

**MASTER DRAINAGE PLAN  
for the  
ATRISCO BUSINESS PARK**

**SEPTEMBER 1992  
REVISED  
MARCH 1993  
OCTOBER 1993  
REDLINE COPY**

HYDROLOGY

J10/D2

5 PLANS

3 PLANS

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ENVIRONMENTAL DIVISION

## INTRODUCTION

*This is an updated version of the Master Drainage Plan for the Atrisco Business Park. Since the time that the March 1993 version was approved, some of the planned facilities have been constructed and the concepts for other facilities have changed. The purpose of this revision is to update the plan to reflect these changes.*

*Changes found in this revision include the following:*

### *Coors connection Storm Drain Watershed*

- The area of required conservation treatment has been reduced.*
- The conservation treatment plan has been modified.*
- The proposed Conservation Treatment for Tract "M," Unit 2 consists of perimeter dikes only.*
- Airport Drive Storm Drain and Airport Drive Storm Drain Outfall are constructed.*

### *Tierra Bayita Storm Drain Watershed*

- The proposed Unser Diversion has been modified from sedimentation/detention ponds with a lined channel outfall to a series of ponds connected by storm drains with a storm drain outfall.*
- The design outflow from the Unser Diversion is reduced; therefore it is no longer routed through the S.A.D. 214 Pond.*
- The design inflow to the S.A.D. 214 Pond is reduced; therefore the need for conservation treatment in the 214 Pond watershed has been eliminated. The need for the S.A.D. 214 Pond to be expanded is greatly reduced. Modifications to the pond to convert it from a retention facility to a detention facility are required to serve the developed condition. The proposed pond modification to be constructed with the Tierra Bayita Storm Drain will result in a small increase in pond volume.*
- The AHYMO model of the watershed has been updated to incorporate the changes noted above. The data tables have been updated to reflect the revised output from the updated model.*

# **MASTER DRAINAGE PLAN**

**for the**

## **ATRISCO BUSINESS PARK**

**SEPTEMBER 1992**

**REVISED**

**MARCH 1993**

***OCTOBER 1993***

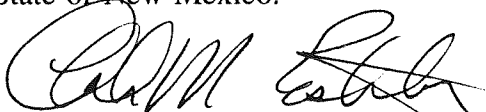
**PREPARED FOR:**

**SUNWEST BANK  
SPECIAL ASSETS DEPARTMENT  
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I, Charles M. Easterling, do hereby certify that this report and all revisions included herein were prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.

  
\_\_\_\_\_  
Charles M. Easterling, P.E.  
NMPE No. 6411

Date

*OCT 22, 1993*

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1. Tierra Bayita Storm Drain Watershed
2. Coors Connection Storm Drain Watershed

### APPENDIX B – AHYMO INPUT DATA

1. Tierra Bayita Storm Drain Watershed
2. Coors Connection Storm Drain Watershed

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## PLATES

Plate 1 – Overall Drainage Plan, Interim Condition

Plate 2 – Overall Drainage Plan, Fully Developed Condition

Plate 3 – Conceptual Grading and Drainage Plan (2.5 & 10 Acre Sites)

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Drainage Treatment Plan Sheet 2

# ATRISCO BUSINESS PARK MASTER DRAINAGE PLAN

## I. GENERAL

### A. Purpose and Authorization

This document has been prepared by Easterling & Associates, Inc. under contract to Sunwest Bank. Its purpose is to provide a drainage solution conducive to removal of the Flood Plain included in the subject area and to provide drainage criteria for subsequent development in the area.

### B. Description of the Plan Area

Drainage areas which are discussed in this plan are illustrated in Figure 1. The focus of this plan is on the tracts of land identified as the onsite watershed in Figure 1. The onsite watershed more specifically includes the following tracts of land within the Atrisco Business Park; Unit 2 Subdivision:

| <u>Parcel</u> | <u>Acres</u> |
|---------------|--------------|
| Tract T       | 40.5         |
| Lot 2         | 33.1         |
| Parcel A-1    | 26.1         |
| Parcel C      | 28.6         |
| Tract M       | 88.1         |
| Tract L-1     | 4.5          |
| Tract S-1     | <u>133.2</u> |
| Total         | 354.1        |

In addition to the onsite area, an offsite area of approximately 794 acres contributes flow either directly to the onsite area or to proposed drainage outfalls for the onsite area. These offsite areas are illustrated on Figure 1. These offsite areas were included in the analysis performed for this plan for the purpose of verifying capacity in existing and proposed storm drainage facilities and equitably distributing the system capacity throughout the watershed. This document is not intended to serve as a master plan for these offsite areas but does identify potential storm water discharge constraints for these areas.

In the existing condition there is no outfall for storm water generated upstream of or on the onsite area. Much of this flow sheet flows across the property and eventually is ponded in natural depressions located in the onsite area. Due to this, a portion of the area is within a 100 Year FEMA Flood Plain as shown on Figure 3. This plan proposes to divide this area into two watersheds as shown on Figure 1. The dividing line is primarily the east right-of-way line of Unser

Boulevard. The west watershed will outfall to the future Tierra Bayita Storm Drain in Unser Boulevard. This watershed includes parcel A-1 located east of Unser Boulevard. The east watershed will outfall to the existing North/South Coors Connection Storm Drain via the future Airport Drive Storm Drain (*Constructed in 1993*). Both of the outfalls identified here outfall to the Amole del Norte Channel.

C. Methodology for Analysis

Hydrologic analysis was performed based on the August 1991, Section 22.2, Volume 2, DPM Drainage Criteria for the City of Albuquerque. Hydrologic Modeling was performed utilizing AMAFCA's AHYMO, March 1992 version. Model runs for the 100 year and 10 year storms were performed in order to verify street capacities and satisfy drainage ordinance criteria. A copy of the model input data is included in Appendix B of this report. Output summary tables are included in Appendix A.

Flow depths in the streets were determined from D.P.M. nomographs for street flow where typical street sections were analyzed and from Manning equation elsewhere.

D. Responsibility for Infrastructure

All of the land in the onsite watershed is included in the 1992 "Atrisco Business Park Master Development Plan for IP Uses." Developer responsibilities and phasing for future infrastructure construction are defined in the Master Development Plan.

II. TIERRA BAYITA STORM DRAIN WATERSHED

A. Background Information

The existing condition watershed is primarily undeveloped as shown by the photo based background on Plates 1 and 2. Existing street and drainage improvements within the onsite watershed were constructed by S.A.D. 214. These improvements include a portion of Unser Boulevard, a portion of Bluewater Road, a storm drain in Unser Boulevard, and a 9.5 ac-ft retention pond located on Tract A-1.

1. Existing Constraints

- Development of the property requires drainage improvements to be constructed along the western edge of the Business Park to intercept the flows from the large offsite watershed located west of the Business Park.

- Discharge of flow from the property limited in volume by lack of a drainage outfall from the area and in rate by the size of the existing Unser Storm Drain.
- F.E.M.A. Flood Plain covers a portion of the area.

## 2. Previous Studies

Several previous studies have been prepared which have referenced this watershed. The previous studies which have pertinence to the drainage plan proposed here are listed and discussed below.

- a. Drainage Plan for the Design of S.A.D. 214 Unser Boulevard by Scanlon and Associates dated February 14, 1983.
  - Established discharge criteria for property discharging into the Unser Storm Drain.
- b. West Bluff Drainage Plan Phase III by Andrews, Asbury, and Roberts, Inc. dated January 1987.
  - Delineated the boundaries of the offsite watershed.
  - Proposed the I-40 interceptor channel be constructed north of I-40. This project which will reduce the size of the offsite watershed.
  - Proposed the Unser Diversion Channel be constructed along the western and southern boundaries of the Business Park to intercept flow from the offsite watershed to the west and convey it to Unser Boulevard.
  - Proposed flow from the Unser Diversion Channel and the Unser Storm Drain be conveyed in a storm drain facility down Unser Boulevard from the south boundary of the Business Park to the Amole del Norte Channel.
- c. Preliminary Analysis Report for Amole del Norte Storm Diversion Facilities/Tierra Bayita Drainage Facilities by Greiner, Inc. dated October 31, 1990.
  - Proposed expansion and conversion of the existing S.A.D. 214 pond from a 9.5 ac-ft retention pond to a permanent 19 ac-ft detention pond.

*The design concept analyzed in the report assumed the flow from the Unser Diversion would be routed through the S.A.D. 214*

*Pond. The current plan for the Unser Diversion makes this routing unnecessary. Thus, the pond volume expansion is also unnecessary. Conversion to a detention pond is required in the current drainage plan.*

- Established the design flow rate for the S.A.D. 214 pond outfall (the Tierra Bayita Storm Drain) in Unser Boulevard at 311 cfs.

## B. Drainage Schemes

Plates 1 and 2 illustrate the drainage schemes for the interim and the fully developed conditions in the watershed.

### 1. Interim Condition

The interim condition illustrated on Plate 1 shows the facilities required to remove the FEMA Flood Plain from the onsite watershed. These facilities include:

- The Unser Diversion ~~Channel~~, a series of collection facilities and detention/retention/sedimentation ponds to be located along the western boundary of the Atrisco Business Park. These facilities will collect and treat runoff from the offsite watershed located north and west of the Business Park.
- ~~Expansion of the S.A.D. 214 Pond to 21.0 ac-ft capacity.~~
- ~~The Tierra Bayita Storm Drain Outfall or temporary facilities to retain runoff from the watershed. Specific information regarding these facilities will be provided in the Design Analysis Report for Unser Diversion Channel.~~
- ~~Conservation treatment and/or desiltation basins in portions of the undeveloped watershed to reduce sediment load and peak flow rates contributed to the drainage facilities.~~

### 2. Fully Developed Condition

The Fully Developed condition illustrated on Plate 2 shows the watershed in the fully developed condition and assumes the I-40 Interceptor will be constructed. The public drainage infrastructure requirements ~~are essentially the same as noted for the Interim Condition except that the Tierra Bayita storm will be required to support this level of development.~~ include:

- *The Tierra Bayita Storm Drain in Unser Boulevard to provide an outfall for the S.A.D. 214 Pond and the Unser Diversion.*
- *Modification of the S.A.D. 214 Pond to convert it from a retention facility to a detention facility.*

C. Developed Condition Constraints

- Lots discharging flow to the existing Unser Storm Drain must control peak flow rates to those established by the Drainage Plan for the Design of S.A.D. 214 Unser Boulevard, by Scanlon & Associates dated February 14, 1983.
- A master drainage plan should be developed for the watershed west of the Unser Diversion Channel prior to discharge of developed flow from that area. This future drainage plan should determine allowable release rates from the area based on downstream capacity. ~~The analysis performed for this report indicates the maximum allowable discharge from the gross area is 1.3 cfs/Ac.~~ *The "Agreement for Atrisco Business Park Storm Water Improvements", filed with the City of Albuquerque Clerk's office on August 25, 1993 as document #93093160, establishes the discharge constraint for this property to not be less than 1.3 cfs/acre. A higher discharge rate may be possible depending upon how drainage facilities are configured within the area. The modeling performed for this plan assumed flow rates from the developed condition Unser Diversion Watershed of 2.2 to 2.5 cfs per acre. A multiple basin detention facility is very sensitive to the timing of inflow, therefore, future detailed drainage planning for the developed condition Unser Diversion Watershed should include modeling of the entire Unser Diversion System and Watershed.*
- ~~Peak 100 year flow rates from lot 1, Unit 2, Atrisco Business Park are restricted to a maximum of 1.3 cfs per acre.~~
- Lot 4 2, Unit 2 is allowed free discharge into the Unser Diversion Channel Storm Drain.
- Parcel A-1 and Lot 1, Unit 2 is are allowed free discharge into the expander modified S.A.D. 214 pond.
- Peak 100 year flow rates corresponding to the above criteria are noted on Plate 2.
- ~~The Unser Diversion Channel should be routed directly to the Tierra Bayita Storm Drain with excess flow routed to the expanded S.A.D. 214 Pond in order to accommodate the 100 year peak allowable discharge rates noted above. Modeling demonstrated that due to the wide peak in~~

~~the hydrograph created by detention in the upstream watershed, 21.0 ac-ft is not sufficient volume to control outflow from the S.A.D. 214 Pond to 311 cfs (the design capacity of the future outfall) if conventional reservoir routing is used. A schematic drawing Figure 2 illustrates a possible configuration of the connection to the Tierra Bayita Storm Drain. This configuration is beneficial in that the full capacity of the storm drain can be utilized earlier in the storm than normal routing through the pond would allow.~~

- *In regard to the S.A.D. 214 Pond modifications, it is recommended that the invert of the outfall for the S.A.D. 214 Pond be designed as low as possible in order to provide the opportunity for future expansion of the pond capacity.*

### III. COORS CONNECTION STORM DRAIN WATERSHED

#### A. Background Information

As illustrated on the photo based background of Plate 1, the existing condition watershed is largely undeveloped. Paved streets within the onsite watershed include the following:

- Bluewater Road from Unser Boulevard to Airport Drive.
- Airport Road from Los Volcanes to Bluewater Road.
- Airport Drive from Bluewater to the south line of the Business Park.
- No drainage facilities are constructed within the onsite watershed.

#### 1. Existing Constraints

- ~~No drainage outfall or collector system currently exists.~~
- *At the time of the first draft of this report, no drainage outfall or collector system existed. The Airport Drive Storm Drain was constructed in early 1993 to provide an outfall.*
- FEMA Flood plain covers much of the onsite watershed. This Flood plain is caused by sheet flow from the large offsite watershed west of Unser. The existing Unser Boulevard and the Unser Boulevard Storm drain were designed to handle flows from the on-site area west of Unser. Therefore, the additional flow from the offsite area west of Unser Boulevard is in excess of the design capacity of existing Unser Boulevard improvements.

- Lots in the lower portion of the watershed receive sheet flow from lots in the upper portion of the watershed.

## 2. Previous Studies

Several previous studies have included all of or portions of this watershed. Some of the most recent and pertinent studies are listed and discussed below.

### a. West Bluff Drainage Plan Phase III by Andrews, Asbury and Roberts, Inc. dated January 1987.

- Proposed the onsite watershed outfall to the West Bluff Outfall via the Future I-40 Interceptor, and the Future West Mesa Diversion.
- Due to the fact that completion of the projects listed above will be very costly and not expected to occur in the near future, another outfall for the onsite area is proposed in the plan presented here.

### b. Drainage Management Study for the North/South Coors Connection by Denny-Gross and Associates dated June 1983.

- Hydrologic and hydraulic analysis pertaining to the existing Coors Connection Storm Drain established the peak discharge rate from the entire Coors Connection Storm Drain at 138 cfs.

As-built drawings of the Coors Connection Storm Drain show a larger storm drain than the one analyzed in the study. A hydrologic analysis coinciding with the higher peak flow rates associated with the upsized storm drain could not be located. The analysis done for the Drainage Plan presented here includes the Coors Connection Storm Drain per the as-built drawings for the Project. The Watershed assumed for the Coors Connection Storm Drain includes the area which contributes flow to the storm drain in the existing condition. The allowable discharge rates, determined by this analysis, for the area currently discharging to the Coors Connection Storm Drain are in excess of 138 cfs.

### c. Letter/Report RE: North/South Coors Connection/Airport Drive Storm Drain Capacity by Easterling & Associates, Inc., dated April 7, 1992.

- Presented preliminary modeling of the watersheds of the subject storm drains and preliminary hydraulic analysis of the subject storm drains.
- d. Design Analysis Report for Airport Drive Storm Drain Outfall by Easterling & Associates, Inc., dated October 1992.
- e. Design Analysis Report for Airport Drive/Bluewater Storm Drain by Easterling & Associates, Inc., dated February 1993.

## B. Drainage Schemes

Plates 1 and 2 illustrate the drainage schemes and associated peak flow rates for the interim and the fully developed conditions in the watershed.

1. The interim condition illustrated on Plate 1 shows the facilities required to remove the FEMA flood plain from the onsite watershed and address local drainage problems. These facilities include:

### Facilities required for FEMA Flood Plain removal

- The Unser Diversion, a series of collection facilities and detention/retention/sedimentation pond to be located along the western boundary of the Atrisco Business Park. These facilities will collect and treat runoff from the offsite watershed located north and west of the Atrisco Business Park.

### Facilities required to address local drainage problems

- Airport Drive Storm Drain Outfall, approximately 780 LF of 48" diameter storm drain to be located in the median of Coors Boulevard downstream of Airport Drive. This storm drain will parallel existing 24" and 30" diameter segments of the existing Coors Connection Storm Drain and will connect to an existing 54" segment of the same. (~~PLANNED~~) (*CONSTRUCTED 1993*)
- Airport Drive Storm Drain, a 48" diameter storm drain to be located in Airport Drive extending from the Coors Connection Storm Drain to the south line of the Atrisco Business Park. (~~Currently under construction.~~) (*CONSTRUCTED 1993*)
- Airport Drive/Bluewater Road Storm Drain, a 48" diameter storm drain extending from the Airport Drive Storm Drain to the intersection of Airport Road and Bluewater Road. (*PLANNED FOR LATE 1993 CONSTRUCTION*)

- Conservation treatment as illustrated on Plate 1, Plate 5 and Plate 6 applied to the *indicated* portions of onsite undeveloped tracts to retain runoff and thus sediment onsite. ~~The~~ *This* conservation treatment or other retention or detention facilities ~~must~~ *should* be in place prior to the extension of the Airport Drive Storm Drain into the Business Park. This is due to the fact that the existing condition flow rate is greater than the developed condition flow rates proposed for the onsite area by this Plan.

In addition to providing protection for the Airport Drive storm drain, the conservation treatment can be modified in the future to protect individual developing lots from the sheet flow generated on undeveloped lots located upstream.

A drainage covenant to facilitate the maintenance of the interim drainage facilities will be required to be in place prior to the issuance of building permits within the onsite area of the Coors Connection Storm Drain Watershed.

2. The fully developed condition illustrated in Plate 2 requires the public storm drain facilities as listed for the interim condition and the additional public facilities listed below.
  - Airport Road Storm Drain, a 30" to 36" diameter storm drain extending north along Airport Road from the Airport/Bluewater Storm Drain to the intersection of Airport Road and Los Volcanes Road.
  - Bluewater Road Storm Drain, a 24" diameter storm drain extending west along Bluewater Road from the Airport Drive/Bluewater Road Storm Drain to the eastern boundary of Tract L-1. The purpose of this storm drain is to provide an outfall for the proposed private detention ponds along Bluewater Road.
  - Tract "M" Storm Drain, a 24" diameter storm drain extending down the back lot line of the lots in Tract "M." The purpose of this storm drain is to provide an outfall from the proposed private detention ponds located in the northern portion of Tract "M."
  - Los Volcanes Storm Drain, a 24" diameter storm drain extending west from the Airport Road Storm Drain to the east lot line of Lot 6, Tract S-1. The purpose of this storm drain is to provide

an outfall for the proposed private detention ponds to be located along Los Volcanes Road.

C. Developed Condition Drainage Constraints

1. Onsite Watershed

The maximum allowable peak 100 year discharge rates from lots in the onsite watershed are limited to the following:

- 0.1 cfs per acre except as provided below.
- Small areas of those lots located on the uphill side of a street may discharge uncontrolled to the street where required to facilitate grading. This provision is subject to the following criteria.
  - The total area allowed free discharge from the lot shall not be larger than an area equivalent to a strip 10 feet wide along the total street frontage of the lot.
  - Impervious areas allowed free discharge to the street shall not be larger than an equivalent area two feet wide along the total street frontage of the lot.
  - The free discharge from the small areas defined above shall not be considered a part of the 0.1 cfs allowable discharge from the lot.

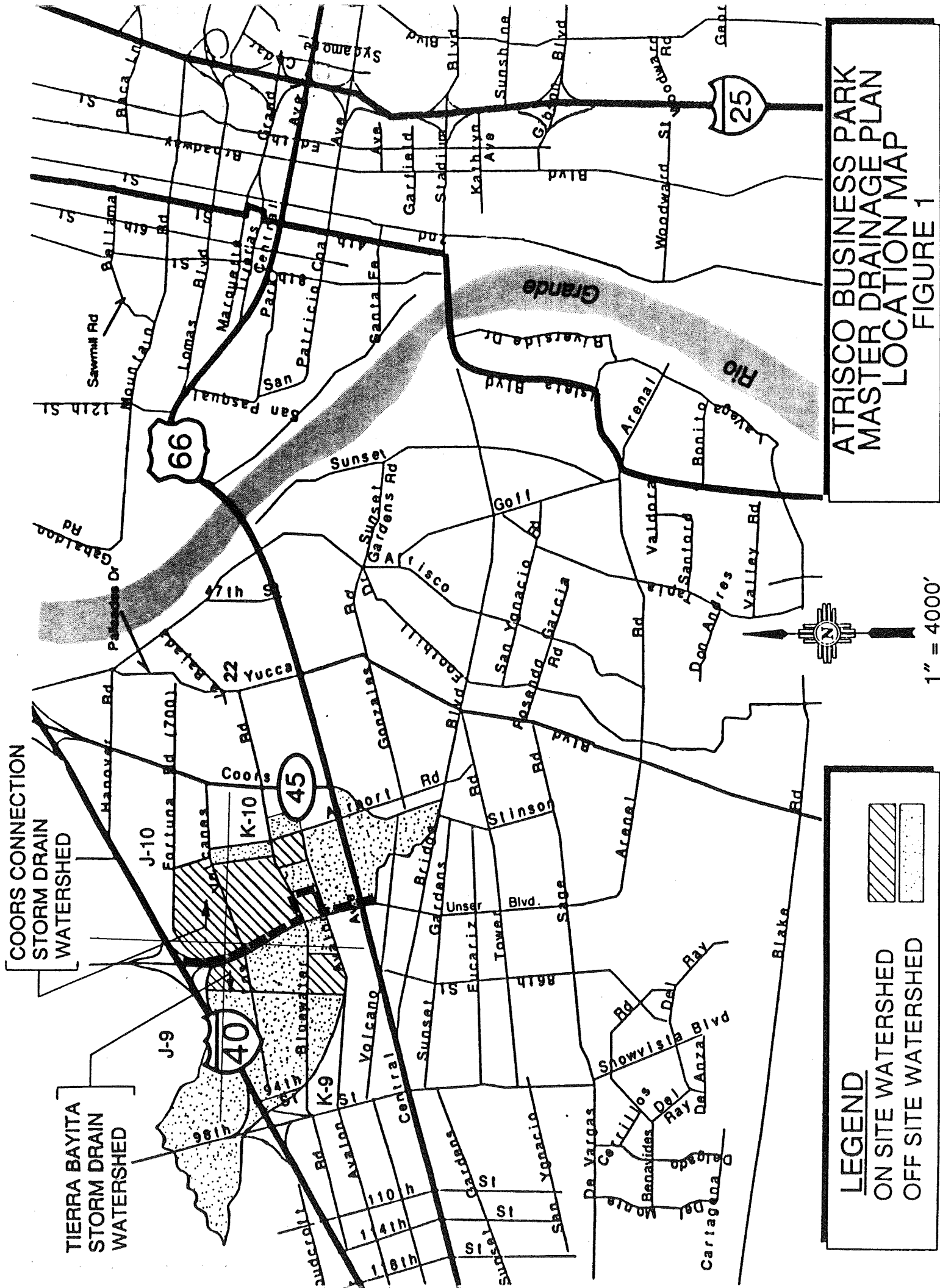
Pond areas outside of the parking areas shall be fully landscaped. A minimum of 85% of the surface area of the pond area shall consist of pervious ground treatments. Bark or other landscape materials which are prone to float under submerged conditions shall not be allowed as a surface treatment material within the limits of pond areas.

Low flow channels shall connect all inlets to the outlet in the detention pond(s). Low flow channels shall be constructed with durable, erosion resistant materials which facilitate long term maintenance of the pond area.

A covenant insuring the perpetuity and the maintenance of the required detention facilities on individual lots will be required to replace the interim condition drainage covenant at the time of development of individual lots.

2. Offsite Watershed

- Peak 100 year discharge from lots discharging into the Airport Drive Storm Drain is limited to 0.1 cfs per acre. This includes Basins 200.6, 210.4, 211.1, 220.2, 220.4 and 220.5 as shown on Plate 2.
- Peak 100 year discharge rates from all other lots contributing flow to the Coors Connection Storm Drain should be limited to rates which will not cause the aggregate flow rate at the point of connection to the Coors Connection Storm Drain to exceed the aggregate existing condition flow rates established by this Plan.



# ATRISCO BUSINESS PARK MASTER DRAINAGE PLAN LOCATION MAP

FIGURE 1

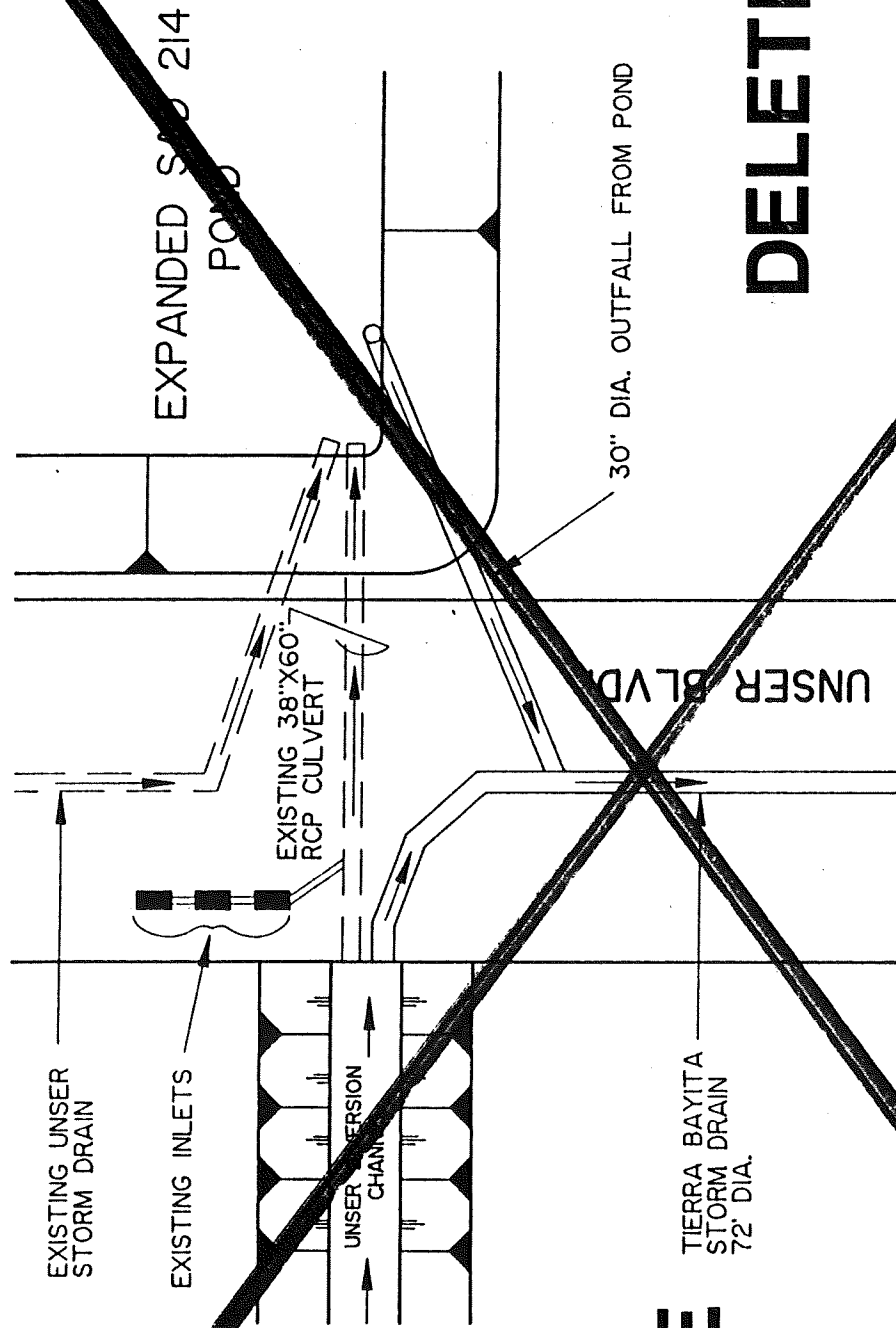
1" = 4000'

## FIGURES

Figure 1 – Location Map

~~Figure 2 – Connection Schematic~~

Figure 3 – F.E.M.A. Flood Plain Map



**DELETE**

**DELETE**

# **CONNECTION TO TIERRA BAYITA STORM DRAIN**

NOTE: INVERT OF TIERRA BAYITA STORM DRAIN CONNECTION TO THE CHANNEL IS LOWER THAN THE EXISTING CULVERT INVERT. LOW FLOWS ARE DIVERTED DIRECTLY TO THE TIERRA BAYITA STORM DRAIN. FLOWS IN EXCESS OF THE TIERRA BAYITA STORM DRAIN CAPACITY ARE ROUTED THROUGH THE EXISTING 38" X 60" CULVERT TO BE DETAINED IN THE EXPANDED S&D 214 POND.

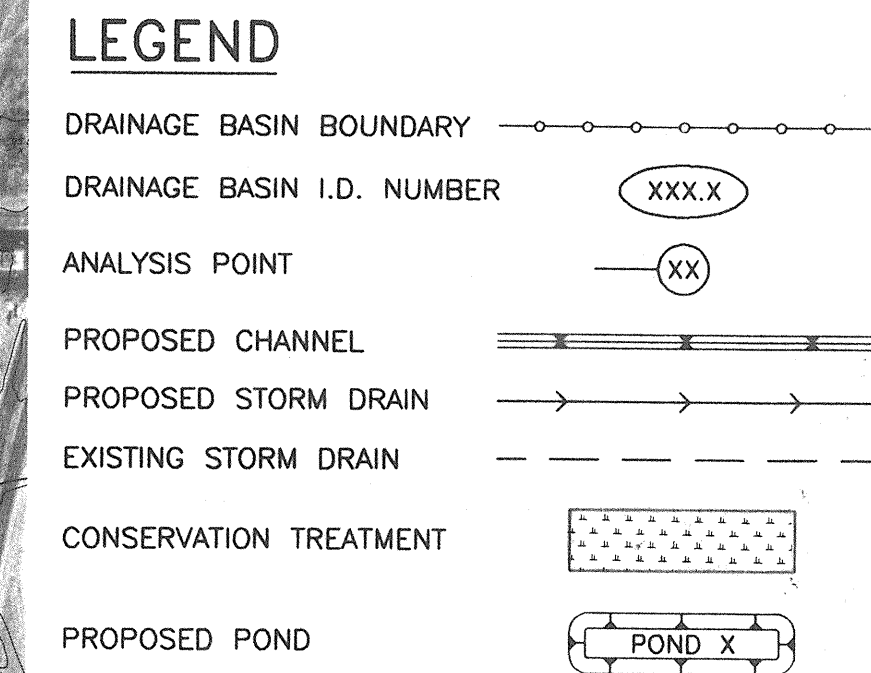
EASTERLING & ASSOCIATES, INC.

ATRISCO BUSINESS PARK  
MASTER DRAINAGE PLAN  
SCHEMATIC

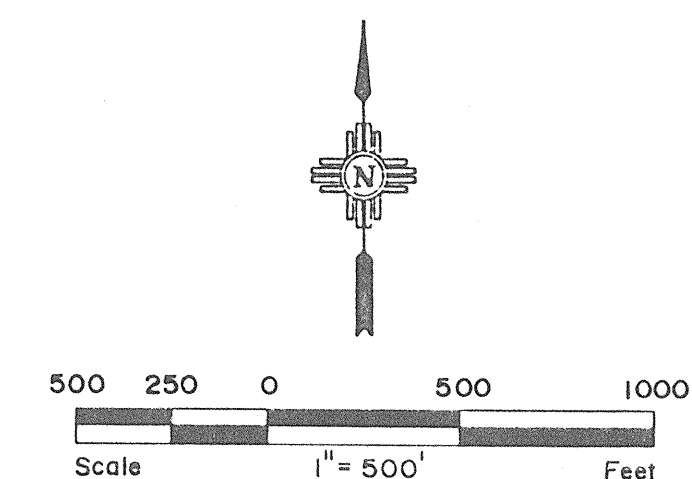
FIGURE NO. 2

DATE: MARCH 1995





THIS BASE MAP WAS PRODUCED BY COMPOSITING THE CONTOURS GENERATED BY BOHANNAN-HUSTON, INC., ALBUQUERQUE, NEW MEXICO, FOR THE 1993 FEMA FLOODWAY MAPS AND 1991 RECTIFIED AERIAL PHOTOGRAPHY.



**GENERAL NOTES**

- CONSERVATION TREATMENT CONSISTING OF SMALL DITCHES AND DIKES IS PROPOSED FOR TRACT M AND THE PORTIONS OF TRACT S-1 THAT CONTRIBUTE FLOW TO THE AIRPORT DRIVE STORM DRAIN. THE PROPOSED TREATMENT SHOULD BE DESIGNED TO PREVENT RUNOFF DEVELOPED ON THESE TRACTS IN THE 100-YEAR 10-DAY EVENT FROM OVERLOADING THE AIRPORT DRIVE STORM DRAIN.
- AS LOTS ARE DEVELOPED WITHIN THESE TRACTS, THE TREATMENT WILL BE REPLACED WITH PERMANENT ONSITE DETENTION PONDS.
- REFER TO THE REPORT FOR THE MASTER DRAINAGE PLAN FOR THE ATRISCO BUSINESS PARK FOR COMPLETE AHYMO ANALYSIS SUMMARY TABLES AND INPUT DATA.

| ANALYSIS POINT | SIDE | STREET FLOW |                       |                        |                 |                  |                  |                       | STORM DRAIN FLOW |                       |                        |            |                 |
|----------------|------|-------------|-----------------------|------------------------|-----------------|------------------|------------------|-----------------------|------------------|-----------------------|------------------------|------------|-----------------|
|                |      | AHYMO HYD # | Q <sub>10</sub> (cfs) | Q <sub>100</sub> (cfs) | SLOPE (ft./ft.) | FLOW DEPTH (ft.) |                  | V <sub>10</sub> (fps) | AHYMO HYD #      | Q <sub>10</sub> (cfs) | Q <sub>100</sub> (cfs) | DIA. (ft.) | SLOPE (ft./ft.) |
|                |      |             |                       |                        |                 | d <sub>10</sub>  | d <sub>100</sub> |                       |                  |                       |                        |            |                 |
| L              | BOTH | 170.31      | 14.7                  | 52.2                   | 0.015           | 0.48             | 0.57             | 2.5                   | --               |                       |                        |            |                 |
| M              | WEST | 170.43      | 0                     | 37.7                   | 0.017           | 0                | 0.63             | 0                     | 170.42           | 29.5                  | 41.0                   | 30"        | 0.010           |
| N              | WEST | --          | 0                     | 0                      | 0.020           | 0                | 0                | 0                     | 170.52           | 34.1                  | 80.8                   | 36"        | 0.015           |
| O              | BOTH | 170.81      | 17.7                  | 62.9                   | 0.014           | 0.50             | 0.62             | 2.7                   | --               |                       |                        |            |                 |
| P              | EAST | 170.94      | 0                     | 15.8                   | 0.018           | 0                | 0.48             | 0                     |                  |                       |                        |            |                 |
|                | WEST | 170.95      | 0                     | 48.0                   | 0.019           | 0                | 0.68             | 4.2                   | 170.92           | 60.7                  | 92.0                   | 42"        | 0.008           |
| Q              | EAST | 171.11      | 3.6                   | 14.3                   | 0.011           | 0.33             | 0.48             | 2.3                   |                  |                       |                        |            |                 |
|                | WEST | 171.02      | 3.8                   | 50.3                   | 0.011           | 0.35             | 0.77             | 2.4                   | 170.97           | 60.3                  | 92.9                   | 42"        | 0.010           |
| R              |      |             |                       |                        |                 |                  |                  |                       | 160.23           | 44.6                  | 135.4                  | 36"x60"    | 0.005           |
|                |      |             |                       |                        |                 |                  |                  |                       | 171.15           | 63.5                  | 100.2                  | 42"        | 0.010           |
| S              | EAST | 171.14      | 0                     | 6.3                    | 0.008           | 0                | 0.41             |                       |                  |                       |                        |            |                 |
|                | WEST | 171.04      | 0                     | 30.3                   | 0.008           | 0                | 0.69             |                       | 180.13           | 63.2                  | 90.2                   | 72"        | 0.010           |
| AA             | BOTH | 200.40      | 6.6                   | 10.4                   | 0.008           | 0.34             | 0.38             | 2.0                   | --               |                       |                        |            |                 |
| BB             | BOTH | 200.51      | 8.6                   | 14.3                   | 0.005           | 0.39             | 0.46             | 1.7                   | --               |                       |                        |            |                 |
| CC             | BOTH | 210.31      | 9.1                   | 15.7                   | 0.005           | 0.40             | 0.47             | 1.7                   | --               |                       |                        |            |                 |
| DD             | BOTH | 210.70      | 5.2                   | 8.2                    | 0.003           | 0.36             | 0.41             | 1.3                   | --               |                       |                        |            |                 |
| EE             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 210.92           | 17.1                  | 29.4                   | 48"        | 0.003           |
| FF             | BOTH | 220.10      | 5.5                   | 8.7                    | 0.004           | 0.36             | 0.41             | 1.6                   | 211.13           | 15.2                  | 26.7                   | 48"        | 0.003           |
| GG             | BOTH | 220.70      | 4.2                   | 6.7                    | 0.004           | 0.32             | 0.38             | 1.5                   | 220.72           | 22.3                  | 38.4                   | 48"        | 0.004           |
| HH             | BOTH | 230.31      | 11.3                  | 19.5                   | 0.008           | 0.40             | 0.47             | 2.3                   | 220.73           | 21.0                  | 19.5                   | 48"        | 0.004           |
| II             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 230.51           | 13.1                  | 24.9                   | 30"        | 0.006           |
| JJ             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 230.82           | 19.7                  | 40.6                   | 30"        | 0.010           |
| KK             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 230.84           | 45.2                  | 86.6                   | 48"        | 0.050           |
| LL             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 270.23           | 112.1                 | 231.8                  | 54"        | 0.021           |
| MM             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 280.31           | 116.3                 | 244.3                  | 72"        | 0.010           |
| NN             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 290.12           | 119.0                 | 262.2                  | 72"        | 0.005           |
| OO             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 290.21           | 123.5                 | 273.0                  | 72"        | 0.006           |
| PP             | BOTH | 210.91      | 8.9                   | 14.6                   | 0.003           | 0.43             | 0.50             | 1.4                   | --               |                       |                        |            |                 |
| QQ             | BOTH | 210.51      | 9.4                   | 16.7                   | 0.005           | 0.40             | 0.49             | 1.7                   | --               |                       |                        |            |                 |
| RR             | --   | --          | --                    | --                     | --              | --               | --               | --                    | 230.32           | 27.5                  | 49.3                   | 48"        | 0.020           |

NOTE: STREET FLOW DEPTHS IN OFFSITE AREAS WERE NOT ANALYZED IN AREAS WHERE THE STORM DRAIN HAS THE CAPACITY TO CARRY ALL OF THE FLOW FROM THE UPSTREAM STREET.

| INTERIM CONDITION DRAINAGE BASIN DATA |                  |           |                        |                          |                        |                        |                                |                        |                        |
|---------------------------------------|------------------|-----------|------------------------|--------------------------|------------------------|------------------------|--------------------------------|------------------------|------------------------|
| BASIN I.D. NUMBER                     | ASSUMED LAND USE | AREA (AC) | RUNOFF                 |                          | ANALYSIS FLOW RATE     |                        | Q <sub>100</sub> RELEASE (cfs) | Q <sub>100</sub> (cfs) | Q <sub>100</sub> (cfs) |
|                                       |                  |           | Q <sub>100</sub> (cfs) | V <sub>100</sub> (Ac-Ft) | Q <sub>100</sub> (cfs) | Q <sub>100</sub> (cfs) |                                |                        |                        |
| 1 120.X                               | Existing - U.    | 101.4     | 93.7                   | 4.68                     | 1                      | 93.7                   |                                |                        |                        |
| 1 130.X                               | Existing - U.    | 211.0     | 211.5                  | 9.42                     | 3                      | 211.5                  |                                |                        |                        |
| 1 140.X                               | Existing - U.    | 69.6      | 100.0                  | 8.40                     | 1                      | 100.0                  |                                |                        |                        |
| 1 150.X                               | Existing - U.    | 97.6      | 89.6                   | 3.88                     | 1                      | 89.6                   |                                |                        |                        |
| 160.1                                 | Existing - U.    | 33.1      | 47.2                   | 1.32                     |                        | 47.2                   |                                |                        |                        |
| 160.2                                 | Existing - P.D.  | 22.4      | 59.7                   | 2.25                     |                        | 59.7                   |                                |                        |                        |
| 170.1                                 | Existing - U.    | 40.5      | 44.0                   | 1.55                     |                        | 44.0                   |                                |                        |                        |
| 170.7                                 | Existing - U.    | 55.0      | 51.4                   | 2.05                     |                        | 51.4                   |                                |                        |                        |
| 180.1                                 | Existing - U.    | 21.6      | 34.2                   | 1.14                     |                        | 34.2                   |                                |                        |                        |
| 200.1                                 | Existing - U.    | 133.2     | 201.2                  | 5.31                     |                        | 201.2                  |                                |                        |                        |
| 210.1                                 | Existing - U.    | 47.9      | 67.7                   | 1.91                     |                        | 67.7                   |                                |                        |                        |
| 210.6                                 | Existing - U.    | 44.8      | 63.2                   | 1.79                     |                        | 63.2                   |                                |                        |                        |
| 220.2                                 | Existing - U.    | 20.0      | 77.8                   | 3.49                     |                        | 77.8                   |                                |                        |                        |
| 220.3                                 | Existing - U.    | 28.6      | 6.1                    | 0.28                     |                        | 6.1                    |                                |                        |                        |
| 220.6                                 | Developed        | 12.7      | 49.2                   | 2.21                     |                        | 49.2                   |                                |                        |                        |
| 230.1                                 | Existing - P.D.  | 1.2       | 3.8                    | 0.14                     |                        | 3.8                    |                                |                        |                        |
| 230.2                                 | Existing - P.D.  | 3.3       | 10.9                   | 0.40                     |                        | 10.9                   |                                |                        |                        |
| 230.5                                 | Existing - U.    | 4.2       | 6.5                    | 0.18                     |                        | 6.5                    |                                |                        |                        |
| 230.8                                 | Existing - P.D.  | 7.2       | 15.8                   | 0.53                     |                        | 15.8                   |                                |                        |                        |
| 240.1                                 | Existing - P.D.  | 21.3      | 58.7                   | 2.66                     |                        | 58.7                   |                                |                        |                        |
| 240.2                                 | Existing - P.D.  | 8.0       | 25.7                   | 1.32                     |                        | 25.7                   |                                |                        |                        |
| 240.3                                 | Existing - P.D.  | 5.1       | 12.9                   | 0.58                     |                        | 12.9                   |                                |                        |                        |
| 240.4                                 | Existing - P.D.  | 14.8      | 42.5                   | 2.26                     |                        | 42.5                   |                                |                        |                        |
| 250.1                                 | Existing - P.D.  | 15.8      | 33.2                   | 1.65                     |                        | 33.2                   |                                |                        |                        |
| 250.2                                 | Existing - P.D.  | 5.0       | 14.9                   | 0.60                     |                        | 14.9                   |                                |                        |                        |
| 260.1                                 | Existing - U.    | 25.5      | 33.1                   | 1.10                     |                        | 33.1                   |                                |                        |                        |
| 270.1                                 | Existing - P.D.  | 14.2      | 21.3                   | 0.64                     |                        | 21.3                   |                                |                        |                        |
| 280.1                                 | Existing - P.D.  | 4.2       | 6.6                    | 0.20                     |                        | 6.6                    |                                |                        |                        |
| 290.1                                 | Existing - P.D.  | 20.1      | 28.8                   | 0.85                     |                        | 28.8                   |                                |                        |                        |

- 1 Aggregate Basin
- 2 Clear Water Plus Sediment
- 3 Flow Rate into the Unser Diversion
- U. = UNDEVELOPED
- P.D. = PARTIALLY DEVELOPED

| UNSER DIVERSION STORM DRAIN DATA SUMMARY |            |                    |                    |                          |                          |                            |                            |
|--|------------|--------------------|--------------------|--------------------------|--------------------------|----------------------------|----------------------------|
| ANALYSIS POINT                           | AHYMO HYD# | PIPE DIAMETER (FT) | PIPE SLOPE (FT/FT) | FULL PIPE CAPACITY (CFS) | FULL PIPE VELOCITY (FPS) | % FULL PIPE CAPACITY (CFS) | % FULL PIPE VELOCITY (FPS) |
| A  | 120.66     | 36"                | 0.0270             | 109.6                    | 15.5                     | 15.0                       | 10.9                       |
| B  | 130.86     | 48"                | 0.0260             | 231.6                    | 18.4                     | 31.7                       | 12.9                       |
| C  | 130.88     | 42"                | 0.0130             | 114.7                    | 11.9                     | 15.7                       | 8.4                        |
| D  | 140.25     | 42"                | 0.0100             | 100.6                    | 10.5                     | 13.9                       | 7.4                        |
| E  | 140.27     | 48"                | 0.0125             | 160.6                    | 12.8                     | 22.0                       | 9.0                        |
| F  | 150.14     | 42"                | 0.0165             | 129.2                    | 13.4                     | 17.7                       | 9.4                        |

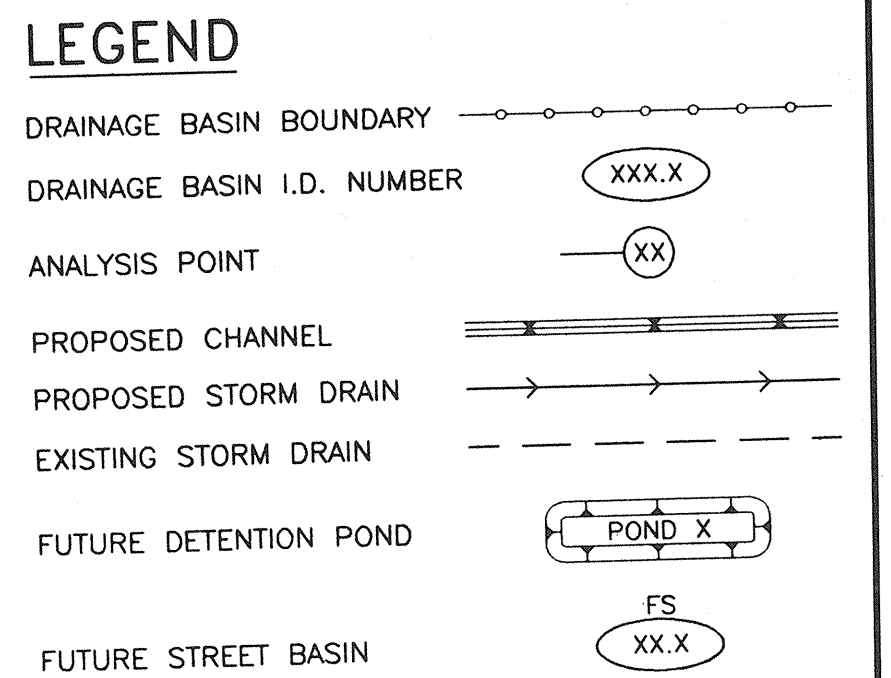
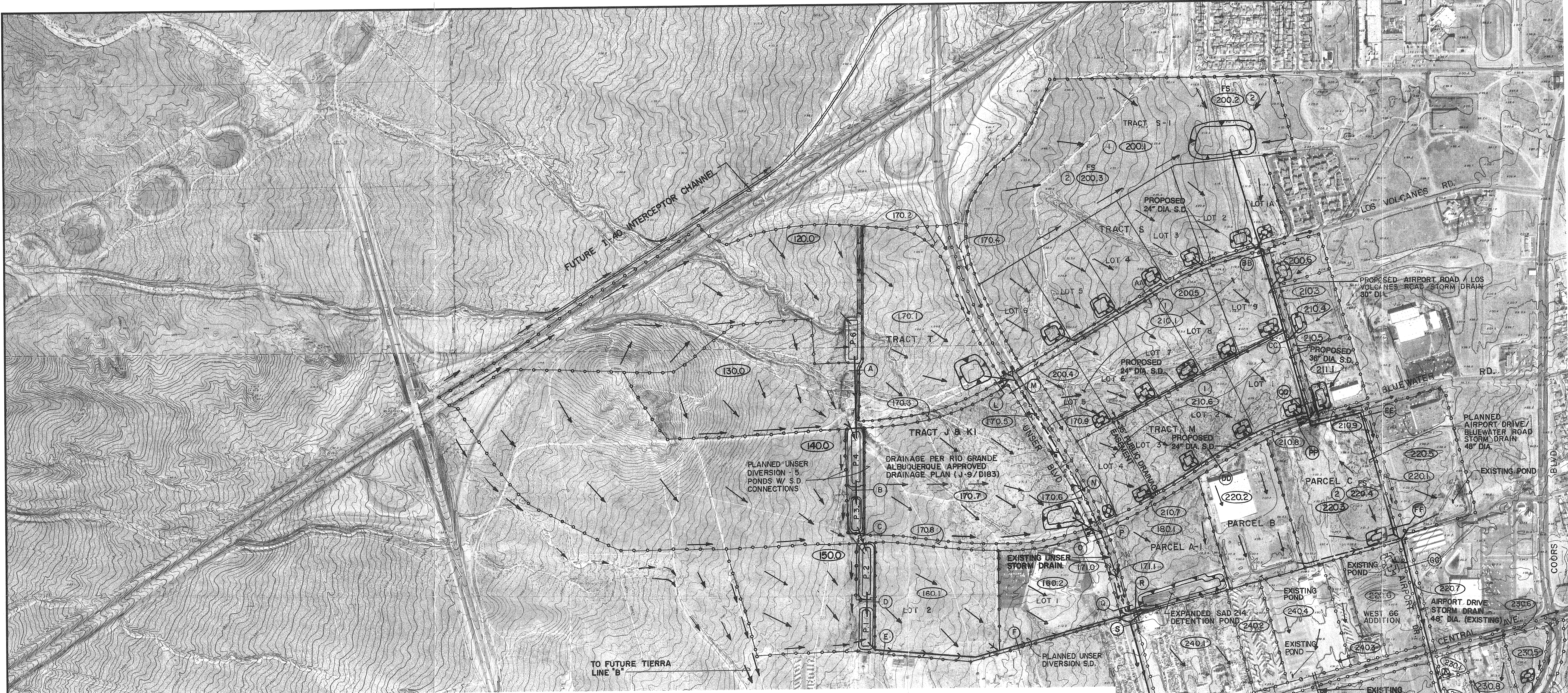
\*Refer to the Design Analysis Report for the Unser Diversion for additional information.



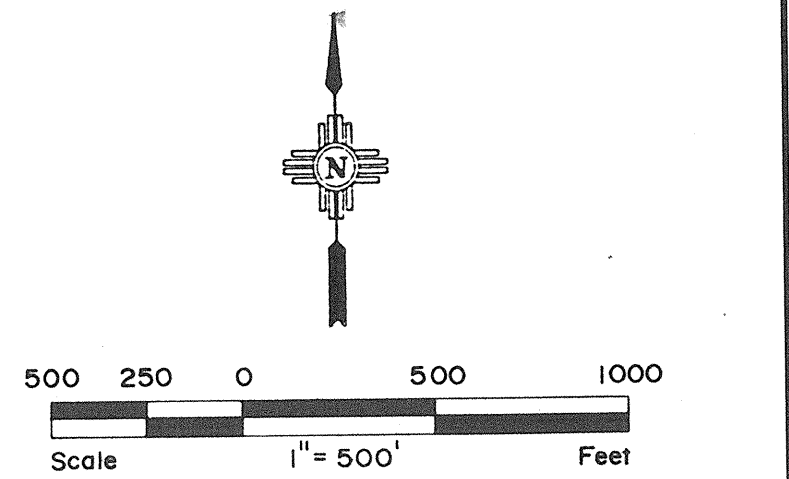
**ATRISCO BUSINESS PARK MASTER DRAINAGE PLAN OVERALL DRAINAGE PLAN INTERIM CONDITION**

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|                       |                           |                      |
|-----------------------|---------------------------|----------------------|
| DESIGNED BY<br>V.S.F. | DRAWN BY<br>D.E.C./J.L.B. | CHECKED BY<br>C.M.E. |
| JOB NO.<br>3321       | DATE<br>FEB, 1992         | Plate 1              |



THIS BASE MAP WAS PRODUCED BY COMPOSITING THE CONTOURS GENERATED BY BOHANNAN-HUSTON, INC., ALBUQUERQUE, NEW MEXICO, FOR THE 1983 FEMA FLOODWAY MAPS AND 1991 RECTIFIED AERIAL PHOTOGRAPHY.



**GENERAL NOTES**

- FUTURE PONDS ARE SHOWN SCHEMATICALLY ON THIS PLAN ONLY TO REPRESENT THAT CONTROL OF THE FLOW FROM THE UPSTREAM WATERSHED IS REQUIRED. LOCATION AND CONFIGURATION OF ACTUAL DETENTION PONDS SHALL BE APPROPRIATE FOR THE TYPE OF DEVELOPMENT WHICH OCCURS IN THE WATERSHED TO BE CONTROLLED.
- REFER TO THE REPORT FOR THE MASTER DRAINAGE PLAN FOR THE ATRISCO BUSINESS PARK FOR COMPLETE AHYMO ANALYSIS SUMMARY TABLES AND INPUT DATA.

**KEYED NOTES**

- FOR THE PURPOSE OF ANALYSIS TRACT "S-1," AND TRACT "M" WERE MODELED AS SINGLE BASINS WITH SINGLE DETENTION PONDS. IF PROPERTY DEVELOPS PER CURRENT SUBDIVISION, EACH LOT WILL REQUIRE A DETENTION POND AS ILLUSTRATED. ALL LOTS WITHIN THESE LARGE TRACTS ARE SUBJECT TO A MAXIMUM ALLOWABLE 100 YEAR PEAK DISCHARGE OF 0.1 CFS/ACRE.
- TO FACILITATE POSSIBLE FUTURE SUBDIVISION, SOME ESTIMATED FUTURE STREET AREAS WERE INCLUDED IN THE AHYMO MODELING OF THE SYSTEM.

**DEVELOPED CONDITION DRAINAGE BASIN DATA**

| ANALYSIS POINT |      | STREET FLOW |                       |                        |                 |                  |                       |             | STORM DRAIN FLOW      |                        |            |                 |       |
|----------------|------|-------------|-----------------------|------------------------|-----------------|------------------|-----------------------|-------------|-----------------------|------------------------|------------|-----------------|-------|
|                |      | AHYMO HYD # | Q <sub>10</sub> (cfs) | Q <sub>100</sub> (cfs) | SLOPE (ft./ft.) | FLOW DEPTH (ft.) | V <sub>10</sub> (fps) | AHYMO HYD # | Q <sub>10</sub> (cfs) | Q <sub>100</sub> (cfs) | DIA. (ft.) | SLOPE (ft./ft.) |       |
| L              | BOTH | 170.30      | 6.3                   | 9.7                    | 0.015           | 0.31             | 0.35                  | 2.5         | --                    |                        |            |                 |       |
| M              | WEST | 170.45      | 9.6                   | 32.1                   | 0.017           | 0.41             | 0.63                  | 3.5         | 170.44                | 41                     | 41.0       | 30"             | 0.010 |
| N              | WEST | --          | 0                     | 0                      | 0.020           | 0                | 0                     | 0           | 170.52                | 50.6                   | 75.1       | 36"             | 0.015 |
| O              | BOTH | 170.80      | 9.1                   | 14.1                   | 0.014           | 0.34             | 0.39                  | 2.7         | --                    |                        |            |                 |       |
| P              | EAST | 170.94      | 0                     | 6.8                    | 0.018           | 0                | 0.39                  | 0           | 170.92                | 92.0                   | 92.0       | 42"             | 0.008 |
|                | WEST | 170.95      | 12.0                  | 48.0                   | 0.019           | 0.44             | 0.68                  | 3.8         |                       |                        |            |                 |       |
| Q              | EAST | 171.11      | 3.6                   | 7.4                    | 0.011           | 0.33             | 0.41                  | 2.3         | 170.97                | 92.3                   | 92.9       | 42"             | 0.009 |
|                | WEST | 171.02      | 12.6                  | 51.0                   | 0.011           | 0.47             | 0.76                  | 3.1         |                       |                        |            |                 |       |
| R              |      |             |                       |                        |                 |                  |                       |             | 160.21                | 78.8                   | 111.1      | 38"x60"         | 0.005 |
|                |      |             |                       |                        |                 |                  |                       |             | 171.13                | 96.4                   | 99.4       | 42"             | 0.010 |
| S              | EAST | 171.14      | 0                     | 0                      | 0.008           | 0                | 0.20                  | 0           | 180.14                | 164.8                  | 226.8      | 72"             | 0.010 |
|                | WEST | 171.04      | 0                     | 31.1                   | 0.008           |                  | 0.66                  |             |                       |                        |            |                 |       |
| AA             | BOTH | 200.41      | 17.8                  | 28.4                   | 0.008           | 0.46             | 0.52                  | 2.6         | --                    | --                     | 2.2        | 24"             | 0.005 |
| BB             | BOTH | 200.51      | 16.7                  | 28.3                   | 0.005           | 0.48             | 0.57                  | 2.1         | 200.62                | 12.4                   | 18.3       | 30'             | 0.005 |
| CC             | BOTH | 216.31      | 16.0                  | 27.7                   | 0.005           | 0.47             | 0.57                  | 2.1         | 210.43                | 16.4                   | 31.1       | 36"             | 0.005 |
| DD             | BOTH | 210.70      | 5.2                   | 8.2                    | 0.003           | 0.36             | 0.42                  | 1.4         | --                    | --                     | 2.3        | 24"             | 0.005 |
| EE             |      | --          |                       |                        |                 |                  |                       |             | 211.12                | 48.1                   | 78.4       | 48"             | 0.003 |
| FF             | BOTH | 220.10      | 5.5                   | 8.7                    | 0.004           | 0.36             | 0.41                  | 1.6         | 211.13                | 45.4                   | 73.3       | 48"             | 0.003 |
| GG             | BOTH | 220.70      | 4.2                   | 6.7                    | 0.004           | 0.32             | 0.38                  | 1.5         | 220.72                | 55.9                   | 89.3       | 48"             | 0.004 |
| HH             | BOTH | 230.31      | 12.7                  | 19.0                   | 0.008           | 0.41             | 0.46                  | 2.3         | 220.73                | 54.6                   | 86.3       | 48"             | 0.004 |
| II             | --   | --          |                       |                        |                 |                  |                       |             | 230.51                | 5.0                    | 6.5        | 24"             | 0.006 |
| JJ             | --   | --          |                       |                        |                 |                  |                       |             | 230.82                | 27.1                   | 38.4       | 30"             | 0.010 |
| KK             | --   | --          |                       |                        |                 |                  |                       |             | 230.84                | 83.3                   | 133.1      | 48"             | 0.050 |
| LL             |      | 270.22      | 0.0                   | 16.0                   | 0.029           | 0                | 0.43                  | 0           | 270.23                | 190.3                  | 269.2      | 54"             | 0.021 |
| MM             | --   | --          |                       |                        |                 |                  |                       |             | 280.31                | 201.5                  | 287.3      | 72"             | 0.010 |
| NN             | --   | --          |                       |                        |                 |                  |                       |             | 290.12                | 221.7                  | 315.6      | 72"             | 0.005 |
| OO             | --   | --          |                       |                        |                 |                  |                       |             | 290.21                | 226.6                  | 323.7      | 72"             | 0.006 |
| PP             | BOTH | 210.91      | 8.9                   | 14.6                   | 0.003           | 0.43             | 0.50                  | 1.4         | --                    |                        |            |                 |       |
| QQ             | BOTH | 210.51      | 16.1                  | 30.0                   | 0.005           | 0.40             | 0.49                  | 1.7         | --                    |                        |            |                 |       |
| RR             | --   | --          |                       |                        |                 |                  |                       |             | 230.32                | 60.8                   | 99.8       | 48"             | 0.020 |

NOTE: STREET FLOW DEPTHS IN OFF-SITE AREAS WERE NOT ANALYZED IN LOCATIONS WHERE THE STORM DRAIN HAS THE CAPACITY TO CARRY ALL OF THE FLOW FROM THE UPSTREAM STREET.

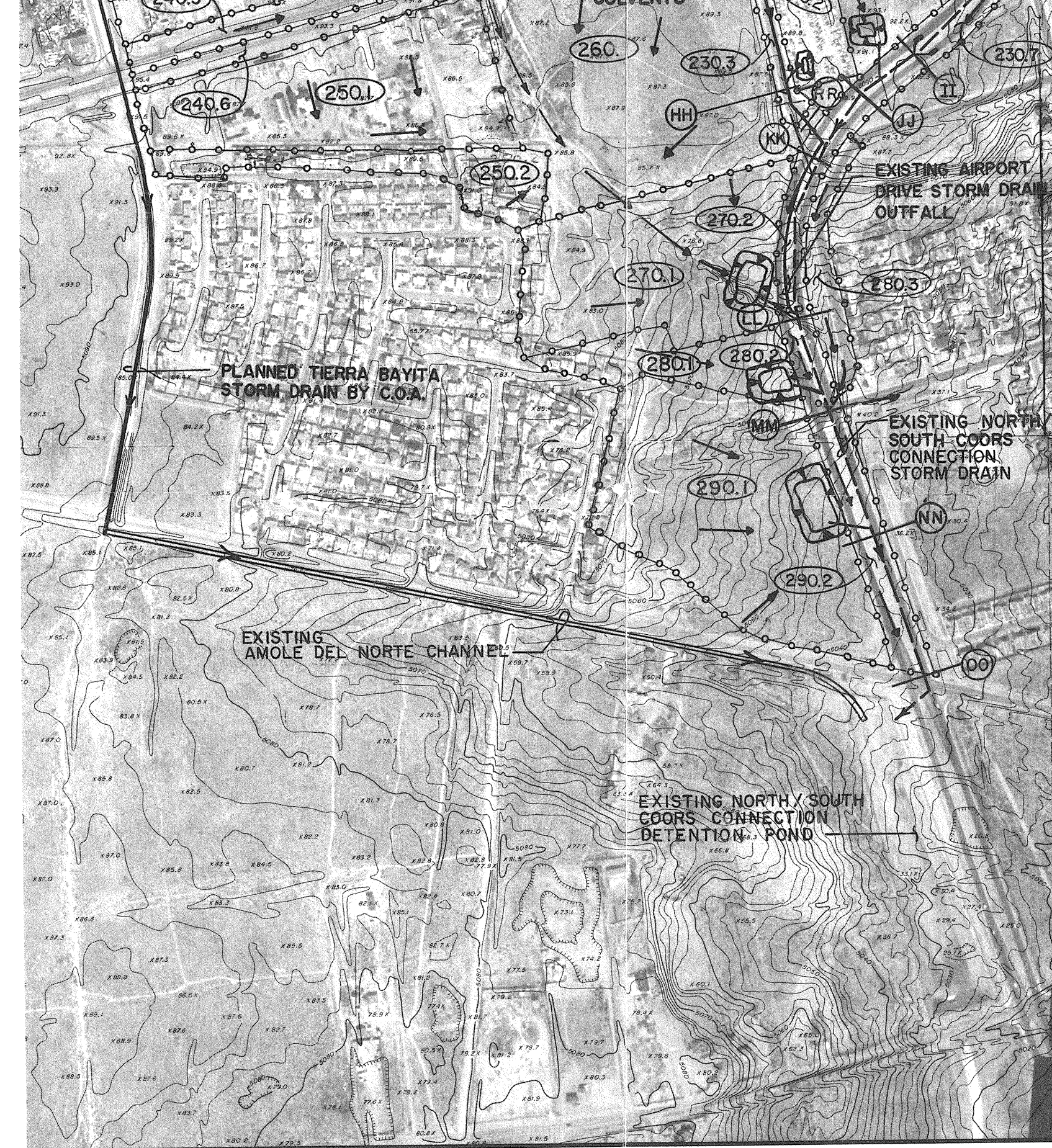
| BASIN I.D. NUMBER | ASSUMED LAND USE/ZONING | AREA (AC) | RUNOFF                 |                          | MAX. ALLOWED Q <sub>100</sub> RELEASE (cfs) |
|-------------------|-------------------------|-----------|------------------------|--------------------------|---|
|                   |                         |           | Q <sub>100</sub> (cfs) | V <sub>100</sub> (Ac-Ft) |   |
| 120.0             | IP                      | 72.0      | 273.9                  | 12.10                    | 93.6  |
| 130.0             | IP                      | 44.0      | 167.8                  | 7.39                     | 57.2  |
| 140.0             | IP                      | 95.0      | 284.1                  | 15.96                    | 123.5                                       |
| 150.0             | IP                      | 27.5      | 104.9                  | 4.62                     | 35.8  |
| 160.1             | IP                      | 33.0      | 126.1                  | 5.56                     | 126.1                                       |
| 160.2             | IP                      | 22.4      | 85.3                   | 3.76                     | 85.3  |
| 170.1             | IP                      | 40.5      | 160.2                  | 7.03                     | 47.2  |
| 170.7             | IP                      | 55.0      | 217.1                  | 9.90                     | 56.6  |
| 180.1             | IP                      | 21.6      | 77.9                   | 3.38                     | 77.9  |
| 200.1             | IP                      | 133.2     | 513.4                  | 23.19                    | 13.3  |
| 200.2             | Future Street           | 2.7       | 10.2                   | 0.45                     | 10.2  |
| 200.3             | Future Street           | 4.9       | 18.0                   | 0.82                     | 18.0  |
| 200.6             | IP                      | 4.5       | 17.4                   | 0.78                     | 0.5   |
| 210.1             | IP                      | 47.9      | 185.7                  | 8.34                     | 4.8   |
| 210.2             | Future Street           | 5.0       | 18.1                   | 0.84                     | 18.1  |
| 210.4             | IP                      | 7.5       | 29.1                   | 1.30                     | 0.7   |
| 210.6             | IP                      | 44.8      | 173.8                  | 7.80                     | 4.5   |
| 211.1             | IP                      | 7.5       | 29.1                   | 1.30                     | 0.8   |
| 220.2             | IP                      | 20.0      | 77.8                   | 3.49                     | 2.0   |
| 220.3             | IP                      | 28.6      | 111.1                  | 4.98                     | 2.9   |
| 220.4             | Future Street           | 1.2       | 4.4                    | 0.19                     | 4.4   |
| 220.5             | IP                      | 20.0      | 77.8                   | 3.49                     | 2.0   |
| 220.6             | C-2                     | 12.7      | 49.2                   | 2.21                     | 1.3   |
| 230.1             | C-2                     | 1.2       | 4.5                    | 0.20                     | 3.8   |
| 230.2             | C-2                     | 3.3       | 12.9                   | 0.58                     | 10.9  |
| 230.5             | C-2                     | 4.2       | 16.6                   | 0.74                     | 6.5   |
| 230.8             | C-2                     | 7.2       | 28.1                   | 1.26                     | 15.8  |
| 240.1             | IP                      | 21.3      | 81.2                   | 3.58                     | 1   |
| 240.2             | IP                      | 8.0       | 25.7                   | 1.32                     | 1   |
| 240.3             | C-2                     | 5.1       | 20.1                   | 0.90                     | 1   |
| 240.4             | Church                  | 14.8      | 42.5                   | 2.26                     | 1   |
| 250.1             | C-2, RT                 | 15.8      | 62.0                   | 2.77                     | 1   |
| 250.2             | R-1, C-2                | 5.0       | 14.9                   | 0.60                     | 1   |
| 260.1             | C-2, 0-1                | 25.5      | 97.1                   | 4.28                     | 1   |
| 270.1             | Mobile Home Park        | 14.2      | 54.2                   | 2.39                     | 1   |
| 280.1             | RA-1                    | 4.2       | 16.1                   | 0.71                     | 6.6   |
| 290.1             | Residential             | 20.1      | 67.5                   | 2.79                     | 28.8  |

- The aggregate peak Q<sub>100</sub> from basins 240.1, 240.2, 240.3, 240.4, 240.5, 240.6, 250.1, 250.2, 260.1, and 270.1 shall not exceed 146 cfs at the point of discharge to the Coors Connection Storm Drain.
- Basin modeled to verify capacity for future public streets.
- Release rate based on the 1.3 cfs per acre criteria included in the 8-25-93 Agreement for Atrisco Business Park Storm Water Improvements. Actual maximum allowed release rate should be based on downstream capacity as this property is master planned.

**UNSER DIVERSION STORM DRAIN DATA SUMMARY**

| ANALYSIS POINT | AHYMO HYD# | PIPE DIAMETER (FT) | PIPE SLOPE (FT/FT) | FULL PIPE CAPACITY (CFS) | FULL PIPE VELOCITY (FPS) | 1/4 FULL PIPE CAPACITY (CFS) | 1/4 FULL PIPE VELOCITY (FPS) | Q <sub>100</sub> (CFS)* |
|----------------|------------|--------------------|--------------------|--------------------------|--------------------------|------------------------------|------------------------------|-------------------------|
| A              | 120.02     | 36"                | 0.0270             | 109.6                    | 15.5                     | 15.0                         | 10.9                         | 65.2                    |
| B              | 130.03     | 42"                | 0.0130             | 114.7                    | 11.9                     | 15.7                         | 8.4                          | 98.6                    |
| C              | 130.05     | 42"                | 0.0100             | 100.6                    | 10.5                     | 13.9                         | 7.4                          | 93.2                    |
| D              | 140.03     | 48"                | 0.0125             | 160.6                    | 12.8                     | 22.0                         | 9.0                          | 144.4                   |
| E              | 150.03     | 42"                | 0.0165             | 129.2                    | 13.4                     | 17.7                         | 9.4                          | 125.0                   |
| F              | 160.12     | 48"                | 0.0190             | 198.0                    | 15.8                     | 27.1                         | 11.0                         | 147.6                   |

\*These peak flow rates are based on assumed detention in the watershed controlling flows to the Unser Diversion to between 2.2 to 2.5 cfs/acre.

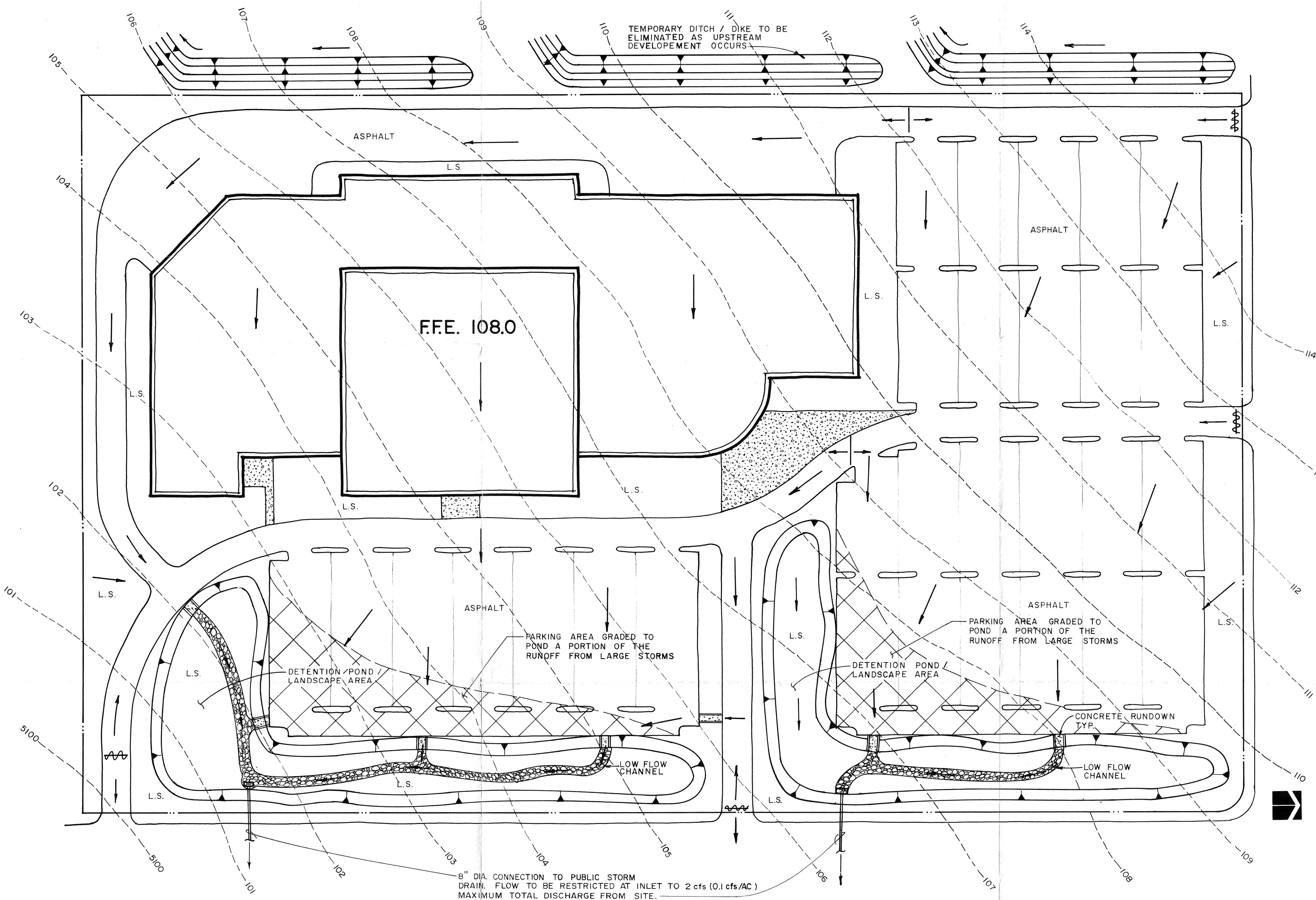


10-93 REVISION  
— REVISED UNSER DIVERSION SYSTEM  
— UP-DATED RUNOFF DATA TO REFLECT THIS CHANGE

**ATRISCO BUSINESS PARK MASTER DRAINAGE PLAN OVERALL DRAINAGE PLAN FULLY DEVELOPED CONDITION**

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|                       |                    |                      |                   |
|-----------------------|--------------------|----------------------|-------------------|
| DESIGNED BY<br>V.S.F. | DRAWN BY<br>C.L.B. | CHECKED BY<br>C.M.E. | DATE<br>FEB. 1992 |
| JOB NO.<br>3321       | PLATE<br>2         | REVISION<br>1        | DATE<br>FEB. 1992 |



TYPICAL 20 ACRE SITE

HYDROLOGY

TYPICAL SITE HYDROLOGY

| CONDITION   | AREA<br>(AC.) | LAND TREATMENT TYPE (%) |    |    |    | Q <sub>10</sub><br>(CFS) | Q <sub>100</sub><br>(CFS) | V <sub>10</sub><br>(AC-FT) | V <sub>100</sub><br>(AC-FT) | MAX. ALLOWABLE<br>DISCHARGE (CFS) | APPROX. POND VOLUME*<br>REQUIRED (AC-FT) |
|-------------|---------------|-------------------------|----|----|----|--------------------------|---------------------------|----------------------------|-----------------------------|-----------------------------------|--|
|             |               | A                       | B  | C  | D  |                          |                           |                            |                             |                                   |  |
| UNDEVELOPED | 20.0          | 100                     | 0  | 0  | 0  | 4.7                      | 25.7                      | 0.13                       | 0.73                        | 2.0                               |  |
| DEVELOPED   | 20.0          | 0                       | 15 | 10 | 75 | 47.6                     | 76.2                      | 1.64                       | 3.36                        | 2.0                               | 2.5                                      |

\*POND VOLUME PER AHYMO 100 YEAR 24 HOUR STORM ROUTING. DUE TO SMALL OUTLET SIZE, POND IS NOT COMPLETELY EVACUATED IN 24 HOURS. POND VOLUME CHECKED FOR ADEQUACY IN THE 10 DAY 100 YEAR STORM AS FOLLOWS:

TYPICAL 20 ACRE SITE

POND VOLUME REQUIRED PER 24 HOUR STORM ROUTING = 2.5 AC. FT.  
VOLUME REMAINING IN POND AT END OF 24 HOURS = 0.62 AC. FT.  
 $\Delta V$  24 HOUR - 10 DAY STORM =  $((3.67-2.66) + 12) \times (20.0 \times 0.75) = 1.26$  AC. FT.  
 $0.62 + 1.26 = 1.88$  AC. FT. < 2.5 AC. FT.

CONCLUSION: AT THE END OF THE 24 HOUR STORM, THE POND HAS ENOUGH VOLUME AVAILABLE TO POND THE ADDITIONAL VOLUME OF THE 10 DAY STORM. SIZE POND FOR 100 YEAR 24 HOUR STORM.

LEGEND

| DESCRIPTION            | NEW            | EXISTING       |
|------------------------|----------------|----------------|
| CONTOURS               | 5094<br>● 5088 | 5094<br>● 5088 |
| SPOT ELEVATIONS        | 5094<br>● 5088 | 5094<br>● 5088 |
| DRAINAGE AREA BOUNDARY | .....          | .....          |
| DRAINAGE DIVIDE        | .....          | .....          |
| WATER BLOCK            | .....          | .....          |
| DIRECTION OF FLOW      | .....          | .....          |
| ASPHALT PAVING         | ASPHALT        | ASPHALT        |
| LANDSCAPING            | L.S.           | L.S.           |
| CONCRETE               | CONCRETE       | CONCRETE       |
| SWALE                  | .....          | .....          |
| PROPERTY LINE          | .....          | .....          |

NOTES

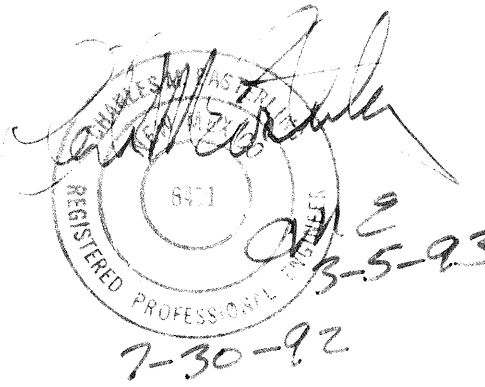
1. THE MAXIMUM ALLOWABLE DISCHARGE RATES SHOWN ON THIS SHEET APPLY TO ALL LOTS LOCATED EAST OF UNSER BOULEVARD EXCEPT PARCEL A-1, UNIT 2. THE MAXIMUM ALLOWABLE DISCHARGE RATE FOR LOTS LOCATED WEST OF UNSER BOULEVARD AND PARCEL A-1 SHALL BE AS STATED IN THE "1992 MASTER DRAINAGE PLAN REPORT FOR ATRISCO BUSINESS PARK."
2. THE MAXIMUM ALLOWABLE 100 YEAR STORM WATER DISCHARGE RATES FROM LOTS EAST OF UNSER BOULEVARD EXCEPT PARCEL A-1, UNIT 2, AS NOTED ABOVE, SHALL BE LIMITED TO THE FOLLOWING:
  - 0.1 CFS PER ACRE EXCEPT AS PROVIDED BELOW.
  - SMALL AREAS OF THOSE LOTS LOCATED ON THE UPHILL SIDE OF A STREET MAY BE ALLOWED FREE DISCHARGE TO THE STREET WHERE REQUIRED TO FACILITATE GRADING. THIS PROVISION IS SUBJECT TO THE FOLLOWING CRITERIA.
    - THE TOTAL AREA ALLOWED FREE DISCHARGE FROM THE LOT SHALL NOT BE LARGER THAN AN EQUIVALENT AREA 10 FEET WIDE ALONG THE TOTAL STREET FRONTAGE OF THE LOT.
    - IMPERVIOUS AREAS ALLOWED FREE DISCHARGE TO THE STREET SHALL NOT BE LARGER THAN AN EQUIVALENT AREA TWO FEET WIDE ALONG THE TOTAL STREET FRONTAGE OF THE LOT.
    - THE FREE DISCHARGE FROM THE SMALL AREAS DEFINED ABOVE SHALL NOT BE CONSIDERED A PART OF THE 0.1 CFS ALLOWABLE DISCHARGE FROM THE LOT.
3. POND AREAS OUTSIDE OF THE PARKING AREAS SHALL BE FULLY LANDSCAPED. A MINIMUM OF 85% OF THE SURFACE AREA OF THE POND AREA SHALL CONSIST OF PERVIOUS GROUND TREATMENTS. BARK OR OTHER LANDSCAPE MATERIALS WHICH ARE PRONE TO FLOAT UNDER SUBMERGED CONDITIONS SHALL NOT BE ALLOWED AS A SURFACE TREATMENT MATERIAL WITHIN THE LIMITS OF POND AREAS.
4. LOW FLOW CHANNELS SHALL CONNECT ALL INLETS TO THE OUTLET IN THE DETENTION POND(S). LOW FLOW CHANNELS SHALL BE CONSTRUCTED WITH DURABLE, EROSION RESISTANT MATERIALS WHICH FACILITATE LONG TERM MAINTENANCE OF THE POND AREA.

CONCEPTUAL  
GRADING AND DRAINAGE PLAN  
( 20 ACRE SITE )

ATRISCO  
BUSINESS  
PARK

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