

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: SIERRA RANCH SUBDIVISION ZONE MAP/DRG. FILE # N-8/D3
DRB # 1003429 EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Sierra Ranch Unit 2
CITY ADDRESS: South of Gibson Blvd., East of 118th Street, West of Sierra Ranch Unit 1, North of Amole Mesa Avenue

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

OWNER: Bokay Construction CONTACT: Bo Johnson
ADDRESS: 5160 San Francisco NE PHONE: 899-9656
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:

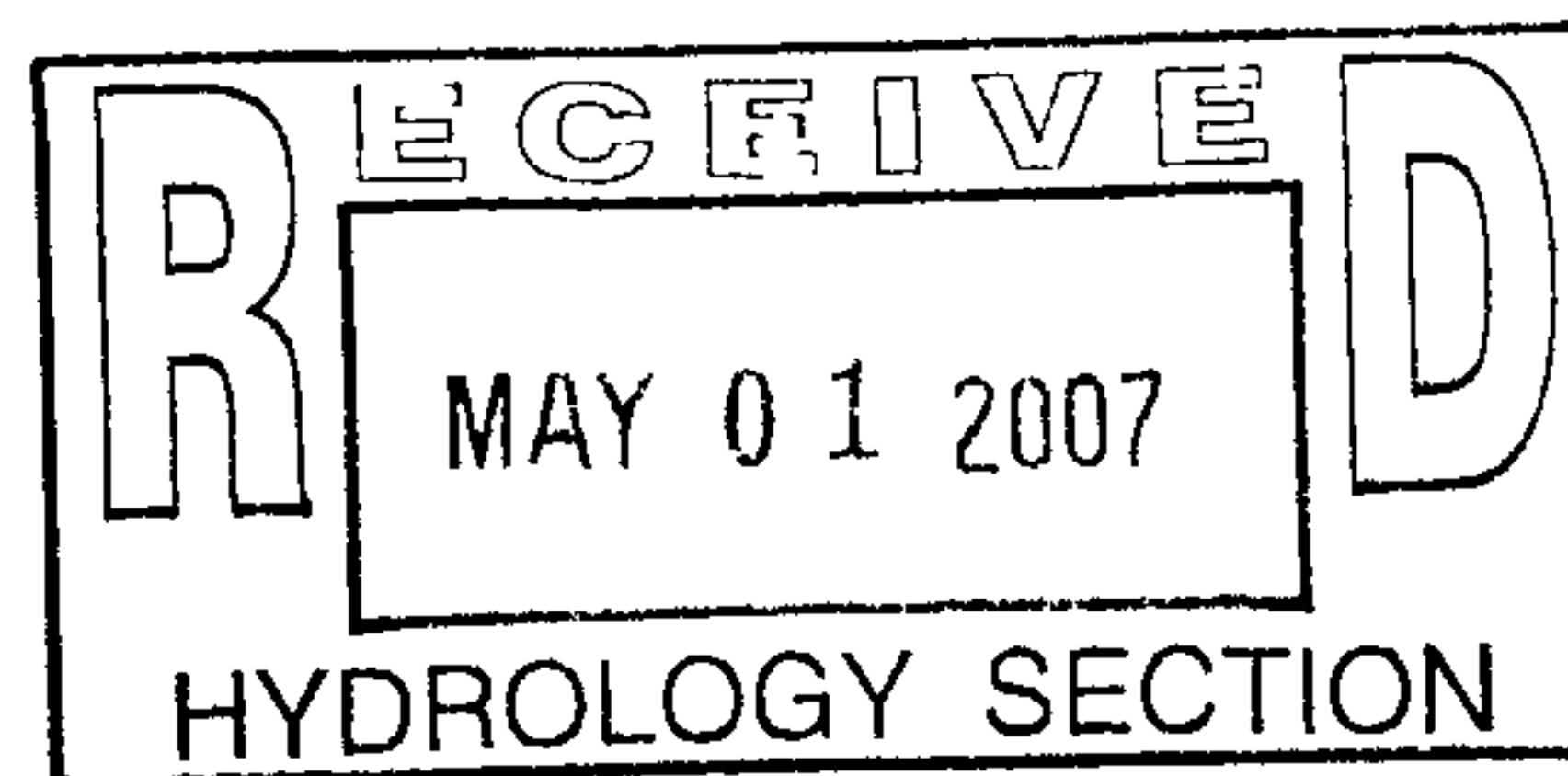
- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1st SUBMITTAL, **REQUIRES TCL or equal**
- ☒ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION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

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
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- ☐ FINAL PLAT APPROVAL
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- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☒ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED



DATE SUBMITTED: April 26, 2007 BY: Scott Steffen

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.

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

April 30, 2007

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

Re: Sierra Ranch Unit 2 Subdivision, COA Project No. 757582; DRB Case No. 1003429
Offsite Drainage Design Approval

Dear Mr. Bingham:

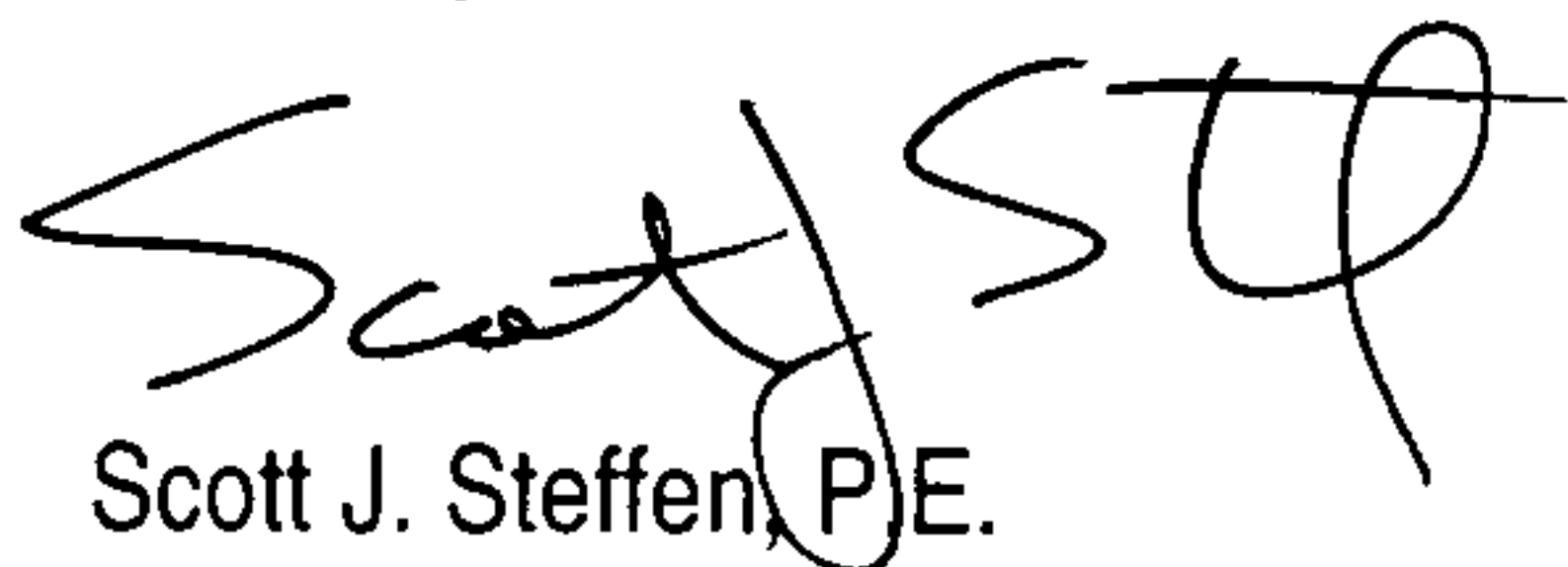
Pursuant to our field meeting on April 4, 2007 with Lynn Mazur of AMAFCA this letter provides clarification of the proposed design for handling the offsite drainage impacting Sierra Ranch Unit 2 and requests your approval of that design. Enclosed for you information are a revised off-site basin map showing the 118th Street right-of-way, the PNM and AMAFCA easements on the west and east side of 118th Street, respectively, and the Sierra Ranch storm drain system.

The approved infrastructure list provides two options for intercepting and controlling offsite drainage that impacts Sierra Ranch Unit 2 from the west. Option 1 calls for an interim South Powerline Channel located in the 200-foot PNM easement west of 118th Street. Option 2 calls for two temporary retention ponds located in the 150-foot AMAFCA easement east of 118th Street. As was discussed in the field our preferred method for handling the offsite flows is Option 2. The ponds shown on the basin map are sized to accept undeveloped flows and contain twice the 100-year, 6-hour storm volume.

Our client, Bokay Construction, requests that AMAFCA maintain the ponds.

Your review and approval is requested so that pond construction can be completed with the site grading for Sierra Ranch Unit 2. I appreciate your time and consideration. If you have questions or require additional information, please contact me at 823-1000.

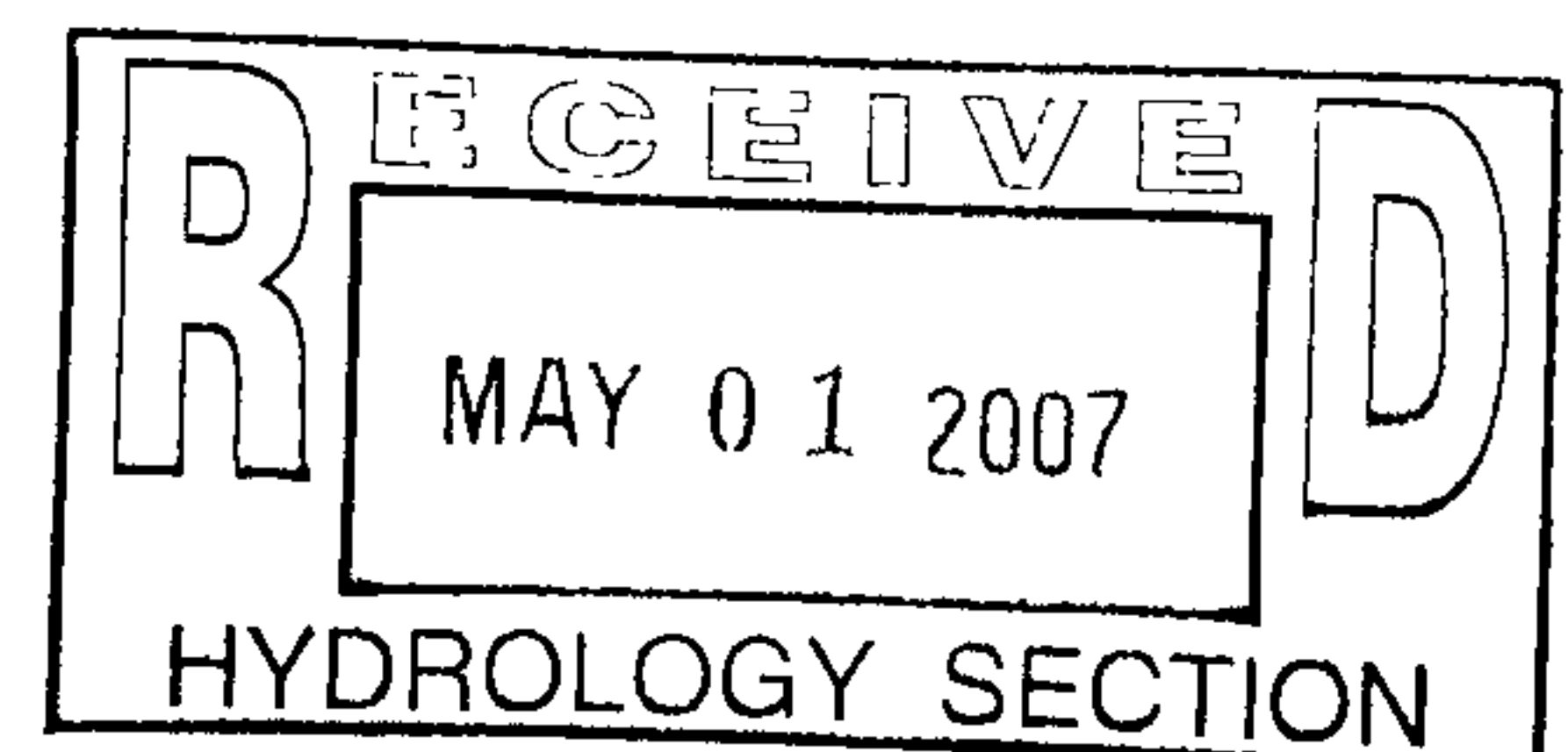
Sincerely,

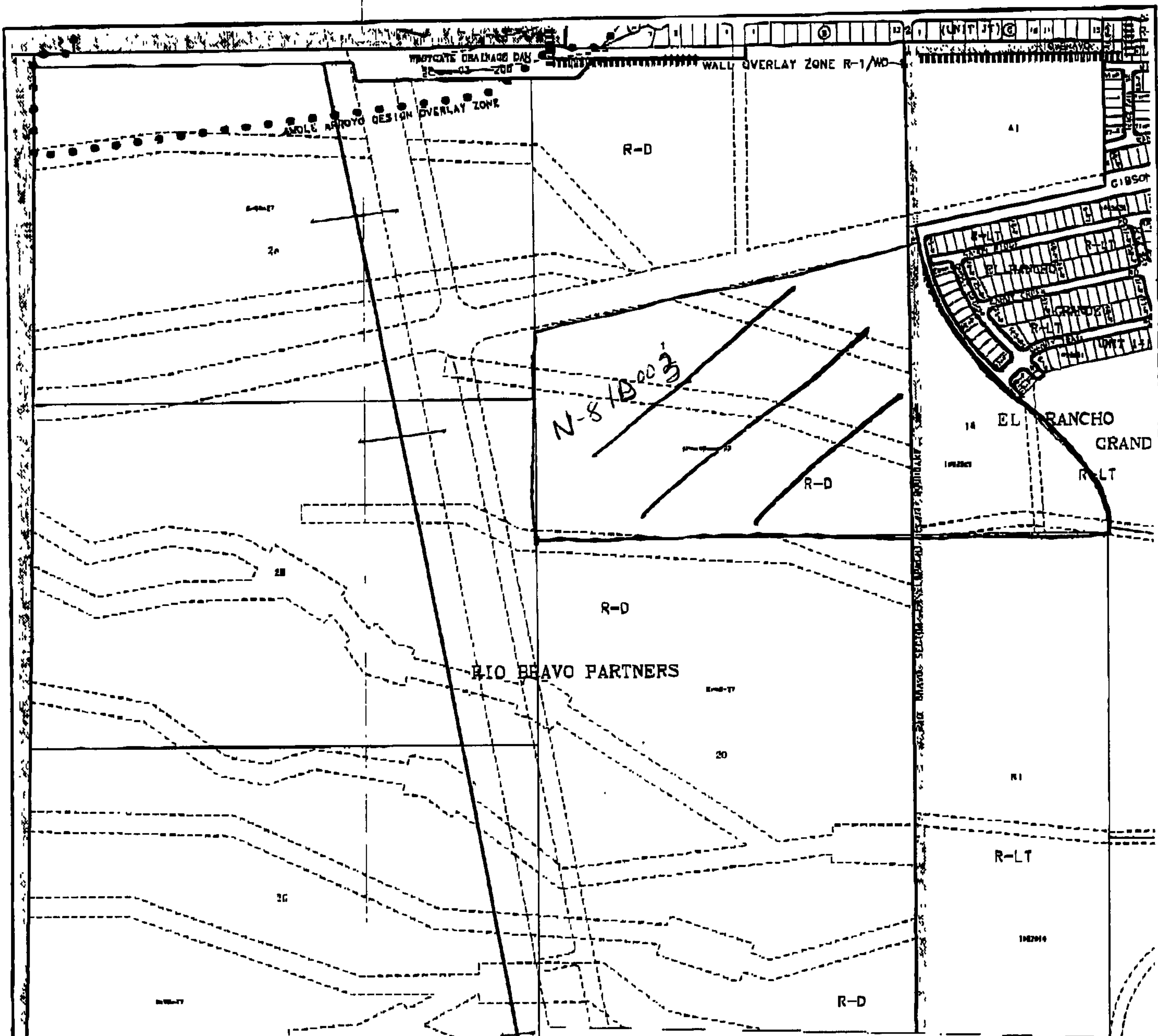


Scott J. Steffen, P.E.
Project Manager, Community Development
and Planning Group

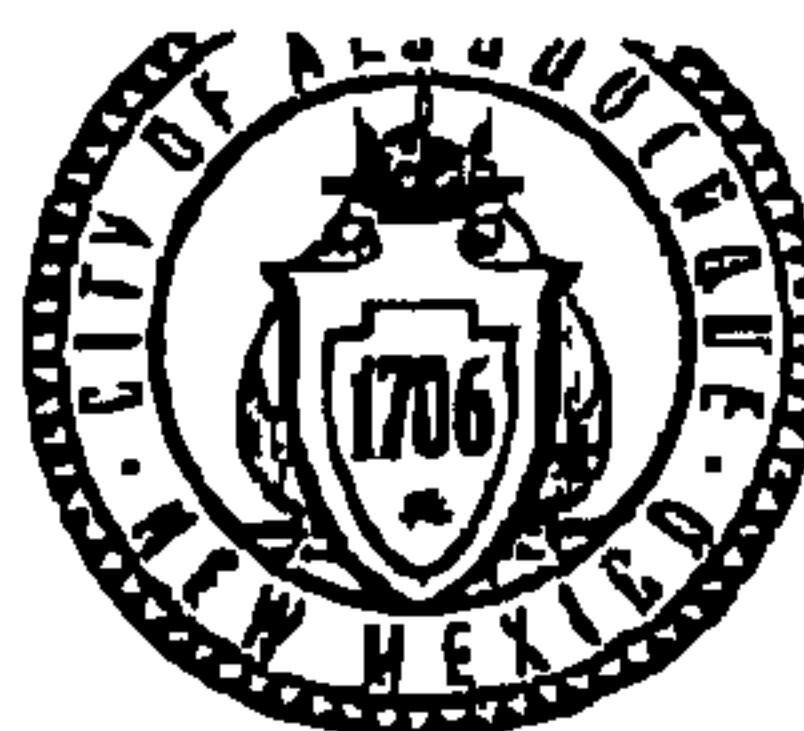
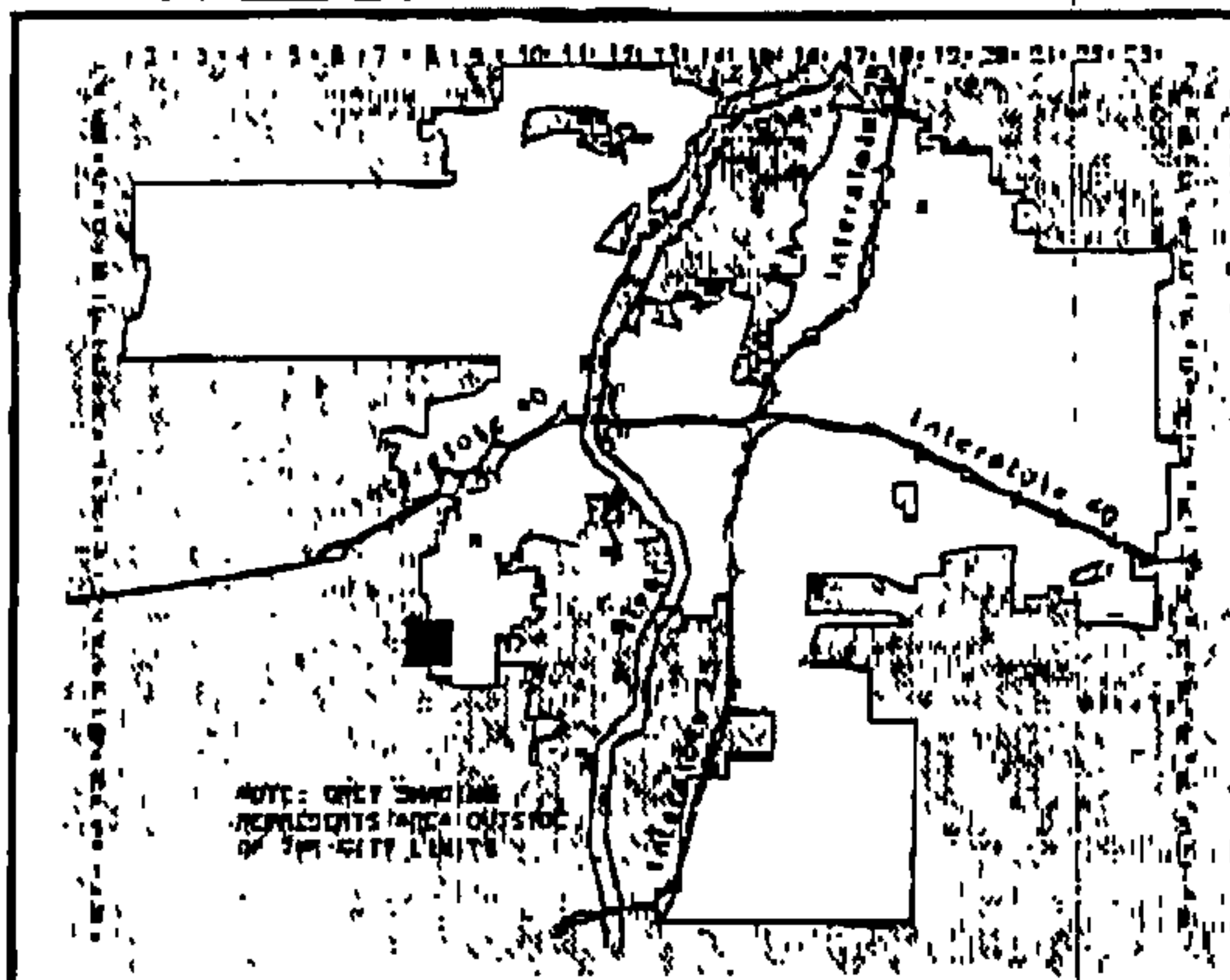
Enclosure

Cc: Bo Johnson, Bokay Construction (w/ encl)
Rick Squires, Bokay Construction (w/ encl)
Lynn Mazur, AMAFCA (w/ encl)





Post-It® Fax Note 7871		Date 12-20	# of pages 1
To <u>Orlene</u>		From <u>Stephanie</u>	
Co./Dept. <u>Sierra Ranch</u>		Co.	
Phone #		Phone # <u>708-7965</u>	
Fax # <u>0124-3864</u>		Fax #	



Albuquerque Geographic Information Systems
PLANNING DEPARTMENT

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Zone Atlas Page

N-8-Z

Map Amended through December 03, 2004

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

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ENGINEERING FIRM: Bohannon Huston, Inc. CONTACT: Scott Steffen
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CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Curb Inc. CONTACT: Bo Johnson
ADDRESS: 5160 San Francisco NE PHONE: 899-9656
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- ☐ WORK ORDER APPROVAL
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WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
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Rec'd 12-20-04

DATE SUBMITTED: December 16, 2004 BY: Scott Steffen

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:

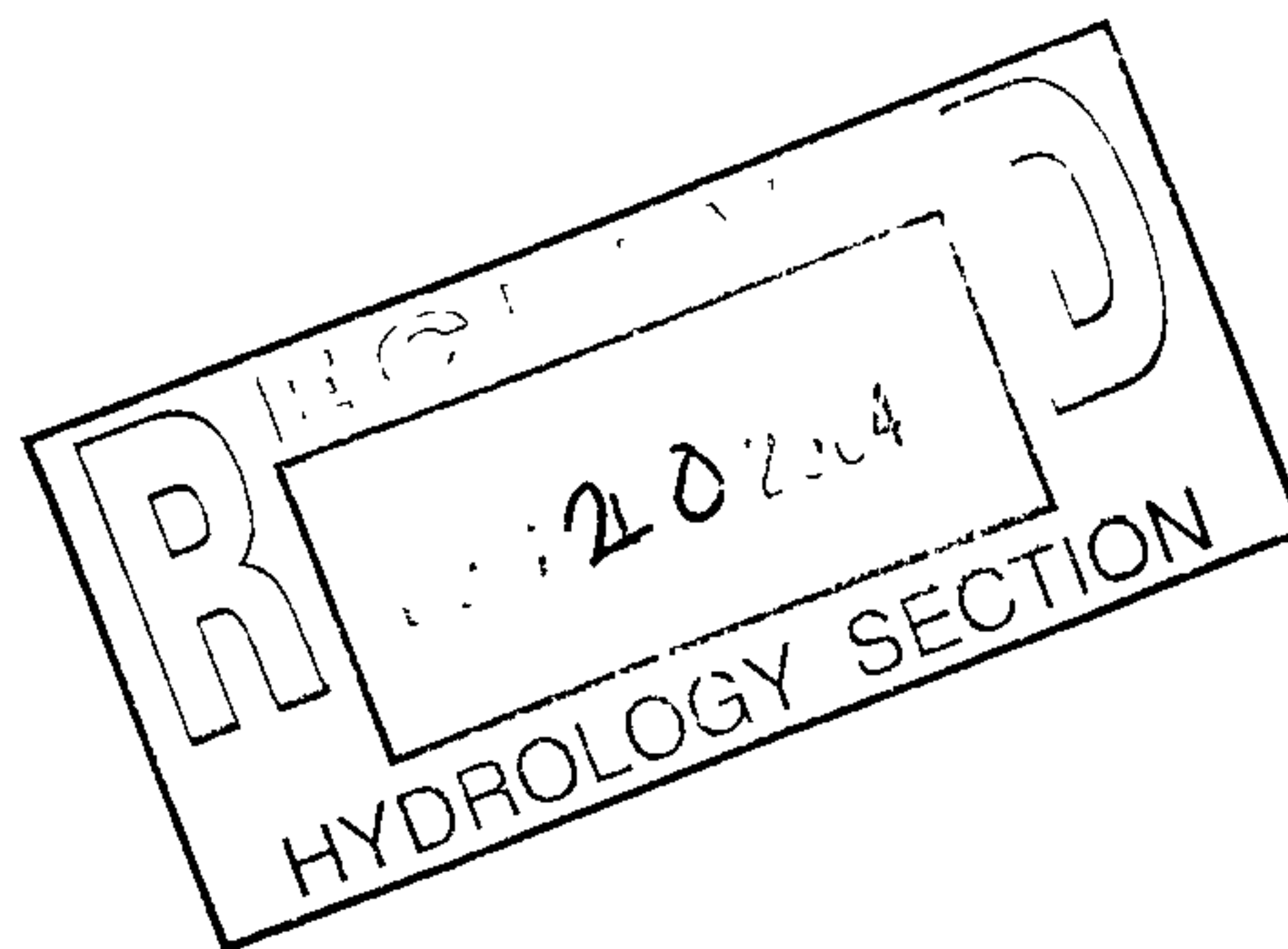
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- 3. Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 24, 2004



Mr. Bo K. Johnson, P.E.
Curb, Inc.
5160 San Francisco DR. NE
Albuquerque, NM 87109

RE: Water and Sewer Availability Statement
Tract 1A, 1B, 1C and 1D of the Lands of Rio Bravo Partners

N-8

Mr. Johnson:

Project Information: The project site consists of approximately 103 acres of undeveloped property both north and south of Gibson west of Messina in southwest Albuquerque. Current zoning is R-LT as governed by the Rio Bravo Sector Plan. Recent sketch plat submittals have suggested that this site will be subdivided into approximately 590 individual lots which will be developed as single family residences. Please be advised that this configuration will not be allowed due to the fact that some of these proposed lots would be located above serviceable elevations. Based on the existing topography, the dwellings within tracts 1B and 1C will have pad elevations between 5,160 and 5,255 feet and will be serviceable within the 2W pressure zone. Tracts 1A and 1D are located within the 3W pressure zone and are, therefore, not serviceable.

Existing Conditions: As of the date of this correspondence, there are no existing structures present on-site. Nearby construction projects include the El Rancho Grande subdivisions as well as a 20- / 18-inch bottom of zone water transmission line which will supply pressure zones 2W and 2WR. Please refer to project number 679581 for specifics regarding this line. The Snow Vista sanitary sewer interceptor, which will be the outfall for the region, is currently in the design phase and will be located east of the site.

Metered Water Service will be contingent on the completion and acceptance of the improvements associated with the adjacent El Rancho Grande developments and the 18-inch bottom of zone transmission line in Mesa Arenosco Drive. Service to tracts 1B and 1C will require the extension of a 20-inch Master Plan top of zone 2W line south from Cartagena to Gibson. At Gibson, the line will reduce to an 18-inch and proceed west across the northern frontage of tract 1B. A 12-inch must also be constructed south of tract 1C from the 18-inch Mesa Arenosco line west to the southwest corner of tract 1C. In addition to the perimeter lines described, looped water lines must be constructed at standard locations within each of the rights-of-way internal to the subdivision. Internal lines for tract 1B will connect to both the 20-inch top of zone line and the proposed 8-inch main in Messina. Internal lines for tract 1C will be connected to both the 18-inch top of zone line and the new 12-inch line to the south. These lines will be a combination of 8-inch and 6-inch mains to which routine service connections may be made.

Sanitary Sewer Service will be contingent on the completion and acceptance of the Snow Vista Interceptor and the improvements associated with the adjacent El Rancho Grande developments. Minimum 8-inch collectors along with manholes at regular intervals must be constructed within each of the rights-of-way internal to the subdivision. The sewer lines within tract 1B will outfall to the southern 8-inch line in Unit 11. Tract 1C will outfall to the 10-inch at the southwest corner

of Unit 15. Upon completion and acceptance of each of these improvements, service for each parcel will be available via routine connection.

Fire Protection: Fire flow rates are determined by the Fire Marshal based on both the size and type of construction. In addition to fire hydrants located at each street intersection, additional hydrants will be required so as not to exceed a maximum distance of 500 feet from any given structure. This distance is measured as the fire equipment travels. The precise number and location of each fire hydrant must be coordinated with the Fire Marshal and approved prior to DRC approval.

Design and Construction of all required improvements will be at the developer / property owner's expense and must be coordinated through the City of Albuquerque via the DRC / City Work Order process. Both water and sewer stubs to each property must be included with the design of the new lines. Designs must be by a New Mexico registered professional engineer. Construction must be by a licensed, bonded public utility contractor.

Easements: City of Albuquerque public water and sewer easements are required for all public lines to be constructed outside of dedicated rights-of-way. Minimum easement widths shall be 20-feet where single service lines are to be constructed and 25-feet where both water and sewer lines are included. Acceptable easements must be documented prior to DRC approval.

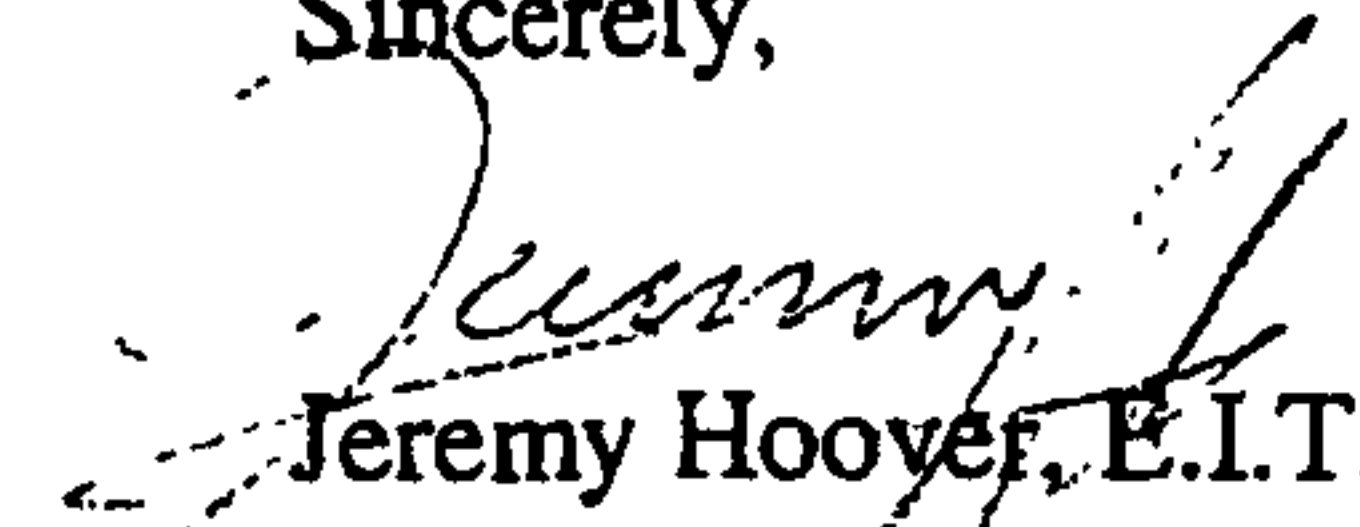
Utility Expansion Charges: In addition to installation and construction costs, both sanitary sewer and metered water service to each property will be subject to Utility Expansion Charges (UEC). These charges are payable at the time service is requested and will be based on the ordinances in effect at the time of connection.

Pro Rata Charges: Any and all outstanding pro rata charges assessed towards this property will be due at the time of development. The costs of perimeter and off-site water and sanitary sewer lines may be prorated against adjacent benefiting properties. Such assessments must be requested at the time of development in order to be considered.

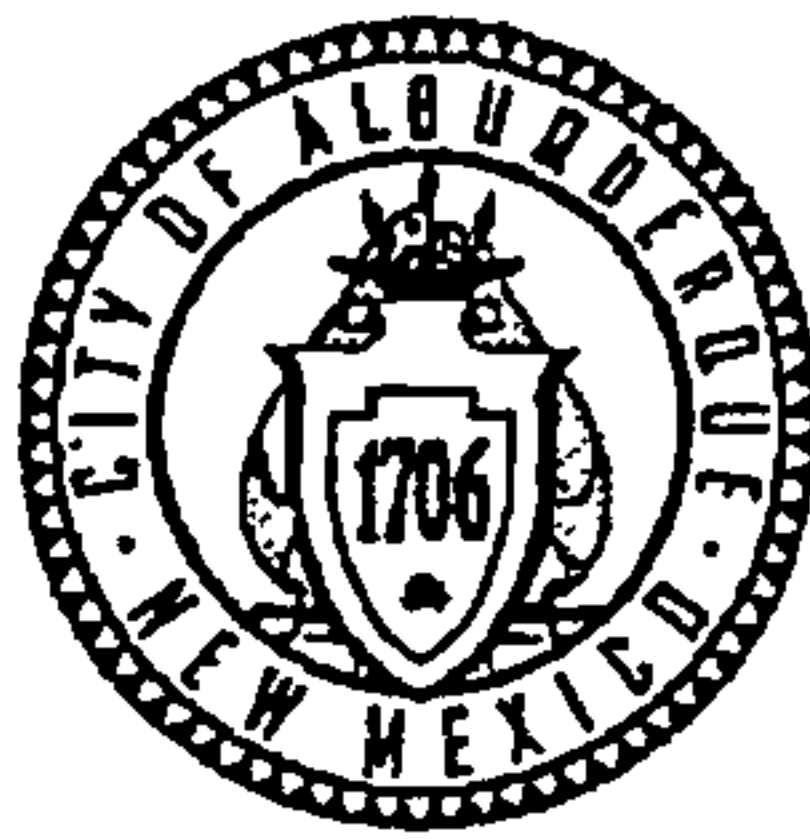
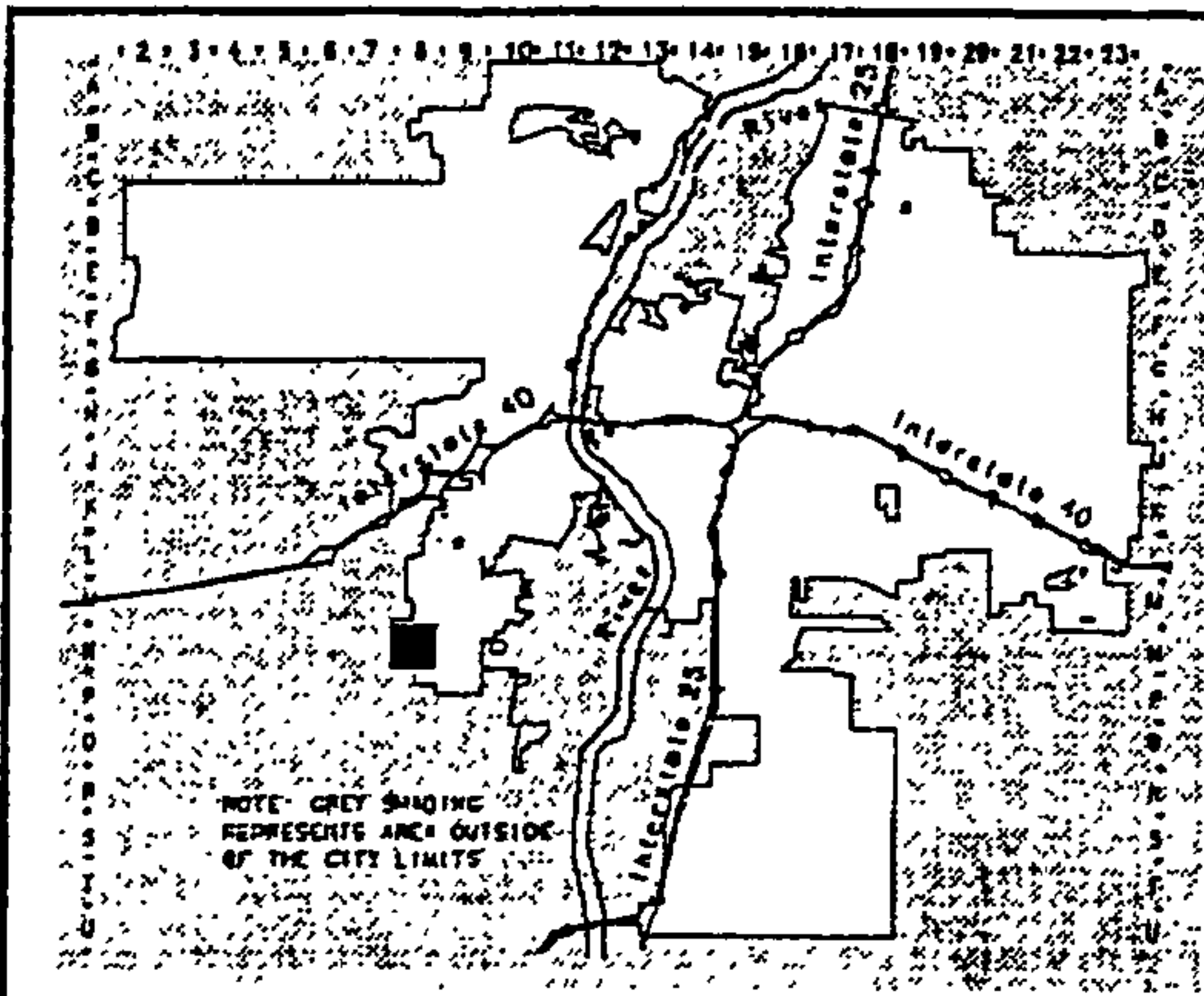
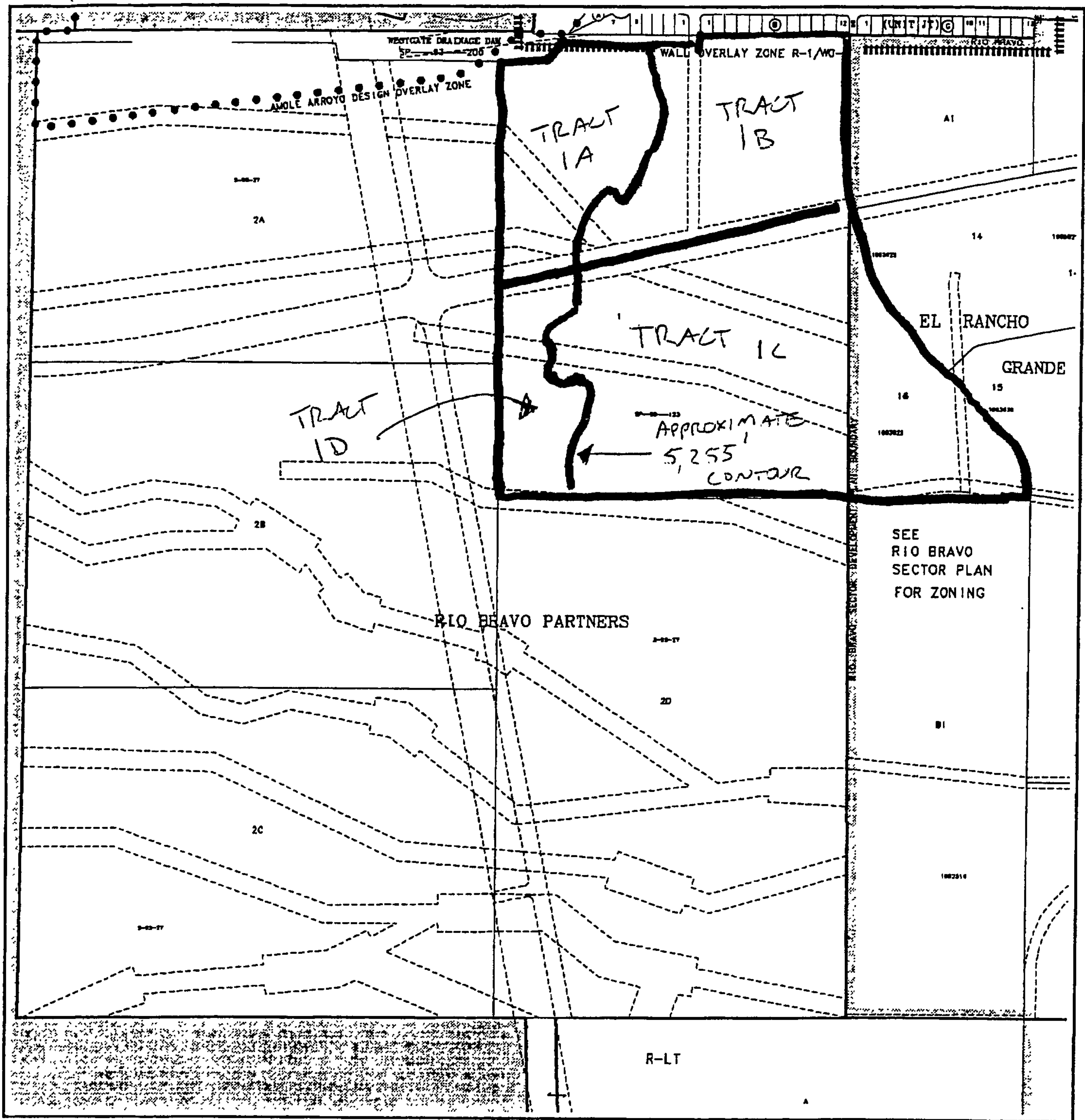
Closure: This statement of availability will remain in effect for a period of one (1) year from the date of issue and applies only to the development identified herein. Its validity is, in part, contingent upon the continuing accuracy of the information supplied by the developer. Changes in the proposed development may require reevaluation of availability and should be brought to the attention of the Utility Development Section of the City of Albuquerque as soon as possible. Any outstanding pro rata and standby assessments must be paid at the time service is taken. All charges and rates collected will be based on the ordinances and policies in effect at the time service is actually requested and authorized.

Please feel free to contact the undersigned at (505) 924-3987, or by fax at (505) 924-3864 if you have questions regarding the information presented herein or need additional information.

Sincerely,

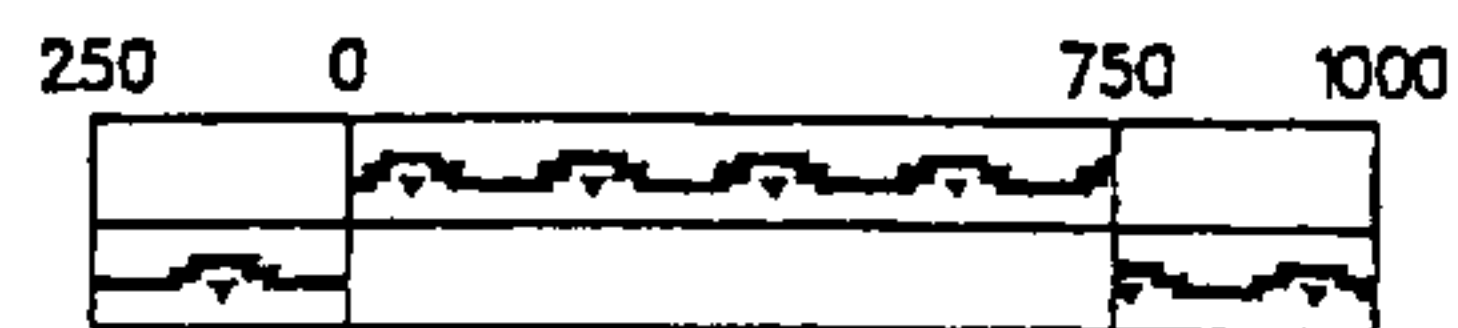

Jeremy Hoover, E.I.T.
Engineering Associate
Utility Development Services
Public Works Department

Cc: Christian J. Sholtis, P.E. – Bohannon Huston
f/ availability N-8
f/ readers #40405
f/ DRB #1003429



Albuquerque **G**raphic **I**nteraction **S**ystem
PLANNING DEPARTMENT
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GRAPHIC SCALE IN FEET

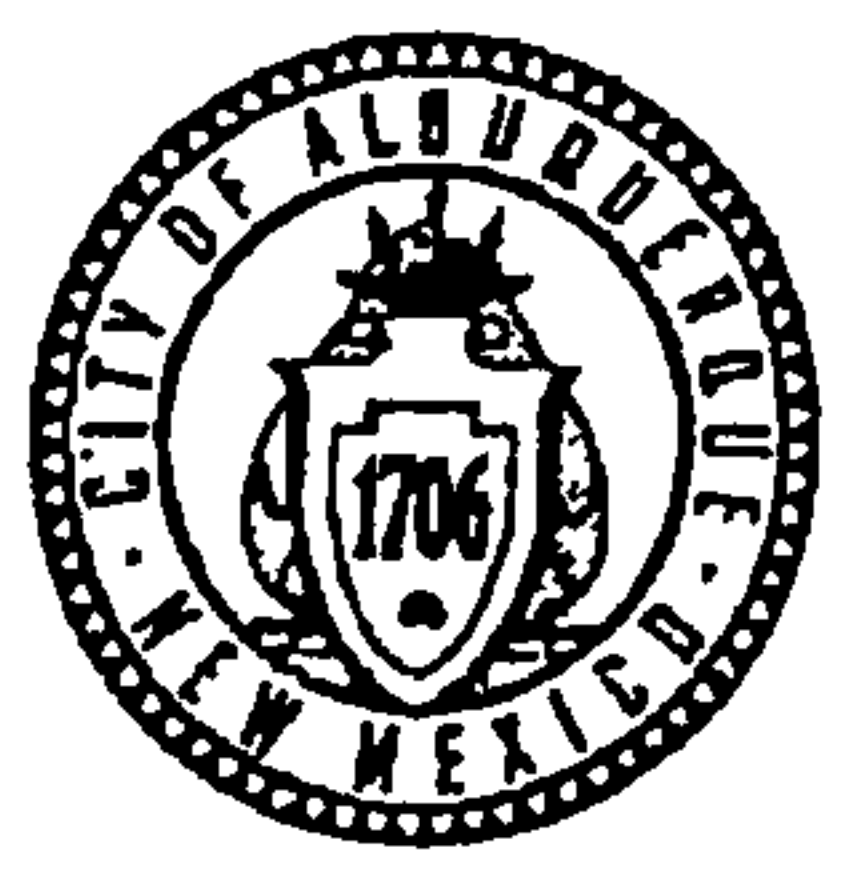
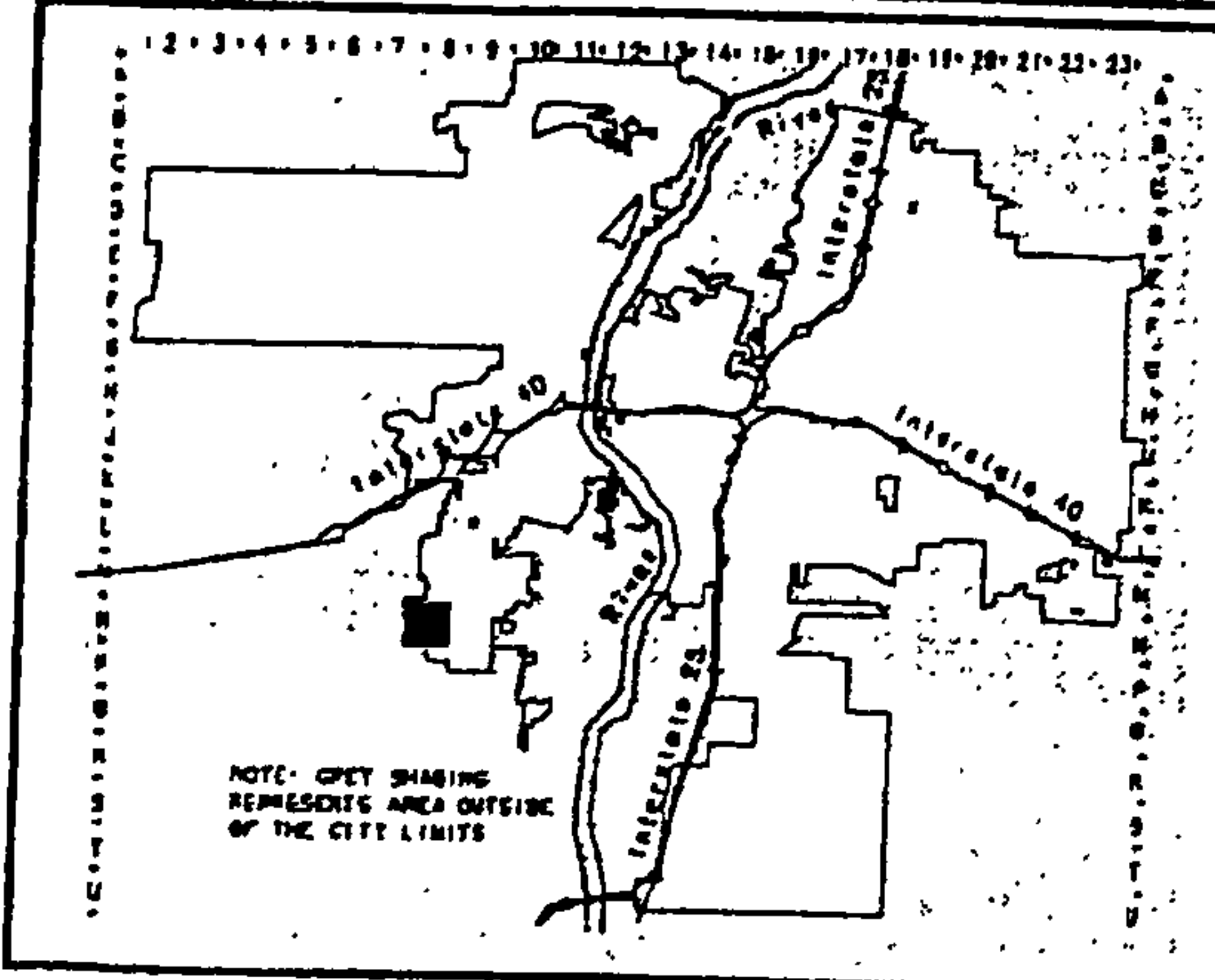
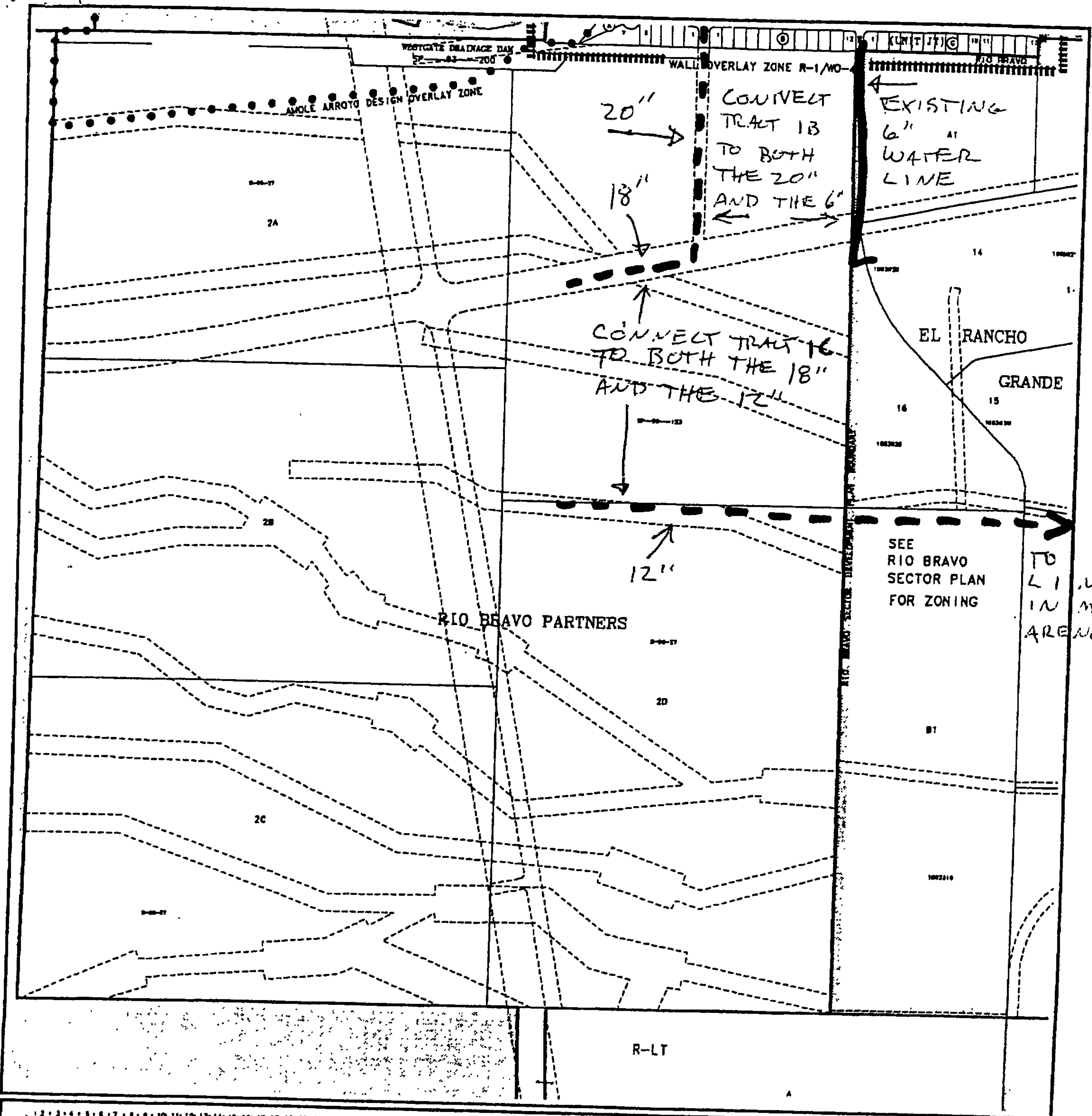


Zone Atlas Page

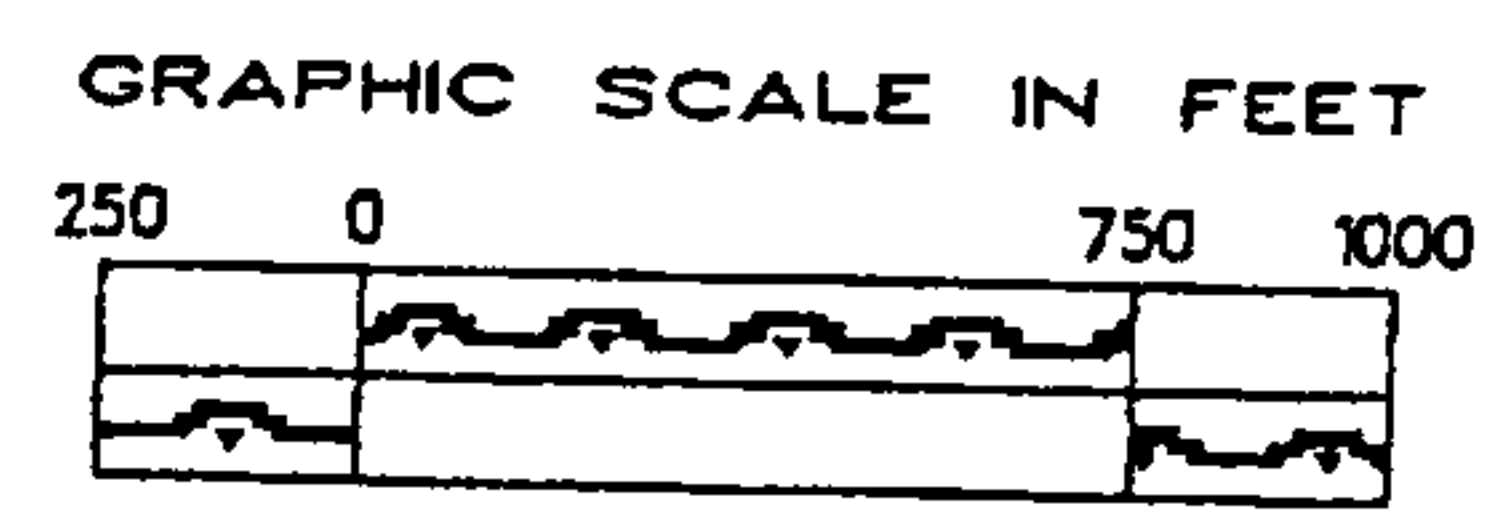
N-8-Z

Map Amended through May 05, 2004

SITE MAP

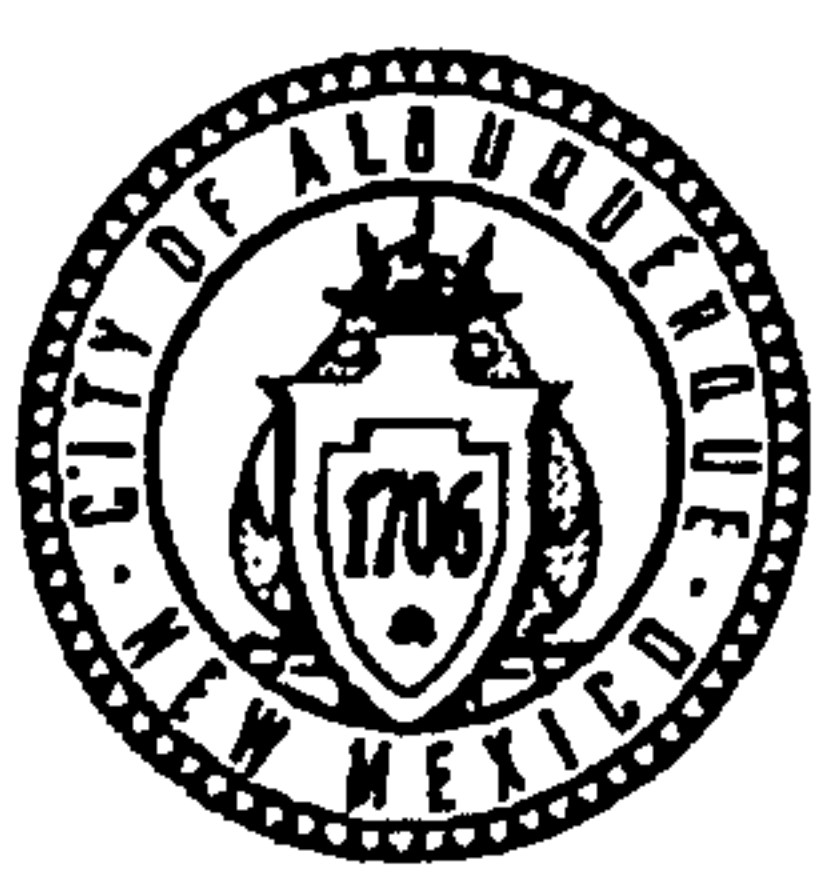
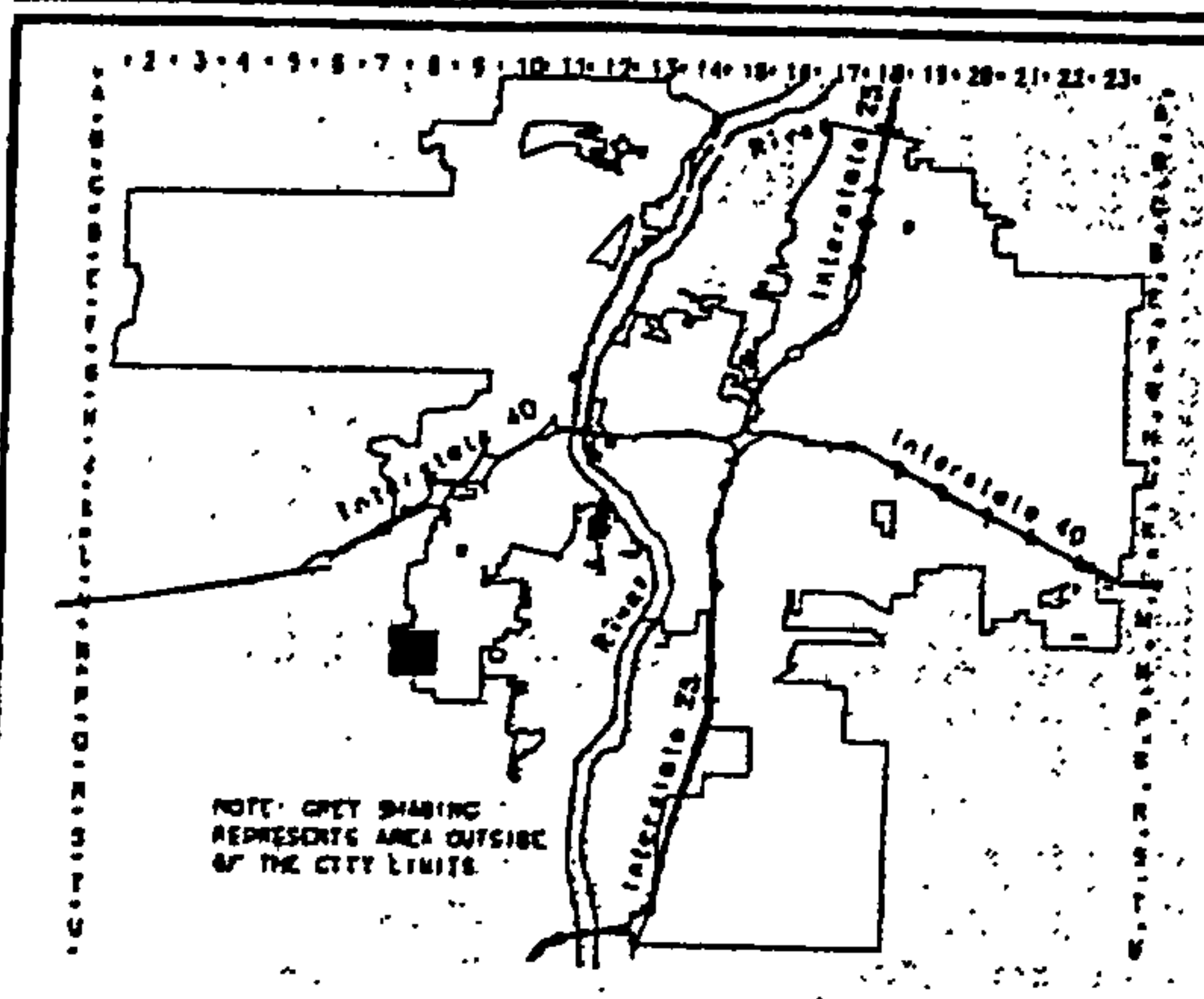
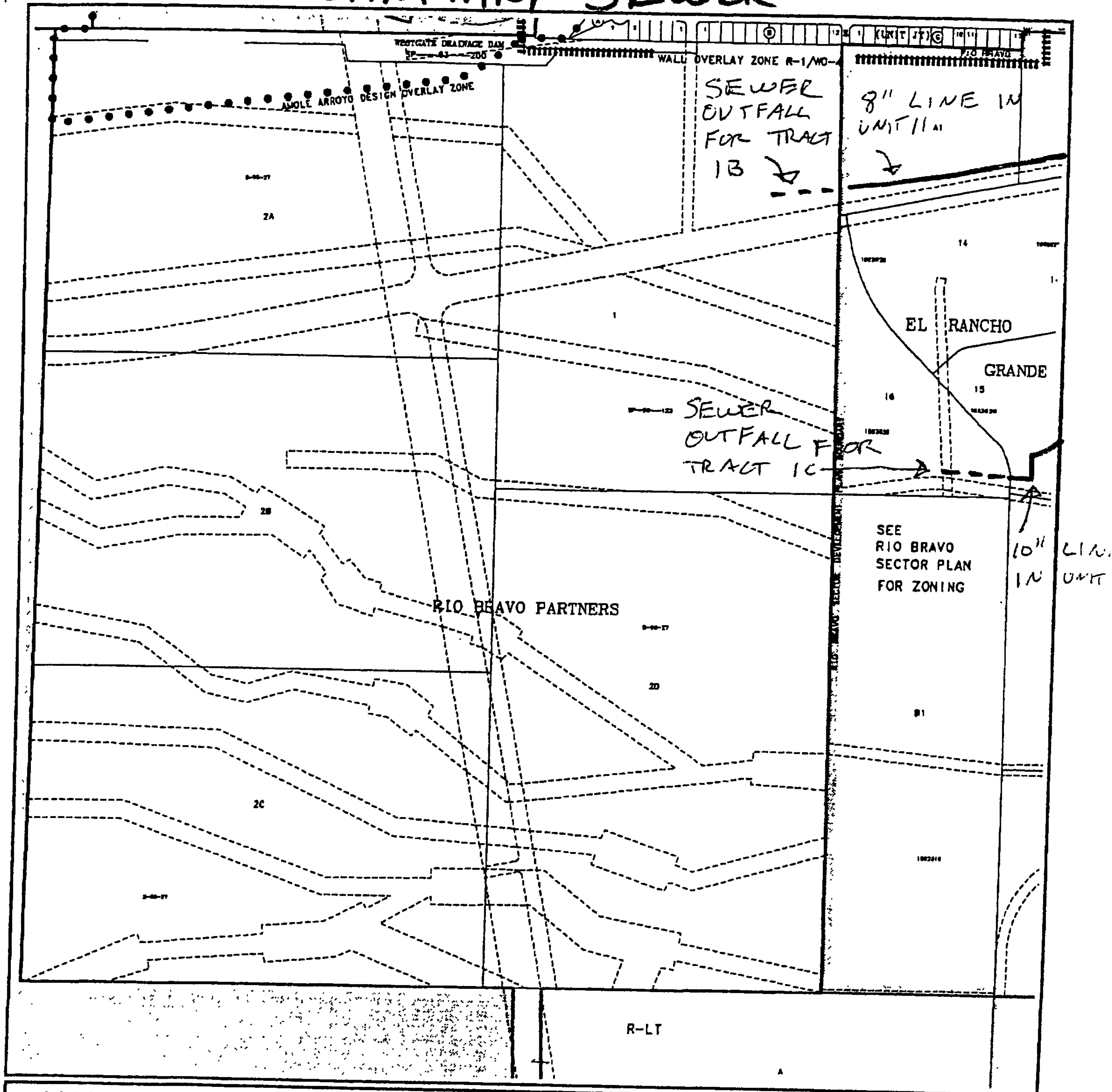


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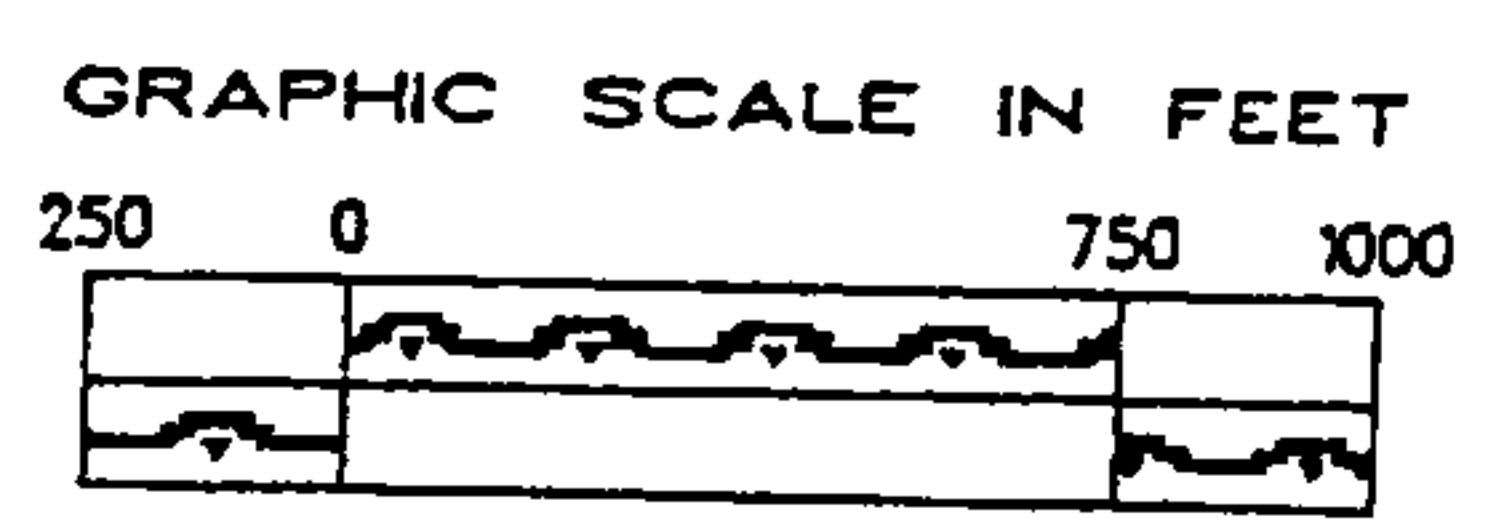


Zone Atlas Page
N-8-Z
 Map Amended through May 05, 2004

SANITARY SEWER

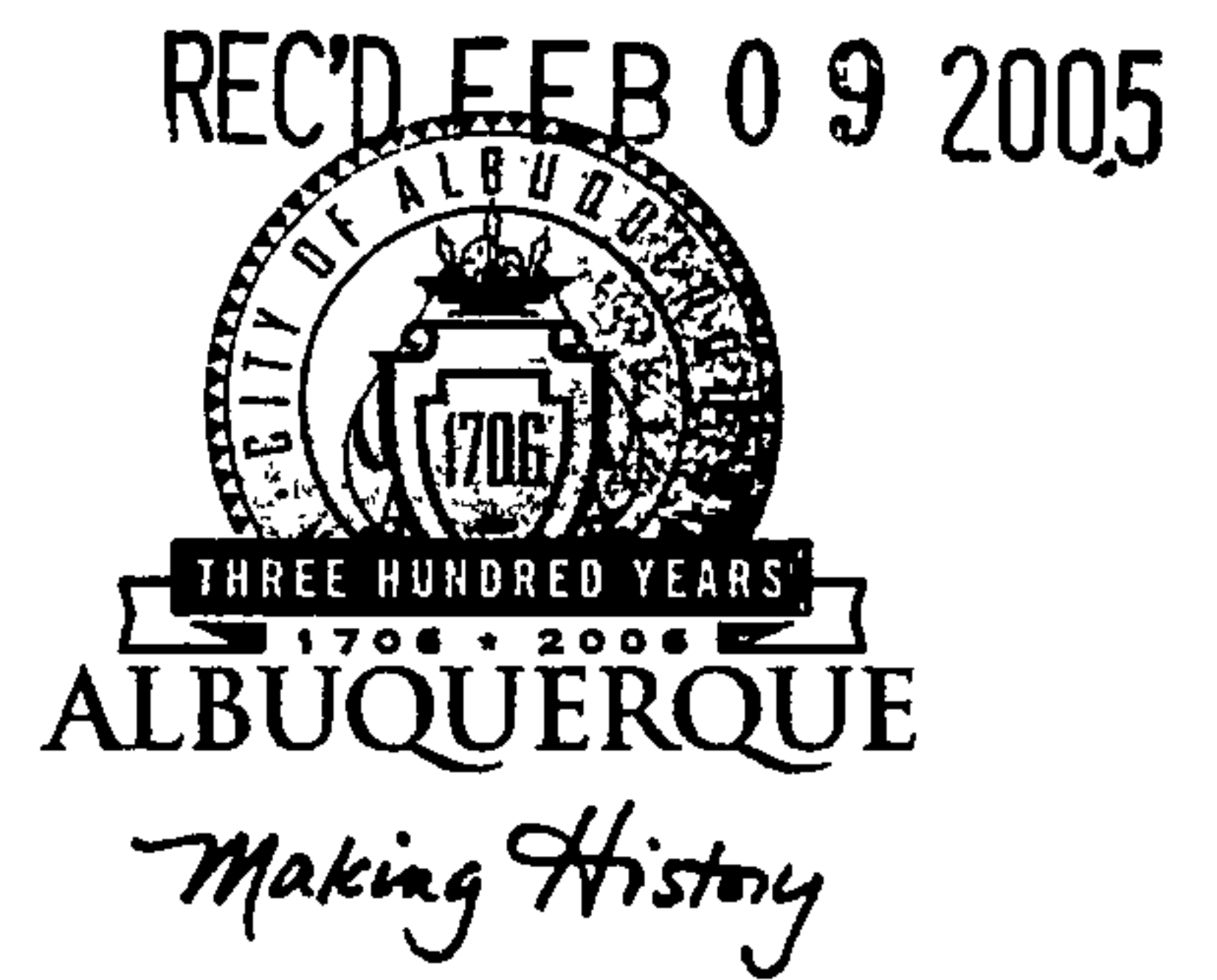


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Zone Atlas Page
N-8-Z
Map Amended through May 05, 2004

CITY OF ALBUQUERQUE



February 7, 2005

Scott Steffen, PE
Bohannon Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sierra Ranch Subdivision Drainage Report
Engineer's Stamp dated 1-25-05 (N8/D3)

Dear Mr. Steffen,

Based upon the information provided in your submittals dated 12-17-04 and 1-26-05, the above referenced report is approved for Preliminary Plat action by the DRB. Once that board approves the plan, please submit a mylar copy for my signature in order to obtain a Rough Grading Permit.

P.O. Box 1293

Albuquerque

New Mexico 87103

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department, Hydrology section at 768-3654 (Charles Caruso).

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

www.cabq.gov

Sincerely,

A handwritten signature in black ink, reading 'Bradley L. Bingham'.

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

C: Chuck Caruso, DMD
file

***** NPDES Update *****

Effective July 1st, 2003

Attention Developers And Contractors Operating Within The City Of Albuquerque

Construction Projects that disturb one (1) acre of land or more, after March 10, 2003, will need a National Pollutant Discharge Elimination System (NPDES) Phase 2 Permit. Sites that disturb over five (5) acres are already required to have a NPDES Permit under U.S. Environmental Protection Agency (EPA) Phase 1 NPDES regulations. Additional information can be found at: www.epa.gov/earth1r6/6en/w/sw/hotopcn.htm or www.epa.gov/npdes/pubs/fact3-0.pdf

NPDES Permit Requirements are as follows:

- Complete and submit a **Notice of Intent (NOI)** to the EPA prior to commencing construction activities.
- Develop and implement a **Storm Water Pollution Prevention Plan (SWP3)** before the submittal of the NOI.

Effective July 1, 2003

The new 2003 Construction General Permit has been completed by the U.S. Environmental Protection Agency (EPA). It can be found at <http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

Some Additional Permit Requirements as of July 1, 2003*

- Sediment Control Plan Required for New Mexico and must be certified by a New Mexico Professional Engineer.
- NOIs now have a seven-day waiting period. This is to allow the U.S. Fish and Wildlife Service time to review regarding endangered species.

Other References/Materials Available:

New Mexico State Highway and Transportation Department *National Pollutant Discharge Elimination System Manual, Storm Water Management Guidelines for Construction and Industrial Activities*. This manual is available on the COA Website at: <http://www.cabq.gov/flood/> (Just click on the "NPDES Construction Information")

* For a full list of additional permit requirements, consult the 2003 Construction General Permit (web link provided above), or contact anybody listed on the back page of this notice.

COA Contacts:

For technical assistance or questions on developing a SWP3, contact the COA, Public Works/Hydrology Division at 768-3654 or 768-3645.

EPA Contacts:

Storm Water - Compliance, and Enforcement:
Everett Spencer (6EN-WT)
Enforcement Officer
214-665-8060, spencer.everett@epa.gov

Storm Water - Permit Questions:
Brent Larsen (6WQ-PP)
NPDES Permit Writer
214-665-7523, larsen.brent@epa.gov

NMED Contact:

New Mexico Environment Department (NMED), Surface Water Quality Bureau:
Richard Powell
Team Leader
505-827-2798, richard_powell@nmenv.state.nm.us

CITY OF ALBUQUERQUE



October 23, 2006

Mr. Scott Steffen, PE
BOHANNAN-HUSTON, INC.
7500 Jefferson St. NE - Court
Albuquerque, NM 87199

RE: SIERRA RANCH SUBDIVISION, UNIT 1 (N-8/D3)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 12/17/2005
Engineers Certification dated 10/17/2006

Dear Scott:

Based upon the information provided in your Engineer's Certification Submittal dated 10/18/2006, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, you can contact me at 924-3982

Sincerely,

Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

C: Marilyn Maldonado, COA# 757581
File

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

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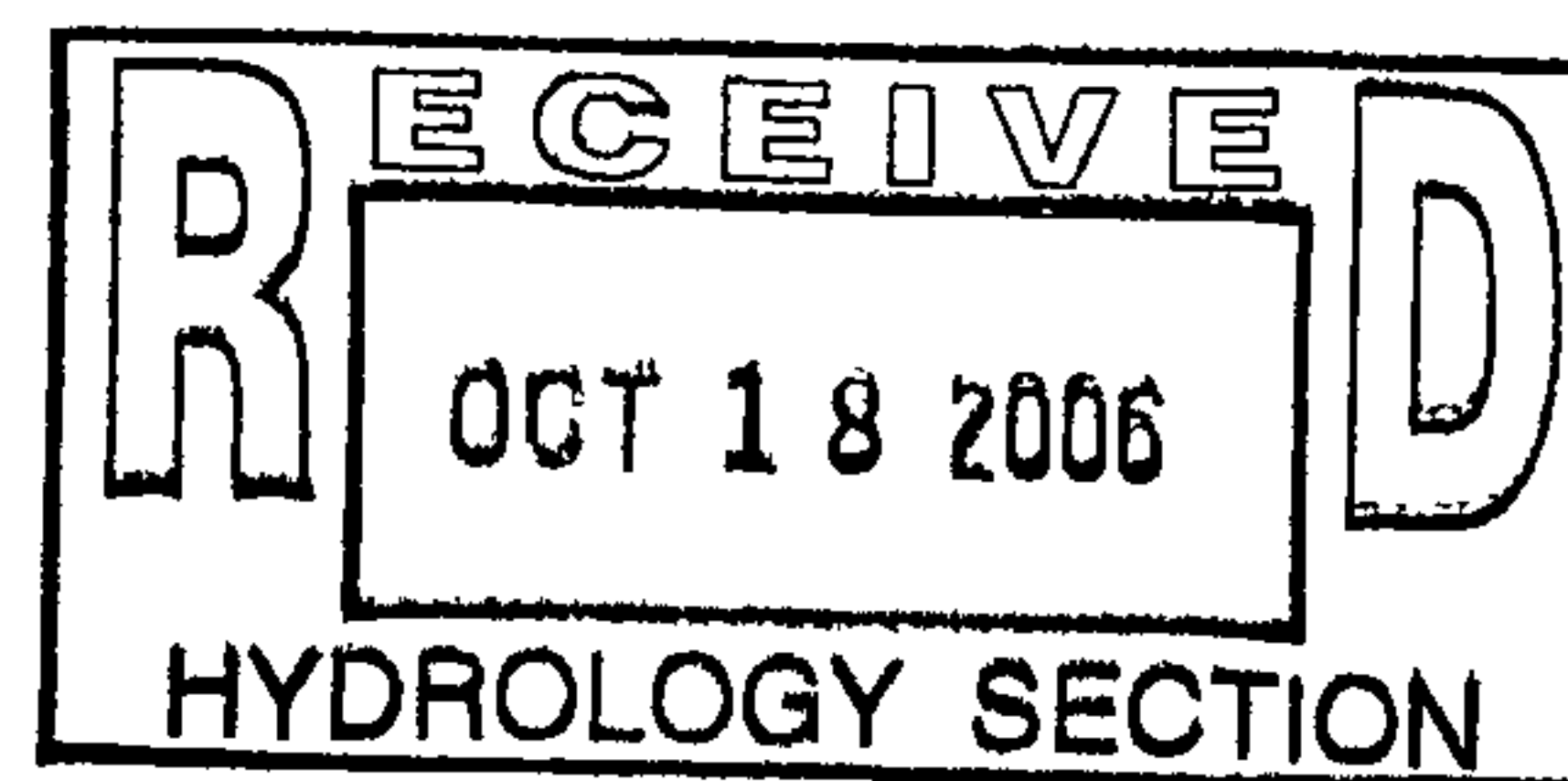
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- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED



DATE SUBMITTED: October 17, 2006 BY: Scott Steffen

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

CLIENT/COURIER TRANSMITTAL

To: Brad Bingham
Hydrology Development
City of Albuquerque
Plaza del Sol - 2nd Floor West

Requested by: Scott Steffen

Date: October 18, 2006

Time Due: ☒ This A.M.
☐ This P.M.
☐ Rush _____
☐ By Tomorrow

Phone: 924-3986

Job No.: 050188

Job Name: Sierra Ranch Unit 1

DELIVERY VIA

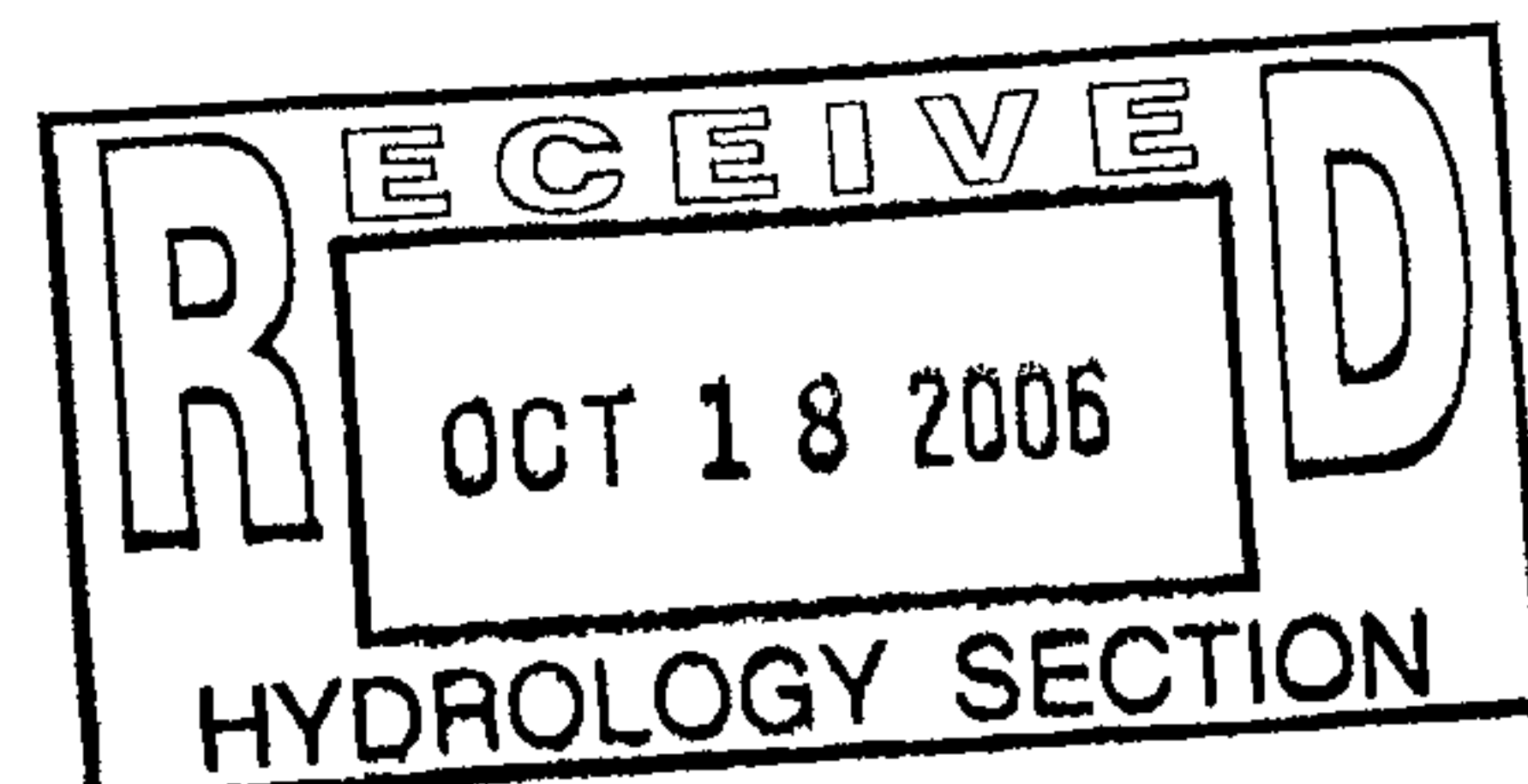
☒ Courier ☐ Federal Express
☐ Mail ☐ UPS
☐ Other

PICK UP

Item: _____

<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1	1	G&D cert cover letter
2	1	Drainage information sheet
3	1	DRB grading approval letter
4	1	DRB approved grading plan dated 1/25/05 with as-built elevations

COMMENTS / INSTRUCTIONS



REC'D BY: _____ **DATE:** _____ **TIME:** _____

ENGINEERING 

SPATIAL DATA 

ADVANCED TECHNOLOGIES 

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

October 17, 2006

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

Re: Grading and Drainage Certification
Sierra Ranch Unit 1 Subdivision, COA Project No. 757581; DRB Case No. 1003429

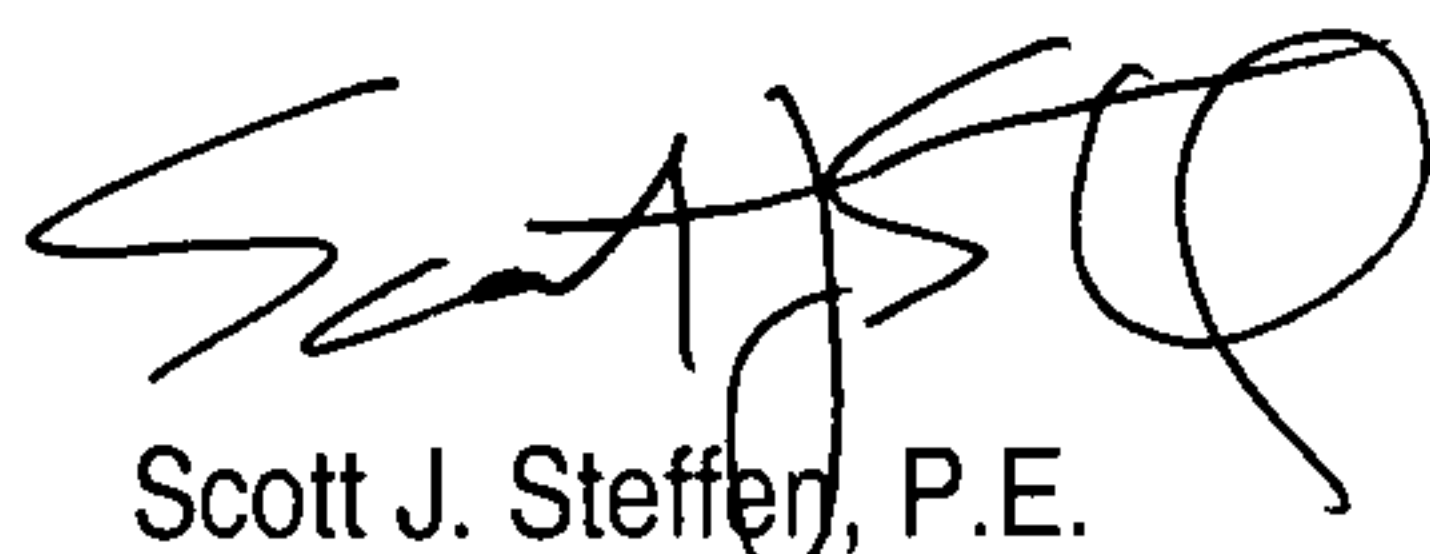
Dear Mr. Bingham:

Enclosed for your review is the DRB approved grading plan, dated 1/25/05, with as-built elevations. The DRB approved grading plan covers both Sierra Ranch Unit 1 and Unit 2. This certification is only for Unit 1. Unit 2 has not been graded at this time and will be certified separately upon completion of grading. The as-built survey was provided by Aldrich Land Surveying Inc. After reviewing these as-built elevations, it is my belief that the site has been graded in substantial compliance with the approved grading plan.

The temporary retention ponds shown on Sheet 1 have not been constructed per the approved plan. The pond north of Gibson Boulevard was removed due to the construction of the El Rancho Grande Unit 17 subdivision. The pond at the west end of Walnut Canyon Road was not constructed per the plan because borrow required from Sierra Ranch Unit 2 to balance the earthwork for Sierra Ranch Unit 1 resulted in a much larger ponding area along the western edge of Sierra Ranch Unit 1 than shown on the approved grading plan. Based on visual inspection of the site on August 25, 2006 it is my belief that there is sufficient storage west of Sierra Ranch Unit 1 to meet the intent of the temporary pond shown on the approved plan.

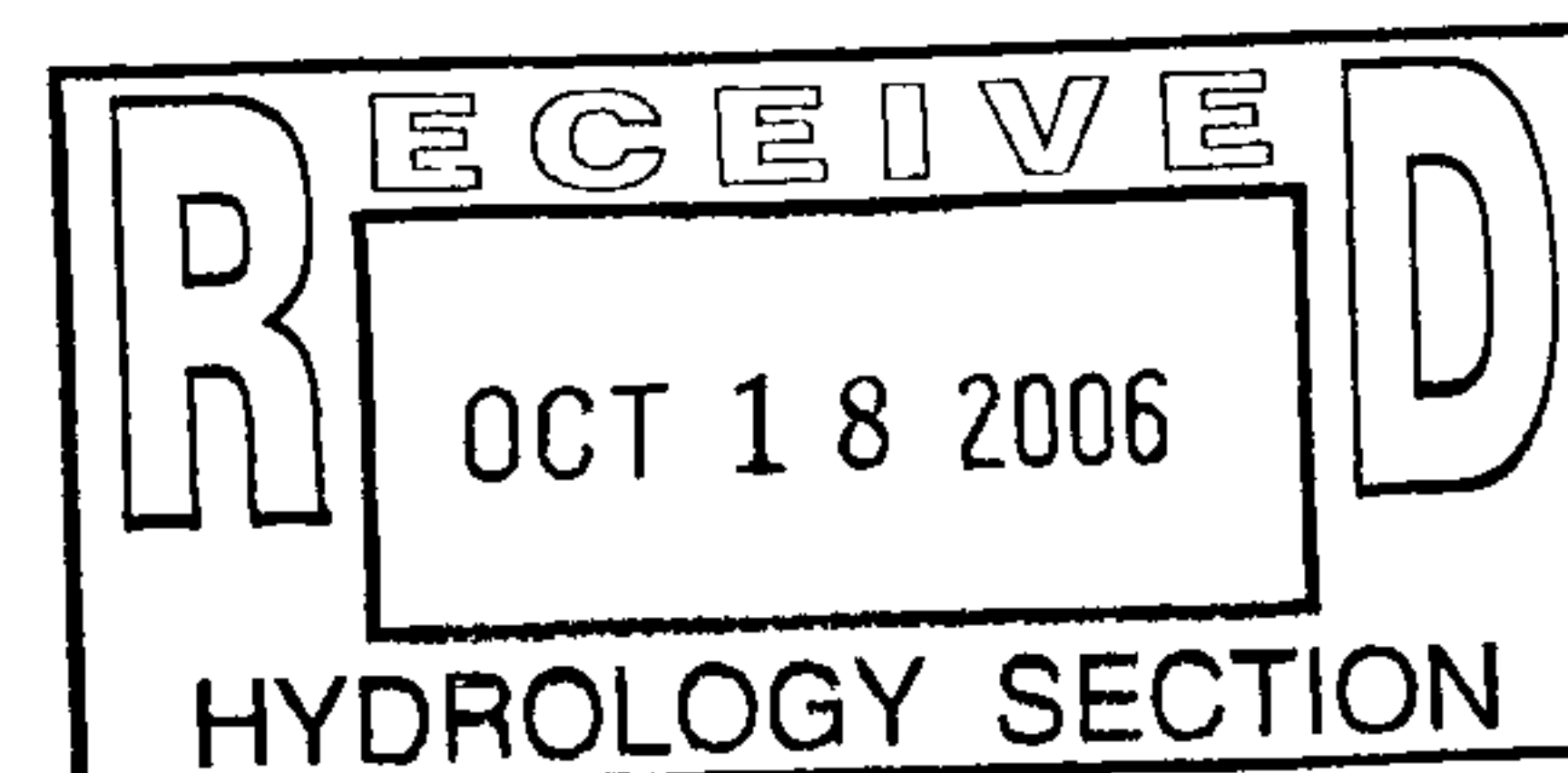
Your review and approval is requested for SIA/financial guaranty release of the project. I appreciate your time and consideration. If you have questions or require additional information, please contact me at 823-1000.

Sincerely,

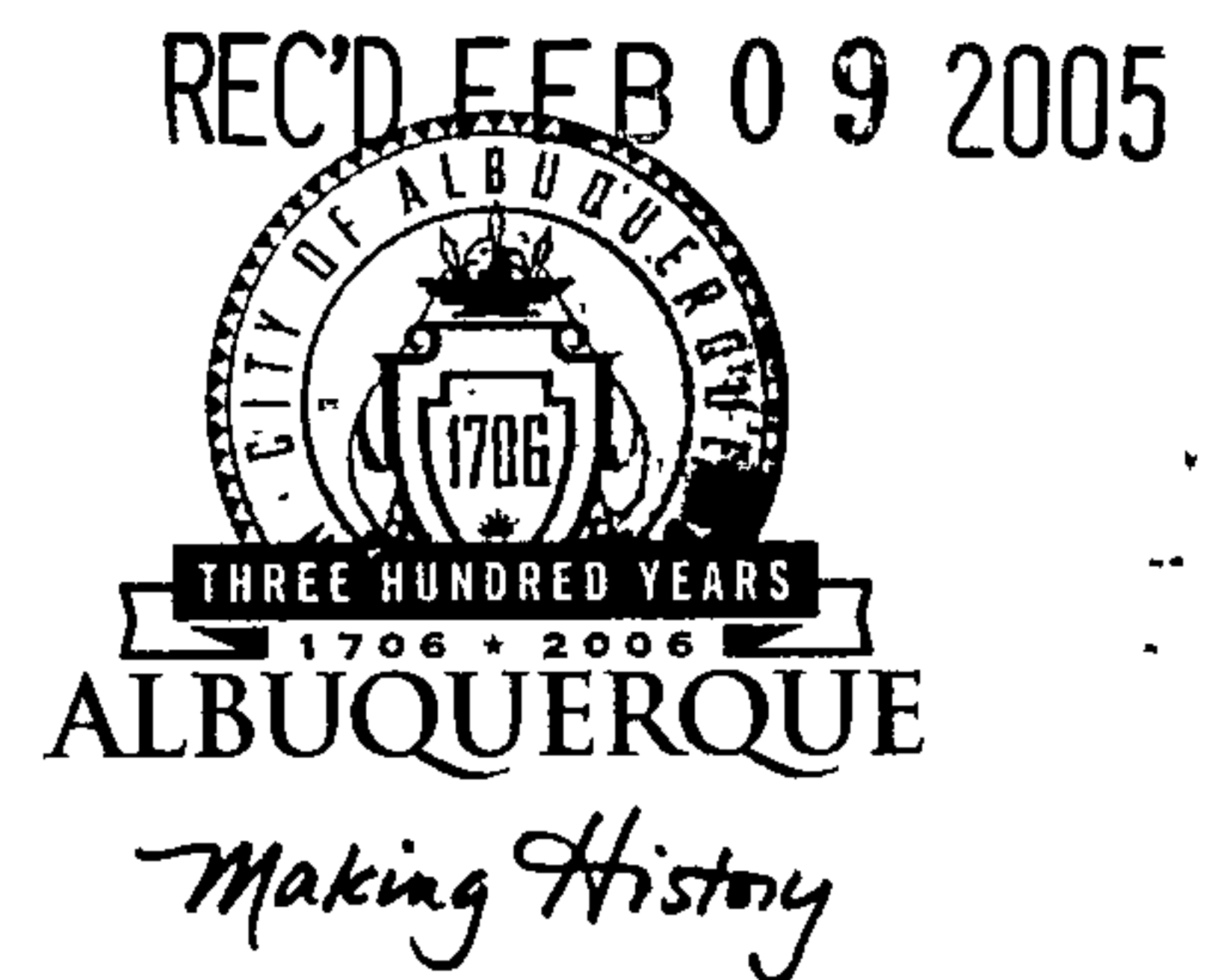


Scott J. Steffer, P.E.
Project Manager, Community Development
and Planning Group

Enclosure



CITY OF ALBUQUERQUE



February 7, 2005

Scott Steffen, PE
Bohannon Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sierra Ranch Subdivision Drainage Report
Engineer's Stamp dated 1-25-05 (N8/D3)

Dear Mr. Steffen,

P.O. Box 1293

Based upon the information provided in your submittals dated 12-17-04 and 1-26-05, the above referenced report is approved for Preliminary Plat action by the DRB. Once that board approves the plan, please submit a mylar copy for my signature in order to obtain a Rough Grading Permit.

Albuquerque

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department, Hydrology section at 768-3654 (Charles Caruso).

New Mexico 87103

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

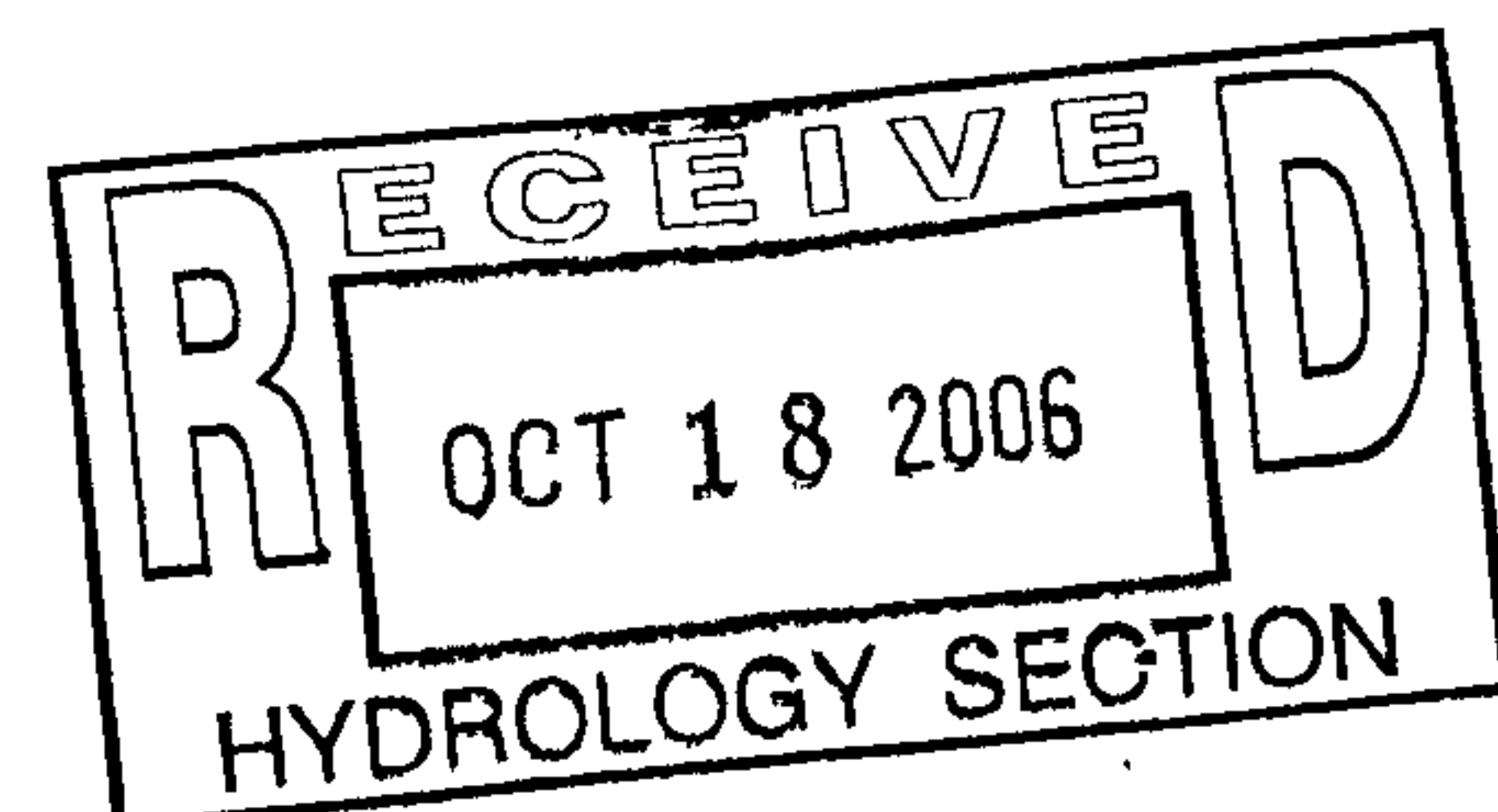
www.cabq.gov

Sincerely,

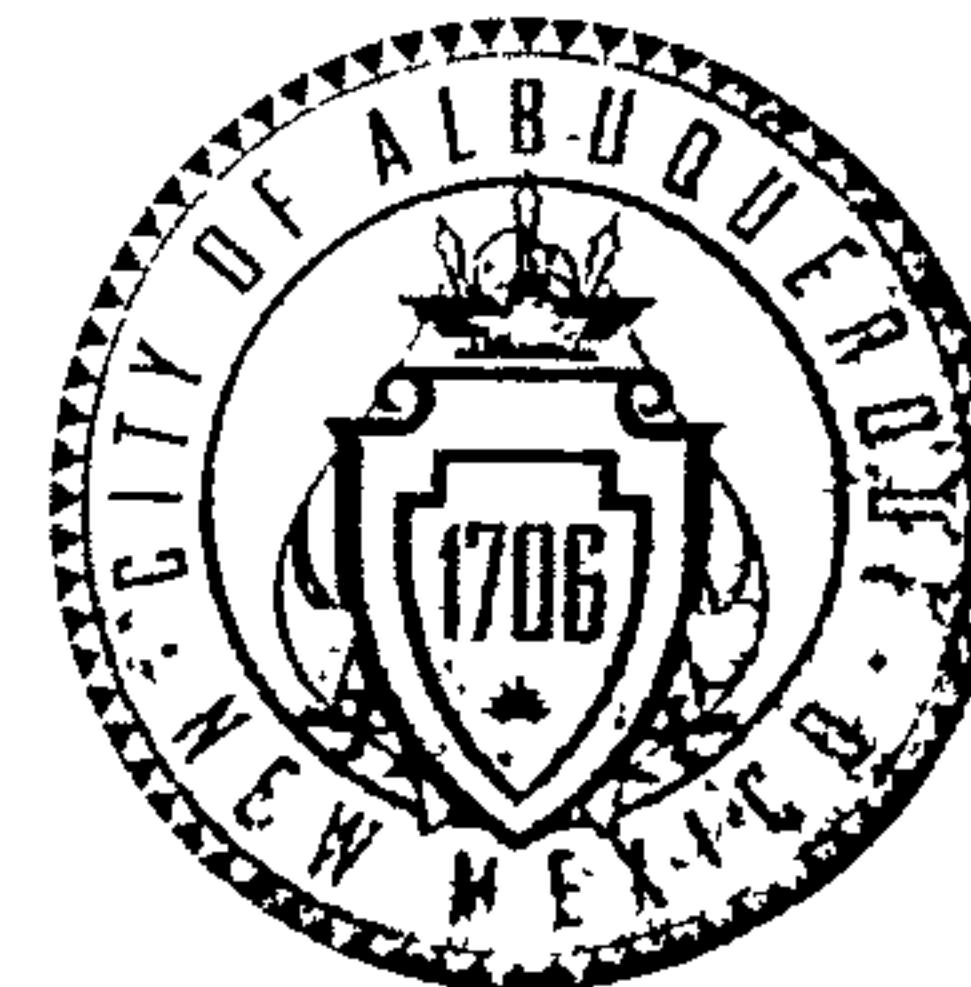
A handwritten signature in black ink, reading "Bradley L. Bingham".

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

C: Chuck Caruso, DMD
file



CITY OF ALBUQUERQUE



July 3, 2008

Scott J. Steffen, P.E.
BOHANNAN-HUSTON, INC.
7500 Jefferson Street NE Courtyard I
Albuquerque, NM 87109

RE: Sierra Ranch Subdivision Unit 2, (N-08/D003)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 1/25/2005
Engineers Certification dated 07/01/2008

Mr. Steffen:

PO Box 1293

Based upon the information provided in submittal dated 07/01/2008, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

Albuquerque

If you have any questions, you can contact me at 924-3982.

NM 87103

Sincerely,

Timothy E. Sims

www.cabq.gov

Plan Checker, Planning Dept. - Hydrology
Development and Building Services

C: Marilyn Maldonado, COA# 75782
File

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: SIERRA RANCH UNIT 2 SUBDIVISION ZONE MAP/DRG. FILE # N8/D3
DRB # 1003429 EPC#: _____ WORK ORDER#: 75782

LEGAL DESCRIPTION: Sierra Ranch Unit 2 Subdivision
CITY ADDRESS: South of Gibson Blvd., East of 118th Street, West of Messina Drive, North of Amole Mesa Avenue

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

OWNER: Curb Inc. CONTACT: Bo Johnson
ADDRESS: 5160 San Francisco NE PHONE: 899-9656
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:

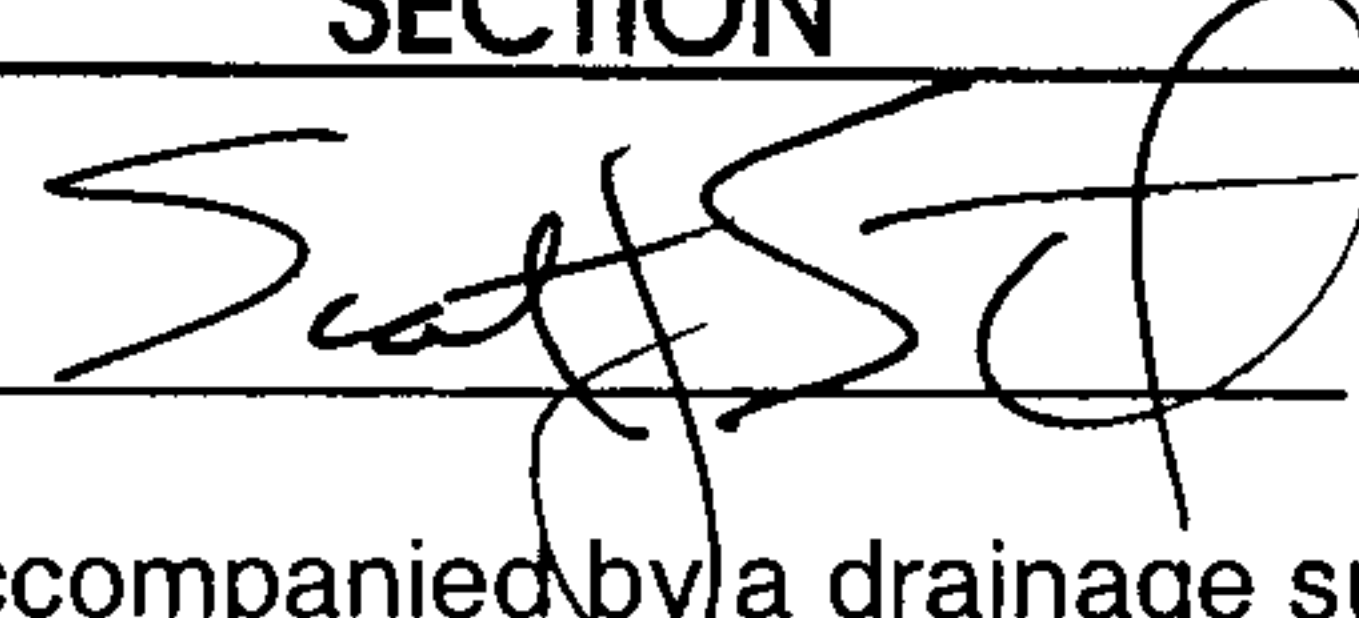
- ☐ DRAINAGE REPORT
☐ DRAINAGE PLAN 1st SUBMITTAL, **REQUIRES TCL or equal**
☐ DRAINAGE PLAN RESUBMITTAL
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☒ ENGINEER'S CERTIFICATION (HYDROLOGY)
☐ CLOMR/LOMR
☐ TRAFFIC CIRCULATION LAYOUT (TCL)
☐ ENGINEERS CERTIFICATION (TCL)
☐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

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ 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
☐ WORK ORDER APPROVAL
☐ OTHER (SPECIFY) _____

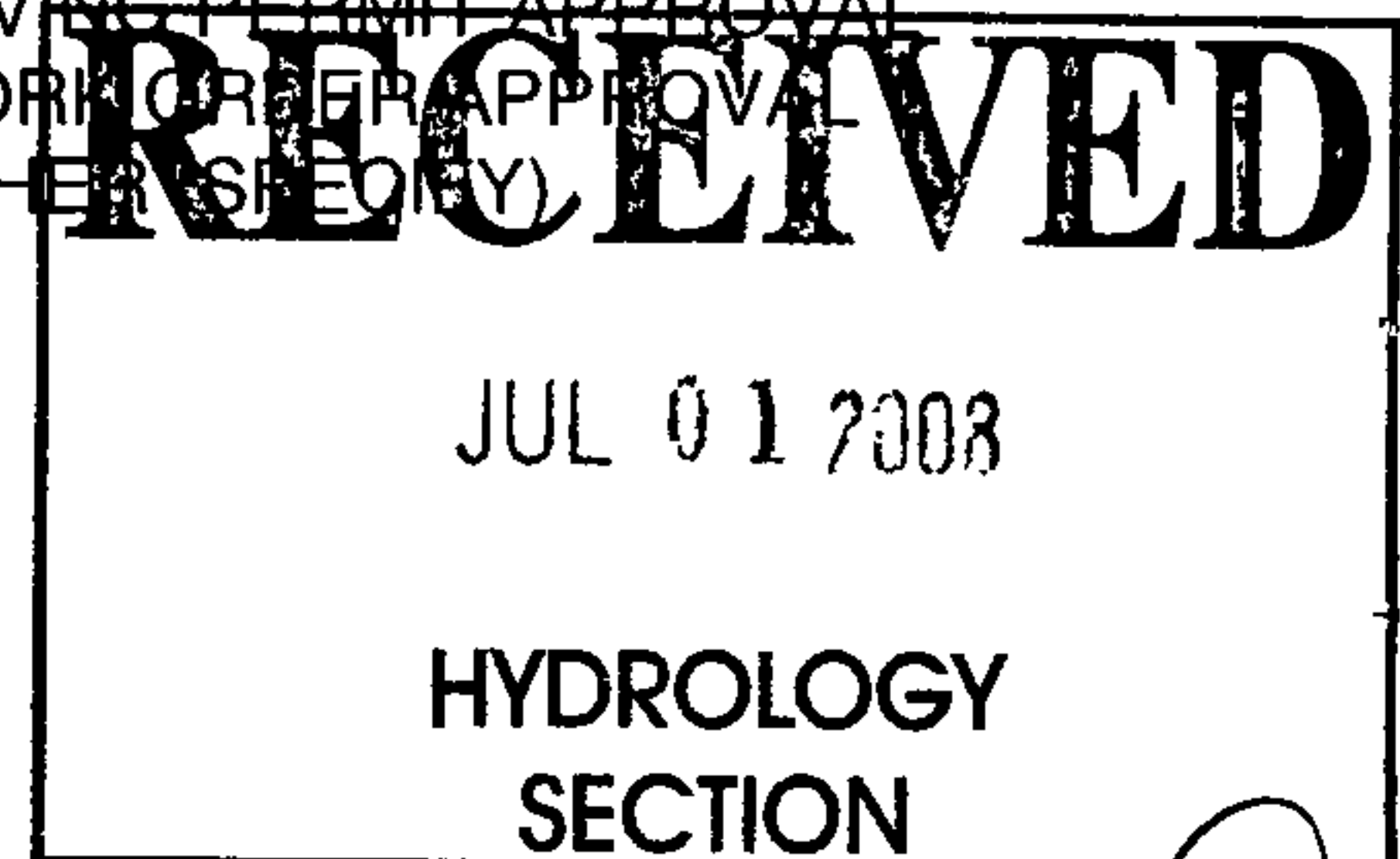
WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
☐ NO
☐ COPY PROVIDED

DATE SUBMITTED: July 1, 2008 BY: Scott Steffen 

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.
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- 3. Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.



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

July 1, 2008

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

Re: Grading and Drainage Certification
Sierra Ranch Unit 2 Subdivision, COA Project No. 757582; DRB Case No. 1003429

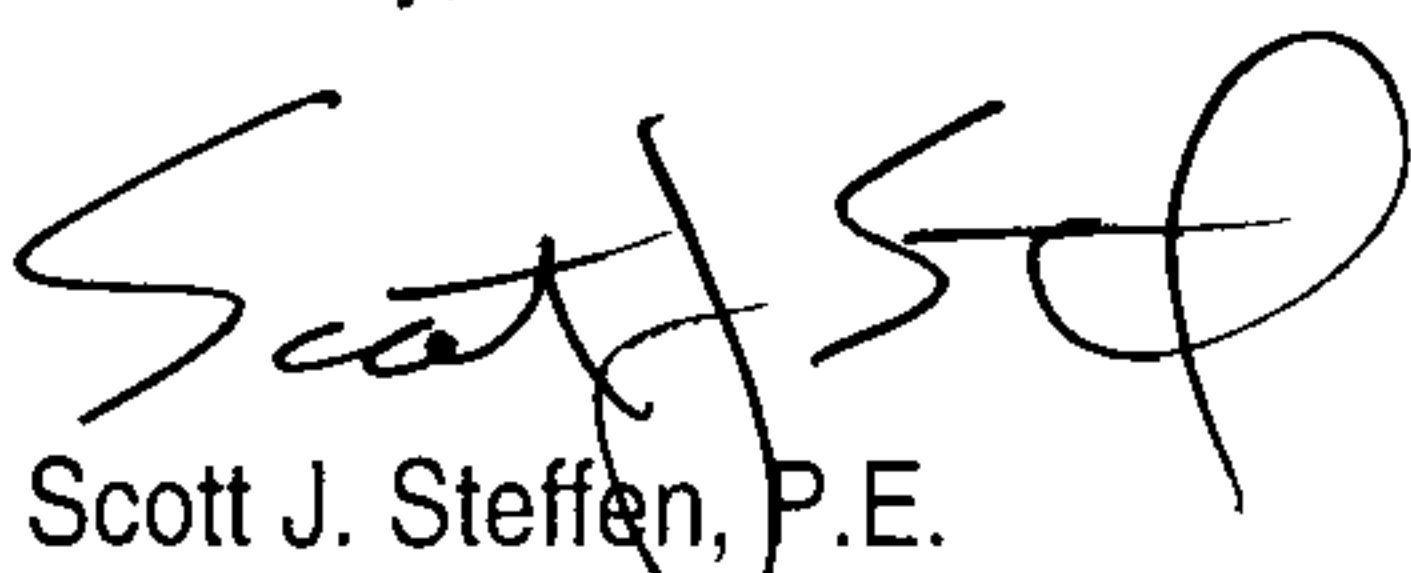
Dear Mr. Bingham:

Enclosed for your review is the DRB approved grading plan, dated 1/25/05, with as-built elevations. The DRB approved grading plan covers both Sierra Ranch Unit 1 and Unit 2. This certification is only for Unit 2. The Unit 1 certification was approved by the City on October 23, 2006. The as-built survey was provided by Aldrich Land Surveying Inc. After reviewing these as-built elevations, it is my belief that the site has been graded in substantial compliance with the approved grading plan.

The temporary retention ponds shown on Sheet 5 have not been constructed per the approved plan. The ponds were relocated to the west of 118th Street, within the existing PNM easement. The location of the offsite ponds is consistent with the South Powerline Channel pond/drainage system. In addition, a small off-site detention pond, with storm drain riser, has been constructed to the west of Sierra Ranch to collect undeveloped flows from the property to the east of 118th Street and Sierra Ranch Unit 2. The storm drain riser is connected to the storm drain that was extended to the property through Sierra Ranch. As-builts of the ponds is also included in the submittal.

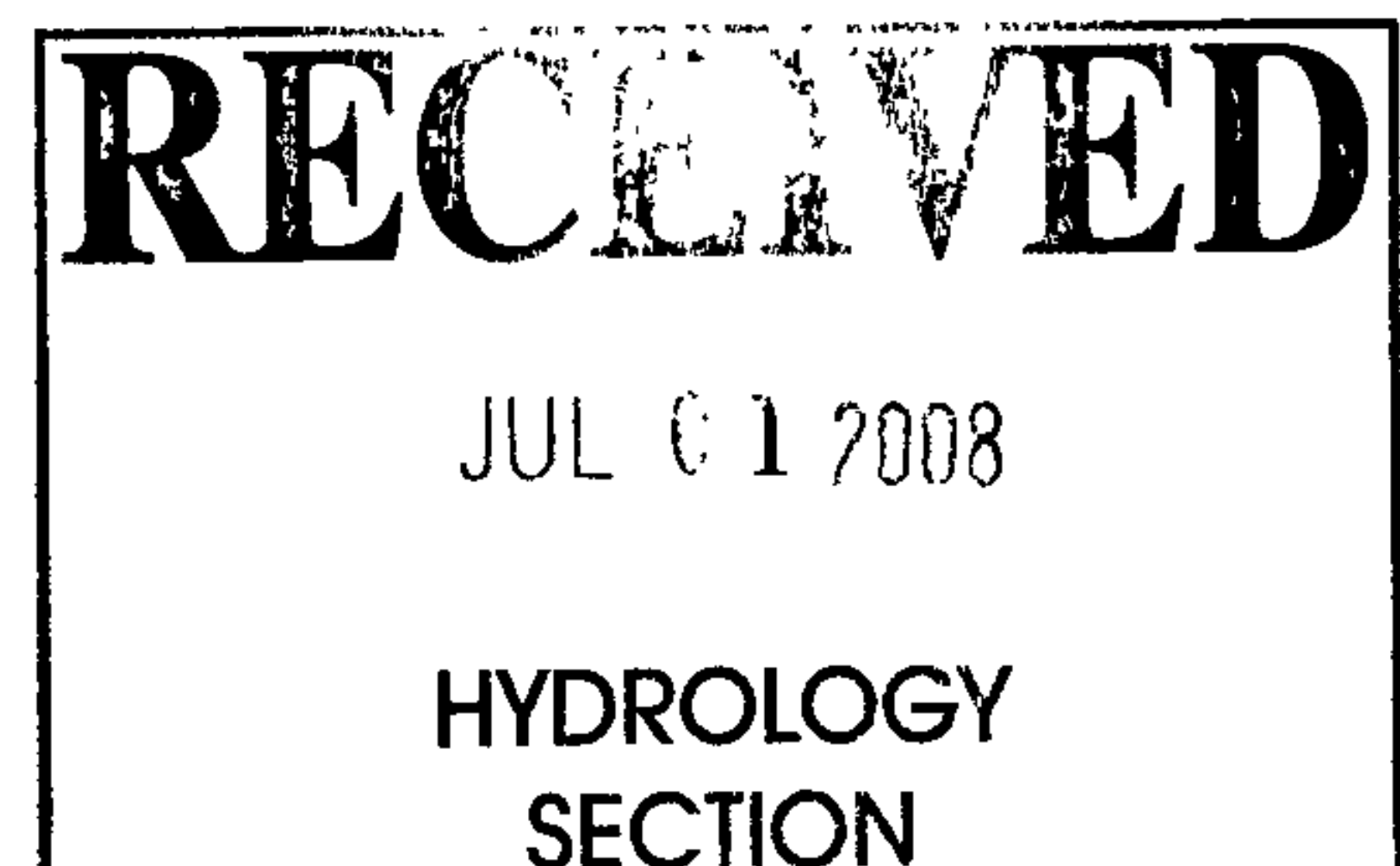
Your review and approval is requested for SIA/financial guaranty release of the project. I appreciate your time and consideration. If you have questions or require additional information, please contact me at 823-1000.

Sincerely,

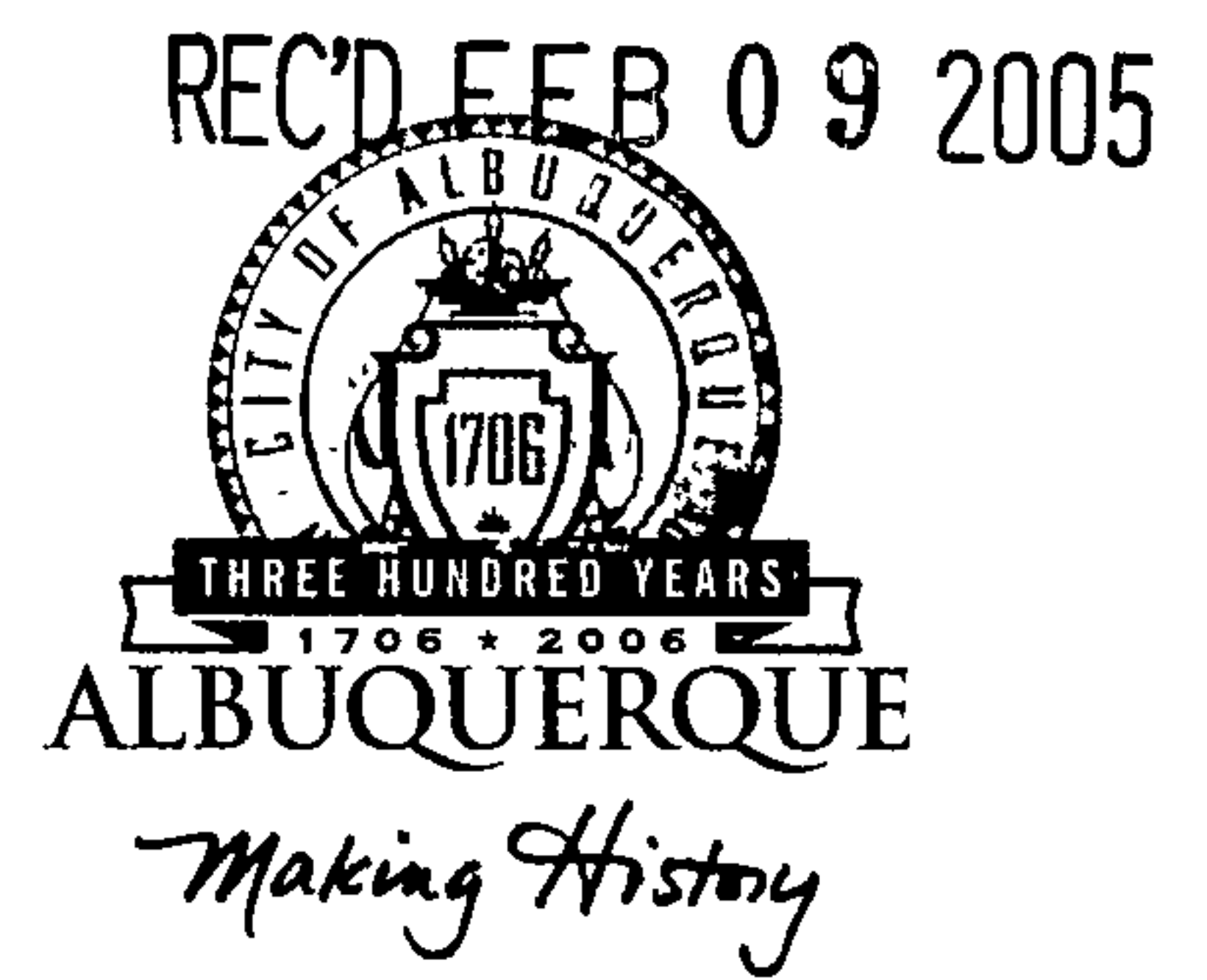


Scott J. Steffen, P.E.
Vice President, Community Development
and Planning Group

Enclosure



CITY OF ALBUQUERQUE



February 7, 2005

Scott Steffen, PE
Bohannon Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sierra Ranch Subdivision Drainage Report
Engineer's Stamp dated 1-25-05 (N8/D3)

Dear Mr. Steffen,

P.O. Box 1293

Based upon the information provided in your submittals dated 12-17-04 and 1-26-05, the above referenced report is approved for Preliminary Plat action by the DRB. Once that board approves the plan, please submit a mylar copy for my signature in order to obtain a Rough Grading Permit.

Albuquerque

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department, Hydrology section at 768-3654 (Charles Caruso).

New Mexico 87103

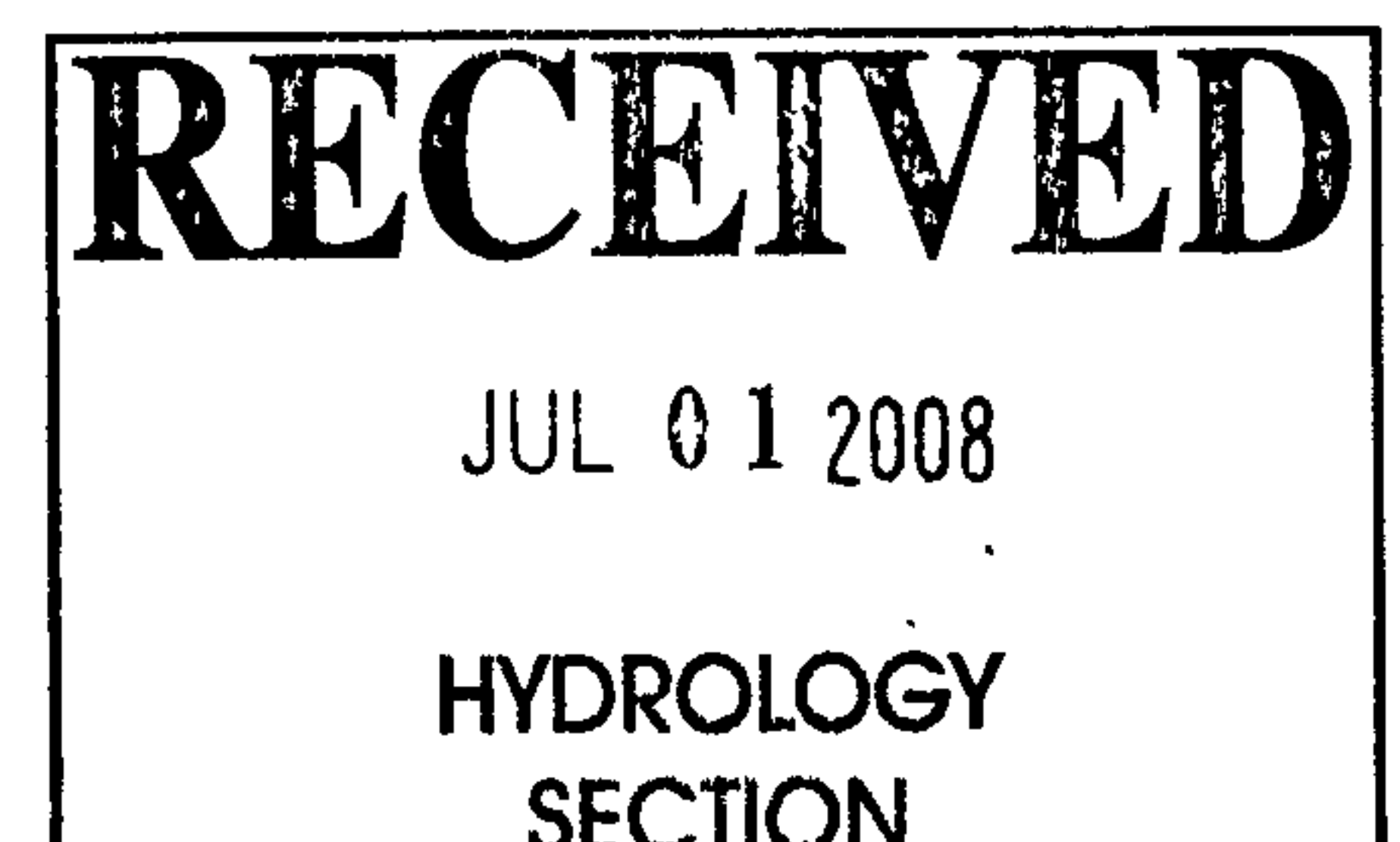
If you have any questions, you can contact me at 924-3986.

www.cabq.gov

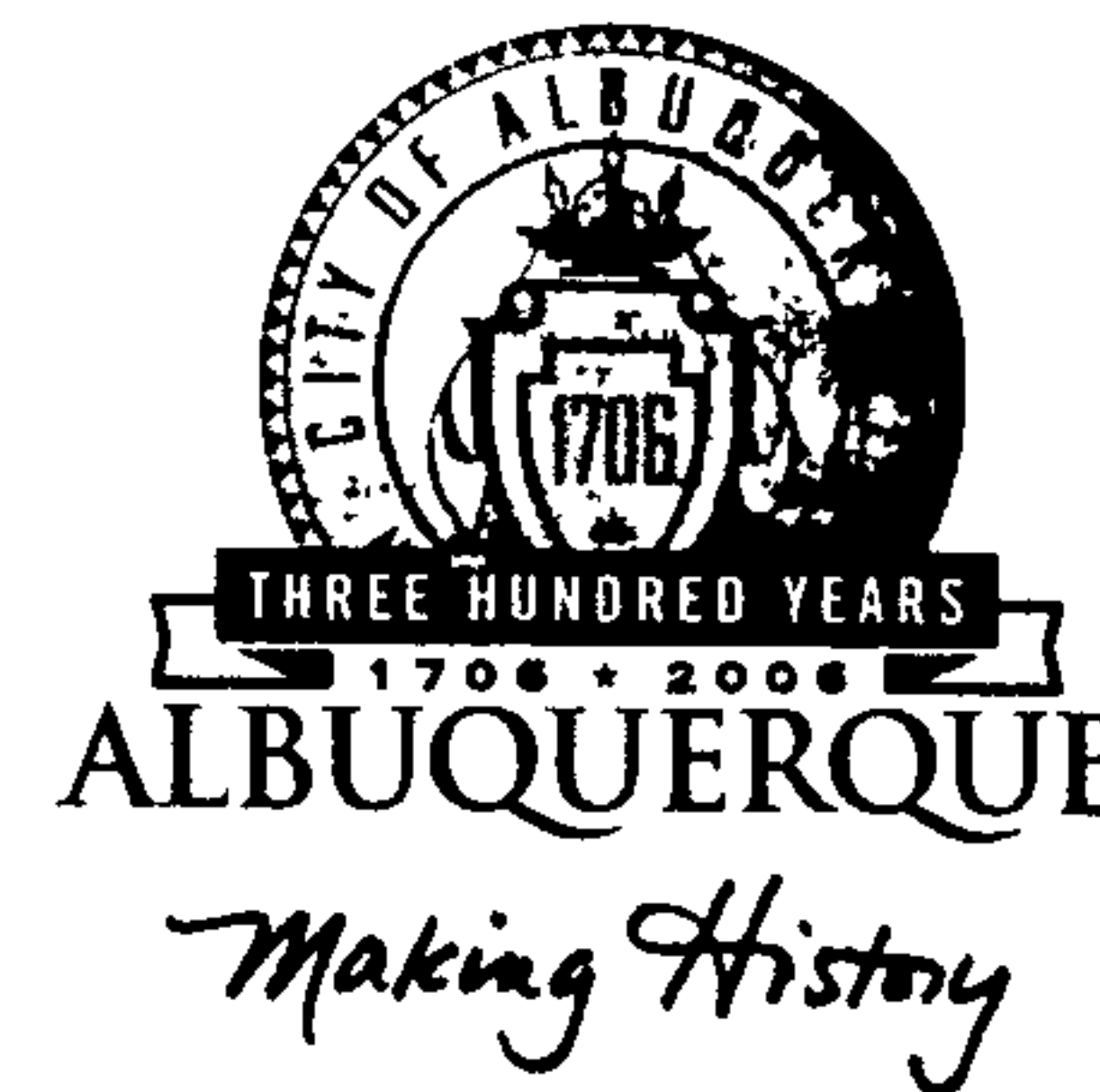
Sincerely,

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

C: Chuck Caruso, DMD
file



CITY OF ALBUQUERQUE



February 7, 2005

Scott Steffen, PE
Bohannon Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Sierra Ranch Subdivision Drainage Report
Engineer's Stamp dated 1-25-05 (N8/D3)

Dear Mr. Steffen,

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P.O. Box 1293

Albuquerque

New Mexico 87103

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

www.cabq.gov

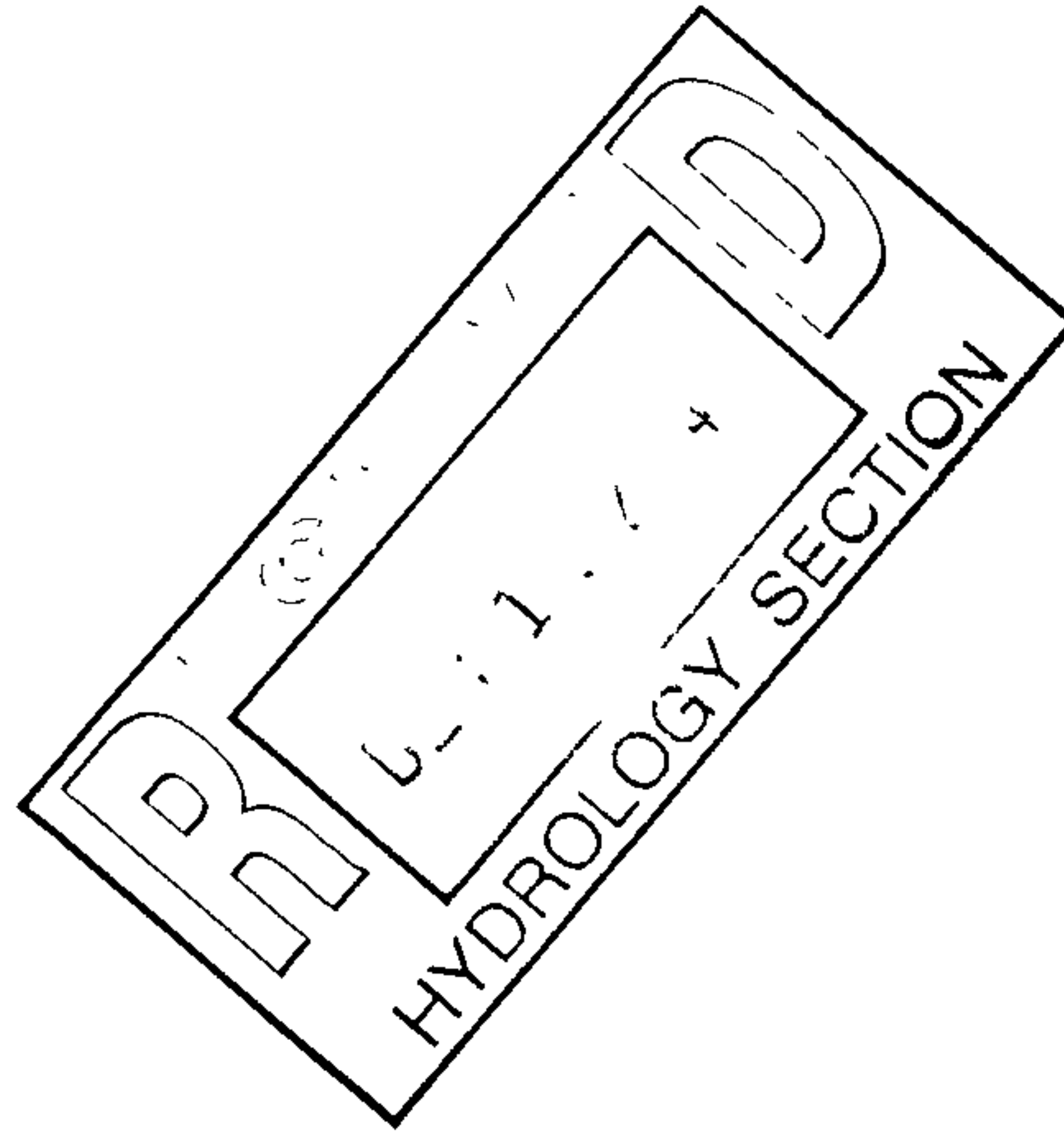
Sincerely,

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

C: Chuck Caruso, DMD
file

DRAINAGE STUDY FOR SIERRA RANCH SUBDIVISION

DECEMBER 16, 2004



Prepared for:

Curb Inc.

5160 San Francisco NE

Albuquerque, NM 87109

Bohannon & Huston INC.

ENGINEERING ▲

SPATIAL DATA ▲

ADVANCED TECHNOLOGIES ▲



**DRAINAGE STUDY
FOR
SIERRA RANCH SUBDIVISION**

DECEMBER 16, 2004

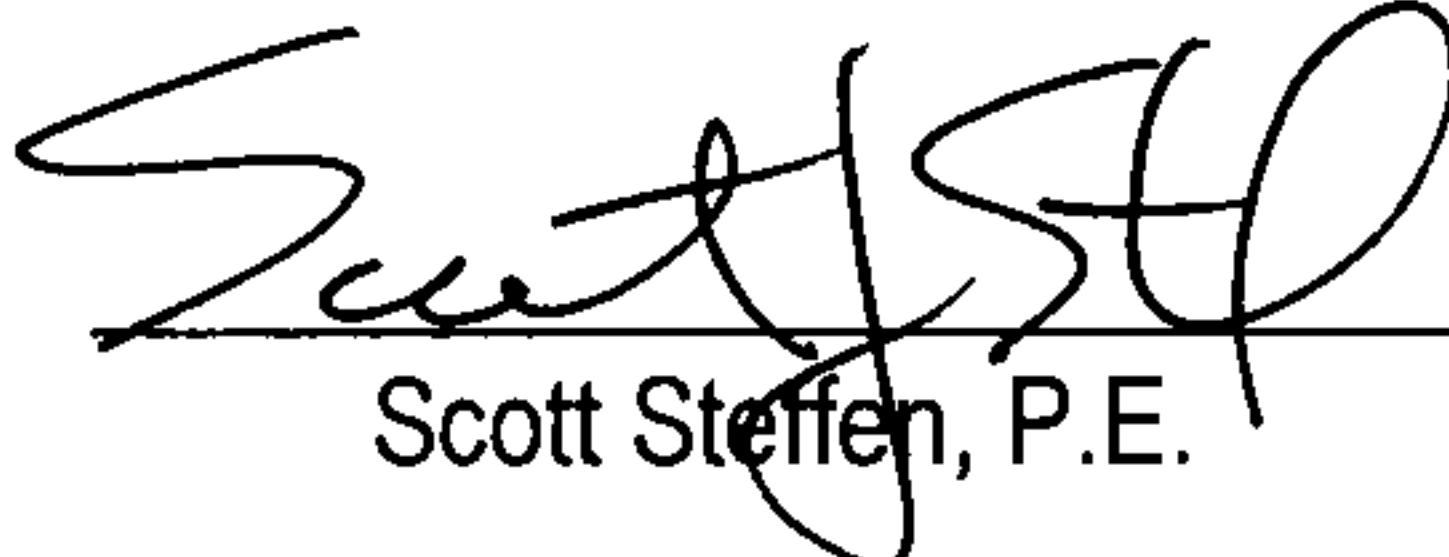
Prepared for:

**CURB INC.
5160 SAN FRANCISCO NE
ALBUQUERQUE, NM 87109**

Prepared by:

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

PREPARED BY:


Scott Steffen, P.E.

12/16/04
Date

1-25-05



Bohannon Huston INC.



TABLE OF CONTENTS

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I. INTRODUCTION	1
II. METHODOLOGY	1
III. EXISTING CONDITIONS.....	2
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B. Existing Drainage Patterns.....	2
IV. PROPOSED DEVELOPED CONDITIONS.....	2
A. Offsite Flows.....	2
B. Onsite Flows.....	4
C. FEMA Floodplain.....	4
V. CONCLUSION.....	5

APPENDICES

- APPENDIX A - AHYMO INPUT AND SUMMARY FILES FOR DEVELOPED CONDITIONS
- APPENDIX B - STREET CAPACITY AND STORM DRAIN INLET ANALYSIS
- APPENDIX C - INFRASTRUCTURE LIST

EXHIBITS

- EXHIBIT 1 - PRELIMINARY PLAT
- EXHIBIT 2 - GRADING PLAN
- EXHIBIT 3 - DEVELOPED CONDITIONS BASIN MAP
- EXHIBIT 4 - OFFSITE BASIN MAP

I. INTRODUCTION

This drainage study establishes a drainage management plan for the proposed development of Sierra Ranch. This subdivision is approximately 71 acres of residential (R-LT, R-D) land to be subdivided into 383 single family residential lots. The property is adjacent to the Rio Bravo Sector Plan and is located on Albuquerque's southwest mesa, south of the future Gibson Boulevard and east of 118th Street. Sierra Ranch is in the Amole Arroyo Watershed and encompassed by the Amole-Hubbell Drainage Management Plan.

This study provides hydrologic and hydraulic analysis and provides a drainage management plan as necessary to support the planned 383-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. The Arid-lands Hydrologic Model (AHYMO) was utilized to determine peak flow rates for design of the storm drainage improvements within the project. The 100-year, 6-hour storm is used as the design event. The results are included in **Appendix A**. Street capacities were analyzed using Manning's equation, consistent with the revised DPM Section 22.2. The storm sewer system is analyzed using current DPM methods for gravity flow conditions. All data and calculations supporting this study are located in **Appendix B**.

The hydrologic analysis is also based on the approved drainage report: Amole-Hubbell Drainage Management Plan, Volume I, Final Facilities Plan Report dated July 22, 1999, prepared by Leedshill-Herkenhoff, Inc.

III. EXISTING CONDITIONS

A. Topography

Sierra Ranch is currently undeveloped land with grades ranging from approximately 3% to 6%. The area generally slopes from northwest to southeast. Soils in the area have an SCS soil classification of BCC (Bluepoint loamy fine sand). BCC soils consist of deep, somewhat excessively drained soils formed in sandy alluvial soils, with rapid permeability, slow runoff characteristics, and severe hazard for wind erosion. Vegetation is light consisting mostly of native grasses.

B. Existing Drainage Patterns

Sierra Ranch is located in the Amole Arroyo Drainage Basin. The site generally drains from northwest to southeast. Areas to the east are currently being developed as residential subdivisions. Areas to the north and west of the site are currently undeveloped and discharge undeveloped runoff through the site.

IV. PROPOSED DEVELOPED CONDITIONS

Sierra Ranch subdivision is a proposed single-family residential development with 383 lots on 71 acres. Proposed street configurations are shown on the *Preliminary Plat*, **Exhibit 1**. The Amole-Hubbell DMP allows for full discharge of developed flows from the Amole Arroyo Basin to the Amole and Hubbell Lake storage facilities.

The percent impervious land treatment for the proposed conditions is determined from Table A-5 of the DPM, Section 22.2. The land treatment values used in the AHYMO analysis are the same as the Gibson Boulevard DMP.

A. Offsite Flows

No offsite flows reach the site from the south or east because the natural ground slopes away from Sierra Ranch on these sides. The offsite flow from the north will be intercepted by El Rancho Grande Unit 16 or a temporary pond on that property. If Unit 16 or Gibson Blvd. is built before Sierra Ranch, then the undeveloped runoff from the north

offsite basin (See Offsite Basin Map) will be contained or intercepted by others. If Sierra Ranch is developed before Unit 16, then the undeveloped runoff from the north offsite basin will be contained by a temporary pond within Unit 16. This pond has been sized to contain flows produced from a 100-year 6-hour design storm. If a larger storm occurs, the pond will overflow to the Gibson Blvd. right-of-way.

The property to the west of Sierra Ranch is currently undeveloped. Temporary ponds will be placed to capture the western offsite historic flows until that property develops or 118th Street is built. Since Sierra Ranch will be developed with two phases, each phase must be analyzed separately for offsite flows.

When Phase 1 is developed, the offsite undeveloped flows from Phase 2 and offsite basins 3 and 4 will be contained with a temporary pond on Phase 2. If the Phase 1 development occurs before 118th Street is built, then the temporary pond on Phase 2 will be increased to accommodate additional undeveloped runoff from offsite basins 1 and 2. This pond (See Offsite Basin Map) has been sized to contain flows produced from a 100-year 6-hour design storm. If a larger storm occurs, the pond will overflow to the right-of-way of Walnut Canyon Road.

When Phase 2 is developed, the historic runoff from offsite basins 3 and 4 will be contained with temporary ponds on the property to the west of Phase 2 or the ponds will be located in Phase 2 on encumbered lots. If the Phase 2 development occurs before 118th Street is built, additional temporary ponds will be built on the adjacent parcel within the existing 150' drainage easement to accommodate runoff from offsite basins 1 and 2. These ponds are sized to contain twice the 100-year, 6-hour storm.

The Sierra Ranch subdivision is required to accept developed flows from the western offsite parcel. A storm drain stub will be provided through an easement at the western side of the subdivision. This storm drain will be sized to accept fully developed residential flows from the offsite parcel, based on current zoning.

under 150' 7

B. Onsite Flows

Developed runoff from Sierra Ranch will be conveyed by the internal street system to Bison Springs Street, where it will be collected by a public storm drain system. See **Appendix B** for street capacity and inlet capacity calculations. This drainage plan proposes discharging 250 cfs to the storm drain in Messina Drive. Portions of Gibson Blvd., Messina Drive, and Amole Mesa will also discharge into the master storm drain system. (See Basin Map A for contributing basins.) The storm drain is part of the master planned system and has been designed to accept all of the developed runoff from Sierra Ranch.

A surge pond located in the park at the southeast corner of the subdivision is connected to the outfall storm drain system in Messina Drive. No developed flows from Sierra Ranch will directly discharge into the pond. The 100-year, 6-hour storm peak flow in the Messina Drive storm drain upstream of the surge pond is 514 cfs. The storm drain system downstream of the surge pond is designed to pass 226 cfs before the hydraulic grade line of the system rises to a level that water will surge into the pond. The peak flow of the 2-year storm is 171 cfs. The peak flow of the 5-year storm is 250 cfs. The storage volume required for the surge pond is 4.2 acre-feet. See **Exhibit 2, Grading Plan**, for the location of the pond.

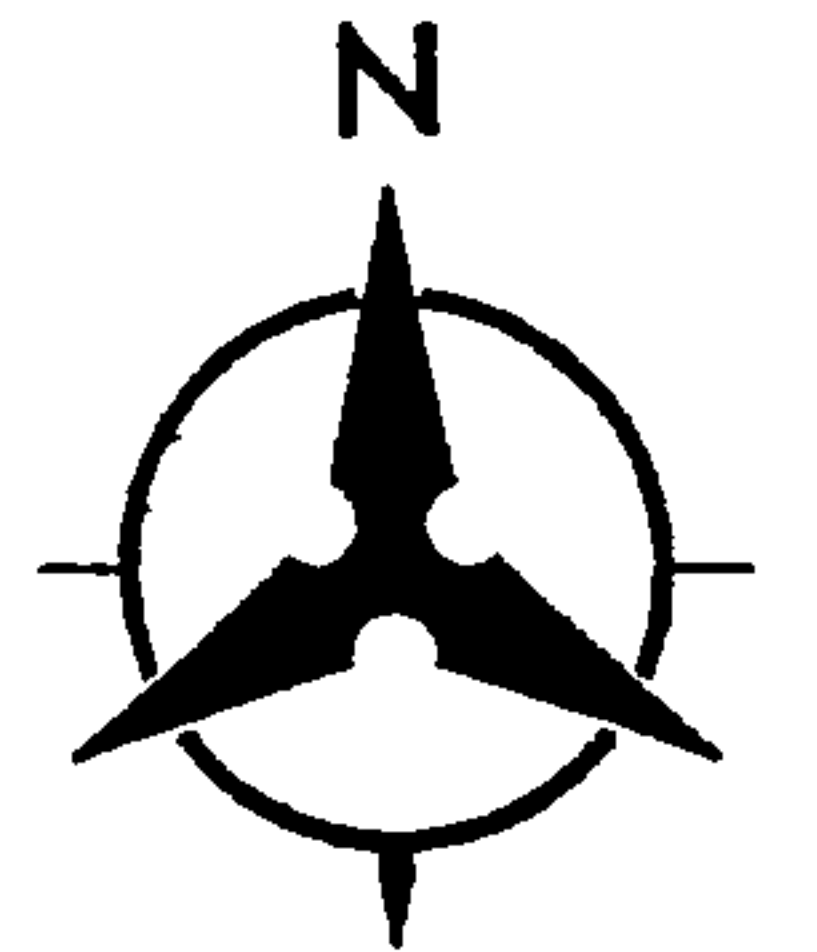
C. FEMA Floodplain

As designated on Panel 336 of 825 (Map number 35001C0336D) of the National Flood Insurance Program, Flood Insurance Rate Maps published by FEMA for Bernalillo County, New Mexico, effective date September 20, 1996, there is no existing flood hazard zone (zone AO) within the proposed development. See the FEMA Floodplain exhibit provided at the end of the report text.

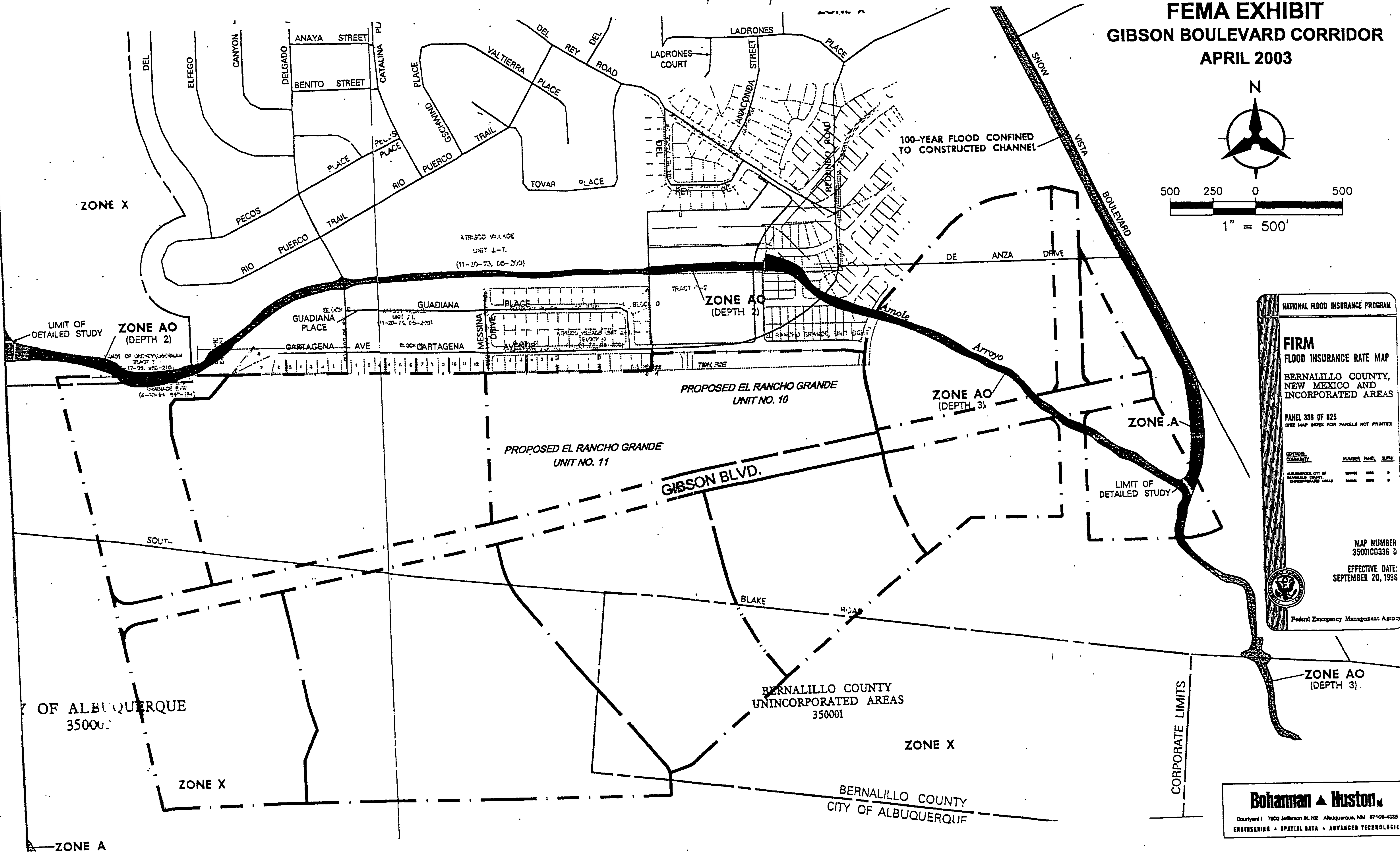
V. CONCLUSION

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

FEMA EXHIBIT GIBSON BOULEVARD CORRIDOR APRIL 2003



500 250 0 500
1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO AND
INCORPORATED AREAS

PANEL 336 OF 825
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS	NUMBER	PANEL	SURF
ALBUQUERQUE CITY OF	350002	336	0
BERNALILLO COUNTY	350001	336	0
UNINCORPORATED AREAS	350001	336	0

MAP NUMBER
35001C0336 D

EFFECTIVE DATE:
SEPTEMBER 20, 1996

Federal Emergency Management Agency

Bohannon & Huston
 Courtyard 1 7800 Jefferson BL NE Albuquerque, NM 87109-4335
 ENGINEERING • SPATIAL DATA • ADVANCED TECHNOLOGIES

APPENDICES

- APPENDIX A - AHYMO INPUT AND SUMMARY FILES FOR DEVELOPED CONDITIONS
- APPENDIX B - STREET CAPACITY AND STORM DRAIN INLET ANALYSIS
- APPENDIX C - INFRASTRUCTURE LIST

APPENDIX A

AHYMO INPUT AND SUMMARY FILES
FOR DEVELOPED CONDITIONS

```

*S*          PROJECT NAME:  SIERRA RANCH SUBDIVISION (ERG 16SOUTH)
*S*          DATE:    DECEMBER 9, 2004
*S*          INPUT FILE NAME:  SIERRA.HYM
*S*          OUTUPUT FILE NAME:  SIERRA.OUT
*S*          PROJECT NUMBER:  050188
*S*          COMMENTS: 100 YEAR-6 HOUR STORM
*S*          //////////////////////////////////////
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RAINFALL       TYPE=1      RAIN QUARTER=0.0
               RAIN ONE=1.90 IN    RAIN SIX=2.20 IN
               RAIN DAY=2.60 IN    DT=0.05 HRS
*****
*S*****
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                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=1      CODE=1
*S*****
COMPUTE NM HYD      ID=2      HYD NO=BASIN.B      DA=0.0195 SQ MI
                   PER A=0.0   PER B=20   PER C=20   PER D=60
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=2      CODE=1
*S*****
COMPUTE NM HYD      ID=4      HYD NO=BASIN.C      DA=0.0209 SQ MI
                   PER A=0.0   PER B=20   PER C=20   PER D=60
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=4      CODE=1
*S*****
COMPUTE NM HYD      ID=5      HYD NO=BASIN.D      DA=0.0211 SQ MI
                   PER A=0.0   PER B=20   PER C=20   PER D=60
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=5      CODE=1
*S*****
COMPUTE NM HYD      ID=6      HYD NO=BASIN.E      DA=0.0183 SQ MI
                   PER A=0.0   PER B=20   PER C=20   PER D=60
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=6      CODE=1
*S*****
COMPUTE NM HYD      ID=10     HYD NO=GIBSON.1     DA=0.00267 SQ MI
                   PER A=10    PER B=0    PER C=0    PER D=90
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=10     CODE=1
*S*****
COMPUTE NM HYD      ID=11     HYD NO=GIBSON.2     DA=0.00242 SQ MI
                   PER A=10    PER B=0    PER C=0    PER D=90
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=11     CODE=1
*S*****
COMPUTE NM HYD      ID=12     HYD NO=AMOLE.1     DA=0.000893 SQ MI
                   PER A=10    PER B=0    PER C=0    PER D=90
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=12     CODE=1
*S*****
COMPUTE NM HYD      ID=13     HYD NO=AMOLE.2     DA=0.0023 SQ MI
                   PER A=10    PER B=0    PER C=0    PER D=90
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=13     CODE=1
*S*****
COMPUTE NM HYD      ID=14     HYD NO=MESSINA     DA=0.00193 SQ MI
                   PER A=10    PER B=0    PER C=0    PER D=90
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=14     CODE=1
*S*****
COMPUTE NM HYD      ID=15     HYD NO=OFF.PRCL     DA=0.00912 SQ MI
                   PER A=0     PER B=20   PER C=20   PER D=60
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=15     CODE=1
*S*****
COMPUTE NM HYD      ID=16     HYD NO=PARK      DA=0.0099 SQ MI
                   PER A=0     PER B=50   PER C=50   PER D=0
                   TP=-0.1333 HR    MASSRAIN=-1
PRINT HYD          ID=16     CODE=1
*S*****
FINISH

```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -
INPUT FILE = SIERRA.HYM

- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =12/09/2004
USER NO.= AHYMO-S-9702c1BohanHu-AH

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	
S	PROJECT NAME: SIERRA RANCH SUBDIVISION (ERG 16SOUTH)										
S	DATE: DECEMBER 9, 2004										
S	INPUT FILE NAME: SIERRA.HYM										
S	OUTUPUT FILE NAME: SIERRA.OUT										
S	PROJECT NUMBER: 050188										
S	COMMENTS:100 YEAR-6 HOUR STORM										
*S	////////////////////////////////////										
START									TIME=	.00	
RAINFALL TYPE= 1									RAIN6=	2.200	
*S*****											
COMPUTE NM HYD	BASIN.A	-	1	.01600	36.93	1.292	1.51376	1.500	3.606 PER IMP=	60.00	
*S*****											
COMPUTE NM HYD	BASIN.B	-	2	.01950	45.01	1.574	1.51376	1.500	3.606 PER IMP=	60.00	
*S*****											
COMPUTE NM HYD	BASIN.C	-	4	.02090	48.24	1.687	1.51376	1.500	3.606 PER IMP=	60.00	
*S*****											
COMPUTE NM HYD	BASIN.D	-	5	.02110	48.70	1.703	1.51376	1.500	3.606 PER IMP=	60.00	
*S*****											
COMPUTE NM HYD	BASIN.E	-	6	.01830	42.24	1.477	1.51376	1.500	3.606 PER IMP=	60.00	
*S*****											
*S*****											
COMPUTE NM HYD	GIBSON.1	-	10	.00267	6.94	.259	1.81666	1.500	4.064 PER IMP=	90.00	
*S*****											
COMPUTE NM HYD	GIBSON.2	-	11	.00242	6.30	.234	1.81667	1.500	4.065 PER IMP=	90.00	
*S*****											
COMPUTE NM HYD	AMOLE.1	-	12	.00089	2.33	.087	1.81666	1.500	4.080 PER IMP=	90.00	
*S*****											
COMPUTE NM HYD	AMOLE.2	-	13	.00230	5.98	.223	1.81667	1.500	4.066 PER IMP=	90.00	
*S*****											
COMPUTE NM HYD	MESSINA	-	14	.00193	5.02	.187	1.81667	1.500	4.067 PER IMP=	90.00	
*S*****											
COMPUTE NM HYD	OFF.PRCL	-	15	.00912	21.06	.736	1.51376	1.500	3.608 PER IMP=	60.00	
*S*****											
COMPUTE NM HYD	PARK	-	16	.00990	15.66	.439	.83146	1.500	2.472 PER IMP=	.00	
*S*****											
FINISH											

```

*S*          PROJECT NAME:  SIERRA RANCH SUBDIVISION (ERG 16SOUTH)
*S*          DATE:    NOVEMBER 9, 2004
*S*          INPUT FILE NAME:  OFFSITE.HYM
*S*          OUTUPUT FILE NAME:  OFFSITE.OUT
*S*          PROJECT NUMBER:  050188
*S*          COMMENTS:    100 YEAR-6 HOUR STORM
*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=2.60 IN    DT=0.05 HRS

*****
*S*****IF SIERRA RANCH IS BUILT BEFORE GIBSON BLVD., A POND WILL BE BUILT ON THE
*S*****NORTHERN TRACT TO ACCOMMODATE THIS OFFSITE BASIN.*****
COMPUTE NM HYD      ID=1      HYD NO=NORTH      DA=0.1458 SQ MI
                    PER A=100    PER B=0      PER C=0      PER D=0
                    TP=-0.1333 HR    MASSRAIN=-1

PRINT HYD          ID=1      CODE=1
*S*****
COMPUTE NM HYD      ID=2      HYD NO=BASIN.1      DA=0.0351 SQ MI
                    PER A=100    PER B=0      PER C=0      PER D=0
                    TP=-0.1333 HR    MASSRAIN=-1

PRINT HYD          ID=2      CODE=1
*S*****
COMPUTE NM HYD      ID=4      HYD NO=BASIN.2      DA=0.0197 SQ MI
                    PER A=100    PER B=0      PER C=0      PER D=0
                    TP=-0.1333 HR    MASSRAIN=-1

PRINT HYD          ID=4      CODE=1
*S*****
*S*****IF 118TH IS BUILT BEFORE SIERRA RANCH SUB., THEN PONDS WILL BE BUILT TO
*S*****ACCOMMODATE FLOWS FROM BASINS 3 AND 4.*****
COMPUTE NM HYD      ID=5      HYD NO=BASIN.3      DA=0.00433 SQ MI
                    PER A=100    PER B=0      PER C=0      PER D=0
                    TP=-0.1333 HR    MASSRAIN=-1

PRINT HYD          ID=5      CODE=1
*S*****
COMPUTE NM HYD      ID=6      HYD NO=BASIN.4      DA=0.00433 SQ MI
                    PER A=100    PER B=0      PER C=0      PER D=0
                    TP=-0.1333 HR    MASSRAIN=-1

PRINT HYD          ID=6      CODE=1
*S*****
*S*****IF SIERRA RANCH IS BUILT BEFORE 118TH, THEN PONDS WILL BE BUILT TO
*S*****ACCOMMODATE FLOWS FROM BASINS 1&3 AND BASINS 2&4.*****
ADD HYD            ID=7      HYD NO=BASIN.1.3      ID I=2      ID II=5
PRINT HYD          ID=7      CODE=1
*S*****
ADD HYD            ID=8      HYD NO=BASIN.2.4      ID I=4      ID II=6
PRINT HYD          ID=8      CODE=1
*S*****
*S*****PHASE 1 OF THE SIERRA RANCH SUBDIVISION WILL BE BUILT BEFORE PHASE 2,
*S*****THEREFORE, PONDS WILL BE BUILT ON PHASE 2 TO ACCOMMODATE OFFSITE FLOWS****
COMPUTE NM HYD      ID=9      HYD NO=PHASE.2      DA=0.0448 SQ MI
                    PER A=100    PER B=0      PER C=0      PER D=0
                    TP=-0.1333 HR    MASSRAIN=-1

PRINT HYD          ID=9      CODE=1
*S*****
ADD HYD            ID=10     HYD NO=BASIN.1234      ID I=7      ID II=8
PRINT HYD          ID=10     CODE=1
*S*****
*S*****IF PHASE 1 IS BUILT BEFORE 118TH, a POND WILL BE BUILT ON PHASE 2 TO
*S*****ACCOMMODATE ALL THE FLOW FROM THE OFFSITE WESTERN BASINS
ADD HYD            ID=11     HYD NO=WEST.TOTAL      ID I=9      ID II=10
PRINT HYD          ID=11     CODE=1
*S*****
FINISH

```

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	
S	PROJECT NAME: SIERRA RANCH SUBDIVISION (ERG 16SOUTH)										
S	DATE: NOVEMBER 9, 2004										
S	INPUT FILE NAME: OFFSITE.HYM										
S	OUTUPUT FILE NAME: OFFSITE.OUT										
S	PROJECT NUMBER: 050188										
S	COMMENTS:100 YEAR-6 HOUR STORM										
*S	////////////////////////////////////										
START									TIME=	.00	
RAINFALL TYPE= 1									RAIN6=	2.200	
*S****IF SIERRA RANCH IS BUILT BEFORE GIBSON BLVD., A POND WILL BE BUILT ON THE											
*S****NORTHERN TRACT TO ACCOMMODATE THIS OFFSITE BASIN.*****											
COMPUTE NM HYD	NORTH	-	1	.14580	128.08	3.492	.44903	1.500	1.373 PER IMP=	.00	
*S*****											
COMPUTE NM HYD	BASIN.1	-	2	.03510	29.51	.841	.44903	1.500	1.314 PER IMP=	.00	
*S*****											
COMPUTE NM HYD	BASIN.2	-	4	.01970	16.57	.472	.44903	1.500	1.314 PER IMP=	.00	
*S*****											
*S****IF 118TH IS BUILT BEFORE SIERRA RANCH SUB., THEN PONDS WILL BE BUILT TO											
*S****ACCOMMODATE FLOWS FROM BASINS 3 AND 4.*****											
COMPUTE NM HYD	BASIN.3	-	5	.00433	3.65	.104	.44903	1.500	1.316 PER IMP=	.00	
*S*****											
COMPUTE NM HYD	BASIN.4	-	6	.00433	3.65	.104	.44903	1.500	1.316 PER IMP=	.00	
*S*****											
*S****IF SIERRA RANCH IS BUILT BEFORE 118TH, THEN PONDS WILL BE BUILT TO											
*S****ACCOMMODATE FLOWS FROM BASINS 1&3 AND BASINS 2&4.*****											
ADD HYD	BASIN.1.3	2& 5	7	.03943	33.16	.944	.44903	1.500	1.314		
*S*****											
ADD HYD	BASIN.2.4	4& 6	8	.02403	20.21	.575	.44903	1.500	1.314		
*S*****											
*S*****PHASE 1 OF THE SIERRA RANCH SUBDIVISION WILL BE BUILT BEFORE PHASE.2,											
*S*****THEREFORE, PONDS WILL BE BUILT ON PHASE 2 TO ACCOMMODATE OFFSITE FLOWS***											
COMPUTE NM HYD	PHASE.2	-	9	.04480	37.66	1.073	.44903	1.500	1.314 PER IMP=	.00	
*S*****											
ADD HYD	BASIN.1234	7& 8	10	.06346	53.37	1.520	.44903	1.500	1.314		
*S*****											
*S****IF PHASE 1 IS BUILT BEFORE 118TH, a POND WILL BE BUILT ON PHASE 2 TO											
*S****ACCOMMODATE ALL THE FLOW FROM THE OFFSITE WESTERN BASINS											
ADD HYD	WEST.TOTAL	9&10	11	.10826	91.03	2.593	.44903	1.500	1.314		
*S*****											
FINISH											

A-4/4

APPENDIX B

STREET CAPACITY AND STORM DRAIN INLET ANALYSIS

SIERRA RANCH SUBDIVISION
Internal Street and Storm Drain Inlet Capacity Calculations
December 2004

1. **Four Mile Road**
Basin A
Q = 37 cfs

The total amount of developed runoff produced from Basin A and a small amount from Gibson Blvd. exceeds the street capacity of Four Mile Road. Therefore, inlets will be placed at the eastern end of the street to intercept a portion of the flow (See Grading Plan for proposed inlet locations). Excess flow will continue on the surface east towards Bison Springs Street. Roll curb may be installed to Lot 254. See PC stream output and inlet nomograph.

2. **Corona Ranch Road**
Basin B
Q = 45 cfs

The total amount of developed runoff produced from Basin B exceeds the street capacity of Corona Ranch Road. Therefore, inlets will be placed before Salado Creek Street to intercept a portion of the flow (See Grading Plan for proposed inlet locations). Excess surface flow will continue east towards Bison Springs Street. Roll curb may be installed to Lot 276. See PC stream output and inlet nomograph. Developed runoff from the western offsite parcel will also discharge through Basin B, however, all the flow will be contained in the storm drain.

3. **Walnut Canyon Road**
Basin C
Q = 48 cfs

The total amount of developed runoff produced from Basin C exceeds the street capacity of Walnut Canyon Road. Therefore, inlets will be placed at the unit boundary to intercept a portion of the flow (See Grading Plan for proposed inlet locations). The remaining surface flow will continue east towards Bison Springs Street. Roll curb may be installed to Devils Tower Street. See PC stream output and inlet nomograph.

4. **Buck Island Road**
Basin D
Q = 49 cfs

The total amount of developed runoff produced from Basin D exceeds the street capacity of Buck Island Road. Therefore, inlets will be placed beginning at Lot 139 to intercept a portion of the flow (See Grading Plan for proposed inlet locations). The remaining surface flow will continue east towards Bison Springs Street. Roll curb may be installed to Mountaintop Drive. See PC stream output and inlet nomograph.

5. Pipestone Road

Basin E

Q = 42 cfs

The total amount of developed runoff produced from Basin E and a small amount from Amole Mesa Avenue exceeds the street capacity of Pipestone Road. Therefore, inlets will be placed at Mountaintop Drive and Gila Cliff Drive to intercept a portion of the flow (See Grading Plan for proposed inlet locations). The remaining surface flow will continue east towards Big Springs Road. Roll curb may be installed to Devils Tower Street. See PC stream output and inlet nomograph.

6. Big Springs Road

Basin D

Q = 49 cfs

The total amount of developed surface runoff at the east end of Big Springs Road is 21 cfs. A roadway the size of Big Springs Road with standard curb can carry more than 53 cfs. Therefore, inlets are not required in Big Springs Road. The flow will continue east towards Bison Springs Street. See PC stream output.

7. Bison Springs Street

Basins A, B, C, D, E, and offsite parcel

Q = 246 cfs

The total developed runoff from the subdivision and the western offsite parcel flows to Bison Springs Street on the roadway surface or in a storm drain. Any remaining surface flow will be captured by inlets in this street. At the southern stub terminus of Bison Springs Street, the internal storm drain connects to the master storm drain system in Messina Drive. The master storm drain system is planned to accommodate all the developed runoff from this subdivision.

The sump inlet located at the southern stub terminus of Bison Springs Street is designed to capture the remaining surface runoff produced from a 100-year 6-hour storm. If a greater storm event occurs, the stub street will act as an emergency overflow spillway towards the surge pond.

PC PROGRAM STREAM

SEPTEMBER 1994

FOUR MILE ROAD

MANNING'S N= .017 SLOPE= .037

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.48	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.75	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.99	0.94	0.02	0.05
0.04	0.04	0.03	0.0	1.32	1.20	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.39	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.57	1.88	0.04	0.10
0.07	0.07	0.08	0.1	2.30	1.74	2.19	0.05	0.12
0.08	0.08	0.10	0.2	2.63	1.90	2.50	0.06	0.14
0.09	0.09	0.13	0.3	2.96	2.06	2.81	0.07	0.16
0.10	0.10	0.16	0.3	3.29	2.21	3.13	0.08	0.18
0.11	0.11	0.19	0.4	3.62	2.35	3.44	0.09	0.20
0.12	0.12	0.23	0.6	3.95	2.49	3.75	0.10	0.22
0.13	0.13	0.26	0.7	4.28	2.63	4.07	0.11	0.24
0.14	0.14	0.31	0.8	5.15	2.58	4.93	0.10	0.24
0.15	0.15	0.36	0.9	6.03	2.58	5.79	0.10	0.25
0.16	0.16	0.43	1.1	6.91	2.62	6.65	0.11	0.27
0.17	0.17	0.50	1.3	7.79	2.68	7.51	0.11	0.28
0.18	0.18	0.58	1.6	8.67	2.76	8.38	0.12	0.30
0.19	0.19	0.66	1.9	9.54	2.84	9.24	0.13	0.32
0.20	0.20	0.76	2.2	10.42	2.94	10.10	0.13	0.33
0.21	0.21	0.87	2.6	11.30	3.03	10.96	0.14	0.35
0.22	0.22	0.98	3.1	12.18	3.13	11.83	0.15	0.37
0.23	0.23	1.10	3.6	13.06	3.24	12.69	0.16	0.39
0.24	0.24	1.23	4.1	13.93	3.34	13.55	0.17	0.41
0.25	0.25	1.37	4.7	14.81	3.44	14.41	0.18	0.43
0.26	0.26	1.52	5.4	15.69	3.55	15.27	0.20	0.46
0.27	0.27	1.68	6.1	16.57	3.65	16.14	0.21	0.48
0.28	0.28	1.84	6.9	17.45	3.76	17.00	0.22	0.50
0.29	0.29	2.02	7.8	18.32	3.86	17.86	0.23	0.52
0.30	0.30	2.20	8.7	19.20	3.97	18.72	0.24	0.54
0.31	0.31	2.39	9.7	20.08	4.07	19.59	0.26	0.57
0.32	0.32	2.59	10.8	20.96	4.17	20.45	0.27	0.59
0.33	0.33	2.80	12.0	21.84	4.28	21.31	0.28	0.61
0.34	0.34	3.02	13.2	22.71	4.38	22.17	0.30	0.64
0.35	0.35	3.25	14.5	23.59	4.48	23.03	0.31	0.66
0.36	0.36	3.48	15.9	24.47	4.58	23.90	0.33	0.69
0.37	0.37	3.72	17.4	25.35	4.68	24.76	0.34	0.71
0.38	0.38	3.98	19.0	26.23	4.78	25.62	0.35	0.73
0.39	0.39	4.24	20.7	27.10	4.88	26.48	0.37	0.76
0.40	0.40	4.50	22.4	27.98	4.98	27.35	0.38	0.78
0.41	0.41	4.78	24.3	28.86	5.07	28.21	0.40	0.81
0.42	0.42	5.06	26.7	28.88	5.27	28.21	0.43	0.85
0.43	0.43	5.35	29.2	28.90	5.46	28.22	0.46	0.89
0.44	0.44	5.64	31.6	28.92	5.65	28.23	0.49	0.92
0.45	0.45	5.91	34.5	28.94	5.83	28.23	0.53	0.98
0.46	0.46	6.19	37.2	28.96	6.01	28.23	0.56	1.02
0.47	0.47	6.48	40.1	28.98	6.19	28.24	0.60	1.07
0.48	0.48	6.76	43.0	29.01	6.37	28.24	0.63	1.11
0.49	0.49	7.04	46.0	29.03	6.54	28.25	0.66	1.15

ROLL CURB
LIMIT

PC PROGRAM STREAM

SEPTEMBER 1994

FOUR MILE ROAD

MANNING'S N= .017 SLOPE= .034

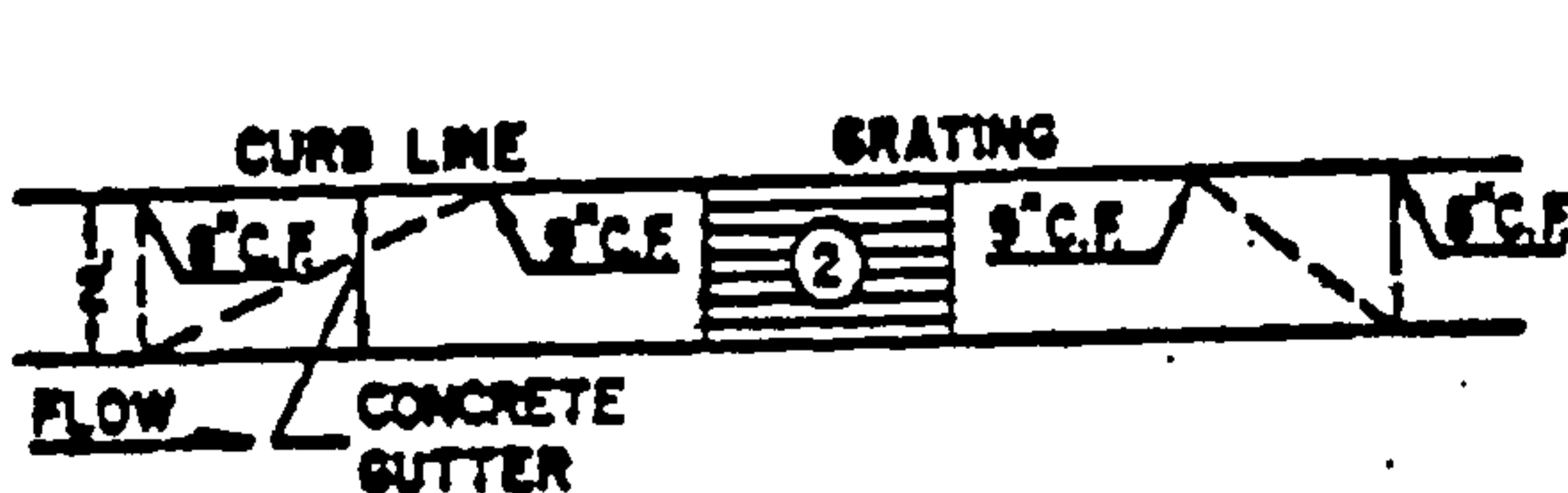
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(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	1.50	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	1.82	2.50	0.05	0.13
0.09	0.09	0.13	0.2	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	2.25	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	0.09	0.23
0.15	0.15	0.36	0.9	6.03	2.47	5.79	0.10	0.25
0.16	0.16	0.43	1.1	6.91	2.51	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	2.64	8.38	0.11	0.29
0.19	0.19	0.66	1.8	9.54	2.72	9.24	0.12	0.31
0.20	0.20	0.76	2.1	10.42	2.81	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	3.00	11.83	0.14	0.36
0.23	0.23	1.10	3.4	13.06	3.10	12.69	0.15	0.38
0.24	0.24	1.23	3.9	13.93	3.20	13.55	0.16	0.40
0.25	0.25	1.37	4.5	14.81	3.30	14.41	0.17	0.42
0.26	0.26	1.52	5.2	15.69	3.40	15.27	0.18	0.44
0.27	0.27	1.68	5.9	16.57	3.50	16.14	0.19	0.46
0.28	0.28	1.84	6.6	17.45	3.60	17.00	0.20	0.48
0.29	0.29	2.02	7.5	18.32	3.70	17.86	0.21	0.50
0.30	0.30	2.20	8.4	19.20	3.80	18.72	0.22	0.52
0.31	0.31	2.39	9.3	20.08	3.90	19.59	0.24	0.55
0.32	0.32	2.59	10.4	20.96	4.00	20.45	0.25	0.57
0.33	0.33	2.80	11.5	21.84	4.10	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	13.9	23.59	4.30	23.03	0.29	0.64
0.36	0.36	3.48	15.3	24.47	4.39	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	4.58	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	4.77	27.35	0.35	0.75
0.41	0.41	4.78	23.3	28.86	4.86	28.21	0.37	0.78
0.42	0.42	5.06	25.6	28.88	5.05	28.21	0.40	0.82
0.43	0.43	5.35	28.0	28.90	5.23	28.22	0.43	0.86
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	33.0	28.94	5.59	28.23	0.49	0.94
0.46	0.46	6.19	35.7	28.96	5.76	28.23	0.52	0.98
0.47	0.47	6.48	38.4	28.98	5.93	28.24	0.55	1.02
0.48	0.48	6.76	41.2	29.01	6.10	28.24	0.58	1.06
0.49	0.49	7.04	44.1	29.03	6.27	28.25	0.61	1.10

STREET CAPACITY

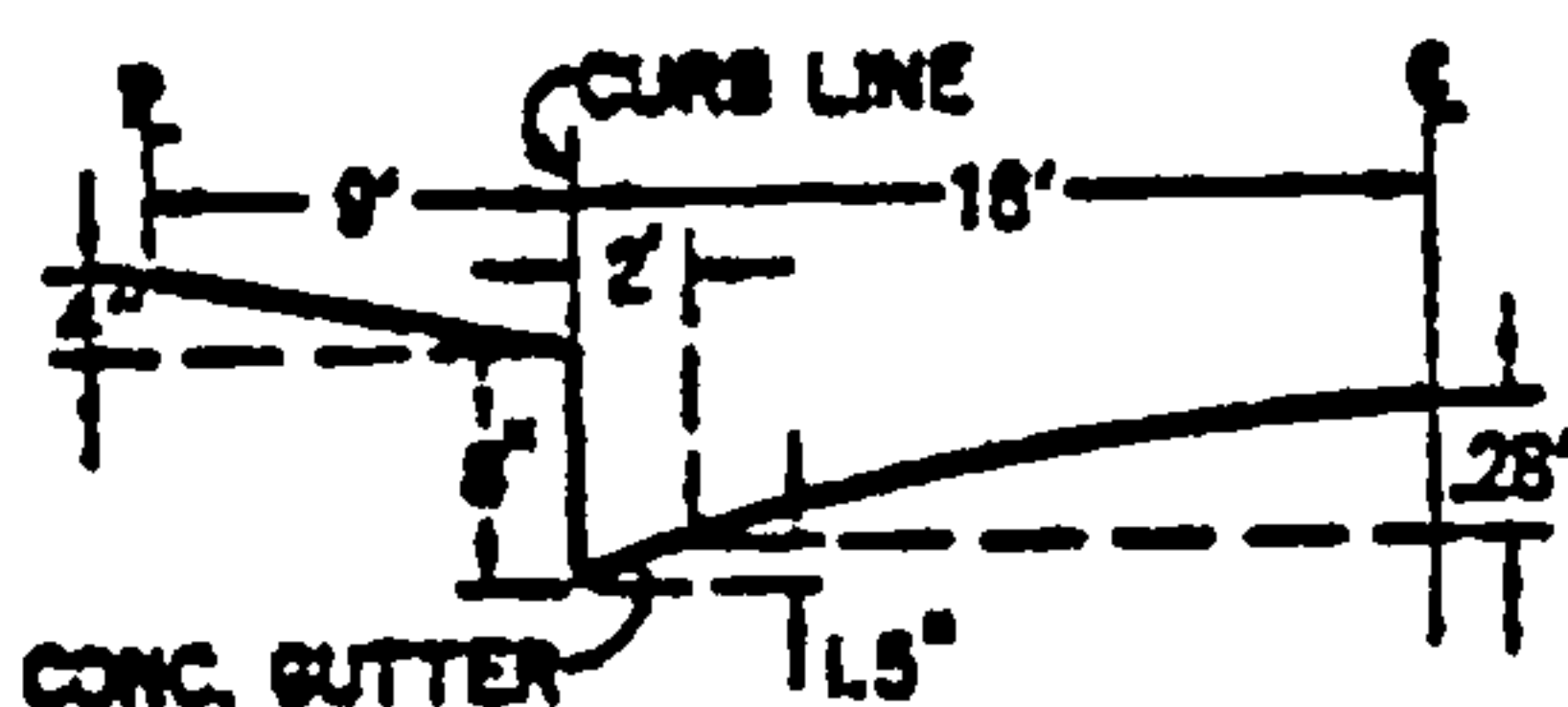
FOUR MILE ROAD

Chapter 22 - Drainage, Flood Control and Erosion Control

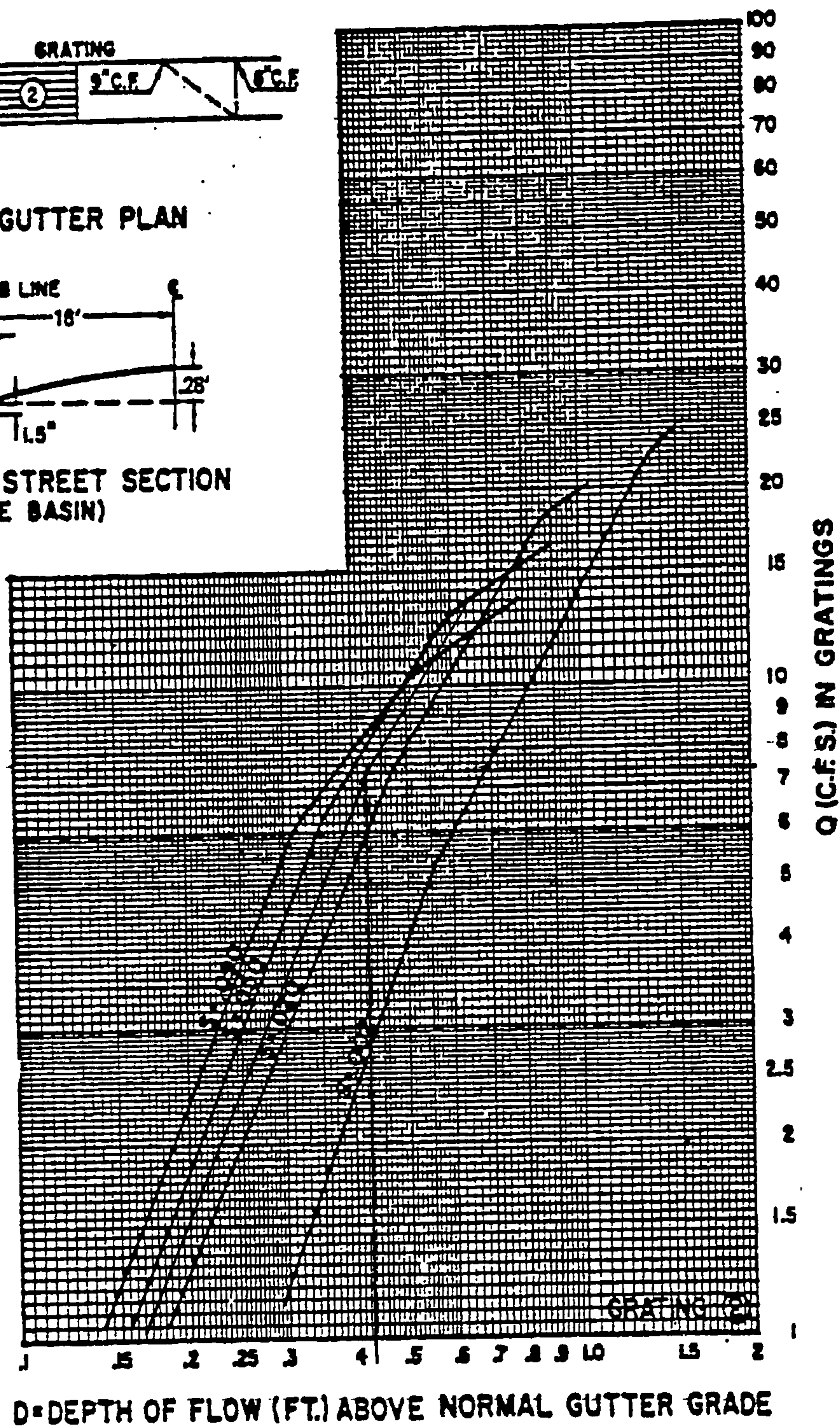
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



Slope = 3.4%

D = 0.43, Q = 7.4 cfs

Analyzer Report

=====

Drainage Structure Analyzer

Open Hydraulic Analysis

Four Mile Road

Date: Friday, November 12, 2004 10:59:04

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Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	14.8 cfs
Slope	3.400%
Size (W x T):	18.00 x 2.0000

Output Results

Flow Rate	14.8 cfs
Slope	3.400%
CD	0.65
Capacity	19.4 cfs
Velocity	12.09 ft/s
Depth	0.98 ft
Critical Depth	1.40 ft
Size (W x T):	18.00 x 2.0000

PC PROGRAM STREAM

SEPTEMBER 1994

CORONA RANCH ROAD

MANNING'S N= .017 SLOPE= .037

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ. FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.48	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.75	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.99	0.94	0.02	0.05
0.04	0.04	0.03	0.0	1.32	1.20	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.39	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.57	1.88	0.04	0.10
0.07	0.07	0.08	0.1	2.30	1.74	2.19	0.05	0.12
0.08	0.08	0.10	0.2	2.63	1.90	2.50	0.06	0.14
0.09	0.09	0.13	0.3	2.96	2.06	2.81	0.07	0.16
0.10	0.10	0.16	0.3	3.29	2.21	3.13	0.08	0.18
0.11	0.11	0.19	0.4	3.62	2.35	3.44	0.09	0.20
0.12	0.12	0.23	0.6	3.95	2.49	3.75	0.10	0.22
0.13	0.13	0.26	0.7	4.28	2.63	4.07	0.11	0.24
0.14	0.14	0.31	0.8	5.15	2.58	4.93	0.10	0.24
0.15	0.15	0.36	0.9	6.03	2.58	5.79	0.10	0.25
0.16	0.16	0.43	1.1	6.91	2.62	6.65	0.11	0.27
0.17	0.17	0.50	1.3	7.79	2.68	7.51	0.11	0.28
0.18	0.18	0.58	1.6	8.67	2.76	8.38	0.12	0.30
0.19	0.19	0.66	1.9	9.54	2.84	9.24	0.13	0.32
0.20	0.20	0.76	2.2	10.42	2.94	10.10	0.13	0.33
0.21	0.21	0.87	2.6	11.30	3.03	10.96	0.14	0.35
0.22	0.22	0.98	3.1	12.18	3.13	11.83	0.15	0.37
0.23	0.23	1.10	3.6	13.06	3.24	12.69	0.16	0.39
0.24	0.24	1.23	4.1	13.93	3.34	13.55	0.17	0.41
0.25	0.25	1.37	4.7	14.81	3.44	14.41	0.18	0.43
0.26	0.26	1.52	5.4	15.69	3.55	15.27	0.20	0.46
0.27	0.27	1.68	6.1	16.57	3.65	16.14	0.21	0.48
0.28	0.28	1.84	6.9	17.45	3.76	17.00	0.22	0.50
0.29	0.29	2.02	7.8	18.32	3.86	17.86	0.23	0.52
0.30	0.30	2.20	8.7	19.20	3.97	18.72	0.24	0.54
0.31	0.31	2.39	9.7	20.08	4.07	19.59	0.26	0.57
0.32	0.32	2.59	10.8	20.96	4.17	20.45	0.27	0.59
0.33	0.33	2.80	12.0	21.84	4.28	21.31	0.28	0.61
0.34	0.34	3.02	13.2	22.71	4.38	22.17	0.30	0.64
0.35	0.35	3.25	14.5	23.59	4.48	23.03	0.31	0.66
0.36	0.36	3.48	15.9	24.47	4.58	23.90	0.33	0.69
0.37	0.37	3.72	17.4	25.35	4.68	24.76	0.34	0.71
0.38	0.38	3.98	19.0	26.23	4.78	25.62	0.35	0.73
0.39	0.39	4.24	20.7	27.10	4.88	26.48	0.37	0.76
0.40	0.40	4.50	22.4	27.98	4.98	27.35	0.38	0.78
0.41	0.41	4.78	24.3	28.86	5.07	28.21	0.40	0.81
0.42	0.42	5.06	26.7	28.88	5.27	28.21	0.43	0.85
0.43	0.43	5.35	29.2	28.90	5.46	28.22	0.46	0.89
□ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ. FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	34.5	28.94	5.83	28.23	0.53	0.98
0.46	0.46	6.19	37.2	28.96	6.01	28.23	0.56	1.02
0.47	0.47	6.48	40.1	28.98	6.19	28.24	0.60	1.07
0.48	0.48	6.76	43.0	29.01	6.37	28.24	0.63	1.11
0.49	0.49	7.04	46.0	29.03	6.54	28.25	0.66	1.15

ROLL CURB
LIMIT

PC PROGRAM STREAM

SEPTEMBER 1994

CORONA RANCH ROAD

MANNING'S N= .017 SLOPE= .0316

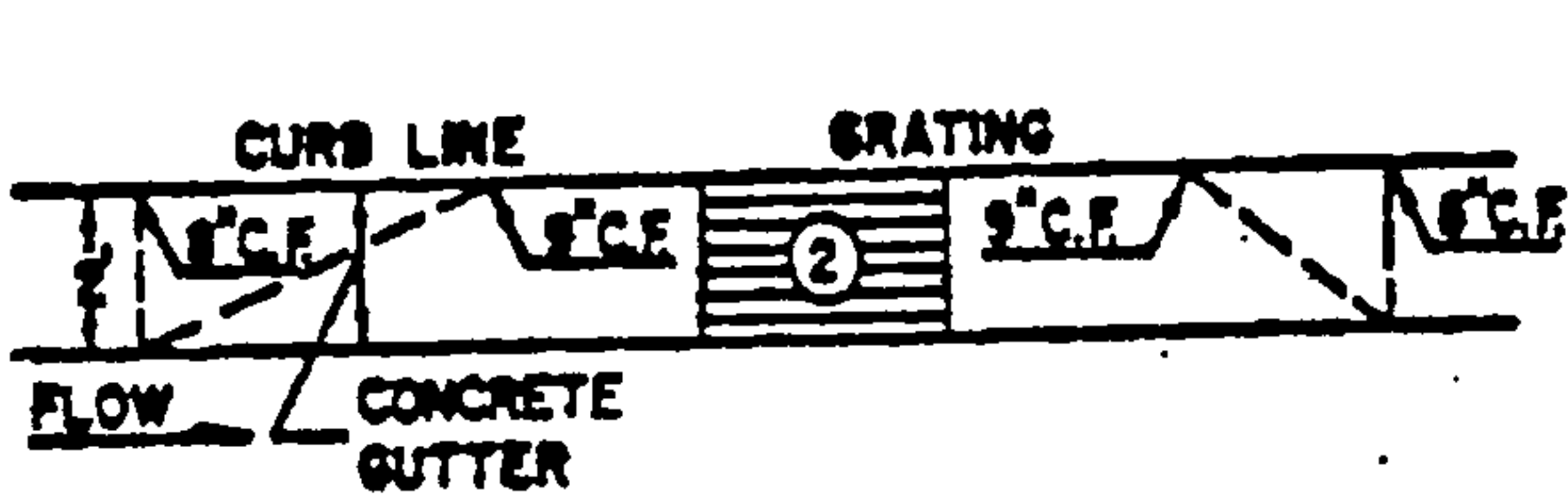
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.44	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.70	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.91	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	1.11	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.28	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.45	1.88	0.03	0.09
0.07	0.07	0.08	0.1	2.30	1.61	2.19	0.04	0.11
0.08	0.08	0.10	0.2	2.63	1.76	2.50	0.05	0.13
0.09	0.09	0.13	0.2	2.96	1.90	2.81	0.06	0.15
0.10	0.10	0.16	0.3	3.29	2.04	3.13	0.06	0.16
0.11	0.11	0.19	0.4	3.62	2.17	3.44	0.07	0.18
0.12	0.12	0.23	0.5	3.95	2.30	3.75	0.08	0.20
0.13	0.13	0.26	0.6	4.28	2.43	4.07	0.09	0.22
0.14	0.14	0.31	0.7	5.15	2.38	4.93	0.09	0.23
0.15	0.15	0.36	0.9	6.03	2.39	5.79	0.09	0.24
0.16	0.16	0.43	1.0	6.91	2.42	6.65	0.09	0.25
0.17	0.17	0.50	1.2	7.79	2.48	7.51	0.10	0.27
0.18	0.18	0.58	1.5	8.67	2.55	8.38	0.10	0.28
0.19	0.19	0.66	1.7	9.54	2.63	9.24	0.11	0.30
0.20	0.20	0.76	2.1	10.42	2.71	10.10	0.11	0.31
0.21	0.21	0.87	2.4	11.30	2.80	10.96	0.12	0.33
0.22	0.22	0.98	2.8	12.18	2.90	11.83	0.13	0.35
0.23	0.23	1.10	3.3	13.06	2.99	12.69	0.14	0.37
0.24	0.24	1.23	3.8	13.93	3.09	13.55	0.15	0.39
0.25	0.25	1.37	4.4	14.81	3.18	14.41	0.16	0.41
0.26	0.26	1.52	5.0	15.69	3.28	15.27	0.17	0.43
0.27	0.27	1.68	5.7	16.57	3.38	16.14	0.18	0.45
0.28	0.28	1.84	6.4	17.45	3.47	17.00	0.19	0.47
0.29	0.29	2.02	7.2	18.32	3.57	17.86	0.20	0.49
0.30	0.30	2.20	8.1	19.20	3.67	18.72	0.21	0.51
0.31	0.31	2.39	9.0	20.08	3.76	19.59	0.22	0.53
0.32	0.32	2.59	10.0	20.96	3.86	20.45	0.23	0.55
0.33	0.33	2.80	11.1	21.84	3.95	21.31	0.24	0.57
0.34	0.34	3.02	12.2	22.71	4.05	22.17	0.25	0.59
0.35	0.35	3.25	13.4	23.59	4.14	23.03	0.27	0.62
0.36	0.36	3.48	14.7	24.47	4.23	23.90	0.28	0.64
0.37	0.37	3.72	16.1	25.35	4.33	24.76	0.29	0.66
0.38	0.38	3.98	17.6	26.23	4.42	25.62	0.30	0.68
0.39	0.39	4.24	19.1	27.10	4.51	26.48	0.32	0.71
0.40	0.40	4.50	20.7	27.98	4.60	27.35	0.33	0.73
0.41	0.41	4.78	22.4	28.86	4.69	28.21	0.34	0.75
0.42	0.42	5.06	24.7	28.88	4.87	28.21	0.37	0.79
0.43	0.43	5.35	27.0	28.90	5.04	28.22	0.40	0.83
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	31.9	28.94	5.39	28.23	0.45	0.90
0.46	0.46	6.19	34.4	28.96	5.56	28.23	0.48	0.94
0.47	0.47	6.48	37.1	28.98	5.72	28.24	0.51	0.98
0.48	0.48	6.76	39.8	29.01	5.88	28.24	0.54	1.02
0.49	0.49	7.04	42.6	29.03	6.04	28.25	0.57	1.06

STREET
CAPACITY

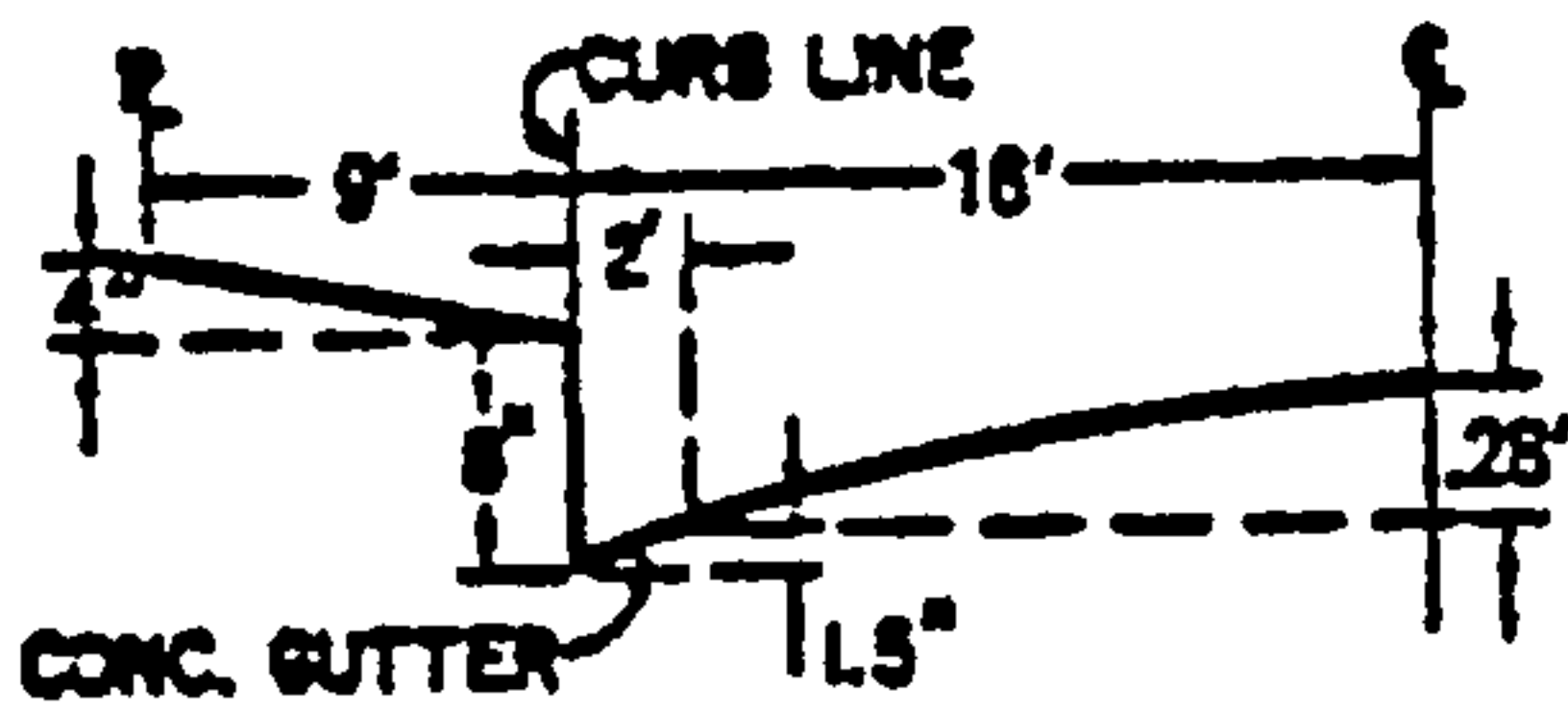
Corona Ranch Road

Chapter 22 - Drainage, Flood Control and Erosion Control

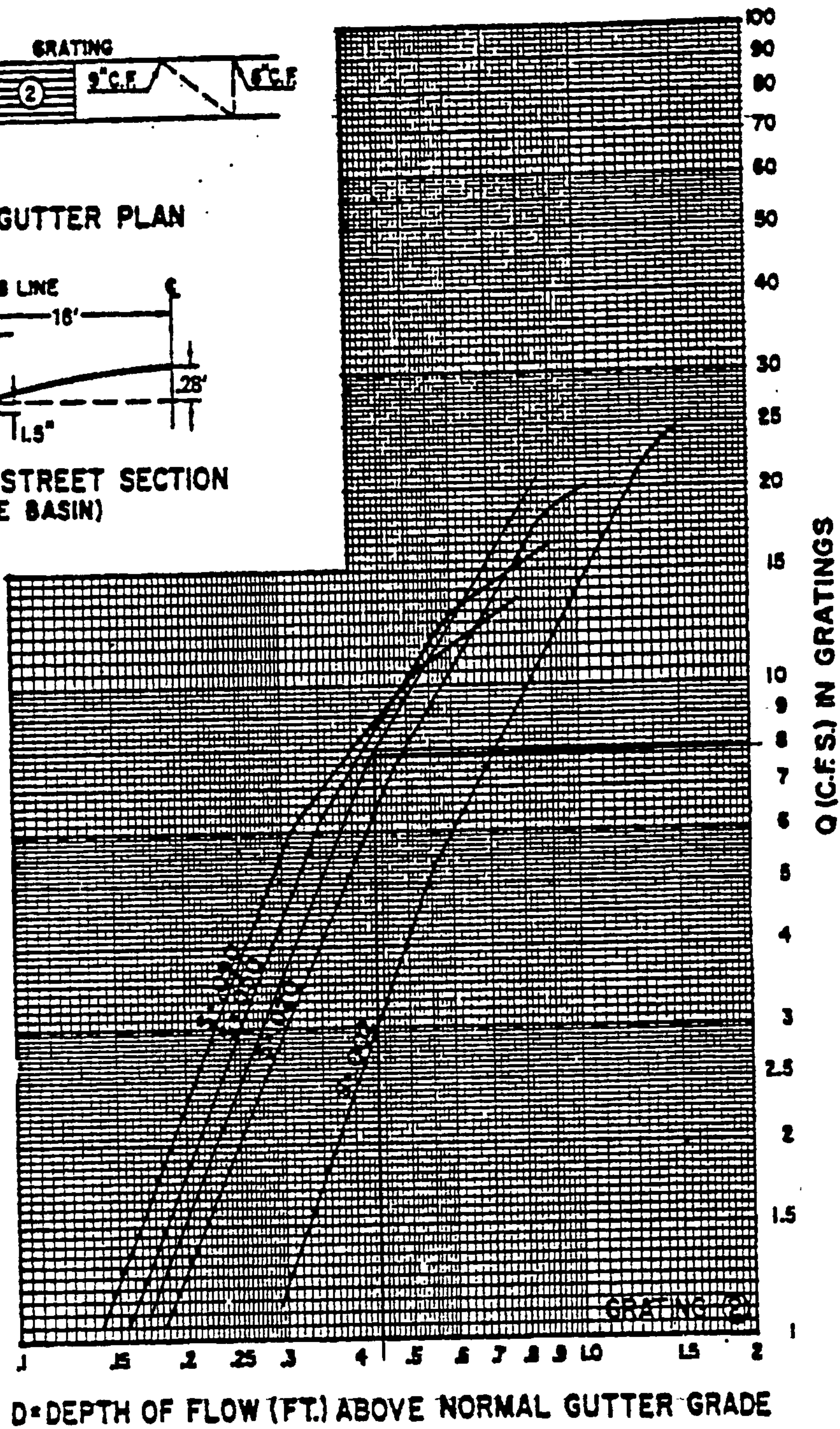
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



$$\text{Slope} = 3.2\%$$

$$D = 0.44, Q = 7.9 \text{ cfs}$$

alyzer Report

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Drainage Structure Analyzer

pe Hydraulic Analysis

STORM DRAIN FROM
OFFSITE PARCEL

Date: Thursday, November 18, 2004 13:28:40

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Input Data

ape	Circular
terial	RC C76-A
Roughness	0.013000
thod	Manning
ow Rate	21.1 cfs
ope	2.000%
Size (W x T):	24.00 x 2.5000

Output Results

Flow Rate	21.1 cfs
ope	2.000%
D	0.59
Capacity	32.0 cfs
Velocity	10.88 ft/s
pth	1.18 ft
ritical Depth	1.64 ft
Size (W x T):	24.00 x 2.5000

Analyzer Report

=====

Drainage Structure Analyzer

Hydraulic Analysis

SALADO CREEK ST.

Date: Thursday, November 18, 2004 13:55:00

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Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	36.9 cfs
Slope	2.400%
Size (W x T):	24.00 x 2.5000

Output Results

Flow Rate	36.9 cfs
Slope	2.400%
CD	0.88
Capacity	35.0 cfs
Velocity	12.62 ft/s
Depth	1.76 ft
Critical Depth	1.93 ft
Size (W x T):	24.00 x 2.5000

PC PROGRAM STREAM

SEPTEMBER 1994

WALNUT CANYON ROAD

MANNING'S N= .017 SLOPE= .0388

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.49	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.77	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	1.01	0.94	0.02	0.05
0.04	0.04	0.03	0.0	1.32	1.23	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.42	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.61	1.88	0.04	0.10
0.07	0.07	0.08	0.1	2.30	1.78	2.19	0.05	0.12
0.08	0.08	0.10	0.2	2.63	1.95	2.50	0.06	0.14
0.09	0.09	0.13	0.3	2.96	2.11	2.81	0.07	0.16
0.10	0.10	0.16	0.4	3.29	2.26	3.13	0.08	0.18
0.11	0.11	0.19	0.5	3.62	2.41	3.44	0.09	0.20
0.12	0.12	0.23	0.6	3.95	2.55	3.75	0.10	0.22
0.13	0.13	0.26	0.7	4.28	2.69	4.07	0.11	0.24
0.14	0.14	0.31	0.8	5.15	2.64	4.93	0.11	0.25
0.15	0.15	0.36	1.0	6.03	2.64	5.79	0.11	0.26
0.16	0.16	0.43	1.1	6.91	2.68	6.65	0.11	0.27
0.17	0.17	0.50	1.4	7.79	2.75	7.51	0.12	0.29
0.18	0.18	0.58	1.6	8.67	2.82	8.38	0.12	0.30
0.19	0.19	0.66	1.9	9.54	2.91	9.24	0.13	0.32
0.20	0.20	0.76	2.3	10.42	3.01	10.10	0.14	0.34
0.21	0.21	0.87	2.7	11.30	3.11	10.96	0.15	0.36
0.22	0.22	0.98	3.1	12.18	3.21	11.83	0.16	0.38
0.23	0.23	1.10	3.7	13.06	3.31	12.69	0.17	0.40
0.24	0.24	1.23	4.2	13.93	3.42	13.55	0.18	0.42
0.25	0.25	1.37	4.8	14.81	3.53	14.41	0.19	0.44
0.26	0.26	1.52	5.5	15.69	3.63	15.27	0.21	0.47
0.27	0.27	1.68	6.3	16.57	3.74	16.14	0.22	0.49
0.28	0.28	1.84	7.1	17.45	3.85	17.00	0.23	0.51
0.29	0.29	2.02	8.0	18.32	3.96	17.86	0.24	0.53
0.30	0.30	2.20	8.9	19.20	4.06	18.72	0.26	0.56
0.31	0.31	2.39	10.0	20.08	4.17	19.59	0.27	0.58
0.32	0.32	2.59	11.1	20.96	4.28	20.45	0.28	0.60
0.33	0.33	2.80	12.3	21.84	4.38	21.31	0.30	0.63
0.34	0.34	3.02	13.5	22.71	4.48	22.17	0.31	0.65
0.35	0.35	3.25	14.9	23.59	4.59	23.03	0.33	0.68
0.36	0.36	3.48	16.3	24.47	4.69	23.90	0.34	0.70
0.37	0.37	3.72	17.8	25.35	4.79	24.76	0.36	0.73
0.38	0.38	3.98	19.5	26.23	4.89	25.62	0.37	0.75
0.39	0.39	4.24	21.2	27.10	5.00	26.48	0.39	0.78
0.40	0.40	4.50	23.0	27.98	5.10	27.35	0.40	0.80
0.41	0.41	4.78	24.8	28.86	5.19	28.21	0.42	0.83
0.42	0.42	5.06	27.3	28.88	5.39	28.21	0.45	0.87
0.43	0.43	5.35	29.9	28.90	5.59	28.22	0.49	0.92
0.44	0.44	5.64	32.4	28.92	5.79	28.23	0.53	0.96
0.45	0.45	5.91	35.3	28.94	5.97	28.23	0.55	1.00
0.46	0.46	6.19	38.1	28.96	6.16	28.23	0.59	1.05
0.47	0.47	6.48	41.1	28.98	6.34	28.24	0.62	1.09
0.48	0.48	6.76	44.1	29.01	6.52	28.24	0.66	1.14
0.49	0.49	7.04	47.2	29.03	6.70	28.25	0.70	1.19

ROLL CURB
LIMIT

PC PROGRAM STREAM

SEPTEMBER 1994

WALNUT CANYON ROAD

MANNING'S N= .017 SLOPE= .0275

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.41	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.65	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.85	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	1.03	1.25	0.02	0.06
0.05	0.05	0.04	0.0	1.64	1.20	1.56	0.02	0.07
0.06	0.06	0.06	0.1	1.97	1.35	1.88	0.03	0.09
0.07	0.07	0.08	0.1	2.30	1.50	2.19	0.03	0.10
0.08	0.08	0.10	0.2	2.63	1.64	2.50	0.04	0.12
0.09	0.09	0.13	0.2	2.96	1.77	2.81	0.05	0.14
0.10	0.10	0.16	0.3	3.29	1.90	3.13	0.06	0.16
0.11	0.11	0.19	0.4	3.62	2.03	3.44	0.06	0.17
0.12	0.12	0.23	0.5	3.95	2.15	3.75	0.07	0.19
0.13	0.13	0.26	0.6	4.28	2.27	4.07	0.08	0.21
0.14	0.14	0.31	0.7	5.15	2.22	4.93	0.08	0.22
0.15	0.15	0.36	0.8	6.03	2.23	5.79	0.08	0.23
0.16	0.16	0.43	1.0	6.91	2.26	6.65	0.08	0.24
0.17	0.17	0.50	1.1	7.79	2.31	7.51	0.08	0.25
0.18	0.18	0.58	1.4	8.67	2.38	8.38	0.09	0.27
0.19	0.19	0.66	1.6	9.54	2.45	9.24	0.09	0.28
0.20	0.20	0.76	1.9	10.42	2.53	10.10	0.10	0.30
0.21	0.21	0.87	2.3	11.30	2.61	10.96	0.11	0.32
0.22	0.22	0.98	2.6	12.18	2.70	11.83	0.11	0.33
0.23	0.23	1.10	3.1	13.06	2.79	12.69	0.12	0.35
0.24	0.24	1.23	3.5	13.93	2.88	13.55	0.13	0.37
0.25	0.25	1.37	4.1	14.81	2.97	14.41	0.14	0.39
0.26	0.26	1.52	4.7	15.69	3.06	15.27	0.15	0.41
0.27	0.27	1.68	5.3	16.57	3.15	16.14	0.15	0.42
0.28	0.28	1.84	6.0	17.45	3.24	17.00	0.16	0.44
0.29	0.29	2.02	6.7	18.32	3.33	17.86	0.17	0.46
0.30	0.30	2.20	7.5	19.20	3.42	18.72	0.18	0.48
0.31	0.31	2.39	8.4	20.08	3.51	19.59	0.19	0.50
0.32	0.32	2.59	9.3	20.96	3.60	20.45	0.20	0.52
0.33	0.33	2.80	10.3	21.84	3.69	21.31	0.21	0.54
0.34	0.34	3.02	11.4	22.71	3.78	22.17	0.22	0.56
0.35	0.35	3.25	12.5	23.59	3.86	23.03	0.23	0.58
0.36	0.36	3.48	13.7	24.47	3.95	23.90	0.24	0.60
0.37	0.37	3.72	15.0	25.35	4.04	24.76	0.25	0.62
0.38	0.38	3.98	16.4	26.23	4.12	25.62	0.26	0.64
0.39	0.39	4.24	17.8	27.10	4.21	26.48	0.27	0.66
0.40	0.40	4.50	19.3	27.98	4.29	27.35	0.29	0.69
0.41	0.41	4.78	20.9	28.86	4.37	28.21	0.30	0.71
0.42	0.42	5.06	23.0	28.88	4.54	28.21	0.32	0.74
0.43	0.43	5.35	25.2	28.90	4.71	28.22	0.34	0.77
□ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	29.7	28.94	5.03	28.23	0.39	0.84
0.46	0.46	6.19	32.1	28.96	5.18	28.23	0.42	0.88
0.47	0.47	6.48	34.6	28.98	5.34	28.24	0.44	0.91
0.48	0.48	6.76	37.1	29.01	5.49	28.24	0.47	0.95
0.49	0.49	7.04	39.7	29.03	5.64	28.25	0.49	0.98

STREET
CAPACITY

PC PROGRAM STREAM

SEPTEMBER 1994

WALNUT CANYON ROAD

MANNING'S N= .017 SLOPE= .032

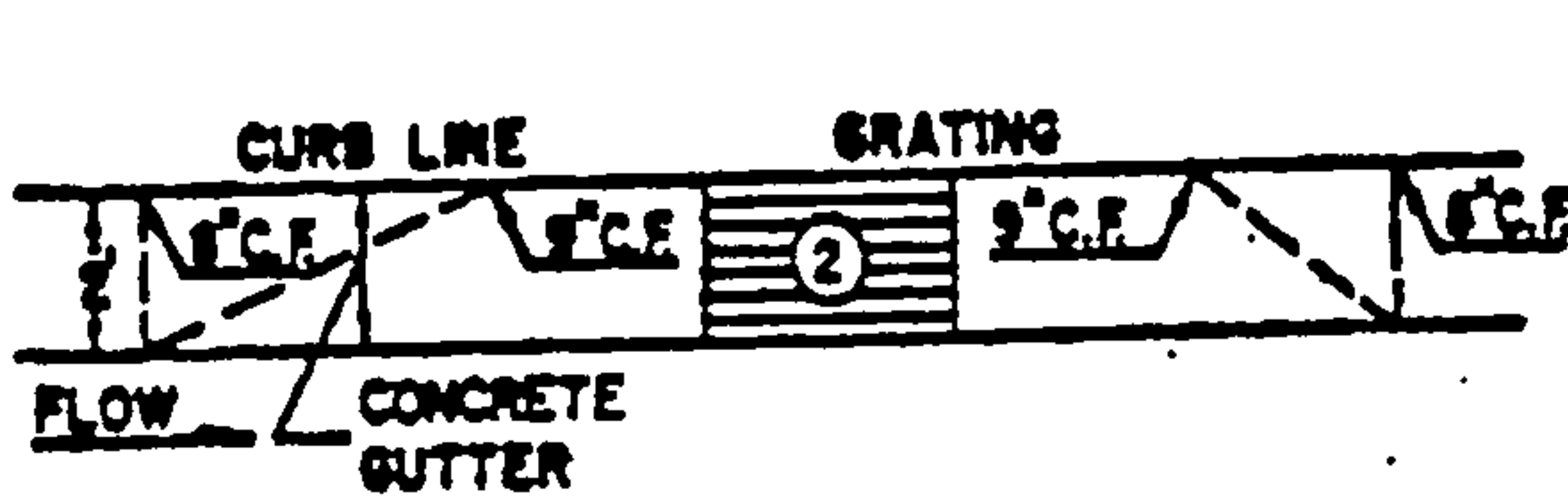
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00
□ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.44	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.70	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.92	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	1.11	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.29	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.46	1.88	0.03	0.09
0.07	0.07	0.08	0.1	2.30	1.62	2.19	0.04	0.11
0.08	0.08	0.10	0.2	2.63	1.77	2.50	0.05	0.13
0.09	0.09	0.13	0.2	2.96	1.91	2.81	0.06	0.15
0.10	0.10	0.16	0.3	3.29	2.05	3.13	0.07	0.17
0.11	0.11	0.19	0.4	3.62	2.19	3.44	0.07	0.18
0.12	0.12	0.23	0.5	3.95	2.32	3.75	0.08	0.20
0.13	0.13	0.26	0.6	4.28	2.44	4.07	0.09	0.22
0.14	0.14	0.31	0.7	5.15	2.40	4.93	0.09	0.23
0.15	0.15	0.36	0.9	6.03	2.40	5.79	0.09	0.24
0.16	0.16	0.43	1.0	6.91	2.44	6.65	0.09	0.25
0.17	0.17	0.50	1.2	7.79	2.49	7.51	0.10	0.27
0.18	0.18	0.58	1.5	8.67	2.56	8.38	0.10	0.28
0.19	0.19	0.66	1.8	9.54	2.64	9.24	0.11	0.30
0.20	0.20	0.76	2.1	10.42	2.73	10.10	0.12	0.32
0.21	0.21	0.87	2.4	11.30	2.82	10.96	0.12	0.33
0.22	0.22	0.98	2.9	12.18	2.91	11.83	0.13	0.35
0.23	0.23	1.10	3.3	13.06	3.01	12.69	0.14	0.37
0.24	0.24	1.23	3.8	13.93	3.11	13.55	0.15	0.39
0.25	0.25	1.37	4.4	14.81	3.20	14.41	0.16	0.41
0.26	0.26	1.52	5.0	15.69	3.30	15.27	0.17	0.43
0.27	0.27	1.68	5.7	16.57	3.40	16.14	0.18	0.45
0.28	0.28	1.84	6.4	17.45	3.50	17.00	0.19	0.47
0.29	0.29	2.02	7.3	18.32	3.59	17.86	0.20	0.49
0.30	0.30	2.20	8.1	19.20	3.69	18.72	0.21	0.51
0.31	0.31	2.39	9.1	20.08	3.79	19.59	0.22	0.53
0.32	0.32	2.59	10.1	20.96	3.88	20.45	0.23	0.55
0.33	0.33	2.80	11.1	21.84	3.98	21.31	0.25	0.58
0.34	0.34	3.02	12.3	22.71	4.07	22.17	0.26	0.60
0.35	0.35	3.25	13.5	23.59	4.17	23.03	0.27	0.62
0.36	0.36	3.48	14.8	24.47	4.26	23.90	0.28	0.64
0.37	0.37	3.72	16.2	25.35	4.35	24.76	0.29	0.66
0.38	0.38	3.98	17.7	26.23	4.45	25.62	0.31	0.69
0.39	0.39	4.24	19.2	27.10	4.54	26.48	0.32	0.71
0.40	0.40	4.50	20.8	27.98	4.63	27.35	0.33	0.73
0.41	0.41	4.78	22.6	28.86	4.72	28.21	0.35	0.76
0.42	0.42	5.06	24.8	28.88	4.90	28.21	0.37	0.79
0.43	0.43	5.35	27.1	28.90	5.08	28.22	0.40	0.83
□ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	32.1	28.94	5.42	28.23	0.46	0.91
0.46	0.46	6.19	34.6	28.96	5.59	28.23	0.49	0.95
0.47	0.47	6.48	37.3	28.98	5.76	28.24	0.51	0.98
0.48	0.48	6.76	40.0	29.01	5.92	28.24	0.54	1.02
0.49	0.49	7.04	42.8	29.03	6.08	28.25	0.57	1.06

STREET
CAPACITY

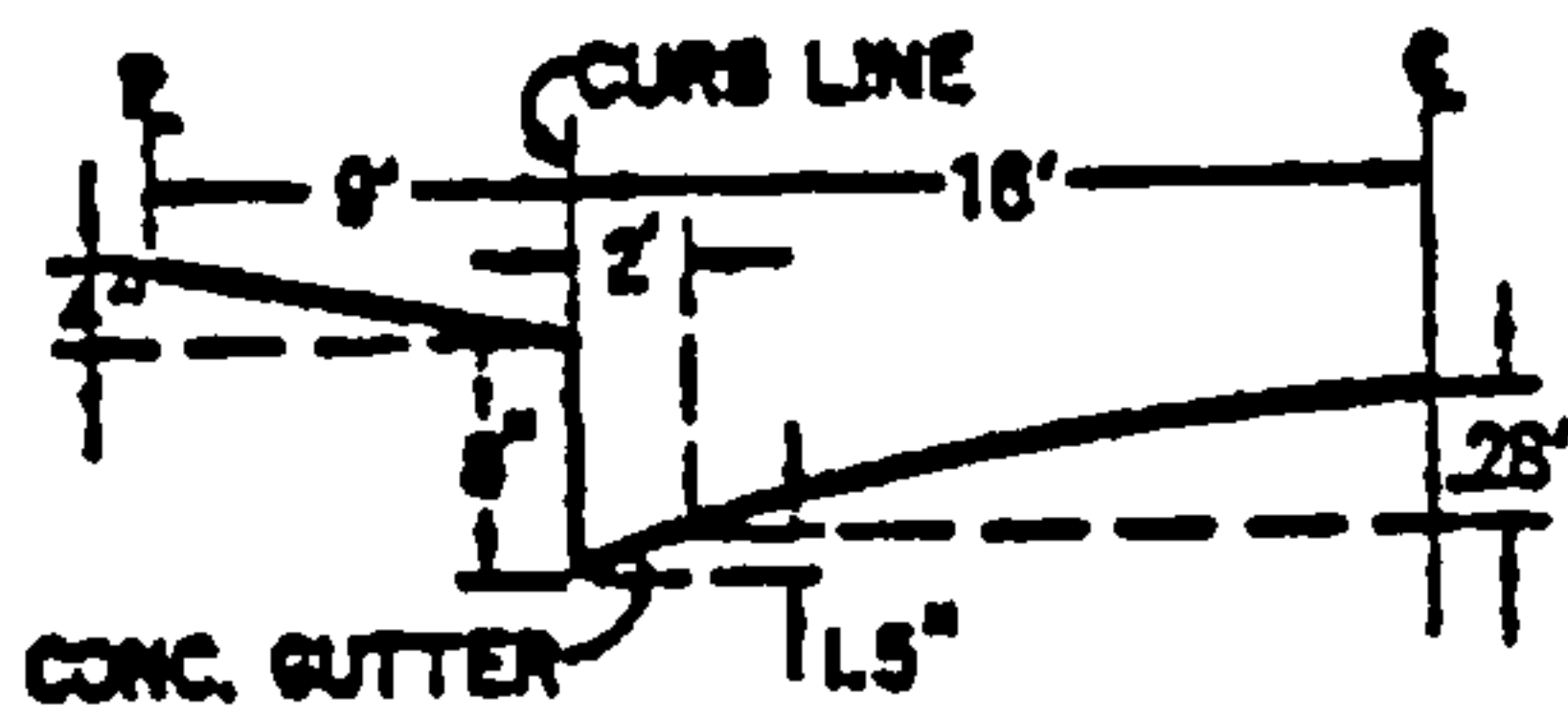
WALNUT CANYON ROAD

Chapter 22 - Drainage, Flood Control and Erosion Control

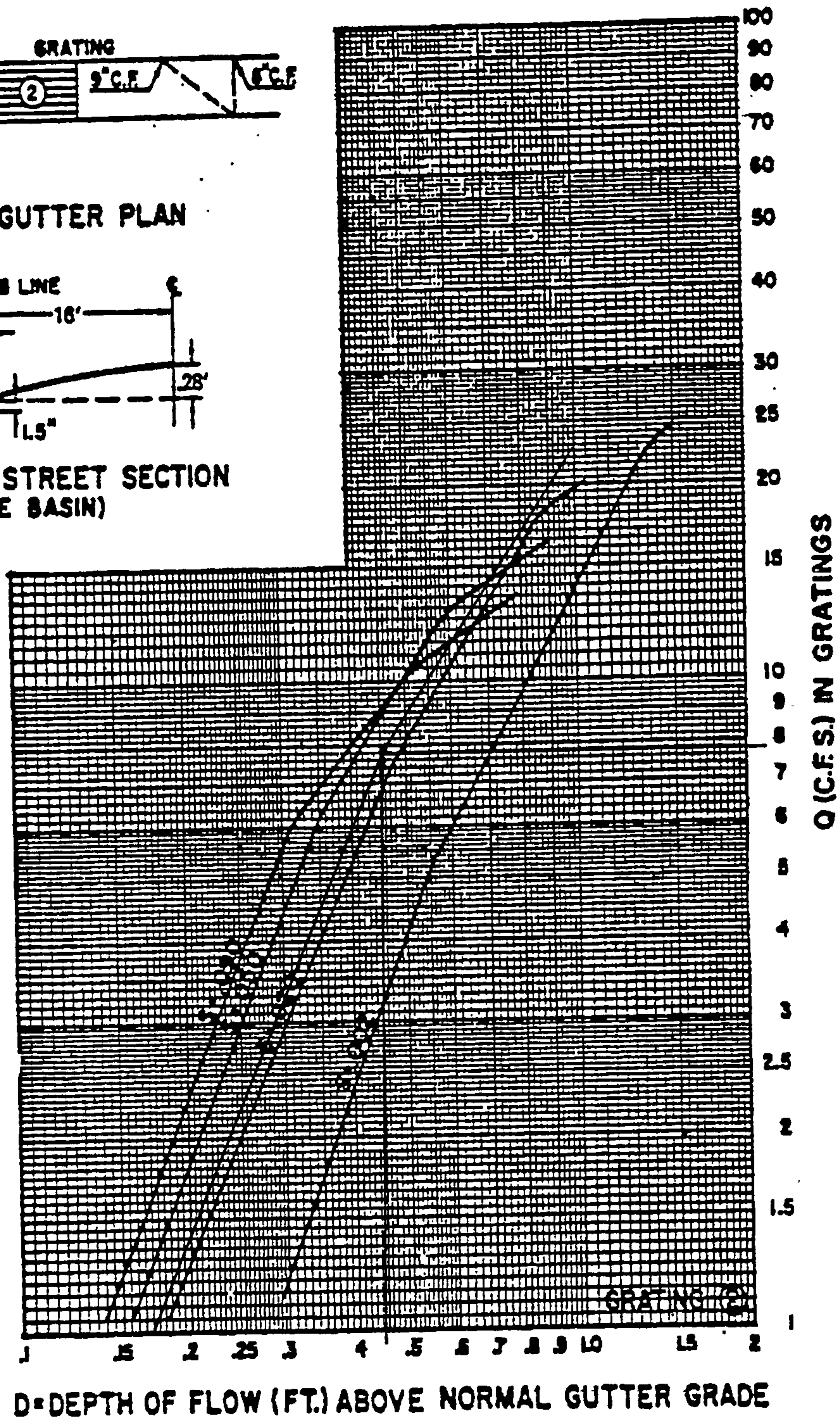
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



$$\text{SLOPE} = 2.8\%, D = 0.45, Q = 7.8 \text{ cfs}$$

$$D = 0.44, Q = 7.6 \text{ cfs}$$

PLATE 22.3 D-5

May 2001

$$\text{SLOPE} = 2.6\%, D = 0.4, Q = 5.8 \text{ cfs}$$

22-144

B-15

Analyzer Report

=====

Drainage Structure Analyzer

Flow Hydraulic Analysis

WALNUT CANYON RD.

Date: Thursday, November 18, 2004 13:57:30

=====

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	52.5 cfs
Slope	3.200%
Size (W x T):	30.00 x 2.7500

Output Results

Flow Rate	52.5 cfs
Slope	3.200%
CD	0.63
Capacity	73.4 cfs
Velocity	16.25 ft/s
Depth	1.56 ft
Critical Depth	2.32 ft
Size (W x T):	30.00 x 2.7500

Analyzer Report

=====

Drainage Structure Analyzer

Open Hydraulic Analysis

WALNUT CANYON ROAD.

Date: Thursday, November 18, 2004 13:58:57

=====

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	67.7 cfs
Slope	2.600%
Size (W x T):	30.00 x 2.7500

Output Results

Flow Rate	67.7 cfs
Slope	2.600%
D	0.84
Capacity	66.1 cfs
Velocity	15.34 ft/s
Depth	2.11 ft
Critical Depth	2.43 ft
Size (W x T):	30.00 x 2.7500

Analyzer Report

=====

Drainage Structure Analyzer

WALNUT CANYON RD.

Hydraulic Analysis

SD TO MESSINA DR.

Date: Tuesday, December 14, 2004 08:04:26

=====

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	124.0 cfs
Slope	2.000%
Size (W x T):	42.00 x 3.5000

Output Results

Flow Rate	124.0 cfs
Slope	2.000%
D	0.72
Capacity	142.3 cfs
Velocity	16.66 ft/s
Depth	2.53 ft
Critical Depth	3.27 ft
Size (W x T):	42.00 x 3.5000

PC PROGRAM STREAM

SEPTEMBER 1994

BUCK ISLAND ROAD

MANNING'S N= .017 SLOPE= .034

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ. FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(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	1.50	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	1.82	2.50	0.05	0.13
0.09	0.09	0.13	0.2	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	2.25	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	0.09	0.23
0.15	0.15	0.36	0.9	6.03	2.47	5.79	0.10	0.25
0.16	0.16	0.43	1.1	6.91	2.51	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	2.64	8.38	0.11	0.29
0.19	0.19	0.66	1.8	9.54	2.72	9.24	0.12	0.31
0.20	0.20	0.76	2.1	10.42	2.81	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	3.00	11.83	0.14	0.36
0.23	0.23	1.10	3.4	13.06	3.10	12.69	0.15	0.38
0.24	0.24	1.23	3.9	13.93	3.20	13.55	0.16	0.40
0.25	0.25	1.37	4.5	14.81	3.30	14.41	0.17	0.42
0.26	0.26	1.52	5.2	15.69	3.40	15.27	0.18	0.44
0.27	0.27	1.68	5.9	16.57	3.50	16.14	0.19	0.46
0.28	0.28	1.84	6.6	17.45	3.60	17.00	0.20	0.48
0.29	0.29	2.02	7.5	18.32	3.70	17.86	0.21	0.50
0.30	0.30	2.20	8.4	19.20	3.80	18.72	0.22	0.52
0.31	0.31	2.39	9.3	20.08	3.90	19.59	0.24	0.55
0.32	0.32	2.59	10.4	20.96	4.00	20.45	0.25	0.57
0.33	0.33	2.80	11.5	21.84	4.10	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	13.9	23.59	4.30	23.03	0.29	0.64
0.36	0.36	3.48	15.3	24.47	4.39	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	4.58	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	4.77	27.35	0.35	0.75
0.41	0.41	4.78	23.3	28.86	4.86	28.21	0.37	0.78
0.42	0.42	5.06	25.6	28.88	5.05	28.21	0.40	0.82
0.43	0.43	5.35	28.0	28.90	5.23	28.22	0.43	0.86
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ. FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	33.0	28.94	5.59	28.23	0.49	0.94
0.46	0.46	6.19	35.7	28.96	5.76	28.23	0.52	0.98
0.47	0.47	6.48	38.4	28.98	5.93	28.24	0.55	1.02
0.48	0.48	6.76	41.2	29.01	6.10	28.24	0.58	1.06
0.49	0.49	7.04	44.1	29.03	6.27	28.25	0.61	1.10

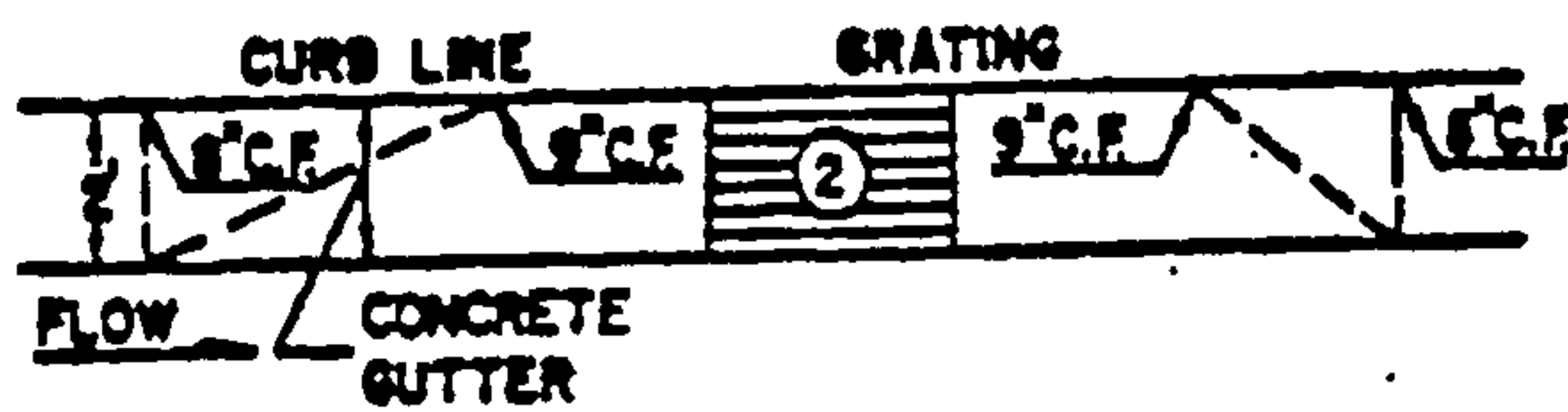
ROLL CURB
LIMIT

STREET CAPACITY

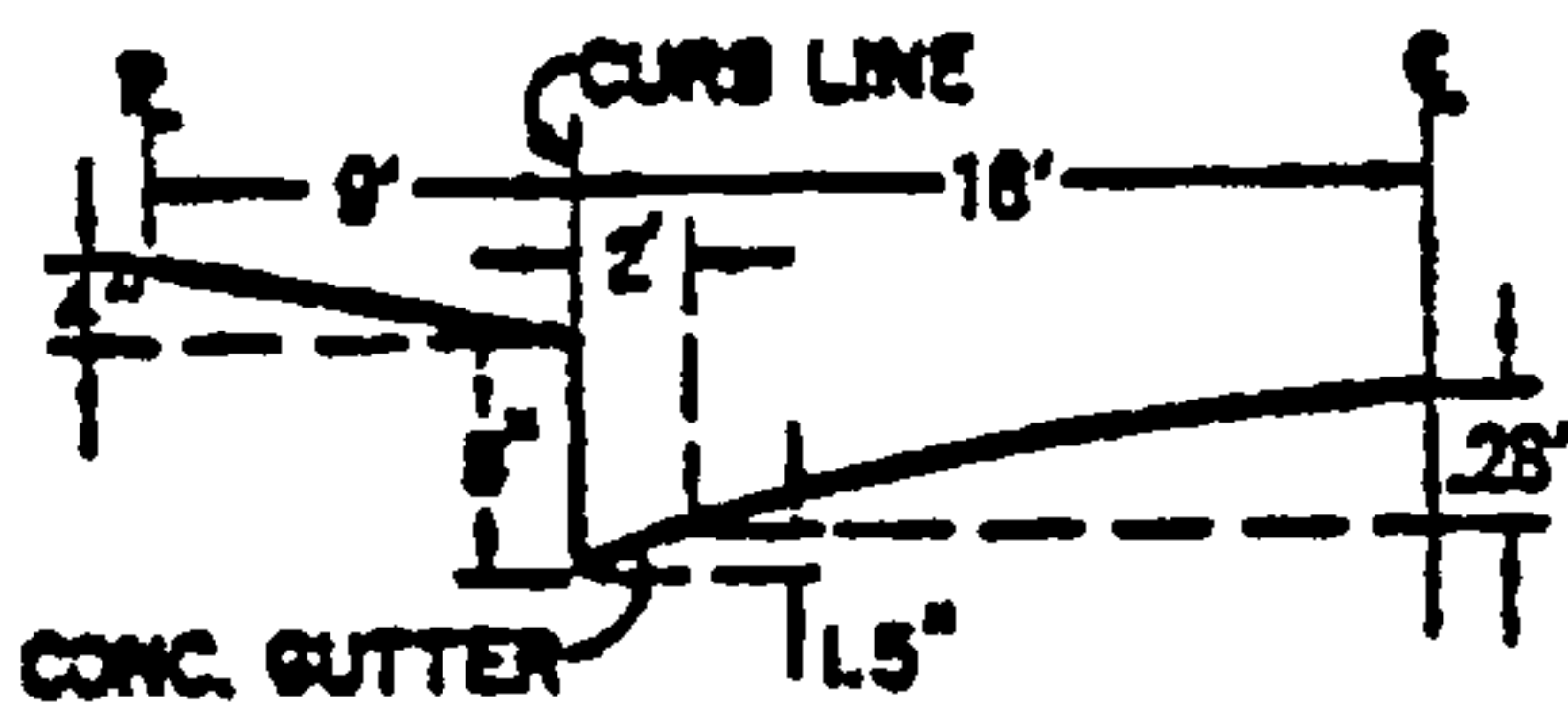
Buck Island Road

Chapter 22 - Drainage, Flood Control and Erosion Control

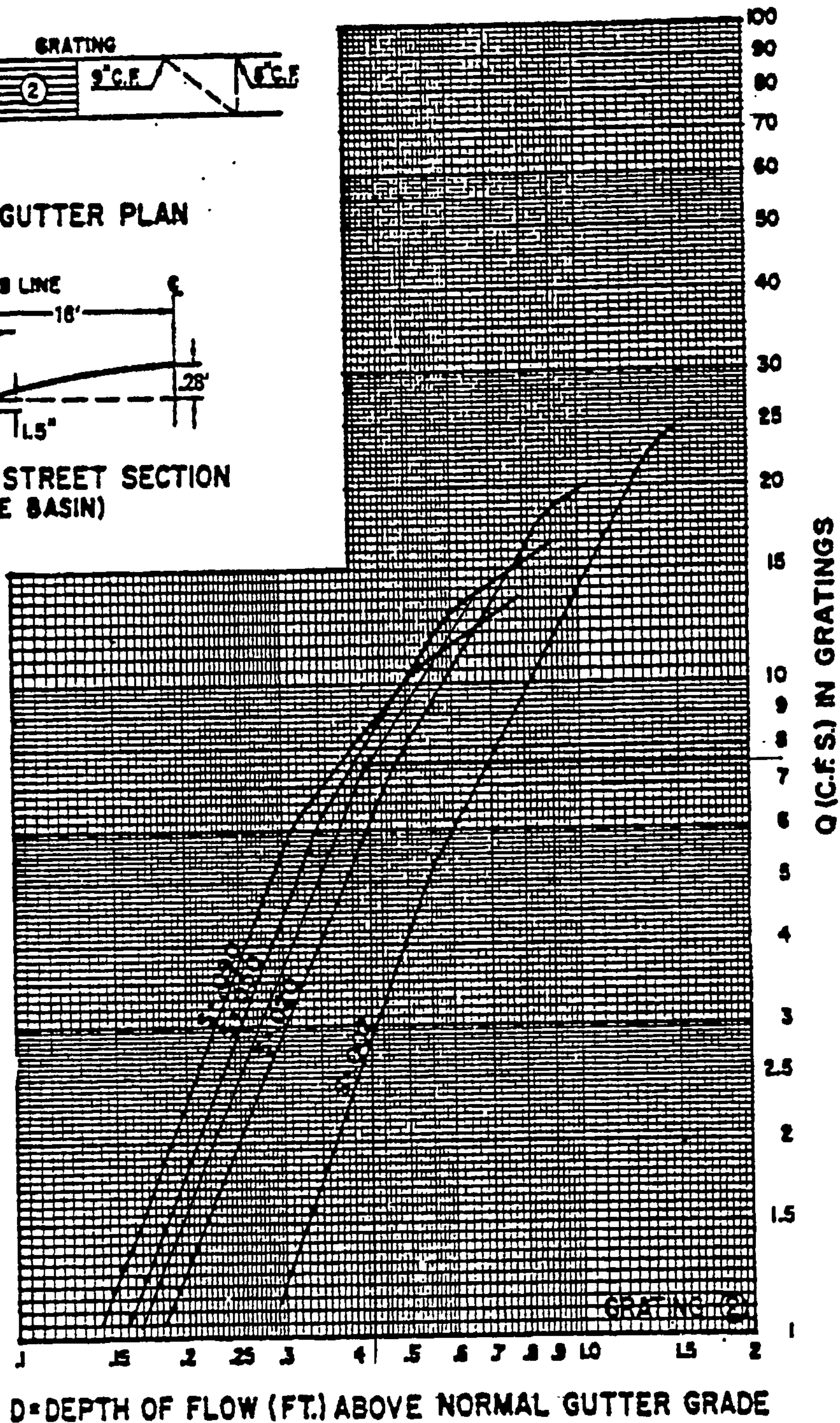
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



Analyzer Report

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Drainage Structure Analyzer

Hydraulic Analysis

Buck Island Road

Date: Friday, November 12, 2004 11:05:43

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Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	15.0 cfs
Slope	3.400%
Size (W x T):	18.00 x 2.0000

Comput Results

Flow Rate	15.0 cfs
Slope	3.400%
CD	0.66
Capacity	19.4 cfs
Velocity	12.11 ft/s
Depth	0.99 ft
Critical Depth	1.40 ft
Size (W x T):	18.00 x 2.0000

PC PROGRAM STREAM

SEPTEMBER 1994

PIPESTONE ROAD

MANNING'S N= .017 SLOPE= .0447

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.52	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.83	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	1.09	0.94	0.02	0.05
0.04	0.04	0.03	0.0	1.32	1.32	1.25	0.03	0.07
0.05	0.05	0.04	0.1	1.64	1.53	1.56	0.04	0.09
0.06	0.06	0.06	0.1	1.97	1.73	1.88	0.05	0.11
0.07	0.07	0.08	0.1	2.30	1.91	2.19	0.06	0.13
0.08	0.08	0.10	0.2	2.63	2.09	2.50	0.07	0.15
0.09	0.09	0.13	0.3	2.96	2.26	2.81	0.08	0.17
0.10	0.10	0.16	0.4	3.29	2.43	3.13	0.09	0.19
0.11	0.11	0.19	0.5	3.62	2.58	3.44	0.10	0.21
0.12	0.12	0.23	0.6	3.95	2.74	3.75	0.12	0.24
0.13	0.13	0.26	0.8	4.28	2.89	4.07	0.13	0.26
0.14	0.14	0.31	0.9	5.15	2.83	4.93	0.12	0.26
0.15	0.15	0.36	1.0	6.03	2.84	5.79	0.12	0.27
0.16	0.16	0.43	1.2	6.91	2.88	6.65	0.13	0.29
0.17	0.17	0.50	1.5	7.79	2.95	7.51	0.13	0.30
0.18	0.18	0.58	1.7	8.67	3.03	8.38	0.14	0.32
0.19	0.19	0.66	2.1	9.54	3.12	9.24	0.15	0.34
0.20	0.20	0.76	2.5	10.42	3.23	10.10	0.16	0.36
0.21	0.21	0.87	2.9	11.30	3.33	10.96	0.17	0.38
0.22	0.22	0.98	3.4	12.18	3.44	11.83	0.18	0.40
0.23	0.23	1.10	3.9	13.06	3.56	12.69	0.20	0.43
0.24	0.24	1.23	4.5	13.93	3.67	13.55	0.21	0.45
0.25	0.25	1.37	5.2	14.81	3.79	14.41	0.22	0.47
0.26	0.26	1.52	5.9	15.69	3.90	15.27	0.24	0.50
0.27	0.27	1.68	6.7	16.57	4.02	16.14	0.25	0.52
0.28	0.28	1.84	7.6	17.45	4.13	17.00	0.27	0.55
0.29	0.29	2.02	8.6	18.32	4.25	17.86	0.28	0.57
0.30	0.30	2.20	9.6	19.20	4.36	18.72	0.30	0.60
0.31	0.31	2.39	10.7	20.08	4.48	19.59	0.31	0.62
0.32	0.32	2.59	11.9	20.96	4.59	20.45	0.33	0.65
0.33	0.33	2.80	13.2	21.84	4.70	21.31	0.34	0.67
0.34	0.34	3.02	14.5	22.71	4.81	22.17	0.36	0.70
0.35	0.35	3.25	16.0	23.59	4.92	23.03	0.38	0.73
0.36	0.36	3.48	17.5	24.47	5.04	23.90	0.39	0.75
0.37	0.37	3.72	19.2	25.35	5.14	24.76	0.41	0.78
0.38	0.38	3.98	20.9	26.23	5.25	25.62	0.43	0.81
0.39	0.39	4.24	22.7	27.10	5.36	26.48	0.45	0.84
0.40	0.40	4.50	24.6	27.98	5.47	27.35	0.46	0.86
0.41	0.41	4.78	26.7	28.86	5.58	28.21	0.48	0.89
0.42	0.42	5.06	29.3	28.88	5.79	28.21	0.52	0.94
0.43	0.43	5.35	32.1	28.90	6.00	28.22	0.56	0.99
☐ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	37.9	28.94	6.41	28.23	0.64	1.09
0.46	0.46	6.19	40.9	28.96	6.61	28.23	0.68	1.14
0.47	0.47	6.48	44.1	28.98	6.80	28.24	0.72	1.19
0.48	0.48	6.76	47.3	29.01	7.00	28.24	0.76	1.24
0.49	0.49	7.04	50.6	29.03	7.19	28.25	0.80	1.29

STREET
CAPACITY

PC PROGRAM STREAM

SEPTEMBER 1994

PIPESTONE ROAD

MANNING'S N= .017 SLOPE= .0255

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.39	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.63	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.82	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	0.99	1.25	0.02	0.06
0.05	0.05	0.04	0.0	1.64	1.15	1.56	0.02	0.07
0.06	0.06	0.06	0.1	1.97	1.30	1.88	0.03	0.09
0.07	0.07	0.08	0.1	2.30	1.44	2.19	0.03	0.10
0.08	0.08	0.10	0.2	2.63	1.58	2.50	0.04	0.12
0.09	0.09	0.13	0.2	2.96	1.71	2.81	0.05	0.14
0.10	0.10	0.16	0.3	3.29	1.83	3.13	0.05	0.15
0.11	0.11	0.19	0.4	3.62	1.95	3.44	0.06	0.17
0.12	0.12	0.23	0.5	3.95	2.07	3.75	0.07	0.19
0.13	0.13	0.26	0.6	4.28	2.18	4.07	0.07	0.20
0.14	0.14	0.31	0.7	5.15	2.14	4.93	0.07	0.21
0.15	0.15	0.36	0.8	6.03	2.14	5.79	0.07	0.22
0.16	0.16	0.43	0.9	6.91	2.18	6.65	0.07	0.23
0.17	0.17	0.50	1.1	7.79	2.23	7.51	0.08	0.25
0.18	0.18	0.58	1.3	8.67	2.29	8.38	0.08	0.26
0.19	0.19	0.66	1.6	9.54	2.36	9.24	0.09	0.28
0.20	0.20	0.76	1.9	10.42	2.44	10.10	0.09	0.29
0.21	0.21	0.87	2.2	11.30	2.52	10.96	0.10	0.31
0.22	0.22	0.98	2.5	12.18	2.60	11.83	0.11	0.33
0.23	0.23	1.10	3.0	13.06	2.69	12.69	0.11	0.34
0.24	0.24	1.23	3.4	13.93	2.77	13.55	0.12	0.36
0.25	0.25	1.37	3.9	14.81	2.86	14.41	0.13	0.38
0.26	0.26	1.52	4.5	15.69	2.95	15.27	0.13	0.39
0.27	0.27	1.68	5.1	16.57	3.03	16.14	0.14	0.41
0.28	0.28	1.84	5.8	17.45	3.12	17.00	0.15	0.43
0.29	0.29	2.02	6.5	18.32	3.21	17.86	0.16	0.45
0.30	0.30	2.20	7.3	19.20	3.29	18.72	0.17	0.47
0.31	0.31	2.39	8.1	20.08	3.38	19.59	0.18	0.49
0.32	0.32	2.59	9.0	20.96	3.47	20.45	0.19	0.51
0.33	0.33	2.80	9.9	21.84	3.55	21.31	0.20	0.53
0.34	0.34	3.02	11.0	22.71	3.64	22.17	0.21	0.55
0.35	0.35	3.25	12.1	23.59	3.72	23.03	0.21	0.56
0.36	0.36	3.48	13.2	24.47	3.80	23.90	0.22	0.58
0.37	0.37	3.72	14.5	25.35	3.89	24.76	0.23	0.60
0.38	0.38	3.98	15.8	26.23	3.97	25.62	0.24	0.62
0.39	0.39	4.24	17.2	27.10	4.05	26.48	0.25	0.64
0.40	0.40	4.50	18.6	27.98	4.13	27.35	0.26	0.66
0.41	0.41	4.78	20.1	28.86	4.21	28.21	0.28	0.69
0.42	0.42	5.06	22.1	28.88	4.37	28.21	0.30	0.72
0.43	0.43	5.35	24.2	28.90	4.53	28.22	0.32	0.75
0.44	0.44	5.64	26.3	29.02	4.69	28.23	0.34	0.78
0.45	0.45	5.91	28.6	28.94	4.84	28.23	0.36	0.81
0.46	0.46	6.19	30.9	28.96	4.99	28.23	0.39	0.85
0.47	0.47	6.48	33.3	28.98	5.14	28.24	0.41	0.88
0.48	0.48	6.76	35.7	29.01	5.29	28.24	0.43	0.91
0.49	0.49	7.04	38.2	29.03	5.43	28.25	0.46	0.95

Roll CURB
LIMIT

PC PROGRAM STREAM

SEPTEMBER 1994

PIPESTONE ROAD

MANNING'S N= .017 SLOPE= .04

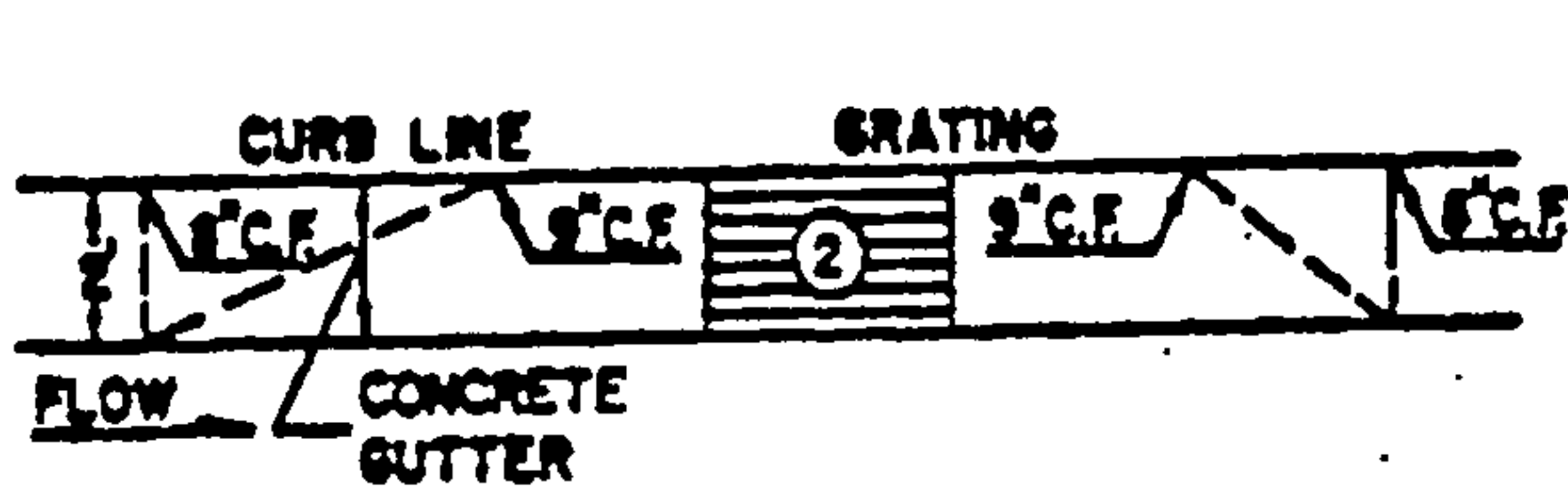
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00
☐ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.49	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.78	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	1.03	0.94	0.02	0.05
0.04	0.04	0.03	0.0	1.32	1.25	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.45	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.63	1.88	0.04	0.10
0.07	0.07	0.08	0.1	2.30	1.81	2.19	0.05	0.12
0.08	0.08	0.10	0.2	2.63	1.98	2.50	0.06	0.14
0.09	0.09	0.13	0.3	2.96	2.14	2.81	0.07	0.16
0.10	0.10	0.16	0.4	3.29	2.29	3.13	0.08	0.18
0.11	0.11	0.19	0.5	3.62	2.44	3.44	0.09	0.20
0.12	0.12	0.23	0.6	3.95	2.59	3.75	0.10	0.22
0.13	0.13	0.26	0.7	4.28	2.73	4.07	0.12	0.25
0.14	0.14	0.31	0.8	5.15	2.68	4.93	0.11	0.25
0.15	0.15	0.36	1.0	6.03	2.68	5.79	0.11	0.26
0.16	0.16	0.43	1.2	6.91	2.72	6.65	0.12	0.28
0.17	0.17	0.50	1.4	7.79	2.79	7.51	0.12	0.29
0.18	0.18	0.58	1.6	8.67	2.87	8.38	0.13	0.31
0.19	0.19	0.66	2.0	9.54	2.96	9.24	0.14	0.33
0.20	0.20	0.76	2.3	10.42	3.05	10.10	0.14	0.34
0.21	0.21	0.87	2.7	11.30	3.15	10.96	0.15	0.36
0.22	0.22	0.98	3.2	12.18	3.26	11.83	0.16	0.38
0.23	0.23	1.10	3.7	13.06	3.36	12.69	0.18	0.41
0.24	0.24	1.23	4.3	13.93	3.47	13.55	0.19	0.43
0.25	0.25	1.37	4.9	14.81	3.58	14.41	0.20	0.45
0.26	0.26	1.52	5.6	15.69	3.69	15.27	0.21	0.47
0.27	0.27	1.68	6.4	16.57	3.80	16.14	0.22	0.49
0.28	0.28	1.84	7.2	17.45	3.91	17.00	0.24	0.52
0.29	0.29	2.02	8.1	18.32	4.02	17.86	0.25	0.54
0.30	0.30	2.20	9.1	19.20	4.13	18.72	0.26	0.56
0.31	0.31	2.39	10.1	20.08	4.23	19.59	0.28	0.59
0.32	0.32	2.59	11.3	20.96	4.34	20.45	0.29	0.61
0.33	0.33	2.80	12.5	21.84	4.45	21.31	0.31	0.64
0.34	0.34	3.02	13.7	22.71	4.55	22.17	0.32	0.66
0.35	0.35	3.25	15.1	23.59	4.66	23.03	0.34	0.69
0.36	0.36	3.48	16.6	24.47	4.76	23.90	0.35	0.71
0.37	0.37	3.72	18.1	25.35	4.87	24.76	0.37	0.74
0.38	0.38	3.98	19.8	26.23	4.97	25.62	0.38	0.76
0.39	0.39	4.24	21.5	27.10	5.07	26.48	0.40	0.79
0.40	0.40	4.50	23.3	27.98	5.17	27.35	0.42	0.82
0.41	0.41	4.78	25.2	28.86	5.27	28.21	0.43	0.84
0.42	0.42	5.06	27.7	28.88	5.48	28.21	0.47	0.89
0.43	0.43	5.35	30.3	28.90	5.68	28.22	0.50	0.93
☐ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	35.8	28.94	6.06	28.23	0.57	1.02
0.46	0.46	6.19	38.7	28.96	6.25	28.23	0.61	1.07
0.47	0.47	6.48	41.7	28.98	6.44	28.24	0.64	1.11
0.48	0.48	6.76	44.7	29.01	6.62	28.24	0.68	1.16
0.49	0.49	7.04	47.9	29.03	6.80	28.25	0.72	1.21

STREET
CAPACITY

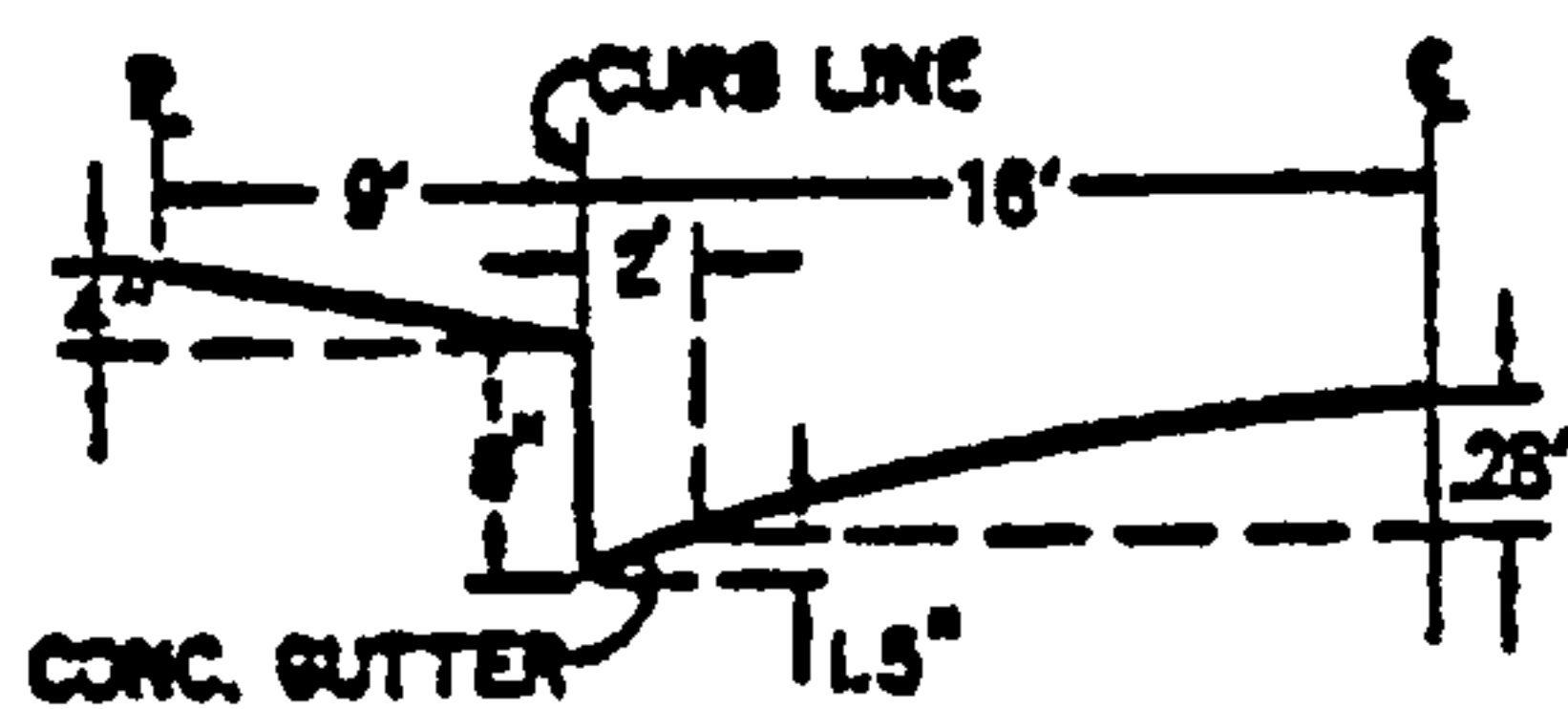
PIPESTONE ROAD

Chapter 22 - Drainage, Flood Control and Erosion Control

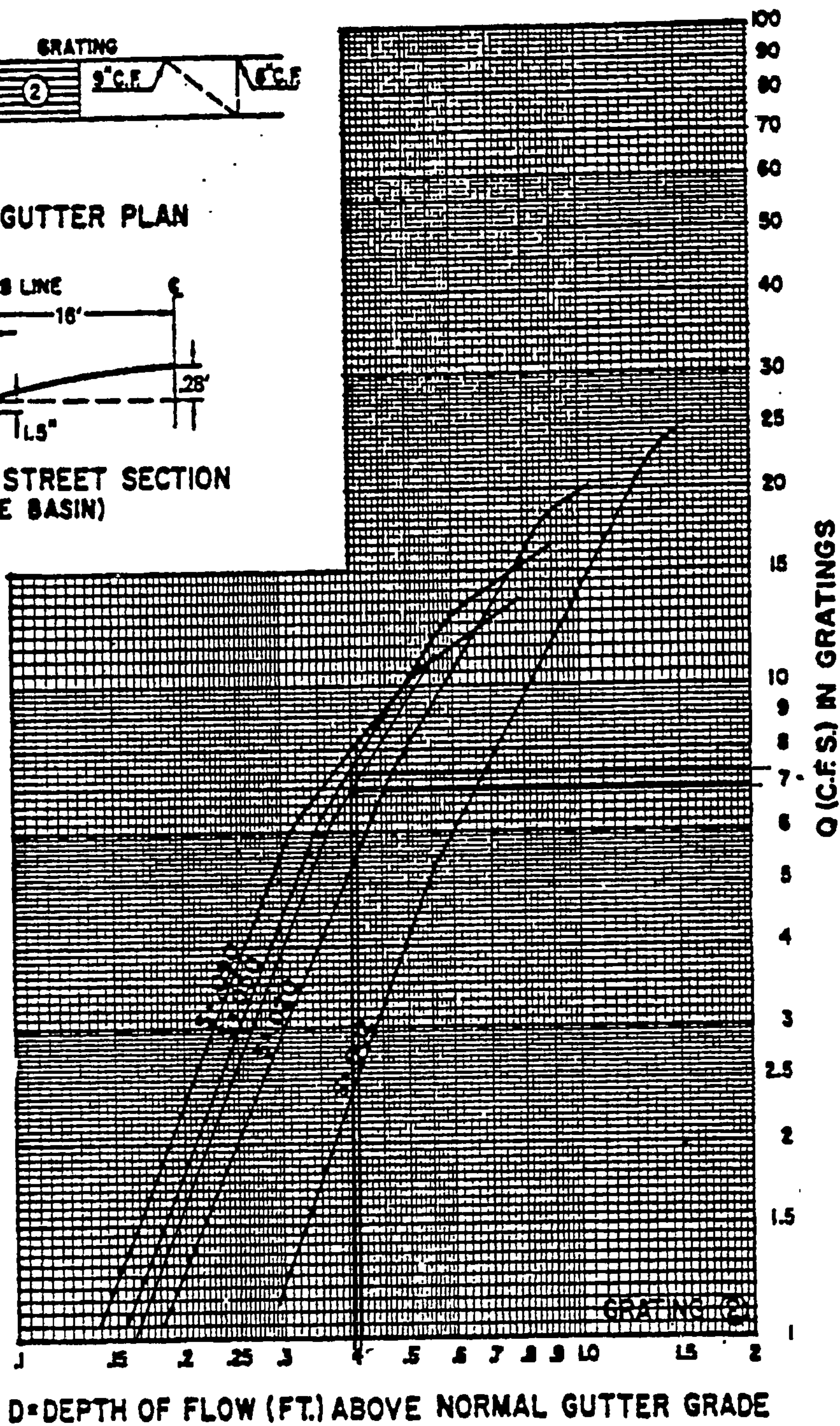
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



$$\text{Slope} = 4.5\%$$

$$D = 0.4, Q = 7.2 \text{ cfs}$$

$$\text{Slope} = 4\%, D = 0.41, Q = 7 \text{ cfs}$$

Analyzer Report

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Drainage Structure Analyzer

Pipe Hydraulic Analysis

Date: Friday, November 12, 2004 11:07:02

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Pipe Stone Road

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	28.4 cfs
Slope	4.000%
Size (W x T):	24.00 x 2.5000

Output Results

Flow Rate	28.4 cfs
Slope	4.000%
Capacity	0.57
Velocity	45.2 cfs
Depth	15.22 ft/s
Critical Depth	1.15 ft
Size (W x T):	1.83 ft
	24.00 x 2.5000

PC PROGRAM STREAM

SEPTEMBER 1994

Big Springs Road

MANNING'S N= .017 SLOPE= .006

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	45.17	0.67
2	8.38	0.67	6	27.00	0.45	10	45.63	0.67
3	8.83	0.67	7	43.00	0.13	11	54.00	0.83
4	9.00	0.00	8	45.00	0.00	12	0.00	0.00
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.19	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.30	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.40	0.94	0.00	0.03
0.04	0.04	0.03	0.0	1.32	0.48	1.25	0.00	0.04
0.05	0.05	0.04	0.0	1.64	0.56	1.56	0.00	0.05
0.06	0.06	0.06	0.0	1.97	0.63	1.88	0.01	0.07
0.07	0.07	0.08	0.1	2.30	0.70	2.19	0.01	0.08
0.08	0.08	0.10	0.1	2.63	0.77	2.50	0.01	0.09
0.09	0.09	0.13	0.1	2.96	0.83	2.81	0.01	0.10
0.10	0.10	0.16	0.1	3.29	0.89	3.13	0.01	0.11
0.11	0.11	0.19	0.2	3.62	0.95	3.44	0.01	0.12
0.12	0.12	0.23	0.2	3.95	1.00	3.75	0.02	0.14
0.13	0.13	0.26	0.3	4.28	1.06	4.07	0.02	0.15
0.14	0.14	0.31	0.3	5.30	1.02	5.07	0.02	0.16
0.15	0.15	0.37	0.4	6.32	1.01	6.08	0.02	0.17
0.16	0.16	0.43	0.4	7.34	1.02	7.08	0.02	0.18
0.17	0.17	0.51	0.5	8.36	1.05	8.09	0.02	0.19
0.18	0.18	0.59	0.6	9.38	1.07	9.09	0.02	0.20
0.19	0.19	0.69	0.8	10.40	1.11	10.10	0.02	0.21
0.20	0.20	0.80	0.9	11.42	1.15	11.10	0.02	0.22
0.21	0.21	0.91	1.1	12.44	1.19	12.11	0.02	0.23
0.22	0.22	1.04	1.3	13.46	1.23	13.11	0.02	0.24
0.23	0.23	1.17	1.5	14.49	1.27	14.12	0.02	0.25
0.24	0.24	1.32	1.7	15.51	1.31	15.12	0.03	0.27
0.25	0.25	1.48	2.0	16.53	1.35	16.13	0.03	0.28
0.26	0.26	1.64	2.3	17.55	1.40	17.13	0.03	0.29
0.27	0.27	1.82	2.6	18.57	1.44	18.14	0.03	0.30
0.28	0.28	2.00	3.0	19.59	1.48	19.14	0.03	0.31
0.29	0.29	2.20	3.4	20.61	1.52	20.15	0.04	0.33
0.30	0.30	2.41	3.8	21.63	1.57	21.15	0.04	0.34
0.31	0.31	2.62	4.2	22.65	1.61	22.16	0.04	0.35
0.32	0.32	2.85	4.7	23.67	1.65	23.16	0.04	0.36
0.33	0.33	3.09	5.2	24.69	1.69	24.17	0.04	0.37
0.34	0.34	3.33	5.8	25.71	1.73	25.17	0.05	0.39
0.35	0.35	3.59	6.4	26.74	1.78	26.18	0.05	0.40
0.36	0.36	3.86	7.0	27.76	1.82	27.18	0.05	0.41
0.37	0.37	4.13	7.7	28.78	1.86	28.19	0.05	0.42
0.38	0.38	4.42	8.4	29.80	1.90	29.19	0.06	0.44
0.39	0.39	4.72	9.1	30.82	1.94	30.20	0.06	0.45
0.40	0.40	5.03	9.9	31.84	1.98	31.20	0.06	0.46
0.41	0.41	5.34	10.8	32.86	2.02	32.21	0.06	0.47
0.42	0.42	5.67	11.7	33.88	2.06	33.21	0.07	0.49
0.43	0.43	6.01	12.6	34.90	2.09	34.22	0.07	0.50
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	6.71	14.6	36.94	2.17	36.23	0.07	0.52
0.46	0.46	7.07	15.9	36.96	2.25	36.23	0.08	0.54
0.47	0.47	7.44	17.3	36.98	2.32	36.24	0.08	0.55
0.48	0.48	7.80	18.7	37.01	2.40	36.24	0.09	0.57
0.49	0.49	8.16	20.2	37.03	2.47	36.25	0.09	0.58
0.50	0.50	8.52	21.7	37.05	2.54	36.25	0.10	0.60
0.51	0.51	8.89	23.2	37.07	2.61	36.26	0.11	0.62
0.52	0.52	9.25	24.8	37.09	2.68	36.26	0.11	0.63
0.53	0.53	9.61	26.4	37.11	2.75	36.27	0.12	0.65
0.54	0.54	9.97	28.1	37.13	2.82	36.27	0.12	0.66
0.55	0.55	10.34	29.8	37.15	2.89	36.28	0.13	0.68
0.56	0.56	10.70	31.6	37.17	2.95	36.28	0.14	0.70
0.57	0.57	11.06	33.4	37.19	3.02	36.29	0.14	0.71
0.58	0.58	11.43	35.2	37.21	3.08	36.29	0.15	0.73
0.59	0.59	11.79	37.1	37.23	3.15	36.30	0.15	0.74
0.60	0.60	12.15	39.0	37.25	3.21	36.30	0.16	0.76
0.61	0.61	12.51	40.9	37.27	3.27	36.31	0.17	0.78
0.62	0.62	12.88	42.9	37.29	3.33	36.31	0.17	0.79
0.63	0.63	13.24	44.9	37.31	3.39	36.32	0.18	0.81
0.64	0.64	13.60	47.0	37.34	3.45	36.32	0.19	0.83
0.65	0.65	13.97	49.1	37.36	3.51	36.33	0.19	0.84
0.66	0.66	14.33	51.2	37.38	3.57	36.33	0.20	0.86
0.67	0.67	14.69	53.4	37.40	3.63	36.34	0.20	0.87
0.68	0.68	15.06	54.6	38.44	3.63	38.30	0.20	0.88

STREET CAPACITY

B-27

PC PROGRAM STREAM

SEPTEMBER 1994

BISON SPRINGS ST.

MANNING'S N= .017 SLOPE= .031

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.44	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.69	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.91	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	1.10	1.25	0.02	0.06
0.05	0.05	0.04	0.0	1.64	1.27	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.44	1.88	0.03	0.09
0.07	0.07	0.08	0.1	2.30	1.59	2.19	0.04	0.11
0.08	0.08	0.10	0.2	2.63	1.74	2.50	0.05	0.13
0.09	0.09	0.13	0.2	2.96	1.88	2.81	0.06	0.15
0.10	0.10	0.16	0.3	3.29	2.02	3.13	0.06	0.16
0.11	0.11	0.19	0.4	3.62	2.15	3.44	0.07	0.18
0.12	0.12	0.23	0.5	3.95	2.28	3.75	0.08	0.20
0.13	0.13	0.26	0.6	4.28	2.41	4.07	0.09	0.22
0.14	0.14	0.31	0.7	5.15	2.36	4.93	0.09	0.23
0.15	0.15	0.36	0.9	6.03	2.36	5.79	0.09	0.24
0.16	0.16	0.43	1.0	6.91	2.40	6.65	0.09	0.25
0.17	0.17	0.50	1.2	7.79	2.45	7.51	0.09	0.26
0.18	0.18	0.58	1.5	8.67	2.52	8.38	0.10	0.28
0.19	0.19	0.66	1.7	9.54	2.60	9.24	0.11	0.30
0.20	0.20	0.76	2.0	10.42	2.69	10.10	0.11	0.31
0.21	0.21	0.87	2.4	11.30	2.78	10.96	0.12	0.33
0.22	0.22	0.98	2.8	12.18	2.87	11.83	0.13	0.35
0.23	0.23	1.10	3.3	13.06	2.96	12.69	0.14	0.37
0.24	0.24	1.23	3.8	13.93	3.06	13.55	0.15	0.39
0.25	0.25	1.37	4.3	14.81	3.15	14.41	0.15	0.40
0.26	0.26	1.52	4.9	15.69	3.25	15.27	0.16	0.42
0.27	0.27	1.68	5.6	16.57	3.34	16.14	0.17	0.44
0.28	0.28	1.84	6.3	17.45	3.44	17.00	0.18	0.46
0.29	0.29	2.02	7.1	18.32	3.54	17.86	0.19	0.48
0.30	0.30	2.20	8.0	19.20	3.63	18.72	0.20	0.50
0.31	0.31	2.39	8.9	20.08	3.73	19.59	0.22	0.53
0.32	0.32	2.59	9.9	20.96	3.82	20.45	0.23	0.55
0.33	0.33	2.80	11.0	21.84	3.92	21.31	0.24	0.57
0.34	0.34	3.02	12.1	22.71	4.01	22.17	0.25	0.59
0.35	0.35	3.25	13.3	23.59	4.10	23.03	0.26	0.61
0.36	0.36	3.48	14.6	24.47	4.19	23.90	0.27	0.63
0.37	0.37	3.72	16.0	25.35	4.28	24.76	0.29	0.66
0.38	0.38	3.98	17.4	26.23	4.38	25.62	0.30	0.68
0.39	0.39	4.24	18.9	27.10	4.47	26.48	0.31	0.70
0.40	0.40	4.50	20.5	27.98	4.55	27.35	0.32	0.72
0.41	0.41	4.78	22.2	28.86	4.64	28.21	0.33	0.74
0.42	0.42	5.06	24.4	28.88	4.82	28.21	0.36	0.78
0.43	0.43	5.35	26.7	28.90	5.00	28.22	0.39	0.82
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	31.6	28.94	5.34	28.23	0.44	0.89
0.46	0.46	6.19	34.1	28.96	5.50	28.23	0.47	0.93
0.47	0.47	6.48	36.7	28.98	5.67	28.24	0.50	0.97
0.48	0.48	6.76	39.4	29.01	5.83	28.24	0.53	1.01
0.49	0.49	7.04	42.1	29.03	5.99	28.25	0.56	1.05

STREET
CAPACITY

PC PROGRAM STREAM

SEPTEMBER 1994

BISON SPRINGS ST.

MANNING'S N= .017 SLOPE= .025

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.39	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.62	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.81	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	0.98	1.25	0.02	0.06
0.05	0.05	0.04	0.0	1.64	1.14	1.56	0.02	0.07
0.06	0.06	0.06	0.1	1.97	1.29	1.88	0.03	0.09
0.07	0.07	0.08	0.1	2.30	1.43	2.19	0.03	0.10
0.08	0.08	0.10	0.2	2.63	1.56	2.50	0.04	0.12
0.09	0.09	0.13	0.2	2.96	1.69	2.81	0.04	0.13
0.10	0.10	0.16	0.3	3.29	1.81	3.13	0.05	0.15
0.11	0.11	0.19	0.4	3.62	1.93	3.44	0.06	0.17
0.12	0.12	0.23	0.5	3.95	2.05	3.75	0.07	0.19
0.13	0.13	0.26	0.6	4.28	2.16	4.07	0.07	0.20
0.14	0.14	0.31	0.7	5.15	2.12	4.93	0.07	0.21
0.15	0.15	0.36	0.8	6.03	2.12	5.79	0.07	0.22
0.16	0.16	0.43	0.9	6.91	2.15	6.65	0.07	0.23
0.17	0.17	0.50	1.1	7.79	2.20	7.51	0.08	0.25
0.18	0.18	0.58	1.3	8.67	2.27	8.38	0.08	0.26
0.19	0.19	0.66	1.6	9.54	2.34	9.24	0.08	0.27
0.20	0.20	0.76	1.8	10.42	2.41	10.10	0.09	0.29
0.21	0.21	0.87	2.2	11.30	2.49	10.96	0.10	0.31
0.22	0.22	0.98	2.5	12.18	2.58	11.83	0.10	0.32
0.23	0.23	1.10	2.9	13.06	2.66	12.69	0.11	0.34
0.24	0.24	1.23	3.4	13.93	2.74	13.55	0.12	0.36
0.25	0.25	1.37	3.9	14.81	2.83	14.41	0.12	0.37
0.26	0.26	1.52	4.4	15.69	2.92	15.27	0.13	0.39
0.27	0.27	1.68	5.0	16.57	3.00	16.14	0.14	0.41
0.28	0.28	1.84	5.7	17.45	3.09	17.00	0.15	0.43
0.29	0.29	2.02	6.4	18.32	3.18	17.86	0.16	0.45
0.30	0.30	2.20	7.2	19.20	3.26	18.72	0.17	0.47
0.31	0.31	2.39	8.0	20.08	3.35	19.59	0.17	0.48
0.32	0.32	2.59	8.9	20.96	3.43	20.45	0.18	0.50
0.33	0.33	2.80	9.9	21.84	3.52	21.31	0.19	0.52
0.34	0.34	3.02	10.9	22.71	3.60	22.17	0.20	0.54
0.35	0.35	3.25	12.0	23.59	3.68	23.03	0.21	0.56
0.36	0.36	3.48	13.1	24.47	3.77	23.90	0.22	0.58
0.37	0.37	3.72	14.3	25.35	3.85	24.76	0.23	0.60
0.38	0.38	3.98	15.6	26.23	3.93	25.62	0.24	0.62
0.39	0.39	4.24	17.0	27.10	4.01	26.48	0.25	0.64
0.40	0.40	4.50	18.4	27.98	4.09	27.35	0.26	0.66
0.41	0.41	4.78	19.9	28.86	4.17	28.21	0.27	0.68
0.42	0.42	5.06	21.9	28.88	4.33	28.21	0.29	0.71
0.43	0.43	5.35	24.0	28.90	4.49	28.22	0.31	0.74
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
(FT)	INC	AREA	RATE	PER	VEL	(FT)	HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	28.3	28.94	4.79	28.23	0.36	0.81
0.46	0.46	6.19	30.6	28.96	4.94	28.23	0.38	0.84
0.47	0.47	6.48	33.0	28.98	5.09	28.24	0.40	0.87
0.48	0.48	6.76	35.4	29.01	5.23	28.24	0.43	0.91
0.49	0.49	7.04	37.8	29.03	5.38	28.25	0.45	0.94

STREET
CAPACITY

B-29

PC PROGRAM STREAM

SEPTEMBER 1994

BISON SPRINGS ST.

MANNING'S N= .017 SLOPE= .035

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	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(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	0.73	0.63	0.01	0.03
0.03	0.03	0.01	0.0	0.99	0.96	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	1.17	1.25	0.02	0.06
0.05	0.05	0.04	0.1	1.64	1.35	1.56	0.03	0.08
0.06	0.06	0.06	0.1	1.97	1.53	1.88	0.04	0.10
0.07	0.07	0.08	0.1	2.30	1.69	2.19	0.04	0.11
0.08	0.08	0.10	0.2	2.63	1.85	2.50	0.05	0.13
0.09	0.09	0.13	0.3	2.96	2.00	2.81	0.06	0.15
0.10	0.10	0.16	0.3	3.29	2.15	3.13	0.07	0.17
0.11	0.11	0.19	0.4	3.62	2.29	3.44	0.08	0.19
0.12	0.12	0.23	0.5	3.95	2.42	3.75	0.09	0.21
0.13	0.13	0.26	0.7	4.28	2.56	4.07	0.10	0.23
0.14	0.14	0.31	0.8	5.15	2.51	4.93	0.10	0.24
0.15	0.15	0.36	0.9	6.03	2.51	5.79	0.10	0.25
0.16	0.16	0.43	1.1	6.91	2.55	6.65	0.10	0.26
0.17	0.17	0.50	1.3	7.79	2.61	7.51	0.11	0.28
0.18	0.18	0.58	1.5	8.67	2.68	8.38	0.11	0.29
0.19	0.19	0.66	1.8	9.54	2.76	9.24	0.12	0.31
0.20	0.20	0.76	2.2	10.42	2.85	10.10	0.13	0.33
0.21	0.21	0.87	2.6	11.30	2.95	10.96	0.14	0.35
0.22	0.22	0.98	3.0	12.18	3.05	11.83	0.14	0.36
0.23	0.23	1.10	3.5	13.06	3.15	12.69	0.15	0.38
0.24	0.24	1.23	4.0	13.93	3.25	13.55	0.16	0.40
0.25	0.25	1.37	4.6	14.81	3.35	14.41	0.17	0.42
0.26	0.26	1.52	5.3	15.69	3.45	15.27	0.18	0.44
0.27	0.27	1.68	6.0	16.57	3.55	16.14	0.20	0.47
0.28	0.28	1.84	6.7	17.45	3.66	17.00	0.21	0.49
0.29	0.29	2.02	7.6	18.32	3.76	17.86	0.22	0.51
0.30	0.30	2.20	8.5	19.20	3.86	18.72	0.23	0.53
0.31	0.31	2.39	9.5	20.08	3.96	19.59	0.24	0.55
0.32	0.32	2.59	10.5	20.96	4.06	20.45	0.26	0.58
0.33	0.33	2.80	11.7	21.84	4.16	21.31	0.27	0.60
0.34	0.34	3.02	12.9	22.71	4.26	22.17	0.28	0.62
0.35	0.35	3.25	14.1	23.59	4.36	23.03	0.29	0.64
0.36	0.36	3.48	15.5	24.47	4.46	23.90	0.31	0.67
0.37	0.37	3.72	17.0	25.35	4.55	24.76	0.32	0.69
0.38	0.38	3.98	18.5	26.23	4.65	25.62	0.34	0.72
0.39	0.39	4.24	20.1	27.10	4.74	26.48	0.35	0.74
0.40	0.40	4.50	21.8	27.98	4.84	27.35	0.36	0.76
0.41	0.41	4.78	23.6	28.86	4.93	28.21	0.38	0.79
0.42	0.42	5.06	25.9	28.88	5.12	28.21	0.41	0.83
0.43	0.43	5.35	28.4	28.90	5.31	28.22	0.44	0.87
WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	33.5	28.94	5.67	28.23	0.50	0.95
0.46	0.46	6.19	36.2	28.96	5.85	28.23	0.53	0.99
0.47	0.47	6.48	39.0	28.98	6.02	28.24	0.56	1.03
0.48	0.48	6.76	41.9	29.01	6.19	28.24	0.60	1.08
0.49	0.49	7.04	44.8	29.03	6.36	28.25	0.63	1.12

STREET
CAPACITY

PC PROGRAM STREAM

SEPTEMBER 1994

BISON SPRINGS ST.

MANNING'S N= .017 SLOPE= .018

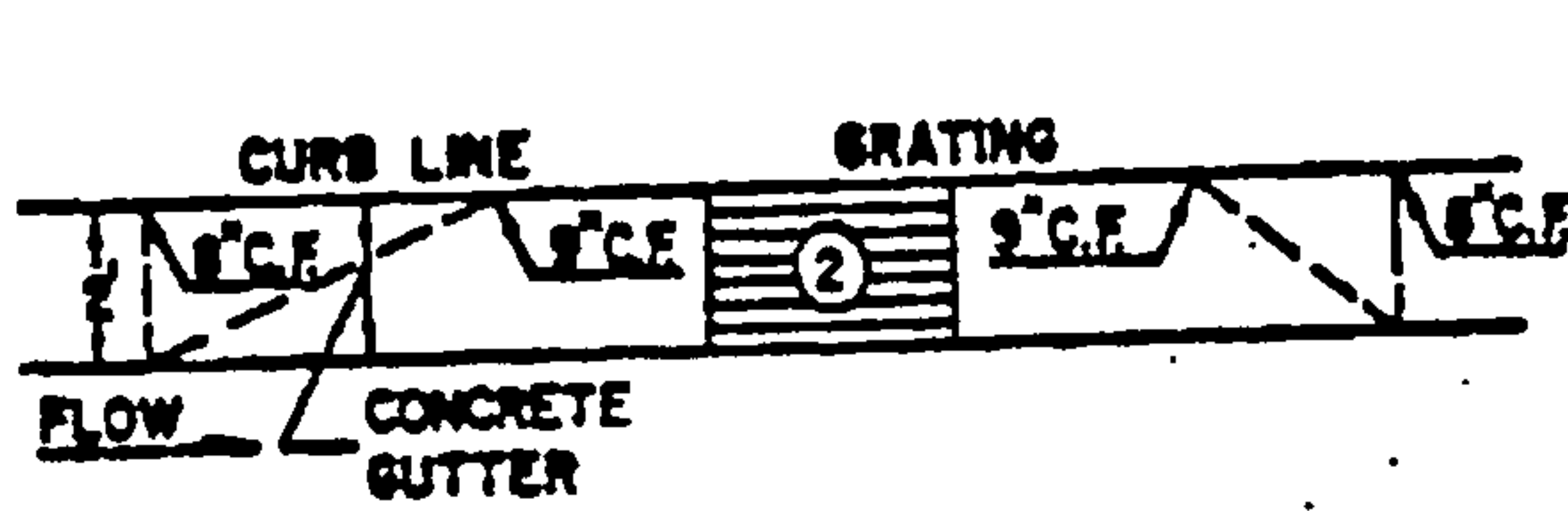
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.83	5	11.00	0.13	9	37.17	0.67
2	8.38	0.67	6	23.00	0.41	10	37.63	0.67
3	8.83	0.67	7	35.00	0.13	11	46.00	0.83
4	9.00	0.00	8	37.00	0.00	12	0.00	0.00
☐ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.01	0.01	0.00	0.0	0.33	0.33	0.31	0.00	0.01
0.02	0.02	0.01	0.0	0.66	0.53	0.63	0.00	0.02
0.03	0.03	0.01	0.0	0.99	0.69	0.94	0.01	0.04
0.04	0.04	0.03	0.0	1.32	0.84	1.25	0.01	0.05
0.05	0.05	0.04	0.0	1.64	0.97	1.56	0.01	0.06
0.06	0.06	0.06	0.1	1.97	1.09	1.88	0.02	0.08
0.07	0.07	0.08	0.1	2.30	1.21	2.19	0.02	0.09
0.08	0.08	0.10	0.1	2.63	1.33	2.50	0.03	0.11
0.09	0.09	0.13	0.2	2.96	1.43	2.81	0.03	0.12
0.10	0.10	0.16	0.2	3.29	1.54	3.13	0.04	0.14
0.11	0.11	0.19	0.3	3.62	1.64	3.44	0.04	0.15
0.12	0.12	0.23	0.4	3.95	1.74	3.75	0.05	0.17
0.13	0.13	0.26	0.5	4.28	1.83	4.07	0.05	0.18
0.14	0.14	0.31	0.6	5.15	1.80	4.93	0.05	0.19
0.15	0.15	0.36	0.7	6.03	1.80	5.79	0.05	0.20
0.16	0.16	0.43	0.8	6.91	1.83	6.65	0.05	0.21
0.17	0.17	0.50	0.9	7.79	1.87	7.51	0.05	0.22
0.18	0.18	0.58	1.1	8.67	1.92	8.38	0.06	0.24
0.19	0.19	0.66	1.3	9.54	1.98	9.24	0.06	0.25
0.20	0.20	0.76	1.6	10.42	2.05	10.10	0.07	0.27
0.21	0.21	0.87	1.8	11.30	2.11	10.96	0.07	0.28
0.22	0.22	0.98	2.1	12.18	2.18	11.83	0.07	0.29
0.23	0.23	1.10	2.5	13.06	2.26	12.69	0.08	0.31
0.24	0.24	1.23	2.9	13.93	2.33	13.55	0.08	0.32
0.25	0.25	1.37	3.3	14.81	2.40	14.41	0.09	0.34
0.26	0.26	1.52	3.8	15.69	2.48	15.27	0.10	0.36
0.27	0.27	1.68	4.3	16.57	2.55	16.14	0.10	0.37
0.28	0.28	1.84	4.8	17.45	2.62	17.00	0.11	0.39
0.29	0.29	2.02	5.4	18.32	2.69	17.86	0.11	0.40
0.30	0.30	2.20	6.1	19.20	2.77	18.72	0.12	0.42
0.31	0.31	2.39	6.8	20.08	2.84	19.59	0.13	0.44
0.32	0.32	2.59	7.6	20.96	2.91	20.45	0.13	0.45
0.33	0.33	2.80	8.4	21.84	2.98	21.31	0.14	0.47
0.34	0.34	3.02	9.2	22.71	3.05	22.17	0.14	0.48
0.35	0.35	3.25	10.1	23.59	3.13	23.03	0.15	0.50
0.36	0.36	3.48	11.1	24.47	3.20	23.90	0.16	0.52
0.37	0.37	3.72	12.2	25.35	3.26	24.76	0.17	0.54
0.38	0.38	3.98	13.3	26.23	3.33	25.62	0.17	0.55
0.39	0.39	4.24	14.4	27.10	3.40	26.48	0.18	0.57
0.40	0.40	4.50	15.6	27.98	3.47	27.35	0.19	0.59
0.41	0.41	4.78	16.9	28.86	3.54	28.21	0.19	0.60
0.42	0.42	5.06	18.6	28.88	3.67	28.21	0.21	0.63
0.43	0.43	5.35	20.4	28.90	3.81	28.22	0.23	0.66
☐ WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	VEL	ENERGY
	INC	AREA	RATE	PER	VEL		HEAD	HEAD
(FT)	(FT)	SQ.FT.	(CFS)	(FT)	(FPS)	(FT)	(FT)	(FT)
0.45	0.45	5.91	24.0	28.94	4.07	28.23	0.26	0.71
0.46	0.46	6.19	26.0	28.96	4.19	28.23	0.27	0.73
0.47	0.47	6.48	28.0	28.98	4.32	28.24	0.29	0.76
0.48	0.48	6.76	30.0	29.01	4.44	28.24	0.31	0.79
0.49	0.49	7.04	32.1	29.03	4.56	28.25	0.32	0.81
0.50	0.50	7.32	34.3	29.05	4.68	28.25	0.34	0.84
0.51	0.51	7.61	36.5	29.07	4.80	28.26	0.36	0.87
0.52	0.52	7.89	38.8	29.09	4.91	28.26	0.37	0.89
0.53	0.53	8.17	41.1	29.11	5.03	28.27	0.39	0.92
0.54	0.54	8.45	43.5	29.13	5.14	28.27	0.41	0.95
0.55	0.55	8.74	45.9	29.15	5.25	28.28	0.43	0.98
0.56	0.56	9.02	48.4	29.17	5.36	28.28	0.45	1.01

STREET CAPACITY

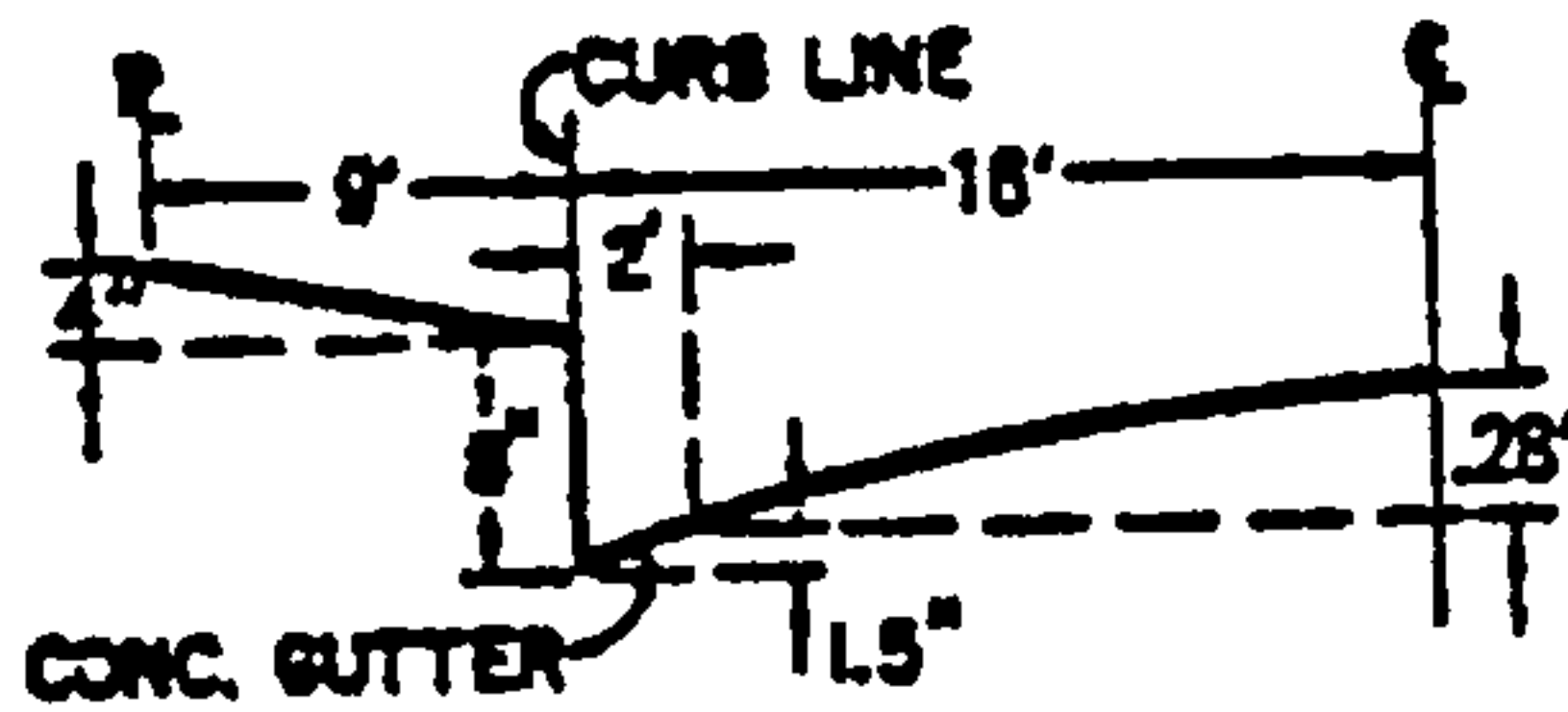
BISON SPRINGS ST.

Chapter 22 - Drainage, Flood Control and Erosion Control

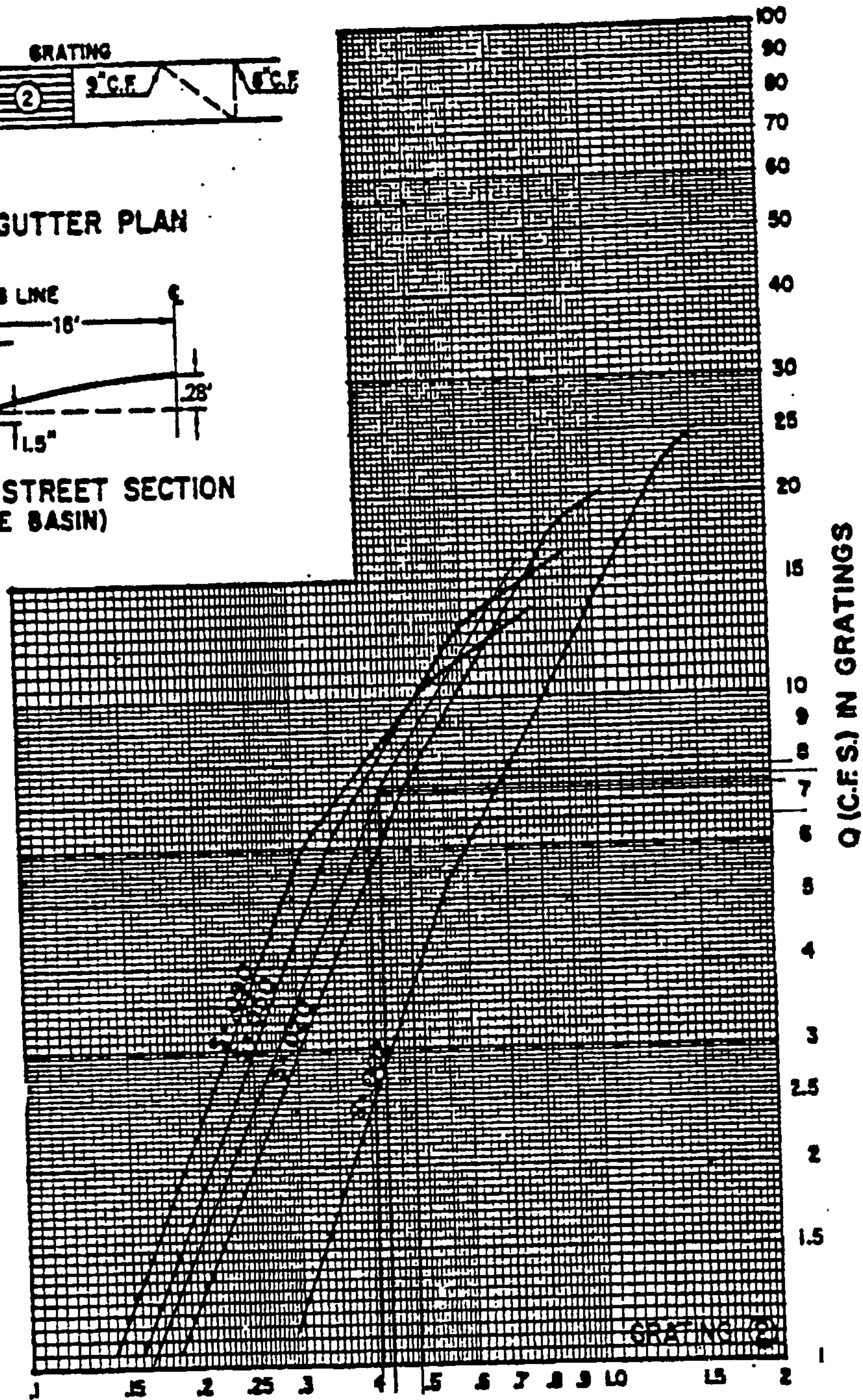
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

$$\text{Slope} = 3.1\%, D = 0.41, Q = 6.5 \text{ cfs}$$

$$\text{Slope} = 2.5\%, D = 0.48, Q = 7.8 \text{ cfs}$$

$$D = 0.42, Q = 6.5 \text{ cfs}$$

PLATE 22.3 D-5

May 2001

$$\text{SLOPE} = 3.5\%, D = 0.43, Q = 7.3 \text{ cfs}$$

$$\text{SLOPE} = 1.8\%, D = 0.48, Q = 7.5 \text{ cfs}$$

22-144

B-32

alyzer Report

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Drainage Structure Analyzer

pe Hydraulic Analysis

Bison Springs St.

Date: Friday, November 12, 2004 11:01:15

=====

Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	43.4 cfs
Slope	2.500%
Size (W x T):	30.00 x 2.7500

Output Results

Flow Rate	43.4 cfs
Slope	2.500%
D	0.60
Capacity	64.9 cfs
Velocity	14.16 ft/s
Depth	1.50 ft
Critical Depth	2.19 ft
Size (W x T):	30.00 x 2.7500

alyzer Report

=====

Drainage Structure Analyzer

pe Hydraulic Analysis

Date: Tuesday, December 14, 2004 08:05:00

=====

BISON SPRINGS ST. SD

WALNUT CANYON TO BUCK ISLAND

Input Data

ape	Circular
aterial	RC C76-A
Roughness	0.013000
ethod	Manning
ow Rate	14.6 cfs
lope	3.500%
Size (W x T):	18.00 x 2.0000

Output Results

Flow Rate	14.6 cfs
lope	3.500%
/D	0.64
apacity	19.7 cfs
Velocity	12.19 ft/s
epth	0.96 ft
ritical Depth	1.39 ft
Size (W x T):	18.00 x 2.0000

alyzer Report

=====

Drainage Structure Analyzer

pe Hydraulic Analysis

Date: Tuesday, December 14, 2004 08:06:07

=====

BISON SPRINGS ST. SD

BUCK ISLAND TO BIG SPRINGS

Input Data

ape	Circular
terial	RC C76-A
Roughness	0.013000
ethod	Manning
low Rate	44.4 cfs
lope	1.800%
Size (W x T):	30.00 x 2.7500

Output Results

Flow Rate	44.4 cfs
lope	1.800%
/D	0.68
Capacity	55.0 cfs
Velocity	12.47 ft/s
epth	1.70 ft
ritical Depth	2.21 ft
Size (W x T):	30.00 x 2.7500

alyzer Report

=====

Drainage Structure Analyzer

pe Hydraulic Analysis

Date: Tuesday, December 14, 2004 08:07:09

=====

BISON SPRINGS ST. SD

BIG SPRINGS TO SUMP

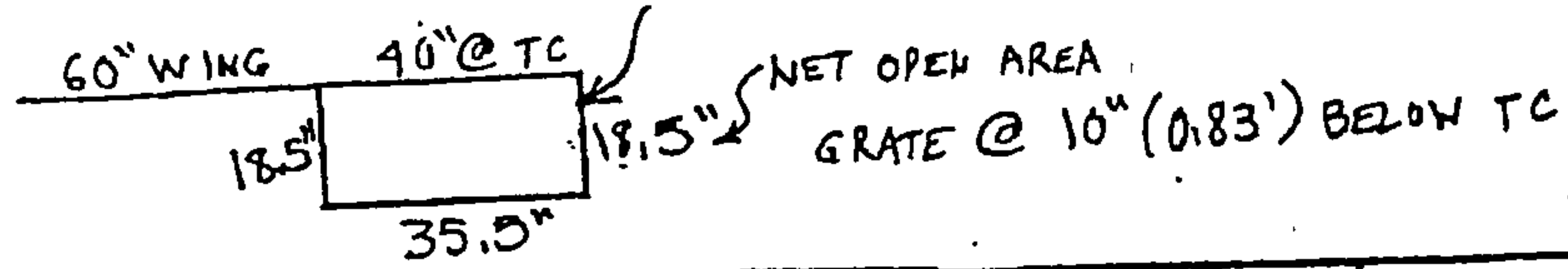
Input Data

Shape	Circular
Material	RC C76-A
Roughness	0.013000
Method	Manning
Flow Rate	87.8 cfs
Slope	1.800%
Size (W x T):	36.00 x 3.0000

Output Results

Flow Rate	87.8 cfs
Slope	1.800%
V/D	0.80
Capacity	89.5 cfs
Velocity	14.43 ft/s
Depth	2.41 ft
Critical Depth	2.83 ft
Size (W x T):	36.00 x 3.0000

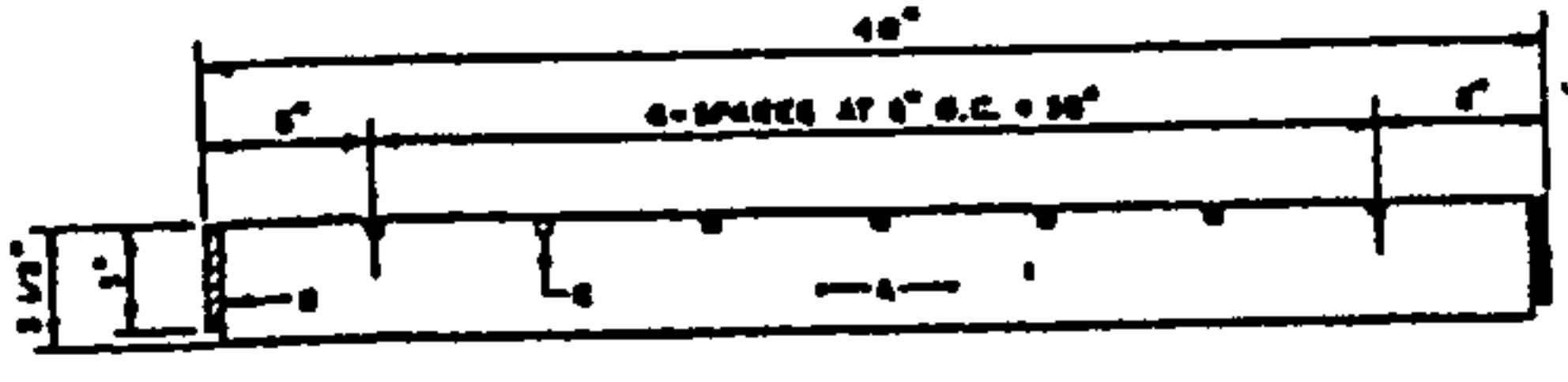
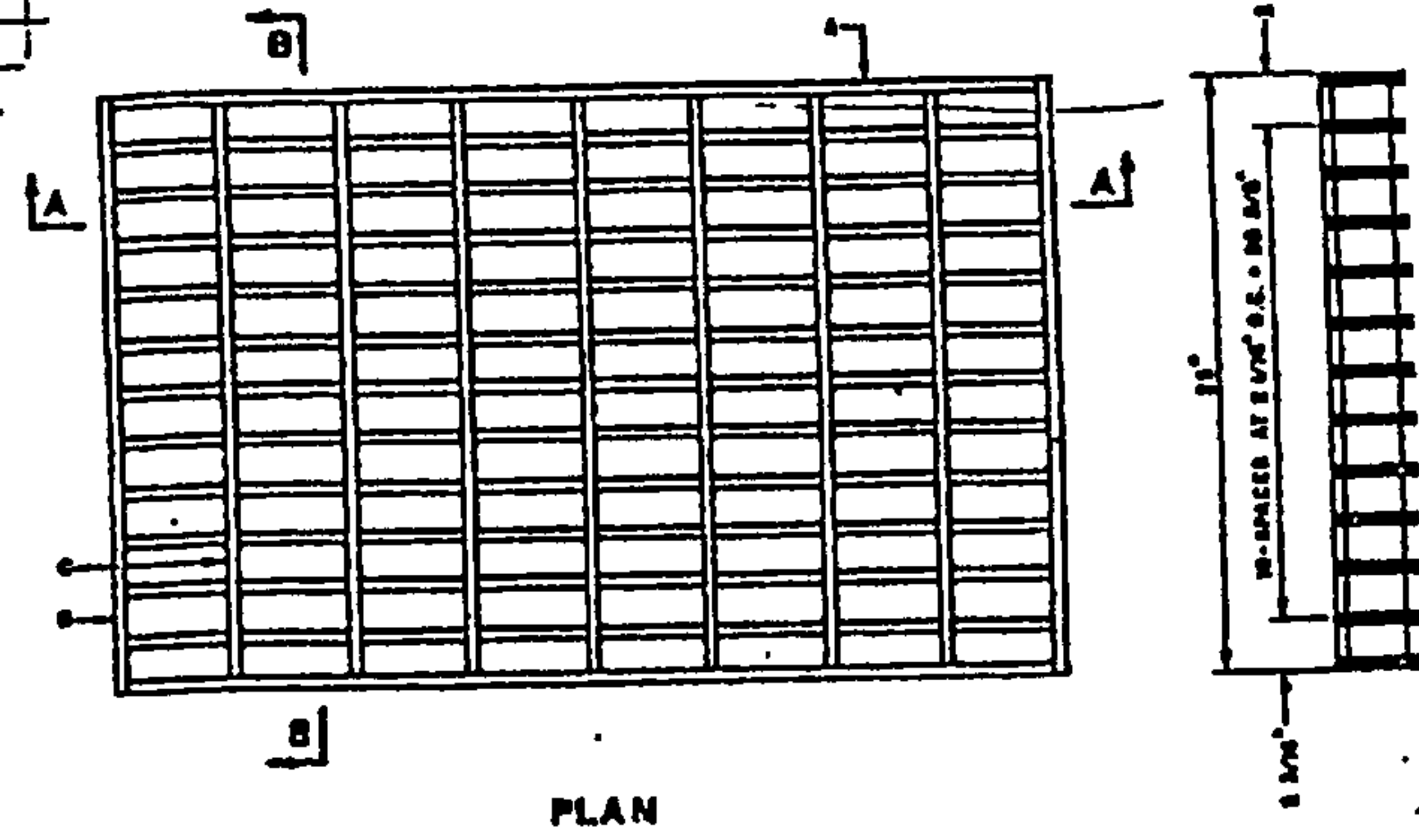
90



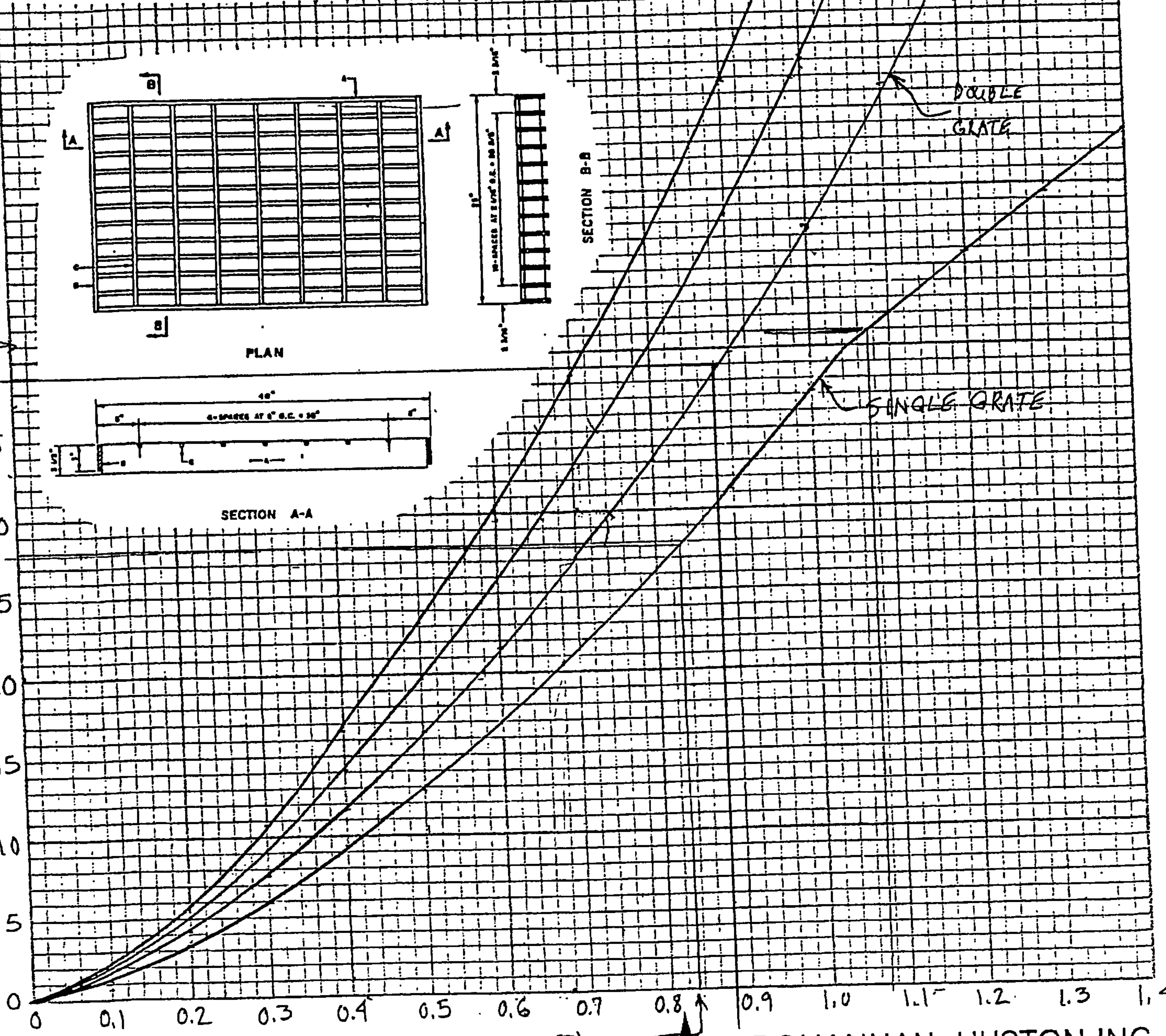
EQUATION	SGL A	DBL A	TRPL A	QDPL A
1) ORIFICE	$22.0 h^{0.5} + 16.5 h^{1.5}$	$43.9 h^{0.5} + 16.5 h^{1.5}$	$65.9 h^{0.5} + 16.5 h^{1.5}$	$87.8 h^{0.5} + 16.5 h^{1.5}$
2) 3-SIDED WEIR ($h \leq 0.83'$)	$36.4 h^{1.5}$	$46.2 h^{1.5}$	$56.0 h^{1.5}$	$65.7 h^{1.5}$
3) 4-SIDED WEIR ($h > 0.83'$)	ADD TO 2): $11(h-0.83)^{1.5}$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

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

GRATE CAPACITY (Q) IN CFS



SECTION B-B



TC 0.83'

HEAD (h) IN FEET

BOHANNAN-HUSTON INC.

PROJECT NAME BISON SPRINGS ST. SHEET OF
 PROJECT NO. SUMP CONDITION BY DATE
 SUBJECT RATING CURVE FOR TYPE A INLETS CH'D DATE B-87

alyzer Report

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Drainage Structure Analyzer

pe Hydraulic Analysis

Date: Tuesday, December 14, 2004 08:08:35

=====

SUMP INLET TO
MESSINA DR. SD
IN EASEMENT

Input Data

ape	Circular
terial	RC C76-A
Roughness	0.013000
ethod	Manning
ow Rate	126.5 cfs
lope	1.800%
Size (W x T):	42.00 x 3.5000

Output Results

Flow Rate	126.5 cfs
lope	1.800%
/D	0.77
apacity	135.0 cfs
Velocity	15.95 ft/s
epth	2.69 ft
ritical Depth	3.29 ft
Size (W x T):	42.00 x 3.5000

APPENDIX C

INFRASTRUCTURE LIST

Current DRC
Project No. _____

Date submitted: _____ of 16,
Date Site Plan Approved: _____
Date Preliminary Plat Approved: _____
Date Preliminary Plat Expires: _____

Figure 12
INFRASTRUCTURE LIST
EXHIBIT "A"
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

DRB Project No. _____

SIERRA RANCH SUBDIVISION
PRELIMINARY PLAT

APPLICATION NO. _____

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 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
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SIERRA RANCH SUBDIVISION - UNIT I

ONSITE PUBLIC ROADWAY IMPROVEMENTS

30' EOA-F	ARTERIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON SOUTH SIDE ONLY	GIBSON BOULEVARD	CHACO CANYON DR	MESSINA DRIVE
24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON WEST SIDE ONLY	MESSINA DRIVE	GIBSON BOULEVARD	AMOLE MESA AVENUE
24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY	AMOLE MESA AVE	WEST BOUNDARY	MESSINA DRIVE
28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	FOUR MILE ROAD	WEST BOUNDARY	BISON SPRINGS STREET
24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY*	FOUR MILE ROAD	BISON SPRINGS STREET	EAST STUB TERMINUS
28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CORONA RANCH RD	WEST BOUNDARY	BISON SPRINGS STREET
28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	WALNUT CANYON RD	WEST BOUNDARY	BISON SPRINGS STREET
52' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	WALNUT CANYON RD	BISON SPRINGS STREET	MESSINA DRIVE
28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BUCK ISLAND ROAD	WEST BOUNDARY	BISON SPRINGS STREET

/	/	/
/	/	/
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/	/	/
/	/	/
/	/	/
/	/	/

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
ONSITE PUBLIC ROADWAY IMPROVEMENTS (CONT.)									
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	PIPESTONE ROAD	WEST BOUNDARY	BIG SPRINGS ROAD	/	/	/
		36' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BIG SPRINGS ROAD	AMOLE MESA AVE	BISON SPRINGS STREET	/	/	/
		48' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CHACO CANYON DR	GIBSON BOULEVARD	FOUR MILE ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	SALADO CREEK ST	FOUR MILE ROAD	WALNUT CANYON ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CARIZZO PLAIN DR	WALNUT CANYON RD	BUCK ISLAND ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON EAST SIDE ONLY*	GILA CLIFF DRIVE	NORTH STUB TERMINUS	PIPESTONE ROAD	/	/	/
		25' WIDE	6' AC TRAIL	PEDESTRIAN ACCESS BETWEEN LOTS 206/207	PIPESTONE ROAD	AMOLE MESA AVENUE	/	/	/
		* SIDEWALKS TO BE DEFERRED PER DEFERRAL EXHIBIT 'B'. WAIVER OF SIDEWALK ON SOUTH SIDE OF FOUR MILE ROAD STUB AND WEST SIDE OF GILA CLIFF DRIVE							
STREET LIGHTS AS PER COA DPM									

0.2

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
SIERRA RANCH SUBDIVISION - UNIT I									
ON SITE PUBLIC STORM DRAIN IMPROVEMENTS									
		18"-72" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	MESSINA DRIVE	GIBSON BLVD	AMOLE MESA AVENUE	/	/	/
		18" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	FOUR MILE ROAD	LOT 29	BISON SPRINGS STREET	/	/	/
		18"-24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	CORONA RANCH RD	WEST BOUNDARY	SALADO CREEK STREET	/	/	/
		24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	SALADO CREEK ST.	CORONA RANCH RD.	WALNUT CANYON ROAD	/	/	/
		18" - 30" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	WALNUT CANYON RD	WEST BOUNDARY	BISON SPRINGS STREET	/	/	/
		18" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BUCK ISLAND ROAD	LOT 138	BISON SPRINGS STREET	/	/	/
		18" - 24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PIPESTONE ROAD	WEST BOUNDARY	BIG SPRINGS ROAD	/	/	/
		24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BIG SPRINGS ROAD	PIPESTONE ROAD	BISON SPRINGS STREET	/	/	/
		18" - 36" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS	/	/	/
		42" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PUBLIC EASEMENT	BISON SPRINGS ST	MESSINA DRIVE	/	/	/
		42" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	WALNUT CANYON RD.	BISON SPRINGS ST	MESSINA DRIVE	/	/	/
			4.2 ACRE-FEET SURGE POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	PARK TRACT			/	/	/
			3.5 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	EL RANCHO GRANDE TRACT 16 NORTH			/	/	/
			2.6 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	SIERRA RANCH UNIT 2			/	/	/

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

THERE WILL BE NO RELEASE OF FINANCIAL GUARANTEE OR SIA UNTIL AGREEMENT IS PROCESSED AND APPROVED WITH AMAFCA FOR CONSTRUCTION OF THE AMOLE ARROYO IMPROVEMENTS.

ONSITE PUBLIC WATERLINE IMPROVEMENTS

18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	CHACO CANYON DR	GIBSON BLVD	FOUR MILE ROAD
4-8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	FOUR MILE ROAD	WEST BOUNDARY	EAST STUB TERMINUS
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	CORONA RANCH RD	WEST BOUNDARY	BISON SPRINGS ST
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	WALNUT CANYON RD	WEST BOUNDARY	BISON SPRINGS ST
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BUCK ISLAND ROAD	WEST BOUNDARY	BISON SPRINGS ST
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	PIPESTONE ROAD	WEST BOUNDARY	BIG SPRINGS RD
6-8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BIG SPRINGS ROAD	AMOLE MESA AVE	BISON SPRINGS ST
4-6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS
4" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	GILA CLIFF DRIVE	NORTH STUB TERMINUS	PIPESTONE ROAD
12" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	AMOLE MESA AVE	WEST BOUNDARY	MESSINA DRIVE
12" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	AMOLE MESA AVE	MESSINA DRIVE	MESA ARENOSA

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2-4

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
SIERRA RANCH SUBDIVISION - UNIT I									
ONSITE PUBLIC SANITARY SEWER IMPROVEMENTS									
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	FOUR MILE ROAD	WEST BOUNDARY	EAST STUB TERMINUS	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	CORONA RANCH RD	WEST BOUNDARY	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	WALNUT CANYON RD	WEST BOUNDARY	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BUCK ISLAND ROAD	WEST BOUNDARY	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PIPESTONE ROAD	WEST BOUNDARY	BIG SPRINGS RD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BIG SPRINGS ROAD	PIPESTONE ROAD	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	GILA CLIFF DRIVE	NORTH STUB TERMINUS	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS	/	/	/
		10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PUBLIC EASEMENT	BISON SPRINGS ST	MESSINA DRIVE	/	/	/
		10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	MESSINA DRIVE	PUBLIC EASEMENT	AMOLE MESA AVENUE	/	/	/
		10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	AMOLE MESA AVE.	MESSINA DRIVE	PUBLIC EASEMENT IN EL RANCHO GRANDE UNIT 15	/	/	/
		8-10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PUBLIC EASEMENT IN EL RANCHO GRANDE UNIT 15	AMOLE MESA AVENUE	FUTURE OPEN RANGE AVE. EXISTING STUB	/	/	/

C-5

SIERRA RANCH SUBDIVISION - UNIT 2

NOTE: ALL UNIT 1 PUBLIC IMPROVEMENTS REQUIRED FOR UNIT 2.

ONSITE PUBLIC ROADWAY IMPROVEMENTS

		30' EOA-F	ARTERIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON SOUTH SIDE ONLY	GIBSON BOULEVARD	WEST BOUNDARY	CHACO CANYON DR
		24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY	AMOLE MESA AVE	WEST BOUNDARY	EAST BOUNDARY
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	FOUR MILE ROAD	PIPESPRING STREET	EAST BOUNDARY
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CORONA RANCH RD	PIPESPRING STREET	EAST BOUNDARY
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	WALNUT CANYON RD	PIPESPRING STREET	EAST BOUNDARY
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY*	BUCK ISLAND ROAD	WEST STUB TERMINUS	ALAMO CANYON DRIVE
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BUCK ISLAND ROAD	ALAMO CANYON DR	EAST BOUNDARY
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	PIPESTONE ROAD	PIPESPRING STREET	EAST BOUNDARY
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	PIPESPRING STREET	FOUR MILE ROAD	PIPESTONE ROAD
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	DEVILS TOWER ST	WALNUT CANYON RD	PIPESTONE ROAD
		48' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	ALAMO CANYON DR	PIPESTONE ROAD	AMOLE MESA AVENUE
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	ALAMO CANYON DR	BUCK ISLAND ROAD	PIPESTONE ROAD
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	FOSTER RANCH ST	FOUR MILE ROAD	WALNUT CANYON ROAD
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	MOUNTAINTOP DR	BUCK ISLAND ROAD	PIPESTONE ROAD

- * SIDEWALKS TO BE DEFERRED PER DEFERRAL EXHIBIT 'B'.
WAIVER OF SIDEWALK ON SOUTH SIDE OF BUCK ISLAND ROAD STUB

STREET LIGHTS AS PER COA DPM

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SIERRA RANCH SUBDIVISION - UNIT 2

ONSITE PUBLIC STORM DRAIN IMPROVEMENTS

Size	Type of Improvement	Location	From	To
18"-24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PUBLIC EASEMENT	WEST BOUNDARY	PIPESPRING STREET
18"-24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PIPESPRING STREET	PUBLIC EASEMENT	CORONA RANCH ROAD
18"-24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	CORONA RANCH RD	PIPESPRING STREET	PHASE BOUNDARY
	1.6 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	150' AMAFCA DRAINAGE EASEMENT		
	1.0 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	150' AMAFCA DRAINAGE EASEMENT		

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

THERE WILL BE NO RELEASE OF FINANCIAL GUARANTEE OR SIA UNTIL AGREEMENT IS PROCESSED AND APPROVED WITH AMAFCA FOR CONSTRUCTION OF THE AMOLE ARROYO IMPROVEMENTS.

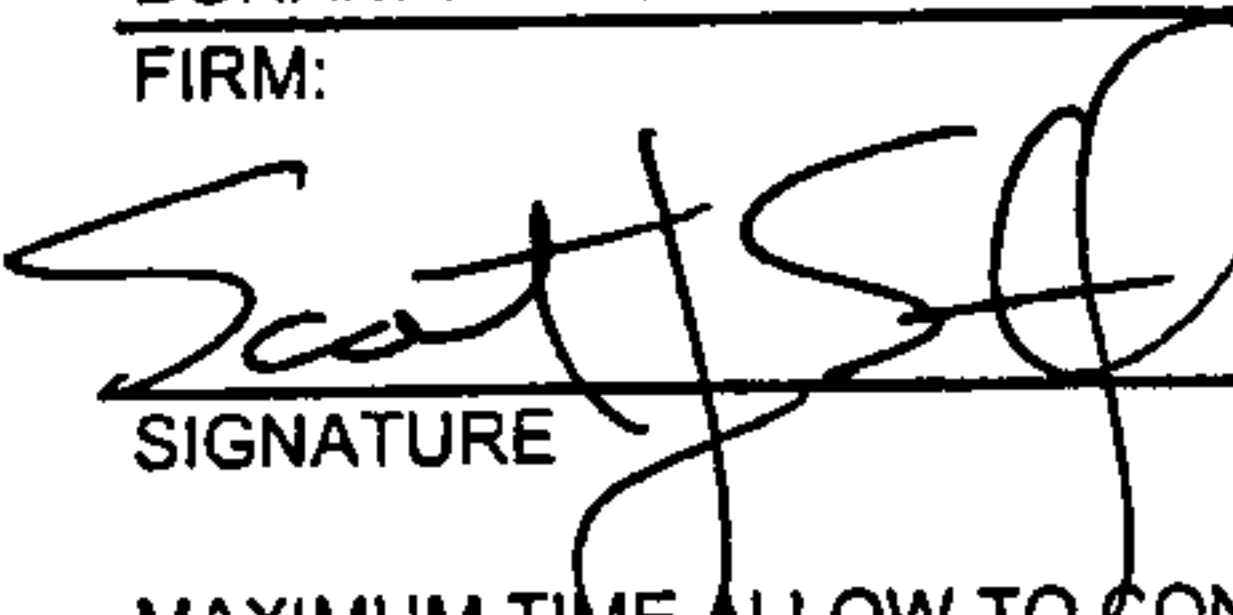
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ONSITE PUBLIC WATERLINE IMPROVEMENTS

		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	FOUR MILE ROAD	PIPESPRING STREET	EAST BOUNDARY
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	CORONA RANCH RD	PIPESPRING STREET	EAST BOUNDARY
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	WALNUT CANYON RD	PIPESPRING STREET	EAST BOUNDARY
		4-6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BUCK ISLAND ROAD	WEST STUB TERMINUS	EAST BOUNDARY
		6-8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	PIPESTONE ROAD	PIPESPRING STREET	EAST BOUNDARY
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	PIPESPRING STREET	FOUR MILE ROAD	PIPESTONE ROAD
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	DEVILS TOWER ST	WALNUT CANYON RD	PIPESTONE ROAD
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	MOUNTAINTOP DR	BUCK ISLAND ROAD	PIPESTONE ROAD
		20" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	PUBLIC EASEMENT IN EL RANCHO GRANDE UNIT 16	DELGADO	GIBSON BLVD. AT CHACO CANYON DRIVE
		18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	FOUR MILE ROAD	FOSTER RANCH ST.	EAST BOUNDARY
		18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	FOSTER RANCH ST.	FOUR MILE ROAD	WALNUT CANYON ROAD
		18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	WALNUT CANYON RD	DEVILS TOWER ST.	FOSTER RANCH ST
		18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	DEVILS TOWER ST.	WALNUT CANYON RD.	PIPESTONE ROAD
		18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	PIPESTONE ROAD	DEVILS TOWER ST	ALAMO CANYON DRIVE
		18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	ALAMO CANYON DR.	PIPESTONE ROAD	AMOLE MESA AVENUE
		12-18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	AMOLE MESA AVE	WEST BOUNDARY	EAST BOUNDARY

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SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
ONSITE PUBLIC SANITARY SEWER IMPROVEMENTS									
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	FOUR MILE ROAD	PIPESPRING STREET	EAST BOUNDARY	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	CORONA RANCH RD	PIPESPRING STREET	EAST BOUNDARY	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	WALNUT CANYON RD	PIPESPRING STREET	EAST BOUNDARY	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BUCK ISLAND ROAD	WEST STUB TERMINUS	EAST BOUNDARY	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PIPESTONE ROAD	PIPESPRING STREET	EAST BOUNDARY	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PIPESPRING STREET	FOUR MILE ROAD	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	DEVILS TOWER ST	WALNUT CANYON RD	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	MOUNTAINTOP DR	BUCK ISLAND ROAD	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PUBLIC EASEMENT	WEST BOUNDARY	PIPESPRING STREET	/	/	/

SCOTT STEFFEN	12/16/04				
PREPARED BY: PRINT NAME	DATE	DRB CHAIR	DATE	PARKS & RECREATION DEPARTMENT	DATE
BOHANNAN HUSTON INC.					
FIRM:		TRANSPORTATION DEVELOPMENT	DATE	AMAFCA	DATE
	12/16/04				
SIGNATURE	DATE	UTILITY DEVELOPMENT	DATE	CITY ENGINEER	DATE
MAXIMUM TIME ALLOW TO CONSTRUCT IMPROVEMENTS WITHOUT A DRB EXTENSION					
		NEW MEXICO UTILITIES INC.	DATE		DATE

DESIGN REVIEW COMMITTEE REVISIONS

REVISION	DATE	DRC CHAIR	USER DEPARTMENT	AGENT/OWNER



EXHIBITS

EXHIBIT 1 - PRELIMINARY PLAT

EXHIBIT 2 - GRADING PLAN

EXHIBIT 3 - DEVELOPED CONDITIONS BASIN MAP

EXHIBIT 4 - OFFSITE BASIN MAP

EXHIBIT 1

PRELIMINARY PLAT



EXHIBIT 2

GRADING PLAN

2

EXHIBIT 3

DEVELOPED CONDITIONS BASIN MAP

Bohannon 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

CITY OF ALBUQUERQUE

NO 8/D003A



December 19, 2008

Scott Medina, PE
Mark Goodwin & Associates
P.O. 90606
Albuquerque, NM 87199

Re: Sierra Ranch Unit 2 Temporary Pond Maintenance request
Letter dated 12-9-08

Dear Mr. Medina,

For clarification, the storm drain and ponding area on the western side of Sierra Ranch Unit 2, in the easement between lots 243 and 244, and AMAFCA easement behind the subdivision was intended to be publicly (CoA) maintained. From the pictures provided and my knowledge of the area, access to this pond and inlet structure is adequate and the pond is appropriately constructed.

PO Box 1293

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

Albuquerque

NM 87103

www.cabq.gov

Sincerely,

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

C: ✓ Wilfred Gallegos, PE, Street Maintenance
file



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

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539

~ 2008 ACEC/NM Award Winner for Engineering Excellence, Small Firm ~

December 9, 2008

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

Re: Sierra Ranch Unit 2 Temporary Pond Maintenance

Dear Mr. Bingham:

On behalf of Curb Inc., we are formally requesting that the City of Albuquerque accept maintenance of the temporary pond located on Lands of Rio Bravo Partners, Parcel 2-A. The temporary pond was constructed with Sierra Ranch Unit 2, in an effort to intercept offsite flows and convey them through the developed subdivision. The Sierra Ranch Unit 2 grading was certified and approved by the city on 7/1/2008. Enclosed is a drawing illustrating the pond and storm drain requiring maintenance.

Sincerely,

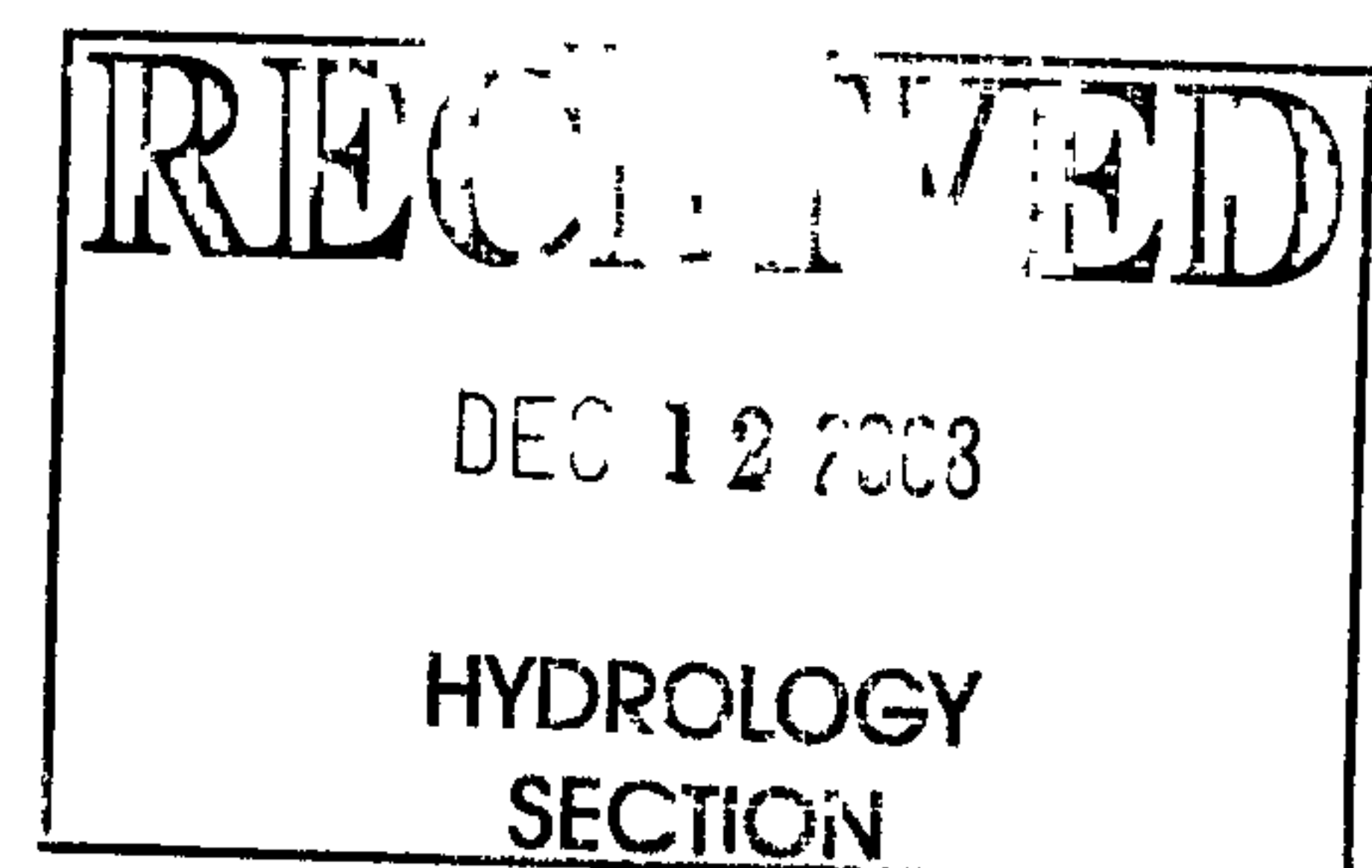
MARK GOODWIN & ASSOCIATES, PA

Scott Medina, P.E.
Project Engineer

ASM/la

Attachment

Cc: Bo Johnson – Curb Inc.





ORIGINAL

Figure 12

INFRASTRUCTURE LIST

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

SIERRA RANCH SUBDIVISION
PRELIMINARY PLAT

Date Submitted January 25, 2005

Date Site Plan Approved _____

Date Preliminary Plat Approved: 1/26/05

Date Preliminary Plat Expires: 1/26/26

DRB Project No 1003429

APPLICATION NO 04DRB-01950

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 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
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SIERRA RANCH SUBDIVISION - UNIT I

ONSITE PUBLIC ROADWAY IMPROVEMENTS

		30' ~~EOA-F~~ F-F	ARTERIAL PAVING W/ PCC CURB & GUTTER, MEDIAN CURB AND PCC 6' WIDE SIDEWALK ON SOUTH SIDE ONLY	GIBSON BOULEVARD	CHACO CANYON DR	MESSINA DRIVE	/	/	/
		24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON WEST SIDE ONLY	MESSINA DRIVE	GIBSON BOULEVARD	AMOLE MESA AVENUE	/	/	/
		24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON NORTH SIDE ONLY	AMOLE MESA AVE	LOT 207	MESSINA DRIVE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	FOUR MILE ROAD	LOTS 42/43	BISON SPRINGS STREET	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY*	FOUR MILE ROAD	BISON SPRINGS STREET	EAST STUB TERMINUS	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CORONA RANCH RD	LOTS 76/77	BISON SPRINGS STREET	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	WALNUT CANYON RD	LOTS 109/110	BISON SPRINGS STREET	/	/	/
		48' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON BOTH SIDES*	WALNUT CANYON RD	BISON SPRINGS STREET	MESSINA DRIVE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BUCK ISLAND ROAD	LOTS 148/149	BISON SPRINGS STREET	/	/	/

ORIGINAL

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
ONSITE PUBLIC ROADWAY IMPROVEMENTS (CONT.)									
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	PIPESTONE ROAD	LOTS 188/207	BIG SPRINGS ROAD	/	/	/
		36' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BIG SPRINGS ROAD	AMOLE MESA AVE	BISON SPRINGS STREET	/	/	/
		48' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON BOTH SIDES*	CHACO CANYON DR	GIBSON BOULEVARD	FOUR MILE ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	SALADO CREEK ST	FOUR MILE ROAD	WALNUT CANYON ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CARIZZO PLAIN DR	WALNUT CANYON RD	BUCK ISLAND ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS	/	/	/
		~~28' F-F~~ 24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON EAST SIDE ONLY*	GILA CLIFF DRIVE	NORTH STUB TERMINUS	PIPESTONE ROAD	/	/	/
		25' WIDE	6' AC TRAIL	PEDESTRIAN ACCESS BETWEEN LOTS 206/207	PIPESTONE ROAD	AMOLE MESA AVENUE	/	/	/
			* SIDEWALKS TO BE DEFERRED PER DEFERRAL EXHIBIT 'B'. WAIVER OF SIDEWALK ON SOUTH SIDE OF FOUR MILE ROAD STUB AND WEST SIDE OF GILA CLIFF DRIVE						
			STREET LIGHTS AS PER COA DPM						

ORIGINAL

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
SIERRA RANCH SUBDIVISION - UNIT I									
ON SITE PUBLIC STORM DRAIN IMPROVEMENTS									
		18"-72" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	MESSINA DRIVE	GIBSON BLVD	AMOLE MESA AVENUE	/	/	/
		18-24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	FOUR MILE ROAD	LOT 29	BISON SPRINGS STREET	/	/	/
		18"-24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	CORONA RANCH RD	LOTS 76/77	SALADO CREEK STREET	/	/	/
		30" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	SALADO CREEK ST.	CORONA RANCH RD.	WALNUT CANYON ROAD	/	/	/
		18" - 36" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	WALNUT CANYON RD	LOTS 109/110	BISON SPRINGS STREET	/	/	/
		18" 24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BUCK ISLAND ROAD	LOT 138	BISON SPRINGS STREET	/	/	/
		18" - 24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PIPESTONE ROAD	LOTS 188/207	BIG SPRINGS ROAD	/	/	/
		30" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BIG SPRINGS ROAD	PIPESTONE ROAD	BISON SPRINGS STREET	/	/	/
		18" - 42" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS	/	/	/
		60" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PUBLIC EASEMENT TRACT 16-A	BISON SPRINGS ST	MESSINA DRIVE	/	/	/
		18" 48" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	WALNUT CANYON RD.	BISON SPRINGS ST	MESSINA DRIVE	/	/	/
		54" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	OPEN RANGE AVE EL RANCHO GRANDE UNIT 15	MESSINA DRIVE	EXISTING STUB BLUE SKY STREET	/	/	/
			* THIS ITEM IS ON THE EL RANCHO GRANDE UNIT 15 INFRASTRUCTURE LIST DRB#1003030 AND SHOWN ON THE INFRASTRUCTURE PLANS, COA PROJECT #699388, WHICH HAS NOT GONE TO WORK ORDER						
		72" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	OPEN RANGE AVE SUN GATE SUBDIVISION	BLUE SKY STREET	BLAKE ROAD	/	/	/
			* THIS ITEM IS ON THE SUN GATE SUBDIVISION INFRASTRUCTURE LIST DRB#1003175, SHOWN ON THE INFRASTRUCTURE PLANS, COA PROJECT #736781, AND FINANCIALLY GUARANTEED WITH THE SUN GATE FINAL PLAT. DEFERRED ITEM.						
		72" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BLAKE ROAD	OPEN RANGE AVE	98TH STREET	/	/	/
			* THIS ITEM IS ON THE SUN GATE ESTATES SUBDIVISION INFRASTRUCTURE LIST DRB#1003591 SHOWN ON INFRASTRUCTURE PLANS, COA PROJECT #722783.						
		72-90" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	BLAKE ROAD	98TH STREET	AMOLE ARROYO	/	/	/
			* SHOWN ON INFRASTRUCTURE PLANS, COA PROJECT #722783, WHICH HAS NOT GONE TO WORK ORDER.						

ORIGINAL

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
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SIERRA RANCH SUBDIVISION - UNIT 1

ONSITE PUBLIC STORM DRAIN IMPROVEMENTS (CONT'D)

4.2 ACRE-FEET SURGE POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	PARK TRACT TRACT 16-A
3.5 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	TRACT 16-D EL RANCHO GRANDE
2.6 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT	SIERRA RANCH UNIT 2

/	/	/
/	/	/
/	/	/

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

THERE WILL BE NO RELEASE OF FINANCIAL GUARANTEE OR SIA UNTIL AGREEMENT IS PROCESSED AND APPROVED WITH AMAFCA FOR CONSTRUCTION OF THE AMOLE ARROYO IMPROVEMENTS.

ORIGINAL

SIA
Sequence #

COA DRC
Project #

SIERRA RANCH SUBDIVISION - UNIT I

Size

Type of Improvement

Location

From

To

Private
Inspector

City
Inspector

City Cnst
Engineer

ONSITE PUBLIC WATERLINE IMPROVEMENTS

18" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	CHACO CANYON DR	GIBSON BLVD	FOUR MILE ROAD
4-8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	FOUR MILE ROAD	LOTS 42/43	EAST STUB TERMINUS
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	CORONA RANCH RD	LOTS 76/77	BISON SPRINGS ST
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	WALNUT CANYON RD	LOTS 109/110	BISON SPRINGS ST
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BUCK ISLAND ROAD	LOTS 148/149	BISON SPRINGS ST
6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	PIPESTONE ROAD	LOTS 188/207	BIG SPRINGS RD
6-8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BIG SPRINGS ROAD	AMOLE MESA AVE	BISON SPRINGS ST
4-6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS
4" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	GILA CLIFF DRIVE	NORTH STUB TERMINUS	PIPESTONE ROAD
12" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	AMOLE MESA AVE	LOT 207	MESSINA DRIVE
12" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	AMOLE MESA AVE	MESSINA DRIVE	MESA ARENOSA

NOTE: WATER METER FOR LANDSCAPING IN THE PUBLIC RIGHT-OF-WAY

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ORIGINAL

SIA
Sequence #

COA DRC
Project #

SIERRA RANCH SUBDIVISION - UNIT I

Size

Type of Improvement

Location

From

To

Private
Inspector

City
Inspector

City Cnst
Engineer

ONSITE PUBLIC SANITARY SEWER IMPROVEMENTS

		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	FOUR MILE ROAD	LOTS 42/43	EAST STUB TERMINUS	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	CORONA RANCH RD	LOTS 76/77	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	WALNUT CANYON RD	LOTS 109/110	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BUCK ISLAND ROAD	LOTS 148/149	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PIPESTONE ROAD	LOTS 188/207	BIG SPRINGS RD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BIG SPRINGS ROAD	PIPESTONE ROAD	BISON SPRINGS ST	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	GILA CLIFF DRIVE	NORTH STUB TERMINUS	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BISON SPRINGS ST	FOUR MILE ROAD	SOUTH STUB TERMINUS	/	/	/
		10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PUBLIC EASEMENT	BISON SPRINGS ST	MESSINA DRIVE	/	/	/
		10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	MESSINA DRIVE	PUBLIC EASEMENT	AMOLE MESA AVENUE	/	/	/
		10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	AMOLE MESA AVE.	MESSINA DRIVE	PUBLIC EASEMENT IN EL RANCHO GRANDE UNIT 15	/	/	/
		8-10" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PUBLIC EASEMENT IN EL RANCHO GRANDE UNIT 15	AMOLE MESA AVENUE	FUTURE OPEN RANGE AVE. EXISTING STUB	/	/	/

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
SIERRA RANCH SUBDIVISION - UNIT 2				NOTE: ALL UNIT 1 PUBLIC IMPROVEMENTS REQUIRED FOR UNIT 2.					
ONSITE PUBLIC ROADWAY IMPROVEMENTS									
		30' EOA-F F-F	ARTERIAL PAVING W/ PCC CURB & GUTTER, MEDIAN CURB AND PCC 6' WIDE SIDEWALK ON SOUTH SIDE ONLY	GIBSON BOULEVARD	LOT 247	CHACO CANYON DR	/	/	/
		24' EOA-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON NORTH SIDE ONLY	AMOLE MESA AVE	LOT 229	LOT 208	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	FOUR MILE ROAD	PIPESPRING STREET	LOTS 261/262	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	CORONA RANCH RD	PIPESPRING STREET	LOTS 291/292	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	WALNUT CANYON RD	PIPESPRING STREET	LOTS 328/329	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON NORTH SIDE ONLY*	BUCK ISLAND ROAD	WEST STUB TERMINUS	ALAMO CANYON DRIVE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	BUCK ISLAND ROAD	ALAMO CANYON DR	LOTS 352/353	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	PIPESTONE ROAD	PIPESPRING STREET	LOTS 208/356	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	PIPESPRING STREET	FOUR MILE ROAD	PIPESTONE ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	DEVILS TOWER ST	WALNUT CANYON RD	PIPESTONE ROAD	/	/	/
		48' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 6' WIDE SIDEWALK ON BOTH SIDES*	ALAMO CANYON DR	PIPESTONE ROAD	AMOLE MESA AVENUE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	ALAMO CANYON DR	BUCK ISLAND ROAD	PIPESTONE ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	FOSTER RANCH ST	FOUR MILE ROAD	WALNUT CANYON ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER AND PCC 4' WIDE SIDEWALK ON BOTH SIDES*	MOUNTAINTOP DR	BUCK ISLAND ROAD	PIPESTONE ROAD	/	/	/
			* SIDEWALKS TO BE DEFERRED PER DEFERRAL EXHIBIT 'B'. WAIVER OF SIDEWALK ON SOUTH SIDE OF BUCK ISLAND ROAD STUB				/	/	/
			STREET LIGHTS AS PER COA DPM						

ORIGINAL

SIA
Sequence #

COA DRC
Project #

SIERRA RANCH SUBDIVISION - UNIT 2

Size Type of Improvement Location From To

Private
Inspector

City
Inspector

City Cnst
Engineer

ONSITE PUBLIC STORM DRAIN IMPROVEMENTS

24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PUBLIC EASEMENT LOT 244	WEST BOUNDARY	PIPESPRING STREET
24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	PIPESPRING STREET	PUBLIC EASEMENT	CORONA RANCH ROAD
24" DIA	RCP W/ NEC. MH'S, LATERALS & INLETS	CORONA RANCH RD	PIPESPRING STREET	LOTS 291/292
OFFSITE DRAINAGE OPTION #1 INTERIM SOUTH POWERLINE RIPRAP CHANNEL W/DROP STRUCTURES & NECESSARY SEDIMENTATION CONTROL STRUCTURES		200' PNM EASEMENT	GIBSON BLVD	POND #2 - ANDERSON HTS APPROVED GRADING PLAN
OFFSITE DRAINAGE OPTION #2 1.6 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT		150' AMAFCA DRAINAGE EASEMENT		
1.0 ACRE-FEET TEMPORARY RETENTION POND WITH PUBLIC EASEMENT AND COVENANT AND AGREEMENT		150' AMAFCA DRAINAGE EASEMENT		

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

THERE WILL BE NO RELEASE OF FINANCIAL GUARANTEE OR SIA UNTIL AGREEMENT IS PROCESSED AND APPROVED WITH AMAFCA FOR CONSTRUCTION OF THE AMOLE ARROYO IMPROVEMENTS.

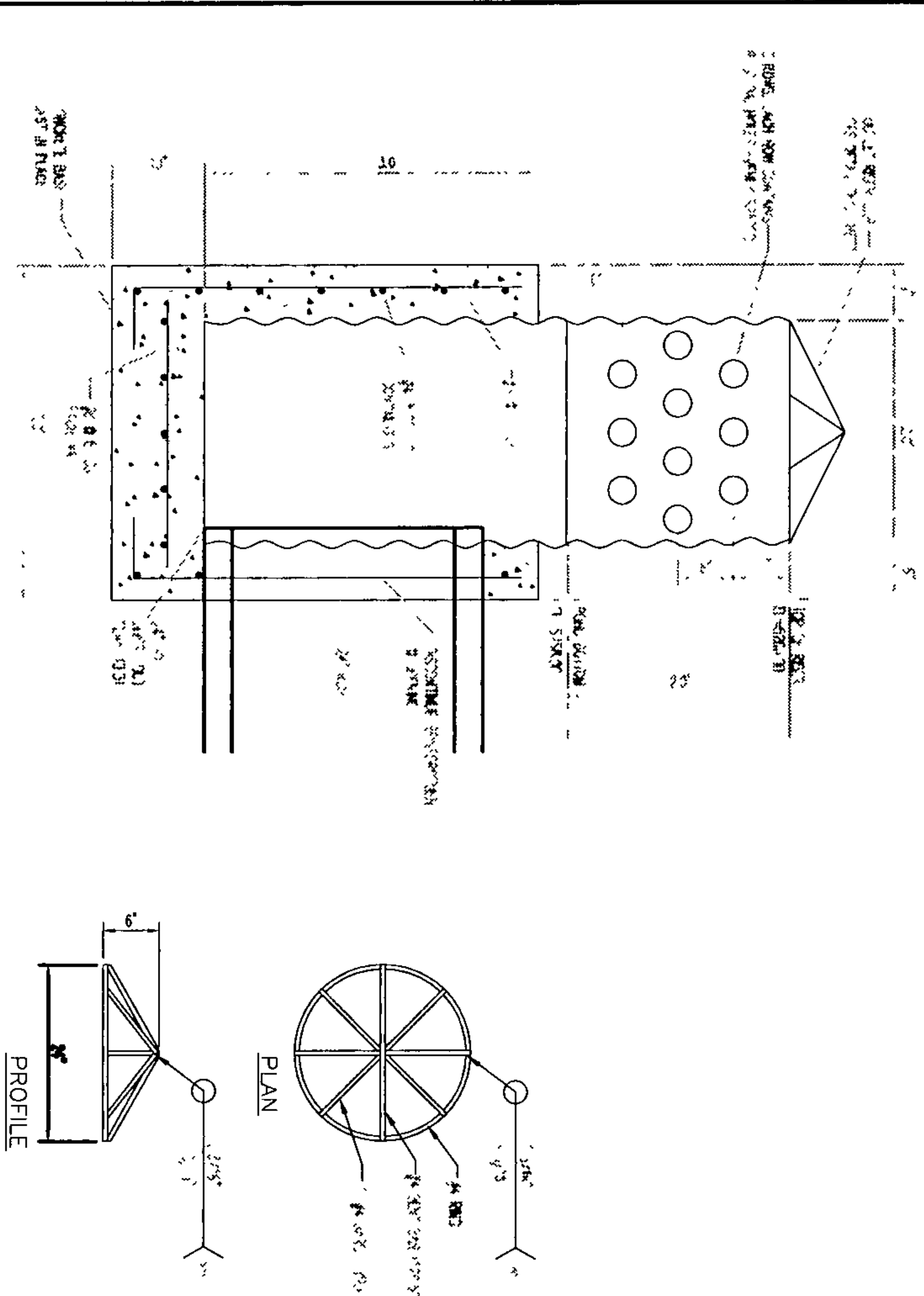
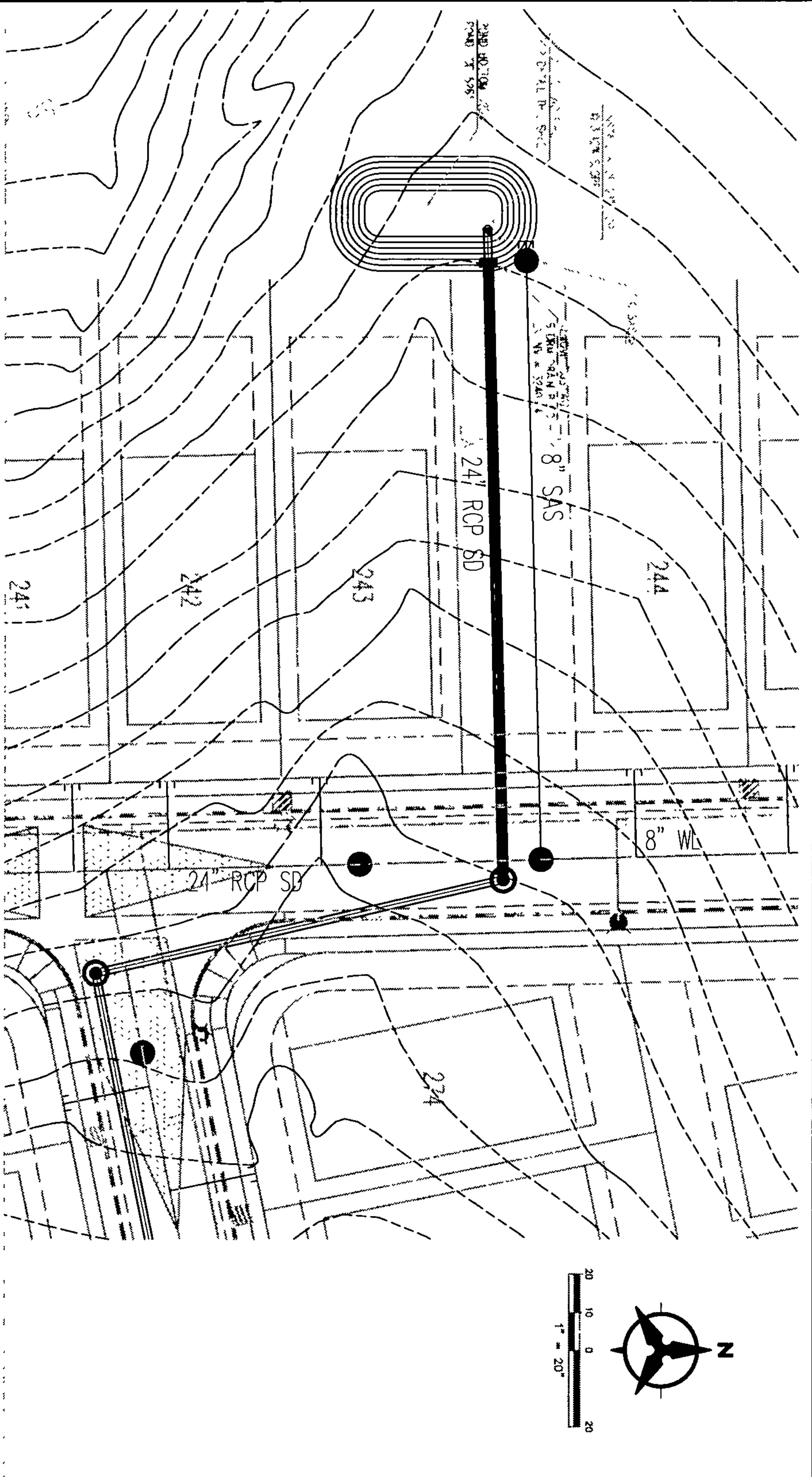
ORIGINAL

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
ONSITE PUBLIC SANITARY SEWER IMPROVEMENTS									
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	FOUR MILE ROAD	PIPESPRING STREET	LOTS 261/262	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	CORONA RANCH RD	PIPESPRING STREET	LOTS 291/292	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	WALNUT CANYON RD	PIPESPRING STREET	LOTS 328/329	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	BUCK ISLAND ROAD	WEST STUB TERMINUS	LOTS 352/353	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PIPESTONE ROAD	PIPESPRING STREET	LOTS 208/356	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PIPESPRING STREET	FOUR MILE ROAD	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	DEVILS TOWER ST	WALNUT CANYON RD	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	MOUNTAINTOP DR	BUCK ISLAND ROAD	PIPESTONE ROAD	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	PUBLIC EASEMENT LOT 224	WEST BOUNDARY	PIPESPRING STREET	/	/	/

- NOTES:
- 1 LANDSCAPE MAINTENANCE AGREEMENT FOR LANDSCAPING IN THE PUBLIC RIGHT-OF-WAY
 - 2 PERIMETER WALLS PER DRB APPROVED PERIMETER WALL DESIGN
 - 3 WALL AND LANDSCAPING CERTIFICATION FROM REGISTERED ENGINEER AND/OR REGISTERED LANDSCAPE ARCHITECT REQUIRED PRIOR TO RELEASE OF FINANCIAL GUARANTEES.

SCOTT STEFFEN PREPARED BY: PRINT NAME	01/25/05 DATE	<i>[Signature]</i> DRB CHAIR	1/26/05 DATE	Christina Sandoval PARKS & RECREATION DEPARTMENT	1/26/05 DATE
BOHANNAN HUSTON INC. FIRM:		<i>[Signature]</i> TRANSPORTATION DEVELOPMENT	1-26-05 DATE	Lynn M. M... AMAFCA	1-26-05 DATE
<i>[Signature]</i> SIGNATURE	1/25/05 DATE	<i>[Signature]</i> UTILITY DEVELOPMENT	1/26/05 DATE	Bradley L. Bingham 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
1	3/31/05	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
2	5/05/05	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>



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Bohannon & Huston ENGINEERING & SPATIAL DATA & ADVANCED TECHNOLOGIES		RECEIVED DEC 12 2008 HYDROLOGY SECTION		ENGINEER'S SEAL		SURVEY INFORMATION FIELD NOTES NO. BY DATE		BENCH MARKS		AS-BUILT INFORMATION CONTRACTOR DATE INSPECTED BY DATE INSPECTION ACCEPTABLE BY DATE REVISION BY DATE REVISION CORRECTED BY DATE	
CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT SIERRA RANCH UNIT 2 OFFSITE POND		REVISIONS No. Date REMARKS		DESIGN Designed By: SJS DATE 02/25/08 Drawn By: SJS DATE 02/25/08 Checked By: SJS DATE 02/25/08						MICRO-FILM INFORMATION RECORDED BY DATE NO	
Design Review Committee City Engineer Approval		Us Approved		Sheet 1 of 1		Zone And No. N-9		Date And No. XXXXXX		Date And No. XXXXXX	