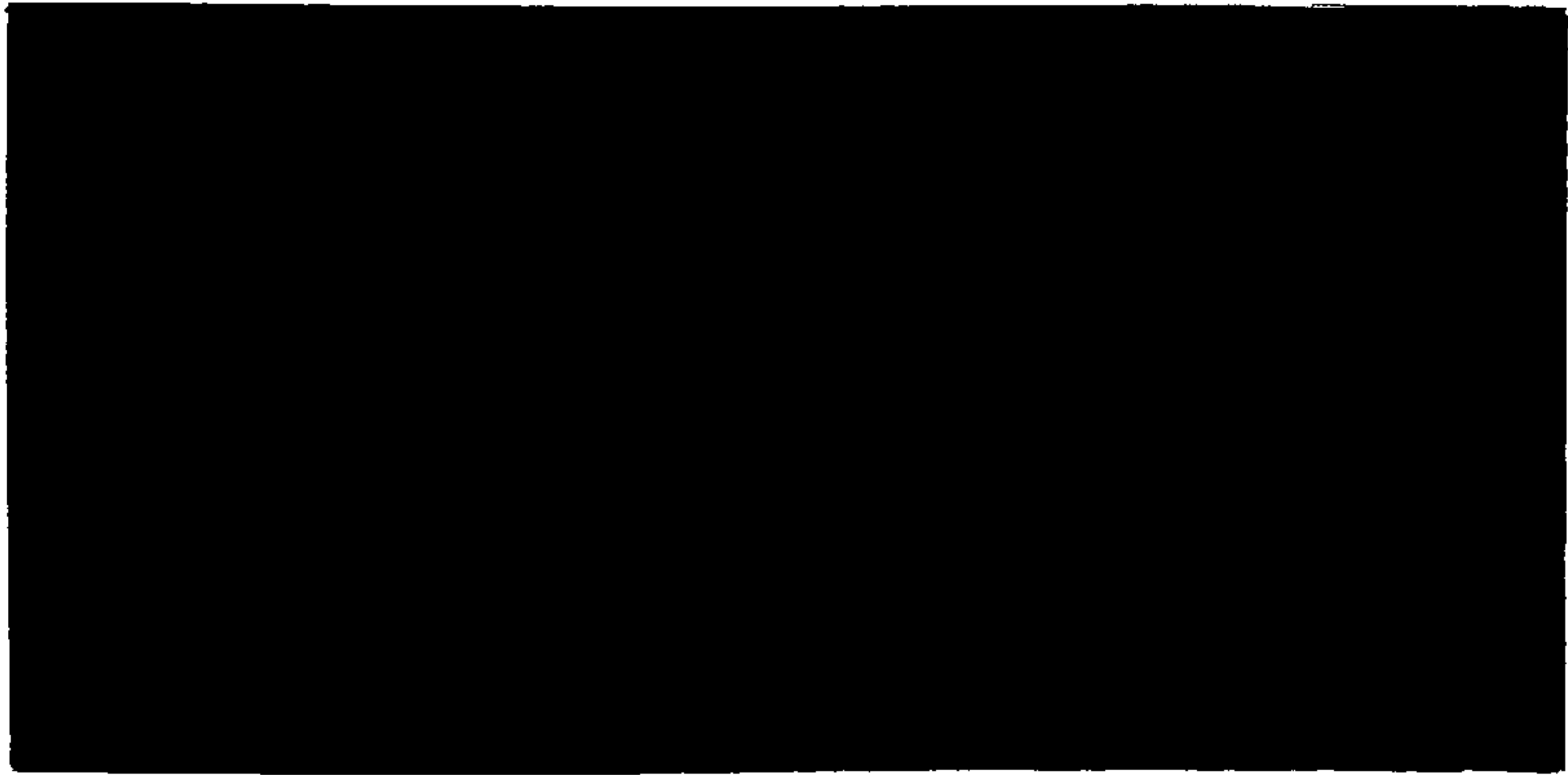




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APR 6 1998  
HYDROLOGY SECTION

MARK GOODWIN

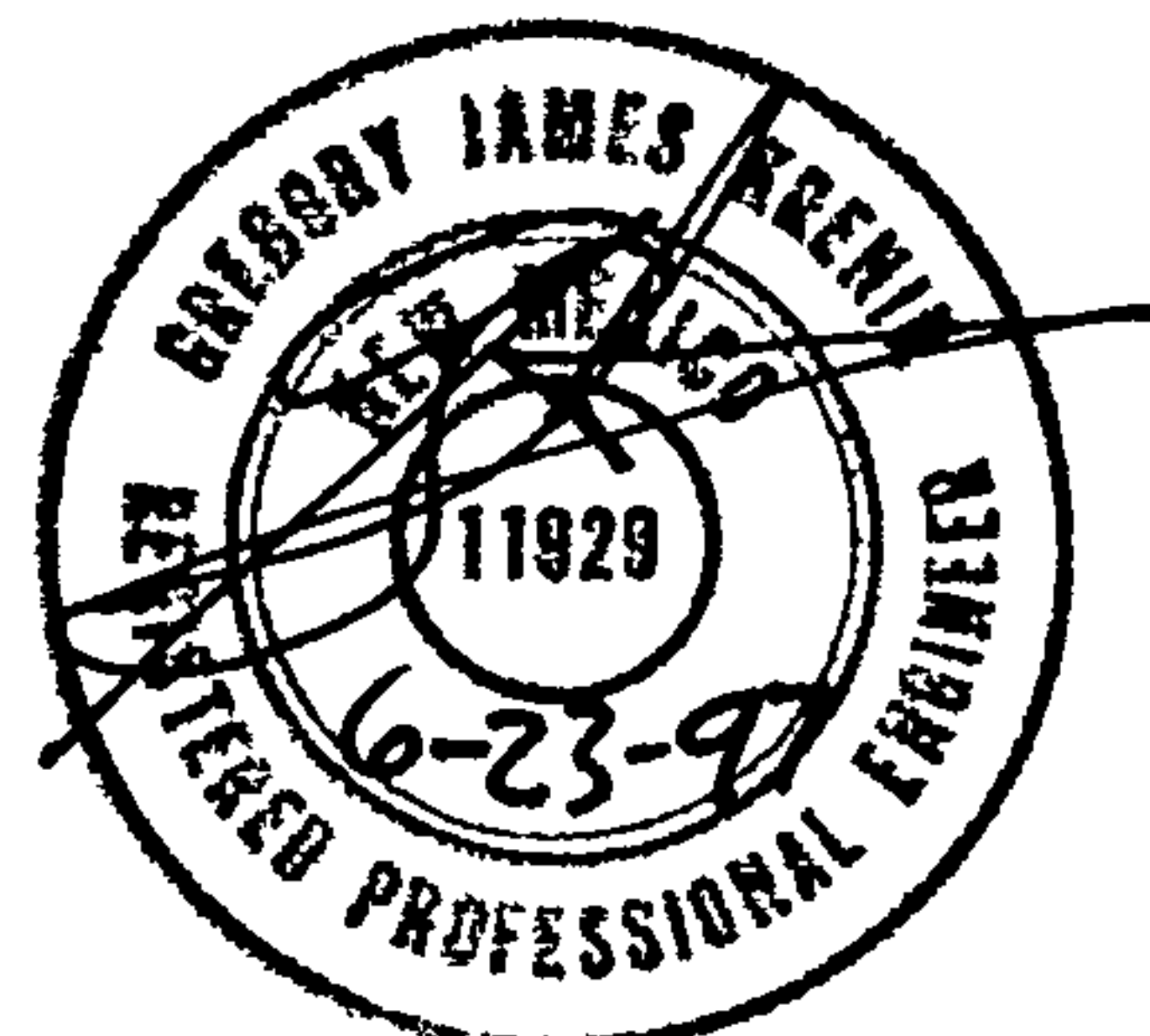
**& ASSOCIATES**  
CONSULTING ENGINEERS

dmg

**DRAINAGE REPORT**  
**For**  
**NEW MEXICO MOTOR SPEEDWAY**  
**NORTHWEST OF THE I-40 AND**  
**RIO PUERCO INTERSECTION.**  
**MESITA NEGRA, NEW MEXICO**

**RECEIVED**  
APR 07 1998  
HYDROLOGY SECTION

JUNE 1997



7-31-97

8-15-97

10-21-97

4-3-98

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1

*The New Mexico Motor Speedway*  
**CANADA DEL OJO**  
**FLOOD PLAIN ANALYSIS**

**INTRODUCTION**

*The proposed New Mexico Motor Speedway is located in Bernalillo County, west of Albuquerque in Section 5, T9N, R1W. The site contains 648.8 acres with the northern portion of the property located within a 100 yr flood zone. The flood zone has been designated by FEMA as Zone "A" where no base elevation has been determined as shown on map panels 287, 289, and 300. The site is located northwest of the intersection of Interstate 40 and the Rio Puerco. The site is located at the south end of the Canada del Ojo Drainage Basin which covers approximately 85 square miles and is approximately 26 miles in length to the I-40 boundary. This study analyzes the impact for erosion and scour. Results indicate erosion protection is required where improvements intercept existing flow. The natural condition of the Canada Del Ojo Arroyo will be altered at the northeast corner of the site. Erosion protective measures will include soil cement and scour walls along the developed arroyo. See sections C, D and E for the HEC-RAS analysis and the erosion and scour analysis.*

**Existing Conditions**

*The Canada Del Ojo Basin generates a discharge of 5702 cfs of runoff. The basin stretches in a northwesterly direction with the majority of the basin located on the Laguna Pueblo Reservation. The terrain is typical of a high mountain desert with foothills, mountains, and cliffs. The soil varies from silty sands to cemented sands and many sandstone outcroppings. The vegetation varies from light brush to wooded. For the HEC-RAS analysis the terrain consisted of light brush and silty sands. The entire basin generates a peak discharge of 5701.5 cfs with a peak discharge of 4599 cfs at the upper most reach at HEC-RAS Cross Section 1029. Additional runoff enters the flood plain at Cross Section 10 + 20 for a total discharge of 5024 cfs and at Cross Section 10 + 05 for a total discharge of 5449 cfs. This models the storm runoff that is generated by the site and the upper basins under the existing conditions for the*

proposed condition discharge point #1. The proposed discharge point #2 contains the remainder of the developed runoff for the Canada Del Ojo basin 253 cfs which does not enter into the analyzed flood plain. The flows from discharge point #2 flow towards the western most I-40 culvert. See attached sheets for downstream conditions of discharge point #2.

### **Proposed Conditions**

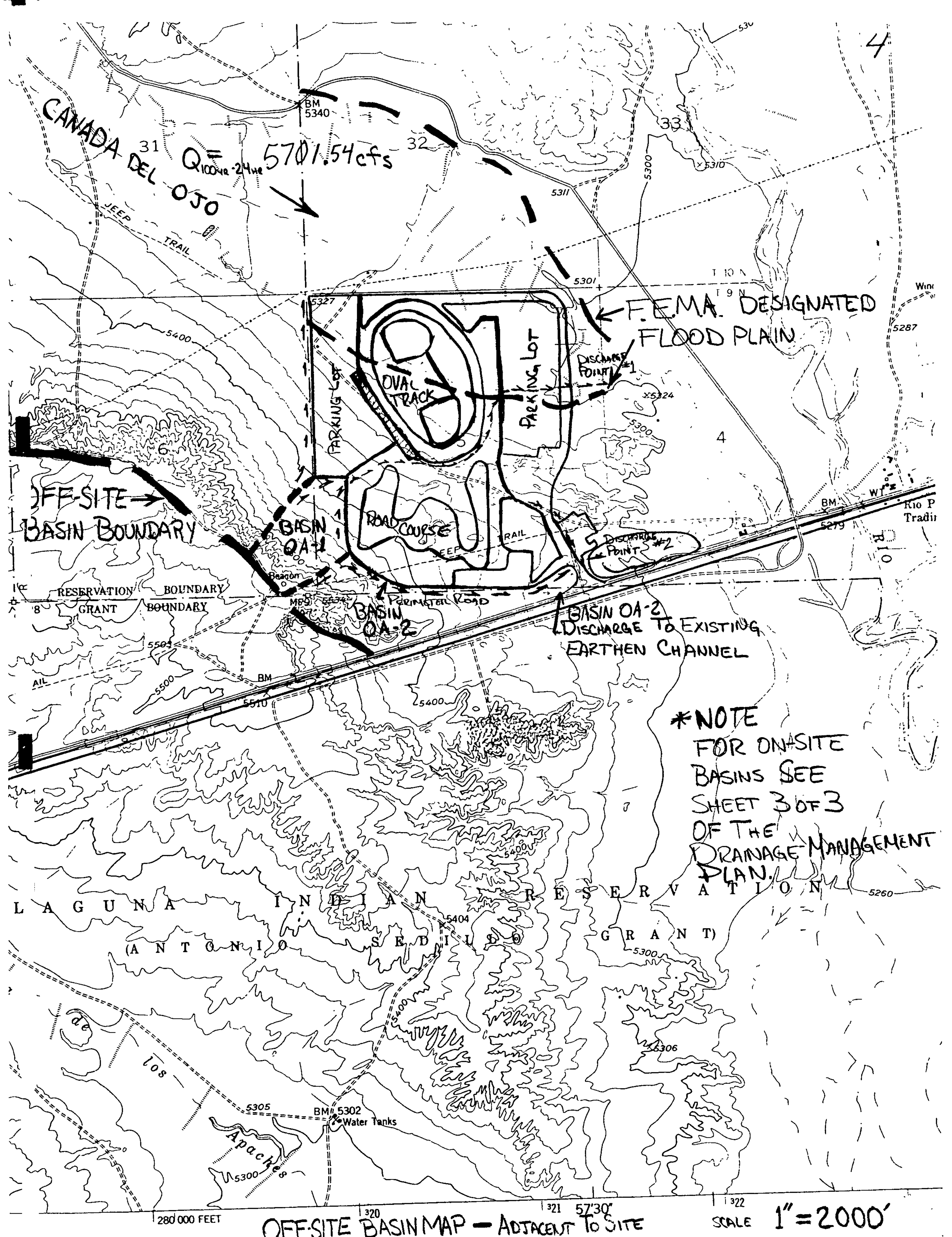
Proposed development of this site includes an oval track, road course, drag strip, and auto museum. The onsite drainage management plan involves discharging existing developed flow and routing upper basin offsite flows around and through the site. The oval track will retain the difference between the proposed and existing developed flows at discharge point #1. The allowable discharge is equivalent to the combined existing rate from discharge points #1 & 2 from the sites 648.7817 acres, which is 1008 cfs. The generated storm runoff at discharge point #1 proposed condition is 756 cfs and discharged into the flood plain. Proposed conditions attempted to model the existing condition closely for the exiting velocity at discharge point #1. The existing condition was 2.9 fps with a computed water surface elevation equal to 5301.73 . The proposed condition is 2.71 fps with a computed water surface elevation of 5301.18. The discharged storm runoff is less than the existing storm runoff and given the previous information the existing condition has been accurately modeled. The HEC-RAS analysis focuses on the flood plain and specifically the increased velocities in the improved channel. The intent of the proposed improvements in the floodplain is to decelerate the flow through the channel to allow sedimentation to occur before exiting the site. The developed flow from discharge point #2 will be directed via a proposed graded channel and existing channel towards the western most culvert at I-40. This culvert can convey the increased flow rate generated by the site. The increased flow from discharge point #2 compared to the existing condition is  $Q=32.10$  cfs. The AHYMO results show the total discharge from the fully developed site at the two discharge points will be,  $Q_{TOTAL} = 1040.78$  cfs as shown on sheet 28A and 21A of the calculations section. The retention pond located in the southern portion of the oval track is sized for the 100 year 10 day storm. The pond accepts developed flow from basins T1-B and C to retain the difference from proposed to existing conditions from the entire site, see sheet 5C. The required ponding volume is 27.37 acre-feet and the design ponding volume provided is 36.46 acre-feet.

Parking areas shall be designated as follows:

Western parking area(Basins T1-B, & C)..... Asphalt  
 All other parking area..... Gravel drive aisles and native grass parking

*The majority of the developed storm runoff flow is conveyed overland with the exception of the flow generated by Basins T1-B, and C which discharges into the oval track retention ponds. The road crossings shall be box culverts or RCP and the sizing calculations for these structures can be found in section E.*

*This drainage management plan complies with current county standards. Implementation of the onsite and offsite storm conveyance systems will preserve the historical flow patterns and the integrity of the generated flow.*



$Q_{100yr-24hr} = 5701.54 cfs$

FEMA DESIGNATED FLOOD PLAIN

OFF-SITE BASIN BOUNDARY

BASIN OA-1

BASIN OA-2

BASIN OA-2 DISCHARGE TO EXISTING EARTHEN CHANNEL

\*NOTE FOR ON-SITE BASINS SEE SHEET 3 OF 3 OF THE DRAINAGE MANAGEMENT PLAN.

OFF-SITE BASIN MAP - ADJACENT TO SITE

SCALE 1" = 2000'



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers and Surveyors

PROJECT NM MOTOR SPEEDWAY  
SUBJECT DRAINAGE  
BY RM DATE 15 Aug 97  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 5 OF \_\_\_\_\_

## COMPARISON OF EXISTING TO PROPOSED CONDITIONS (FROM AHYMO RESULTS)

### ● DISCHARGE POINT #1 FROM BASIN T1-E & 1/2 OF THE UNDISTURBED AREA

#### — EXISTING CONDITIONS

##### - BASIN T1-E D.P. #1

TOTAL AREA = 0.7909 SQ. MILES  $Q_{PK} = 797.13 \text{ cfs}$

$VOL_{PK} = 19.878 \text{ ACRE-Feet}$  HYD No. = 102.2

##### - BASIN 1/2 UNDISTURBED AREA

TOTAL AREA = 0.0605 SQ. MILES  $Q_{PK} = 52.85 \text{ cfs}$

$VOL_{PK} = 0.2313 \text{ ACRE-Feet}$  HYD No. = 101.39

TOTAL DISCHARGE  $Q = 849.98 \text{ cfs}$

#### — PROPOSED CONDITION (FULLY DEVELOPED)

- BASIN AREA WILL NOT BE EQUIVALENT DUE TO THE 100% RETENTION OF BASINS T1-A, T1-B, & T1-C.

TOTAL AREA = 0.50680 SQ. MILES  $Q_{PK} = 703.15 \text{ cfs}$

$VOL_{PK} = 22.931 \text{ ACRE-Feet}$  HYD No. 101.31

##### - BASIN 1/2 UNDISTURBED AREA

AREA = 0.0605 SQ. MILES  $Q_{PK} = 52.85 \text{ cfs}$

$VOL_{PK} = 0.2313 \text{ ACRE-Feet}$  HYD No. = 101.39

TOTAL DISCHARGE  $Q = 756.00 \text{ cfs}$

### ● DISCHARGE POINT FROM BASINS T2-H, T2-K, T2-I, & 1/2 OF THE UNDISTURBED AREA.

#### — EXISTING CONDITIONS

##### - OUT PUT FOR DISCHARGE POINT #2

TOTAL AREA = 0.2092 SQ. MILES  $Q_{PK} = 199.83 \text{ cfs}$

$VOL_{PK} = 5.258 \text{ ACRE-Feet}$  HYD. No. = 102.2

##### - BASIN 1/2 UNDISTURBED AREA

TOTAL AREA = 0.0605 SQ. MILES  $Q_{PK} = 52.85 \text{ cfs}$

$VOL_{PK} = 0.2313 \text{ ACRE-Feet}$  HYD NO. 101.39

TOTAL DISCHARGE  $Q = 252.68 \text{ cfs}$

CONTINUED ON NEXT PAGE



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers and Surveyors

PROJECT NM MOTOR SPEEDWAY  
SUBJECT DRAINAGE  
BY BM DATE \_\_\_\_\_  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 6 OF \_\_\_\_\_

- DISCHARGE POINT FROM BASINS T2-H, T2-K, T2-I, &  
1/2 OF THE UNDISTURBED AREA.

— PROPOSED CONDITION (FULLY DEVELOPED)

— OUTPUT FOR DISCHARGE POINT #2

TOTAL AREA = 0.2092 SQ. MILES  $Q_{PK} = 231.93 \text{ cfs}$

$VOL_{PK} = 8.707 \text{ ACRE FEET}$   $HYD NO. = 101.38$

— BASIN 1/2 UNDISTURBED AREA

TOTAL AREA = 0.0605 SQ. MILES  $Q_{PK} = 52.85 \text{ cfs}$

$VOL_{PK} = 0.2313 \text{ ACRE FEET}$   $HYD NO. = 101.39$

TOTAL DISCHARGE  $Q = 284.78 \text{ cfs}$

SUMMARY

DISCHARGE POINT #1

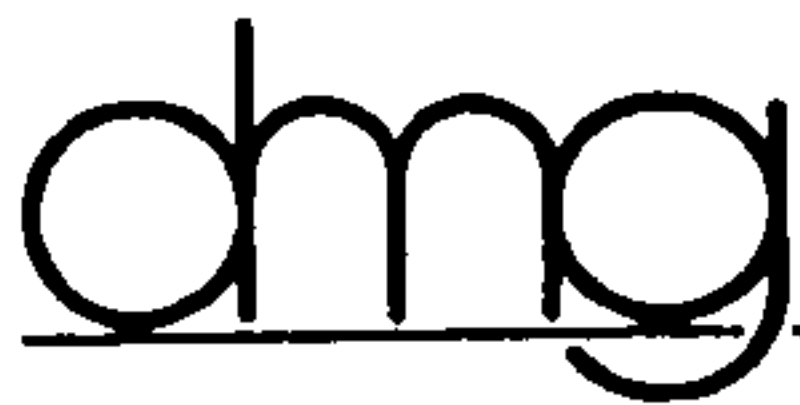
EXISTING  $Q = 849.98 \text{ cfs}$

PROPOSED  $Q = 756.00 \text{ cfs}$

DISCHARGE POINT #2

EXISTING  $Q = 252.68 \text{ cfs}$

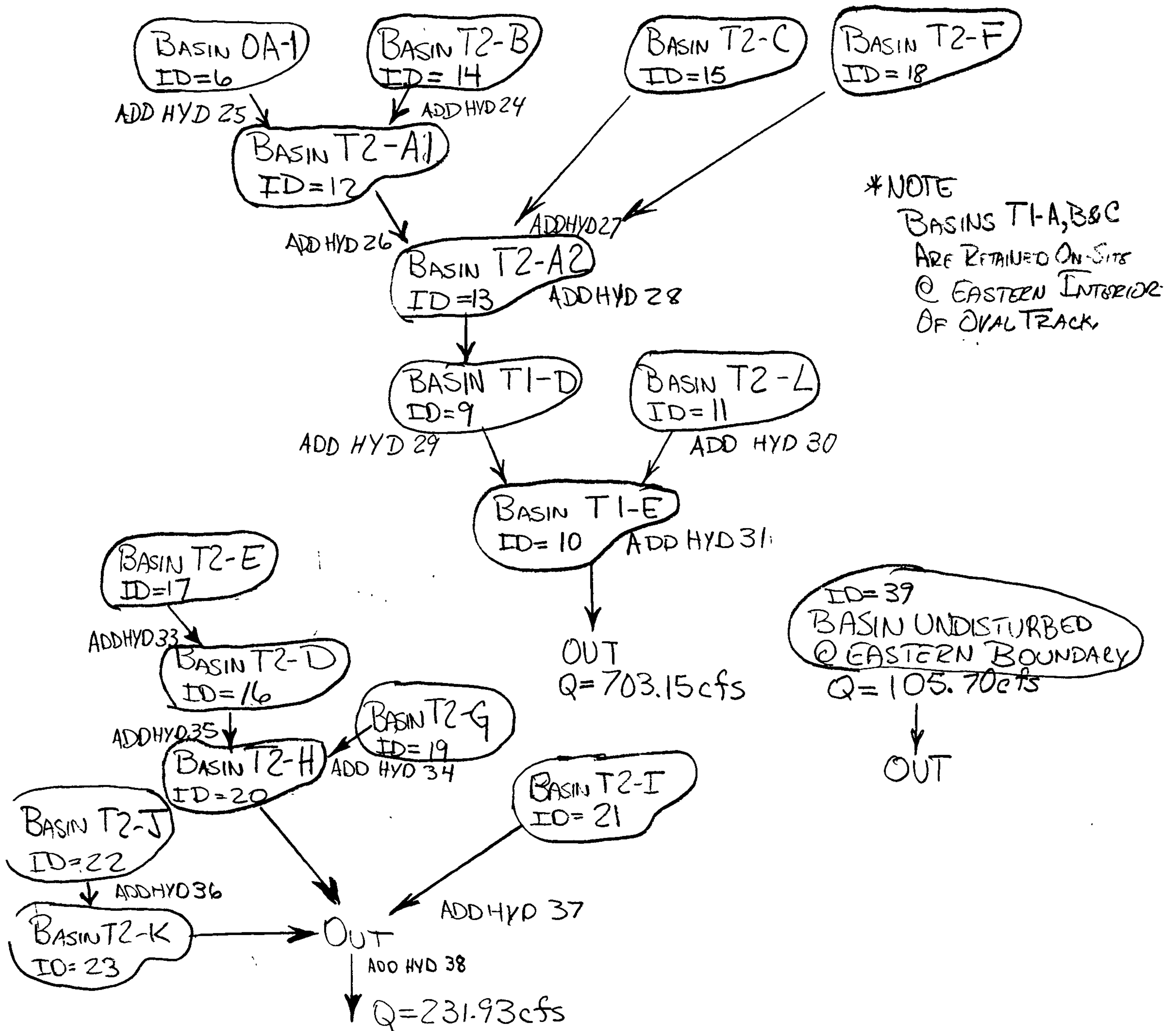
PROPOSED  $Q = 284.78 \text{ cfs}$



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Consulting Engineers and Surveyors

PROJECT NEW MEXICO MOTOR SPEEDWAY  
SUBJECT DRAINAGE  
BY RM DATE 30 July 97  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 7 OF \_\_\_\_\_

### AHYMO Flow Chart



EXISTING OFF-SITE DISCHARGE  $Q = 1007.88 \text{ cfs}$   
TOTAL DEVELOPED OFF-SITE DISCHARGE  $\begin{cases} Q = 703.15 + 105.70 + 231.93 \\ Q = 1040.78 \text{ cfs} \end{cases}$

## ***SECTION A***

# AHYMO INPUT AND DETAILED OUTPUT

## INPUT PROPOSED CONDITIONS

START TIME=0.0

\*\*\*\*\* HYDROGRAPH FOR ALBUQUERQUE INTERNATIONAL SPEEDWAY  
\*\*\*\*\* NORTHWEST CORNER OF INTERSTATE 40 AND THE RIO PUERCO

RAINFALL TYPE=2 RAIN QUARTER=0.0 IN  
RAIN ONE=1.85 IN RAIN SIX=2.20 IN  
RAIN DAY=2.69 IN DT=0.05 HR

\*HYDROGRAPH FOR OFF-SITE DRAINAGE

COMPUTE NM HYD ID=1 HYD NO=101.01 AREA=84.8657 SQ MI  
PER A=70.33 PER B=12.14 PER C=17.53 PER D=0.00  
TP=2.6543 HR MASS RAINFALL=-1

PRINT HYD ID=1 CODE=1

\*HYDROGRAPH FOR ON-SITE PROPERTY FOR TOTAL FLOW FROM SITE UNDER EXISTING  
\*CONDITIONS. PORTIONS OF DISCHARGE FLOWS THROUGH THE SITE.

COMPUTE NM HYD ID=2 HYD NO=101.02 AREA=1.0000 SQ MI  
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=2 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - A

\*AREA OF OVAL RACETRACK WITH 100% RETENTION

COMPUTE NM HYD ID=3 HYD NO=101.03 AREA=0.1219 SQ MI  
PER A=0.0 PER B=64.00 PER C=0.00 PER D=36.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=3 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - B

\*AREA DISCHARGING TO OVAL RACETRACK WITH 100% RETENTION

\*BASIN DISCHARGES INTO BASIN T1 - A.

COMPUTE NM HYD ID=4 HYD NO=101.04 AREA=0.0552 SQ MI  
PER A=0.0 PER B=25.00 PER C=0.00 PER D=75.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=4 CODE=1

\*ADD HYDROGRAPHS OF T1-A&B FOR RETENTION AT INTERIOR OF OVAL TRACK

\*SIZES RETENTION POND AND STORM DRAIN SYSTEM INTO RETENTION POND

\*BASIN T1-C DISCHARGES INTO OVAL TRACK POND. SEE ADD HYD #32

ADD HYD ID=5 HYD NO=101.05 ID=3 ID=4

PRINT HYD ID=5 CODE=1

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 1

\*AREA DISCHARGES THROUGH SITE BETWEEN OVAL TRACK AND ROAD COURSE

COMPUTE NM HYD ID=6 HYD NO=101.06 AREA=0.1076 SQ MI  
PER A=50.0 PER B=15.00 PER C=35.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=6 CODE=1

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 2

\*AREA DOES NOT DISCHARGE THROUGH SITE FLOWS TO EARTHEN CHANNEL

\*ADJACENT TO INTERSTATE 40

COMPUTE NM HYD ID=7 HYD NO=101.07 AREA=0.1349 SQ MI  
PER A=48.0 PER B=12.00 PER C=40.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=7 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - C

\*BASIN FLOWS INTO BASIN T1 - B.

COMPUTE NM HYD ID=8 HYD NO=101.08 AREA=0.0465 SQ MI  
PER A=0.0 PER B=0.00 PER C=0.00 PER D=100.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=8 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - D

\*AREA DISCHARGES INTO BASIN T1-E. BASIN T2-A2 FLOWS INTO AND

\*THROUGH THIS BASIN.

COMPUTE NM HYD ID=9 HYD NO=101.09 AREA=0.0385 SQ MI  
PER A=0.0 PER B=24.00 PER C=24.00 PER D=52.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=9 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - E

\*AREA DISCHARGES INTO FLOOD PLAIN. THIS BASIN IS THE FINAL

\*ROUTING OFF SITE.

COMPUTE NM HYD ID=10 HYD NO=101.10 AREA=0.2151 SQ MI  
PER A=7.50 PER B=74.00 PER C=5.00 PER D=13.50  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=10 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - L

\*AREA DISCHARGES INTO BASIN T1 - E.

COMPUTE NM HYD ID=11 HYD NO=101.11 AREA=0.0085 SQ MI  
PER A=0.0 PER B=35.00 PER C=30.00 PER D=35.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=11 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - A1

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=12 HYD NO=101.12 AREA=0.0280 SQ MI  
PER A=78.0 PER B=10.00 PER C=7.00 PER D=5.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=12 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - A2

\*AREA DISCHARGES INTO BASIN T1 - D.

COMPUTE NM HYD ID=13 HYD NO=101.13 AREA=0.0421 SQ MI  
PER A=78.0 PER B=10.00 PER C=7.00 PER D=5.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=13 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - B

\*AREA DISCHARGES INTO BASIN T2 - A1.

COMPUTE NM HYD ID=14 HYD NO=101.14 AREA=0.0260 SQ MI  
PER A=89.0 PER B=0.00 PER C=0.00 PER D=11.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=14 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - C

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=15 HYD NO=101.15 AREA=0.0172 SQ MI  
PER A=20.0 PER B=50.00 PER C=20.00 PER D=10.00  
TP=0.1333 HR MASS RAINFALL=-1

PRINT HYD ID=15 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - D

\*AREA DISCHARGES INTO BASIN T2 - H.

COMPUTE NM HYD ID=16 HYD NO=101.16 AREA=0.0213 SQ MI  
 PER A=58.0 PER B=14.00 PER C=14.00 PER D=14.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=16 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - E

\*AREA DISCHARGES INTO BASIN T2 - D.

COMPUTE NM HYD ID=17 HYD NO=101.17 AREA=0.0027 SQ MI  
 PER A=0.0 PER B=25.00 PER C=25.00 PER D=50.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=17 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - F

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=18 HYD NO=101.18 AREA=0.0238 SQ MI  
 PER A=60.0 PER B=10.00 PER C=5.00 PER D=25.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=18 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - G

\*AREA DISCHARGES INTO BASIN T2 - H.

COMPUTE NM HYD ID=19 HYD NO=101.19 AREA=0.0421 SQ MI  
 PER A=90.0 PER B=0.00 PER C=0.00 PER D=10.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=19 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - H

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=20 HYD NO=101.20 AREA=0.0598 SQ MI  
 PER A=4.0 PER B=35.00 PER C=25.00 PER D=36.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=20 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - I

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=21 HYD NO=101.21 AREA=0.0052 SQ MI  
 PER A=74.0 PER B=0.00 PER C=0.00 PER D=26.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=21 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - J

\*AREA DISCHARGES INTO BASIN T2-K.

COMPUTE NM HYD ID=22 HYD NO=101.22 AREA=0.0088 SQ MI  
 PER A=0.0 PER B=80.00 PER C=11.00 PER D=9.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=22 CODE=1

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - K

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=23 HYD NO=101.23 AREA=0.0088 SQ MI  
 PER A=0.0 PER B=2.5.00 PER C=2.50 PER D=95.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=23 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO BASIN T2 - A1.

ADD HYD ID=24 HYD NO=101.24 ID=6 ID=12  
 PRINT HYD ID=24 CODE=1

ADD HYD ID=25 HYD NO=101.25 ID=24 ID=14  
 PRINT HYD ID=25 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO BASIN T2 - A2.

ADD HYD ID=26 HYD NO=101.26 ID=25 ID=13  
PRINT HYD ID=26 CODE=1

ADD HYD ID=27 HYD NO=101.27 ID=26 ID=15  
PRINT HYD ID=27 CODE=1

ADD HYD ID=28 HYD NO=101.28 ID=27 ID=18  
PRINT HYD ID=28 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - D.

ADD HYD ID=29 HYD NO=101.29 ID=28 ID=9  
PRINT HYD ID=29 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - E.

\*DISCHARGES OFF SITE INTO FLOOD PLAIN.

ADD HYD ID=30 HYD NO=101.30 ID=29 ID=10  
PRINT HYD ID=30 CODE=1

ADD HYD ID=31 HYD NO=101.31 ID=30 ID=11  
PRINT HYD ID=31 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO RETENTION PONDS.

\*BASINS T1-A, T1-B, AND T1-C.

ADD HYD ID=32 HYD NO=101.32 ID=5 ID=8  
PRINT HYD ID=32 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO T2 - D.

ADD HYD ID=33 HYD NO=101.33 ID=16 ID=17  
PRINT HYD ID=33 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO T2 - H.

ADD HYD ID=34 HYD NO=101.34 ID=33 ID=20  
PRINT HYD ID=34 CODE=1

ADD HYD ID=35 HYD NO=101.35 ID=34 ID=19  
PRINT HYD ID=35 CODE=1

\*ADD HYDROGRAPHS FLOWING INTO T2 - J.

ADD HYD ID=36 HYD NO=101.36 ID=22 ID=23  
PRINT HYD ID=36 CODE=1

\*ADD HYDROGRAPHS FLOWING OFF SITE INTO FLOOD PLAIN.

ADD HYD ID=37 HYD NO=101.37 ID=21 ID=35  
PRINT HYD ID=37 CODE=1

ADD HYD ID=38 HYD NO=101.38 ID=36 ID=37  
PRINT HYD ID=38 CODE=1

\*HYDROGRAPH FOR ON-SITE UNDISTURBED AREA ALONG EASTERN BOUNDARY

\*OF SITE. AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=39 HYD NO=101.39 AREA=0.1209 SQ MI  
PER A=95.0 PER B=3.00 PER C=1.00 PER D=1.00  
TP=0.1333 HR MASS RAINFALL=-1  
PRINT HYD ID=39 CODE=1

FINISH

5A

# OUTPUT PROPOSED CONDITIONS

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE  
(MON/DAY/YR) = 07/30/1997  
START TIME (HR:MIN:SEC) = 07:58:15 USER NO.= M\_GOODWN.I01  
INPUT FILE = SPEEDWAY.DAT

START TIME=0.0

\*\*\*\*\* HYDROGRAPH FOR ALBUQUERQUE INTERNATIONAL SPEEDWAY  
\*\*\*\*\* NORTHWEST CORNER OF INTERSTATE 40 AND THE RIO PUERCO

RAINFALL TYPE=2 RAIN QUARTER=0.0 IN  
RAIN ONE=1.85 IN RAIN SIX=2.20 IN  
RAIN DAY=2.69 IN DT=0.05 HR

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2  
PEAK AT 1.40 HR.

DT = .050 HOURS END TIME = 24.00 HOURS

|        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|
| .0000  | .0028  | .0056  | .0086  | .0117  | .0148  | .0181  |
| .0216  | .0251  | .0288  | .0327  | .0367  | .0409  | .0454  |
| .0501  | .0551  | .0604  | .0660  | .0720  | .0786  | .0856  |
| .0934  | .1021  | .1270  | .1860  | .2875  | .4444  | .6703  |
| .9792  | 1.2229 | 1.3329 | 1.4249 | 1.5054 | 1.5773 | 1.6425 |
| 1.7020 | 1.7566 | 1.8068 | 1.8532 | 1.8960 | 1.9356 | 1.9448 |
| 1.9532 | 1.9611 | 1.9685 | 1.9754 | 1.9820 | 1.9883 | 1.9942 |
| 1.9999 | 2.0054 | 2.0107 | 2.0157 | 2.0206 | 2.0254 | 2.0299 |
| 2.0344 | 2.0387 | 2.0429 | 2.0469 | 2.0509 | 2.0548 | 2.0586 |
| 2.0623 | 2.0659 | 2.0694 | 2.0728 | 2.0762 | 2.0795 | 2.0828 |
| 2.0860 | 2.0891 | 2.0922 | 2.0952 | 2.0981 | 2.1011 | 2.1039 |
| 2.1067 | 2.1095 | 2.1123 | 2.1150 | 2.1176 | 2.1202 | 2.1228 |
| 2.1253 | 2.1279 | 2.1303 | 2.1328 | 2.1352 | 2.1376 | 2.1399 |
| 2.1422 | 2.1445 | 2.1468 | 2.1490 | 2.1513 | 2.1535 | 2.1556 |
| 2.1578 | 2.1599 | 2.1620 | 2.1641 | 2.1661 | 2.1682 | 2.1702 |
| 2.1722 | 2.1741 | 2.1761 | 2.1780 | 2.1800 | 2.1819 | 2.1837 |
| 2.1856 | 2.1875 | 2.1893 | 2.1911 | 2.1929 | 2.1947 | 2.1965 |
| 2.1983 | 2.2000 | 2.2021 | 2.2042 | 2.2062 | 2.2083 | 2.2103 |
| 2.2124 | 2.2144 | 2.2164 | 2.2185 | 2.2205 | 2.2225 | 2.2245 |
| 2.2265 | 2.2285 | 2.2304 | 2.2324 | 2.2344 | 2.2364 | 2.2383 |
| 2.2403 | 2.2422 | 2.2441 | 2.2461 | 2.2480 | 2.2499 | 2.2518 |
| 2.2537 | 2.2556 | 2.2575 | 2.2594 | 2.2613 | 2.2632 | 2.2650 |
| 2.2669 | 2.2687 | 2.2706 | 2.2724 | 2.2743 | 2.2761 | 2.2779 |
| 2.2798 | 2.2816 | 2.2834 | 2.2852 | 2.2870 | 2.2888 | 2.2906 |
| 2.2924 | 2.2942 | 2.2959 | 2.2977 | 2.2995 | 2.3012 | 2.3030 |
| 2.3047 | 2.3065 | 2.3082 | 2.3099 | 2.3117 | 2.3134 | 2.3151 |
| 2.3168 | 2.3185 | 2.3202 | 2.3219 | 2.3236 | 2.3253 | 2.3270 |
| 2.3287 | 2.3304 | 2.3320 | 2.3337 | 2.3354 | 2.3370 | 2.3387 |
| 2.3403 | 2.3420 | 2.3436 | 2.3453 | 2.3469 | 2.3485 | 2.3501 |
| 2.3518 | 2.3534 | 2.3550 | 2.3566 | 2.3582 | 2.3598 | 2.3614 |
| 2.3630 | 2.3646 | 2.3661 | 2.3677 | 2.3693 | 2.3708 | 2.3724 |
| 2.3740 | 2.3755 | 2.3771 | 2.3786 | 2.3802 | 2.3817 | 2.3833 |
| 2.3848 | 2.3863 | 2.3878 | 2.3894 | 2.3909 | 2.3924 | 2.3939 |
| 2.3954 | 2.3969 | 2.3984 | 2.3999 | 2.4014 | 2.4029 | 2.4044 |
| 2.4059 | 2.4073 | 2.4088 | 2.4103 | 2.4118 | 2.4132 | 2.4147 |
| 2.4161 | 2.4176 | 2.4190 | 2.4205 | 2.4219 | 2.4234 | 2.4248 |
| 2.4262 | 2.4277 | 2.4291 | 2.4305 | 2.4320 | 2.4334 | 2.4348 |
| 2.4362 | 2.4376 | 2.4390 | 2.4404 | 2.4418 | 2.4432 | 2.4446 |
| 2.4460 | 2.4474 | 2.4488 | 2.4501 | 2.4515 | 2.4529 | 2.4543 |
| 2.4556 | 2.4570 | 2.4584 | 2.4597 | 2.4611 | 2.4624 | 2.4638 |

6A

|        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|
| 2.4651 | 2.4665 | 2.4678 | 2.4691 | 2.4705 | 2.4718 | 2.4731 |
| 2.4745 | 2.4758 | 2.4771 | 2.4784 | 2.4798 | 2.4811 | 2.4824 |
| 2.4837 | 2.4850 | 2.4863 | 2.4876 | 2.4889 | 2.4902 | 2.4915 |
| 2.4928 | 2.4941 | 2.4953 | 2.4966 | 2.4979 | 2.4992 | 2.5005 |
| 2.5017 | 2.5030 | 2.5043 | 2.5055 | 2.5068 | 2.5081 | 2.5093 |
| 2.5106 | 2.5118 | 2.5131 | 2.5143 | 2.5156 | 2.5168 | 2.5180 |
| 2.5193 | 2.5205 | 2.5217 | 2.5230 | 2.5242 | 2.5254 | 2.5266 |
| 2.5279 | 2.5291 | 2.5303 | 2.5315 | 2.5327 | 2.5339 | 2.5351 |
| 2.5364 | 2.5376 | 2.5388 | 2.5400 | 2.5411 | 2.5423 | 2.5435 |
| 2.5447 | 2.5459 | 2.5471 | 2.5483 | 2.5495 | 2.5506 | 2.5518 |
| 2.5530 | 2.5542 | 2.5553 | 2.5565 | 2.5577 | 2.5588 | 2.5600 |
| 2.5611 | 2.5623 | 2.5635 | 2.5646 | 2.5658 | 2.5669 | 2.5681 |
| 2.5692 | 2.5703 | 2.5715 | 2.5726 | 2.5738 | 2.5749 | 2.5760 |
| 2.5772 | 2.5783 | 2.5794 | 2.5805 | 2.5817 | 2.5828 | 2.5839 |
| 2.5850 | 2.5861 | 2.5872 | 2.5884 | 2.5895 | 2.5906 | 2.5917 |
| 2.5928 | 2.5939 | 2.5950 | 2.5961 | 2.5972 | 2.5983 | 2.5994 |
| 2.6005 | 2.6015 | 2.6026 | 2.6037 | 2.6048 | 2.6059 | 2.6070 |
| 2.6080 | 2.6091 | 2.6102 | 2.6113 | 2.6123 | 2.6134 | 2.6145 |
| 2.6155 | 2.6166 | 2.6177 | 2.6187 | 2.6198 | 2.6208 | 2.6219 |
| 2.6230 | 2.6240 | 2.6251 | 2.6261 | 2.6272 | 2.6282 | 2.6292 |
| 2.6303 | 2.6313 | 2.6324 | 2.6334 | 2.6344 | 2.6355 | 2.6365 |
| 2.6375 | 2.6386 | 2.6396 | 2.6406 | 2.6416 | 2.6427 | 2.6437 |
| 2.6447 | 2.6457 | 2.6467 | 2.6478 | 2.6488 | 2.6498 | 2.6508 |
| 2.6518 | 2.6528 | 2.6538 | 2.6548 | 2.6558 | 2.6568 | 2.6578 |
| 2.6588 | 2.6598 | 2.6608 | 2.6618 | 2.6628 | 2.6638 | 2.6648 |
| 2.6658 | 2.6668 | 2.6677 | 2.6687 | 2.6697 | 2.6707 | 2.6717 |
| 2.6726 | 2.6736 | 2.6746 | 2.6756 | 2.6765 | 2.6775 | 2.6785 |
| 2.6794 | 2.6804 | 2.6814 | 2.6823 | 2.6833 | 2.6843 | 2.6852 |
| 2.6862 | 2.6871 | 2.6881 | 2.6890 | 2.6900 |        |        |

\*HYDROGRAPH FOR OFF-SITE DRAINAGE

COMPUTE NM HYD ID=1 HYD NO=101.01 AREA=84.8657 SQ MI  
 PER A=70.33 PER B=12.14 PER C=17.53 PER D=0.00  
 TP=2.6543 HR MASS RAINFALL=-1

K = 2.537492HR TP = 2.654300HR K/TP RATIO = .955993  
 SHAPE CONSTANT, N = 3.696456 UNIT PEAK = 10692.CFS  
 UNIT VOLUME = .9907 B = 334.40 P60 = 1.8500  
 AREA = 84.865690 SQ MI IA = .57920 INCHES INF = 1.47176 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD ID=1 CODE=1 PARTIAL HYDROGRAPH 101.01  
 RUNOFF VOLUME = .52760 INCHES = 2387.9800 ACRE-Feet  
 PEAK DISCHARGE RATE = 5701.54 CFS AT 4.050 HOURS  
 BASIN AREA = 84.8657 SQ. MI.

\*HYDROGRAPH FOR ON-SITE PROPERTY FOR TOTAL FLOW FROM SITE UNDER EXISTING

\*CONDITIONS. PORTIONS OF DISCHARGE FLOWS THROUGH THE SITE.

COMPUTE NM HYD ID=2 HYD NO=101.02 AREA=1.0000 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .131450HR TP = .133300HR K/TP RATIO = .986124  
 SHAPE CONSTANT, N = 3.580687 UNIT PEAK = 2446.9 CFS  
 UNIT VOLUME = 1.001 B = 326.17 P60 = 1.8500  
 AREA = 1.000000 SQ MI IA = .62000 INCHES INF = 1.58600 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD ID=2 CODE=1 PARTIAL HYDROGRAPH 101.02  
 RUNOFF VOLUME = .47124 INCHES = 25.1328  
 PEAK DISCHARGE RATE = 1007.88 CFS AT 1.500 HOURS  
 BASIN AREA = 1.0000 SQ. MI.

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\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - A

\*AREA OF OVAL RACETRACK WITH 100% RETENTION

COMPUTE NM HYD ID=3 HYD NO=101.03 AREA=0.1219 SQ MI  
PER A=0.0 PER B=64.00 PER C=0.00 PER D=36.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .073705HR TP = .133300HR K/TP RATIO = .552927  
SHAPE CONSTANT, N = 6.976394  
UNIT PEAK = 171.24 CFS UNIT VOLUME = .9990 B = 520.14 P60 = 1.8500  
AREA = .043884 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .128562HR TP = .133300HR K/TP RATIO = .964459  
SHAPE CONSTANT, N = 3.663017  
UNIT PEAK = 194.33 CFS UNIT VOLUME = 1.001 B = 332.04 P60 = 1.8500  
AREA = .078016 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=3 CODE=1 PARTIAL HYDROGRAPH 101.03  
RUNOFF VOLUME = 1.30526 INCHES = 8.4859 ACRE-FEET  
PEAK DISCHARGE RATE = 219.78 CFS AT 1.500 HOURS  
BASIN AREA = .1219 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - B

\*AREA DISCHARGING TO OVAL RACETRACK WITH 100% RETENTION

\*BASIN DISCHARGES INTO BASIN T1 - A.

COMPUTE NM HYD ID=4 HYD NO=101.04 AREA=0.0552 SQ MI  
PER A=0.0 PER B=25.00 PER C=0.00 PER D=75.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 163.45 CFS UNIT VOLUME = .9990 B = 526.28 P60 = 1.8500  
AREA = .041400 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .131344HR TP = .133300HR K/TP RATIO = .985325  
SHAPE CONSTANT, N = 3.583641  
UNIT PEAK = 33.789 CFS UNIT VOLUME = 1.001 B = 326.38 P60 = 1.8500  
AREA = .013800 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=4 CODE=1 PARTIAL HYDROGRAPH 101.04  
RUNOFF VOLUME = 2.00659 INCHES = 5.9074 ACRE-FEET  
PEAK DISCHARGE RATE = 130.33 CFS AT 1.500 HOURS  
BASIN AREA = .0552 SQ. MI.

\*ADD HYDROGRAPHS OF T1-A&B FOR RETENTION AT INTERIOR OF OVAL TRACK

\*SIZES RETENTION POND AND STORM DRAIN SYSTEM INTO RETENTION POND

\*BASIN T1-C DISCHARGES INTO OVAL TRACK POND. SEE ADD HYD #32

ADD HYD ID=5 HYD NO=101.05 ID=3 ID=4  
PRINT HYD ID=5 CODE=1 PARTIAL HYDROGRAPH 101.05  
RUNOFF VOLUME = 1.52385 INCHES = 14.3932 ACRE-FEET  
PEAK DISCHARGE RATE = 350.11 CFS AT 1.500 HOURS  
BASIN AREA = .1771 SQ. MI.

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 1

\*AREA DISCHARGES THROUGH SITE BETWEEN OVAL TRACK AND ROAD COURSE

COMPUTE NM HYD ID=6 HYD NO=101.06 AREA=0.1076 SQ MI  
PER A=50.0 PER B=15.00 PER C=35.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .135718HR TP = .133300HR K/TP RATIO = 1.018140  
SHAPE CONSTANT, N = 3.467025  
UNIT PEAK = 256.62 CFS UNIT VOLUME = 1.001 B = 317.92 P60 = 1.8500

AREA = .107600 SQ MI      IA = .52250 INCHES      INF = 1.31300 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD      ID=6      CODE=1      PARTIAL HYDROGRAPH      101.06  
 RUNOFF VOLUME = .61795 INCHES = 3.5462 ACRE-FEET  
 PEAK DISCHARGE RATE = 128.91 CFS AT 1.500 HOURS  
 BASIN AREA = .1076 SQ. MI.

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 2

\*AREA DOES NOT DISCHARGE THROUGH SITE FLOWS TO EARTHEN CHANNEL

\*ADJACENT TO INTERSTATE 40

COMPUTE NM HYD      ID=7 HYD NO=101.07 AREA=0.1349 SQ MI  
 PER A=48.0 PER B=12.00 PER C=40.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .132192HR      TP = .133300HR      K/TP RATIO = .991685  
 SHAPE CONSTANT, N = 3.560279  
 UNIT PEAK = 328.60 CFS      UNIT VOLUME = 1.001      B = 324.70      P60 = 1.8500  
 AREA = .134900 SQ MI      IA = .51200 INCHES      INF = 1.28360 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD      ID=7      CODE=1      PARTIAL HYDROGRAPH      101.07  
 RUNOFF VOLUME = .63627 INCHES = 4.5777 ACRE-FEET  
 PEAK DISCHARGE RATE = 167.62 CFS AT 1.500 HOURS  
 BASIN AREA = .1349 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - C

\*BASIN FLOWS INTO BASIN T1 - B.

COMPUTE NM HYD      ID=8 HYD NO=101.08 AREA=0.0465 SQ MI  
 PER A=0.0 PER B=0.00 PER C=0.00 PER D=100.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR      TP = .133300HR      K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 183.58 CFS      UNIT VOLUME = .9991      B = 526.28      P60 = 1.8500  
 AREA = .046500 SQ MI      IA = .10000 INCHES      INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD      ID=8      CODE=1      PARTIAL HYDROGRAPH      101.08  
 RUNOFF VOLUME = 2.45616 INCHES = 6.0912 ACRE-FEET  
 PEAK DISCHARGE RATE = 126.60 CFS AT 1.500 HOURS  
 BASIN AREA = .0465 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - D

\*AREA DISCHARGES INTO BASIN T1-E. BASIN T2-A2 FLOWS INTO AND

\*THROUGH THIS BASIN.

COMPUTE NM HYD      ID=9 HYD NO=101.09 AREA=0.0385 SQ MI  
 PER A=0.0 PER B=24.00 PER C=24.00 PER D=52.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR      TP = .133300HR      K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 79.040 CFS      UNIT VOLUME = .9990      B = 526.28      P60 = 1.8500  
 AREA = .020020 SQ MI      IA = .10000 INCHES      INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 K = .118493HR      TP = .133300HR      K/TP RATIO = .888916  
 SHAPE CONSTANT, N = 3.990201  
 UNIT PEAK = 49.148 CFS      UNIT VOLUME = 1.001      B = 354.52      P60 = 1.8500  
 AREA = .018480 SQ MI      IA = .42500 INCHES      INF = 1.04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD      ID=9      CODE=1      PARTIAL HYDROGRAPH      101.09  
 RUNOFF VOLUME = 1.66368 INCHES = 3.4161  
 PEAK DISCHARGE RATE = 83.00 CFS AT 1.500 HOURS  
 BASIN AREA = .0385 SQ. MI.

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\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T1 - E

\*AREA DISCHARGES INTO FLOOD PLAIN. THIS BASIN IS THE FINAL

\*ROUTING OFF SITE.

COMPUTE NM HYD ID=10 HYD NO=101.10 AREA=0.2151 SQ MI  
PER A=7.50 PER B=74.00 PER C=5.00 PER D=13.50  
TP=0.1333 HR MASS RAINFALL=-1

K = .075363HR TP = .133300HR K/TP RATIO = .565365  
SHAPE CONSTANT, N = 6.781809  
UNIT PEAK = 111.28 CFS UNIT VOLUME = .9989 B = 510.82 P60 = 1.8500  
AREA = .029039 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .124989HR TP = .133300HR K/TP RATIO = .937654  
SHAPE CONSTANT, N = 3.771531  
UNIT PEAK = 474.07 CFS UNIT VOLUME = 1.001 B = 339.64 P60 = 1.8500  
AREA = .186062 SQ MI IA = .50434 INCHES INF = 1.26214 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=10 CODE=1 PARTIAL HYDROGRAPH 101.10  
RUNOFF VOLUME = .89388 INCHES = 10.2545 ACRE-FEET  
PEAK DISCHARGE RATE = 321.02 CFS AT 1.500 HOURS  
BASIN AREA = .2151 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - L

\*AREA DISCHARGES INTO BASIN T1 - E.

COMPUTE NM HYD ID=11 HYD NO=101.11 AREA=0.0085 SQ MI  
PER A=0.0 PER B=35.00 PER C=30.00 PER D=35.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 11.745 CFS UNIT VOLUME = .9983 B = 526.28 P60 = 1.8500  
AREA = .002975 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .119481HR TP = .133300HR K/TP RATIO = .896332  
SHAPE CONSTANT, N = 3.954992  
UNIT PEAK = 14.596 CFS UNIT VOLUME = 1.000 B = 352.16 P60 = 1.8500  
AREA = .005525 SQ MI IA = .43077 INCHES INF = 1.05615 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=11 CODE=1 PARTIAL HYDROGRAPH 101.11  
RUNOFF VOLUME = 1.37521 INCHES = .6234 ACRE-FEET  
PEAK DISCHARGE RATE = 16.52 CFS AT 1.500 HOURS  
BASIN AREA = .0085 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - A1

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=12 HYD NO=101.12 AREA=0.0280 SQ MI  
PER A=78.0 PER B=10.00 PER C=7.00 PER D=5.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 5.5273 CFS UNIT VOLUME = .9971 B = 526.28 P60 = 1.8500  
AREA = .001400 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .156417HR TP = .133300HR K/TP RATIO = 1.173419  
SHAPE CONSTANT, N = 3.023066  
UNIT PEAK = 56.612 CFS UNIT VOLUME = .9988 B = 283.70 P60 = 1.8500  
AREA = .026600 SQ MI IA = .61211 INCHES INF = 1.56389 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=12 CODE=1 PARTIAL HYDROGRAPH 101.12  
RUNOFF VOLUME = .58088 INCHES = .8674 ACRE-FEET

PEAK DISCHARGE RATE = 28.06 CFS AT 1.500 HOURS  
BASIN AREA = .0280 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - A2

\*AREA DISCHARGES INTO BASIN T1 - D.

COMPUTE NM HYD ID=13 HYD NO=101.13 AREA=0.0421 SQ MI  
PER A=78.0 PER B=10.00 PER C=7.00 PER D=5.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 8.3107 CFS UNIT VOLUME = .9978 B = 526.28 P60 = 1.8500  
AREA = .002105 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .156417HR TP = .133300HR K/TP RATIO = 1.173419  
SHAPE CONSTANT, N = 3.023066  
UNIT PEAK = 85.120 CFS UNIT VOLUME = .9989 B = 283.70 P60 = 1.8500  
AREA = .039995 SQ MI IA = .61211 INCHES INF = 1.56389 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=13 CODE=1 PARTIAL HYDROGRAPH 101.13  
RUNOFF VOLUME = .58088 INCHES = 1.3043 ACRE-FEET  
PEAK DISCHARGE RATE = 42.18 CFS AT 1.500 HOURS  
BASIN AREA = .0421 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - B

\*AREA DISCHARGES INTO BASIN T2 - A1.

COMPUTE NM HYD ID=14 HYD NO=101.14 AREA=0.0260 SQ MI  
PER A=89.0 PER B=0.00 PER C=0.00 PER D=11.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 11.291 CFS UNIT VOLUME = .9981 B = 526.28 P60 = 1.8500  
AREA = .002860 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .164188HR TP = .133300HR K/TP RATIO = 1.231718  
SHAPE CONSTANT, N = 2.891709  
UNIT PEAK = 47.369 CFS UNIT VOLUME = .9980 B = 272.87 P60 = 1.8500  
AREA = .023140 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=14 CODE=1 PARTIAL HYDROGRAPH 101.14  
RUNOFF VOLUME = .65590 INCHES = .9095 ACRE-FEET  
PEAK DISCHARGE RATE = 26.58 CFS AT 1.500 HOURS  
BASIN AREA = .0260 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - C

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=15 HYD NO=101.15 AREA=0.0172 SQ MI  
PER A=20.0 PER B=50.00 PER C=20.00 PER D=10.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 6.7907 CFS UNIT VOLUME = .9975 B = 526.28 P60 = 1.8500  
AREA = .001720 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
K = .132931HR TP = .133300HR K/TP RATIO = .997231  
SHAPE CONSTANT, N = 3.540217  
UNIT PEAK = 37.539 CFS UNIT VOLUME = 1.001 B = 323.25 P60 = 1.8500  
AREA = .015480 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
PRINT HYD ID=15 CODE=1 PARTIAL HYDROGRAPH 101.15  
RUNOFF VOLUME = .83771 INCHES = .7685 ACRE-FEET

PEAK DISCHARGE RATE = 24.30 CFS AT 1.500 HOURS  
 BASIN AREA = .0172 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - D

\*AREA DISCHARGES INTO BASIN T2 - H.

COMPUTE NM HYD ID=16 HYD NO=101.16 AREA=0.0213 SQ MI  
 PER A=58.0 PER B=14.00 PER C=14.00 PER D=14.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 11.773 CFS UNIT VOLUME = .9983 B = 526.28 P60 = 1.8500  
 AREA = .002982 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 K = .149310HR TP = .133300HR K/TP RATIO = 1.120108  
 SHAPE CONSTANT, N = 3.158241  
 UNIT PEAK = 40.467 CFS UNIT VOLUME = .9995 B = 294.48 P60 = 1.8500  
 AREA = .018318 SQ MI IA = .57674 INCHES INF = 1.46488 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD ID=16 CODE=1 PARTIAL HYDROGRAPH 101.16  
 RUNOFF VOLUME = .80147 INCHES = .9105 ACRE-FEET  
 PEAK DISCHARGE RATE = 26.66 CFS AT 1.500 HOURS  
 BASIN AREA = .0213 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - E

\*AREA DISCHARGES INTO BASIN T2 - D.

COMPUTE NM HYD ID=17 HYD NO=101.17 AREA=0.0027 SQ MI  
 PER A=0.0 PER B=25.00 PER C=25.00 PER D=50.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 5.3299 CFS UNIT VOLUME = .9971 B = 526.28 P60 = 1.8500  
 AREA = .001350 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 K = .118493HR TP = .133300HR K/TP RATIO = .888916  
 SHAPE CONSTANT, N = 3.990201  
 UNIT PEAK = 3.5904 CFS UNIT VOLUME = .9974 B = 354.52 P60 = 1.8500  
 AREA = .001350 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD ID=17 CODE=1 PARTIAL HYDROGRAPH 101.17  
 RUNOFF VOLUME = 1.63066 INCHES = .2348 ACRE-FEET  
 PEAK DISCHARGE RATE = 5.77 CFS AT 1.500 HOURS  
 BASIN AREA = .0027 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - F

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=18 HYD NO=101.18 AREA=0.0238 SQ MI  
 PER A=60.0 PER B=10.00 PER C=5.00 PER D=25.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 23.491 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.8500  
 AREA = .005950 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 K = .155906HR TP = .133300HR K/TP RATIO = 1.169585  
 SHAPE CONSTANT, N = 3.032272  
 UNIT PEAK = 38.089 CFS UNIT VOLUME = .9988 B = 284.44 P60 = 1.8500  
 AREA = .017850 SQ MI IA = .61000 INCHES INF = 1.55800 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD ID=18 CODE=1 PARTIAL HYDROGRAPH 101.18

12A

RUNOFF VOLUME = .97787 INCHES = 1.2412 ACRE-FEET  
 PEAK DISCHARGE RATE = 32.58 CFS AT 1.500 HOURS  
 BASIN AREA = .0238 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - G

\*AREA DISCHARGES INTO BASIN T2 - H.

COMPUTE NM HYD ID=19 HYD NO=101.19 AREA=0.0421 SQ MI  
 PER A=90.0 PER B=0.00 PER C=0.00 PER D=10.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 K = .072649HR TP = .133300HR K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 16.621 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 1.8500  
 AREA = .004210 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 K = .164188HR TP = .133300HR K/TP RATIO = 1.231718  
 SHAPE CONSTANT, N = 2.891709  
 UNIT PEAK = 77.562 CFS UNIT VOLUME = .9982 B = 272.87 P60 = 1.8500  
 AREA = .037890 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD ID=19 CODE=1 PARTIAL HYDROGRAPH 101.19  
 RUNOFF VOLUME = .63567 INCHES = 1.4273 ACRE-FEET  
 PEAK DISCHARGE RATE = 42.22 CFS AT 1.500 HOURS  
 BASIN AREA = .0421 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - H

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=20 HYD NO=101.20 AREA=0.0598 SQ MI  
 PER A=4.0 PER B=35.00 PER C=25.00 PER D=36.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 K = .072649HR TP = .133300HR K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 84.994 CFS UNIT VOLUME = .9990 B = 526.28 P60 = 1.8500  
 AREA = .021528 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 K = .123356HR TP = .133300HR K/TP RATIO = .925405  
 SHAPE CONSTANT, N = 3.823764  
 UNIT PEAK = 98.549 CFS UNIT VOLUME = 1.001 B = 343.24 P60 = 1.8500  
 AREA = .038272 SQ MI IA = .45078 INCHES INF = 1.11219 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 PRINT HYD ID=20 CODE=1 PARTIAL HYDROGRAPH 101.20  
 RUNOFF VOLUME = 1.36569 INCHES = 4.3556 ACRE-FEET  
 PEAK DISCHARGE RATE = 114.12 CFS AT 1.500 HOURS  
 BASIN AREA = .0598 SQ. MI.

\*HYDROGRAPH FOR ON-SITE DRAINAGE BASIN T2 - I

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=21 HYD NO=101.21 AREA=0.0052 SQ MI  
 PER A=74.0 PER B=0.00 PER C=0.00 PER D=26.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 K = .072649HR TP = .133300HR K/TP RATIO = .545000  
 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 5.3378 CFS UNIT VOLUME = .9971 B = 526.28 P60 = 1.8500  
 AREA = .001352 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050  
 K = .164188HR TP = .133300HR K/TP RATIO = 1.231718  
 SHAPE CONSTANT, N = 2.891709  
 UNIT PEAK = 7.8770 CFS UNIT VOLUME = .9965 B = 272.87 P60 = 1.8500  
 AREA = .003848 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR

BASIN AREA = .1616 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO BASIN T2 - A2.

ADD HYD ID=26 HYD NO=101.26 ID=25 ID=13

PRINT HYD ID=26 CODE=1

PARTIAL HYDROGRAPH 101.26

RUNOFF VOLUME = .61003 INCHES = 6.6273 ACRE-FEET

PEAK DISCHARGE RATE = 225.72 CFS AT 1.500 HOURS

BASIN AREA = .2037 SQ. MI.

ADD HYD ID=27 HYD NO=101.27 ID=26 ID=15

PRINT HYD ID=27 CODE=1

PARTIAL HYDROGRAPH 101.27

RUNOFF VOLUME = .62776 INCHES = 7.3958 ACRE-FEET

PEAK DISCHARGE RATE = 250.02 CFS AT 1.500 HOURS

BASIN AREA = .2209 SQ. MI.

ADD HYD ID=28 HYD NO=101.28 ID=27 ID=18

PRINT HYD ID=28 CODE=1

PARTIAL HYDROGRAPH 101.28

RUNOFF VOLUME = .66181 INCHES = 8.6370 ACRE-FEET

PEAK DISCHARGE RATE = 282.60 CFS AT 1.500 HOURS

BASIN AREA = .2447 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - D.

ADD HYD ID=29 HYD NO=101.29 ID=28 ID=9

PRINT HYD ID=29 CODE=1

PARTIAL HYDROGRAPH 101.29

RUNOFF VOLUME = .79801 INCHES = 12.0530 ACRE-FEET

PEAK DISCHARGE RATE = 365.60 CFS AT 1.500 HOURS

BASIN AREA = .2832 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - E.

\*DISCHARGES OFF SITE INTO FLOOD PLAIN.

ADD HYD ID=30 HYD NO=101.30 ID=29 ID=10

PRINT HYD ID=30 CODE=1

PARTIAL HYDROGRAPH 101.30

RUNOFF VOLUME = .83939 INCHES = 22.3075 ACRE-FEET

PEAK DISCHARGE RATE = 686.62 CFS AT 1.500 HOURS

BASIN AREA = .4983 SQ. MI.

ADD HYD ID=31 HYD NO=101.31 ID=30 ID=11

PRINT HYD ID=31 CODE=1

PARTIAL HYDROGRAPH 101.31

RUNOFF VOLUME = .84838 INCHES = 22.9309 ACRE-FEET

PEAK DISCHARGE RATE = 703.15 CFS AT 1.500 HOURS

BASIN AREA = .5068 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO RETENTION PONDS.

\*BASINS T1-A, T1-B, AND T1-C.

ADD HYD ID=32 HYD NO=101.32 ID=5 ID=8

PRINT HYD ID=32 CODE=1

PARTIAL HYDROGRAPH 101.32

RUNOFF VOLUME = 1.71774 INCHES = 20.4844 ACRE-FEET

PEAK DISCHARGE RATE = 476.71 CFS AT 1.500 HOURS

BASIN AREA = .2236 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO T2 - D.

ADD HYD ID=33 HYD NO=101.33 ID=16 ID=17

PRINT HYD ID=33 CODE=1

PARTIAL HYDROGRAPH 101.33

RUNOFF VOLUME = .89473 INCHES = 1.1452 ACRE-FEET

PEAK DISCHARGE RATE = 32.43 CFS AT 1.500 HOURS

BASIN AREA = .0240 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO T2 - H.

ADD HYD ID=34 HYD NO=101.34 ID=33 ID=20

PRINT HYD ID=34 CODE=1

PARTIAL HYDROGRAPH 101.34

RUNOFF VOLUME = 1.23081 INCHES = 5.5008 ACRE-FEET

PEAK DISCHARGE RATE = 146.55 CFS AT 1.500 HOURS

BASIN AREA = .0838 SQ. MI.

ADD HYD ID=35 HYD NO=101.35 ID=34 ID=19

PRINT HYD ID=35 CODE=1

PARTIAL HYDROGRAPH 101.35

RUNOFF VOLUME = 1.03180 INCHES = 6.9281 ACRE-FEET

PEAK DISCHARGE RATE = 188.77 CFS AT 1.500 HOURS

BASIN AREA = .1259 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO T2 - J.

ADD HYD ID=36 HYD NO=101.36 ID=22 ID=23

PRINT HYD ID=36 CODE=1

PARTIAL HYDROGRAPH 101.36

RUNOFF VOLUME = 1.61165 INCHES = 1.5128 ACRE-FEET

PEAK DISCHARGE RATE = 36.35 CFS AT 1.500 HOURS

BASIN AREA = .0176 SQ. MI.

\*ADD HYDROGRAPHS FLOWING OFF SITE INTO FLOOD PLAIN.

ADD HYD ID=37 HYD NO=101.37 ID=21 ID=35

PRINT HYD ID=37 CODE=1

PARTIAL HYDROGRAPH 101.37

RUNOFF VOLUME = 1.02232 INCHES = 7.1480 ACRE-FEET

PEAK DISCHARGE RATE = 194.77 CFS AT 1.500 HOURS

BASIN AREA = .1311 SQ. MI.

ADD HYD ID=38 HYD NO=101.38 ID=36 ID=37

PRINT HYD ID=38 CODE=1

PARTIAL HYDROGRAPH 101.38

RUNOFF VOLUME = 1.09208 INCHES = 8.6608 ACRE-FEET

PEAK DISCHARGE RATE = 231.12 CFS AT 1.500 HOURS

BASIN AREA = .1487 SQ. MI.

\*HYDROGRAPH FOR ON-SITE UNDISTURBED AREA ALONG EASTERN BOUNDARY

\*OF SITE. AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=39 HYD NO=101.39 AREA=0.1209 SQ MI

PER A=95.0 PER B=3.00 PER C=1.00 PER D=1.00

TP=0.1333 HR MASS RAINFALL=-1

K = .073687HR TP = .133300HR K/TP RATIO = .552794

SHAPE CONSTANT, N = 6.978568

UNIT PEAK = 4.7184 CFS UNIT VOLUME = .9969 B = 520.24 P60 = 1.8500

AREA = .001209 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050

K = .155840HR TP = .133300HR K/TP RATIO = 1.169093

SHAPE CONSTANT, N = 3.033459

UNIT PEAK = 255.49 CFS UNIT VOLUME = .9991 B = 284.54 P60 = 1.8500

AREA = .119691 SQ MI IA = .64242 INCHES INF = 1.64879 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .050

PRINT HYD ID=39 CODE=1 PARTIAL HYDROGRAPH 101.39

RUNOFF VOLUME = .46268 INCHES = 2.9834 ACRE-FEET

PEAK DISCHARGE RATE = 105.70 CFS AT 1.500 HOURS

BASIN AREA = .1209 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 07:58:28

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994  
 RUN DATE (MON/DAY/YR) = 07/30/1997  
 INPUT FILE = speedway.dat  
 USER NO. = M\_GOODWN.10

| START<br>RAINFALL TYPE = 2                                       | TIME = .00<br>RAIN 24 = 2.690               |                 | PAGE = 1        |                            |                             |                    |                            |                    |                       |
|------------------------------------------------------------------|---------------------------------------------|-----------------|-----------------|----------------------------|-----------------------------|--------------------|----------------------------|--------------------|-----------------------|
| COMMAND                                                          | FROM<br>HYDROGRAPH ID<br>IDENTIFICATION NO. | TO<br>ID<br>NO. | AREA<br>(SQ MI) | PEAK<br>DISCHARGE<br>(CFS) | RUNOFF<br>VOLUME<br>(AC-FT) | RUNOFF<br>(INCHES) | TIME TO<br>PEAK<br>(HOURS) | CFS<br>PER<br>ACRE | NOTATION              |
| COMPUTE NM HYD                                                   | 101.01                                      | - offsite       | 1               | 84.8657                    | 5701.54                     | 2387.995           | .52760                     | 4.050              | .105 PER IMP= .00     |
| COMPUTE NM HYD                                                   | 101.02                                      | - existing      | 2               | 1.0000                     | 1007.88                     | 25.133             | .47124                     | 1.500              | 1.575 PER IMP= .00    |
| COMPUTE NM HYD                                                   | 101.03                                      | - T1-A          | 3               | .1219                      | 219.78                      | 8.486              | 1.30526                    | 1.500              | 2.817 PER IMP= 36.00  |
| COMPUTE NM HYD                                                   | 101.04                                      | - T1-B          | 4               | .0552                      | 130.33                      | 5.907              | 2.00659                    | 1.500              | 3.689 PER IMP= 75.00  |
| *SIZES RETENTION POND AND STORM DRAIN SYSTEM INTO RETENTION POND |                                             |                 |                 |                            |                             |                    |                            |                    |                       |
| ADD HYD                                                          | 101.05                                      |                 | 3& 4,5          | .1771                      | 350.11                      | 14.393             | 1.52385                    | 1.500              | 3.089                 |
| COMPUTE NM HYD                                                   | 101.06                                      | -OA-1           | 6               | .1076                      | 128.91                      | 3.546              | .61795                     | 1.500              | 1.872 PER IMP= .00    |
| COMPUTE NM HYD                                                   | 101.07                                      | -OA-2           | 7               | .1349                      | 167.62                      | 4.578              | .63627                     | 1.500              | 1.941 PER IMP= .00    |
| COMPUTE NM HYD                                                   | 101.08                                      | -T1-C           | 8               | .0465                      | 126.60                      | 6.091              | 2.45616                    | 1.500              | 4.254 PER IMP= 100.00 |
| COMPUTE NM HYD                                                   | 101.09                                      | -T1-D           | 9               | .0385                      | 83.00                       | 3.416              | 1.66368                    | 1.500              | 3.368 PER IMP= 52.00  |
| COMPUTE NM HYD                                                   | 101.10                                      | -T1-E           | 10              | .2151                      | 321.02                      | 10.255             | .89388                     | 1.500              | 2.332 PER IMP= 13.50  |
| COMPUTE NM HYD                                                   | 101.11                                      | -T2-L           | 11              | .0085                      | 16.52                       | .623               | 1.37521                    | 1.500              | 3.037 PER IMP= 35.00  |
| COMPUTE NM HYD                                                   | 101.12                                      | -T2-A1          | 12              | .0280                      | 28.06                       | .867               | .58088                     | 1.500              | 1.566 PER IMP= 5.00   |
| COMPUTE NM HYD                                                   | 101.13                                      | -T2-A2          | 13              | .0421                      | 42.18                       | 1.304              | .58088                     | 1.500              | 1.565 PER IMP= 5.00   |
| COMPUTE NM HYD                                                   | 101.14                                      | -T2-B           | 14              | .0260                      | 26.58                       | .910               | .65590                     | 1.500              | 1.597 PER IMP= 11.00  |
| COMPUTE NM HYD                                                   | 101.15                                      | -T2-C           | 15              | .0172                      | 24.30                       | .768               | .83771                     | 1.500              | 2.207 PER IMP= 10.00  |
| COMPUTE NM HYD                                                   | 101.16                                      | -T2-D           | 16              | .0213                      | 26.66                       | .910               | .80147                     | 1.500              | 1.956 PER IMP= 14.00  |
| COMPUTE NM HYD                                                   | 101.17                                      | -T2-E           | 17              | .0027                      | 5.77                        | .235               | 1.63066                    | 1.500              | 3.340 PER IMP= 50.00  |
| COMPUTE NM HYD                                                   | 101.18                                      | -T2-F           | 18              | .0238                      | 32.58                       | 1.241              | .97787                     | 1.500              | 2.139 PER IMP= 25.00  |
| COMPUTE NM HYD                                                   | 101.19                                      | -T2-G           | 19              | .0421                      | 42.22                       | 1.427              | .63567                     | 1.500              | 1.567 PER IMP= 10.00  |
| COMPUTE NM HYD                                                   | 101.20                                      | -T2-H           | 20              | .0598                      | 114.12                      | 4.356              | 1.36569                    | 1.500              | 2.982 PER IMP= 36.00  |
| COMPUTE NM HYD                                                   | 101.21                                      | -T2-I           | 21              | .0052                      | 6.82                        | .266               | .95931                     | 1.500              | 2.048 PER IMP= 26.00  |
| COMPUTE NM HYD                                                   | 101.22                                      | -T2-J           | 22              | .0088                      | 12.89                       | .399               | .84976                     | 1.500              | 2.289 PER IMP= 9.00   |
| COMPUTE NM HYD                                                   | 101.23                                      | -T2-K           | 23              | .0088                      | 23.45                       | 1.114              | 2.37361                    | 1.500              | 4.164 PER IMP= 95.00  |
| ADD HYD                                                          | 101.24                                      |                 | 6&12, 24        | .1356                      | 156.97                      | 4.414              | .61029                     | 1.500              | 1.809                 |
| ADD HYD                                                          | 101.25                                      |                 | 24&14, 25       | .1616                      | 183.54                      | 5.323              | .61763                     | 1.500              | 1.775                 |
| ADD HYD                                                          | 101.26                                      |                 | 25&13, 26       | .2037                      | 225.72                      | 6.627              | .61003                     | 1.500              | 1.731                 |
| ADD HYD                                                          | 101.27                                      |                 | 26&15, 27       | .2209                      | 250.02                      | 7.396              | .62776                     | 1.500              | 1.768                 |
| ADD HYD                                                          | 101.28                                      |                 | 27&18, 28       | .2447                      | 282.60                      | 8.637              | .66181                     | 1.500              | 1.805                 |
| ADD HYD                                                          | 101.29                                      |                 | 28& 9, 29       | .2832                      | 365.60                      | 12.053             | .79801                     | 1.500              | 2.017                 |
| ADD HYD                                                          | 101.30                                      |                 | 29&10, 30       | .4983                      | 686.62                      | 22.308             | .83939                     | 1.500              | 2.153                 |
| ADD HYD                                                          | 101.31                                      |                 | 30&11, 31       | .5068                      | * 703.15                    | 22.931             | .84838                     | 1.500              | 2.168                 |
| ADD HYD                                                          | 101.32                                      |                 | 5& 8, 32        | .2236                      | 476.71                      | 20.485             | 1.71774                    | 1.500              | 3.331                 |
| ADD HYD                                                          | 101.33                                      |                 | 16&17, 33       | .0240                      | 32.43                       | 1.145              | .89473                     | 1.500              | 2.111                 |
| ADD HYD                                                          | 101.34                                      |                 | 33&20, 34       | .0838                      | 146.55                      | 5.501              | 1.23081                    | 1.500              | 2.733                 |
| ADD HYD                                                          | 101.35                                      |                 | 34&19, 35       | .1259                      | 188.77                      | 6.928              | 1.03180                    | 1.500              | 2.343                 |
| ADD HYD                                                          | 101.36                                      |                 | 22&23, 36       | .0176                      | 36.35                       | 1.513              | 1.61165                    | 1.500              | 3.227                 |
| ADD HYD                                                          | 101.37                                      |                 | 21&35, 37       | .1311                      | 195.59                      | 7.194              | 1.02892                    | 1.500              | 2.331                 |
| ADD HYD                                                          | 101.38                                      |                 | 36&37, 38       | .1487                      | * 231.93                    | 8.707              | 1.09789                    | 1.500              | 2.437                 |
| COMPUTE NM HYD                                                   | 101.39                                      | -               | 39              | .1209                      | * 105.70                    | 2.983              | .46268                     | 1.500              | 1.366 PER IMP= 1.00   |
| FINISH                                                           |                                             |                 |                 |                            |                             |                    |                            |                    |                       |

TOTAL FLOW DISCHARGED = 703 15 + 231 93 + 105 70 = 1040 78cfs

16A

## ***SECTION B***

INPUT EXISTING CONDITION

START TIME=0.0

\*\*\*\*\* HYDROGRAPH FOR ALBUQUERQUE INTERNATIONAL SPEEDWAY  
 \*\*\*\*\* NORTHWEST CORNER OF INTERSTATE 40 AND THE RIO PUERCO  
 \*\*\*\*\* ONLY EXISTING CONDITIONS FOR EACH SEPARATE BASIN.

RAINFALL TYPE=2 RAIN QUARTER=0.0 IN  
 RAIN ONE=1.85 IN RAIN SIX=2.20 IN  
 RAIN DAY=2.69 IN DT=0.05 HR

\*HYDROGRAPH FOR OFF-SITE DRAINAGE  
 COMPUTE NM HYD ID=1 HYD NO=101.01 AREA=84.8657 SQ MI  
 PER A=70.33 PER B=12.14 PER C=17.53 PER D=0.00  
 TP=2.6543 HR MASS RAINFALL=-1  
 PRINT HYD ID=1 CODE=1

\*HYDROGRAPH FOR ON-SITE PROPERTY FOR TOTAL FLOW FROM SITE UNDER EXISTING  
 \*CONDITIONS. PORTIONS OF DISCHARGE FLOWS THROUGH THE SITE.  
 COMPUTE NM HYD ID=2 HYD NO=101.02 AREA=1.000 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=2 CODE=1

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - A  
 COMPUTE NM HYD ID=3 HYD NO=101.03 AREA=0.1219 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=3 CODE=1

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - B  
 COMPUTE NM HYD ID=4 HYD NO=101.04 AREA=0.0552 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=4 CODE=1

\*ADD HYDROGRAPHS OF T1-A&B FOR RETENTION AT INTERIOR OF OVAL TRACK  
 \*SIZES RETENTION POND AND STORM DRAIN SYSTEM INTO RETENTION POND  
 \*BASIN T1-C DISCHARGES INTO OVAL TRACK POND. SEE ADD HYD #32  
 ADD HYD ID=5 HYD NO=101.05 ID=3 ID=4  
 PRINT HYD ID=5 CODE=1

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 1  
 \*AREA DISCHARGES THROUGH SITE BETWEEN OVAL TRACK AND ROAD COURSE  
 COMPUTE NM HYD ID=6 HYD NO=101.06 AREA=0.1076 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=6 CODE=1

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 2  
 \*AREA DOES NOT DISCHARGE THROUGH SITE FLOWS TO EARTHEN CHANNEL  
 \*ADJACENT TO INTERSTATE 40  
 COMPUTE NM HYD ID=7 HYD NO=101.07 AREA=0.1349 SQ MI  
 PER A=48.0 PER B=12.00 PER C=40.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1  
 PRINT HYD ID=7 CODE=1

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - C  
 COMPUTE NM HYD ID=8 HYD NO=101.08 AREA=0.0465 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

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TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=8 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - D
*AREA DISCHARGES INTO BASIN T1-E. BASIN T2-A2 FLOWS INTO AND
*THROUGH THIS BASIN.
COMPUTE NM HYD ID=9 HYD NO=101.09 AREA=0.0385 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=9 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - E
*AREA DISCHARGES INTO FLOOD PLAIN. THIS BASIN IS THE FINAL
*ROUTING OFF SITE.
COMPUTE NM HYD ID=10 HYD NO=101.10 AREA=0.2151 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=10 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - L
*AREA DISCHARGES INTO BASIN T1 - E.
COMPUTE NM HYD ID=11 HYD NO=101.11 AREA=0.0085 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=11 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - A1
*AREA DISCHARGES INTO BASIN T2 - A2.
COMPUTE NM HYD ID=12 HYD NO=101.12 AREA=0.0280 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=12 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - A2
*AREA DISCHARGES INTO BASIN T1 - D.
COMPUTE NM HYD ID=13 HYD NO=101.13 AREA=0.0421 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=13 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - B
*AREA DISCHARGES INTO BASIN T2 - A1.
COMPUTE NM HYD ID=14 HYD NO=101.14 AREA=0.0260 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=14 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - C
*AREA DISCHARGES INTO BASIN T2 - A2.
COMPUTE NM HYD ID=15 HYD NO=101.15 AREA=0.0172 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=15 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - D
*AREA DISCHARGES INTO BASIN T2 - H.
COMPUTE NM HYD ID=16 HYD NO=101.16 AREA=0.0213 SQ MI
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD ID=16 CODE=1

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*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - E
*AREA DISCHARGES INTO BASIN T2 - D.
COMPUTE NM HYD      ID=17 HYD NO=101.17 AREA=0.0027 SQ MI
                    PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=17 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - F
*AREA DISCHARGES INTO BASIN T2 - A2.
COMPUTE NM HYD      ID=18 HYD NO=101.18 AREA=0.0238 SQ MI
                    PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=18 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - G
*AREA DISCHARGES INTO BASIN T2 - H.
COMPUTE NM HYD      ID=19 HYD NO=101.19 AREA=0.0421 SQ MI
                    PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=19 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - H
*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.
COMPUTE NM HYD      ID=20 HYD NO=101.20 AREA=0.0598 SQ MI
                    PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=20 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - I
*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.
COMPUTE NM HYD      ID=21 HYD NO=101.21 AREA=0.0052 SQ MI
                    PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=21 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - J
*AREA DISCHARGES INTO BASIN T2-K.
COMPUTE NM HYD      ID=22 HYD NO=101.22 AREA=0.0088 SQ MI
                    PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=22 CODE=1

*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - K
*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.
COMPUTE NM HYD      ID=23 HYD NO=101.23 AREA=0.0088 SQ MI
                    PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=23 CODE=1

*ADD HYDROGRAPHS FLOWING INTO BASIN T2 - A1.
ADD HYD             ID=24 HYD NO=101.24 ID=6 ID=12
PRINT HYD           ID=24 CODE=1

ADD HYD             ID=25 HYD NO=101.25 ID=24 ID=14
PRINT HYD           ID=25 CODE=1

*ADD HYDROGRAPHS FLOWING INTO BASIN T2 - A2.
ADD HYD             ID=26 HYD NO=101.26 ID=25 ID=13
PRINT HYD           ID=26 CODE=1

ADD HYD             ID=27 HYD NO=101.27 ID=26 ID=15

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PRINT HYD          ID=27 CODE=1

ADD HYD            ID=28  HYD NO=101.28  ID=27  ID=18
PRINT HYD          ID=28 CODE=1

*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - D.
ADD HYD            ID=29  HYD NO=101.29  ID=28  ID=9
PRINT HYD          ID=29 CODE=1

*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - E.
*DISCHARGES OFF SITE INTO FLOOD PLAIN.
ADD HYD            ID=30  HYD NO=101.30  ID=29  ID=10
PRINT HYD          ID=30 CODE=1

ADD HYD            ID=31  HYD NO=101.31  ID=30  ID=11
PRINT HYD          ID=31 CODE=1

*ADD HYDROGRAPHS FLOWING INTO RETENTION PONDS.
*BASINS T1-A, T1-B, AND T1-C.
ADD HYD            ID=32  HYD NO=101.32  ID=5   ID=8
PRINT HYD          ID=32 CODE=1

*ADD HYDROGRAPHS FLOWING INTO T2 - D.
ADD HYD            ID=33  HYD NO=101.33  ID=16  ID=17
PRINT HYD          ID=33 CODE=1

*ADD HYDROGRAPHS FLOWING INTO T2 - H.
ADD HYD            ID=34  HYD NO=101.34  ID=33  ID=20
PRINT HYD          ID=34 CODE=1

ADD HYD            ID=35  HYD NO=101.35  ID=34  ID=19
PRINT HYD          ID=35 CODE=1

*ADD HYDROGRAPHS FLOWING INTO T2 - J.
ADD HYD            ID=36  HYD NO=101.36  ID=22  ID=23
PRINT HYD          ID=36 CODE=1

*ADD HYDROGRAPHS FLOWING OFF SITE INTO FLOOD PLAIN.
ADD HYD            ID=37  HYD NO=101.37  ID=21  ID=35
PRINT HYD          ID=37 CODE=1

ADD HYD            ID=38  HYD NO=101.38  ID=36  ID=37
PRINT HYD          ID=38 CODE=1

*HYDROGRAPH FOR ON-SITE UNDISTURBED AREA ALONG EASTERN BOUNDARY
*OF SITE. AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.
COMPUTE NM HYD     ID=39 HYD NO=101.39 AREA=0.1209 SQ MI
                   PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00
                   TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD          ID=39 CODE=1

FINISH

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OUTPUT EXISTING CONDITION

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994  
 RUN DATE (MON/DAY/YR) = 08/14/1997  
 START TIME (HR:MIN:SEC) = 15:20:04 USER NO.= M\_GOODWN.I01  
 INPUT FILE = SWXSTING.DAT

START TIME=0.0

\*\*\*\*\* HYDROGRAPH FOR ALBUQUERQUE INTERNATIONAL SPEEDWAY

\*\*\*\*\* NORTHWEST CORNER OF INTERSTATE 40 AND THE RIO PUERCO

\*\*\*\*\* ONLY EXISTING CONDITIONS FOR EACH SEPARATE BASIN.

RAINFALL TYPE=2 RAIN QUARTER=0.0 IN

RAIN ONE=1.85 IN RAIN SIX=2.20 IN

RAIN DAY=2.69 IN DT=0.05 HR

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS  
 2 - PEAK AT 1.40 HR.

| DT = .050000 HOURS |        |        | END TIME = 24.000000 HOURS |        |        |        |
|--------------------|--------|--------|----------------------------|--------|--------|--------|
| .0000              | .0028  | .0056  | .0086                      | .0117  | .0148  | .0181  |
| .0216              | .0251  | .0288  | .0327                      | .0367  | .0409  | .0454  |
| .0501              | .0551  | .0604  | .0660                      | .0720  | .0786  | .0856  |
| .0934              | .1021  | .1270  | .1860                      | .2875  | .4444  | .6703  |
| .9792              | 1.2229 | 1.3329 | 1.4249                     | 1.5054 | 1.5773 | 1.6425 |
| 1.7020             | 1.7566 | 1.8068 | 1.8532                     | 1.8960 | 1.9356 | 1.9448 |
| 1.9532             | 1.9611 | 1.9685 | 1.9754                     | 1.9820 | 1.9883 | 1.9942 |
| 1.9999             | 2.0054 | 2.0107 | 2.0157                     | 2.0206 | 2.0254 | 2.0299 |
| 2.0344             | 2.0387 | 2.0429 | 2.0469                     | 2.0509 | 2.0548 | 2.0586 |
| 2.0623             | 2.0659 | 2.0694 | 2.0728                     | 2.0762 | 2.0795 | 2.0828 |
| 2.0860             | 2.0891 | 2.0922 | 2.0952                     | 2.0981 | 2.1011 | 2.1039 |
| 2.1067             | 2.1095 | 2.1123 | 2.1150                     | 2.1176 | 2.1202 | 2.1228 |
| 2.1253             | 2.1279 | 2.1303 | 2.1328                     | 2.1352 | 2.1376 | 2.1399 |
| 2.1422             | 2.1445 | 2.1468 | 2.1490                     | 2.1513 | 2.1535 | 2.1556 |
| 2.1578             | 2.1599 | 2.1620 | 2.1641                     | 2.1661 | 2.1682 | 2.1702 |
| 2.1722             | 2.1741 | 2.1761 | 2.1780                     | 2.1800 | 2.1819 | 2.1837 |
| 2.1856             | 2.1875 | 2.1893 | 2.1911                     | 2.1929 | 2.1947 | 2.1965 |
| 2.1983             | 2.2000 | 2.2021 | 2.2042                     | 2.2062 | 2.2083 | 2.2103 |
| 2.2124             | 2.2144 | 2.2164 | 2.2185                     | 2.2205 | 2.2225 | 2.2245 |
| 2.2265             | 2.2285 | 2.2304 | 2.2324                     | 2.2344 | 2.2364 | 2.2383 |
| 2.2403             | 2.2422 | 2.2441 | 2.2461                     | 2.2480 | 2.2499 | 2.2518 |
| 2.2537             | 2.2556 | 2.2575 | 2.2594                     | 2.2613 | 2.2632 | 2.2650 |
| 2.2669             | 2.2687 | 2.2706 | 2.2724                     | 2.2743 | 2.2761 | 2.2779 |
| 2.2798             | 2.2816 | 2.2834 | 2.2852                     | 2.2870 | 2.2888 | 2.2906 |
| 2.2924             | 2.2942 | 2.2959 | 2.2977                     | 2.2995 | 2.3012 | 2.3030 |
| 2.3047             | 2.3065 | 2.3082 | 2.3099                     | 2.3117 | 2.3134 | 2.3151 |
| 2.3168             | 2.3185 | 2.3202 | 2.3219                     | 2.3236 | 2.3253 | 2.3270 |
| 2.3287             | 2.3304 | 2.3320 | 2.3337                     | 2.3354 | 2.3370 | 2.3387 |
| 2.3403             | 2.3420 | 2.3436 | 2.3453                     | 2.3469 | 2.3485 | 2.3501 |
| 2.3518             | 2.3534 | 2.3550 | 2.3566                     | 2.3582 | 2.3598 | 2.3614 |

|        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|
| 2.3630 | 2.3646 | 2.3661 | 2.3677 | 2.3693 | 2.3708 | 2.3724 |
| 2.3740 | 2.3755 | 2.3771 | 2.3786 | 2.3802 | 2.3817 | 2.3833 |
| 2.3848 | 2.3863 | 2.3878 | 2.3894 | 2.3909 | 2.3924 | 2.3939 |
| 2.3954 | 2.3969 | 2.3984 | 2.3999 | 2.4014 | 2.4029 | 2.4044 |
| 2.4059 | 2.4073 | 2.4088 | 2.4103 | 2.4118 | 2.4132 | 2.4147 |
| 2.4161 | 2.4176 | 2.4190 | 2.4205 | 2.4219 | 2.4234 | 2.4248 |
| 2.4262 | 2.4277 | 2.4291 | 2.4305 | 2.4320 | 2.4334 | 2.4348 |
| 2.4362 | 2.4376 | 2.4390 | 2.4404 | 2.4418 | 2.4432 | 2.4446 |
| 2.4460 | 2.4474 | 2.4488 | 2.4501 | 2.4515 | 2.4529 | 2.4543 |
| 2.4556 | 2.4570 | 2.4584 | 2.4597 | 2.4611 | 2.4624 | 2.4638 |
| 2.4651 | 2.4665 | 2.4678 | 2.4691 | 2.4705 | 2.4718 | 2.4731 |
| 2.4745 | 2.4758 | 2.4771 | 2.4784 | 2.4798 | 2.4811 | 2.4824 |
| 2.4837 | 2.4850 | 2.4863 | 2.4876 | 2.4889 | 2.4902 | 2.4915 |
| 2.4928 | 2.4941 | 2.4953 | 2.4966 | 2.4979 | 2.4992 | 2.5005 |
| 2.5017 | 2.5030 | 2.5043 | 2.5055 | 2.5068 | 2.5081 | 2.5093 |
| 2.5106 | 2.5118 | 2.5131 | 2.5143 | 2.5156 | 2.5168 | 2.5180 |
| 2.5193 | 2.5205 | 2.5217 | 2.5230 | 2.5242 | 2.5254 | 2.5266 |
| 2.5279 | 2.5291 | 2.5303 | 2.5315 | 2.5327 | 2.5339 | 2.5351 |
| 2.5364 | 2.5376 | 2.5388 | 2.5400 | 2.5411 | 2.5423 | 2.5435 |
| 2.5447 | 2.5459 | 2.5471 | 2.5483 | 2.5495 | 2.5506 | 2.5518 |
| 2.5530 | 2.5542 | 2.5553 | 2.5565 | 2.5577 | 2.5588 | 2.5600 |
| 2.5611 | 2.5623 | 2.5635 | 2.5646 | 2.5658 | 2.5669 | 2.5681 |
| 2.5692 | 2.5703 | 2.5715 | 2.5726 | 2.5738 | 2.5749 | 2.5760 |
| 2.5772 | 2.5783 | 2.5794 | 2.5805 | 2.5817 | 2.5828 | 2.5839 |
| 2.5850 | 2.5861 | 2.5872 | 2.5884 | 2.5895 | 2.5906 | 2.5917 |
| 2.5928 | 2.5939 | 2.5950 | 2.5961 | 2.5972 | 2.5983 | 2.5994 |
| 2.6005 | 2.6015 | 2.6026 | 2.6037 | 2.6048 | 2.6059 | 2.6070 |
| 2.6080 | 2.6091 | 2.6102 | 2.6113 | 2.6123 | 2.6134 | 2.6145 |
| 2.6155 | 2.6166 | 2.6177 | 2.6187 | 2.6198 | 2.6208 | 2.6219 |
| 2.6230 | 2.6240 | 2.6251 | 2.6261 | 2.6272 | 2.6282 | 2.6292 |
| 2.6303 | 2.6313 | 2.6324 | 2.6334 | 2.6344 | 2.6355 | 2.6365 |
| 2.6375 | 2.6386 | 2.6396 | 2.6406 | 2.6416 | 2.6427 | 2.6437 |
| 2.6447 | 2.6457 | 2.6467 | 2.6478 | 2.6488 | 2.6498 | 2.6508 |
| 2.6518 | 2.6528 | 2.6538 | 2.6548 | 2.6558 | 2.6568 | 2.6578 |
| 2.6588 | 2.6598 | 2.6608 | 2.6618 | 2.6628 | 2.6638 | 2.6648 |
| 2.6658 | 2.6668 | 2.6677 | 2.6687 | 2.6697 | 2.6707 | 2.6717 |
| 2.6726 | 2.6736 | 2.6746 | 2.6756 | 2.6765 | 2.6775 | 2.6785 |
| 2.6794 | 2.6804 | 2.6814 | 2.6823 | 2.6833 | 2.6843 | 2.6852 |
| 2.6862 | 2.6871 | 2.6881 | 2.6890 | 2.6900 |        |        |

\*HYDROGRAPH FOR OFF-SITE DRAINAGE

COMPUTE NM HYD ID=1 HYD NO=101.01 AREA=84.8657 SQ MI

PER A=70.33 PER B=12.14 PER C=17.53 PER D=0.00

TP=2.6543 HR MASS RAINFALL=-1

K = 2.537492HR TP = 2.654300HR K/TP RATIO = .955993  
 SHAPE CONSTANT, N = 3.696456  
 UNIT PEAK = 10692. CFS UNIT VOLUME = .9907 B =  
 334.40 P60 = 1.8500  
 AREA = 84.865690 SQ MI IA = .57920 INCHES INF = 1.47176  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD

ID=1 CODE=1

## PARTIAL HYDROGRAPH 101.01

RUNOFF VOLUME = .52760 INCHES = 2387.9800 ACRE-FEET  
 PEAK DISCHARGE RATE = 5701.54 CFS AT 4.050 HOURS BASIN AREA =  
 84.8657 SQ. MI.

\*HYDROGRAPH FOR ON-SITE PROPERTY FOR TOTAL FLOW FROM SITE UNDER EXISTING  
 \*CONDITIONS. PORTIONS OF DISCHARGE FLOWS THROUGH THE SITE.

COMPUTE NM HYD ID=2 HYD NO=101.02 AREA=1.000 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .131450HR TP = .133300HR K/TP RATIO = .986124  
 SHAPE CONSTANT, N = 3.580687  
 UNIT PEAK = 2446.9 CFS UNIT VOLUME = 1.001 B =  
 326.17 P60 = 1.8500  
 AREA = 1.000000 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=2 CODE=1

## PARTIAL HYDROGRAPH 101.02

RUNOFF VOLUME = .47124 INCHES = 25.1328 ACRE-FEET  
 PEAK DISCHARGE RATE = 1007.88 CFS AT 1.500 HOURS BASIN AREA =  
 1.0000 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - A

COMPUTE NM HYD ID=3 HYD NO=101.03 AREA=0.1219 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .151674HR TP = .133300HR K/TP RATIO = 1.137837  
 SHAPE CONSTANT, N = 3.111535  
 UNIT PEAK = 265.92 CFS UNIT VOLUME = .9996 B =  
 290.79 P60 = 1.8500  
 AREA = .121900 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR

8B

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = .050000

PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 101.03

RUNOFF VOLUME = .47124 INCHES = 3.0637 ACRE-Feet  
PEAK DISCHARGE RATE = 111.52 CFS AT 1.500 HOURS BASIN AREA =  
.1219 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - B

COMPUTE NM HYD ID=4 HYD NO=101.04 AREA=0.0552 SQ MI

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
SHAPE CONSTANT, N = 2.995411  
UNIT PEAK = 116.55 CFS UNIT VOLUME = .9987 B =  
281.45 P60 = 1.8500  
AREA = .055200 SQ MI IA = .62000 INCHES INF = 1.58600  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = .050000

PRINT HYD ID=4 CODE=1

PARTIAL HYDROGRAPH 101.04

RUNOFF VOLUME = .47124 INCHES = 1.3873 ACRE-Feet  
PEAK DISCHARGE RATE = 49.12 CFS AT 1.500 HOURS BASIN AREA =  
.0552 SQ. MI.

\*ADD HYDROGRAPHS OF T1-A&B FOR RETENTION AT INTERIOR OF OVAL TRACK

\*SIZES RETENTION POND AND STORM DRAIN SYSTEM INTO RETENTION POND

\*BASIN T1-C DISCHARGES INTO OVAL TRACK POND. SEE ADD HYD #32

ADD HYD ID=5 HYD NO=101.05 ID=3 ID=4

PRINT HYD ID=5 CODE=1

PARTIAL HYDROGRAPH 101.05

9B

RUNOFF VOLUME = .47124 INCHES = 4.4510 ACRE-FEET  
 PEAK DISCHARGE RATE = 160.64 CFS AT 1.500 HOURS BASIN AREA =  
 .1771 SQ. MI.

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 1

\*AREA DISCHARGES THROUGH SITE BETWEEN OVAL TRACK AND ROAD COURSE

COMPUTE NM HYD ID=6 HYD NO=101.06 AREA=0.1076 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .153191HR TP = .133300HR K/TP RATIO = 1.149220  
 SHAPE CONSTANT, N = 3.082492  
 UNIT PEAK = 232.86 CFS UNIT VOLUME = .9994 B =  
 288.48 P60 = 1.8500  
 AREA = .107600 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=6 CODE=1

PARTIAL HYDROGRAPH 101.06

RUNOFF VOLUME = .47124 INCHES = 2.7043 ACRE-FEET  
 PEAK DISCHARGE RATE = 97.77 CFS AT 1.500 HOURS BASIN AREA =  
 .1076 SQ. MI.

\*HYDROGRAPH FOR OFF-SITE DRAINAGE BASIN OA - 2

\*AREA DOES NOT DISCHARGE THROUGH SITE FLOWS TO EARTHEN CHANNEL

\*ADJACENT TO INTERSTATE 40

COMPUTE NM HYD ID=7 HYD NO=101.07 AREA=0.1349 SQ MI  
 PER A=48.0 PER B=12.00 PER C=40.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .132192HR TP = .133300HR K/TP RATIO = .991685  
 SHAPE CONSTANT, N = 3.560279  
 UNIT PEAK = 328.60 CFS UNIT VOLUME = 1.001 B =  
 324.70 P60 = 1.8500

AREA = .134900 SQ MI IA = .51200 INCHES INF = 1.28360  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=7 CODE=1

PARTIAL HYDROGRAPH 101.07

RUNOFF VOLUME = .63627 INCHES = 4.5777 ACRE-FEET  
 PEAK DISCHARGE RATE = 167.62 CFS AT 1.500 HOURS BASIN AREA =  
 .1349 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - C

COMPUTE NM HYD ID=8 HYD NO=101.08 AREA=0.0465 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 98.179 CFS UNIT VOLUME = .9987 B =  
 281.45 P60 = 1.8500  
 AREA = .046500 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=8 CODE=1

PARTIAL HYDROGRAPH 101.08

RUNOFF VOLUME = .47124 INCHES = 1.1687 ACRE-FEET  
 PEAK DISCHARGE RATE = 41.38 CFS AT 1.500 HOURS BASIN AREA =  
 .0465 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - D

\*AREA DISCHARGES INTO BASIN T1-E. BASIN T2-A2 FLOWS INTO AND  
 \*THROUGH THIS BASIN.

COMPUTE NM HYD ID=9 HYD NO=101.09 AREA=0.0385 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 81.288 CFS UNIT VOLUME = .9987 B =  
 281.45 P60 = 1.8500  
 AREA = .038500 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=9 CODE=1

PARTIAL HYDROGRAPH 101.09

RUNOFF VOLUME = .47124 INCHES = .9676 ACRE-FEET  
 PEAK DISCHARGE RATE = 34.26 CFS AT 1.500 HOURS BASIN AREA =  
 .0385 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T1 - E

\*AREA DISCHARGES INTO FLOOD PLAIN. THIS BASIN IS THE FINAL

\*ROUTING OFF SITE.

COMPUTE NM HYD ID=10 HYD NO=101.10 AREA=0.2151 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .141785HR TP = .133300HR K/TP RATIO = 1.063652  
 SHAPE CONSTANT, N = 3.320050  
 UNIT PEAK = 495.32 CFS UNIT VOLUME = 1.000 B =  
 306.95 P60 = 1.8500  
 AREA = .215100 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=10 CODE=1

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = .47124 INCHES = 5.4061 ACRE-FEET  
 PEAK DISCHARGE RATE = 206.09 CFS AT 1.500 HOURS BASIN AREA =  
 .2151 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - L

\*AREA DISCHARGES INTO BASIN T1 - E.

COMPUTE NM HYD ID=11 HYD NO=101.11 AREA=0.0085 SQ MI

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 17.947 CFS UNIT VOLUME = .9981 B =  
 281.45 P60 = 1.8500  
 AREA = .008500 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=11 CODE=1

PARTIAL HYDROGRAPH 101.11

RUNOFF VOLUME = .47124 INCHES = .2136 ACRE-FEET  
 PEAK DISCHARGE RATE = 7.57 CFS AT 1.500 HOURS BASIN AREA =  
 .0085 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - A1

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=12 HYD NO=101.12 AREA=0.0280 SQ MI

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 59.119 CFS UNIT VOLUME = .9986 B =  
 281.45 P60 = 1.8500  
 AREA = .028000 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=12 CODE=1

PARTIAL HYDROGRAPH 101.12

RUNOFF VOLUME = .47124 INCHES = .7037 ACRE-FEET  
 PEAK DISCHARGE RATE = 24.92 CFS AT 1.500 HOURS BASIN AREA =  
 .0280 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - A2

\*AREA DISCHARGES INTO BASIN T1 - D.

COMPUTE NM HYD ID=13 HYD NO=101.13 AREA=0.0421 SQ MI

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 88.889 CFS UNIT VOLUME = .9987 B =  
 281.45 P60 = 1.8500  
 AREA = .042100 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=13 CODE=1

PARTIAL HYDROGRAPH 101.13

RUNOFF VOLUME = .47124 INCHES = 1.0581 ACRE-FEET  
 PEAK DISCHARGE RATE = 37.47 CFS AT 1.500 HOURS BASIN AREA =  
 .0421 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - B

\*AREA DISCHARGES INTO BASIN T2 - A1.

COMPUTE NM HYD ID=14 HYD NO=101.14 AREA=0.0260 SQ MI

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 54.896 CFS UNIT VOLUME = .9986 B =  
 281.45 P60 = 1.8500  
 AREA = .026000 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

14B

PRINT HYD ID=14 CODE=1

PARTIAL HYDROGRAPH 101.14

RUNOFF VOLUME = .47124 INCHES = .6535 ACRE-FEET  
PEAK DISCHARGE RATE = 23.14 CFS AT 1.500 HOURS BASIN AREA =  
.0260 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - C

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=15 HYD NO=101.15 AREA=0.0172 SQ MI  
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
SHAPE CONSTANT, N = 2.995411  
UNIT PEAK = 36.316 CFS UNIT VOLUME = .9985 B =  
281.45 P60 = 1.8500  
AREA = .017200 SQ MI IA = .62000 INCHES INF = 1.58600  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = .050000

PRINT HYD ID=15 CODE=1

PARTIAL HYDROGRAPH 101.15

RUNOFF VOLUME = .47124 INCHES = .4323 ACRE-FEET  
PEAK DISCHARGE RATE = 15.31 CFS AT 1.500 HOURS BASIN AREA =  
.0172 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - D

\*AREA DISCHARGES INTO BASIN T2 - H.

COMPUTE NM HYD ID=16 HYD NO=101.16 AREA=0.0213 SQ MI  
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
SHAPE CONSTANT, N = 2.995411

15B

UNIT PEAK = 44.972 CFS UNIT VOLUME = .9985 B =  
 281.45 P60 = 1.8500  
 AREA = .021300 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=16 CODE=1

# PARTIAL HYDROGRAPH 101.16

RUNOFF VOLUME = .47124 INCHES = .5353 ACRE-FEET  
 PEAK DISCHARGE RATE = 18.96 CFS AT 1.500 HOURS BASIN AREA =  
 .0213 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - E

\*AREA DISCHARGES INTO BASIN T2 - D.

COMPUTE NM HYD ID=17 HYD NO=101.17 AREA=0.0027 SQ MI

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 5.7007 CFS UNIT VOLUME = .9963 B =  
 281.45 P60 = 1.8500  
 AREA = .002700 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=17 CODE=1

# PARTIAL HYDROGRAPH 101.17

RUNOFF VOLUME = .47124 INCHES = .0679 ACRE-FEET  
 PEAK DISCHARGE RATE = 2.41 CFS AT 1.500 HOURS BASIN AREA =  
 .0027 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - F

\*AREA DISCHARGES INTO BASIN T2 - A2.

COMPUTE NM HYD ID=18 HYD NO=101.18 AREA=0.0238 SQ MI

16B

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 50.251 CFS UNIT VOLUME = .9986 B =  
 281.45 P60 = 1.8500  
 AREA = .023800 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=18 CODE=1

PARTIAL HYDROGRAPH 101.18

RUNOFF VOLUME = .47124 INCHES = .5982 ACRE-FEET  
 PEAK DISCHARGE RATE = 21.18 CFS AT 1.500 HOURS BASIN AREA =  
 .0238 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - G

\*AREA DISCHARGES INTO BASIN T2 - H.

COMPUTE NM HYD ID=19 HYD NO=101.19 AREA=0.0421 SQ MI

PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00

TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 88.889 CFS UNIT VOLUME = .9987 B =  
 281.45 P60 = 1.8500  
 AREA = .042100 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=19 CODE=1

PARTIAL HYDROGRAPH 101.19

RUNOFF VOLUME = .47124 INCHES = 1.0581 ACRE-FEET  
 PEAK DISCHARGE RATE = 37.47 CFS AT 1.500 HOURS BASIN AREA =  
 .0421 SQ. MI.

17B

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - H

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=20 HYD NO=101.20 AREA=0.0598 SQ MI  
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
SHAPE CONSTANT, N = 2.995411  
UNIT PEAK = 126.26 CFS UNIT VOLUME = .9987 B =  
281.45 P60 = 1.8500  
AREA = .059800 SQ MI IA = .62000 INCHES INF = 1.58600  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = .050000

PRINT HYD ID=20 CODE=1

PARTIAL HYDROGRAPH 101.20

RUNOFF VOLUME = .47124 INCHES = 1.5029 ACRE-FEET  
PEAK DISCHARGE RATE = 53.21 CFS AT 1.500 HOURS BASIN AREA =  
.0598 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - I

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=21 HYD NO=101.21 AREA=0.0052 SQ MI  
PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
SHAPE CONSTANT, N = 2.995411  
UNIT PEAK = 10.979 CFS UNIT VOLUME = .9976 B =  
281.45 P60 = 1.8500  
AREA = .005200 SQ MI IA = .62000 INCHES INF = 1.58600  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = .050000

PRINT HYD ID=21 CODE=1

PARTIAL HYDROGRAPH 101.21

18B

RUNOFF VOLUME = .47124 INCHES = .1307 ACRE-Feet  
 PEAK DISCHARGE RATE = 4.63 CFS AT 1.500 HOURS BASIN AREA =  
 .0052 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - J

\*AREA DISCHARGES INTO BASIN T2-K.

COMPUTE NM HYD ID=22 HYD NO=101.22 AREA=0.0088 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 18.580 CFS UNIT VOLUME = .9981 B =  
 281.45 P60 = 1.8500  
 AREA = .008800 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=22 CODE=1

PARTIAL HYDROGRAPH 101.22

RUNOFF VOLUME = .47124 INCHES = .2212 ACRE-Feet  
 PEAK DISCHARGE RATE = 7.84 CFS AT 1.500 HOURS BASIN AREA =  
 .0088 SQ. MI.

\*HYDROGRAPH FOR EXISTING CONDITION OF ON-SITE BASIN T2 - K

\*AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=23 HYD NO=101.23 AREA=0.0088 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .157976HR TP = .133300HR K/TP RATIO = 1.185118  
 SHAPE CONSTANT, N = 2.995411  
 UNIT PEAK = 18.580 CFS UNIT VOLUME = .9981 B =  
 281.45 P60 = 1.8500  
 AREA = .008800 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

19B

PRINT HYD ID=23 CODE=1

PARTIAL HYDROGRAPH 101.23

RUNOFF VOLUME = .47124 INCHES = .2212 ACRE-FEET  
PEAK DISCHARGE RATE = 7.84 CFS AT 1.500 HOURS BASIN AREA =  
.0088 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO BASIN T2 - A1.

ADD HYD ID=24 HYD NO=101.24 ID=6 ID=12

PRINT HYD ID=24 CODE=1

PARTIAL HYDROGRAPH 101.24

RUNOFF VOLUME = .47124 INCHES = 3.4080 ACRE-FEET  
PEAK DISCHARGE RATE = 122.69 CFS AT 1.500 HOURS BASIN AREA =  
.1356 SQ. MI.

ADD HYD ID=25 HYD NO=101.25 ID=24 ID=14

PRINT HYD ID=25 CODE=1

PARTIAL HYDROGRAPH 101.25

RUNOFF VOLUME = .47124 INCHES = 4.0615 ACRE-FEET  
PEAK DISCHARGE RATE = 145.83 CFS AT 1.500 HOURS BASIN AREA =  
.1616 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO BASIN T2 - A2.

ADD HYD ID=26 HYD NO=101.26 ID=25 ID=13

PRINT HYD ID=26 CODE=1

PARTIAL HYDROGRAPH 101.26

RUNOFF VOLUME = .47124 INCHES = 5.1195 ACRE-FEET  
PEAK DISCHARGE RATE = 183.30 CFS AT 1.500 HOURS BASIN AREA =  
.2037 SQ. MI.

20B

ADD HYD ID=27 HYD NO=101.27 ID=26 ID=15

PRINT HYD ID=27 CODE=1

PARTIAL HYDROGRAPH 101.27

RUNOFF VOLUME = .47124 INCHES = 5.5518 ACRE-Feet  
PEAK DISCHARGE RATE = 198.61 CFS AT 1.500 HOURS BASIN AREA =  
.2209 SQ. MI.

ADD HYD ID=28 HYD NO=101.28 ID=27 ID=18

PRINT HYD ID=28 CODE=1

PARTIAL HYDROGRAPH 101.28

RUNOFF VOLUME = .47124 INCHES = 6.1500 ACRE-Feet  
PEAK DISCHARGE RATE = 219.79 CFS AT 1.500 HOURS BASIN AREA =  
.2447 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - D.

ADD HYD ID=29 HYD NO=101.29 ID=28 ID=9

PRINT HYD ID=29 CODE=1

PARTIAL HYDROGRAPH 101.29

RUNOFF VOLUME = .47124 INCHES = 7.1176 ACRE-Feet  
PEAK DISCHARGE RATE = 254.05 CFS AT 1.500 HOURS BASIN AREA =  
.2832 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO BASIN T1 - E.

\*DISCHARGES OFF SITE INTO FLOOD PLAIN.

ADD HYD ID=30 HYD NO=101.30 ID=29 ID=10

21B

PRINT HYD ID=30 CODE=1

PARTIAL HYDROGRAPH 101.30

RUNOFF VOLUME = .47124 INCHES = 12.5236 ACRE-Feet  
PEAK DISCHARGE RATE = 460.14 CFS AT 1.500 HOURS BASIN AREA =  
.4983 SQ. MI.

ADD HYD ID=31 HYD NO=101.31 ID=30 ID=11

PRINT HYD ID=31 CODE=1

PARTIAL HYDROGRAPH 101.31

RUNOFF VOLUME = .47124 INCHES = 12.7373 ACRE-Feet  
PEAK DISCHARGE RATE = 467.71 CFS AT 1.500 HOURS BASIN AREA =  
.5068 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO RETENTION PONDS.

\*BASINS T1-A, T1-B, AND T1-C.

ADD HYD ID=32 HYD NO=101.32 ID=5 ID=8

PRINT HYD ID=32 CODE=1

PARTIAL HYDROGRAPH 101.32

RUNOFF VOLUME = .47124 INCHES = 5.6197 ACRE-Feet  
PEAK DISCHARGE RATE = 202.02 CFS AT 1.500 HOURS BASIN AREA =  
.2236 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO T2 - D.

ADD HYD ID=33 HYD NO=101.33 ID=16 ID=17

PRINT HYD ID=33 CODE=1

PARTIAL HYDROGRAPH 101.33

RUNOFF VOLUME = .47124 INCHES = .6032 ACRE-Feet

22B

PEAK DISCHARGE RATE = 21.37 CFS AT 1.500 HOURS BASIN AREA =  
.0240 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO T2 - H.

ADD HYD ID=34 HYD NO=101.34 ID=33 ID=20

PRINT HYD ID=34 CODE=1

PARTIAL HYDROGRAPH 101.34

RUNOFF VOLUME = .47124 INCHES = 2.1061 ACRE-FEET  
PEAK DISCHARGE RATE = 74.58 CFS AT 1.500 HOURS BASIN AREA =  
.0838 SQ. MI.

ADD HYD ID=35 HYD NO=101.35 ID=34 ID=19

PRINT HYD ID=35 CODE=1

PARTIAL HYDROGRAPH 101.35

RUNOFF VOLUME = .47124 INCHES = 3.1642 ACRE-FEET  
PEAK DISCHARGE RATE = 112.05 CFS AT 1.500 HOURS BASIN AREA =  
.1259 SQ. MI.

\*ADD HYDROGRAPHS FLOWING INTO T2 - J.

ADD HYD ID=36 HYD NO=101.36 ID=22 ID=23

PRINT HYD ID=36 CODE=1

PARTIAL HYDROGRAPH 101.36

RUNOFF VOLUME = .47124 INCHES = .4423 ACRE-FEET  
PEAK DISCHARGE RATE = 15.67 CFS AT 1.500 HOURS BASIN AREA =  
.0176 SQ. MI.

\*ADD HYDROGRAPHS FLOWING OFF SITE INTO FLOOD PLAIN.

23B

ADD HYD ID=37 HYD NO=101.37 ID=21 ID=35

PRINT HYD ID=37 CODE=1

# PARTIAL HYDROGRAPH 101.37

RUNOFF VOLUME = .47124 INCHES = 3.2949 ACRE-FEET  
 PEAK DISCHARGE RATE = 116.68 CFS AT 1.500 HOURS BASIN AREA =  
 .1311 SQ. MI.

ADD HYD ID=38 HYD NO=101.38 ID=36 ID=37

PRINT HYD ID=38 CODE=1

# PARTIAL HYDROGRAPH 101.38

RUNOFF VOLUME = .47124 INCHES = 3.7372 ACRE-FEET  
 PEAK DISCHARGE RATE = 132.35 CFS AT 1.500 HOURS BASIN AREA =  
 .1487 SQ. MI.

\*HYDROGRAPH FOR ON-SITE UNDISTURBED AREA ALONG EASTERN BOUNDARY

\*OF SITE. AREA DISCHARGES OFF SITE INTO FLOOD PLAIN.

COMPUTE NM HYD ID=39 HYD NO=101.39 AREA=0.1209 SQ MI  
 PER A=85.0 PER B=10.00 PER C=5.00 PER D=0.00  
 TP=0.1333 HR MASS RAINFALL=-1

K = .151780HR TP = .133300HR K/TP RATIO = 1.138633  
 SHAPE CONSTANT, N = 3.109480  
 UNIT PEAK = 263.59 CFS UNIT VOLUME = .9995 B =  
 290.63 P60 = 1.8500  
 AREA = .120900 SQ MI IA = .62000 INCHES INF = 1.58600  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = .050000

PRINT HYD ID=39 CODE=1

# PARTIAL HYDROGRAPH 101.39

RUNOFF VOLUME = .47124 INCHES = 3.0386 ACRE-FEET  
 PEAK DISCHARGE RATE = 110.55 CFS AT 1.500 HOURS BASIN AREA =  
 .1209 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 15:20:15

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994  
 INPUT FILE = SWXSTING.DAT

RUN DATE (MON/DAY/YR) =08/14/1997  
 USER NO.= M\_GOODWN.I01

| COMMAND                                                          | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | PAGE = 1 | NOTATION      |
|------------------------------------------------------------------|---------------------------|-------------|-----------|--------------|----------------------|-----------------------|-----------------|----------------------|--------------|----------|---------------|
| START                                                            |                           |             |           |              |                      |                       |                 |                      |              |          | TIME= .00     |
| RAINFALL TYPE= 2                                                 |                           |             |           |              |                      |                       |                 |                      |              |          | RAIN24= 2.690 |
| COMPUTE NM HYD                                                   | 101.01                    | -           | 1         | 84.86570     | 5701.54              | 2387.995              | .52760          | 4.050                | .105         |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.02                    | -           | 2         | 1.00000      | 1007.88              | 25.133                | .47124          | 1.500                | 1.575        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.03                    | -           | 3         | .12190       | 111.52               | 3.064                 | .47124          | 1.500                | 1.429        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.04                    | -           | 4         | .05520       | 49.12                | 1.387                 | .47124          | 1.500                | 1.390        |          | PER IMP= .00  |
| *SIZES RETENTION POND AND STORM DRAIN SYSTEM INTO RETENTION POND |                           |             |           |              |                      |                       |                 |                      |              |          |               |
| ADD HYD                                                          | 101.05                    | 3& 4        | 5         | .17710       | 160.64               | 4.451                 | .47124          | 1.500                | 1.417        |          |               |
| COMPUTE NM HYD                                                   | 101.06                    | -           | 6         | .10760       | 97.77                | 2.704                 | .47124          | 1.500                | 1.420        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.07                    | -           | 7         | .13490       | 167.62               | 4.578                 | .63627          | 1.500                | 1.941        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.08                    | -           | 8         | .04650       | 41.38                | 1.169                 | .47124          | 1.500                | 1.390        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.09                    | -           | 9         | .03850       | 34.26                | .968                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.10                    | -           | 10        | .21510       | 206.09               | 5.406                 | .47124          | 1.500                | 1.497        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.11                    | -           | 11        | .00850       | 7.57                 | .214                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.12                    | -           | 12        | .02800       | 24.92                | .704                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.13                    | -           | 13        | .04210       | 37.47                | 1.058                 | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.14                    | -           | 14        | .02600       | 23.14                | .653                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.15                    | -           | 15        | .01720       | 15.31                | .432                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.16                    | -           | 16        | .02130       | 18.96                | .535                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.17                    | -           | 17        | .00270       | 2.41                 | .068                  | .47124          | 1.500                | 1.394        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.18                    | -           | 18        | .02380       | 21.18                | .598                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.19                    | -           | 19        | .04210       | 37.47                | 1.058                 | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.20                    | -           | 20        | .05980       | 53.21                | 1.503                 | .47124          | 1.500                | 1.390        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.21                    | -           | 21        | .00520       | 4.63                 | .131                  | .47124          | 1.500                | 1.392        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.22                    | -           | 22        | .00880       | 7.84                 | .221                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| COMPUTE NM HYD                                                   | 101.23                    | -           | 23        | .00880       | 7.84                 | .221                  | .47124          | 1.500                | 1.391        |          | PER IMP= .00  |
| ADD HYD                                                          | 101.24                    | 6&12        | 24        | .13560       | 122.69               | 3.408                 | .47124          | 1.500                | 1.414        |          |               |
| ADD HYD                                                          | 101.25                    | 24&14       | 25        | .16160       | 145.83               | 4.061                 | .47124          | 1.500                | 1.410        |          |               |
| ADD HYD                                                          | 101.26                    | 25&13       | 26        | .20370       | 183.30               | 5.120                 | .47124          | 1.500                | 1.406        |          |               |
| ADD HYD                                                          | 101.27                    | 26&15       | 27        | .22090       | 198.61               | 5.552                 | .47124          | 1.500                | 1.405        |          |               |
| ADD HYD                                                          | 101.28                    | 27&18       | 28        | .24470       | 219.79               | 6.150                 | .47124          | 1.500                | 1.403        |          |               |
| ADD HYD                                                          | 101.29                    | 28& 9       | 29        | .28320       | 254.05               | 7.118                 | .47124          | 1.500                | 1.402        |          |               |
| ADD HYD                                                          | 101.30                    | 29&10       | 30        | .49830       | 460.14               | 12.524                | .47124          | 1.500                | 1.443        |          |               |
| ADD HYD                                                          | 101.31                    | 30&11       | 31        | .50680       | 467.71               | 12.737                | .47124          | 1.500                | 1.442        |          |               |
| ADD HYD                                                          | 101.32                    | 5& 8        | 32        | .22360       | 202.02               | 5.620                 | .47124          | 1.500                | 1.412        |          |               |
| ADD HYD                                                          | 101.33                    | 16&17       | 33        | .02400       | 21.37                | .603                  | .47124          | 1.500                | 1.391        |          |               |
| ADD HYD                                                          | 101.34                    | 33&20       | 34        | .08380       | 74.58                | 2.106                 | .47124          | 1.500                | 1.391        |          |               |
| ADD HYD                                                          | 101.35                    | 34&19       | 35        | .12590       | 112.05               | 3.164                 | .47124          | 1.500                | 1.391        |          |               |
| ADD HYD                                                          | 101.36                    | 22&23       | 36        | .01760       | 15.67                | .442                  | .47124          | 1.500                | 1.391        |          |               |
| ADD HYD                                                          | 101.37                    | 21&35       | 37        | .13110       | 116.68               | 3.295                 | .47124          | 1.500                | 1.391        |          |               |
| ADD HYD                                                          | 101.38                    | 36&37       | 38        | .14870       | 132.35               | 3.737                 | .47124          | 1.500                | 1.391        |          |               |
| COMPUTE NM HYD                                                   | 101.39                    | -           | 39        | .12090       | 110.55               | 3.039                 | .47124          | 1.500                | 1.429        |          | PER IMP= .00  |
| FINISH                                                           |                           |             |           |              |                      |                       |                 |                      |              |          |               |

24B

## ***SECTION C***

HEC-RAS Version 1.2 April 1996  
 U.S. Army Corp of Engineers  
 Hydrologic Engineering Center  
 609 Second Street, Suite D  
 Davis, California 95616-4687  
 (916) 756-1104

```

X      X  XXXXXX  XXXX      XXXX      XX      XXXX
X      X  X      X      X      X  X      X  X      X
X      X  X      X      X      X  X      X  X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X      X      X      X  X      X      X      X
X      X  X      X      X      X  X      X      X      X
X      X  XXXXXX  XXXX      X      X      X      X      XXXXX

```

\*\*\*\*\*

PROJECT DATA

Project Title:  
 Project File : xspdway.prj  
 Run Date and Time: 4/3/98 12:20:26 PM

Project in English units

\*\*\*\*\*

PLAN DATA

Plan Title: Plan 01  
 Plan File : c:\hec\ras\xspdway.p01

Geometry Title: Plan 01  
 Geometry File : c:\hec\ras\xspdway.p01

Flow Title : Plan 01  
 Flow File : c:\hec\ras\xspdway.p01

Plan Summary Information:

|            |                  |    |                      |   |
|------------|------------------|----|----------------------|---|
| Number of: | Cross Sections = | 12 | Multitple Openings = | 0 |
|            | Culverts =       | 0  | Inline Weirs =       | 0 |
|            | Bridges =        | 0  |                      |   |

Computational Information

|                                       |      |
|---------------------------------------|------|
| Water surface calculation tolerance = | .01  |
| Critical depth calculaton tolerance = | .01  |
| Maximum number of interations =       | 20   |
| Maximum difference tolerance =        | .3   |
| Flow tolerance factor =               | .001 |

Computational Flow Regime: Mixed Flow

Encroachment Data: None

Flow Distribution Locations: None

\*\*\*\*\*

FLOW DATA

Flow Title: Flow 01  
 Flow File : c:\hec\ras\xspdway.f01

Flow Data (cfs)

```

*****
* Reach      Riv Sta *    PF#1 *
*****
* CNDA ARROYO 1029    * 4598.88 *
* CNDA ARROYO 1020    * 5023.87 *
* CNDA ARROYO 1005    * 5448.86 *

```

```
*****  
Boundary Conditions  
*****  
* Reach          Profile *           Upstream             Downstream      *  
*****  
* CNDA ARROYO        1 *           Known WS =   5329       Known WS =   5301 *  
*****  
  
*****
```

## GEOMETRY DATA

Geometry Title: NM MOTOR SPEEDWAY EXISTING CHANNEL  
Geometry File : c:\hec\ras\xspdway.g01

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1029  
Description:

| Station Elevation Data, num = 30 |         |      |         |      |         |      |         |      |       |
|----------------------------------|---------|------|---------|------|---------|------|---------|------|-------|
| Sta.                             | Elev.   | Sta. | Elev.   | Sta. | Elev.   | Sta. | Elev.   | Sta. | Elev. |
| 0                                | 5329    | 100  | 5328.78 | 225  | 5328.5  | 450  | 5328    | 460  | 5328  |
| 510                              | 5328.25 | 550  | 5328    | 580  | 5327.5  | 620  | 5327.5  | 665  | 5327  |
| 685                              | 5328    | 775  | 5327.5  | 1075 | 5327    | 1145 | 5326.5  | 1205 | 5327  |
| 1280                             | 5326.5  | 1345 | 5327    | 1525 | 5328    | 1610 | 5328.25 | 1690 | 5328  |
| 1740                             | 5327.5  | 1810 | 5328    | 1990 | 5327.5  | 2160 | 5328    | 2345 | 5328  |
| 2510                             | 5327.5  | 2760 | 5328    | 3000 | 5328.59 | 3100 | 5328.83 | 3170 | 5329  |

|                             |       |      |       |      |       |
|-----------------------------|-------|------|-------|------|-------|
| Manning's n Values, num = 3 |       |      |       |      |       |
| Sta.                        | Value | Sta. | Value | Sta. | Value |
| 0                           | .05   | 100  | .05   | 3100 | .05   |

|           |      |       |          |      |         |       |       |        |        |
|-----------|------|-------|----------|------|---------|-------|-------|--------|--------|
| Bank Sta: | Left | Right | Lengths: | Left | Channel | Right | Coeff | Contr. | Expan. |
|           | 100  | 3100  |          | 530  | 530     | 530   |       | .1     | .3     |

| CROSS SECTION OUTPUT |            |                     | Reach: CNDA ARROYO | Riv Sta: 1029 | Profile # 1 |   |  |
|----------------------|------------|---------------------|--------------------|---------------|-------------|---|--|
| *****                |            |                     |                    |               |             |   |  |
| * W.S. Elev (ft)     | * 5328.48  | * Element           | * Left OB          | * Channel     | * Right OB  | * |  |
| * Vel Head (ft)      | * 0.07     | * Wt. n-Val.        | *                  | * 0.050       | *           | * |  |
| * E.G. Elev (ft)     | * 5328.56  | * Reach Len. (ft)   | * 530.00           | * 530.00      | * 530.00    | * |  |
| * E.G. Slope (ft/ft) | * 0.007051 | * Flow Area (sq ft) | *                  | * 2155.05     | *           | * |  |
| * Q Total (cfs)      | * 4598.88  | * Flow (cfs)        | *                  | * 4598.88     | *           | * |  |
| * Top Width (ft)     | * 2725.05  | * Top Width (ft)    | *                  | * 2725.05     | *           | * |  |
| * Vel Total (ft/s)   | * 2.13     | * Avg. Vel. (ft/s)  | *                  | * 2.13        | *           | * |  |
| * Max Chl Dpth (ft)  | * 1.98     | * Hydr. Depth (ft)  | *                  | * 0.79        | *           | * |  |
| * Crit W.S. (ft)     | *          | * Wetted Per. (ft)  | *                  | * 2725.11     | *           | * |  |
| * Conv. Total (cfs)  | * 54768.7  | * Conv. (cfs)       | *                  | * 54768.7     | *           | * |  |
| *****                |            |                     |                    |               |             |   |  |

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1025  
Description:

| Station Elevation Data, num = 41 |         |      |        |      |         |      |        |      |         |
|----------------------------------|---------|------|--------|------|---------|------|--------|------|---------|
| Sta.                             | Elev.   | Sta. | Elev.  | Sta. | Elev.   | Sta. | Elev.  | Sta. | Elev.   |
| -340                             | 5326    | -245 | 5325.5 | -150 | 5325    | 0    | 5325   | 250  | 5324.38 |
| 400                              | 5324    | 465  | 5323.5 | 495  | 5323    | 525  | 5323.5 | 545  | 5324    |
| 560                              | 5324.25 | 575  | 5324   | 645  | 5323    | 650  | 5322   | 655  | 5322    |
| 665                              | 5323    | 670  | 5324   | 750  | 5323    | 770  | 5323   | 880  | 5324    |
| 885                              | 5324.25 | 890  | 5324   | 895  | 5323.5  | 900  | 5324   | 1040 | 5324.5  |
| 1430                             | 5324    | 1500 | 5323.5 | 1565 | 5324    | 1610 | 5323.5 | 1635 | 5324    |
| 1750                             | 5324.42 | 1910 | 5325   | 1965 | 5324.5  | 2015 | 5325   | 2270 | 5324    |
| 2285                             | 5324    | 2635 | 5325   | 2685 | 5324.75 | 2740 | 5325   | 3065 | 5325.5  |
| 3305                             | 5326    |      |        |      |         |      |        |      |         |

|                             |       |      |       |      |       |
|-----------------------------|-------|------|-------|------|-------|
| Manning's n Values, num = 3 |       |      |       |      |       |
| Sta.                        | Value | Sta. | Value | Sta. | Value |
| -340                        | .05   | -245 | .05   | 3065 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|-----------|------|-------|----------|--------------|-------|--------------|--------|

-245      3065                      600      600      600                      .1                      .3

CROSS SECTION OUTPUT    Reach: CNDA ARROYO    Riv Sta: 1025                      Profile # 1

\*\*\*\*\*

|                      |            |                     |           |           |            |   |
|----------------------|------------|---------------------|-----------|-----------|------------|---|
| * W.S. Elev (ft)     | * 5325.09  | * Element           | * Left OB | * Channel | * Right OB | * |
| * Vel Head (ft)      | * 0.06     | * Wt. n-Val.        | *         | * 0.050   | *          | * |
| * E.G. Elev (ft)     | * 5325.15  | * Reach Len. (ft)   | * 600.00  | * 600.00  | * 600.00   | * |
| * E.G. Slope (ft/ft) | * 0.005875 | * Flow Area (sq ft) | *         | * 2354.35 | *          | * |
| * Q Total (cfs)      | * 4598.88  | * Flow (cfs)        | *         | * 4598.88 | *          | * |
| * Top Width (ft)     | * 2964.24  | * Top Width (ft)    | *         | * 2964.24 | *          | * |
| * Vel Total (ft/s)   | * 1.95     | * Avg. Vel. (ft/s)  | *         | * 1.95    | *          | * |
| * Max Chl Dpth (ft)  | * 3.09     | * Hydr. Depth (ft)  | *         | * 0.79    | *          | * |
| * Crit W.S. (ft)     | *          | * Wetted Per. (ft)  | *         | * 2964.61 | *          | * |
| * Conv. Total (cfs)  | * 60002.1  | * Conv. (cfs)       | *         | * 60002.1 | *          | * |

\*\*\*\*\*

Warning - The energy loss was greater than 1.0 ft (0.3 m) . between the  
current and previous cross section. This may indicate the need for  
additional cross sections.

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1022  
Description:

Station Elevation Data, num = 54

| Sta. | Elev.   | Sta. | Elev.  | Sta. | Elev.  | Sta. | Elev.  | Sta. | Elev.  |
|------|---------|------|--------|------|--------|------|--------|------|--------|
| 0    | 5322    | 185  | 5321   | 190  | 5320.5 | 200  | 5321   | 245  | 5321   |
| 265  | 5321.5  | 280  | 5321   | 435  | 5320   | 550  | 5319.5 | 625  | 5320   |
| 660  | 5322.5  | 700  | 5321   | 780  | 5320   | 790  | 5319   | 805  | 5318.5 |
| 815  | 5319    | 855  | 5320   | 865  | 5319   | 875  | 5318.5 | 885  | 5319   |
| 895  | 5320    | 940  | 5320.5 | 985  | 5320   | 987  | 5319.5 | 990  | 5320   |
| 1080 | 5320.5  | 1195 | 5320   | 1270 | 5320.5 | 1330 | 5320   | 1332 | 5319.5 |
| 1335 | 5320    | 1385 | 5320.5 | 1435 | 5320   | 1445 | 5319   | 1460 | 5320   |
| 1625 | 5321    | 1665 | 5321.5 | 1715 | 5321   | 1825 | 5320.5 | 1920 | 5321   |
| 1995 | 5321.5  | 2075 | 5321   | 2140 | 5320.5 | 2270 | 5320.5 | 2355 | 5321   |
| 2385 | 5321.25 | 2495 | 5321   | 2705 | 5320.5 | 2990 | 5320.7 | 3405 | 5321   |
| 3430 | 5321.25 | 3460 | 5321   | 3580 | 5321   | 3660 | 5322   |      |        |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .05   | 0    | .05   | 3660 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 3660  |          | 680      580 | 580   | .1           | .3     |

CROSS SECTION OUTPUT    Reach: CNDA ARROYO    Riv Sta: 1022                      Profile # 1

\*\*\*\*\*

|                      |            |                     |           |           |            |   |
|----------------------|------------|---------------------|-----------|-----------|------------|---|
| * W.S. Elev (ft)     | * 5321.28  | * Element           | * Left OB | * Channel | * Right OB | * |
| * Vel Head (ft)      | * 0.06     | * Wt. n-Val.        | *         | * 0.050   | *          | * |
| * E.G. Elev (ft)     | * 5321.34  | * Reach Len. (ft)   | * 680.00  | * 580.00  | * 580.00   | * |
| * E.G. Slope (ft/ft) | * 0.006855 | * Flow Area (sq ft) | *         | * 2345.18 | *          | * |
| * Q Total (cfs)      | * 4598.88  | * Flow (cfs)        | *         | * 4598.88 | *          | * |
| * Top Width (ft)     | * 3295.36  | * Top Width (ft)    | *         | * 3295.36 | *          | * |
| * Vel Total (ft/s)   | * 1.96     | * Avg. Vel. (ft/s)  | *         | * 1.96    | *          | * |
| * Max Chl Dpth (ft)  | * 2.78     | * Hydr. Depth (ft)  | *         | * 0.71    | *          | * |
| * Crit W.S. (ft)     | *          | * Wetted Per. (ft)  | *         | * 3296.00 | *          | * |
| * Conv. Total (cfs)  | * 55547.2  | * Conv. (cfs)       | *         | * 55547.2 | *          | * |

\*\*\*\*\*

Warning - Divided flow computed for this cross-section.

Warning - The conveyance ratio (upstream conveyance divided by  
downstream conveyance) is less than 0.7 or greater than 1.4. This  
may indicate the need for additional cross sections.

Warning - The energy loss was greater than 1.0 ft (0.3 m) . between the  
current and previous cross section. This may indicate the need for  
additional cross sections.

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1020  
Description:

Station Elevation Data, num = 38

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev.  |
|------|-------|------|-------|------|-------|------|--------|
| 0    | 5320  | 225  | 5319  | 495  | 5318  | 610  | 5317   |
|      |       |      |       |      |       | 615  | 5316.5 |

|      |        |      |        |      |         |      |        |      |        |
|------|--------|------|--------|------|---------|------|--------|------|--------|
| 620  | 5317   | 625  | 5316.5 | 635  | 5317    | 642  | 5317.5 | 650  | 5317   |
| 665  | 5316.5 | 675  | 5317   | 760  | 5317.25 | 840  | 5317   | 845  | 5316   |
| 850  | 5315.5 | 855  | 5316   | 925  | 5317    | 970  | 5317   | 1130 | 5316   |
| 1190 | 5317   | 1215 | 5319   | 1220 | 5318    | 1285 | 5317   | 1300 | 5316.5 |
| 1310 | 5317   | 1570 | 5318   | 1700 | 5318.5  | 1840 | 5318   | 2710 | 5317   |
| 2720 | 5316.5 | 2730 | 5317   | 2855 | 5317.5  | 2950 | 5317   | 2955 | 5316.5 |
| 2960 | 5317   | 3395 | 5318   | 3685 | 5319    |      |        |      |        |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .05   | 225  | .05   | 3685 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 225  | 3685  |          | 600          | 760   | 600          | .1     |
|           |      |       |          |              |       |              | .3     |

CROSS SECTION OUTPUT Reach: CNDA ARROYO Riv Sta: 1020 Profile # 1

```

*****
* W.S. Elev (ft) * 5318.34 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.05 * Wt. n-Val. * * 0.050 * *
* E.G. Elev (ft) * 5318.39 * Reach Len. (ft) * 600.00 * 760.00 * 600.00 *
* E.G. Slope (ft/ft) * 0.004005 * Flow Area (sq ft) * * 2795.92 *
* Q Total (cfs) * 5023.87 * Flow (cfs) * * 5023.87 *
* Top Width (ft) * 2993.37 * Top Width (ft) * * 2993.37 *
* Vel Total (ft/s) * 1.80 * Avg. Vel. (ft/s) * * 1.80 *
* Max Chl Dpth (ft) * 2.84 * Hydr. Depth (ft) * * 0.93 *
* Crit W.S. (ft) * * Wetted Per. (ft) * * 2993.88 *
* Conv. Total (cfs) * 79386.0 * Conv. (cfs) * * 79386.0 *
*****

```

Warning - Divided flow computed for this cross-section.

Warning - The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION INPUT Reach: CNDA ARROYO River Station: 1016

Description:

Station Elevation Data, num = 46

| Sta. | Elev.   | Sta. | Elev.   | Sta. | Elev.   | Sta. | Elev.   | Sta. | Elev.   |
|------|---------|------|---------|------|---------|------|---------|------|---------|
| 0    | 5316    | 220  | 5315    | 410  | 5314    | 415  | 5313.75 | 425  | 5314    |
| 475  | 5314.25 | 550  | 5314    | 1090 | 5313    | 1100 | 5312.75 | 1110 | 5313    |
| 1155 | 5313.25 | 1205 | 5313    | 1212 | 5313.25 | 1220 | 5313    | 1225 | 5312.75 |
| 1230 | 5313    | 1275 | 5313.25 | 1330 | 5313    | 1365 | 5312.5  | 1400 | 5313    |
| 1490 | 5314    | 1650 | 5315    | 1720 | 5315.5  | 1800 | 5315    | 1840 | 5314    |
| 1930 | 5313.5  | 2000 | 5314    | 2100 | 5314    | 2130 | 5313.5  | 2140 | 5314    |
| 2150 | 5314.5  | 2160 | 5314    | 2190 | 5313.5  | 2220 | 5314    | 2400 | 5314.5  |
| 2520 | 5314.5  | 2650 | 5314    | 3000 | 5314    | 3100 | 5314.6  | 3200 | 5314    |
| 3300 | 5314    | 3350 | 5314.3  | 3400 | 5314    | 3460 | 5313.6  | 3520 | 5314    |
| 3670 | 5315    |      |         |      |         |      |         |      |         |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .05   | 220  | .05   | 3670 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 220  | 3670  |          | 500          | 525   | 550          | .1     |
|           |      |       |          |              |       |              | .3     |

CROSS SECTION OUTPUT Reach: CNDA ARROYO Riv Sta: 1016 Profile # 1

```

*****
* W.S. Elev (ft) * 5314.71 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.06 * Wt. n-Val. * * 0.050 * *
* E.G. Elev (ft) * 5314.77 * Reach Len. (ft) * 500.00 * 525.00 * 550.00 *
* E.G. Slope (ft/ft) * 0.005678 * Flow Area (sq ft) * * 2567.19 *
* Q Total (cfs) * 5023.87 * Flow (cfs) * * 5023.87 *
* Top Width (ft) * 3142.32 * Top Width (ft) * * 3142.32 *
* Vel Total (ft/s) * 1.96 * Avg. Vel. (ft/s) * * 1.96 *
* Max Chl Dpth (ft) * 2.21 * Hydr. Depth (ft) * * 0.82 *
* Crit W.S. (ft) * * Wetted Per. (ft) * * 3142.46 *
* Conv. Total (cfs) * 66671.8 * Conv. (cfs) * * 66671.8 *
*****

```

Warning - Divided flow computed for this cross-section.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the  
current and previous cross section. This may indicate the need for  
additional cross sections.

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1013  
Description:

| Station Elevation Data, num = 45 |         |      |         |      |       |      |        |      |         |
|----------------------------------|---------|------|---------|------|-------|------|--------|------|---------|
| Sta.                             | Elev.   | Sta. | Elev.   | Sta. | Elev. | Sta. | Elev.  | Sta. | Elev.   |
| 0                                | 5313    | 100  | 5312    | 115  | 5311  | 122  | 5311   | 125  | 5312    |
| 165                              | 5312.25 | 205  | 5312    | 305  | 5311  | 360  | 5310.5 | 415  | 5311    |
| 500                              | 5310    | 630  | 5310.5  | 780  | 5310  | 785  | 5309.5 | 790  | 5310    |
| 825                              | 5310.5  | 850  | 5310    | 1080 | 5310  | 1190 | 5310.5 | 1280 | 5311    |
| 1360                             | 5311.25 | 1420 | 5311    | 1710 | 5310  | 1790 | 5310.5 | 1870 | 5310    |
| 2020                             | 5310.5  | 2170 | 5310    | 2220 | 5311  | 2400 | 5312   | 2405 | 5311.75 |
| 2410                             | 5312    | 2500 | 5312    | 2655 | 5311  | 2945 | 5310   | 2950 | 5309    |
| 2955                             | 5310    | 2990 | 5310.25 | 3020 | 5310  | 3040 | 5311   | 3155 | 5312    |
| 3230                             | 5313    | 3290 | 5314    | 3330 | 5315  | 3405 | 5316   | 3470 | 5316.75 |

| Manning's n Values, num = 3 |       |      |       |      |       |
|-----------------------------|-------|------|-------|------|-------|
| Sta.                        | Value | Sta. | Value | Sta. | Value |
| 0                           | .05   | 165  | .05   | 3155 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 165  | 3155  |          | 500          | 500   | .1           | .3     |

CROSS SECTION OUTPUT      Reach: CNDA ARROYO      Riv Sta: 1013      Profile # 1  
\*\*\*\*\*  
\* W.S. Elev (ft)      \* 5311.33 \* Element      \* Left OB \* Channel \* Right OB \*  
\* Vel Head (ft)      \* 0.08 \* Wt. n-Val.      \* 0.050 \* 0.050 \*  
\* E.G. Elev (ft)      \* 5311.41 \* Reach Len. (ft)      \* 500.00 \* 500.00 \* 500.00 \*  
\* E.G. Slope (ft/ft) \* 0.007196 \* Flow Area (sq ft)      \* 3.23 \* 2173.91 \*  
\* Q Total (cfs)      \* 5023.87 \* Flow (cfs)      \* 3.23 \* 5020.64 \*  
\* Top Width (ft)      \* 2491.71 \* Top Width (ft)      \* 12.85 \* 2478.86 \*  
\* Vel Total (ft/s)      \* 2.31 \* Avg. Vel. (ft/s)      \* 1.00 \* 2.31 \*  
\* Max Chl Dpth (ft) \* 2.33 \* Hydr. Depth (ft)      \* 0.25 \* 0.88 \*  
\* Crit W.S. (ft)      \*      \* Wetted Per. (ft)      \* 12.92 \* 2479.18 \*  
\* Conv. Total (cfs) \* 59224.3 \* Conv. (cfs)      \* 38.1 \* 59186.3 \*  
\*\*\*\*\*

Warning - Divided flow computed for this cross-section.  
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the  
current and previous cross section. This may indicate the need for  
additional cross sections.

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1009  
Description:

| Station Elevation Data, num = 53 |         |      |       |      |        |      |        |      |        |
|----------------------------------|---------|------|-------|------|--------|------|--------|------|--------|
| Sta.                             | Elev.   | Sta. | Elev. | Sta. | Elev.  | Sta. | Elev.  | Sta. | Elev.  |
| 0                                | 5309    | 75   | 5308  | 225  | 5308   | 240  | 5307   | 250  | 5306   |
| 260                              | 5306    | 265  | 5307  | 290  | 5308   | 400  | 5307   | 475  | 5306   |
| 485                              | 5305.5  | 490  | 5306  | 500  | 5306.5 | 510  | 5306   | 517  | 5305.5 |
| 525                              | 5306    | 555  | 5306  | 560  | 5305.5 | 570  | 5306   | 575  | 5307   |
| 650                              | 5307.5  | 730  | 5307  | 755  | 5306.5 | 785  | 5307   | 890  | 5307.5 |
| 980                              | 5307    | 981  | 5306  | 982  | 5305   | 995  | 5305   | 1000 | 5306   |
| 1005                             | 5307    | 1090 | 5308  | 1180 | 5308.5 | 1270 | 5308   | 1285 | 5307.5 |
| 1400                             | 5308    | 1420 | 5307  | 1510 | 5308   | 1725 | 5307.5 | 1945 | 5308   |
| 1955                             | 5307.75 | 1960 | 5308  | 2440 | 5307   | 2450 | 5306   | 2460 | 5307   |
| 2545                             | 5308    | 2635 | 5309  | 2730 | 5310   | 2780 | 5311   | 2830 | 5312   |
| 2900                             | 5313    | 2950 | 5314  | 3010 | 5315   |      |        |      |        |

| Manning's n Values, num = 3 |       |      |       |      |       |
|-----------------------------|-------|------|-------|------|-------|
| Sta.                        | Value | Sta. | Value | Sta. | Value |
| 0                           | .05   | 0    | .05   | 2635 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 2635  |          | 500          | 500   | .1           | .3     |

CROSS SECTION OUTPUT      Reach: CNDA ARROYO      Riv Sta: 1009      Profile # 1  
\*\*\*\*\*  
\* W.S. Elev (ft)      \* 5308.46 \* Element      \* Left OB \* Channel \* Right OB \*

```

* Vel Head (ft)      *      0.06 * Wt. n-Val.      *      *      0.050 *
* E.G. Elev (ft)     * 5308.52 * Reach Len. (ft) * 500.00 * 500.00 * 500.00 *
* E.G. Slope (ft/ft) * 0.004781 * Flow Area (sq ft) *      * 2478.85 *
* Q Total (cfs)      * 5023.87 * Flow (cfs)      *      * 5023.87 *
* Top Width (ft)     * 2529.17 * Top Width (ft)   *      * 2529.17 *
* Vel Total (ft/s)   *      2.03 * Avg. Vel. (ft/s) *      *      2.03 *
* Max Chl Dpth (ft)  *      3.46 * Hydr. Depth (ft) *      *      0.98 *
* Crit W.S. (ft)     * 5307.87 * Wetted Per. (ft) *      * 2530.83 *
* Conv. Total (cfs)  * 72655.3 * Conv. (cfs)     *      * 72655.3 *
*****

```

Warning - Divided flow computed for this cross-section.  
Warning - The energy loss was greater than 1.0 ft (0.3 m) between the  
current and previous cross section. This may indicate the need for  
additional cross sections.

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1006  
Description:

Station Elevation Data, num = 40

| Sta. | Elev.  | Sta. | Elev.   | Sta. | Elev.  | Sta. | Elev.  | Sta. | Elev.   |
|------|--------|------|---------|------|--------|------|--------|------|---------|
| 0    | 5306   | 50   | 5305.55 | 110  | 5305   | 115  | 5304   | 120  | 5304    |
| 130  | 5305   | 260  | 5305    | 310  | 5304   | 330  | 5303   | 340  | 5303    |
| 370  | 5304   | 445  | 5304.4  | 520  | 5304   | 525  | 5303   | 530  | 5303    |
| 535  | 5304   | 770  | 5304.75 | 985  | 5304   | 990  | 5303.5 | 1000 | 5304    |
| 1005 | 5303.5 | 1010 | 5304    | 1125 | 5304.5 | 1230 | 5304   | 1235 | 5303.75 |
| 1240 | 5304   | 1350 | 5304.75 | 1450 | 5304   | 1725 | 5305   | 1880 | 5305.5  |
| 2015 | 5305   | 2050 | 5304    | 2055 | 5303   | 2060 | 5303   | 2065 | 5304    |
| 2080 | 5305   | 2285 | 5306    | 2415 | 5307   | 2470 | 5308   | 2530 | 5309    |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .05   | 50   | .05   | 2285 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 50   | 2285  |          | 400          | 450   | .1           | .3     |

CROSS SECTION OUTPUT      Reach: CNDA ARROYO      Riv Sta: 1006      Profile # 1

```

*****
* W.S. Elev (ft)      * 5305.51 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      *      0.09 * Wt. n-Val.   *      *      0.050 *
* E.G. Elev (ft)     * 5305.60 * Reach Len. (ft) * 400.00 * 450.00 * 450.00 *
* E.G. Slope (ft/ft) * 0.007175 * Flow Area (sq ft) *      * 2048.20 *
* Q Total (cfs)      * 5023.87 * Flow (cfs)    *      * 5023.87 *
* Top Width (ft)     * 2128.75 * Top Width (ft) *      * 2128.75 *
* Vel Total (ft/s)   *      2.45 * Avg. Vel. (ft/s) *      *      2.45 *
* Max Chl Dpth (ft)  *      2.51 * Hydr. Depth (ft) *      *      0.96 *
* Crit W.S. (ft)     *      * Wetted Per. (ft) *      * 2129.52 *
* Conv. Total (cfs)  * 59309.8 * Conv. (cfs)   *      * 59309.8 *
*****

```

Warning - The conveyance ratio (upstream conveyance divided by  
downstream conveyance) is less than 0.7 or greater than 1.4. This  
may indicate the need for additional cross sections.  
Warning - The energy loss was greater than 1.0 ft (0.3 m) between the  
current and previous cross section. This may indicate the need for  
additional cross sections.

CROSS SECTION INPUT      Reach: CNDA ARROYO      River Station: 1005  
Description:

Station Elevation Data, num = 39

| Sta. | Elev.  | Sta. | Elev.   | Sta. | Elev. | Sta. | Elev.  | Sta. | Elev. |
|------|--------|------|---------|------|-------|------|--------|------|-------|
| 0    | 5304   | 200  | 5303.51 | 410  | 5303  | 415  | 5302   | 455  | 5301  |
| 460  | 5302   | 760  | 5302    | 765  | 5301  | 780  | 5302   | 800  | 5302  |
| 830  | 5301   | 870  | 5300    | 940  | 5300  | 965  | 5301   | 1000 | 5302  |
| 1030 | 5302   | 1070 | 5301    | 1080 | 5301  | 1090 | 5302   | 1120 | 5302  |
| 1170 | 5301   | 1180 | 5301    | 1190 | 5302  | 1200 | 5303   | 1230 | 5306  |
| 1250 | 5302   | 1260 | 5301    | 1275 | 5301  | 1310 | 5302   | 1340 | 5302  |
| 1520 | 5302.6 | 1590 | 5302    | 1600 | 5301  | 1610 | 5301   | 1620 | 5302  |
| 1860 | 5303   | 1900 | 5303.4  | 1960 | 5304  | 2000 | 5304.5 |      |       |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .05   | 0    | .05   | 1960 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 1960  |          | 350 400      | 500   | .1           | .3     |

CROSS SECTION OUTPUT Reach: CNDA ARROYO Riv Sta: 1005 Profile # 1

```

*****
* W.S. Elev (ft)      * 5303.62 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 0.07 * Wt. n-Val.   *         * 0.050 *         *
* E.G. Elev (ft)      * 5303.69 * Reach Len. (ft) * 350.00 * 400.00 * 500.00 *
* E.G. Slope (ft/ft) * 0.002871 * Flow Area (sq ft) *         * 2605.86 *         *
* Q Total (cfs)       * 5448.86 * Flow (cfs)      *         * 5448.86 *         *
* Top Width (ft)      * 1730.83 * Top Width (ft)   *         * 1730.83 *         *
* Vel Total (ft/s)    * 2.09 * Avg. Vel. (ft/s) *         * 2.09 *         *
* Max Chl Dpth (ft)   * 3.62 * Hydr. Depth (ft) *         * 1.51 *         *
* Crit W.S. (ft)      *         * Wetted Per. (ft) *         * 1731.77 *         *
* Conv. Total (cfs)   * 101691.1 * Conv. (cfs)     *         * 101691.1 *         *
*****

```

Warning - Divided flow computed for this cross-section.

Warning - The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION INPUT Reach: CNDA ARROYO River Station: 1002

Description:

Station Elevation Data, num = 32

| Sta. | Elev. | Sta. | Elev.  | Sta. | Elev. | Sta. | Elev.  | Sta. | Elev. |
|------|-------|------|--------|------|-------|------|--------|------|-------|
| -475 | 5304  | -185 | 5303   | -100 | 5302  | 0    | 5301.5 | 100  | 5301  |
| 115  | 5300  | 120  | 5299.5 | 130  | 5300  | 135  | 5301   | 165  | 5301  |
| 170  | 5300  | 175  | 5299   | 230  | 5299  | 235  | 5300   | 240  | 5301  |
| 390  | 5301  | 470  | 5300   | 475  | 5299  | 480  | 5298   | 490  | 5298  |
| 495  | 5299  | 500  | 5300   | 575  | 5301  | 675  | 5301   | 825  | 5300  |
| 920  | 5299  | 930  | 5299   | 950  | 5300  | 1075 | 5301   | 1180 | 5302  |
| 1270 | 5303  | 1350 | 5304   |      |       |      |        |      |       |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| -475 | .05   | -185 | .05   | 1270 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | -185 | 1270  |          | 150 200      | 300   | .1           | .3     |

CROSS SECTION OUTPUT Reach: CNDA ARROYO Riv Sta: 1002 Profile # 1

```

*****
* W.S. Elev (ft)      * 5302.46 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 0.08 * Wt. n-Val.   *         * 0.050 *         *
* E.G. Elev (ft)      * 5302.55 * Reach Len. (ft) * 150.00 * 200.00 * 300.00 *
* E.G. Slope (ft/ft) * 0.002832 * Flow Area (sq ft) *         * 2376.99 *         *
* Q Total (cfs)       * 5448.86 * Flow (cfs)      *         * 5448.86 *         *
* Top Width (ft)      * 1361.26 * Top Width (ft)   *         * 1361.26 *         *
* Vel Total (ft/s)    * 2.29 * Avg. Vel. (ft/s) *         * 2.29 *         *
* Max Chl Dpth (ft)   * 4.46 * Hydr. Depth (ft) *         * 1.75 *         *
* Crit W.S. (ft)      *         * Wetted Per. (ft) *         * 1362.29 *         *
* Conv. Total (cfs)   * 102382.5 * Conv. (cfs)     *         * 102382.5 *         *
*****

```

CROSS SECTION INPUT Reach: CNDA ARROYO River Station: 1001

Description:

Station Elevation Data, num = 29

| Sta. | Elev. | Sta. | Elev.  | Sta. | Elev.  | Sta. | Elev.   | Sta. | Elev. |
|------|-------|------|--------|------|--------|------|---------|------|-------|
| -50  | 5302  | 0    | 5301   | 50   | 5300   | 85   | 5301.25 | 135  | 5300  |
| 150  | 5300  | 235  | 5300.5 | 270  | 5300   | 285  | 5299    | 295  | 5297  |
| 315  | 5300  | 340  | 5297   | 345  | 5297   | 393  | 5300.75 | 421  | 5300  |
| 566  | 5300  | 691  | 5299   | 711  | 5298.5 | 741  | 5299.25 | 769  | 5298  |
| 784  | 5298  | 796  | 5299   | 861  | 5300   | 911  | 5301    | 946  | 5302  |
| 986  | 5303  | 1025 | 5304   | 1175 | 5309   | 1200 | 5310    |      |       |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| -50  | .05   | -50  | .05   | 946  | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | -50  | 946   |          | 120          | 120   | 120          | .1 .3  |

CROSS SECTION OUTPUT Reach: CNDA ARROYO Riv Sta: 1001 Profile # 1

```

*****
* W.S. Elev (ft) * 5301.73 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.13 * Wt. n-Val. * * 0.050 * *
* E.G. Elev (ft) * 5301.87 * Reach Len. (ft) * 120.00 * 120.00 * 120.00 *
* E.G. Slope (ft/ft) * 0.004074 * Flow Area (sq ft) * * 1864.04 *
* Q Total (cfs) * 5448.86 * Flow (cfs) * * 5448.86 *
* Top Width (ft) * 973.46 * Top Width (ft) * * 973.46 *
* Vel Total (ft/s) * 2.92 * Avg. Vel. (ft/s) * * 2.92 *
* Max Chl Dpth (ft) * 4.73 * Hydr. Depth (ft) * * 1.91 *
* Crit W.S. (ft) * * Wetted Per. (ft) * * 974.43 *
* Conv. Total (cfs) * 85365.3 * Conv. (cfs) * * 85365.3 *
*****

```

CROSS SECTION INPUT Reach: CNDA ARROYO River Station: 1000  
Description:

Station Elevation Data, num = 20

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0    | 5302  | 200  | 5301  | 290  | 5300  | 320  | 5299  | 340  | 5299  |
| 350  | 5300  | 370  | 5300  | 430  | 5299  | 450  | 5296  | 460  | 5296  |
| 480  | 5299  | 700  | 5299  | 760  | 5298  | 770  | 5297  | 780  | 5297  |
| 790  | 5298  | 860  | 5299  | 920  | 5300  | 960  | 5301  | 1000 | 5302  |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .05   | 0    | .05   | 1000 | .05   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 1000  |          | 0            | 0     | 0            | .1 .3  |

CROSS SECTION OUTPUT Reach: CNDA ARROYO Riv Sta: 1000 Profile # 1

```

*****
* W.S. Elev (ft) * 5301.00 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.23 * Wt. n-Val. * * 0.050 * *
* E.G. Elev (ft) * 5301.23 * Reach Len. (ft) * * * *
* E.G. Slope (ft/ft) * 0.007085 * Flow Area (sq ft) * * 1430.00 *
* Q Total (cfs) * 5448.86 * Flow (cfs) * * 5448.86 *
* Top Width (ft) * 760.00 * Top Width (ft) * * 760.00 *
* Vel Total (ft/s) * 3.81 * Avg. Vel. (ft/s) * * 3.81 *
* Max Chl Dpth (ft) * 5.00 * Hydr. Depth (ft) * * 1.88 *
* Crit W.S. (ft) * 5300.15 * Wetted Per. (ft) * * 760.66 *
* Conv. Total (cfs) * 64732.6 * Conv. (cfs) * * 64732.6 *
*****

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#### SUMMARY OF MANNING'S N VALUES

```

*****
* Reach * River Sta. * n1 * n2 * n3 *
*****
*CNDA ARROYO * 1029 * .05* .05* .05*
*CNDA ARROYO * 1025 * .05* .05* .05*
*CNDA ARROYO * 1022 * .05* .05* .05*
*CNDA ARROYO * 1020 * .05* .05* .05*
*CNDA ARROYO * 1016 * .05* .05* .05*
*CNDA ARROYO * 1013 * .05* .05* .05*
*CNDA ARROYO * 1009 * .05* .05* .05*
*CNDA ARROYO * 1006 * .05* .05* .05*
*CNDA ARROYO * 1005 * .05* .05* .05*
*CNDA ARROYO * 1002 * .05* .05* .05*
*CNDA ARROYO * 1001 * .05* .05* .05*
*CNDA ARROYO * 1000 * .05* .05* .05*
*****

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# SUMMARY OF REACH LENGTHS

\*\*\*\*\*

| * Reach         | * River Sta. | * Left | * Channel* | Right * |
|-----------------|--------------|--------|------------|---------|
| *CND A ARROYO * | 1029         | * 530* | 530*       | 530*    |
| *CND A ARROYO * | 1025         | * 600* | 600*       | 600*    |
| *CND A ARROYO * | 1022         | * 680* | 580*       | 580*    |
| *CND A ARROYO * | 1020         | * 600* | 760*       | 600*    |
| *CND A ARROYO * | 1016         | * 500* | 525*       | 550*    |
| *CND A ARROYO * | 1013         | * 500* | 500*       | 500*    |
| *CND A ARROYO * | 1009         | * 500* | 500*       | 500*    |
| *CND A ARROYO * | 1006         | * 400* | 450*       | 450*    |
| *CND A ARROYO * | 1005         | * 350* | 400*       | 500*    |
| *CND A ARROYO * | 1002         | * 150* | 200*       | 300*    |
| *CND A ARROYO * | 1001         | * 120* | 120*       | 120*    |
| *CND A ARROYO * | 1000         | * 0*   | 0*         | 0*      |

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\*\*\*\*\*

# SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

\*\*\*\*\*

| * Reach         | * River Sta. | * Contr.* | Expan. * |
|-----------------|--------------|-----------|----------|
| *CND A ARROYO * | 1029         | * .1*     | .3*      |
| *CND A ARROYO * | 1025         | * .1*     | .3*      |
| *CND A ARROYO * | 1022         | * .1*     | .3*      |
| *CND A ARROYO * | 1020         | * .1*     | .3*      |
| *CND A ARROYO * | 1016         | * .1*     | .3*      |
| *CND A ARROYO * | 1013         | * .1*     | .3*      |
| *CND A ARROYO * | 1009         | * .1*     | .3*      |
| *CND A ARROYO * | 1006         | * .1*     | .3*      |
| *CND A ARROYO * | 1005         | * .1*     | .3*      |
| *CND A ARROYO * | 1002         | * .1*     | .3*      |
| *CND A ARROYO * | 1001         | * .1*     | .3*      |
| *CND A ARROYO * | 1000         | * .1*     | .3*      |

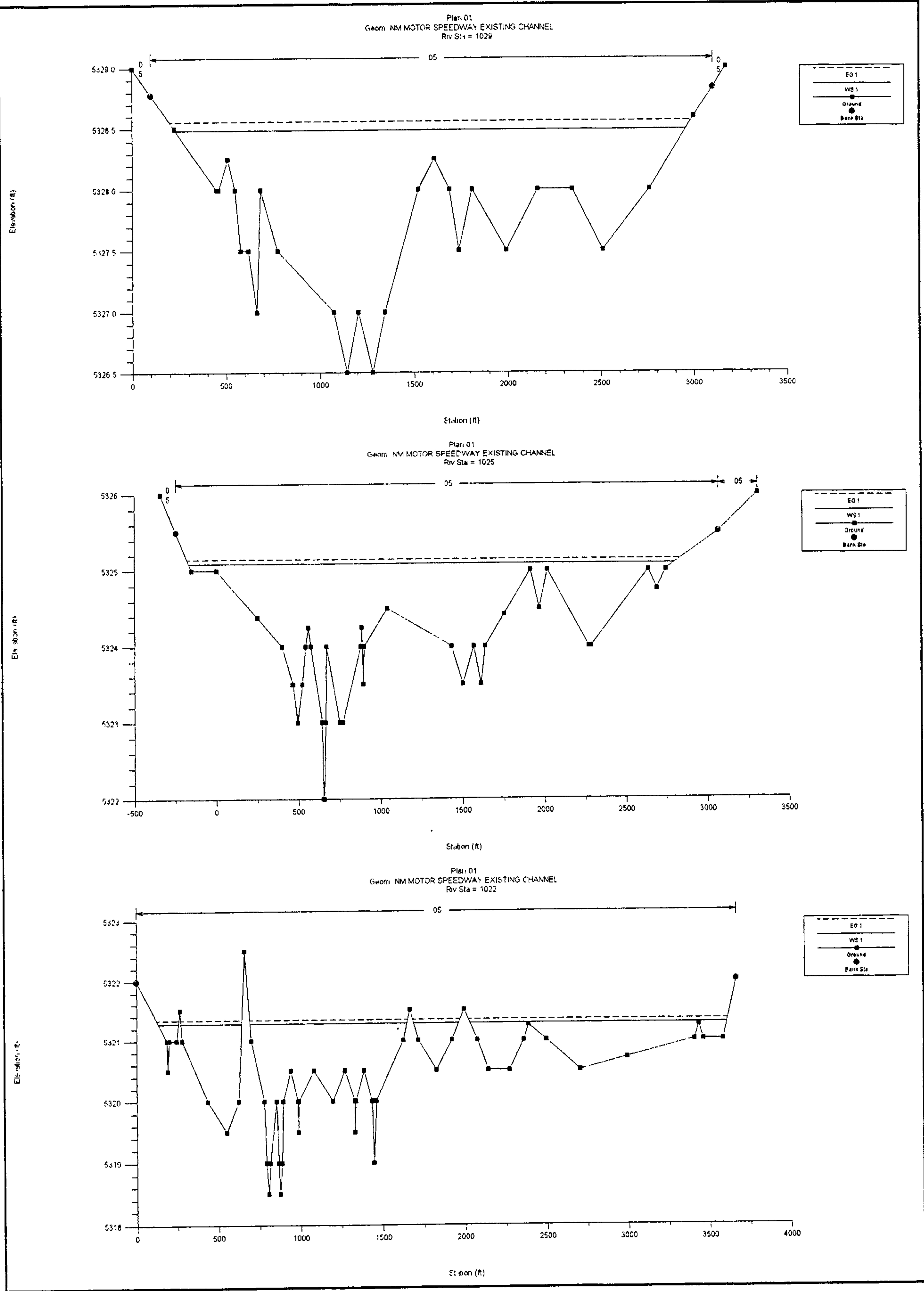
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Profile Output Table - Standard Table 1

| * River Sta. * | * Q Total * | * Min Ch El * | * W.S. Elev * | * Crit W.S. * | * E.G. Elev * | * E.G. Slope * | * Vel Chnl * | * Flow Area * | * Top Width * | * Froude # * | * Chl *  |
|----------------|-------------|---------------|---------------|---------------|---------------|----------------|--------------|---------------|---------------|--------------|----------|
|                | (cfs)       | (ft)          | (ft)          | (ft)          | (ft)          | (ft/ft)        | (ft/s)       | (sq ft)       | (ft)          |              |          |
| * 1029         | * 4598.88 * | * 5326.50 *   | * 5328.48 *   |               | * 5328.56 *   | * 0.007051 *   | * 2.13 *     | * 2155.05 *   | * 2725.05 *   |              | * 0.42 * |
| * 1025         | * 4598.88 * | * 5322.00 *   | * 5325.09 *   |               | * 5325.15 *   | * 0.005875 *   | * 1.95 *     | * 2354.35 *   | * 2964.24 *   |              | * 0.39 * |
| * 1022         | * 4598.88 * | * 5318.50 *   | * 5321.28 *   |               | * 5321.34 *   | * 0.006855 *   | * 1.96 *     | * 2345.18 *   | * 3295.36 *   |              | * 0.41 * |
| * 1020         | * 5023.87 * | * 5315.50 *   | * 5318.34 *   |               | * 5318.39 *   | * 0.004005 *   | * 1.80 *     | * 2795.92 *   | * 2993.37 *   |              | * 0.33 * |
| * 1016         | * 5023.87 * | * 5312.50 *   | * 5314.71 *   |               | * 5314.77 *   | * 0.005678 *   | * 1.96 *     | * 2567.19 *   | * 3142.32 *   |              | * 0.38 * |
| * 1013         | * 5023.87 * | * 5309.00 *   | * 5311.33 *   |               | * 5311.41 *   | * 0.007196 *   | * 2.31 *     | * 2177.13 *   | * 2491.71 *   |              | * 0.43 * |
| * 1009         | * 5023.87 * | * 5305.00 *   | * 5308.46 *   | * 5307.87 *   | * 5308.52 *   | * 0.004781 *   | * 2.03 *     | * 2478.85 *   | * 2529.17 *   |              | * 0.36 * |
| * 1006         | * 5023.87 * | * 5303.00 *   | * 5305.51 *   |               | * 5305.60 *   | * 0.007175 *   | * 2.45 *     | * 2048.20 *   | * 2128.75 *   |              | * 0.44 * |
| * 1005         | * 5448.86 * | * 5300.00 *   | * 5303.62 *   |               | * 5303.69 *   | * 0.002871 *   | * 2.09 *     | * 2605.86 *   | * 1730.83 *   |              | * 0.30 * |
| * 1002         | * 5448.86 * | * 5298.00 *   | * 5302.46 *   |               | * 5302.55 *   | * 0.002832 *   | * 2.29 *     | * 2376.99 *   | * 1361.26 *   |              | * 0.31 * |
| * 1001         | * 5448.86 * | * 5297.00 *   | * 5301.73 *   |               | * 5301.87 *   | * 0.004074 *   | * 2.92 *     | * 1864.04 *   | * 973.46 *    |              | * 0.37 * |
| * 1000         | * 5448.86 * | * 5296.00 *   | * 5301.00 *   | * 5300.15 *   | * 5301.23 *   | * 0.007085 *   | * 3.81 *     | * 1430.00 *   | * 760.00 *    |              | * 0.49 * |

Profile Output Table - Standard Table 2

| * River Sta. * | * E.G. Elev * | * W.S. Elev * | * Vel Head * | * Frctn Loss * | * C & E Loss * | * Q Left * | * Q Channel * | * Q Right * | * Top Width * |
|----------------|---------------|---------------|--------------|----------------|----------------|------------|---------------|-------------|---------------|
|                | (ft)          | (ft)          | (ft)         | (ft)           | (ft)           | (cfs)      | (cfs)         | (cfs)       | (ft)          |
| * 1029         | * 5328.56 *   | * 5328.48 *   | * 0.07 *     | * 3.40 *       | * 0.00 *       |            | * 4598.88 *   |             | * 2725.05 *   |
| * 1025         | * 5325.15 *   | * 5325.09 *   | * 0.06 *     | * 3.81 *       | * 0.00 *       |            | * 4598.88 *   |             | * 2964.24 *   |
| * 1022         | * 5321.34 *   | * 5321.28 *   | * 0.06 *     | * 2.94 *       | * 0.00 *       |            | * 4598.88 *   |             | * 3295.36 *   |
| * 1020         | * 5318.39 *   | * 5318.34 *   | * 0.05 *     | * 3.62 *       | * 0.00 *       |            | * 5023.87 *   |             | * 2993.37 *   |
| * 1016         | * 5314.77 *   | * 5314.71 *   | * 0.06 *     | * 3.36 *       | * 0.00 *       |            | * 5023.87 *   |             | * 3142.32 *   |
| * 1013         | * 5311.41 *   | * 5311.33 *   | * 0.08 *     | * 2.88 *       | * 0.01 *       | * 3.23 *   | * 5020.64 *   |             | * 2491.71 *   |
| * 1009         | * 5308.52 *   | * 5308.46 *   | * 0.06 *     | * 2.92 *       | * 0.00 *       |            | * 5023.87 *   |             | * 2529.17 *   |
| * 1006         | * 5305.60 *   | * 5305.51 *   | * 0.09 *     | * 1.90 *       | * 0.01 *       |            | * 5023.87 *   |             | * 2128.75 *   |
| * 1005         | * 5303.69 *   | * 5303.62 *   | * 0.07 *     | * 1.14 *       | * 0.00 *       |            | * 5448.86 *   |             | * 1730.83 *   |
| * 1002         | * 5302.55 *   | * 5302.46 *   | * 0.08 *     | * 0.67 *       | * 0.01 *       |            | * 5448.86 *   |             | * 1361.26 *   |
| * 1001         | * 5301.87 *   | * 5301.73 *   | * 0.13 *     | * 0.63 *       | * 0.01 *       |            | * 5448.86 *   |             | * 973.46 *    |
| * 1000         | * 5301.23 *   | * 5301.00 *   | * 0.23 *     | * 0.00 *       | * 0.00 *       |            | * 5448.86 *   |             | * 760.00 *    |



## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1029 Profile: 1

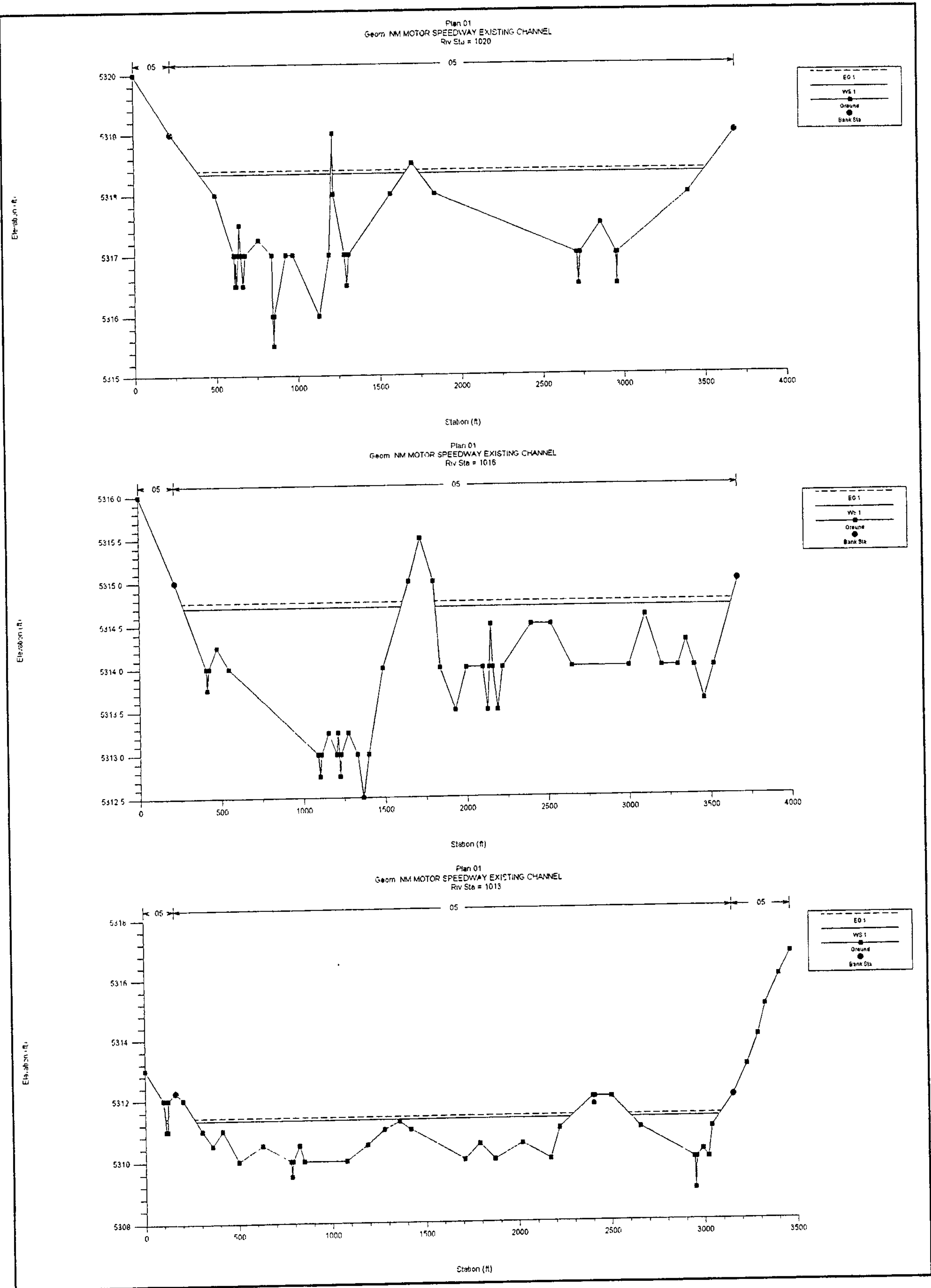
| W.S. Elev (ft)     | 5328.48  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.07     | Wt. n-Val.        |         | 0.050   |          |
| E.G. Elev (ft)     | 5328.56  | Reach Len. (ft)   | 530.00  | 530.00  | 530.00   |
| E.G. Slope (ft/ft) | 0.007051 | Flow Area (sq ft) |         | 2155.05 |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 2725.05  | Top Width (ft)    |         | 2725.05 |          |
| Vel Total (ft/s)   | 2.13     | Avg. Vel. (ft/s)  |         | 2.13    |          |
| Max Chl Dpth (ft)  | 1.98     | Hydr. Depth (ft)  |         | 0.79    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 2725.11 |          |
| Conv. Total (cfs)  | 54768.7  | Conv. (cfs)       |         | 54768.7 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1025 Profile: 1

| W.S. Elev (ft)     | 5325.09  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.06     | Wt. n-Val.        |         | 0.050   |          |
| E.G. Elev (ft)     | 5325.15  | Reach Len. (ft)   | 600.00  | 600.00  | 600.00   |
| E.G. Slope (ft/ft) | 0.005875 | Flow Area (sq ft) |         | 2354.35 |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 2964.24  | Top Width (ft)    |         | 2964.24 |          |
| Vel Total (ft/s)   | 1.95     | Avg. Vel. (ft/s)  |         | 1.95    |          |
| Max Chl Dpth (ft)  | 3.09     | Hydr. Depth (ft)  |         | 0.79    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 2964.61 |          |
| Conv. Total (cfs)  | 60002.1  | Conv. (cfs)       |         | 60002.1 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1022 Profile: 1

| W.S. Elev (ft)     | 5321.28  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.06     | Wt. n-Val.        |         | 0.050   |          |
| E.G. Elev (ft)     | 5321.34  | Reach Len. (ft)   | 680.00  | 580.00  | 580.00   |
| E.G. Slope (ft/ft) | 0.006855 | Flow Area (sq ft) |         | 2345.18 |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 3295.36  | Top Width (ft)    |         | 3295.36 |          |
| Vel Total (ft/s)   | 1.96     | Avg. Vel. (ft/s)  |         | 1.96    |          |
| Max Chl Dpth (ft)  | 2.78     | Hydr. Depth (ft)  |         | 0.71    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 3296.00 |          |
| Conv. Total (cfs)  | 55547.2  | Conv. (cfs)       |         | 55547.2 |          |



## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1020 Profile: 1

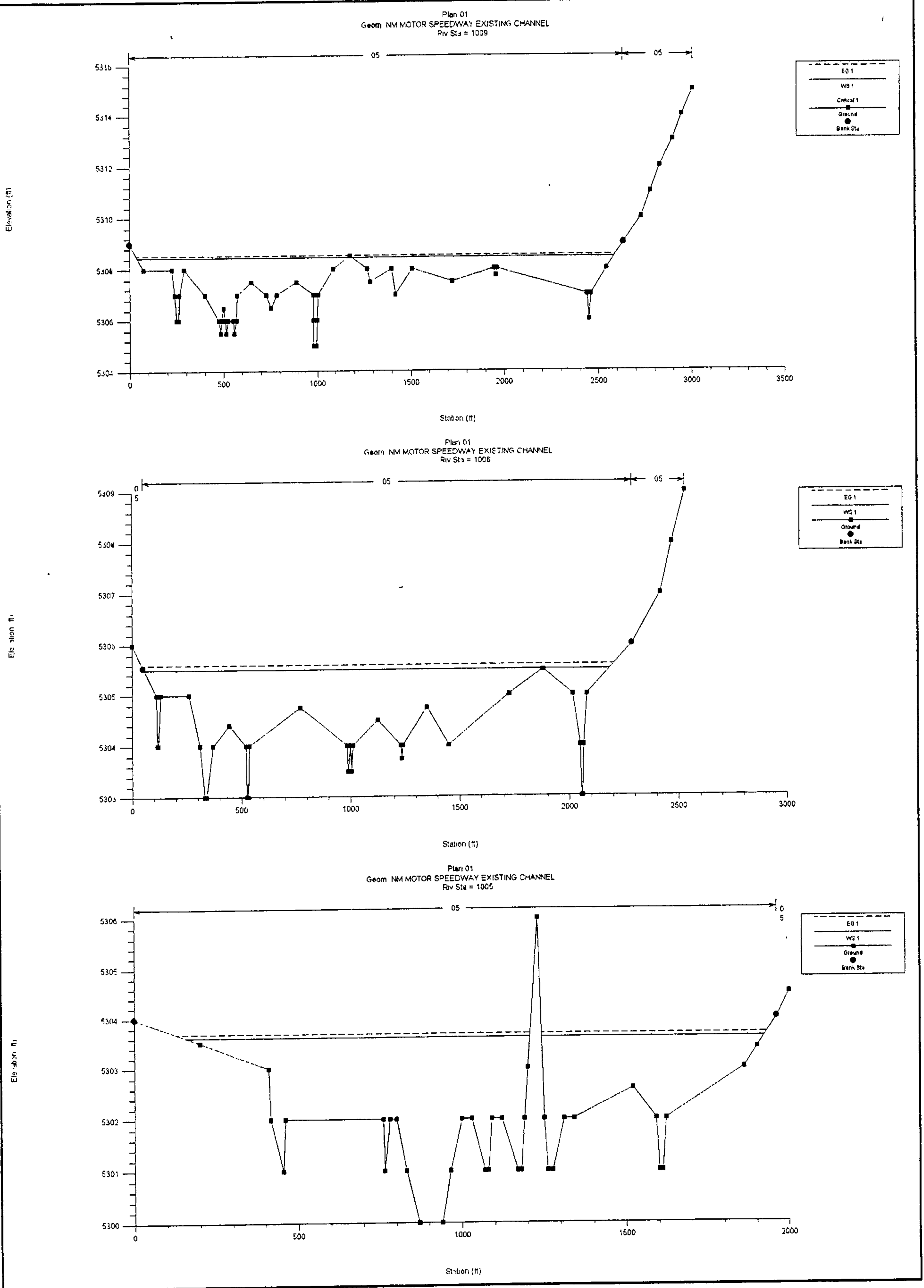
|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev (ft)     | 5318.34  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.05     | Wt. n-Val.        |         | 0.050   |          |
| E.G. Elev (ft)     | 5318.39  | Reach Len. (ft)   | 600.00  | 760.00  | 600.00   |
| E.G. Slope (ft/ft) | 0.004005 | Flow Area (sq ft) |         | 2795.92 |          |
| Q Total (cfs)      | 5023.87  | Flow (cfs)        |         | 5023.87 |          |
| Top Width (ft)     | 2993.37  | Top Width (ft)    |         | 2993.37 |          |
| Vel Total (ft/s)   | 1.80     | Avg. Vel. (ft/s)  |         | 1.80    |          |
| Max Chl Dpth (ft)  | 2.84     | Hydr. Depth (ft)  |         | 0.93    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 2993.88 |          |
| Conv. Total (cfs)  | 79386.0  | Conv. (cfs)       |         | 79386.0 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1016 Profile: 1

|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev (ft)     | 5314.71  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.06     | Wt. n-Val.        |         | 0.050   |          |
| E.G. Elev (ft)     | 5314.77  | Reach Len. (ft)   | 500.00  | 525.00  | 550.00   |
| E.G. Slope (ft/ft) | 0.005678 | Flow Area (sq ft) |         | 2567.19 |          |
| Q Total (cfs)      | 5023.87  | Flow (cfs)        |         | 5023.87 |          |
| Top Width (ft)     | 3142.32  | Top Width (ft)    |         | 3142.32 |          |
| Vel Total (ft/s)   | 1.96     | Avg. Vel. (ft/s)  |         | 1.96    |          |
| Max Chl Dpth (ft)  | 2.21     | Hydr. Depth (ft)  |         | 0.82    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 3142.46 |          |
| Conv. Total (cfs)  | 66671.8  | Conv. (cfs)       |         | 66671.8 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1013 Profile: 1

|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev (ft)     | 5311.33  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.08     | Wt. n-Val.        | 0.050   | 0.050   |          |
| E.G. Elev (ft)     | 5311.41  | Reach Len. (ft)   | 500.00  | 500.00  | 500.00   |
| E.G. Slope (ft/ft) | 0.007196 | Flow Area (sq ft) | 3.23    | 2173.91 |          |
| Q Total (cfs)      | 5023.87  | Flow (cfs)        | 3.23    | 5020.64 |          |
| Top Width (ft)     | 2491.71  | Top Width (ft)    | 12.85   | 2478.86 |          |
| Vel Total (ft/s)   | 2.31     | Avg. Vel. (ft/s)  | 1.00    | 2.31    |          |
| Max Chl Dpth (ft)  | 2.33     | Hydr. Depth (ft)  | 0.25    | 0.88    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  | 12.92   | 2479.18 |          |
| Conv. Total (cfs)  | 59224.3  | Conv. (cfs)       | 38.1    | 59186.3 |          |



## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1009 Profile: 1

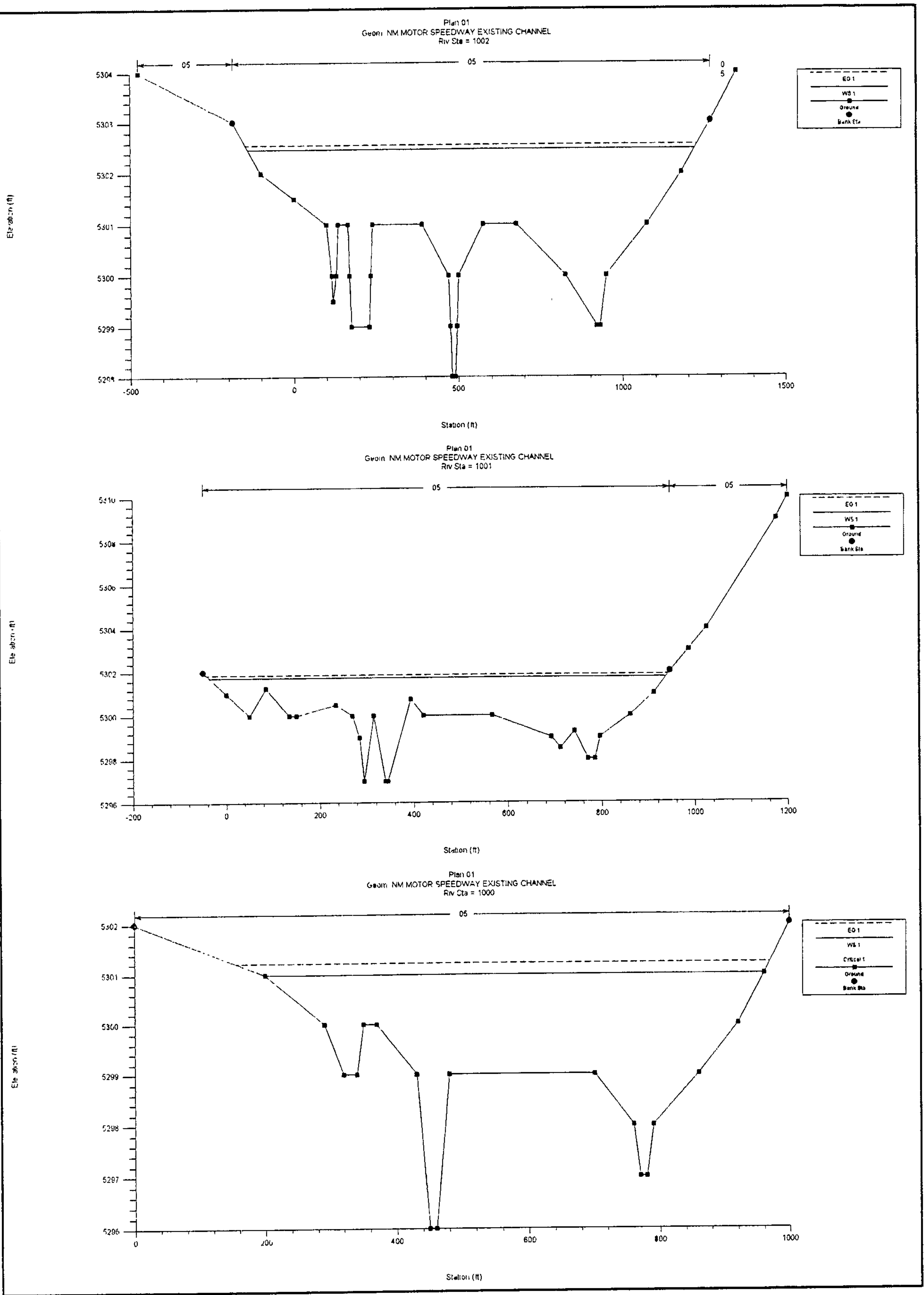
| W.S. Elev (ft)     | 5308.46  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.06     | Wt. n-Val         |         | 0.050   |          |
| E.G. Elev (ft)     | 5308.52  | Reach Len. (ft)   | 500.00  | 500.00  | 500.00   |
| E.G. Slope (ft/ft) | 0.004781 | Flow Area (sq ft) |         | 2478.85 |          |
| Q Total (cfs)      | 5023.87  | Flow (cfs)        |         | 5023.87 |          |
| Top Width (ft)     | 2529.17  | Top Width (ft)    |         | 2529.17 |          |
| Vel Total (ft/s)   | 2.03     | Avg. Vel. (ft/s)  |         | 2.03    |          |
| Max Chl Dpth (ft)  | 3.46     | Hydr. Depth (ft)  |         | 0.98    |          |
| Crit W.S. (ft)     | 5307.87  | Wetted Per. (ft)  |         | 2530.83 |          |
| Conv. Total (cfs)  | 72655.3  | Conv. (cfs)       |         | 72655.3 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1006 Profile: 1

| W.S. Elev (ft)     | 5305.51  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.09     | Wt. n-Val         |         | 0.050   |          |
| E.G. Elev (ft)     | 5305.60  | Reach Len. (ft)   | 400.00  | 450.00  | 450.00   |
| E.G. Slope (ft/ft) | 0.007175 | Flow Area (sq ft) |         | 2048.20 |          |
| Q Total (cfs)      | 5023.87  | Flow (cfs)        |         | 5023.87 |          |
| Top Width (ft)     | 2128.75  | Top Width (ft)    |         | 2128.75 |          |
| Vel Total (ft/s)   | 2.45     | Avg. Vel. (ft/s)  |         | 2.45    |          |
| Max Chl Dpth (ft)  | 2.51     | Hydr. Depth (ft)  |         | 0.96    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 2129.52 |          |
| Conv. Total (cfs)  | 59309.8  | Conv. (cfs)       |         | 59309.8 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1005 Profile: 1

| W.S. Elev (ft)     | 5303.62  | Element           | Left OB | Channel  | Right OB |
|--------------------|----------|-------------------|---------|----------|----------|
| Vel Head (ft)      | 0.07     | Wt. n-Val         |         | 0.050    |          |
| E.G. Elev (ft)     | 5303.69  | Reach Len. (ft)   | 350.00  | 400.00   | 500.00   |
| E.G. Slope (ft/ft) | 0.002871 | Flow Area (sq ft) |         | 2605.86  |          |
| Q Total (cfs)      | 5448.86  | Flow (cfs)        |         | 5448.86  |          |
| Top Width (ft)     | 1730.83  | Top Width (ft)    |         | 1730.83  |          |
| Vel Total (ft/s)   | 2.09     | Avg. Vel. (ft/s)  |         | 2.09     |          |
| Max Chl Dpth (ft)  | 3.62     | Hydr. Depth (ft)  |         | 1.51     |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 1731.77  |          |
| Conv. Total (cfs)  | 101691.1 | Conv. (cfs)       |         | 101691.1 |          |



HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1002 Profile: 1

|                    |          |                   |         |          |          |
|--------------------|----------|-------------------|---------|----------|----------|
| W.S. Elev (ft)     | 5302.46  | Element           | Left OB | Channel  | Right OB |
| Vel Head (ft)      | 0.08     | Wt. n-Val.        |         | 0.050    |          |
| E.G. Elev (ft)     | 5302.55  | Reach Len. (ft)   | 150.00  | 200.00   | 300.00   |
| E.G. Slope (ft/ft) | 0.002832 | Flow Area (sq ft) |         | 2376.99  |          |
| Q Total (cfs)      | 5448.86  | Flow (cfs)        |         | 5448.86  |          |
| Top Width (ft)     | 1361.26  | Top Width (ft)    |         | 1361.26  |          |
| Vel Total (ft/s)   | 2.29     | Avg. Vel. (ft/s)  |         | 2.29     |          |
| Max Chl Dpth (ft)  | 4.46     | Hydr. Depth (ft)  |         | 1.75     |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 1362.29  |          |
| Conv. Total (cfs)  | 102382.5 | Conv. (cfs)       |         | 102382.5 |          |

HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1001 Profile: 1

|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev (ft)     | 5301.73  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.13     | Wt. n-Val.        |         | 0.050   |          |
| E.G. Elev (ft)     | 5301.87  | Reach Len. (ft)   | 120.00  | 120.00  | 120.00   |
| E.G. Slope (ft/ft) | 0.004074 | Flow Area (sq ft) |         | 1864.04 |          |
| Q Total (cfs)      | 5448.86  | Flow (cfs)        |         | 5448.86 |          |
| Top Width (ft)     | 973.46   | Top Width (ft)    |         | 973.46  |          |
| Vel Total (ft/s)   | 2.92     | Avg. Vel. (ft/s)  |         | 2.92    |          |
| Max Chl Dpth (ft)  | 4.73     | Hydr. Depth (ft)  |         | 1.91    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 974.43  |          |
| Conv. Total (cfs)  | 85365.3  | Conv. (cfs)       |         | 85365.3 |          |

HEC-RAS Plan: Plan 01 Reach: CNDA ARROYO Riv Sta: 1000 Profile: 1

|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev (ft)     | 5301.00  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.23     | Wt. n-Val.        |         | 0.050   |          |
| E.G. Elev (ft)     | 5301.23  | Reach Len. (ft)   |         |         |          |
| E.G. Slope (ft/ft) | 0.007085 | Flow Area (sq ft) |         | 1430.00 |          |
| Q Total (cfs)      | 5448.86  | Flow (cfs)        |         | 5448.86 |          |
| Top Width (ft)     | 760.00   | Top Width (ft)    |         | 760.00  |          |
| Vel Total (ft/s)   | 3.81     | Avg. Vel. (ft/s)  |         | 3.81    |          |
| Max Chl Dpth (ft)  | 5.00     | Hydr. Depth (ft)  |         | 1.88    |          |
| Crit W.S. (ft)     | 5300.15  | Wetted Per. (ft)  |         | 760.66  |          |
| Conv. Total (cfs)  | 64732.6  | Conv. (cfs)       |         | 64732.6 |          |

## ***SECTION D***

HEC-RAS Version 1.2 April 1996  
U.S. Army Corp of Engineers  
Hydrologic Engineering Center  
609 Second Street, Suite D  
Davis, California 95616-4687  
(916) 756-1104

```

X      X  XXXXXX  XXXX      XXXX      XX      XXXX
X      X  X      X      X      X      X      X
X      X  X      X      X      X      X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X      X      X      X      X      X      X
X      X  X      X      X      X      X      X      X
X      X  XXXXXX  XXXX      X      X      X      X      XXXXX

```

\*\*\*\*\*

PROJECT DATA

Project Title: NEW MEXICO MOTOR SPEEDWAY  
Project File : speedway.prj  
Run Date and Time: 4/3/98 11:42:20 AM

Project in English units

\*\*\*\*\*

PLAN DATA

Plan Title: Plan 01  
Plan File : c:\hec\ras\speedway.p01

Geometry Title: Plan 01  
Geometry File : c:\hec\ras\speedway.p01

Flow Title : Plan 01  
Flow File : c:\hec\ras\speedway.p01

Plan Summary Information:

|            |                  |    |                      |   |
|------------|------------------|----|----------------------|---|
| Number of: | Cross Sections = | 15 | Multitple Openings = | 0 |
|            | Culverts =       | 0  | Inline Weirs =       | 0 |
|            | Bridges =        | 0  |                      |   |

Computational Information

|                                       |      |
|---------------------------------------|------|
| Water surface calculation tolerance = | .01  |
| Critical depth calculaton tolerance = | .01  |
| Maximum number of interations =       | 20   |
| Maximum difference tolerance =        | .3   |
| Flow tolerance factor =               | .001 |

Computational Flow Regime: Mixed Flow

Encroachment Data: None

Flow Distribution Locations: None

\*\*\*\*\*

FLOW DATA

Flow Title: Flow 01  
Flow File : c:\hec\ras\speedway.f01

Flow Data (cfs)

\*\*\*\*\*  
\* Reach Riv Sta \* PF#1 \*  
\*\*\*\*\*  
\* CNDA.DELOJO 2740 \* 4598.88 \*  
\* CNDA.DELOJO 0700 \* 5354.88 \*  
\*\*\*\*\*

# Boundary Conditions

```
*****
* Reach      Profile *      Upstream      Downstream *
*****
* CNDA.DELOJO      1 *      Critical      Known WS = 5300 *
*****
*****
```

## GEOMETRY DATA

Geometry Title: NEW MEXICO MOTOR SPEEDWAY  
Geometry File : c:\hec\ras\speedway.g01

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 2740  
Description: EXISTING CONDITION OF ARROYO

### Station Elevation Data, num = 39

| Sta. | Elev.  | Sta. | Elev.   | Sta. | Elev.   | Sta. | Elev.   | Sta. | Elev.   |
|------|--------|------|---------|------|---------|------|---------|------|---------|
| 0    | 5312   | 10   | 5311.9  | 20   | 5312    | 75   | 5312    | 100  | 5312.05 |
| 120  | 5312   | 130  | 5311.9  | 140  | 5312    | 170  | 5312.05 | 200  | 5312    |
| 220  | 5311   | 240  | 5310    | 250  | 5311    | 285  | 5311.4  | 335  | 5311    |
| 340  | 5310.9 | 350  | 5311    | 375  | 5311.1  | 420  | 5311    | 500  | 5310.5  |
| 580  | 5310   | 600  | 5309.75 | 620  | 5310    | 630  | 5310.05 | 640  | 5310    |
| 650  | 5309.5 | 660  | 5310    | 670  | 5310.05 | 680  | 5310    | 690  | 5309.5  |
| 700  | 5310   | 740  | 5310.5  | 790  | 5310    | 800  | 5309.5  | 810  | 5310    |
| 1180 | 5310   | 1210 | 5311    | 1460 | 5311    | 1490 | 5314.6  |      |         |

### Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .03   | 100  | .03   | 1460 | .03   |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 100  | 1460  |          | 220          | 200   | 250          | .1 .3  |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 2740 Profile # 1

```
*****
* W.S. Elev (ft) * 5311.46 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.21 * Wt. n-Val. * * 0.030 * 0.030 *
* E.G. Elev (ft) * 5311.67 * Reach Len. (ft) * 220.00 * 200.00 * 250.00 *
* E.G. Slope (ft/ft) * 0.005421 * Flow Area (sq ft) * * 1256.17 * 0.87 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * * 4598.71 * 0.17 *
* Top Width (ft) * 1252.96 * Top Width (ft) * * 1249.15 * 3.81 *
* Vel Total (ft/s) * 3.66 * Avg. Vel. (ft/s) * * 3.66 * 1.36 *
* Max Chl Dpth (ft) * 1.96 * Hydr. Depth (ft) * * 1.01 * 0.23 *
* Crit W.S. (ft) * * Wetted Per. (ft) * * 1249.35 * 3.84 *
* Conv. Total (cfs) * 62461.6 * Conv. (cfs) * * 62445.5 * 16.1 *
*****
```

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 2200  
Description:

### Station Elevation Data, num = 6

| Sta. | Elev.   | Sta.  | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|---------|-------|-------|------|-------|------|-------|
| 0    | 5308.25 | 17.25 | 5314  | 25   | 5314  | 40   | 5309  |
| 800  | 5313.5  |       |       |      |       | 760  | 5309  |

### Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .022  | 25   | .03   | 800  | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 25   | 800   |          | 220          | 200   | 250          | .1 .3  |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 2200 Profile # 1

```
*****
* W.S. Elev (ft) * 5310.68 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.22 * Wt. n-Val. * * 0.022 * 0.030 *
* E.G. Elev (ft) * 5310.89 * Reach Len. (ft) * 220.00 * 200.00 * 250.00 *
* E.G. Slope (ft/ft) * 0.002895 * Flow Area (sq ft) * * 8.85 * 1225.42 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * * 29.42 * 4569.46 *
* Top Width (ft) * 747.24 * Top Width (ft) * * 7.29 * 739.96 *
*****
```

```

* Vel Total (ft/s) *      3.73 * Avg. Vel. (ft/s) *      3.33 *      3.73 *
* Max Chl Dpth (ft) *      2.43 * Hydr. Depth (ft) *      1.21 *      1.66 *
* Crit W.S. (ft) *      * Wetted Per. (ft) *      10.11 *      740.32 *
* Conv. Total (cfs) * 85478.5 * Conv. (cfs) *      546.8 *      84931.7 *
*****

```

Warning - Divided flow computed for this cross-section.  
Warning - The cross-section end points had to be extended vertically for the  
computed water surface.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 2000  
Description:

```

Station Elevation Data, num = 6
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
  0 5307 18 5313 25 5313 40 5308 560 5308
600 5311.6

```

```

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
  0 .022 25 .03 600 .022

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
      25 600 220 200 215 .1 .3

```

```

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 2000 Profile # 1
*****
* W.S. Elev (ft) * 5310.06 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.27 * Wt. n-Val. * 0.022 * 0.030 *
* E.G. Elev (ft) * 5310.32 * Reach Len. (ft) * 220.00 * 200.00 * 215.00 *
* E.G. Slope (ft/ft) * 0.002767 * Flow Area (sq ft) * 14.01 * 1099.03 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * 53.09 * 4545.79 *
* Top Width (ft) * 558.18 * Top Width (ft) * 9.17 * 549.01 *
* Vel Total (ft/s) * 4.13 * Avg. Vel. (ft/s) * 3.79 * 4.14 *
* Max Chl Dpth (ft) * 3.06 * Hydr. Depth (ft) * 1.53 * 2.00 *
* Crit W.S. (ft) * * Wetted Per. (ft) * 12.72 * 549.44 *
* Conv. Total (cfs) * 87428.0 * Conv. (cfs) * 1009.2 * 86418.8 *
*****

```

Warning - Divided flow computed for this cross-section.  
Warning - The cross-section end points had to be extended vertically for the  
computed water surface.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 1800  
Description:

```

Station Elevation Data, num = 6
Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev. Sta. Elev.
  0 5306.25 17.25 5312 25 5312 40 5307 420 5307
450 5310.75

```

```

Manning's n Values, num = 3
Sta. Value Sta. Value Sta. Value
  0 .022 25 .03 450 .022

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
      25 450 160 140 130 .1 .3

```

```

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 1800 Profile # 1
*****
* W.S. Elev (ft) * 5309.24 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.41 * Wt. n-Val. * 0.022 * 0.030 *
* E.G. Elev (ft) * 5309.65 * Reach Len. (ft) * 160.00 * 140.00 * 130.00 *
* E.G. Slope (ft/ft) * 0.003870 * Flow Area (sq ft) * 13.42 * 879.09 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * 59.26 * 4539.62 *
* Top Width (ft) * 413.62 * Top Width (ft) * 8.97 * 404.65 *
* Vel Total (ft/s) * 5.15 * Avg. Vel. (ft/s) * 4.42 * 5.16 *
* Max Chl Dpth (ft) * 2.99 * Hydr. Depth (ft) * 1.50 * 2.17 *
* Crit W.S. (ft) * * Wetted Per. (ft) * 12.45 * 405.15 *
* Conv. Total (cfs) * 73929.3 * Conv. (cfs) * 952.6 * 72976.7 *
*****

```

Warning - Divided flow computed for this cross-section.

Warning - The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 1660

Description:

Station Elevation Data, num = 4

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|
| 0    | 5309  | 9    | 5306  | 309  | 5306  | 327  | 5312  |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .022  | 0    | .03   | 327  | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 327   |          | 150          | 140   | 135          | .1     |
|           |      |       |          |              |       |              | .3     |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 1660 Profile # 1

```

*****
* W.S. Elev (ft)      * 5308.23 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 0.70 * Wt. n-Val.      *          * 0.030 *          *
* E.G. Elev (ft)      * 5308.93 * Reach Len. (ft) * 150.00 * 140.00 * 135.00 *
* E.G. Slope (ft/ft) * 0.006498 * Flow Area (sq ft) *          * 684.98 *          *
* Q Total (cfs)       * 4598.88 * Flow (cfs)       *          * 4598.88 *          *
* Top Width (ft)      * 313.40 * Top Width (ft)   *          * 313.40 *          *
* Vel Total (ft/s)    * 6.71 * Avg. Vel. (ft/s) *          * 6.71 *          *
* Max Chl Dpth (ft)   * 2.23 * Hydr. Depth (ft) *          * 2.19 *          *
* Crit W.S. (ft)      *          * Wetted Per. (ft) *          * 314.13 *          *
* Conv. Total (cfs)   * 57052.2 * Conv. (cfs)      *          * 57052.2 *          *
*****

```

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 1520

Description:

Station Elevation Data, num = 7

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0    | 5309  | 12   | 5305  | 142  | 5305  | 152  | 5304  | 162  | 5305  |
| 312  | 5305  | 330  | 5311  |      |       |      |       |      |       |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .022  | 0    | .03   | 330  | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 330   |          | 165          | 150   | 125          | .1     |
|           |      |       |          |              |       |              | .3     |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 1520 Profile # 1

```

*****
* W.S. Elev (ft)      * 5306.98 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 0.86 * Wt. n-Val.      *          * 0.030 *          *
* E.G. Elev (ft)      * 5307.85 * Reach Len. (ft) * 165.00 * 150.00 * 125.00 *
* E.G. Slope (ft/ft) * 0.009135 * Flow Area (sq ft) *          * 617.28 *          *
* Q Total (cfs)       * 4598.88 * Flow (cfs)       *          * 4598.88 *          *
* Top Width (ft)      * 311.91 * Top Width (ft)   *          * 311.91 *          *
* Vel Total (ft/s)    * 7.45 * Avg. Vel. (ft/s) *          * 7.45 *          *
* Max Chl Dpth (ft)   * 2.98 * Hydr. Depth (ft) *          * 1.98 *          *
* Crit W.S. (ft)      *          * Wetted Per. (ft) *          * 312.65 *          *
* Conv. Total (cfs)   * 48117.2 * Conv. (cfs)      *          * 48117.2 *          *
*****

```

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 1380

Description:

## Station Elevation Data, num = 8

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0    | 5308  | 12   | 5304  | 257  | 5304  | 260  | 5303  | 270  | 5303  |
| 273  | 5304  | 427  | 5304  | 445  | 5310  |      |       |      |       |

## Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .022  | 0    | .03   | 445  | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |    |
|-----------|------|-------|----------|--------------|-------|--------------|--------|----|
|           | 0    | 445   |          | 140          | 135   | 140          | .1     | .3 |

## CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 1380 Profile # 1

```

*****
* W.S. Elev (ft) * 5305.52 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.77 * Wt. n-Val. * * 0.030 *
* E.G. Elev (ft) * 5306.30 * Reach Len. (ft) * 140.00 * 135.00 * 140.00 *
* E.G. Slope (ft/ft) * 0.011473 * Flow Area (sq ft) * * 651.77 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * * 4598.88 *
* Top Width (ft) * 424.13 * Top Width (ft) * * 424.13 *
* Vel Total (ft/s) * 7.06 * Avg. Vel. (ft/s) * * 7.06 *
* Max Chl Dpth (ft) * 2.52 * Hydr. Depth (ft) * * 1.54 *
* Crit W.S. (ft) * 5305.52 * Wetted Per. (ft) * * 424.95 *
* Conv. Total (cfs) * 42934.8 * Conv. (cfs) * * 42934.8 *
*****

```

Warning - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning - The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 1230  
Description:

## Station Elevation Data, num = 8

| Sta.  | Elev.  | Sta.  | Elev. | Sta.  | Elev. | Sta.  | Elev. | Sta.  | Elev. |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0     | 5307.1 | 12.3  | 5303  | 382.3 | 5303  | 392.3 | 5302  | 412.3 | 5302  |
| 422.3 | 5303   | 572.3 | 5303  | 590.3 | 5309  |       |       |       |       |

## Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta.  | Value |
|------|-------|------|-------|-------|-------|
| 0    | .022  | 0    | .03   | 590.3 | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |    |
|-----------|------|-------|----------|--------------|-------|--------------|--------|----|
|           | 0    | 590.3 |          | 150          | 165   | 150          | .1     | .3 |

## CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 1230 Profile # 1

```

*****
* W.S. Elev (ft) * 5304.50 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.43 * Wt. n-Val. * * 0.030 *
* E.G. Elev (ft) * 5304.93 * Reach Len. (ft) * 150.00 * 165.00 * 150.00 *
* E.G. Slope (ft/ft) * 0.006324 * Flow Area (sq ft) * * 876.19 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * * 4598.88 *
* Top Width (ft) * 568.99 * Top Width (ft) * * 568.99 *
* Vel Total (ft/s) * 5.25 * Avg. Vel. (ft/s) * * 5.25 *
* Max Chl Dpth (ft) * 2.50 * Hydr. Depth (ft) * * 1.54 *
* Crit W.S. (ft) * * Wetted Per. (ft) * * 569.58 *
* Conv. Total (cfs) * 57832.4 * Conv. (cfs) * * 57832.4 *
*****

```

Warning - The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 1100  
Description:

Station Elevation Data, num = 8

| Sta. | Elev. | Sta. | Elev. | Sta.  | Elev.  | Sta. | Elev. |
|------|-------|------|-------|-------|--------|------|-------|
| 0    | 5306  | 12   | 5302  | 365   | 5302   | 375  | 5301  |
| 420  | 5302  | 590  | 5302  | 609.2 | 5308.4 | 410  | 5301  |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta.  | Value |
|------|-------|------|-------|-------|-------|
| 0    | .022  | 0    | .03   | 609.2 | .022  |

| Bank Sta: | Left  | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|-------|-------|----------|--------------|-------|--------------|--------|
| 0         | 609.2 | 120   | 120      | 130          | .1    | .3           |        |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 1100 Profile # 1

```

*****
* W.S. Elev (ft) * 5303.42 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.43 * Wt. n-Val. * * 0.030 *
* E.G. Elev (ft) * 5303.85 * Reach Len. (ft) * 120.00 * 120.00 * 130.00 *
* E.G. Slope (ft/ft) * 0.006740 * Flow Area (sq ft) * * 870.05 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * * 4598.88 *
* Top Width (ft) * 586.50 * Top Width (ft) * * 586.50 *
* Vel Total (ft/s) * 5.29 * Avg. Vel. (ft/s) * * 5.29 *
* Max Chl Dpth (ft) * 2.42 * Hydr. Depth (ft) * * 1.48 *
* Crit W.S. (ft) * * Wetted Per. (ft) * * 587.06 *
* Conv. Total (cfs) * 56017.2 * Conv. (cfs) * * 56017.2 *
*****

```

Warning - The energy loss was greater than 1.0 ft (0.3 m) between the  
current and previous cross section. This may indicate the need for  
additional cross sections.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 1000  
Description:

Station Elevation Data, num = 8

| Sta. | Elev. | Sta. | Elev. | Sta.  | Elev.  | Sta. | Elev. |
|------|-------|------|-------|-------|--------|------|-------|
| 0    | 5305  | 12   | 5301  | 350   | 5301   | 353  | 5300  |
| 376  | 5301  | 632  | 5301  | 651.5 | 5307.5 | 373  | 5300  |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta.  | Value |
|------|-------|------|-------|-------|-------|
| 0    | .022  | 0    | .03   | 651.5 | .022  |

| Bank Sta: | Left  | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|-------|-------|----------|--------------|-------|--------------|--------|
| 0         | 651.5 | 100   | 120      | 130          | .1    | .3           |        |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 1000 Profile # 1

```

*****
* W.S. Elev (ft) * 5302.15 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 0.60 * Wt. n-Val. * * 0.030 *
* E.G. Elev (ft) * 5302.75 * Reach Len. (ft) * 100.00 * 120.00 * 130.00 *
* E.G. Slope (ft/ft) * 0.012713 * Flow Area (sq ft) * * 738.68 *
* Q Total (cfs) * 4598.88 * Flow (cfs) * * 4598.88 *
* Top Width (ft) * 626.89 * Top Width (ft) * * 626.89 *
* Vel Total (ft/s) * 6.23 * Avg. Vel. (ft/s) * * 6.23 *
* Max Chl Dpth (ft) * 2.15 * Hydr. Depth (ft) * * 1.18 *
* Crit W.S. (ft) * 5302.15 * Wetted Per. (ft) * * 627.58 *
* Conv. Total (cfs) * 40787.0 * Conv. (cfs) * * 40787.0 *
*****

```

Warning - The energy equation could not be balanced within the specified  
number of iterations. The program selected the water surface that  
had the least amount of error between computed and assumed  
values.

Warning - The conveyance ratio (upstream conveyance divided by  
downstream conveyance) is less than 0.7 or greater than 1.4. This  
may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water  
surface was set equal to critical depth, the calculated water  
surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION INPUT      Reach: CNDA.DELOJO      River Station: 0900  
Description:

Station Elevation Data, num = 8

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0    | 5304  | 12   | 5300  | 330  | 5300  | 333  | 5299  | 353  | 5299  |
| 356  | 5300  | 692  | 5300  | 713  | 5307  |      |       |      |       |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .022  | 0    | .03   | 713  | .022  |

Bank Sta: Left    Right    Lengths: Left Channel    Right    Coeff Contr.    Expan.

|   |     |     |     |     |    |    |
|---|-----|-----|-----|-----|----|----|
| 0 | 713 | 100 | 140 | 140 | .1 | .3 |
|---|-----|-----|-----|-----|----|----|

CROSS SECTION OUTPUT    Reach: CNDA.DELOJO    Riv Sta: 0900    Profile # 1

\*\*\*\*\*

|                      |            |                     |           |           |            |
|----------------------|------------|---------------------|-----------|-----------|------------|
| * W.S. Elev (ft)     | * 5301.62  | * Element           | * Left OB | * Channel | * Right OB |
| * Vel Head (ft)      | * 0.25     | * Wt. n-Val.        | *         | * 0.030   | *          |
| * E.G. Elev (ft)     | * 5301.88  | * Reach Len. (ft)   | * 100.00  | * 140.00  | * 140.00   |
| * E.G. Slope (ft/ft) | * 0.003451 | * Flow Area (sq ft) | *         | * 1134.91 | *          |
| * Q Total (cfs)      | * 4598.88  | * Flow (cfs)        | *         | * 4598.88 | *          |
| * Top Width (ft)     | * 689.74   | * Top Width (ft)    | *         | * 689.74  | *          |
| * Vel Total (ft/s)   | * 4.05     | * Avg. Vel. (ft/s)  | *         | * 4.05    | *          |
| * Max Chl Dpth (ft)  | * 2.62     | * Hydr. Depth (ft)  | *         | * 1.65    | *          |
| * Crit W.S. (ft)     | *          | * Wetted Per. (ft)  | *         | * 690.59  | *          |
| * Conv. Total (cfs)  | * 78282.1  | * Conv. (cfs)       | *         | * 78282.1 | *          |

\*\*\*\*\*

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION INPUT      Reach: CNDA.DELOJO      River Station: 0800  
Description:

Station Elevation Data, num = 8

| Sta. | Elev. | Sta. | Elev. | Sta.  | Elev.  | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|-------|--------|------|-------|------|-------|
| 0    | 5303  | 12   | 5299  | 300   | 5299   | 303  | 5298  | 323  | 5298  |
| 326  | 5299  | 750  | 5299  | 775.5 | 5307.5 |      |       |      |       |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta.  | Value |
|------|-------|------|-------|-------|-------|
| 0    | .022  | 0    | .03   | 775.5 | .022  |

Bank Sta: Left    Right    Lengths: Left Channel    Right    Coeff Contr.    Expan.

|   |       |     |     |     |    |    |
|---|-------|-----|-----|-----|----|----|
| 0 | 775.5 | 100 | 200 | 300 | .1 | .3 |
|---|-------|-----|-----|-----|----|----|

CROSS SECTION OUTPUT    Reach: CNDA.DELOJO    Riv Sta: 0800    Profile # 1

\*\*\*\*\*

|                      |            |                     |           |            |            |
|----------------------|------------|---------------------|-----------|------------|------------|
| * W.S. Elev (ft)     | * 5301.56  | * Element           | * Left OB | * Channel  | * Right OB |
| * Vel Head (ft)      | * 0.09     | * Wt. n-Val.        | *         | * 0.030    | *          |
| * E.G. Elev (ft)     | * 5301.65  | * Reach Len. (ft)   | * 100.00  | * 200.00   | * 300.00   |
| * E.G. Slope (ft/ft) | * 0.000658 | * Flow Area (sq ft) | *         | * 1933.46  | *          |
| * Q Total (cfs)      | * 4598.88  | * Flow (cfs)        | *         | * 4598.88  | *          |
| * Top Width (ft)     | * 753.37   | * Top Width (ft)    | *         | * 753.37   | *          |
| * Vel Total (ft/s)   | * 2.38     | * Avg. Vel. (ft/s)  | *         | * 2.38     | *          |
| * Max Chl Dpth (ft)  | * 3.56     | * Hydr. Depth (ft)  | *         | * 2.57     | *          |
| * Crit W.S. (ft)     | *          | * Wetted Per. (ft)  | *         | * 754.53   | *          |
| * Conv. Total (cfs)  | * 179327.8 | * Conv. (cfs)       | *         | * 179327.8 | *          |

\*\*\*\*\*

CROSS SECTION INPUT      Reach: CNDA.DELOJO      River Station: 0700  
Description:

Station Elevation Data, num = 8

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|------|-------|
| 0    | 5303  | 12   | 5299  | 280  | 5299  | 286  | 5297  | 306  | 5297  |
| 312  | 5299  | 832  | 5299  | 850  | 5305  |      |       |      |       |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .022  | 0    | .03   | 850  | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 850   |          | 15           | 215   | 410          | .1     |
|           |      |       |          |              |       |              | .3     |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 0700 Profile # 1

```

*****
* W.S. Elev (ft)      * 5301.39 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)       * 0.11  * Wt. n-Val.       *          * 0.030  *          *
* E.G. Elev (ft)      * 5301.50 * Reach Len. (ft)   * 15.00  * 215.00 * 410.00 *
* E.G. Slope (ft/ft)  * 0.000874 * Flow Area (sq ft) *          * 2026.20 *          *
* Q Total (cfs)       * 5354.88 * Flow (cfs)        *          * 5354.88 *          *
* Top Width (ft)      * 834.32 * Top Width (ft)    *          * 834.32 *          *
* Vel Total (ft/s)    * 2.64  * Avg. Vel. (ft/s)  *          * 2.64  *          *
* Max Chl Dpth (ft)   * 4.39  * Hydr. Depth (ft)  *          * 2.43  *          *
* Crit W.S. (ft)      *          * Wetted Per. (ft)  *          * 835.74 *          *
* Conv. Total (cfs)   * 181118.1 * Conv. (cfs)       *          * 181118.1 *          *
*****

```

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 0600  
Description: CROSS SECTION AT PROPERTY LINE

Station Elevation Data, num = 8

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|
| 0    | 5303  | 12   | 5299  | 330  | 5299  | 339  | 5296  |
| 368  | 5299  | 872  | 5299  | 884  | 5303  | 359  | 5296  |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| 0    | .022  | 0    | .03   | 884  | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 0    | 884   |          | 50           | 50    | 50           | .1     |
|           |      |       |          |              |       |              | .3     |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 0600 Profile # 1

```

*****
* W.S. Elev (ft)      * 5301.18 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)       * 0.11  * Wt. n-Val.       *          * 0.030  *          *
* E.G. Elev (ft)      * 5301.29 * Reach Len. (ft)   * 50.00  * 50.00  * 50.00  *
* E.G. Slope (ft/ft)  * 0.001012 * Flow Area (sq ft) *          * 1974.93 *          *
* Q Total (cfs)       * 5354.88 * Flow (cfs)        *          * 5354.88 *          *
* Top Width (ft)      * 873.07 * Top Width (ft)    *          * 873.07 *          *
* Vel Total (ft/s)    * 2.71  * Avg. Vel. (ft/s)  *          * 2.71  *          *
* Max Chl Dpth (ft)   * 5.18  * Hydr. Depth (ft)  *          * 2.26  *          *
* Crit W.S. (ft)      *          * Wetted Per. (ft)  *          * 874.75 *          *
* Conv. Total (cfs)   * 168346.3 * Conv. (cfs)       *          * 168346.3 *          *
*****

```

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION INPUT Reach: CNDA.DELOJO River Station: 0550  
Description: CROSS SECTION EAST OF PROPERTY LINE

Station Elevation Data, num = 20

| Sta. | Elev. | Sta. | Elev. | Sta. | Elev. | Sta. | Elev. |
|------|-------|------|-------|------|-------|------|-------|
| -125 | 5301  | -100 | 5300  | 0    | 5300  | 120  | 5300  |
| 146  | 5296  | 156  | 5296  | 160  | 5297  | 170  | 5298  |
| 195  | 5300  | 455  | 5299  | 485  | 5298  | 490  | 5297  |
| 505  | 5298  | 520  | 5299  | 570  | 5299  | 660  | 5300  |
|      |       |      |       |      |       |      | 690   |
|      |       |      |       |      |       |      | 5301  |

Manning's n Values, num = 3

| Sta. | Value | Sta. | Value | Sta. | Value |
|------|-------|------|-------|------|-------|
| -125 | .022  | 120  | .03   | 660  | .022  |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
|           | 120  | 660   |          | 0            | 0     | 0            | .1     |
|           |      |       |          |              |       |              | .3     |

CROSS SECTION OUTPUT Reach: CNDA.DELOJO Riv Sta: 0550 Profile # 1

```

*****
* W.S. Elev (ft)      * 5300.59 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)       * 0.54  * Wt. n-Val.   * 0.022 * 0.030 * 0.022 *
* E.G. Elev (ft)      * 5301.14 * Reach Len. (ft) *      *      *      *
* E.G. Slope (ft/ft) * 0.009300 * Flow Area (sq ft) * 134.46 * 778.31 * 5.24 *
* Q Total (cfs)       * 5354.88 * Flow (cfs)     * 603.94 * 4735.79 * 15.15 *
* Top Width (ft)      * 792.52 * Top Width (ft) * 234.78 * 540.00 * 17.74 *
* Vel Total (ft/s)    * 5.83  * Avg. Vel. (ft/s) * 4.49 * 6.08 * 2.89 *
* Max Chl Dpth (ft)   * 4.59  * Hydr. Depth (ft) * 0.57 * 1.44 * 0.30 *
* Crit W.S. (ft)      * 5300.59 * Wetted Per. (ft) * 234.79 * 541.31 * 17.75 *
* Conv. Total (cfs)   * 55528.8 * Conv. (cfs)     * 6262.7 * 49109.0 * 157.2 *
*****

```

Warning - User specified water surface is not possible for the specified flow regime. The program used critical depth as the starting water surface.

Warning - The cross section had to be extended vertically during the critical depth calculations.

Warning - The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

\*\*\*\*\*

#### SUMMARY OF MANNING'S N VALUES

```

*****
* Reach * River Sta. * n1 * n2 * n3 *
*****
*CNDA.DELOJO * 2740 * .03* .03* .03*
*CNDA.DELOJO * 2200 * .022* .03* .022*
*CNDA.DELOJO * 2000 * .022* .03* .022*
*CNDA.DELOJO * 1800 * .022* .03* .022*
*CNDA.DELOJO * 1660 * .022* .03* .022*
*CNDA.DELOJO * 1520 * .022* .03* .022*
*CNDA.DELOJO * 1380 * .022* .03* .022*
*CNDA.DELOJO * 1230 * .022* .03* .022*
*CNDA.DELOJO * 1100 * .022* .03* .022*
*CNDA.DELOJO * 1000 * .022* .03* .022*
*CNDA.DELOJO * 0900 * .022* .03* .022*
*CNDA.DELOJO * 0800 * .022* .03* .022*
*CNDA.DELOJO * 0700 * .022* .03* .022*
*CNDA.DELOJO * 0600 * .022* .03* .022*
*CNDA.DELOJO * 0550 * .022* .03* .022*
*****

```

\*\*\*\*\*

#### SUMMARY OF REACH LENGTHS

```

*****
* Reach * River Sta. * Left * Channel * Right *
*****
*CNDA.DELOJO * 2740 * 220* 200* 250*
*CNDA.DELOJO * 2200 * 220* 200* 250*
*CNDA.DELOJO * 2000 * 220* 200* 215*
*CNDA.DELOJO * 1800 * 160* 140* 130*
*CNDA.DELOJO * 1660 * 150* 140* 135*
*CNDA.DELOJO * 1520 * 165* 150* 125*
*CNDA.DELOJO * 1380 * 140* 135* 140*
*CNDA.DELOJO * 1230 * 150* 165* 150*
*CNDA.DELOJO * 1100 * 120* 120* 130*
*CNDA.DELOJO * 1000 * 100* 120* 130*
*CNDA.DELOJO * 0900 * 100* 140* 140*
*CNDA.DELOJO * 0800 * 100* 200* 300*
*CNDA.DELOJO * 0700 * 15* 215* 410*
*CNDA.DELOJO * 0600 * 50* 50* 50*
*CNDA.DELOJO * 0550 * 0* 0* 0*
*****

```

\*\*\*\*\*

#### SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

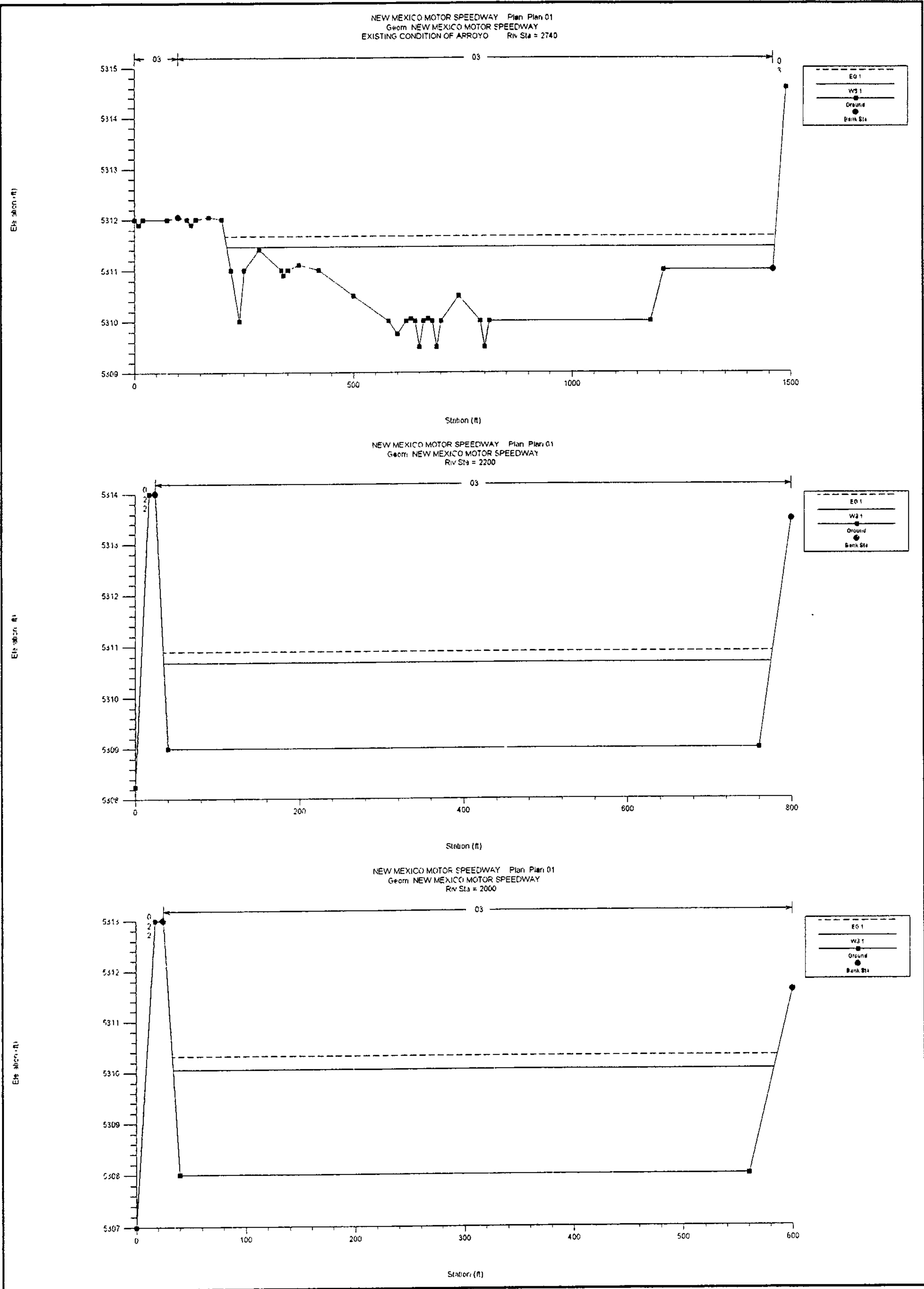
```
*****
* Reach * River Sta. * Contr.* Expan. *
*****
*CND.A.DELOJO * 2740 * .1* .3*
*CND.A.DELOJO * 2200 * .1* .3*
*CND.A.DELOJO * 2000 * .1* .3*
*CND.A.DELOJO * 1800 * .1* .3*
*CND.A.DELOJO * 1660 * .1* .3*
*CND.A.DELOJO * 1520 * .1* .3*
*CND.A.DELOJO * 1380 * .1* .3*
*CND.A.DELOJO * 1230 * .1* .3*
*CND.A.DELOJO * 1100 * .1* .3*
*CND.A.DELOJO * 1000 * .1* .3*
*CND.A.DELOJO * 0900 * .1* .3*
*CND.A.DELOJO * 0800 * .1* .3*
*CND.A.DELOJO * 0700 * .1* .3*
*CND.A.DELOJO * 0600 * .1* .3*
*CND.A.DELOJO * 0550 * .1* .3*
*****
```

# Profile Output Table - Standard Table 1

| * River Sta. * | * Q Total * | * Min Ch El * | * W.S. Elev * | * Crit W.S. * | * E.G. Elev * | * E.G. Slope * | * Vel Chnl * | * Flow Area * | * Top Width * | * Froude # * | * Chl * |
|----------------|-------------|---------------|---------------|---------------|---------------|----------------|--------------|---------------|---------------|--------------|---------|
|                | (cfs)       | (ft)          | (ft)          | (ft)          | (ft)          | (ft/ft)        | (ft/s)       | (sq ft)       | (ft)          |              |         |
| * 2740         | * 4598.88   | * 5309.50     | * 5311.46     |               | * 5311.67     | * 0.005421     | * 3.66       | * 1257.05     | * 1252.96     |              | * 0.64  |
| * 2200         | * 4598.88   | * 5309.00     | * 5310.68     |               | * 5310.89     | * 0.002895     | * 3.73       | * 1234.27     | * 747.24      |              | * 0.51  |
| * 2000         | * 4598.88   | * 5308.00     | * 5310.06     |               | * 5310.32     | * 0.002767     | * 4.14       | * 1113.04     | * 558.18      |              | * 0.52  |
| * 1800         | * 4598.88   | * 5307.00     | * 5309.24     |               | * 5309.65     | * 0.003870     | * 5.16       | * 892.51      | * 413.62      |              | * 0.62  |
| * 1660         | * 4598.88   | * 5306.00     | * 5308.23     |               | * 5308.93     | * 0.006498     | * 6.71       | * 684.98      | * 313.40      |              | * 0.80  |
| * 1520         | * 4598.88   | * 5304.00     | * 5306.98     |               | * 5307.85     | * 0.009135     | * 7.45       | * 617.28      | * 311.91      |              | * 0.93  |
| * 1380         | * 4598.88   | * 5303.00     | * 5305.52     | * 5305.52     | * 5306.30     | * 0.011473     | * 7.06       | * 651.77      | * 424.13      |              | * 1.00  |
| * 1230         | * 4598.88   | * 5302.00     | * 5304.50     |               | * 5304.93     | * 0.006324     | * 5.25       | * 876.19      | * 568.99      |              | * 0.75  |
| * 1100         | * 4598.88   | * 5301.00     | * 5303.42     |               | * 5303.85     | * 0.006740     | * 5.29       | * 870.05      | * 586.50      |              | * 0.76  |
| * 1000         | * 4598.88   | * 5300.00     | * 5302.15     | * 5302.15     | * 5302.75     | * 0.012713     | * 6.23       | * 738.68      | * 626.89      |              | * 1.01  |
| * 0900         | * 4598.88   | * 5299.00     | * 5301.62     |               | * 5301.88     | * 0.003451     | * 4.05       | * 1134.91     | * 689.74      |              | * 0.56  |
| * 0800         | * 4598.88   | * 5298.00     | * 5301.56     |               | * 5301.65     | * 0.000658     | * 2.38       | * 1933.46     | * 753.37      |              | * 0.26  |
| * 0700         | * 5354.88   | * 5297.00     | * 5301.39     |               | * 5301.50     | * 0.000874     | * 2.64       | * 2026.20     | * 834.32      |              | * 0.30  |
| * 0600         | * 5354.88   | * 5296.00     | * 5301.18     |               | * 5301.29     | * 0.001012     | * 2.71       | * 1974.93     | * 873.07      |              | * 0.32  |
| * 0550         | * 5354.88   | * 5296.00     | * 5300.59     | * 5300.59     | * 5301.14     | * 0.009300     | * 6.08       | * 918.01      | * 792.52      |              | * 0.89  |

# Profile Output Table - Standard Table 2

| * River Sta. * | * E.G. Elev * | * W.S. Elev * | * Vel Head * | * Frctn Loss * | * C & E Loss * | * Q Left * | * Q Channel * | * Q Right * | * Top Width * |
|----------------|---------------|---------------|--------------|----------------|----------------|------------|---------------|-------------|---------------|
|                | (ft)          | (ft)          | (ft)         | (ft)           | (ft)           | (cfs)      | (cfs)         | (cfs)       | (ft)          |
| * 2740         | * 5311.67     | * 5311.46     | * 0.21       | * 0.77         | * 0.00         |            | * 4598.71     | * 0.17      | * 1252.96     |
| * 2200         | * 5310.89     | * 5310.68     | * 0.22       | * 0.57         | * 0.00         | * 29.42    | * 4569.46     |             | * 747.24      |
| * 2000         | * 5310.32     | * 5310.06     | * 0.27       | * 0.66         | * 0.01         | * 53.09    | * 4545.79     |             | * 558.18      |
| * 1800         | * 5309.65     | * 5309.24     | * 0.41       | * 0.69         | * 0.03         | * 59.26    | * 4539.62     |             | * 413.62      |
| * 1660         | * 5308.93     | * 5308.23     | * 0.70       | * 1.07         | * 0.02         |            | * 4598.88     |             | * 313.40      |
| * 1520         | * 5307.85     | * 5306.98     | * 0.86       | * 1.52         | * 0.02         |            | * 4598.88     |             | * 311.91      |
| * 1380         | * 5306.30     | * 5305.52     | * 0.77       | * 1.12         | * 0.10         |            | * 4598.88     |             | * 424.13      |
| * 1230         | * 5304.93     | * 5304.50     | * 0.43       | * 1.07         | * 0.00         |            | * 4598.88     |             | * 568.99      |
| * 1100         | * 5303.85     | * 5303.42     | * 0.43       | * 1.08         | * 0.02         |            | * 4598.88     |             | * 586.50      |
| * 1000         | * 5302.75     | * 5302.15     | * 0.60       | * 0.72         | * 0.10         |            | * 4598.88     |             | * 626.89      |
| * 0900         | * 5301.88     | * 5301.62     | * 0.25       | * 0.18         | * 0.05         |            | * 4598.88     |             | * 689.74      |
| * 0800         | * 5301.65     | * 5301.56     | * 0.09       | * 0.15         | * 0.00         |            | * 4598.88     |             | * 753.37      |
| * 0700         | * 5301.50     | * 5301.39     | * 0.11       | * 0.20         | * 0.00         |            | * 5354.88     |             | * 834.32      |
| * 0600         | * 5301.29     | * 5301.18     | * 0.11       | * 0.11         | * 0.04         |            | * 5354.88     |             | * 873.07      |
| * 0550         | * 5301.14     | * 5300.59     | * 0.54       | * 0.00         | * 0.00         | * 603.94   | * 4735.79     | * 15.15     | * 792.52      |



## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 2740 Profile: 1

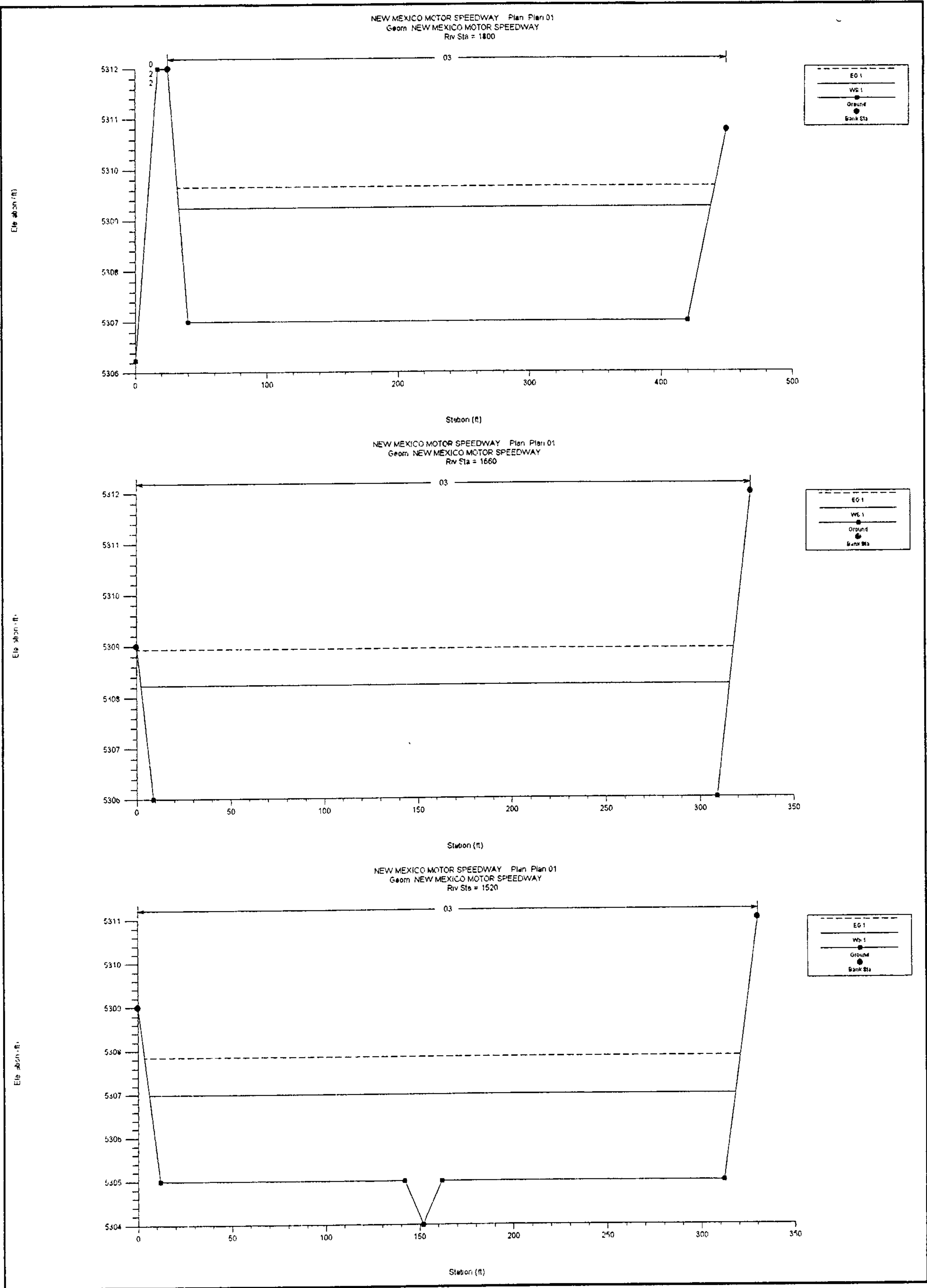
| W.S. Elev (ft)     | 5311.46  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.21     | Wt. n-Val.        |         | 0.030   | 0.030    |
| E.G. Elev (ft)     | 5311.67  | Reach Len. (ft)   | 220.00  | 200.00  | 250.00   |
| E.G. Slope (ft/ft) | 0.005421 | Flow Area (sq ft) |         | 1256.17 | 0.87     |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.71 | 0.17     |
| Top Width (ft)     | 1252.96  | Top Width (ft)    |         | 1249.15 | 3.81     |
| Vel Total (ft/s)   | 3.66     | Avg. Vel. (ft/s)  |         | 3.66    | 1.36     |
| Max Chl Dpth (ft)  | 1.96     | Hydr. Depth (ft)  |         | 1.01    | 0.23     |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 1249.35 | 3.84     |
| Conv. Total (cfs)  | 62461.6  | Conv. (cfs)       |         | 62445.5 | 16.1     |

## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 2200 Profile: 1

| W.S. Elev (ft)     | 5310.68  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.22     | Wt. n-Val.        | 0.022   | 0.030   |          |
| E.G. Elev (ft)     | 5310.89  | Reach Len. (ft)   | 220.00  | 200.00  | 250.00   |
| E.G. Slope (ft/ft) | 0.002895 | Flow Area (sq ft) | 8.85    | 1225.42 |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        | 29.42   | 4569.46 |          |
| Top Width (ft)     | 747.24   | Top Width (ft)    | 7.29    | 739.96  |          |
| Vel Total (ft/s)   | 3.73     | Avg. Vel. (ft/s)  | 3.33    | 3.73    |          |
| Max Chl Dpth (ft)  | 2.43     | Hydr. Depth (ft)  | 1.21    | 1.66    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  | 10.11   | 740.32  |          |
| Conv. Total (cfs)  | 85478.5  | Conv. (cfs)       | 546.8   | 84931.7 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 2000 Profile: 1

| W.S. Elev (ft)     | 5310.06  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.27     | Wt. n-Val.        | 0.022   | 0.030   |          |
| E.G. Elev (ft)     | 5310.32  | Reach Len. (ft)   | 220.00  | 200.00  | 215.00   |
| E.G. Slope (ft/ft) | 0.002767 | Flow Area (sq ft) | 14.01   | 1099.03 |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        | 53.09   | 4545.79 |          |
| Top Width (ft)     | 558.18   | Top Width (ft)    | 9.17    | 549.01  |          |
| Vel Total (ft/s)   | 4.13     | Avg. Vel. (ft/s)  | 3.79    | 4.14    |          |
| Max Chl Dpth (ft)  | 3.06     | Hydr. Depth (ft)  | 1.53    | 2.00    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  | 12.72   | 549.44  |          |
| Conv. Total (cfs)  | 87428.0  | Conv. (cfs)       | 1009.2  | 86418.8 |          |



## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 1800 Profile: 1

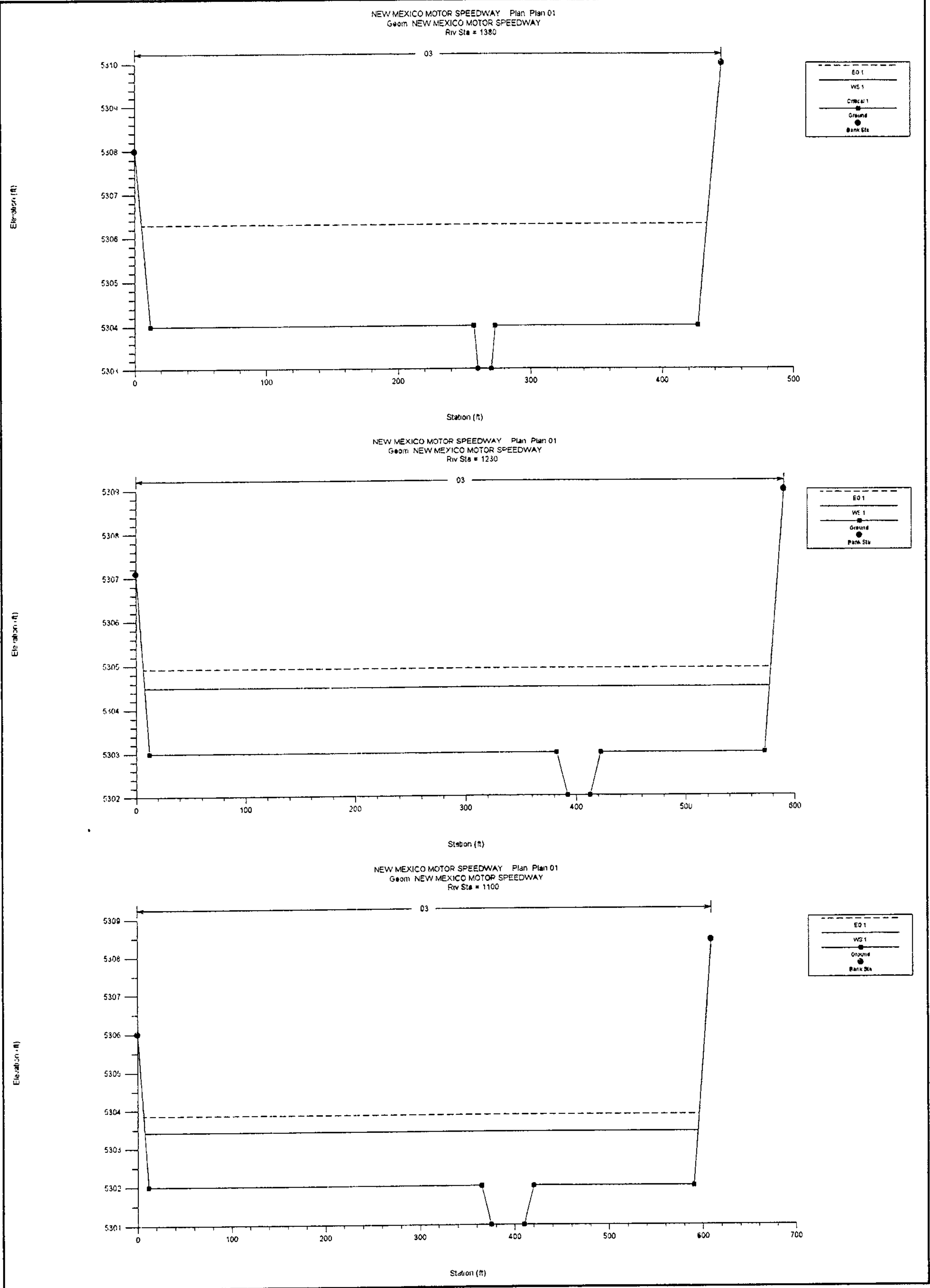
| W.S. Elev (ft)     | 5309.24  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.41     | Wt. n-Val.        | 0.022   | 0.030   |          |
| E.G. Elev (ft)     | 5309.65  | Reach Len. (ft)   | 160.00  | 140.00  | 130.00   |
| E.G. Slope (ft/ft) | 0.003870 | Flow Area (sq ft) | 13.42   | 879.09  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        | 59.26   | 4539.62 |          |
| Top Width (ft)     | 413.62   | Top Width (ft)    | 8.97    | 404.65  |          |
| Vel Total (ft/s)   | 5.15     | Avg. Vel. (ft/s)  | 4.42    | 5.16    |          |
| Max Chl Dpth (ft)  | 2.99     | Hydr. Depth (ft)  | 1.50    | 2.17    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  | 12.45   | 405.15  |          |
| Conv. Total (cfs)  | 73929.3  | Conv. (cfs)       | 952.6   | 72976.7 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 1660 Profile: 1

| W.S. Elev (ft)     | 5308.23  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.70     | Wt. n-Val.        |         | 0.030   |          |
| E.G. Elev (ft)     | 5308.93  | Reach Len. (ft)   | 150.00  | 140.00  | 135.00   |
| E.G. Slope (ft/ft) | 0.006498 | Flow Area (sq ft) |         | 684.98  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 313.40   | Top Width (ft)    |         | 313.40  |          |
| Vel Total (ft/s)   | 6.71     | Avg. Vel. (ft/s)  |         | 6.71    |          |
| Max Chl Dpth (ft)  | 2.23     | Hydr. Depth (ft)  |         | 2.19    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 314.13  |          |
| Conv. Total (cfs)  | 57052.2  | Conv. (cfs)       |         | 57052.2 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 1520 Profile: 1

| W.S. Elev (ft)     | 5306.98  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.86     | Wt. n-Val.        |         | 0.030   |          |
| E.G. Elev (ft)     | 5307.85  | Reach Len. (ft)   | 165.00  | 150.00  | 125.00   |
| E.G. Slope (ft/ft) | 0.009135 | Flow Area (sq ft) |         | 617.28  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 311.91   | Top Width (ft)    |         | 311.91  |          |
| Vel Total (ft/s)   | 7.45     | Avg. Vel. (ft/s)  |         | 7.45    |          |
| Max Chl Dpth (ft)  | 2.98     | Hydr. Depth (ft)  |         | 1.98    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 312.65  |          |
| Conv. Total (cfs)  | 48117.2  | Conv. (cfs)       |         | 48117.2 |          |



## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 1380 Profile: 1

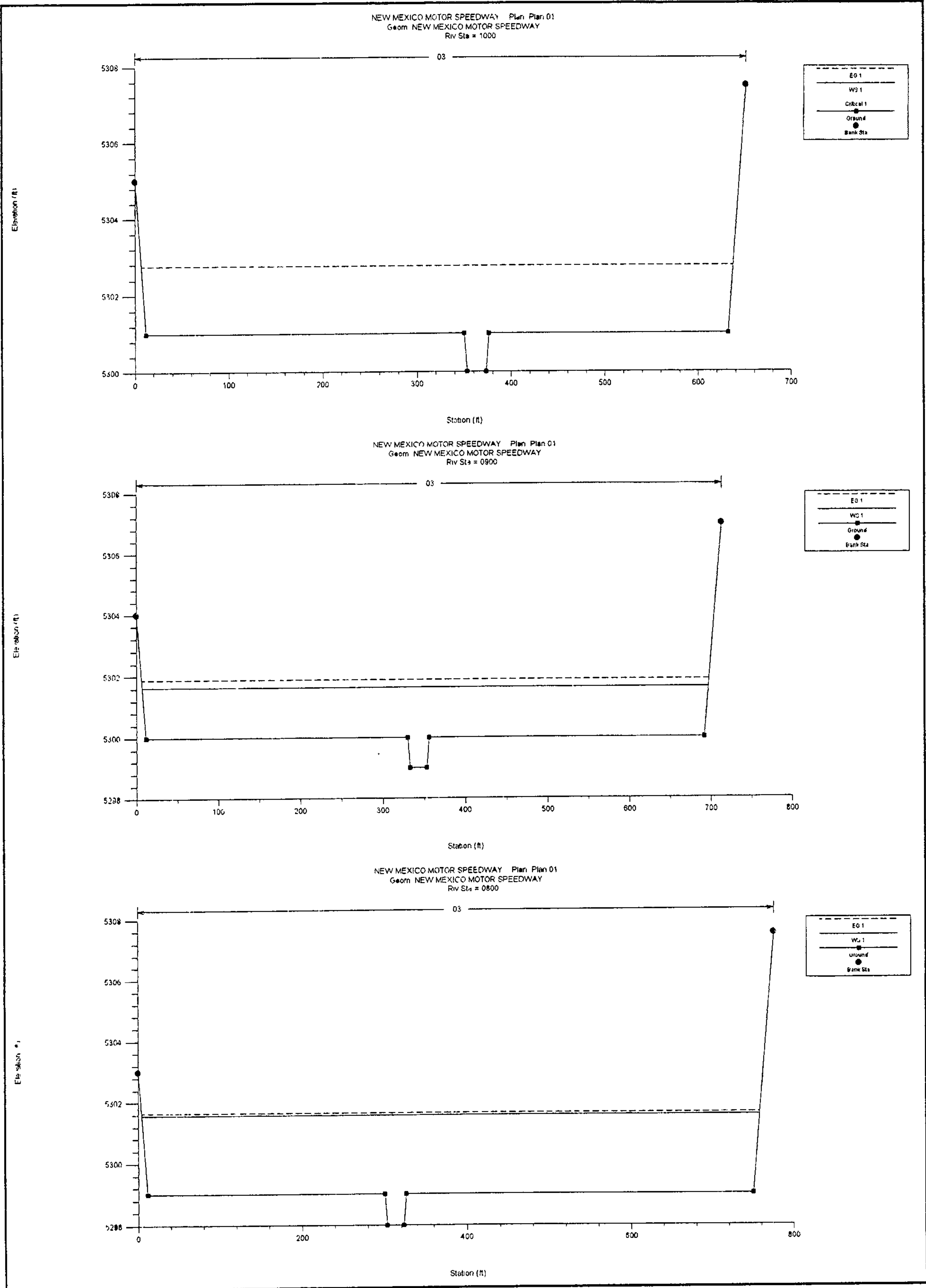
| W.S. Elev (ft)     | 5305.52  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.77     | Wt. n-Val.        |         | 0.030   |          |
| E.G. Elev (ft)     | 5306.30  | Reach Len. (ft)   | 140.00  | 135.00  | 140.00   |
| E.G. Slope (ft/ft) | 0.011473 | Flow Area (sq ft) |         | 651.77  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 424.13   | Top Width (ft)    |         | 424.13  |          |
| Vel Total (ft/s)   | 7.06     | Avg. Vel. (ft/s)  |         | 7.06    |          |
| Max Chl Dpth (ft)  | 2.52     | Hydr. Depth (ft)  |         | 1.54    |          |
| Crit W.S. (ft)     | 5305.52  | Wetted Per. (ft)  |         | 424.95  |          |
| Conv. Total (cfs)  | 42934.8  | Conv. (cfs)       |         | 42934.8 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 1230 Profile: 1

| W.S. Elev (ft)     | 5304.50  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.43     | Wt. n-Val.        |         | 0.030   |          |
| E.G. Elev (ft)     | 5304.93  | Reach Len. (ft)   | 150.00  | 165.00  | 150.00   |
| E.G. Slope (ft/ft) | 0.006324 | Flow Area (sq ft) |         | 876.19  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 568.99   | Top Width (ft)    |         | 568.99  |          |
| Vel Total (ft/s)   | 5.25     | Avg. Vel. (ft/s)  |         | 5.25    |          |
| Max Chl Dpth (ft)  | 2.50     | Hydr. Depth (ft)  |         | 1.54    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 569.58  |          |
| Conv. Total (cfs)  | 57832.4  | Conv. (cfs)       |         | 57832.4 |          |

## HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 1100 Profile: 1

| W.S. Elev (ft)     | 5303.42  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.43     | Wt. n-Val.        |         | 0.030   |          |
| E.G. Elev (ft)     | 5303.85  | Reach Len. (ft)   | 120.00  | 120.00  | 130.00   |
| E.G. Slope (ft/ft) | 0.006740 | Flow Area (sq ft) |         | 870.05  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 586.50   | Top Width (ft)    |         | 586.50  |          |
| Vel Total (ft/s)   | 5.29     | Avg. Vel. (ft/s)  |         | 5.29    |          |
| Max Chl Dpth (ft)  | 2.42     | Hydr. Depth (ft)  |         | 1.48    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 587.06  |          |
| Conv. Total (cfs)  | 56017.2  | Conv. (cfs)       |         | 56017.2 |          |



19D

HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 1000 Profile: 1

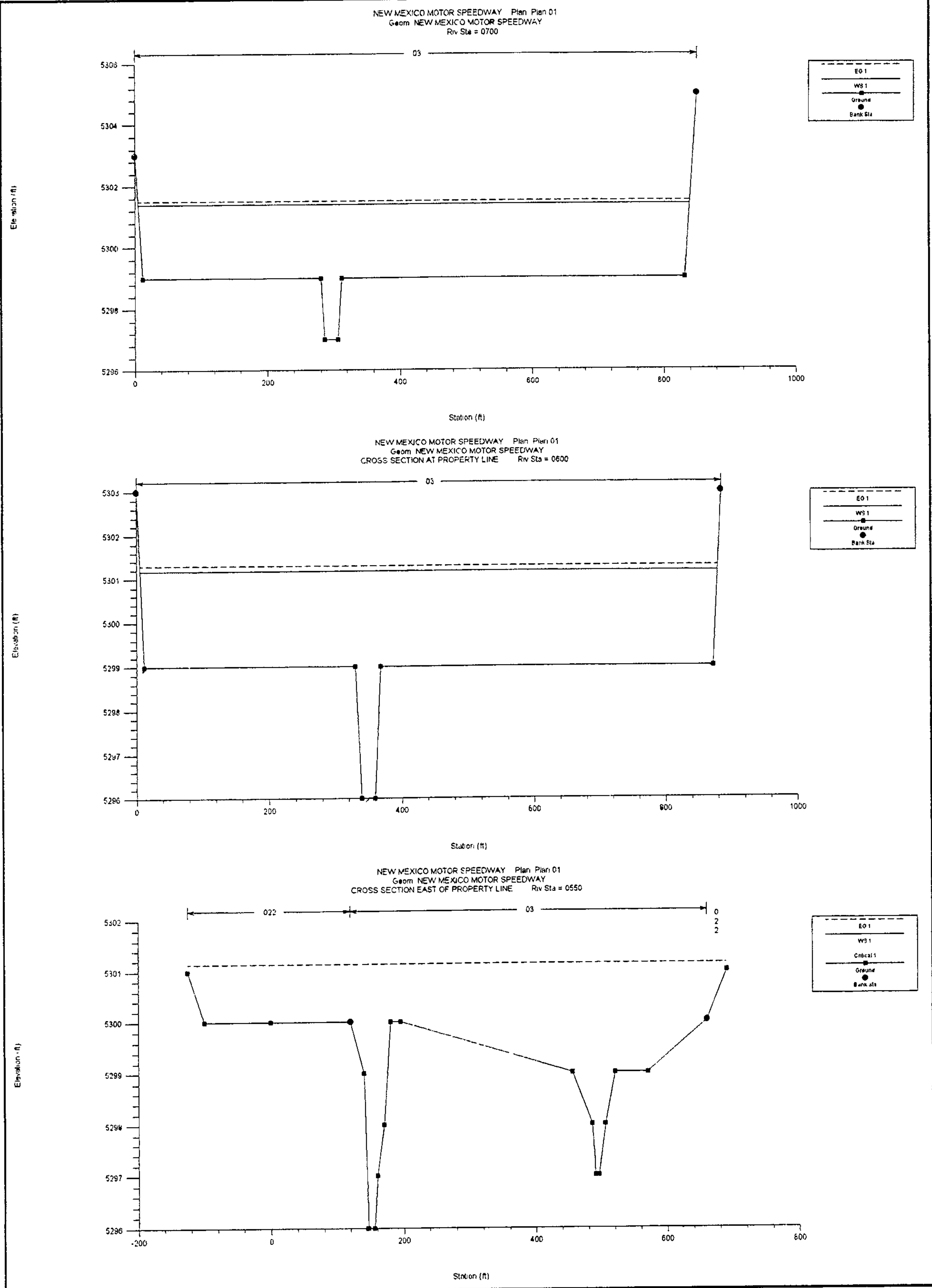
|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev (ft)     | 5302.15  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.60     | Wt. n-Val.        |         | 0.030   |          |
| E.G. Elev (ft)     | 5302.75  | Reach Len. (ft)   | 100.00  | 120.00  | 130.00   |
| E.G. Slope (ft/ft) | 0.012713 | Flow Area (sq ft) |         | 738.68  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 626.89   | Top Width (ft)    |         | 626.89  |          |
| Vel Total (ft/s)   | 6.23     | Avg. Vel. (ft/s)  |         | 6.23    |          |
| Max Chl Dpth (ft)  | 2.15     | Hydr. Depth (ft)  |         | 1.18    |          |
| Crit W.S. (ft)     | 5302.15  | Wetted Per. (ft)  |         | 627.58  |          |
| Conv. Total (cfs)  | 40787.0  | Conv. (cfs)       |         | 40787.0 |          |

HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 0900 Profile: 1

|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev (ft)     | 5301.62  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.25     | Wt. n-Val.        |         | 0.030   |          |
| E.G. Elev (ft)     | 5301.88  | Reach Len. (ft)   | 100.00  | 140.00  | 140.00   |
| E.G. Slope (ft/ft) | 0.003451 | Flow Area (sq ft) |         | 1134.91 |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88 |          |
| Top Width (ft)     | 689.74   | Top Width (ft)    |         | 689.74  |          |
| Vel Total (ft/s)   | 4.05     | Avg. Vel. (ft/s)  |         | 4.05    |          |
| Max Chl Dpth (ft)  | 2.62     | Hydr. Depth (ft)  |         | 1.65    |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 690.59  |          |
| Conv. Total (cfs)  | 78282.1  | Conv. (cfs)       |         | 78282.1 |          |

HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 0800 Profile: 1

|                    |          |                   |         |          |          |
|--------------------|----------|-------------------|---------|----------|----------|
| W.S. Elev (ft)     | 5301.56  | Element           | Left OB | Channel  | Right OB |
| Vel Head (ft)      | 0.09     | Wt. n-Val.        |         | 0.030    |          |
| E.G. Elev (ft)     | 5301.65  | Reach Len. (ft)   | 100.00  | 200.00   | 300.00   |
| E.G. Slope (ft/ft) | 0.000658 | Flow Area (sq ft) |         | 1933.46  |          |
| Q Total (cfs)      | 4598.88  | Flow (cfs)        |         | 4598.88  |          |
| Top Width (ft)     | 753.37   | Top Width (ft)    |         | 753.37   |          |
| Vel Total (ft/s)   | 2.38     | Avg. Vel. (ft/s)  |         | 2.38     |          |
| Max Chl Dpth (ft)  | 3.56     | Hydr. Depth (ft)  |         | 2.57     |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 754.53   |          |
| Conv. Total (cfs)  | 179327.8 | Conv. (cfs)       |         | 179327.8 |          |



HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 0700 Profile: 1

| W.S. Elev (ft)     | 5301.39  | Element           | Left OB | Channel  | Right OB |
|--------------------|----------|-------------------|---------|----------|----------|
| Vel Head (ft)      | 0.11     | Wt. n-Val.        |         | 0.030    |          |
| E.G. Elev (ft)     | 5301.50  | Reach Len. (ft)   | 15.00   | 215.00   | 410.00   |
| E.G. Slope (ft/ft) | 0.000874 | Flow Area (sq ft) |         | 2026.20  |          |
| Q Total (cfs)      | 5354.88  | Flow (cfs)        |         | 5354.88  |          |
| Top Width (ft)     | 834.32   | Top Width (ft)    |         | 834.32   |          |
| Vel Total (ft/s)   | 2.64     | Avg. Vel. (ft/s)  |         | 2.64     |          |
| Max Chl Dpth (ft)  | 4.39     | Hydr. Depth (ft)  |         | 2.43     |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 835.74   |          |
| Conv. Total (cfs)  | 181118.1 | Conv. (cfs)       |         | 181118.1 |          |

HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 0600 Profile: 1

| W.S. Elev (ft)     | 5301.18  | Element           | Left OB | Channel  | Right OB |
|--------------------|----------|-------------------|---------|----------|----------|
| Vel Head (ft)      | 0.11     | Wt. n-Val.        |         | 0.030    |          |
| E.G. Elev (ft)     | 5301.29  | Reach Len. (ft)   | 50.00   | 50.00    | 50.00    |
| E.G. Slope (ft/ft) | 0.001012 | Flow Area (sq ft) |         | 1974.93  |          |
| Q Total (cfs)      | 5354.88  | Flow (cfs)        |         | 5354.88  |          |
| Top Width (ft)     | 873.07   | Top Width (ft)    |         | 873.07   |          |
| Vel Total (ft/s)   | 2.71     | Avg. Vel. (ft/s)  |         | 2.71     |          |
| Max Chl Dpth (ft)  | 5.18     | Hydr. Depth (ft)  |         | 2.26     |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 874.75   |          |
| Conv. Total (cfs)  | 168346.3 | Conv. (cfs)       |         | 168346.3 |          |

HEC-RAS Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 0550 Profile: 1

| W.S. Elev (ft)     | 5300.59  | Element           | Left OB | Channel | Right OB |
|--------------------|----------|-------------------|---------|---------|----------|
| Vel Head (ft)      | 0.54     | Wt. n-Val.        | 0.022   | 0.030   | 0.022    |
| E.G. Elev (ft)     | 5301.14  | Reach Len. (ft)   |         |         |          |
| E.G. Slope (ft/ft) | 0.009300 | Flow Area (sq ft) | 134.46  | 778.31  | 5.24     |
| Q Total (cfs)      | 5354.88  | Flow (cfs)        | 603.94  | 4735.79 | 15.15    |
| Top Width (ft)     | 792.52   | Top Width (ft)    | 234.78  | 540.00  | 17.74    |
| Vel Total (ft/s)   | 5.83     | Avg. Vel. (ft/s)  | 4.49    | 6.08    | 2.89     |
| Max Chl Dpth (ft)  | 4.59     | Hydr. Depth (ft)  | 0.57    | 1.44    | 0.30     |
| Crit W.S. (ft)     | 5300.59  | Wetted Per. (ft)  | 234.79  | 541.31  | 17.75    |
| Conv. Total (cfs)  | 55528.8  | Conv. (cfs)       | 6262.7  | 49109.0 | 157.2    |

## ***SECTION E***



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers and Surveyors

PROJECT NEW MEXICO MOTOR SPEEDWAY  
SUBJECT DRAINAGE  
BY ZM DATE \_\_\_\_\_  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 1Ea OF \_\_\_\_\_

## EROSION SET BACK ANALYSIS UTILIZING AMAFCA'S "SEDIMENT AND EROSION DESIGN GUIDE," SECTION 3.4.5.

1. 100yr DOMINANT DISCHARGE

$$Q_D = 0.2 * Q_{100} = 0.2 (5701.54) \text{ cfs}$$

$$Q_D = 1140.31 \text{ cfs}$$

2. ESTIMATE CHANNEL WIDTH FOR SUBCRITICAL FLOW

$$W_D = 2.46 Q_D^{0.375} S^{-0.188} = 2.46 (1140.31)^{0.375} (0.0071)^{-0.188}$$

$$W_D = 87.26' = 87'$$

3. ESTIMATE DOWN VALLEY LENGTH OF THE AERODYN

$$L_V = \lambda \quad \lambda \text{ meander wavelength} = W_D * 14$$

$$\lambda = W_D * 14$$

$$\lambda = 87.26' * 14$$

$$L_V = \lambda = 1221.57'$$

4. LATERAL CONTROLS DO NOT APPLY HERE

5. MAXIMUM LATERAL EROSION DISTANCE

$$\Delta_{MAX} = 3.5 W_D = 3.5 (87.26) = 305.41'$$

6. The required erosion setback was determined from the bank line setback (BSB) because this will identify the maximum lateral migration potential of the channel (when compared to the center setback distance) northward into the pito.

7. The determination given Erosion Setback Analysis will be to take preventive measures by constructing a scour wall. See Scour Analysis for depth of scour and proposed improvements.

## SCOUR ANALYSIS

This type of analysis is addressed for protection of potential lateral migration of the arroyo adjacent to this site. The following computational methods have been employed on several projects in the recent past and were obtained from "Design Guidelines and Criteria - Channels & Hydraulic Structures on Sandy Soil" by Simons, Li & Associates, June 1981.

| HEC SECTION | *<br>DEPTH<br>OF FLOW<br>(ft) | *<br>VELOCITY<br>OF<br>CHANNEL<br>(ft/s) | *<br>AREA OF<br>FLOW IN<br>CHANNEL | *<br>TOP<br>WIDTH OF<br>CHANNEL | CALC.<br>HYDRULC<br>DEPTH<br>dH | FROUDE<br>NUMBER<br>Fr |
|-------------|-------------------------------|------------------------------------------|------------------------------------|---------------------------------|---------------------------------|------------------------|
| 05+50       | 4.59                          | 5.83                                     | 778.31                             | 792.52                          | 0.98                            | 1.04                   |
| 06+00       | 5.18                          | 2.71                                     | 1,974.93                           | 873.07                          | 2.26                            | 0.32                   |
| 07+00       | 4.39                          | 2.64                                     | 2,026.20                           | 834.32                          | 2.43                            | 0.30                   |
| 08+00       | 3.56                          | 2.38                                     | 1,933.46                           | 753.37                          | 2.57                            | 0.26                   |
| 09+00       | 2.62                          | 4.05                                     | 1,134.91                           | 689.74                          | 1.65                            | 0.56                   |
| 10+00       | 2.15                          | 6.23                                     | 738.68                             | 626.89                          | 1.18                            | 1.01                   |
| 11+00       | 12.42                         | 5.29                                     | 870.05                             | 586.50                          | 1.48                            | 0.77                   |
| 12+30       | 2.50                          | 5.25                                     | 876.19                             | 568.99                          | 1.54                            | 0.75                   |
| 13+80       | 2.52                          | 7.06                                     | 651.77                             | 424.13                          | 1.54                            | 1.00                   |
| 15+20       | 2.98                          | 7.45                                     | 617.28                             | 311.91                          | 1.98                            | 0.93                   |
| 16+60       | 2.23                          | 6.71                                     | 684.98                             | 313.40                          | 2.19                            | 0.80                   |
| 18+00       | 2.99                          | 5.15                                     | 879.09                             | 413.62                          | 2.13                            | 0.62                   |
| 20+00       | 3.06                          | 4.13                                     | 1,099.03                           | 558.18                          | 1.97                            | 0.52                   |
| 22+00       | 2.43                          | 3.73                                     | 1,255.42                           | 747.24                          | 1.68                            | 0.51                   |
| 27+40       | 1.96                          | 3.66                                     | 1,256.17                           | 1,252.96                        | 1.00                            | 0.64                   |

\* Denotes values obtained from HEC-RAS Analysis

Froude Number = Velocity of Channel / (gravity \* Hydraulic Depth (dH))<sup>0.50</sup>

Hydraulic Depth = Area of Channel / Top Width of Channel

The following chart calculates the anticipated depth of scour from the bottom of the channel.

| HEC SECTION | ELEV.<br>AT<br>CHANNEL<br>BASE | LOCAL<br>SCOUR<br><br>Ys | ANTI<br>DUNE<br>SCOUR<br><br>½ Ha | TOTAL<br>SCOUR | ELEV.<br>AT<br>MAX.<br>SCOUR |
|-------------|--------------------------------|--------------------------|-----------------------------------|----------------|------------------------------|
| 05+50       | N/A                            | N/A                      | N/A                               | N/A            | N/A                          |
| 06+00       | 5299.00                        | 6.21                     | 0.10                              | 6.31           | 5292.69                      |
| 07+00       | 5299.00                        | 6.53                     | 0.10                              | 6.63           | 5292.37                      |
| 08+00       | 5299.00                        | 6.59                     | 0.08                              | 6.67           | 5292.33                      |
| 09+00       | 5300.00                        | 5.45                     | 0.22                              | 5.67           | 5294.33                      |
| 10+00       | 5301.00                        | 4.74                     | 0.53                              | 5.27           | 5295.73                      |
| 11+00       | 5301.00                        | 5.43                     | 0.38                              | 5.81           | 5295.19                      |
| 12+30       | 5303.00                        | 5.60                     | 0.38                              | 5.98           | 5297.02                      |

2Eb

| HEC<br>SECTION | ELEV.<br>AT<br>CHANNEL<br>BASE | LOCAL<br>SCOUR<br><br>Ys | ANTI<br>DUNE<br>SCOUR<br><br>½ Ha | TOTAL<br>SCOUR | ELEV.<br>AT<br>MAX.<br>SCOUR |
|----------------|--------------------------------|--------------------------|-----------------------------------|----------------|------------------------------|
| 13+80          | 5304.00                        | 6.16                     | 0.68                              | 6.84           | 5297.16                      |
| 15+20          | 5305.00                        | 7.73                     | 0.76                              | 8.49           | 5296.51                      |
| 16+60          | 5306.00                        | 8.14                     | 0.61                              | 8.75           | 5297.25                      |
| 18+00          | 5307.00                        | 7.28                     | 0.36                              | 7.64           | 5299.36                      |
| 20+00          | 5308.00                        | 6.35                     | 0.23                              | 6.58           | 5301.42                      |
| 22+00          | 5309.00                        | 5.38                     | 0.19                              | 5.57           | 5303.43                      |
| 27+40          | 5309.50                        | 3.45                     | 0.18                              | 3.64           | 5305.86                      |

LOCAL SCOUR =  $Y_s = dH(4)F_r^{0.33}$

ANTI DUNE SCOUR =  $\frac{1}{2} Ha = 0.07 \cdot 2 \cdot \pi \cdot \text{Velocity of Channel}^2 / \text{gravity}$

TOTAL SCOUR =  $Y_s + \frac{1}{2} Ha$



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers and Surveyors

PROJECT N.W. Motor Speedway  
SUBJECT Box Culvert Sizing  
BY RM DATE 31 July 97  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 1 OF 1

1. BOX CULVERTS SHALL BE CONSTRUCTED W/ 45° FLARE ON WINGWALL  
AND HAVE AN  $\frac{HW}{D} \geq 1$ . SEE ATTACHED CHART 1 CURVE 1.

• CULVERT CROSSING AT BASIN OA-1 TO BASIN T2-A1.

$$Q = 128.91 \text{ cfs} \approx 130 \text{ cfs}$$

a) ASSUME BOX IS 10' X ?

$$\frac{HW}{D} = 1$$

$$Q/b = 13$$

BOX SIZE - 10' X 2.75'

b) RE SIZE UTILIZING 2 BOX CULVERTS

$$Q = 130/2 = 65 \text{ cfs}$$

$$Q/b = 6.5$$

BOX SIZE - 2 @ 10' X 1.75'

c) RE-SIZE UTILIZING 3 BOX CULVERTS & BOX = 5'

$$Q = 130/3 = 43.33 \approx 44 \text{ cfs}$$

$$Q/b = 8.8 \approx 9$$

BOX SIZE - 3 @ 5' X 2.25'

∴ CULVERT CROSSING @ BASIN OA-1 TO BASIN T2-A1

3-BOX CULVERTS @ 2.25' X 5'



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers and Surveyors

PROJECT NM MOTOR SPEEDWAY  
SUBJECT BOX CULVERT SIZING  
BY RM DATE \_\_\_\_\_  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 2E OF \_\_\_\_\_

### BOX CULVERT SIZING (CONTINUED)

|                                       |                 |
|---------------------------------------|-----------------|
| 1. BASIN T2-B TO BASIN T2-A2          | 1 @ 3' x 2.25'  |
| 2. BASIN T2-C TO BASIN T2-A2          | 1 @ 3' x 2'     |
| 3. BASIN T2-D TO BASIN T2-H           | 1 @ 3' x 2.5'   |
| 4. BASIN T2-F TO BASIN T2-A2          | 1 @ 3' x 2.5'   |
| 5. BASIN T2-A2 TO BASIN T1-D          | 6 @ 5' x 2.50'  |
| 6. BASIN T2-H IN Paddock AREA         | 2 @ 3' x 2.75'  |
| 7. BASIN T2-I TO OFF-SITE BASIN       | 1 @ 2' x 1.25   |
| 8. OFF-SITE BASIN SOUTH OF BASIN T2-I | 5 @ 5' x 2.50'  |
| 9. BASIN T2-H TO OFF-SITE BASIN       | 4 @ 5' x 2.25'  |
| 10. BASIN T2-J TO BASIN T2-K          | 1 @ 2' x 1.75'  |
| 11. BASIN T2-K TO OFF-SITE BASIN      | 1 @ 3' x 2.75'  |
| 12. BASIN T1-D TO BASIN T1-E          | 8 @ 5' x 2.25'  |
| 13. BASIN T1-E TO OFF-SITE BASIN      | 15 @ 5' x 2.25' |

### EXISTING BOX CULVERT @ I-40

PROPOSED FLOW THROUGH CULVERT  $Q = 284.78 \text{ cfs}$

Box CULVERTS NORTH & SOUTH 6' x 16' w/ 45° FLARED WING WALLS  
CAPACITY OF CULVERTS

HEIGHT OF BOX = 6'

$$\frac{HW}{D} = 1$$

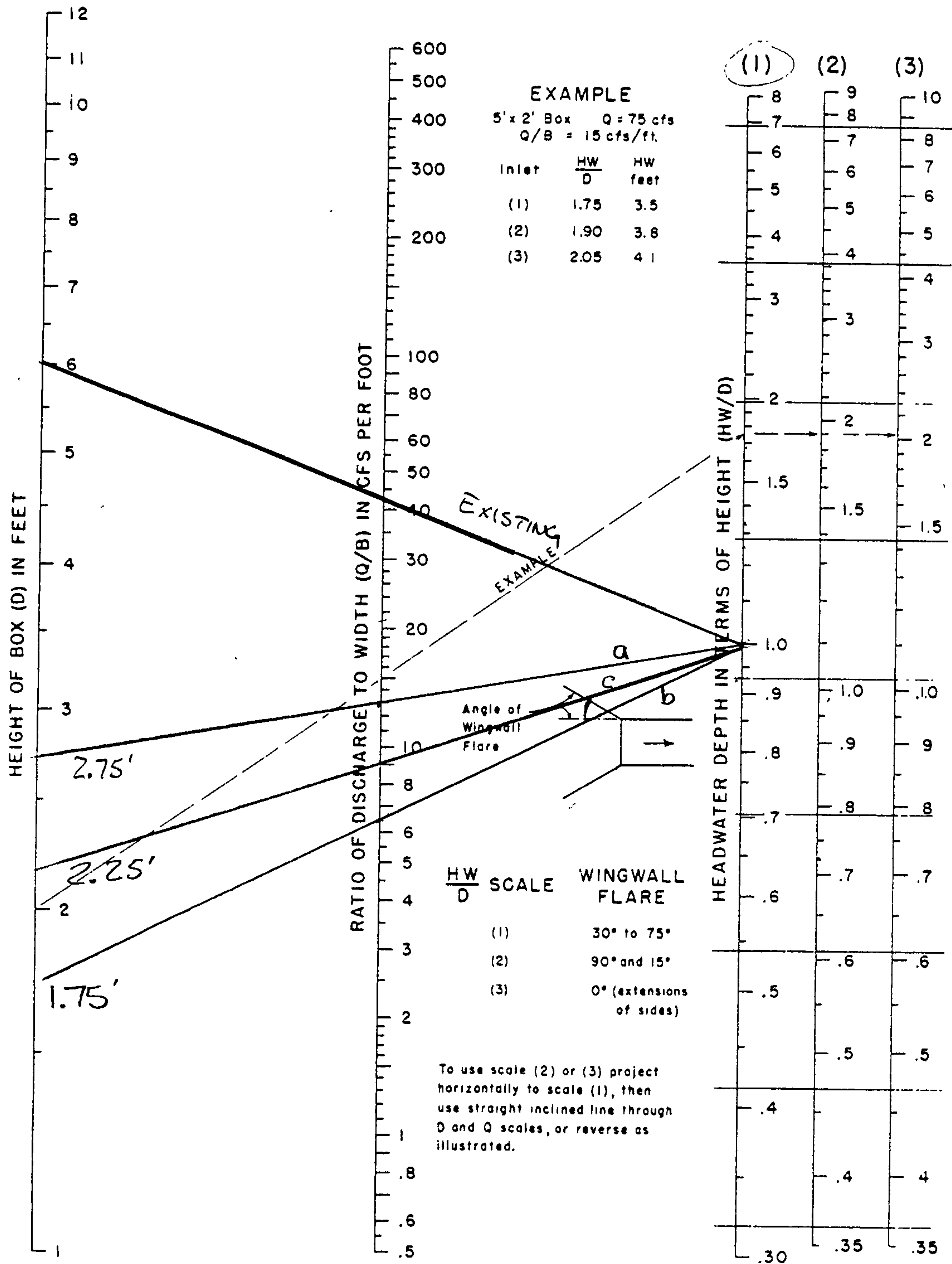
$$Q/b = 43 \text{ cfs}$$

$$b = 16$$

$$Q = 688 \text{ cfs} > \text{PROPOSED } Q = 284.78 \text{ cfs}$$

∴ EXISTING CULVERTS CONTAIN THE CAPACITY TO CONVEY  
PROPOSED FLOWS.

# CHART I



### POND SIZING

Ponds are located at the interior of the Oval Track eastern boundary. Ponds retain Basins T1 - A, T1 - B, and T1 - C. Developed storm runoff is conveyed by 48" RCP for Basins T1-B, T1-C and overland flow for Basin T1-A. For pipe sizing see the succeeding pages.

#### OVAL TRACK POND

| ELEVATION | AREA<br>(ft <sup>2</sup> ) | VOLUME<br>(ft <sup>3</sup> ) | STORAGE<br>(Acre-Feet) |
|-----------|----------------------------|------------------------------|------------------------|
| 5303.00   | 301,426.00                 |                              |                        |
|           |                            | 304,636.50                   | 6.99                   |
| 5304.00   | 307,847.00                 |                              |                        |
|           |                            | 311,086.00                   | 7.14                   |
| 5305.00   | 314,325.00                 |                              |                        |
|           |                            | 317,592.00                   | 7.29                   |
| 5306.00   | 320,859.00                 |                              |                        |
|           |                            | 324,154.50                   | 7.44                   |
| 5307.00   | 327,450.00                 |                              |                        |
|           |                            | 330,773.50                   | 7.59                   |
| 5308.00   | 334,097.00                 |                              |                        |
|           |                            | TOTAL                        | 36.46                  |

AHYMO EQUATION (a-9) page A8 of DPM Section 22.2

$$\text{VOLUME}_{10\text{DAY}} = 27.3749 \text{ Acre-Feet} = V_{360} + A_D \cdot (P_{10\text{days}} - P_{360}) / 12 \text{ in/ft}$$

PONDING VOLUME REQUIRED = 27.37 Acre-Feet

POND CAPACITY = 36.46 Acre-Feet

MAXIMUM WATER SURFACE ELEVATION = 5306.75

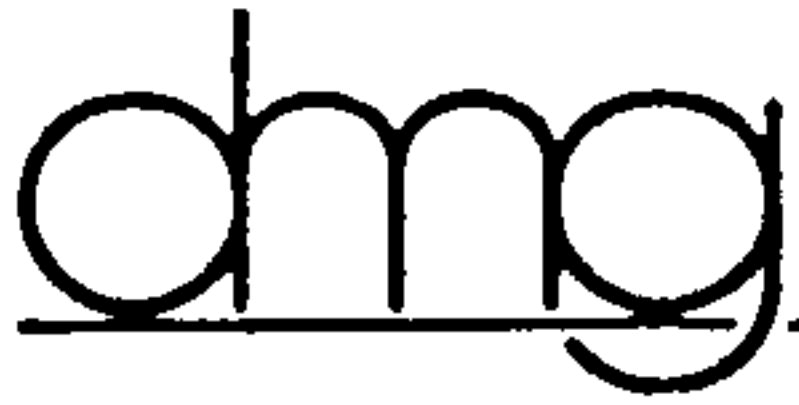
### PIPE SIZING

The following Hydraflow detailed output outlines the pipe sizes that will convey the developed storm runoff from Basins T1 - B and T1 - C into Oval Track ponding area. The output is the same for both the north and south legs of the storm drain system. See GD1 for plan view of system.

The following table reflects the 18" R.C.P. from Basin T2-E to Basin T2-D utilizing flow equation

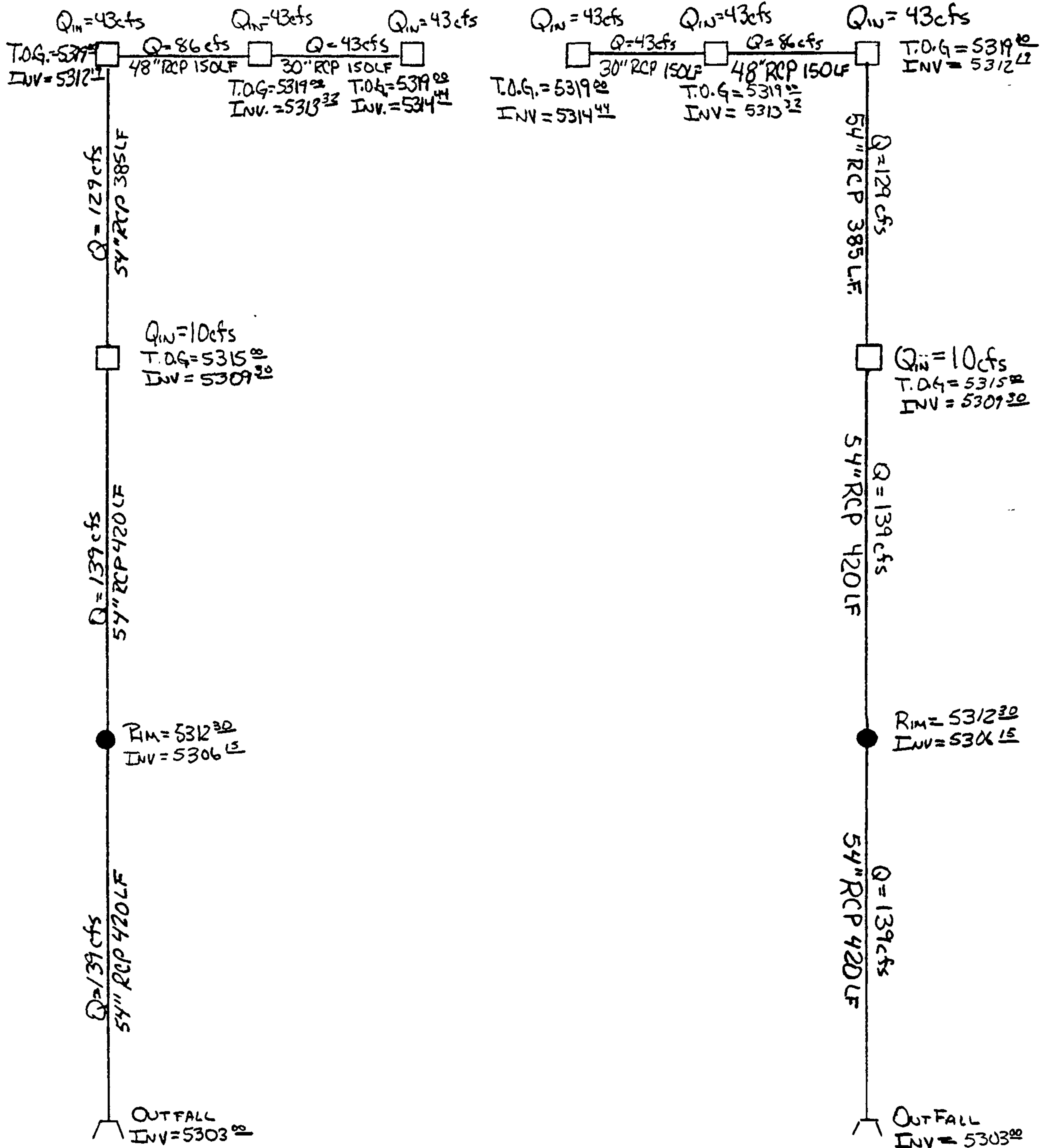
$$Q = k/n \cdot A \cdot R_H^{0.67} \cdot S^{0.5}$$

| PIPE SIZE<br>(inches) | "n"<br>Manning C. | SLOPE<br>(ft/ft) | AREA<br>(ft <sup>2</sup> ) | HYDRAULIC<br>RADIUS | FLOW<br>Q(cfs) | VELOCITY<br>(ft/s) |
|-----------------------|-------------------|------------------|----------------------------|---------------------|----------------|--------------------|
| 18                    | 0.13              | 0.01             | 1.77                       | 0.52                | 10.53          | 5.96               |



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers and Surveyors

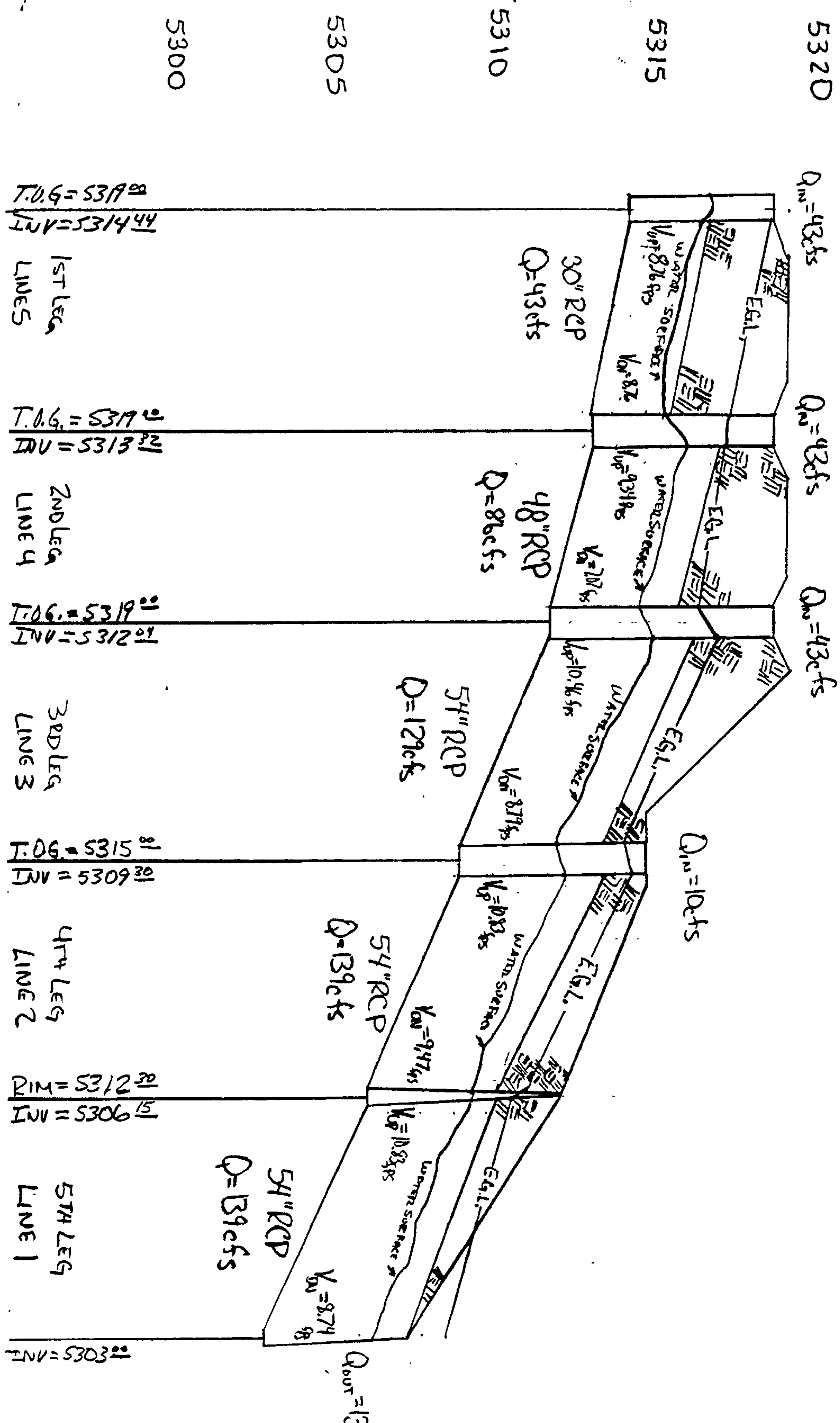
PROJECT N.M. Motor Speedway  
SUBJECT INTERNAL STORM DRAIN SYSTEM  
BY RM DATE \_\_\_\_\_  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 2 OF Ed





D. Mark Goodwin & Associates, P.A.  
Consulting Engineers and Surveyors

PROJECT NM Motor Speedway  
SUBJECT INTERNAL STORM DRAIN SYSTEM  
BY RM DATE \_\_\_\_\_  
CHECKED \_\_\_\_\_ DATE \_\_\_\_\_  
SHEET 35d OF \_\_\_\_\_



4Ed

LINE 5 / Q = 43.0 / HT = 30 / WID = 30 / N = .013 / L = 150 / JLC = .25

-----  
1st Leg North / DNLN = 4

|        | HGL     | DEPTH | INVERT  | VEL  | EGL     | T WID | COVER | AREA |
|--------|---------|-------|---------|------|---------|-------|-------|------|
| DNSTRM | 5316.41 | 30.00 | 5313.32 | 8.76 | 5317.60 | 0.00  | 3.18  | 4.91 |
| UPSTRM | 5318.36 | 30.00 | 5314.44 | 8.76 | 5319.55 | 0.00  | 2.06  | 4.91 |

|                      |      |                                |       |
|----------------------|------|--------------------------------|-------|
| Drainage area (ac) = | 0    | Slope of invert (%) =          | 0.747 |
| Runoff coefficient = | 0    | Slope energy grade line (%) =  | 1.100 |
| Time of conc (min) = | 0    | Critical depth (in) =          | 26.55 |
| Inlet time (min) =   | 0    | Req'd length curb inlet (ft) = | 1.4   |
| Intensity (in/hr) =  | 0.00 | Req'd grate area (sf) =        | 3.7   |
| Cumulative C*A =     | 0.0  | Depth at inlet opening (in) =  | 54.72 |
| Flow contrib (cfs) = | 43   | Confluence angle (deg) =       | 0     |
| Default Q (cfs) =    | 43   | Natural ground elev (ft) =     | 5319  |
| Line capac. (cfs) =  | 35.4 | Line storage (cuft) =          | 736   |

-----

LINE 4 / Q = 86.0 / HT = 48 / WID = 48 / N = .013 / L = 150 / JLC = .25

-----  
2nd Leg North / DNLN = 3

|        | HGL     | DEPTH | INVERT  | VEL  | EGL     | T WID | COVER | AREA  |
|--------|---------|-------|---------|------|---------|-------|-------|-------|
| DNSTRM | 5315.87 | 44.19 | 5312.19 | 7.07 | 5316.65 | 24.74 | 2.81  | 12.17 |
| UPSTRM | 5316.07 | 32.99 | 5313.32 | 9.34 | 5317.42 | 44.50 | 1.68  | 9.21  |

|                      |       |                                |       |
|----------------------|-------|--------------------------------|-------|
| Drainage area (ac) = | 0     | Slope of invert (%) =          | 0.753 |
| Runoff coefficient = | 0     | Slope energy grade line (%) =  | 0.517 |
| Time of conc (min) = | 1     | Critical depth (in) =          | 32.90 |
| Inlet time (min) =   | 0     | Req'd length curb inlet (ft) = | 2.1   |
| Intensity (in/hr) =  | 0.00  | Req'd grate area (sf) =        | 6.7   |
| Cumulative C*A =     | 0.0   | Depth at inlet opening (in) =  | 68.16 |
| Flow contrib (cfs) = | 86    | Confluence angle (deg) =       | -90   |
| Default Q (cfs) =    | 86    | Natural ground elev (ft) =     | 5319  |
| Line capac. (cfs) =  | 124.7 | Line storage (cuft) =          | 1603  |

-----

5E8

LINE 3 / Q = 129.0 / HT = 54 / WID = 54 / N = .013 / L = 385 / JLC = .25

3rd Leg North / DNLN = 2

|        | HGL     | DEPTH | INVERT  | VEL   | EGL     | T WID | COVER | AREA  |
|--------|---------|-------|---------|-------|---------|-------|-------|-------|
| DNSTRM | 5313.14 | 46.09 | 5309.30 | 8.79  | 5314.34 | 36.48 | 1.2   | 14.67 |
| UPSTRM | 5315.45 | 39.09 | 5312.19 | 10.46 | 5317.15 | 48.29 | 2.31  | 12.33 |

|                           |                                     |
|---------------------------|-------------------------------------|
| Drainage area (ac) = 0    | Slope of invert (%) = 0.751         |
| Runoff coefficient = 0    | Slope energy grade line (%) = 0.729 |
| Time of conc (min) = 2    | Critical depth (in) = 39.08         |
| Inlet time (min) = 0      | Req'd length curb inlet (ft) = 2.4  |
| Intensity (in/hr) = 0.00  | Req'd grate area (sf) = 9.2         |
| Cumulative C*A = 0.0      | Depth at inlet opening (in) = 81.72 |
| Flow contrib (cfs) = 129  | Confluence angle (deg) = 0          |
| Default Q (cfs) = 129     | Natural ground elev (ft) = 5319     |
| Line capac. (cfs) = 170.4 | Line storage (cuft) = 5198          |

LINE 2 / Q = 139.0 / HT = 54 / WID = 54 / N = .013 / L = 420 / JLC = .25

4th Leg North / DNLN = 1

|        | HGL     | DEPTH | INVERT  | VEL   | EGL     | T WID | COVER | AREA  |
|--------|---------|-------|---------|-------|---------|-------|-------|-------|
| DNSTRM | 5309.99 | 46.09 | 5306.15 | 9.47  | 5311.38 | 36.48 | 1.64  | 14.67 |
| UPSTRM | 5312.69 | 40.63 | 5309.30 | 10.83 | 5314.51 | 46.61 | 1.2   | 12.84 |

|                           |                                     |
|---------------------------|-------------------------------------|
| Drainage area (ac) = 0    | Slope of invert (%) = 0.750         |
| Runoff coefficient = 0    | Slope energy grade line (%) = 0.743 |
| Time of conc (min) = 4    | Critical depth (in) = 40.57         |
| Inlet time (min) = 0      | Req'd length curb inlet (ft) = 3.3  |
| Intensity (in/hr) = 0.00  | Req'd grate area (sf) = 10.8        |
| Cumulative C*A = 0.0      | Depth at inlet opening (in) = 68.4  |
| Flow contrib (cfs) = 139  | Confluence angle (deg) = 0          |
| Default Q (cfs) = 139     | Natural ground elev (ft) = 5315     |
| Line capac. (cfs) = 170.3 | Line storage (cuft) = 5777          |

6Ed

LINE 1 / Q = 139.0 / HT = 54 / WID = 54 / N = .013 / L = 420 / JLC = .25

-----  
5th Leg North / Outfall

|        | HGL     | DEPTH | INVERT  | VEL   | EGL     | T WID | COVER | AREA  |
|--------|---------|-------|---------|-------|---------|-------|-------|-------|
| DNSTRM | 5307.50 | 54.00 | 5303.00 | 8.74  | 5308.69 | 0.00  | -4.5  | 15.90 |
| UPSTRM | 5309.54 | 40.63 | 5306.15 | 10.83 | 5311.36 | 46.61 | 1.64  | 12.84 |

|                    |         |                              |          |
|--------------------|---------|------------------------------|----------|
| Drainage area (ac) | = 0     | Slope of invert (%)          | = 0.750  |
| Runoff coefficient | = 0     | Slope energy grade line (%)  | = 0.636  |
| Time of conc (min) | = 6     | Critical depth (in)          | = 40.57  |
| Inlet time (min)   | = 0     | Req'd length curb inlet (ft) | = 3.0    |
| Intensity (in/hr)  | = 0.00  | Req'd grate area (sf)        | = 10.4   |
| Cumulative C*A     | = 0.0   | Depth at inlet opening (in)  | = 73.8   |
| Flow contrib (cfs) | = 139   | Confluence angle (deg)       | = 0      |
| Default Q (cfs)    | = 139   | Natural ground elev (ft)     | = 5312.3 |
| Line capac. (cfs)  | = 170.3 | Line storage (cuft)          | = 6035   |

-----

# County of Bernalillo

State of New Mexico



BOARD OF COUNTY COMMISSIONERS  
TOM RUTHERFORD, CHAIR  
DISTRICT 3  
BARBARA J. SEWARD, VICE CHAIR  
DISTRICT 4  
KEN SANCHEZ, MEMBER  
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STEVE D. GALLEGOS, MEMBER  
DISTRICT 2  
LES HOUSTON, MEMBER  
DISTRICT 5  
JUAN R. VIGIL, COUNTY MANAGER

DAVID K. ANDERSON, ASSESSOR  
JUDY D. WOODWARD, CLERK  
THOMAS J. MESCALL, PROBATE JUDGE  
JOE BOWDICH, SHERIFF  
ORLANDO VIGIL, TREASURER

2400 BROADWAY, S.E.  
ALBUQUERQUE, NEW MEXICO 87102  
PUBLIC WORKS (505) 848-1500

June 10, 1998

Gregory J. Krenik, P.E.  
Mark Goodwin & Associates  
P. O. Box 90606  
Albuquerque, New Mexico 87199

**RE: New Mexico Motor Speedway (P2/D1) (PWD-97-114), Engineer's Stamp Dated 4/3/98.**

Dear Mr. Krenik:

Based on the information provided, the above referenced Drainage Report and Grading and Drainage Plan is conceptually approved by my office and by County Public Works.

We still have concerns with the clean water discharging to the bar ditch located within the Highway Department right-of-way and the potential for scour downstream due to the smaller, more frequent rainfall events.

Also, we require that the Speedway work out an agreement with the downstream property owner that allows the Speedway to discharge through that property, or that makes the Speedway responsible for constructing improvements to mitigate downstream damages. Please provide documentation to us that this agreement is in place by September 1, 1998.

If you have any questions, please call me at 924-3982, or contact Brad Catanach at the County.

Sincerely,

  
Susan M. Calongne, P.E.  
City/County Floodplain Administrator

c: Brad Catanach, Bernalillo County Public Works Division  
File

---

Author: rogerp@mercury.bernco.gov (Roger Paul) at INTERNET  
Date: 4/14/98 4:21 PM  
Priority: Normal  
Receipt Requested  
BCC: Susan Calongne at CABQ-PUBWORKS  
TO: scalongne@cabq.gov at INTERNET  
TO: bradc@mercury.bernco.gov at INTERNET  
CC: MartinG@mercury.bernco.gov at INTERNET  
CC: chrisb@mercury.bernco.gov at INTERNET  
Subject: NM Motor Speedway conditions

----- Message Contents -----

I spoke with Greg Krenik of Mark Goodwin & Associates regarding the resolution of the downstream impacts of the Speedway's runoff.

The Speedway is going to provide a copy of the proposed agreement between the Speedway and the downstream property owner that is their solution to this problem. The downstream owners will probably not be able to agree to this solution within the Speedway's time constraints.

I have agreed to let Greg Krenik provide a letter of intent regarding this agreement and a backup position that the Speedway will study the engineering solution within a couple of months if the agreement isn't executed.

Since this issue is the last outstanding problem, we should be able to give a conditional approval that is tied to them either providing an executed agreement or the engineered solution prior to approval of construction plans, concurrence with rough grading, start of construction, or whatever "approval" step they're at.

We'll decide on our final conditional language after receipt of Greg Krenik's resubmittal.....Thanks, RAP



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199  
(505) 828-2200 FAX 797-9539  
e-mail: dmgs@swcp.com

*April 15, 1998*

*Ms. Susan M. Calongne, PE  
City/County Floodplain Administrator  
One Civic Plaza  
Albuquerque, NM 87103*

**Re: New Mexico Motor Speedway (P2/P1) (PWD 97-114)**

*Dear Ms. Calongne:*

*This letter is in response to your letter of April 14, 1998, for the referenced project as well as my telephone conversation with Roger Paul of the same date.*

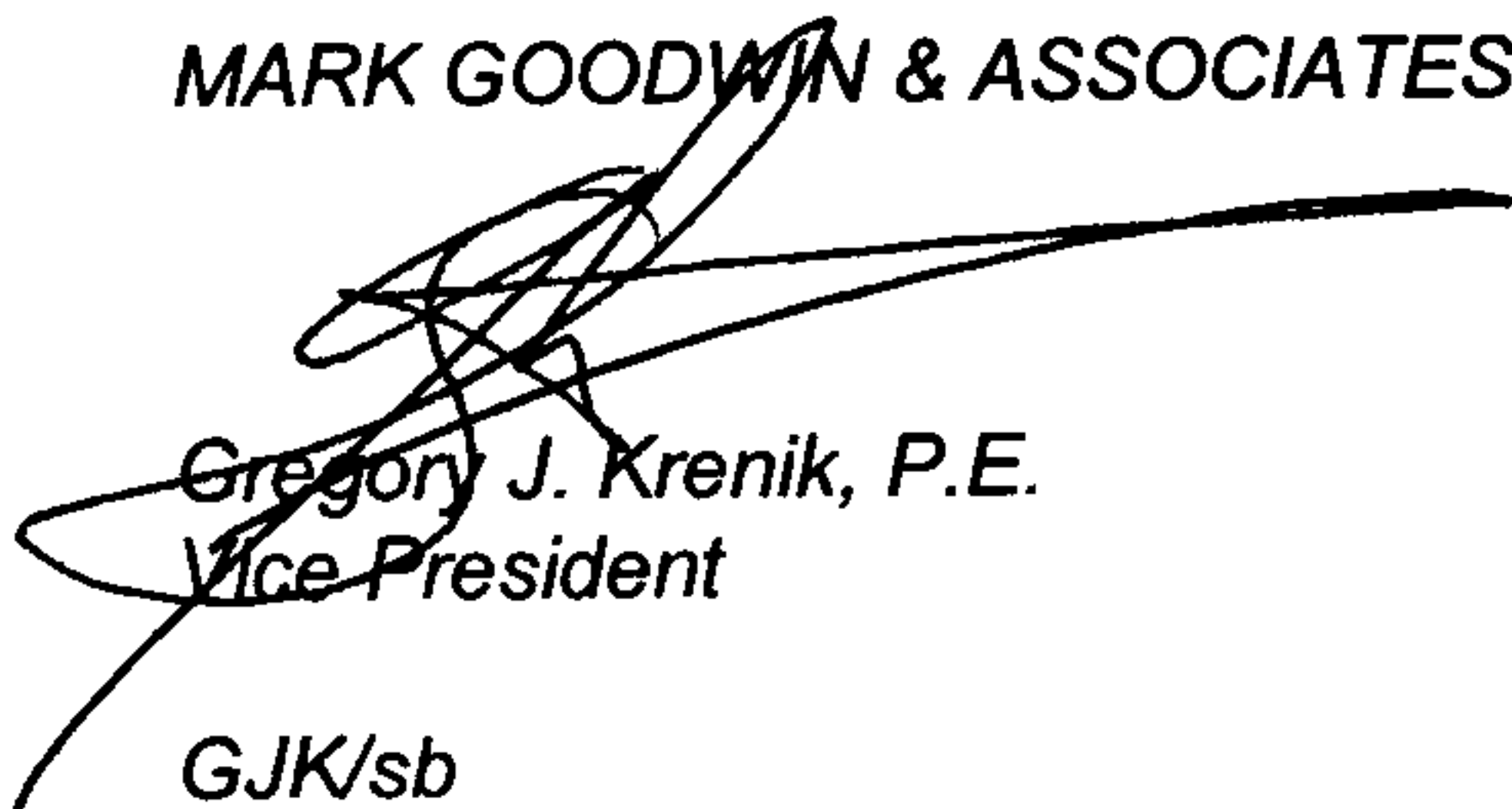
*Attached is a copy of the Drainage Agreement we will be trying to have, Barry Shalit, the adjacent east property owner sign. A representative of the Speedway has already signed the agreement. This will be mailed by certified mail, although the history of the contact with the owner has been slow and we don't anticipate a signed agreement for approximately three months.*

*If we do not reach an agreement with the adjacent owner we agree to do the analysis of the smaller, more frequent storms and make any improvements on the Speedway side of the property line to satisfy the County Public Works Division.*

*Please contact our office with any questions or comments.*

*Very Truly Yours,*

**MARK GOODWIN & ASSOCIATES, P.A.**

  
*Gregory J. Krenik, P.E.  
Vice President*

*GJK/sb*

*Attachment*

*f:\speedway\drainagr.ltr*

## DRAINAGE AGREEMENT

The New Mexico Motor Speedway will study the runoff from the new improvements for a period of five (5) years. If at that time any damage to the existing arroyo through the adjacent property to the east is found beyond normal erosion, the New Mexico Motor Speedway will repair and complete construction of improvements as necessary.

### NEW MEXICO MOTOR SPEEDWAY

Signature: M. B. Pete Ford  
Print Name: M. B. Pete Ford  
Title: Managing Partner  
Date: 15 April 98

### ADJACENT EAST PROPERTY OWNER

Signature: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

STATE OF NEW MEXICO }  
COUNTY BERNALILLO } SS



OFFICIAL SEAL  
PAUL E. ZON  
NOTARY PUBLIC-STATE OF NEW MEXICO  
My commission expires: 2/5/00

This instrument was acknowledged before me on 15 day of APRIL,  
1998, by M. B. Pete Ford, MANAGING PARTNER  
of New Mexico Motor Speedway.

STATE OF \_\_\_\_\_ }  
COUNTY \_\_\_\_\_ } SS

This instrument was acknowledged before me on \_\_\_\_\_ day of \_\_\_\_\_,  
19\_\_\_\_, by Barry Shalit, Owner.

NO FEE REQUIRED PER Roger PAUL

BERNALILLO COUNTY

☐ NEW SUBMITTAL

☒ RESUBMITTAL

TODAY'S DATE

4-15-98

PERMIT APPLICATION

PWD (Use for all PWD permits EXCEPT Street Excavation)

CASE NO:

97-PWD-114

OWNER

OWNER NEW MEXICO MOTOR SPEEDWAY, INC. PHONE

MAILING ADDRESS 330 WASHINGTON STREET SE CITY ALB ZIP 87108

AGENT

AGENT CONTRACTOR MARK GOODWIN & ASSOCIATES PHONE 828-2200

MAILING ADDRESS P.O. Box 90606 CITY ALB ZIP 87199

STATE LICENSE NO N/A EXP DATE VOLUME CLASS

ARCHITECT ENGINEER GREGORY J. KRENIK LICENSE NO 11929 PHONE 828-2200

SITE INFORMATION

SITE ADDRESS and/or DIRECTIONS

APPROXIMATELY THE NW CORNER OF I-40 AND THE RIO PUECO

ZONE

ATLAS NO.: N-5W

LEGAL DESCRIPTION TRACTS A & B, PLAT OF MIDWAY RANCH WITHIN SECTION 5, T9N, R1W

UNIFORM PROPERTY CODE (UPC No.):

200505413026420144

PROPERTY SIZE IN ACRES.

618.80

EXISTING BUILDING(S) AND USE:

NONE

PROPOSED BUILDING(S):

BLEACHER / BOX SEATING BLDG, RV PARK COMMUNITY BLDG, AUTO MUSEUM / VISITOR CENTER

TYPE OF SUBMITTAL

- |                                                                 |                                                                  |
|-----------------------------------------------------------------|------------------------------------------------------------------|
| <input type="checkbox"/> REPLAT                                 | <input type="checkbox"/> TRAFFIC IMPACT ANALYSIS / TRAFFIC STUDY |
| <input type="checkbox"/> MINOR SUBDIVISION                      | <input type="checkbox"/> INFRASTRUCTURE LIST / DESIGN REVIEW     |
| <input type="checkbox"/> MAJOR SUBDIVISION                      | <input type="checkbox"/> SPECIAL USE PERMIT                      |
| <input type="checkbox"/> CONSTRUCTION DRAWINGS                  | <input type="checkbox"/> BARRICADING PERMIT                      |
| <input checked="" type="checkbox"/> GRADING & DRAINAGE PLAN     | <input type="checkbox"/> BUILDING PERMIT                         |
| <input type="checkbox"/> AS-CONSTRUCTED GRADING & DRAINAGE PLAN | <input type="checkbox"/> INSPECTION                              |
| <input type="checkbox"/> VARIANCE REQUEST                       | <input type="checkbox"/> OTHER (Specify):                        |
| <input type="checkbox"/> LAND DIVISION                          |                                                                  |

The issuance of a permit or a review or approval of plan specifications, computations, and shop drawings, shall not be interpreted to be a permit for, or an approval of any variance or violation of any of the provisions of any COUNTY or STATE codes, ordinances, standards, or policies. Nor shall such issuance of a permit or approval of plans, specifications, computations, and shop drawings prevent any authorized COUNTY representative or COUNTY inspector from thereafter requiring the correction of errors in said plans, specifications, computations, or shop drawings or from stopping construction operations which are being carried on thereunder when in violation of any COUNTY or STATE codes, ordinances, standards, or policies.

☐ Owner ☒ Agent ☐ Contractor

Signature

Date

4-15-98

COUNTY

BERNALILLO COUNTY USE ONLY

C/R's

TOTAL FEE.

Receipt No.:

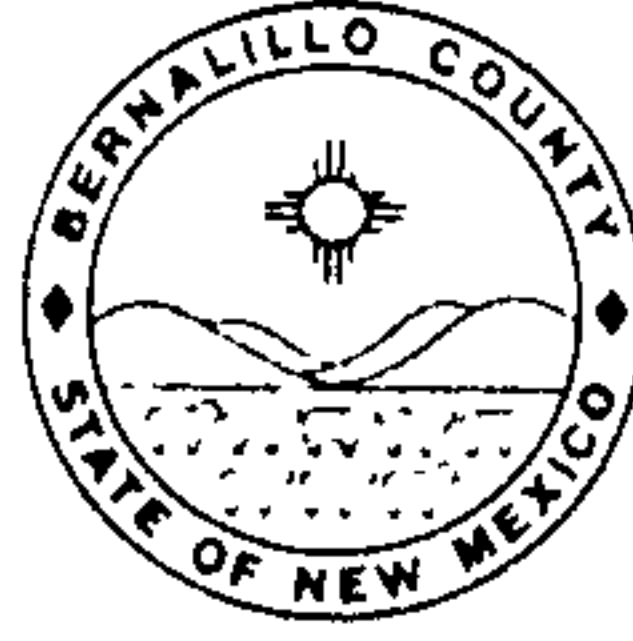
Received By:

# County of Bernalillo

State of New Mexico

**BOARD OF COUNTY COMMISSIONERS**

TOM RUTHERFORD, CHAIR  
DISTRICT 3  
BARBARA J. SEWARD, VICE CHAIR  
DISTRICT 4  
KEN SANCHEZ, MEMBER  
DISTRICT 1  
STEVE D. GALLEGOS, MEMBER  
DISTRICT 2  
LES HOUSTON, MEMBER  
DISTRICT 5  
JUAN R. VIGIL, COUNTY MANAGER



2400 BROADWAY, S.E.  
ALBUQUERQUE, NEW MEXICO 87102  
PUBLIC WORKS (505) 848-1500

DAVID K. ANDERSON, ASSESSOR  
JUDY D. WOODWARD, CLERK  
THOMAS J. MESCALL, PROBATE JUDGE  
JOE BOWDICH, SHERIFF  
ORLANDO VIGIL, TREASURER

April 14, 1998

Gregory J. Krenik, P.E.  
Mark Goodwin & Associates  
P. O. Box 90606  
Albuquerque, New Mexico 87199

**RE: New Mexico Motor Speedway (P2/D1) (PWD-97-114), Engineer's Stamp Dated 4/3/98.**

Dear Mr. Krenik:

The purpose of this letter is to provide additional comments regarding the above referenced site. These comments may be addressed without a complete resubmittal of the drainage report.

Although your analysis addressed the 100-year storm, the County and I have concerns with degradation on downstream properties during the smaller, more frequent storms due to clean water discharging from the site.

With respect to discharge point #2, the effect of the culverts at the entrance to the site will be reviewed and approved by the State Highway Department.

If you have any questions, please call me at 924-3982, or contact Brad Catanach at the County.

Sincerely,

A handwritten signature in cursive script, appearing to read "Susan Calongne".

Susan M. Calongne, P.E.  
City/County Floodplain Administrator

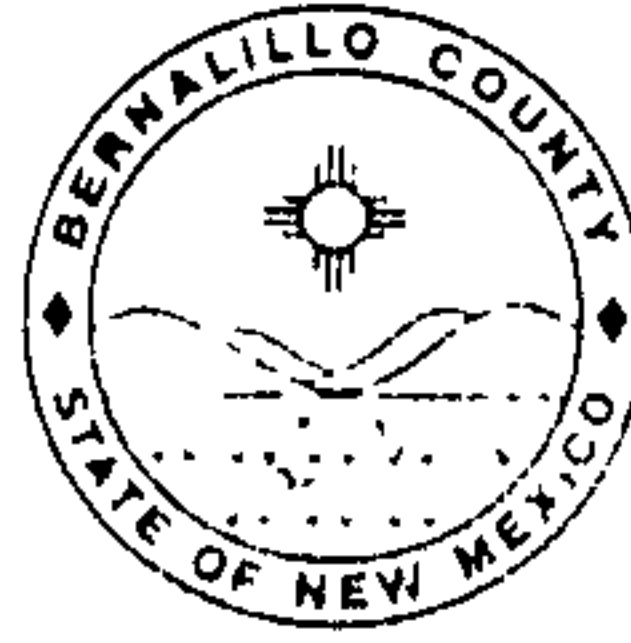
c: Brad Catanach, Bernalillo County Public Works Division  
File

# County of Bernalillo

State of New Mexico

BOARD OF COUNTY COMMISSIONERS

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DISTRICT 3  
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JUDY D. WOODWARD, CLERK  
THOMAS J. MESCALL, PROBATE JUDGE  
JOE BOWDICH, SHERIFF  
ORLANDO VIGIL, TREASURER

December 8, 1997

Gregory J. Krenik, P.E.  
Mark Goodwin & Associates  
P. O. Box 90606  
Albuquerque, New Mexico 87199

**RE: New Mexico Motor Speedway (P2/D1) (PWD-97-114)**

Dear Mr. Krenik:

This letter is in response to your letter dated November 19, 1997 regarding the above referenced site. The County and I have concerns because your analysis indicates that the velocity exiting the improved channel will increase to about 5 ft/sec. Since the existing velocity was approximately 3 ft/sec, please address the potential erosion problems that may be caused downstream of the project.

If you should have any questions, please call me at 924-3982, or contact Brad Catanach at the County.

Sincerely,

A handwritten signature in cursive script, reading "Susan Calongne".

Susan M. Calongne, P.E.  
City/County Floodplain Administrator

c: Brad Catanach, Bernalillo County Public Works Division  
(File)



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199  
(505) 828-2200 FAX 797-9539  
e-mail: dmgs@swcp.com

November 19, 1997

Ms. Susan M. Calongne, PE  
City / County Floodplain Administrator  
P.O. Box 1293  
Albuquerque, NM 87103

**Re: New Mexico Motor Speedway (P2/D1) (PWD - 97 - 114)**

Dear Ms. Calongne:

*This letter is an itemized response to your letter of November 17, 1997.*

- 1) *Please review the attached sheets from the drainage report that addresses our discharge to the adjacent property.*
  - a) *Proposed water surface is 0.88' lower than existing.*
  - b) *Proposed width of flow is 286.6' narrower than existing.*
  - c) *Proposed depth is 0.28' shallower than existing.*
  - d) *Proposed velocity is 1.7 ft/sec more than the existing.*

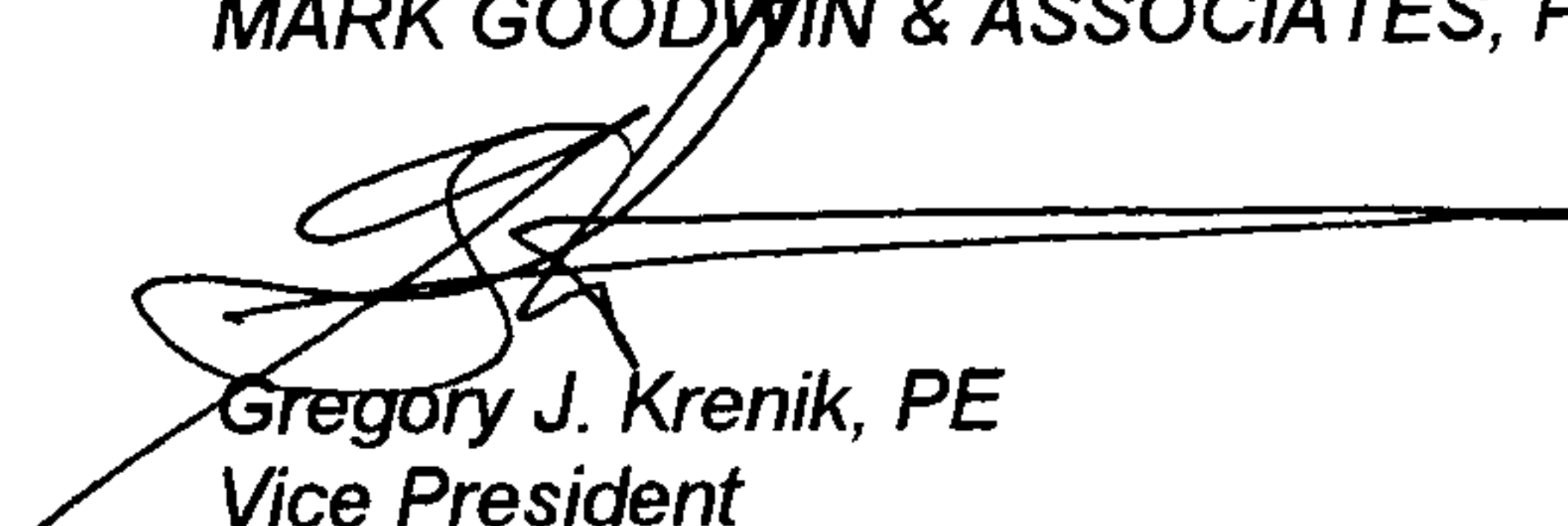
*Since 5,400 cfs will be flowing during the 100 year storm, the increase in velocity will not do anything more than have a minimal effect. These conditions show that we are not adversely impacting properties downstream. (Please see the attached Corps of Engineers permit for the same work.)*

- 2) *The possible erosion problems along the north side have been taken care of by having the soil cement protection extended to the west until the velocity falls below 3 ft/sec. This information is in the report and shown on sheets GD1 and GD2.*

*Please contact our office with questions or concerns.*

Sincerely,

MARK GOODWIN & ASSOCIATES, PA



Gregory J. Krenik, PE  
Vice President

GJK/sat

CC BRAD OSTANACH

f:\speedway\comments no3

Plan: Plan 01 Reach: CNDA DEL OJO Riv Sta: 1002 Profile: 1 10/9/97

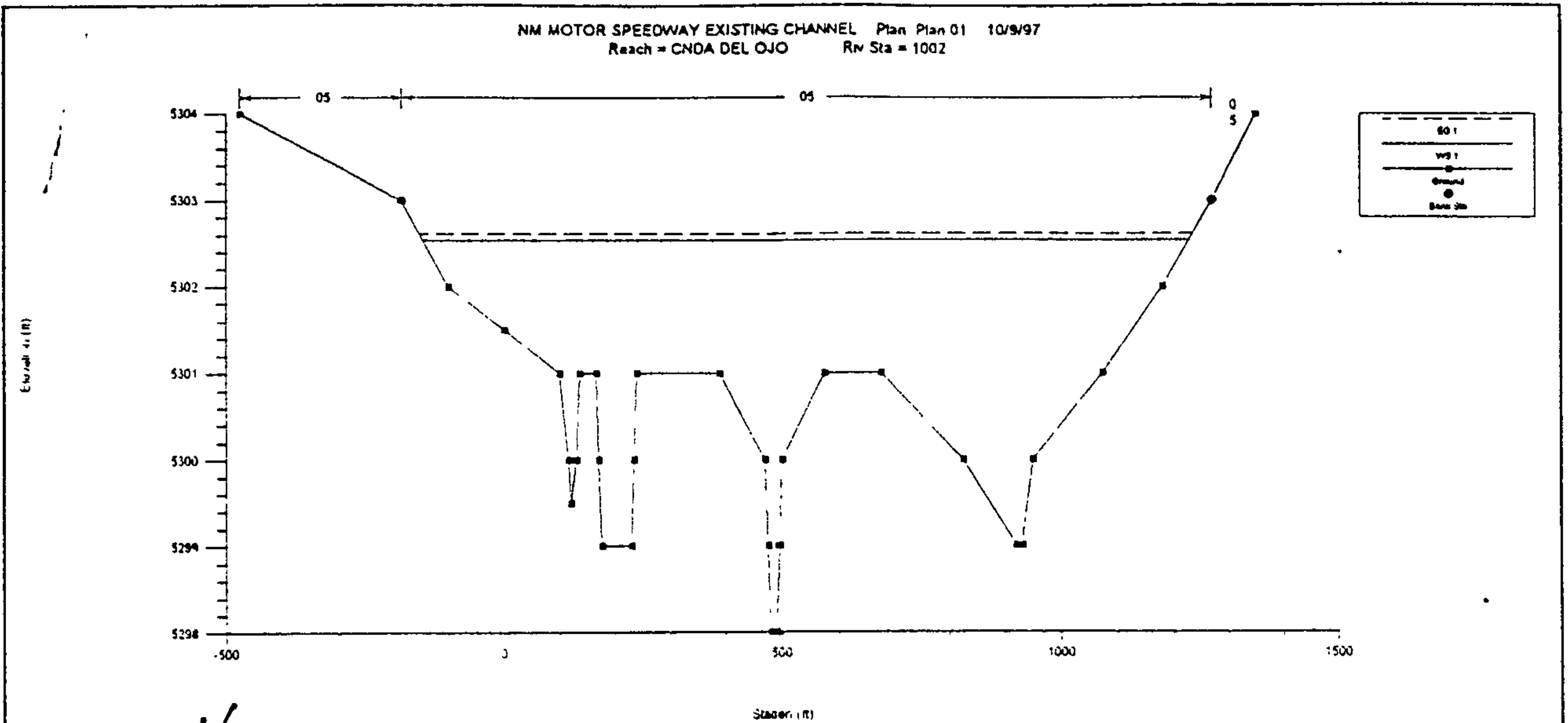
|                    |          |                   |         |          |          |
|--------------------|----------|-------------------|---------|----------|----------|
| W.S. Elev. (ft)    | 5302.54  | Element           | Left OB | Channel  | Right OB |
| Vel Head (ft)      | 0.07     | Wt n Val          |         | 0.050    |          |
| E.G. Elev. (ft)    | 5302.62  | Reach Len. (ft)   | 500.00  | 250.00   | 390.00   |
| E.G. Slope (ft/ft) | 0.002483 | Flow Area (sq ft) |         | 2482.53  |          |
| Q Total (cfs)      | 5448.86  | Flow (cfs)        |         | 5448.86  |          |
| Top Width (ft)     | 1374.76  | Top Width (ft)    |         | 1374.76  |          |
| Vel Total (ft/s)   | 2.19     | Avg Vel (ft/s)    |         | 2.19     |          |
| Max Chl Dpth (ft)  | 4.54     | Hydr Depth (ft)   |         | 1.81     |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 1375.79  |          |
| Conv. Total (cfs)  | 109349.2 | Conv. (cfs)       |         | 109349.2 |          |

EXISTING

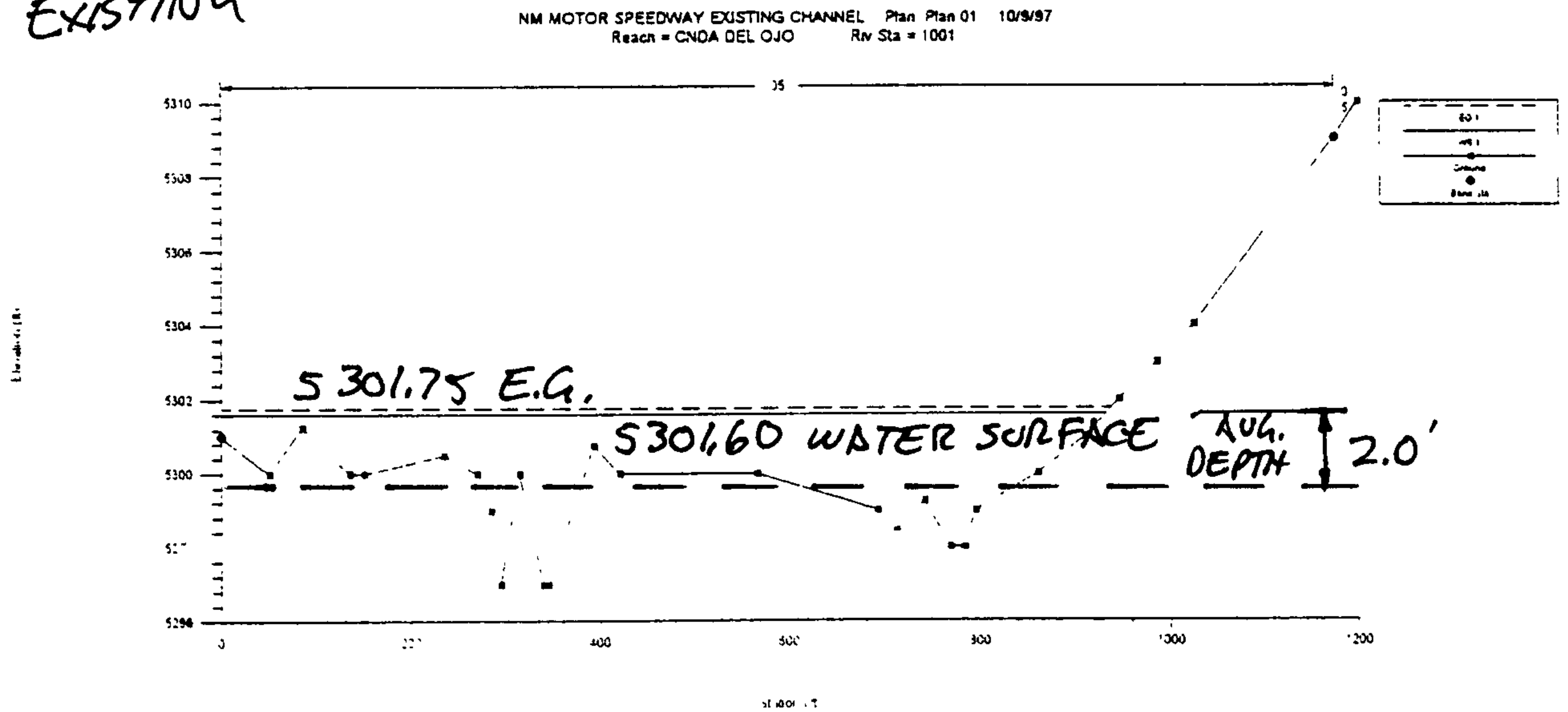
Plan: Plan 01 Reach: CNDA DEL OJO Riv Sta: 1001 Profile: 1 10/9/97

|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev. (ft)    | 5301.60  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.16     | Wt n Val          |         | 0.050   |          |
| E.G. Elev. (ft)    | 5301.75  | Reach Len. (ft)   |         |         |          |
| E.G. Slope (ft/ft) | 0.005008 | Flow Area (sq ft) |         | 1722.34 |          |
| Q Total (cfs)      | 5448.86  | Flow (cfs)        |         | 5448.86 |          |
| Top Width (ft)     | 931.92   | Top Width (ft)    |         | 931.92  |          |
| Vel Total (ft/s)   | 3.16     | Avg Vel (ft/s)    |         | 3.16    |          |
| Max Chl Dpth (ft)  | 4.60     | Hydr Depth (ft)   |         | 1.85    |          |
| Crit W.S. (ft)     | 5300.72  | Wetted Per. (ft)  |         | 933.47  |          |
| Conv. Total (cfs)  | 76999.6  | Conv. (cfs)       |         | 76999.6 |          |

AUG  
DEPTH  
2.0'



EXISTING



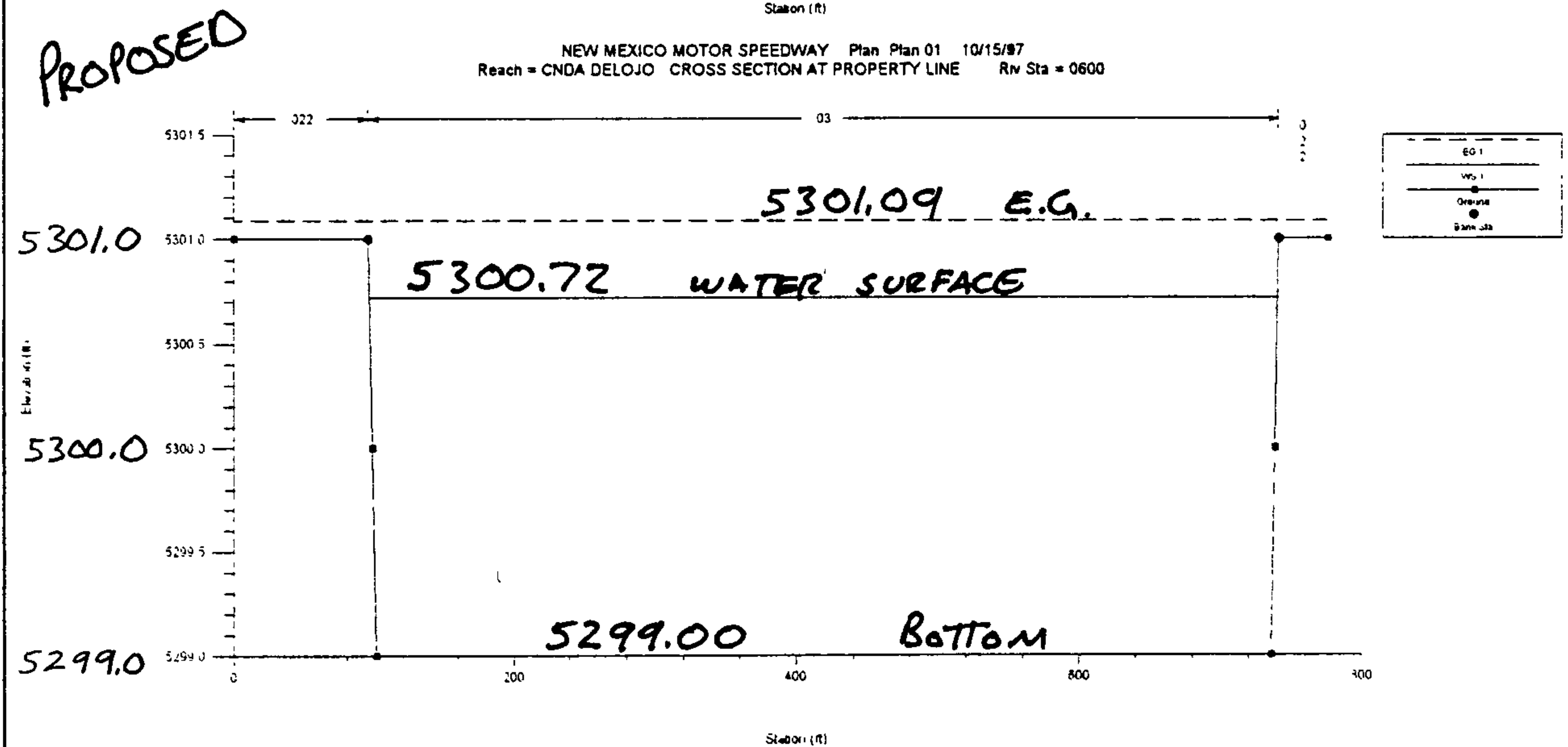
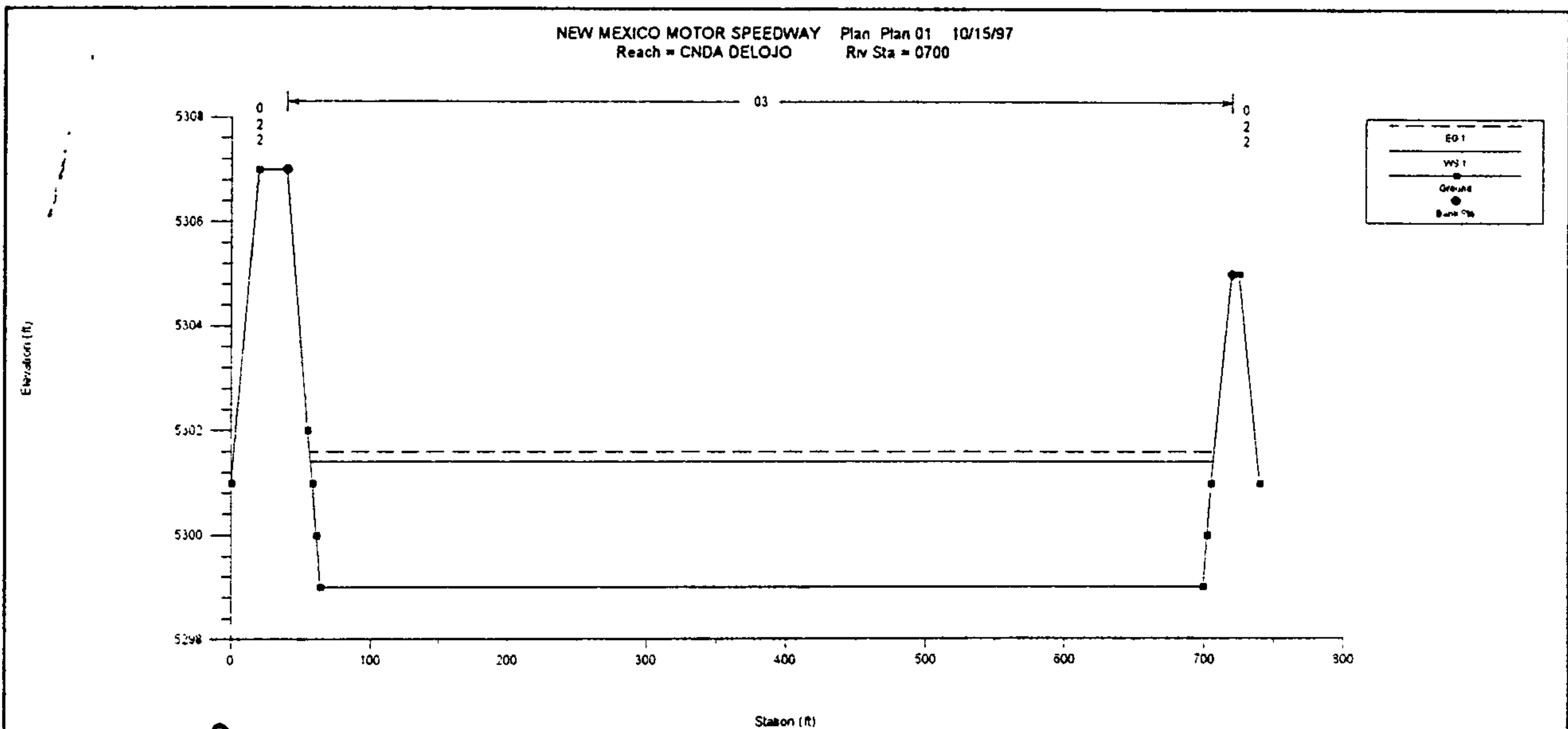
Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 0700 Profile: 1 10/15/97

|                    |          |                   |         |          |          |
|--------------------|----------|-------------------|---------|----------|----------|
| W.S. Elev. (ft)    | 5301.41  | Element           | Left OB | Channel  | Right OB |
| Vel Head (ft)      | 0.18     | Wt n Val          |         | 0.030    |          |
| E.G. Elev. (ft)    | 5301.60  | Reach Len. (ft)   | 35.00   | 195.00   | 265.00   |
| E.G. Slope (ft/ft) | 0.001563 | Flow Area (sq ft) |         | 1553.09  |          |
| Q Total (cfs)      | 5354.88  | Flow (cfs)        |         | 5354.88  |          |
| Top Width (ft)     | 663.96   | Top Width (ft)    |         | 663.96   |          |
| Vel Total (ft/s)   | 3.45     | Avg Vel (ft/s)    |         | 3.45     |          |
| Max Chl Dpth (ft)  | 2.41     | Hydr Depth (ft)   |         | 2.34     |          |
| Crit W.S. (ft)     |          | Wetted Per. (ft)  |         | 664.68   |          |
| Conv. Total (cfs)  | 135454.5 | Conv. (cfs)       |         | 135454.5 |          |

Plan: Plan 01 Reach: CNDA.DELOJO Riv Sta: 0600 Profile: 1 10/15/97

|                    |          |                   |         |         |          |
|--------------------|----------|-------------------|---------|---------|----------|
| W.S. Elev. (ft)    | 5300.72  | Element           | Left OB | Channel | Right OB |
| Vel Head (ft)      | 0.37     | Wt n Val          |         | 0.030   |          |
| E.G. Elev. (ft)    | 5301.09  | Reach Len. (ft)   |         |         |          |
| E.G. Slope (ft/ft) | 0.004732 | Flow Area (sq ft) |         | 1101.21 |          |
| Q Total (cfs)      | 5354.88  | Flow (cfs)        |         | 5354.88 |          |
| Top Width (ft)     | 645.32   | Top Width (ft)    |         | 645.32  |          |
| Vel Total (ft/s)   | 4.86     | Avg Vel (ft/s)    |         | 4.86    |          |
| Max Chl Dpth (ft)  | 1.72     | Hydr Depth (ft)   |         | 1.71    |          |
| Crit W.S. (ft)     | 5300.29  | Wetted Per. (ft)  |         | 645.88  |          |
| Conv. Total (cfs)  | 77844.1  | Conv. (cfs)       |         | 77844.1 |          |

PROPOSED





**DEPARTMENT OF THE ARMY**  
**ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS**  
**4101 JEFFERSON PLAZA NE**  
**ALBUQUERQUE, NEW MEXICO 87109-3435**  
**FAX (505) 342-3498**

November 13, 1997

REPLY TO  
ATTENTION OF:

Operations Division  
Regulatory Branch

Mr. Gregory J. Krenik, P.E.  
Vice President  
D. Mark Goodwin & Associates, P.A.  
P.O. Box 90606  
Albuquerque, New Mexico 87199

Dear Mr. Krenik:

This is in reference to your application dated October 27, 1997, regarding the realignment of the Canada del Ojo around the northeast corner of the proposed New Mexico Motor Speedway near Albuquerque, Bernalillo County, New Mexico, Action No. 1997 00280.

After reviewing the project in accordance with the Nationwide Permit pre-construction notification procedures (General Condition No. 13), I have determined that the proposed work will not result in more than minimal individual or cumulative adverse environmental effects. The public interest would best be served by allowing the work to proceed under the nationwide permit with a special condition.

You are therefore authorized to proceed under the authority of Nationwide Permit No. 26 for headwaters and isolated waters discharges. A summary of Nationwide Permit No. 26 is enclosed for your use. In addition to the conditions described in the permit summary, the following conditions must be met:

If archeological resources are found during construction, the work shall stop and the New Mexico State Historic Preservation Officer (NMSHPO) and the Corps of Engineers shall be contacted for advice concerning the discovery.

The permittee must insure compliance with all conditions of the permit, including submittal of the enclosed Compliance Certification required by General Condition No. 14.

General Condition No. 11 requires that no activity is authorized under any Nationwide Permit which is likely to jeopardize the continued existence of a listed or proposed

threatened or endangered species, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. We have determined that the proposed work, as described, will have no affect on any listed or proposed endangered or threatened species or its critical habitat.

This verification will be valid for 2 years unless the nationwide permit is modified, reissued or revoked. The verification will remain valid if, during that time, the nationwide permit is reissued without modification or the activity complies with any subsequent modification of the nationwide permit authorization. If the nationwide permit authorization expires, is suspended, revoked, or modified such that the activity would no longer comply with the terms and conditions of the nationwide permit, the provisions of 33 CFR 330.6(b) will apply.

If you have any questions regarding this determination and these regulations, please feel free to write or call Mr. James Wood at (505) 342-3280.

Sincerely,



Andrew J. Rosenau  
Chief, Regulatory Branch

2 Enclosures

1. Nationwide Permit Summary
2. Compliance Certification form

Copy furnished:

New Motor Speedway, Inc.  
330 Washington Street NE  
Albuquerque, NM 87108

**Certification of Compliance  
with Department of the Army Nationwide Permit**

Action Number: **199700280**

Name of Permittee: **New Mexico Motor Speedway, Inc.**

Nationwide Permit: **No. 26, Headwaters and Isolated Waters**

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

District Engineer  
Albuquerque District, Corps of Engineers  
ATTN: Regulatory Branch  
4101 Jefferson Plaza, NE  
Albuquerque, New Mexico 87109-3435

Please note that your permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

Please enclose photographs showing the completed project (if available).

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

Date Work Started \_\_\_\_\_

Date Work Completed \_\_\_\_\_

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Permittee



U.S. Army Corps  
of Engineers  
Albuquerque District

# Nationwide Permit Summary

## HEADWATERS AND ISOLATED WATERS DISCHARGES (NWP Final Notice, 61 FR 65916, para. 26)

Discharges of dredged or fill material into headwaters and isolated waters provided that the activity meets all of the following criteria:

- a. The discharge does not cause the loss of more than 3 acres of waters of the United States nor cause the loss of waters of the United States for a distance greater than 500 linear feet of the stream bed;
- b. For discharges causing the loss of greater than 1/3 acre of waters of the United States, the permittee notifies the District Engineer in accordance with the "Notification" general condition;
- c. For discharges causing a loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the information listed below;
- d. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands (Also see 33 CFR 330.1(e)); and
- e. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project. Note, this NWP will expire on December 13, 1998.

For the purposes of this NWP, the acreage of loss of waters of the United States includes the filled area plus waters of the United States that are adversely affected by flooding, excavation or drainage as a result of the project. The 3 acre and 1/3 acre limits of NWP 26 are absolute, and cannot be increased by any mitigation plan offered by the applicant or required by the District Engineer. Whenever any other NWP is used in conjunction with this NWP, the total acreage of impacts to waters of the United States of all NWPs combined, can not exceed 3 acres.

**Subdivisions:** For any real estate subdivision created or subdivided after October 5, 1984, a notification pursuant to subsection (b) of this NWP is required for any discharge which would cause the aggregate total loss of waters of the United States for the entire subdivision to exceed 1/3 acre. Any discharge in any real estate subdivision which would cause the aggregate total loss of waters of the United States in the subdivision to exceed 3 acres is not authorized by this NWP; unless the District Engineer exempts a particular subdivision or parcel by making a written

determination that: (1) The individual and cumulative adverse environmental effects would be minimal and the property owner had, after October 5, 1984, but prior to February 11, 1997, committed substantial resources in reliance on NWP 26 with regard to a subdivision, in circumstances where it would be inequitable to frustrate the property owner's investment-backed expectations, or (2) that the individual and cumulative adverse environmental effects would be minimal, high quality wetlands would not be adversely affected, and there would be an overall benefit to the aquatic environment. Once the exemption is established for a subdivision, subsequent lot development by individual property owners may proceed using NWP 26. For purposes of NWP 26, the term "real estate subdivision" shall be interpreted to include circumstances where a landowner or developer divides a tract of land into smaller parcels for the purpose of selling, conveying, transferring, leasing, or developing said parcels. This would include the entire area of a residential, commercial or other real estate subdivision, including all parcels and parts thereof.

**Report:** For discharges causing the loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the following information:

- (a) Name, address, and telephone number of the permittee;
- (b) Location of the work;
- (c) Description of the work; and,
- (d) Type and acreage (or square feet) of the loss of waters of the United States (e.g., 1/10 acre of marsh and 50 Square feet of a stream.) (Section 404)

## NATIONWIDE PERMIT CONDITIONS

General Conditions: The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. **Navigation.** No activity may cause more than a minimal adverse effect on navigation.
2. **Proper Maintenance.** Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. **Erosion and Siltation Controls.** Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.
4. **Aquatic Life Movements.** No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody,

including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

**5. Equipment.** Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

**6. Regional and Case-by-Case Conditions.** The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its section 401 water quality certification. **Note:** To date, one regional condition has been added to this permit (see condition #3, Section 404 only conditions).

**7. Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

**8. Tribal Rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

**9. Water Quality Certification.** In certain states, an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)). **Note for work in Albuquerque District:** Required water quality certification for non-tribal lands in Colorado was issued by the State of Colorado. The State of New Mexico, State of Texas, EPA Region 8, EPA Region 6, and tribal certifying authorities have variously issued, conditionally issued, or denied water quality certification for this nationwide permit. An information summary sheet is enclosed. You must insure compliance with the applicable water quality certification requirements for your project.

**10. Coastal Zone Management.** In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)). **Note:** Not applicable in Albuquerque District.

## **11. Endangered Species.**

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

(b) Authorization of an activity by a nationwide permit does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world wide web pages at <http://www.fws.gov/~r9endspp/endspp.html> and [http://kingfish.ssp.mnfs.gov/tmcintyr/prot\\_res.html](http://kingfish.ssp.mnfs.gov/tmcintyr/prot_res.html) respectively.

**12. Historic Properties.** No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR part 325, appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

## **13. Notification:**

(a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Pre-Construction Notification (PCN) as early as possible and shall not begin the activity:

(1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified by the District or Division Engineer that an individual permit is required; or

(3) Unless 30 days (or 45 days for NWP 26 only) have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) **Contents of Notification.** The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and

(4) For NWPs 14, 18, 21, 26, 29, 34, and 38, the PCN must also include a delineation of affected special aquatic sites, including wetlands (see paragraph 13(f));

(5) For NWP 21--Surface Coal Mining Activities, the PCN must include an OSM or state approved mitigation plan.

(6) For NWP 29--Single-Family Housing, the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 0.5 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 0.5 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of

ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(7) For NWP 31--Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a Pre-Construction Notification (PCN) prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site.

(8) For NWP 33--Temporary Construction, Access, and Dewatering, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources.

(c) **Form of Notification.** The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(7) of General Condition 13. A letter may also be used.

(d) **District Engineer's Decision.** In reviewing the pre-construction notification for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the pre-construction notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, the District Engineer will notify the permittee and include any conditions the DE deems necessary.

Any mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the District Engineer will expeditiously review the proposed mitigation plan, but will not commence a second 30-day (or 45-day for NWP 26) notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal,

the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions.

(e) **Agency Coordination.** The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

[Note: Paragraphs (e)(i), (ii), (iii) of the NWP Final Notice (61 FR 65921) are deleted here for brevity. These paragraphs provide specifics regarding the Corps' internal coordination with agencies.]

(f) **Wetlands Delineations.** Wetland delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(6)(iii) for parcels less than 0.5 acres in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period (45 days for NWP 26) will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

(g) **Mitigation.** Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(i) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes;

(ii) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, "in lieu fees" to organizations such as The Nature Conservancy, state or county natural resource management agencies, where such fees contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not

limited to: Reducing the size of the project; establishing wetland or upland buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address wetland impacts, such as functions and values, and cannot be simply used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the NWPs (e.g., for NWP 26, 5 acres of wetlands cannot be created to change a 6-acre loss of wetlands to a 1 acre loss; however, 2 created acres can be used to reduce the impacts of a 3-acre loss.).

**14. Compliance Certification.** Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a. A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b. A statement that any required mitigation was completed in accordance with the permit conditions; c. The signature of the permittee certifying the completion of the work and mitigation.

**15. Multiple Use of Nationwide Permits.** In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the "Notification" General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.6(c) two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

Section 404 Only Conditions: In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in order for authorization by the NWPs to be valid:

**1. Water Supply Intakes.** No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

**2. Shellfish Production.** No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

**3. Suitable Material.** No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

**4. Mitigation.** Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

**5. Spawning Areas.** Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

**6. Obstruction of High Flows.** To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

**7. Adverse Effects From Impoundments.** If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

**8. Waterfowl Breeding Areas.** Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

**9. Removal of Temporary Fills.** Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

[Excerpted from the December 13, 1996 Federal Register, Final Notice of Issuance, Reissuance, and Modification of Nationwide Permits (61 FR 65874)].

#### CONDITIONS, LIMITATIONS, AND RESTRICTIONS (Information from 33 CFR 330.4)

**1. General.** A prospective permittee must satisfy all terms and conditions of an NWP for a valid authorization to occur. Some conditions identify a "threshold" that, if met, requires additional procedures or provisions contained in other paragraphs in this section. It is important to remember that the NWP's only authorize activities from the perspective of the Corps

regulatory authorities and that other Federal, state, and local permits, approvals, or authorizations may also be required.

#### 2. Further Information:

(a) District Engineers have authority to determine if an activity complies with the terms and conditions of a NWP.

(b) NWP's do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorization required by law.

(c) NWP's do not grant any property rights or exclusive privileges.

(d) NWP's do not authorize any injury to the property or rights of others.

(e) NWP's do not authorize interference with any existing or proposed Federal project.

#### ADDITIONAL INFORMATION

For additional information concerning the nationwide permits or for a written determination regarding a specific project, please contact the office below:

##### In New Mexico:

Chief, Regulatory Branch  
Albuquerque District, US Army Corps of Engineers  
4101 Jefferson Plaza, N.E., Room 313  
Albuquerque, NM 87109-3435  
Telephone: (505) 342-3283  
E-Mail: ceswa-od-r@usace.army.mil

##### In southeastern Colorado:

Southern Colorado Project Office  
720 North Main Street, Room 205  
Pueblo, Colorado 81003-3046  
Telephone: (719) 543-9459

##### In southern New Mexico and western Texas:

El Paso Regulatory Office  
P.O. Box 6096  
Ft. Bliss, Texas 79906-0096  
Telephone: (915) 568-1359

Information about the U.S. Army Corps of Engineers regulatory program, including nationwide permits, may also be accessed on our Internet page:  
<http://www.swa.usace.army.mil/reg/>

This nationwide permit is effective February 11, 1997 and expires on December 13, 1998, unless sooner modified, suspended, or revoked.

Summary Version: 2/20/97

**WATER QUALITY CERTIFICATION INFORMATION SUMMARY  
FOR NATIONWIDE PERMIT USE IN THE ALBUQUERQUE DISTRICT**

Section 401 water quality certification for nationwide permits (NWP) in the Albuquerque District has been variously issued, waived, denied, or conditioned by certifying agencies. Review the following list to determine the status of water quality certification for the type of NWP and area of use. This list is a summary of information received from the certifying agencies; the specific requirements are available in each agency's water quality certification. You must obtain any required individual water quality certification from the appropriate water quality certification authority for your project area prior to construction under the specified nationwide permits:

**State of Colorado.** Water quality certification for all nationwide permits is issued by State of Colorado statute.

**State of New Mexico.** Issued unconditional certification for NWPs 20, 22, 27, 30, 38, and "incidental" discharges under NWP 18 (e.g., *de minimus* discharges). Conditional certification is issued for NWPs 3-7, 12-19, 21, 23, 25-26, 28-29, 31-37, and 40. If your project is in or near a perennial surface water, perennial reach of an interrupted or intermittent surface water, or wetland greater than 1/3 acre, you must obtain individual water quality certification from the New Mexico Environment Department to use these conditionally certified NWPs. Any use of NWP 18 exceeding 1/10 cu yd will require an individual water quality certification. NWP 12 is further conditioned requiring all utility lines to be installed perpendicular or as close to perpendicular as possible to a channel to minimize disturbance; any crossing of wetlands or streams must be justified and alternatives explored to avoid construction or maintenance in waters of the State; and the project must be restored to pre-construction contours and stabilized with native vegetation. Contact:

New Mexico Environment Department  
Surface Water Quality Bureau  
Harold Runnels Building, 1190 St. Francis Drive  
P.O. Box 26110  
Santa Fe, New Mexico 87502 Phone: (505) 827-0106

**State of Texas.** Issued conditional water quality certification (Standard Provisions) for all NWP use in Texas. Additional Conditions are included for NWPs 3, 7, 13, 16, 19, 26, 31, and 35. Copies of the conditions may be obtained from the Albuquerque District or from the Texas Natural Resource Conservation Commission. Contact:

Texas Natural Resource Conservation Commission  
P.O. Box 13087  
Austin, Texas 78711-3087 Phone: (512) 239-1000

**Pueblo of Sandia lands.** Requires individual water quality certification for use of any nationwide permit on tribal lands. Contact:

Environmental Director  
Pueblo of Sandia  
Box 6008  
Bernalillo, New Mexico 87004 Phone: (505) 867-4533

**Santa Clara Pueblo lands.** Water quality certification is denied without prejudice for NWPs 6-7, 12-14, 18-19, 23, 25-26, 29, 30, 33, 36, and 40. You must obtain an individual water quality certification for your project to use these NWPs on Pueblo lands. Contact:

Santa Clara Pueblo - Office of Environmental Affairs  
Surface Water Division  
P.O. Box 580  
Española, New Mexico 87532 Phone: (505) 753-7326, ext. 232

**Picuris Pueblo lands.** Requires individual water quality certification for use of any nationwide permit on Pueblo lands. Contact:

Environment Department  
Picuris Pueblo  
P.O. Box 127  
Penasco, New Mexico 87553 Phone: (505) 587-2519

**San Juan Pueblo lands.** Requires individual water quality certification for use of any nationwide permit on Pueblo lands. Contact:

Office of Environmental Affairs  
San Juan Pueblo  
P.O. Box 1099  
San Juan Pueblo, New Mexico 87566 Phone: (505) 852-4212

**Pueblo of Isleta lands.** Water quality certification for all NWPs is denied. You must obtain an individual water quality certification to use any NWP on Pueblo lands. Contact:

Water Quality Program  
Pueblo of Isleta  
P.O. Box 1270  
Isleta, New Mexico 87022 Phone: (505) 869-2710

**Nambe Pueblo lands.** Water quality certification for all NWPs is denied. You must obtain an individual water quality certification to use any NWP on Pueblo lands. Contact:

Nambe Pueblo Department of Environment and Natural Resources  
Route 1, P.O. Box 117BB  
Nambe Pueblo, New Mexico 87501 Phone: (505) 455-2036

**Pojoaque Pueblo lands.** No certification information received. The Corps of Engineers considers that water quality certification is waived for NWP use on Pojoaque Pueblo lands; however, you must contact the Pueblo prior to conducting work on Pueblo lands. Contact:

Environmental Officer  
Pojoaque Pueblo  
Route 11, Box 71  
Santa Fe, New Mexico 87501 Phone: (505) 455-3383

**Tribal lands in Colorado, certifying agency: EPA, Region 8** (Note: EPA certifies projects on tribal lands in Colorado where the tribe does not have water quality certifying authority). EPA waived certification of NWPs 3-6, 14-15, 19-23, 25, 27, 29-30, 32, 34, 36-38, and 40. EPA, Region 8, has denied certification of NWPs 7, 12-13, 16-18, 26, 31, and 33. Individual water quality certification for use of these NWPs must be obtained from the EPA, Region 8. Contact:

U.S. Environmental Protection Agency, Region 8  
Ecosystems Protection Program  
999 18th Street, Suite 500  
Denver, Colorado 80202-2466 Phone: (303) 312-6192

**Tribal lands in New Mexico, certifying agency: EPA, Region 6** (Note: EPA certifies projects on tribal lands in New Mexico where the tribe does not have water quality certifying authority). Issued water quality certification for NWPs 3-4, 6-7, 13-18, 20-21, 23, 27, 30-32, 35-38, and 40. Water quality certification is denied without prejudice for all activities under NWPs 2, 25-26, and 29. Certification is denied for sand and gravel dredging, mining, and excavation under NWP 19. In addition, certification is denied under NWP 33 for activities resulting in the temporary loss of more than 1 acre of special aquatic sites, including wetlands. You must obtain individual water quality certification to use any NWP where water quality certification is denied without prejudice. Contact:

U.S. Environmental Protection Agency, Region 6  
Ecosystems Protection Branch  
1445 Ross Avenue, Suite 1200  
Dallas, Texas 75202-2733 Phone: (214) 665-6694

**Navajo Nation, certifying agency: EPA, Region 9.** Water quality certification for all NWPs is denied without prejudice. You must obtain an individual water quality certification to use any NWP on Navajo Nation lands. Contact:

U.S. Environmental Protection Agency, Region 9  
Water Division  
75 Hawthorne Street  
San Francisco, California 94105-3901 Phone: (415) 744-1967

**General Information** regarding Section 401 water quality certification and Section 404 permit requirements may be obtained from:

Chief, Regulatory Branch  
Albuquerque District, U.S. Army Corps of Engineers  
4101 Jefferson Plaza, NE, Room 302  
Albuquerque, New Mexico 87109-3435  
Phone: (505) 342-3283

**Index of Nationwide Permits:**

- |                                             |                                        |
|---------------------------------------------|----------------------------------------|
| 1. Aids to Navigation                       | 21. Surface Coal Mining Activities     |
| 2. Structures in Artificial Canals          | 22. Removal of Vessels                 |
| 3. Maintenance                              | 23. Approved Categorical Exclusions    |
| 4. Fish and Wildlife..Devices/Activities    | 24. State Administered Sec 404 Pgms    |
| 5. Scientific Measurement Devices           | 25. Structural Discharges              |
| 6. Survey Activities                        | 26. Headwaters and Isolated Waters     |
| 7. Outfall Structures                       | 27. Wetland/Riparian..Activities       |
| 8. Outfall and Gas Structures               | 28. Mods of Existing Marinas           |
| 9. Structures in Fleeting..Areas            | 29. Single-Family Housing              |
| 10. Mooring Buoys                           | 30. Moist Soil Mgmt for Wildlife       |
| 11. Temp Recreation Structures              | 31. Maintenance of Exist Flood Control |
| 12. Utility Line Discharges                 | 32. Completed Enforcement Actions      |
| 13. Bank Stabilization                      | 33. Temp Construction, Access, Dewater |
| 14. Road Crossings                          | 34. Cranberry Production Activities    |
| 15. U.S. Coast Guard Approved Bridges       | 35. Maintenance Dredging of.. Basins   |
| 16. Return Water from Upland..Disposal Area | 36. Boat Ramps                         |
| 17. Hydropower Projects                     | 37. Emergency Watershed Protec..Rehab  |
| 18. Minor Discharges                        | 38. Cleanup of Hazardous & Toxic Waste |
| 19. Minor Dredging                          | 39. Reserved                           |
|                                             | 40. Farm Buildings                     |

WQ Summary Version: 4/15/97

## DRAINAGE INFORMATION SHEET

PROJECT TITLE: New Mexico Motor Speedway ZONE ATLAS/DRNG, FILE#: ~~10/22/97~~  
DRB #: \_\_\_\_\_ EPC #: \_\_\_\_\_ WORK ORDER #: \_\_\_\_\_  
LEGAL DESCRIPTION: Tracts A & B, Plat of Midway Ranch, Sec. 5, T9N, R1W  
CITY ADDRESS: \_\_\_\_\_

ENGINEERING FIRM: Mark Goodwin & Associates, P.A. CONTACT: Gregory J. Krenik PE  
ADDRESS: P.O. Box 90606 ABQ, NM 87199 PHONE: (505) 828-2200  
OWNER: NM Motor Speedway, Inc. CONTACT: MARV RODGERS  
ADDRESS: 330 Washington SE ABQ, NM 87108 PHONE: 262-8535  
ARCHITECT: Design Collaborative Southwest CONTACT: Dave Dekker  
ADDRESS: 105 4th Street SW ABQ, NM 87103 PHONE: 843-9639  
SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich  
ADDRESS: PO Box 30701 ABQ, NM 87190 PHONE: 884-1990  
CONTRACTOR: \_\_\_\_\_ CONTACT: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

### TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT  
☒ DRAINAGE PLAN  
☐ CONCEPTUAL GRADING & DRAINAGE PLAN  
☒ GRADING PLAN  
☐ EROSION CONTROL PLAN  
☐ ENGINEER'S CERTIFICATION  
☐ OTHER

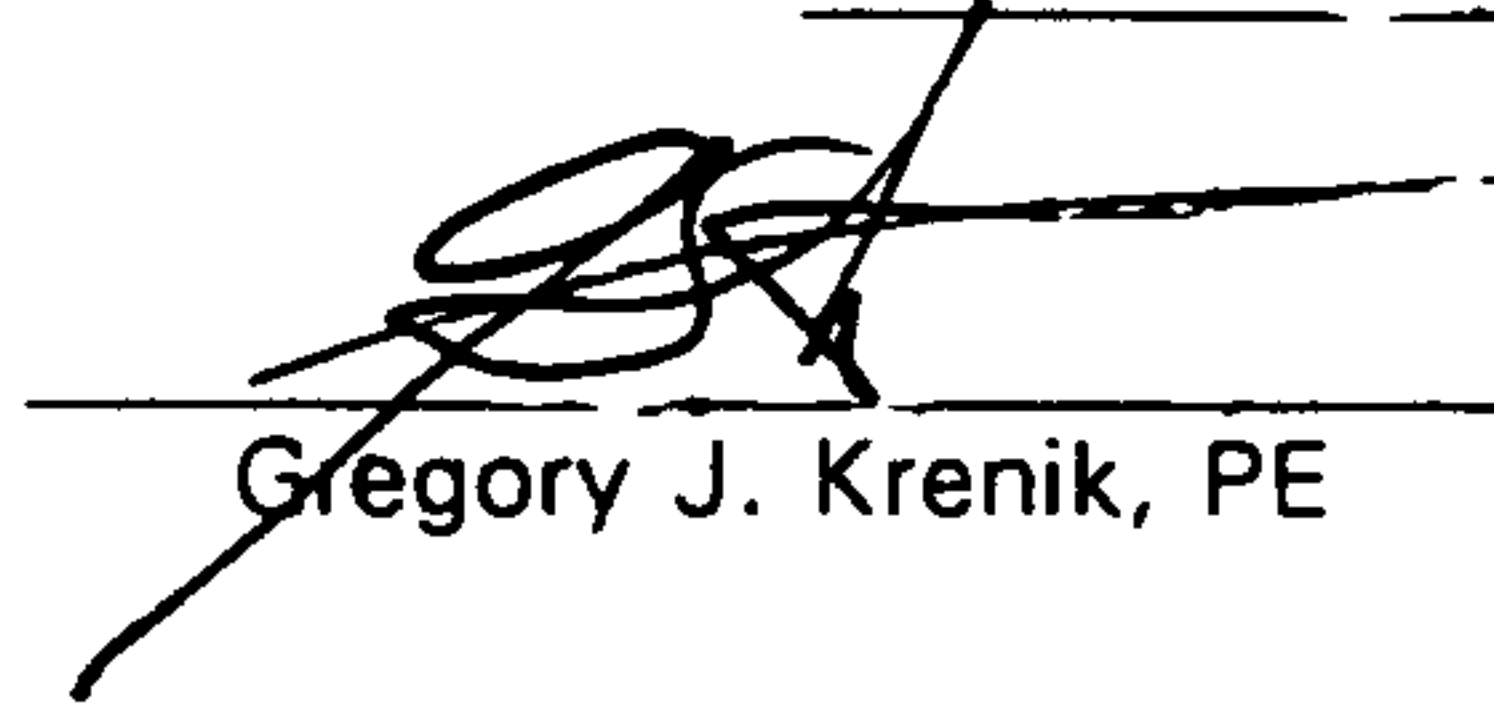
### PRE-DESIGN MEETING:

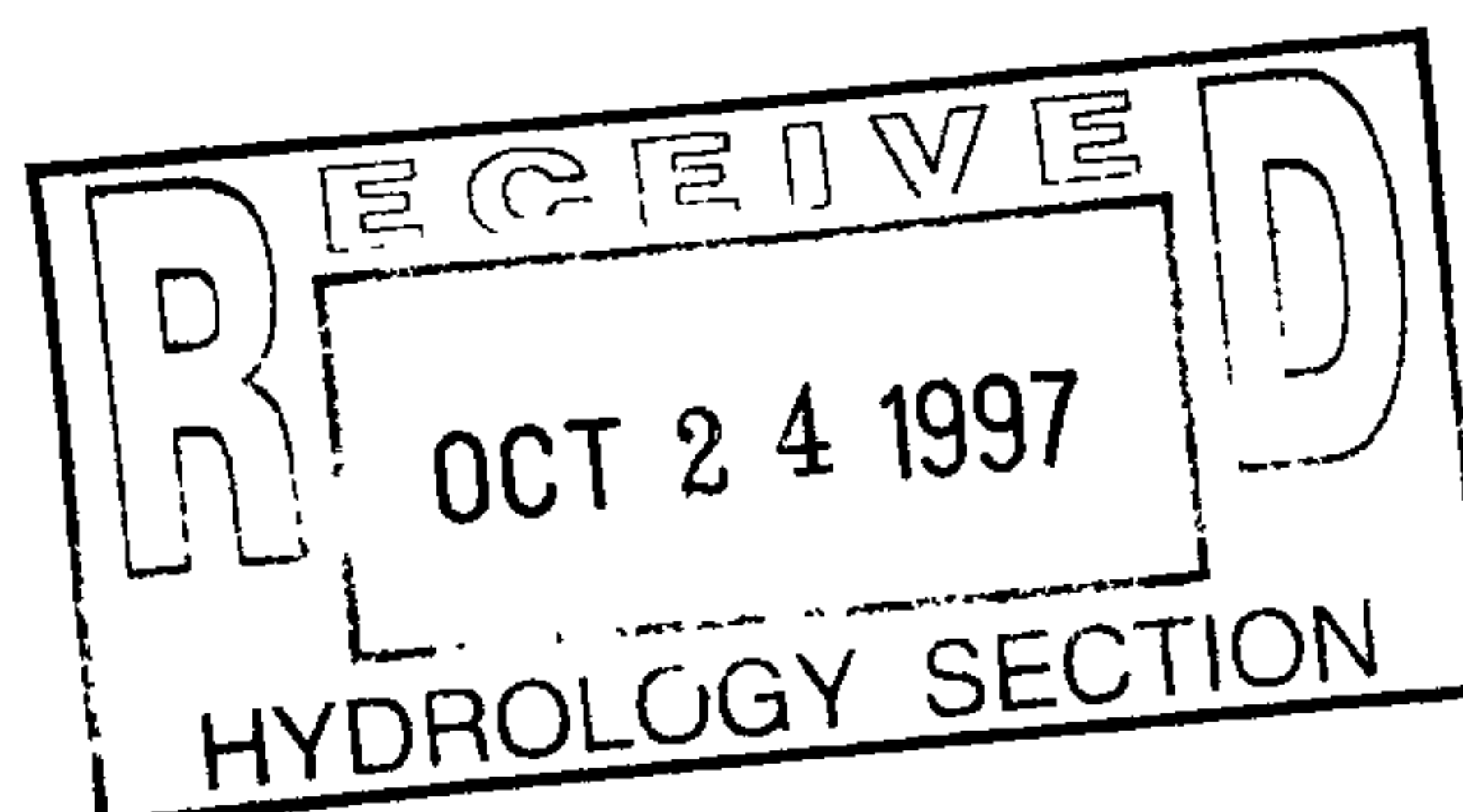
☐ YES  
☐ NO  
☐ COPY PROVIDED

### CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL  
☐ PRELIMINARY PLAT APPROVAL  
☐ S. DEV. PLAN FOR SUB'D APPROVAL  
☐ S. DEV. PLAN FOR BLDG PERMIT APPROVAL  
☐ SECTOR PLAN APPROVAL  
☐ FINAL PLAT APPROVAL  
☐ FOUNDATION PERMIT APPROVAL  
☒ BUILDING PERMIT APPROVAL  
☐ CERTIFICATION OF OCCUPANCY APPROVAL  
☒ GRADING PERMIT APPROVAL  
☐ PAVING PERMIT APPROVAL  
☐ S.A.D. DRAINAGE REPORT  
☐ DRAINAGE REQUIREMENTS  
☒ OTHER ROUGH GRADING (Specify)  
APPROVAL

DATE SUBMITTED: 10-22-97

BY:   
Gregory J. Krenik, PE



# County of Bernalillo

State of New Mexico

**BOARD OF COUNTY COMMISSIONERS**

TOM RUTHERFORD, CHAIR  
DISTRICT 3  
BARBARA J. SEWARD, VICE CHAIR  
DISTRICT 4  
KEN SANCHEZ, MEMBER  
DISTRICT 1  
STEVE D. GALLEGOS, MEMBER  
DISTRICT 2  
LES HOUSTON, MEMBER  
DISTRICT 5  
JUAN R. VIGIL, COUNTY MANAGER



2400 BROADWAY, S.E.  
ALBUQUERQUE, NEW MEXICO 87102  
PUBLIC WORKS (505) 848-1500

DAVID K. ANDERSON, ASSESSOR  
JUDY D. WOODWARD, CLERK  
THOMAS J. MESSALL, PROBATE JUDGE  
JOE BOWDICH, SHERIFF  
ORLANDO VIGIL, TREASURER

November 17, 1997

Gregory J. Krenik, P.E.  
Mark Goodwin & Associates  
P. O. Box 90606  
Albuquerque, New Mexico 87199

**RE: Drainage Report and Grading and Drainage Plan for New Mexico Motor Speedway (P2/D1)  
(PWD-97-114) Submitted for Building Permit and Rough Grading Approval, Engineer's  
Stamp Dated 10/21/97.**

Dear Mr. Krenik:

This letter is a compilation of comments from myself as well as from County Public Works. Prior to approval for Building Permit or Rough Grading, the following comments must be addressed:

1. Typically, grading or channel improvements are not allowed within a floodplain unless it can be demonstrated that the runoff exits the improved area in the same manner as it did in the existing condition, i.e., with the same velocity and at the same depth. Your HEC-RAS analysis failed to show this. Please provide cross-sections downstream, or provide mitigative measures to show that the improvements do not adversely impact properties downstream.
2. It appears that our previous comment about possible erosion problems occurring on the north side of the site was not addressed.

If you should have any questions regarding these comments, you may contact Brad Catanach at the County or call me at 924-3982.

Sincerely,

A handwritten signature in cursive script, reading "Susan Calongne".

Susan M. Calongne, P.E.  
City/County Floodplain Administrator

c: Brad Catanach, Bernalillo County Public Works Division  
File

# LETTER OF TRANSMITTAL



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers & Surveyors

P.O. BOX 90606, ALBUQUERQUE, NM 87199  
(505) 828-2200

TO

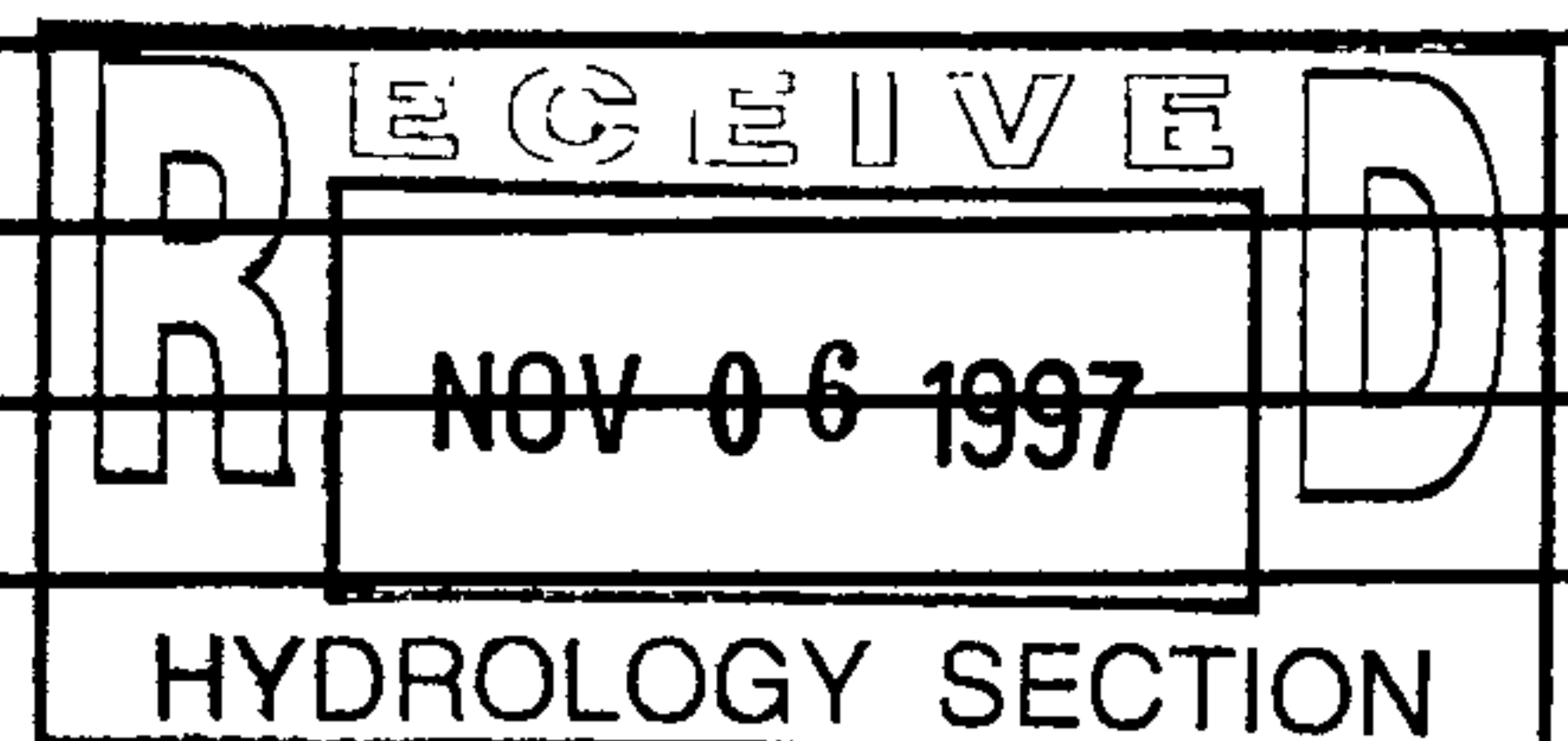
Susan Cologne  
One Stop

|                                      |         |
|--------------------------------------|---------|
| DATE <u>11-6-97</u>                  | JOB NO. |
| ATTENTION                            |         |
| RE: <u>New Mexico Motor Speedway</u> |         |
|                                      |         |
|                                      |         |
|                                      |         |
|                                      |         |
|                                      |         |

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via \_\_\_\_\_ the following items:

- |                                                    |                                       |                                |                                  |                                         |
|----------------------------------------------------|---------------------------------------|--------------------------------|----------------------------------|-----------------------------------------|
| <input type="checkbox"/> Shop drawings             | <input type="checkbox"/> Prints       | <input type="checkbox"/> Plans | <input type="checkbox"/> Samples | <input type="checkbox"/> Specifications |
| <input checked="" type="checkbox"/> Copy of letter | <input type="checkbox"/> Change order | <input type="checkbox"/> _____ |                                  |                                         |

| COPIES | DATE | NO. | DESCRIPTION            |
|--------|------|-----|------------------------|
| 1      |      |     | Corp of Engineers Lett |
|        |      |     |                        |
|        |      |     |                        |
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THESE ARE TRANSMITTED as checked below:

- |                                                                                                                |                                                   |                                                               |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------|
| <input type="checkbox"/> For approval                                                                          | <input type="checkbox"/> Approved as submitted    | <input type="checkbox"/> Resubmit _____ copies for approval   |
| <input checked="" type="checkbox"/> For your use                                                               | <input type="checkbox"/> Approved as noted        | <input type="checkbox"/> Submit _____ copies for distribution |
| <input type="checkbox"/> As requested                                                                          | <input type="checkbox"/> Returned for corrections | <input type="checkbox"/> Return _____ corrected prints        |
| <input type="checkbox"/> For review and comment                                                                | <input type="checkbox"/> _____                    |                                                               |
| <input type="checkbox"/> FOR BIDS DUE _____ 19 _____ <input type="checkbox"/> PRINTS RETURNED AFTER LOAN TO US |                                                   |                                                               |

REMARKS

Please add this to your file for  
the speedway and mention it Friday  
with your meeting w/ Roger & Brad.

I'm sending it to you since it was your  
request or comment that we might need this.

COPY TO \_\_\_\_\_

SIGNED:

Gregory S. Krenik



**DEPARTMENT OF THE ARMY**  
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS  
4101 JEFFERSON PLAZA NE  
ALBUQUERQUE, NEW MEXICO 87109-3435  
FAX (505) 342-3498

November 4, 1997

REPLY TO  
ATTENTION OF:

Operations Division  
Regulatory Branch

Mr. Gregory J. Krenik  
Vice President  
D. Mark Goodwin & Associates, P.A.  
P.O. Box 90606  
Albuquerque, New Mexico 87199-0606

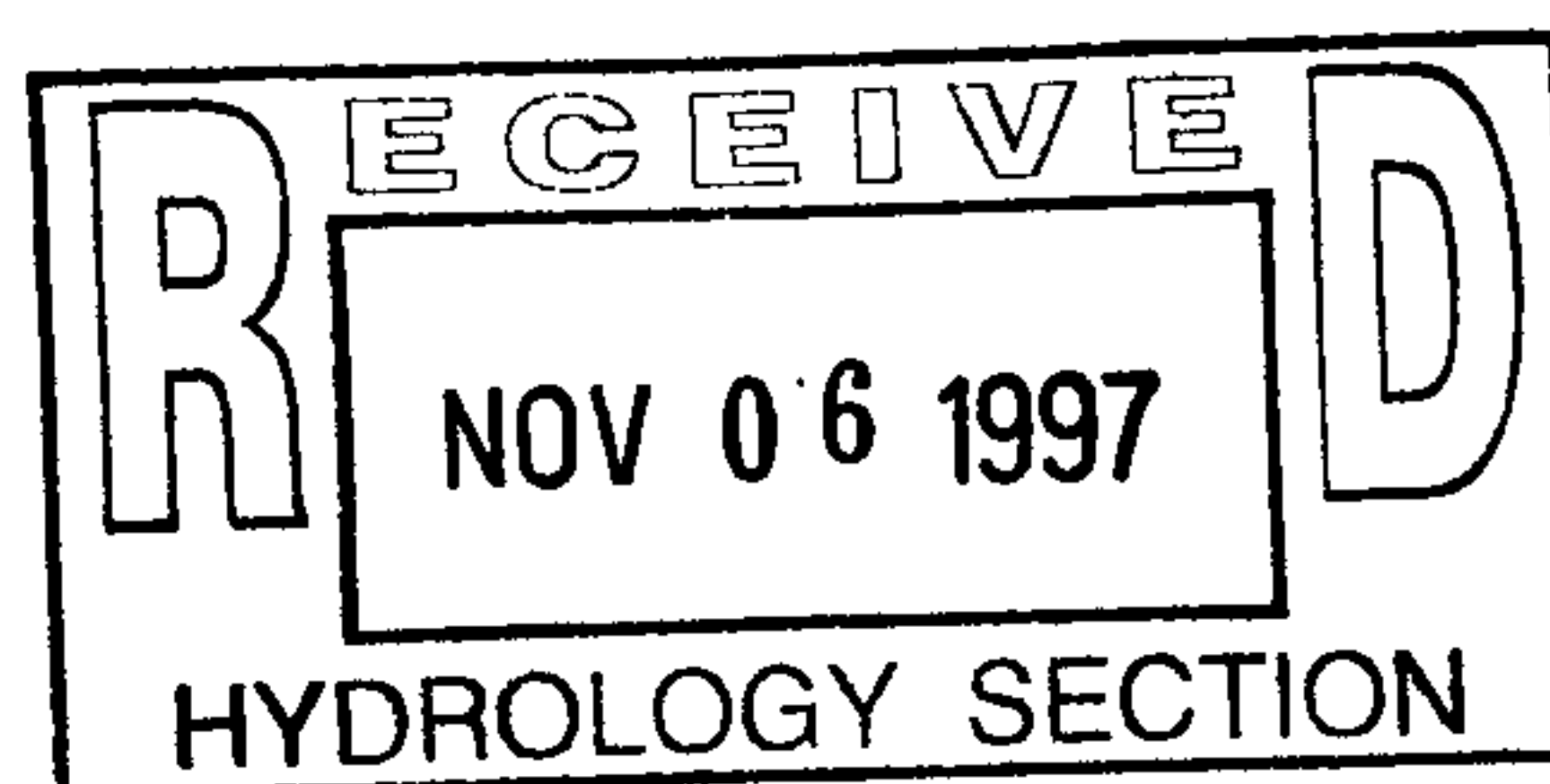
Dear Mr. Krenik:

We received your application dated October 27, 1997, regarding the realignment of the Canada del Ojo around the northeast corner of the proposed New Mexico Motor Speedway near Albuquerque, Bernalillo County, New Mexico, Action No. 1997 00280. After reviewing the project initially, we had told you that the proposed work would require an individual Section 404 permit.

I subsequently visited the site of the proposed work on October 31, 1997. Based on my observations at the site, I have determined that the proposed work will affect approximately 0.5 acres of waters of the United States. Since the proposed work affects between 1/3 and one acre of waters of the United States, we are proceeding with the 45-day, Corps-Only notification procedure required under Section 404 Nationwide Permit No. 26.

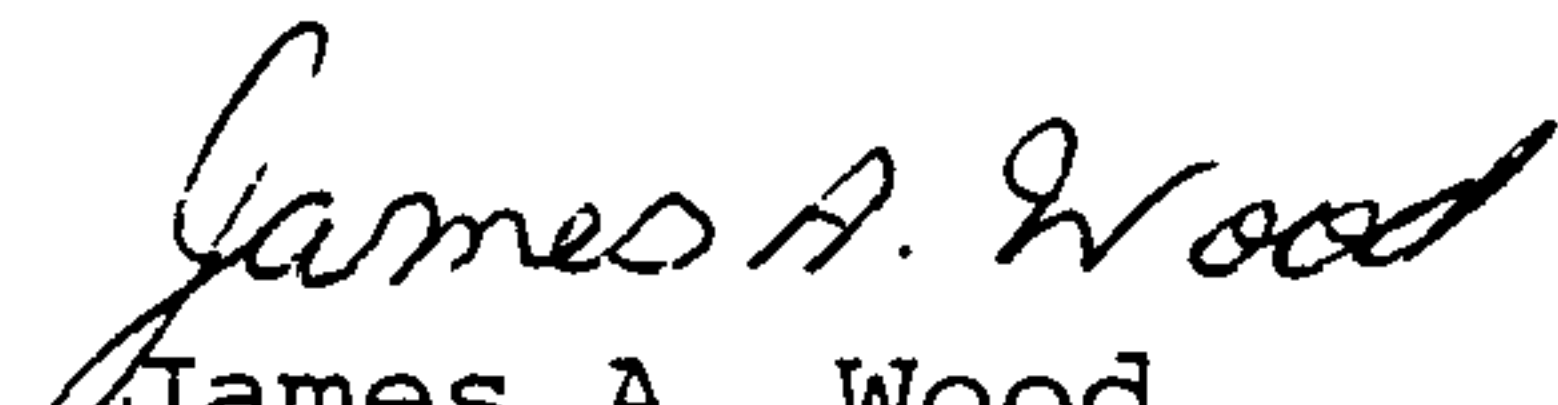
If you do not hear from us by the close of business on December 15, 1997, you are authorized to proceed with the proposed work under Nationwide Permit No. 26. A copy of the Nationwide Permit No. 26 is enclosed for your information.

We will notify you prior to that date if any special conditions will be imposed or if an individual permit will still be required. You are reminded that it is unlawful to discharge dredged or fill material into waters of the United States before December 15, 1997, or before you receive notice from us that you can proceed under the nationwide permit.



If you have any questions regarding these regulations, please feel free to write or call me at (505) 342-3280.

Sincerely,

  
James A. Wood  
Regulatory Project Manager

Enclosure

Copy furnished:

New Mexico Motor Speedway  
330 Washington Street NE  
Albuquerque, NM 87108



U.S. Army Corps  
of Engineers  
Albuquerque District

# Nationwide Permit Summary

## HEADWATERS AND ISOLATED WATERS DISCHARGES (NWP Final Notice, 61 FR 65916, para. 26)

Discharges of dredged or fill material into headwaters and isolated waters provided that the activity meets all of the following criteria:

- a. The discharge does not cause the loss of more than 3 acres of waters of the United States nor cause the loss of waters of the United States for a distance greater than 500 linear feet of the stream bed;
- b. For discharges causing the loss of greater than 1/3 acre of waters of the United States, the permittee notifies the District Engineer in accordance with the "Notification" general condition;
- c. For discharges causing a loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the information listed below;
- d. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands (Also see 33 CFR 330.1(e)); and
- e. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project. Note, this NWP will expire on December 13, 1998.

For the purposes of this NWP, the acreage of loss of waters of the United States includes the filled area plus waters of the United States that are adversely affected by flooding, excavation or drainage as a result of the project. The 3 acre and 1/3 acre limits of NWP 26 are absolute, and cannot be increased by any mitigation plan offered by the applicant or required by the District Engineer. Whenever any other NWP is used in conjunction with this NWP, the total acreage of impacts to waters of the United States of all NWPs combined, can not exceed 3 acres.

**Subdivisions:** For any real estate subdivision created or subdivided after October 5, 1984, a notification pursuant to subsection (b) of this NWP is required for any discharge which would cause the aggregate total loss of waters of the United States for the entire subdivision to exceed 1/3 acre. Any discharge in any real estate subdivision which would cause the aggregate total loss of waters of the United States in the subdivision to exceed 3 acres is not authorized by this NWP; unless the District Engineer exempts a particular subdivision or parcel by making a written

determination that: (1) The individual and cumulative adverse environmental effects would be minimal and the property owner had, after October 5, 1984, but prior to February 11, 1997, committed substantial resources in reliance on NWP 26 with regard to a subdivision, in circumstances where it would be inequitable to frustrate the property owner's investment-backed expectations, or (2) that the individual and cumulative adverse environmental effects would be minimal, high quality wetlands would not be adversely affected, and there would be an overall benefit to the aquatic environment. Once the exemption is established for a subdivision, subsequent lot development by individual property owners may proceed using NWP 26. For purposes of NWP 26, the term "real estate subdivision" shall be interpreted to include circumstances where a landowner or developer divides a tract of land into smaller parcels for the purpose of selling, conveying, transferring, leasing, or developing said parcels. This would include the entire area of a residential, commercial or other real estate subdivision, including all parcels and parts thereof.

**Report:** For discharges causing the loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the following information:

- (a) Name, address, and telephone number of the permittee;
- (b) Location of the work;
- (c) Description of the work; and,
- (d) Type and acreage (or square feet) of the loss of waters of the United States (e.g., 1/10 acre of marsh and 50 Square feet of a stream.) (Section 404)

## NATIONWIDE PERMIT CONDITIONS

General Conditions: The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. **Navigation.** No activity may cause more than a minimal adverse effect on navigation.
2. **Proper Maintenance.** Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.
3. **Erosion and Siltation Controls.** Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.
4. **Aquatic Life Movements.** No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody,

including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

**5. Equipment.** Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

**6. Regional and Case-by-Case Conditions.** The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its section 401 water quality certification. **Note:** To date, one regional condition has been added to this permit (see condition #3, Section 404 only conditions).

**7. Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

**8. Tribal Rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

**9. Water Quality Certification.** In certain states, an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)). **Note for work in Albuquerque District:** Required water quality certification for non-tribal lands in Colorado was issued by the State of Colorado. The State of New Mexico, State of Texas, EPA Region 8, EPA Region 6, and tribal certifying authorities have variously issued, conditionally issued, or denied water quality certification for this nationwide permit. An information summary sheet is enclosed. You must insure compliance with the applicable water quality certification requirements for your project.

**10. Coastal Zone Management.** In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)). **Note:** Not applicable in Albuquerque District.

## **11. Endangered Species.**

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

(b) Authorization of an activity by a nationwide permit does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world wide web pages at <http://www.fws.gov/~r9endspp/endspp.html> and [http://kingfish.ssp.mnfs.gov/tmcintyr/prot\\_res.html](http://kingfish.ssp.mnfs.gov/tmcintyr/prot_res.html) respectively.

**12. Historic Properties.** No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR part 325, appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

## **13. Notification:**

(a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Pre-Construction Notification (PCN) as early as possible and shall not begin the activity:

(1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified by the District or Division Engineer that an individual permit is required; or

(3) Unless 30 days (or 45 days for NWP 26 only) have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) **Contents of Notification.** The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and

(4) For NWPs 14, 18, 21, 26, 29, 34, and 38, the PCN must also include a delineation of affected special aquatic sites, including wetlands (see paragraph 13(f));

(5) For NWP 21--Surface Coal Mining Activities, the PCN must include an OSM or state approved mitigation plan.

(6) For NWP 29--Single-Family Housing, the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 0.5 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 0.5 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of

ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(7) For NWP 31--Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a Pre-Construction Notification (PCN) prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site.

(8) For NWP 33--Temporary Construction, Access, and Dewatering, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources.

(c) **Form of Notification.** The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(7) of General Condition 13. A letter may also be used.

(d) **District Engineer's Decision.** In reviewing the pre-construction notification for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the pre-construction notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, the District Engineer will notify the permittee and include any conditions the DE deems necessary.

Any mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the District Engineer will expeditiously review the proposed mitigation plan, but will not commence a second 30-day (or 45-day for NWP 26) notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal,

the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions.

(e) **Agency Coordination.** The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

[Note: Paragraphs (e)(i), (ii), (iii) of the NWP Final Notice (61 FR 65921) are deleted here for brevity. These paragraphs provide specifics regarding the Corps' internal coordination with agencies.]

(f) **Wetlands Delineations.** Wetland delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(6)(iii) for parcels less than 0.5 acres in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period (45 days for NWP 26) will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

(g) **Mitigation.** Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(i) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes;

(ii) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, "in lieu fees" to organizations such as The Nature Conservancy, state or county natural resource management agencies, where such fees contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not

limited to: Reducing the size of the project; establishing wetland or upland buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address wetland impacts, such as functions and values, and cannot be simply used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the NWPs (e.g., for NWP 26, 5 acres of wetlands cannot be created to change a 6-acre loss of wetlands to a 1 acre loss; however, 2 created acres can be used to reduce the impacts of a 3-acre loss.).

14. **Compliance Certification.** Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a. A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b. A statement that any required mitigation was completed in accordance with the permit conditions; c. The signature of the permittee certifying the completion of the work and mitigation.

15. **Multiple Use of Nationwide Permits.** In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the "Notification" General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.6(c) two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

Section 404 Only Conditions: In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in order for authorization by the NWPs to be valid:

1. **Water Supply Intakes.** No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. **Shellfish Production.** No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

**3. Suitable Material.** No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

**4. Mitigation.** Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

**5. Spawning Areas.** Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

**6. Obstruction of High Flows.** To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

**7. Adverse Effects From Impoundments.** If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

**8. Waterfowl Breeding Areas.** Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

**9. Removal of Temporary Fills.** Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

[Excerpted from the December 13, 1996 Federal Register, Final Notice of Issuance, Reissuance, and Modification of Nationwide Permits (61 FR 65874)].

#### CONDITIONS, LIMITATIONS, AND RESTRICTIONS (Information from 33 CFR 330.4)

**1. General.** A prospective permittee must satisfy all terms and conditions of an NWP for a valid authorization to occur. Some conditions identify a "threshold" that, if met, requires additional procedures or provisions contained in other paragraphs in this section. It is important to remember that the NWP's only authorize activities from the perspective of the Corps

regulatory authorities and that other Federal, state, and local permits, approvals, or authorizations may also be required.

#### 2. Further Information:

(a) District Engineers have authority to determine if an activity complies with the terms and conditions of a NWP.

(b) NWP's do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorization required by law.

(c) NWP's do not grant any property rights or exclusive privileges.

(d) NWP's do not authorize any injury to the property or rights of others.

(e) NWP's do not authorize interference with any existing or proposed Federal project.

#### ADDITIONAL INFORMATION

For additional information concerning the nationwide permits or for a written determination regarding a specific project, please contact the office below:

##### In New Mexico:

Chief, Regulatory Branch  
Albuquerque District, US Army Corps of Engineers  
4101 Jefferson Plaza, N.E., Room 313  
Albuquerque, NM 87109-3435  
Telephone: (505) 342-3283  
E-Mail: ceswa-od-r@usace.army.mil

##### In southeastern Colorado:

Southern Colorado Project Office  
720 North Main Street, Room 205  
Pueblo, Colorado 81003-3046  
Telephone: (719) 543-9459

##### In southern New Mexico and western Texas:

El Paso Regulatory Office  
P.O. Box 6096  
Ft. Bliss, Texas 79906-0096  
Telephone: (915) 568-1359

Information about the U.S. Army Corps of Engineers regulatory program, including nationwide permits, may also be accessed on our Internet page:  
<http://www.swa.usace.army.mil/reg/>

This nationwide permit is effective February 11, 1997 and expires on December 13, 1998, unless sooner modified, suspended, or revoked.

Summary Version: 2/20/97

**WATER QUALITY CERTIFICATION INFORMATION SUMMARY  
FOR NATIONWIDE PERMIT USE IN THE ALBUQUERQUE DISTRICT**

Section 401 water quality certification for nationwide permits (NWP) in the Albuquerque District has been variously issued, waived, denied, or conditioned by certifying agencies. Review the following list to determine the status of water quality certification for the type of NWP and area of use. This list is a summary of information received from the certifying agencies; the specific requirements are available in each agency's water quality certification. You must obtain any required individual water quality certification from the appropriate water quality certification authority for your project area prior to construction under the specified nationwide permits:

**State of Colorado.** Water quality certification for all nationwide permits is issued by State of Colorado statute.

**State of New Mexico.** Issued unconditional certification for NWPs 20, 22, 27, 30, 38, and "incidental" discharges under NWP 18 (e.g., *de minimus* discharges). Conditional certification is issued for NWPs 3-7, 12-19, 21, 23, 25-26, 28-29, 31-37, and 40. If your project is in or near a perennial surface water, perennial reach of an interrupted or intermittent surface water, or wetland greater than 1/3 acre, you must obtain individual water quality certification from the New Mexico Environment Department to use these conditionally certified NWPs. Any use of NWP 18 exceeding 1/10 cu yd will require an individual water quality certification. NWP 12 is further conditioned requiring all utility lines to be installed perpendicular or as close to perpendicular as possible to a channel to minimize disturbance; any crossing of wetlands or streams must be justified and alternatives explored to avoid construction or maintenance in waters of the State; and the project must be restored to pre-construction contours and stabilized with native vegetation. Contact:

New Mexico Environment Department  
Surface Water Quality Bureau  
Harold Runnels Building, 1190 St. Francis Drive  
P.O. Box 26110  
Santa Fe, New Mexico 87502 Phone: (505) 827-0106

**State of Texas.** Issued conditional water quality certification (Standard Provisions) for all NWP use in Texas. Additional Conditions are included for NWPs 3, 7, 13, 16, 19, 26, 31, and 35. Copies of the conditions may be obtained from the Albuquerque District or from the Texas Natural Resource Conservation Commission. Contact:

Texas Natural Resource Conservation Commission  
P.O. Box 13087  
Austin, Texas 78711-3087 Phone: (512) 239-1000

**Pueblo of Sandia lands.** Requires individual water quality certification for use of any nationwide permit on tribal lands. Contact:

Environmental Director  
Pueblo of Sandia  
Box 6008  
Bernalillo, New Mexico 87004 Phone: (505) 867-4533

**Santa Clara Pueblo lands.** Water quality certification is denied without prejudice for NWPs 6-7, 12-14, 18-19, 23, 25-26, 29, 30, 33, 36, and 40. You must obtain an individual water quality certification for your project to use these NWPs on Pueblo lands. Contact:

Santa Clara Pueblo - Office of Environmental Affairs  
Surface Water Division  
P.O. Box 580  
Española, New Mexico 87532 Phone: (505) 753-7326, ext. 232

**Picuris Pueblo lands.** Requires individual water quality certification for use of any nationwide permit on Pueblo lands. Contact:

Environment Department  
Picuris Pueblo  
P.O. Box 127  
Penasco, New Mexico 87553 Phone: (505) 587-2519

**San Juan Pueblo lands.** Requires individual water quality certification for use of any nationwide permit on Pueblo lands. Contact:

Office of Environmental Affairs  
San Juan Pueblo  
P.O. Box 1099  
San Juan Pueblo, New Mexico 87566 Phone: (505) 852-4212

**Pueblo of Isleta lands.** Water quality certification for all NWPs is denied. You must obtain an individual water quality certification to use any NWP on Pueblo lands. Contact:

Water Quality Program  
Pueblo of Isleta  
P.O. Box 1270  
Isleta, New Mexico 87022 Phone: (505) 869-2710

**Nambe Pueblo lands.** Water quality certification for all NWPs is denied. You must obtain an individual water quality certification to use any NWP on Pueblo lands. Contact:

Nambe Pueblo Department of Environment and Natural Resources  
Route 1, P.O. Box 117BB  
Nambe Pueblo, New Mexico 87501 Phone: (505) 455-2036

**Pojoaque Pueblo lands.** No certification information received. The Corps of Engineers considers that water quality certification is waived for NWP use on Pojoaque Pueblo lands; however, you must contact the Pueblo prior to conducting work on Pueblo lands. Contact:

Environmental Officer  
Pojoaque Pueblo  
Route 11, Box 71  
Santa Fe, New Mexico 87501 Phone: (505) 455-3383

**Tribal lands in Colorado, certifying agency: EPA, Region 8** (Note: EPA certifies projects on tribal lands in Colorado where the tribe does not have water quality certifying authority). EPA waived certification of NWPs 3-6, 14-15, 19-23, 25, 27, 29-30, 32, 34, 36-38, and 40. EPA, Region 8, has denied certification of NWPs 7, 12-13, 16-18, 26, 31, and 33. Individual water quality certification for use of these NWPs must be obtained from the EPA, Region 8. Contact:

U.S. Environmental Protection Agency, Region 8  
Ecosystems Protection Program  
999 18th Street, Suite 500  
Denver, Colorado 80202-2466 Phone: (303) 312-6192

**Tribal lands in New Mexico, certifying agency: EPA, Region 6** (Note: EPA certifies projects on tribal lands in New Mexico where the tribe does not have water quality certifying authority). Issued water quality certification for NWPs 3-4, 6-7, 13-18, 20-21, 23, 27, 30-32, 35-38, and 40. Water quality certification is denied without prejudice for all activities under NWPs 12, 25-26, and 29. Certification is denied for sand and gravel dredging, mining, and excavation under NWP 19. In addition, certification is denied under NWP 33 for activities resulting in the temporary loss of more than 1 acre of special aquatic sites, including wetlands. You must obtain individual water quality certification to use any NWP where water quality certification is denied without prejudice. Contact:

U.S. Environmental Protection Agency, Region 6  
Ecosystems Protection Branch  
1445 Ross Avenue, Suite 1200  
Dallas, Texas 75202-2733 Phone: (214) 665-6694

**Navajo Nation, certifying agency: EPA, Region 9.** Water quality certification for all NWPs is denied without prejudice. You must obtain an individual water quality certification to use any NWP on Navajo Nation lands. Contact:

U.S. Environmental Protection Agency, Region 9  
Water Division  
75 Hawthorne Street  
San Francisco, California 94105-3901 Phone: (415) 744-1967

**General Information** regarding Section 401 water quality certification and Section 404 permit requirements may be obtained from:

Chief, Regulatory Branch  
Albuquerque District, U.S. Army Corps of Engineers  
4101 Jefferson Plaza, NE, Room 302  
Albuquerque, New Mexico 87109-3435  
Phone: (505) 342-3283

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WQ Summary Version: 4/15/97

# County of Bernalillo

State of New Mexico

**BOARD OF COUNTY COMMISSIONERS**

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DISTRICT 4  
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DISTRICT 1  
**STEVE D. GALLEGOS, MEMBER**  
DISTRICT 2  
**LES HOUSTON, MEMBER**  
DISTRICT 5  
**JUAN R. VIGIL, COUNTY MANAGER**



2400 BROADWAY, S.E.  
ALBUQUERQUE, NEW MEXICO 87102  
PUBLIC WORKS (505) 848-1500

**DAVID K. ANDERSON, ASSESSOR**  
**JUDY D. WOODWARD, CLERK**  
**THOMAS J. MESCALL, PROBATE JUDGE**  
**JOE BOWDICH, SHERIFF**  
**ORLANDO VIGIL, TREASURER**

August 26, 1997

Gregory J. Krenik, P.E.  
Mark Goodwin & Associates  
P. O. Box 90606  
Albuquerque, New Mexico 87199

**RE: Drainage Report and Grading and Drainage Plan for New Mexico Motor Speedway  
(P2/D1) (PWD-97-114) Submitted for Conceptual Approval and Rough Grading  
Approval, Engineer's Stamp Dated 8/15/97.**

Dear Mr. Krenik:

Based on the information provided in the resubmittal of August 18, 1997, the above referenced Report and Grading and Drainage Plan are approved on a conceptual basis only.

No grading will be allowed until the detailed analysis is submitted to and approved by County Public Works and my office. All of our previous comments must be addressed.

Prior to construction within the arroyo, check with the Corps of Engineers to see if a 404 Permit is required. Please keep me apprised of this process.

If you should have any questions, you may contact Brad Catanach at the County or call me at 924-3982.

Sincerely,

A handwritten signature in cursive script, reading "Susan Calongne".

Susan M. Calongne, P.E.  
City/County Floodplain Administrator

c: Brad Catanach, Bernalillo County Public Works Division  
File ↑

# County of Bernalillo

State of New Mexico



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DAVID K. ANDERSON, ASSESSOR  
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THOMAS J. MESCALL, PROBATE JUDGE  
JOE BOWDICH, SHERIFF  
ORLANDO VIGIL, TREASURER

2400 BROADWAY, S.E.  
ALBUQUERQUE, NEW MEXICO 87102  
PUBLIC WORKS (505) 848-1500

August 28, 1997

Calvin Chavez, Assistant Chief  
Water Rights Division  
P.O. Box 25102  
Santa Fe, NM 87504

RE: NEW MEXICO MOTOR SPEEDWAY

Dear Mr. Chavez,

This letter is in reference to a phone conversation I had on August 22, 1997 with Ms. Elaine Pacheco, Design & Construction Section, about a letter, dated August 7, 1997 written by you to Mr. Gregory Krenik, Mark Goodwin & Assoc., pertaining to the New Mexico Motor Speedway Project. This project has two retention ponds that collect runoff from approximately 143 acres and are sized for a total volume of 30.8 acre-feet. The letter stated that since the project was not retaining waters from a designated watercourse, the project did not fall under Section 72-1-1 NMSA (1985 Repl. Pamp.). Bernalillo County Public Works Division wants a clarification for this project since those waters would have eventually made their way to a designated watercourse. Also, at what size of drainage basin would the State Engineer Office not allow retention of the runoff?

The retention ponds for the project are roughly 15.4 acre-feet which is the 100-year 10-day storm, they have an invert elevation of 5303 feet, water surface elevation of 5307.22 feet, and an existing grade elevation of 5314 feet. The ponds are in the middle of a one mile oval race track where the water surface elevation would have to exceed 5323 feet prior to the water exiting the race track area. With the above parameters for the ponds, is the State Engineer Design & Construction Section required to review and approve the ponds?

If you should have any questions regarding this project, please call me at 848-1515.

Sincerely

A handwritten signature in black ink, appearing to read "R. Paul", is written over the word "Sincerely".

Roger A. Paul, P.E.  
Development Review Section Manager

cc: Tom Turney, State Engineer  
Larry Ferns, State Engineer Design & Construction Section Manager  
Elaine Pacheco, State Engineer Design & Construction Section  
Susan Calongne, City/County Floodplain Administrator

# facsimile

TRANSMITTAL

---

to: **BRAD CATANACH**  
fax #: **848-1510**  
re: **NEW MEXICO MOTOR SPEEDWAY**  
date: **8-18-97**  
pages: **2**, including this cover sheet.

BRAD,

I believe this was left out of our resubmittal on Friday.

From the desk of...

**Gregory J. Krenik, PE**  
Vice President  
Mark Goodwin & Associates, PA  
P.O. Box 90606  
Albuquerque, NM 87199

(505) 828-2200  
Fax (505) 797-9539



STATE OF NEW MEXICO

STATE ENGINEER OFFICE  
SANTA FE

THOMAS C. TURNEY  
State Engineer

BATAAN MEMORIAL BUILDING, ROOM 101  
POST OFFICE BOX 25102  
SANTA FE, NEW MEXICO 87504-5102  
(505) 827-8175  
FAX: (505) 827-8188

August 7, 1997

Gregory J. Krenik, P.E.  
D. Mark Goodwin & Associates P.A.  
P.O. Box 90606  
Albuquerque, NM 87199

Dear Mr. Krenik:

On August 7, 1997 you inquired whether an application would be required from the State Engineer Office for the appropriation of water from the proposed New Mexico Motor Speedway. You explained that the appropriated waters would be waters captured from parking lots and race track and would not result from diversion of waters in existing natural drainages. All natural drainages would be routed around the perimeter of the parking lots and speedway. Appropriated waters from parking lots and race track would be stored in two ponds with an approximate surface area of 7.22 acres with a capacity of 36.8 acre-feet.

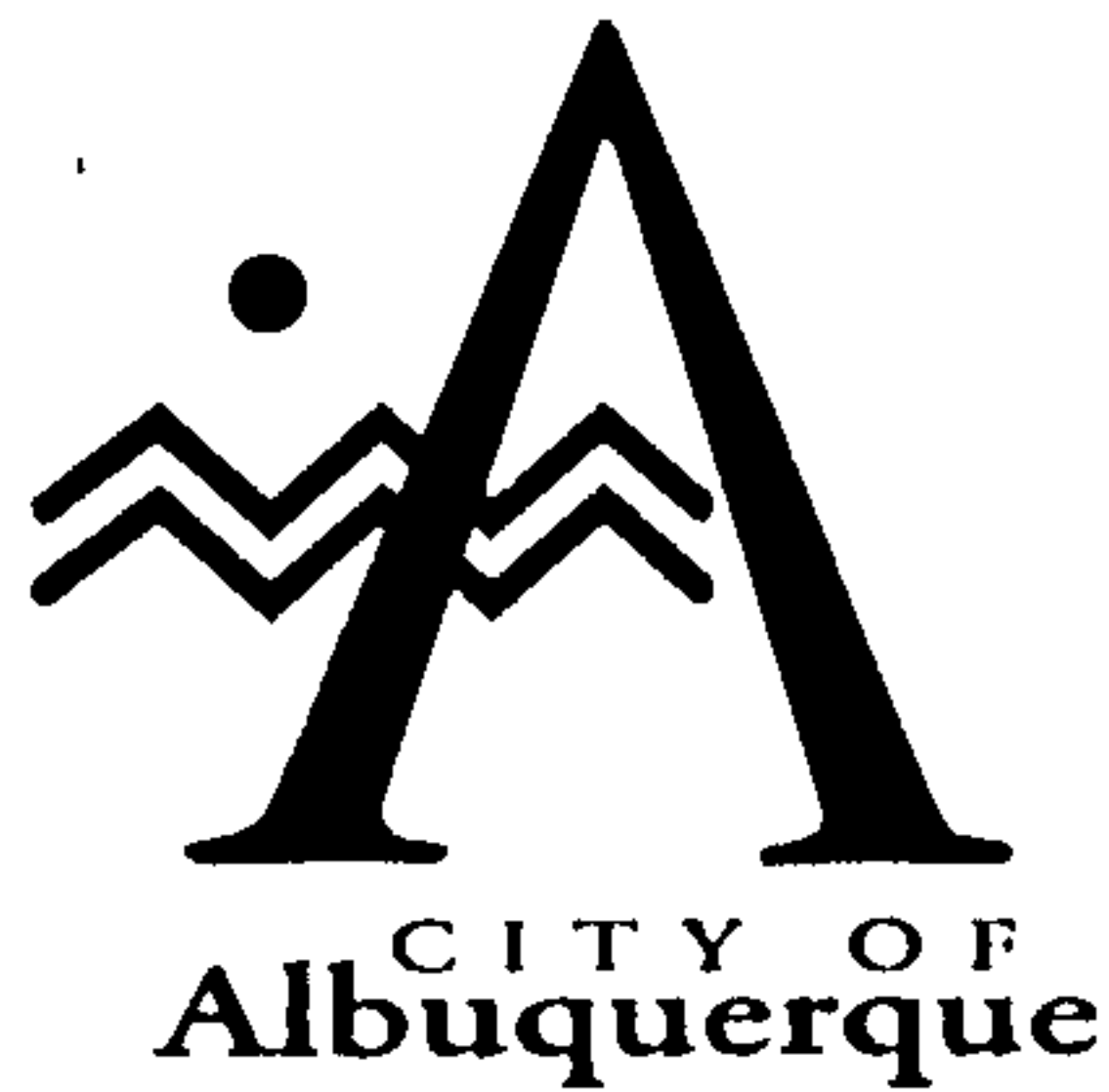
Section 72-1-1 NMSA (1985 Repl. Pamp.) states, "All natural waters flowing in streams and watercourses, whether such be perennial, or torrential, within the limits of the state of New Mexico, belong to the public and are subject to appropriation for beneficial use. A watercourse is hereby defined to be any river, creek, arroyo, canyon, draw or wash, or any other channel having definite banks and bed with visible evidence of the occasional flow of water." Since water is captured prior to entering a natural watercourse, the waters are not considered public waters and any appropriation of "private water" is outside the jurisdiction of the State Engineer.

If I can provide any further guidance or assistance, please let me know.

A handwritten signature in black ink, appearing to read "COG", with a long horizontal stroke extending to the right.

Calvin Chavez, Assistant Chief  
Water Rights Division

cc: Elaine Pacheco, Design & Construction Section  
SEO District I



July 18, 1997

Martin J. Chávez, Mayor

Gregory J. Krenik, P.E.  
Mark Goodwin & Associates  
P. O. Box 90606  
Albuquerque, New Mexico 87199

**RE: Drainage Report and Grading and Drainage Plan for New Mexico Motor Speedway (P2/D1) (PWD-97-114) Submitted for Site Development Plan for Building Permit Approval and Building Permit Approval, Engineer's Stamp Dated 6/23/97.**

Dear Mr. Krenik:

This letter is a compilation of comments from myself as well as from County Public Works. Although the drainage concepts presented in the above referenced report seem reasonable, the following comments must be addressed prior to approval:

1. Free discharge is proposed from this site. Please compare the existing condition runoff and volume calculations with developed flows to justify the free discharge.
2. The land treatments for the off-site basin have 0% D. Is it practical to assume that there will be no development within this basin?
3. It appears that the percentage of land treatment "B" for landscaping is too high for this site.
4. The AHYMO run does not reflect the paving in the parking lot in basin T1-C. The plans must clearly indicate which areas are to be paved.
- ✓ 5. The report states that a request will be made to FEMA for a Conditional Letter of Map Revision to show the proposed limits of the altered floodplain. After construction is complete, a Letter of Map Revision (LOMR) must be obtained from FEMA. The existing floodplain will not be revised until the LOMR is issued by FEMA. Financial Guarantees for this project will not be released until the LOMR is obtained from FEMA.
6. With respect to the floodplain, please show the proposed drainage easements and erosion setback (ESB) limits, and provide the ESB and scour depth calculations.

Good for You, Albuquerque!

P.O. Box 1293, Albuquerque, New Mexico 87103



July 18, 1997

7. Provide catch basin details prior to Building Permit release. Also, provide the culvert details and show erosion protection.
8. Are construction drawings required for this project?
9. Basin T1-F was labeled incorrectly on the map.
10. Provide the invert of the equilibrium pipes between the ponds.
11. How does the infield drain to the pond? Show the rundowns and emergency spillways for the ponds. How much volume is required for these ponds? Is the 100-year 10-day volume provided between elevations 5.0 and 7.77?
12. The report should contain a unifying discussion of this project. Please compare the existing vs. proposed flowrate, and discuss the pond volume.
13. Provide a HEC-RAS or HEC-2 analysis of the floodplain.
14. Show more detail on the Site Drainage Management Plan to show how the floodplain gets through the site. Show the proposed grading around the existing grade control berms.
15. Please revise your AHYMO analysis. The AHYMO run called out two ID=11 hydrographs, so one was written over. It appears that basin T2-G was not added into the model, and that basin T2-A was added twice. Basins T1-C and T1-E should have been added together before adding basin T1-D. Also, basin T2-A should be broken up into two basins, or the routing should be changed.

If you should have any questions regarding these comments, you may contact Brad Catanach at the County or call me at 924-3982.

Sincerely,



Susan M. Calongne, P.E.  
City/County Floodplain Administrator

c: Brad Catanach, Bernalillo County Public Works Division  
(File)

1. Do to pond sizes approval is needed from the State Engineer's Office.
2. At the points of release from the site, compare the existing vs. proposed released rates. Is downstream protection needed as a result of additional discharge from any one release point.
3. Change 608 ac. in text to 648 for onsite area.
4. The proposed discharge is 33 cfs over existing conditions.
5. The statement that there will be no offsite development is unrealistic since housing development is planned upstream.
6. In the area of the floodplain, the EGL and 100 year water elevation should be plotted on the plan.
7. HEC-RAS sections should extend past the 5x2.25 box culverts, until the water hits its natural course.
8. How far is the soil cement channel being extended.
9. What erosion problems may occur at the North side of the site.
10. Area T1-E may require more C treatment since the area is compacted gravel.



# "Conceptual?"

No AMAFCA

- ✓ 1. Offsite Basin - chance of being developed?
- ✓ 2. 128 cfs/acre ~~may be low~~
- ✓ 3. areas of Landscaping ("B") are high for on-site conditions.
- ✓ 4. Altmo does not reflect T1-C being paved parking
- \* 4. Free discharge to arroyo is proposed. Provide existing condition Altmo & Justify free discharge.
5. Along with CLOMR, provide easements, ESB, scour details, QOFFP.
6. Catch basin details
7. Box culvert & ~~catch~~ culvert details with erosion protection
8. Are Construction Drawings Required?
9. Basin T1-F improperly labeled on map
10. Invert of Equil. pipes between ponds
- ✓ 11. Run down for ponds, using spillways tie to 17.
12. Layout Show paving areas
13. HEC Ras of fp — <sup>15</sup> more detail on Site management plan
14. Grading @ Stock ponds (berms) to Show how fp gets through the site
16. Unifying discussion - exist vs proposed Q, vol?
- ✓ 17. how does infield drain to pond how much vol required?  
7.7 elev - is this → ponding 10-day? give is # for 10-day
- rect. channel page 18. ~~What keeps T1-C out of T1-B - doesn't it drain to oval?~~
19. break up T2A <sup>note</sup> for change routing
20. T1F LID = 11 twice in Altmo - lost one
21. [T2G not added note] ~~202 (ditch)~~

- 1 offsite fp
- 2 on site exist
- 3 T1-A - oval
- 4 T1-B to oval - parking lot?
- 5 3+4 = inside oval - ponds
- 6 OA-1 offsite
- 7 OA-2 ? to T2A —
- 8 T1-C (goes to T1E?)
- 9 T1-D (goes to T1F)
- 10 T1-E (goes around oval to fp)
- ~~11 T1-F (or T2-F on plan)~~ — did not count

11 T2-A (goes to T1-D) —

12 T2-B (to T2-A) —

13 T2-C (to T2-A)

14 T2-D (to T2-H) —

15 T2-E (to T2-D)

16 T2-F (to T2A)

17 T2G (to T2H)

18 T2H (to T2K)

19 T2I (out)

20 T2J (to T2K)

21 T2K (out)

22 6 + 11 OA-1 + T2-A

23 22 + 12 OA-1, T2-A, T2-B

24 23 + 13 OA-1, T2-A, T2-B, T2-C

25 24 + 16 " " " " , T2-F

26 25 + 9 OA1, T2A, T2B, T2C, T2F, T1D

27 26 + 8 OA1, T2A, T2B, T2C, T2F, T1D, T1C No

28 27 + 10 OA1, T2A, T2B, T2C, T2F, T1D, T1C, T1E

29 28 + 11 OA1, T2A, T2B, T2C, T2F, T1D, T1C, T1E, T2A (should be T1F)

$$30 = 14 + 15 \quad T2D + T2E$$

$$31 = 30 + 18 \quad T2D, T2E, T2H$$

$$32 = 31 + 19 \quad T2D, T2E, T2H, T2I$$

$$33 = 32 + 20 \quad T2D, T2E, T2H, T2I, T2J$$

$$34 = 33 + 21 \quad T2D, T2E, T2H, T2I, T2J, T2K$$

(Should add  
T1C + T1E)

# County of Bernalillo

State of New Mexico

## BOARD OF COUNTY COMMISSIONERS

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DISTRICT 3  
BARBARA J. SEWARD, VICE CHAIR  
DISTRICT 4  
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2400 BROADWAY, S.E.  
ALBUQUERQUE, NEW MEXICO 87102  
PUBLIC WORKS (505) 848-1500

DAVID K. ANDERSON, ASSESSOR  
JUDY D. WOODWARD, CLERK  
THOMAS J. MESCALL, PROBATE JUDGE  
JOE BOWDICH, SHERIFF  
ORLANDO VIGIL, TREASURER

August 6, 1997

Gregory J. Krenik, P.E.  
Mark Goodwin & Associates  
P. O. Box 90606  
Albuquerque, New Mexico 87199

**RE: Drainage Report and Grading and Drainage Plan for New Mexico Motor Speedway (P2/D1) (PWD-97-114) Submitted for Conceptual Approval and Rough Grading Approval, Engineer's Stamp Dated 7/31/97.**

Dear Mr. Krenik:

This letter is a compilation of comments from myself as well as from County Public Works. Prior to approval for the Special Use permit or Rough Grading approval, the following comments must be addressed:

1. Since the proposed ponds within the Oval are to be greater than 10 acre-feet, approval must be obtained from the State Engineer's Office.
2. This plan proposes to discharge is 33 cfs more than the existing runoff rate. Please compare the existing vs proposed release rates at each point of release from the site. Is downstream protection needed as a result of the additional discharge from any one release point?
3. Change 608 acres in the text to the 648 acres for the onsite area.
4. The statement that there will be no offsite development is unrealistic since a housing development is being planned upstream.
5. Please plot the EGL and the 100-year water surface limits calculated for the floodplain.
6. Please provide more HEC-RAS sections downstream to extend past the 5' x 2.25' box culverts to show how the water continues in its natural course.
7. How far is the soil cement channel being extended?

Gregory J. Krenik, P.E.  
page 2

August 6, 1997

8. What erosion problems may occur on the north side of the site?
9. Area T1-E may require more land treatment "C", since this area is compacted gravel.

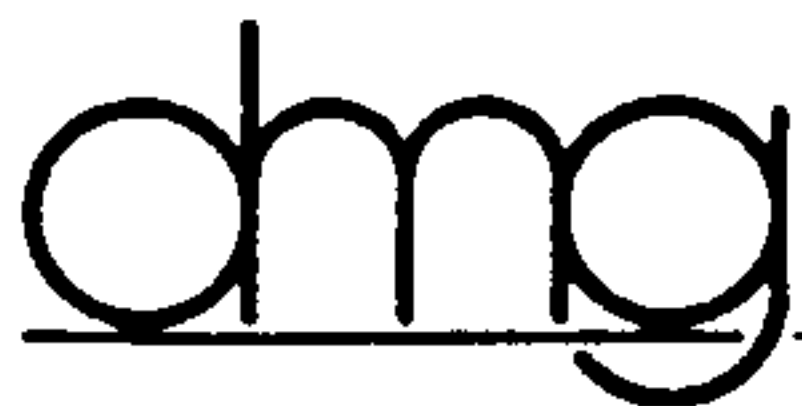
If you should have any questions regarding these comments, you may contact Brad Catanach at the County or call me at 924-3982.

Sincerely,



Susan M. Calongne, P.E.  
City/County Floodplain Administrator

c: Brad Catanach, Bernalillo County Public Works Division  
File J



D. Mark Goodwin & Associates, P.A.  
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199  
(505) 828-2200 FAX 797-9539  
e-mail: dmgs@swcp.com

\* Monday  
Show Bet plans

August 15, 1997

Ms. Susan M. Calongne, PE  
City/County Flood Plain Administrator  
City of Albuquerque  
PO Box 1293  
Albuquerque, NM 87103

**Re: New Mexico Motor Speedway**

Dear Ms. Calongne:

This letter is in response to your letter of August 6, 1997, and part of the resubmittal.

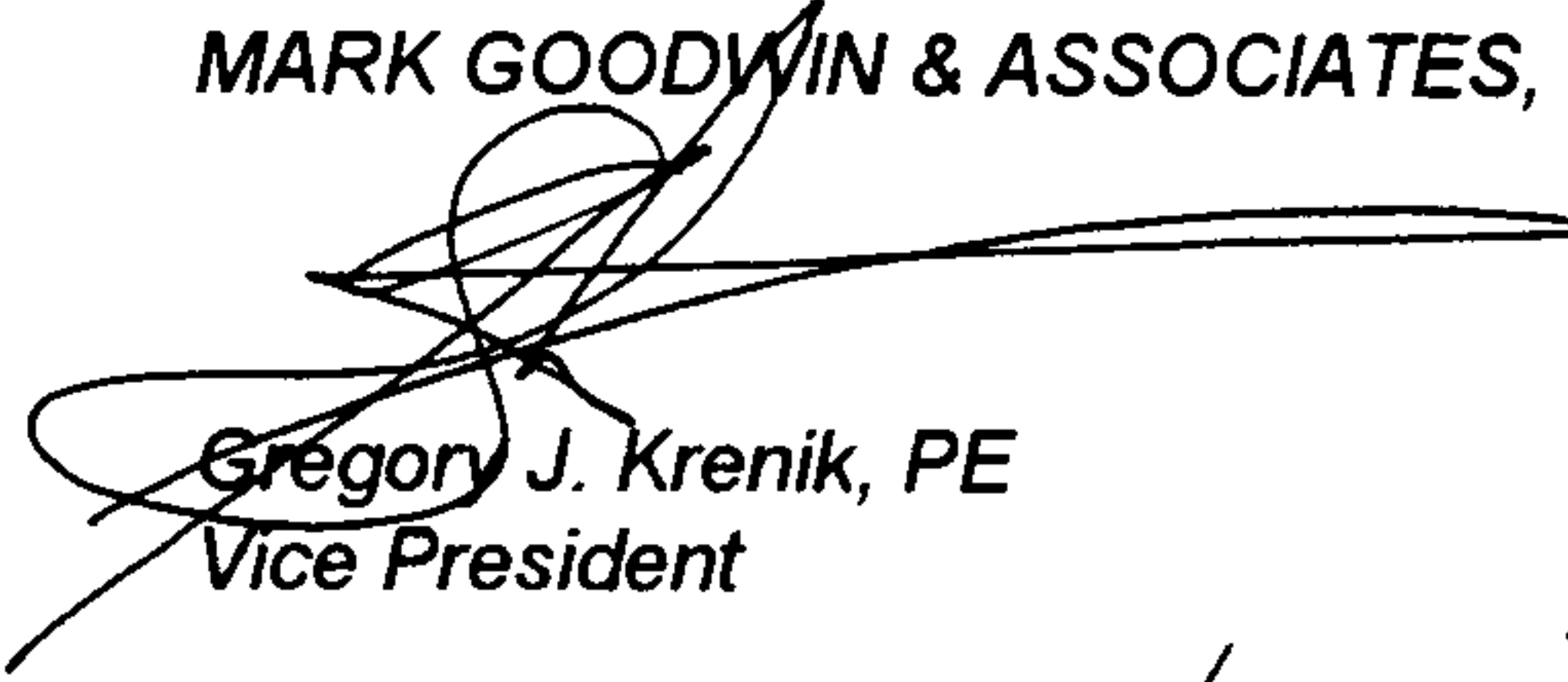
- 1) Please see attached letter from the State Engineer's office that states the project is outside their jurisdiction. *ok*
- 2) This is shown on sheets 28A and 31A of the calculations.
- 3) This has been done.
- did not address* (4) The housing development planned is one of our future phases and a flow from these will be restricted to existing runoff rates. Therefore, there will be no increase in the flows.
- 5) This is on sheets 10B+14B. Both the EGL and 100 year water surface is within the side slopes indicated. *218,*
- 6) Per telephone message from Brad Catanach on August 13, 1997, this item is not required at this time.
- 7) The soil cement channels extent is the berm along the east.
- 8) The roadway along the east and north will have a soil cement embankment to the point where the velocity of flow is below scour potential. This will be detail designed in our submittal for Building Permit in the near future.
- 9) This has been revised in the calculations.

Please contact our office if you have any questions.

Please feel free to contact our office if you have any questions.

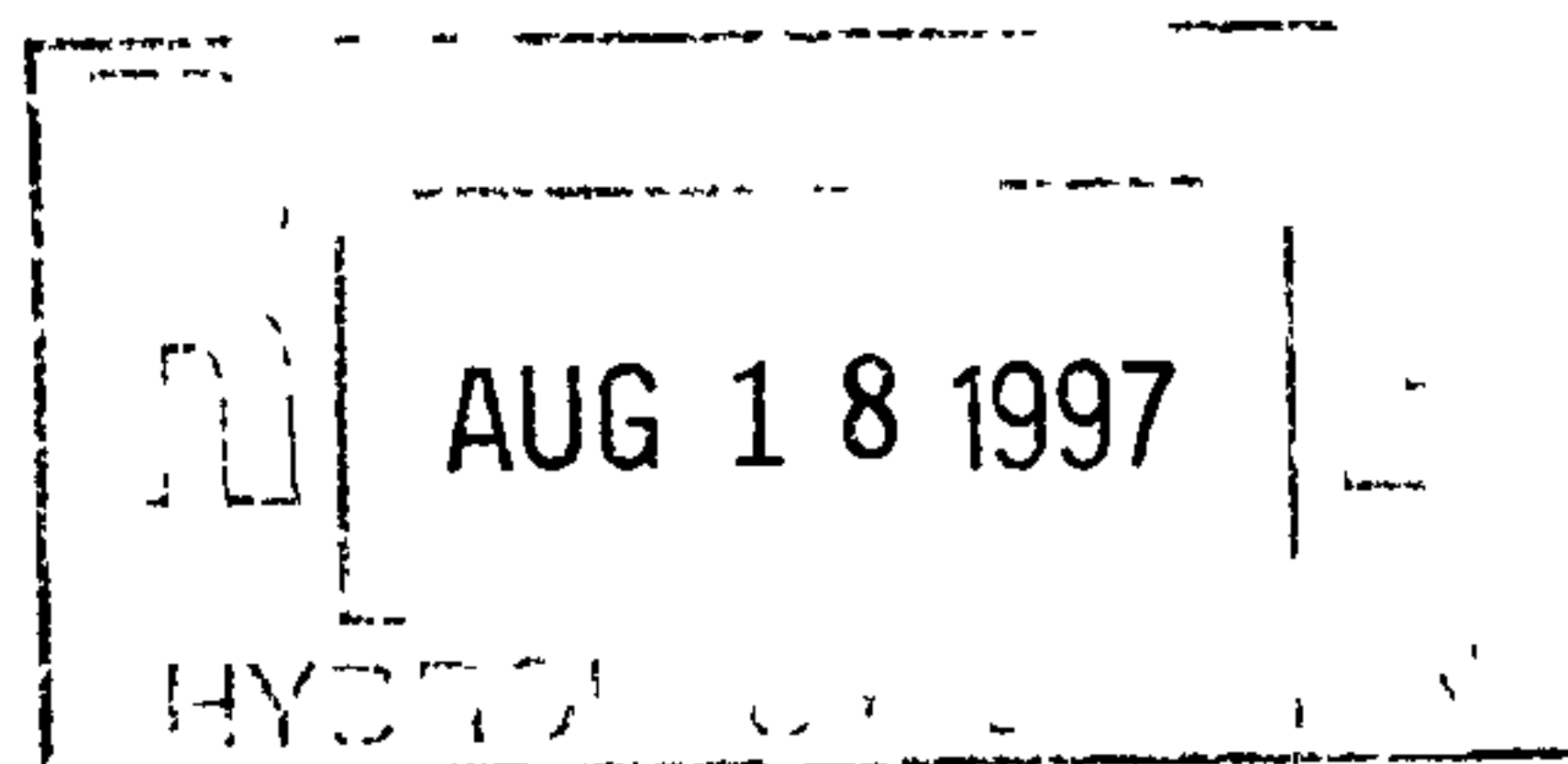
Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

  
Gregory J. Krenik, PE  
Vice President

GJK/sb

Attachments



*exist. permits in arroyo to be removed - Check w/ Corps  
regarding these - may need to be replaced.*

f:\speedway\comments no2

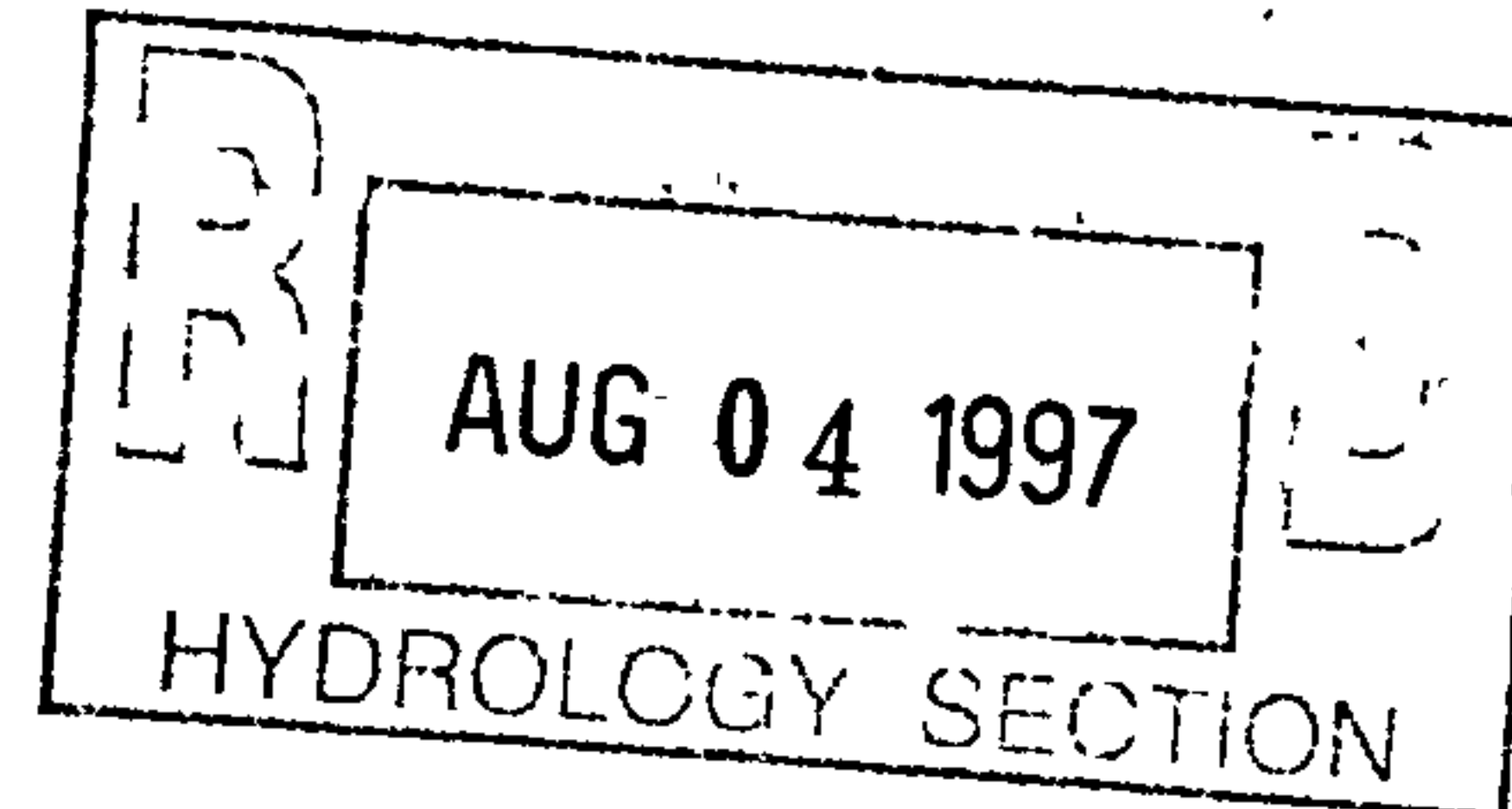


D. Mark Goodwin & Associates, P.A.  
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199  
(505) 828-2200 FAX 797-9539  
e-mail: dmgs@swcp.com

July 31, 1997

Ms. Susan M. Calongne, PE  
City/County Floodplain Administrator  
City of Albuquerque  
PO Box 1293  
Albuquerque, NM 87103



**Re: New Mexico Motor Speedway (P2/D1)(PWD 9-114)**

Dear Ms. Calongne:

*This letter is an itemized response to your letter of July 18, 1997, and part of the resubmittal. On July 29, I spoke with Brad Catanach and he told me we can address items 1, 2, 6, 12, 13 and 14 to obtain conceptual grading approval. After reviewing the list of comments, we will address all the comments except 5 and 7 and hopefully obtain Rough Grading approval. These items will be completed for building permit. Also, as part of the resubmittal, we will submit only the revised Site Drainage Management Plan.*

- 1) *This information is now in the calculations.*
- 2) *Yes, it is practical to assume there will be no development in the off-site basin because it is a flood zone and an arroyo, and due to the topography we find it very difficult to develop any portion except the end of the arroyo, which is our piece.*
- 3) *The percentages of "B" are not just for landscaping but also for slopes of 10-20% slopes and therefore are not too high for the site.*
- 4) *The only parking lot that is paved is the western lot. T1-C is paved. The other two parking lots are not paved but the drive isles are gravel and the parking area is native grasses.*
- 5) *We concur.*
- 6) *This has been shown in the calculations. Since we are showing scour protection the ESB is not necessary but the calculations show what the ESB would be.*
- 7) *The catch basin and culvert details will be included with our submittal for building permit.*
- 8) *Yes, construction drawings will be completed for the tracks and roadways.*
- 9) *This has been revised.*
- 10) *This has been included on the plans.*
- 11) *The infield drains overland to the ponds. I've added rundowns into the ponds. Since the ponds are so deep with regard to the outside of the site, there are no emergency spillways. If the ponds fill up, they will overflow and keeps filling up the interior of the track.*

*The 100 year - 10 day volume is provided in the ponds.*

- 12) *This has been done.*

Ms. Susan Calongne, PE  
City/County Floodplain Administrator  
July 31, 1997  
Page 2

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13) This has been done.

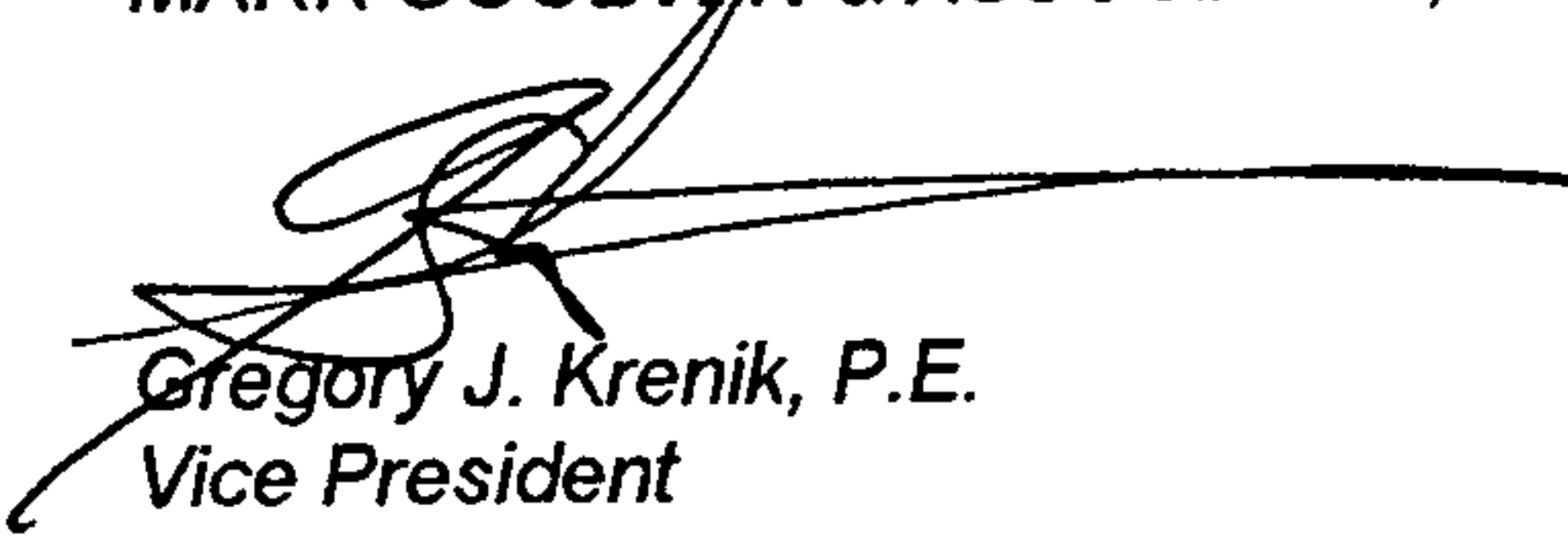
14) This has been done.

15) This all has been revised.

Please contact our office if you have any additional questions or comments.

Very Truly Yours,

MARK GOODWIN & ASSOCIATES, P.A.



Gregory J. Krenik, P.E.  
Vice President

GJK/sb

f:\speedway\comments.no1

# DRAINAGE INFORMATION SHEET

PROJECT TITLE: New Mexico Motor Speedway ZONE ATLAS/DRNG, FILE#: N-5-W  
DRB #: \_\_\_\_\_ EPC #: \_\_\_\_\_ WORK ORDER #: \_\_\_\_\_  
LEGAL DESCRIPTION: Tracts A & B, Plat of Midway Ranch, Sec. 5, T9N, R1W  
CITY ADDRESS: \_\_\_\_\_

ENGINEERING FIRM: Mark Goodwin & Associates, P.A. CONTACT: Gregory J. Krenik PE  
ADDRESS: P.O. Box 90606 ABQ, NM 87199 PHONE: (505) 828-2200  
OWNER: NM Motor Speedway, Inc. CONTACT: \_\_\_\_\_  
ADDRESS: 330 Washington SE ABQ, NM 87108 PHONE: \_\_\_\_\_  
ARCHITECT: Design Collaborative Southwest CONTACT: Dave Dekker  
ADDRESS: 105 4th Street SW ABQ, NM 87103 PHONE: 843-9639  
SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich  
ADDRESS: PO Box 30701 ABQ, NM 87190 PHONE: 884-1990  
CONTRACTOR: \_\_\_\_\_ CONTACT: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

## TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT  
☒ DRAINAGE PLAN  
☐ CONCEPTUAL GRADING & DRAINAGE PLAN  
☒ GRADING PLAN  
☐ EROSION CONTROL PLAN  
☐ ENGINEER'S CERTIFICATION  
☐ OTHER

## PRE-DESIGN MEETING:

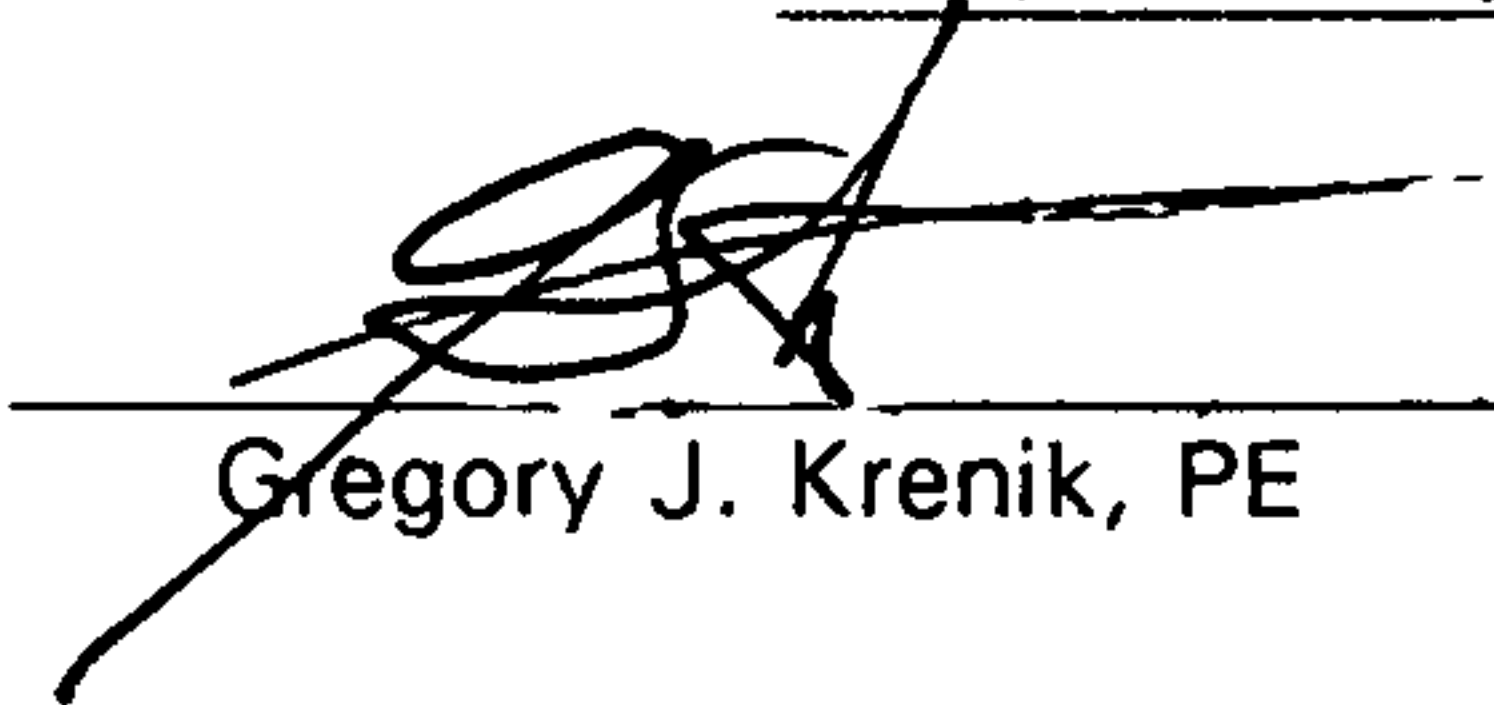
☐ YES  
☐ NO  
☐ COPY PROVIDED

## CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL  
☐ PRELIMINARY PLAT APPROVAL  
☐ S. DEV. PLAN FOR SUB'D APPROVAL  
☐ S. DEV. PLAN FOR BLDG PERMIT APPROVAL  
☐ SECTOR PLAN APPROVAL  
☐ FINAL PLAT APPROVAL  
☐ FOUNDATION PERMIT APPROVAL  
☐ BUILDING PERMIT APPROVAL  
☐ CERTIFICATION OF OCCUPANCY APPROVAL  
☒ GRADING PERMIT APPROVAL  
☐ PAVING PERMIT APPROVAL  
☐ S.A.D. DRAINAGE REPORT  
☐ DRAINAGE REQUIREMENTS  
☒ OTHER ROUGH GRADING (Specify)  
APPROVAL

☒ CONCEPTUAL GRADING + DRAINAGE  
APPROVAL for Special Use permit

DATE SUBMITTED: 7-31-97

BY:   
Gregory J. Krenik, PE

