City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 21, 2003

Rick Beltramo, PE
Bohannan Huston, Inc
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sunrise Ranch South Subdivision Engineer's Certification
Engineer's Stamp dated 8-12-02,
Certification dated 8-21-03 (L9/D30)

Dear Mr. Beltramo,

Based upon the information provided in your submittal dated 8-21-03, the above referenced Certification is acceptable for Release of SIA and Financial Guarantee.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building Services

C: Arlene Portillo, CPN# 695281
file

Bohannan ▲ Huston INC.

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335

www.bhinc.com

voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

August 21, 2003

Bradley Bingham, P.E.
Hydrology Division
City of Albuquerque
600 2nd Street NW
Albuquerque, NM 87102

Re: Grading and Drainage Certification
Sunrise Rancho South Subdivision, City Project No. 695281

Dear Mr. Bingham:

Enclosed for your review is the DRB approved grading plan with as-built elevations. The as-built survey was provided by Community Sciences Corporation. After reviewing these as-built elevations, it is my belief that the site has been graded in substantial compliance with the approved grading plan. Your review and approval is requested for SIA/financial guarantee release of the project.

I appreciate your time and consideration. If you have questions or require additional information, please contact me at 823-1000.

Sincerely,

Rick Beltramo, P.E.
Vice President, Community Development
and Planning Group

Enclosure

RECEIVED
AUG 21 RECD
DEVELOPMENT & BUILDING SERVICES

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(REV. 1/28/2003rd)

PROJECT TITLE: SUNRISE RANCH SOUTH ZONE MAP/DRG. FILE # L-9
DRB #: 1001625 EPC#: WORK ORDER#:

LEGAL DESCRIPTION: TRACTS 1B, 2, 3 AND A PORTION OF 4, BLOCK 11, LANDS OF ATRISCO GRANT
CITY ADDRESS: 98TH STREET BETWEEN EUCARIZ AVE. AND TOWER ROAD

ENGINEERING FIRM: Bohannan Huston, Inc. CONTACT: Rick Beltramo
ADDRESS: 7500 Jefferson NE – Courtyard I PHONE: (505) 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: LONGFORD HOMES CONTACT: Mark Ruhlman
ADDRESS: 7301 JEFFERSON NE PHONE: (505) 761-9911
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN 1st SUBMITTAL, ***REQUIRES TCL or equal***
- ____ DRAINAGE PLAN RESUBMITTAL
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ____ CLOMR/LOMR
- ____ TRAFFIC CIRCULATION LAYOUT (TCL)
- ____ ENGINEERS CERTIFICATION (TCL)
- ____ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- X OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- x SIA / FINANCIAL GUARANTEE RELEASE
- ____ 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
- ____ CERTIFICATE OF OCCUPANCY (PERM.)
- ____ CERTIFICATE OF OCCUPANCY (TEMP.)
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ WORKORDER APPROVAL
- ____ OTHER (SPECIFY)

RECEIVED
AUG 21 REC'D
DEVELOPMENT & BUILDING SERVICES

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ____ YES
- ____ NO
- ____ COPY PROVIDED

DATE SUBMITTED: AUGUST 21, 2003 BY: Rick Beltramo

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 5, 2002

Rick Beltramo, PE
Bohannan Huston, Inc
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sunrise Ranch South Subdivision Drainage Study
Engineer's Stamp dated 8-12-02, (L9/D30)

Dear Mr. Beltramo,

Based upon the information provided in your submittal dated 8-19-02, the above referenced Drainage Study is approved for Preliminary Plat action by the DRB.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building Services

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET
(REV. 11/01/2001)

L-9/D30

PROJECT TITLE: Sunrise Ranch South ZONE MAP/DRG. FILE # L-9
DRB #: EPC#: WORK ORDER#:

LEGAL DESCRIPTION: Tracts 1-B, 3, and Portions of 4, Block 11, Atrisco Grant
CITY ADDRESS: Tower / 98th Street

ENGINEERING FIRM: Bohannan Huston, Inc. CONTACT: Rick Beltramo
ADDRESS: 7500 Jefferson NE – Courtyard I PHONE: (505) 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Longford Group Inc. CONTACT: Mark Ruhlman
ADDRESS: 7301 Jefferson NE PHONE: (505) 761-9911
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:
- X DRAINAGE REPORT
- ___ DRAINAGE PLAN
- X CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ___ CLOMR/LOMR
- ___ TRAFFIC CIRCULATION LAYOUT (TCL)
- ___ ENGINEERS CERTIFICATION (TCL)
- ___ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ___ OTHER

CHECK TYPE OF APPROVAL SOUGHT:
- ___ SIA / FINANCIAL GUARANTEE RELEASE
- X 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
- ___ CERTIFICATE OF OCCUPANCY (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- X GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
- X YES
- ___ NO
- ___ COPY PROVIDED

RECEIVED AUG 19 2002 HYDROLOGY SECTION

DATE SUBMITTED: ~~7-19-02~~ 8/19/02 BY: Rick Beltramo

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

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toll free: 800.877.5332

August 19, 2002

Brad L. Bingham, P.E.
Senior Engineer, Planning department
Development and Building services
City of Albuquerque
PO Box 1293
Albuquerque, NM 87102

RECEIVED
AUG 19 2002
HYDROLOGY SECTION

Re: Sunrise Ranch South Subdivision Drainage Study Review Comments
Engineer's Stamp dated 7-19-02 (L9/D30)

Dear Mr. Bingham:

This letter responds to your written comments dated July 26, 2002. First, thank you for the timely review. This has enabled the design team to address your comments prior to the upcoming Development Review Board (DRB) public hearing. In general, I believe your comments to be relatively minor in nature. Specific responses to all of your comments are provided below.

Comment #1
As requested in comment #3, we have re-analyzed the site hydrology without using table A-5. Our new hydrology also includes removal of the proposed pond. We also added a stream route to model the runoff that passes through the open space area. The basin map has been revised to show an additional small basin contributing to the open space area. This is the purpose of the rundown in King Ranch Lane.

Comment #2
A water block is not necessary. The subdivision has the capacity for the street flows to go in either direction. We elected that instead of placing a water block, we attempt to model where the flows are going and design accordingly. The basins have been slightly modified to show this more accurately.

The pond has been removed from the plan so pond routing is not now necessary. As mentioned in Comment response #1, a stream route has been added for the flows that pass through the open space area.

Comments #3
Agree. We have revised our hydrologic analysis with a more rigorous analysis of the land treatment types. A percent –impervious calculation is provided as you requested in Appendix A. This analysis has been added to the addendum. Land treatment D increased to 69% that resulted in an increase in the runoff. The report has been modified accordingly.

Your comment indicated that it may result in lower runoff rates but we found just the opposite was true and the flow rate increased. However, the stream route did help to reduce the overall runoff. We also changed the open space to 100% type B land treatment that reduced the runoff. The resulting net effect is a decrease in runoff to 70 cfs, still not less than the 69cfs allowed for by the SAD 222 analysis. However, 70cfs is close enough to the allowable of 69cfs, and with respect to hydrology these flow rates are the same.

Construction of ponds or other actions to address the differences are not warranted. Therefore, no ponding should be required.

Comment #4
No water crosses the channel at Tower Road. There is in fact a low point on the west side of the channel that intercepts runoff in the road and discharges to the channel. The highpoint of Tower Road is over the channel.

There are adequate inlets in Tower Road to capture flows from the subdivision and Tower Road. An analysis is provided in Appendix B.

Comment #5
As described in comment #3, a ponding area will no longer be necessary.

Comment #6
Street names have been labeled on the grading plan.

Comment #7
A revised street hydraulic analysis is included in Appendix B. The extents for placement of standard curb and gutter has been increased accordingly.

Comment #8
Since Eucariz Avenue is not planned to cross the channel to the west and is not planned or required to connect to any other subdivision it is proposed to end west of Morning Dew. This creates a "T" intersection. No roadway improvements are planned for Eucariz in the area west of the intersection. The site is already graded. As a part of this construction, the area will be cleared and grubbed and re-vegetated. Also, a new pedestrian/ bike trail will be constructed in the right-of-way.

Should you wish to discuss these comments or need additional information, please call Nina Leung or me any time at 823-1000. We would be glad to meet with you at your convenience.

Sincerely,

Rick Beltramo, P.E.
Senior Project Manager,
Community Development and Planning Group

Enclosures

Bohannan ▲ Huston INC.

Courtyard I
7500 Jefferson St. NE
Albuquerque, NM
87109-4335

www.bhinc.com

voice: 505.823.1000
facsimile: 505.798.7988
toll free: 800.877.5332

DRAINAGE STUDY FOR SUNRISE RANCH SOUTH SUBDIVISION

AUGUST 12, 2002

PREPARED FOR:

LONGFORD HOMES
SUITE G-H
7301 JEFFERSON NE
ALBUQUERQUE, NM 87109

RECEIVED
AUG 1 2002
HYDROLOGY SECTION

PREPARED BY:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON NE
ALBUQUERQUE, NM 87109

ENGINEERING ▲
SPATIAL DATA ▲
ADVANCED TECHNOLOGIES ▲

DRAINAGE STUDY
FOR
SUNRISE RANCH SOUTH SUBDIVISION

AUGUST 12, 2002

Prepared for:

LONGFORD HOMES
7301 JEFFERSON ST. NE - SUITE G-H
ALBUQUERQUE, NM 87109

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON STREET NE
ALBUQUERQUE, NM 87109

Prepared by:

8-12-02

Rick Beltramo, P.E. Date

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PLATES

PLATE 1 - PRELIMINARY PLAT

PLATE 2 - GRADING PLAN

PLATE 3 - PROPOSED BASIN MAP

I. INTRODUCTION

This drainage study establishes a drainage management plan for the proposed development of the property legally described as Tracts 1A, 1B, 3, and a portion of 4 of Block 11 Lands of Atrisco Grant. It is approximately 20 acres of residential (R-T) zoned land to be re-subdivided as the "Sunrise Ranch South Subdivision". The subject property is located on Albuquerque's southwest mesa, west of 98th Street between Tower Road and Eucariz Avenue (see preliminary plat for location, **Plate 1**). Sunrise Ranch South is planned to consist of 137 single-family, residential dwellings.

This study provides hydrologic and hydraulic analysis and provides a drainage management plan as necessary to support the planned 137 unit development. More specifically, this report is submitted in conjunction with the preliminary plat application. Preliminary plat approval and grading plan approval is requested. Prior to final plat and building permit approvals of this project, the City of Albuquerque (COA) must approve final grading plans and work order construction plans.

II. METHODOLOGY

Existing and proposed site hydrological conditions were analyzed for the 100-year, 6-hour storm in accordance with the revised Section 22.2, Hydrology, of the Development Process Manual (DPM) for the City of Albuquerque, dated January 1993. Street capacities were analyzed using Manning's equation, consistent with the revised DPM Section 22.2. All data and calculations supporting this study are located in Appendix B. The new rational method hydrologic procedures identified within the revised DPM Section 22.2 are utilized to determine peak flow rates for design of the storm drainage improvements within the projects. The 100-year, 6-hour storm is used as the design event. The results are included in Appendix A.

The storm drain system internal to the subdivision is analyzed using current DPM methods for gravity flow conditions. Inlet capacity computations, along with all hydraulic computations, are included in Appendix B.

III. EXISTING CONDITIONS

A. Site Data

Sunrise Ranch South is currently undeveloped land, sloping from northwest to southeast with grades ranging from approximately 1% to 3%. Soils consist of deep, well-drained loamy fine sands typical of the West Mesa. Vegetation is light and consists mostly of native grasses and sand sagebrush.

B. Existing Drainage Patterns

Sunrise Ranch South is located within the Tower/Sage Drainage Basin, which is a subbasin of the Amole Del Norte Drainage Basin. Adjacent properties and/or public roadways have been constructed which effectively intercept all potential off-site runoff. Public storm drain facilities constructed in Eucariz Avenue intercept all runoff north of Eucariz Avenue before it reaches the site. The Snow Vista Channel intercepts all runoff west of Sunrise Ranch South. Since the site slopes from north to south, no runoff from the south is possible. Tower Road conveys all runoff within its right-of-way east to 98th Street.

IV. LAND TREATMENTS

The minimum lot dimensions are 40' x 100'. The percent impervious land treatment was determined by measuring respective subareas of the subdivision. Calculations for determination of land treatment percentages are included in Appendix A and incorporated into the AHYMO analysis.

V. PROPOSED CONDITIONS

Sunrise Ranch South Subdivision is a single-family, detached-unit residential development with 137 lots on 20 acres, producing a density of approximately 6.85 D.U. per acre. Proposed street configurations are shown on the Preliminary Plat (See **Plate 1**).

A. Downstream Outfall

Sunrise Ranch South is located within the contributing area of the Special Assessment District (SAD) 222 project. SAD-222 has constructed public storm drains intended to collect all developed runoff from Sunrise Ranch South and the adjacent roadways of Eucariz Avenue, 98th Street, and Tower Road. A storm drain in Tower Road has been built to accept approximately 69 cfs from Sunrise Ranch South and Tower Road. This drainage study establishes an amount of developed runoff from the proposed subdivision which is approximately equal to the capacity of the storm drain in Tower Road.

B. Onsite Flows

Runoff from the subject property will be conveyed to two main outfalls: an onsite storm drain located at the southeast corner of the property, and Tower Rd. through existing inlets (See Basin Map).

The onsite storm drain is located at the intersection of Lonesome Dove Court and Ladder Ranch Road. This storm drain collects flows conveyed by the streets from the eastern portion of the site. This storm drain is designed to carry flows from a 100 year-6 hour design storm. An easement placed between lots 7 and 8 is available as an emergency overflow in the event of a storm that exceeds the storm drain capacity. Flows will be safely conveyed via surface flow to the existing public storm drain in Tower Road.

The southwest corner of Sunrise Ranch South will discharge directly to Tower Road via surface flow. Runoff from Tower Road will combine with this flow and continue east to five existing storm drain inlets located near the intersection of 98th Street. These inlets will intercept all of the flow from Tower Road.

In summary, the two outfalls of Sunrise Ranch South will discharge into the public storm drain in Tower Road. The total developed flow from the subdivision and a portion of Tower Road is 70 cfs. The major storm drain outfall in Tower Road will contain almost all of this flow. If there are any excess flows, it will safely bypass and be intercepted by downstream inlets.

C. Offsite Flows

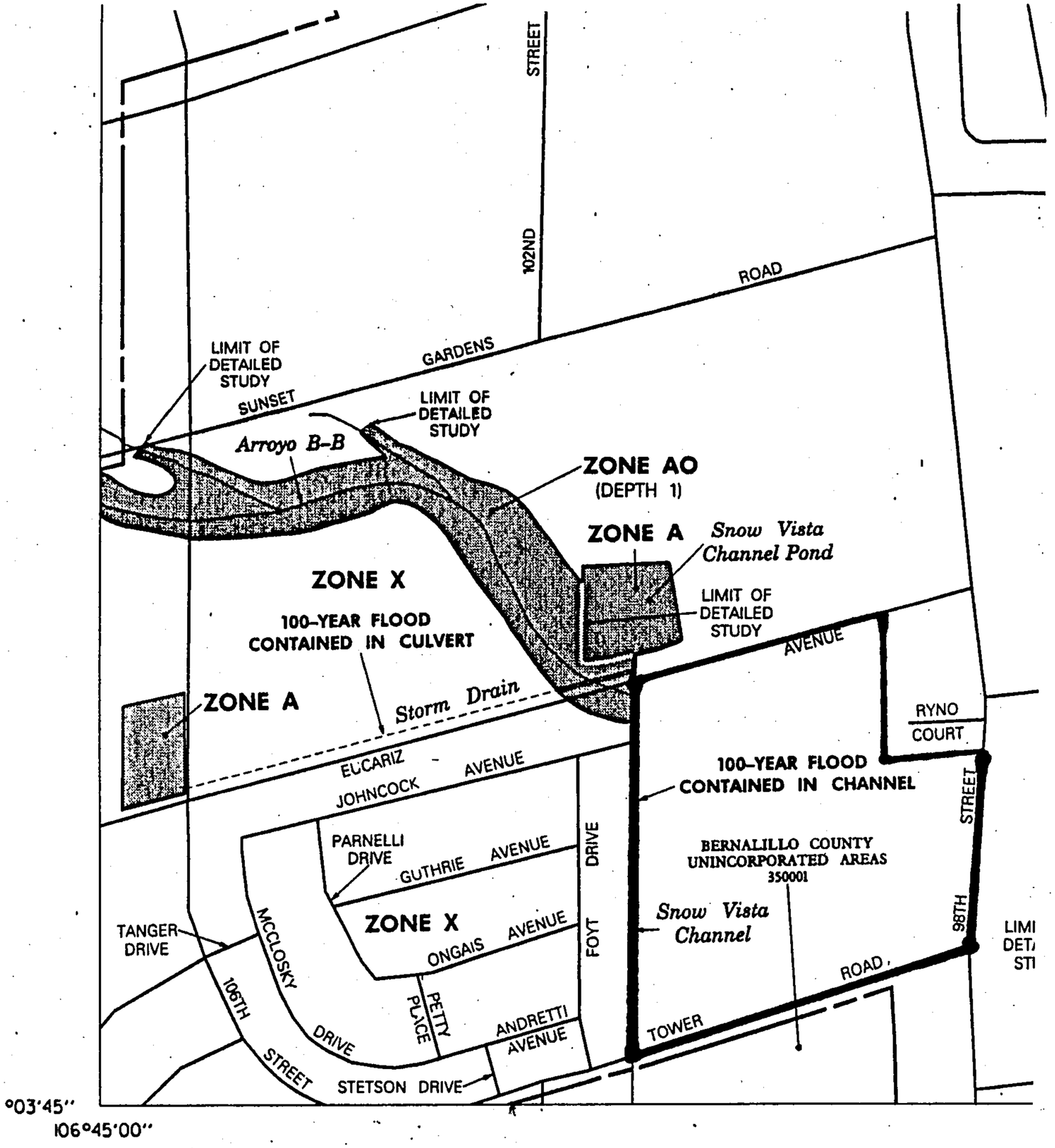
There will be no offsite flows affecting the Sunrise Ranch South subdivision. This is mostly due to the interception of flows by the Snow Vista Channel to the west, Eucariz Avenue to the north, and Tower Road to the south. In addition, the site slopes from west to east, therefore, no runoff from the east is possible.

D. FEMA Floodplain

Sunrise Ranch South Subdivision is not encumbered by a 100-year floodplain as designated on Panel 328 of 825 of the National Flood Insurance Program, Flood Insurance Rate Map published by FEMA for Bernalillo County, New Mexico. With the existing, well-defined arroyo that cuts through the site, a previous Flood Insurance Rate Map (FIRM) did show a floodplain through the site. However, with the construction of Snow Vista Channel, this floodplain has been eliminated. A copy of the current revised FIRM, dated September 20, 1996, is included in the FEMA Floodplain exhibit provided at the end of the report text.

VI. CONCLUSION

This report provides a detailed study of the developed runoff and street capacities for the proposed Sunrise Ranch South Subdivision. Included is the preliminary plat, proposed conditions basin map, grading plans, infrastructure list, and all necessary hydrologic and hydraulic analyses. This drainage plan maintains the overall drainage pattern of the area as proposed in SAD-222 and allows for safe management of storm runoff in permanent as well as interim conditions.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 328 OF 825

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0328	D
BERNALILLO COUNTY, UNINCORPORATED AREAS	350001	0328	D

MAP NUMBER 35001C0328 D

EFFECTIVE DATE: SEPTEMBER 20, 1996

Federal Emergency Management Agency

APPENDICES

APPENDIX A - AHYMO INPUT, OUTPUT FILES

APPENDIX B - STREET FLOW AND INLET CALCULATIONS

APPENDIX C - INFRASTRUCTURE LIST

APPENDIX A

AHYMO INPUT, OUTPUT FILES

SUNRISE RANCH SOUTH SUBDIVISION
August 9, 2002

DETERMINATION OF LAND TREATMENT PERCENTAGES FOR RESIDENTIAL AREAS
(USED FOR BASINS B, C, D, AND E)

(1) Lots
Minimum Lot Dimensions: 40'x100'
Total Lots = 137
Total Lot Area = 12.6 acres
Total Impervious Area = 9.1 acres
Percent A=0
Percent B=28
Percent C=0
Percent D=72

(2) Misc. Lot Areas
(Represents Extra Large Lots)
Total Area = 1.74 acres
Percent A=0
Percent B=100
Percent C=0
Percent D=0

(3) Right-of-Way
Total Area = 4.21 acres
Percent A=0
Percent B=10
Percent C=0
Percent D=90

Cumulative Percentages for Residential Areas
Total Area of Subdivision = 20 acres
Total Area of Park/Pond = 1.45 acres
Total Area of Residential Areas = 18.55 acres

$$\boxed{\frac{12.6}{18.55}(72)+\frac{1.74}{18.55}(0)+\frac{4.21}{18.55}(90) \Rightarrow\Rightarrow PercentD = 69.4}$$

Percent A = 0
Percent B = 30.6
Percent C = 0.0
Percent D = 69.4

```
*S*                    PROJECT NAME:  SUNRISE RANCH SOUTH SUBDIVISION
*S*                    DATE:  AUGUST 9, 2002
*S*                    INPUT FILE NAME:  SUNRISE.HYM
*S*                    OUTUPUT FILE NAME:  SUNRISE.OUT
*S*                    PROJECT NUMBER:  030109
*S*                    COMMENTS:     100 YEAR-6 HOUR STORM
*S
*S ////////////////////////////////////////////////////////////////////////////
START                 TIME=0.0 HR PUNCH CODE=0
RAINFALL              TYPE=1     RAIN QUARTER=0.0
                      RAIN ONE=1.90 IN    RAIN SIX=2.20 IN
                      RAIN DAY=2.67 IN    DT=0.03333 HRS
*****************************************************************************
*S****************************************************************************
*S          SUB-BASIN A (OPEN SPACE)
COMPUTE NM HYD        ID=1     HYD NO=A    DA=0.00226 SQ MI
                      PER A=0.0   PER B=100.0   PER C=0.0    PER D=0.0
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=1     CODE=1
*S****************************************************************************
*S          SUB-BASIN C
COMPUTE NM HYD        ID=2     HYD NO=C    DA=0.00625 SQ MI
                      PER A=0.0   PER B=30.6   PER C=0.0    PER D=69.4
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=2     CODE=1
*S****************************************************************************
*S          SUB-BASINS A&C INTO OPEN SPACE
ADD HYD               ID=3     HYD NO=A.C   ID I=1 ID II=2
PRINT HYD             ID=3     CODE=1
*S****************************************************************************
*S          SUB-BASIN D1
COMPUTE NM HYD        ID=4     HYD NO=D1    DA=0.00172 SQ MI
                      PER A=0.0   PER B=30.6   PER C=0.0    PER D=69.4
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=4     CODE=1
*S****************************************************************************
*S          SUB-BASIN D1 INTO OPEN SPACE
ADD HYD               ID=5     HYD NO=D1.OPEN   ID I=4 ID II=3
PRINT HYD             ID=5     CODE=1
*S****************************************************************************
*S          ROUTE SWALE THROUGH OPEN SPACE
COMPUTE RATING CURVE CID=1   VS NO=1  NO SEGS=1 MIN ELEV=96.9 MAX ELEV=100
                      CH SLP=0.005    FP SLP=.005   N=0.03 DIST=85
                      DIST    ELEV     DIST     ELEV    DIST     ELEV
                      0       100.0    60       96.9    85       97.0
COMPUTE TRAVEL TIME   ID=6 REACH=1  NO VS=1
                      L= 720  SLP= .005
ROUTE                 ID=6  HYD NO=SWALE
                      INFLOW ID=5  DT=0.0
PRINT HYD             ID=6   CODE=20
*S****************************************************************************
*S          TOWER ROAD
COMPUTE NM HYD        ID=7     HYD NO=TOWER    DA=0.00271 SQ MI
                      PER A=0.0   PER B=10.0   PER C=0.0    PER D=90.0
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=7     CODE=1
*S****************************************************************************
*S          SUB-BASIN B2
COMPUTE NM HYD        ID=8     HYD NO=B2    DA=0.00345 SQ MI
                      PER A=0.0   PER B=30.6   PER C=0.0    PER D=69.4
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=8     CODE=1
*S****************************************************************************
*S          ADD SUB-BASIN B2 INTO TOWER ROAD
ADD HYD               ID=9     HYD NO=B2.TOWER   ID I=7 ID II=8
PRINT HYD             ID=9     CODE=1
*S****************************************************************************
*S          SUB-BASIN D2
COMPUTE NM HYD        ID=10     HYD NO=D2    DA=0.00946 SQ MI
                      PER A=0.0   PER B=30.6   PER C=0.0    PER D=69.4
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=10     CODE=1
```

```
*S*************************************************************************
*S          SUB-BASIN E
COMPUTE NM HYD        ID=11     HYD NO=E    DA=0.00647 SQ MI
                      PER A=0.0   PER B=30.6   PER C=0.0    PER D=69.4
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=11     CODE=1
*S*************************************************************************
*S          ADD SUB-BASINS D2&E INTO INTERNAL STORMDRAIN
ADD HYD               ID=12    HYD NO=D2.E   ID I=10 ID II=11
PRINT HYD             ID=12    CODE=1
*S*************************************************************************
*S          ADD FLOW FROM OPEN SPACE INTO INTERNAL STORMDRAIN
ADD HYD               ID=13    HYD NO=INT.SD   ID I=6 ID II=12
PRINT HYD             ID=13    CODE=1
*S*************************************************************************
*S          SUB-BASIN B1
COMPUTE NM HYD        ID=14     HYD NO=B1    DA=0.00161 SQ MI
                      PER A=0.0   PER B=30.6   PER C=0.0    PER D=69.4
                      TP=-0.1333 HR     MASSRAIN=-1
PRINT HYD             ID=14     CODE=1
*S*************************************************************************
*S          ADD SUB-BASIN B1 INTO INTERNAL STORMDRAIN
ADD HYD               ID=15    HYD NO=B1.INTSD   ID I=14 ID II=13
PRINT HYD             ID=15    CODE=1
*S*************************************************************************
*S          ADD FLOW FROM INTERNAL STORMDRAIN TO TOWER ROAD OUTFALL
ADD HYD               ID=16    HYD NO=STORMDRAIN   ID I=9 ID II=15
PRINT HYD             ID=16    CODE=1
*S*************************************************************************
FINISH
```

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AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                    - VERSION:  1997.02c      RUN DATE (MON/DAY/YR) =08/12/2002
INPUT FILE = SUNRISE.HYM                                                            USER NO.= AHYMO-S-9702c1BohanHu-AH

                              FROM  TO                    PEAK        RUNOFF                TIME TO    CFS      PAGE =   1
                  HYDROGRAPH   ID   ID        AREA     DISCHARGE     VOLUME      RUNOFF      PEAK     PER
COMMAND        IDENTIFICATION  NO.  NO.     (SQ MI)      (CFS)       (AC-FT)    (INCHES)   (HOURS)   ACRE     NOTATION

*S*                    PROJECT NAME:  SUNRISE RANCH SOUTH SUBDIVISION
*S*                    DATE:  AUGUST 9, 2002
*S*                    INPUT FILE NAME:  SUNRISE.HYM
*S*                    OUTUPUT FILE NAME:  SUNRISE.OUT
*S*                    PROJECT NUMBER:  030109
*S*                            COMMENTS:  100 YEAR-6 HOUR STORM
*S
*S ////////////////////////////////////////////////////////////////////////////
START                                                                                                  TIME=       .00
RAINFALL  TYPE= 1                                                                                      RAIN6=     2.200
*S*************************************************************************
*S                         SUB-BASIN A (OPEN SPACE)
COMPUTE NM HYD             A   -     1        .00226        2.99        .082      .68101    1.533    2.068 PER IMP=    .00
*S*************************************************************************
*S                         SUB-BASIN C
COMPUTE NM HYD             C   -     2        .00625       14.84        .524     1.57306    1.500    3.709 PER IMP=  69.40
*S*************************************************************************
*S                         SUB-BASINS A&C INTO OPEN SPACE
ADD HYD                  A.C  1& 2   3        .00851       17.81        .606     1.33611    1.500    3.270
*S*************************************************************************
*S                         SUB-BASIN D1
COMPUTE NM HYD            D1   -     4        .00172        4.09        .144     1.57306    1.500    3.719 PER IMP=  69.40
*S*************************************************************************
*S                         SUB-BASIN D1 INTO OPEN SPACE
ADD HYD              D1.OPEN  4& 3   5        .01023       21.90        .751     1.37592    1.500    3.345
*S*************************************************************************
*S                         ROUTE SWALE THROUGH OPEN SPACE
ROUTE                   SWALE    5   6        .01023       16.38        .751     1.37597    1.567    2.502
*S*************************************************************************
*S                         TOWER ROAD
COMPUTE NM HYD          TOWER    -   7        .00271        7.29        .266     1.83784    1.500    4.205 PER IMP=  90.00
*S*************************************************************************
*S                         SUB-BASIN B2
COMPUTE NM HYD            B2   -     8        .00345        8.20        .289     1.57306    1.500    3.712 PER IMP=  69.40
*S*************************************************************************
*S                         ADD SUB-BASIN B2 INTO TOWER ROAD
ADD HYD             B2.TOWER  7& 8   9        .00616       15.49        .555     1.68946    1.500    3.929
*S*************************************************************************
*S                         SUB-BASIN D2
COMPUTE NM HYD            D2   -    10        .00946       22.45        .794     1.57306    1.500    3.707 PER IMP=  69.40
*S*************************************************************************
*S                         SUB-BASIN E
COMPUTE NM HYD             E   -    11        .00647       15.36        .543     1.57306    1.500    3.708 PER IMP=  69.40
*S*************************************************************************
*S                         ADD SUB-BASINS D2&E INTO INTERNAL STORMDRAIN
ADD HYD                 D2.E 10&11  12        .01593       37.80       1.336     1.57302    1.500    3.708
*S*************************************************************************
*S                         ADD FLOW FROM OPEN SPACE INTO INTERNAL STORMDRAIN
ADD HYD               INT.SD  6&12  13        .02616       51.61       2.087     1.49595    1.533    3.082
*S*************************************************************************
*S                         SUB-BASIN B1
COMPUTE NM HYD            B1   -    14        .00161        3.83        .135     1.57306    1.500    3.719 PER IMP=  69.40
*S*************************************************************************
*S                         ADD SUB-BASIN B1 INTO INTERNAL STORMDRAIN
ADD HYD             B1.INTSD 14&13  15        .02777       55.28       2.222     1.50041    1.533    3.111
*S*************************************************************************
*S                         ADD FLOW FROM INTERNAL STORMDRAIN TO TOWER ROAD OUTFALL
ADD HYD           STORMDRAIN  9&15  16        .03393       70.10       2.777     1.53473    1.533    3.228
*S*************************************************************************
FINISH
```

A4

APPENDIX B

STREET FLOW AND INLET CALCULATIONS

SUNRISE RANCH SOUTH SUBDIVISION
Inlet & Street Capacity Calculations
August 9, 2002

1. Saddle Blanket Trail

Basin C (See AHYMO summary table or Basin Map)
S = 1.13%
Q = 14.8 cfs

Total flow from Basin C is 14.8 cfs. The contributing area from Saddle Blanket north of Pony Lane is about 67% of the total Basin C area. Therefore, runoff from this area is 10 cfs.

No inlets are needed for Saddle Blanket Trail, however, standard curb and gutter will be installed at Lot 100. See PC stream output. Water flows into open space area.

2. Pony Lane

Basin C (See AHYMO summary table or Basin Map)
S = 1.67%
Q = 14.8 cfs

No inlets are needed for Pony Lane, however, standard curb and gutter will be placed along the entire length of Pony Lane. See PC stream output. Water flows into open space area.

3. Ladder Ranch Lane and Saddle Blanket Trail

Basin B (See AHYMO summary table or Basin Map)
S = 1.92%
Q = 12.0 cfs

At 1.92%, a road with standard curb can handle 33.2 cfs. Therefore, no inlets are required. Roll curb will continue until Lot 81. See PC stream output. Water flows east until Angus Way. Most of Basin B will flow into Tower Road. Basin B-1 will continue east and flow into the internal storm drain.

4. King Ranch Lane

Basin D-1 (See AHYMO summary table or Basin Map)
S = 1.51%
Q = 4.1 cfs

No inlets are needed for King Ranch Lane. Roll curb will be placed along the entire length. See PC stream output. Water flows into open space area.

5. King Ranch Lane

Basin D-2 (See AHYMO summary table or Basin Map)
S = 3.41%
Q = 22.5 cfs

Total flow from Basin C is 22.5 cfs. The contributing area of King Ranch Lane east of morning dew way is about 29% of the total Basin D-2 area. Therefore, runoff from this area is 6.4 cfs.

No inlets are needed for King Ranch Lane. Roll curb will be placed along the entire length. See PC stream output. Water flows into internal storm drain.

6. Lone River Trail

Basin D-2 (See AHYMO summary table or Basin Map)
S = 1.24%
Q = 22.5 cfs

Standard curb will be placed along the entire length of Lone River Trail. Inlets will be added before the intersection with Ladder Ranch. Install two Type A inlets to capture 11 cfs and bypass 11.5 cfs into inlets at Ladder Ranch Lane and Lonesome Dove Trail. See attached nomograph.

7. Lonesome Dove Trail

Basin E (See AHYMO summary table or Basin Map)
S = 0.76%
Q = 15.4 cfs

Total flow from Basin E is 15.4 cfs. The contributing area from Lonesome Dove Trail is about 63% of the total Basin C area. Therefore, runoff from this area is 10 cfs.

Roll curb will be installed on Lonesome Dove Trail until Lot 26. Inlets will be placed at the intersection of Ladder Ranch Lane and Lonesome Dove Trail. These inlets are placed under sump conditions.

Table of Contributing Flows into Sump Inlets

BASIN	FLOW
A	16.4 cfs
B-1	3.83 cfs
D-2	11.5 cfs
E	15.4 cfs
TOTAL	47.1 cfs

Install two Type A single-grate inlets to capture flow without exceeding the standard curb height. See attached nomograph.

8. Tower Road

Tower Road Basin (See AHYMO summary table or Basin Map)
S = 2%
Q = 15.5 cfs

Basin B-2 contributes flows into Tower Road for a total of 15.5 cfs. There are five existing inlets placed on Tower Road before the intersection of 98th Street. The three inlets on the north side of Tower will intercept 8.5 cfs. Two inlets on the south side of Tower will intercept 7.0 cfs. The inlet analysis is presented below.

INLET	DEPTH (ft)	FLOW IN (cfs)	FLOW CAPTURED	FLOW OUT (cfs)
1	0.38	8.5	4.8	3.7
2	0.30	3.7	3.0	0.7
3	0.18	0.7	0.7	0.0
4	0.37	7.0	4.6	2.4
5	0.27	2.4	2.4	0

The total amount of flow in Tower Road is contained with the existing inlets. See the attached nomographs and inlet diagram.

SADDLE BLANKET

MANNING'S N= .017 SLOPE= .0113

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.26	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.42	0.63	0.00	0.02	
0.03	0.03	0.01	0.0	0.99	0.55	0.94	0.00	0.03	
0.04	0.04	0.03	0.0	1.32	0.66	1.25	0.01	0.05	
0.05	0.05	0.04	0.0	1.64	0.77	1.56	0.01	0.06	
0.06	0.06	0.06	0.0	1.97	0.87	1.88	0.01	0.07	
0.07	0.07	0.08	0.1	2.30	0.96	2.19	0.01	0.08	
0.08	0.08	0.10	0.1	2.63	1.05	2.50	0.02	0.10	
0.09	0.09	0.13	0.1	2.96	1.14	2.81	0.02	0.11	
0.10	0.10	0.16	0.2	3.29	1.22	3.13	0.02	0.12	
0.11	0.11	0.19	0.2	3.62	1.30	3.44	0.03	0.14	
0.12	0.12	0.23	0.3	3.95	1.38	3.75	0.03	0.15	
0.13	0.13	0.26	0.4	4.28	1.45	4.07	0.03	0.16	
0.14	0.14	0.31	0.4	5.15	1.42	4.93	0.03	0.17	
0.15	0.15	0.36	0.5	6.03	1.43	5.79	0.03	0.18	
0.16	0.16	0.43	0.6	6.91	1.45	6.65	0.03	0.19	
0.17	0.17	0.50	0.7	7.79	1.48	7.51	0.03	0.20	
0.18	0.18	0.58	0.9	8.67	1.52	8.38	0.04	0.22	
0.19	0.19	0.66	1.0	9.54	1.57	9.24	0.04	0.23	
0.20	0.20	0.76	1.2	10.42	1.62	10.10	0.04	0.24	
0.21	0.21	0.87	1.5	11.30	1.68	10.96	0.04	0.25	
0.22	0.22	0.98	1.7	12.18	1.73	11.83	0.05	0.27	
0.23	0.23	1.10	2.0	13.06	1.79	12.69	0.05	0.28	
0.24	0.24	1.23	2.3	13.93	1.85	13.55	0.05	0.29	
0.25	0.25	1.37	2.6	14.81	1.90	14.41	0.06	0.31	
0.26	0.26	1.52	3.0	15.69	1.96	15.27	0.06	0.32	
0.27	0.27	1.68	3.4	16.57	2.02	16.14	0.06	0.33	
0.28	0.28	1.84	3.8	17.45	2.08	17.00	0.07	0.35	
0.29	0.29	2.02	4.3	18.32	2.14	17.86	0.07	0.36	
0.30	0.30	2.20	4.8	19.20	2.19	18.72	0.07	0.37	
0.31	0.31	2.39	5.4	20.08	2.25	19.59	0.08	0.39	
0.32	0.32	2.59	6.0	20.96	2.31	20.45	0.08	0.40	
0.33	0.33	2.80	6.6	21.84	2.36	21.31	0.09	0.42	Roll Curb limit
0.34	0.34	3.02	7.3	22.71	2.42	22.17	0.09	0.43	
0.35	0.35	3.25	8.0	23.59	2.48	23.03	0.10	0.45	
0.36	0.36	3.48	8.8	24.47	2.53	23.90	0.10	0.46	
0.37	0.37	3.72	9.6	25.35	2.59	24.76	0.10	0.47	Actual Q
0.38	0.38	3.98	10.5	26.23	2.64	25.62	0.11	0.49	
0.39	0.39	4.24	11.4	27.10	2.70	26.48	0.11	0.50	
0.40	0.40	4.50	12.4	27.98	2.75	27.35	0.12	0.52	
0.41	0.41	4.78	13.4	28.86	2.80	28.21	0.12	0.53	
0.42	0.42	5.06	14.7	28.88	2.91	28.21	0.13	0.55	
0.43	0.43	5.35	16.1	28.90	3.02	28.22	0.14	0.57	

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	5.91	19.0	28.94	3.22	28.23	0.16	0.61	
0.46	0.46	6.19	20.6	28.96	3.32	28.23	0.17	0.63	
0.47	0.47	6.48	22.2	28.98	3.42	28.24	0.18	0.65	
0.48	0.48	6.76	23.8	29.01	3.52	28.24	0.19	0.67	
0.49	0.49	7.04	25.4	29.03	3.61	28.25	0.20	0.69	
0.50	0.50	7.32	27.2	29.05	3.71	28.25	0.21	0.71	
0.51	0.51	7.61	28.9	29.07	3.80	28.26	0.22	0.73	
0.52	0.52	7.89	30.7	29.09	3.89	28.26	0.24	0.76	
0.53	0.53	8.17	32.6	29.11	3.98	28.27	0.25	0.78	
0.54	0.54	8.45	34.4	29.13	4.07	28.27	0.26	0.80	
0.55	0.55	8.74	36.4	29.15	4.16	28.28	0.27	0.82	
0.56	0.56	9.02	38.3	29.17	4.25	28.28	0.28	0.84	STANDARD CURB LIM

Pony

MANNING'S N= .017 SLOPE= .0167

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	9.00	0.13	9	31.17	0.67
2	6.37	0.67	6	19.00	0.33	10	31.63	0.67
3	6.83	0.67	7	29.00	0.13	11	38.00	0.83
4	7.00	0.00	8	31.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.32	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.51	0.63	0.00	0.02	
0.03	0.03	0.01	0.0	0.99	0.66	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	0.80	1.25	0.01	0.05	
0.05	0.05	0.04	0.0	1.64	0.93	1.56	0.01	0.06	
0.06	0.06	0.06	0.1	1.97	1.05	1.88	0.02	0.08	
0.07	0.07	0.08	0.1	2.30	1.17	2.19	0.02	0.09	
0.08	0.08	0.10	0.1	2.63	1.28	2.50	0.03	0.11	
0.09	0.09	0.13	0.2	2.96	1.38	2.81	0.03	0.12	
0.10	0.10	0.16	0.2	3.29	1.48	3.13	0.03	0.13	
0.11	0.11	0.19	0.3	3.62	1.58	3.44	0.04	0.15	
0.12	0.12	0.23	0.4	3.95	1.67	3.75	0.04	0.16	
0.13	0.13	0.26	0.5	4.28	1.77	4.07	0.05	0.18	
0.14	0.14	0.31	0.5	5.30	1.70	5.07	0.05	0.19	
0.15	0.15	0.37	0.6	6.32	1.69	6.08	0.04	0.19	
0.16	0.16	0.43	0.7	7.34	1.71	7.08	0.05	0.21	
0.17	0.17	0.51	0.9	8.36	1.74	8.09	0.05	0.22	
0.18	0.18	0.59	1.1	9.38	1.79	9.09	0.05	0.23	
0.19	0.19	0.69	1.3	10.40	1.85	10.10	0.05	0.24	
0.20	0.20	0.80	1.5	11.42	1.91	11.10	0.06	0.26	
0.21	0.21	0.91	1.8	12.44	1.98	12.11	0.06	0.27	
0.22	0.22	1.04	2.1	13.46	2.05	13.11	0.06	0.28	
0.23	0.23	1.17	2.5	14.49	2.11	14.12	0.07	0.30	
0.24	0.24	1.32	2.9	15.51	2.19	15.12	0.07	0.31	
0.25	0.25	1.48	3.3	16.53	2.26	16.13	0.08	0.33	
0.26	0.26	1.64	3.8	17.55	2.33	17.13	0.08	0.34	
0.27	0.27	1.82	4.4	18.57	2.40	18.14	0.09	0.36	
0.28	0.28	2.00	5.0	19.59	2.47	19.14	0.09	0.37	
0.29	0.29	2.20	5.6	20.61	2.54	20.15	0.10	0.39	
0.30	0.30	2.41	6.3	21.63	2.61	21.15	0.11	0.41	
0.31	0.31	2.62	7.0	22.65	2.68	22.16	0.11	0.42	
0.32	0.32	2.85	7.9	23.67	2.75	23.16	0.12	0.44	
0.33	0.33	3.09	8.7	24.69	2.82	24.17	0.12	0.45	
0.34	0.34	3.33	9.9	24.71	2.97	24.17	0.14	0.48	
0.35	0.35	3.57	11.1	24.73	3.11	24.18	0.15	0.50	ROLL CURB
0.36	0.36	3.81	12.4	24.76	3.25	24.18	0.16	0.52	
0.37	0.37	4.05	13.7	24.78	3.38	24.19	0.18	0.55	ACTUAL
0.38	0.38	4.30	15.1	24.80	3.51	24.19	0.19	0.57	
0.39	0.39	4.54	16.5	24.82	3.64	24.20	0.21	0.60	
0.40	0.40	4.78	18.0	24.84	3.77	24.20	0.22	0.62	
0.41	0.41	5.02	19.5	24.86	3.89	24.21	0.23	0.64	
0.42	0.42	5.26	21.1	24.88	4.01	24.21	0.25	0.67	
0.43	0.43	5.51	22.7	24.90	4.13	24.22	0.27	0.70	
0.45	0.45	5.99	26.2	24.94	4.37	24.23	0.30	0.75	
0.46	0.46	6.23	27.9	24.96	4.48	24.23	0.31	0.77	
0.47	0.47	6.48	29.7	24.98	4.59	24.24	0.33	0.80	
0.48	0.48	6.72	31.6	25.00	4.70	24.24	0.34	0.82	
0.49	0.49	6.96	33.5	25.02	4.81	24.25	0.36	0.85	STANDARD CURB LIMIT
0.50	0.50	7.20	35.5	25.04	4.92	24.25	0.38	0.88	
0.51	0.51	7.45	37.4	25.06	5.03	24.26	0.39	0.90	

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

MANNING'S N= .017 SLOPE= .0192

LADDER RANCH

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.34	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.54	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.71	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	0.86	1.25	0.01	0.05
0.05	0.05	0.04	0.0	1.64	1.00	1.56	0.02	0.07
0.06	0.06	0.06	0.1	1.97	1.13	1.88	0.02	0.08
0.07	0.07	0.08	0.1	2.30	1.25	2.19	0.02	0.09
0.08	0.08	0.10	0.1	2.63	1.37	2.50	0.03	0.11
0.09	0.09	0.13	0.2	2.96	1.48	2.81	0.03	0.12
0.10	0.10	0.16	0.2	3.29	1.59	3.13	0.04	0.14
0.11	0.11	0.19	0.3	3.62	1.69	3.44	0.04	0.15
0.12	0.12	0.23	0.4	3.95	1.79	3.75	0.05	0.17
0.13	0.13	0.26	0.5	4.28	1.89	4.07	0.06	0.19
0.14	0.14	0.31	0.6	5.15	1.86	4.93	0.05	0.19
0.15	0.15	0.36	0.7	6.03	1.86	5.79	0.05	0.20
0.16	0.16	0.43	0.8	6.91	1.89	6.65	0.06	0.22
0.17	0.17	0.50	1.0	7.79	1.93	7.51	0.06	0.23
0.18	0.18	0.58	1.1	8.67	1.99	8.38	0.06	0.24
0.19	0.19	0.66	1.4	9.54	2.05	9.24	0.07	0.26
0.20	0.20	0.76	1.6	10.42	2.11	10.10	0.07	0.27
0.21	0.21	0.87	1.9	11.30	2.18	10.96	0.07	0.28
0.22	0.22	0.98	2.2	12.18	2.26	11.83	0.08	0.30
0.23	0.23	1.10	2.6	13.06	2.33	12.69	0.08	0.31
0.24	0.24	1.23	3.0	13.93	2.41	13.55	0.09	0.33
0.25	0.25	1.37	3.4	14.81	2.48	14.41	0.10	0.35
0.26	0.26	1.52	3.9	15.69	2.56	15.27	0.10	0.36
0.27	0.27	1.68	4.4	16.57	2.63	16.14	0.11	0.38
0.28	0.28	1.84	5.0	17.45	2.71	17.00	0.11	0.39
0.29	0.29	2.02	5.6	18.32	2.78	17.86	0.12	0.41
0.30	0.30	2.20	6.3	19.20	2.86	18.72	0.13	0.43
0.31	0.31	2.39	7.0	20.08	2.93	19.59	0.13	0.44
0.32	0.32	2.59	7.8	20.96	3.01	20.45	0.14	0.46
0.33	0.33	2.80	8.6	21.84	3.08	21.31	0.15	0.48
0.34	0.34	3.02	9.5	22.71	3.15	22.17	0.15	0.49
0.35	0.35	3.25	10.5	23.59	3.23	23.03	0.16	0.51
0.36	0.36	3.48	11.5	24.47	3.30	23.90	0.17	0.53
0.37	0.37	3.72	12.6	25.35	3.37	24.76	0.18	0.55
0.38	0.38	3.98	13.7	26.23	3.44	25.62	0.18	0.56
0.39	0.39	4.24	14.9	27.10	3.51	26.48	0.19	0.58
0.40	0.40	4.50	16.1	27.98	3.58	27.35	0.20	0.60
0.41	0.41	4.78	17.5	28.86	3.65	28.21	0.21	0.62
0.42	0.42	5.06	19.2	28.88	3.79	28.21	0.22	0.64
0.43	0.43	5.35	21.0	28.90	3.93	28.22	0.24	0.67

ROLL CURB LIM

ACTUAL Q = 12.0c

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	24.8	28.94	4.20	28.23	0.27	0.72
0.46	0.46	6.19	26.8	28.96	4.33	28.23	0.29	0.75
0.47	0.47	6.48	28.9	28.98	4.46	28.24	0.31	0.78
0.48	0.48	6.76	31.0	29.01	4.59	28.24	0.33	0.81
0.49	0.49	7.04	33.2	29.03	4.71	28.25	0.34	0.83
0.50	0.50	7.32	35.4	29.05	4.83	28.25	0.36	0.86
0.51	0.51	7.61	37.7	29.07	4.96	28.26	0.38	0.89
0.52	0.52	7.89	40.0	29.09	5.07	28.26	0.40	0.92
0.53	0.53	8.17	42.4	29.11	5.19	28.27	0.42	0.95
0.54	0.54	8.45	44.9	29.13	5.31	28.27	0.44	0.98
0.55	0.55	8.74	47.4	29.15	5.42	28.28	0.46	1.01
0.56	0.56	9.02	50.0	29.17	5.54	28.28	0.48	1.04
0.57	0.57	9.30	52.6	29.19	5.65	28.29	0.50	1.07
0.58	0.58	9.59	55.2	29.21	5.76	28.29	0.52	1.10
0.59	0.59	9.87	57.9	29.23	5.87	28.30	0.54	1.13

STANDARD CURB LIMIT

KING RANCH
BASIN D-1

MANNING'S N= .017 SLOPE= .0151

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.01	0.01	0.00	0.0	0.33	0.30	0.31	0.00	0.01	
0.02	0.02	0.01	0.0	0.66	0.48	0.63	0.00	0.02	
0.03	0.03	0.01	0.0	0.99	0.63	0.94	0.01	0.04	
0.04	0.04	0.03	0.0	1.32	0.77	1.25	0.01	0.05	
0.05	0.05	0.04	0.0	1.64	0.89	1.56	0.01	0.06	
0.06	0.06	0.06	0.1	1.97	1.00	1.88	0.02	0.08	
0.07	0.07	0.08	0.1	2.30	1.11	2.19	0.02	0.09	
0.08	0.08	0.10	0.1	2.63	1.21	2.50	0.02	0.10	
0.09	0.09	0.13	0.2	2.96	1.31	2.81	0.03	0.12	
0.10	0.10	0.16	0.2	3.29	1.41	3.13	0.03	0.13	
0.11	0.11	0.19	0.3	3.62	1.50	3.44	0.04	0.15	
0.12	0.12	0.23	0.4	3.95	1.59	3.75	0.04	0.16	
0.13	0.13	0.26	0.4	4.28	1.68	4.07	0.04	0.17	
0.14	0.14	0.31	0.5	5.15	1.65	4.93	0.04	0.18	
0.15	0.15	0.36	0.6	6.03	1.65	5.79	0.04	0.19	
0.16	0.16	0.43	0.7	6.91	1.67	6.65	0.04	0.20	
0.17	0.17	0.50	0.8	7.79	1.71	7.51	0.05	0.22	
0.18	0.18	0.58	1.0	8.67	1.76	8.38	0.05	0.23	
0.19	0.19	0.66	1.2	9.54	1.82	9.24	0.05	0.24	
0.20	0.20	0.76	1.4	10.42	1.88	10.10	0.05	0.25	
0.21	0.21	0.87	1.7	11.30	1.94	10.96	0.06	0.27	
0.22	0.22	0.98	2.0	12.18	2.00	11.83	0.06	0.28	
0.23	0.23	1.10	2.3	13.06	2.07	12.69	0.07	0.30	
0.24	0.24	1.23	2.6	13.93	2.13	13.55	0.07	0.31	
0.25	0.25	1.37	3.0	14.81	2.20	14.41	0.08	0.33	
0.26	0.26	1.52	3.4	15.69	2.27	15.27	0.08	0.34	
0.27	0.27	1.68	3.9	16.57	2.33	16.14	0.08	0.35	ACTUAL Q = 4.1 cfs
0.28	0.28	1.84	4.4	17.45	2.40	17.00	0.09	0.37	
0.29	0.29	2.02	5.0	18.32	2.47	17.86	0.09	0.38	
0.30	0.30	2.20	5.6	19.20	2.53	18.72	0.10	0.40	
0.31	0.31	2.39	6.2	20.08	2.60	19.59	0.11	0.42	
0.32	0.32	2.59	6.9	20.96	2.67	20.45	0.11	0.43	
0.33	0.33	2.80	7.7	21.84	2.73	21.31	0.12	0.45	ROLL CURB LIMIT
0.34	0.34	3.02	8.4	22.71	2.80	22.17	0.12	0.46	
0.35	0.35	3.25	9.3	23.59	2.86	23.03	0.13	0.48	
0.36	0.36	3.48	10.2	24.47	2.93	23.90	0.13	0.49	
0.37	0.37	3.72	11.1	25.35	2.99	24.76	0.14	0.51	
0.38	0.38	3.98	12.1	26.23	3.05	25.62	0.14	0.52	
0.39	0.39	4.24	13.2	27.10	3.12	26.48	0.15	0.54	
0.40	0.40	4.50	14.3	27.98	3.18	27.35	0.16	0.56	
0.41	0.41	4.78	15.5	28.86	3.24	28.21	0.16	0.57	
0.42	0.42	5.06	17.0	28.88	3.37	28.21	0.18	0.60	
0.43	0.43	5.35	18.6	28.90	3.49	28.22	0.19	0.62	

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)	
0.45	0.45	5.91	22.0	28.94	3.73	28.23	0.22	0.67	
0.46	0.46	6.19	23.8	28.96	3.84	28.23	0.23	0.69	
0.47	0.47	6.48	25.6	28.98	3.96	28.24	0.24	0.71	
0.48	0.48	6.76	27.5	29.01	4.07	28.24	0.26	0.74	
0.49	0.49	7.04	29.4	29.03	4.18	28.25	0.27	0.76	
0.50	0.50	7.32	31.4	29.05	4.29	28.25	0.29	0.79	
0.51	0.51	7.61	33.4	29.07	4.39	28.26	0.30	0.81	
0.52	0.52	7.89	35.5	29.09	4.50	28.26	0.31	0.83	STANDARD CURB LIMIT
0.53	0.53	8.17	37.6	29.11	4.61	28.27	0.33	0.86	
0.54	0.54	8.45	39.8	29.13	4.71	28.27	0.34	0.88	
0.55	0.55	8.74	42.0	29.15	4.81	28.28	0.36	0.91	
0.56	0.56	9.02	44.3	29.17	4.91	28.28	0.37	0.93	

KING RANCH
BASIN D-2

MANNING'S N= .017 SLOPE= .0341

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.46	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.72	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.95	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	1.15	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.33	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.51	1.88	0.04	0.10
0.07	0.07	0.08	0.1	2.30	1.67	2.19	0.04	0.11
0.08	0.08	0.10	0.2	2.63	1.83	2.50	0.05	0.13
0.09	0.09	0.13	0.3	2.96	1.97	2.81	0.06	0.15
0.10	0.10	0.16	0.3	3.29	2.12	3.13	0.07	0.17
0.11	0.11	0.19	0.4	3.62	2.26	3.44	0.08	0.19
0.12	0.12	0.23	0.5	3.95	2.39	3.75	0.09	0.21
0.13	0.13	0.26	0.7	4.28	2.52	4.07	0.10	0.23
0.14	0.14	0.31	0.8	5.15	2.47	4.93	0.10	0.24
0.15	0.15	0.36	0.9	6.03	2.48	5.79	0.10	0.25
0.16	0.16	0.43	1.1	6.91	2.52	6.65	0.10	0.26
0.17	0.17	0.50	1.3	7.79	2.57	7.51	0.10	0.27
0.18	0.18	0.58	1.5	8.67	2.65	8.38	0.11	0.29
0.19	0.19	0.66	1.8	9.54	2.73	9.24	0.12	0.31
0.20	0.20	0.76	2.1	10.42	2.82	10.10	0.12	0.32
0.21	0.21	0.87	2.5	11.30	2.91	10.96	0.13	0.34
0.22	0.22	0.98	2.9	12.18	3.01	11.83	0.14	0.36
0.23	0.23	1.10	3.4	13.06	3.11	12.69	0.15	0.38
0.24	0.24	1.23	4.0	13.93	3.21	13.55	0.16	0.40
0.25	0.25	1.37	4.5	14.81	3.31	14.41	0.17	0.42
0.26	0.26	1.52	5.2	15.69	3.41	15.27	0.18	0.44
0.27	0.27	1.68	5.9	16.57	3.51	16.14	0.19	0.46
0.28	0.28	1.84	6.7	17.45	3.61	17.00	0.20	0.48
0.29	0.29	2.02	7.5	18.32	3.71	17.86	0.21	0.50
0.30	0.30	2.20	8.4	19.20	3.81	18.72	0.23	0.53
0.31	0.31	2.39	9.4	20.08	3.91	19.59	0.24	0.55
0.32	0.32	2.59	10.4	20.96	4.01	20.45	0.25	0.57
0.33	0.33	2.80	11.5	21.84	4.11	21.31	0.26	0.59
0.34	0.34	3.02	12.7	22.71	4.20	22.17	0.27	0.61
0.35	0.35	3.25	14.0	23.59	4.30	23.03	0.29	0.64
0.36	0.36	3.48	15.3	24.47	4.40	23.90	0.30	0.66
0.37	0.37	3.72	16.7	25.35	4.49	24.76	0.31	0.68
0.38	0.38	3.98	18.2	26.23	4.59	25.62	0.33	0.71
0.39	0.39	4.24	19.8	27.10	4.68	26.48	0.34	0.73
0.40	0.40	4.50	21.5	27.98	4.78	27.35	0.35	0.75
0.41	0.41	4.78	23.3	28.86	4.87	28.21	0.37	0.78
0.42	0.42	5.06	25.6	28.88	5.06	28.21	0.40	0.82
0.43	0.43	5.35	28.0	28.90	5.24	28.22	0.43	0.86

ACTUAL Q=6.4 cf.

ROLL CURB LIMIT

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	33.1	28.94	5.60	28.23	0.49	0.94
0.46	0.46	6.19	35.8	28.96	5.77	28.23	0.52	0.98
0.47	0.47	6.48	38.5	28.98	5.94	28.24	0.55	1.02
0.48	0.48	6.76	41.3	29.01	6.11	28.24	0.58	1.06
0.49	0.49	7.04	44.2	29.03	6.28	28.25	0.61	1.10
0.50	0.50	7.32	47.2	29.05	6.44	28.25	0.64	1.14
0.51	0.51	7.61	50.2	29.07	6.60	28.26	0.68	1.19
0.52	0.52	7.89	53.4	29.09	6.76	28.26	0.71	1.23
0.53	0.53	8.17	56.5	29.11	6.92	28.27	0.74	1.27
0.54	0.54	8.45	59.8	29.13	7.08	28.27	0.78	1.32
0.55	0.55	8.74	63.2	29.15	7.23	28.28	0.81	1.36
0.56	0.56	9.02	66.6	29.17	7.38	28.28	0.85	1.41

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

MANNING'S N= .017 SLOPE= .0118

LONE RIVER

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.27	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.43	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.56	0.94	0.00	0.03
0.04	0.04	0.03	0.0	1.32	0.68	1.25	0.01	0.05
0.05	0.05	0.04	0.0	1.64	0.78	1.56	0.01	0.06
0.06	0.06	0.06	0.0	1.97	0.89	1.88	0.01	0.07
0.07	0.07	0.08	0.1	2.30	0.98	2.19	0.01	0.08
0.08	0.08	0.10	0.1	2.63	1.07	2.50	0.02	0.10
0.09	0.09	0.13	0.1	2.96	1.16	2.81	0.02	0.11
0.10	0.10	0.16	0.2	3.29	1.25	3.13	0.02	0.12
0.11	0.11	0.19	0.3	3.62	1.33	3.44	0.03	0.14
0.12	0.12	0.23	0.3	3.95	1.41	3.75	0.03	0.15
0.13	0.13	0.26	0.4	4.28	1.48	4.07	0.03	0.16
0.14	0.14	0.31	0.5	5.15	1.46	4.93	0.03	0.17
0.15	0.15	0.36	0.5	6.03	1.46	5.79	0.03	0.18
0.16	0.16	0.43	0.6	6.91	1.48	6.65	0.03	0.19
0.17	0.17	0.50	0.8	7.79	1.51	7.51	0.04	0.21
0.18	0.18	0.58	0.9	8.67	1.56	8.38	0.04	0.22
0.19	0.19	0.66	1.1	9.54	1.61	9.24	0.04	0.23
0.20	0.20	0.76	1.3	10.42	1.66	10.10	0.04	0.24
0.21	0.21	0.87	1.5	11.30	1.71	10.96	0.05	0.26
0.22	0.22	0.98	1.7	12.18	1.77	11.83	0.05	0.27
0.23	0.23	1.10	2.0	13.06	1.83	12.69	0.05	0.28
0.24	0.24	1.23	2.3	13.93	1.89	13.55	0.06	0.30
0.25	0.25	1.37	2.7	14.81	1.94	14.41	0.06	0.31
0.26	0.26	1.52	3.0	15.69	2.00	15.27	0.06	0.32
0.27	0.27	1.68	3.5	16.57	2.06	16.14	0.07	0.34
0.28	0.28	1.84	3.9	17.45	2.12	17.00	0.07	0.35
0.29	0.29	2.02	4.4	18.32	2.18	17.86	0.07	0.36
0.30	0.30	2.20	4.9	19.20	2.24	18.72	0.08	0.38
0.31	0.31	2.39	5.5	20.08	2.30	19.59	0.08	0.39
0.32	0.32	2.59	6.1	20.96	2.36	20.45	0.09	0.41
0.33	0.33	2.80	6.8	21.84	2.42	21.31	0.09	0.42
0.34	0.34	3.02	7.5	22.71	2.47	22.17	0.09	0.43
0.35	0.35	3.25	8.2	23.59	2.53	23.03	0.10	0.45
0.36	0.36	3.48	9.0	24.47	2.59	23.90	0.10	0.46
0.37	0.37	3.72	9.8	25.35	2.64	24.76	0.11	0.48
0.38	0.38	3.98	10.7	26.23	2.70	25.62	0.11	0.49
0.39	0.39	4.24	11.7	27.10	2.75	26.48	0.12	0.51
0.40	0.40	4.50	12.7	27.98	2.81	27.35	0.12	0.52
0.41	0.41	4.78	13.7	28.86	2.86	28.21	0.13	0.54
0.42	0.42	5.06	15.1	28.88	2.97	28.21	0.14	0.56
0.43	0.43	5.35	16.5	28.90	3.08	28.22	0.15	0.58

ACTUAL Q = 17 cfs

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	19.5	28.94	3.29	28.23	0.17	0.62
0.46	0.46	6.19	21.0	28.96	3.40	28.23	0.18	0.64
0.47	0.47	6.48	22.6	28.98	3.50	28.24	0.19	0.66
0.48	0.48	6.76	24.3	29.01	3.60	28.24	0.20	0.68
0.49	0.49	7.04	26.0	29.03	3.69	28.25	0.21	0.70
0.50	0.50	7.32	27.8	29.05	3.79	28.25	0.22	0.72
0.51	0.51	7.61	29.5	29.07	3.88	28.26	0.23	0.74
0.52	0.52	7.89	31.4	29.09	3.98	28.26	0.25	0.77
0.53	0.53	8.17	33.3	29.11	4.07	28.27	0.26	0.79
0.54	0.54	8.45	35.2	29.13	4.16	28.27	0.27	0.81
0.55	0.55	8.74	37.2	29.15	4.25	28.28	0.28	0.83
0.56	0.56	9.02	39.2	29.17	4.34	28.28	0.29	0.85
0.57	0.57	9.30	41.2	29.19	4.43	28.29	0.30	0.87
0.58	0.58	9.59	43.3	29.21	4.52	28.29	0.32	0.90
0.59	0.59	9.87	45.4	29.23	4.60	28.30	0.33	0.92

STANDARD CURB LIMIT

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

MANNING'S N= .017 SLOPE= .0124

LONE PINE

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.28	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.44	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.57	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	0.69	1.25	0.01	0.05
0.05	0.05	0.04	0.0	1.64	0.80	1.56	0.01	0.06
0.06	0.06	0.06	0.1	1.97	0.91	1.88	0.01	0.07
0.07	0.07	0.08	0.1	2.30	1.01	2.19	0.02	0.09
0.08	0.08	0.10	0.1	2.63	1.10	2.50	0.02	0.10
0.09	0.09	0.13	0.2	2.96	1.19	2.81	0.02	0.11
0.10	0.10	0.16	0.2	3.29	1.28	3.13	0.03	0.13
0.11	0.11	0.19	0.3	3.62	1.36	3.44	0.03	0.14
0.12	0.12	0.23	0.3	3.95	1.44	3.75	0.03	0.15
0.13	0.13	0.26	0.4	4.28	1.52	4.07	0.04	0.17
0.14	0.14	0.31	0.5	5.15	1.49	4.93	0.03	0.17
0.15	0.15	0.36	0.5	6.03	1.49	5.79	0.03	0.18
0.16	0.16	0.43	0.6	6.91	1.52	6.65	0.04	0.20
0.17	0.17	0.50	0.8	7.79	1.55	7.51	0.04	0.21
0.18	0.18	0.58	0.9	8.67	1.60	8.38	0.04	0.22
0.19	0.19	0.66	1.1	9.54	1.65	9.24	0.04	0.23
0.20	0.20	0.76	1.3	10.42	1.70	10.10	0.04	0.24
0.21	0.21	0.87	1.5	11.30	1.76	10.96	0.05	0.26
0.22	0.22	0.98	1.8	12.18	1.81	11.83	0.05	0.27
0.23	0.23	1.10	2.1	13.06	1.87	12.69	0.05	0.28
0.24	0.24	1.23	2.4	13.93	1.93	13.55	0.06	0.30
0.25	0.25	1.37	2.7	14.81	1.99	14.41	0.06	0.31
0.26	0.26	1.52	3.1	15.69	2.05	15.27	0.07	0.33
0.27	0.27	1.68	3.6	16.57	2.12	16.14	0.07	0.34
0.28	0.28	1.84	4.0	17.45	2.18	17.00	0.07	0.35
0.29	0.29	2.02	4.5	18.32	2.24	17.86	0.08	0.37
0.30	0.30	2.20	5.1	19.20	2.30	18.72	0.08	0.38
0.31	0.31	2.39	5.6	20.08	2.36	19.59	0.09	0.40
0.32	0.32	2.59	6.3	20.96	2.42	20.45	0.09	0.41
0.33	0.33	2.80	6.9	21.84	2.48	21.31	0.10	0.43
0.34	0.34	3.02	7.7	22.71	2.54	22.17	0.10	0.44
0.35	0.35	3.25	8.4	23.59	2.59	23.03	0.10	0.45
0.36	0.36	3.48	9.2	24.47	2.65	23.90	0.11	0.47
0.37	0.37	3.72	10.1	25.35	2.71	24.76	0.11	0.48
0.38	0.38	3.98	11.0	26.23	2.77	25.62	0.12	0.50
0.39	0.39	4.24	12.0	27.10	2.82	26.48	0.12	0.51
0.40	0.40	4.50	13.0	27.98	2.88	27.35	0.13	0.53
0.41	0.41	4.78	14.0	28.86	2.94	28.21	0.13	0.54
0.42	0.42	5.06	15.4	28.88	3.05	28.21	0.14	0.56
0.43	0.43	5.35	16.9	28.90	3.16	28.22	0.16	0.59

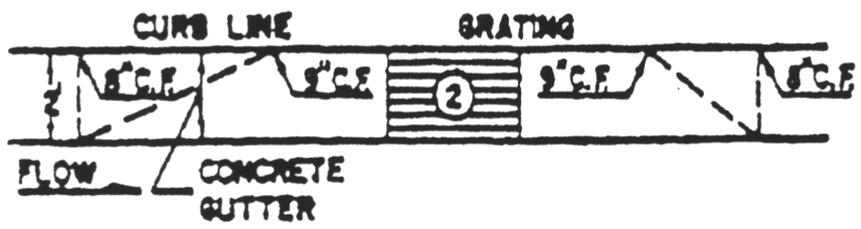
WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	20.0	28.94	3.38	28.23	0.18	0.63
0.46	0.46	6.19	21.6	28.96	3.48	28.23	0.19	0.65
0.47	0.47	6.48	23.2	28.98	3.58	28.24	0.20	0.67
0.48	0.48	6.76	24.9	29.01	3.69	28.24	0.21	0.69
0.49	0.49	7.04	26.7	29.03	3.79	28.25	0.22	0.71
0.50	0.50	7.32	28.4	29.05	3.88	28.25	0.23	0.73
0.51	0.51	7.61	30.3	29.07	3.98	28.26	0.25	0.76
0.52	0.52	7.89	32.2	29.09	4.08	28.26	0.26	0.78
0.53	0.53	8.17	34.1	29.11	4.17	28.27	0.27	0.80
0.54	0.54	8.45	36.1	29.13	4.27	28.27	0.28	0.82
0.55	0.55	8.74	38.1	29.15	4.36	28.28	0.30	0.85
0.56	0.56	9.02	40.1	29.17	4.45	28.28	0.31	0.87
0.57	0.57	9.30	42.2	29.19	4.54	28.29	0.32	0.89
0.58	0.58	9.59	44.4	29.21	4.63	28.29	0.33	0.91
0.59	0.59	9.87	46.6	29.23	4.72	28.30	0.35	0.94

ACTUAL Q = 22.5 c

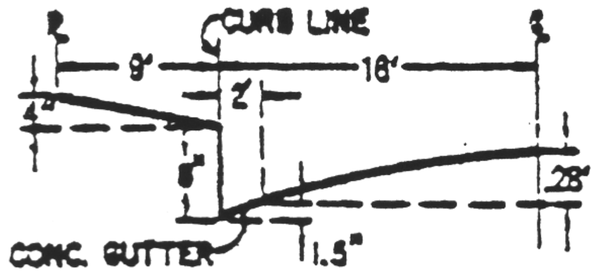
STANDARD CURB LIMIT

LONE RIVER

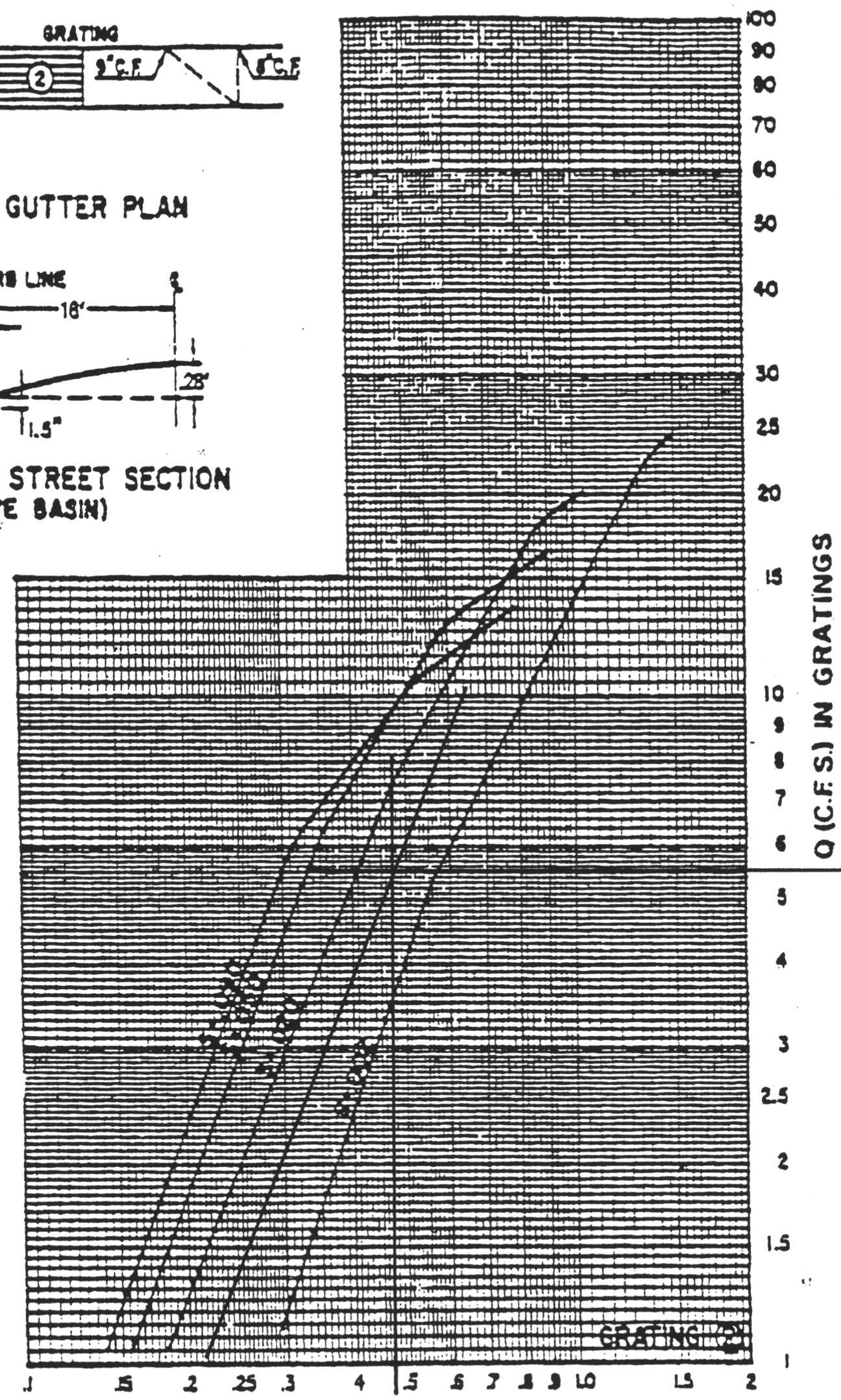
GRATING CAPACITIES FOR TYPE 'A', 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



5.5

d = 0.47 ft

PLATE 22.3 D-5

MANNING'S N= .017 SLOPE= .0076

LONESOME DOVE

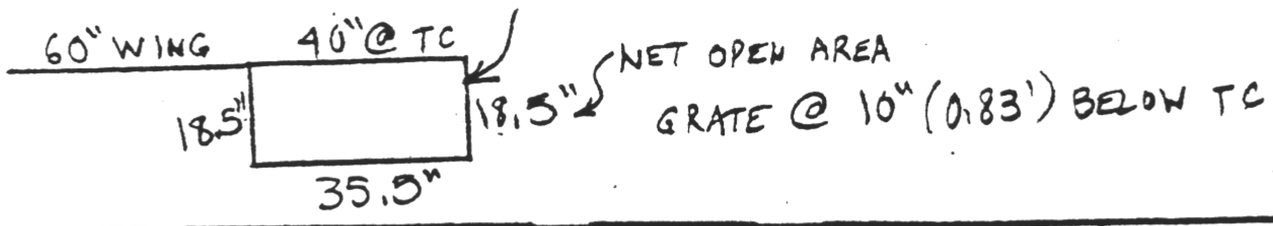
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00

WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.01	0.01	0.00	0.0	0.33	0.22	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.34	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.45	0.94	0.00	0.03
0.04	0.04	0.03	0.0	1.32	0.54	1.25	0.00	0.04
0.05	0.05	0.04	0.0	1.64	0.63	1.56	0.01	0.06
0.06	0.06	0.06	0.0	1.97	0.71	1.88	0.01	0.07
0.07	0.07	0.08	0.1	2.30	0.79	2.19	0.01	0.08
0.08	0.08	0.10	0.1	2.63	0.86	2.50	0.01	0.09
0.09	0.09	0.13	0.1	2.96	0.93	2.81	0.01	0.10
0.10	0.10	0.16	0.2	3.29	1.00	3.13	0.02	0.12
0.11	0.11	0.19	0.2	3.62	1.07	3.44	0.02	0.13
0.12	0.12	0.23	0.3	3.95	1.13	3.75	0.02	0.14
0.13	0.13	0.26	0.3	4.28	1.19	4.07	0.02	0.15
0.14	0.14	0.31	0.4	5.15	1.17	4.93	0.02	0.16
0.15	0.15	0.36	0.4	6.03	1.17	5.79	0.02	0.17
0.16	0.16	0.43	0.5	6.91	1.19	6.65	0.02	0.18
0.17	0.17	0.50	0.6	7.79	1.22	7.51	0.02	0.19
0.18	0.18	0.58	0.7	8.67	1.25	8.38	0.02	0.20
0.19	0.19	0.66	0.9	9.54	1.29	9.24	0.03	0.22
0.20	0.20	0.76	1.0	10.42	1.33	10.10	0.03	0.23
0.21	0.21	0.87	1.2	11.30	1.37	10.96	0.03	0.24
0.22	0.22	0.98	1.4	12.18	1.42	11.83	0.03	0.25
0.23	0.23	1.10	1.6	13.06	1.47	12.69	0.03	0.26
0.24	0.24	1.23	1.9	13.93	1.51	13.55	0.04	0.28
0.25	0.25	1.37	2.1	14.81	1.56	14.41	0.04	0.29
0.26	0.26	1.52	2.4	15.69	1.61	15.27	0.04	0.30
0.27	0.27	1.68	2.8	16.57	1.66	16.14	0.04	0.31
0.28	0.28	1.84	3.1	17.45	1.70	17.00	0.05	0.33
0.29	0.29	2.02	3.5	18.32	1.75	17.86	0.05	0.34
0.30	0.30	2.20	4.0	19.20	1.80	18.72	0.05	0.35
0.31	0.31	2.39	4.4	20.08	1.85	19.59	0.05	0.36
0.32	0.32	2.59	4.9	20.96	1.89	20.45	0.06	0.38
0.33	0.33	2.80	5.4	21.84	1.94	21.31	0.06	0.39
0.34	0.34	3.02	6.0	22.71	1.98	22.17	0.06	0.40
0.35	0.35	3.25	6.6	23.59	2.03	23.03	0.06	0.41
0.36	0.36	3.48	7.2	24.47	2.08	23.90	0.07	0.43
0.37	0.37	3.72	7.9	25.35	2.12	24.76	0.07	0.44
0.38	0.38	3.98	8.6	26.23	2.17	25.62	0.07	0.45
0.39	0.39	4.24	9.4	27.10	2.21	26.48	0.08	0.47
0.40	0.40	4.50	10.2	27.98	2.26	27.35	0.08	0.48
0.41	0.41	4.78	11.0	28.86	2.30	28.21	0.08	0.49
0.42	0.42	5.06	12.1	28.88	2.39	28.21	0.09	0.51
0.43	0.43	5.35	13.2	28.90	2.47	28.22	0.10	0.53

ROLL CURB LIMIT

ACTUAL Q

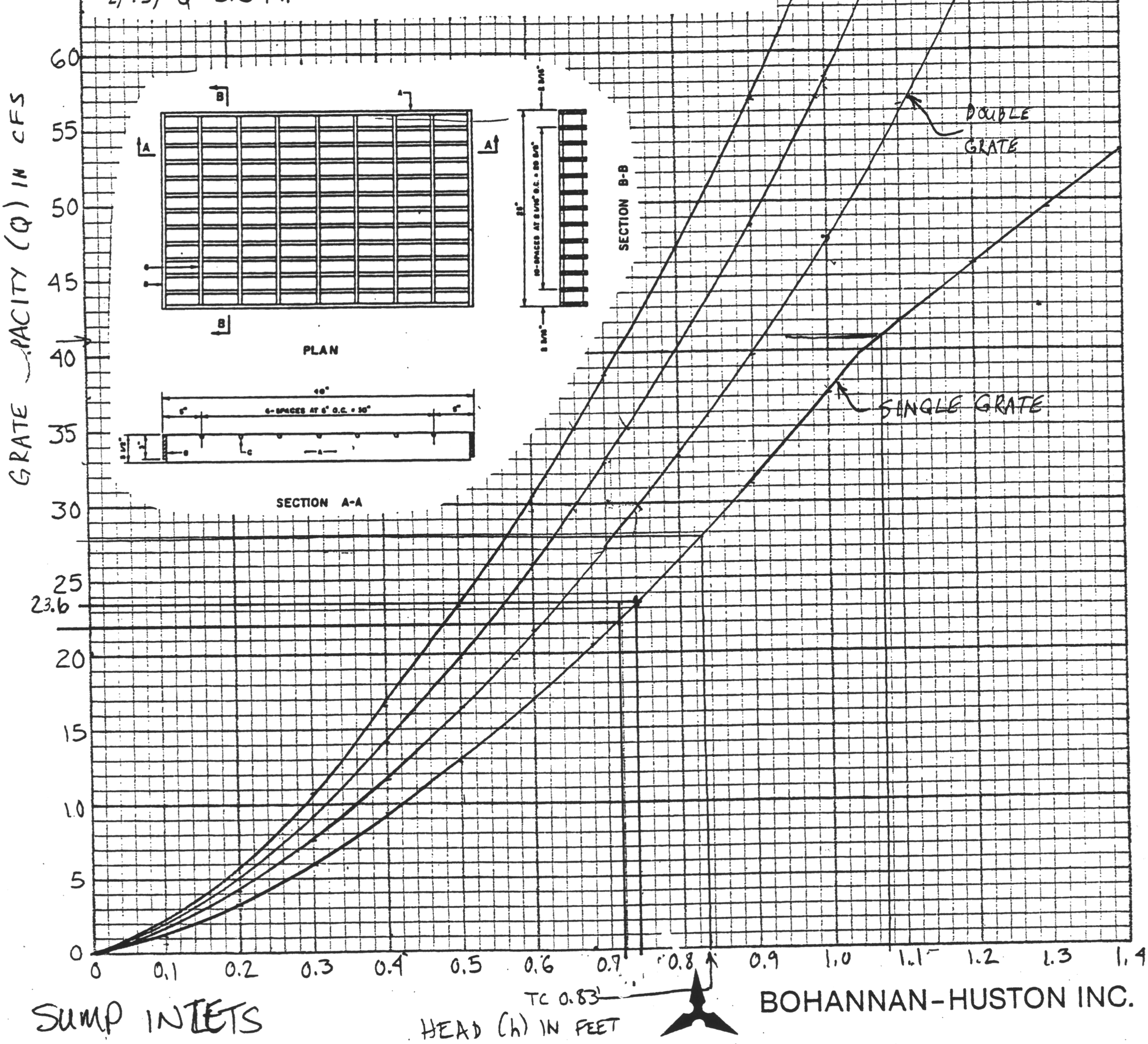
WSEL (FT)	DEPTH INC (FT)	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID (FT)	VEL HEAD (FT)	ENERGY HEAD (FT)
0.45	0.45	5.91	15.6	28.94	2.64	28.23	0.11	0.56
0.46	0.46	6.19	16.9	28.96	2.73	28.23	0.12	0.58
0.47	0.47	6.48	18.2	28.98	2.81	28.24	0.12	0.59
0.48	0.48	6.76	19.5	29.01	2.89	28.24	0.13	0.61
0.49	0.49	7.04	20.9	29.03	2.96	28.25	0.14	0.63
0.50	0.50	7.32	22.3	29.05	3.04	28.25	0.14	0.64
0.51	0.51	7.61	23.7	29.07	3.12	28.26	0.15	0.66
0.52	0.52	7.89	25.2	29.09	3.19	28.26	0.16	0.68
0.53	0.53	8.17	26.7	29.11	3.27	28.27	0.17	0.70
0.54	0.54	8.45	28.2	29.13	3.34	28.27	0.17	0.71
0.55	0.55	8.74	29.8	29.15	3.41	28.28	0.18	0.73
0.56	0.56	9.02	31.4	29.17	3.48	28.28	0.19	0.75



EQUATION	SGL A	DBL A	TRPL A	QDPL A
1) ORIFICE	$22.0\,h^{0.5} + 16.5\,h^{1.5}$	$43.9\,h^{0.5} + 16.5\,h^{1.5}$	$65.9\,h^{0.5} + 16.5\,h^{1.5}$	$87.8\,h^{0.5} + 16.5\,h^{1.5}$
2) 3-SIDED WEIR ($h \le 0.83'$)	$36.4\,h^{1.5}$	$46.2\,h^{1.5}$	$56.0\,h^{1.5}$	$65.7\,h^{1.5}$
3) 4-SIDED WEIR ($h > 0.83'$)	ADD TO 2): $11(h-.83)^{1.5}$	ADD TO 2): $22(h-.83)^{1.5}$	ADD TO 2): $33(h-.83)^{1.5}$	ADD TO 2): $44(h-.83)^{1.5}$

1) $Q = 0.6\,A\sqrt{2gh} + 3.3(5')\,h^{1.5}$

2) & 3) $Q = 3.3\,P\,h^{1.5}$



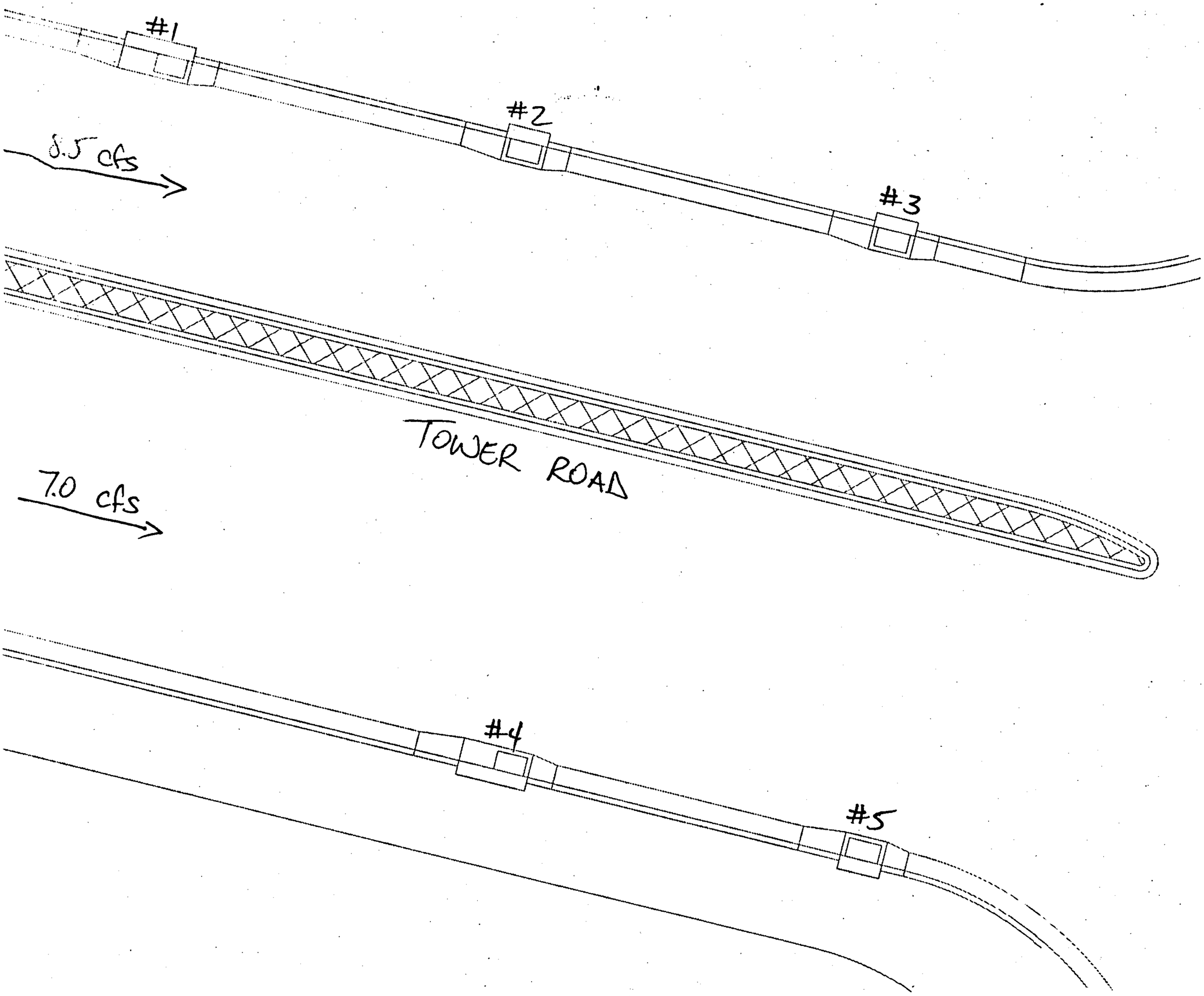
SUMP INLETS

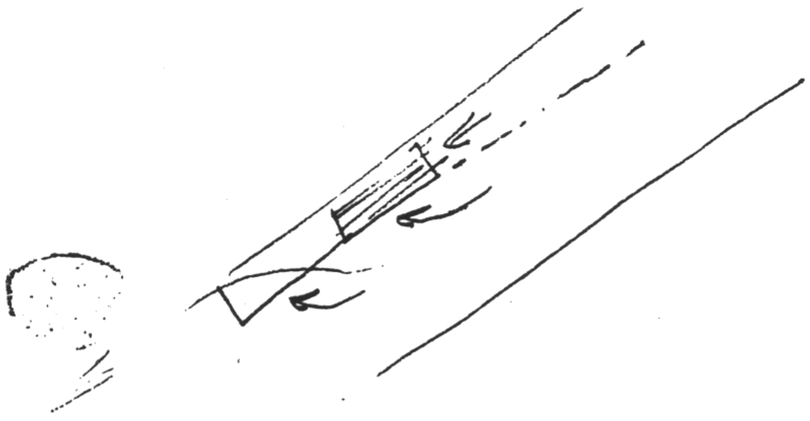
BOHANNAN-HUSTON INC.

PROJECT NAME _____ SHEET _____ OF _____

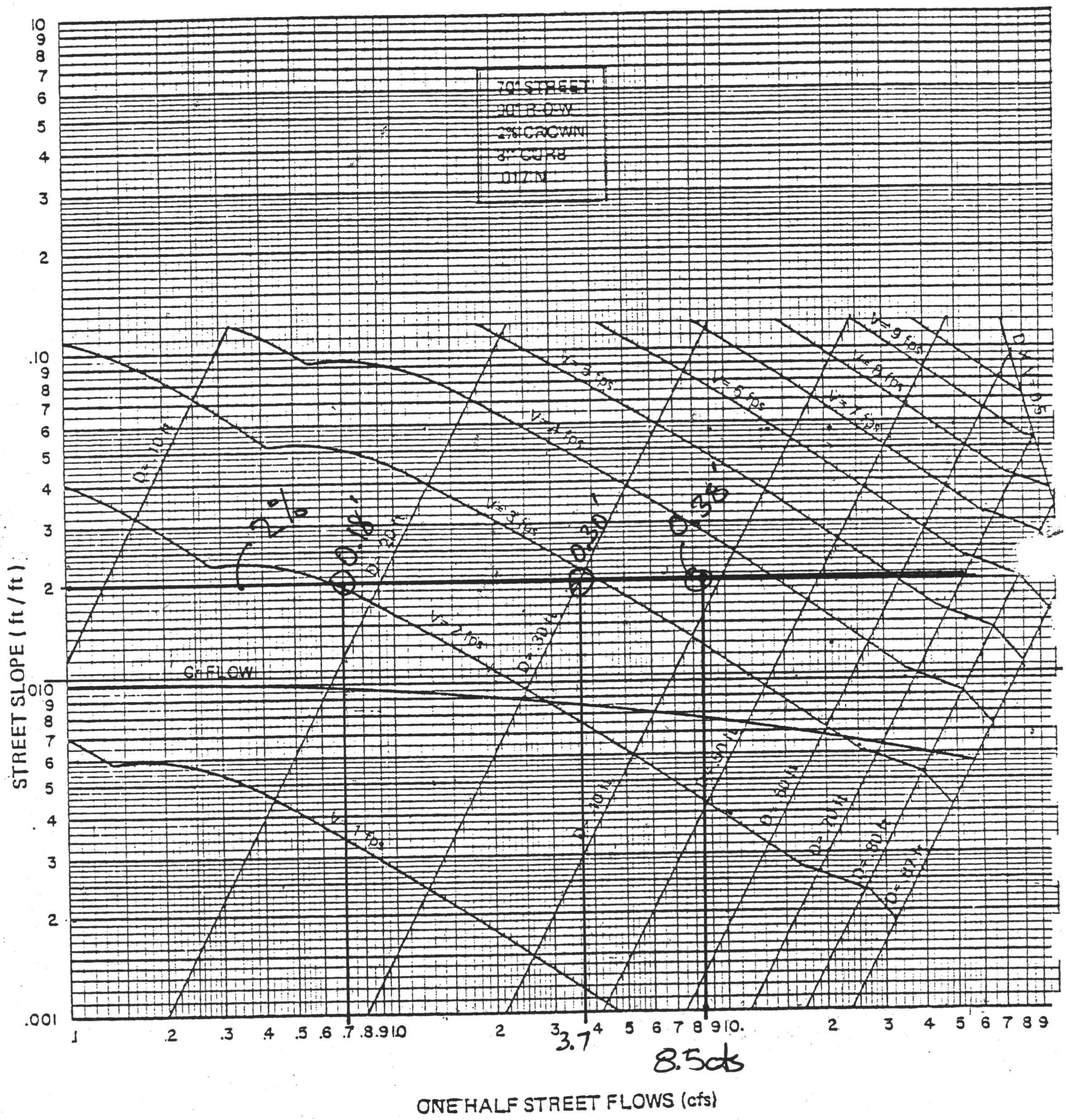
PROJECT NO. _____ BY JPK DATE 4/9/92

SUBJECT RATING CURVE FOR TYPE A INLETS CH'D _____ DATE _____


#1
#2
#3
8.5 cfs
TOWER ROAD
7.0 cfs
#4
#5



TOWER ROAD
STREET CAPACITY
INLETS 1, 2, 3



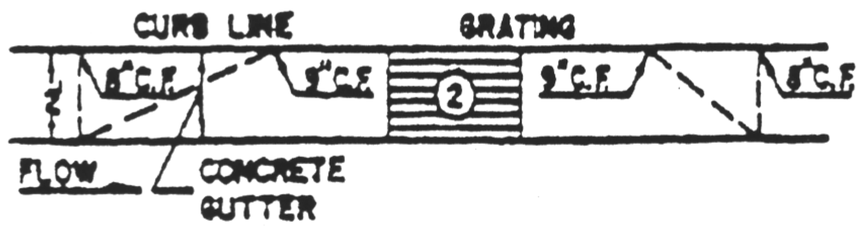
REV. 3-83

PLATE 22.3 D-4

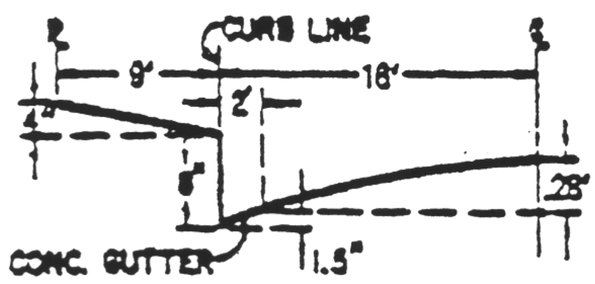
B-15

TOWER ROAD
INLETS 1, 2, 3

GRATING CAPACITIES FOR TYPE 'A', 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

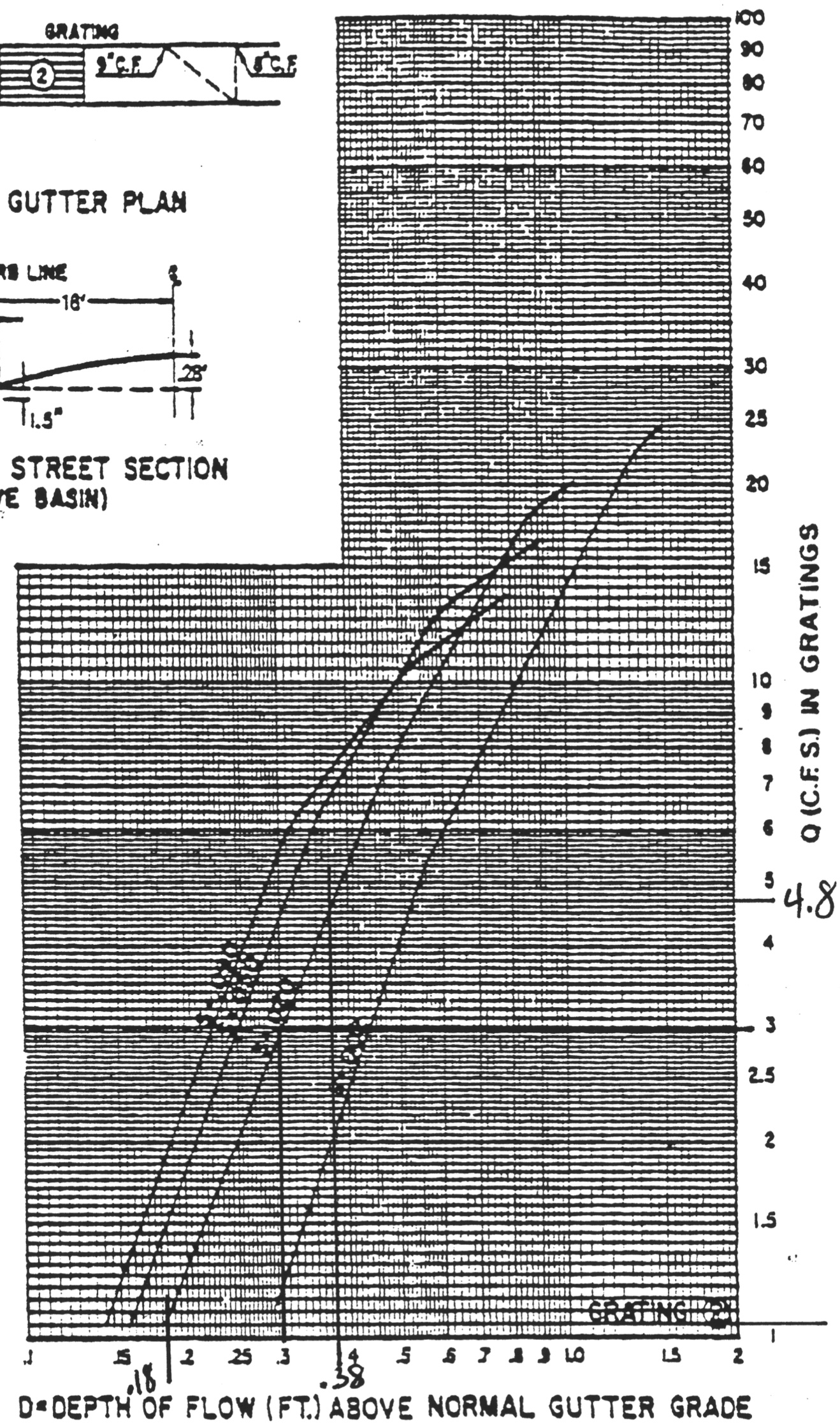
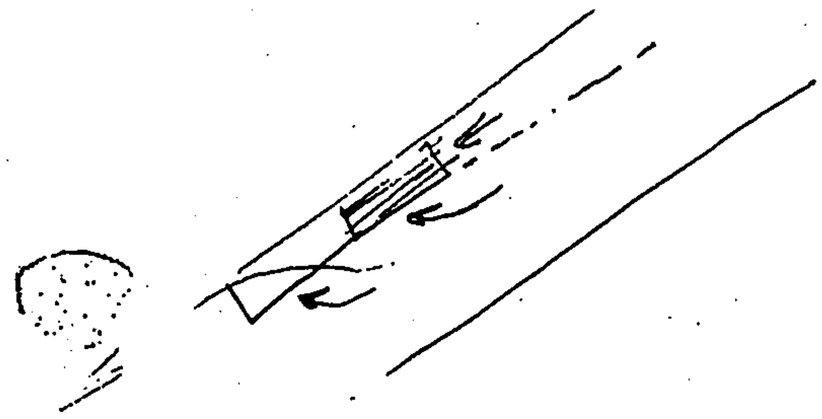
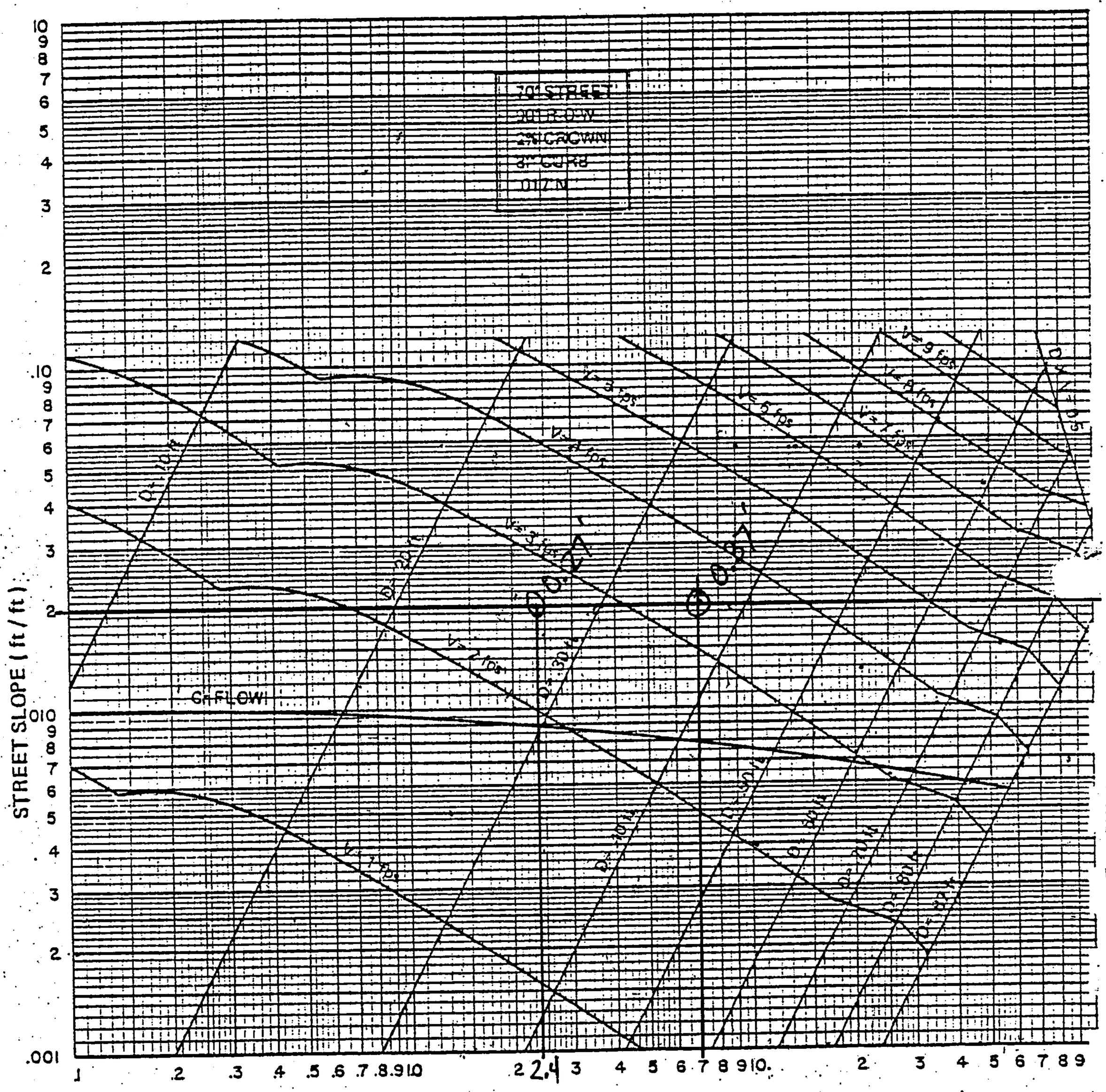


PLATE 22.3 D-5



STREET CAPACITY

TOWER ROAD
INLETS 4,5



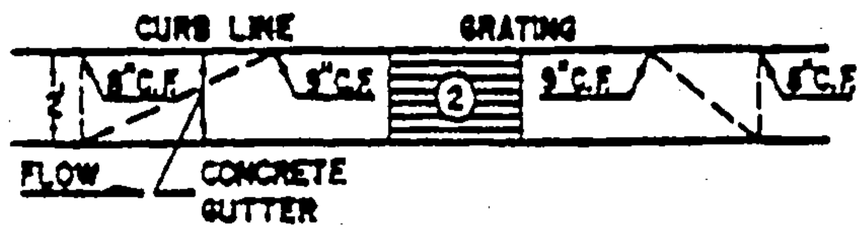
REV. 3-83

PLATE 22.3 D-4

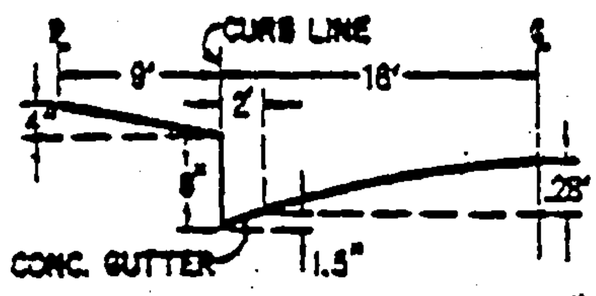
B-17

TOWER ROAD
INLETS 4,5

GRATING CAPACITIES FOR TYPE 'A', 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

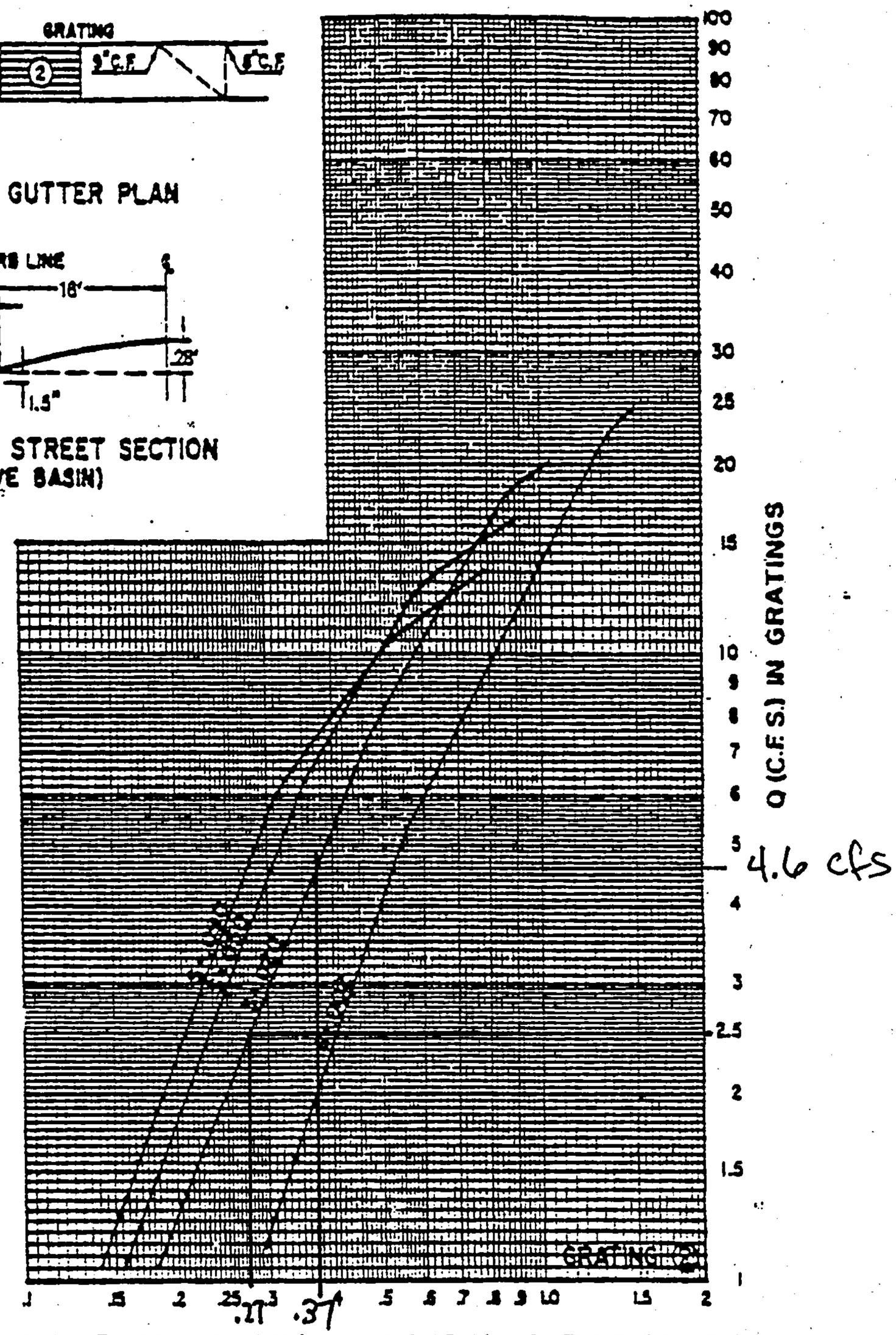


PLATE 22.3 D-5

APPENDIX C

INFRASTRUCTURE LIST

Current DRC
Project No. _____

Date Submitted: July 19, 2002

Date Site Plan Approved: N/A

Date Preliminary Plat Approved: _____

Date Preliminary Plat Expiers: _____

DRB Project No. _____

APPLICATION NO.

Figure 12

INFRASTRUCTURE LIST

EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

SUNRISE RANCH SOUTH
UNITS 1 AND 2
PRELIMINARY PLAT

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This Listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City.

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
			UNIT 1 PUBLIC ROADWAY IMPROVEMENTS						
		12' F-EOP 32' F-F TOTAL	RESIDENTIAL PAVING W/ PCC CURB & GUTTER SOUTH SIDE ONLY 4' SIDEWALK ON SOUTH SIDE ONLY	EUCARIZ RD	MORNING DEW WAY	EAST BOUNDARY LINE	/	/	/
		46' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON EAST SIDE ONLY	MORNING DEW WAY	KING RANCH LANE	EUCARIZ ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON BOTH SIDES*	KING RANCH LANE	MORNING DEW WAY	LONE RIVER TRAIL	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON NORTH SIDE ONLY*	KING RANCH LANE	LONE RIVER TRAIL	STUB TERMINUS	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON BOTH SIDES*	LONE RIVER TRAIL	KING RANCH LANE	LADDER RANCH LANE	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON NORTH SIDE ONLY*	HIDEOUT LANE	LONE RIVER TRAIL	STUB TERMINUS	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON BOTH SIDES*	LADDER RANCH LANE	ANGUS WAY	LONESOME DOVE TR	/	/	/
		32' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON WEST SIDE ONLY	ANGUS WAY	TOWER RD	LADDER RANCH LANE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON BOTH SIDES*	LONESOME DOVE TR	LADDER RANCH LANE	CUL-DE-SAC TERMINUS	/	/	/
			* SIDEWALKS TO BE DEFERRED. WAIVER OF SIDEWALKS ON WEST SIDE OF STUB STREETS STREET LIGHTS AS PER COA DPM				/	/	/

C-1

UNIT 1 PUBLIC STORM DRAIN IMPROVEMENTS

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		18"-36" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	25' EASEMENT	TOWER ROAD	LADDER RANCH LANE	/	/	/
		18"-36" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	LADDER RANCH LANE	25' EASEMENT	LONE RIVER TRAIL	/	/	/
		18"-36" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	LONE RIVER TRAIL	LADDER RANCH LANE	30' NORTH OF LADDER RANCH LANE	/	/	/

NOTE: A GRADING AND DRAINAGE CERTIFICAITON OF THE APPROVED GRADING PLAN IS REQUIRED PRIOR TO THE RELEASE OF FINANCIAL GUARANTEES.

UNIT 1 PUBLIC WATERLINE IMPROVEMENTS

		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	KING RANCH LANE	MORNING DEW WAY	LONE RIVER TRAIL	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	KING RANCH LANE	LONE RIVER TRAIL	STUB TERMINUS	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	LONE RIVER TRAIL	LADDER RANCH LANE	KING RANCH LANE	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	HIDEOUT LANE	LONE RIVER TRAIL	STUB TERMINUS	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	TRACT 'B'	LONE RIVER TRAIL	WEST PHASE BOUNDARY	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	LADDER RANCH LANE	ANGUS WAY	LONESOME DOVE TR	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	LONESOME DOVE TR	LADDER RANCH LANE	CUL-DE-SAC TERMINUS	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	ANGUS WAY	LADDER RANCH LANE	TOWER RD	/	/	/
		4" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	20' WL EASEMENT	LONESOME DOVE TR	LONE RIVER TRAIL	/	/	/

C-2

UNIT 1 PUBLIC SANITARY SEWER IMPROVEMENTS

		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	KING RANCH LANE	STUB TERMINUS	WEST PHASE BOUNDARY	/ / /
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	LONE RIVER TRAIL	KING RANCH LANE	LADDER RANCH LANE	/ / /
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	HIDEOUT LANE	STUB TERMINUS	LONE RIVER TRAIL	/ / /
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	TRACT 'B'	WEST PHASE BNDRY	LONE RIVER TRAIL	/ / /
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	LADDER RANCH LANE	ANGUS WAY	25' EASEMENT	/ / /
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	LONESOME DOVE TR	CUL-DE-SAC TERMINUS	25' EASEMENT	/ / /
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	25' EASEMENT	LADDER RANCH LANE	TOWER ROAD	/ / /

C-3

UNIT 2

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
			UNIT 2 PUBLIC ROADWAY IMPROVEMENTS						
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON BOTH SIDES*	KING RANCH LANE	MORNING DEW WAY	SADDLE BLANKET TR	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON NORTH SIDE ONLY*	KING RANCH LANE	SADDLE BLANKET TR	STUB TERMINUS	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON BOTH SIDES*	SADDLE BLANKET TR	KING RANCH LANE	LADDER RANCH LANE	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON SOUTH SIDE ONLY*	PONY LANE	SADDLE BLANKET TR	STUB TERMINUS	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON BOTH SIDES*	LADDER RANCH LANE	SADDLE BLANKET TR	ANGUS WAY	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER & PCC 4' WIDE 4' SIDEWALK ON SOUTH SIDE ONLY*	LADDER RANCH LANE	STUB TERMINUS	SADDLE BLANKET TR	/	/	/

* SIDEWALKS TO BE DEFERRED. WAIVER OF SIDEWALKS ON WEST SIDE OF STUB STREETS
STREET LIGHTS AS PER COA DPM

C-4

UNIT 2 PUBLIC WATERLINE IMPROVEMENTS

		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	KING RANCH LANE	MORNING DEW WAY	SADDLE BLANKET TR	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	KING RANCH LANE	SADDLE BLANKET TR	STUB TERMINUS	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	SADDLE BLANKET TR	LADDER RANCH LANE	KING RANCH LANE	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	PONY LANE	SADDLE BLANKET TR	TRACT 'B' (EX. STUB)	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	LADDER RANCH LANE	ANGUS WAY (EX. STUB)	SADDLE BLANKET TR	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	LADDER RANCH LANE	SADDLE BLANKET TR	STUB TERMINUS	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	MORNING DEW WAY	EUCARIZ RD	KING RANCH LANE	/	/	/

UNIT 2 PUBLIC SANITARY SEWER IMPROVEMENTS

		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	KING RANCH LANE	STUB TERMINUS	EAST PHASE BOUNDARY (EX. STUB)	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	SADDLE BLANKET TR	KING RANCH LANE	LADDER RANCH LANE	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PONY LANE	SADDLE BLANKET TR	TRACT 'B' (EX. STUB)	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	LADDER RANCH LANE	STUB TERMINUS	ANGUS WAY (EX. STUB)	/	/	/

S-2

RICK BELTRAMO PREPARED BY: PRINT NAME	07/19/02 DATE	DRB CHAIR	DATE	PARKS & RECREATION DEPARTMENT	DATE
BOHANNAN HUSTON INC. FIRM:		TRANSPORTATION DEVELOPMENT	DATE	AMAFCA	DATE
SIGNATURE	7/18/02 DATE	UTILITY DEVELOPMENT	DATE	CITY ENGINEER	DATE
MAXIMUM TIME ALLOW TO CONSTRUCT IMPROVEMENTS WITHOUT A DRB EXTENSION		N/A NEW MEXICO UTILITIES INC.	DATE		DATE

DESIGN REVIEW COMMITTEE REVISIONS

REVISION	DATE	DRC CHAIR	USER DEPARTMENT	AGENT/OWNER

C-6/6

PLATES

PLATE 1 - PRELIMINARY PLAT

PLATE 2 - GRADING PLAN

PLATE 3 - PROPOSED BASIN MAP

PLATE 1

PRELIMINARY PLAT

PRELIMINARY PLAT FOR
SUNRISE RANCH SOUTH
WITHIN THE
TOWN OF ATRISCO GRANT
PROJECTED SECTION 28
TOWNSHIP 10 NORTH, RANGE 2 EAST, N.M.P.M.
CITY OF ALBUQUERQUE
BERNALILLO COUNTY, NEW MEXICO
AUGUST 2002

NEW EASEMENTS

- (A) NEW 20' PUBLIC DRAINAGE, PUBLIC WATERLINE AND SANITARY SEWER EASEMENT AND PRIVATE PEDESTRIAN ACCESS EASEMENT.
- (B) NEW 15' PUBLIC WATERLINE EASEMENT.
- (C) NEW 25' PUBLIC SANITARY SEWER AND DRAINAGE EASEMENT.
- (D) PRIVATE ACCESS, PUBLIC DRAINAGE, WATER & SANITARY SEWER EASEMENT ON TRACT 'E'
- (E) 30' PUBLIC WATER AND SANITARY SEWER EASEMENT.
- (F) TRACT "B" IS ENCUMBERED BY A BLANKET PRIVATE PED. ACCESS EASEMENT AND PUBLIC DRAINAGE EASEMENT FOR THE JOINT USE AND BENEFIT OF LOTS 1 THRU 137 SUNRISE RANCH SOUTH.
- (G) NEW 5' X 25' GUY WIRE EASEMENT
- (H) NEW PRIVATE PEDESTRIAN ACCESS EASEMENT ON TRACTS "A" THRU "D"

EXISTING EASEMENTS

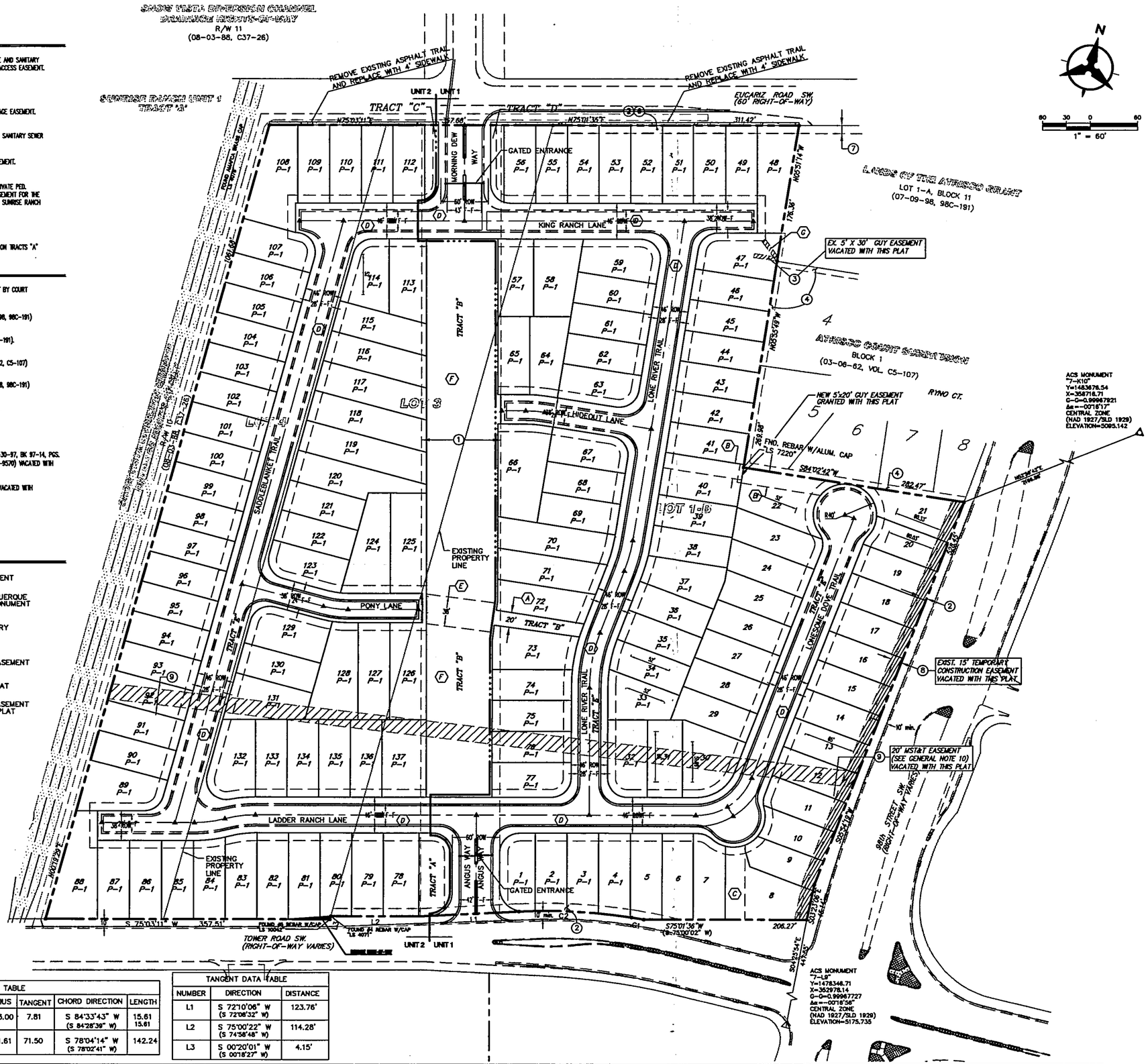
1. EXISTING 100' PNM TRANSMISSION LINE EASEMENT BY COURT ORDER CASE 65632
2. EXISTING 10' PUBLIC UTILITY EASEMENT (07-09-98, 98C-191)
3. EXISTING 5'x30' GUY EASEMENT (07-09-98, 98C-191). PORTIONS TO BE VACATED BY THIS PLAT.
4. EXISTING 7' PUBLIC UTILITY EASEMENT (03-06-62, C5-107)
5. * EXISTING 7' PUBLIC UTILITY EASEMENT (07-09-98, 98C-191)
6. 10' PNM & USWEST EASEMENT (06-08-98, BK. 9810, PG. 8841)
7. 10' PNM EASEMENT (06-08-98, BK. 9810, PG. 8847)
8. 15' TEMPORARY CONSTRUCTION EASEMENT (05-30-97, BK 97-14, PGS. 7642-7645) (06-12-97, BK 97-15, PGS. 9587-9570) VACATED WITH THIS PLAT
9. 20' MST&T EASEMENT (SEE GENERAL NOTE 10) VACATED WITH THIS PLAT

NOTE:

* NOT APPLICABLE TO THIS PLAT

LEGEND

- ▲ CENTER LINE MONUMENT
- FND. CITY OF ALBUQUERQUE CONTROL SURVEY MONUMENT
- DENOTES EXISTING SUBDIVISION BOUNDARY
- DENOTES EXISTING PROPERTY LINE
- DENOTES EXISTING EASEMENT
- DENOTES EASEMENT GRANTED BY THIS PLAT
- DENOTES EXISTING EASEMENT VACATED WITH THIS PLAT



CURVE DATA TABLE						
NUMBER	ARC LENGTH	DELTA ANGLE	RADIUS	TANGENT	CHORD DIRECTION	LENGTH
C1	15.61	01°03'40" (01°03'39")	843.00	7.81	S 84°33'43" W (S 84°28'39" W)	15.61 15.61
C2	142.49	11°48'17"	691.61	71.50	S 78°04'14" W (S 78°02'41" W)	142.24

TANGENT DATA TABLE		
NUMBER	DIRECTION	DISTANCE
L1	S 72°10'06" W (S 72°08'32" W)	123.76'
L2	S 75°00'22" W (S 74°58'48" W)	114.28'
L3	S 00°20'01" W (S 00°18'27" W)	4.15'

LEGAL DISCRIPTION

TRACTS 1-B, 3, & PORTION OF 4, BLOCK 11 LANDS OF ATRISCO GRANT

SITE DATA

GROSS ACREAGE	19.9896 AC
ZONE ATLAS NO.	L-9-Z
NO. OF EXISTING TRACTS	4 TRACTS
NO. OF TRACTS ELIMINATED	4 TRACTS
NO. OF LOTS CREATED	137 LOTS
NO. OF TRACTS CREATED	5 TRACTS
DATE OF SURVEY	MAY 2002
ZONING	R-T

GENERAL NOTES

1. UNLESS OTHERWISE NOTED, ALL BOUNDARY CORNERS SHOWN THUS + SHALL BE MARKED BY A #5 REBAR W/ CAP STAMPED ALS LS 7778.
2. ALL STREET CENTERLINE MONUMENTATION SHALL BE INSTALLED AT ALL CENTERLINE PC'S, PT'S, ANGLE POINTS, AND STREET INTERSECTIONS AND SHOWN THUS ▲, WILL BE MARKED BY A FOUR INCH (4") ALUMINUM CAP STAMPED:
   "CITY OF ALBUQUERQUE CENTERLINE MONUMENTATION"
   "DO NOT DISTURB"
   PS #11993"
3. BOUNDARY SHALL BE TIED TO THE NEW MEXICO STATE PLANE COORDINATE SYSTEM AS SHOWN.
4. BASIS OF BEARING SHALL BE NEW MEXICO STATE PLANE GRID BEARINGS.
5. ALL DISTANCES SHALL BE GROUND DISTANCES.
6. MANHOLES WILL BE OFFSET AT ALL POINTS OF CURVATURE, POINTS OF TANGENCY, STREET INTERSECTIONS, AND ALL OTHER ANGLE POINTS TO ALLOW USE OF CENTERLINE MONUMENTATION.
7. PRIVATE ACCESS: THIS SUBDIVISION IS PLANNED TO BE A GATED COMMUNITY. ALL ROADS WITHIN THE DEVELOPMENT EXISTING WITHIN TRACT E.
8. OPEN SPACE: TRACTS "A" THRU "D" ARE OPEN SPACE TRACTS ENCUMBERED BY PRIVATE PEDESTRIAN ACCESS EASEMENT.
9. HOME OWNERS ASSOCIATION: THIS SUBDIVISION WILL HAVE A HOMEOWNERS ASSOCIATION. THE HOMEOWNERS ASSOCIATION WILL OWN TRACTS "A" THRU "E" AND BE RESPONSIBLE FOR MAINTENANCE INCLUDING STREET AND LANDSCAPING IMPROVEMENTS. MAINTENANCE OF THE OPEN SPACE AREA LOCATED ON TRACT "B" IS ALSO THE RESPONSIBILITY OF THE HOMEOWNERS ASSOCIATION.
10. THESE TRACTS ARE AFFECTED BY A RIGHT-OF-WAY EASEMENT TO AMERICAN TELEPHONE & TELEGRAPH COMPANY, FILED MAY 17, 1930 RECORDED IN BOOK 112, PAGE 290, SAID EASEMENT AMENDED BY A MODIFICATION EASEMENT, FILED FEBRUARY 13, 1973 RECORDED IN BOOK MISC. 298, PAGE 835, SAID EASEMENT ASSIGNED TO THE MOUNTAIN STATES TELEPHONE AND TELEGRAPH COMPANY BY ASSIGNMENT FILED DECEMBER 19, 1977, RECORDED IN BOOK MISC. 575, PAGE 928 ALL BEING RECORDS OF BERNALILLO COUNTY, NEW MEXICO.
11. ALL CORNERS ARE 25' RADIUS AT ROW AND AT FACE OF CURB EXCEPT AT STUB STREETS. ALL STUB STREETS ARE 20' RADIUS AT ROW AND FACE OF CURB.

APPROVED FOR MONUMENTATION AND STREET NAMES

CITY SURVEYOR, CITY OF ALBUQUERQUE, N.M. — DATE

OWNER: LONGFORD HOMES OF NEW MEXICO, INC.

MARK RUHLMAN, DIVISION PRESIDENT — DATE

RECEIVED
AUG 19 2002
HYDROLOGY SECTION

Bohannan ▲ Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
ENGINEERING ▲ SPATIAL DATA ▲ ADVANCED TECHNOLOGIES

PLATE 2

GRADING PLAN

PLATE 3

PROPOSED BASIN MAP

DRAINAGE INFORMATION SHEET
(REV. 11/01/2001)

SUNRISE RANCH SOUTH SUBD

L-9/D30

PROJECT TITLE: ~~Sunrise Ranch~~ ZONE MAP/DRG. FILE # L-9
DRB #: EPC#: WORK ORDER#:

LEGAL DESCRIPTION: Tracts 1-B, 3, and Portions of 4, Block 11, Atrisco Grant
CITY ADDRESS: Tower / 98th Street

ENGINEERING FIRM: Bohannan Huston, Inc. CONTACT: Rick Beltramo
ADDRESS: 7500 Jefferson NE – Courtyard I PHONE: (505) 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Longford Group Inc. CONTACT: Mark Ruhlman
ADDRESS: 7301 Jefferson NE PHONE: (505) 761-9911
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:
- X DRAINAGE REPORT
- ___ DRAINAGE PLAN
- X CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ___ CLOMR/LOMR
- ___ TRAFFIC CIRCULATION LAYOUT (TCL)
- ___ ENGINEERS CERTIFICATION (TCL)
- ___ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ___ OTHER

CHECK TYPE OF APPROVAL SOUGHT:
- ___ SIA / FINANCIAL GUARANTEE RELEASE
- X 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
- ___ CERTIFICATE OF OCCUPANCY (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- X GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ OTHER (SPECIFY)

RECEIVED
JUL 19 2002
HYDROLOGY SECTION

WAS A PRE-DESIGN CONFERENCE ATTENDED:
- X YES
- ___ NO
- ___ COPY PROVIDED

DATE SUBMITTED: 7-19-02 BY: Rick Beltramo

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 26, 2002

Rick Beltramo, PE
Bohannan Huston, Inc
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sunrise Ranch South Subdivision Drainage Study
Engineer's Stamp dated 7-19-02, (L9/D30)

Dear Mr. Beltramo,

Based upon the information provided in your submittal dated 7-19-02, the above referenced Drainage Study cannot be approved for Preliminary Plat until the following comments are addressed.

- The pond outfall must be to a pipe. Please show an extension of your storm drain in Ladder Ranch Lane to the pond. You will also need a low-flow channel from Pony Lane to this outfall. What is the purpose of the rundown in King Ranch Lane?

- From the AHYMO model, basin B adds to the internal storm drain but the grading plan shows it draining to Tower. Is a water block needed in Angus Way? If B adds to the storm drain, wouldn't the pond also? Why isn't the pond routed in the AHYMO model? Please clarify this.

- You can only use the equation in Table A-5 for dwelling unit density of 6 per acre or less. Please provide a typical percent-impervious calculation for comparison. It is possible that a pond is not necessary in order to get under the 69 cfs allowable.

- The basin map shows no water in Tower crossing the Snow Vista channel. Do inlets west of the channel pick up all the upstream water? Are there enough inlets on your side to pick up all water in Tower plus any water from your subdivision? Please provide inlet calculations for this basin.

- You have 14 feet of fall across the pond. Please add more detail to the pond area by showing actual size and proposed pond bottom and slopes.

- Please label street names on the grading plan.

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- Per the DPM, the depth of flow cannot exceed the curb height (0.33' for roll curb) nor can the energy head exceed 0.2 feet above the curb. On Saddle Blanket, please revise your street capacity calculation to show that standard curb is necessary around lot 112 and on Lonesome Dove around lot 26. Indicate on the inlet nomograph what depth and Q you are designing for.

- What will Eucariz look like west of Morning Dew?

If you have any questions about my comments, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building Services

C: file

L-9/D30

DEVELOPMENT & BUILDING SERVICE CENTER
ONE STOP SHOP
600 SECOND ST. N.W.

ATTENTION: Kristal

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Records Withdrawal Form

Project No. L9/D30 **Date:** 9/13/04

Project Title: Sunrise Ranch South Grading Plan

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d. Other _____

Requested by: Rob M. Lieb **Phone No.:** 833-3938
Name and Company

Comments: (1) Copy plack (full size)

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Records Withdrawal Form

Project No. L9/D30 **Date:** 9/13/04

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d. Other _____

Requested by: Rob M. Lieb **Phone No.:** 833-3938
Name and Company

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