97088555

5319

AGREEMENT AND COVENANT #571281

This Agreement and Covenant, between the City of Albuquerque, New Mexico ("City") and HIGH DESERT INVESTMENT, ("User") is made in Albuquerque, New Mexico and is entered into as of the date of recording this Agreement with the Bernalillo County Clerk.

1. Recital. The User is the owner of certain real property ("User's Property") located at ACADEMY AND CORTADERIA N.E., in Albuquerque, New Mexico, and more particularly described as:

TRACT 9B, HIGH DESERT RECORDED IN THE OFFICE OF THE CLERK OF BERNALILLO COUNTY ON 6/11/97, VOLUME 97C, FOLIO 182, DOCUMENT 97059341

The City is the owner of certain real property, easement or public right-of-way ("City's Property") in the vicinity of, contiguous to, abutting or within User's Property, and more particularly described as:

SEE EXHIBIT A

The User wishes to construct upon, improve or repair and to maintain the following "Improvement" on the City's Property (or already has done so):

TEMPORARY DETENTION PONDS

A sketch of the proposed or existing Improvement is attached as Exhibit A and made a part of this Agreement.

The City agrees to permit the Improvement to exist on the City's Property provided the User complies with the terms of this Agreement.

2. City Use of City's Property and City Liability. The City has the right to enter upon the City's Property at any time and perform whatever inspection, installation, maintenance, repair, modification or removal ("Work") it deems appropriate without liability to the User. If the Work affects the Improvement the City will not be financially or otherwise responsible for rebuilding or repairing the Improvement. The User promptly will repair the Improvement to the City's satisfaction. The cost of repairing the Improvement will be paid by User.

3. User's Responsibility for Improvement. The User will be solely responsible for constructing, maintaining, repairing and, if required, removing the Improvement, all in accordance with standards required by the City as per the approved Grading and Drainage Plan E23/d3M on file at City Hydrology. The User will be solely responsible for paying all related costs. The User will not permit the Improvement to constitute a hazard to the health or safety of the general public or to interfere with the City's use of the City's Property. The User will conform with all

applicable laws, ordinances and regulations.

4. Use of the Improvement. If the City's Property is a public right-of-way, it shall be open to the use of the general public at all times, subject to reasonable curtailment during periods of construction, maintenance or repair.

5. Demand for Repair, Modification or Removal. The City may send written notice ("Notice") to the User requiring the User to repair, modify or remove the Improvement within 30 days ("Deadline") and the User will comply promptly with the requirements of the Notice. If removal is demanded, the City also may require the User to return the City's Property to its original condition by the Deadline. The User will perform all required work by the Deadline, at User's sole expense.

6. Failure to Perform by User and Emergency Work by City. If the User fails to comply with the terms of the Notice by the Deadline stated, or, if the City determines that an emergency condition exists, the City may perform the work itself. The City then may assess the User for the cost of the work and for any other expenses or damages which result from User's failure to perform. The User agrees promptly to pay the City the amount assessed. If the User fails to pay the City within thirty (30) days after the City gives the User written notice of the amount due, the City may impose a lien against User's Property for the total resulting amount.

7. Cancellation of Agreement and Release of Covenant. This Agreement may be cancelled and User's covenants released by the City at will by the City's mailing to the User notice of the City's intention to record a Cancellation and Release with the Bernalillo County Clerk. The Cancellation and Release will be effective thirty (30) days after the date of mailing the notice to the User unless a later date is stated in the notice or the Cancellation and Release. After the effective date, the City will record the Cancellation and Release with the Bernalillo County Clerk.

8. Condemnation. If any part of the User's Property is ever condemned by the City, the User will forego all claims to compensation for any portion of User's structure which encroaches on City Property and for severance damage to the remaining portion of User's structure on User's Property.

9. Assessment. Nothing in this Agreement shall be construed to relieve the User, his heirs, assigns and successors from an assessment against User's Property for improvements to the City Property under a duly authorized and approved Special Assessment District. The parties specifically agree that the value of the Improvement will not reduce the amount assessed by the City.

Approved as to form by
Legal Department 2/23/95

10. Notice. For purposes of giving formal written notice to the User, User's address is:

HIGH DESERT INVESTMENT CORP.
13,000 ACADEMY N.E.
ALBUQUERQUE, NEW MEXICO 87111

Notice may be given to the User either in person or by mailing the notice by regular U.S. mail, postage paid. Notice will be considered to have been received by the User within 3 days after the notice is mailed if there is no actual evidence of receipt. The User may change User's address by giving written notice of the change by certified mail, return receipt requested, to the City Engineer at P.O. Box 1293, Albuquerque, New Mexico 87103.

11. Indemnification. The User agrees to defend, indemnify and hold harmless the City, its officials, agents and employees from and against any and all claims, actions, suits or proceedings of any kind brought against said parties as a result of User's use of the City's Property. To the extent, if at all, Section 56-7-1 NMSA 1978 is applicable to this Agreement, this Agreement to indemnify will not extend to liability, claims, damages, losses or expenses, including attorney's fees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications by the indemnitee, or the agents or employees of the indemnitee; or (2) the giving of or the failure to give direction or instructions by the indemnitee, where such giving or failure to give directions or instructions is the primary cause of bodily injury to persons or damage to property.

12. Term. This Agreement shall continue until revoked by the City pursuant to Section 7 above.

13. Binding on User's Property. The covenants and obligations of the User set forth herein shall be binding on User, his heirs, assigns and successors and on User's Property and constitute covenants running with User's Property until released by the City.

14. Entire Agreement. This Agreement contains the entire agreement of the parties and supersedes any and all other agreements or understandings, oral or written, whether previous to the execution hereof or contemporaneous herewith.

15. Changes of Agreement. Changes to this Agreement are not binding unless made in writing, signed by both parties.

Approved as to form by
Legal Department 2/23/95

16. Construction and Severability. If any part of this Agreement is held to be invalid or unenforceable, the remainder of the Agreement will remain valid and enforceable if the remainder is reasonably capable of completion.

17. Captions. The captions to the sections or paragraphs of this Agreement are not part of this Agreement and will not affect the meaning or construction of any of its provisions.

CITY OF ALBUQUERQUE

By: _____
Lawrence Rael
Chief Administrative Officer
Dated: 8/25/97

USER: HIGH DESERT INVESTMENT CORP.

By: _____
Its: President
Dated: August 7, 1997

APPROVED:

_____
Director
Public Works Department

Reviewed by:

_____ 8/20/97
Rick Reybal, City Engineer
Construction Management/PWD
8/11/97 SMC 8-20-97

CITY'S ACKNOWLEDGEMENTS

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on August 25, 1997, by Lawrence Rael, Chief Administrative Officer for the City of Albuquerque, a New Mexico municipal corporation, on behalf of the corporation.

OFFICIAL SEAL
RENIE HERRERA
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires:

_____
Notary Public

My Commission Expires:
1/3/98

Approved as to form by
Legal Department 2/23/95

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on August 22, 199 7, by Jay Czar, Acting Director, Public Works Department for the City of Albuquerque, a New Mexico municipal corporation, on behalf of the corporation.

Felicia Lucero
Notary Public

My Commission Expires:

1-27-98

USER'S ACKNOWLEDGEMENT

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on AUGUST 7, 1997, by DOUGLAS H. COLLISTER, PRESIDENT, on behalf of HIGH DESERT INVESTMENT CORP.

Notary Public

My Commission Expires:

7-14-98

Approved as to form by
Legal Department 2/23/95

EXHIBIT A

DESCRIPTION

A certain tract of land situate within Elena Gallegos Grant in projected Section 26, Township 11 North, Range 4 East, New Mexico Principal Meridian, Bernalillo County, Albuquerque, New Mexico, said tract being a westerly portion of Tract 9B of PLAT OF TRACTS 9A, 9B, 9C, 9D, & 15D-1, HIGH DESERT (Replat of Tract 9 & 15D) Albuquerque, New Mexico, as the same is shown and designated on the plat thereof, recorded in the office of the County Clerk of Bernalillo County, New Mexico on June 11, 1997 in Volume 97C, Folio 182 as Document No. 97059341 and being more particularly described by New Mexico State Plane Grid Bearings (Central Zone NAD 1927 Datum) and ground distances as follows:

BEGINNING at the northwest corner of the tract herein, a point on the westerly boundary line of said Tract 9B, whence the northwest corner of said Tract 9B bears N12°31'27"E, a distance of 117.76 feet and from said point of beginning running thence along the northerly boundary line of the tract herein described, N64°52'43"E, a distance of 192.60 feet to the northeast corner of the tract herein described, thence running along the easterly boundary line of the tract herein described,
S25°07'17"E, a distance of 198.00 feet to a point; thence,
S64°52'43"W, a distance of 74.42 feet to a point; thence,
S25°07'17"E, a distance of 85.30 feet to a point; thence,
S05°29'44"E, a distance of 129.35 feet to a point; thence,
S82°13'45"E, a distance of 107.59 feet to a point; thence,
S07°46'15"W, a distance of 81.00 feet to a point; thence,
S82°13'45"E, a distance of 143.48 feet to a point; thence,
S07°46'15"W, a distance of 211.88 feet to the southeast corner of the tract herein described, thence running along the southerly boundary line of the tract herein described,
N82°13'45"W, a distance of 94.75 feet to the southwest corner of the tract herein described, a point on the westerly boundary line of said Tract 9B, thence running along the westerly boundary line of said Tract 9B,
N07°46'15"E, a distance of 60.76 feet to a point of curvature; thence,
86.46 feet along the arc of a curve to the left having a radius of 525.00 feet and a chord which bears N03°03'10"E, a distance of 86.37 feet to a point of tangency; thence,
N01°39'55"W, a distance of 15.86 feet to a point of curvature (non-tangent); thence,
43.13 feet along the arc of a curve to the right having a radius of 375.00 feet and a chord which bears N85°31'27"W, a distance of 43.11 feet to a point of tangency; thence,
N82°13'45"W, a distance of 125.68 feet to a point; thence,
N07°46'15"E, a distance of 39.25 feet to a point; thence,
N05°29'44"W, a distance of 226.48 feet to a point; thence,
N83°34'47"W, a distance of 83.88 feet to a point; thence,
N37°12'50"W, a distance of 65.96 feet to a point; thence,
N25°07'17"W, a distance of 133.35 feet to a point of curvature (non-tangent); thence,
8.44 feet along the arc of a curve to the left having a radius of 524.90 feet and a chord which bears S70°00'57"W, a distance of 8.44 feet to a point of non-tangency; thence,
N12°31'27"E, a distance of 20.14 feet to the point and place of beginning.

Tract contains 2.0865 acres, more or less.

Bohannan-Huston Inc.
Courtyard I
7500 Jefferson Street NE
Albuquerque, NM 87109

A. Dwain Weaver
N.M.P.S. No. 6544

July 31, 1997
Date

A. DWAIN WEAVER NEW MEXICO 6544 REGISTERED PROFESSIONAL SURVEYOR

JOB NO. 97-178A-08-2400

Bohannan Huston
Courtyard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109

ENGINEERS PLANNERS PHOTOGRAMMETRISTS
SURVEYORS LANDSCAPE ARCHITECTS

C:\SDSKPROJ\97178A08\DWG\SITE1.DWG 07/31/1997

97088556

5326

TEMPORARY DRAINAGE EASEMENT

#571281

This Grant of Easement between **HIGH DESERT INVESTMENT CORPORATION.,** a New Mexico corporation ("Grantor"), and **CITY OF ALBUQUERQUE**, a New Mexico municipal corporation ("City"), whose address is P.O. Box 1293, Albuquerque, New Mexico 87103.

1. **Grant of Easement.** The Grantor grants to the City an exclusive temporary drainage easement for a Temporary Drainage Pond for a ("Public Improvement") on, over, across and through the real property described on Exhibit "A" attached hereto (the "Property") together with the right of the City to operate, maintain, repair, replace and construct the Public Improvement and the right to remove trees, bushes,udergrowth and any other obstacles upon the Property if the City determines they interfere with the appropriate use of the easement.

2. **Warranties.** Grantor covenants and warrants that it is the owner in fee simple of the Property and that it has a good, lawful right to convey the Property or any part thereof, that the Grantor will forever warrant and defend the title to the Property against all claims from all persons and entities.

3. **Binding on Grantor's Property.** The grant and other provisions of this Easement constitute covenants running with the title to the property land for the benefit of the City and its successors and assigns until terminated.

4. **Temporary.** This easement will be released by the City when the City Engineer determines that the Easement is no longer required.

WITNESS my hand and seal this 4 day of August, 1997.

GRANTOR: **HIGH DESERT INVESTMENT CORPORATION**, a New Mexico corporation

By: Douglas H. Collister
Its: President
Date: 8-4-97

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED FOR RECORD
1997 AUG 27 PM 3:24
BK 97-23 PG 5326-
JUDY D WOODWARD
CO. CLERK & RECORDER DEPUTY
5328

STATE OF NEW MEXICO)
SS
COUNTY OF BERNALILLO

This instrument was acknowledged before me on August 4, 1997 by Douglas H. Collister of High Desert Investment Corporation on behalf of said corporation.

My Commission Expires:

7-14-98

Notary Public

EXHIBIT A

DESCRIPTION

A certain tract of land situate within Elena Gallegos Grant in projected Section 26, Township 11 North, Range 4 East, New Mexico Principal Meridian, Bernalillo County, Albuquerque, New Mexico, said tract being a westerly portion of Tract 9B of PLAT OF TRACTS 9A, 9B, 9C, 9D, & 15D-1, HIGH DESERT (Replat of Tract 9 & 15D) Albuquerque, New Mexico, as the same is shown and designated on the plat thereof, recorded in the office of the County Clerk of Bernalillo County, New Mexico on June 11, 1997 in Volume 97C, Folio 182 as Document No. 97059341 and being more particularly described by New Mexico State Plane Grid Bearings (Central Zone NAD 1927 Datum) and ground distances as follows:

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S64°52'43"W, a distance of 74.42 feet to a point; thence,
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43.13 feet along the arc of a curve to the right having a radius of 375.00 feet and a chord which bears N85°31'27"W, a distance of 43.11 feet to a point of tangency; thence,
N82°13'45"W, a distance of 125.68 feet to a point; thence,
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N37°12'50"W, a distance of 65.96 feet to a point; thence,
N25°07'17"W, a distance of 133.35 feet to a point of curvature (non-tangent); thence,
8.44 feet along the arc of a curve to the left having a radius of 524.90 feet and a chord which bears S70°00'57"W, a distance of 8.44 feet to a point of non-tangency; thence,
N12°31'27"E, a distance of 20.14 feet to the point and place of beginning.

Tract contains 2.0865 acres, more or less.

Bohannan-Huston Inc.
Courtyard I
7500 Jefferson Street NE
Albuquerque, NM 87109

A. Dwain Weaver
A. Dwain Weaver
N.M.P.S. No. 6544

July 31, 1997
Date

A. DWAIN WEAVER NEW MEXICO 6544 REGISTERED PROFESSIONAL SURVEYOR

JOB NO. 97-178A-08-2400

Bohannan Huston
Courtyard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109

ENGINEERS PLANNERS PHOTOGRAMMETRISTS
SURVEYORS LANDSCAPE ARCHITECTS

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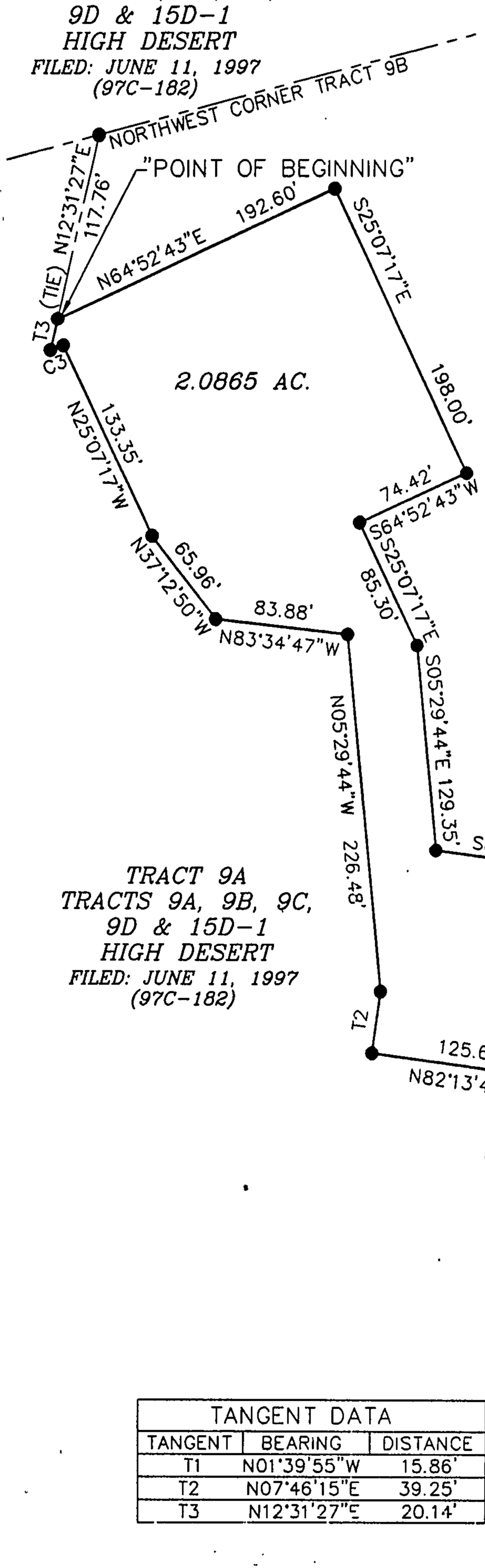
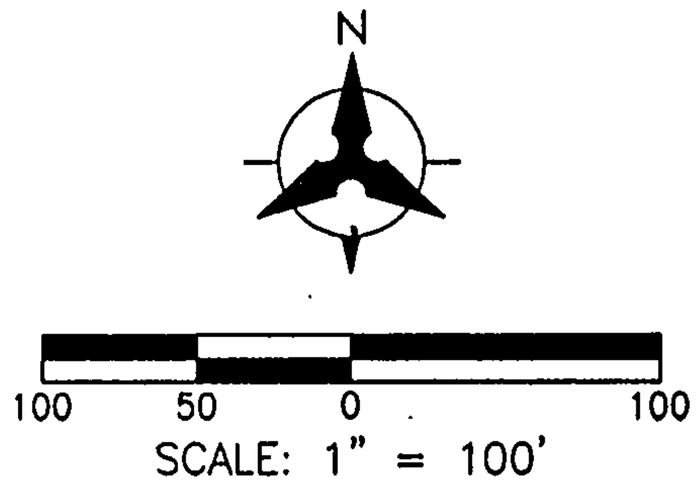
TRACT 9D
TRACTS 9A, 9B, 9C,
9D & 15D-1
HIGH DESERT
FILED: JUNE 11, 1997
(97C-182)





TRACT 9B
TRACTS 9A, 9B, 9C,
9D & 15D-1
HIGH DESERT
FILED: JUNE 11, 1997
(97C-182)

TRACT 9A
TRACTS 9A, 9B, 9C,
9D & 15D-1
HIGH DESERT
FILED: JUNE 11, 1997
(97C-182)

TANGENT DATA		
TANGENT	BEARING	DISTANCE
T1	N01°39'55"W	15.86'
T2	N07°46'15"E	39.25'
T3	N12°31'27"E	20.14'

CURVE DATA						
CURVE	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING	DELTA
C1	525.00'	86.46'	43 33'	86.37'	N03°03'10"E	09°26'10"
C2	375.00'	43.13'	21.59'	43.11'	N85°31'27"W	06°35'24"
C3	524.90'	8.44'	4.22'	8.44'	S70°00'57"W	00°55'17"

JOB NO. 97--178A-08-2400

Bohannan Huston

Courtyard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109

ENGINEERS PLANNERS PHOTOGRAMMETRISTS
SURVEYORS LANDSCAPE ARCHITECTS

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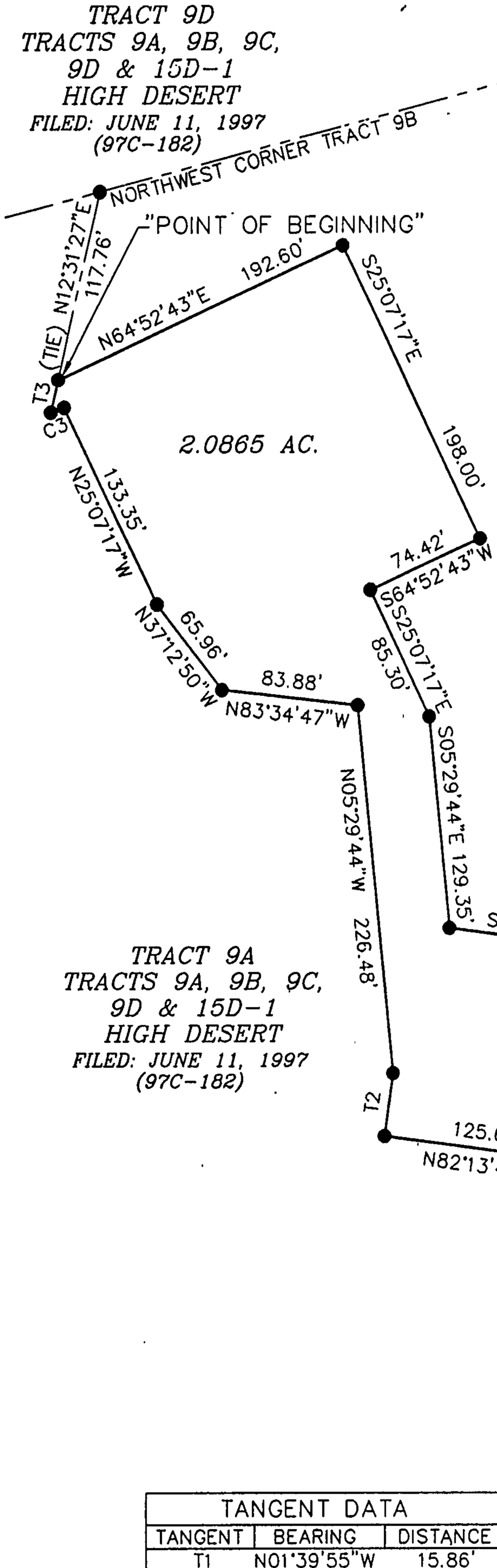
5325



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100 50 0 100

SCALE: 1" = 100'

TRACT 9D
TRACTS 9A, 9B, 9C,
9D & 15D-1
HIGH DESERT
FILED: JUNE 11, 1997
(97C-182)

TRACT 9B
TRACTS 9A, 9B, 9C,
9D & 15D-1
HIGH DESERT
FILED: JUNE 11, 1997
(97C-182)

TRACT 9A
TRACTS 9A, 9B, 9C,
9D & 15D-1
HIGH DESERT
FILED: JUNE 11, 1997
(97C-182)

STATE OF NEW MEXICO
COUNTY OF BERNALILLO
FILED FOR RECORD
1997 AUG 27 PM 3:36
JUDY D. WOODWARD
CO. CLERK & RECORDER, DEPUTY
BK 97-23 PG 5319 - 5325

Documents

TANGENT DATA		
TANGENT	BEARING	DISTANCE
T1	N01°39'55"W	15.86'
T2	N07°46'15"E	39.25'
T3	N12°31'27"E	20.14'

CURVE DATA						
CURVE	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING	DELTA
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JOB NO. 97-178A-08-2400

Bohannan Huston

Courtyard One
7500 JEFFERSON NE
Albuquerque
NEW MEXICO 87109

ENGINEERS PLANNERS PHOTOGRAMMETRISTS
SURVEYORS LANDSCAPE ARCHITECTS

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CITY OF
Albuquerque

May 12, 1998

Kevin Patton, P.E.
Bohannan-Huston, Inc.
7500 Jefferson Street NE
Albuquerque, New Mexico 87109

RE: Grading and Drainage Certification for Sunset Ridge At High Desert (E23/D3M), Engineer's Stamp Dated 4/28/98.

Dear Mr. Patton:

The above referenced Engineer's Certification for Sunset Ridge at High Desert is adequate to satisfy the Grading and Drainage certification requirements per the Infrastructure List dated May 6, 1997 for the release of Financial Guarantees.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

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

c: Terri Martin, DRB 97-134
James Topmiller, P.E., Bohannan Huston
File

DRAINAGE REPORT
FOR
SUNSET RIDGE AT HIGH DESERT

APRIL 1997

Prepared by:

BOHANNAN-HUSTON INC.
COURTYARD I, 7500 JEFFERSON STREET N.E.
ALBUQUERQUE, NM 87109

Prepared for:

MESA VERDE DEVELOPMENT
6060 SAN MATEO BLVD. NE
ALBUQUERQUE, NM 87109

PREPARED BY:

Kevin Patton, E.I. — Date 4/10/97

UNDER THE SUPERVISION OF:

Michial Emery, President — Date 4/11/97

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BOHANNAN-HUSTON INC.
ENGINEERS • PLANNERS • PHOTOGRAMMETRISTS • SURVEYORS • LANDSCAPE ARCHITECTS
ALBUQUERQUE LAS CRUCES SANTA FE

I. PURPOSE

The purpose of this report is to present existing and proposed drainage conditions for the proposed residential development of Tract 9A at High Desert, *referred to as Sunset Ridge at High Desert*. This plan is prepared and submitted to support rough grading, infrastructure design, preliminary and final plat approvals.

II. METHODOLOGIES

Site conditions are analyzed for a 10-year and 100-year, 6-hour storm events in accordance with the City of Albuquerque Drainage Ordinance and the Development Process Manual (DPM), Volume 2, Design Criteria, Section 22.2, Hydrology for the City of Albuquerque, January 1993.

The site, as described in the 'Site Location and Characteristics' section below, is approximately 21.5 acres. Therefore, Part A of the DPM, Section 22.2, which provides a simplified procedure for projects with sub-basins smaller than 40 acres was used.

This report will reference the *High Desert Drainage Management Master Plan*, dated December 1993 (hereafter referred to as the HDDMMP), which was prepared for High Desert Investment Corporation and approved by the City of Albuquerque. That report was prepared to support future drainage plans submitted for the development of individual land parcels within High Desert, and to provide design guidance for the installation of major drainage infrastructure to be constructed in advance of, or simultaneously with individual parcel development. In addition, it provides fully developed flow rates for basins within the High Desert Development.

This report differs slightly from HDDMMP by shifting the drainage basin boundaries within Tract 9. Although the basin boundaries will be shifted in Tract 9, the amount of storm water flow intercepted by the two major storm drains located to the north and south of Tract 9 will not change. Please refer to the proposed conditions section of this report for more information regarding the relocation of basin boundaries within Tract 9.

This report will also reference the *Drainage Report for Chamisa Ridge at High Desert*, dated July 1996, which was prepared for Mesa Verde Development Corporation, and approved by the City of Albuquerque. This report designed temporary facilities on Tract 9 which divert upstream undeveloped flows away from the Tract 4 development.

In order to more clearly convey information about the site, and existing facilities on and near the site, photographs have been included within Appendix A of this report. A Photo Orientation Map, showing the location and direction from which each photo was taken, has also been included in Appendix A.

III. SUMMARY OF RELATED PLATTING ACTION

Please see the proposed Bulk Land Plat enclosed in the Plates section of this report.

Tract 9 at High Desert is currently being subdivided into four separate tracts, Tract 9A, 9B, 9C and 9D, via a bulk land plat. This Bulk Land Plat was heard at the City Development Review Board on April 8, 1997, and delegated to City Engineer, Transportation and Planning.

Tract 9C is adjacent to Academy Road and is totally encompassed by an existing drainage easement granted to the City of Albuquerque and the High Desert Residential Owners Association. Tract 9C contains the Bear Tributary Arroyo, which is

a "dry" arroyo. This arroyo is dry due to the existing Bear Tributary Arroyo Diversion Dike located within Tract 15D, and the Phase 1-B-1 Storm Drain Project. Despite the dry condition of this arroyo, an existing FEMA Floodplain covers approximately 95% of Tract 9C. The Bear Tributary Arroyo is a part of the High Desert Open Space Concept, which is preserving the natural arroyos and implementing water harvesting techniques to enhance the natural vegetation.

Tract 9D is located within the South Pino Tributary Arroyo and adjacent to Blue Gramma Road between Cortaderia and Imperata Street. This tract is also encompassed by an existing drainage easement granted to the City of Albuquerque and the High Desert Residential Owners Association. Tract 9D contains an active FEMA Flood Plain within 95% of its area.

Tract 9B lies between Tracts 9C and 9D to the North and South, and between the future Imperata Street and Tract 9A to the East and West. This report addresses existing conditions within this tract only. A separate report will be submitted with future development of this tract.

Tract 9A lies between Tracts 9C and 9D to the North and South, and between Cortaderia Street and Tract 9B to the East and West. For the purposes of this report, the "Site" will be defined as Tract 9A. Sunset Ridge at High Desert will utilize approximately 21.5 acres, entirely within Tract 9A. The Final Plat for Sunset Ridge at High Desert will further subdivide Tract 9A into 91 lots, 7 public streets to be dedicated to the City of Albuquerque, and one or two smaller tracts to be deeded to The High Desert Residential Owners Association for landscaping purposes. It should be noted that all of the land within the FEMA floodplain of the Bear Tributary and South Pino Tributary Arroyos is completely encompassed by easements dedicated to the City of Albuquerque and The High Desert Residential Owners Association.

IV. SITE LOCATION AND CHARACTERISTICS

For the location of the site, please refer to the vicinity map on the grading and drainage plan enclosed with this report.

Sunset Ridge at High Desert is located in the far northeast heights of Albuquerque, on Zone Atlas, page E-23. The project is bounded on the west by Cortaderia Street, on the south by the Bear Tributary Arroyo, on the east Tract 9B, and on the north by the South Pino Tributary Arroyo. Access to the site will be provided from Cortaderia Street.

Vegetation on the site consists primarily of prairie grasses and a few juniper trees. The site slopes from east to west at approximately 4% to 6%. The Soil Conservation Service has classified the soils on the site as Embudo Tijeras Complex, Embudo gravely fine sandy loam, and Tijeras gravely fine sandy loam, all of which correspond to a common hydrologic soil group classification of B. You may refer to the enclosed photos which will provide an overall view of the site vegetation.

V. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS

The existing hydraulic and hydrologic conditions of this site adheres to the *Drainage Report for Chamisa Ridge at High Desert*, dated July 1996, which was prepared for Mesa Verde Development and approved by the City of Albuquerque. The existing basins mentioned above are portions of the 1993 HDDMMP Basins 24, 26 and 40.

For additional assistance, please refer to the Existing Conditions Map and the enclosed photos.

The existing site consist of four drainage basins, labeled Basins 1-4. Three of these basins, Basins 1, 2 and 4, drain to the South Pino Tributary Arroyo, located to the north of this site. The remaining basin, Basin 3, located along the southern portion of Tract 9, within the Bear Tributary Arroyo, drains to a detention pond located at the northeast corner of Academy Road and Cortaderia Street.

Existing Basins 1, 2 and 4

The recently accepted public work order for Cortaderia Street north of Academy (W.O. # 554981) constructed a temporary diversion swale for the purpose of redirecting storm water flows east of Cortaderia Street, Basins 1 and 2, around the now existing Chamisa Trail Subdivision. This swale conveys flows from Basins 1 (33.89 cfs), 2 (26.57 cfs) and 4 (1.79 cfs), (combined Q_{100} = 62.25cfs) to the South Pino Tributary Arroyo.

Flows from the South Pino Tributary Arroyo are conveyed under Tramway Boulevard by 6-60" RCP culverts. The HDDMMP determined that the capacity of the culverts is 1680 cfs. Under existing conditions, the flow at the culverts is approximately 1677 cfs. The 1677 cfs given is a conservative number considering that the analysis did not take into account the time of concentration over the large area and the fact that the peak flows do not occur at the same point in time.

Existing Basin 3

Existing Basin 3 drains to an existing detention pond located at the northeast corner of Academy Road and Cortaderia Street. This pond currently collects 64.6cfs in a 100 year 6 hour storm event and conveys flow into two type "D" double grate inlets which are directed to the Academy Storm Drain.

The future flows entering this pond will be significantly reduced, from 64.6 cfs to 42.05 cfs, with the proposed development of Tract 9A and then again with the future development of Tract 9B and 15D. Development of these tracts will reduce the flows further with the required construction of Imperata Street north of Academy Road and east of Tract 9C.

VI. PROPOSED HYDRAULIC AND HYDROLOGIC CONDITIONS

For additional assistance throughout this section, please refer to the Grading and Drainage Plan, the Proposed Conditions Basin Map and a portion of the Ultimate Condition Map taken from the 1993 HDDMMP enclosed with the plates section of this report.

Comparison to the 1993 HDDMMP

The drainage basins established within Tract 9 for the Ultimate Developed Conditions in the 1993 HDDMMP are Basins 26, 27, 39 and 40.

The north half of Tract 9 contains two drainage basins from the 1993 report, Basin 39 and 40. Basin 39 encompasses the proposed Tract 9D located within the South Pino Tributary Arroyo. Tract 9D is known as the High Desert Open Space, which will remain undeveloped as a natural "dry" arroyo. Basin 40 encompasses the north half of proposed Tracts 9A and 9B, which will be developed. The 1993 HDDMMP report drained Basins 39 and 40 to a future storm drain located within the South Pino Tributary Arroyo.

A separate drainage report is being submitted concurrently with this report which addresses the proposed construction of the South Pino Tributary Storm Drain. The South Pino Tributary Storm Drain will support future development of Tract 9B and Tract 15D.

The south half of Tract 9 contains two drainage basins from the 1993 report, Basin 26 and 27. Basin 27 encompasses the proposed Tract 9C located within the Bear Tributary Arroyo. Tract 9C is also a part of the High Desert Open Space which will remain undeveloped and as a natural "dry" arroyo. Basin 26 encompasses the south half of proposed Tracts 9A and 9B. The 1993 report indicates these basins were to drain to the existing Academy Storm Drain.

This report proposes to divide the Tract 9A and 9B basin boundaries into an east and west division instead of north and south diversion without changing the amount of flow is directed to the south and north. The following table compares the storm water runoff proposed in this report and those that were approved in the 1993 report.

1993 HDDMMP	**1997 Tract 9 Report**
Basin 40 (north ½) - Q_{100} = 100 cfs	Future East Basin - Q_{100} ~ 90 cfs
Basin 26 (south ½) - Q_{100} =90 cfs	Proposed West Basin - Q_{100} = 80.74 cfs

A South Pino Tributary Arroyo Prudent Line has been provided on the Grading and Drainage Plan enclosed. This prudent line assisted in defining the boundary between Tracts 9A and 9B. Although this prudent line is not a recorded easement or boundary, it should be noted that proposed house pads along the South Pino Tributary Arroyo in Tract 9A have been located beyond its limits. Completion of the future South Pino Tributary Storm Drain will render this prudent line unnecessary. A retaining wall is proposed along the backyards of Lots 78 - 81. The wall along these four lots will mitigate the effects of the prudent line impacts on the backyards until the construction of the future South Pino Storm Drain.

Tract 9A Off-Site Basins

Basins 01 - 04 are very similar to those found in the existing conditions of this report except that they have been reduced in size. The drainage patterns of these basins will remain the same but their impact to the adjacent arroyos will no longer exist with the construction of temporary detention ponds along the boundary between Tracts 9A and 9B.

Please refer to the Proposed Conditions Basin Map enclosed within this report.

Basin 01 (8.97ac, Q_{100}=19.73cfs, V_{100}=0.6ac-ft) will drain via sheet flow and shallow concentrated flows (small existing natural arroyos) to a temporary detention pond located at the northwest corner of Tract 9B. The temporary detention pond is sized to hold 0.6 acre-ft during the 100-year 6-hour storm event. The pond is sized according to Section 22.2 of the City of Albuquerque's Development Process Manual using Table A-8. The temporary pond is 136 ft by 136 ft by 3.5 ft deep. During the 100-year 6 hour storm, the water surface elevation is designed not exceed 18" above the bottom of the pond and should provide 2.0 ft of freeboard and sufficient sediment storage. Should the water surface elevation rise 18" above the bottom of the pond, a temporary 6" PVC pipe will discharge 1 cfs to Sunset Trail Place. This flow combines with the storm water in Basin A flowing west into inlets down stream. Please refer to the Appendix of this report for design calculations.

Basin 02 (4.4ac, Q_{100}=9.68cfs, V_{100}=0.29ac-ft) will drain via sheet flow and shallow concentrated flows (small existing natural arroyos) to a temporary detention pond located half between Tract 9D and 9C along the west boundary of Tract 9B. The temporary detention pond is sized to hold 0.37 acre-ft during the 100-year 6-hour storm event. The pond is sized according to Section 22.2

of the City of Albuquerque's Development Process Manual using Table A-8. The temporary pond is 75 ft by 75 ft by 6.0 ft deep. The water surface elevation during the 100-year 6-hour storm event is designed not exceed 3.0 ft above the bottom of the pond and providing sufficient free board and sediment storage. Should the water surface elevation rise 3.0 feet above the bottom of the pond, approximately 1 cfs will be discharged through a 6" PVC pipe onto Sunset Ridge Place. This flow will combine with flows in Basin B which travel to a series of inlets down stream.

Basin 03 (1.22ac, Q_{100}=2.68cfs, V_{100}=0.08ac-ft) is a small watershed that will be redirected to the detention pond within Basin 02 via a constructed swale and drop structure. The detention pond within Basin 02 has been size to accept this flow.

Basin 04 (15.93ac, Q_{100}=35.05cfs, V_{100}=1.06ac-ft) will drain via sheet flow and shallow concentrated flows (small existing natural arroyos) to an existing permanent detention pond located along the western boundary of Tract 9C. The permanent detention pond was constructed with the Cortaderia Street Improvements and was sized for larger flows (64.6 cfs) than what the future and proposed development will convey. This pond also receives flows (Q_{100}=6.55cfs) from the On-Site Basin C-1 mentioned below.

<u>On-Site Basins</u>

A number of drainage/grading concepts have been utilized for this subdivision. These include ribbon channels, water harvesting, and standard lot drainage to the adjacent street. Each concept, as well as the characteristics of the onsite basins, are discussed in the paragraphs below. Garden walls (18" max. grade separation) between lots are also being utilized. However, spot elevations on the grading plan adjacent to side lot lines are at the bottom of the

side yard swales, not at the top and bottom of the garden wall. A side lot line detail has been provided on the detail sheet located in the Plates section of this report.

The City of Albuquerque is now requiring that any inlets located on roadway grades greater than 3% provide 1½ times the number of inlets. This report has multiplied the design runoff during the 100-year 6-hour storm event by 1½ times in order to satisfy this requirement. This report labels this runoff as $1.5Q_{100}$.

Basin A (5.42ac, Q_{100}=23.03cfs) accepts 1.0 cfs from the pond located along its eastern boundary. The storm water within this basin drains down Sunrise Trail Place to a couple of double grate Type "A" inlets located on each side of the street. These inlets accept approximately 8.6 cfs each allowing approximately 13.2 cfs to continue down the street. A double grate Type"A" inlet (with curb opening wings on both sides) is located at the end of the cul-de-sac. This inlet is sized to accept 2x the 100-year storm (26.4 cfs), as is required for inlets which are in sump condition and do not have an emergency spillway. The inlets then convey the storm water to a underground storm drain which heads south through a public drainage, sanitary sewer and water easement and Sunset Ridge Place. Calculations verifying the capacity of the inlets and storm drain can be found in the Appendix of this report.

Basin A-1 (1.1ac, Q_{100}=3.58cfs) consists of the backyards along the South Pino Tributary Arroyo. This basin will drain only the backyards of these lots. It is the intent that the roofs of these lots drain to the public roadway and not to the arroyo. This will be accomplished by installing roof drains directing flows to the south.

Basin B (4.83ac, Q_{100}=20.52cfs) accepts 1.0 cfs from the pond located along its eastern boundary. The runoff within this basin is directed down Sunset Ridge Place to a series of Type "A" inlets. The first set of inlets are two double-grate Type "A" inlets located on each side of the street. The first set of inlets accept approximately 8.6 cfs each allowing 13.58 cfs to continue down the street. A second set of single Type "A" grate inlets accept 5.2 cfs each and allows 3.18 cfs to continue down to Cortaderia Street. These series of Type "A" inlets direct flow to an underground storm drain system which is heading south to Sage Point Court.

Basin C (5.03ac, Q_{100}=21.37cfs) drains down Sandia Point Road to a couple of double grate Type "A" inlets located on each side of the street. These inlets accept approximately 8.4 cfs each allowing 15.25 cfs to continue down the street. A double grate Type "D" inlet located in a valley gutter within the roadway sump accepts 2x the 100-year 6-hour runoff. The inlet directs the storm water to an underground storm drain which continues south to connect to the Academy Storm Drain.

Basin C-1 (1.60ac, Q_{100}=6.55cfs) is half of the lots that are located along the Bear Tributary Arroyo (Tract 9C). These lots will contribute to the flow collected in the existing Detention Pond located at the northeast corner of Academy Road and Cortaderia Street. As mentioned above the development of this tract will reduce the runoff from 64.6 cfs to 42.05 cfs.

Basin D (0.98ac, Q_{100}=4.16cfs) is the north half of Sage Point Court. Storm water from this basin drains to the cul-de-sac at the north end where a single grate Type "A" inlet (with curb opening wings on both sides) is located. This inlet is sized to accept 2x the 100 year storm (8.32 cfs). The inlet directs flow to the 36" RCP storm drains which is located directly below it.

Basin E (1.14ac, Q_{100}=5.11cfs) is the south portion of both Cortaderia Street and the lots along the east side of Cortaderia Street. The flow from this basin drains to the existing double grate Type "D" inlets constructed with the Cortaderia Street Improvements. These inlets are located in a low point in Cortaderia and convey flows via an existing underground storm drain to the Academy Storm Drain System.

Basin F (2.72ac, Q_{100}=11.92cfs) is the north portion of both Cortaderia Street and the lots along the east side of Cortaderia Street. The flow from this basin along with the residual (3.18 cfs) from Sunset Ridge Place east of Cortaderia temporarily drains to a modified swale located at the north end of undeveloped portion of the Cortaderia Right of Way. The existing swale which was build north of Sunset Ridge Place in the Cortaderia Right of Way, will be modified to work with this proposed grading and drainage plan. This modified swale will direct the flows in Basin F to the South Pino Tributary Arroyo as it did with the existing flows prior to development. In the future, this basin will drain to an inlet located in Cortaderia Street. This future inlet will tie to the South Pino Tributary Storm Drain.

The Academy Storm Drain

Phase 1-B-1, the Academy Storm Drain was constructed by City Work Order # 4809.95. The approved drainage report supporting this infrastructure and the Construction As Built Plans indicate the Academy Storm Drain accepting 80 cfs from the development of Tract 9 at the northeast corner of Academy Road and Cortaderia Street (Sta. 14+77.77). At this same location (Sta. 14+77.77), the analysis performed within the Academy Storm Drain Report neglected to provide for the flow from Basin 27 (1993 HDDMMP), also referred to in this report as Off-Site Basin 04. Instead The Academy Storm Drain Report accepted the flow from Basin 04 (a.k.a. Basin 27) downstream at the northeast

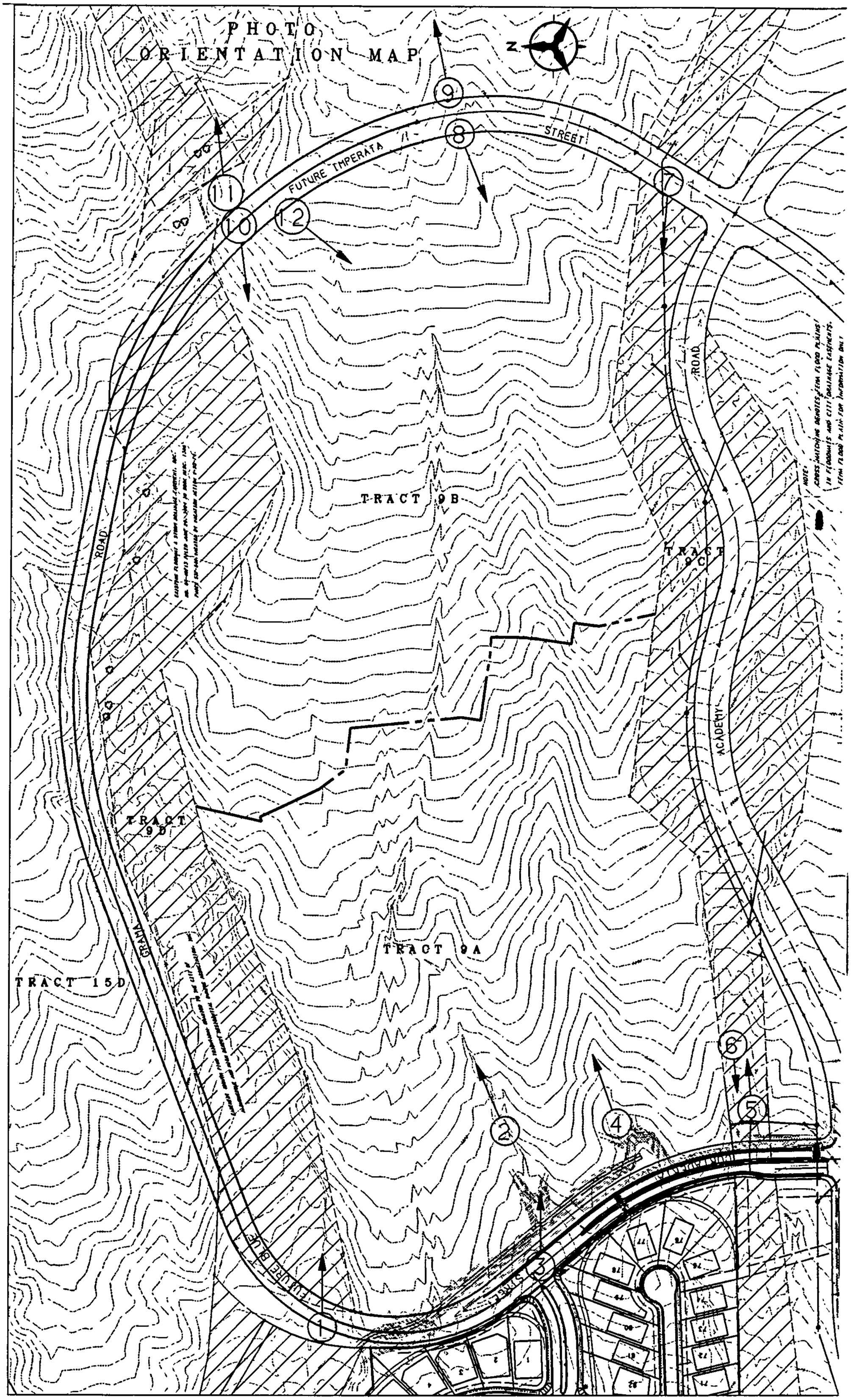
corner of Tramway Boulevard and Academy Road. Calculations and a Plan and Profile have been provided within the Appendix and Plates section of this report indicating the revised analysis of the Academy Storm Drain. The flow within this storm drain remains under gravity flow conditions.

VII. CONCLUSION

This report has presented a comprehensive drainage management plan for the proposed residential subdivision. It has shown that the proposed drainage basins can be modified from the 1993 HDDMMP without compromising the amount of flow indicated in past reports. This report has also addressed the minor affects it will have on the adjacent arroyos located to the north and south of the proposed development. A prudent line has been provided to address any concerns relative to erosion during the interim condition in the South Pino Tributary Arroyo. As mentioned within the report above, a separate drainage submittal addressing the South Pino Tributary Arroyo and the future storm drain is being made concurrently with this report.

This plan provides safe and adequate drainage protection for the proposed development. It is recommended that this plan be approved for rough grading, preliminary and final platting actions.

PHOTO ORIENTATION MAP



TRACT 9A @ HIGH DESERT
UNDEVELOPED CONDITIONS

BASIN	AREA (ACRES)	% LAND TREATMENT* A	B	C	D	PEAK DISCHARGE - (CFS/ACRE)** A	B	C	D	Q(100-YR) UNDEVELOPED (CFS)
1	15.41	100.00	0.00	0.00	0.00	2.20	2.92	3.73	5.25	33.89
2	12.08	100.00	0.00	0.00	0.00	2.20	2.92	3.73	5.25	26.57
3	19.75	100.00	0.00	0.00	0.00	2.20	2.92	3.73	5.25	43.46
4	0.39	0.00	0.00	44.00	56.00	2.20	2.92	3.73	5.25	1.79

NOTES:
Obtained from Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, January, 1993
* Table A-4
** Table A-9

TRACT 9A @ HIGH DESERT
FULLY DEVELOPED CONDITIONS

BASIN	AREA	% LAND TREATMENT*				PEAK DISCHARGE - (CFS/ACRE)**				Q(100-YR) DEVELOPED
On-Site	(ACRES)	A	B	C	D	A	B	C	D	(CFS)
A	5.42	0.00	26.00	26.00	48.00	2.20	2.92	3.73	5.25	23.03
A-1	1.10	20.00	40.00	30.00	10.00	2.20	2.92	3.73	5.25	3.58
B	4.83	0.00	26.00	26.00	48.00	2.20	2.92	3.73	5.25	20.52
C	5.03	0.00	26.00	26.00	48.00	2.20	2.92	3.73	5.25	21.37
C-1	1.60	0.00	30.00	30.00	40.00	2.20	2.92	3.73	5.25	6.55
D	0.98	0.00	26.00	26.00	48.00	2.20	2.92	3.73	5.25	4.16
E	1.14	0.00	20.00	20.00	60.00	2.20	2.92	3.73	5.25	5.11
F	2.72	0.00	22.50	22.50	55.00	2.20	2.92	3.73	5.25	11.92
Off-Site										**84.33**
O1	8.97	100.00	0.00	0.00	0.00	2.20	2.92	3.73	5.25	19.73
O2	4.40	100.00	0.00	0.00	0.00	2.20	2.92	3.73	5.25	9.68
O3	1.22	100.00	0.00	0.00	0.00	2.20	2.92	3.73	5.25	2.68
O4	15.93	100.00	0.00	0.00	0.00	2.20	2.92	3.73	5.25	35.05
										67.14
TOTAL	53.34									163.39

TRACT 9A @ HIGH DESERT
TEMPORARY DETENTION PONDS VOLUMES ALONG EAST BOUNDARY

BASIN	AREA	% LAND TREATMENT*				EXCESS PRECIPITATION - (IN) 6-HR***				V(100-YR) UNDEVELOPED
	(ACRES)	A	B	C	D	A	B	C	D	(ACRE-FT)
O1	8.97	100.00	0.00	0.00	0.00	0.80	1.08	1.46	2.64	0.60
O2	4.40	100.00	0.00	0.00	0.00	0.80	1.08	1.46	2.64	0.29
O3	1.22	100.00	0.00	0.00	0.00	0.80	1.08	1.46	2.64	0.08
O4	15.93	100.00	0.00	0.00	0.00	0.80	1.08	1.46	2.64	1.06
										2.03

NOTES:
Obtained from Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, January, 1993
* Table A-4
** Table A-9
***Table A-8
From Table A-5 in the COA DPM SECTION 22.2
Percent Treeatment D - Impervious
No. of units 91
Acres 21.5
N = 4.23
% D = 43.76 use 48

SUMMARY OF THE ROADWAY CAPACITY ANALYSIS FOR TRACT 9A

SUNRISE TRAIL PLACE - Drainage Basin A

Max Q (cfs) 23.03

Roadway Grade (%)	Q(100 YR) (cfs)	Curb Type	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	V^2/2*G (ft)	EGL (ft)	ROW Elevation (ft)	COMMENTS
4.56	18.42	STD	0.37	5.20	0.42	0.79	1.00	OK
3.56	16.12	ROLL	0.36	4.30	0.29	0.65	0.67	OK
2.92	5.76	ROLL	0.27	3.20	0.16	0.43	0.67	OK
2.30	3.45	ROLL	0.24	2.60	0.10	0.34	0.67	OK
4.00	2.30	ROLL	0.20	3.00	0.14	0.34	0.67	OK

SUNSET RIDGE PLACE - Drainage Basin B

Max Q (cfs) 20.52

Roadway Grade (%)	Q(100 YR) (cfs)	Curb Type	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	V^2/2*G (ft)	EGL (ft)	ROW Elevation (ft)	COMMENTS
3.78	6.16	STD	0.26	3.70	0.21	0.47	1.00	OK
3.93	8.21	STD	0.28	3.90	0.24	0.52	1.00	OK
6.00	10.26	STD	0.28	4.80	0.36	0.64	1.00	OK
3.00	12.31	STD	0.34	3.80	0.22	0.56	1.00	OK
1.05	14.36	STD	0.42	2.90	0.13	0.55	1.00	OK
4.81	18.47	STD	0.37	5.30	0.44	0.81	1.00	OK

ALPINE TRAIL STREET - Drainage Basin A & B

Max Q (cfs) 23.03

Roadway Grade (%)	Q(100 YR) (cfs)	Curb Type	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	V^2/2*G (ft)	EGL (ft)	ROW Elevation (ft)	COMMENTS
1.58	2.30	ROLL	0.25	2.50	0.10	0.35	0.67	OK
0.75	3.45	ROLL	0.33	2.10	0.07	0.40	0.67	OK
2.54	4.61	ROLL	0.29	3.60	0.20	0.49	0.67	OK
0.75	1.00	ROLL	0.22	1.60	0.04	0.26	0.67	OK

NOTE:
There is a 3% cross-slope along this roadway.

KAAS TRAIL STREET - Drainage Basin C

Max Q (cfs) 21.37

Roadway Grade (%)	Q(100 YR) (cfs)	Curb Type	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	V^2/2*G (ft)	EGL (ft)	ROW Elevation (ft)	COMMENTS
1.69	2.14	ROLL	0.23	2.50	0.10	0.33	0.67	OK

NOTE:
There is a 3% cross-slope along this roadway.

PINON POINT STREET - Drainage Basin B & C

Max Q (cfs) 23.03

Roadway Grade (%)	Q(100 YR) (cfs)	Curb Type	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	V^2/2*G (ft)	EGL (ft)	ROW Elevation (ft)	COMMENTS
2.80	1.84	ROLL	0.33	4.00	0.25	0.58	0.67	OK
2.93	1.15	ROLL	0.18	2.60	0.10	0.28	0.67	OK
0.98	2.30	ROLL	0.28	2.10	0.07	0.35	0.67	OK

NOTE:
There is a 3% cross-slope along this roadway.

SAGE POINT COURT - Drainage Basin D

Max Q (cfs) 4.16

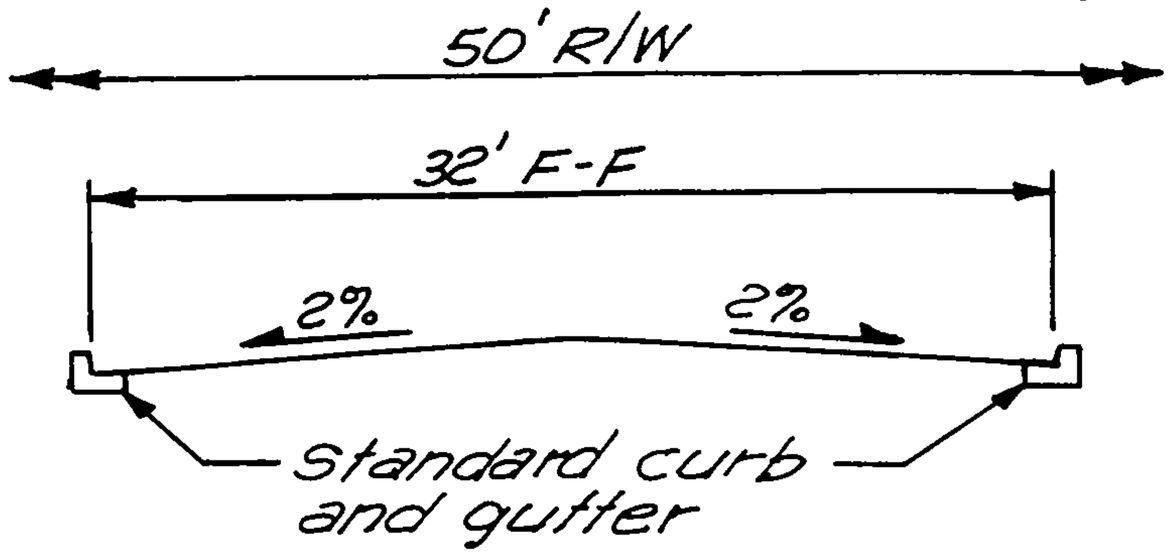
Roadway Grade (%)	Q(100 YR) (cfs)	Curb Type	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	V^2/2*G (ft)	EGL (ft)	ROW Elevation (ft)	COMMENTS
1.40	4.16	ROLL	0.32	2.80	0.12	0.44	0.67	OK

NOTE:
There is a 3% cross-slope along this roadway.

SANDIA POINT PLACE - Drainage Basin C

Max Q (cfs) 23.03

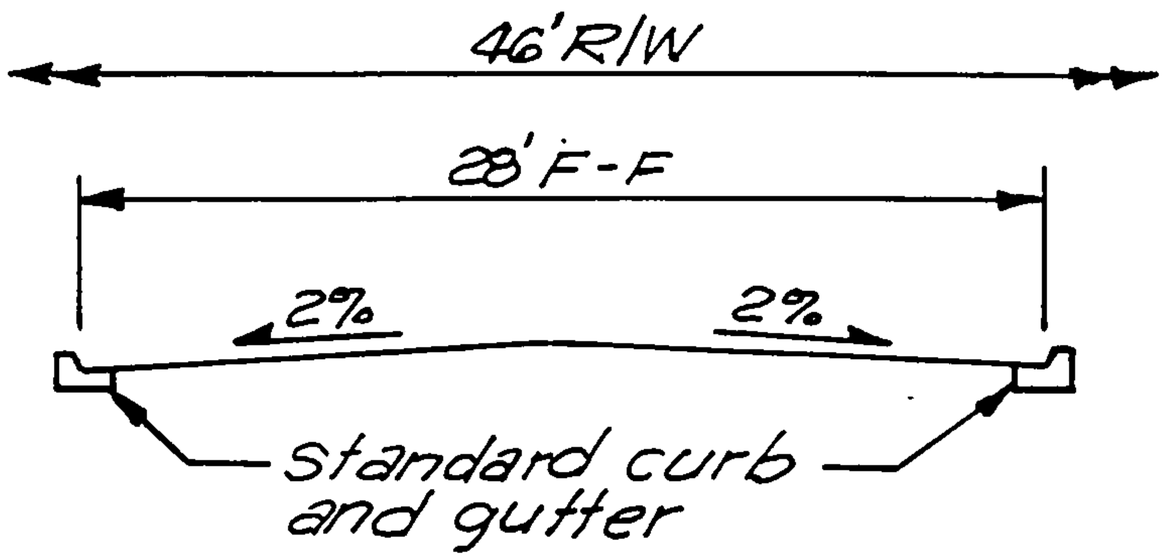
Roadway Grade (%)	Q(100 YR) (cfs)	Curb Type	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	V^2/2*G (ft)	EGL (ft)	ROW Elevation (ft)	COMMENTS
4.00	4.61	ROLL	0.24	3.40	0.18	0.42	0.67	OK
1.50	9.21	ROLL	0.33	2.60	0.10	0.43	0.67	OK
5.90	13.82	STD	0.32	5.10	0.40	0.72	1.00	OK
2.63	17.27	STD	0.38	4.20	0.27	0.65	1.00	OK
4.30	20.73	STD	0.38	5.50	0.47	0.85	1.00	OK



SECTION

NTS

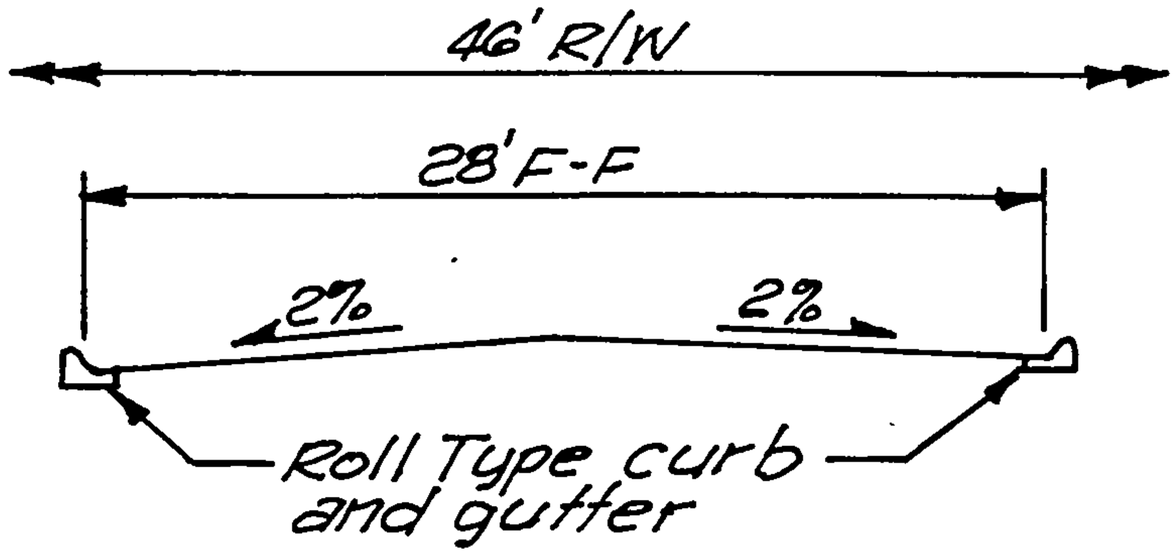
SUNSET RIDGE PLACE



SECTION

NTS

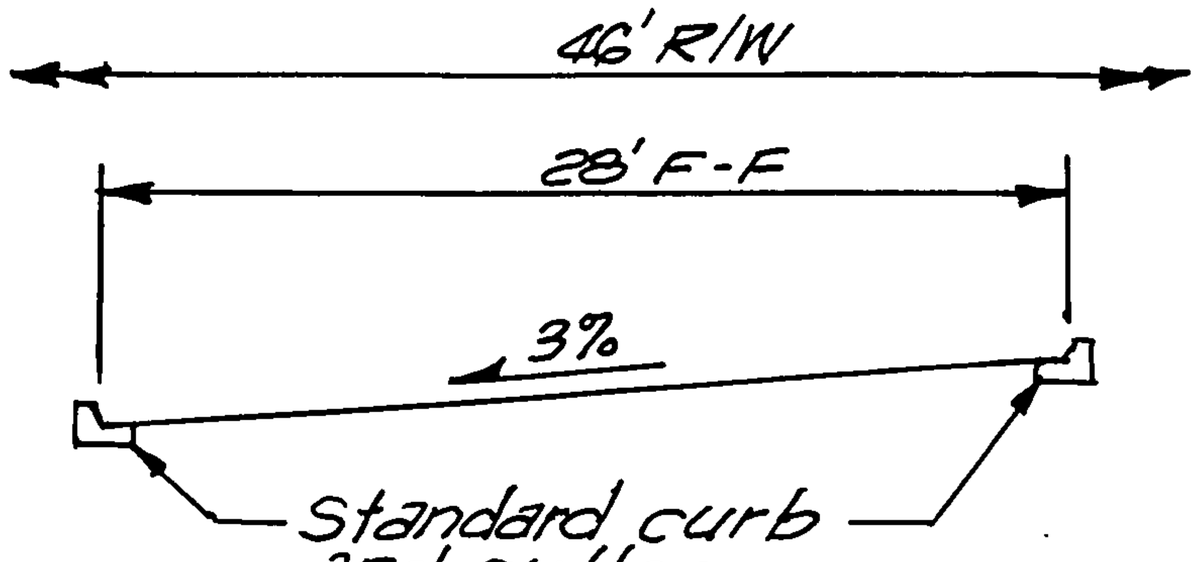
SUNRISE TRAIL PLACE (WESTERN PORTION)
SANDIA POINT ROAD (WESTERN PORTION)



SECTION

NTS

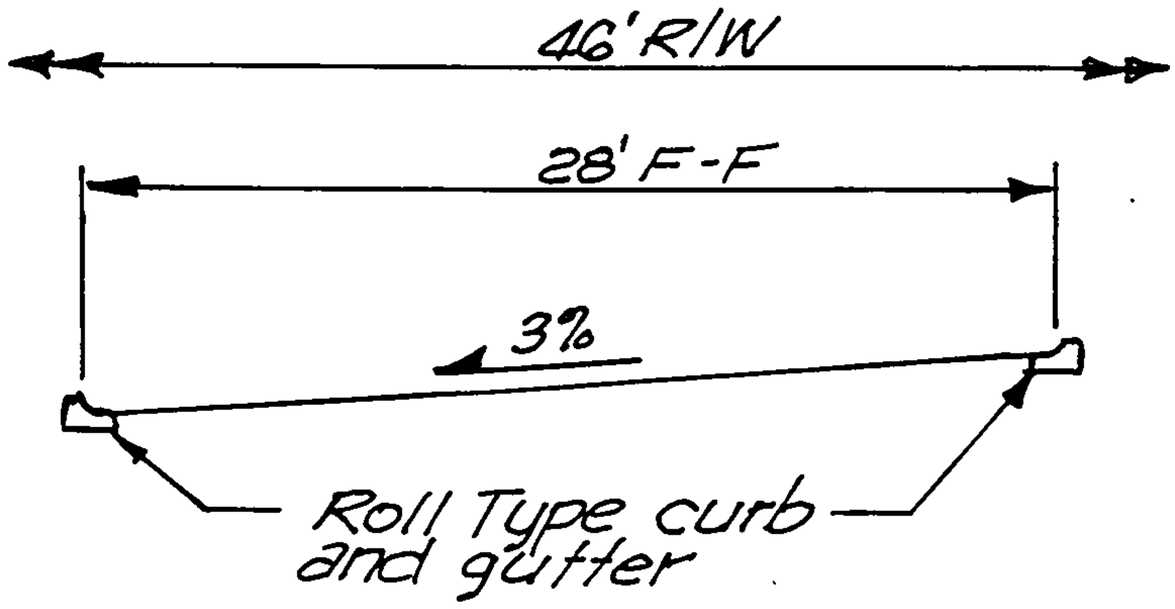
SUNRISE TRAIL PLACE (EASTERN TWO THIRDS)
SANDIA POINT ROAD (EASTERN TWO THIRDS)



SECTION

NTS

SAGE POINT COURT



SECTION

NTS

ALPINE TRAIL STREET

KAAS TRAIL STREET

PINON POINT STREET

DOUBLE GRATE TYPE "A" INLET

DOUBLE GRATE TYPE "A" W/ WINGS ON BOTH SIDES

SUNRISE TRAIL PLACE

Q_{INLET} = 8.6 CFS

4.56%

1.5 $Q_{RESIDUAL}$ = 17.3 CFS

$Q_{RESIDUAL}$ = 13.2 CFS

Q_{Inlet} = 8.6 CFS

1.5 Q_{100} = 34.5 CFS

Q_{100} = 23.03 CFS

2 x Q_{100} = 26.4 CFS

DOUBLE GRATE TYPE "A" INLET

INLET CAPACITY @ ROW

Q_{cap} = 50.82 CFS

30' PUBLIC DRAINAGE, WL AND SAS EASEMENT

60

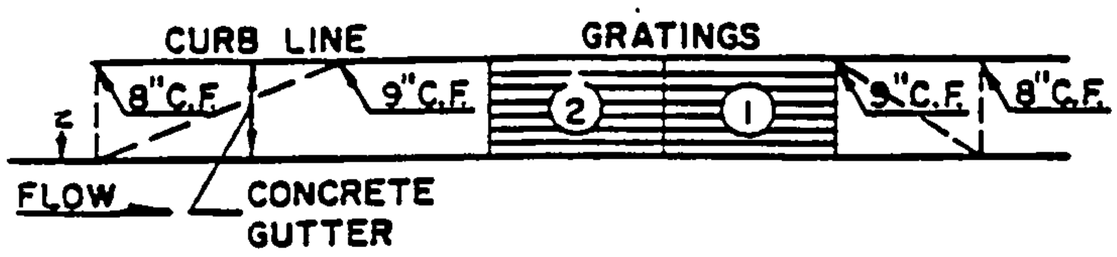
61

SUNRISE TRAIL PLACE

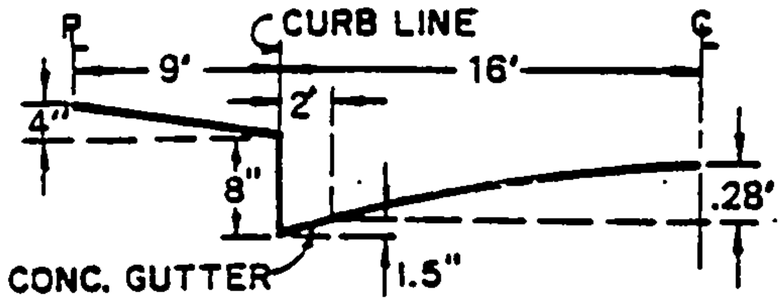
NORTH

SUNRISE

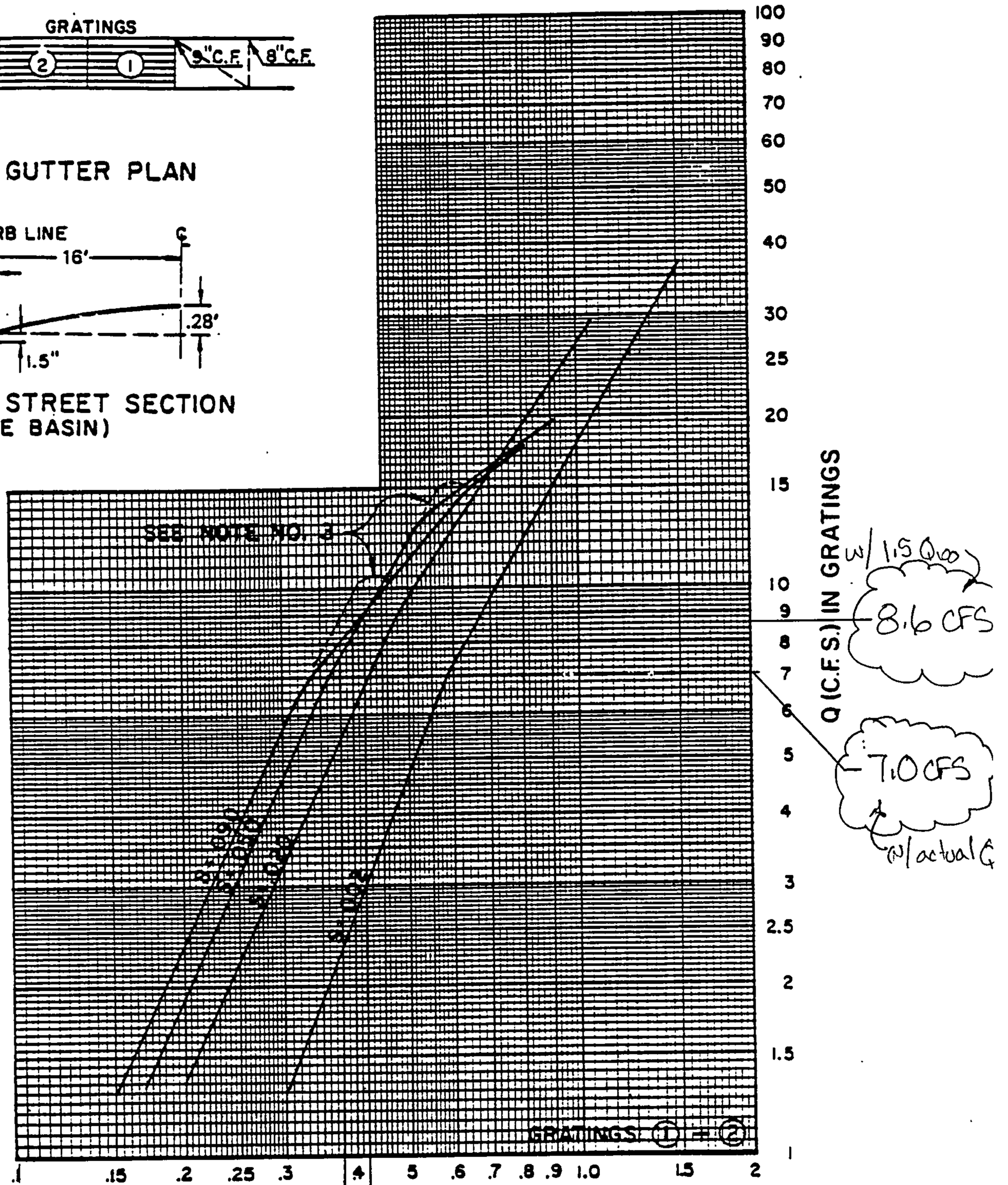
GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



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

Roadway Grade is 4.56%

0.42 FT w/ 1.5 Q100

0.38 FT w/ actual Q100

Type "A" Double Grate.

REV. 3-83

PLATE 22.3 D-6

Q_{100} = 23.03 CFS

$1.5\,Q_{100}$ = 34.5 CFS

ANALYSIS OF AN INLET IN A SUMP CONDITION - **Sunrise Ridge Place**

INLET TYPE: Double Grate Type "A" with curb opening wings on both sides on inlet.

WEIR: Q=C*L*H^1.5

Wing opening
C= 3.0
L= 4.0 ft
Q=3.0(4.0')H**1.5= 12.0H**1.5

Grate opeining
C=3.0
L(double grate)=[2(2.67')+2(1.8')]=8.94 ft
Q=3.0(8.94)H^1.5=26.82*H^1.5

ORIFICE: Q=C*A*(2*G*H)**0.5

Grate opening
C=0.6
A(double grate)=8.19 sf
Q=4.194*(64.4*H)^0.5

Wing opening
C=0.6
A=2.0 sf
Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR "A" OPENING	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	COMMENTS:
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.85	12.47	1.61	Weir controls on grate analysis
	0.20	0.20	1.07	2.40	17.64	4.55	Q(100 yr) = 13.2 cfs is provided at this depth
	0.30	0.30	1.97	4.41	21.60	8.35	
	0.40	0.40	3.04	6.78	24.94	12.86	
	0.50	0.50	4.24	9.48	27.88	17.97	
	0.60	0.60	5.58	12.46	30.55	23.62	
TOP OF CURB	0.70	0.70	7.03	15.71	32.99	29.76	Q(2x100 yr) = 26.4 cfs is provided at this depth
	0.80	0.80	8.59	19.19	35.27	36.36	
	0.90	0.90	10.25	22.90	37.41	43.39	
ROW LIMIT	1.00	1.00	12.00	26.82	39.43	50.82	

NOTE: The total runoff intercepted by the inlet at the low point in the cul-de-sac is:

Qr(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].

THE 100 YR STORM EVENT = 13.2 CFS at the sump condition

THE 2 x 100 YR STORM EVENT = 26.4 CFS at the sump condition

ROLL CURB - 28' F/F

MANNING'S N = .0170 SLOPE = .0400

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.13	7	36.99	0.00
2	9.00	0.33	5	23.00	0.37	8	37.00	0.33
3	9.01	0.00	6	35.00	0.13	9	46.00	0.67

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.4	1.60
0.10	0.10	0.2	0.4	3.4	2.3	3.19
0.15	0.15	0.4	1.0	6.8	2.6	6.49
0.20	0.20	0.8	2.5	11.9	3.0	11.49
0.25	0.25	1.5	5.4	17.0	3.5	16.50
0.30	0.30	2.5	10.1	22.1	4.1	21.50
0.35	0.35	3.7	16.7	28.1	4.5	27.42
0.40	0.40	5.2	26.8	32.3	5.2	31.61
0.45	0.45	6.8	40.3	35.0	5.9	34.31
0.50	0.50	8.6	56.4	37.7	6.5	37.00
0.55	0.55	10.5	75.2	40.4	7.1	39.69
0.60	0.60	12.6	96.9	43.1	7.7	42.39
0.65	0.65	14.8	121.6	45.8	8.2	45.08
0.67	0.67	15.5	130.7	46.7	8.4	46.00

ROLL CURB - 28' F/F

MANNING'S N = .0170 SLOPE = .0230

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.13	7	36.99	0.00
2	9.00	0.33	5	23.00	0.37	8	37.00	0.33
3	9.01	0.00	6	35.00	0.13	9	46.00	0.67

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.7	1.1	1.60
0.10	0.10	0.2	0.3	3.4	1.7	3.19
0.15	0.15	0.4	0.7	6.8	1.9	6.49
0.20	0.20	0.8	1.9	11.9	2.2	11.49
0.25	0.25	1.5	4.1	17.0	2.7	16.50
0.30	0.30	2.5	7.6	22.1	3.1	21.50
0.35	0.35	3.7	12.6	28.1	3.4	27.42
0.40	0.40	5.2	20.3	32.3	3.9	31.61
0.45	0.45	6.8	30.5	35.0	4.5	34.31
0.50	0.50	8.6	42.8	37.7	5.0	37.00
0.55	0.55	10.5	57.1	40.4	5.4	39.69
0.60	0.60	12.6	73.5	43.1	5.8	42.39
0.65	0.65	14.8	92.2	45.8	6.2	45.08
0.67	0.67	15.5	99.1	46.7	6.4	46.00

ROLL CURB - 28' F/F

MANNING'S N = .0170 SLOPE = .0292

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.13	7	36.99	0.00
2	9.00	0.33	5	23.00	0.37	8	37.00	0.33
3	9.01	0.00	6	35.00	0.13	9	46.00	0.67

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.7	1.2	1.60
0.10	0.10	0.2	0.3	3.4	1.9	3.19
0.15	0.15	0.4	0.8	6.8	2.2	6.49
0.20	0.20	0.8	2.1	11.9	2.5	11.49
0.25	0.25	1.5	4.6	17.0	3.0	16.50
0.30	0.30	2.5	8.6	22.1	3.5	21.50
0.35	0.35	3.7	14.2	28.1	3.9	27.42
0.40	0.40	5.2	22.9	32.3	4.4	31.61
0.45	0.45	6.8	34.4	35.0	5.0	34.31
0.50	0.50	8.6	48.2	37.7	5.6	37.00
0.55	0.55	10.5	64.3	40.4	6.1	39.69
0.60	0.60	12.6	82.8	43.1	6.6	42.39
0.65	0.65	14.8	103.9	45.8	7.0	45.08
0.67	0.67	15.5	111.6	46.7	7.2	46.00

ROLL CURB - 28' F/F

MANNING'S N = .0170 SLOPE = .0356

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.13	7	36.99	0.00
2	9.00	0.33	5	23.00	0.37	8	37.00	0.33
3	9.01	0.00	6	35.00	0.13	9	46.00	0.67

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.4	1.60
0.10	0.10	0.2	0.3	3.4	2.1	3.19
0.15	0.15	0.4	0.9	6.8	2.4	6.49
0.20	0.20	0.8	2.3	11.9	2.8	11.49
0.25	0.25	1.5	5.1	17.0	3.3	16.50
0.30	0.30	2.5	9.5	22.1	3.8	21.50
0.35	0.35	3.7	15.7	28.1	4.3	27.42
0.40	0.40	5.2	25.3	32.3	4.9	31.61
0.45	0.45	6.8	38.0	35.0	5.6	34.31
0.50	0.50	8.6	53.2	37.7	6.2	37.00
0.55	0.55	10.5	71.0	40.4	6.7	39.69
0.60	0.60	12.6	91.5	43.1	7.3	42.39
0.65	0.65	14.8	114.7	45.8	7.8	45.08
0.67	0.67	15.5	123.3	46.7	7.9	46.00

STD CURB - 28' F/F

MANNING'S N = .0170 SLOPE = .0456

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	23.00	0.37	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	46.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.5	1.59
0.10	0.10	0.2	0.4	3.4	2.4	3.19
0.15	0.15	0.4	1.0	6.8	2.7	6.48
0.20	0.20	0.8	2.6	11.9	3.2	11.49
0.25	0.25	1.5	5.7	17.0	3.7	16.49
0.30	0.30	2.5	10.8	22.1	4.3	21.49
0.35	0.35	3.7	18.1	27.2	4.9	26.49
0.40	0.40	5.1	29.7	28.8	5.9	27.99
0.45	0.45	6.5	44.5	28.9	6.9	27.99
0.50	0.50	7.9	61.5	29.0	7.8	27.99
0.55	0.55	9.3	80.6	29.1	8.7	28.00
0.60	0.60	10.7	101.7	29.2	9.5	28.00
0.65	0.65	12.1	124.7	29.3	10.3	28.00
0.70	0.70	13.5	144.3	31.1	10.7	29.78
0.75	0.75	15.1	163.8	33.8	10.9	32.49
0.80	0.80	16.7	185.8	36.5	11.1	35.19
0.85	0.85	18.6	210.5	39.2	11.3	37.89
0.90	0.90	20.5	238.1	41.9	11.6	40.59
0.95	0.95	22.6	268.6	44.6	11.9	43.30
1.00	1.00	24.9	302.1	47.3	12.2	46.00

60

61

62

30' PUBLIC

DRAINAGE, WL AND SAS EASEMENT

SINGLE GRATE TYPE "A"

DOUBLE GRATE TYPE "A"

STD CURB

SUNSET RIDGE PLACE

Q_{inlet} = 5.2 CFS

Q_{inlet} = 8.6 CFS

4.81%

1.5 $Q_{RESIDUAL}$ = 13.58 CFS

Q_{100} = 20.52 CFS

1.5 Q_{100} = 30.78 CFS

$Q_{residual}$ = 3.18 CFS

Q_{inlet} = 5.2 CFS

Q_{inlet} = 8.6 CFS

SINGLE GRATE TYPE "A"

DOUBLE GRATE TYPE "A"

STD CURB

30' PUBLIC

DRAINAGE, SAS AND WL EASEMENT

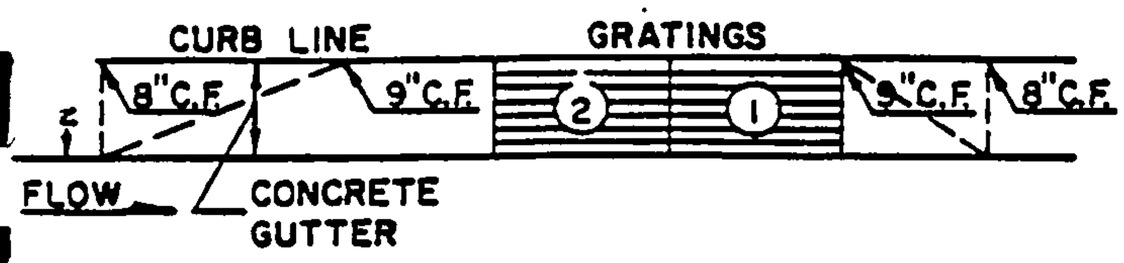
9

SAGE POINT CT

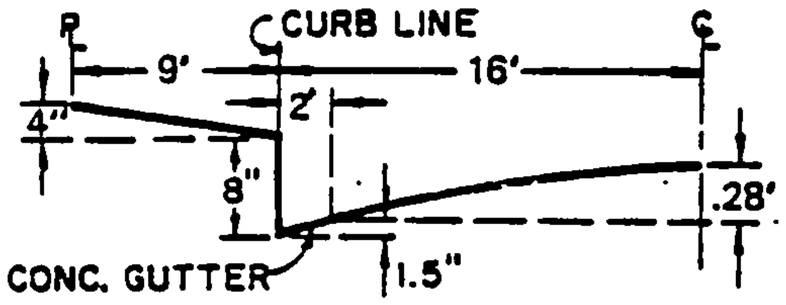
NORTH

SUNSET

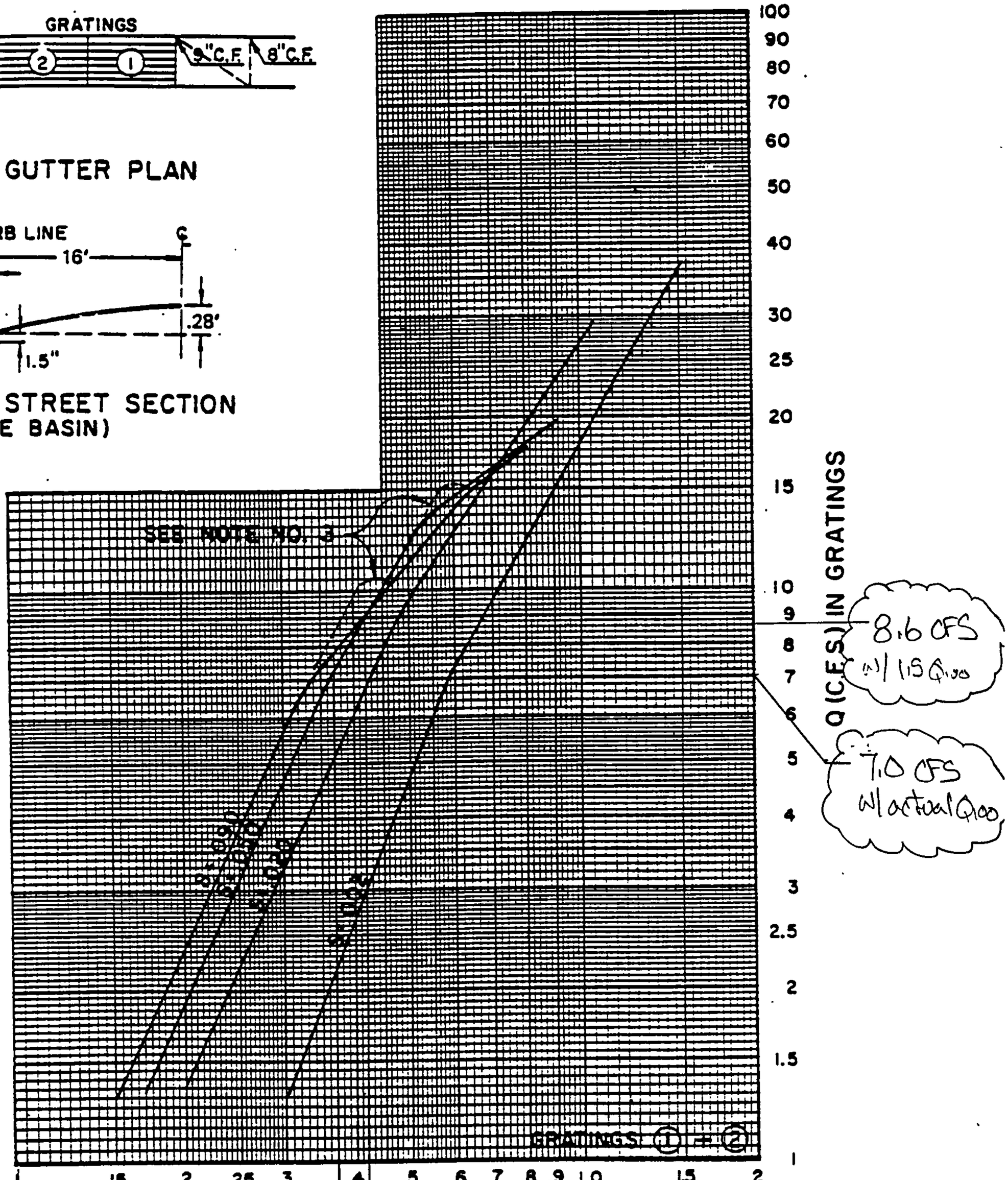
GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



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

Roadway Grade 4.81%

0.42 FT w/ 1.5 Q100

0.37 FT w/ actual Q100

Type "A" - Double Grate

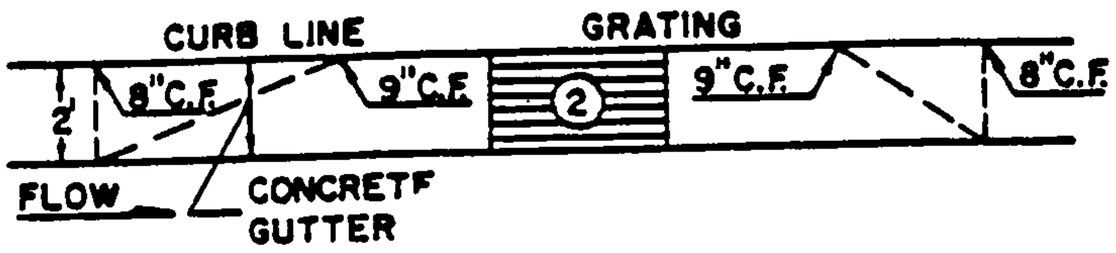
Q_{100} = 20.52 CFS REV. 3-83

$5Q_{100}$ = 30.78 CFS

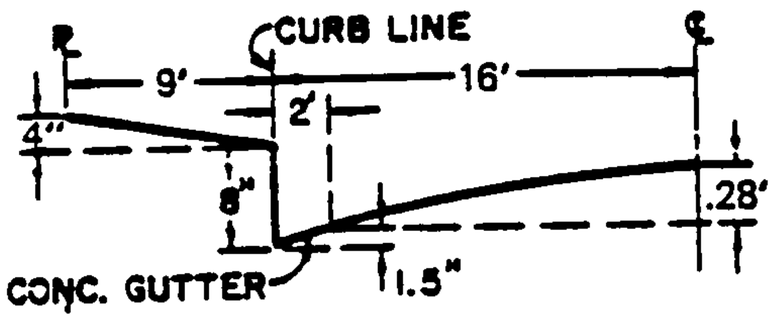
PLATE 22.3 D-6

SUNSET

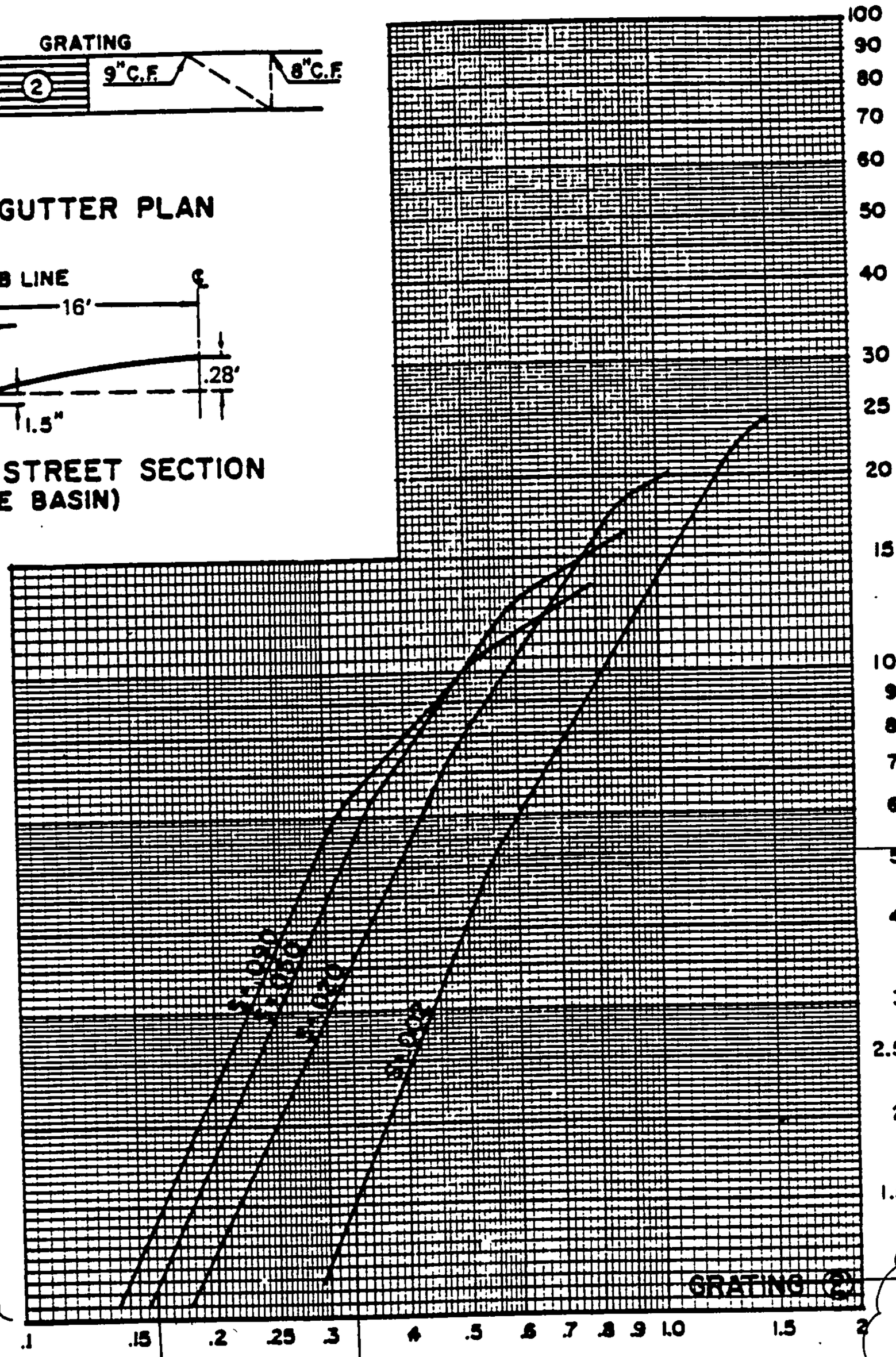
GRATING CAPACITIES FOR TYPE "A" , "C" and "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



Two Type "A" Double Grates are 60FT upstream

Roadway Grade 4.81%

1.5Q100 (residual) = 13.58 CFS

Q100 (residual) = 6.52 CFS

(1.5) Residual = 3.18 CFS

1st Residual = 1.32 CFS

REV. 3-83

PLATE 22.3 D-5.

STD CURB - 32' F/F

MANNING'S N = .0170 SLOPE = .0378

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	25.00	0.41	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	50.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.4	1.59
0.10	0.10	0.2	0.4	3.4	2.2	3.19
0.15	0.15	0.4	1.0	6.4	2.6	6.13
0.20	0.20	0.8	2.3	10.8	3.0	10.41
0.25	0.25	1.4	4.9	15.2	3.5	14.70
0.30	0.30	2.3	9.1	19.6	4.0	18.99
0.35	0.35	3.3	15.1	24.0	4.5	23.28
0.40	0.40	4.6	23.1	28.4	5.0	27.56
0.45	0.45	6.0	35.6	28.9	5.9	27.99
0.50	0.50	7.4	50.4	29.0	6.8	27.99
0.55	0.55	8.8	67.2	29.1	7.6	28.00
0.60	0.60	10.2	85.8	29.2	8.4	28.00
0.65	0.65	11.6	106.1	29.3	9.2	28.00
0.70	0.70	13.0	122.8	31.5	9.4	30.18
0.75	0.75	14.6	139.2	34.8	9.5	33.48
0.80	0.80	16.4	158.3	38.1	9.7	36.79
0.85	0.85	18.3	180.2	41.4	9.9	40.09
0.90	0.90	20.4	205.0	44.7	10.1	43.39
0.95	0.95	22.6	232.9	48.0	10.3	46.70
1.00	1.00	25.0	263.8	51.3	10.5	50.00

STD CURB - 32' F/F

MANNING'S N = .0170 SLOPE = .0393

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	25.00	0.41	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	50.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.4	1.59
0.10	0.10	0.2	0.4	3.4	2.3	3.19
0.15	0.15	0.4	1.0	6.4	2.6	6.13
0.20	0.20	0.8	2.4	10.8	3.0	10.41
0.25	0.25	1.4	5.0	15.2	3.6	14.70
0.30	0.30	2.3	9.3	19.6	4.1	18.99
0.35	0.35	3.3	15.4	24.0	4.6	23.28
0.40	0.40	4.6	23.6	28.4	5.1	27.56
0.45	0.45	6.0	36.3	28.9	6.1	27.99
0.50	0.50	7.4	51.4	29.0	7.0	27.99
0.55	0.55	8.8	68.5	29.1	7.8	28.00
0.60	0.60	10.2	87.5	29.2	8.6	28.00
0.65	0.65	11.6	108.2	29.3	9.3	28.00
0.70	0.70	13.0	125.2	31.5	9.6	30.18
0.75	0.75	14.6	141.9	34.8	9.7	33.48
0.80	0.80	16.4	161.4	38.1	9.9	36.79
0.85	0.85	18.3	183.8	41.4	10.0	40.09
0.90	0.90	20.4	209.1	44.7	10.3	43.39
0.95	0.95	22.6	237.4	48.0	10.5	46.70
1.00	1.00	25.0	269.0	51.3	10.7	50.00

STD CURB - 32' F/F

MANNING'S N = .0170 SLOPE = .0600

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	25.00	0.41	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	50.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.8	1.59
0.10	0.10	0.2	0.4	3.4	2.8	3.19
0.15	0.15	0.4	1.2	6.4	3.2	6.13
0.20	0.20	0.8	2.9	10.8	3.7	10.41
0.25	0.25	1.4	6.2	15.2	4.4	14.70
0.30	0.30	2.3	11.5	19.6	5.1	18.99
0.35	0.35	3.3	19.0	24.0	5.7	23.28
0.40	0.40	4.6	29.1	28.4	6.4	27.56
0.45	0.45	6.0	44.9	28.9	7.5	27.99
0.50	0.50	7.4	63.5	29.0	8.6	27.99
0.55	0.55	8.8	84.7	29.1	9.6	28.00
0.60	0.60	10.2	108.1	29.2	10.6	28.00
0.65	0.65	11.6	133.6	29.3	11.5	28.00
0.70	0.70	13.0	154.7	31.5	11.9	30.18
0.75	0.75	14.6	175.4	34.8	12.0	33.48
0.80	0.80	16.4	199.5	38.1	12.2	36.79
0.85	0.85	18.3	227.1	41.4	12.4	40.09
0.90	0.90	20.4	258.3	44.7	12.7	43.39
0.95	0.95	22.6	293.4	48.0	13.0	46.70
1.00	1.00	25.0	332.4	51.3	13.3	50.00

STD CURB - 32' F/F

MANNING'S N = .0170 SLOPE = .0300

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	25.00	0.41	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	50.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.7	1.2	1.59
0.10	0.10	0.2	0.3	3.4	2.0	3.19
0.15	0.15	0.4	0.9	6.4	2.3	6.13
0.20	0.20	0.8	2.1	10.8	2.6	10.41
0.25	0.25	1.4	4.4	15.2	3.1	14.70
0.30	0.30	2.3	8.1	19.6	3.6	18.99
0.35	0.35	3.3	13.4	24.0	4.0	23.28
0.40	0.40	4.6	20.6	28.4	4.5	27.56
0.45	0.45	6.0	31.7	28.9	5.3	27.99
0.50	0.50	7.4	44.9	29.0	6.1	27.99
0.55	0.55	8.8	59.9	29.1	6.8	28.00
0.60	0.60	10.2	76.4	29.2	7.5	28.00
0.65	0.65	11.6	94.5	29.3	8.2	28.00
0.70	0.70	13.0	109.4	31.5	8.4	30.18
0.75	0.75	14.6	124.0	34.8	8.5	33.48
0.80	0.80	16.4	141.1	38.1	8.6	36.79
0.85	0.85	18.3	160.6	41.4	8.8	40.09
0.90	0.90	20.4	182.7	44.7	9.0	43.39
0.95	0.95	22.6	207.4	48.0	9.2	46.70
1.00	1.00	25.0	235.0	51.3	9.4	50.00

STD CURB - 32' F/F

MANNING'S N = .0170 SLOPE = .0105

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	25.00	0.41	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	50.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.7	0.7	1.59
0.10	0.10	0.2	0.2	3.4	1.2	3.19
0.15	0.15	0.4	0.5	6.4	1.3	6.13
0.20	0.20	0.8	1.2	10.8	1.6	10.41
0.25	0.25	1.4	2.6	15.2	1.8	14.70
0.30	0.30	2.3	4.8	19.6	2.1	18.99
0.35	0.35	3.3	7.9	24.0	2.4	23.28
0.40	0.40	4.6	12.2	28.4	2.7	27.56
0.45	0.45	6.0	18.8	28.9	3.1	27.99
0.50	0.50	7.4	26.6	29.0	3.6	27.99
0.55	0.55	8.8	35.4	29.1	4.0	28.00
0.60	0.60	10.2	45.2	29.2	4.4	28.00
0.65	0.65	11.6	55.9	29.3	4.8	28.00
0.70	0.70	13.0	64.7	31.5	5.0	30.18
0.75	0.75	14.6	73.4	34.8	5.0	33.48
0.80	0.80	16.4	83.5	38.1	5.1	36.79
0.85	0.85	18.3	95.0	41.4	5.2	40.09
0.90	0.90	20.4	108.1	44.7	5.3	43.39
0.95	0.95	22.6	122.7	48.0	5.4	46.70
1.00	1.00	25.0	139.0	51.3	5.6	50.00

STD CURB - 32' F/F

MANNING'S N = .0170 SLOPE = .0481

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	25.00	0.41	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	50.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.6	1.59
0.10	0.10	0.2	0.4	3.4	2.5	3.19
0.15	0.15	0.4	1.1	6.4	2.9	6.13
0.20	0.20	0.8	2.6	10.8	3.3	10.41
0.25	0.25	1.4	5.6	15.2	3.9	14.70
0.30	0.30	2.3	10.3	19.6	4.5	18.99
0.35	0.35	3.3	17.0	24.0	5.1	23.28
0.40	0.40	4.6	26.1	28.4	5.7	27.56
0.45	0.45	6.0	40.2	28.9	6.7	27.99
0.50	0.50	7.4	56.9	29.0	7.7	27.99
0.55	0.55	8.8	75.8	29.1	8.6	28.00
0.60	0.60	10.2	96.8	29.2	9.5	28.00
0.65	0.65	11.6	119.7	29.3	10.3	28.00
0.70	0.70	13.0	138.5	31.5	10.6	30.18
0.75	0.75	14.6	157.0	34.8	10.7	33.48
0.80	0.80	16.4	178.6	38.1	10.9	36.79
0.85	0.85	18.3	203.3	41.4	11.1	40.09
0.90	0.90	20.4	231.3	44.7	11.4	43.39
0.95	0.95	22.6	262.7	48.0	11.6	46.70
1.00	1.00	25.0	297.6	51.3	11.9	50.00

SINGLE TYPE "A" INLET W/ WINGS ON BOTH SIDES

LOW PT.

$Q_{100} = 4.16$ CFS

$2 \times Q_{100} = 8.32$ CFS

STD CURB

3%

ROLL CURB

SAGE POINT COVE

1.4%

NORTH

10

11

12

13

14

15

9

8

7

6

5

ANALYSIS OF AN INLET IN A SUMP CONDITION - **Sage Point Court**

INLET TYPE: Single Grate Type "A" with curb opening wings on both sides on inlet.

WEIR: Q=C*L*H^1.5

Wing opening
C= 3.0
L= 4.0 ft
Q=3.0(4.0')H**1.5= 12.0H**1.5

Grate opeining
C=3.0
L(single grate)=[(2.67')+2(1.8')]=6.27 ft
Q=3.0(6.27)H^1.5=18.81*H^1.5

ORIFICE: Q=C*A*(2*G*H)**0.5

Grate opening
C=0.6
A(single grate)=4.09 sf
Q=2.46*(64.4*H)^0.5

Wing opening
C=0.6
A=2.0 sf
Q=1.2*(64.4*H)^0.5

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR WING OPENING	Q (CFS) WEIR SINGLE GRATE	Q (CFS) ORIFICE SINGLE GRATE	TOTAL Q (CFS)	COMMENTS:
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	0.00	Flow at double "A" inlet w/ two wing openings
	0.10	0.10	0.38	0.59	6.24	1.35	Weir controls on grate analysis
	0.20	0.20	1.07	1.68	8.82	3.83	
	0.30	0.30	1.97	3.09	10.80	7.03	
	0.40	0.40	3.04	4.76	12.47	10.83	Inlet provides 2x the 100 yr storm at this depth
	0.50	0.50	4.24	6.65	13.94	15.14	
	0.60	0.60	5.58	8.74	15.27	19.90	
TOP OF CURB	0.70	0.70	7.03	11.02	16.50	25.07	
	0.80	0.80	8.59	13.46	17.64	30.63	
	0.90	0.90	10.25	16.06	18.71	36.55	
ROW LIMIT	1.00	1.00	12.00	18.81	19.72	42.81	

NOTE: The total runoff intercepted by the inlet at the low point in the cul-de-sac is:

Q(100) = 2*[(runoff of the wing opening) + (the lesser of the weir or orifice amount taken by the double grate)].

THE 100 YR STORM EVENT = 4.16 CFS at the sump condition

THE 2 x 100 YR STORM EVENT = 8.32 CFS at the sump condition

ROLLED CURB - 3% X-SLOPE - 28' F/F

SAGE

MANNING'S N = .0170 SLOPE = .0140

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	0.9	0.94
0.10	0.10	0.1	0.1	2.6	1.2	2.53
0.15	0.15	0.3	0.5	4.4	1.6	4.35
0.20	0.20	0.5	1.1	6.2	2.0	6.17
0.25	0.25	0.9	2.1	8.0	2.4	7.98
0.30	0.30	1.3	3.7	9.9	2.7	9.80
0.35	0.35	1.9	5.6	12.1	3.0	12.02
0.40	0.40	2.6	8.1	15.1	3.2	15.04
0.45	0.45	3.4	11.4	18.1	3.4	18.05
0.50	0.50	4.4	15.7	21.1	3.6	21.07
0.55	0.55	5.5	21.1	24.1	3.9	24.08
0.60	0.60	6.8	27.7	27.2	4.1	27.09
0.65	0.65	8.2	35.6	30.2	4.3	30.11
0.67	0.67	8.7	38.5	31.2	4.4	31.13

SNOW POINT CT.

3%

1

5.

Double GRATE "A"

Qinlet = 8.4 cfs

SANDIA POINT

4.3%

1.5XQ100 = 32.05 cfs

1.5 Qresidual =

15.25 CFS

Double "D" Inlet

Qinlet = 8.4 cfs

Double GRATE "A"

2X(1.5 Qresidual) =

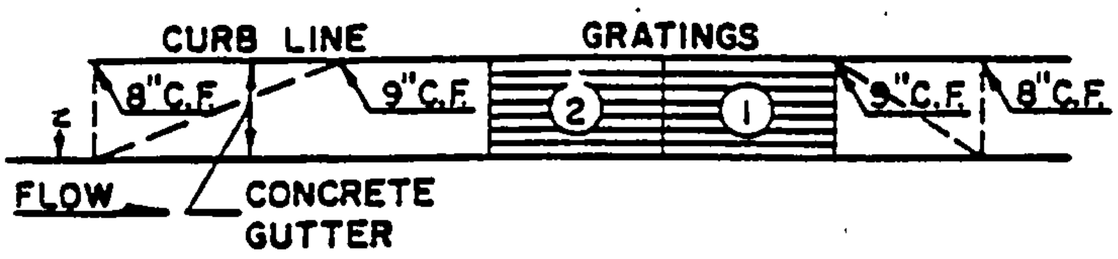
30.5 CFS

25' PUBLIC STORM DRAIN EASEMENT

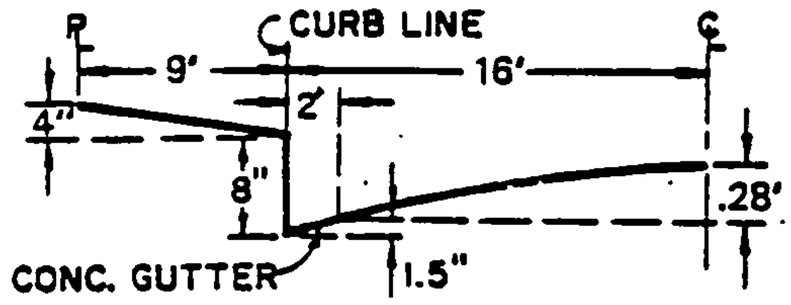
NORTH

SANDIA POINT 2D

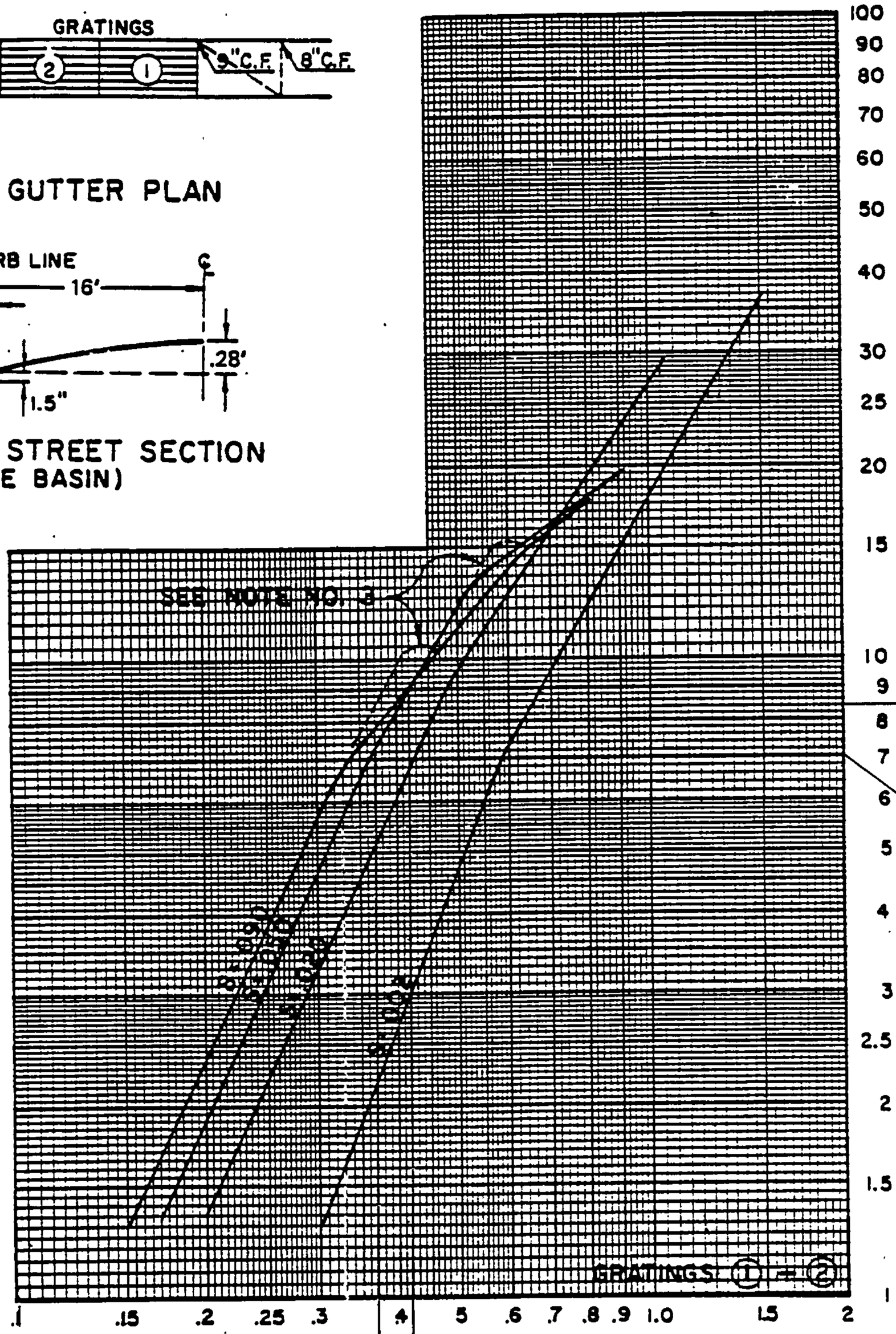
GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



8.4 CFS
w/ 1.5 Q100

7.0 CFS
w/ actual Q100

Roadway Grade
4.3%

0.42 CFS
w/ 1.5 Q100

75

0.37 CFS
w/ actual Q100

Q100 = 21.37 CFS 7.37

1.5 Q100 = 32.05 CFS

13.25

REV. 3-83

PLATE 22.3 D-6

ANALYSIS OF AN INLET IN A SUMP CONDITION - **Intersection of Sage Point and Sandia Point**

INLET TYPE: Double Grate Type "D"

WEIR: Q=C*L*H^1.5

Grate opeining

C=3.0

L(double grate)=[4(2.67')+2(1.8')]=14.28 ft

Q=3.0(14.28)H^1.5=42.84*H^1.5

ORIFICE:

Grate opening

C=0.6

A(double grate)=8.19 sf

Q=4.194*(64.4*H)^0.5

	WS ELEVATION	HEIGHT ABOVE INLET	Q (CFS) WEIR DOUBLE GRATE	Q (CFS) ORIFICE DOUBLE GRATE	TOTAL Q (CFS)	COMMENTS:
~FL @ INLET	0.00	0.00	0.00	0.00	0.00	Flow at double "D" inlet at cul-del-sac low point
	0.10	0.10	1.35	12.47	1.35	Weir controls on grate analysis
	0.20	0.20	3.83	17.64	3.83	
	0.30	0.30	7.04	21.60	7.04	
	0.40	0.40	10.84	24.94	10.84	
	0.50	0.50	15.15	27.88	15.15	Inlet provides 2x the 100 yr storm event w/ actual residual
	0.60	0.60	19.91	30.55	19.91	
TOP OF CURB	0.70	0.70	25.09	32.99	25.09	
	0.80	0.80	30.65	35.27	30.65	Inlet provides 2x the 100 yr storm event w/ the 1.5 factor
	0.90	0.90	36.58	37.41	36.58	
ROW LIMIT	1.00	1.00	42.84	39.43	39.43	

NOTE: The total runoff intercepted by the inlet at the low point in the valley gutter is:

The residual from the the upstream type "A" double grate inlets is as follows:

THE RESIDUAL OF THE 1.5xQ(100 YR) STORM EVENT = 15.25 CFS at the sump condition

THE RESIDUAL OF 2X THE 1.5xQ(100 YR) STORM EVENT = 30.5 CFS at the sump condition

THE RESIDUAL OF THE ACTUAL Q(100 YR) STORM EVENT = 7.37 CFS at the sump condition

THE RESIDUAL OF 2X THE ACTUAL Q(100 YR)) STORM EVENT = 15.4 CFS at the sump condition

ROLL CURB - 28' F/F

SANDA

MANNING'S N = .0170 SLOPE = .0400

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.13	7	36.99	0.00
2	9.00	0.33	5	23.00	0.37	8	37.00	0.33
3	9.01	0.00	6	35.00	0.13	9	46.00	0.67

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.4	1.60
0.10	0.10	0.2	0.4	3.4	2.3	3.19
0.15	0.15	0.4	1.0	6.8	2.6	6.49
0.20	0.20	0.8	2.5	11.9	3.0	11.49
0.25	0.25	1.5	5.4	17.0	3.5	16.50
0.30	0.30	2.5	10.1	22.1	4.1	21.50
0.35	0.35	3.7	16.7	28.1	4.5	27.42
0.40	0:40	5.2	26.8	32.3	5.2	31.61
0.45	0.45	6.8	40.3	35.0	5.9	34.31
0.50	0.50	8.6	56.4	37.7	6.5	37.00
0.55	0.55	10.5	75.2	40.4	7.1	39.69
0.60	0.60	12.6	96.9	43.1	7.7	42.39
0.65	0.65	14.8	121.6	45.8	8.2	45.08
0.67	0.67	15.5	130.7	46.7	8.4	46.00

ROLL CURB - 28' F/F

SANDIA

MANNING'S N = .0170 SLOPE = .0150

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.13	7	36.99	0.00
2	9.00	0.33	5	23.00	0.37	8	37.00	0.33
3	9.01	0.00	6	35.00	0.13	9	46.00	0.67

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.7	0.9	1.60
0.10	0.10	0.2	0.2	3.4	1.4	3.19
0.15	0.15	0.4	0.6	6.8	1.6	6.49
0.20	0.20	0.8	1.5	11.9	1.8	11.49
0.25	0.25	1.5	3.3	17.0	2.2	16.50
0.30	0.30	2.5	6.2	22.1	2.5	21.50
0.35	0.35	3.7	10.2	28.1	2.8	27.42
0.40	0.40	5.2	16.4	32.3	3.2	31.61
0.45	0.45	6.8	24.7	35.0	3.6	34.31
0.50	0.50	8.6	34.5	37.7	4.0	37.00
0.55	0.55	10.5	46.1	40.4	4.4	39.69
0.60	0.60	12.6	59.4	43.1	4.7	42.39
0.65	0.65	14.8	74.5	45.8	5.0	45.08
0.67	0.67	15.5	80.0	46.7	5.1	46.00

ROLL CURB - 28' F/F

SANDIA

MANNING'S N = .0170 SLOPE = .0590

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.13	7	36.99	0.00
2	9.00	0.33	5	23.00	0.37	8	37.00	0.33
3	9.01	0.00	6	35.00	0.13	9	46.00	0.67

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.7	1.60
0.10	0.10	0.2	0.4	3.4	2.8	3.19
0.15	0.15	0.4	1.2	6.8	3.1	6.49
0.20	0.20	0.8	3.0	11.9	3.6	11.49
0.25	0.25	1.5	6.5	17.0	4.3	16.50
0.30	0.30	2.5	12.2	22.1	4.9	21.50
0.35	0.35	3.7	20.2	28.1	5.5	27.42
0.40	0.40	5.2	32.6	32.3	6.3	31.61
0.45	0.45	6.8	48.9	35.0	7.2	34.31
0.50	0.50	8.6	68.5	37.7	7.9	37.00
0.55	0.55	10.5	91.4	40.4	8.7	39.69
0.60	0.60	12.6	117.7	43.1	9.4	42.39
0.65	0.65	14.8	147.7	45.8	10.0	45.08
0.67	0.67	15.5	158.7	46.7	10.2	46.00

STD CURB - 28' F/F

SANDIA

MANNING'S N = .0170 SLOPE = .0263

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	23.00	0.37	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	46.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.7	1.2	1.59
0.10	0.10	0.2	0.3	3.4	1.8	3.19
0.15	0.15	0.4	0.8	6.8	2.1	6.48
0.20	0.20	0.8	2.0	11.9	2.4	11.49
0.25	0.25	1.5	4.4	17.0	2.8	16.49
0.30	0.30	2.5	8.2	22.1	3.3	21.49
0.35	0.35	3.7	13.7	27.2	3.7	26.49
0.40	0.40	5.1	22.5	28.8	4.5	27.99
0.45	0.45	6.5	33.8	28.9	5.2	27.99
0.50	0.50	7.9	46.7	29.0	5.9	27.99
0.55	0.55	9.3	61.2	29.1	6.6	28.00
0.60	0.60	10.7	77.3	29.2	7.2	28.00
0.65	0.65	12.1	94.7	29.3	7.8	28.00
0.70	0.70	13.5	109.6	31.1	8.1	29.78
0.75	0.75	15.1	124.4	33.8	8.3	32.49
0.80	0.80	16.7	141.1	36.5	8.4	35.19
0.85	0.85	18.6	159.9	39.2	8.6	37.89
0.90	0.90	20.5	180.8	41.9	8.8	40.59
0.95	0.95	22.6	204.0	44.6	9.0	43.30
1.00	1.00	24.9	229.4	47.3	9.2	46.00

STD CURB - 28' F/F

SANDIA

MANNING'S N = .0170 SLOPE = .0430

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	1.00	4	11.00	0.13	7	36.99	0.00
2	9.00	0.67	5	23.00	0.37	8	37.00	0.67
3	9.01	0.00	6	35.00	0.13	9	46.00	1.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.1	1.7	1.5	1.59
0.10	0.10	0.2	0.4	3.4	2.4	3.19
0.15	0.15	0.4	1.0	6.8	2.7	6.48
0.20	0.20	0.8	2.5	11.9	3.1	11.49
0.25	0.25	1.5	5.6	17.0	3.6	16.49
0.30	0.30	2.5	10.4	22.1	4.2	21.49
0.35	0.35	3.7	17.6	27.2	4.8	26.49
0.40	0.40	5.1	28.8	28.8	5.7	27.99
0.45	0.45	6.5	43.2	28.9	6.7	27.99
0.50	0.50	7.9	59.7	29.0	7.6	27.99
0.55	0.55	9.3	78.3	29.1	8.5	28.00
0.60	0.60	10.7	98.8	29.2	9.3	28.00
0.65	0.65	12.1	121.1	29.3	10.0	28.00
0.70	0.70	13.5	140.1	31.1	10.4	29.78
0.75	0.75	15.1	159.0	33.8	10.6	32.49
0.80	0.80	16.7	180.4	36.5	10.8	35.19
0.85	0.85	18.6	204.5	39.2	11.0	37.89
0.90	0.90	20.5	231.2	41.9	11.3	40.59
0.95	0.95	22.6	260.8	44.6	11.5	43.30
1.00	1.00	24.9	293.3	47.3	11.8	46.00

ROLLED CURB - 3% X-SLOPE - 28' F/F

KAAS

MANNING'S N = .0170 SLOPE = .0169

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	1.0	0.94
0.10	0.10	0.1	0.1	2.6	1.4	2.53
0.15	0.15	0.3	0.5	4.4	1.8	4.35
0.20	0.20	0.5	1.2	6.2	2.2	6.17
0.25	0.25	0.9	2.4	8.0	2.6	7.98
0.30	0.30	1.3	4.0	9.9	3.0	9.80
0.35	0.35	1.9	6.2	12.1	3.3	12.02
0.40	0.40	2.6	8.9	15.1	3.5	15.04
0.45	0.45	3.4	12.6	18.1	3.7	18.05
0.50	0.50	4.4	17.3	21.1	4.0	21.07
0.55	0.55	5.5	23.2	24.1	4.2	24.08
0.60	0.60	6.8	30.5	27.2	4.5	27.09
0.65	0.65	8.2	39.1	30.2	4.8	30.11
0.67	0.67	8.7	42.3	31.2	4.9	31.13

ROLLED CURB - 3% X-SLOPE - 28' F/F

PINON POINT

MANNING'S N = .0170 SLOPE = .0280

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	1.2	0.94
0.10	0.10	0.1	0.2	2.6	1.8	2.53
0.15	0.15	0.3	0.6	4.4	2.3	4.35
0.20	0.20	0.5	1.6	6.2	2.9	6.17
0.25	0.25	0.9	3.0	8.0	3.4	7.98
0.30	0.30	1.3	5.2	9.9	3.9	9.80
0.35	0.35	1.9	7.9	12.1	4.2	12.02
0.40	0.40	2.6	11.4	15.1	4.5	15.04
0.45	0.45	3.4	16.2	18.1	4.8	18.05
0.50	0.50	4.4	22.3	21.1	5.1	21.07
0.55	0.55	5.5	29.9	24.1	5.4	24.08
0.60	0.60	6.8	39.2	27.2	5.8	27.09
0.65	0.65	8.2	50.3	30.2	6.1	30.11
0.67	0.67	8.7	54.5	31.2	6.3	31.13

ROLLED CURB - 3% X-SLOPE - 28' F/F

PINON POINT

MANNING'S N = .0170 SLOPE = .0293

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	1.3	0.94
0.10	0.10	0.1	0.2	2.6	1.8	2.53
0.15	0.15	0.3	0.7	4.4	2.4	4.35
0.20	0.20	0.5	1.6	6.2	2.9	6.17
0.25	0.25	0.9	3.1	8.0	3.5	7.98
0.30	0.30	1.3	5.3	9.9	4.0	9.80
0.35	0.35	1.9	8.1	12.1	4.3	12.02
0.40	0.40	2.6	11.7	15.1	4.6	15.04
0.45	0.45	3.4	16.5	18.1	4.9	18.05
0.50	0.50	4.4	22.8	21.1	5.2	21.07
0.55	0.55	5.5	30.6	24.1	5.6	24.08
0.60	0.60	6.8	40.1	27.2	5.9	27.09
0.65	0.65	8.2	51.5	30.2	6.3	30.11
0.67	0.67	8.7	55.8	31.2	6.4	31.13

ROLLED CURB - 3% X-SLOPE - 28' F/F

MANNING'S N = .0170 SLOPE = .0098

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	0.7	0.94
0.10	0.10	0.1	0.1	2.6	1.0	2.53
0.15	0.15	0.3	0.4	4.4	1.4	4.35
0.20	0.20	0.5	0.9	6.2	1.7	6.17
0.25	0.25	0.9	1.8	8.0	2.0	7.98
0.30	0.30	1.3	3.1	9.9	2.3	9.80
0.35	0.35	1.9	4.7	12.1	2.5	12.02
0.40	0.40	2.6	6.8	15.1	2.6	15.04
0.45	0.45	3.4	9.6	18.1	2.8	18.05
0.50	0.50	4.4	13.2	21.1	3.0	21.07
0.55	0.55	5.5	17.7	24.1	3.2	24.08
0.60	0.60	6.8	23.2	27.2	3.4	27.09
0.65	0.65	8.2	29.8	30.2	3.6	30.11
0.67	0.67	8.7	32.2	31.2	3.7	31.13

ROLLED CURB - 3% X-SLOPE - 28' F/F

MANNING'S N = .0170 SLOPE = .0254

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	1.2	0.94
0.10	0.10	0.1	0.2	2.6	1.7	2.53
0.15	0.15	0.3	0.6	4.4	2.2	4.35
0.20	0.20	0.5	1.5	6.2	2.7	6.17
0.25	0.25	0.9	2.9	8.0	3.2	7.98
0.30	0.30	1.3	4.9	9.9	3.7	9.80
0.35	0.35	1.9	7.6	12.1	4.0	12.02
0.40	0.40	2.6	10.9	15.1	4.3	15.04
0.45	0.45	3.4	15.4	18.1	4.6	18.05
0.50	0.50	4.4	21.2	21.1	4.9	21.07
0.55	0.55	5.5	28.5	24.1	5.2	24.08
0.60	0.60	6.8	37.3	27.2	5.5	27.09
0.65	0.65	8.2	47.9	30.2	5.8	30.11
0.67	0.67	8.7	51.9	31.2	6.0	31.13

ROLLED CURB - 3% X-SLOPE - 28' F/F

MANNING'S N = .0170 SLOPE = .0075

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	0.6	0.94
0.10	0.10	0.1	0.1	2.6	0.9	2.53
0.15	0.15	0.3	0.3	4.4	1.2	4.35
0.20	0.20	0.5	0.8	6.2	1.5	6.17
0.25	0.25	0.9	1.6	8.0	1.8	7.98
0.30	0.30	1.3	2.7	9.9	2.0	9.80
0.35	0.35	1.9	4.1	12.1	2.2	12.02
0.40	0.40	2.6	5.9	15.1	2.3	15.04
0.45	0.45	3.4	8.4	18.1	2.5	18.05
0.50	0.50	4.4	11.5	21.1	2.6	21.07
0.55	0.55	5.5	15.5	24.1	2.8	24.08
0.60	0.60	6.8	20.3	27.2	3.0	27.09
0.65	0.65	8.2	26.0	30.2	3.2	30.11
0.67	0.67	8.7	28.2	31.2	3.2	31.13

ROLLED CURB - 3% X-SLOPE - 28' F/F

MANNING'S N = .0170 SLOPE = .0158

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	0.67	4	11.00	0.06	7	37.00	1.05
2	9.00	0.33	5	35.00	0.78	8	46.00	1.38
3	10.00	0.00	6	36.00	0.72			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
0.05	0.05	0.0	0.0	1.0	0.9	0.94
0.10	0.10	0.1	0.1	2.6	1.3	2.53
0.15	0.15	0.3	0.5	4.4	1.8	4.35
0.20	0.20	0.5	1.2	6.2	2.2	6.17
0.25	0.25	0.9	2.3	8.0	2.5	7.98
0.30	0.30	1.3	3.9	9.9	2.9	9.80
0.35	0.35	1.9	6.0	12.1	3.2	12.02
0.40	0.40	2.6	8.6	15.1	3.4	15.04
0.45	0.45	3.4	12.1	18.1	3.6	18.05
0.50	0.50	4.4	16.7	21.1	3.8	21.07
0.55	0.55	5.5	22.5	24.1	4.1	24.08
0.60	0.60	6.8	29.4	27.2	4.4	27.09
0.65	0.65	8.2	37.8	30.2	4.6	30.11
0.67	0.67	8.7	40.9	31.2	4.7	31.13

TOP OF GRATE ≈ 67.71
INVERT ≈ 63.71

1.5Q100 = 8.6 CFS

11.6%
18" RCP

5.18%
18" RCP

1.5Q100 = 34.5 CFS

Q100 = 23.03 CFS

TOP OF GRATE ≈ 64.5
INV = 60.5

1.14%
24" RCP

RIM ≈ 66.2
INVERT ≈ 60.2

1.5Q100 = 8.6 CFS

TOP OF GRATE ≈ 70.30
INVERT OF INLET ≈ 66.30

1.5Q100 = 17.3 CFS

1.27%
36" RCP

QPIPE =

30' WIDE DRAINAGE, SAS & UGL EASEMENT

60

61

NORTH

PIPE ANALYSIS AT AN INLET

ORIFICE:

18" RCP Q=CA(2GH)^.5

C=0.6

DEPTH OF INLET 4.00

AREA (SF) = 1.77

WS ELEVATION	HEIGHT ABOVE ABOVE C.L. OF PIPE	Q (CFS) ORIFICE DOUBLE GRATE	COMMENTS
0.00	0.00	0.00	
1.50	0.75	7.37	
1.70	0.95	8.29	
1.90	1.15	9.12	FLOW FROM 1ST INLET
2.10	1.35	9.88	
2.30	1.55	10.59	
2.50	1.75	11.25	
2.70	1.95	11.88	
2.90	2.15	12.47	
3.10	2.35	13.04	
3.30	2.55	13.58	
3.50	2.75	14.10	
3.70	2.95	14.61	
3.90	3.15	15.09	

PIPE ANALYSIS AT AN INLET

ORIFICE:

24" RCP Q=CA(2GH)^.5

C=0.6

DEPTH OF INLET 5.00

AREA (SF) = 3.14

WS ELEVATION	HEIGHT ABOVE ABOVE C.L. OF PIPE	Q (CFS) ORIFICE DOUBLE GRATE	COMMENTS
0.00	0.00	0.00	
2.00	1.00	15.12	
2.20	1.20	16.56	
2.40	1.40	17.89	FLOW @ SUMP ENTERS
2.60	1.60	19.12	
2.80	1.80	20.28	
3.00	2.00	21.38	
3.20	2.20	22.43	
3.40	2.40	23.42	
3.60	2.60	24.38	
3.80	2.80	25.30	
4.00	3.00	26.19	
4.20	3.20	27.05	
4.40	3.40	27.88	
4.60	3.60	28.69	
4.80	3.80	29.47	
5.00	4.00	30.24	

TRACT 9A STORM DRAIN ANALYSIS

SUNRISE

INLET #1

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.05180

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.03862	0.14374	3.72163
2.00000	0.10733	0.62256	5.80042
3.00000	0.19359	1.44357	7.45675
4.00000	0.29241	2.58910	8.85450
5.00000	0.40056	4.03037	10.06187
6.00000	0.51564	5.73136	11.11509
7.00000	0.63565	7.65050	12.03579
8.00000	0.75883	9.74151	12.83754
9.00000	0.88357	11.95372	13.52885
10.00000	1.00831	14.23197	14.11462
11.00000	1.13150	16.51624	14.59678
12.00000	1.25151	18.74060	14.97442
13.00000	1.36659	20.83136	15.24336
14.00000	1.47474	22.70347	15.39490
15.00000	1.57355	24.25290	15.41283
16.00000	1.65981	25.33745	15.26523
17.00000	1.72852	25.70964	14.87376
18.00000	1.76715	23.90745	13.52885

1.5 Q_{100} = 8.6 CFS

TRACT 9A STORM DRAIN ANALYSIS

SUNKISE

INLET #2

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.11600

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.03862	0.21509	5.56926
2.00000	0.10733	0.93163	8.68008
3.00000	0.19359	2.16024	11.15871
4.00000	0.29241	3.87448	13.25038
5.00000	0.40056	6.03128	15.05715
6.00000	0.51564	8.57673	16.63326
7.00000	0.63565	11.44864	18.01104
8.00000	0.75883	14.57775	19.21082
9.00000	0.88357	17.88822	20.24534
10.00000	1.00831	21.29753	21.12191
11.00000	1.13150	24.71584	21.84345
12.00000	1.25151	28.04449	22.40858
13.00000	1.36659	31.17322	22.81103
14.00000	1.47474	33.97476	23.03781
15.00000	1.57355	36.29342	23.06463
16.00000	1.65981	37.91639	22.84375
17.00000	1.72852	38.47337	22.25794
18.00000	1.76715	35.77647	20.24535

1.5 Q100 =

17.2 CFS

TRACT 9A STORM DRAIN ANALYSIS

SUNRISE

DOUBLE "D" SUMP

CULVERT RATING TABLE

24. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.01140

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.04479	0.07855	1.75371
2.00000	0.12504	0.34342	2.74643
3.00000	0.22665	0.80438	3.54894
4.00000	0.34416	1.45846	4.23770
5.00000	0.47417	2.29718	4.84468
6.00000	0.61418	3.30866	5.38709
7.00000	0.76224	4.47854	5.87546
8.00000	0.91669	5.79048	6.31674
9.00000	1.07605	7.22651	6.71575
10.00000	1.23901	8.76711	7.07589
11.00000	1.40432	10.39138	7.39958
12.00000	1.57079	12.07704	7.68849
13.00000	1.73727	13.80033	7.94369
14.00000	1.90258	15.53597	8.16574
15.00000	2.06554	17.25690	8.35468
16.00000	2.22490	18.93394	8.51001
17.00000	2.37935	20.53529	8.63065
18.00000	2.52741	22.02558	8.71469
19.00000	2.66742	23.36433	8.75914
20.00000	2.79743	24.50312	8.75916
21.00000	2.91494	25.37947	8.70670
22.00000	3.01655	25.90170	8.58654
23.00000	3.09680	25.89446	8.36168
24.00000	3.14159	24.15410	7.68849

$1.5Q_{100}$ = 17.3 CFS

TRACT 9A STORM DRAIN ANALYSIS

CULVERT RATING TABLE

30. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.01270

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.05020	0.09317	1.85594
2.00000	0.14054	0.40962	2.91468
3.00000	0.25547	0.96504	3.77754
4.00000	0.38908	1.76054	4.52485
5.00000	0.53776	2.79107	5.19022
6.00000	0.69890	4.04787	5.79181
7.00000	0.87048	5.51954	6.34078
8.00000	1.05085	7.19264	6.84462
9.00000	1.23855	9.05207	7.30860
10.00000	1.43233	11.08131	7.73659
11.00000	1.63102	13.26257	8.13146
12.00000	1.83356	15.57688	8.49543
13.00000	2.03894	18.00417	8.83017
14.00000	2.24619	20.52329	9.13694
15.00000	2.45437	23.11195	9.41666
16.00000	2.66255	25.74677	9.66998
17.00000	2.86980	28.40314	9.89727
18.00000	3.07518	31.05509	10.09864
19.00000	3.27772	33.67516	10.27397
20.00000	3.47641	36.23408	10.42285
21.00000	3.67019	38.70042	10.54454
22.00000	3.85789	41.03999	10.63794
23.00000	4.03825	43.21494	10.70140
24.00000	4.20984	45.18237	10.73257
25.00000	4.37098	46.89185	10.72800
26.00000	4.51965	48.28090	10.68243
27.00000	4.65327	49.26535	10.58726
28.00000	4.76820	49.71489	10.42635
29.00000	4.85853	49.36448	10.16037
30.00000	4.90874	46.22394	9.41667

Q_{100} = 23.03 CFS

1.5 Q_{100} = 34.5 CFS

60

61

62

36" RCP @ 12.7%

15 Q100 = 34.5 CFS

TOP OF GRATE ≈ 67°
INVERT ≈ 63°

18" RCP
6.2%

TOP OF GRATE ≈ 70.10
INVERT ≈ 66.10

5.2 CFS

8.6 CFS

RIM ≈ 67.5
INV ≈ 58°

24" RCP @ 10.0%

18" RCP 5.0%

RIM ≈ 66°
INV = 60°

18" RCP 15.0%

5.2 CFS

8.6 CFS

I, S Q100 = 30.78 CFS

SUNSET RIDGE PLACE

Q100 = 20.52 CFS

18" RCP
6.2%

TOP OF GRATE ≈ 67°
INVERT ≈ 63°

TOP OF GRATE ≈ 70.10
INVERT ≈ 66.10

I, S Q100 = 62.1 CFS

36" RCP @ 1.0%

9

NORTH

TRACT 9A STORM DRAIN ANALYSIS

SUNSET
INLETS 1 & 2

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.06200

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.03862	0.15725	4.07159
2.00000	0.10733	0.68110	6.34586
3.00000	0.19359	1.57931	8.15795
4.00000	0.29241	2.83257	9.68713
5.00000	0.40056	4.40936	11.00803
6.00000	0.51564	6.27030	12.16030
7.00000	0.63565	8.36991	13.16757
8.00000	0.75883	10.65755	14.04471
9.00000	0.88357	13.07778	14.80103
10.00000	1.00831	15.57027	15.44188
11.00000	1.13150	18.06934	15.96938
12.00000	1.25151	20.50286	16.38253
13.00000	1.36659	22.79022	16.67676
14.00000	1.47474	24.83838	16.84255
15.00000	1.57355	26.53351	16.86217
16.00000	1.65981	27.72004	16.70068
17.00000	1.72852	28.12723	16.27241
18.00000	1.76715	26.15557	14.80103

1.5 Q100 =
8.6 CFS

TRACT 9A STORM DRAIN ANALYSIS

SUNSET
INLETS 3 & 4

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.15000

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.03862	0.24459	6.33307
2.00000	0.10733	1.05940	9.87053
3.00000	0.19359	2.45651	12.68910
4.00000	0.29241	4.40585	15.06763
5.00000	0.40056	6.85845	17.12219
6.00000	0.51564	9.75300	18.91446
7.00000	0.63565	13.01878	20.48120
8.00000	0.75883	16.57704	21.84553
9.00000	0.88357	20.34153	23.02193
10.00000	1.00831	24.21842	24.01872
11.00000	1.13150	28.10555	24.83921
12.00000	1.25151	31.89071	25.48185
13.00000	1.36659	35.44854	25.93950
14.00000	1.47474	38.63430	26.19737
15.00000	1.57355	41.27095	26.22788
16.00000	1.65981	43.11651	25.97670
17.00000	1.72852	43.74988	25.31056
18.00000	1.76715	40.68311	23.02194

15Q00 =
13.8 CFS

TRACT 9A STORM DRAIN ANALYSIS

SUNRISE

MANHOLE TO MANHOLE

CULVERT RATING TABLE

24. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.10000

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.04479	0.23263	5.19405
2.00000	0.12504	1.01712	8.13423
3.00000	0.22665	2.38238	10.51105
4.00000	0.34416	4.31958	12.55097
5.00000	0.47417	6.80367	14.34870
6.00000	0.61418	9.79941	15.95518
7.00000	0.76224	13.26428	17.40161
8.00000	0.91669	17.14993	18.70858
9.00000	1.07605	21.40306	19.89034
10.00000	1.23901	25.96593	20.95698
11.00000	1.40432	30.77662	21.91566
12.00000	1.57079	35.76910	22.77134
13.00000	1.73727	40.87305	23.52719
14.00000	1.90258	46.01357	24.18484
15.00000	2.06554	51.11051	24.74442
16.00000	2.22490	56.07750	25.20448
17.00000	2.37935	60.82029	25.56177
18.00000	2.52741	65.23413	25.81070
19.00000	2.66742	69.19918	25.94232
20.00000	2.79743	72.57196	25.94239
21.00000	2.91494	75.16749	25.78701
22.00000	3.01655	76.71422	25.43112
23.00000	3.09680	76.69276	24.76515
24.00000	3.14159	71.53826	22.77134

1.5Q100=
27.6 CFS

TRACT 9A STORM DRAIN ANALYSIS

CULVERT RATING TABLE

36. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.01000

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.05509	0.09088	1.64978
2.00000	0.15449	0.40100	2.59570
3.00000	0.28134	0.94831	3.37062
4.00000	0.42932	1.73685	4.04559
5.00000	0.59457	2.76491	4.65030
6.00000	0.77437	4.02735	5.20082
7.00000	0.96662	5.51657	5.70707
8.00000	1.16962	7.22322	6.17570
9.00000	1.38191	9.13643	6.61144
10.00000	1.60224	11.24415	7.01779
11.00000	1.82946	13.53325	7.39741
12.00000	2.06255	15.98966	7.75238
13.00000	2.30056	18.59842	8.08432
14.00000	2.54258	21.34379	8.39453
15.00000	2.78778	24.20921	8.68406
16.00000	3.03532	27.17742	8.95372
17.00000	3.28442	30.23033	9.20417
18.00000	3.53429	33.34915	9.43589
19.00000	3.78416	36.51425	9.64923
20.00000	4.03326	39.70518	9.84444
21.00000	4.28080	42.90054	10.02161
22.00000	4.52600	46.07796	10.18073
23.00000	4.76802	49.21393	10.32166
24.00000	5.00603	52.28359	10.44412
25.00000	5.23912	55.26054	10.54768
26.00000	5.46634	58.11649	10.63170
27.00000	5.68667	60.82072	10.69532
28.00000	5.89896	63.33942	10.73739
29.00000	6.10196	65.63454	10.75631
30.00000	6.29421	67.66210	10.74990
31.00000	6.47401	69.36908	10.71501
32.00000	6.63926	70.68784	10.64695
33.00000	6.78723	71.52412	10.53804
34.00000	6.91409	71.72620	10.37392
35.00000	7.01349	70.97216	10.11938
36.00000	7.06858	66.69835	9.43589

Q_{100} = 43.5 CFS

1.5 Q_{100} = 62.1 CFS

PIPE ANALYSIS AT AN INLET

ORIFICE:
18" RCP Q=CA(2GH)^.5
C=0.6
DEPTH OF INLET 4.00
AREA (SF) = 1.77

WS ELEVATION	HEIGHT ABOVE ABOVE C.L. OF PIPE	Q (CFS) ORIFICE / DOUBLE GRATE	COMMENTS
0.00	0.00	0.00	
1.50	0.75	7.37	
1.70	0.95	8.29	
1.90	1.15	9.12	DOUBLE "A" INLETS
2.10	1.35	9.88	
2.30	1.55	10.59	
2.50	1.75	11.25	
2.70	1.95	11.88	
2.90	2.15	12.47	
3.10	2.35	13.04	
3.30	2.55	13.58	
3.50	2.75	14.10	SINGLE "A" INLETS
3.70	2.95	14.61	
3.90	3.15	15.09	

PIPE ANALYSIS AT AN INLET

ORIFICE:
24" RCP Q=CA(2GH)^.5
C=0.6
DEPTH OF INLET 5.00
AREA (SF) = 3.14

WS ELEVATION	HEIGHT ABOVE ABOVE C.L. OF PIPE	Q (CFS) ORIFICE DOUBLE GRATE	COMMENTS
0.00	0.00	0.00	
2.00	1.00	15.12	
2.20	1.20	16.56	
2.40	1.40	17.89	
2.60	1.60	19.12	
2.80	1.80	20.28	
3.00	2.00	21.38	
3.20	2.20	22.43	
3.40	2.40	23.42	
3.60	2.60	24.38	
3.80	2.80	25.30	
4.00	3.00	26.19	
4.20	3.20	27.05	
4.40	3.40	27.88	
4.60	3.60	28.69	FLOW FROM ALL 4 INLETS
4.80	3.80	29.47	
5.00	4.00	30.24	

6

5

4

SAGE PO

TOP OF GRATE 67°

INVERT WILL TEE FROM TOP OF STORM DRAIN

Q_{100} = 4.16 CFS (INLET)

36" RCP

1.0%

$1.5Q_{100}$ (PIPE) = 6.26 CFS

R

SAGE POINT COURT

NORTH

1

5

SNAG POINT COURT

1.5Q100 = 66.25 CFS 36" RCP 1.27%

R = 75'

1.5Q100 = 15.25 CFS

18" RCP 6.84%

TOP OF GRATE = 718
INVERT ≈ 678

8.4 CFS

18" RCP 4.17%

8.4 CFS

TOP OF GRATE ≈ 718
INVERT = 668

1.5Q100 = 32.05 CFS

SANDIA POINT ROAD

PUBLIC STORM DRAIN EASEMENT

42" RCP 1.78%

24" RCP @ 20.0%

Qpipe = 69.08 CFS

NOT 1.5 Q100

NORTH

TRACT 9A STORM DRAIN ANALYSIS

SANDIA POINT

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.04170

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.03862	0.12896	3.33915
2.00000	0.10733	0.55858	5.20430
3.00000	0.19359	1.29521	6.69041
4.00000	0.29241	2.32302	7.94451
5.00000	0.40056	3.61616	9.02779
6.00000	0.51564	5.14234	9.97278
7.00000	0.63565	6.86424	10.79886
8.00000	0.75883	8.74036	11.51821
9.00000	0.88357	10.72522	12.13847
10.00000	1.00831	12.76933	12.66404
11.00000	1.13150	14.81885	13.09665
12.00000	1.25151	16.81460	13.43548
13.00000	1.36659	18.69049	13.67678
14.00000	1.47474	20.37021	13.81275
15.00000	1.57355	21.76040	13.82883
16.00000	1.65981	22.73348	13.69640
17.00000	1.72852	23.06743	13.34517
18.00000	1.76715	21.45045	12.13848

$1.5Q_{100}$ = 8.4 CFS

TRACT 9A STORM DRAIN ANALYSIS

SANDIA POINT

CULVERT RATING TABLE

18. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.06840

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.03862	0.16517	4.27658
2.00000	0.10733	0.71539	6.66535
3.00000	0.19359	1.65882	8.56866
4.00000	0.29241	2.97517	10.17484
5.00000	0.40056	4.63136	11.56223
6.00000	0.51564	6.58598	12.77251
7.00000	0.63565	8.79129	13.83050
8.00000	0.75883	11.19411	14.75180
9.00000	0.88357	13.73619	15.54620
10.00000	1.00831	16.35416	16.21931
11.00000	1.13150	18.97905	16.77337
12.00000	1.25151	21.53509	17.20732
13.00000	1.36659	23.93760	17.51636
14.00000	1.47474	26.08888	17.69050
15.00000	1.57355	27.86935	17.71110
16.00000	1.65981	29.11562	17.54149
17.00000	1.72852	29.54332	17.09165
18.00000	1.76715	27.47239	15.54620

$1.5Q_{100} =$ 16.8 CFS

TRACT 9A STORM DRAIN ANALYSIS

SANDIA POINT / SAGE
INLET @ SUMP

CULVERT RATING TABLE

24. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.20000

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.04479	0.32899	7.34550
2.00000	0.12504	1.43842	11.50353
3.00000	0.22665	3.36919	14.86486
4.00000	0.34416	6.10882	17.74976
5.00000	0.47417	9.62184	20.29213
6.00000	0.61418	13.85846	22.56404
7.00000	0.76224	18.75853	24.60959
8.00000	0.91669	24.25367	26.45792
9.00000	1.07605	30.26850	28.12919
10.00000	1.23901	36.72137	29.63764
11.00000	1.40432	43.52472	30.99342
12.00000	1.57079	50.58514	32.20353
13.00000	1.73727	57.80321	33.27247
14.00000	1.90258	65.07301	34.20253
15.00000	2.06554	72.28117	34.99389
16.00000	2.22490	79.30556	35.64452
17.00000	2.37935	86.01289	36.14981
18.00000	2.52741	92.25498	36.50183
19.00000	2.66742	97.86242	36.68798
20.00000	2.79743	102.63226	36.68809
21.00000	2.91494	106.30288	36.46834
22.00000	3.01655	108.49029	35.96504
23.00000	3.09680	108.45995	35.02321
24.00000	3.14159	101.17038	32.20354

1.5 Q_{100} = 32.05 CFS

TRACT 9A STORM DRAIN ANALYSIS

MH @ SANDIA/SAGE TO EXIST STUB OUT

CULVERT RATING TABLE

42. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 1.00 SLOPE = 0.01780

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
1.00000	0.05957	0.13129	2.20382
2.00000	0.16728	0.58077	3.47197
3.00000	0.30503	1.37709	4.51459
4.00000	0.46609	2.52914	5.42625
5.00000	0.64640	4.03769	6.24645
6.00000	0.84309	5.89875	6.99655
7.00000	1.05400	8.10501	7.68976
8.00000	1.27735	10.64666	8.33495
9.00000	1.51167	13.51194	8.93844
10.00000	1.75567	16.68747	9.50493
11.00000	2.00821	20.15849	10.03802
12.00000	2.26829	23.90899	10.54053
13.00000	2.53496	27.92188	11.01472
14.00000	2.80736	32.17910	11.46241
15.00000	3.08467	36.66162	11.88510
16.00000	3.36612	41.34953	12.28402
17.00000	3.65099	46.22210	12.66017
18.00000	3.93855	51.25774	13.01438
19.00000	4.22811	56.43405	13.34735
20.00000	4.51900	61.72783	13.65961
21.00000	4.81056	67.11501	13.95160
22.00000	5.10212	72.57063	14.22363
23.00000	5.39301	78.06884	14.47593
24.00000	5.68258	83.58285	14.70862
25.00000	5.97013	89.08472	14.92173
26.00000	6.25500	94.54546	15.11519
27.00000	6.53645	99.93464	15.28883
28.00000	6.81376	105.22041	15.44234
29.00000	7.08616	110.36920	15.57532
30.00000	7.35283	115.34528	15.68720
31.00000	7.61291	120.11057	15.77723
32.00000	7.86545	124.62369	15.84444
33.00000	8.10945	128.83943	15.88756
34.00000	8.34377	132.70731	15.90496
35.00000	8.56712	136.16960	15.89445
36.00000	8.77802	139.15834	15.85304
37.00000	8.97472	141.59000	15.77654
38.00000	9.15503	143.35521	15.65864
39.00000	9.31609	144.29752	15.48907
40.00000	9.45384	144.15787	15.24860
41.00000	9.56155	142.36964	14.88981
42.00000	9.62112	134.23007	13.95160

Q_{100} = 69.08 CFS

BASINS A, B, C & D

PIPE ANALYSIS AT AN INLET

ORIFICE:

18" RCP Q=CA(2GH)^.5

C=0.6

DEPTH OF INLET 4.00

AREA (SF) = 1.77

WS ELEVATION	HEIGHT ABOVE ABOVE C.L. OF PIPE	Q (CFS) ORIFICE DOUBLE GRATE	COMMENTS
0.00	0.00	0.00	
1.50	0.75	7.37	
1.70	0.95	8.29	
1.90	1.15	9.12	FLOW FROM DOUBLE "A"
2.10	1.35	9.88	
2.30	1.55	10.59	
2.50	1.75	11.25	
2.70	1.95	11.88	
2.90	2.15	12.47	
3.10	2.35	13.04	
3.30	2.55	13.58	
3.50	2.75	14.10	
3.70	2.95	14.61	
3.90	3.15	15.09	

PIPE ANALYSIS AT AN INLET

ORIFICE:
24" RCP Q=CA(2GH)^.5
C=0.6
DEPTH OF INLET 5.00
AREA (SF) = 3.14

WS ELEVATION	HEIGHT ABOVE ABOVE C.L. OF PIPE	Q (CFS) ORIFICE DOUBLE GRATE	COMMENTS
0.00	0.00	0.00	
2.00	1.00	15.12	
2.20	1.20	16.56	
2.40	1.40	17.89	
2.60	1.60	19.12	
2.80	1.80	20.28	
3.00	2.00	21.38	
3.20	2.20	22.43	
3.40	2.40	23.42	
3.60	2.60	24.38	
3.80	2.80	25.30	
4.00	3.00	26.19	
4.20	3.20	27.05	
4.40	3.40	27.88	
4.60	3.60	28.69	
4.80	3.80	29.47	
5.00	4.00	30.24	

TRACT 9A AT HIGH DESERT

***** HYDRAULIC GRADE LINE CALCULATIONS *****

Manning's n = 0.013
for pipe

Station	Structure	Diam. (in.)	Q (cfs)	Area	Vel.	K	Sf	Length (ft.)	MH Dia. (ft.)	JNCT Angle	Hf	Hb	Hj	Hmh	Ht	Total Losses	HGL(dn)	HGL(up)	Low Point	HV	EGL(dn)	EGL(up)
2+12.17	CON								0.0	0.0		0.00	0.00	0.00	0.00	0.00		6001.39	6002.55	5.96	6007.35	6007.35
		96	985.0	50.27	19.60	9121	0.0117	8.00			0.09					0.09						
2+19.20	WYE								0.0	0.0		0.00	0.00	0.00	0.00	0.00	6001.48	6002.31	6002.95	5.13	6007.45	6007.45
		96	914.0	50.27	18.18	9121	0.0100	24.00			0.24					0.24						
2+33.26	BEND								0.00	45.00		1.10	0.00	0.00	0.22	1.31	6002.55	5998.08	6002.75	10.92	6007.69	6009.00
		78	880.0	33.18	26.52	5243	0.0282	8.00			0.23					0.23						
2+46.41	BEE H.								4.00	0.00		0.00	0.00	0.55	0.00	0.55	5998.30	5998.85	6009.00	10.92	6009.23	6009.77
		78	880.0	33.18	26.52	5243	0.0282	8.00			0.23					0.23						
2+54.41	TEE								0.00	0.00		0.00	0.00	0.00	0.00	0.00	5999.08	6000.47	6001.95	9.53	6010.00	6010.00
		78	822.0	33.18	24.77	5243	0.0246	8.00			0.20					0.20						
2+62.41	WYE								0.00	0.00		0.00	0.00	0.48	0.00	0.48	6000.66	6001.14	6002.80	9.53	6010.19	6010.67
		78	822.0	33.18	24.77	5243	0.0246	325.00			7.99					7.99						
5+86.89	BEND								0.00	20.00		0.90	0.00	0.48	0.00	1.37	6009.13	6010.51	6012.56	9.53	6018.66	6020.03
		78	822.0	33.18	24.77	5243	0.0246	32.00			0.79					0.79						
6+18.89	MH								4.00	0.00		0.00	0.00	0.48	0.00	0.48	6011.29	6011.77	6024.77	9.53	6020.82	6021.30
		78	822.0	33.18	24.77	5243	0.0246	441.42			10.85					10.85						
10+60.31	BEND								0.00	20.00		0.90	0.00	0.48	0.00	1.37	6022.62	6023.99	6045.00	9.53	6032.15	6033.52
		78	822.0	33.18	24.77	5243	0.0246	8.00			0.20					0.20						
10+68.31	MH								4.00	0.00		0.00	0.00	0.48	0.00	0.48	6024.19	6024.67	6044.43	9.53	6033.72	6034.20
		78	822.0	33.18	24.77	5243	0.0246	253.50			6.23					6.23			6031.70			
13+21.81	MH								8.00	0.00		0.00	0.00	0.00	0.12	0.12	6030.90	6025.72	6053.38	14.82	6040.43	6040.54
		66	734.0	23.76	30.89	3358	0.0478	155.96			7.45					7.45			6042.55			
14+77.77	MH								4.00	0.00		0.00	0.00	0.00	0.00	0.00	6033.17	6037.18	6061.26	10.81	6048.00	6048.00
		66	627.0	23.76	26.39	3358	0.0349	435.42			15.18					15.18			6049.39			
19+13.19	MH								4.00	0.00		0.00	0.00	0.54	0.00	0.54	6052.36	6052.90	6078.81	10.81	6063.17	6063.72
		66	627.0	23.76	26.39	3358	0.0349	1.00			0.03					0.03						
									0.00	0.00		0.00	0.00	0.00	2.16	2.16	6052.94	6065.91	6079.00	0.00	6063.75	6065.91

FLOW IN 66" RCP IS AT MAXIMUM BETWEEN GRAVITY & PRESSURE FLOW

THE DESIGN FLOW IS VERY CONSERVATIVE BECAUSE THE ACADEMY STORM DRAIN REPORT DID NOT ACCOUNT FOR DETAINING THE FLOW IN THE HIGHLANDS PONDS.

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NORTH

TRACT 4C
HIGH DESERT OPEN SPACE

EXIST 42" RCP
3.02%

2-DOUBLE GRATE
TYPE "D" INLETS

EXIST 42"x62" RCP
2.09%

42" RCP
2.00%

42" RCP
1.78%

EXIST 18" RCP
6.24%

SANITARY SEWER

CORTADERIA STREET

BASALE

ACADEMY STORM DRAIN ANALYSIS

CULVERT RATING TABLE

78. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.04200

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.22949	1.23253	5.37062
4.00000	0.64403	5.44592	8.45599
6.00000	1.17371	12.89727	10.98848
8.00000	1.79234	23.65692	13.19893
10.00000	2.48410	37.71817	15.18385
12.00000	3.23785	55.02849	16.99539
14.00000	4.04503	75.50364	18.66578
16.00000	4.89870	99.03541	20.21667
18.00000	5.79300	125.49654	21.66347
20.00000	6.72285	154.74405	23.01762
22.00000	7.68373	186.62115	24.28784
24.00000	8.67154	220.95920	25.48096
26.00000	9.68252	257.57837	26.60241
28.00000	10.71316	296.28894	27.65654
30.00000	11.76014	336.89175	28.64691
32.00000	12.82031	379.17828	29.57636
34.00000	13.89063	422.93124	30.44724
36.00000	14.96813	467.92459	31.26140
38.00000	16.04992	513.92322	32.02030
40.00000	17.13313	560.68292	32.72507
42.00000	18.21492	607.94989	33.37648
44.00000	19.29242	655.46002	33.97500
46.00000	20.36274	702.93848	34.52083
48.00000	21.42290	750.09784	35.01382
50.00000	22.46989	796.63702	35.45354
52.00000	23.50052	842.23938	35.83917
54.00000	24.51150	886.56952	36.16953
56.00000	25.49931	929.27020	36.44295
58.00000	26.46019	969.95605	36.65718
60.00000	27.39004	1008.20776	36.80928
62.00000	28.28434	1043.55945	36.89531
64.00000	29.13801	1075.48376	36.90999
66.00000	29.94519	1103.36475	36.84614
68.00000	30.69894	1126.45190	36.69351
70.00000	31.39071	1143.77576	36.43676
72.00000	32.00933	1153.96509	36.05090
74.00000	32.53901	1154.78015	35.48910
76.00000	32.95355	1141.38965	34.63631
78.00000	33.18306	1074.44763	32.37940

GRAVITY FLOW IN PIPE

ACADEMY STORM DRAIN ANALYSIS

CULVERT RATING TABLE

66. INCH DIAMETER PIPE

N = 0.01300 INCREMENT = 2.00 SLOPE = 0.04500

FLOW DEPTH (IN)	FLOW AREA (SQ FT)	DISCHARGE (CFS)	VELOCITY (FPS)
2.00000	0.21081	1.17019	5.55099
4.00000	0.59071	5.15479	8.72646
6.00000	1.07487	12.16948	11.32178
8.00000	1.63878	22.24909	13.57660
10.00000	2.26750	35.35288	15.59113
12.00000	2.95040	51.39467	17.41953
14.00000	3.67926	70.25630	19.09523
16.00000	4.44731	91.79534	20.64062
18.00000	5.24882	115.84968	22.07157
20.00000	6.07872	142.24046	23.39975
22.00000	6.93246	170.77431	24.63403
24.00000	7.80586	201.24455	25.78122
26.00000	8.69503	233.43219	26.84662
28.00000	9.59627	267.10654	27.83441
30.00000	10.50603	302.02533	28.74780
32.00000	11.42088	337.93503	29.58924
34.00000	12.33740	374.57007	30.36053
36.00000	13.25224	411.65271	31.06287
38.00000	14.16201	448.89178	31.69690
40.00000	15.06325	485.98163	32.26274
42.00000	15.95242	522.59979	32.75991
44.00000	16.82582	558.40442	33.18735
46.00000	17.67956	593.03027	33.54327
48.00000	18.50946	626.08344	33.82505
50.00000	19.31096	657.13275	34.02900
52.00000	20.07902	685.69696	34.14993
54.00000	20.80787	711.22534	34.18059
56.00000	21.49078	733.06165	34.11052
58.00000	22.11949	750.38049	33.92395
60.00000	22.68340	762.04974	33.59504
62.00000	23.16757	766.27985	33.07554
64.00000	23.54747	759.34509	32.24742
66.00000	23.75829	712.35834	29.98357

← RUNOFF IS REACHING PRESSURE FLOW