.00
Reach-1	1974	1328.00	6246.00	6246.97	6247.75	1.47	6.72	6249.56	0.147635	7.85	109.04	130.15	1.98	1954.00
Reach-1	1906.8	1373.00	6243.00	6245.73	6245.73	2.73	5.27	6246.49	0.025857	6.99	196.33	129.65	1.00	1886.80
Reach-1	1902.2	1373.00	6242.60	6244.36	6244.90	1.76	5.64	6246.17	0.100350	10.80	127.09	120.86	1.86	1882.20
Reach-1	1882.2	1373.00	6242.60	6244.86	6244.86	2.26	5.14	6245.63	0.025825	7.06	194.42	126.33	1.00	1862.20
Reach-1	1862.2	1373.00	6240.10	6242.35	6243.02	2.25	4.95	6244.54	0.113698	11.87	115.63	104.57	1.99	1842.20
Reach-1	1842.2	1373.00	6239.60	6242.54	6242.54	2.94	6.46	6243.32	0.026064	7.10	193.26	125.28	1.01	1822.20
Reach-1	1800	1373.00	6238.30	6240.30	6240.90	2.00	6.80	6242.28	0.104977	11.30	121.54	111.78	1.91	1802.20
Reach-1	1802.2	1373.00	6237.40	6239.96	6240.17	2.56	6.04	6241.02	0.040653	8.29	165.67	118.65	1.24	1782.20
Reach-1	1760	1373.00	6235.70	6238.89	6239.20	3.19	7.11	6240.13	0.048363	8.94	153.63	112.04	1.34	1762.20
Reach-1	1762.3	1373.00	6232.30	6236.21	6236.94	3.91	9.39	6238.61	0.111873	12.43	110.43	91.50	1.99	1742.30
Reach-1	1722.3	1373.00	6230.70	6234.84	6234.94	4.14	9.06	6235.79	0.030278	7.82	175.56	109.85	1.09	1702.30
Reach-1	1702.3	1373.00	6230.50	6234.71	6234.71	4.21	8.89	6235.55	0.025425	7.35	186.76	112.41	1.01	1682.30
Reach-1	1668.7	1373.00	6229.70	6233.57	6233.71	3.87	8.73	6234.58	0.031898	8.06	170.45	106.03	1.12	1648.70
Reach-1	1648.7	1373.00	6227.90	6232.35	6232.73	4.45	2.95	6233.72	0.054645	9.42	145.74	107.38	1.43	1628.70
Reach-1	1628.7	1373.00	6227.90	6232.67	6232.67	4.77	2.43	6233.47	0.026325	7.18	191.33	122.62	1.01	1608.70
Reach-1	1588.7	1373.00	6226.10	6230.83	6231.16	4.73	3.67	6232.16	0.037878	9.25	148.49	85.26	1.23	1568.70
Reach-1	1568.7	1373.00	6225.10	6229.52	6230.01	4.42	6.08	6231.29	0.042448	10.67	128.62	64.75	1.33	1548.70
Reach-1	1548.7	1373.00	6224.90	6229.80	6229.80	4.90	5.90	6230.88	0.023649	8.34	164.58	77.41	1.01	1528.70
Reach-1	1528.8	1373.00	6223.90	6227.58	6228.36	3.68	8.62	6229.96	0.075228	12.37	110.95	68.95	1.72	1508.80
Reach-1	1508.8	1373.00	6222.60	6227.03	6227.35	4.43	8.97	6228.54	0.034957	9.88	138.98	67.81	1.22	1488.80
Reach-1	1488.8	1373.00	6222.00	6226.50	6226.75	4.50	9.30	6227.95	0.031653	9.65	142.24	66.74	1.17	1468.80
Reach-1	1468.8	1373.00	6221.60	6226.46	6226.46	4.86	4.84	6227.55	0.023799	8.39	163.56	76.43	1.01	1448.80
Reach-1	1448.8	1373.00	6220.20	6223.76	6224.60	3.56	10.54	6226.48	0.118518	13.24	103.72	81.79	2.07	1428.80
Reach-1	1428.8	1373.00	6220.00	6224.30	6224.30	4.30	10.00	6225.20	0.024970	7.63	179.84	100.86	1.01	1408.80
Reach-1	1408.8	1373.00	6219.10	6223.63	6223.88	4.53	7.77	6224.99	0.034895	9.37	146.49	77.03	1.20	1388.80

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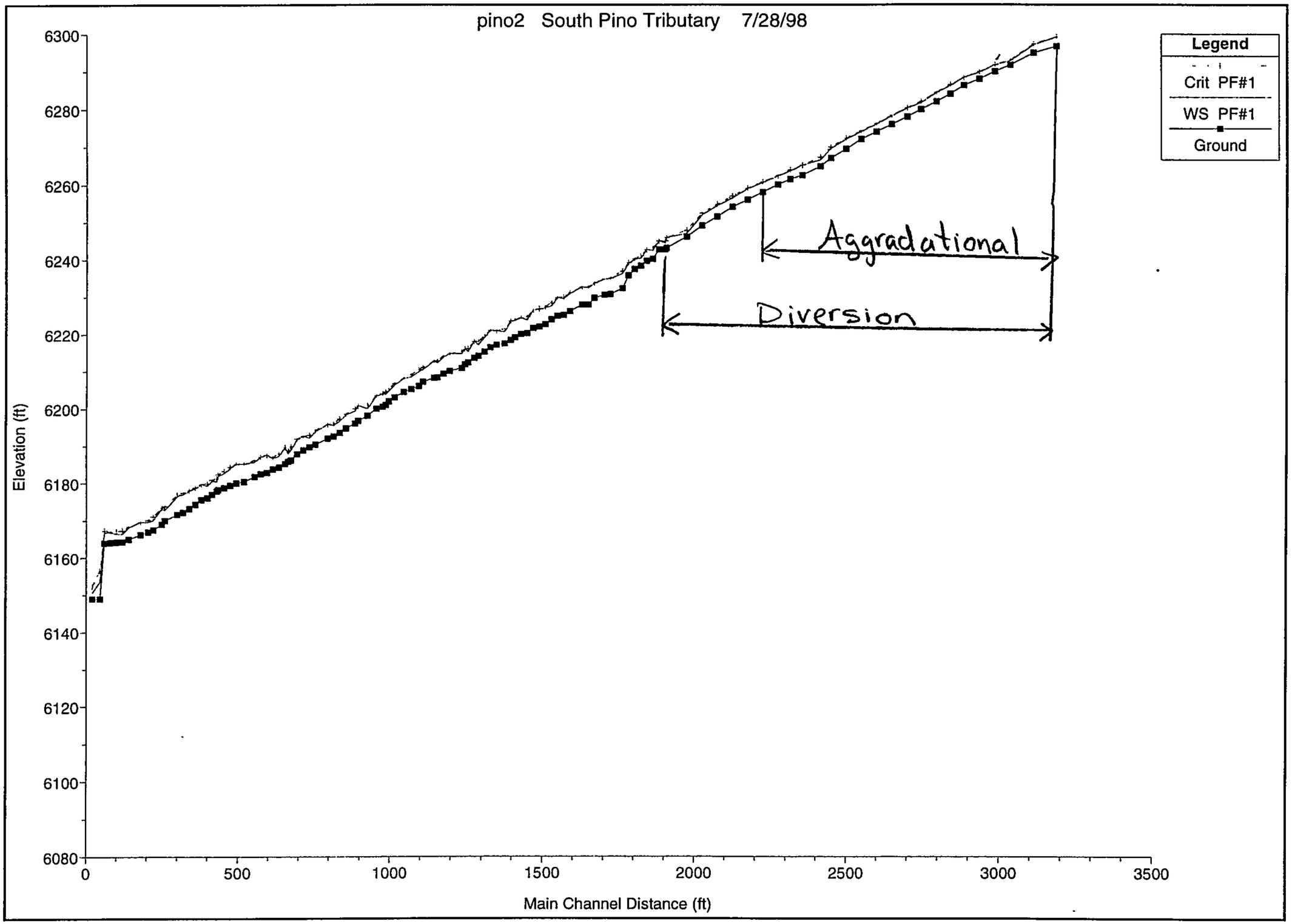
HEC-RAS Plan: S_Pino Trib River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	Max Chl Dpth	L. Freeboard	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Cum Ch Len
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
Reach-1	1395.1	1373.00	6218.40	6223.37	6223.53	4.97	2.73	6224.42	0.032405	8.23	166.75	101.36	1.13	1375.10
Reach-1	1375	1373.00	6217.40	6220.63	6221.37	3.23	1.97	6223.10	0.129377	12.62	108.84	98.96	2.12	1355.00
Reach-1	1348.6	1373.00	6217.10	6220.85	6220.85	3.75	0.55	6221.69	0.025223	7.37	186.33	111.40	1.00	1328.60
Reach-1	1328.6	1373.00	6216.40	6220.98	6220.98	4.58	5.02	6221.94	0.024208	7.84	175.02	91.97	1.00	1308.60
Reach-1	1308.6	1373.00	6215.20	6219.07	6219.68	3.87	5.43	6221.11	0.055532	11.46	119.77	66.23	1.50	1288.60
Reach-1	1288.6	1373.00	6214.10	6217.04	6217.92	2.94	5.86	6219.77	0.073017	13.26	103.57	56.35	1.72	1268.60
Reach-1	1275	1373.00	6213.50	6218.05	6218.05	4.55	6.45	6219.27	0.022636	8.86	154.98	63.87	1.00	1255.00
Reach-1	1255	1373.00	6212.30	6215.20	6216.09	2.90	9.90	6218.15	0.134292	13.79	99.56	81.38	2.20	1235.00
Reach-1	1245	1373.00	6211.80	6215.90	6215.90	4.10	9.50	6217.20	0.022456	9.16	149.97	58.83	1.01	1225.00
Reach-1	1235	1373.00	6210.80	6214.72	6215.32	3.92	6.98	6216.80	0.047879	11.56	118.79	58.09	1.42	1215.00
Reach-1	1195	1373.00	6210.00	6214.64	6214.64	4.64	7.36	6215.79	0.022846	8.60	159.58	69.80	1.00	1175.00
Reach-1	1175	1373.00	6209.30	6213.74	6214.01	4.44	9.56	6215.21	0.032330	9.72	141.26	66.75	1.18	1155.00
Reach-1	1155	1373.00	6208.30	6212.16	6212.82	3.86	10.44	6214.34	0.052776	11.85	115.91	58.72	1.49	1135.00
Reach-1	1145	1373.00	6208 20	6212.72	6212.72	4.52	9.88	6213.90	0.023164	8.72	157.51	68.19	1.01	1125.00
Reach-1	1108.4	1373.00	6207.10	6210.37	6211.03	3.27	10.33	6212.54	0.058634	11.84	115.98	63.96	1.55	1088.40
Reach-1	1095	1373.00	6206.00	6209.86	6210.36	3.86	4.44	6211.73	0.043310	10.96	125.31	61.74	1.36	1075.00
Reach-1	1070	1373.00	6205 20	6208.47	6209.06	3.27	3.33	6210.36	0.066663	11.04	124.32	83.94	1.60	1050.00
Reach-1	1045	1373.00	6204.40	6207.97	6208.13	3.57	5.43	6209.17	0.029690	8.79	156.18	80.92	1.12	1025.00
Reach-1	1015	1373.00	6203.00	6206.25	6206.74	3.25	6.75	6207.97	0.049752	10.52	130.51	76.09	1.42	995.00
Reach-1	995	1373.00	6201.90	6204.66	6205.30	2.76	8.84	6206.75	0.071684	11.60	118.32	78.45	1.67	975.00
Reach-1	985	1373.00	6201.00	6203.72	6204.44	2.72	9.38	6206.03	0.072090	12.20	112.55	69.45	1.69	965.00
Reach-1	975	1373.00	6200.50	6203.83	6204.04	3.33	8.37	6205.14	0.032110	9.19	149.38	76.77	1.16	955.00
Reach-1	955	1373.00	6200.00	6203.33	6203.53	3.33	8.27	6204.61	0.031464	9.07	151.33	78.14	1.15	935.00
Reach-1	925	1373.00	6198.10	6199.95	6200.76	1.85	12.45	6202.73	0.137823	13.38	102.65	89.82	2.20	905.00
Reach-1	895	1373.00	6196.70	6200.80	6200.80	4.10	5.10	6201.80	0.023910	8.05	170.55	85.64	1.01	875.00
Reach-1	885	1373.00	6196.00	6199.36	6199.97	3.36	5.54	6201.35	0.060063	11.32	121.30	73.01	1.55	865.00
Reach-1	855	1373.00	6194.70	6198.26	6198.57	3.56	6.74	6199.71	0.036292	9.65	142.29	74.49	1.23	835.00
Reach-1	835	1373.00	6193.50	6196.62	6197.26	3.12	7.08	6198.70	0.063760	11.56	118.77	72.43	1.59	815.00
Reach-1	815	1373.00	6192.60	6195.49	6196.08	2.89	7.31	6197.43	0.058372	11.18	122.76	73.65	1.53	795.00
Reach-1	795	1373.00	6192.00	6195.78	6195.78	3.78	7.02	6196.83	0.023837	8.25	166.49	80.48	1.01	775.00
Reach-1	755	1373.00	6190.40	6193.85	6194.29	3.45	8.75	6195.55	0.040608	10.47	131.16	65.94	1.31	735.00
Reach-1	735	1373.00	6189.70	6192.13	6192.86	2.43	10.47	6194.44	0.069331	12.20	112.55	67.37	1.66	715.00
Reach-1	715	1373.00	6188.90	6192.64	6192.64	3.74	9.86	6193.72	0.023174	8.34	164.55	76.35	1.00	695.00
Reach-1	695	1373.00	6187.80	6191.68	6191.95	3.88	6.82	6193.15	0.032445	9.73	141.05	66.82	1.18	675.00
Reach-1	675	1373.00	6186.10	6188.96	6189.84	2.86	3.84	6191.88	0.118202	13.71	100.12	75.00	2.09	655.00
Reach-1	685	1373.00	6185.80	6187.94	6188.83	2.14	3.86	6190.73	0.100423	13.39	102.55	70.47	1.96	645.00
Reach-1	655	1373.00	6185.20	6189.63	6189.63	4.43	8.47	6190.71	0.023161	8.34	164.66	76.37	1.00	635.00
Reach-1	635	1373.00	6184.20	6187.23	6188.01	3.03	11.37	6189.72	0.094533	12.67	108.40	77.29	1.88	615.00
Reach-1	615	1373.00	6183.70	6186.63	6186.94	2.93	11.97	6188.04	0.037234	9.53	144.01	78.11	1.24	595.00
Reach-1	595	1373.00	6182.80	6187.56	6187.56	4.76	3.74	6188.59	0.023583	8.13	168.87	82.56	1.00	575.00
Reach-1	575	1373.00	6182.50	6187.02	6187.05	4.52	3.28	6188.10	0.024463	8.37	164.08	78.95	1.02	555.00
Reach-1	555	1373.00	6181.70	6185.63	6186.11	3.93	2.87	6187.39	0.046439	10.64	129.05	69.75	1.38	535.00
Reach-1	520	1373.00	6180.40	6185.17	6185.17	4.77	7.03	6186.42	0.022862	8.99	152.73	62.27	1.01	500.00
Reach-1	495	1373.00	6180.00	6185.09	6185.09	5.09	6.91	6186.32	0.022439	8.90	154.24	62.92	1.00	475.00
Reach-1	475	1373.00	6179.40	6183.93	6184.37	4.53	7.87	6185.71	0.038448	10.71	128.15	59.42	1.29	455.00
Reach-1	455	1373.00	6178.80	6182.68	6183.31	3.88	7.92	6184.79	0.051932	11.64	117.94	60.70	1.47	435.00
Reach-1	435	1373.00	6178.30	6181.88	6182.35	3.58	8.02	6183.63	0.045426	10.62	129.33	69.31	1.37	415.00
Reach-1	430	1373.00	6177.90	6180.38	6181.28	2.48	9.42	6183.19	0.094897	13.46	102.02	66.74	1.92	410.00
Reach-1	415	1373.00	6177.00	6180.65	6180.93	3.65	3.35	6182.01	0.035663	9.37	146.46	79.03	1.21	395.00

HEC-RAS Plan: S. Pino Trib. River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	Max Chl Dpth	L. Freeboard	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Cum Ch Len
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)
Reach-1	400	1373.00	6176.10	6179.28	6179.89	3.18	3.52	6181.26	0.065689	11.29	121.60	78.56	1.60	389.00
Reach-1	380	1373.00	6175.60	6179.78	6179.78	4.18	2.92	6180.78	0.024397	8.01	171.38	87.91	1.01	360.00
Reach-1	360	1373.00	6174.30	6178.56	6178.91	4.26	6.64	6180.14	0.036010	10.07	136.30	66.29	1.24	340.00
Reach-1	340	1373.00	6173.20	6177.97	6178.23	4.77	6.43	6179.50	0.028397	9.93	138.20	57.07	1.13	320.00
Reach-1	320	1373.00	6172.20	6177.01	6177.48	4.81	6.79	6178.85	0.035154	10.88	126.21	53.05	1.24	300.00
Reach-1	300	1373.00	6171.60	6176.52	6177.03	4.92	7.08	6178.37	0.036284	10.91	125.83	57.51	1.26	280.00
Reach-1	260	1373.00	6170.00	6172.83	6173.79	2.83	5.17	6175.92	0.105925	14.10	97.34	64.48	2.02	240 00
Reach-1	250	1373.00	6169.00	6173.25	6173.53	4.25	2.54	6174.75	0.030807	9.83	139.71	62.64	1.16	230.00
Reach-1	222	1373.00	6167.50	6170.06	6171.06	2.56	3.04	6173.24	0.090012	14.31	95.96	54.89	1.91	202.00
Reach-1	205	1373.00	6166.90	6169.59	6170.14	2.69	1.71	6171.54	0.048685	11.20	122.57	63.86	1.42	185.00
Reach-1	180	1373.00	6166.20	6169.63	6169.63	3.43	1.97	6170.80	0.022765	8.68	158.12	68.15	1.00	160.00
Reach-1	140	1373.00	6165.00	6168.19	6168.40	3.19	6.81	6169.75	0.028653	10.04	136.72	55.87	1.13	120.00
Reach-1	120	1373.00	6164.30	6166.41	6167.30	2.11	7.59	6169.35	0.008045	13.75	99.84	50.62	1.73	100.00
Reach-1	100	1373.00	6164.22	6166.47	6167.21	2.25	2.53	6169.02	0.006463	12.81	107.22	51.30	1.56	80.00
Reach-1	80	1373.00	6164.11	6166.85	6167.06	2.74	2.15	6168.46	0.003199	10.17	135.02	53.63	1.13	60.00
Reach-1	60	1373.00	6164.00	6166.79	6167.30	2.79	2.21	6168.64	0.005242	10.91	125.84	65.94	1.39	40.00
Reach-1	45	1373.00	6149.00	6153.52	6156.60	4.52	5.48	6167.27	0.279455	29.75	46.15	18.41	3.31	25.00
Reach-1	20	1373.00	6149.00	6150.66	6152.35	1.66	9.34	6157.51	0.226217	21.00	65.39	40.68	2.92	



LOMR FIGURE 8.1

LOMR FIGURE 8.1

APPENDIX H: Section 4

NMSHTD Standard Specification
Section 602
Slope and Erosion Protection Structures

SOURCE: New Mexico State Highway and Transportation Department - Standard Specifications for Highway - Bridge Construction

SECTION 602—SLOPE & EROSION PROTECTION STRUCTURES

1994 Edition

602.1 DESCRIPTION.

602.11 This work shall consist of furnishing and placing riprap, gabions, sacked concrete revetment, concrete block revetment and other systems specified in the contract on the slopes of embankments and the sides and bottoms of channels, drain outlets, ditches and other locations shown in the contract. The work shall be performed in compliance with and to the lines, grades, dimensions and at the locations, shown in the contract.

The type(s) of slope protection structures to be furnished and placed shall be as specified in the contract.

602.2 MATERIALS

602.21 Classifications. Riprap will be classified as shown in Table 602–A. Riprap of the class specified and gabions shall meet the requirements shown.

At least eighty percent (80%) of the stones used shall meet the size requirements specified.

Stones less than the minimum dimension shown may be used only to fill the voids between stones. For riprap Class A and gabions stones smaller than the least dimension of the mesh openings shall not be used.

TABLE 602–A
RIPRAP CLASSIFICATIONS & GABION REQUIREMENTS

Class	Description	Stone Cubic Min.	Volume, Feet Max.	*Minimum Dimension, Inches
A	Wire Enclosed Riprap	1/6	2/3	4
B	Non-Enclosed Riprap	1	2	6
C	Non-Enclosed Riprap	2	4	9
D	Derrick Stone	14	27	12
E	Grouted Riprap	1/3	1	3
F	Grouted Riprap	1	2	6
G	Rock Plating	—	—	**4 to 8
n/a	Gabions	—	—	**4 to 8

*Minimum size in the least dimension.
**Seventy to eighty percent (70%–80%) of the stone shall be at least four (4) inches but not more than eight (8) inches in least dimension. The remainder of the stone shall be no larger than four (4) inches in any dimension.

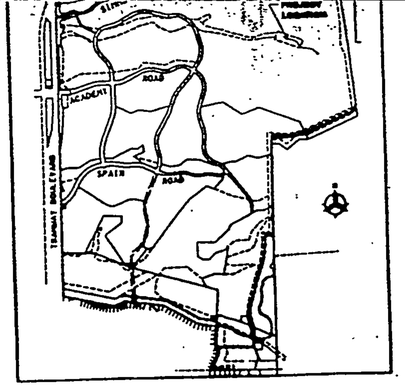
602.22 Riprap.

602.221 Stone for Riprap. Stone to be used for riprap, except for riprap Class G, shall be rocks or rough quarry stone with a percent wear of not more than sixty (60) as determined by AASHTO T 96 and a soundness loss of not more than twenty one (21) as determined by AASHTO T 104 using a magnesium sulfate solution with a test duration of five (5) cycles.

APPENDIX H: Section 5

As-Built Figures for
Bear Tributary Arroyo Diversion

CONSTRUCTION PLANS
FOR
BEAR TRIBUTARY ARROYO DIVERSION



LOCATION MAP

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

(AS-BUILT)

INDEX

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
2	SURVEY PLAT
3	GENERAL NOTES
4	STA 10+35 TO 20+00 DIVERSION BERM PLAN AND PROFILE
5	STA 20+00 TO 23+16.39 DIVERSION BERM PLAN AND PROFILE
6	STA 1+00 TO 2+22.01 DROP STRUCTURE PLAN PROFILE
7	TYPICAL CROSS-SECTIONS
8	GABION AND WATERLINE DETAILS
9	WIRE ENCLOSED RIPRAP DETAILS
10-16	CROSS-SECTIONS
17	TEMPORARY STOCKPILE LOCATION & SOUTH RINO HEADWALL STRUCTURE

REFERENCES:

1. HIGH DESERT PRUDENT LINE ANALYSIS – PHASE I BOHANNAN-HUSTON INC., DECEMBER 1994
2. DESIGN ANALYSIS REPORT FOR THE BEAR TRIBUTARY ARROYO DIVERSION. BOHANNAN-HUSTON INC., MAY 1994

Approved For Construction

Larry A. Blair 3/9/95

WILLIAM L. VRACIN NEW MEXICO 8151 REGISTERED PROFESSIONAL ENGINEER 8/15/95

RECORD DRAWING
DATE: 8/15/95

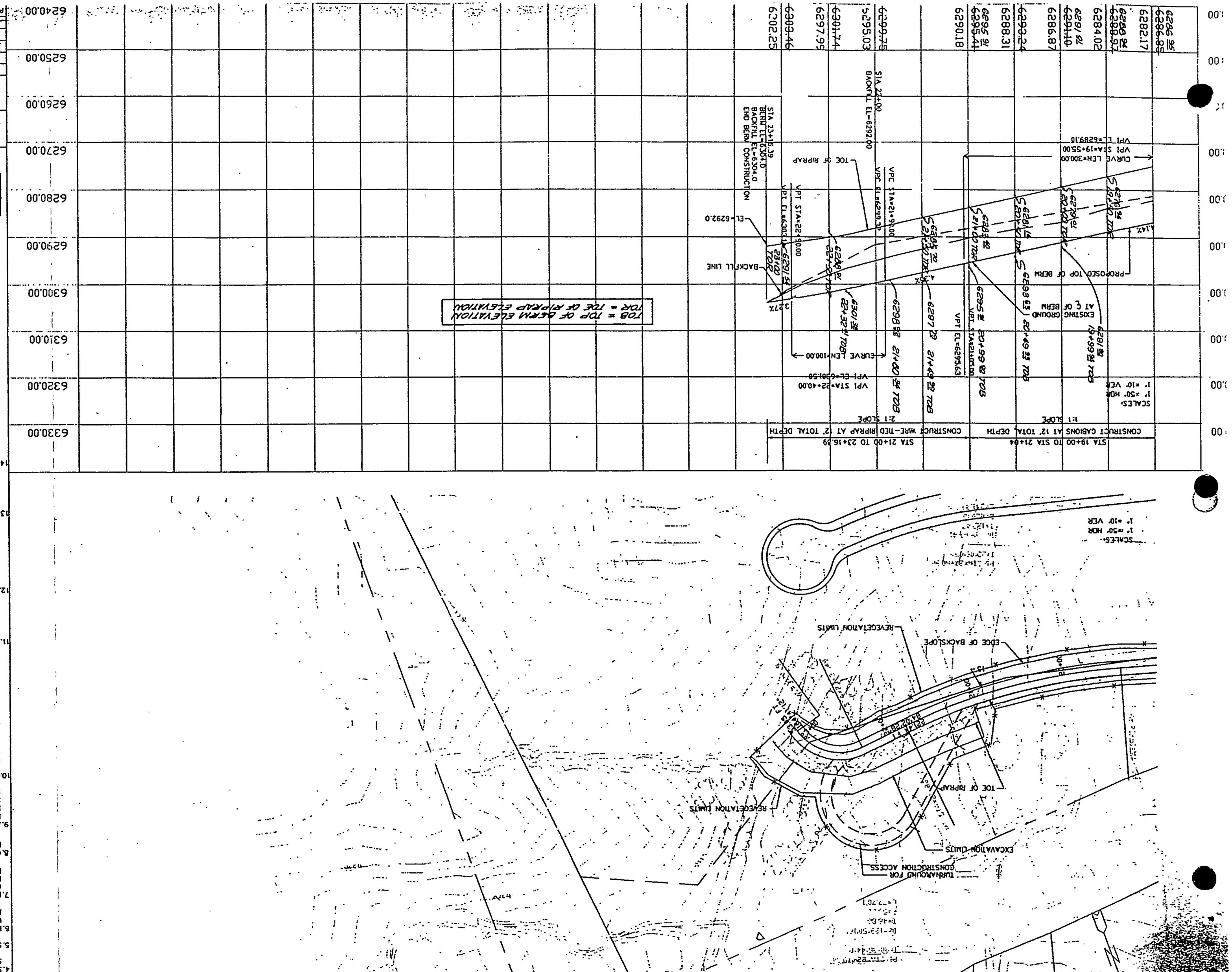
LYLE R. WAGNER NEW MEXICO 11199 REGISTERED PROFESSIONAL ENGINEER 8-15-95

BOHANNAN HUSTON INC.
ALBUQUERQUE, NEW MEXICO
ENGINEERS PLANNERS PHOTOGRAMMETRISTS

PROJECT NUMBER

LOMR FIGURE 8.2

LOMR FIGURE 8.4



BEAR TRIBUTARY ARROYO DIVERSION
DIVISION BERM PLAN & PROFILE
STA 20+00 TO STA 23+16.39

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

RECORD DRAWING
DATE: 8/15/95

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
AMAFCA					

PROJECT | MAP NO. | SHEET OF

NO.	DATE	REMARKS	BY

REVISIONS
DESIGN

DESIGNED BY	LMM	DATE 2-24-95
DRAWN BY	JRM	DATE 2-24-95
CHECKED BY	LMM	DATE 2-24-95

ENGINEER'S SEAL

SURVEY INFORMATION

FIELD NOTES

NO.	DATE	BY

BENCH MARKS

STATION IS A STANDARD ACS BRASS TABLET STAMPED "1-D24" CEMENTED IN TOP OF A 2-INCH IRON PIPE PROJECTING 1 FT. ABOVE GROUND. STATION IS APPROX. 2 MILES NORTH OF MONTGOMERY BLVD. ON TRAMWAY RD. AND 1 MILE EAST OF TRAMWAY RD. ALONG FENCE LINE TO A FENCE CORNER.
ELEV. = 6262.2779 Ft.

AS BUILT IN

CONTRACTOR	Kiheart	
SURVEYED BY		
INSPECTED BY	John Mc	
FIELD CORRECTED BY	John Mc	
MICRO-FILM BY	John Mc	
RECORDED BY		
NO.		

14.SEE GABION DETAILS SHEET 8.

ENGINEER.

13.CONTRACTOR SHALL TAKE PRECAUTIONS TO PRESERVE TREES SHOWN ON PLANS, UNLESS OTHERWISE NOTED OR DIRECTED BY THE ENGINEER.

12.CONTRACTOR SHALL ERECT TEMPORARY FENCE AT 5' OFFSET FROM EXCAVATION & FILL LIMITS AS SHOWN USING 6-1/2' LONG 4' MESH STRAND OF SMOOTH WIRE ON TOP OF POSTS WITH FLAGGING PLACED ALONG WIRE. CONTRACTOR SHALL CONFINE WORK AREA WITHIN LIMITS OF FENCING.

11.EXISTING RIPRAP SHALL BE USED AS BURIED BACKFILL MATERIAL ON THE DOWNSTREAM SIDE OF THE DROP STRUCTURE AS DIRECTED BY THE ENGINEER. SEE TYPICAL CROSS-SECTIONS ON SHEET 7.

FROM STATION	TO STATION	SLOPE
10+35	12+00	4:1
12+00	14+00	3:1
14+00	16+00	4:1
16+00	22+00	3:1
22+00	23+16.39	4:1

BERM BACK SLOPE

10.CONTRACTOR SHALL TIE BACK SLOPE OF BERM TO EXISTING GROUND AND SHALL VARY THE SLOPE BY THE FOLLOWING TABLE. CONTRACTOR SHALL PROVIDE SMOOTH TRANSITION BETWEEN SLOPE CHANGES.

9.AFTER COMPLETION OF RIPRAP AND GABIONS INSTALLATION, CONTRACTOR SHALL COVER ALL EXPOSED RIPRAP WITH EARTH FILL AT 3:1 SLOPE AND RESEED. SEE TYPICAL CROSS-SECTIONS ON SHEET 7.

8.CONTRACTOR SHALL RESEED AND MULCH ALL DISTURBED AREA. SEE SEEDING MIX.

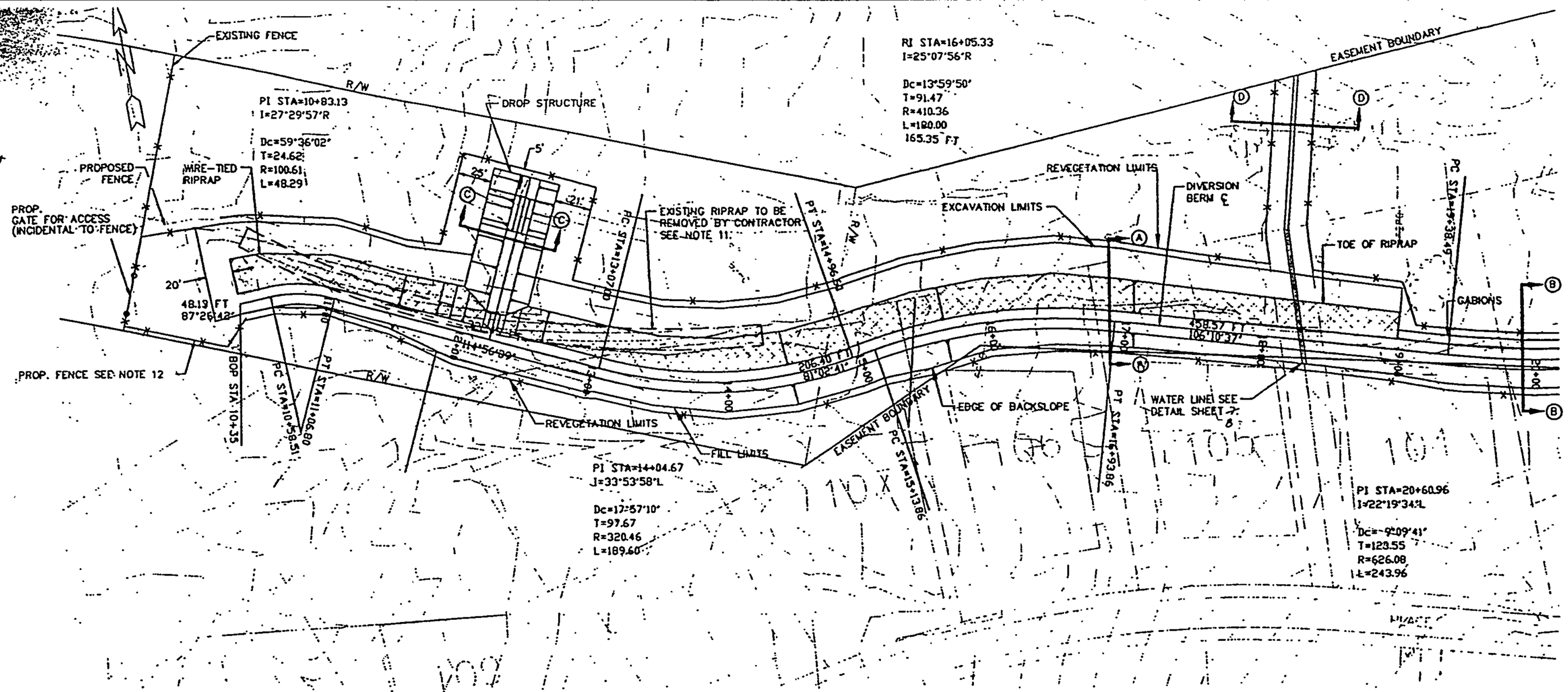
7.EXCAVATION & BACKFILL FOR THE CONSTRUCTION OF RIPRAP AND GABIONS SHALL BE PAID FOR UNDER BID ITEM "UNCLASSIFIED EXCAVATION AND BACKFILL".

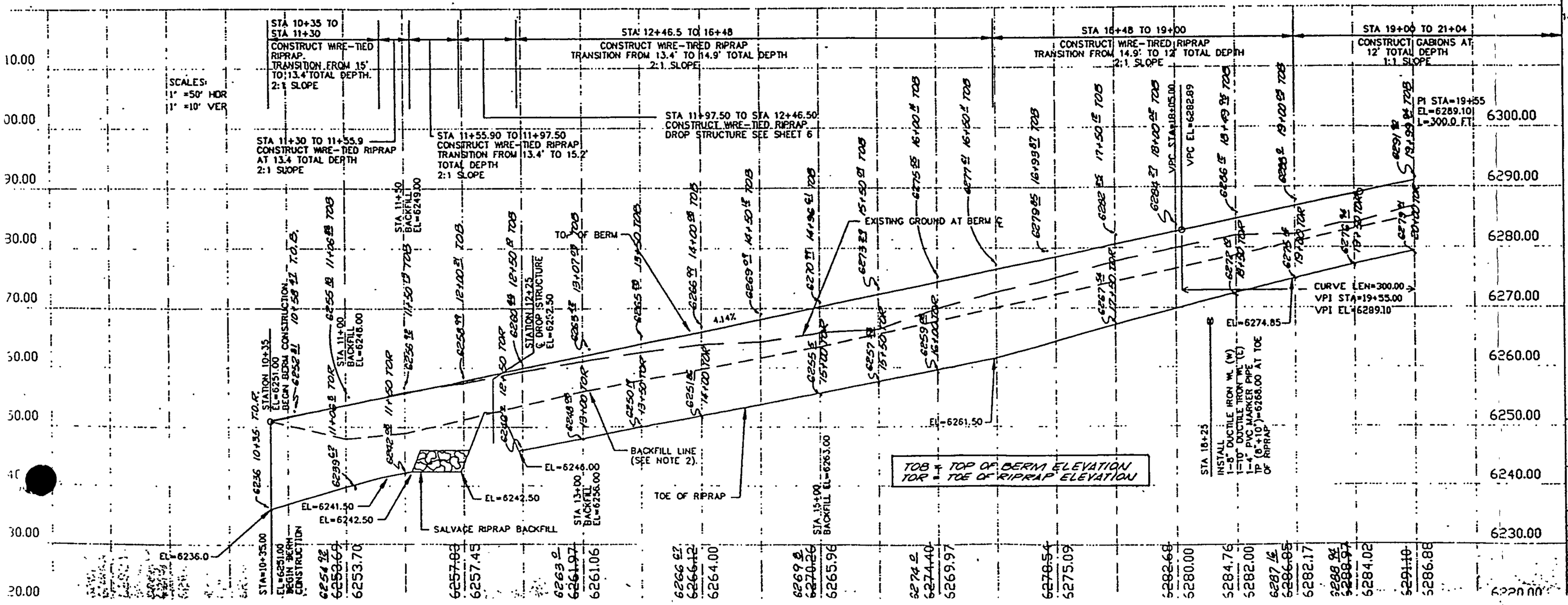
6.BERM CONSTRUCTION SHALL BE PAID FOR UNDER "FILL CONSTRUCTION". FILL SHALL BE PROVIDED BY THE OWNER.

5.SEE TYPICAL BERM CROSS-SECTIONS SHEET 7.

4.SEE DROP STRUCTURE PLAN & PROFILE SHEET 6.

3.SEE WIRE-TIED RIPRAP DETAILS SHEET 9.





3. SEE WIRE-TIED RIPRAP DETAILS SHEET 9.

4. SEE DROP STRUCTURE PLAN & PROFILE SHEET 6.

5. SEE TYPICAL BERM CROSS-SECTIONS SHEET 7.

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BERM BACK SLOPE

FROM STATION	TO STATION	SLOPE
10+35	12+00	4:1
12+00	14+00	3:1
14+00	16+00	4:1
16+00	22+00	3:1
22+00	23+16.39	4:1

11. EXISTING RIPRAP SHALL BE USED AS BURIED BACKFILL MATERIAL ON THE DOWNSTREAM SIDE OF THE DROP STRUCTURE AS DIRECTED BY THE ENGINEER. SEE TYPICAL CROSS-SECTIONS ON SHEET 7.

12. CONTRACTOR SHALL ERECT TEMPORARY FENCE AT 5' OFFSET FROM EXCAVATION & FILL LIMITS AS SHOWN USING 6-1/2' LONG 4' HIGH T-POST AT 40' ON CENTER. INSTALL ONE STRAND OF SMOOTH WIRE ON TOP OF POSTS WITH FLAGGING PLACED ALONG WIRE. CONTRACTOR SHALL CONFINE WORK AREA WITHIN LIMITS OF FENCING.

13. CONTRACTOR SHALL TAKE PRECAUTIONS TO PRESERVE TREES SHOWN ON PLANS, UNLESS OTHERWISE NOTED OR DIRECTED BY THE ENGINEER.

14. SEE GABION DETAILS SHEET 8.

SURVEY INFORMATION
FIELD NOTES

NO.	DATE	BY

BENCH MARKS
STATION IS A STANDARD ACS BRASS TABLET STAMPED "1-D24" CEMENTED IN TOP OF A 2-INCH IRON PIPE PROJECTING 1 FT. ABOVE GROUND. STATION IS APPROX. 2 MILES NORTH OF MONTGOMERY BLVD. ON TRAMWAY RD. AND 1 MILE EAST OF TRAMWAY RD. ALONG FENCE LINE TO A FENCE CORNER.
ELEV. = 6262.2779 FT.

AS BUILT INFORMATION
CONTRACTOR Kiborn Construction
WORK STAKED BY John Wilson
INSPECTED BY John Wilson
FIELD VERIFICATION BY John Wilson
CORRECTED BY John Wilson
MICRO-FILM INFORMATION
RECORDED BY
DATE

ENGINEER'S SEAL
WILLIAM L. WREDE
NEW MEXICO
6151
REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	REMARKS	BY
	DATE 2-24-95	REVISIONS DESIGN	
	DATE 2-24-95		
	DATE 2-24-95		

DESIGNED BY LMW
DRAWN BY JSM
CHECKED BY LMW

RECORD DRAWING
DATE: 8/15/95

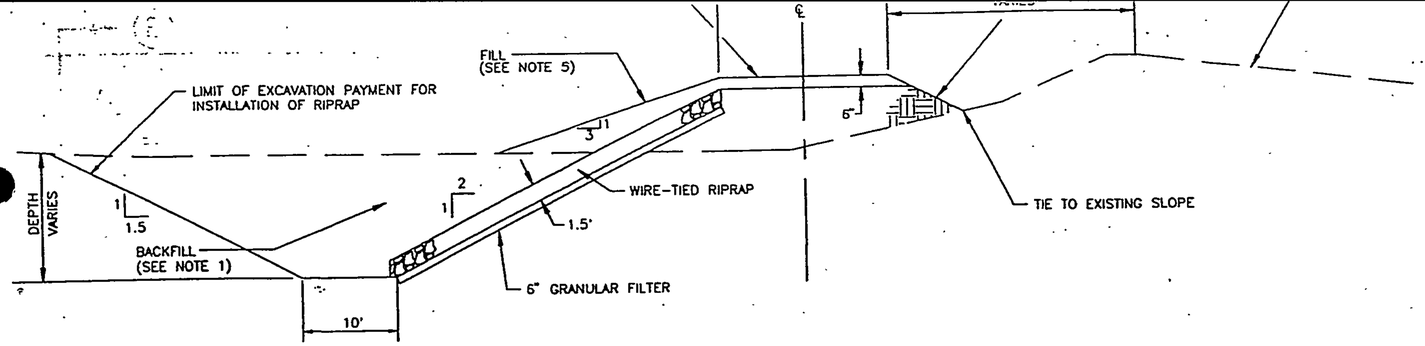
ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

BEAR TRIBUTARY ARROYO DIVERSION
DIVERSION BERM PLAN & PROFILE
STA 10+35 TO STA 20+00

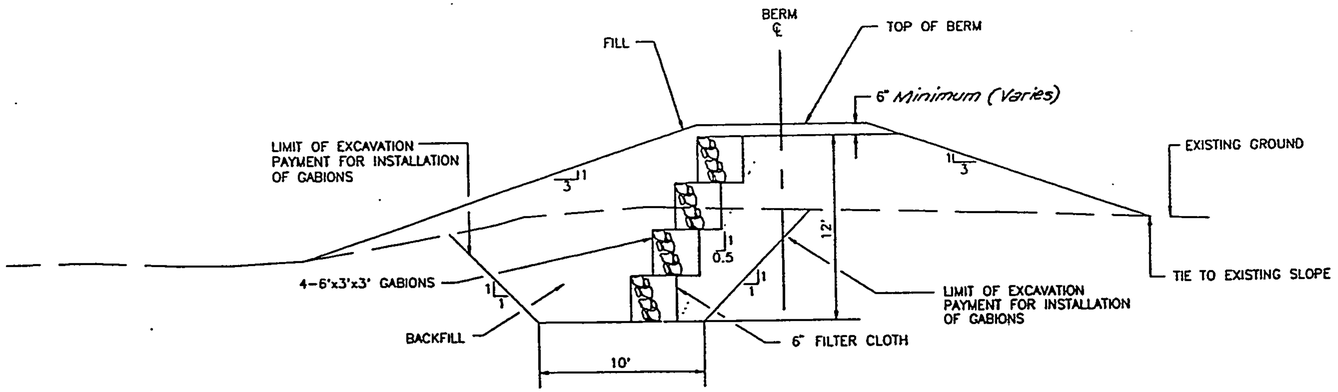
APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
AMAFCA					

PROJECT | MAP NO. | SHEET | OF

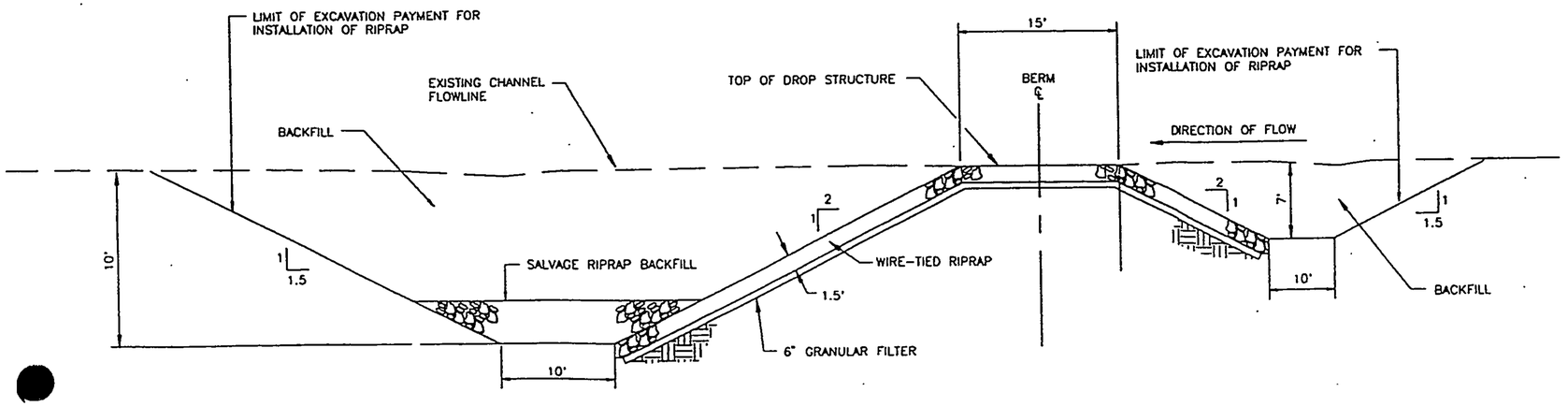
LOMR FIGURE 8.3



SECTION A
DIVERSION BERM
WIRE-TIED RIPRAP SECTION
NOT TO SCALE



SECTION B
DIVERSION BERM
GABION SECTION
NOT TO SCALE



SECTION C
TYPICAL DROP STRUCTURE
CROSS – SECTION STA 1+20.22 TO STA 1+81.01
NOT TO SCALE

3/8"	100
#4	95–100
#16	45–90
#50	10–30
#100	2–10
#200	0–2

3. WIRE-TIED RIPRAP AND GABIONS GRADATION SHALL CONFORM TO NEW MEXICO STATE HIGHWAY AND TRANSPORTATION DEPARTMENT STANDARD SPECIFICATION, SECTION 602, 1994 EDITION.

4. THE CONTRACTOR CAN SUBSTITUTE GRAVEL FILTER WITH FILTER CLOTH. PAYMENT FOR FOR FILTER CLOTH SHALL BE BY THE SQUARE YARD, COMPLETE IN PLACE. IF GRANULAR FILTER IS USED, CONTRACTOR SHALL USE SUPPLIED GRADATION IN TABLE.

5. BACKFILL AND FILL ON TOP OF RIPRAP AND GABIONS SHALL BE COMPACTED TO 90% AS PER ASTM D1557.

AS BUILT

BENCH MARKS
STATION IS A STANDARD ACS BRASS TABLET STAMPED "1-024" CEMENTED IN TOP OF A 2-INCH IRON PIPE PROJECTING 1 FT. ABOVE GROUND. STATION IS APPROX. 2 MILES NORTH OF MONTGOMERY BLVD. ON TRAMWAY RD. AND 1 MILE EAST OF TRAMWAY RD. ALONG FENCE LINE TO A FENCE CORNER.
ELEV. = 6262.2779 FT.

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

CONSTRUCTION STAKED BY KPA DATE
FIELD VERIFICATION BY LAM DATE 2-24-95
PLOTTING ACCEPTED BY LAM DATE 2-24-95
DRAWING CORRECTED BY LAM DATE 2-24-95
MICRO-FILMED BY DATE
RECORDED BY

ENGINEER'S SEAL
JOHN W. MAYER 8131 REGISTERED PROFESSIONAL ENGINEER 7-3-95

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	LAM
		DRAWN BY	JSM
		CHECKED BY	LAM

WILLIAM L. VREELAND 8131 NEW MEXICO REGISTERED PROFESSIONAL ENGINEER 8/15/95

RECORD DRAWING
DATE: 8/15/95

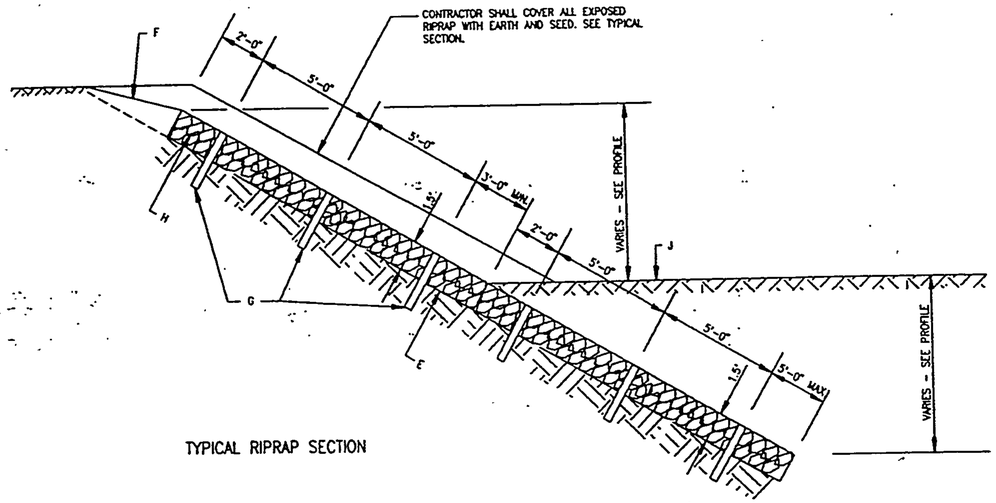
ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

BEAR TRIBUTARY ARROYO DIVERSION
TYPICAL CROSS-SECTIONS

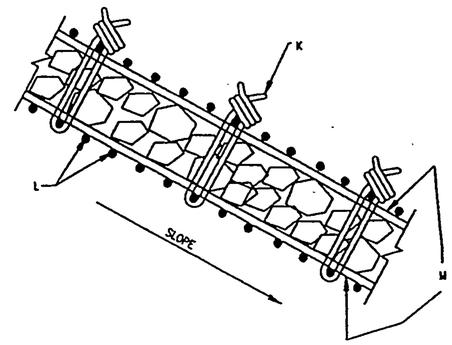
APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
AMAFCA					

PROJECT NO. 94295.21 | MAP NO. E-24 | SHEET 7 OF 18

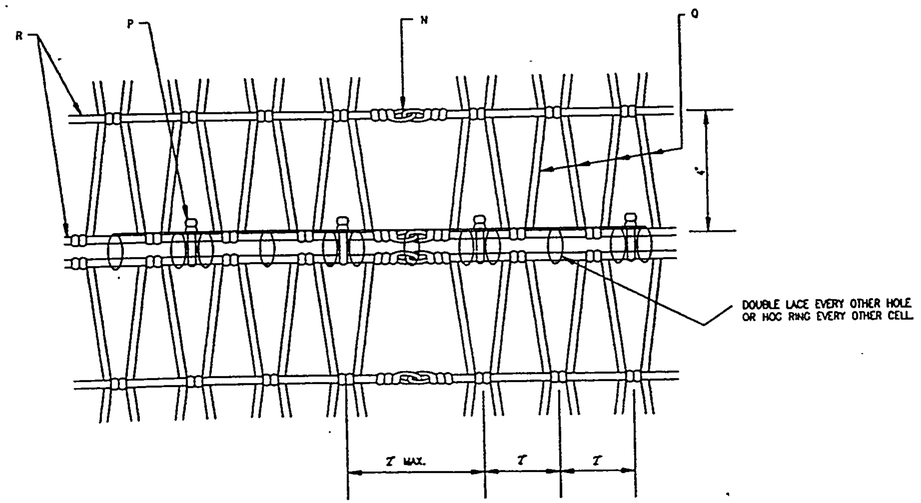
LOMR FIGURE 8.5



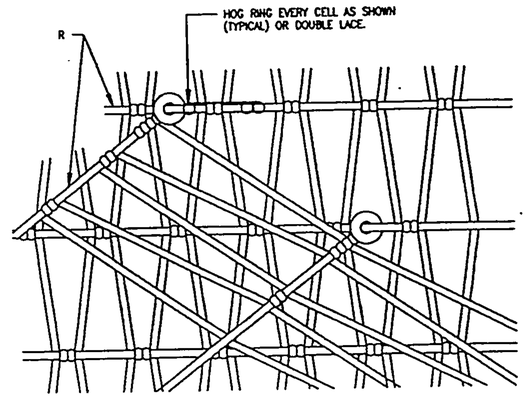
TYPICAL RIPRAP SECTION



WIRE/SLOPE DETAIL



DETAIL OF WIRE FABRIC AND NORMAL SPLICE



DETAIL OF SPLICE AT SKEWED INTERSECTIONS

WIRE MESH

3. IF LENGTH OF SLOPE IS 15' OR LESS ONLY ONE ROW OF STEEL STAKES 2' FROM THE TOP EDGE OF THE RIPRAP WILL BE REQUIRED UNLESS OTHERWISE NOTED ON PLANS.

4. CONTRACTOR SHALL DOUBLE LACE EVERY OTHER HOLE (OR HOG RING EVERY OTHER CELL) HORIZONTALLY AND VERTICALLY WHEN TYING EXISTING WIRE-TIED RIPRAP TO PROPOSED WIRE-TIED RIPRAP.

5. LONGITUDINAL SPLICES MAY BE MADE WITH ONE LAP OF GALVANIZED 9 GAGE TIE WIRE, 9 GAGE GALVANIZED HOG RINGS OR 11-1/2 GAGE GALVANIZED HARD DRAW INTERLOCKING WIRE CLIPS.

CONSTRUCTION NOTES:

E. FILTER MATERIAL, 6" MIN. DEPTH AS SHOWN ON PLANS, 2" MIN. OVERLAP.

F. FILL & COMPACT AT 90% ASTM 1557 AFTER PLACEMENT OF RIPRAP.

G. STEEL STAKES MAY BE RAILROAD RAILS NOT LESS THAN 30 LBS. PER YARD, 4"O.D. STANDARD STRENGTH GALV. ST. PIPE OR 4"x4"x3/8" STEEL ANGLES. STEEL STAKES SHALL BE 5' LONG AND 5' O.C. AND SHALL BE RECESSED TO A MAX. OF 3" BELOW TOP OF RIPRAP.

H. WIRE ENCLOSED RIPRAP.

J. FINISHED GROUND LINE.

K. NO. 9 GAGE GALV. WIRE TIES APPROX. 2' O.C. LONGITUDINALLY & TRANSVERSELY.

L. MAIN WIRES TO BE PLACED PERPENDICULAR TO SLOPE.

M. WIRE FABRIC.

N. TRANSVERSE SPLICE.

P. LONGITUDINAL SPLICE, NO. 9 GALV. WIRE TIES (TWO WRAPS ALTERNATE SPACES).

Q. CROSS WIRES: SINGLE 12 1/2 GAGE WIRES SPACED AT 2' WITH NOT LESS THAN TWO TURNS AROUND MAIN WIRES.

R. MAIN WIRES: TWO NO. 12 1/2 GAGE STRANDED WIRES SPACED AT 4'.

AS BUILT
CONTRACTOR Khren
DATE
INSPECTORS ACCEPTANCE
TEST CONDUCTED BY
DRAWING CORRECTED BY
MICRO-FIL
RECORDED BY

BENCH MARKS
STATION IS A STANDARD ACS BRASS TABLET STAMPED "1-024" CEMENTED IN TOP OF A 2-INCH IRON PIPE PROJECTING 1 FT. ABOVE GROUND. STATION IS APPROX. 2 MILES NORTH OF MONTGOMERY BLVD. ON TRAMWAY RD. AND 1 MILE EAST OF TRAMWAY RD. ALONG FENCE LINE TO A FENCE CORNER.
ELEV. = 6262.2779 FT.

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL
ALLEN W. MAYER 11110 REGISTERED PROFESSIONAL ENGINEER

NO.	REMARKS	DATE	BY
	REVISIONS		
	DESIGN	DATE 2-24-95	LMM
	DESIGNED BY	DATE 2-24-95	JSM
	DRAWN BY	DATE 2-24-95	LMM
	CHECKED BY		

WILLIAM L. VREELAND NEW MEXICO 8131 REGISTERED PROFESSIONAL ENGINEER 7/24/95

RECORD DRAWING
DATE: 8/15/95

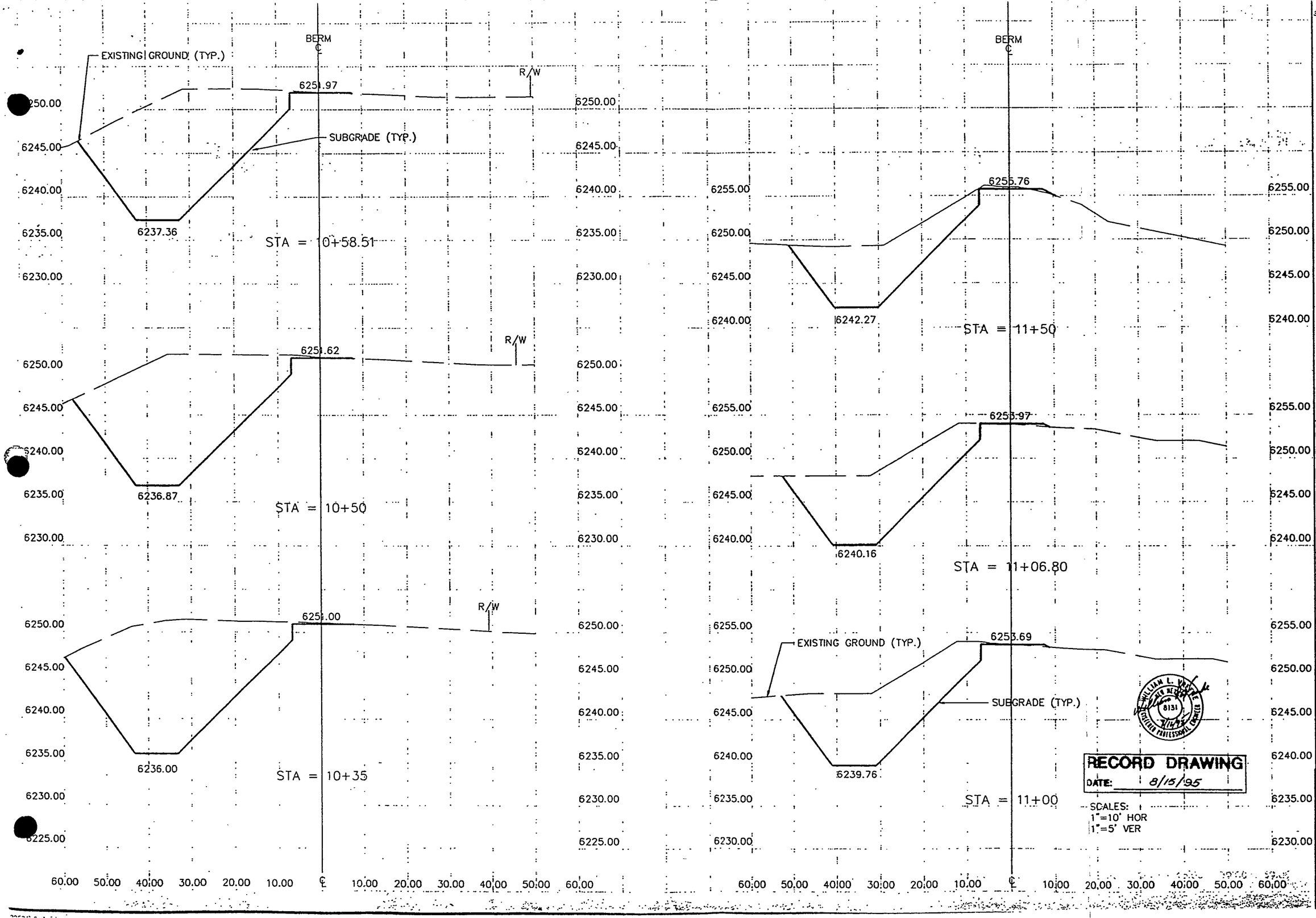
ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

BEAR TRIBUTARY ARROYO DIVERSION
WIRE ENCLOSED RIPRAP

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
AMAFCA					

PROJECT NO. 9429521 | MAP NO. E-24 | SHEET 9 OF 18

— LOMR FIGURE 8.6



3. Elevations given at the centerline of each cross-section denote the top of rock elevation.

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DATE 2-24-95	LWM
		DATE 2-24-95	JSM
		DATE 2-24-95	LWM

DESIGNED BY LWM
DRAWN BY JSM
CHECKED BY LWM

RECORD DRAWING
DATE: 8/15/95

SCALES:
1"=10' HOR
1"=5' VER

BEAR TRIBUTARY ARROYO DIVERSION CROSS SECTIONS
STA 10+35
TO
STA 11+50

LOMR FIGURE 8.7

SHEET 10 OF 18

BERM
℄
EXISTING GROUND (TYP.)
FILL (TYP)
6261.97
R/W
6260.00
6255.00
6250.00
6245.00
SUBGRADE (TYP.)
6248.06
STA = 13+00
6259.90
R/W
6246.13
STA = 12+50
6257.83
R/W
6242.68
STA = 12+00
6235.00
60.00 50.00 40.00 30.00 20.00 10.00 ℄ 10.00 20.00 30.00 40.00 50.00 60.00

BERM
℄
FILL (TYP.)
6266.12
R/W
6265.00
6260.00
6255.00
6250.00
6251.93
STA = 14+00
6264.05
R/W
6249.99
STA = 13+50
EXISTING GROUND (TYP.)
6262.26
R/W
SUBGRADE (TYP.)
6248.33
STA = 13+07
6245.00
6240.00
6235.00
60.00 50.00 40.00 30.00 20.00 10.00 ℄ 10.00 20.00 30.00 40.00 50.00 60.00

WIRE-TIED RIPRAP.

3. Elevations given at the centerline of the cross-section denote the top of rock elevation.

LOMR FIGURE 8.8

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	DATE 2-24-95
		DESIGNED BY LMH	DATE 2-24-95
		DRAWN BY JSH	DATE 2-24-95
		CHECKED BY LMH	

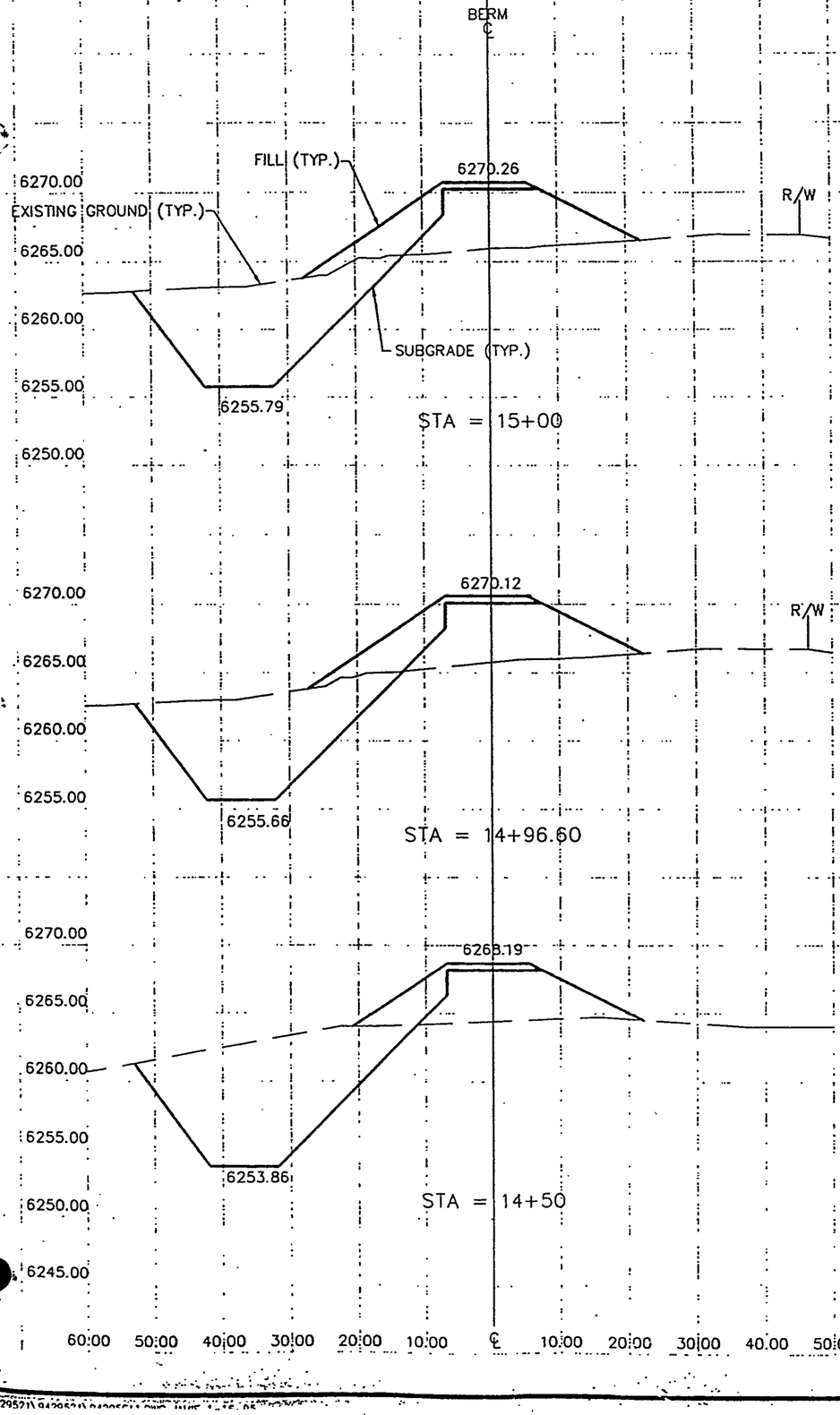
WILLIAM L. HSU 8131 REGISTERED PROFESSIONAL ENGINEER 3/14/95

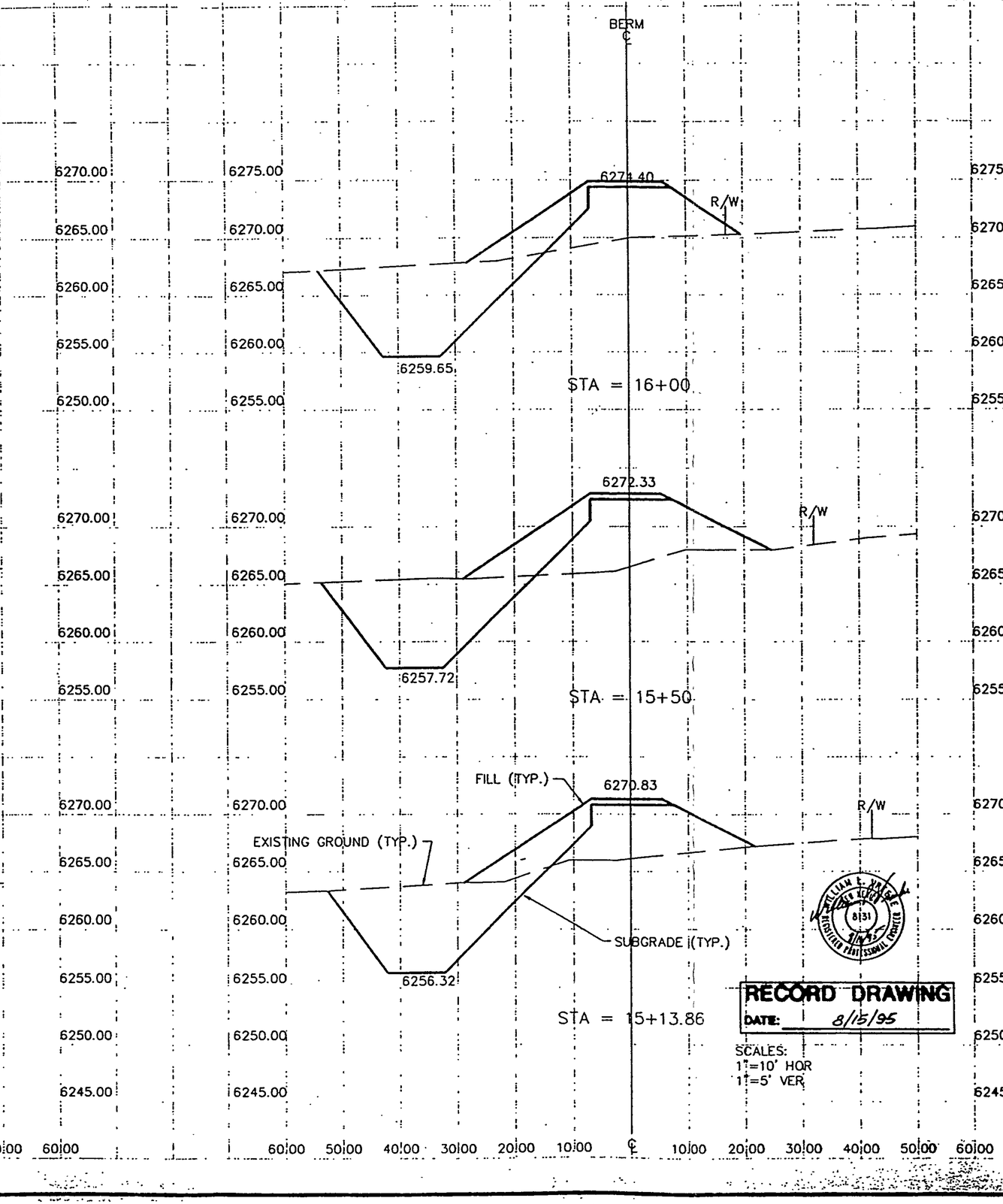
RECORD DRAWING
DATE: 8/15/95

SCALES:
1"=10' HOR
1"=5' VER

BEAR TRIBUTARY ARROYO DIVERSION CROSS SECTIONS
STA 12+00
TO
STA 14+00

3. Elevations given at the centerline of each cross-section denote the top of rock elevation.





LOMR FIGURE 8.9

ENGINEER'S SEAL

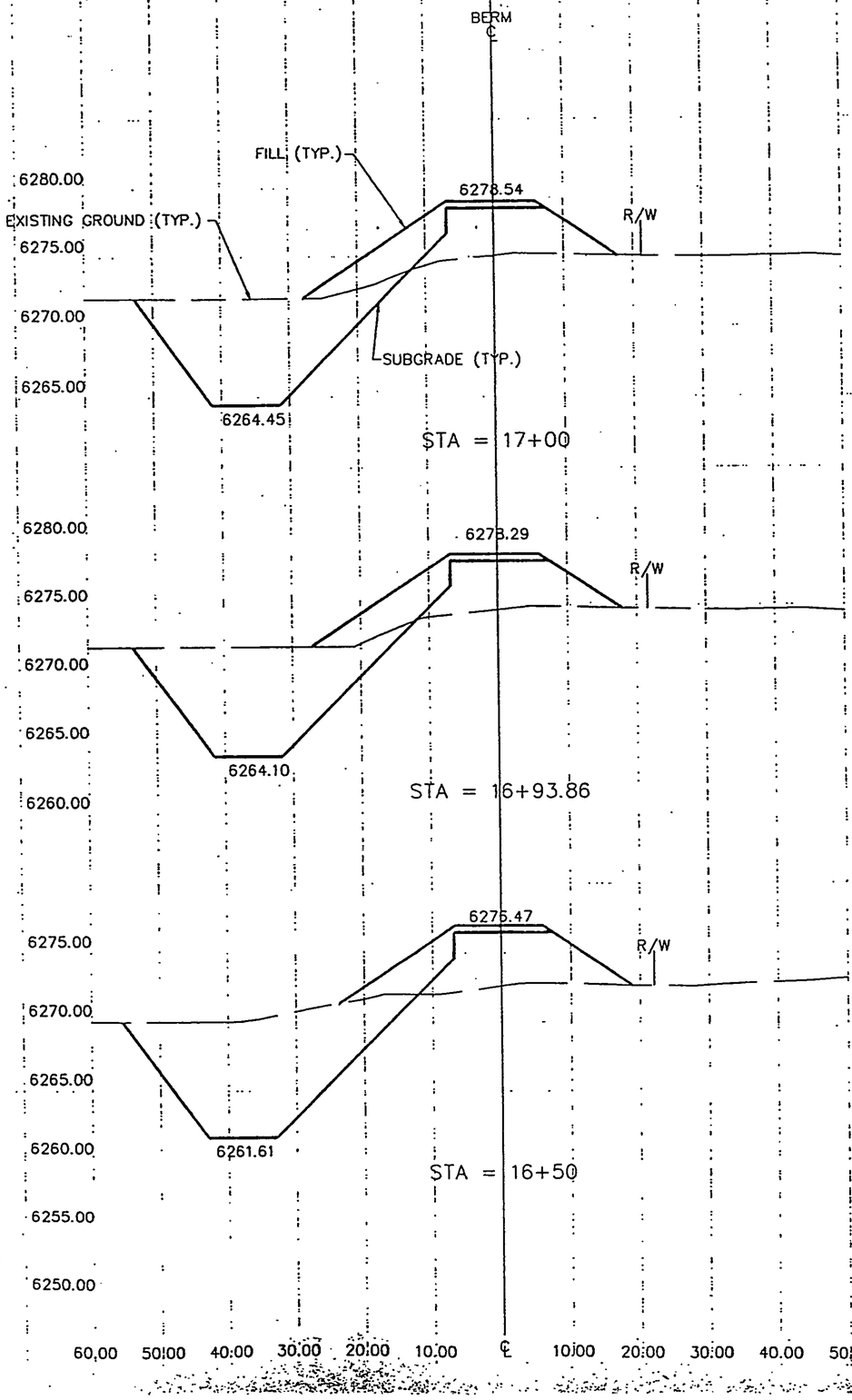
NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
	2-24-95		
	2-24-95		

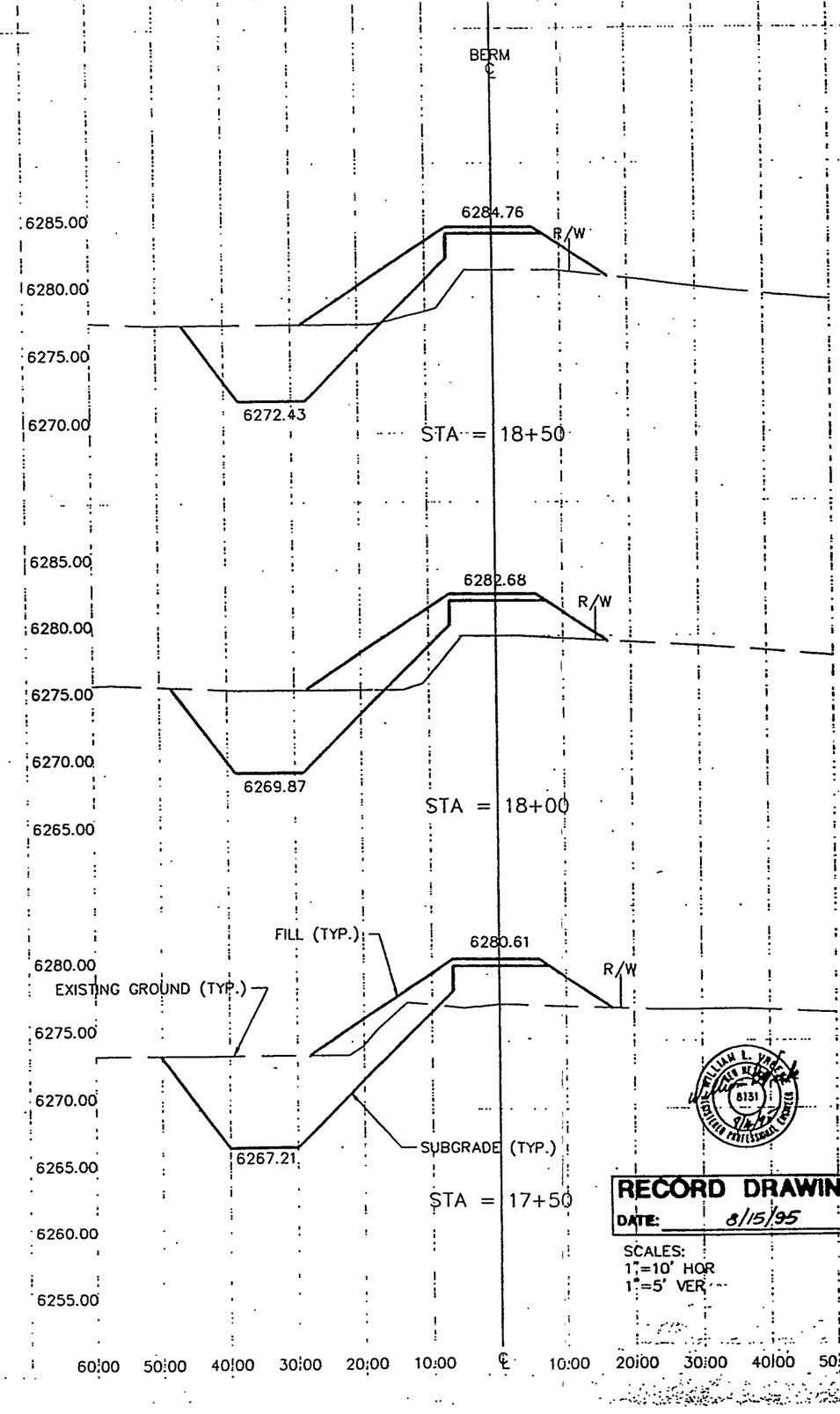
DESIGNED BY LMM
DRAWN BY JSM

RECORD DRAWING
DATE: 8/15/95

SCALES:
1"=10' HOR
1"=5' VER

BEAR TRIBUTARY ARROYO DIVERSION
CROSS SECTIONS
STA 14+50
TO
STA 16+00





WIRE-TIED RIPRAP.

3. Elevations given at the centerline of each cross-section denote the top of rock elevation.

LOMR FIGURE 8.10

ENGINEER'S SEAL

WILLIAM L. YARBROUGH
TENNESSEE REGISTERED ENGINEER
8131

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
	2-24-95	DRAWN BY	JSM
	2-24-95	CHECKED BY	LMM

RECORD DRAWING
DATE: 8/15/95

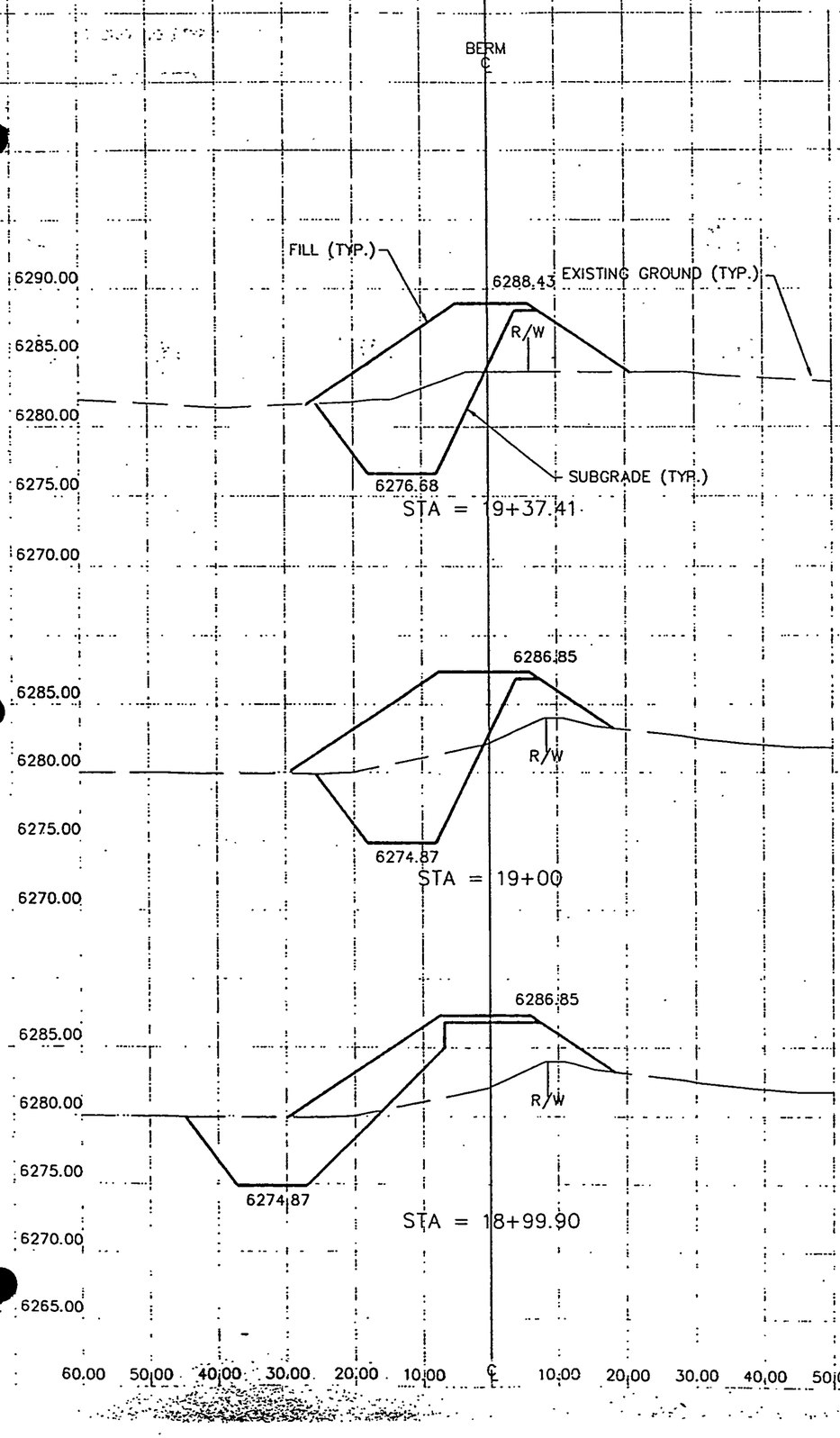
SCALES:
1"=10' HOR
1"=5' VER

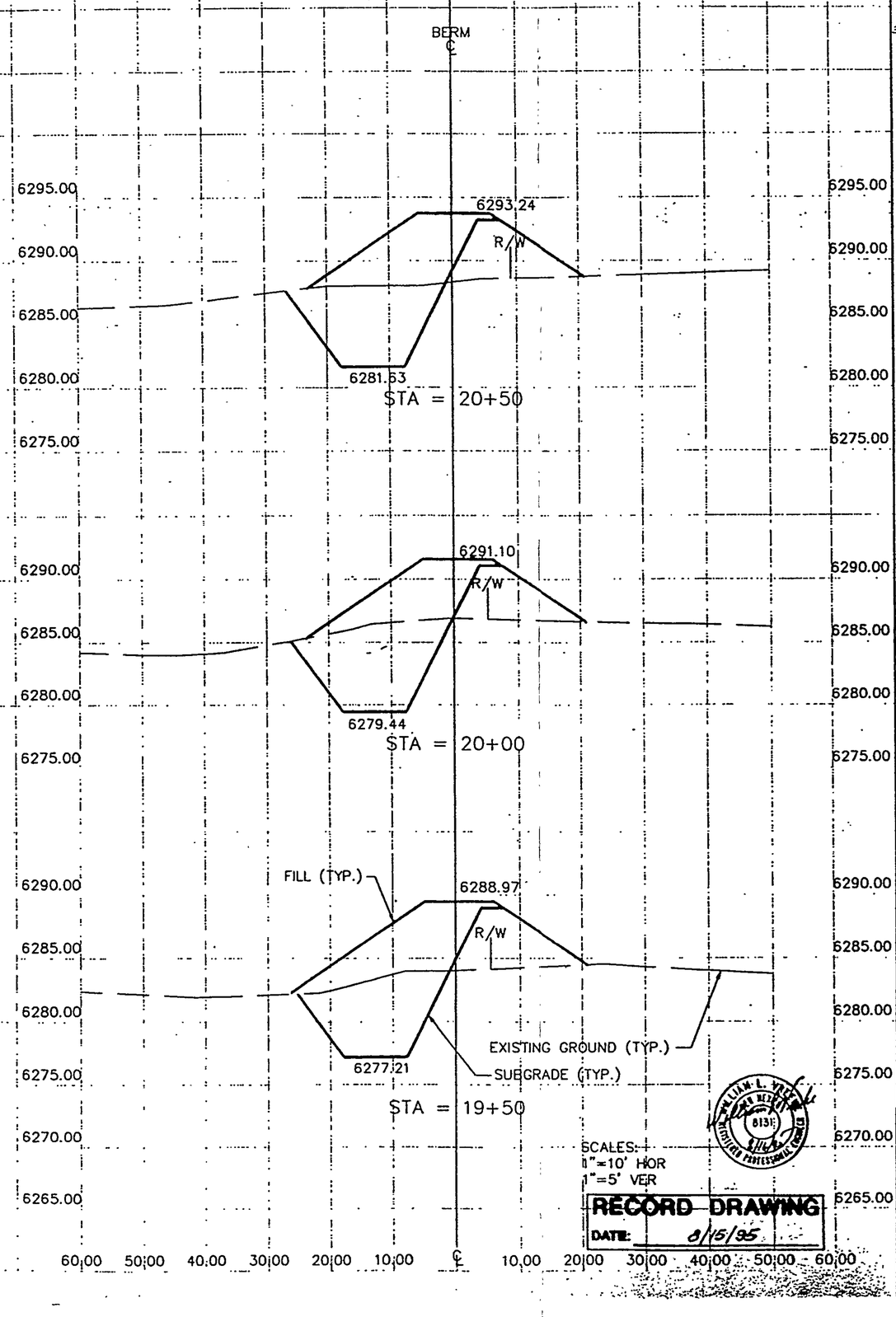
BEAR TRIBUTARY
ARROYO DIVERSION
CROSS SECTIONS
STA 16+50
TO
STA 18+50

SHEET 11 OF

2. SUBGRADE IS LIMIT OF CUT REQUIRED TO CONSTRUCT WIRE-TIED RIPRAP AND GABIONS.

3. Elevations given at the centerline of each cross-section denote the top of rock elevation.





SCALES:
1"=10' HOR
1"=5' VER

RECORD DRAWING
DATE: 8/15/95

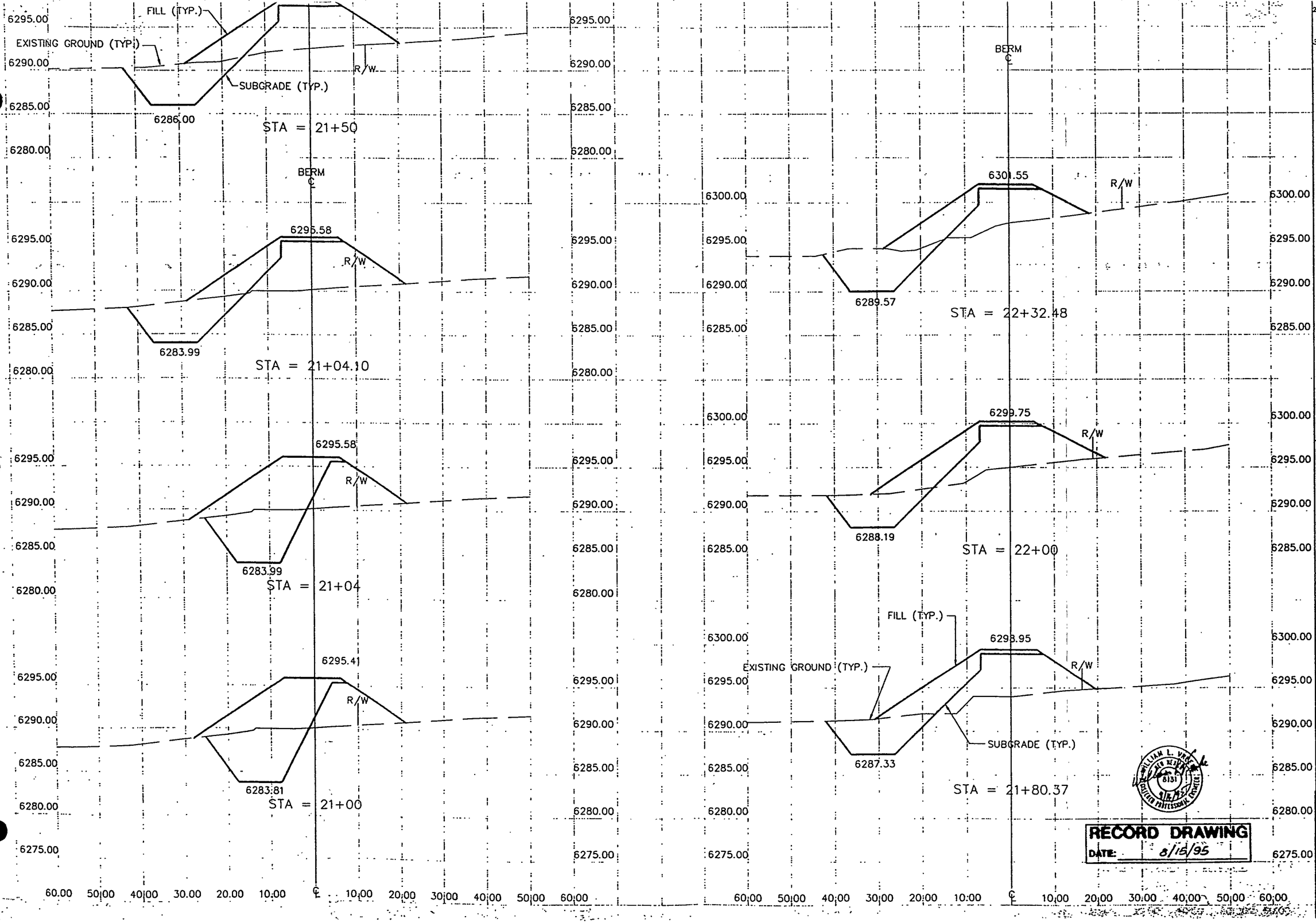
LOMR FIGURE 8.11

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	LMM
		DRAWN BY	JSM
		CHECKED BY	LMM

DATE 2-24-95
DATE 2-24-95
DATE 2-24-95

BEAR TRIBUTARY
ARROYO DIVERSION
CROSS SECTIONS
STA 18+99.90
TO
STA 20+50



2. SUBGRADE IS LIMIT OF CUT REQUIRED TO CONSTRUCT WIRE-TIED RIPRAP AND GABIONS.

3. Elevations given at the centerline of each cross-section denote the top of rock elevation.

LOMR FIGURE 8.12

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	LAM
		DRAWN BY	JSM
		CHECKED BY	LAM

DATE 2-24-95
DATE 2-24-95
DATE 2-24-95

RECORD DRAWING
DATE: 8/15/95

BEAR TRIBUTARY ARROYO DIVERSION CROSS SECTIONS STA 21+00 TO STA 22+32.48

BERM ℄

6305.00
6300.00
6295.00
6290.00
6285.00

EXISTING GROUND (TYP.)
FILL (TYP)
6303.46
SUBGRADE (TYP.)
6291.53

STA = 23+00

6305.00
6300.00
6295.00
6290.00
6285.00

6302.80
R/W
6290.95

STA = 22+80

6305.00
6300.00
6295.00
6290.00
6285.00

FILL (TYP.)
EXISTING GROUND (TYP.)
6301.74
R/W
SUBGRADE (TYP.)
6290.08

STA = 22+50

SCALES:
1"=10' HOR
1"=5' VER

60:00 50.00 40:00 30.00 20:00 10:00 ℄ 10:00 20:00 30:00 40:00 50:00 60:00

BERM ℄

6305.00
6300.00
6295.00
6290.00
6285.00

6304.00
6292.00

STA = 23+16.39

6305.00
6300.00
6295.00
6290.00
6285.00

6305.80
6291.82

STA = 23+10.19

60:00 50.00 40:00 30.00 20:00 10:00 ℄ 10:00 20:00 30:00 40:00 50:00 60:00

3. Elevations given at the centerline of each cross-section denote the top of rock elevation.

LOMR FIGURE 8.13

ENGINEER'S SEAL

WILLIAM L. VRE
NEW MEXICO
8131
REGISTERED PROFESSIONAL ENGINEER

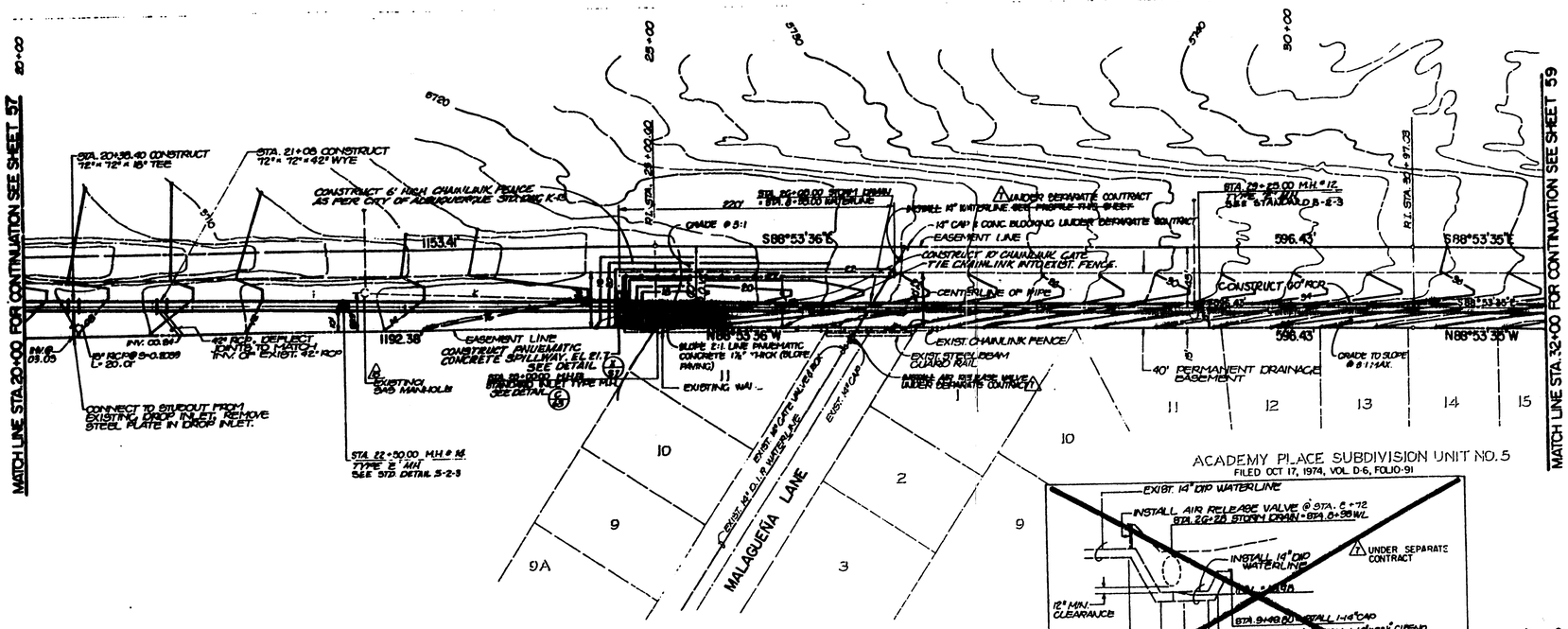
NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DATE 2-24-95	
		DATE 2-24-95	
		DATE 2-24-95	

DESIGNED BY LMW
DRAWN BY JSM
CHECKED BY LMW

RECORD DRAWING
DATE: 8/15/95

BEAR TRIBUTARY ARROYO DIVERSION CROSS SECTIONS
STA 22+50
TO
STA 23+16.39

SHEET 16 OF 18



GENERAL NOTES

1. All RCP shall be A.S.T.M. Class III.
2. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
3. Temporary ponds at manhole inlets are for existing flows only. As adjoining parcels are improved, the developers are required to make standard inlet connections to the storm drain and remove the manhole inlets and associated ponding facilities at their costs.

AS-BUILT CERTIFICATION

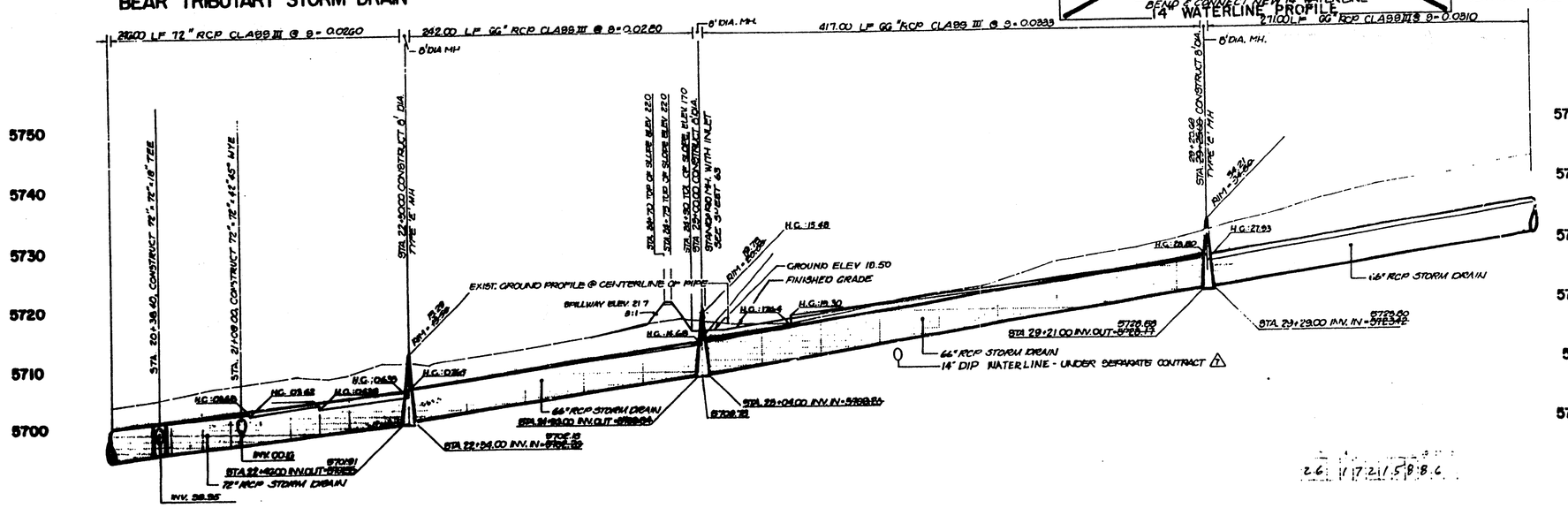
I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr. NMPE & LS No. 3792 — Date 2-11-94

A "D" CUT ON TOP OF THE CONCRETE CURB LOCATED ON THE NNE CURB RETURN AT THE INTERSECTION OF CARRUTHERS RD. AND DONAHOO CT. IN THE NORTHEAST QUADRANT OF THE INTERSECTION. (ALB. B.M. 19 - P22) ELEVATION = 5787.30

BEAR TRIBUTARY STORM DRAIN



FOR REVISION ⚠1 ONLY

⚠1 Widen LOWERING OF 14" WATERLINE DELETED FROM CONTRACT. 9/93

BOHANNAN HUSTON INC. ENGINEERS

2.6 | 17.21.5 8.8.6

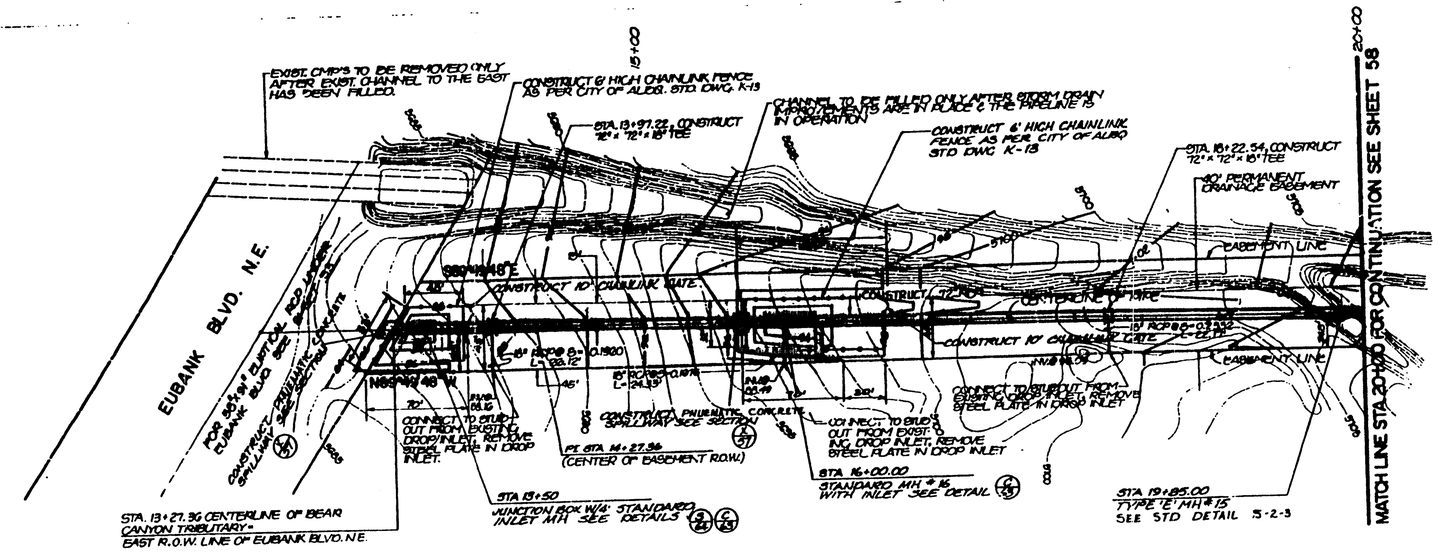
BEAR CANYON TRIBUTARY
STORM DRAIN PLAN & PROFILE
STA. 20+00 TO STA. 32+00

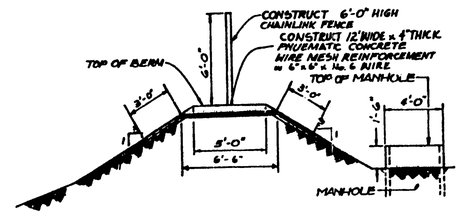
C.E. Hamilton 7/1/94 — R. Bohannan 7/1/94
J.C. Kelly 7/1/94 — N.P. Duell 7/1/94
Jim Zink 7/1/94 — R. Bohannan 7/1/94

1721 | 58 | 87

LOMR FIGURE 7.3.3

CITY OF ALBUQUERQUE





GUNITE SPILLWAY DETAIL (X/—)
NTS

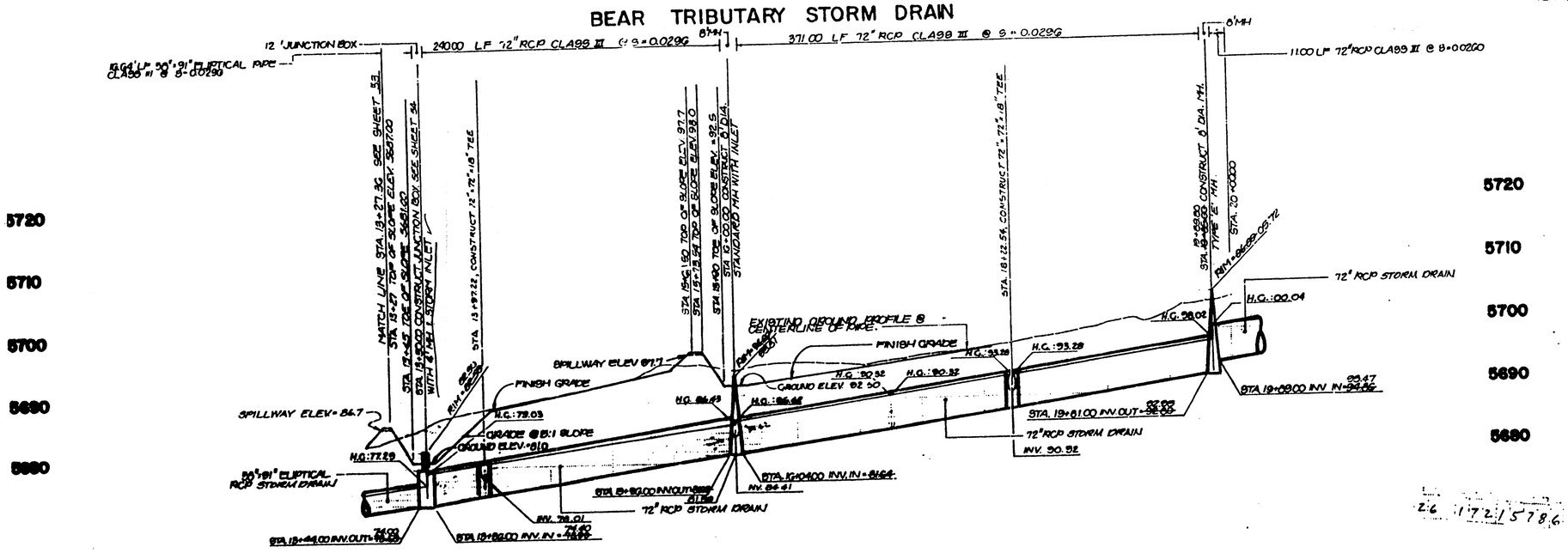
GENERAL NOTES

1. All RCP shall be A.S.T.M. Class III.
2. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
3. Temporary ponds at manhole inlets are for existing flows only. As adjoining parcels are improved, the developers are required to make standard inlet connections to the storm drain and remove the manhole inlets and associated ponding facilities at their costs.

A 'D' CUT ON TOP OF THE CONCRETE CURB LOCATED ON THE INSIDE CURB RETURN AT THE INTERSECTION OF CARRUTHERS RD. AND DONAHOO CT. IN THE NORTHEAST QUADRANT OF THE INTERSECTION. (AUB. BM 19-F22) ELEVATION = 5781.30

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 10'

BEAR TRIBUTARY STORM DRAIN



STORM DRAIN INV. ELEV:

13+00	14+00	15+00	16+00	17+00	18+00	19+00	20+00
3673.14 INV.	3675.29 INV.	3678.29 INV.	MH. # 16	3684.49 INV.	3687.44 INV.	3690.40 INV.	MH. # 15 3695.15 INV.

AS-BUILT CERTIFICATION

I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr. NMPE & LS No. 7922 — Date 3-11-96

2.6 172/5786

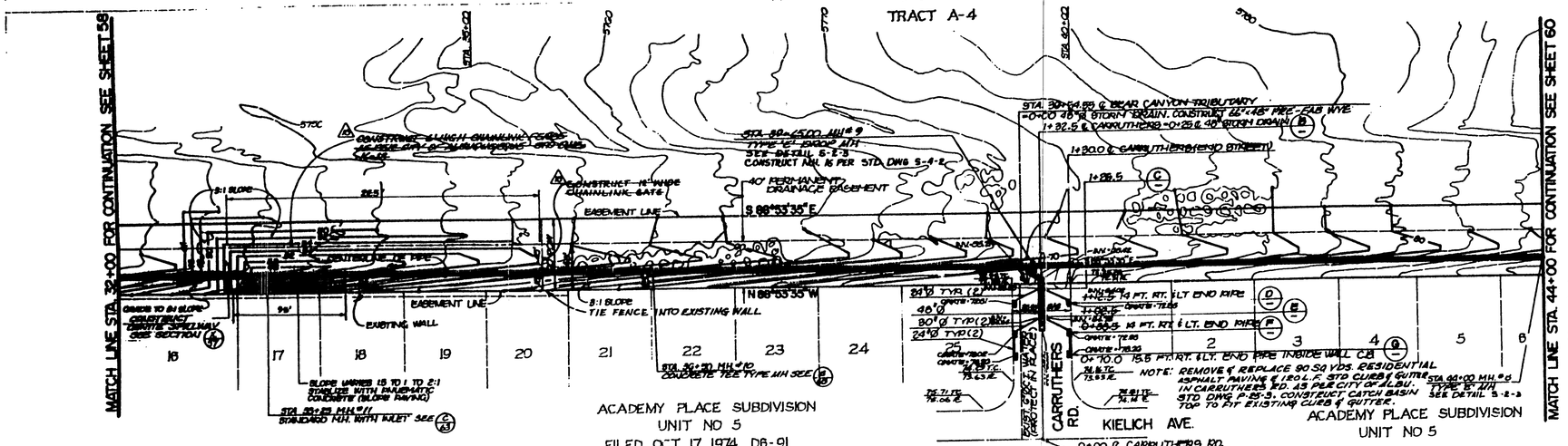
BEAR CANYON TRIBUTARY
STORM DRAIN PLAN & PROFILE
STA 13+27.36 TO STA. 20+00

C.D. Hymer 6/6/94	A. Brito	7/1/94
Hydro 7/5/94	WA Dev't	7/1/94
Jim Lind 7/7/94	A. Brito	7/1/94

1721 — 57 — 87

LOMR FIGURE 7.3.2

CITY OF ALBUQUERQUE



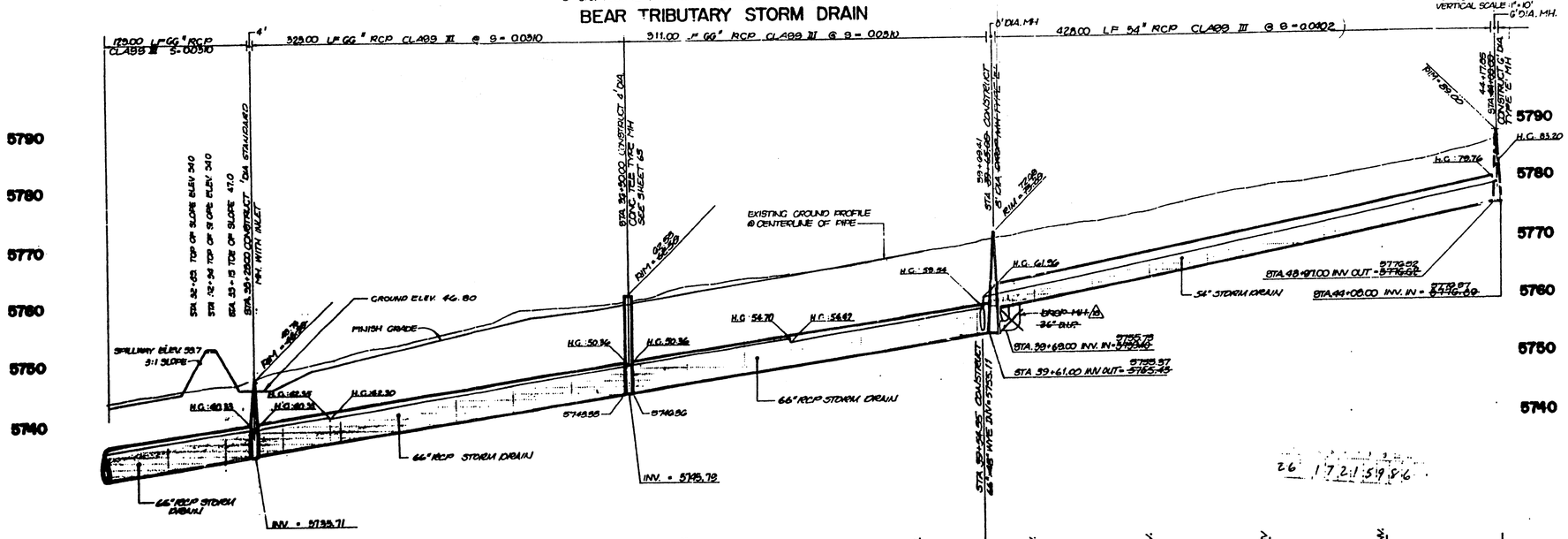
CATCH BASIN DATA					
	STA.	TYPE	PIPE INV. ELEV. IN	PIPE INV. ELEV. OUT	NOTES
D	1+12.5	DOUBLE 'C'		64.90	STD. DWG. K-5.2 TYP (2)
F	0+88.5	DOUBLE 'C'	65.10	64.90	STD. DWG. K-5.2 TYP (2)
G	0+71.5	TYPE 'D'		68.80	STD. DWG. K-3.2 TYP (2)

1. STA. REFERENCES @ CB TO @ CARRUTHERS
2. CURB & GUTTER TRANSITION PER STD. DWG. K-7.
3. C.B. FRAME & GRATING PER STD. DWG. K-5 & K-8

PRECAST PIPE STRUCTURES				
	STA.	DESCRIPTION	INV. ELEV.	NOTES
B	1+32.9	4 "Ø-60" EL.	65.72	
C	2 STUBS 1+26.5 A	DOUBLE 45° WYE 48"X 24"X 24"	63.90	
E	2 STUBS 1+02.5	DOUBLE 45° WYE 48"X 30"X 30"	64.70	PLUG END

1. STA. REFERS TO @ CARRUTHERS AVE.
2. INVERT ELEVATIONS @ INTERSECTION OF PIPE @'s

BEAR TRIBUTARY STORM DRAIN



HORIZONTAL SCALE: 1"=50'
VERTICAL SCALE: 1"=10'

GENERAL NOTES

1. All RCP shall be A.S.T.M. Class III.
2. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
3. Temporary ponds at manhole inlets are for existing flows only. As adjoining parcels are improved, the developers are required to make standard inlet connections to the storm drain and remove the manhole inlets and associated ponding facilities at their costs.

A 'D' CUT ON TOP OF THE CONCRETE CURB LOCATED ON THE NNE CURB RETURN AT THE INTERSECTION OF CARRUTHERS RD. AND DONAHOO CT. IN THE NORTHEAST QUADRANT OF THE INTERSECTION. (ALB. B.M. # 19-F22) ELEVATION = 5757.30

AS-BUILT CERTIFICATION

I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr. NMPE & LS No. 7922 — Date 9-11-96

4.1" = 1.25'
X 100'
X = 30.7

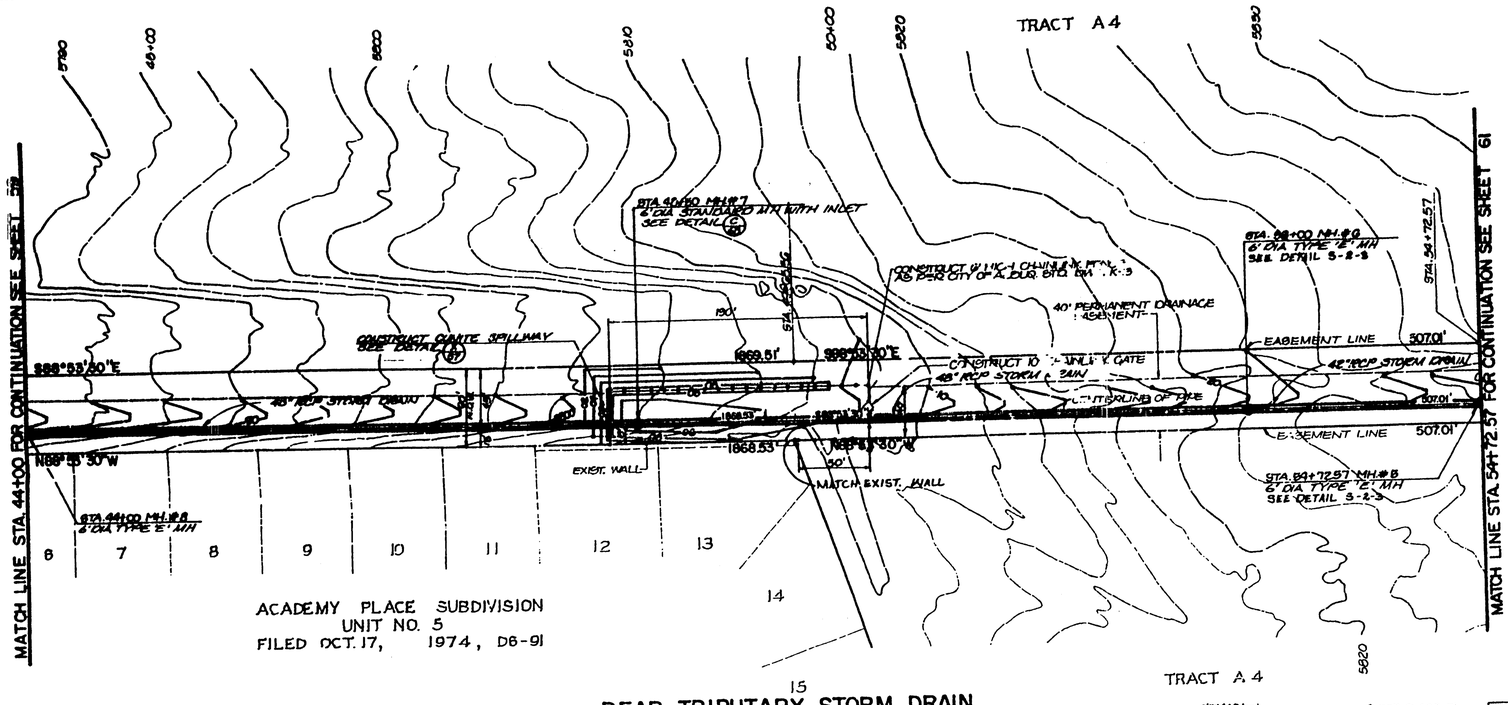
BEAR CANYON TRIBUTARY
STORM DRAIN PLAN & PROFILE
STA. 32+00 TO STA. 44+00

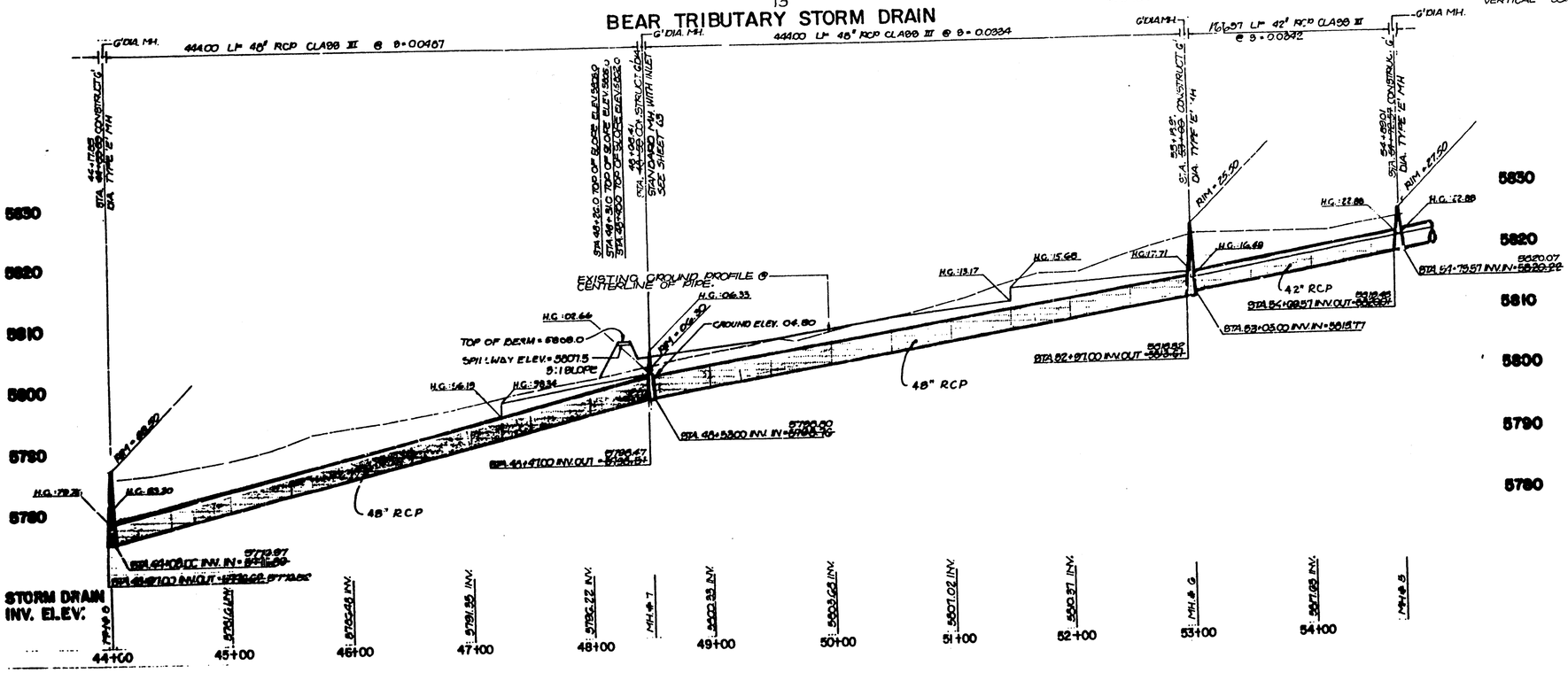
R. Arias 7/3/09
WA Dunn 7/3/09
R. Arias 7/3/09

1721 59 87

LOMR FIGURE 7.3.4

BEAR CITY OF ALBUQUERQUE





HORIZONTAL SCALE 1"=50'
VERTICAL SCALE 1"=10'

GENERAL NOTES

1. All RCP shall be A.S.T.M. Class III.
2. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
3. Temporary ponds at manhole inlets are for existing flows only. As adjoining parcels are improved, the developers are required to make standard inlet connections to the storm drain and remove the manhole inlets and associated ponding facilities at their costs.

A 'D' CUT ON TOP OF THE CONCRETE CURB LOCATED ON THE NW CURB RETURN AT THE INTERSECTION OF CARRUTHERS RD. AND DONAHOO CT. IN THE NORTHEAST QUADRANT OF THE INTERSECTION. (ALB. BM. 15-F12)
ELEVATION = 5787.30

AS-BUILT CERTIFICATION

I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr. NMPE & LS No. 3792 — Date 3.11.96

RICHARDS MCI • ALBUQUERQUE • NEW MEXICO • 87110 ENGINEERS

Z.C. 172/1608

BEAR CANYON TRIBUTARY
STORM DRAIN PLAN & PROFILE
STA. 44+00 TO STA. 54+73

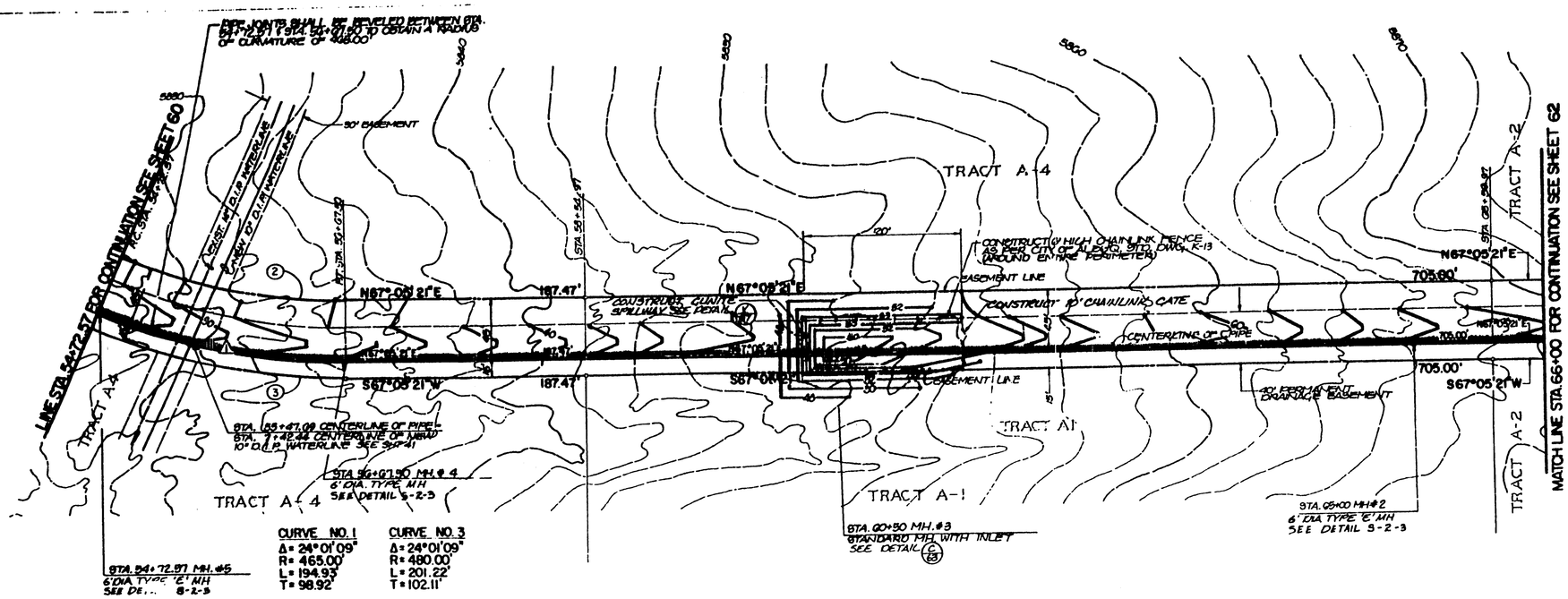
C.D. Chiasson 7/3/96	R. Price	7/3/96
M.C. Dietz 7/2/96	NA Dull	7/2/96
Jim Zimba 7/2/96	R. Price	7/2/96

1721 60 87

LOMR FIGURE 7.3.5

LEGEND

CITY OF ALBUQUERQUE



GENERAL NOTES

1. All RCP shall be A.S.T.M. Class III.
2. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.H. D1557.
3. Temporary ponds at manhole inlets are for existing flows only. As adjoining parcels are improved, the developers are required to make standard inlet connections to the storm drain and remove the manhole inlets and associated ponding facilities at their costs.

A 'D' CUT ON TOP OF THE CONCRETE CURB LOCATED ON THE NW/E CURB RETURN AT THE INTERSECTION OF CARUTHERS RD. AND DONAHOO CT. IN THE NORTHEAST QUADRANT OF THE INTERSECTION (ALB. B.M. 19-F22) ELEVATION = 6787.80

AS-BUILT CERTIFICATION

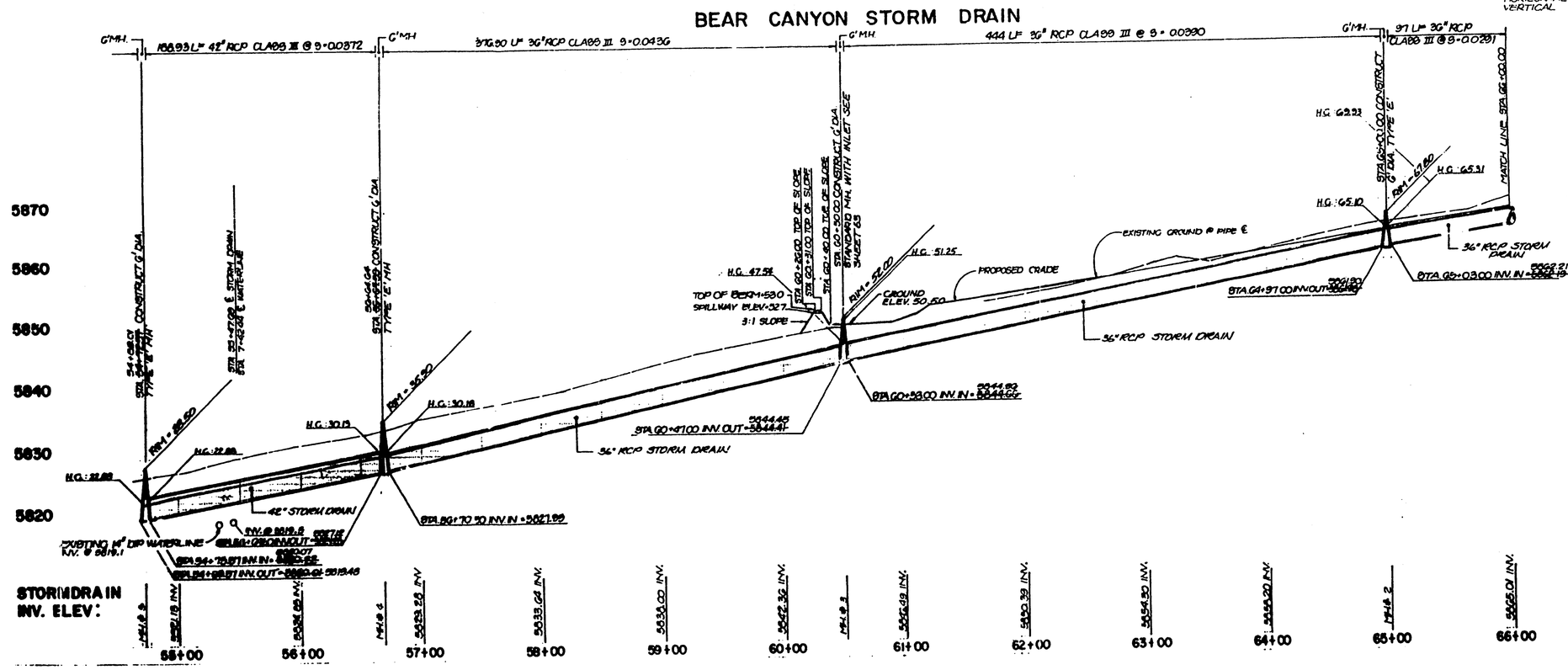
I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr. NMPE & LS No. 3792 — Date 8-11-04

HORIZONTAL SCALE: 1" = 50'
VERTICAL SCALE: 1" = 5'

BEAR CANYON STORM DRAIN



BEAR CANYON TRIBUTARY
STORM DRAIN PLAN & PROFILE
STA. 54+73 TO STA. 66+00

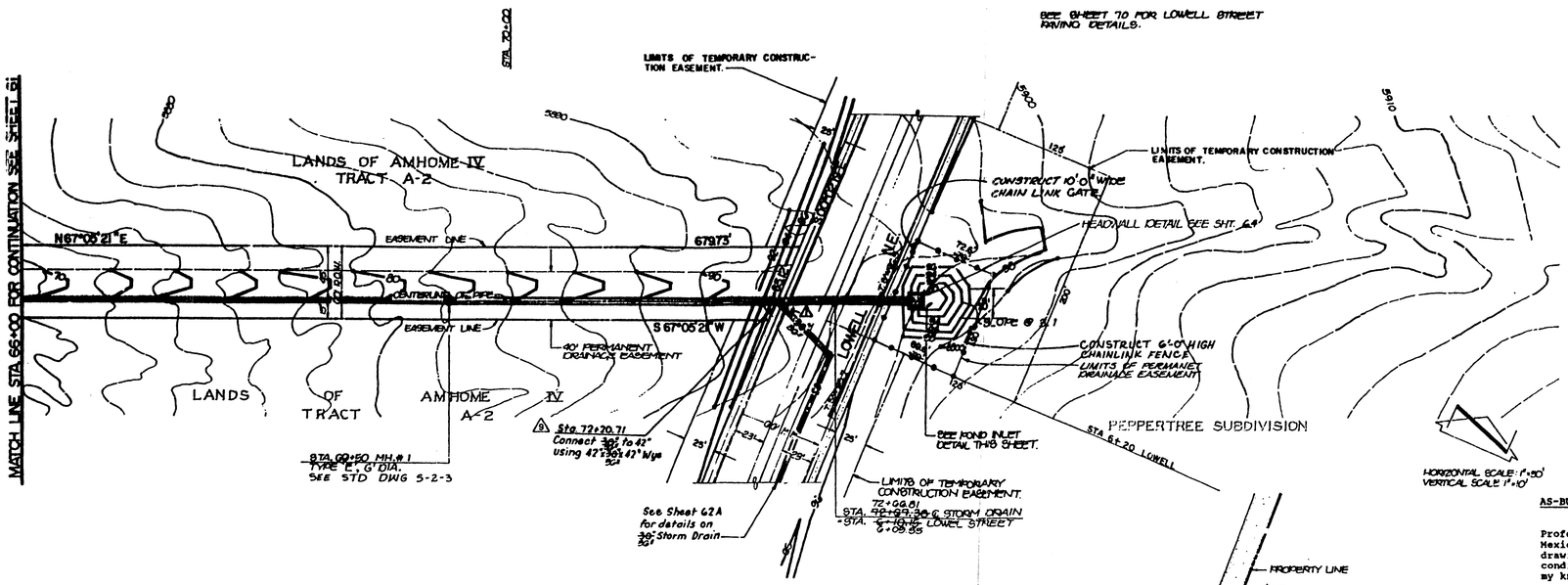
C.A.D.	7/3/84	R. Arias
[illegible]	7/7/87	NA DuH
[illegible]	7/4/89	R. Arias

1721 — 61 — 87

LOMR FIGURE 7.3.6

BEAR

CITY OF ALBUQUERQUE



GENERAL NOTES

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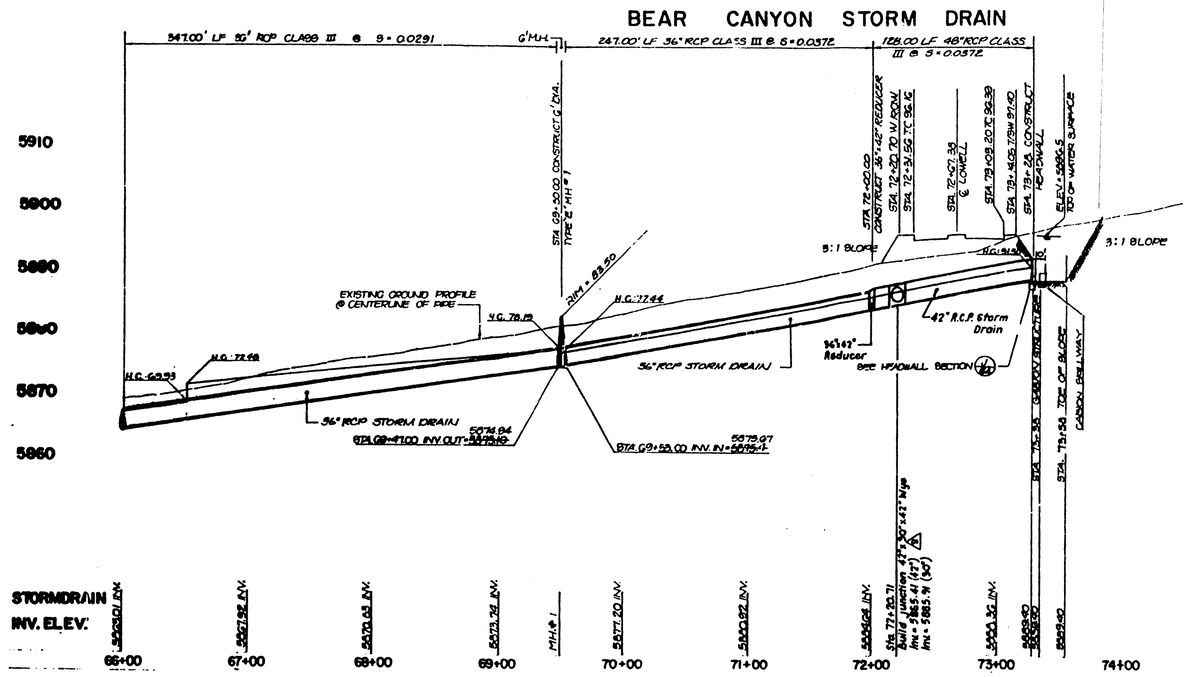
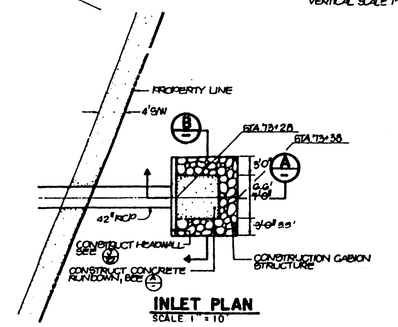
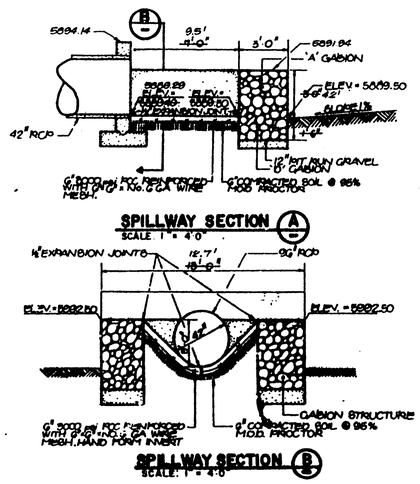
2. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
3. Temporary ponds at manhole inlets are for existing flows only. As adjoining parcels are improved, the developers are required to make standard inlet connections to the storm drain and remove the manhole inlets and associated ponding facilities at their costs.

A CUT ON TOP OF THE CONCRETE CURB LOCATED ON THE NNE CURB RETURN AT THE INTERSECTION OF CARRUTHERS RD. AND DONAHOO CT. IN THE NORTH-EAST QUADRANT OF THE INTERSECTION. (ALB. B-M. 13 - P.22.) ELEVATION = 5787.30





INLET PLAN
SCALE 1" = 10'



AS-BUILT CERTIFICATION

I, Thomas T. Hann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Hann, Jr. — Date 3.11.86
NMPE & LS No. 5878

FOR REVISION 3 ONLY

Gabions:

Gabions shall be MacCaferri Series 300 gabions or equal. Gabions shall be filled with rock, D_{50} = 6 inches. Individual shall be tied together as specified by MacCaferri.

CODE	LENGTH	WIDTH	HEIGHT	# CELLS	CAPACITY
A	6'	3'	3'	2	2.0 CY
B	6'	3'	1.6"	2	1.0 CY

2 6 1.7 2 1 6 2 8 6

3 11-4-86 30' Line Added by Scanlon & Assoc. KZ

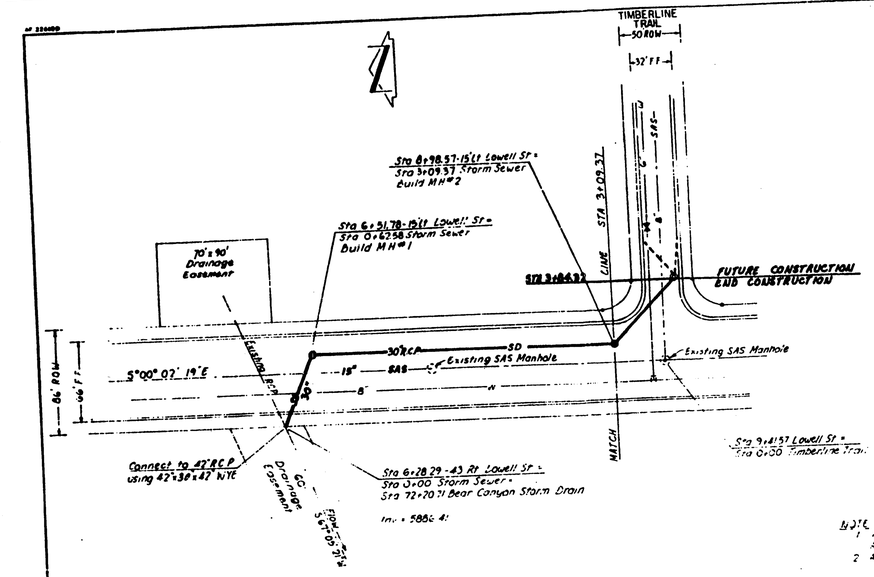
BEAR CANYON TRIBUTARY
STORM DRAIN PLAN & PROFILE
STA 66+00 TO STA 78+00

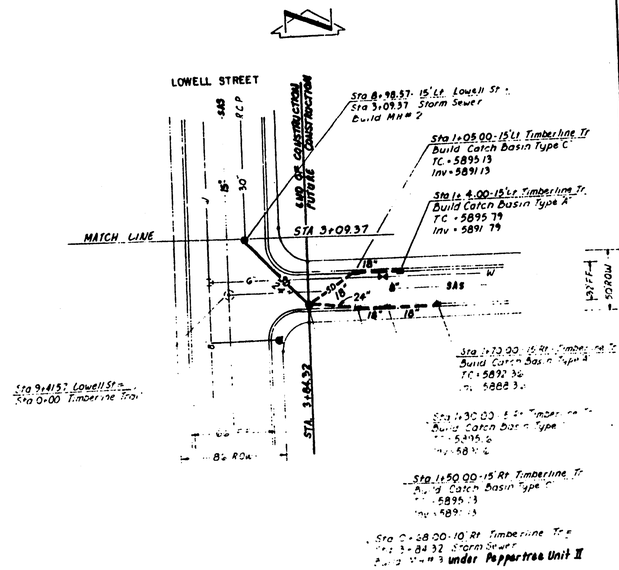
C.W. Jeffreys 6/6/86 — R. Price 7/2/86
H.A. Duvall 7/1/89 — H.A. Duvall 7/6/89
Jim Zink 7/1/89 — R. Price 7/6/89

1721 62 87

LOMR FIGURE 7.3.7

CITY OF ALBUQUERQUE

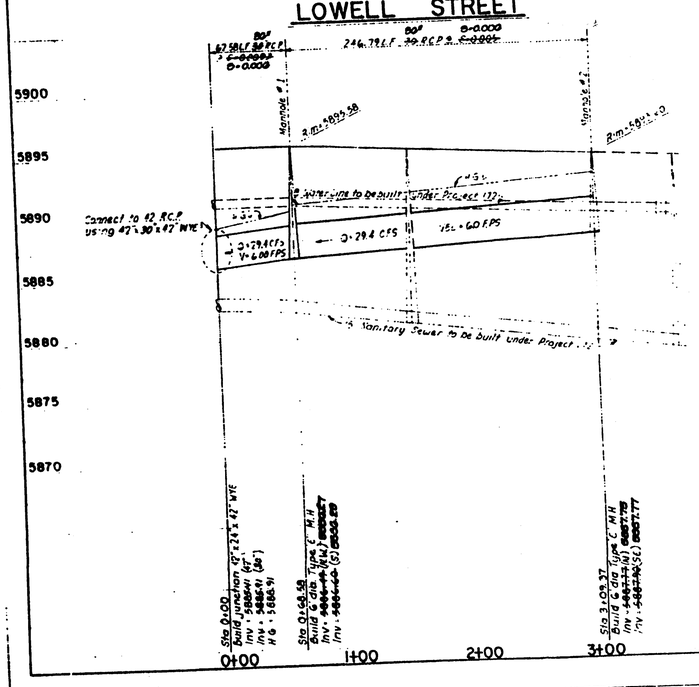




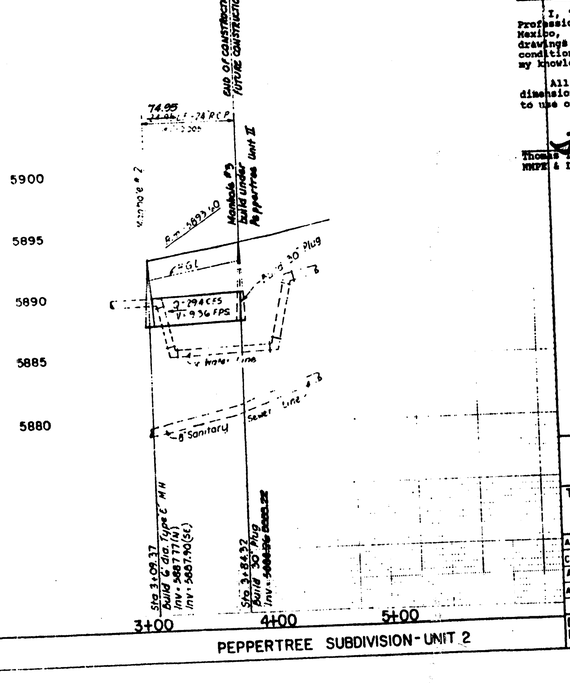
NOTE
1. ALL CATCH BASINS INSIDE ARE ALTERNATE GRATING BMS A-D 3
2. ALL PIPE 5'TO BE ASTM C-76

SCALE: 1":50' HORIZONTAL
1":5' VERTICAL

LOWELL STREET



TIMBERLINE TRAIL



PEPPERTREE SUBDIVISION - UNIT 2

AS-BUILT CERTIFICATION

I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr. NMPE & LS No. 5792 — 2-11-96 Date

NEW MEXICO 5792 REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR

AS BUILT INFORMATION

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES BY DATE

NO

MICRO-FILM INFORMATION
DATE

ENGINEER'S SEAL

11-4-96 30' LANE ADDED BY BOHANON & ASSOC.

NO DATE REMARKS
REVISIONS
DESIGN

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

TITLE: STORM SEWER PLAN AND PROFILE
LOWELL STREET AND TIMBERLINE TRAIL

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer		12/96	Liquid Waste		12/6/96
A C E - Design		12/96	Traffic		12/6/96
A C E - Hydrology		12/9/96	Water		12/6/96

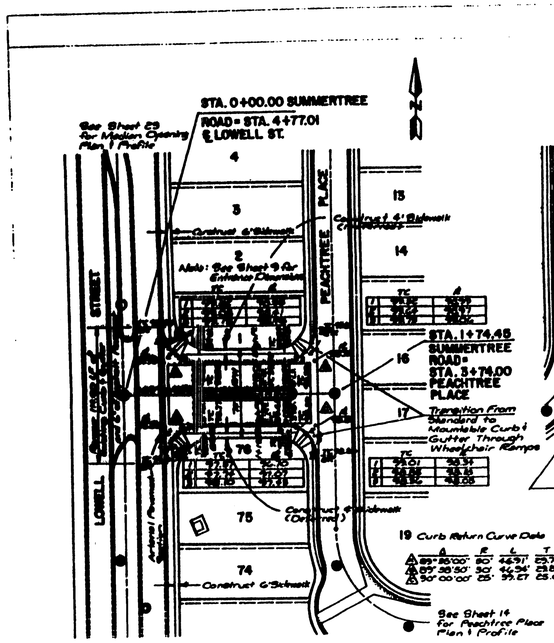
DRAWING NO 1721 — MAP NO — SHEET 62A OF 87

LOMR FIGURE 7.3.8

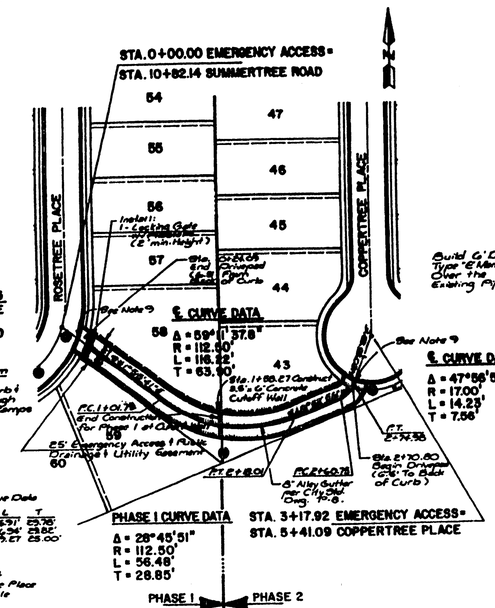
D 24 C 20 B 16 A 12

CITY OF ALBUQUERQUE

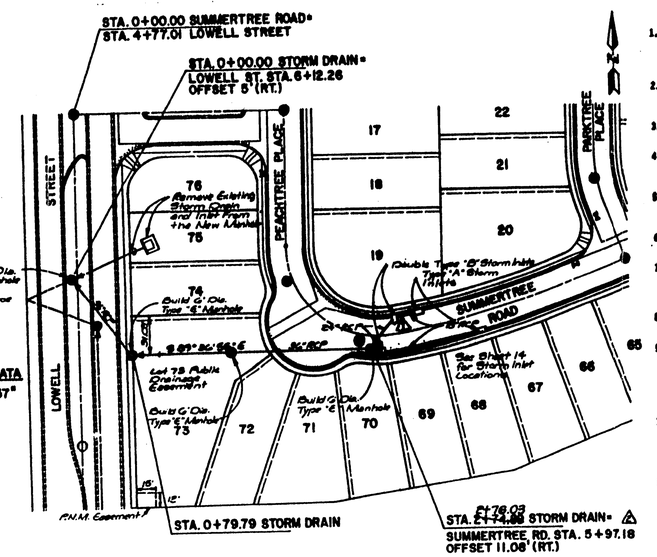
C



SUMMERTREE ROAD



EMERGENCY ACCESS



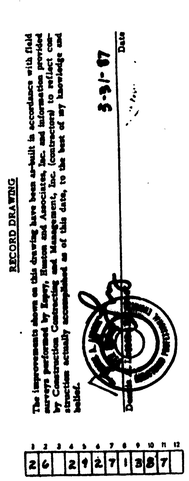
STORM DRAIN OUTFALL

NOTES

1. ALL CURB AND GUTTER SHALL BE STANDARD, MOUNTABLE ROLL-TYPE OR EQUAL, AS SHOWN ON THE PLANS, PER CITY OF ALBUQUERQUE STD. DWG. P-9.
2. ALL STREET PAVEMENT SECTIONS SHALL BE RESIDENTIAL PER CITY OF ALBUQUERQUE STD. DWG. P-2, UNLESS OTHERWISE NOTED.
3. VALLEY GUTTERS SHALL BE CONSTRUCTED PER CITY OF ALBUQUERQUE STD. DWG. P-9.
4. WHEEL CHAIR RAMPS SHALL BE CONSTRUCTED PER CITY OF ALBUQUERQUE STD. DWGS. P-16 AND P-17.
5. DRIVEPADS AND SIDEWALKS SHALL BE CONSTRUCTED PER CITY OF ALBUQUERQUE STD. DWGS. P-11, P-15 AND P-16.
6. ALL STATIONING IS BASED ON STREET CENTERLINE.
7. MOUNTABLE TO STANDARD CURB TRANSITIONS THROUGH WHEELCHAIR RAMPS SHALL BE AS CONSTRUCTED PER CITY OF ALBUQUERQUE STD. DWG. P-16.
8. ALL CURB RETURN RADII ARE 25' UNLESS NOTED OTHERWISE.
9. THE EMERGENCY ACCESS/STREET INTERSECTIONS SHALL BE CONSTRUCTED PER CITY OF ALBUQUERQUE STD. DWG. P-15. AT THE COPPERTREE PLACE INTERSECTION THE SLOPE OF THE EMERGENCY ACCESS SHALL BE AWAY FROM THE STREET.
10. SIDEWALK CONSTRUCTION HAS BEEN DEFERRED UNTIL THE BUILDING IS CONSTRUCTED EXCEPT FOR LOWELL ST. AND ACADEMY RD. SIDEWALKS ON LOWELL ST. AND ACADEMY RD. SHALL BE CONSTRUCTED WITH THIS PROJECT.
11. CITY OF ALBUQUERQUE RESTORATION FEE WILL BE CHARGED FOR ALL WORK DONE IN LOWELL ST.
12. THE CONTRACTOR MUST SUBMIT A TRAFFIC CONTROL PLAN TO THE CITY TRAFFIC ENGINEER'S OFFICE AND RECEIVE A BARRICADING PERMIT PRIOR TO CONSTRUCTION IN LOWELL ST.

THE STATION IS A STANDARD A.C.S. BRASS TABLET STAMPED "E-22 LS 4972" SET IN TOP OF A CONCRETE POST 1.2 MILES EAST ON ACADEMY FROM THE INTERSECTION OF EUBANK BLVD. N.E. AND ACADEMY ROAD N.E. THE STATION IS THEN 375' SOUTH ON THE SOUTH RIM OF A SHALLOW ARROYO. ELEVATION: 5934.53'

7-97	CCM	
1-97	EHA	
2-97	EHA	



4/86	Relocate Manhole and Catch Basins	DJG
4/86		SAH
4/86		DJG

MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

COMPOUND at PEPPERTREE
STREET PLAN & PROFILE
SUMMERTREE RD.-EMERGENCY ACCESS-STORM DRAIN OUTFALL

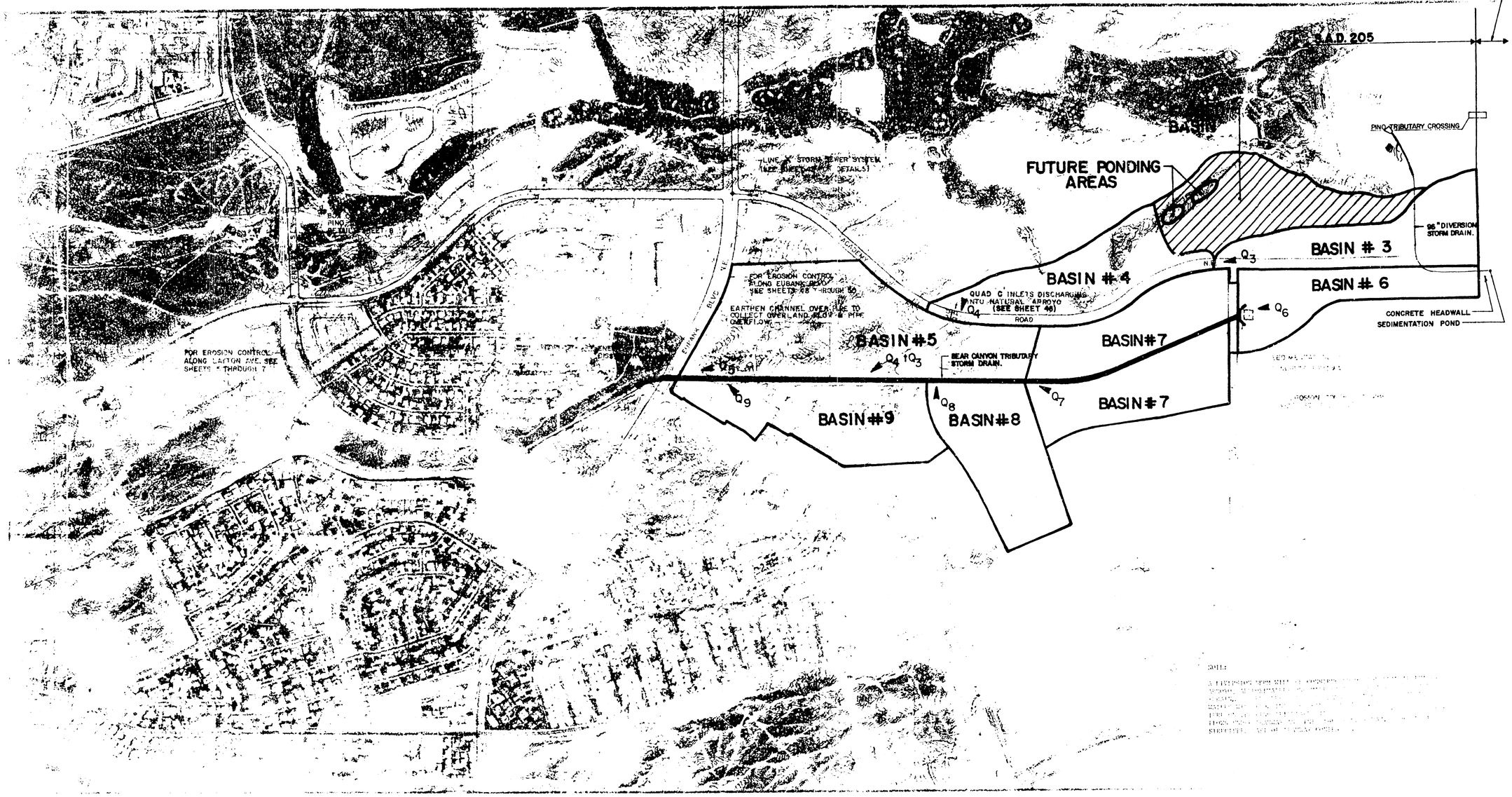
SCALE: 1"=50' Horiz. 1"=10' Vert.

7/24/96 — N/A 7/18/96 — 7/24/96 — 7/18/96

2927 E-22 13 23

LOMR FIGURE 7.3.9

CITY OF [redacted]



CALCULATIONS USING HYDRO
(100 Year Frequency Storm)

BASIN	AREA (ac.)	DEVELOPED Cn	Tp (Sec)	Q (Cfs)
3	23.0	85	14	78
4	25.0	85	16	80
5	75.5	85	16	224
6	28.1	85	16	92
7	51.8	85	14	183
8	35.8	85	14	130
9	36.5	85	14	128

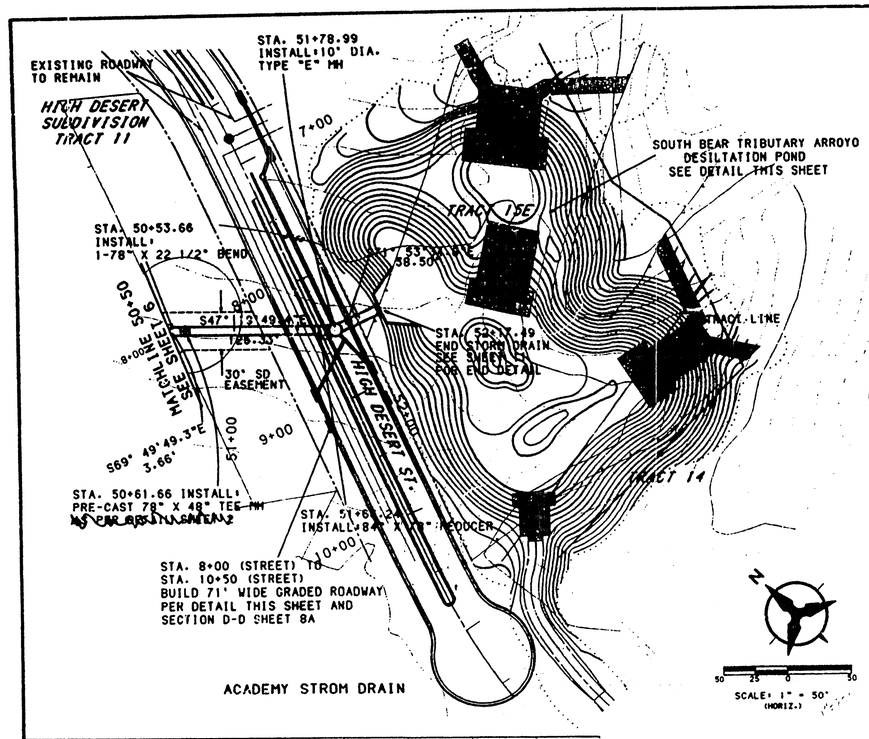
FUTURE DEVELOPED DRAINAGE BASINS FOR SIZING OF BEAR CANYON TRIBUTARY BETWEEN EUBANK BLVD. & LOWELL ST.

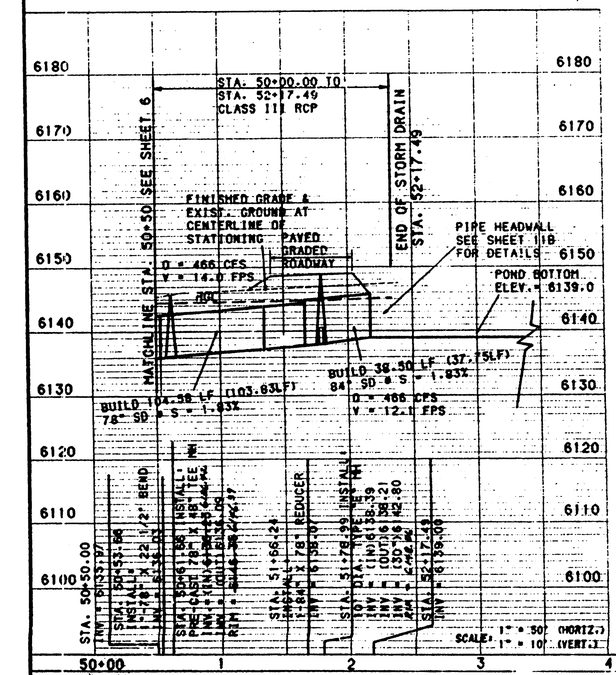
FUTURE DEVELOPED DRAINAGE BASINS

1721 4B 87

C 20 B 16 A 12

CITY OF ALBUQUERQUE

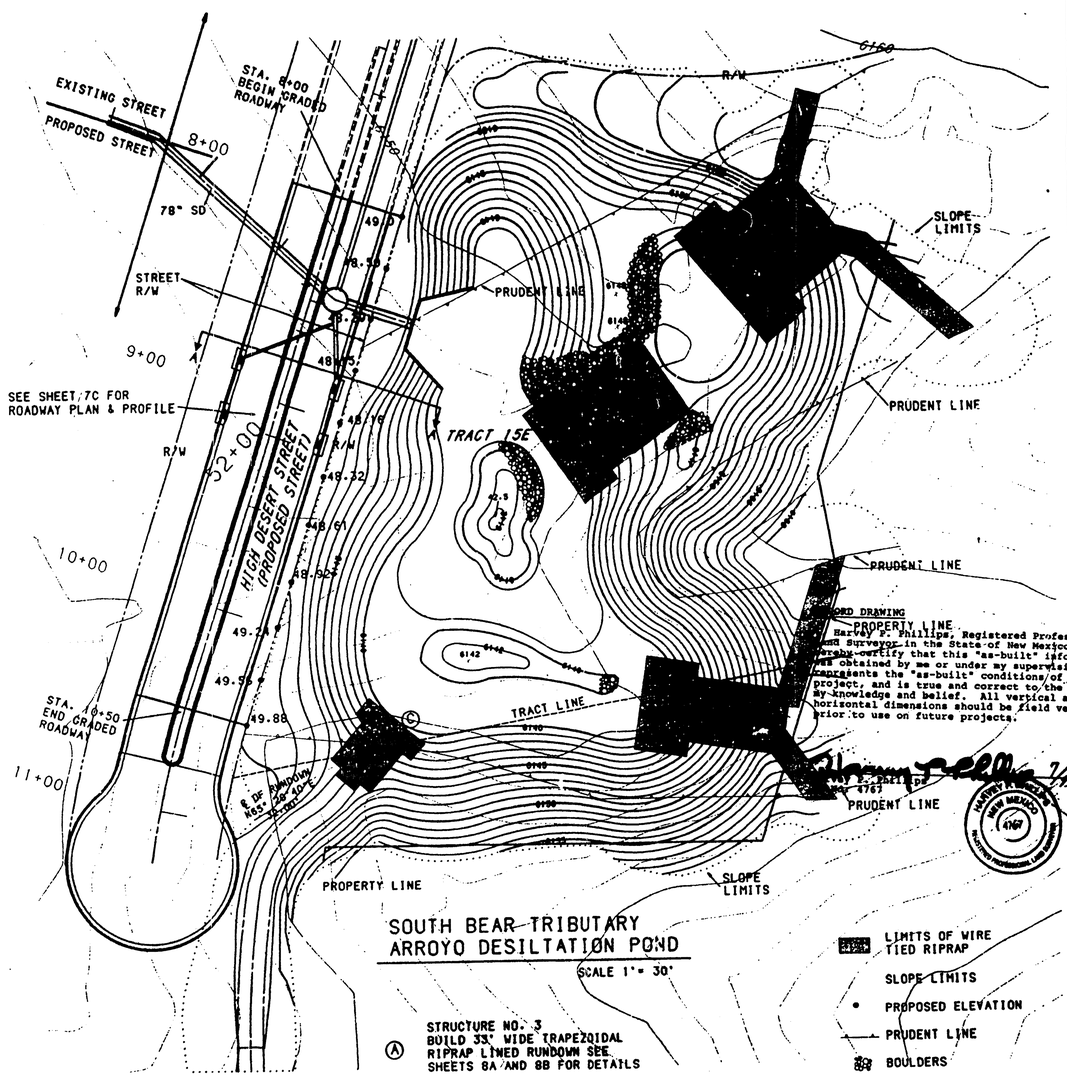




FILENAME: HYDRO-CH9421520.PAB
FILENAME: AC800.60F

NOTES

1. ALL STORM DRAIN SHALL BE CLASS III RCP. UNLESS OTHERWISE NOTED ON THE PLANS.
2. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.
3. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.
4. ANY DAMAGE TO THE EXISTING FACILITIES (CURB AND GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
5. REMOVAL OF THE EXISTING CURB AND GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).
6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
7. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION, AS AMENDED WITH UPDATE #4.
8. STORM DRAIN BUILD NOTE DISTANCES ARE FROM MH TO MH. WYE OR IN LINE VPI. DISTANCES IN PARENTHESIS DENOTE IN TO OUT DISTANCES BETWEEN MH'S WYES OR MATCHLINES. NO DISTANCE DIMENSIONS ARE TO BENDS, UNLESS OTHERWISE NOTED. SLOPES ARE CALCULATED FROM IN TO OUT INVERTS AND DISTANCES.
9. CENTERLINE BEARING DISTANCES ARE FROM BEND TO BEND OR BEND TO MATCHLINE, UNLESS OTHERWISE NOTED.
10. ALL WYES SHALL BE 45° WYES UNLESS OTHERWISE NOTED ON PLANS.



NOTE:

BOULDERS SHALL BE PLACED IN ACCORDANCE WITH THE PLANS AND PLAN QUANTITIES AND DIRECTED BY THE PROJECT MANAGER. BOULDERS SHALL BE A MINIMUM OF 6" DIA. AND SHALL BE PLACED IN LAYERS FROM 1.5' TO 2.0' THICK.

QUANTITIES

ITEM DESCRIPTION	QUANTITIES
DUMPED BOULDERS	132 CY
WIRE TIED RIPRAP	690 CY
GRAVEL FILTER	230 CY

Ⓐ STRUCTURE NO. 3
BUILD 33' WIDE TRAPEZOIDAL RIPRAP LINED RUNDOWN SEE SHEETS 8A AND 8B FOR DETAILS

Ⓑ STRUCTURE NO. 4
BUILD 15' WIDE TRAPEZOIDAL RIPRAP LINED RUNDOWN SEE SHEETS 8A AND 8B FOR DETAILS

Ⓒ STRUCTURE NO. 5
BUILD 12' WIDE TRAPEZOIDAL RIPRAP LINED RUNDOWN SEE SHEETS 8A AND 8B FOR DETAILS

Ⓓ STRUCTURE NO. 6
BUILD 33' WIDE TRAPEZOIDAL RIPRAP LINED RUNDOWN SEE SHEETS 8A AND 8B FOR DETAILS

BMI JOB NO. 94215.20

AS-BUILT INFORMATION

BENCH MARKS
The bench mark is a standard USC&GS brass
CONTRACTOR [illegible]
Tabie stamped "Tumble 1969" set in concrete
[illegible] BY [illegible] DATE
located approximately 489 feet west and 35 feet
north of the intersection of Tramway Street
and San Antonio Drive.
Plane coordinates: X=425 485.55 Y=1513 470.01
Ground-to-grid factor 0.99961970
Elevation = 6009.155 feet

MICRO-FILM INFORMATION
RECORDED BY
DATE

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S CERTIFICATION
Harvey E. Phillips, Registered Professional Engineer and Surveyor in the State of New Mexico, hereby certify that this "as-built" information was obtained by me or under my supervision and represents the "as-built" conditions of this project, and is true and correct to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use on future projects.
[illegible] P.E. & L.S.
NEW MEXICO 4767
REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
7/20/95

RECORD DRAWING
PROPERTY LINE

NO. DATE REMARKS BY
DESIGNED BY CM/RB
DRAWN BY TBH
CHECKED BY HE/CMR
DESIGN
REVISIONS
DATE 11/94
DATE 11/94
DATE 11/94

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT SUBDIVISION PHASE 1-B-1
STORM DRAIN PLAN & PROFILE
ACADEMY STA. 50+50 TO 52+33.74

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
DRC CHAIRMAN	[illegible]	7-27-95	WATER	N/A	
TRANSPORTATION	[illegible]	7-20-95	WASTE WATER		
HYDROLOGY	[illegible]	7-7-95			

DRAWING NO. 4809.95 | MAP NO. E-23 | SHEET 7A OF 11

LOMR FIGURE 7.2.7

[illegible] CITY OF ALBUQUERQUE

HIGH DESERT STREET
STATION 8+00 TO 10+50 [1]

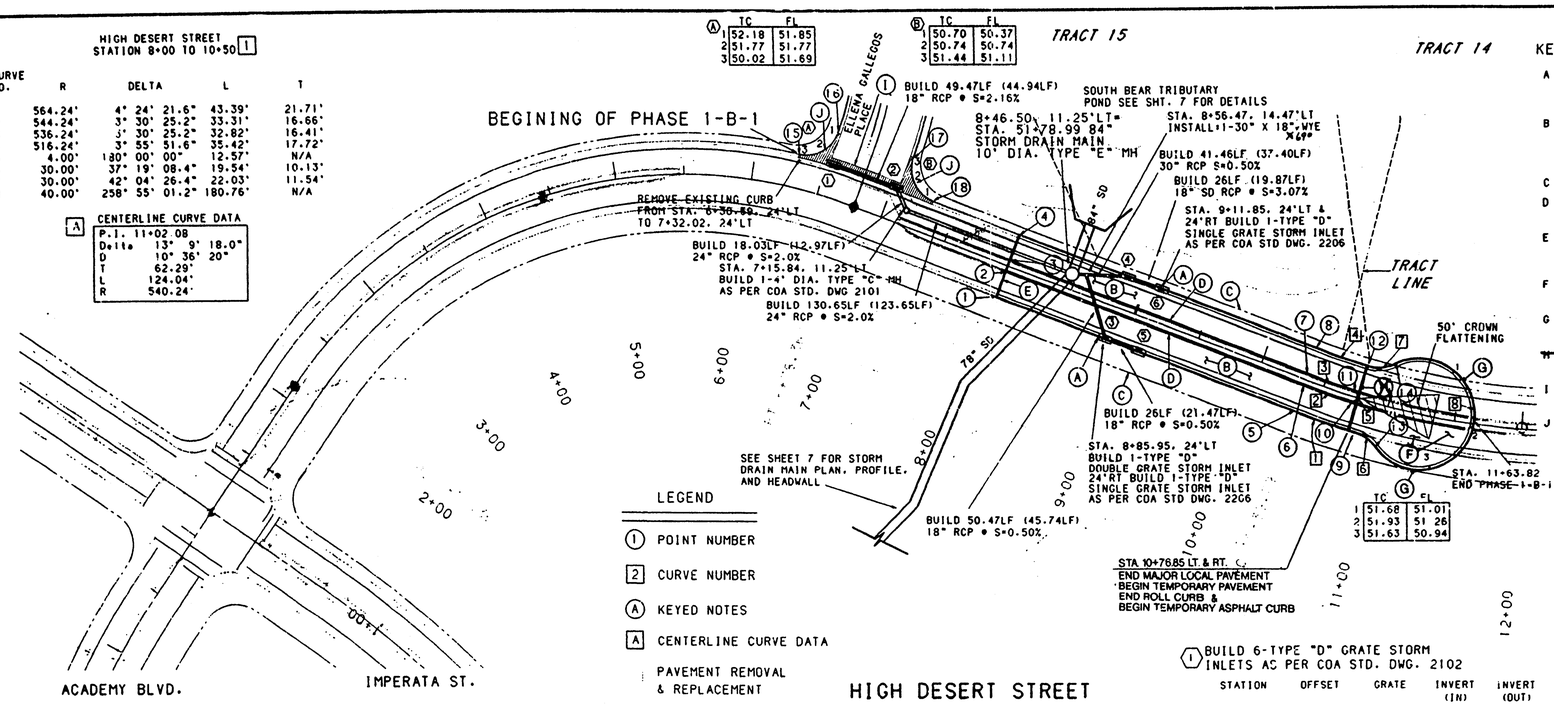
CURVE NO.	R	DELTA	L	T
1	564.24'	4° 24' 21.6"	43.39'	21.71'
2	544.24'	3° 30' 25.2"	33.31'	16.66'
3	536.24'	3° 30' 25.2"	32.82'	16.41'
4	516.24'	3° 55' 51.6"	35.42'	17.72'
5	4.00'	180° 00' 00"	12.57'	N/A
6	30.00'	37° 19' 08.4"	19.54'	10.13'
7	30.00'	42° 04' 26.4"	22.03'	11.54'
8	40.00'	258° 55' 01.2"	180.76'	N/A

[A] CENTERLINE CURVE DATA

P.I.	11+02.08
Delta	13° 9' 18.0"
D	10° 36' 20"
T	62.29'
L	124.04'
R	540.24'

(A)	TC	FL
1	52.18	51.85
2	51.77	51.77
3	50.02	51.69

(B)	IC	FL
1	50.70	50.37
2	50.74	50.74
3	51.44	51.11



TC	FL
1 51.68	51.01
2 51.93	51.26
3 51.63	50.94

LEGEND

(1) POINT NUMBER
[2] CURVE NUMBER
(A) KEYED NOTES
[A] CENTERLINE CURVE DATA
PAVEMENT REMOVAL & REPLACEMENT

KEYED NOTES (A)

A BUILD MOUNTABLE CURB ROLL TYPE AS PER COA STD. DWG. 2415
B BUILD MAJOR LOCAL PAVEMENT SEE THIS SHEET FOR TYPICAL MAJOR LOCAL PAVEMENT SECTION
C PROPOSED RIGHT-OF-WAY LINE
D BUILD MOUNTABLE MEDIAN CURB ROLL TYPE AS PER DETAIL THIS SHEET.
E BEGINING OF PAVEMENT (END OF PHASE 1-A). REMOVE EXISTING CUTOFF WALL.
F BUILD TEMPORARY PAVEMENT. SEE THIS SHEET FOR TEMPORARY PAVEMENT SECTION.
G BUILD 8" TEMPORARY ASPHALT CURB AS PER COA STD. DWG. 2415.
~~H BUILD CUTOFF WALL AS PER COA STD. DWG. 2415.~~
I BUILD CONCRETE VALLEY GUTTER AS PER COA STD DWG. 2420.
J DEPRESS CURB FOR FUTURE WHEELCHAIR RAMP.

(1) BUILD 6-TYPE "D" GRATE STORM INLETS AS PER COA STD. DWG. 2102

	STATION	OFFSET	GRATE	INVERT (IN)	INVERT (OUT)	TYPE
1	6+55.20	24.00'LT	6151.44	N/A	6147.44	SINGLE
2	7+03.09	24.00'LT	6150.47	6146.47	6146.27	SINGLE
3.	8+85.95	24.00'RT	6147.69	6143.66	6143.56	SINGLE
4.	8+85.95	24.00'LT	6147.69	6143.16	6142.96	DOUBLE
5•	9+11.95	24.00'RT	6147.77	N/A	6143.77	SINGLE
6•	9+11.95	24.00'LT	6147.77	N/A	6143.77	SINGLE

NOTE:
TYPE "D" STORM INLET GRATES WITH • SHALL BE NEENAH GRATE OR APPROVED EQUAL.

SCALE: 1" = 50' HORIZ.

NOTES

1. ALL STORM DRAIN SHALL BE CLASS III RCP. UNLESS OTHERWISE NOTED ON THE PLANS.
2. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.
3. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.
4. ANY DAMAGE TO THE EXISTING FACILITIES (CURB AND GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
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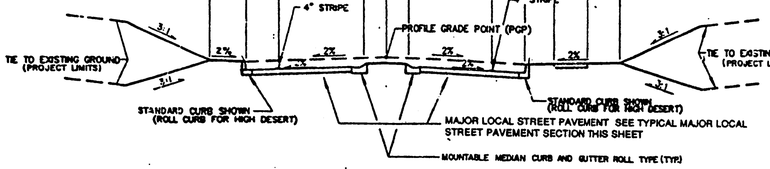
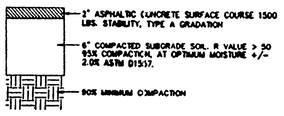
9. CENTERLINE BEARING DISTANCES ARE FROM BEND TO BEND OR BEND TO MATCHLINE. UNLESS OTHERWISE NOTED.
10. ALL WYES SHALL BE 45° WYES UNLESS OTHERWISE NOTED ON PLANS.

PAVING NOTES

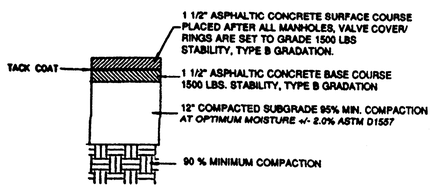
1. ALL CURB DATA AND DIMENSIONS REFER TO FACE OF CURB UNLESS OTHERWISE SPECIFIED.
2. GRADE ELEVATIONS, WHERE NOTED ARE FOR TOP OF STANDARD CURB UNLESS OTHERWISE SPECIFIED.
3. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.
4. REMOVAL OF EXISTING PAVEMENT SHALL BE BY SAWCUT ONLY.



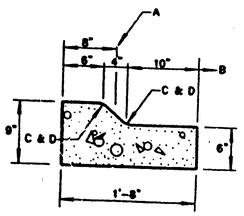
DIVIDED MAJOR LOCAL STREETS – SECTION C-C
NOT TO SCALE



TEMPORARY PAVEMENT SECTION
NOT TO SCALE



TYPICAL MAJOR LOCAL STREET PAVEMENT SECTION
NOT TO SCALE



MOUNTABLE MEDIAN CURB AND GUTTER ROLL TYPE DETAIL
N.T.S.

CURB CONSTRUCTION NOTES

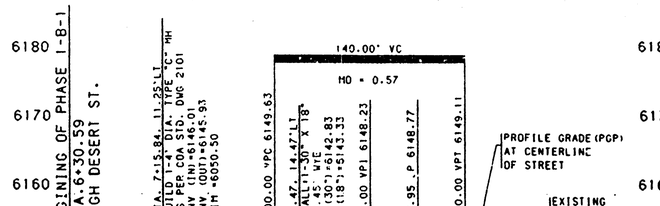
A. THEORITICAL FACE OF CURB
B. TRAFFIC SIDE
C. 2" RADIUS
D. DIMENSION AT ROUNDED CORNERS MEASURED TO INTERSECTION OF STRAIGHT LINES

RECORD DRAWING

I, ~~Harvey P. Phillips~~, Registered Professional Land Surveyor in the State of New Mexico, do hereby certify that this "as-built" information was obtained by me or under my supervision and represents the "as-built" conditions of this project, and is true and correct to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use on future projects.

HARVEY P. PHILLIPS NEW MEXICO 4767 REGISTERED PROFESSIONAL LAND SURVEYOR

Harvey P. Phillips 7/5/95
Harvey P. Phillips Date
LS No. 4767



SCALE: 1" = 50' (HORIZ.) 1" = 10' (VERT.)

AS-BUILT INFORMATION			
BENCH MARKS	CONTRACTOR Joe Concrete Inc.		
The bench mark is a standard USCAGS brass	WORK INSPECTED BY M.B. Phillips	DATE 8-22-95	
tablet stamped "Tumble 1969" set in concrete	INSPECTOR'S ACCEPTANCE BY J.S.	DATE 8-22-95	
located approximately 489 feet east and 35 feet	CERTIFICATION BY	DATE	
north of the intersection of Tennyson Street	CORRECTED BY M.G.	DATE 8-22-95	
and San Antonio Drive.			

SURVEY INFORMATION		
FIELD NOTES		
NO.	BY	DATE

ENGINEER'S SEAL			
NO.	BY	DATE	REMARKS
1	MG	8-22-95	AS-BUILT

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT SUBDIVISION PHASE
PAVING AND STORM DRAIN PLAN & PROF
HIGH DESERT ST. STA. 6+30.59 TO STA. 1

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER
DRC CHAIRMAN		8-23-95	WATER	N/A
TRANSPORTATION		8-10-95	WASTE WATER	
HYDROLOGY		8-8-95		

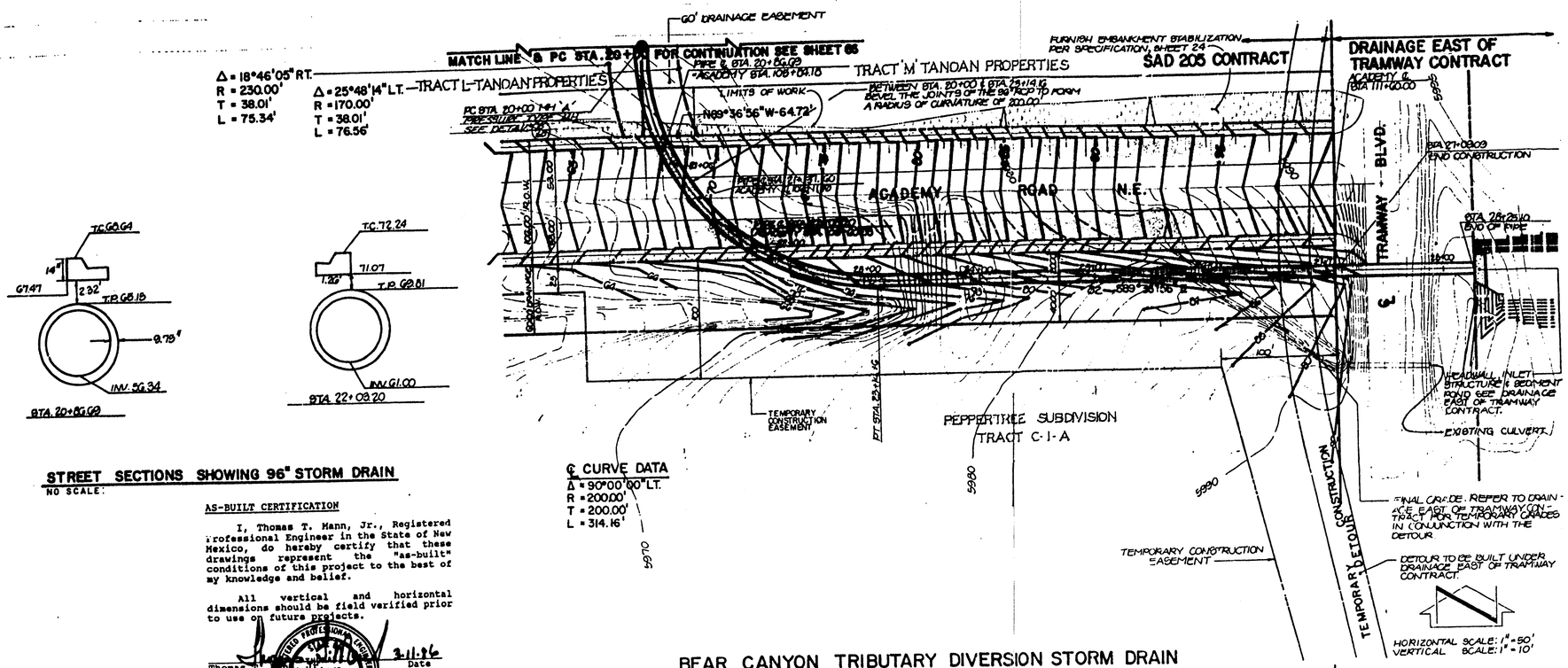
DRAWING NO. 4809.95 | MAP NO. E-23 | SHEET 7C 7

USERNAME: HYDRO[M9421520.PAT]
FILENAME: HDSHT1.GRF

D 24 C 20 B 16 A 12

LOMR FIGURE 7.2.8

CITY OF ALBUQUERQUE



STREET SECTIONS SHOWING 96" STORM DRAIN

NO SCALE

AS-BUILT CERTIFICATION

I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr.
NMPE & LS No. 3792

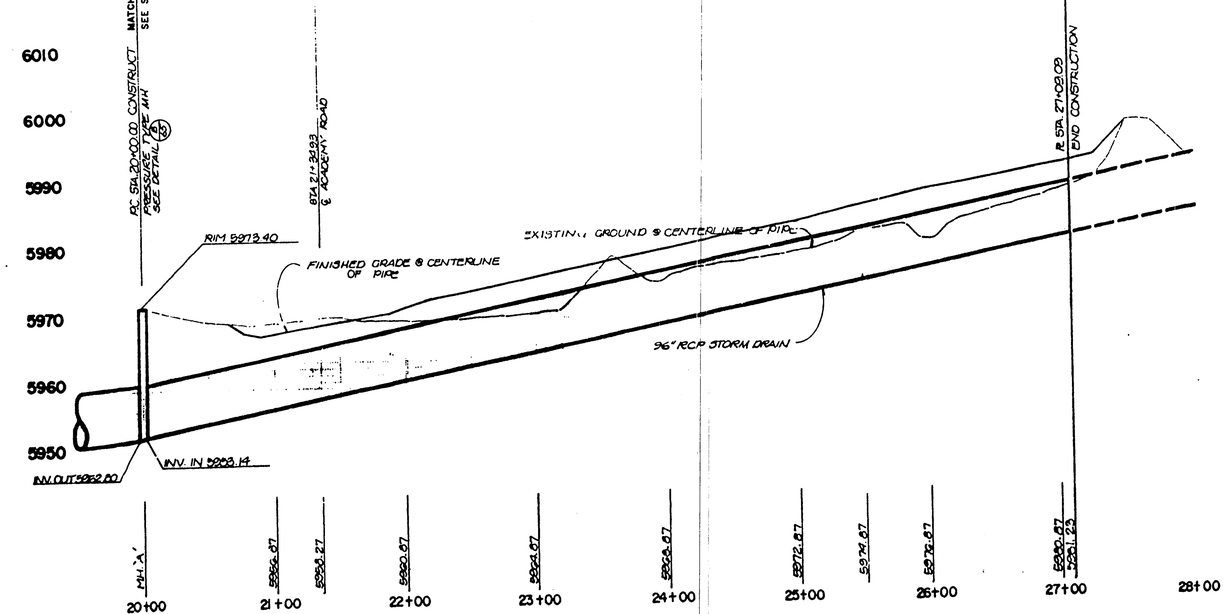
3-1-96
Date

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
THOMAS T. MANN, JR.
3792
NEW MEXICO

6010

BEAR CANYON TRIBUTARY DIVERSION STORM DRAIN

702.39' OF 96" RCP CLASS III @ S = 0.0400



GENERAL NOTES

1. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
2. Bedding for pipe shall be Class B (NMSHD M-16-71), which includes a 2" minimum thickness sand cushion.
3. Coordinate construction with detour plans as shown in Drainage East of Tramway Contract.
4. Westerly R.O.W. at Tramway Boulevard is the boundary for SAD 205. Construction east of the boundary is part of the Drainage East of Tramway Contract.

CONSTRUCTION SEQUENCING: THE CONTRACTOR SHALL COORDINATE WORK PERFORMED UNDER THIS CONTRACT WITH IMPROVEMENTS CONTAINED WITHIN THE DRAINAGE STRUCTURES EAST OF TRAMWAY CONTRACT. CONSTRUCTION OF IMPROVEMENTS MUST BE PERFORMED IN THE FOLLOWING SEQUENCE:

1. THE DRAINAGE STRUCTURE EAST OF TRAMWAY CONTRACTOR SHALL CONSTRUCT PINO TRIBUTARY CROSSING AT TRAMWAY. THIS CROSSING STUCTURE MUST BE COMPLETED AND IN PLACE PRIOR TO CONSTRUCTION OF THE UPPER DIVERSION BERM.
2. THE DRAINAGE STRUCTURE EAST OF TRAMWAY CONTRACTOR SHALL CONSTRUCT UPPER DIVERSION BERM. THE BERM MUST BE IN PLACE PRIOR TO IMPLEMENTATION OF DOWNSTREAM FACILITIES.
3. THE SAD 205 CONTRACTOR SHALL CONSTRUCT 96" DIVERSION STORM DRAIN STARTING AT THE OUTLET STRUCTURE AND PROCEEDING UPSTREAM TO TRAMWAY BOULEVARD.
4. THE DRAINAGE STRUCTURE EAST OF TRAMWAY CONTRACTOR SHALL CONSTRUCT THE BEAR TRIBUTARY CROSSING STRUCTURE WHEN THE SAD 205 CONTRACTOR COMPLETES THE 96" DIVERSION STORM DRAIN DOWNSTREAM FROM TRAMWAY BOULEVARD. THE CROSSING STRUCTURE, INLET STRUCTURE, AND SEDIMENT POND MUST BE IN PLACE PRIOR TO THE CONSTRUCTION OF THE BEAR TRIBUTARY STORM DRAIN BETWEEN EUBANK AND LOWELL (SAD 205).
5. THE DRAINAGE STRUCTURE EAST OF TRAMWAY CONTRACTOR SHALL REMOVE THE DETOUR USED TO CONSTRUCT THE TRAMWAY CROSSING AND REGRADE WEST OF EUBANK TO MATCH ORIGINAL.
6. THE SAD 205 CONTRACTOR SHALL GRADE THE AREA WEST OF TRAMWAY TO FINISH GRADE SHOWN IN THESE PLANS.
7. SAD 205 CONTRACTOR SHALL CONSTRUCT BEAR TRIBUTARY STORM DRAIN FROM EUBANK TO LOWELL.
8. ALL DRAINAGE FACILITIES MUST BE COMPLETE AND IN PLACE PRIOR TO CONSTRUCTION OF OTHER IMPROVEMENTS WITHIN THE BEAR TRIBUTARY FLOODPLAIN.

A STANDARD A.C.S. BRASS TABLET STAMPED "G 22 L 9 1972" SET IN THE TOP OF A CONCRETE POST LOCATED 375' SOUTH OF ACADEMY ROAD AND APPROXIMATELY 1 m 2 MILES EAST OF EUBANK BLVD. ON THE SOUTH RIM OF THE BEAR TRIBUTARY.
ELEVATION = 5994.53

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
THOMAS T. MANN, JR.
NEW MEXICO
3792

26 17216185

BEAR CANYON TRIBUTARY DIVERSION
STORM DRAIN PLAN & PROFILE
STA 20+00 TO STA 27+09.09

C. W. Hayman 7/1/81
7/1/81
Jim Zink 7/2/81

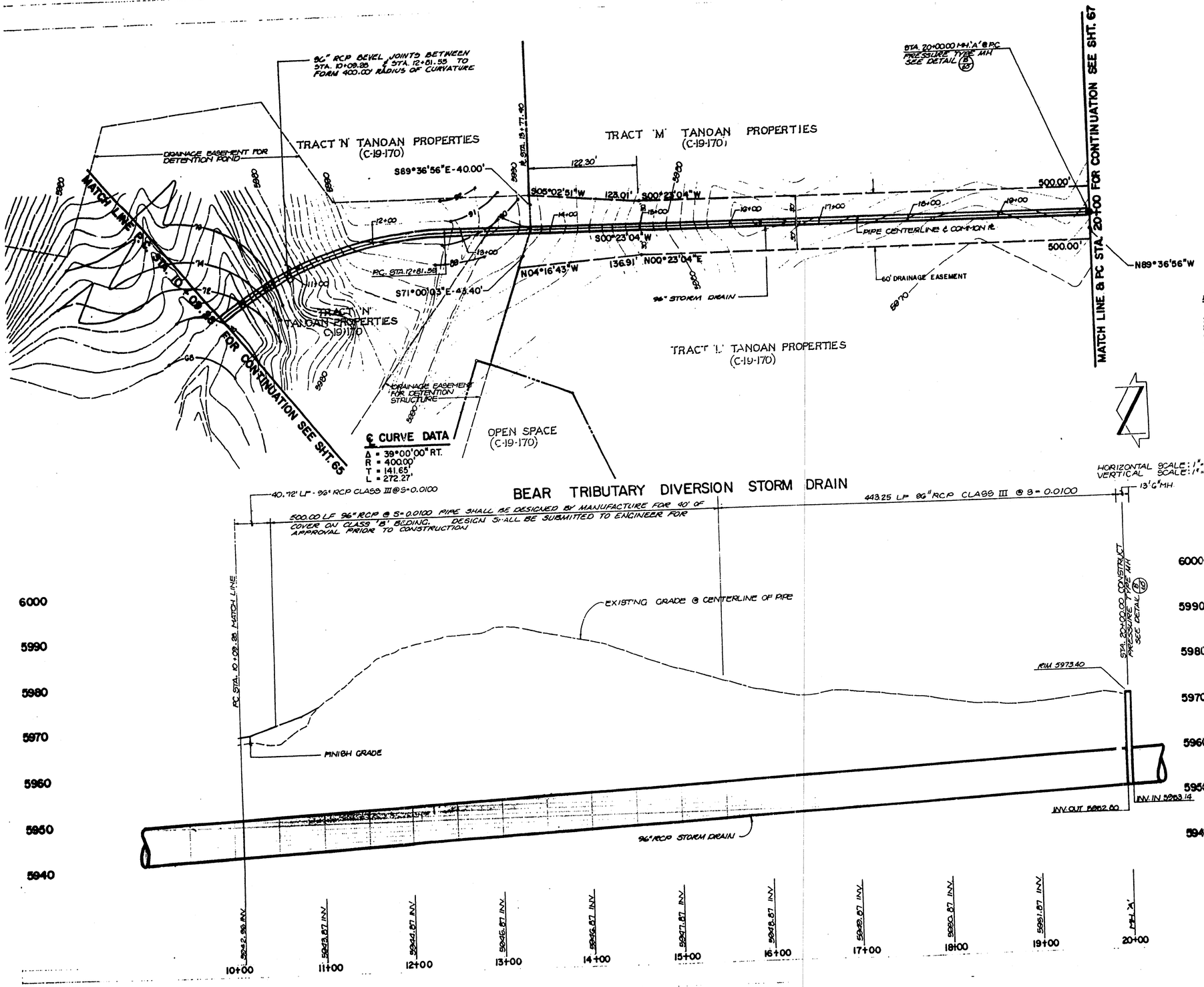
R. Rios 7/1/81
NA DAH 7/1/81
R. Rios 7/1/81

1721 67 87

LOMR FIGURE 7.2 12

L C B A

CITY OF ALBUQUERQUE



GENERAL NOTES

1. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
2. Bedding for pipe shall be Class B (NMSHD M-16-71), which includes a 2" minimum thickness sand cushion.

A 'X' CUT ON TOP OF THE CONCRETE CURB LOCATED ON THE NNE CURB RETURN AT THE INTERSECTION OF CARRUTHERS RD. AND CONNAUGHT CT. IN THE NORTHEAST QUADRANT OF THE INTERSECTION. (ALBUQ. B.M. 19-F22) ELEVATION = 5787.30

AS-BUILT CERTIFICATION

I, Thomas T. Mann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Mann, Jr. NMPE & LS No. 3792 — Date 3-11-96

STATE OF NEW MEXICO — REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR — THOMAS T. MANN, JR. — 3792

STATE OF NEW MEXICO — REGISTERED PROFESSIONAL ENGINEER — THOMAS T. MANN, JR. — 3792

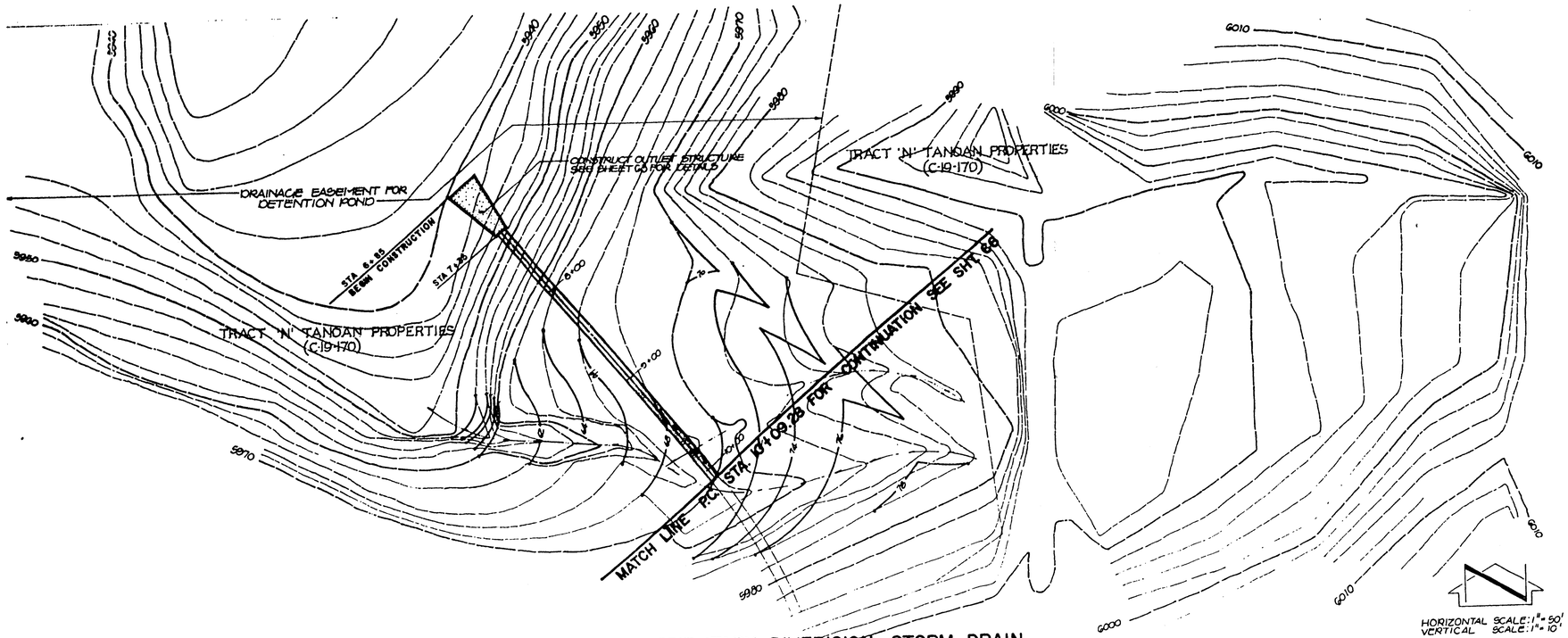
BEAR CANYON TRIBUTARY
STORM DRAIN PLAN & PROFILE
STA. 10+09.28 TO STA. 20+00

[illegible]	7/6/94	R. Brito 7/1/94
[illegible]	7/6/94	W.B. Dow 7/1/94
[illegible]	7/6/94	R. Brito 7/1/94

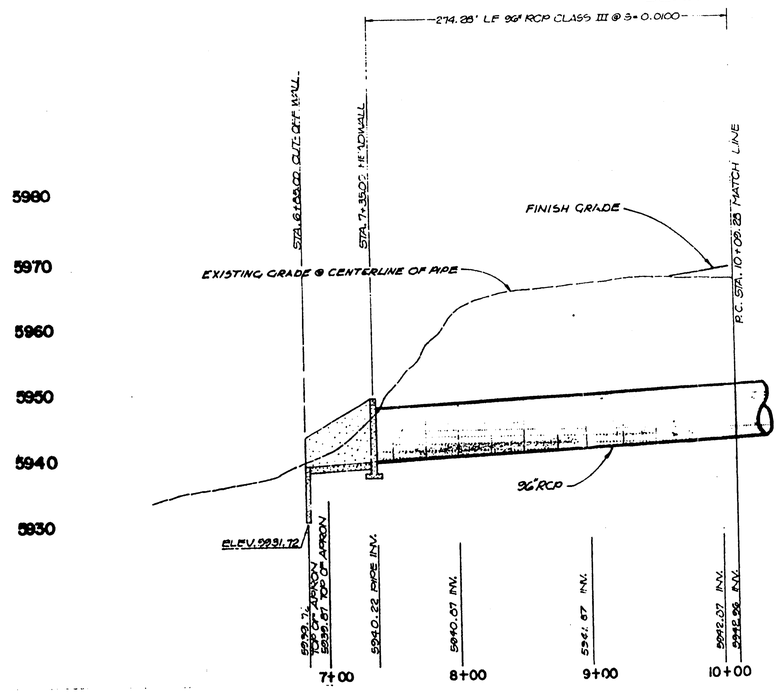
1721 — 66 — 87

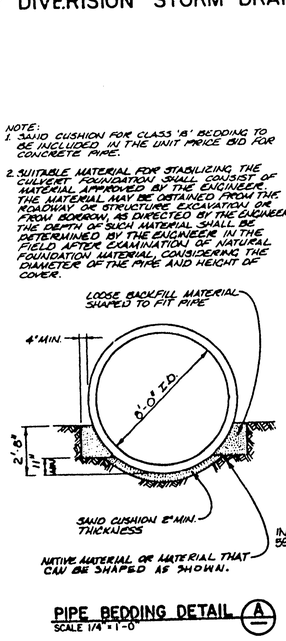
LOMR FIGURE 7.2.2 II

CITY OF ALBUQUERQUE

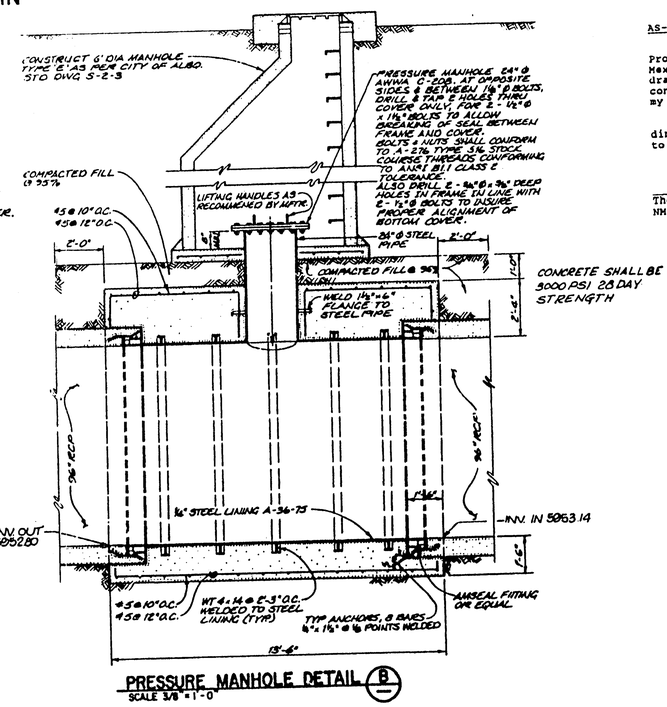


BEAR TRIBUTARY DIVERISION STORM DRAIN





PIPE BEDDING DETAIL (A)
SCALE 1/4" = 1'-0"



PRESSURE MANHOLE DETAIL (B)
SCALE 3/8" = 1'-0"

GENERAL NOTES

1. All trench fill shall be compacted to a minimum density of 95% of optimum (modified) A.S.T.M. D1557.
2. Bedding for pipe shall be Class B (NMSBD M-16-71), which includes a 2" minimum thickness sand cushion.

A STANDARD A.C.S. BRASS TABLET STAMPED "G-22 LS 4972" SET IN THE TOP OF A CONCRETE POST LOCATED 378' SOUTH OF ACADEMY ROAD AND APPROXIMATELY 1 1/2 MILES EAST OF EUBANK BLVD. ON THE SOUTH RIM OF THE BEAR TRIBUTARY.
ELEVATION = 5934.53

AS-BUILT CERTIFICATION

I, Thomas T. Hann, Jr., Registered Professional Engineer in the State of New Mexico, do hereby certify that these drawings represent the "as-built" conditions of this project to the best of my knowledge and belief.

All vertical and horizontal dimensions should be field verified prior to use on future projects.

Thomas T. Hann, Jr. NMPE & LS No. 3792 — Date 3-11-86

BEAR CANYON TRIBUTARY DIVERSION
STORM DRAIN PLAN & PROFILE
STA. 6+85 TO STA. 10+09.28

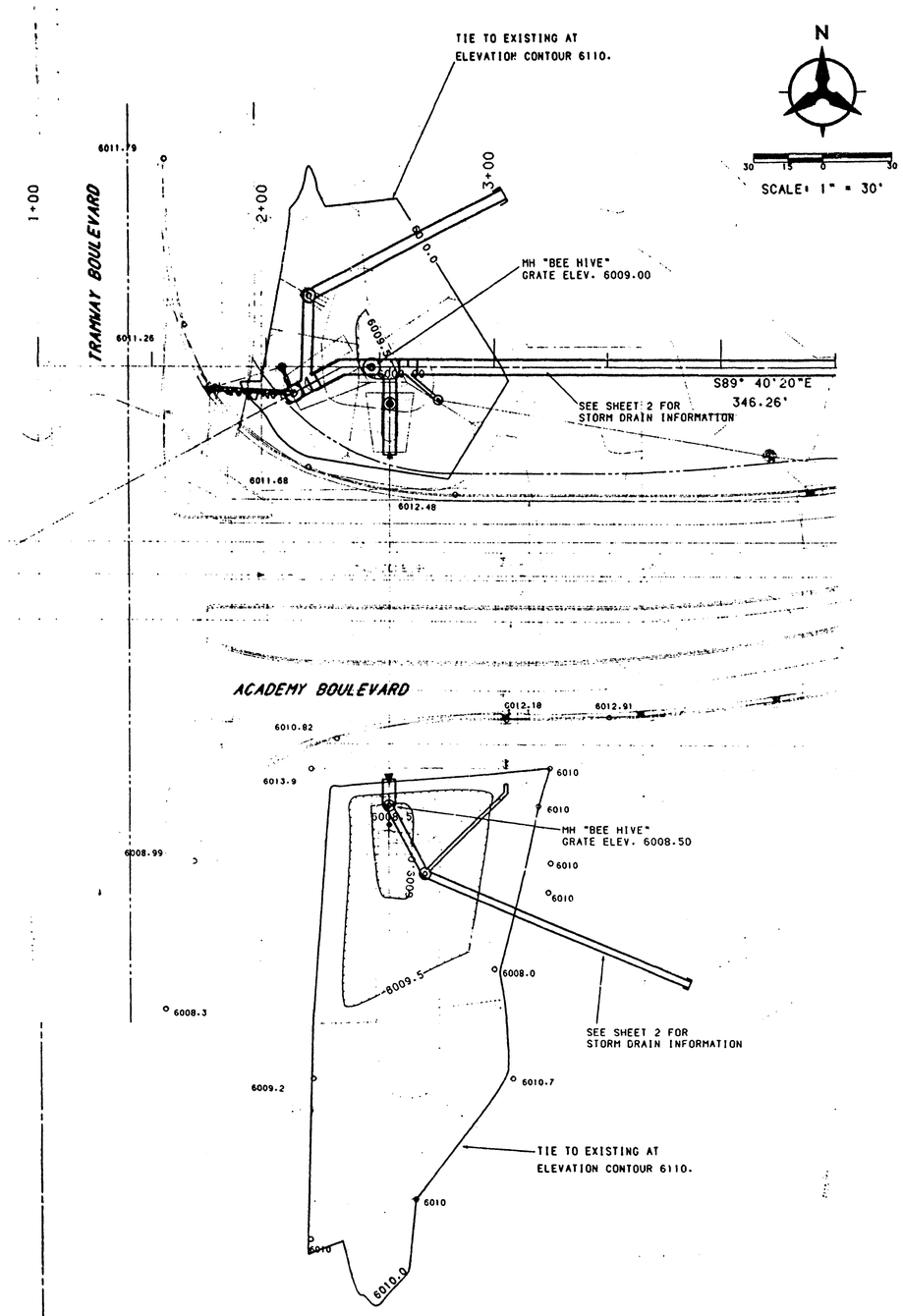
C. Hann	7/2/84	R. Peters	7/2/84
T. Hann	7/2/84	M. Hann	7/2/84
Jim Smith	7/2/84	R. Peters	7/2/84

1721 65 87

LOMR FIGURE 7.2.10

LSBA

CITY OF ALBUQUERQUE

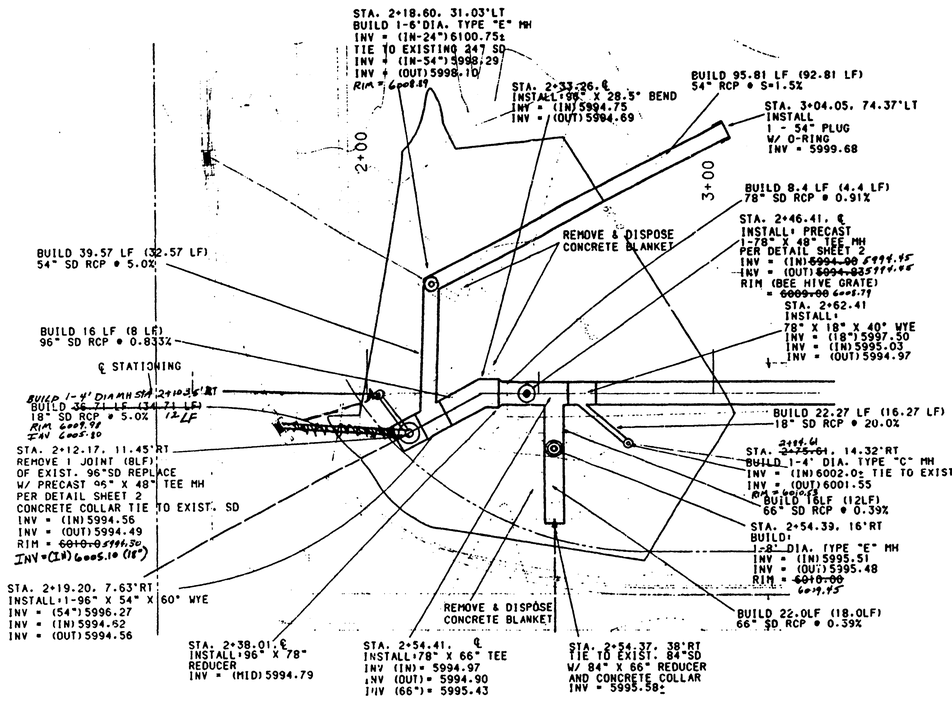


TRAMWAY PONDS GRADING PLAN

SCALE: 1" = 30'

NOTES:

1. FILL PONDS TO FINAL DESIGN CONTOURS AND SPOT ELEVATIONS.
2. FILL SHALL BE COMPACTED TO MINIMUM 95% COMPACTION.



DETAIL "B"

SEE SHEET 27B

SCALE 1" = 20'

NOTE: ALL MANHOLE BEE HIVE GRATES SHALL BE NEENAH MODEL R-2561 OR APPROVED EQUAL.

RECORD DRAWING

I, Harvey P. Phillips, Registered Professional Land Surveyor in the State of New Mexico, do hereby certify that this "as-built" information was obtained by me or under my supervision and represents the "as-built" conditions of this project, and is true and correct to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use on future projects.

Harvey P. Phillips 7/16
Harvey P. Phillips Date
LS No. 4767

HARVEY P. PHILLIPS NEW MEXICO 4767 REGISTERED PROFESSIONAL LAND SURVEYOR

BHI JOB NO. 94215.20

AS BUILT INFORMATION

BENCH MARKS

The bench mark is a standard USC&GS brass tablet stamped "Tumbleweed 1969" set in concrete located approximately 489 feet west and 35 feet north of the intersection of Tramway Street and San Antonio Drive.

Plane coordinates: X=425 465.55 Y=1513 470.01
Grid-to-grid factor 0.99961970

CONTRACTOR New Concepts Inc.

INSPECTOR'S ACCEPTANCE
STAKED BY H.P. Phillips DATE 2/5
VERIFICATION BY J.S. DATE 7/16
CORRECTED BY M.C. DATE 7/16

MICRO-FILM INFORMATION
RECORDED BY DATE

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

NO.	DATE	BY	REMARKS
			REVISIONS
			DESIGN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
2C-4809.95 09195

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

HIGH DESERT SUBDIVISION PHASE 1

TRAMWAY PONDS GRADING PLAN & MISC DETAI

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER
DRC CHAIRMAN		11-3-94	WATER	
TRANSPORTATION		11-12-94	WASTE WATER	
HYDROLOGY		11-9-94		

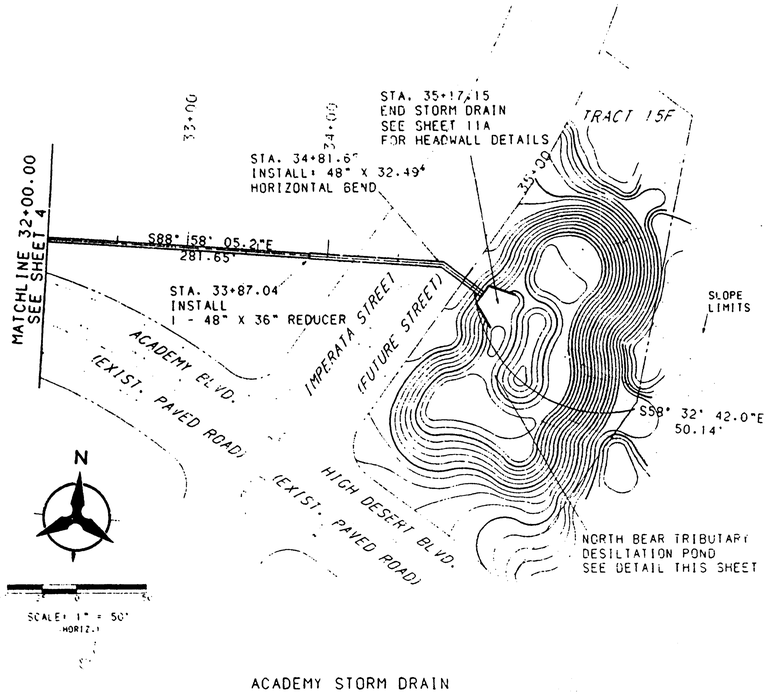
DRAWING NO. 4809.95 | MAP NO. E23.F23 | SHEET 9

USERNAME: HYDRO-(LM942520.PAD)
FILENAME: IR:\PONDS-3C.CRF

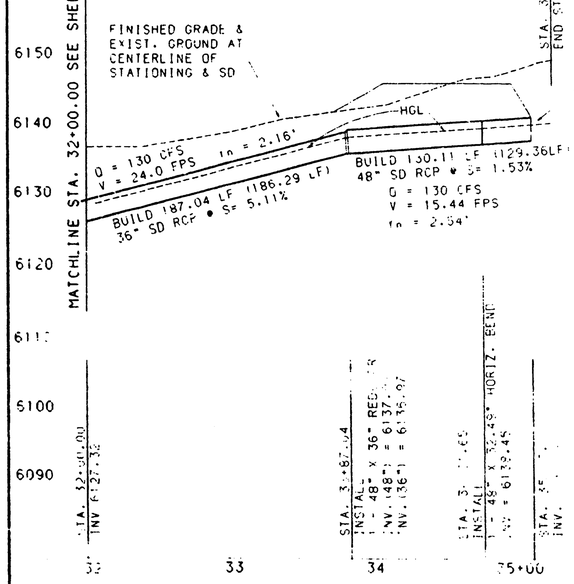
LOMR FIGURE 7.2.9

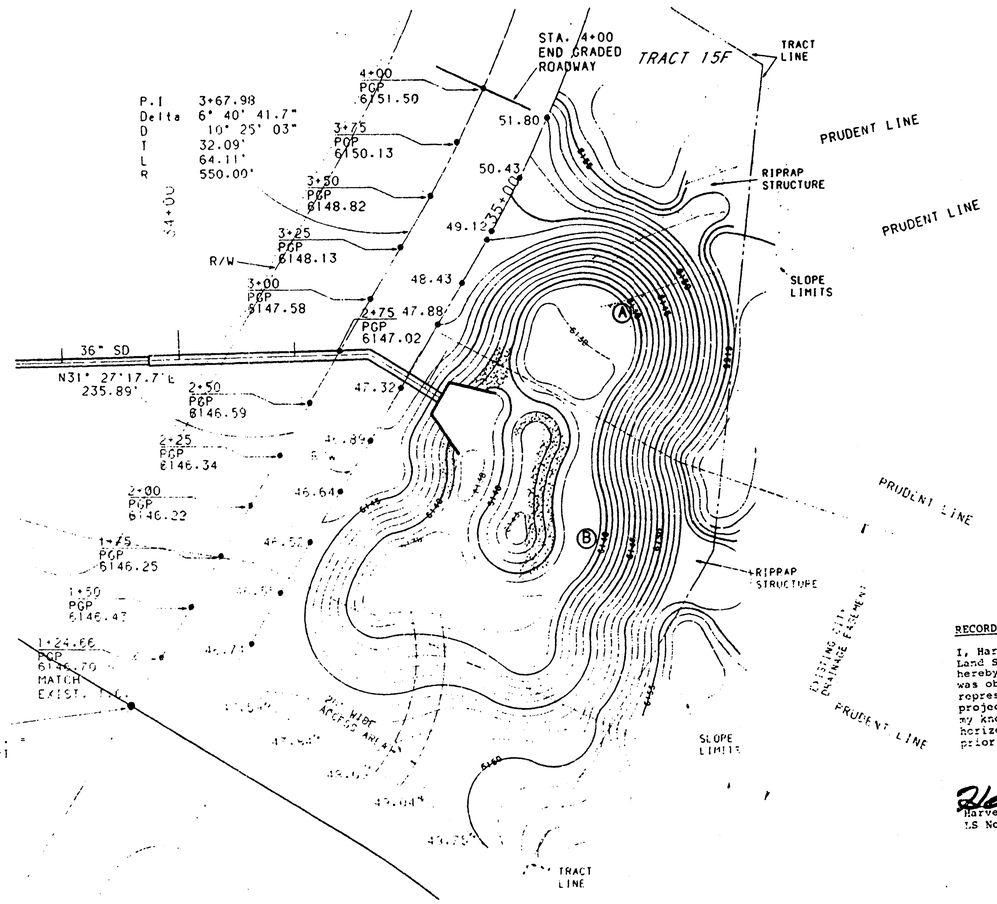
D 24 C 20 B 16 A 12

CITY OF ALBUQUERQUE



ACADEMY STORM DRAIN





NOTES

1. ALL STORM DRAIN SHALL BE CLASS III RCP, UNLESS OTHERWISE NOTED ON THE PLANS.

2. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.

3. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.

4. ANY DAMAGE TO THE EXISTING FACILITIES (CURB AND GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

5. REMOVAL OF THE EXISTING CURB AND GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).

6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

7. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION, AS AMENDED WITH UPDATE #4.

8. STORM DRAIN BUILD NOTE DISTANCES ARE FROM MH TO MH, WYE OR IN LINE VPI. DISTANCES IN PARENTHESIS DENOTE IN TO OUT DISTANCES BETWEEN MH'S WYES OR MATCHLINES. NO DISTANCE DIMENSIONS ARE TO BENDS, UNLESS OTHERWISE NOTED. SLOPES ARE CALCULATED FROM IN TO OUT INVERTS AND DISTANCES.

9. CENTERLINE BEARING DISTANCES ARE FROM BEND TO BEND OR BEND TO MATCHLINE UNLESS OTHERWISE NOTED.

10. ALL WYES SHALL BE 45° WYES UNLESS OTHERWISE NOTED ON PLANS.

AS-BUILT INFORMATION

BENCH MARKS

CONTRACTOR New Concepts Inc. DATE

SURVEYED BY H.P. Phillips DATE

INSPECTOR'S ACCEPTANCE BY JS DATE 7/95

VERIFICATION BY JS DATE 7/95

CORRECTED BY AG DATE 7/95

MICRO-FILM INFORMATION

RECORDED BY DATE

NO.

FIELD NOTES

The Bench mark is a standard USC&GS brass tablet stamped "Tumbo 1969" set in concrete located approximately 489 feet west and 35 feet north of the intersection of Tennyson Street and San Antonio Drive.

Plane coordinates N=425 465.55 E=1513 470.01

Ground-to-grid factor 0.99961970

Elevation = 6009.155 feet

RECORD DRAWING

I, Harvey P. Phillips, Registered Professional Land Surveyor in the State of New Mexico, do hereby certify that this "as-built" information was obtained by me or under my supervision and represents the "as-built" conditions of this project, and is true and correct to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use on future projects.

Harvey P. Phillips
NS No. 4767

7/9/95
Date

HARVEY P. PHILLIPS
NEW MEXICO
4767
REGISTERED PROFESSIONAL LAND SURVEYOR

NORTH BEAR TRIBUTARY
ARROYO DESILTATION POND

SCALE 1" = 30'

(A) STRUCTURE NO. 1
BUILD 12' WIDE TRAPEZOIDAL RIPRAP LINED RUNDOWN SEE SHEETS 8A AND 8B FOR DETAILS

(B) STRUCTURE NO.2
BUILD 27' WIDE TRAPEZOIDAL RIPRAP LINED RUNDOWN SEE SHEETS 8A AND 8B FOR DETAILS

LIMITS OF WIRE TIED RIPRAP
SLOPE LIMITS
PROPOSED ELEVATION
EXISTING ELEVATION
PRUDENT LINE
BOULDERS

NOTE:
BOULDERS SHALL BE PLACED IN ACCORDANCE WITH THE PLANS AND PLAN QUANTITIES AND DIRECTED BY THE PROJECT MANAGER. BOULDERS SHALL BE A MINIMUM OF 6' DIA. AND SHALL BE PLACED IN LAYERS FROM 1.5' TO 2.0' THICK.

QUANTITIES

ITEM DESCRIPTION	QUANTITIES
DUMPED BOULDERS	100CY
WIRE TIED RIPRAP	325CY
GRAVEL FILTER	108CY

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT [illegible] DIVISION PHASE I-B
ST[illegible] & PROFILE
ACADEMY [illegible] 32+00 TO 35+17.15

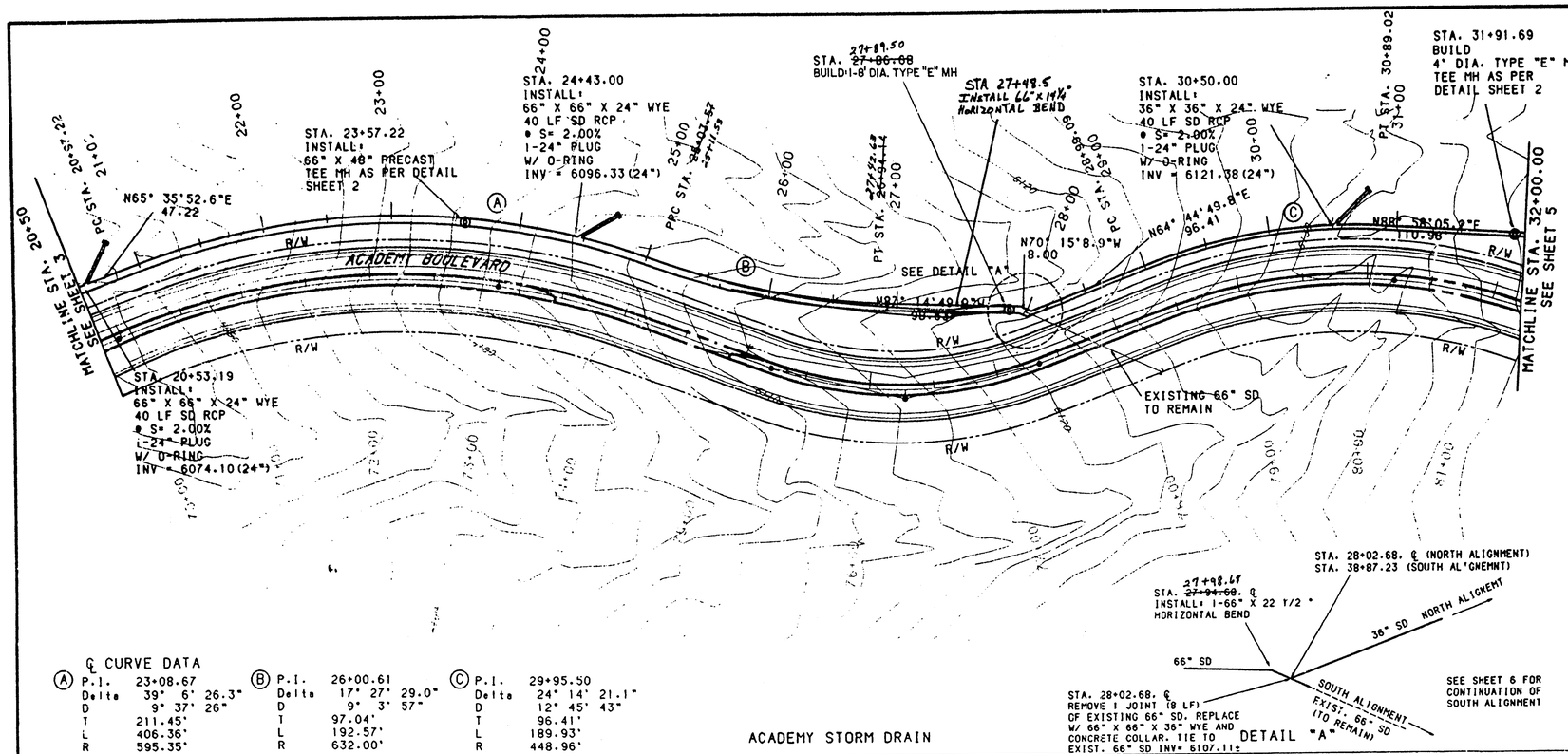
APPROVALS		DATE	APPROVALS	ENGINEER	DA
DRC CHAIRMAN					
TRANSPORTATION DIV.	S.G.S.	2-23-95	MAI	V.P.	
UTILITIES DEV.	[illegible]	2-10-95	UTILITIES		
CITY ENGINEER	Hunter	2-23-95			

DRAWING NO. 4809.95 | MAP NO. E-23 | SHEET NO. 5A

LOMR FIGURE 7.2.5

D 24 C 20 B 16 A 12

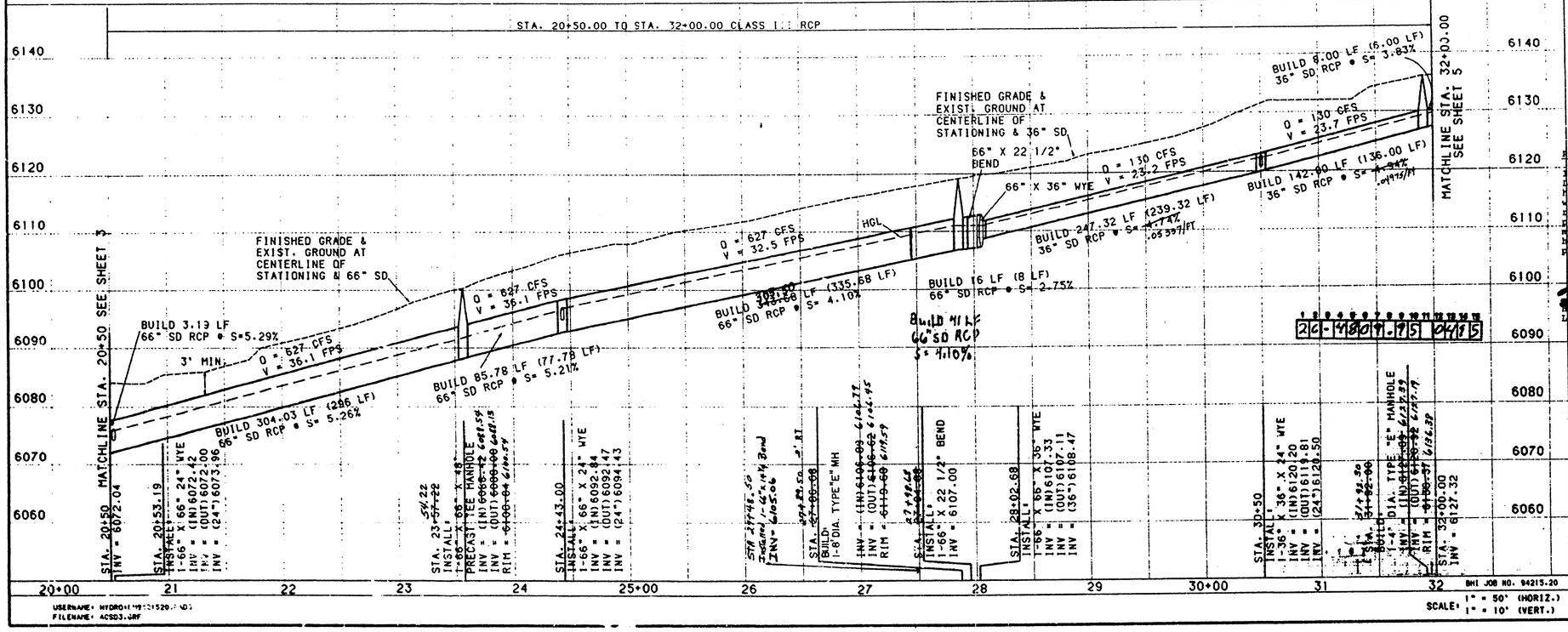
CITY OF ALBUQUERQUE



℄ CURVE DATA

(A)		(B)		(C)	
P.I.	23+08.67	P.I.	26+00.61	P.I.	29+95.50
Delta	39° 6' 26.3"	Delta	17° 27' 29.0"	Delta	24° 14' 21.1"
D	9° 37' 26"	D	9° 3' 57"	D	12° 45' 43"
T	211.45'	T	97.04'	T	96.41'
L	406.36'	L	192.57'	L	189.93'
R	595.35'	R	632.00'	R	448.96'

ACADEMY STORM DRAIN



USERNAME= HYDRO1
FILENAME= ACSD3.DRF

SCALE: 1" = 50' (HORIZ.)
1" = 10' (VERT.)

NOTES

1. ALL STORM DRAIN SHALL BE CLASS III RCP, UNLESS OTHERWISE NOTED ON THE PLANS.

2. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.

3. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.

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6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

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8. STORM DRAIN BUILD NOTE DISTANCES ARE FROM MH TO MH, WYE OR IN LINE VPI. DISTANCES IN PARENTHESIS DENOTE IN TO OUT DISTANCES BETWEEN MH'S WYES OR MATCHLINES. NO DISTANCE DIMENSIONS ARE TO BENDS, UNLESS OTHERWISE NOTED. SLOPES ARE CALCULATED FROM IN TO OUT INVERTS AND DISTANCES.

9. CENTERLINE BEARING DISTANCES ARE FROM BEND TO BEND OR BEND TO MATCHLINE, UNLESS OTHERWISE NOTED.

10. ALL WYES SHALL BE 45° WYES UNLESS OTHERWISE NOTED ON PLANS.

AS-BUILT INFORMATION

BENCH MARKS
The bench mark is a standard USC&GS brass
FIELD NOTES
NO. | BY | DATE
Established stamped "Tumble 1968" set in concrete located approximately 489 feet west and 35 feet north of the intersection of Tennyson Street and San Antonio Drive.

SURVEY INFORMATION
CONTRACTOR Lew Concrete Inc.
SURVEYED BY H.P. Phillips
INSPECTION'S ACCEPTANCE BY Bob DATE 7/6/
VERIFICATION BY JS DATE 7/6/
CHECKED BY AG DATE 7/6/
MICRO-FILM INFORMATION
Plane coordinates X=425 465.55 Y=1513 470.01
Ground-to-grid factor 0.99961970
RECORDED BY
DATE
MD.

ENGINEER'S SEAL

RECORD DRAWING

I, Harvey P. Phillips, Registered Professional Land Surveyor in the State of New Mexico, do Hereby certify that this "as-built" information was obtained by me or under my supervision and represents the "as-built" conditions of this project, and is true and correct to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use on future projects.

Harvey P. Phillips 7/6
Harvey P. Phillips Date
LS No. 4767

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY CM/DEB	DATE 9/94
		DRAWN BY TONY M.	DATE 9/94
		CHECKED BY JKS/DRM	DATE 9/94

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT SUBDIVISION PHASE 1-B-1
STORM DRAIN PLAN & PROFILE
ACADEMY STA. 20+50 TO 32+00

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
DRC CHAIRMAN		11-3-94	WATER		
TRANSPORTATION		10-12-94	WASTE WATER		
HYDROLOGY					

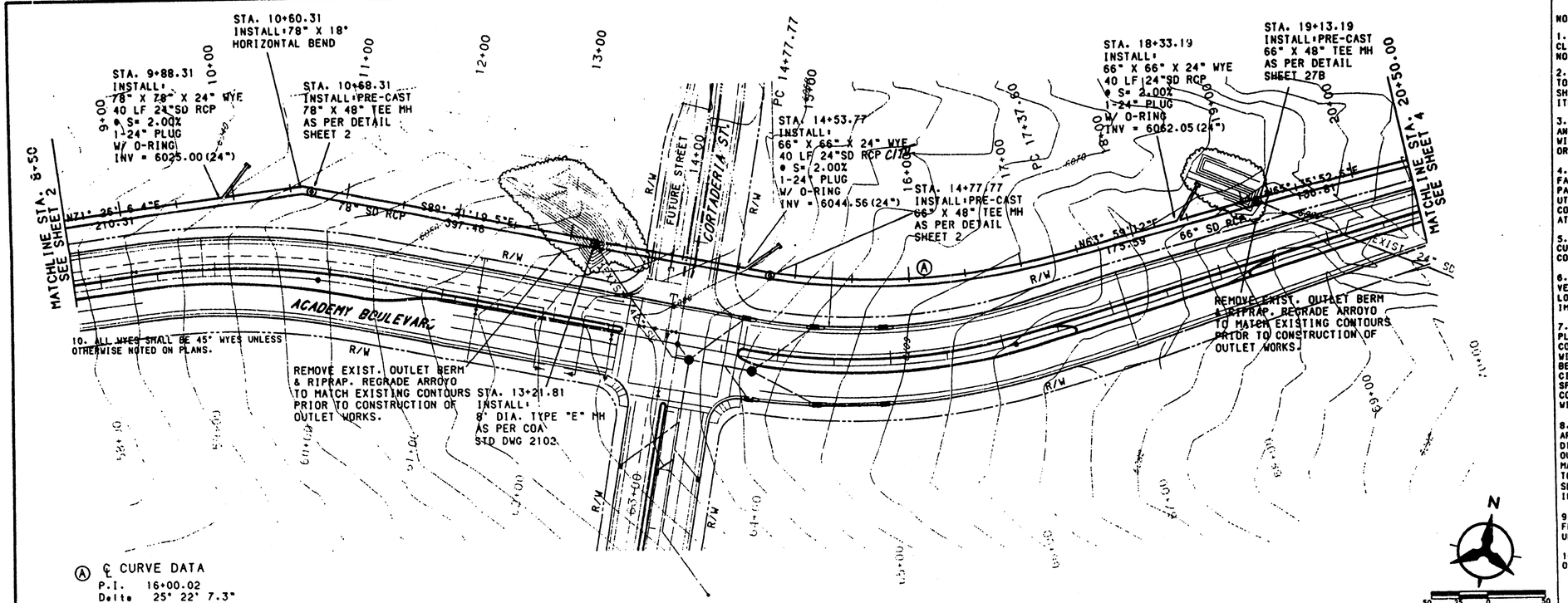
BHI JOB NO. 94215.20

DRAWING NO. 4809.95 | MAP NO. E-23 | SHEET 4 OF 11

LOMR FIGURE 7.2.4

D 24 | C 20 | B 16 | A 12

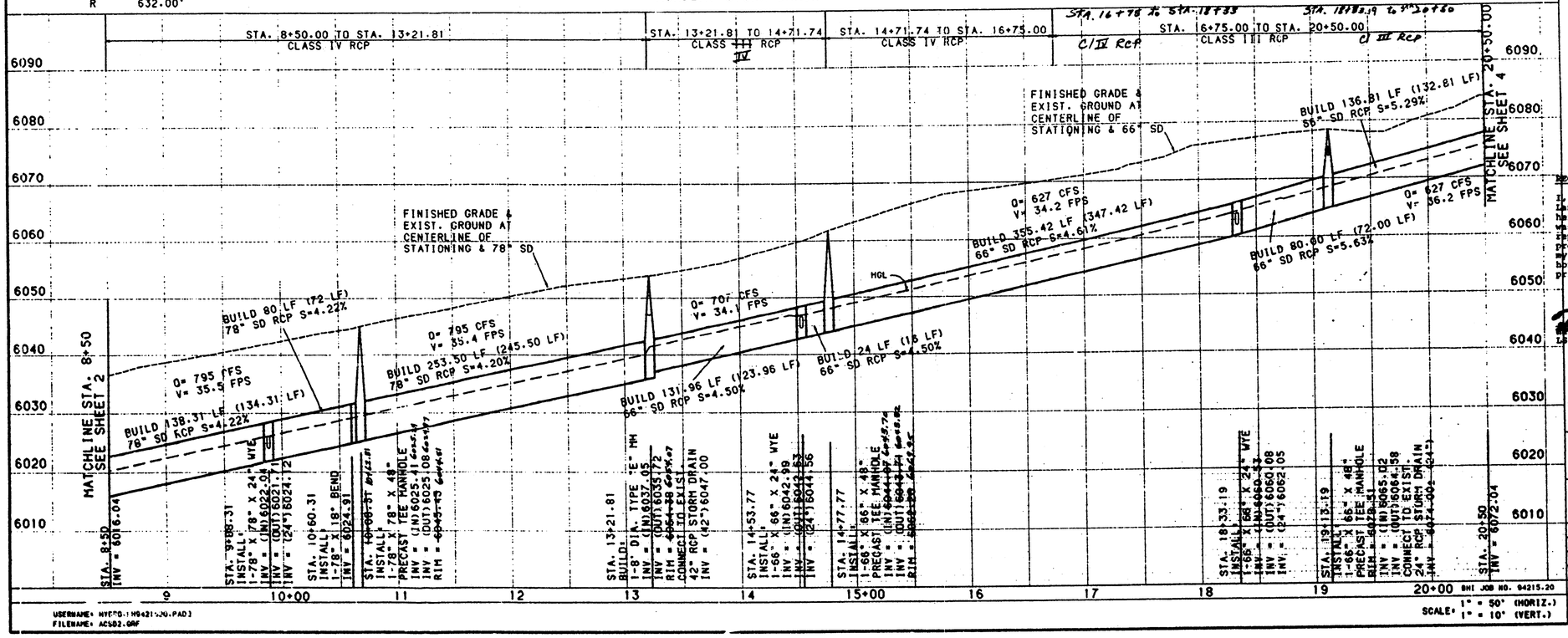
CITY OF ALBUQUERQUE



Ⓐ ℄ CURVE DATA

P.I.	16+00.02
Delta	25° 22' 7.3"
D	9° 3' 57"
T	142.25'
L	279.83'
R	632.00'

ACADEMY STORM DRAIN



USERNAME: HYDRO-1\M9421520.PAD1
FILENAME: ACSD2.GRF

NOTES

1. ALL STORM DRAIN SHALL BE CLASS III RCP, UNLESS OTHERWISE NOTED ON THE PLANS.

2. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.

3. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.

4. ANY DAMAGE TO THE EXISTING FACILITIES (CURB AND GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

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6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

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8. STORM DRAIN BUILD NOTE DISTANCES ARE FROM MH TO MH, WYE OR IN LINE VPI. DISTANCES IN PARENTHESIS DENOTE IN TO OUT DISTANCES BETWEEN MH'S WYES OR MATCHLINES, NO DISTANCE DIMENSIONS ARE TO BENDS, UNLESS OTHERWISE NOTED. SLOPES ARE CALCULATED FROM IN TO OUT INVERTS AND DISTANCES.

9. CENTERLINE BEARING DISTANCES ARE FROM BEND TO BEND OR BEND TO MATCHLINE, UNLESS OTHERWISE NOTED.

10. ALL WYES SHALL BE 45° WYES UNLESS OTHERWISE NOTED ON PLANS.

AS-BUILT INFORMATION

BENCH MARKS

The bench mark is a standard USC&GS brass

CONTRACTOR Los Lunas Inc.

SURVEYED BY H.R. Phillips DATE 2-5-

INSPECTED BY Bryce DATE 2-5-

VERIFICATION BY J.S. DATE 2-5-

CORRECTED BY C.G. DATE 2-5-

MICRO-FILM INFORMATION

RECORDED BY DATE

NO.

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE
		Tablet stamped "Tumble 1969" set in concrete located approximately 489 feet west and 35 feet north of the intersection of Tennyson Street and San Antonio Drive.

ENGINEER'S SEAL

CERTIFICATE OF SURVEY

RECORD DRAWING

I, Harvey P. Phillips, Registered Professional Land Surveyor in the State of New Mexico, do hereby certify that this "as-built" information was obtained by me or under my supervision and represents the "as-built" conditions of this project, and is true and correct to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use on future projects.

Harvey P. Phillips 7/94
Date

Lic No. 4767

HARVEY P. PHILLIPS NEW MEXICO 4767 REGISTERED LAND SURVEYOR

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	

DESIGNED BY CM/DEB DATE 9/94
DRAWN BY TONY M DATE 9/94
CHECKED BY MGE/GRM DATE 9/94

24C-4809.95 E23

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT SUBDIVISION PHASE 1-B-1
STORM DRAIN PLAN & PROFILE
ACADEMY STA. 8+50 TO 20+50

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
DRC CHAIRMAN		11-3-94	WATER		
TRANSPORTATION		10-28-94	WASTE WATER		
HYDROLOGY		10-28-94			

DRAWING NO. 4809.95 | MAP NO. E-23 | SHEET 3 OF 11

BHI JOB NO. 94215.20

LOMR FIGURE 7.2.3

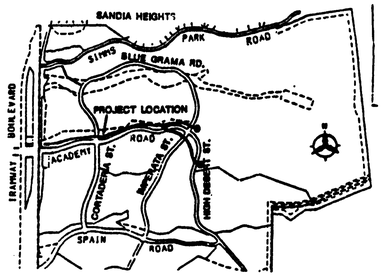
D 24 C 20 B 16 A 12

CITY OF ALBUQUERQUE

CONSTRUCTION PLANS
FOR
HIGH DESERT SUBDIVISION
PHASE 1-B-1 STORM DRAINAGE
(ACADEMY STORM DRAIN)
ALBUQUERQUE, NEW MEXICO

INDEX

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET / VICINITY MAP
2	PLAN AND PROFILE STA. 2+08 TO 8+50
3	PLAN AND PROFILE STA. 8+50 TO 20+50
4	PLAN AND PROFILE STA. 20+50 TO 32+00
~~5~~	~~PLAN AND PROFILE STA. 32+00 TO 35+31.79 AND NORTH BEAR TRIBUTARY DESILTATION POND~~
5A	PLAN AND PROFILE STA. 32+00 TO 35+17.15
5B	NORTH BEAR TRIBUTARY POND
6	PLAN AND PROFILE STA. 40+00 TO 50+50
~~7~~	~~PLAN AND PROFILE STA. 50+50 TO 52+33.74 AND SOUTH BEAR TRIBUTARY DESILTATION POND~~
7A	PLAN AND PROFILE STA. 50+50 TO 52+33.74
7B	SOUTH BEAR TRIBUTARY POND
7C	PLAN AND PROFILE STA. 6+30.59 TO 11+65.82
8A,B	DESILTATION PONDS DETAILS / RIPRAP DETAILS
9	TRAMWAY PONDS GRADING PLAN & MISC. DETAILS
10	WIRE ENCLOSED RIPRAP
~~11~~	~~STRUCTURAL DETAILS~~
11A	SPECIAL WINGWALL & HEADWALL FOR 48" DIA. RCP STA. 35+17.15
11B	SPECIAL WINGWALL & HEADWALL FOR 84" DIA. RCP STA. 52+17.49
11C	DETAILS AT 48" DIA. RCP HEADWALL AND WINGWALLS
11D	DETAILS AT 84" DIA. RCP HEADWALL AND WINGWALLS



LEGAL DESCRIPTION:
HIGH DESERT SUBDIVISION TRACTS 3.4.8C.9.11.15E.&15F.

VICINITY MAP
NOT TO SCALE
C-12

NOTICE TO CONTRACTORS

1. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDE CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDE FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE NE MEXICO STATE HIGHWAY AND TRANSPORTATION DEPARTMEN STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTIO (CURRENT EDITION).
2. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTO MUST CONTACT NEW MEXICO ONE CALL SYSTEM (260-199 FOR LOCATION OF EXISTING UTILITIES.
3. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AL VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF AL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTO SHALL NOTIFY THE ENGINEER OR SURVEYOR IMMEDIATELY S THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOU OF DELAY.
4. THREE(3) WORKING DAYS PRIOR TO CONST., THE CONTRACTO SHALL OBTAIN A BARRICADING PERMIT FROM THE CONS COORDINATION DIVISION. CONTRACTOR SHALL NOTIFY BARRICA ENGINEER (768-2551) PRIOR TO OCCUPYING AN INTERSECTIO REFER TO SECTION 19 OF THE GENERAL CONDITIONS OF TH STANDARD SPECIFICATIONS.
5. ALL STREET STRIPING ALTERED OR DESTROYED SHALL REPLACED IN KIND BY CONTRACTOR TO LOCATION AND IN KI AS EXISTING OR AS INDICATED BY THIS PLAN SET.
6. CONTRACTOR SHALL NOTIFY THE ENGINEER NOT LESS THAN SEV (7) DAYS PRIOR TO STARTING WORK IN ORDER THAT T ENGINEER MAY TAKE NECESSARY MEASURES TO INSURE T PRESERVATION OF SURVEY MONUMENTS. CONTRACTOR SHALL N DISTURB PERMANENT SURVEY MONUMENTS WITHOUT THE CONSE OF THE ENGINEER AND SHALL NOTIFY THE ENGINEER AND BE THE EXPENSE OF REPLACING ANY THAT MAY BE DISTURB WITHOUT PERMISSION. REPLACEMENT SHALL BE DONE ONLY THE CITY SURVEY SECTION. WHEN A CHANGE IS MADE IN T FINISHED ELEV. OF THE PAVEMENT OF ANY ROADWAY IN WHICH PERMANENT SURVEY MONUMENT IS LOCATED, CONTRACTOR SHAL AT HIS OWN EXPENSE, ADJUST THE MONUMENT COVER TO THE N GRADE UNLESS OTHERWISE SPECIFIED.

THE FOLLOWING NOTES ALSO APPLY WHEN CHECKED

- ☐ ALL UTILITIES AND UTILITY SERVICE LINES SHALL INSTALLED PRIOR TO PAVING.
- ☐ BACKFILL COMPACTION SHALL BE ACCORDING TO SPECIFI STREET USE.
- ☐ TACK COAT REQUIREMENTS SHALL BE DETERMINED BY THE CI ENGINEER.
- ☐ SIDEWALKS AND WHEELCHAIR RAMPS WITHIN THE CURB RETUI SHALL BE CONSTRUCTED WHEREVER A NEW CURB RETURN CONSTRUCTED.
- ☒ IF CURB IS DEPRESSED FOR A DRIVEPAD, THE DRIVEPAD SH BE CONSTRUCTED PRIOR TO ACCEPTANCE OF CURB AND GUTTER
- ☒ ALL STORM DRAINAGE FACILITIES SHALL BE COMPLETED PR TO FINAL ACCEPTANCE.
- ☒ THE REQUESTOR OR DEVELOPER SHALL BE RESPONSIBLE REPAIR OR REPLACEMENT OF ALL CURB AND GUTTER OR SIDEW DAMAGED AFTER APPROVAL BY THE CITY ENGINEER OF W COMPLETED BY THE CONTRACTOR.

RECORD DRAWING

I, Harvey P. Phillips, Registered Professional Land Surveyor in the State of New Mexico, do hereby certify that this "as-built" information was obtained by me or under my supervision and represents the "as-built" conditions of this project, and is true and correct to the best of my knowledge and belief. All vertical and horizontal dimensions should be field verified prior to use on future projects.

Harvey P. Phillips 7/95
LS No. 4767

APPROVAL OF AS BUILT DRAWINGS
CITY CONSTRUCTION ENGINEER
DATE 8-25-95

REV	SHEETS	CITY ENGINEER	DATE	USER DEPARTMENT	DATE	USER DEPARTMENT
2	11A,11B,11C,11D		8-27-95		2-9-96	
1	5,7,8,11		7-23-95		2-7-95	

APPROVAL OF REVISIONS

BOHANNAN HUSTON INC.
ALBUQUERQUE, NEW MEXICO
ENGINEERS PLANNERS SURVEYORS

APPROVED FOR CONSTRUCTION:

PROJECT NUMBER
4809.95

SHEET 1 OF

JOB NO. 94215.20

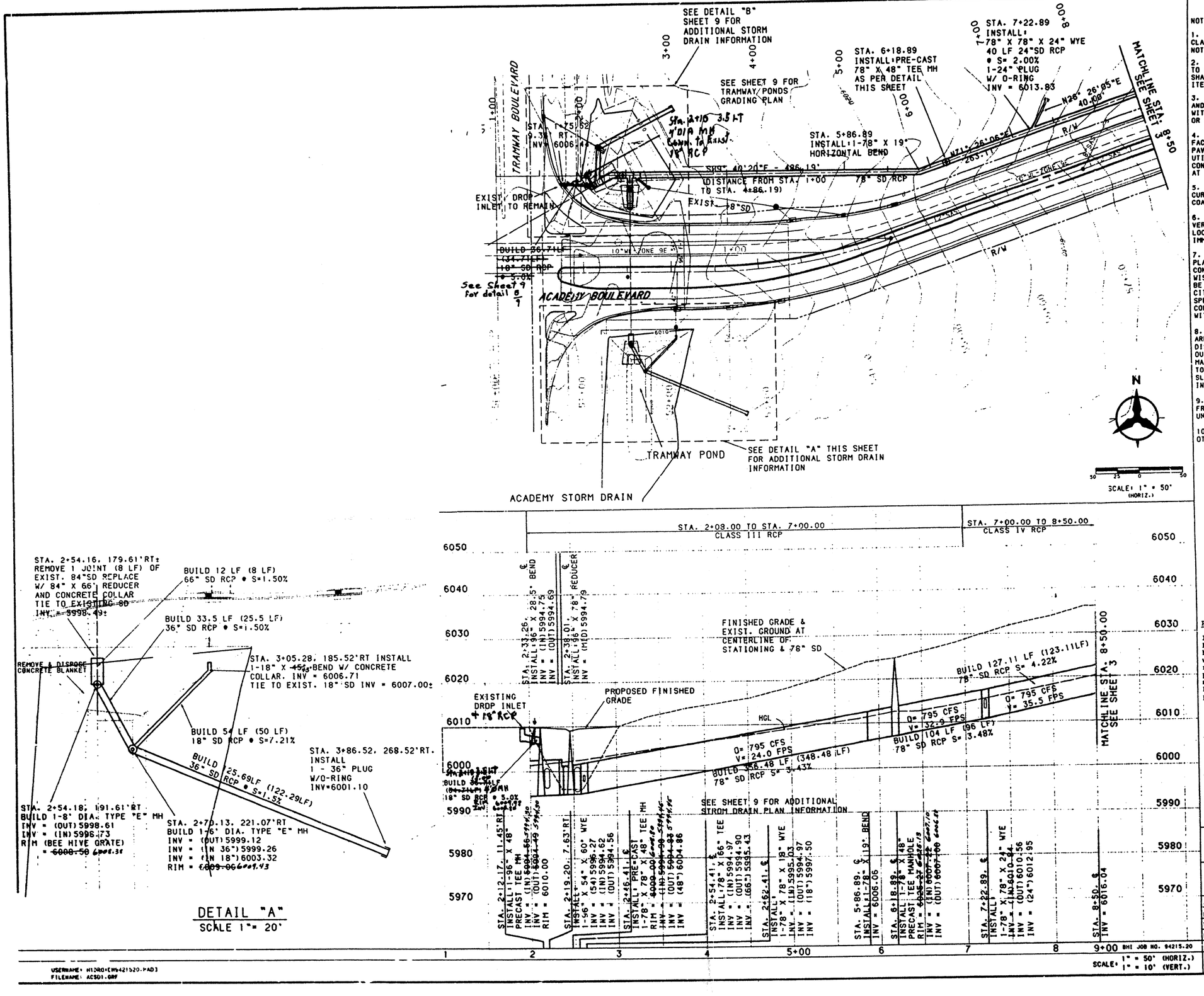
Copyright Bohannan-Huston, Inc.

USERNAME: HYDRO-[H9421520.PAD]
FILENAME: COVER.ORF

LOMR FIGURE 7.2.1

CITY OF ALBUQUERQUE

D 24 C 20 B 16 A 12



NOTES

1. ALL STORM DRAIN SHALL BE CLASS III RCP, UNLESS OTHERWISE NOTED ON THE PLANS.

2. ANY ADDITIONAL GRADING REQUIRED TO MATCH PROPOSED STREET GRADES SHALL BE INCIDENTAL TO PAVING ITEMS.

3. CONTRACTOR SHALL PARK EQUIPMENT AND VEHICLES AS NOT TO INTERFERE WITH NORMAL ACTIVITIES OF RESIDENTS OR OTHER CONTRACTORS ON SITE.

4. ANY DAMAGE TO THE EXISTING FACILITIES (CURB AND GUTTER, PAVEMENT, CONDUITS, LANDSCAPING, UTILITY LINES, ETC.) DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

5. REMOVAL OF THE EXISTING CURB AND GUTTER SHALL BE AS PER COA STD. DWG. 2415 (SAWCUT ONLY).

6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

7. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION, AS AMENDED WITH UPDATE #4.

8. STORM DRAIN BUILD NOTE DISTANCES ARE FROM MH TO MH, WYE OR IN LINE VPI. DISTANCES IN PARENTHESIS DENOTE IN TO OUT DISTANCES BETWEEN MH'S WYES OR MATCHLINES. NO DISTANCE DIMENSIONS ARE TO BENDS, UNLESS OTHERWISE NOTED. SLOPES ARE CALCULATED FROM IN TO OUT INVERTS AND DISTANCES.

9. CENTERLINE BEARING DISTANCES ARE FROM BEND TO BEND OR BEND TO MATCHLINE, UNLESS OTHERWISE NOTED.

10. ALL WYES SHALL BE 45° WYES UNLESS OTHERWISE NOTED ON PLANS.

AS-BUILT INFORMATION
CONTRACTOR: Mud Dauglas Inc.
STAKED BY: H.P. Phillips DATE: 2/94
INSPECTED BY: J.S. DATE: 3/94
FIELD VERIFICATION BY: M.G. DATE: 3/94
DRAWINGS CORRECTED BY: DATE:
RECORDED BY: DATE:

BENCH MARKS
The bench mark is a standard USC&GS brass tablet stamped "Tumbo 1969" set in concrete located approximately 489 feet west and 35 feet north of the intersection of Tennyson Street and San Antonio Drive.
Plane coordinates: X=425 465.55 Y=1513 470.01
Ground-to-grid factor 0.99961970
Elevation = 6009.155 feet

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL

DETAIL "A"
SCALE 1"= 20'

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Harvey P. Phillips 7/94
Harvey P. Phillips
LS No. 4767

REMARKS
NO. DATE BY
REVISIONS
DESIGNED BY CM/DEB DATE 9/94
DESIGN
DRAWN BY TONY M DATE 9/94

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT SUBDIVISION PHASE 1-B-
STORM DRAIN PLAN & PROFILE
ACADEMY STA. 2+08 TO 8+50

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
DRC CHAIRMAN		11-2-94	WATER		6/94
TRANSPORTATION		10-12-94	WASTE WATER		
HYDROLOGY		10-18-94			

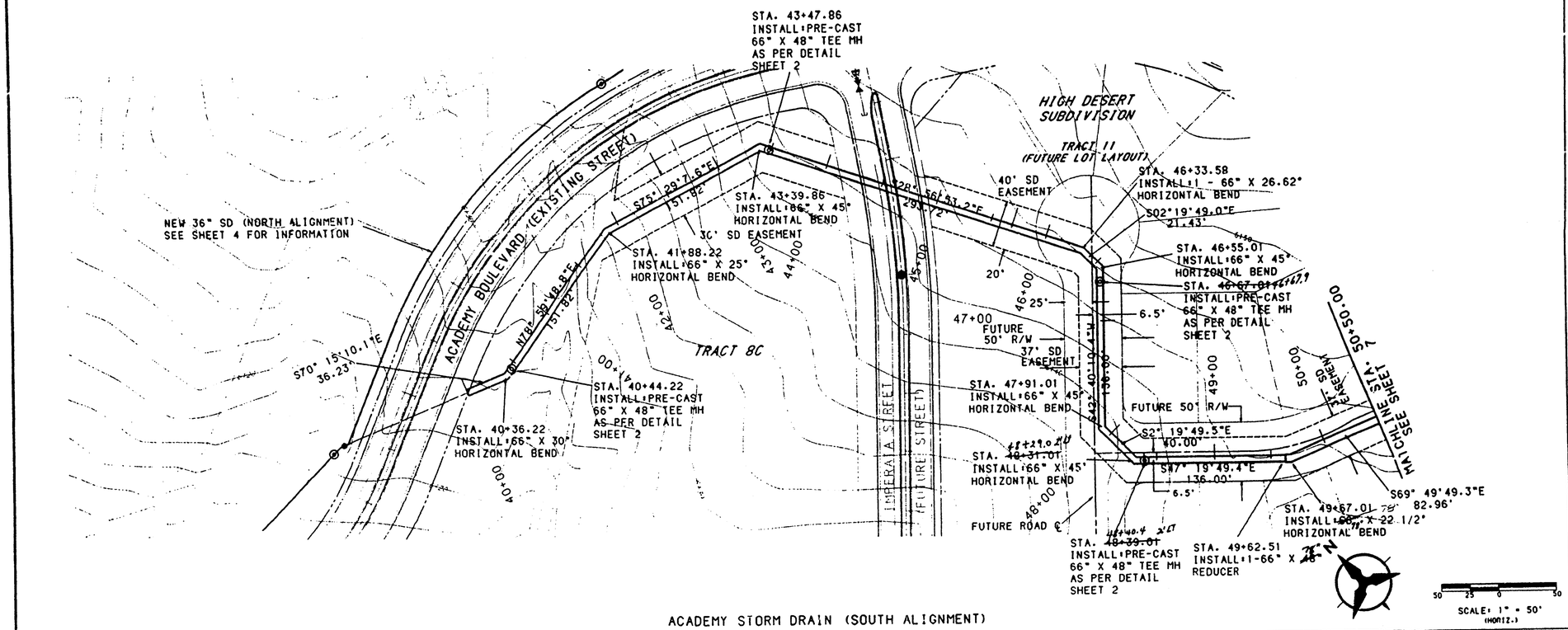
DRAWING NO. 4809.95 | MAP NO. E-23 | SHEET 2 OF 1

USERNAME: HIGH-CMS421520-PAD3
FILENAME: ACSD1.DRF

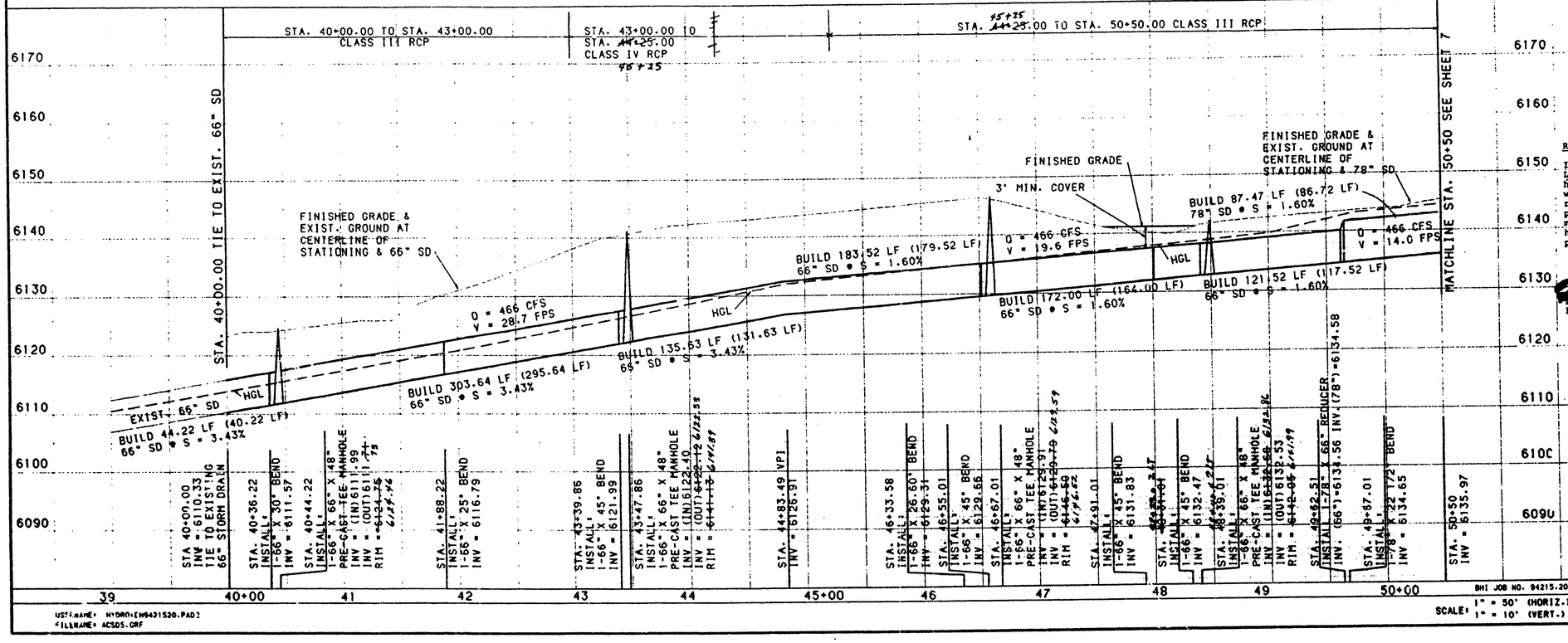
LOMR FIGURE 7.2.2

D 24 C 20 B 16 A 12

CITY OF ALBUQUERQUE



ACADEMY STORM DRAIN (SOUTH ALIGNMENT)



BHI JOB NO. 94215.20

USERNAME: HYDRO-IN\94215\20.PAD3
FILENAME: ACSD5.GRF

SCALE: 1" = 50' (HORIZ.)
1" = 10' (VERT.)

NOTES

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AS-BUILT INFORMATION

BENCH MARKS

CONTRACTOR Jon Concepts Inc.
STAKED BY H.B. Phillips DATE 2/5/95
INSPECTION & WORKS BY Best DATE 2/5/95
FIELD VERIFICATION BY J.S. DATE 2/6/95
CONNECTED BY M.C. DATE 2/15/95

A.U.S. DEPT. OF THE INTERIOR GEOLOGICAL SURVEY BENCH MARK. TOP OF A W.M.S.H.D. RIGHT-OF-WAY MARKER (1"I" RAIL). STA. 706+50, LOCATED ON THE EASTERLY RIGHT-OF-WAY OF NEW MEXICO STATE HWY. 14.

MICRO-FILM INFORMATION

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

RECORD DRAWING

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Harvey P. Phillips
Lic No. 4767

7/6/95
Date

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
2C-4809.95 b675

NO.	DATE	REMARKS
		EY

REVISIONS

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING

HIGH DESERT SUBDIVISION PHASE
STORM DRAIN PLAN & PROFILE
ACADEMY STA. 40+00 TO 50+50

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER
DRC CHAIRMAN			WATER	
TRANSPORTATION			WASTE WATER	
HYDROLOGY				

DRAWING NO. 4809.95
MAP NO. E-23
SHEET 6

LOMR FIGURE 7.2.6

D 24 C 20 B 16 A 12

CITY OF ALBUQUERQUE