PLANNING

RETENTION BASIN ANALYSIS

FINAL REPORT

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For

CITY OF TEMPE

DRAINAGE DIVERSION PROJECT
PHASE II

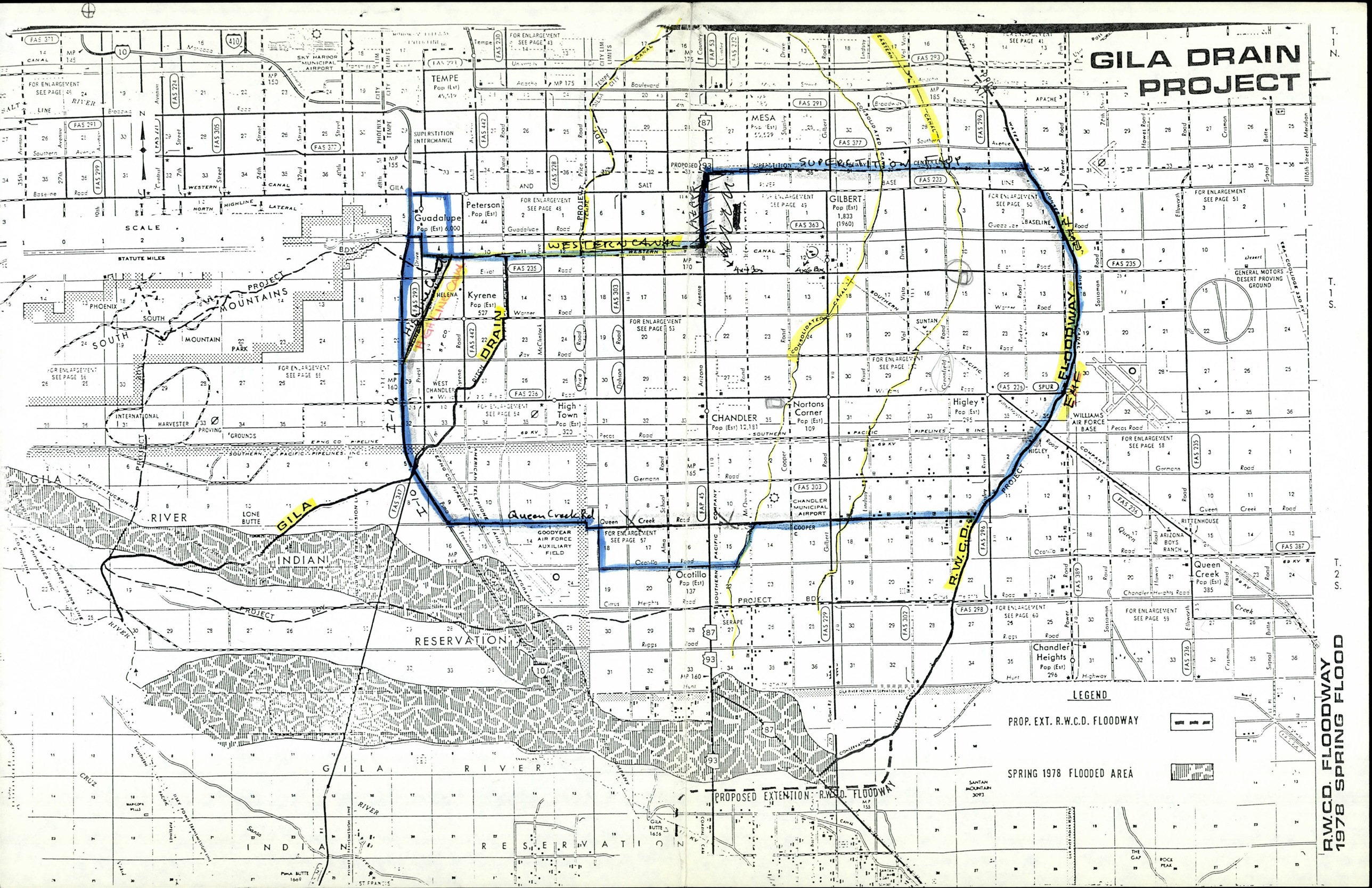
PROJECT NO. 886239

AUGUST 21, 1989

Registered Professional Engineer (Civil)
CERTIFICATE NO. 13124
RANDY HAUREL
Date Signed 8-21-89
ARIZONA, U.S.A.

CREEGAN + D'ANGELO

GILA DRAIN PROJECT



R.W.C.D. FLOODWAY
1978 SPRING FLOOD

CREEGAN + D'ANGELO
(FORMERLY BENSON & GERDIN)

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August 21, 1989

Mr. Lee Quaas, P.E.
City Engineer
P.O. Box 5002
Tempe, Arizona 85281

Attention: Mr. Howard Hargis

Reference: Drainage Diversion Project - Phase II
Project No. 886239

Gentlemen:

Per your letter dated August 15, 1989, we are submitting six copies of our Retention Basin Analysis, Final Report dated August 21, 1989, and have incorporated the City's review comments (letter of May 10, 1989).

Included in the attached report, please find our study for the existing A.D.O.T. borrow pit, review of the pump station plans and specifications, and evaluation of potential uses for the borrow pit.

Feel free to call us if you have any questions with this report, or the project in general.

Very truly yours,

CREEGAN + D'ANGELO

Randy L. Harrel

Randy L. Harrel, P.E.
Vice President

RLH:rs
Enclosure

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EXECUTIVE SUMMARY

This report was prepared for the City of Tempe Engineering Department to analyze the existing A.D.O.T. borrow pit located ¼ mile south of Warner Road just east of Interstate 10, concerning storm water holding, pump station design review, and potential for secondary uses.

1. Storm Water Holding

Precipitation values were computed and used, as follows.

Rainfall (inches)

	Duration		
Frequency	One Day	One Month	Three Months
One year	0.98	-	-
Five year	2.00	3.3	5.4
100 year	3.85	4.8	7.9

Hydrologic parameters for the existing, proposed, and future tributary areas were used as derived in previous reports, and direct runoff computed using SCS methods. Long term rainfalls were split into equal storms at two-week intervals. The percolation/evaporation rate range is ½ inches to 40 inches per day (Substantial further geotechnical testing would be required to determine the actual rate), which is expected to decrease substantially over time. Nominal pumping capacity of 10 cfs into the Highline Canal was considered, using previously specified pump curves. Stage-duration calculations for 21 different conditions were prepared, as summarized in Plate IV, with the following evaluation:

A. Maximum depth generally occurs after the first storm (24-hour rainfall); subsequent rainfalls (two weeks apart) merely extend or renew the inundation. Maximum water depths are 13 foot with the existing (Phase I) tributary area to 42 foot with the future (Phase III) tributary area, for the 100-year storm.

B. Without pumping, the inundation time could be very short or may never drain out (even in a relatively small storm), depending on percolation rates. A 100-year rainfall with the future (Phase III) tributary area would cause at least 12 days of inundation in a three-month period.

C. Hydrologically, the City could continue to operate the basin without pumping, or by using only portable temporary pumps when needed, even with the future tributary areas. However, basin floor "aging", or secondary use of the basin would necessitate pump station construction. In addition, safety, insect-control, and other factors may dictate sooner construction.

D. The pump station has only a small effect on maximum depth, but limits inundation length to a reasonably short period. The 100-year rainfall for the future tributary area will cause inundation of 9-35 days over a three-month period, depending on the percolation rate.

E. Relatively small storms will cause significant water depth. The five-year storm will cause 16 foot water depth, and the one-year storm will cause over a one foot water depth.

2. Pump Station Design

Review comments addressing technical appropriateness, adequacy and completeness of the construction documents, redundancy, and cost considerations have been made. Substantial reworking of the pump station design is recommended.

3. Potential Secondary Land Uses

Because of its primary use as a storm water detention facility, the basin is not suitable for structural, hazardous, un-interruptible, or difficult restoration and cleanup uses. There is possible potential for limited recreational use of the basin. One possible concept has been shown in Plate V.

RETENTION BASIN ANALYSIS

For

CITY OF TEMPE

DRAINAGE DIVERSION PROJECT
PHASE II
PROJECT NO. 886239

A. INTRODUCTION

This report was prepared by Creegan + D'Angelo for the City of Tempe Engineering Department concerning the existing A.D.O.T. borrow pit located ¼ mile south of Warner Road east of Interstate 10 (Plates I and II).

The purposes of this report are threefold.

1. Long term hydrology for the drainage area (Plate III) tributary to the existing A.D.O.T. borrow pit was determined. Inflow and outflow parameters were analyzed in various combinations to produce an estimation of water volume, depth, and expected inundation time in the pit; i.e.: stage-duration (Plate IV).

2. The previously designed (but unconstructed) pump station plans and specifications were reviewed to affirm or revise the concept (Plate VI).

3. Potential uses of the pit were explored.

B. DESIGN ASSUMPTIONS AND APPROACH

The hydrology for this project was previously completed in drainage reports Ref. 2 and Ref. 3. Based upon review of these reports during the concept design for closed conduit alternatives from Elliot Road to Warner Road (Ref.1), and for this report, their design parameters (i.e.: drainage area boundaries, runoff curve numbers, design runoff values, etc. have been accepted and incorporated into the analysis.

The random nature of precipitation must be recognized in all hydrologic analyses. Sixty-one (61) years of rainfall records from the Tempe RAin Gauge Station were used to estimate the maximum probable precipitation that may occur over the tributary drainage area. Since the existing A.D.O.T. borrow pit will be subject to long term inflows, the one-day, one-month, and three-month duration precipitations were analyzed, using the five-year and 100-year return periods. By analyzing these inflows versus outflows due to pumping, infiltration, and evaporation, water depth and inundation times were estimated for the pit. Using this data, the adequacy of the pit storage capacity,and potential for various land uses were studied.

C. PRECIPITATION

Total monthly precipitation raw data dating from 1926 to 1987 was collected from the Tempe Rain Gauge Station operated for the U.S. Department of Commerce, Weather Bureau.

In order to estimate the probable maximum one-month precipitation for the five-year and 100-year events, the highest monthly precipitation values were extracted from the raw data and rank ordered. The Frequency Curve for the one-month duration precipitation was computed mathematically using the Hazen Method outlined in Ref. 6 (which approximates a Log Pearson distribution) and is plotted in the calculations. Values taken from the curve were used to determine total one-month duration precipitation of 3.3 inches for the five-year event, and 4.8 inches for the 100-year event.

The Frequency Curve for the three-month duration precipitation was computed similarly except that total precipitation for three consecutive months was used. A minimum of four months between selected precipitation data was maintained to prevent overlapping (i.e.: data from one month being used twice). The Frequency Curve is plotted in the calculations, and values taken from this curve yielded three-month precipitation totals of 5.4 inches for the five-year event and 7.9 inches for the 100-year event.

Short duration (24-hour) precipitation values were reviewed and extracted from Ref. 2. Total 24-hour precipitation for the five-year event is 2.0 inches, and for the 100-year event is 3.85 inches. These values had been calculated using the procedure outlined in Ref.7.

D. RUNOFF

The drainage areas tributary to the existing borrow pit are shown on the attached drainage area map (Plate III) and determined as follows:

Phase I - Existing Tributary Area

D.A. 1A - This area represents conditions as they currently exist west of the freeway. Runoff from this 1.77 square mile area is conveyed under Interstate 10 by existing drainage conduits #17 through #20. These flows enter the pit via the existing diversion channel from Warner Road southward.

D.A. 1B - This runoff east of the freeway is the existing flow collected in the 56th Street storm sewer. It accounts for approximately 0.1 square miles of developed tributary area (mainly street drainage) and enters the pit via a 54-inch storm sewer.

Phase II - Proposed Tributary Area

D.A. 2A - Flows from this 1.01 square mile area cross under the freeway in culverts #12 through #16. Upon the completion of the proposed drainage conduit between Elliot and Warner Roads, these flows will be directed to the pit.

D.A. 2B - This 1.63 square mile area is subject to partial on-site detention, and crosses the freeway at culvert #11. Similarly, these flows will enter the pit upon completion of the proposed drainage conduit.

D.A. 2C - When fully annexed by the City of Tempe, this 0.95 square-mile area of the southwest overlay district is expected to have a combination of industrial and commercial zoning (Plate IA). No significant runoff is expected to enter the pit from this area until it is developed, and then only that runoff which exceeds the City of Tempe on-site retention requirements.

Phase III - Future Tributary Area

D.A. 3 - Flows from this 1.6 square-mile area when fully urbanized will enter the southwest corner of the pit via a proposed culvert #20A under the freeway.

Runoff Methodology

Tributary areas, curve numbers (CN), and hydraulic length (L) for sub-areas in drainage areas 1A, 1B, 2A, 2B, and 2C were reviewed and taken from Ref. 2, and drainage area 3 was taken from Ref. 3. For each sub-area, direct runoff (in inches) was computed using the SCS Method (Ref. 5).

Assuming an initial abstraction of $I_a = 0.2 \times S$ where $CN = \frac{1000}{10+S}$

The SCS runoff equation then becomes:

$$Q = \frac{(P-0.2S)}{P+0.8S}$$

Direct runoff was programmed using the RUNOFF spreadsheet. The spreadsheet allows reduction of the runoff by considering upstream retention. (Note: This does not significantly reduce the total volume of runoff.)

E. PERCOLATION/EVAPORATION

Borrow pit infiltration rates (as indicated in Attachment A) ranging from ¼ inch per day to as much as 30 to 40 inches per day could be experienced depending on the classification, gradation, and density characteristics of the subsoils at the pit bottom elevation. These rates can be expected to decrease over time as surface crusting and subsurface clogging occur. An average of approximately ¼ inch per day evaporation can also be expected.

For the purposes of this study, total loss in the pit due to the combination of percolation and evaporation was computed using a constant ½ inch per day as a minimum, and 40 inches per day as a maximum over the projected water surface area. This data was used as input data for the STAGE-DURATION spreadsheet.

F. PUMP OUTFLOW

The pump outflow was analyzed using data taken from Ref. 4, and assuming two (2) 50 B.H.P. "Hydromatic" S8L submersible pumps. Friction head losses were computed and plotted as a "System Curve" against the manufacturer's "Performance Characteristic Curve." From this graph an expected pump discharge vs. water depth was computed for various depths of water in the pit. Pump discharge rates for water depths in one foot increments were used as input data for the stage-duration spreadsheet. The pumps discharge their design capacity of 10 cfs at a basin water depth of approximately 13 feet. Lower water depth produces less flow, higher water depth produces more flow.

G. STAGE-DURATION

Direct runoff volumes were calculated as indicated above in the RUNOFF spreadsheet, and used as input for the STAGE-DURATION spreadsheet.

Since a few large storms yield more runoff than several smaller storms during the same period, the largest storms at two-week intervals that were consistent with precipitation frequency amounts were used, as follows:

	Rainfall (Inches)	
Day	5-Year	100-Year
1	2.00	3.85
16	1.30	0.95
31	0.53	0.78
46	0.53	0.78
61	0.53	0.78
76	0.53	0.78
Total	5.42	7.92

Other input included rates of percolation/evaporation, volume-depth relationships, and pump discharge rates for one-foot increments of water depth in the pit.

A Stage-Duration Summary for the three-month precipitation sequence is shown on Plate IV for various combinations of parameters, (i.e.: percolation/evaporation of 0.5 or 40 inches per day, pump station on or off) for each of the drainage areas calculated in Phases I, II, and III. Since upstream retention in sub-areas 2B and 2C did not have a major effect on the total runoff into the pit, retention provided in these areas was not considered in any of the computer runs.

For each combination of parameters, the following calculations were performed for each day of the three-month duration:

1. Volume of pump outflow.
2. Volume of percolation/evaporation.

3. Change in storage volume.
4. Volume of water in the pit.
5. Depth of water in the pit.

By comparing all of these stage-duration outputs, it was possible to determine the water volume and depth along with number of days of inundation in the pit for any combination of input conditions.

H. POTENTIAL SECONDARY BORROW PIT LAND USES

All flows from the above mentioned tributary areas will enter the existing A.D.O.T. borrow pit located south of Warner Road and east of the I-10 Interstate (Plate II). The primary purpose of the basin is storm water detention, which inhibits other uses or activities. The basin will receive and store water from a 4,500-acre watershed, including provisions for accommodating a 1,000-acre drainage area (DA#3) that currently does not contribute runoff into the City of Tempe.

After the installation of a pump station, the pit will remain dry the majority of the time; therefore, several potential secondary compatible land uses were evaluated.

The pit has a number of assets and liabilities for potential secondary uses, which are listed below. The various assets and liabilities have differing importance for each of the various potential secondary land uses; therefor no attempt has been made to rank order or assign importance factors to the assets and liabilities.

Assets

1. Provides visual and sound barriers.

2. Existing side slopes could be flattened or terraced to provide sight lines for spectators and audiences.

3. Adequate setback is provided from the freeway and the Highline Canal.

4. Siting is adjacent to commercial and industrial zoning districts and remotely located from residential areas.

5. There is adequate room for parking on adjacent undeveloped property. The property would have to be acquired, however.

6. Periodic storm water from primarily residential areas is available for irrigation.

Liabilities

1. The basin will be periodically inundated and constitutes a flood hazard area. The basin is currently classified by the City of Tempe as a flood hazard area. The City will also be requesting to the Federal Emergency Management Agency that the

basin area be identified as a Zone "A" flood hazard area. Because of this flood hazard, the basin is not suitable for permanent structures, nor can building permits be issued within the basin. Although the basin currently has substantially more capacity than required for the 100-year rainfall, it must remain at least 42 feet deep to do so, which precludes filling in the basin for other uses. Any secondary use of the basin must be permissible for a flood hazard area.

2. Secondary uses of the basin will be interrupted by periodic storm water inundation. To minimize this interruption, the proposed pump station must be constructed prior to developing any secondary uses. During the 100-year frequency, three-month duration rain period, the basin will be inundated to a maximum depth of 38 feet and will be inundated for 35 days. During the five-year frequency, three-month duration rain period, the basin will be inundated to a maximum depth of 15 feet and will be inundated for 17 days. Even during a one-year, 24-hour storm the basin will be inundated to a maximum depth of over one foot and will be inundated for two days.

3. Site access must come ¼ mile from Warner Road on new right-of-way. Property must be acquired for parking which would be a considerable distance away for most uses.

4. Periodic inundation limits uses to activities which would require only low or moderate clean-up and restoration efforts.

5. The remote location is not conducive to neighborhood type activities.

6. Steep side slopes may pose a safety hazard and will create access difficulties.

7. Many attractive nuisances exist (i.e.: concrete ramps, water pools, etc.) which will require fencing, and could still pose safety risks.

8. Contaminated or mosquito infested standing water is of concern.

9. Utilities services are not readily available.

10. Initial and long-term maintenance of landscaping for such a large area may be cost prohibitive.

11. The upper area adjacent to I-10 is largely covered by salvaged reinforced concrete bridge girders that would require removal, disposal, or screening.

Uses that may be considered appropriate for the pit are:

- amphitheater
- BMX or motocross track
- ramada sites
- water slide
- skateboard park
- pistol range
- archery range
- equestrian activities
- soccer or football field
- baseball or softball field, and
- golf driving range.

A possible concept is shown on Plate V, and involves terracing the borrow pit bottom to provide a depressed fenced area that is sized to retain the one-year frequency storm. By so doing, the raised pad (approximately one half of the basin bottom) would not be inundated from these small storms. Gentle slopes would convey light rainfall toward a low flow channel which in turn would flow into a fenced nuisance water basin where the pump station intakes would be located.

It appears that this pit is too remotely sited to be used for typical neighborhood park activities. The ball fields shown could be used for tournament and league games. Also, there would be adequate room for an "iron" driving range. Any secondary use would require access to the site via a 1,300-foot-long paved road from Warner Road, along with a paved parking area, a paved maintenance road/walkway, and concrete steps into the pit. The possible secondary land use layout (Plate V) is shown to illustrate recreational sizing only and is subject to a total feasibility evaluation, which is beyond the scope of this report.

I. PUMP STATION EVALUATION

The pump station documents (Ref. 4) were reviewed. Comments have been noted by hexagonal symbols on the plans and specifications which are keyed to the remarks sheet found in Plate VI. The comments pertain to:

1. Technical appropriateness.
2. Adequacy and completeness of the documents.
3. Redundancy considerations.

J. REFERENCES

Ref. 1 - "Concept Design for Closed Conduit, Elliot Road to Warner Road." Prepared by: CREEGAN + D'ANGELO, February 9, 1989.

Ref. 2 - "Surface Water Hydrology Report, A.D.O.T. Pit Diversion Channel." Prepared by: Evans, Kuhn & Assoc., April, 1983.

Ref. 3 - "Ray Road Traffic Interchange Drainage Design Report." Prepared by: Ritoch-Herz-Powell, June, 1985.

Ref. 4 - Construction Plans and Specifications for "A.D.O.T. Diversion Channel, Gila Drain Phase I, Project No. 82006." Prepared by: Evans, Kuhn & Assoc., Revised September 16, 1986.

Ref. 5 - A Guide to Hydrologic Analysis Using SCS Methods, Mc Cuen, 1982.

Ref. 6 - Design of Small Dams, USBR, 1973.

Ref. 7 - Hydrologic Design for Highway Drainage in Arizona, A.D.O.T., April, 1975.

/rs

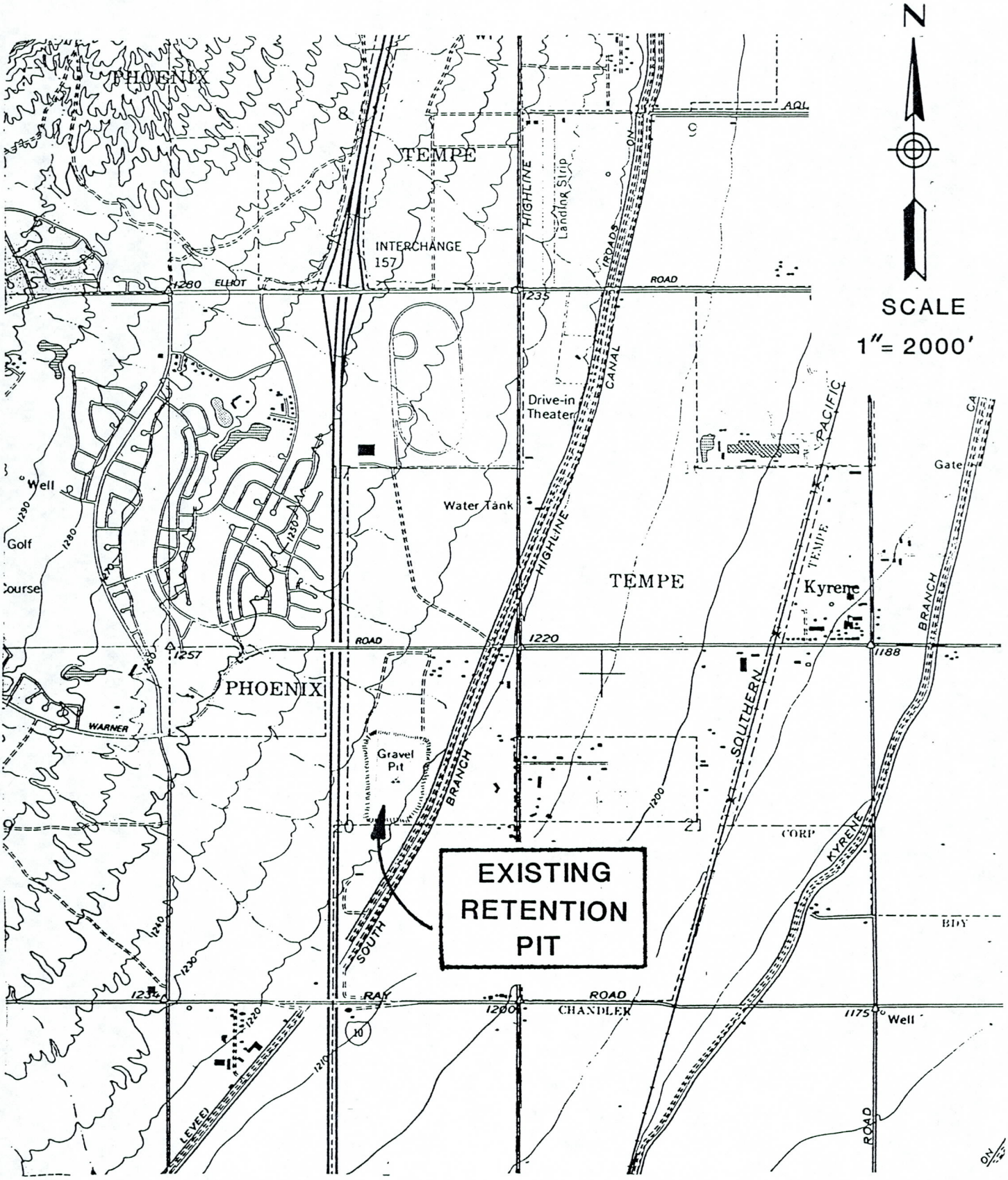

PLATE I

PROJECT LOCATION MAP
TEMPE DRAINAGE STUDY
C&D # 888053 FEB 1989

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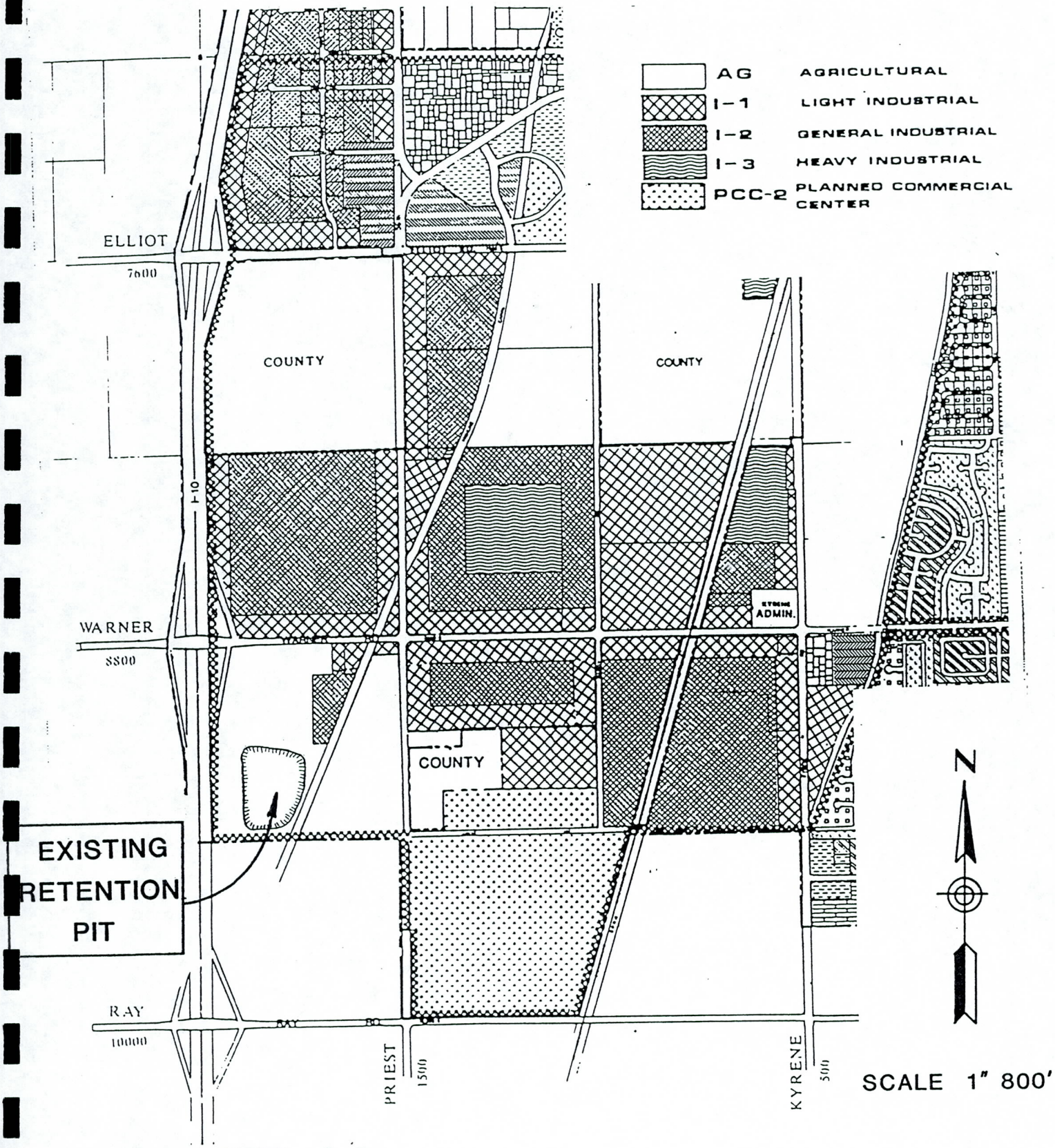

PLATE IA

ZONING MAP

TEMPE DRAINAGE STUDY

C&D # 888053 FEB 1989

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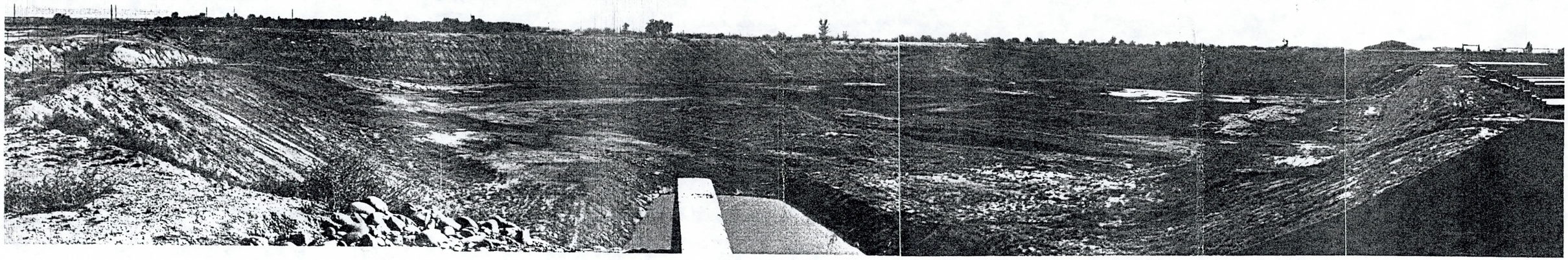
PLATE 11



PANORAMA OF PIT LOOKING SOUTHEAST

Drop Chute Spillway and Plunge Pool (Foreground)

Drop Structure for 60" Storm Drain (Background)

Proposed Location for Wet Well and Pumps (Background)

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Photo Taken 1-17-89

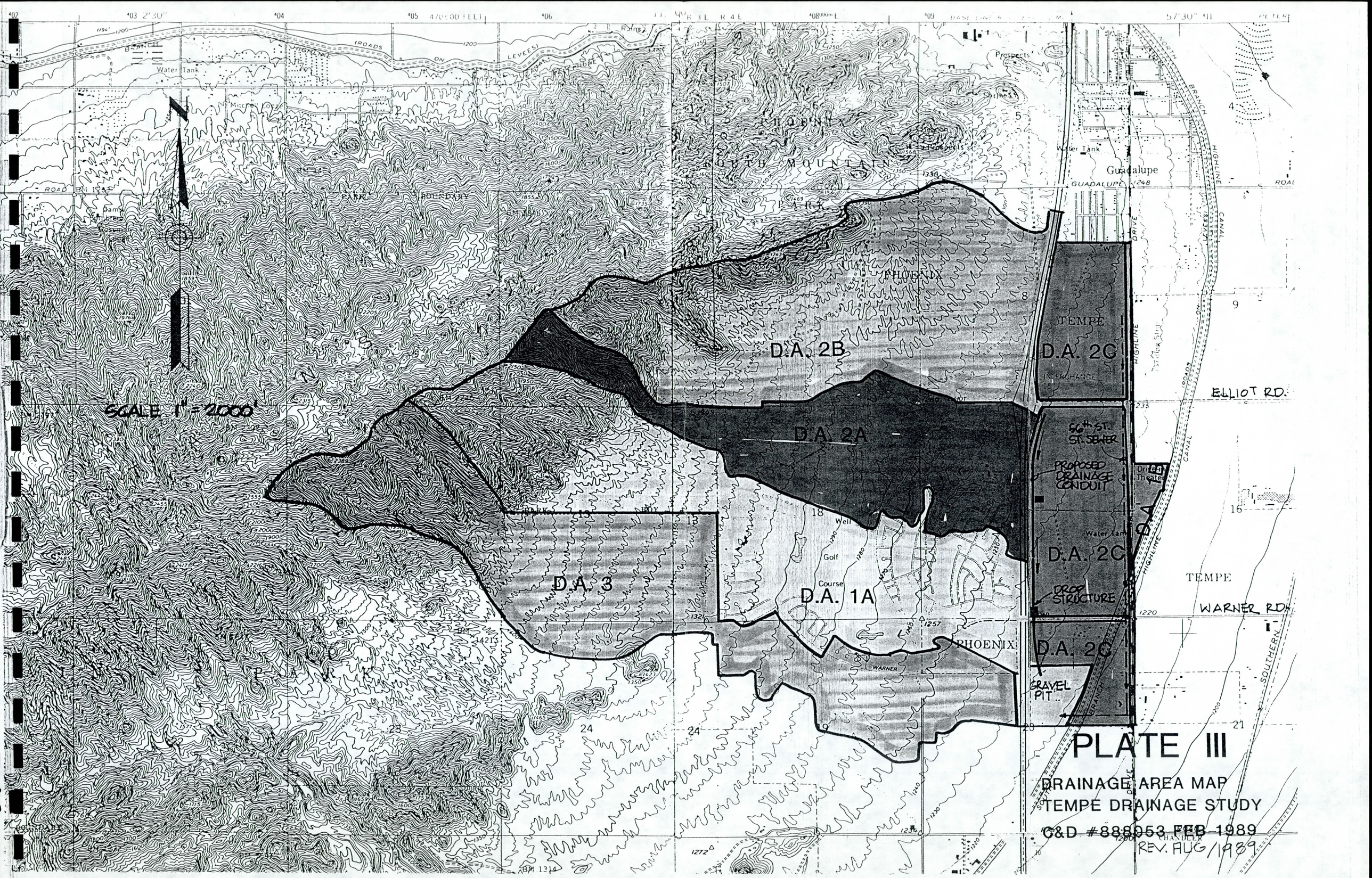

PLATE III

DRAINAGE AREA MAP
TEMPE DRAINAGE STUDY
C&D #888053 FEB 1989
REV. AUG/1989

PLATE IV

STAGE - DURATION SUMMARY
(3-MONTH PRECIPITATION SEQUENCE)

INPUT				OUTPUT					
				5-YEAR			100-YEAR		
PHASE (TRIBUT. AREA)	RETENTION	PERC./EVAP DESIGN IN/DAY	PUMPING DESIGN CFS	MAX DEPTH FT	DAYS OF INUNDATION INITIAL	DAYS OF INUNDATION TOTAL	MAX DEPTH FT	DAYS OF INUNDATION INITIAL	DAYS OF INUNDATION TOTAL
I	-	0.5	—	6	90+	90+	13	90+	90+
		40		3	2	3	12	4	4
II	-	0.5	—	15	90+	90+	32	90+	90+
		40	—	10	4	5	29	9	10
		0.5	10	11	9	13	29	26	27
		40	10	10	2	3	28	6	6
III	-	0.5	—	21	90+	90+	42	90+	90+
		40	—	15	4	6	38	11	12
		0.5	10	15	12	17	38	35	35
		40	10	14	3	4	37	8	9
				1-YEAR					
III	—	0.5	10	1	2	—			

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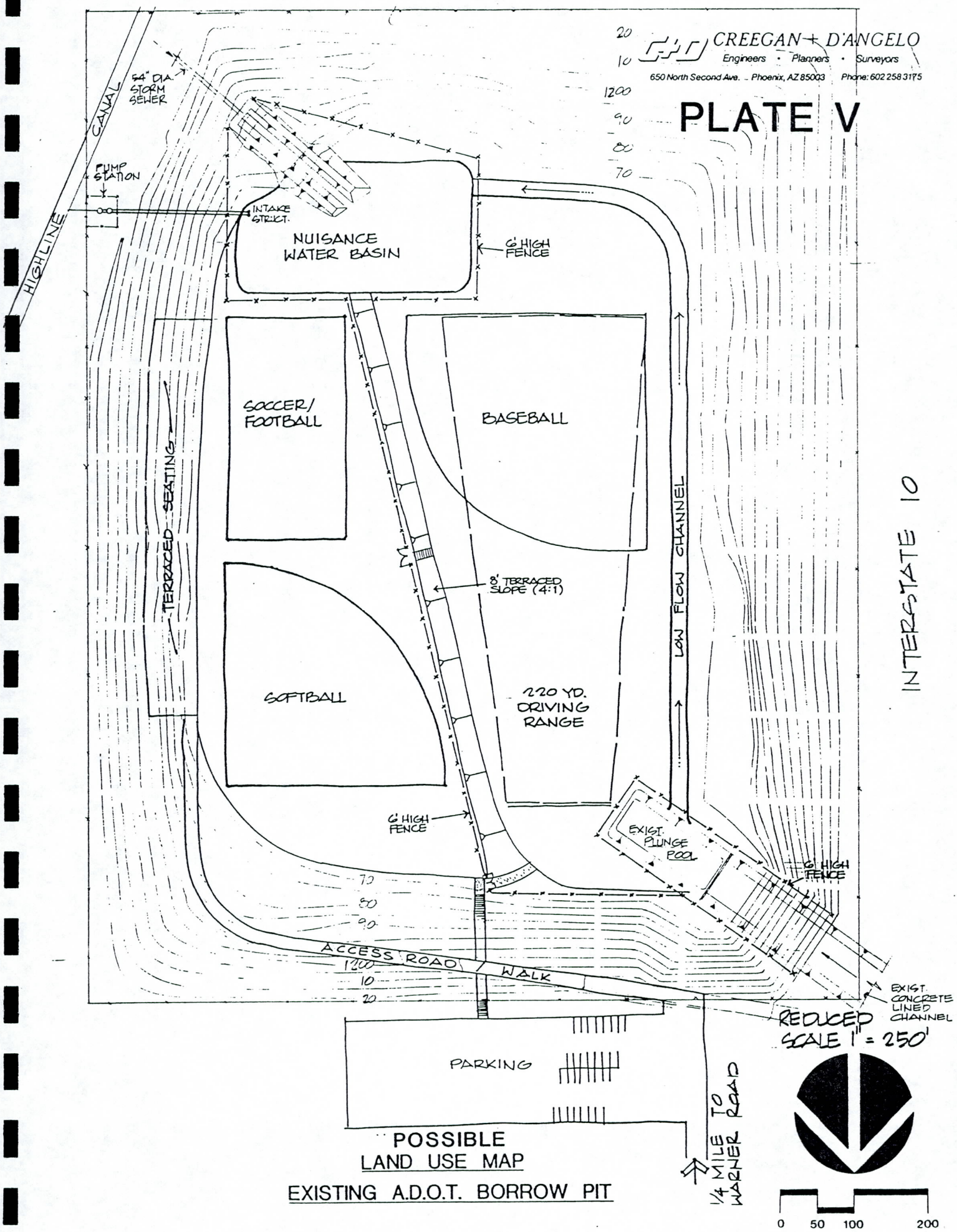
PLATE V



POSSIBLE
LAND USE MAP

EXISTING A.D.O.T. BORROW PIT

PLATE VI

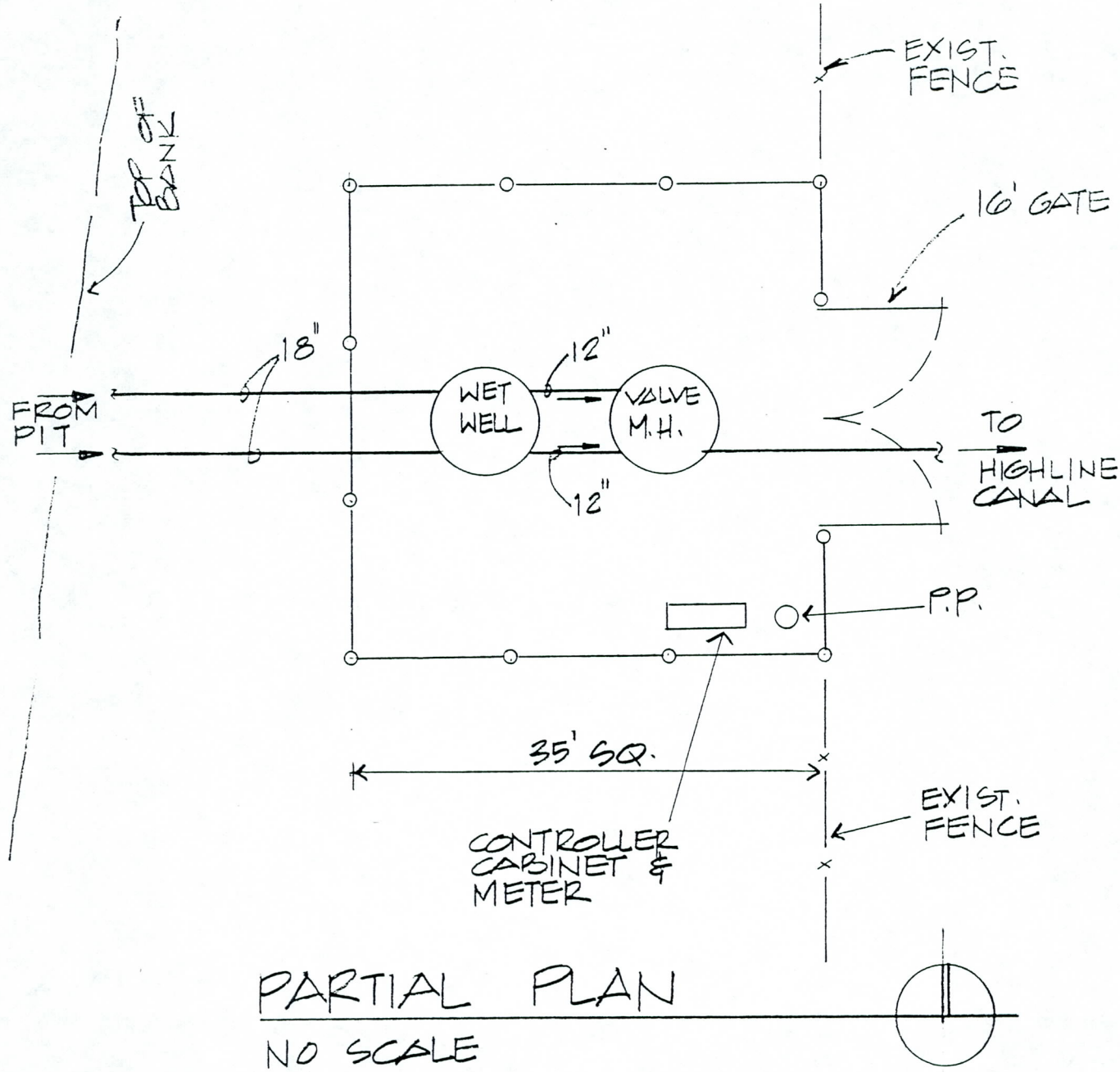
TEMPE DRAINAGE STUDY
PUMP STATION EVALUATION

1. Locate inlet lines closer together and share common trench. Consider having only one inlet line.

2. Have only one (1) wet well (in lieu of two). Increase size for a duplex pump.

3. Controller cabinet, pole, meter, etc. not shown.

4. Alternate fence enclosure layout:



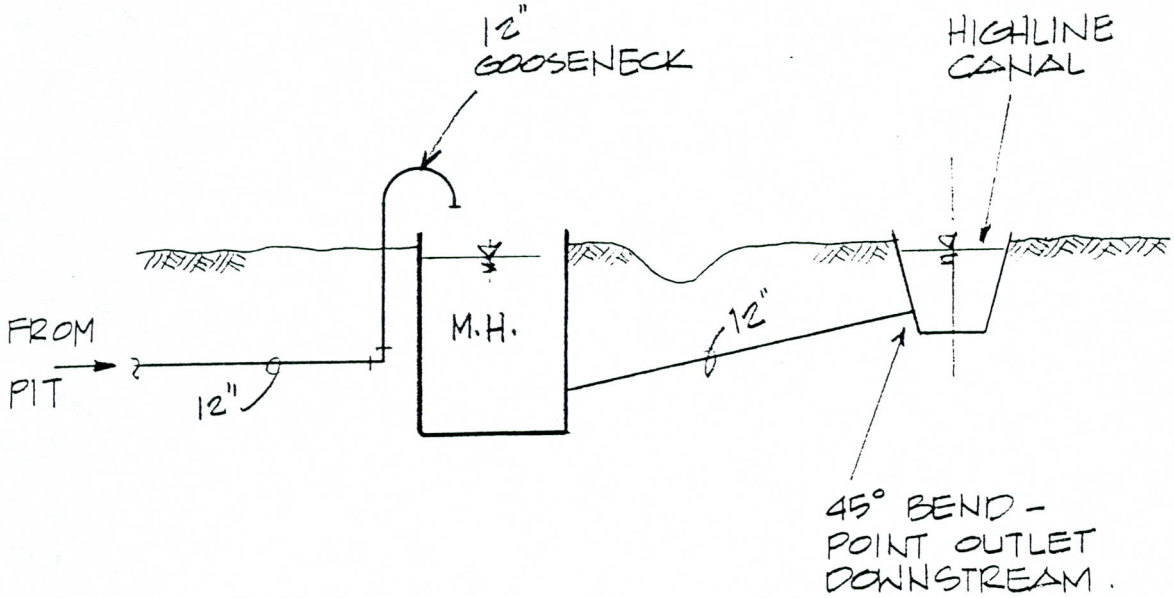
5. Move intake further from slope to reduce siltation.

6. Consider strategically placed subsurface drainage to carry low flows and reduce stagnant water (i.e., mosquito infestation).

7. Make jacking optional - Open cut trench less expensive, especially at low cover.

8. Ductile iron pipe, Class 55, with Type "5" bedding (ABC slurry) much less expensive.

9. Alternate piping layout:



PARTIAL SECTION

NO SCALE

10. Prefer round intake. More area, less protrusions and easier to clean.

11. Reinforce with curved metal bar.

12. Galvanized or stainless steel in lieu of painting since abrasion damage is probable, due to intake suction and cleaning.

13. 1' cover is very shallow. Consider 2', or preferably 3'.

14. Below grade check valve without manhole is unmaintainable. OK to delete, since check valves already exist at valve manhole.

15. Eliminate cage, no room. Use only safety rail.

16. Overall length should be 60'.

17. Verify structural strength for 60' depth.

18. Consider:
    a. Trash basket
    b. Removable fiberglass platform @ 30' depth
    c. Weep holes

19. Add top mat of reinforcing.

20. Show size and location of hatch.

21. Reduce spacing to 10'.

22. Is backfill native material or ABC?

23. If "manual start", why include a float for "pump on"? Consider using an automatic start.

24. Locate "J-box" inside valve manhole for easier access.

25. Key R.C.P. into bottom slab.

26. Use double mat of rebar.

27. Verify thickness and projection for 60' depth.

28. Add tee for cleanout.

29. ABC?

30. Use 3" clear dimension.

31. Provide complete electrical drawings.

32. Re: Aluminum entrance hatch, need to define:
    a. Manufacturer or equal
    b. Live load rating
    c. Circular or square
    d. Opening mechanism
    e. Hold-open or closer mechanism

33. 460 Volt is standard.

34. Specify motor service factor.

35. Add Note: "The motor H.P. shall not be exceeded throughout the entire pump curve". This will keep pumpout rates within acceptable limits even if the basin is full.

36. Specify delay relay so pumps cannot be started at same time (even manually) and consider partial motor starter winding or reduced power starting. May be able to downsize transformer rating if incremental pump starting is provided.

37. Recommend additional alarm light mounted outside of cabinet.

38. Wet well only 60' deep ±.

39. Check wet well wall and joint design for full inside hydrostatic loading.

PLATE VI

EXCERPTS TAKEN FROM CONTRACT DOCUMENT SPECIFICATIONS FOR "A.D.O.T. PIT DIVERSION CHANNEL, GILA DRAIN PHASE I"
TEMPE PROJECT NO. 82006

(1) = COMMENTS BY CREEGAN & D'ANGELO 2/89 JB.

PUMP STATION

Work under this article shall consist of furnishing all materials, labor, and equipment to excavate, construct, and backfill pumping station complete with dual intake inlet pipes, wet wells, pumps, controls, a valve manhole and discharge piping as shown on the plans. (32)

Wet wells shall have a 60 inch aluminum frame and cover, and a ladder with O.S.H.A. approved safety belt rail or cage as shown on drawings. (15)

Install two (2) submersible centrifugal solids handling pumps (4 inch sphere). Each pump shall be equipped with a submersible 1150 R.P.M. electric motor not exceeding 50 HP connected for operation on a 240 volt, 3 phase, 60 hertz, 4 wire service. Each pump shall be capable of delivering 2,250 G.P.M. at 60 feet T.D.H. and at least 1,300 G.P.M. at 70 feet T.D.H. Pump and piping shall fit into a 66 inch diameter reinforced concrete pipe wet well as shown on the drawings. Each pump and motor shall be fitted with a guide rail system, discharge elbow with slip type disconnect flange, top and bottom supports, adjustable level controls, and control panel. The outboard mechanical seal assembly shall have a tungsten carbide face. A spare mechanical seal assembly shall be furnished for each pump. The seal chamber shall have a water level sensing device to turn on an alarm. Heat sensors in the motor shall stop the motor and turn on an alarm. Mercury float type level switches shall be used. Pump assembly shall be model S 8L manufactured by Hydromatic or approved equal. 33 34 35

Control panel for each pump shall have a fusable disconnect switch for 3 phase power, magnetic starter and circuit breaker with 3 leg overload protection for 3 phase 240 volt power, H.O.A. switch with manual over-ride, auxiliary contact on starter, run light, lapse time meter with six digit reading hours, fusable disconnect switch for single phase power (located ahead of starter), single phase 115 volt transformer (50 amp minimum), two single phase circuits with fusable switch or breaker for control unit and a 20 amp breaker and convenience outlet, pump fail (starter overload) alarm light, motor overhead (pump stop) alarm light, wet well high water alarm light, water in seal chamber alarm light. All alarm lights shall be flashing and with off switch. All elements shall be inside NEMA 4 dust proof enclosures suitable for hot, desert conditions, and if not in separate interior panels they shall be mounted on an interior dead front door. The outside door shall have provision for locking, with the keying as per the City's master. The panel shall have legs and be mounted on a 4 inch thick concrete pad. 36 37

Pumps and control panels shall be factory tested and certified by their manufactures as to compliance with these specifications.

Check valve shall have an external lever with an adjustable weight and brass or stainless steel trim as manufactured by Mueller co. or approved equal.

Eccentric plug valve shall have a resiliant seat or coating for a bubble tight seal as made by Dezurik or approved equal.

All piping and valves shall be designed for a minimum pressure of 1.5 times the pump shut-off head or 100 psi. whichever is greater.

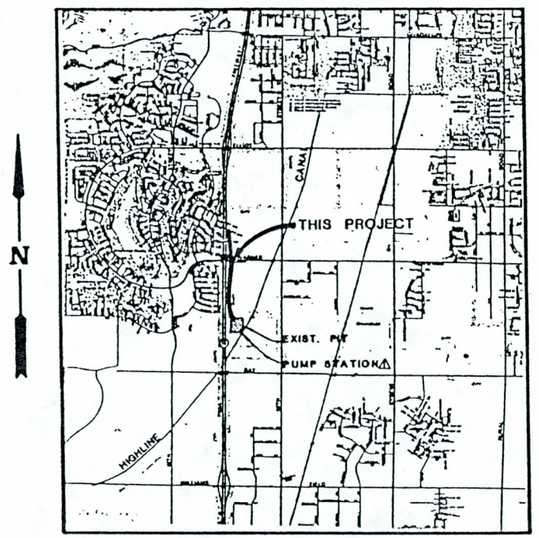
The Contractor shall field test each pump station by temporarily plugging the inlet pipe, filling the wet well with water to a depth of 65 feet, operating pump and all valves and controls in the presence of the City Engineer until the wet well has been emptied. During the performance of the test, measurements of voltage, current, and discharge shall be made and recorded by the Contractor. After the successful completion of the test, the pump shall be raised, inspected and reinstalled to its operating position. The pipe inlets shall be unplugged and the system left by the Contractor in an operating condition.

The Contractor shall submit for approval prior to installation five (5) copies of pump outline drawings, manufacture's certificates, performance curves, and installation guides. After approval and before final acceptance of pump stations, the contractor shall furnish five (5) copies of Operation and Maintenance Instruction Manuals, Parts Lists, Technical Manuals, Warranties, and Field Test Records.

The Contractor shall warrant all work to be free of material defects or workmanship for a period of one year from the date of acceptance. Measurement and payment will be lump sum for each pump station complete in place including the wet well, inlet pipe valves and fittings, and outlet pipe to the valve manhole. Measurement and payment will be lump sum for the valve box, piping, valves, and outlet piping to the canal, complete in place.

PLATE VI

CITY OF TEMPE
ENGINEERING DIVISION
CONSTRUCTION PLANS FOR
A.D.O.T. PIT DIVERSION CHANNEL
GILA DRAIN PHASE I
PROJECT NO. 82006



VICINITY MAP

MAYOR
HARRY E. MITCHELL

VICE MAYOR
WILLIAM J. REAM

CITY COUNCIL

DON CASSANO
ROWLAND G. OONK
WILLIAM J. Lo PIANO △
PATRICIA A. HATTON
FRANK B. PLENCNER

APPROVED BY: [signature] CITY ENGINEER — 10-11-85 DATE

INDEX OF DRAWINGS

SHEET NO	DESCRIPTION
1	COVER SHEET
2	GRADING PLAN (SOUTH HALF OF PIT) △
3	GRADING PLAN (NORTH HALF OF PIT) △
4	CHANNEL PLAN (STA. 0+00.00 to STA. 8+50.00)
5	CHANNEL PLAN (STA. 8+50.00 to STA. 17+00.00)
6	CHANNEL PLAN (STA. 17+00.00 to STA. 25+10.00)
7	ACCESS ROAD PLAN
8	PUMP STATION PLAN
9	PUMP STATION DETAILS
10	TYPICAL SECTION & DETAILS
11	SPILLWAY PLAN & ELEVATION
12	SPILLWAY SECTIONS
13	SPILLWAY DETAILS
14	PROPERTY OWNERSHIP MAP
15	PROPERTY OWNERSHIP MAP

PERMITS REQUIRED

SALT RIVER PROJECT — 9-13-85 △
ARIZONA DEPARTMENT OF TRANSPORTATION
MARICOPA COUNTY HEALTH DEPARTMENT

AS-BUILT
DATE 8-13-86

(1) = COMMENTS BY CREEGAN & D'ANGELO gh 2/89

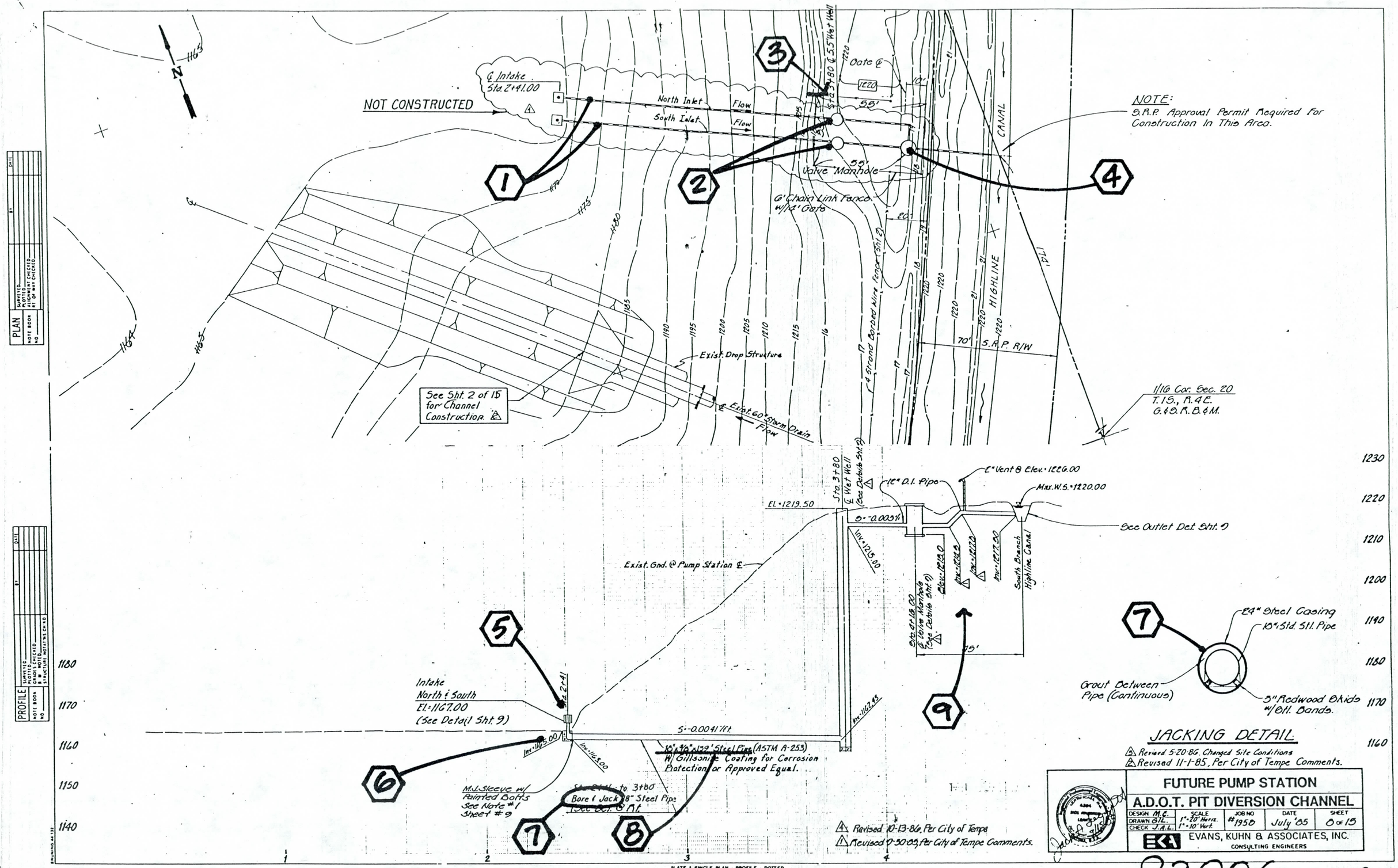
REVISIONS
△ Revised 9-30-85, Showed Pump Station on Vicinity Map. Made Revisions Per City of Tempe Review Comments.
△ Revised 9-16-86 Per City of Tempe Comments.

CITY OF TEMPE, ARIZONA
ENGINEERING DEPARTMENT

EVANS, KUHN & ASSOCIATES, INC.
CONSULTING ENGINEERS
72 E. BETHANY HOME RD. SUITE D-225 PHX., AZ 85014
PHONE (602) 241-0782

INDEX OF DRAWINGS
A.D.O.T. PIT DIVERSION CHANNEL
Project No. 82006

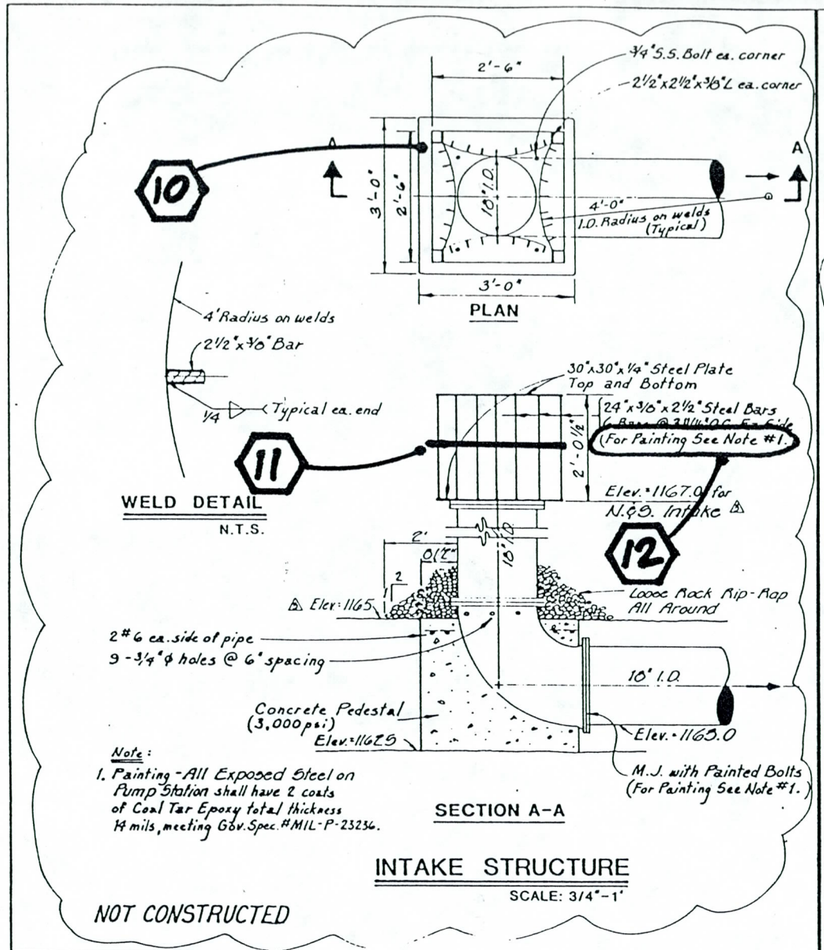
DESIGN B.J.F. DRAWN M.E. CHECK L.A.L. — SCALE NONE — SHEETS 1 of 15

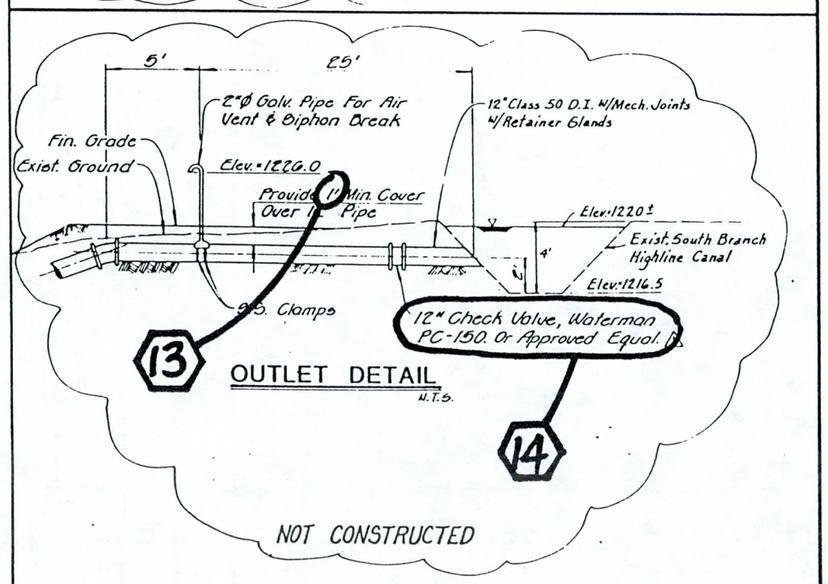


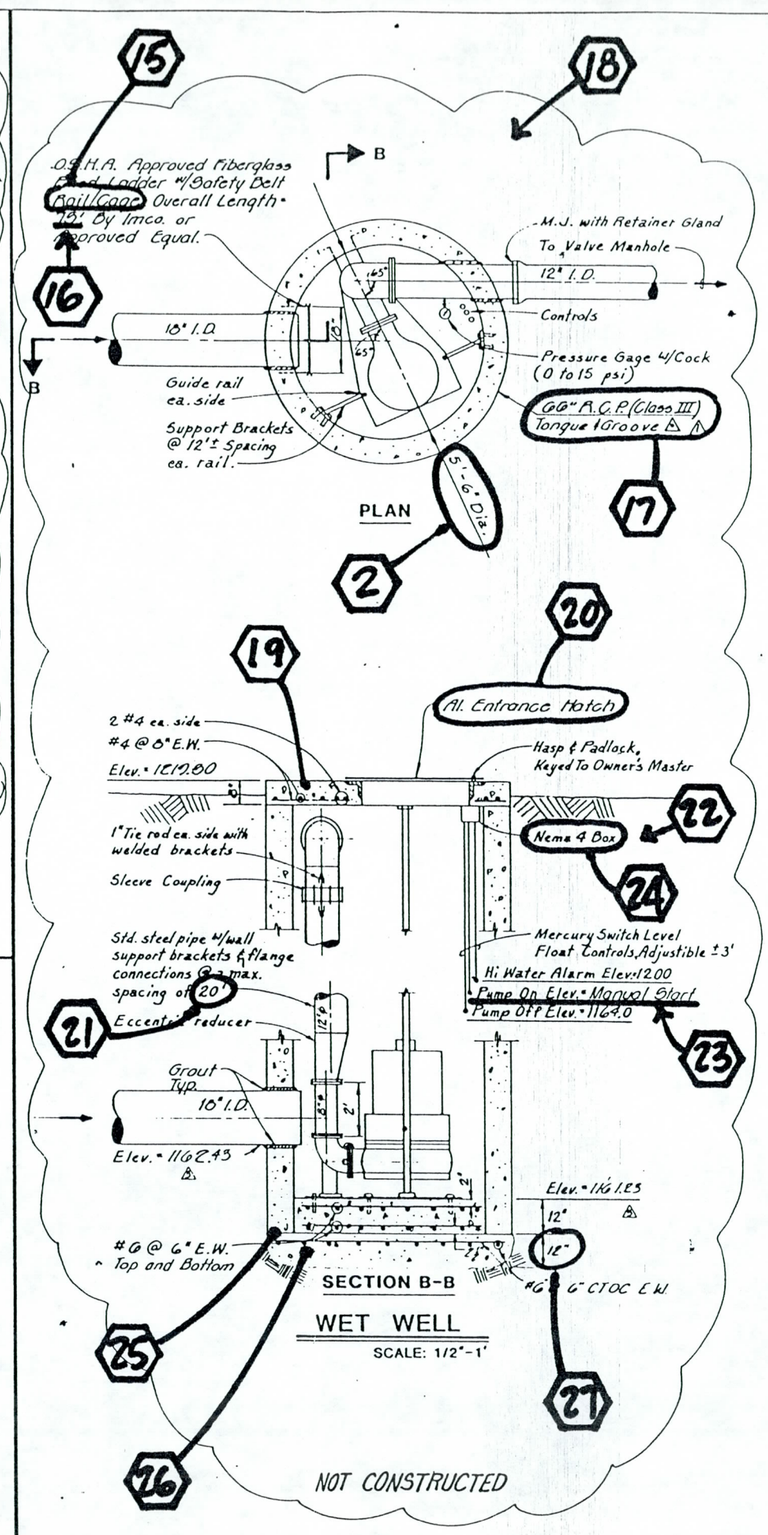
NE20S4 ADOT PIT DIVERSION CHAN

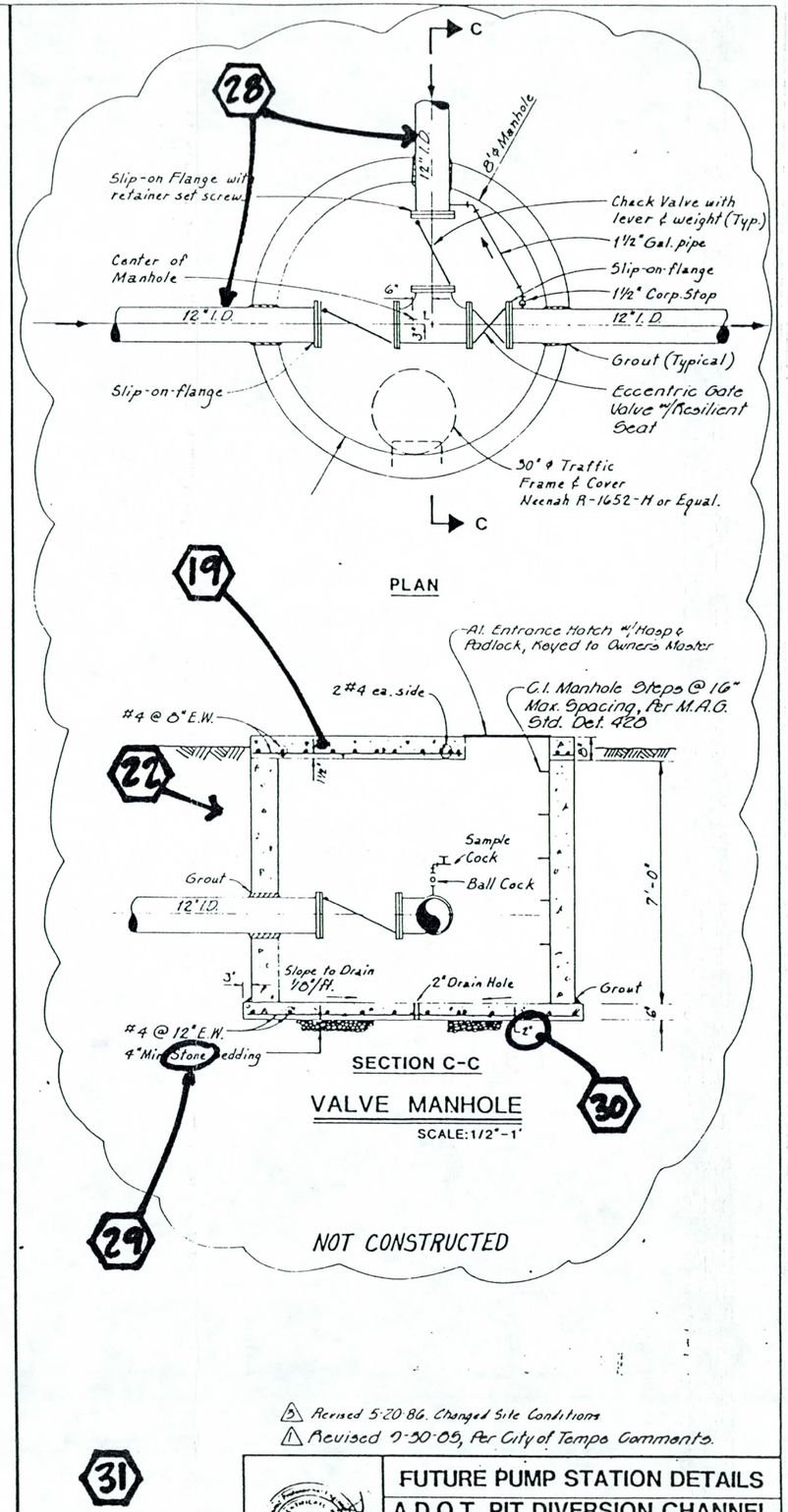
SD 82006

8-15









Revised 5-20-86. Changed Site Conditions

Revised 9-30-05, Per City of Tempe Comments.

31

FUTURE PUMP STATION DETAILS

A.D.O.T. PIT DIVERSION CHANNEL

DESIGN T.A.P.	SCALE	JOB NO	DATE	SHEET
DRAWN G.L.	AS NOTED	1958	July '85	7 of 19
CHECK J.A.L.				

EVANS, KUHN & ASSOCIATES, INC.
CONSULTING ENGINEERS

9-1C

THOMAS-HARTIG & ASSOCIATES, INC.
TOM W. THOMAS, P.E. • HARRY E. HARTIG, P.E.
Geotechnical, Materials Testing, and Environmental Consultants
7031 West Oakland Street • Chandler, Arizona 85226 • 602/961-1169

James R. Morrow
John P. Boyd, P.E.
Charles H. Atkinson, P.E.
Donald J. Spadola, P.E.
Glen K. Copeland, P.E.
James M. Willson, P.E.
Frank M. Guerra, P.E.
Roger A. Brewer, P.E.
Steven A. Haire, P.E.
Chet L. Pearson, P.E.
Kenneth L. Ricker, P.E.

RECEIVED
JAN 30 1989
CREEGAN + D'ANGELO

City of Tempe
c/o Creegan + D'Angelo
650 N. 2nd Avenue
Phoenix, Arizona 85003

30 January, 1989

Attention: Randy Harrel, P.E., L.S.
Manager of Civil Engineering

Project: Diversion Channel and Retention Basis
Near I-10 Freeway and Knox Road
Tempe, Arizona

Project No. 89-0144

In accordance with your request we have reviewed the original soil report and supplement prepared by Thomas-Hartig & Associates, Project No. 84-081, dated 23 January and 2 April, 1984 relative to the following general design information:

1. Anticipated lateral earth pressures which may develop on a box culvert imbedded 15 to 22 feet in the ground.
2. Maximum density value(s) anticipated for the probable soil conditions to be encountered along the one mile of closed conduit (box culvert) from Warner Road north to Elliot Road.
3. Anticipated excavation conditions along the proposed closed conduit alignment.
4. Anticipated percolation rates in the bottom of the currently excavated detention basin.
5. Safe slopes to be expected during construction.

Based on a review of the original soil report and supplement, we present the following design data for use in preliminary planning and/or design process. These

data should be evaluated by further field and laboratory testing once final design is initiated.

1. Lateral earth pressures:
   At-rest earth pressure.....50 psf/ft.
   Passive earth pressure.....340 psf/ft.
2. Maximum densities (ASTM D698 procedures) are estimated to range from 115 to 125 pcf for the Silty to Clayey Sand soils which will probably exist along the alignment of the conduit.
3. As noted in the original soil report, the soils exposed in the side slope of the currently excavated detention pit consist primarily of silty to clayey sands of low plasticity which contain occasional lenses of light to moderate cementation (caliche). It is anticipated that these soils can be excavated with conventional excavation equipment, but that some zones of the moderate cementation may require breakup by use of track mounted equipment drawing single or double shank rippers.
4. Percolation rates were not developed during the original soil exploration; therefore, the following estimates are presented based on previous experience. Infiltration rates ranging from as low as 1/4 inch per day to as much as 30 to 40 inches per day could be experienced depending on the classification, gradation and density characteristics of the subsoils at final detention basin bottom.
5. Based on the shear strength data presented in the original report it is anticipated that temporary slopes could remain stable at 1.5 to 1 (horizontal to vertical). However, localized clean sand lenses at varying depths below existing grade could result in sloughing and/or caving of side slopes and would tend to reduce the slopes to flatter angles.

We trust that this information will aid you in your preliminary planning and design evaluations, but should you have any questions please call us.

Respectfully submitted:
THOMAS HARTIG & ASSOCIATES, INC.

By: _____ Reviewed By: _____
Glen K. Copeland, P.E. John P. Boyd, P.E.

THOMAS-HARTIG & ASSOCIATES, INC.

SOIL AND FOUNDATION ENGINEERS

Tom W. Thomas, P.E.
Harry E. Hartig, P.E.

2720 South Hardy Drive
Tempe, Arizona 85282
(602) 968-8778

John P. Boyd, P.E.
Charles H. Atkinson, P.E.
Glen K. Copeland, P.E.
James R. Morrow, Lab Director

RECEIVED

APR 3 1984

BENSON AND GERDIN
Consulting Engineers

City of Tempe
31 East 5th Street
Tempe, Arizona

2 April 1984

Attention: Mr. Tom Laitem

Project: Storm Water Diversion Channel and Detention Pit
I-10 Freeway and Knox Road
Tempe, Arizona

Project No: 84-081
Supplement No. 1

In accordance with the request of Benson & Girden, Engineers, we have reviewed our soil engineering report relative to lateral earth pressures against the culvert beneath Warner Road, and against the spillway discharging into the detention pit.

The following tabulation presents estimated lateral earth pressures:

Lateral Backfill Pressures:
- Partially Saturated Soils----------50 psf/ft.
- Saturated Soils----------112 psf/ft.

Passive Earth Pressures:
- Horizontal Backfill Surface--
  - Partially Saturated Soils----------340 psf/ft.
  - Saturated Soils----------140 psf/ft.
- *Sloping (reclining) Backfill Surface--
  - Partially Saturated Soils----------170 psf/ft.
  - Saturated Soils----------70 psf/ft.

*2.0 horizontal : 1.0 vertical slope

The estimates are ultimate values and do not include a factor of safety.

This supplement shall be attached to the original report and shall become a part thereof. Please do not hesitate to call if we can be of further service to you.

Respectfully submitted,
THOMAS-HARTIG & ASSOCIATES, INC.

By: _____ Reviewed by: _____
Tom W. Thomas, P.E. Harry E. Hartig, P.E.

/cms
Copies to: Addressee (2)
Evans, Kuhn & Associates, Inc. (2)
Benson & Girden, Engineers/ATTN: Mike Kennelly (1)

THOMAS-HARTIG & ASSOCIATES, INC.

SOIL AND FOUNDATION ENGINEERS

Tom W. Thomas, P.E.
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2720 South Hardy Drive
Tempe, Arizona 85282
(602) 968-8778

John P. Boyd, P.E.
Charles H. Atkinson, P.E.
Glen K. Copeland, P.E.
James R. Morrow, Lab Director

City of Tempe
31 East 5th Street
Tempe, Arizona

23 January 1984

Attention: Mr. Tom Laitem

Project: Storm Water Diversion Channel and Detention Pit
I-10 Freeway and Knox Road
Tempe, Arizona

Project No: 84-081

In accordance with the request of Evans, Kuhn & Associates, Inc., we have provided geotechnical engineering services for the proposed diversion channel and detention pit located as shown on the attached site plan. The following presents our understanding of the project.

A. DIVERSION CHANNEL:

The channel is to begin at a point 800 ft. ± north of Warner Road on the east side of the I-10 Freeway, and will drain southerly via a multi-barrel box culvert beneath Warner Road to the existing ADOT pit 1300 ft. ± south of Warner Road. The spillway into the pit and the channel section from the spillway to Warner Road is to be concrete lined, with the remainder of the channel from Warner Road north being an earthen channel. The lined channel section is to have a 50 foot bottom width, and 7 foot high sides on 1.5 horizontal to 1.0 vertical slopes. The box culvert beneath Warner Road, and the spillway, are to accommodate 100 year flows of 2600 cfs.

B. DETENTION PIT:

The existing ADOT materials pit is to be utilized for surface water detention. A 100 year storm is expected to fill the lower 10 feet ± of the approximate 40 foot ± deep pit. The water is then to be pumped out slowly (1 cfs ±) into the adjacent Highline Canal. Very little percolation of water into the soils beneath the pit is expected. Portions of the pit will probably be deepened an additional 20 feet in the future by ADOT.

INVESTIGATION

Test borings were drilled at three (3) locations along the alignment of the proposed Diversion Channel (Borings C1-C3) and at two (2) locations adjacent to the existing Detention Pit (Borings P1 & P2). In addition, the existing pit walls were visually examined at eight (8) locations (two locations along each of the four sides). The locations of all field testing are shown on the attached site plan and the results of the test drilling are presented in "Field Results".

Representative samples obtained during the field investigation were subjected to the following laboratory analyses:

Test	Sample(s)	Purpose
Compression/ Expansion	Undisturbed (9)	Volume change potential of subsoil under conditions of saturation
Direct Shear	Undisturbed (6)	Strength characteristics of site soils
Sieve Analysis & Plasticity Index	Surface and subsoils (4)	Classification and expansion potential

(Continued)

Soluble Salts, Sulfates and Chlorides	Surface and sub-soils (4)	Corrosivity potential of site soils on concrete
*Dry Density and Moisture Content	Undisturbed (23)	In-situ density and moisture determination to correlate engineering properties

*Reported on boring logs.

The results of testing are presented in "Laboratory Results".

DISCUSSION AND RECOMMENDATIONS

General: The results of the geotechnical engineering aspects of the project are presented as follows. The discussions and recommendations are based upon the properties of the surface and subsoils as determined by the field and laboratory tests, the results of which are attached herewith. Additional evaluations/recommendations will be provided upon request.

Surface and Subsoil Stratification: As disclosed by the test borings, and confirmed by examination of the pit walls, the surface and subsoils encountered to depths of approximately 40 feet are predominantly silty to clayey sands of low plasticity. This deposit is highly stratified with variable lenses of sandy clays (CL), sandy silts (ML), and clean sands (SP). In addition, some occasional lenses of weak to medium calcite (caliche) cementation were also encountered.

The underlying subsoils are predominantly sandy clay, clayey sand mixtures of low to medium plasticity. These soils are also stratified with lenses of silty sands, and zones of weak to medium calcite (caliche) cementation.

Surface and subsoil moisture contents were described as being slightly damp to damp, and no free ground water table was encountered in any of the test borings at the time of this investigation.

Excavation Conditions: Excavations along the alignment of the proposed channel and for steepening or deepening the existing detention pit should be readily accomplished with conventional excavation equipment. Temporary channel and spillway excavation slopes will probably be stable on approximate 1.0 horizontal to 1.0 vertical slope. However, excavations which penetrate clean sand lenses will be susceptible to caving and raveling, especially if these soils are allowed to dry, and flatter slopes may be required. All vertical excavations should be braced or sloped as required to provide personnel safety and satisfy applicable safety codes and regulations.

Channel and Spillway Considerations: Concrete lined channel and spillway side slopes should not be steeper than 1.5 horizontal to 1.0 vertical, and unlined channel sections should be constructed with side slopes no steeper than 3.0 horizontal to 1.0 vertical. The existing or compacted surface and subsoils will be moderately susceptible to scour and erosion.

The existing surface soils along the channel alignment are of relatively low density and should be compacted to a depth of 24 inches to ensure the proper support of the concrete lined channel side slopes. This compaction will probably best be accomplished prior to excavating and trimming the side slopes in preparation for concrete lining. However, the lower portions of the side slope excavations should not require compaction unless areas of looser soils are encountered. The soils exposed at the base of the channel excavation should be moisture conditioned and compacted to a depth of 6 inches. Compaction of the upper 24 inches of surface soils, any loose soil areas, and the soils exposed in the base of the

channel excavation should be accomplished to a minimum 95 percent of the maximum ASTM: D698 density at the optimum moisture content ±3 percent.

Similar preparations are also recommended for support of the culvert beneath Warner Road, and for support of the spillway section into the detention pit. Any backfill against the culvert walls should be MAG Select Type materials compacted to a minimum 100 percent of the maximum ASTM: D698 density.

The soluble salt, sulfate and chloride concentrations of site soils do not indicate unusual soil corrosivity potentials or potentials for significant deterioration of concrete in contact with site soils. Concrete lining constructed of Type II Portland Cement should be suitable.

As indicated by the results of the laboratory compression/expansion tests, the subsoils possess some potential for volume change under conditions of increased moisture. The magnitude of volume change, either compression or expansion, is relatively low and, from our experience, is typical of many soils. Therefore, unusual movements of the channel and spillway linings, and culvert, is not expected as the supporting soils become wet. The lining should be constructed with frequent control joints to better accommodate slight movements.

Detention Pit Considerations: The following tabulation presents the computed factors of safety against a slope stability failure of the existing pit slopes, and for steepened slopes. It is understood that considerable additional soils will probably be excavated from the pit for other ADOT projects.

Pit Slopes	Factor of Safety
Existing (Approx. 3 hor:1.0 ver)	2.4
2.5 horizontal to 1.0 vertical	2.0
2.0 horizontal to 1.0 vertical	1.6
1.5 horizontal to 1.0 vertical	1.3
*Combination 3.0/2.0 hor : 1.0 ver	1.5

*Retaining the existing slopes, with additional deeper excavating accomplished at a 2.0 hor:1.0 ver slope.

If the pit is deepened in the future after the spillway is constructed, the deeper excavating should not be accomplished within the near vicinity of the spillway. Preferably, no future excavations should be made within 50 feet of the base of the spillway.

Pumping Facilities: All foundation elements associated with the pumping facilities at the southeast corner of the pit should be located sufficiently beyond the crest of the pit, or be embedded to sufficient depth so as not to be adversely effected by the pit. Therefore, all foundation elements should be reviewed on an individual basis during their design.

In general, the existing soils will provide bearing support as follows:

Footing Depth	Allowable Foundation Bearing Pressure
2.0 ft.	2000 psf
4.0 ft.	3000 psf
7.0 ft.	6000 psf
10.0 ft.	10000 psf

The depth of footings refers to their base below the lowest adjacent grade within a lateral 10 foot distance. Two (2.0) feet is recommended as the minimum width of isolated column type footings, and 1.33 feet of continuous wall type footings.

Please do not hesitate to call if we can be of further service to you.

Respectfully submitted,

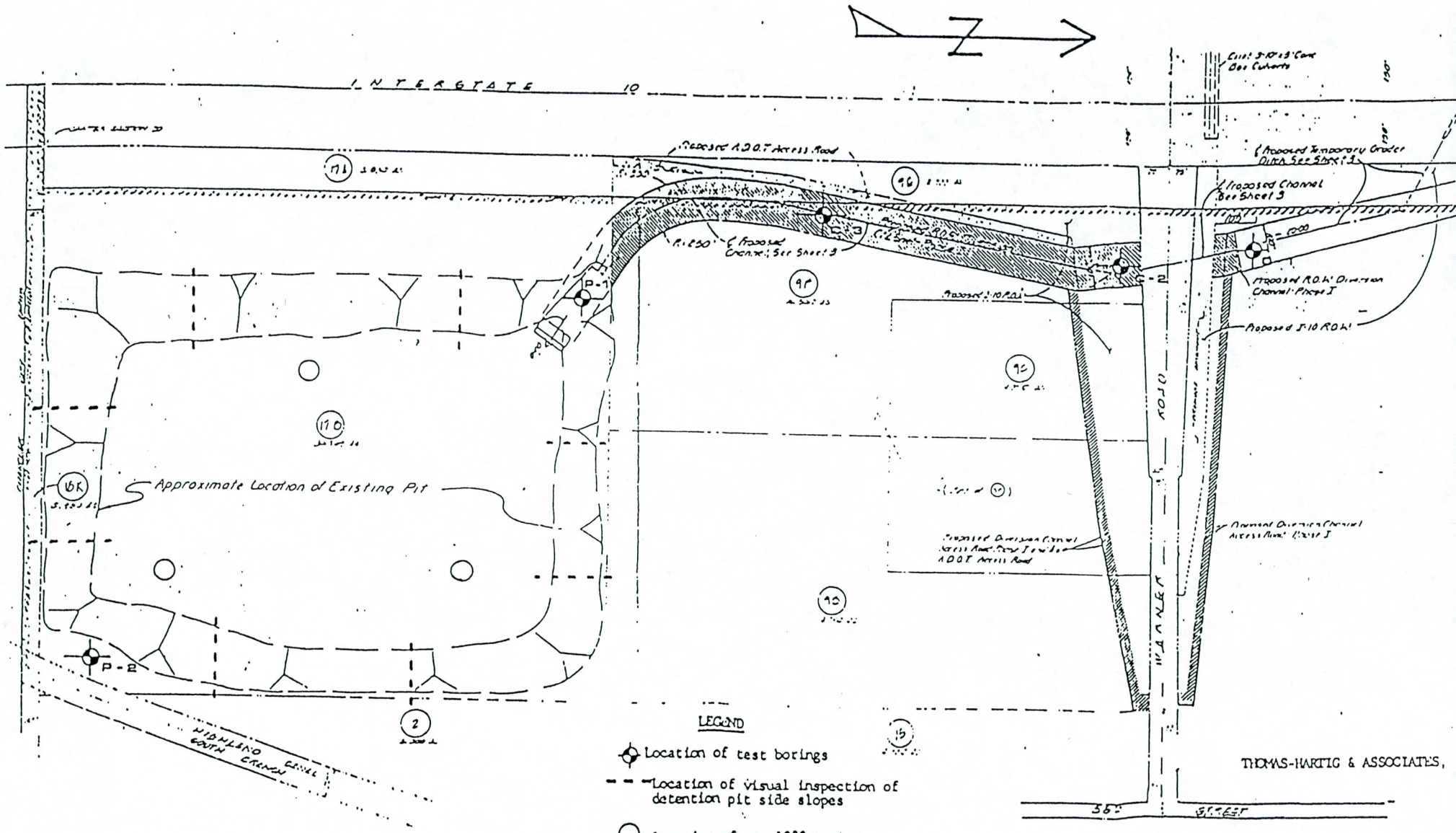
THOMAS-HARTIG & ASSOCIATES, INC.

By: _____ Reviewed by: _____

Tom W. Thomas, P.E. Harry E. Hartig, P.E.

/cms

Copies to: Addressee (2)
Evans, Kuhn & Associates, Inc. (2)



Project No: 84-081

SOIL BORING LOG

Sheet 1 of 2

NO. P-1 ELEV: ---------- SIZE OF HOLE 7 in. FIELD ENGR: J.T. DATE: 12/28/83

DEPTH FT	PENETRATION RESISTANCE BLOWS/FT C	PENETRATION RESISTANCE BLOWS/FT R	SAMPLE TYPE	DRY DENSITY PCF	MOISTURE CONTENT	DESCRIPTION	SOIL CLASSIFICATION	GRADATION WELL	GRADATION MED	GRADATION POOR	GRAIN SHAPE ANGULAR	GRAIN SHAPE SUBANGULAR	GRAIN SHAPE ROUNDED	GRAIN SHAPE SUBROUNDED	RELATIVE DENSITY LOW	RELATIVE DENSITY MED	RELATIVE DENSITY HIGH	PLASTICITY NONE	PLASTICITY LOW	PLASTICITY MEDIUM	PLASTICITY HIGH	CONSISTENCY SOFT	CONSISTENCY FIRM	CONSISTENCY STIFF	CONSISTENCY VERY STIFF	CONSISTENCY HARD	CEMENTATION NONE	CEMENTATION WEAK	CEMENTATION MEDIUM	CEMENTATION STRONG
1					sli	Silty to Clayey Sand; brown	SM-			X	X	X			X	X			X									X		
2					damp	to light brown, highly stra-	SC																							
3					to	tified with variable lenses																								
4					damp	of sandy clays (CL), sandy										X												X	X	
5		47	R	103.2	4.8	silts (ML) and clean sands																								
6						(SP), occasional thin lenses																								
7						of weak to medium calcite																								
8						(caliche) cementation.																								
9																														
10		50/9"	R	108.6	3.6																									
1																														
2																														
3																														
4																														
5		50/9"	R	87.8	7.9																									
6																														
7																														
8																														
9																														
20		40	R	104.1	5.4																									
1																														
2																														
3																														
4																														
5		50/10"	R	94.6	4.9																									
6																														
7																														
8																														
9																														
30		50	R	105.2	4.8																									
1																														
2																														
3																														
4																														
5		29	R	99.0	3.0																									
6																														
7																														
8																														
9																														
40		50/6"	R	97.6	8.1																									

(Continued)

NOTE: The data presented on the boring logs represents subsurface conditions only at the specific locations and at the time designated. This data may not represent conditions at other locations and/or times. This boring data was compiled primarily for design purposes, and should not be construed as part of the plans governing construction or defining construction techniques. Bidders are fully responsible for interpretations or conclusions they draw from the boring log.

Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

SOIL BORING LOG

Sheet 2 of 2

NO. P-1 ELEV: ---------- SIZE OF HOLE 7 in. FIELD ENGR. J.T. DATE: 12/28/83

DEPTH FT	PENETRATION RESISTANCE BLOWS/FT C	PENETRATION RESISTANCE BLOWS/FT R	SAMPLE TYPE	DRY DENSITY PCF	MOISTURE CONTENT	DESCRIPTION	SOIL CLASSIFICATION	GRADATION WELL	GRADATION MED	GRADATION POOR	GRAIN SHAPE ANGULAR	GRAIN SHAPE SUBANGULAR	GRAIN SHAPE ROUNDED	GRAIN SHAPE SUBROUNDED	RELATIVE DENSITY LOW	RELATIVE DENSITY MED	RELATIVE DENSITY HIGH	PLASTICITY NONE	PLASTICITY LOW	PLASTICITY MEDIUM	PLASTICITY HIGH	CONSISTENCY SOFT	CONSISTENCY FIRM	CONSISTENCY STIFF	CONSISTENCY VERY STIFF	CONSISTENCY HARD	CEMENTATION NONE	CEMENTATION WEAK	CEMENTATION MEDIUM	CEMENTATION STRONG
41					sli	Sandy Clay-Clayey Sand;	CL-			X	X					X			X	X						X		X	X	
2					damp	brown, small amount of fine	SC																							
3					to	gravel, highly stratified																								
4					damp	with lenses of silty sands																								
5		50/8"	R	97.5	6.0	(SM), occasional thin zones																								
6						of weak to medium calcite																								
7						(caliche) cementation.																								
8																														
9																														
50		50/9"	R	102.1	7.7																									
1																														
2																														
3																														
4																														
5		50/6"	R	110.6	3.9																									
6																														
7																														
8																														
9																														
60																														
1																														
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9																														
70																														
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3																														
4																														
5																														
6																														
7																														
8																														
9																														
80																														

Stopped test drilling at: 60 feet

Ground water encountered: none

Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

NOTE: The data presented on the boring logs represents subsurface conditions only at the specific locations and at the time designated. This data may not represent conditions at other locations and/or times. This boring data was compiled primarily for design purposes, and should not be construed as part of the plans governing construction or defining construction techniques. Bidders are fully responsible for interpretations or conclusions they draw from the boring log.

SOIL BORING LOG

Sheet 1 of 2

NO. P-2 ELEV: --------- SIZE OF HOLE 7 in. FIELD ENGR: J.T. DATE 12/28/83

DEPTH FT	PENETRATION RESISTANCE BLOWS/FT C	PENETRATION RESISTANCE BLOWS/FT R	SAMPLE TYPE	DRY DENSITY PCF	MOISTURE CONTENT	DESCRIPTION	SOIL CLASSIFICATION	GRADATION WELL	GRADATION MED	GRADATION POOR	GRAIN SHAPE ANGULAR	GRAIN SHAPE SUBANGULAR	GRAIN SHAPE ROUNDED	GRAIN SHAPE SUBROUNDED	RELATIVE DENSITY LOW	RELATIVE DENSITY MED	RELATIVE DENSITY HIGH	PLASTICITY NONE	PLASTICITY LOW	PLASTICITY MEDIUM	PLASTICITY HIGH	CONSISTENCY SOFT	CONSISTENCY FIRM	CONSISTENCY STIFF	CONSISTENCY VERY STIFF	CONSISTENCY HARD	CEMENTATION NONE	CEMENTATION WEAK	CEMENTATION MEDIUM	CEMENTATION STRONG
1					sli	Silty to Clayey Sand: brown	SM-			X	X	X	X		X	X			X									X		
2					damp	to light brown, highly stra-	SC																							
3					to	tified with variable lenses																								
4					damp	of sandy clays (CL), sandy																								
5		53	R	109.7	2.3	silts (ML) and clean sands										X												X	X	
6						(SP), occasional thin lenses																								
7						of weak to medium calcite																								
8						(caliche) cementation.																								
9																														
10		50/8"	R	104.7	5.5																									
1																														
2																														
3																														
4																														
5		54	R	97.3	6.3																									
6																														
7																														
8																														
9																														
20		31	R	104.9	1.8																									
1																														
2																														
3																														
4																														
5		50/11"	R	97.8	6.9																									
6																														
7																														
8																														
9																														
30		33	R	105.9	2.4																									
1																														
2																														
3																														
4																														
5		50/11"	R	95.9	7.2																									
6																														
7																														
8																														
9																														
40		36	R	118.2	2.9																									

(Continued)

NOTE: The data presented on the boring logs represents subsurface conditions only at the specific locations and at the time designated. This data may not represent conditions at other locations and/or times. This boring data was compiled primarily for design purposes, and should not be construed as part of the plans governing construction or defining construction techniques. Bidders are fully responsible for interpretations or conclusions they draw from the boring log.

Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

SOIL BORING LOG

Sheet 2 of 2

NO. P-2 ELEV: ---------- SIZE OF HOLE 7 in. FIELD ENGR: J.T. DATE: 12/28/83

DEPTH FT	PENETRATION RESISTANCE BLOWS/FT C	PENETRATION RESISTANCE BLOWS/FT R	SAMPLE TYPE	DRY DENSITY PCF	MOISTURE CONTENT	DESCRIPTION	SOIL CLASSIFICATION	GRADATION WELL	GRADATION MED	GRADATION POOR	GRAIN SHAPE ANGULAR	GRAIN SHAPE SUBANGULAR	GRAIN SHAPE ROUNDED	GRAIN SHAPE SUBROUNDED	RELATIVE DENSITY LOW	RELATIVE DENSITY MED	RELATIVE DENSITY HIGH	PLASTICITY NONE	PLASTICITY LOW	PLASTICITY MEDIUM	PLASTICITY HIGH	CONSISTENCY SOFT	CONSISTENCY FIRM	CONSISTENCY STIFF	CONSISTENCY VERY STIFF	CONSISTENCY HARD	CEMENTATION NONE	CEMENTATION WEAK	CEMENTATION MEDIUM	CEMENTATION STRONG
41					sli	Sandy Clay-Clayey Sand;	CL-			X	X					X			X	X						X		X	X	
2					damp	brown, small amount of fine	SC																							
3					to	gravel, highly stratified																								
4					damp	with lenses of silty sands																								
5		50/7"	R	89.3	8.0	(SM), occasional thin zones																								
6						of weak to medium calcite																								
7						(caliche) cementation.																								
8																														
9																														
50		50/6"	R	100.0	4.4																									
1																														
2																														
3																														
4																														
5		50/3"	R	*																										
6																														
7																														
8																														
9																														
60																														
1																														
2																														
3																														
4																														
5																														
6																														
7						*No Sample Recovery																								
8																														
9																														
70																														
1																														
2																														
3																														
4																														
5																														
6																														
7																														
8																														
9																														
80																														

Stopped test drilling at: 60 feet

Ground water encountered: none

Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

NOTE: The data presented on the boring logs represents subsurface conditions only at the specific locations and at the time designated. This data may not represent conditions at other locations and/or times. This boring data was compiled primarily for design purposes, and should not be construed as part of the plans governing construction or defining construction techniques. Bidders are fully responsible for interpretations or conclusions they draw from the boring log.

REPORT ON LABORATORY TESTS

SAMPLE: Date 1/21/84

Source Test borings

Type Driven ring sample

Material Subsoil

Sampled By Thompson

TESTED: Volume change (compression or expansion) upon saturation

RESULTS:

Sample	Dry Density	Moisture Content	Load at Saturation	Percent Expansion Upon Saturation
C-2: 4 - 5'	97.9 pcf	4.4%	100 psf	0.18% Expansion
C-2: 9 - 10'	112.0 pcf	2.0%	100 psf	0.06% Expansion
P-1: 9 - 10'	108.0 pcf	3.6%	* 50 psf	0.00
P-1: 19 - 20'	104.1 pcf	5.4%	2770 psf	0.92% Compression
P-1: 29 - 30'	105.2 pcf	4.8%	*550 psf	0.00
P-1: 34 - 34'	99.0 pcf	3.0%	4140 psf	1.75% Compression
P-2: 4 - 5'	109.7 pcf	2.3%	*400 psf	0.00
P-2: 19 - 20'	104.9 pcf	1.8%	2770 psf	1.62% Compression
P-2: 29 - 30'	105.3 pcf	4.8%	3450 psf	1.35% Compression

*Maximum swell pressure (pressure required to prevent expansion upon saturation).

Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC

REPORT ON LABORATORY TESTS

Date 1/16/84

SAMPLE:

Source Test boring #P-1; 19 - 20'

Type Driven ring sample

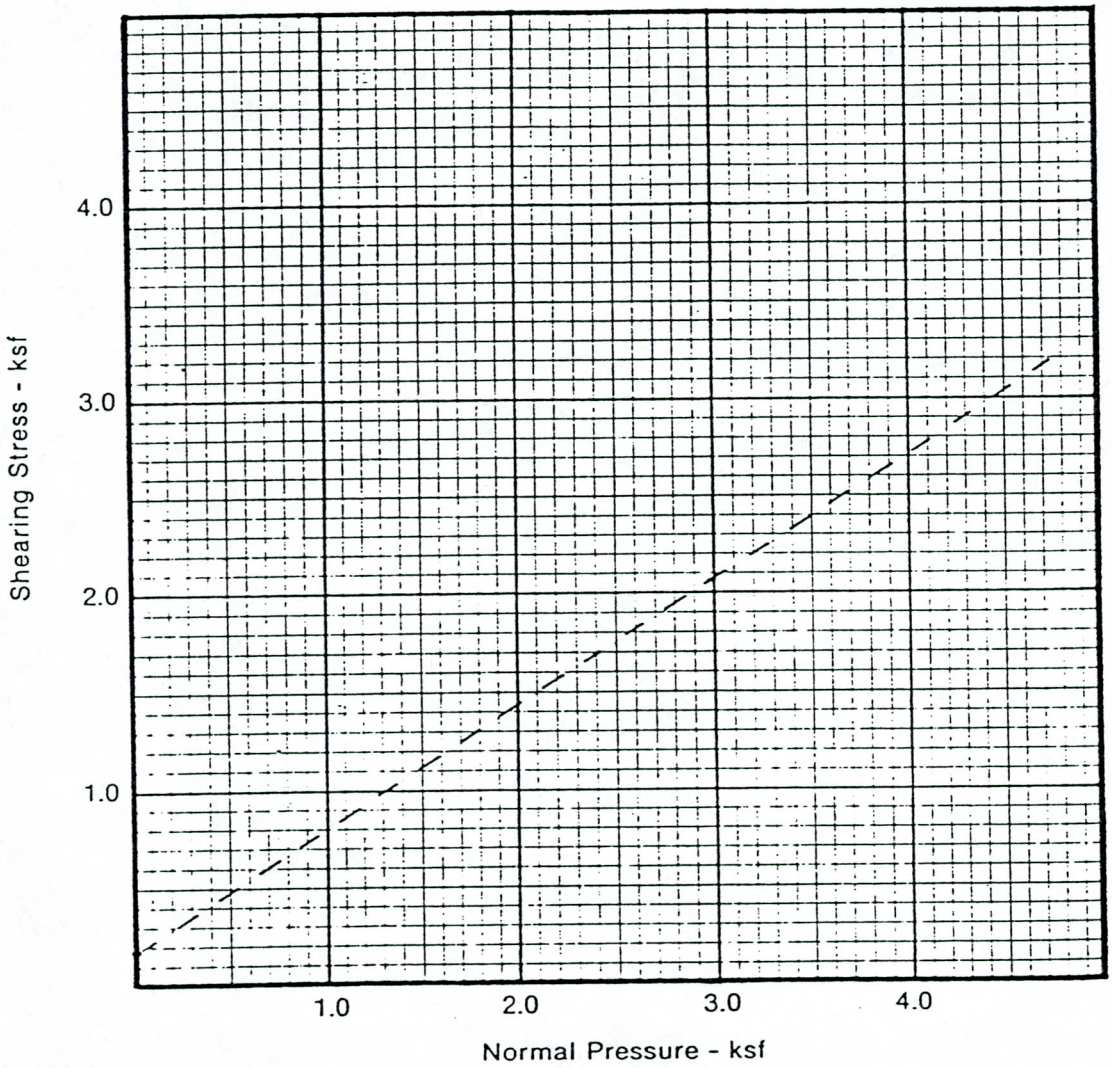
Material Subsoil; 104.1 pcf dry density; 5.2% field moisture

Sampled By Thompson

TESTED: Direct Shear with samples soaked

RESULTS:

Friction Angle (Ø) = 32° Cohesion (c) = 0.19 ksf



Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

REPORT ON LABORATORY TESTS

SAMPLE: Date 1/16/84

Source Test boring #P-1; 34 - 35'

Type Driven ring sample

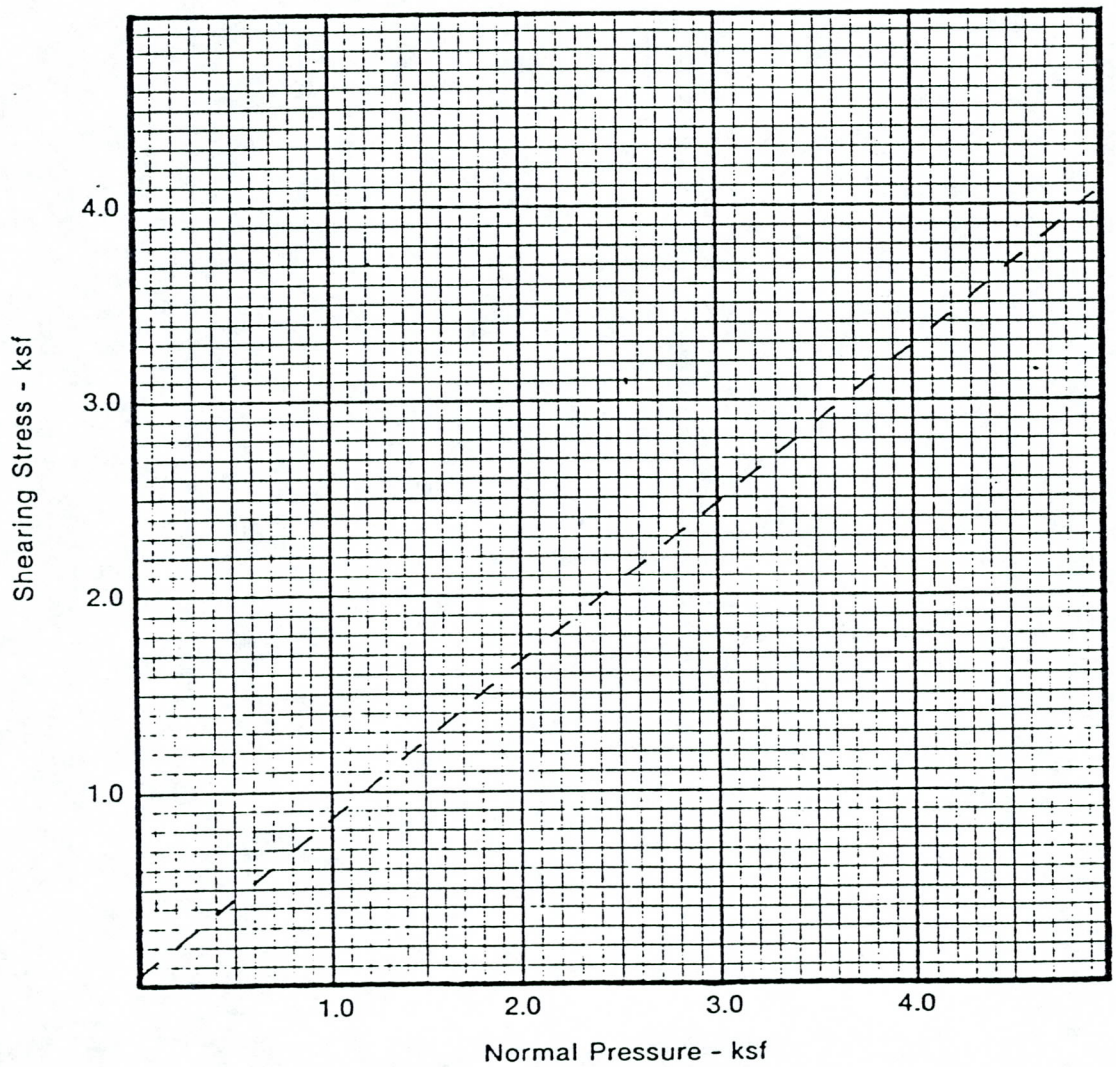
Material Subsoil; 99.0 pcf dry density; 3.0% field moisture

Sampled By Thompson

TESTED: Direct Shear with samples soaked

RESULTS:

Friction Angle (Ø) = 39.0° Cohesion (c) = 0.05 ksf



Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

REPORT ON LABORATORY TESTS

Date 1/16/84

SAMPLE:

Source Test boring #P-2; 9 - 10'

Type Driven ring sample

Material Subsoil; 104.7 pcf dry density; 5.5% field moisture

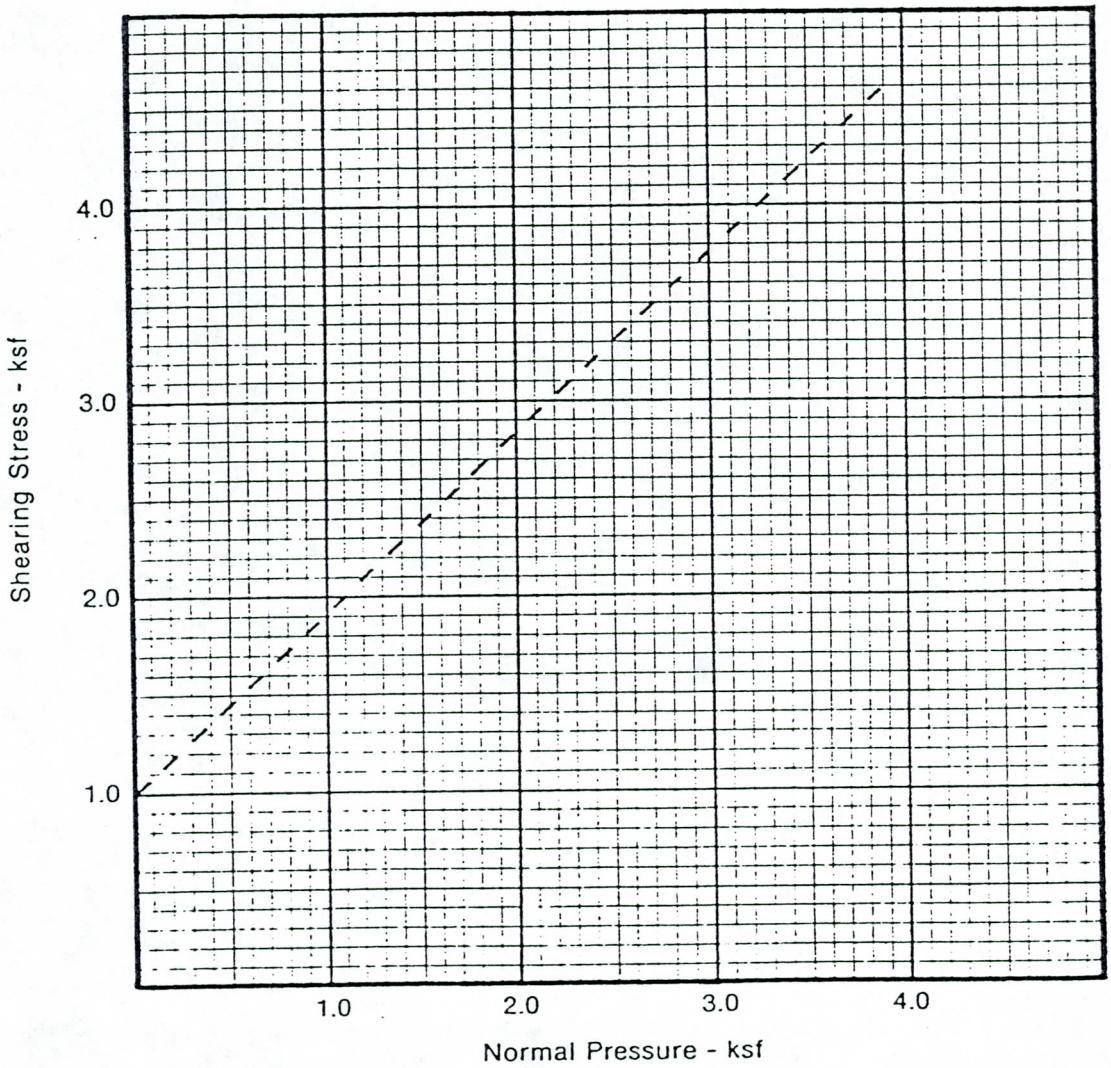
Sampled By Thompson

TESTED: Direct Shear with samples at in-situ moisture

RESULTS:

Friction Angle (Ø) = 42°

Cohesion (c) = 1.0 ksf



Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

REPORT ON LABORATORY TESTS

SAMPLE: Date 1/16/84

Source Test boring #P-2; 19 - 20'

Type Driven ring sample

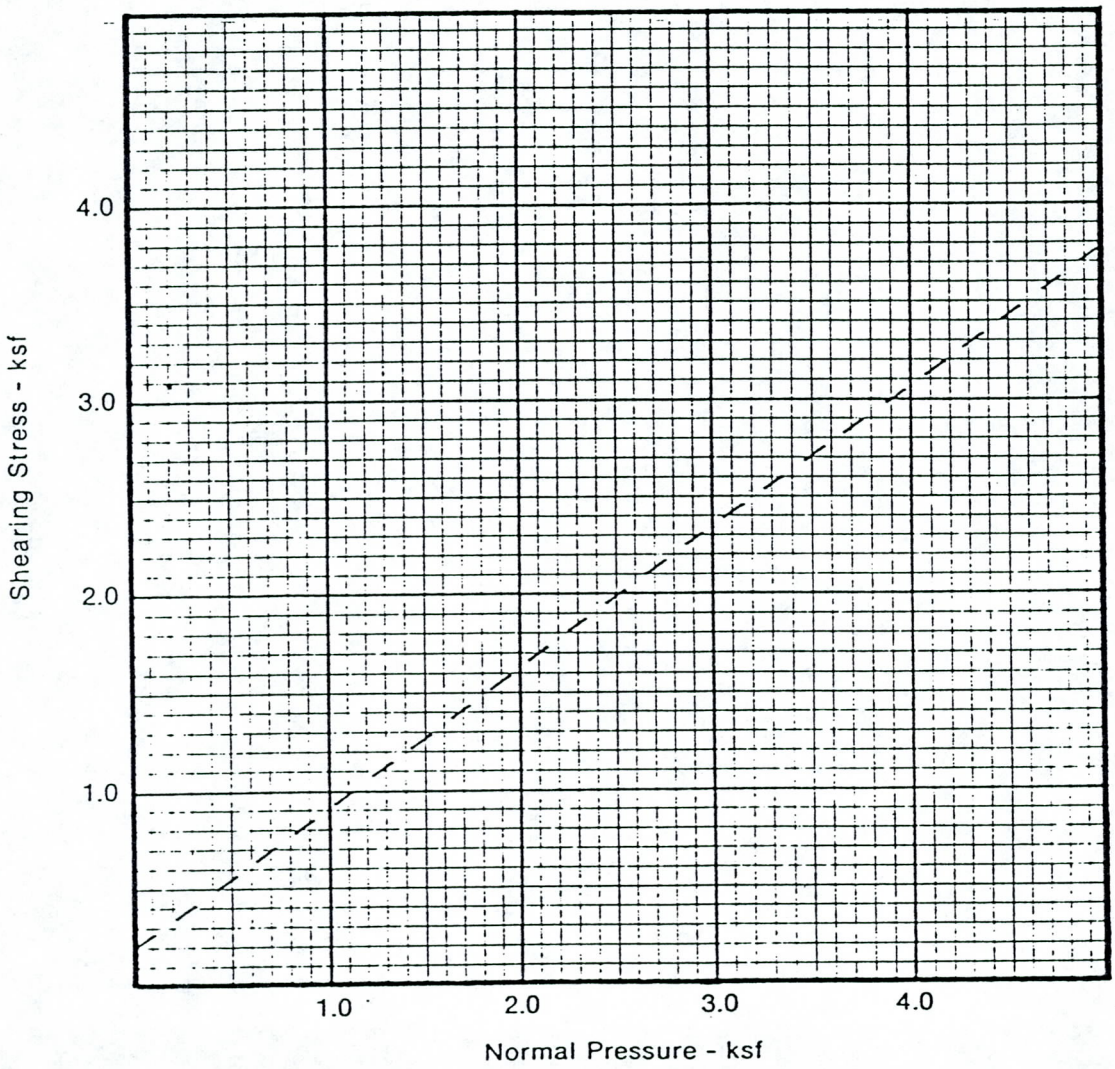
Material Subsoil; 104.9 pcf dry density; 1.8% field moisture

Sampled By Thompson

TESTED: Direct Shear with samples soaked

RESULTS:

Friction Angle (Ø) = 35.4° Cohesion (c) = 0.20 ksf



Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

REPORT ON LABORATORY TESTS

SAMPLE: Date 1/16/84

Source Test boring #P-2; 29 - 30'

Type Driven ring sample

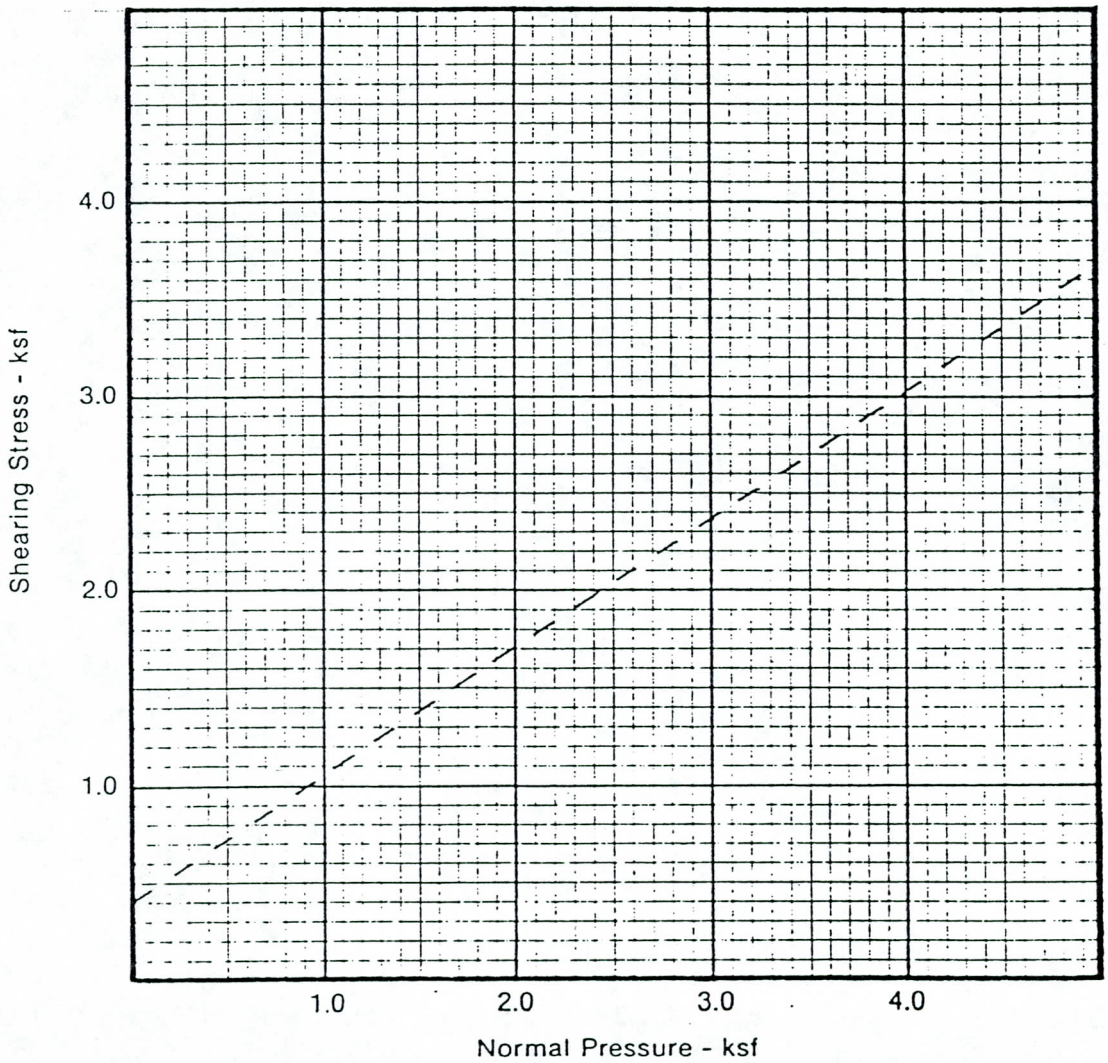
Material Subsoil; 105.9 pcf dry density; 2.4% field moisture

Sampled By Thompson

TESTED: Direct Shear with samples soaked

RESULTS:

Friction Angle (Ø) = 33.0° Cohesion (c) = 0.40 ksf



Project No. 84-081

THOMAS-HARTIG & ASSOCIATES, INC.

INDEX OF CALCULATIONS

Description	Sheet No.
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G. Computer Documentation	G1 - 7

Registered Professional Engineer (Civil)
CERTIFICATE NO. 13124
RANDY L. HARREL
Date Signed 8-23-89
ARIZONA, U.S.A.

A. PRECIPITATION

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175	SHT. NO. A2 OF 25
TEMPE DRAINAGE STUDY	JOB NO. 888053
	BY JB DATE 5-2-89
	REVWD DATE
	REVISED

PRECIPITATION SUMMARY

RETURN PERIOD (YRS.)	DURATION	MEAN INTENSITY	RATIO TO MEAN	TOTAL RAINFALL (IN.)	
5	24 HR.	–	–	2.00	1
50	↓	–	–	3.40	
100		–	–	3.85	
5	1 MO.	2.76 IN / MO.	1.20	3.3	2
10	↓	↓	1.40	3.9	
50			1.70	4.7	
100			1.75	4.8	
5	3 MO.	4.5 IN / MO.	1.20	* 5.4	2
10	↓	↓	1.40	6.3	
50			1.70	7.7	
100			1.75	** 7.9	

DETERMINE INPUT FOR INFLOW:

* DAY 1 = = 2.00
16 = 3.30 − 2.00 = 1.30
31 = (5.4 − 3.3) ÷ 4 = 0.53
46 = " = 0.53
61 = " = 0.53
76 = " = 0.53

TOTAL = 5.42" ≈ 5.4" (5 YR)

** DAY 1 = = 3.85
16 = 4.80 − 3.85 = 0.95
31 = (7.9 − 4.8) ÷ 4 = 0.78
46 = " = 0.78
61 = " = 0.78
76 = " = 0.78

TOTAL = 7.92" ≈ 7.9" (100 YR)

(1) TOTAL RAINFALL = COMPUTED VALUES IN EVANS, KUHN HYDROLOGY REPORT

(2) TOTAL RAINFALL = RATIO TO MEAN × MEAN INTENSITY

SHT. A3 OF 25
#888053
JAB 5-21-89

Steps to be used to determine precipitation values for various durations and return periods.

STEP 1. From the precipitation maps in ~~the manual "Hydrologic Design for Highway Drainage in Arizona"~~ *, determine the precipitation values for the 6 and 24 hour duration storms for return periods of 2, 5, 10, 25, 50 and 100 years. Tabulate these values in Table 1 in the column headed 'Map Values'

* NOAA ATLAS 2, PRECIPITATION-FREQUENCY ATLAS OF THE WESTERN UNITED STATES, VOLUME VIII - ARIZONA

TABLE 1

LOCATION
40TH ST. & ELLIOTT RD.
LATITUDE 33°20'
LONGITUDE 111°57'

Return Period (Years)			Precipitation Values (inches)				
			6 hour duration		24 hour duration		
	1 hr	2 hr	Map Value	Corrected Value	Map Value	Corrected Value	
2	0.9		1.15	1.15	1.40	1.40	USE
5			1.70	1.70	2.00	2.00	
10	1.60	1.75	2.00	2.05	2.40	2.40	
25			2.60	2.50	3.10	2.95	
50			2.90	2.90	3.40	3.40	USE
100	2.65	3.30	3.30	3.30	3.90	3.85	

NOTE: There is a possibility of making an error while reading the maps because, (1) a site is not easy to locate precisely on a series of 12 maps, (2) there may be some slight registration differences in printing, and (3) precise interpolation between isolines is difficult. In order to minimize any errors in reading the maps, these values should be plotted on the diagram "Precipitation Depth versus Return Period" Fig. 1.

EXCERPT FROM EVANS, KUHN & ASSOC. HYDROLOGY REPORT FOR THE 'ADOT PIT DIVERSION CHANNEL' DATED APRIL 1983

BENSON & GERDIN	DIVISION OF CREEGAN & D'ANGELO	PHONE (602) 258-3175	SHT. NO. A4 OF 25
TEMPE DRAINAGE STUDY			JOB NO. 838055
A.S.U. CLIMATOLOGY			BY DATE
RAIN GAGE STATION			REVWD DATE
			REVISED

	1926-1980	1981-1987
LATITUDE :	33° 26' N	33° 25' N
LONG. :	111° 56' W	111° 56' W
SECTION :	22	22
TOWNSHIP :	1 N	1N
RANGE :	4 E	4E
ELEV. :	1150'	1170'
DESCRIP :	3/4 MI. SOUTH OF TEMPE POST OFFICE	

Form No. 1078A—Met'l.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

SHT. A5 OF 25
#088053

Station, Tempe ~~#3~~ County, Maricopa State, Arizona

Latitude _____ Longitude, _____ Elevation, _____ feet

Data, Total precip.

Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1926	.60	.19	1.80	3.05	.37	T	1.59	.38	2.17	.01	.13	2.87	13.16 ✓
1927	.02	1.89	.45	.50	.21	.43	.32	1.36	1.59	.29	.35	1.30	8.71 ✓
1928	.10	1.37	.18	0	0	0	.11	.34	1.15	.41	.21	.74	4.61 ✓
1929	1.03	.23	.35	.59	T	T	.63	1.62	.55	.05	.06	T	5.11 ✓
1930	1.67	.33	1.83	.46	.68	.09	.57	.64	.05	.04	1.04	0	7.40 ✓
1931	.06	2.92	.13	.80	T	T	.13	1.80	.83	.66	2.88	1.05	11.26 ✓
1932	.13	2.77	.07	.15	0	.06	1.28	.45	.02	1.00	0	2.11	8.04 ✓
1933	2.29	.29	0	.86	.04	.35	.83	.40	.80	.66	.74	.04	7.30 ✓
1934	.38	.60	.07	.11	.12	.06	.27	1.54	.05	0	.50	1.60	5.30 ✓
1935	1.20	2.29	1.56	.10	.29	0	.74	3.31	.89	T	.48	.29	11.15 ✓
1936	1.10	1.11	1.31	T	0	T	2.66	.85	.23	.49	.58	2.25	10.58 ✓
1937	1.61	.67	2.17	0	.04	.46	.59	.09	1.09	0	0	.70	7.42 ✓
1938	.42	.78	.85	.06	.51	.10	.72	.78	.01	.06	T	1.34	5.63 ✓
1939	.33	.80	.58	.14	0	0	.35	.82	2.68	.12	.52	0	6.34 ✓
1940	.01	.63	.04	.17	T	T	.38	.47	1.22	1.50	.23	4.35	9.00
1941	1.25	1.99	3.82	2.20	1.38	.00	1.24	1.44	1.55	.33	1.43	1.45	18.08
1942	0.49	0.25	0.24	0.88	0	0	1.16	1.10	.21	.30	0	.22	4.85
1943	0.97	0.02	0.56	0.08	0.02	.01	.01	3.57	1.19	.06	0	1.66	8.15
1944	.34	1.83	.90	.43	.66	0	.51	.56	.24	.18	1.34	1.52	8.51
1945	1.09	.26	.74	0	0	0	.09	.97	T	.99	0	.42	4.56
1946	1.21	.22	.07	.09	0	0	.60	1.87	2.29	.43	.93	.82	8.53
1947	.04	.17	0	0	.25	0	T	1.50	.71	.08	.78	.43	3.96
1948	0	1.14	.53	0	0	.12	.62	.68	T	.46	0	.86	4.41

SUMS

MEANS

REMARKS

U. S. GOVERNMENT PRINTING OFFICE 8—7618

Total Precip.

RAW PRECIP. DATA. (1926 → 1987)
VALUES OVER 2" CIRCLED.

Form No. 1078A—Met'l.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

SHT. A6 OF 25
#888053

Station, Tempe ~~1 SE~~ County, State, Arizona

Latitude, Longitude, Elevation, feet

Data, Total precipitation

Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1949	2.10	.01	.02	.43	.06	.03	.15	1.83	.89	.33	.25	1.02	7.68
1950	.40	1.44	.20	0	0	.05	2.07	.15	.30	0	.02	0	4.63
1951	1.52	.28	.18	.63	.32	0	.63	4.73	.20	.58	.64	.57	10.18
1952	1.03	.45	2.30	1.64	0	.05	.45	2.12	.86	0	2.86	1.04	12.83
1953	.32	.21	1.09	.02	T	0	1.57	.14	0	T	.06	.04	3.45
1954	.83	.63	1.30	0	.16	.02	.69	1.12	.95	.09	0	.09	5.88
1955	2.24	.09	0	T	.02	.54	3.09	1.25	0	.06	.18	.27	7.74
1956	.53	.47	0	.01	.17	T	.66	.15	0.?	.34	0	T	2.63
1957	1.84	.18	.80	T	.96	.33	.38	.79	0	2.78	T	.19	8.25
1958	.02	.52	1.51	.65	.08	.02	.19	.18	1.56	.44	.41	.00	6.18
1959	.21	.71	.00	T	.07	.00	.15	1.00	.01	2.33	.58	3.59	8.65
1960	1.27	.06	.75	.00	T	.00	1.10	1.56	.10	1.29	T	.10	6.23
1961	.21	T	.57	T	.00	.00	.64	1.75	.80	.12	.07	1.00	5.16
1962	1.54	.97	.58	0	0	.35	.28	.06	.54	0	.04	.55	4.91
1963	.65	1.05	.24	.29	.00	.00	.02	2.45	.24	1.19	.59	.00	6.82
1964	.37	.00	.57	.20	.00	.00	1.24	3.80	1.91	.37	.50	.91	10.43
1965	1.88	1.46	1.12	1.87	.29	.41	.36	.36	.22	.34	1.04	4.46	13.81
1966	.37	1.15	.43	0	T	.01	.10	3.46	1.90	.18	.48	.38	8.46
1967	.26	.00	.46	.11	.02	.78	.84	.06	.20	.60	1.22	4.69	9.24
1968	.29	1.45	1.36	.09	.06	0	1.29	.76	0	.39	.93	.88	7.50
Sums													
Means													

REMARKS

U. S. GOVERNMENT PRINTING OFFICE 8—7518

Total precipitation

ESSA Form 79-1A
(10-68)
(Formerly ESSA form 75-1A)

U. S. DEPARTMENT OF COMMERCE, ESSA, ENVIRONMENTAL DATA SERVICE

SHT. A7 OF 25
838053

Station, Tempe County, State,

Latitude, Longitude, Elevation, feet.

Data, Total Precip.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1969	1.42	.79	.70	.17	.43	0	.49	.60	2.98	.16	.88	.95	9.57
1970	T	.41	2.56	T	0	0	.47	1.29	2.54	.62	.01	.21	8.11
1971	.17	.18	0	.20	.06	0	.25	1.96	.88	.67	T	.59	4.96
1972	.00	T	.00	.00	.02	.77	.48	.37	.15	4.54	1.21	1.61	9.15
1973	.25	1.45	2.10	0	.11	.48	.35	.32	0	0	1.19	0	6.25
1974	.87	.05	1.22	.02	0	0	2.03	2.13	1.21	2.37	.43	.74	11.07
1975	.05	.43	1.21	.64	0	0	.91	.10	.69	.48	.80	1.16	6.47
1976	T	.82	.31	1.16	1.36	.16	1.01	.04	2.06	1.41	.71	.30	9.34
1977	1.00	.05	.27	.06	.12	.10	.55	.20	.55	.73	.04	.73	4.40
1978	2.23	2.59	1.99	.08	.01	.29	1.74	1.16	.02	.51	2.39	2.69	15.69
1979	2.49	.19	1.87	.02	.77	.01	.14	1.45	.05	.22	.22	.09	7.52
~~1979~~	~~2.49~~	~~.19~~	~~1.87~~	~~.02~~	~~.77~~								
1980	1.95	2.56	1.05	.36	.43	.00	1.17	1.45	.60	.11	.00	.06	9.74
1981	.71	1.13	1.13	.13	.18	.00	.75	.40	.15	.69	1.25	.00	6.64
1982	.67	1.14	1.33	T	.89	.00	.78	2.85	.27	.01	1.61	2.38	11.93
1983	.41	1.26	3.67	.19	.00	.00	.32	2.71	2.09	.94	.41	1.31	13.81
~~1984~~	~~.00~~	~~.00~~	~~.00~~	~~1.09~~	~~.06~~	~~.23~~	~~3.85~~	~~.27~~	~~2.71~~	~~M~~	~~M~~		
1984	.38	.00	.00	1.09	.03	.23	2.64	.41	2.68	.65	.79	2.87	11.77
1985	.91	.30	.45	.21	0	0	1.68	1.14	1.26	1.38	1.76	1.08	10.17
1986	.07	1.33	1.79	.05	.02	.04	1.33	1.72	.41	.67	.03	1.29	8.75
1987 Sums	.70	2.35	.42	.00	.38	.03	.31	1.88	.35	.44	2.05	1.84	11.25
Means													

REMARKS

Total Precipitation

TEMPE DRAINAGE STUDY

HAZEN'S PLOTTING POINTS FOR PROBABILITY PAPER

REF: DESIGN OF SMALL DAMS
BUREAU OF REC. (1973)
PG. 93, TABLE 7

$$P = 100\left[\frac{2m-1}{2n}\right]$$

$$F = \frac{100}{P}$$

N= 61.

M= 1. P= 0.82 F= 122.0	M= 11. P= 17.21 F= 5.81	M= 21. P= 33.61 F= 2.98	M= 31. P= 50.00 F= 2.00	M= 41. P= 66.39 F= 1.51	M= 51. P= 82.79 F= 1.21
M= 2. P= 2.46 F= 40.67	M= 12. P= 18.85 F= 5.30	M= 22. P= 35.25 F= 2.84	M= 32. P= 51.64 F= 1.94	M= 42. P= 68.03 F= 1.47	M= 52. P= 84.43 F= 1.18
M= 3. P= 4.10 F= 24.40	M= 13. P= 20.49 F= 4.88	M= 23. P= 36.89 F= 2.71	M= 33. P= 53.28 F= 1.88	M= 43. P= 69.67 F= 1.44	M= 53. P= 86.07 F= 1.16
M= 4. P= 5.74 F= 17.43	M= 14. P= 22.13 F= 4.52	M= 24. P= 38.52 F= 2.60	M= 34. P= 54.92 F= 1.82	M= 44. P= 71.31 F= 1.40	M= 54. P= 87.70 F= 1.14
M= 5. P= 7.38 F= 13.56	M= 15. P= 23.77 F= 4.21	M= 25. P= 40.16 F= 2.49	M= 35. P= 56.56 F= 1.77	M= 45. P= 72.95 F= 1.37	M= 55. P= 89.34 F= 1.12
M= 6. P= 9.02 F= 11.09	M= 16. P= 25.41 F= 3.94	M= 26. P= 41.80 F= 2.39	M= 36. P= 58.20 F= 1.72	M= 46. P= 74.59 F= 1.34	M= 56. P= 90.98 F= 1.10
M= 7. P= 10.66 F= 9.38	M= 17. P= 27.05 F= 3.70	M= 27. P= 43.44 F= 2.30	M= 37. P= 59.84 F= 1.67	M= 47. P= 76.23 F= 1.31	M= 57. P= 92.62 F= 1.08
M= 8. P= 12.30 F= 8.13	M= 18. P= 28.69 F= 3.49	M= 28. P= 45.08 F= 2.22	M= 38. P= 61.48 F= 1.63	M= 48. P= 77.87 F= 1.28	M= 58. P= 94.26 F= 1.06
M= 9. P= 13.93 F= 7.18	M= 19. P= 30.33 F= 3.30	M= 29. P= 46.72 F= 2.14	M= 39. P= 63.11 F= 1.58	M= 49. P= 79.51 F= 1.26	M= 59. P= 95.90 F= 1.04
M= 10. P= 15.57 F= 6.42	M= 20. P= 31.97 F= 3.13	M= 30. P= 48.36 F= 2.07	M= 40. P= 64.75 F= 1.54	M= 50. P= 81.15 F= 1.23	M= 60. P= 97.54 F= 1.03
					M= 61. P= 99.18 F= 1.01

```
01♦LBL "TEMPE2"
02 TONE 9
03 1.00001
04 STO 10
05 "ENTER N"
06 PROMPT
07 STO 11
08 1000
09 /
10 ST+ 10
11 SF 12
12 RCL 11
13 FIX 0
14 "N= "
15 ARCL X
16 PRA
17 CF 12
18 ADV
19♦LBL 01
20 RCL 10
21 INT
22 2
23 *
24 1
25 -
26 2
27 /
28 RCL 11
29 /
30 100
31 *
32 STO 15
33 100
34 X<>Y
35 /
36 STO 16
37 RCL 10
38 INT
39 FIX 0
40 "M= "
41 ARCL X
42 PRA
43 RCL 15
44 FIX 2
45 "P= "
46 ARCL X
47 PRA
48 RCL 16
49 "F= "
50 ARCL X
51 PRA
52 ADV
53 ISG 10
54 GTO 01
55 END
```

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. 19 OF 25

JOB NO. 888053

BY [illegible] DATE 2-15-89

REVWD. DATE

REVISED

TEMPE DRAINAGE STUDY

3 MONTHS CUMMULATIVE PRECIP. (IN.)

VALUES ARE PRECIP. ABOVE 3" AND NOT OVERLAPPING IN TIME (ie: 4 VALUES BETWEEN CIRCLED EVENTS).

1926

.60 STO 12
.19 STO 11
1.80 STO 10
XEQ "TEMPE1"
2.59 ***
ENTER
3.05 RUN
5.04 ***
ENTER
.37 RUN
5.22 ***
ENTER
0.00 RUN
3.42 ***
ENTER
1.59 RUN
1.96 ***
ENTER
.38 RUN
1.97 ***
ENTER
2.17 RUN
4.14 ***
ENTER
.01 RUN
2.56 ***
ENTER
.13 RUN
2.31 ***
ENTER
2.87 RUN
3.01 ***

1927

ENTER
.02 RUN
3.02 ***
ENTER
1.89 RUN
4.78 ***
ENTER
.45 RUN
2.36 ***
ENTER
.50 RUN
2.84 ***
ENTER
.21 RUN
1.16 ***
ENTER
.43 RUN
1.14 ***
ENTER
.32 RUN
0.96 ***

1.36 RUN
2.11 ***
1.59 RUN
3.27 ***
.29 RUN
3.24 ***
.35 RUN
2.23 ***
1.30 RUN
1.94 ***

1928

.10 RUN
1.75 ***
1.37 RUN
2.77 ***
.18 RUN
1.65 ***
0.00 RUN
1.55 ***
0.00 RUN
0.18 ***
0.00 RUN
0.00 ***
.11 RUN
0.11 ***
.34 RUN
0.45 ***
1.15 RUN
1.60 ***
.41 RUN
1.90 ***
.21 RUN
1.77 ***
.74 RUN
1.36 ***

1929

1.03 RUN
1.98 ***
.23 RUN
2.00 ***
.35 RUN
1.61 ***
.59 RUN
1.17 ***
0.00 RUN
0.94 ***
0.00 RUN
0.59 ***
.63 RUN
0.63 ***
1.62 RUN
2.25 ***
.55 RUN
2.80 ***
.05 RUN
2.22 ***
.06 RUN
0.66 ***
0.00 RUN
0.11 ***

1930

1.67 RUN
1.73 ***
.33 RUN
2.00 ***
1.83 RUN
3.83 ***
4.00 CLX
.46 RUN
2.62 ***
.68 RUN
2.97 ***
.09 RUN
1.23 ***
.57 RUN
1.34 ***
.64 RUN
1.30 ***
.05 RUN
1.26 ***
.04 RUN
0.73 ***
1.04 RUN
1.13 ***
0.00 RUN
1.08 ***

1931

.06 RUN
1.10 ***
2.92 RUN
2.98 ***
.13 RUN
3.11 ***
.80 RUN
3.85 ***
0.00 RUN
0.93 ***
0.00 RUN
0.80 ***
.13 RUN
0.13 ***
1.80 RUN
1.93 ***
.83 RUN
2.76 ***
.66 RUN
3.29 ***
2.88 RUN
4.37 ***
1.05 RUN
4.59 ***

1932

.13 RUN
4.06 ***
2.77 RUN
3.95 ***
.07 RUN
2.97 ***
.15 RUN
2.99 ***
0.00 RUN
0.22 ***
.06 RUN
0.21 ***
1.28 RUN
1.34 ***
.45 RUN
1.79 ***
.02 RUN
1.75 ***
1.00 RUN
1.47 ***
0.00 RUN
1.02 ***
2.11 RUN
3.11 ***

1933

2.29 RUN
4.40 ***
.29 RUN
4.69 ***
0.00 RUN
2.58 ***
.86 RUN
1.15 ***
.04 RUN
0.90 ***

	.35	RUN	1.60	RUN	0.00	RUN	.70	RUN	0.00	RUN
	1.25	***	2.10	***	0.00	***	0.70	***	0.14	***
ENTER			1935				1938			
	.83	RUN	1.20	RUN	2.66	RUN	.42	RUN	.35	RUN
	1.22	***	3.30	***	2.66	***	1.12	***	0.35	***
ENTER										
	.40	RUN	2.29	RUN	.85	RUN	.78	RUN	.82	RUN
	1.58	***	5.09	***	3.51	***	1.90	***	1.17	***
ENTER										
	.80	RUN	1.56	RUN	.23	RUN	.85	RUN	2.68	RUN
	2.03	***	5.05	***	3.74	***	2.05	***	3.85	***
ENTER										
	.66	RUN	.10	RUN	.49	RUN	.06	RUN	.12	RUN
	1.86	***	3.95	***	1.57	***	1.69	***	3.62	***
ENTER										
	.74	RUN	.29	RUN	.58	RUN	.51	RUN	.52	RUN
	2.20	***	1.95	***	1.30	***	1.42	***	3.32	***
ENTER										
	.04	RUN	0.00	RUN	2.25	RUN	.10	RUN	0.00	RUN
	1.44	***	0.39	***	3.32	***	0.67	***	0.64	***
ENTER	1934				1937				1940	
	.38	RUN	.74	RUN	1.61	RUN	.72	RUN	.01	RUN
	1.16	***	1.03	***	4.44	***	1.33	***	0.53	***
ENTER										
	.60	RUN	3.31	RUN	.67	RUN	.78	RUN	.63	RUN
	1.02	***	4.05	***	4.53	***	1.60	***	0.64	***
ENTER										
	.07	RUN	.89	RUN	2.17	RUN	.01	RUN	.04	RUN
	1.05	***	4.94	***	4.45	***	1.51	***	0.68	***
ENTER										
	.11	RUN	0.00	RUN	0.00	RUN	.06	RUN	.17	RUN
	0.78	***	4.20	***	2.84	***	0.85	***	0.84	***
ENTER										
	.12	RUN	.48	RUN	.04	RUN	0.00	RUN	0.00	RUN
	0.30	***	1.37	***	2.21	***	0.07	***	0.21	***
ENTER										
	.06	RUN	.29	RUN	.46	RUN	1.34	RUN	0.00	RUN
	0.29	***	0.77	***	0.50	***	1.40	***	0.17	***
ENTER			1936				1939			
	.27	RUN	1.10	RUN	.59	RUN	.33	RUN	.38	RUN
	0.45	***	1.87	***	1.09	***	1.67	***	0.38	***
ENTER										
	1.54	RUN	1.11	RUN	.09	RUN	.80	RUN	4.00	CLX
	1.87	***	2.50	***	1.14	***	2.47	***	.47	RUN
ENTER									0.85	***
	.05	RUN	1.31	RUN	1.09	RUN	.58	RUN		
	1.86	***	3.52	***	1.77	***	1.71	***	1.22	RUN
ENTER									2.07	***
	0.00	RUN	0.00	RUN	0.00	RUN	.14	RUN		
	1.59	***	2.42	***	1.18	***	1.52	***	.00	CLX
ENTER									1.50	RUN
	.50	RUN	0.00	RUN	0.00	RUN	0.00	RUN	3.19	***
	0.55	***	1.31	***	1.09	***	0.72	***		

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. A11 OF 25
JOB NO. 888053
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REVWD. DATE
REVISED

ENTER	.23	RUN	0.00	RUN	0.00	RUN	0.00	RUN	.93	RUN
	2.95	***	1.12	***	1.25	***	0.74	***	3.65	***
ENTER	4.35	RUN	0.00	RUN	1.66	RUN	0.00	RUN	.82	RUN
	6.08	***	0.88	***	1.72	***	0.00	***	2.18	***
	1941				1944				1947	
ENTER	1.25	RUN	1.16	RUN	.34	RUN	.09	RUN	.04	RUN
	5.83	***	1.16	***	2.00	***	0.09	***	1.79	***
ENTER	1.99	RUN	1.10	RUN	1.83	RUN	.97	RUN	.17	RUN
	7.59	***	2.26	***	3.83	***	1.06	***	1.03	***
ENTER	3.82	RUN	.21	RUN	.90	RUN	0.00	RUN	0.00	RUN
	7.06	***	2.47	***	3.07	***	1.06	***	0.21	***
ENTER	2.20	RUN	.30	RUN	.43	RUN	.99	RUN	0.00	RUN
	8.01	***	1.61	***	3.16	***	1.96	***	0.17	***
ENTER	1.38	RUN	0.00	RUN	.66	RUN	0.00	RUN	.25	RUN
	7.40	***	0.51	***	1.99	***	0.99	***	0.25	***
ENTER	0.00	RUN	.22	RUN	0.00	RUN	.42	RUN	0.00	RUN
	3.58	***	0.52	***	1.09	***	1.41	***	0.25	***
			1943				1946			
ENTER	1.24	RUN	.97	RUN	.51	RUN	1.21	RUN	0.00	RUN
	2.62	***	1.19	***	1.17	***	1.63	***	0.25	***
ENTER	1.44	RUN	.02	RUN	.56	RUN	.22	RUN	1.50	RUN
	2.68	***	1.21	***	1.07	***	1.85	***	1.50	***
ENTER	1.55	RUN	.56	RUN	.24	RUN	.07	RUN	.71	RUN
	4.23	***	1.55	***	1.31	***	1.50	***	2.21	***
ENTER	.33	RUN	.08	RUN	.18	RUN	.09	RUN	.08	RUN
	3.32	***	0.66	***	0.98	***	0.38	***	2.29	***
ENTER	1.43	RUN	.02	RUN	1.34	RUN	0.00	RUN	.78	RUN
	3.31	***	0.66	***	1.76	***	0.16	***	1.57	***
ENTER	1.45	RUN	.01	RUN	1.52	RUN	0.00	RUN	.43	RUN
	3.21	***	0.11	***	3.04	***	0.09	***	1.29	***
	1942				1945				1948	
ENTER	.49	RUN	.01	RUN	1.09	RUN	.60	RUN	0.00	RUN
	3.37	***	0.04	***	3.95	***	0.60	***	1.21	***
ENTER	.25	RUN	3.57	RUN	.26	RUN	1.87	RUN	1.14	RUN
	2.19	***	3.59	***	2.87	***	2.47	***	1.57	***
ENTER	.24	RUN	1.19	RUN	.74	RUN	2.29	RUN	.53	RUN
	0.98	***	4.77	***	2.09	***	4.76	***	1.67	***
ENTER	.88	RUN	.06	RUN	0.00	RUN	.43	RUN	0.00	RUN
	1.37	***	4.82	***	1.00	***	4.59	***	1.67	***

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. A12 OF 25
JOB NO. 888053
BY GK DATE 2-15-88
REVWD. DATE
REVISED

ENTER											
	0.00	RUN	.25	RUN	.22	RUN	2.86	RUN	.16	RUN	
	0.53	***	1.47	***	1.03	***	3.72	***	1.46	***	
ENTER											
	.12	RUN	1.02	RUN	0.00	RUN	1.04	RUN	.02	RUN	
	0.12	***	1.60	***	0.85	***	3.90	***	0.18	***	
ENTER			1950				1953				
	.62	RUN	.40	RUN	.63	RUN	.32	RUN	.69	RUN	
	0.74	***	1.67	***	0.85	***	4.22	***	0.87	***	
ENTER											
	.68	RUN	1.44	RUN	4.73	RUN	.21	RUN	1.12	RUN	
	1.42	***	2.86	***	5.36	***	1.57	***	1.83	***	
ENTER											
	0.00	RUN	.20	RUN	.28	RUN	1.09	RUN	.95	RUN	
	1.30	***	2.04	***	5.56	***	1.62	***	2.76	***	
ENTER											
	.46	RUN	0.00	RUN	.58	RUN	.02	RUN	.09	RUN	
	1.14	***	1.64	***	5.51	***	1.32	***	2.16	***	
ENTER											
	0.00	RUN	0.00	RUN	.64	RUN	0.00	RUN	0.00	RUN	
	0.46	***	0.20	***	1.42	***	1.11	***	1.04	***	
ENTER											
	.86	RUN	.05	RUN	.57	RUN	0.00	RUN	.09	RUN	
	1.32	***	0.05	***	1.79	***	0.02	***	0.18	***	
ENTER	1949				1952				1955		
	2.10	RUN	2.07	RUN	1.03	RUN	1.57	RUN	2.24	RUN	
	2.96	***	2.12	***	2.24	***	1.57	***	2.33	***	
ENTER											
	.01	RUN	.15	RUN	.45	RUN	.14	RUN	.09	RUN	
	2.97	***	2.27	***	2.05	***	1.71	***	2.42	***	
ENTER											
	.02	RUN	.30	RUN	2.35	RUN	0.00	RUN	0.00	RUN	
	2.13	***	2.52	***	3.83	***	1.71	***	2.33	***	
ENTER											
	.43	RUN	0.00	RUN	1.64	RUN	0.00	RUN	0.00	RUN	
	0.46	***	0.45	***	4.44	***	0.14	***	0.09	***	
ENTER											
	.06	RUN	.02	RUN	0.00	RUN	.06	RUN	.02	RUN	
	0.51	***	0.32	***	3.99	***	0.06	***	0.02	***	
ENTER											
	.83	RUN	0.00	RUN	.05	RUN	.04	RUN	.54	RUN	
	1.32	***	0.02	***	1.69	***	0.10	***	0.56	***	
ENTER			1951				1954				
	.15	RUN	1.52	RUN	.45	RUN	.83	RUN	3.09	RUN	
	1.04	***	1.54	***	0.50	***	0.93	***	3.65	***	
ENTER											
	1.83	RUN	.28	RUN	2.12	RUN	.63	RUN	1.25	RUN	
	2.81	***	1.80	***	2.62	***	1.50	***	4.88	***	
ENTER											
	.89	RUN	.18	RUN	.86	RUN	1.30	RUN	0.00	RUN	
	2.87	***	1.98	***	3.43	***	2.76	***	4.34	***	
ENTER											
	3.00	CLX	.63	RUN	0.00	RUN	0.00	RUN	.06	RUN	
	.33	RUN	1.09	***	2.98	***	1.93	***	1.31	***	
	3.05	***									

BENSON & GERDIN	DIVISION OF CREEGAN & D'ANGELO	PHONE (602) 258-3175	SHT. NO. A13 OF 25
			JOB NO. 888053
			BY DS DATE 2-15-89
			REVWD DATE
			REVISED

ENTER										
	.18	RUN	.96	RUN	.41	RUN	0.00	RUN	.07	RUN
	0.24	***	1.76	***	2.41	***	0.75	***	0.99	***
ENTER										
	.27	RUN	.33	RUN	0.00	RUN	0.00	RUN	1.00	RUN
	0.51	***	1.29	***	0.85	***	0.00	***	1.19	***
					1959				1962	
ENTER	1956									
	.83	RUN	.38	RUN	.21	RUN	1.10	RUN	1.54	RUN
	1.28	***	1.67	***	0.62	***	1.10	***	2.61	***
ENTER										
	.47	RUN	.79	RUN	.71	RUN	1.56	RUN	.97	RUN
	1.57	***	1.50	***	0.92	***	2.66	***	3.51	***
ENTER										
	0.00	RUN	0.00	RUN	0.00	RUN	.10	RUN	.58	RUN
	1.30	***	1.17	***	0.92	***	2.76	***	3.09	***
ENTER										
	.05	RUN	2.78	RUN	0.00	RUN	1.29	RUN	0.00	RUN
	0.52	***	3.57	***	0.71	***	2.95	***	1.55	***
ENTER										
	.17	RUN	0.00	RUN	.07	RUN	0.00	RUN	0.00	RUN
	0.22	***	2.78	***	0.07	***	1.39	***	0.58	***
ENTER										
	0.00	RUN	.19	RUN	0.00	RUN	.10	RUN	.35	RUN
	0.22	***	2.97	***	0.07	***	1.39	***	0.35	***
			1958				1961			
ENTER										
	.66	RUN	.02	RUN	.15	RUN	.21	RUN	.28	RUN
	0.83	***	0.21	***	0.22	***	0.31	***	0.63	***
ENTER										
	.15	RUN	.82	RUN	1.00	RUN	0.00	RUN	.06	RUN
	0.81	***	1.03	***	1.15	***	0.31	***	0.69	***
ENTER										
	0.00	RUN	1.81	RUN	.01	RUN	.57	RUN	.54	RUN
	0.81	***	2.65	***	1.16	***	0.78	***	0.88	***
ENTER										
	.34	RUN	.65	RUN	2.33	RUN	0.00	RUN	0.00	RUN
	0.49	***	3.28	***	3.34	***	0.57	***	0.60	***
ENTER										
	0.00	RUN	.08	RUN	.58	RUN	0.00	RUN	.04	RUN
	0.34	***	2.54	***	2.92	***	0.57	***	0.58	***
ENTER										
	0.00	RUN	.02	RUN	3.59	RUN	0.00	RUN	.55	RUN
	0.34	***	0.75	***	6.50	***	0.00	***	0.59	***
					1960				1963	
ENTER	1957									
	1.84	RUN	.19	RUN	1.27	RUN	.64	RUN	.69	RUN
	1.84	***	0.29	***	5.44	***	0.64	***	1.28	***
ENTER										
	.18	RUN	.18	RUN	.06	RUN	1.75	RUN	1.05	RUN
	2.02	***	0.39	***	4.92	***	2.39	***	2.29	***
ENTER										
	.80	RUN	1.56	RUN	.75	RUN	.80	RUN	.24	RUN
	2.82	***	1.93	***	2.08	***	3.19	***	1.98	***
ENTER										
	0.00	RUN	.44	RUN	0.00	RUN	.12	RUN	.29	RUN
	0.98	***	2.18	***	0.81	***	2.67	***	1.58	***

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

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REVISED

ENTER									
	0.00	RUN	.50	RUN	0.00	RUN	1.22	RUN	.43	RUN
	0.53	***	2.78	***	0.43	***	1.72	***	1.30	***
ENTER										
	0.00	RUN	.91	RUN	.01	RUN	4.69	RUN	0.00	RUN
	0.29	***	1.78	***	0.01	***	6.21	***	0.60	***
			1965				1968			
ENTER										
	.02	RUN	1.88	RUN	.10	RUN	.29	RUN	.49	RUN
	0.02	***	3.29	***	0.11	***	6.20	***	0.92	***
ENTER										
	2.45	RUN	1.46	RUN	3.46	RUN	1.45	RUN	.60	RUN
	2.47	***	4.25	***	3.57	***	6.43	***	1.09	***
ENTER										
	.24	RUN	1.12	RUN	1.90	RUN	1.36	RUN	2.98	RUN
	2.71	***	4.46	***	5.46	***	3.10	***	4.07	***
ENTER										
	1.19	RUN	1.87	RUN	.18	RUN	.09	RUN	.16	RUN
	3.88	***	4.45	***	5.54	***	2.90	***	3.74	***
ENTER										
	.59	RUN	.29	RUN	.48	RUN	.06	RUN	.88	RUN
	2.02	***	3.28	***	2.56	***	1.51	***	4.02	***
ENTER										
	0.00	RUN	.41	RUN	.38	RUN	0.00	RUN	.95	RUN
	1.78	***	2.57	***	1.04	***	0.15	***	1.99	***
	1964				1967				1970	
ENTER										
	.37	RUN	.36	RUN	.26	RUN	1.29	RUN	0.00	RUN
	0.96	***	1.06	***	1.12	***	1.35	***	1.83	***
ENTER										
	0.00	RUN	.36	RUN	0.00	RUN	.76	RUN	.41	RUN
	0.37	***	1.13	***	0.64	***	2.05	***	1.36	***
ENTER										
	.53	RUN	.22	RUN	.46	RUN	0.00	RUN	2.56	RUN
	0.90	***	0.94	***	0.72	***	2.05	***	2.97	***
ENTER										
	.20	RUN	.34	RUN	.11	RUN	.39	RUN	0.00	RUN
	0.73	***	0.92	***	0.57	***	1.15	***	2.97	***
ENTER										
	0.00	RUN	1.04	RUN	.02	RUN	.93	RUN	0.00	RUN
	0.73	***	1.60	***	0.59	***	1.32	***	2.56	***
ENTER										
	0.00	RUN	4.46	RUN	.78	RUN	.88	RUN	0.00	RUN
	0.20	***	5.84	***	0.91	***	2.20	***	0.00	***
			1966				1969			
ENTER										
	1.24	RUN	.37	RUN	.84	RUN	1.42	RUN	.47	RUN
	1.24	***	5.87	***	1.64	***	3.23	***	0.47	***
ENTER										
	3.80	RUN	1.15	RUN	.06	RUN	.79	RUN	1.29	RUN
	5.04	***	5.98	***	1.68	***	3.09	***	1.76	***
ENTER										
	1.91	RUN	.43	RUN	.20	RUN	.70	RUN	2.54	RUN
	6.95	***	1.95	***	1.10	***	2.91	***	4.30	***
ENTER										
	.37	RUN	0.00	RUN	.30	RUN	.17	RUN	.62	RUN
	6.08	***	1.58	***	0.56	***	1.66	***	4.45	***

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ENTER			0.00	RUN	0.00	RUN	.64	RUN	.71	RUN
	.01	RUN	0.00	***	0.32	***	2.28	***	4.18	***
	3.17	***								
ENTER			.02	RUN	1.19	RUN	0.00	RUN	.30	RUN
	.21	RUN	0.02	***	1.19	***	1.85	***	2.42	***
	0.84	***								
	1971								1977	
ENTER			.77	RUN	0.00	RUN	0.00	RUN	1.00	RUN
	.17	RUN	0.79	***	1.19	***	0.64	***	2.01	***
	0.39	***			1974					
ENTER			.48	RUN	.87	RUN	.91	RUN	.05	RUN
	.18	RUN	1.27	***	2.06	***	0.91	***	1.35	***
	0.56	***								
ENTER			.37	RUN	.05	RUN	.10	RUN	.27	RUN
	0.00	RUN	1.62	***	0.92	***	1.01	***	1.32	***
	0.35	***								
ENTER			.15	RUN	1.22	RUN	.69	RUN	.06	RUN
	.20	RUN	1.00	***	2.14	***	1.70	***	0.38	***
	0.38	***								
ENTER			4.54	RUN	.02	RUN	.48	RUN	.12	RUN
	.06	RUN	5.06	***	1.29	***	1.27	***	0.45	***
	0.26	***								
ENTER			1.21	RUN	0.00	RUN	.80	RUN	.10	RUN
	0.00	RUN	5.90	***	1.24	***	1.97	***	0.28	***
	0.26	***								
ENTER			1.61	RUN	0.00	RUN	1.16	RUN	.55	RUN
	.25	RUN	7.36	***	0.02	***	2.44	***	0.77	***
	0.31	***	1973				1976			
ENTER			.25	RUN	2.03	RUN	0.00	RUN	.20	RUN
	1.96	RUN	3.07	***	2.03	***	1.96	***	0.85	***
	2.21	***								
ENTER			1.45	RUN	2.13	RUN	.82	RUN	.55	RUN
	.88	RUN	3.31	***	4.16	***	1.98	***	1.30	***
	3.09	***								
ENTER			2.10	RUN	1.21	RUN	.31	RUN	.73	RUN
	.67	RUN	3.80	***	5.37	***	1.13	***	1.48	***
	3.51	***								
ENTER			0.00	RUN	2.37	RUN	1.16	RUN	.04	RUN
	0.00	RUN	3.55	***	5.71	***	2.29	***	1.32	***
	1.55	***								
ENTER			.11	RUN	.43	RUN	1.36	RUN	.73	RUN
	.59	RUN	2.21	***	4.01	***	2.83	***	1.50	***
	1.26	***								
	1972								1978	
ENTER			.48	RUN	.74	RUN	.16	RUN	2.23	RUN
	.00	CLX	0.59	***	3.54	***	2.68	***	3.00	***
	0.00	RUN			1975					
	0.59	***	.35	RUN	.05	RUN	.04	RUN	2.59	RUN
ENTER			0.94	***	1.22	***	1.21	***	5.55	***
	0.00	RUN								
	0.59	***	.32	RUN	.43	RUN	2.06	RUN	1.99	RUN
ENTER			1.15	***	1.22	***	3.11	***	6.81	***
	0.00	RUN								
	0.00	***	0.00	RUN	1.21	RUN	1.41	RUN	.08	RUN
ENTER			0.67	***	1.69	***	3.51	***	4.66	***

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

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	.01	RUN		0.49	***		.18	RUN		1.61	RUN
	2.08	***					1.44	***		1.89	***
ENTER				.09	RUN						
	.29	RUN		0.53	***		0.00	RUN		2.38	RUN
	0.38	***			1980		0.31	***		4.00	***
ENTER				1.95	RUN						1983
	1.74	RUN		2.26	***		.75	RUN		0.91	RUN
	2.04	***					0.93	***		4.90	***
ENTER				2.56	RUN						
	1.16	RUN		4.60	***		.40	RUN		1.26	RUN
	3.19	***					1.15	***		4.55	***
ENTER				1.05	RUN						
	.02	RUN		5.56	***		.15	RUN		3.67	RUN
	2.92	***					1.30	***		5.84	***
ENTER				.36	RUN						
	.51	RUN		3.97	***		.69	RUN		.19	RUN
	1.69	***					1.24	***		5.12	***
ENTER				.43	RUN						
	2.39	RUN		1.84	***		1.25	RUN		0.00	RUN
	2.92	***					2.09	***		3.86	***
ENTER				0.00	RUN						
	.00	CLX		0.79	***		0.00	RUN		0.00	RUN
	2.68	RUN					1.94	***		0.19	***
	5.58	***		1.17	RUN			1982			
ENTER		1979		1.60	***		.67	RUN		.32	RUN
	2.49	RUN					1.92	***		0.32	***
	7.56	***		1.45	RUN						
ENTER				2.62	***		1.14	RUN		2.71	RUN
	.19	RUN					1.81	***		3.03	***
	5.36	***		.68	RUN						
ENTER				3.22	***		1.33	RUN		2.09	RUN
	1.87	RUN					3.14	***		5.12	***
	4.55	***		.11	RUN						
ENTER				2.16	***		0.00	RUN		.94	RUN
	.02	RUN					2.47	***		5.74	***
	2.08	***		0.00	RUN						
ENTER				0.71	***		.89	RUN		.41	RUN
	.77	RUN					2.22	***		3.44	***
	2.66	***		.06	RUN						
ENTER				0.17	***		0.00	RUN		1.31	RUN
	.01	RUN			1981		0.89	***		2.66	***
	0.80	***		.71	RUN						1984
ENTER				0.77	***		.78	RUN		.38	RUN
	.14	RUN					1.67	***		2.10	***
	0.92	***		1.13	RUN						
ENTER				1.90	***		2.85	RUN		0.00	RUN
	1.45	RUN					3.63	***		1.69	***
	1.60	***		1.13	RUN						
ENTER				2.97	***		.27	RUN		0.00	RUN
	.05	RUN					3.90	***		0.38	***
	1.64	***		.13	RUN						
ENTER				2.39	***		.01	RUN		1.09	RUN
	.22	RUN					3.13	***		1.09	***
	1.72	***									

	.03	RUN			
	1.12	***			
	.23	RUN			
	1.35	***			
	2.64	RUN			
	2.90	***			
	.41	RUN			
	3.28	***			
	2.68	RUN			
	5.73	***			
	.65	RUN			
	3.74	***			
	.79	RUN			
	4.12	***			
	2.87	RUN			
	4.31	***			
		1985			
	.91	RUN			
	4.57	***			
	.30	RUN			
	4.08	***			
	.45	RUN			
	1.66	***			
	.21	RUN			
	0.96	***			
	0.00	RUN			
	0.66	***			
	0.00	RUN			
	0.21	***			
	1.68	RUN			
	1.68	***			
	1.14	RUN			
	2.82	***			
	1.26	RUN			
	4.08	***			
	1.38	RUN			
	3.78	***			

	1.76	RUN		
	4.40	***	.38	RUN
ENTER			0.80	***
	1.08	RUN		
	4.22	***	.03	RUN
ENTER	1986		0.41	***
	.07	RUN		
	2.91	***	.31	RUN
ENTER			0.72	***
	1.33	RUN		
	2.48	***	1.88	RUN
ENTER			2.22	***
	1.79	RUN		
	3.19	***	.85	RUN
ENTER			3.04	***
	.05	RUN		
	3.17	***	.44	RUN
ENTER			3.17	***
	.02	RUN		
	1.86	***	2.05	RUN
ENTER			3.34	***
	.04	RUN		
	0.11	***	1.84	RUN
ENTER			4.33	***
	1.33	RUN		
	1.39	***		
ENTER				
	1.72	RUN		
	3.09	***		
ENTER				
	.41	RUN		
	3.46	***		
ENTER				
	.67	RUN		
	2.80	***		
ENTER				
	.03	RUN		
	1.11	***		
ENTER				
	1.29	RUN		
	1.99	***		
ENTER	1987			
	.70	RUN		
	2.02	***		
ENTER				
	2.35	RUN		
	4.34	***		
ENTER				
	.42	RUN		
	3.47	***		
ENTER				
	0.00	RUN		
	2.77	***		

```
01♦LBL "TEMPE1"
   02♦LBL 01
   03 RCL 10
   04 RCL 11
   05 +
   06 RCL 12
   07 +
   08 PRX
   09 RCL 11
   10 STO 12
   11 RCL 10
   12 STO 11
   13 TONE 1
   14 "ENTER"
   15 PROMPT
   16 STO 10
   17 GTO 01
   18 END
```

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175

SHT. NO. A18 OF 25
JOB NO. 888053
BY [illegible] DATE 3-17-89
REVWD. DATE
REVISED

TEMPE DRAINAGE STUDY

1-MONTH PRECIP (IN.) ≥ 2.0"

YEAR	TOTAL PRECIP. (IN.)	ORDER OF MAG.	PLOTTING POSITION (P)	FREQ (F) IN YEARS	RATIO TO MEAN	ORDER NUMBER (M
1926	3.05	4.73	SEE SHT. 1	SEE SHT. 1	1.71	1
	2.17	4.69			1.70	2
	2.87	4.54			1.64	3
1931	2.92	4.46			1.62	4
	2.88	4.35			1.58	5
1932	2.77	3.82			1.38	6
	2.11	3.80			1.38	7
1933	2.29	3.67			1.33	8
1935	2.29	3.59			1.30	9
	3.31	3.57			1.29	10
1936	2.67	3.46			1.25	11
	2.25	3.31			1.20	12
1937	2.17	3.09			1.12	13
1939	2.68	3.05			1.11	14
1940	4.35	2.98			1.08	15
1941	2.00	2.92			1.06	16
	3.82	2.88			1.04	17
	2.20	2.87			1.04	18
1943	3.57	2.87			1.04	19
1946	2.29	2.86			1.04	20
1949	2.10	2.85			1.03	21
1950	2.07	2.78			1.01	22
1951	4.73	2.77			1.00	23
1952	2.55	2.71			0.98	24
	2.12	2.68			0.97	25
	2.86	2.68			0.97	26

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175

SHT. NO. A19 OF 25
JOB NO. 888053
BY GB DATE 2-17-89
REVWD DATE
REVISED

TEMPE DRAINAGE STUDY

1-MONTH PRECIP. (IN.) ≥ 2.0"

YEAR	TOTAL PRECIP. (IN.)	ORDER OF MAG.	PLOTTING POSITION (P)	FREQ. IN (F) YEARS	RATIO TO MEAN	ORDER NUMBER (M)
1955	2.24	2.68			0.97	27
	3.09	2.66			0.96	28
1957	2.78	2.64			0.96	29
1959	2.33	2.59			0.94	30
	3.59	2.56			0.93	31
1963	2.45	2.56			0.93	32
1964	3.80	2.54			0.92	33
1965	4.46	2.49			0.90	34
1966	3.46	2.45			0.89	35
1967	4.69	2.39			0.87	36
1969	2.98	2.38			0.86	37
1970	2.56	2.37			0.86	38
	2.54	2.35			0.85	39
1972	4.54	2.35			0.85	40
1974	2.03	2.33			0.84	41
	2.13	2.29			0.83	42
	2.37	2.29			0.83	43
1976	2.06	2.29			0.83	44
1978	2.23	2.25			0.82	45
	2.59	2.24			0.81	46
	2.00	2.23			0.81	47
	2.39	2.20			0.80	48
	2.68	2.17			0.79	49
1979	2.49	2.17			0.79	50
1980	2.56	2.13			0.77	51
1982	2.85	2.12			0.77	52
	2.88	2.11			0.76	53

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175

SHT. NO. A20 OF 25
JOB NO. 888053
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REVWD. DATE
REVISED

TEMPE DRAINAGE STUDY

1. MONTH PRECIP. (IN) ≥ 2.0"

YEAR	TOTAL PRECIP. (IN.)	ORDER OF MAG.	PLOTTING POSITION (P)	FREQ. IN (F) YEARS	RATIO TO MEAN	ORDER NUMBER (M)
1983	3.67	2.10			0.76	54
	2.71	2.09			0.76	55
	2.09	2.07			0.75	56
1984	2.64	2.06			0.75	57
	2.68	2.05			0.74	58
	2.87	2.03			0.74	59
1987	2.35	2.0			0.72	60
	2.05	2.0			0.72	61
SUM		168.21				
MEAN		2.76				

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. A21 OF 25
JOB NO. 888053
BY 9/3 DATE 2-17-89
REVWD. DATE
REVISED

TEMPE DRAINAGE STUDY

3 MONTHS CUMMULATIVE PRECIP. (IN.) ≥ 3.0"

YEAR	TOTAL PRECIP. (IN.)	ORDER OF MAG.	PLOTTING POSITION (P)	FREQ. IN YEARS (F)	RATIO TO MEAN	ORDER NUMBER (M)
1926	5.04	8.01	SEE SHT. 1	SEE SHT. 1	1.78	1
	4.14	7.56			1.68	2
1927	4.78	7.36			1.64	3
	3.27	6.95			1.54	4
1930	3.83	6.81			1.51	5
1931	3.85	6.50			1.44	6
	4.37	6.43			1.43	7
1932	3.00	5.87			1.30	8
1933	4.69	5.84			1.30	9
1935	5.09	5.74			1.28	10
	4.94	5.71			1.27	11
1936	3.52	5.56			1.24	12
	3.51	5.56			1.24	13
1937	4.53	5.54			1.23	14
1939	3.62	5.09			1.13	15
1941	8.01	5.04			1.12	16
	4.23	4.94			1.10	17
1943	4.77	4.88			1.08	18
1944	3.83	4.78			1.06	19
1945	3.95	4.77			1.06	20
1946	4.76	4.76			1.06	21
1949	3.00	4.69			1.04	22
	3.05	4.57			1.02	23
1951	5.56	4.53			1.01	24
1952	4.44	4.46			0.99	25
1953	4.22	4.45			0.99	26

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175

SHT. NO. A22 OF 25
JOB NO. 888053
BY [illegible] DATE 2-17-89
REVWD. DATE
REVISED

TEMPE DRAINAGE STUDY

3 MONTHS CUMMULATIVE PRECIP. (IN.) ≥ 3.0"

YEAR	TOTAL PRECIP. (IN.)	ORDER OF MAG.	PLOTTING POSITION (P)	FREQ. IN (F) YEARS	RATIO TO MEAN	ORDER NUMBER (M)
1955	4.88	4.44			0.99	27
1957	3.57	4.40			0.98	28
1958	3.28	4.37			0.97	29
1959	6.50	4.34			0.96	30
1960	3.00	4.33			0.96	31
1961	3.19	4.23			0.94	32
1962	3.51	4.22			0.94	33
1963	3.88	4.18			0.93	34
1964	6.95	4.14			0.92	35
1965	4.46	4.07			0.90	36
1966	5.87	3.95			0.88	37
	5.54	3.90			0.87	38
1968	6.43	3.88			0.86	39
1969	3.23	3.85			0.86	40
	4.07	3.83			0.85	41
1970	3.00	3.33			0.85	42
	4.45	3.62			0.79	43
1971	3.51	3.57			0.79	44
1972	7.36	3.52			0.78	45
1974	5.71	3.51			0.78	46
1976	4.18	3.51			0.78	47
1978	6.81	3.51			0.78	48
	3.19	3.46			0.77	49
1979	7.56	3.28			0.73	50
1980	5.56	3.27			0.73	51
	3.22	3.23			0.72	52

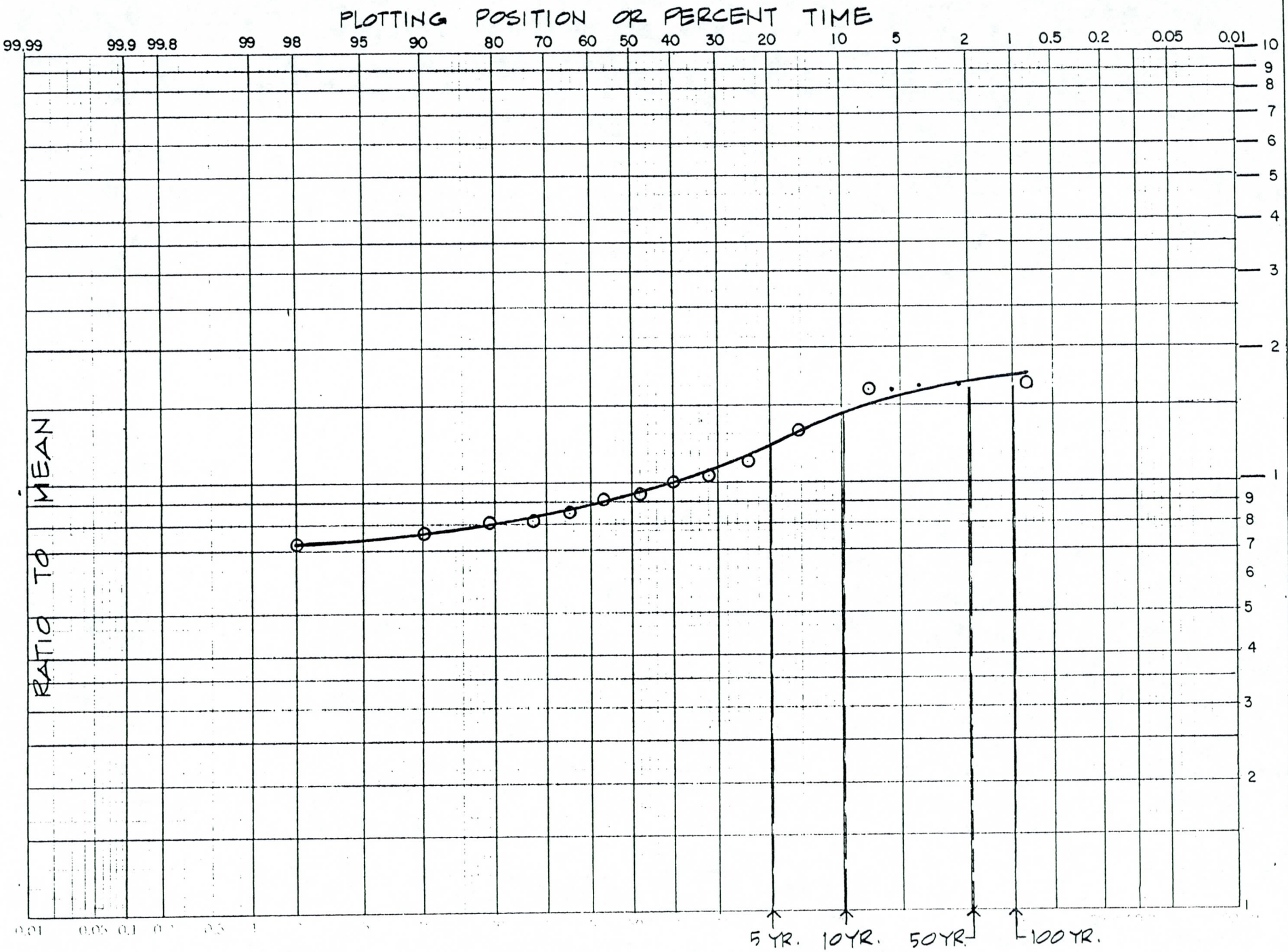
BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175

SHT. NO. A23 OF 25
JOB NO. 888053
BY GB DATE 2-17-89
REVWD. DATE
REVISED

TEMPE DRAINAGE STUDY

3 MONTHS CUMMULATIVE PRECIP. (IN.) ≥ 3.0"

YEAR	TOTAL PRECIP. (IN.)	ORDER OF MAG.	PLOTTING POSITION (P)	FREQ. IN (F) YEARS	RATIO TO MEAN	ORDER NUMBER (M)
1981	3.00	3.22			0.72	53
1982	3.90	3.19			0.72	54
1983	5.84	3.19			0.72	55
	5.74	3.05			0.68	56
1985	4.57	3.0			0.67	57
	4.40	3.0			0.67	58
1986	3.46	3.0			0.67	59
1987	4.34	3.0			0.67	60
	4.33	3.0			0.67	61
SUM		274.49				
MEAN		4.50				



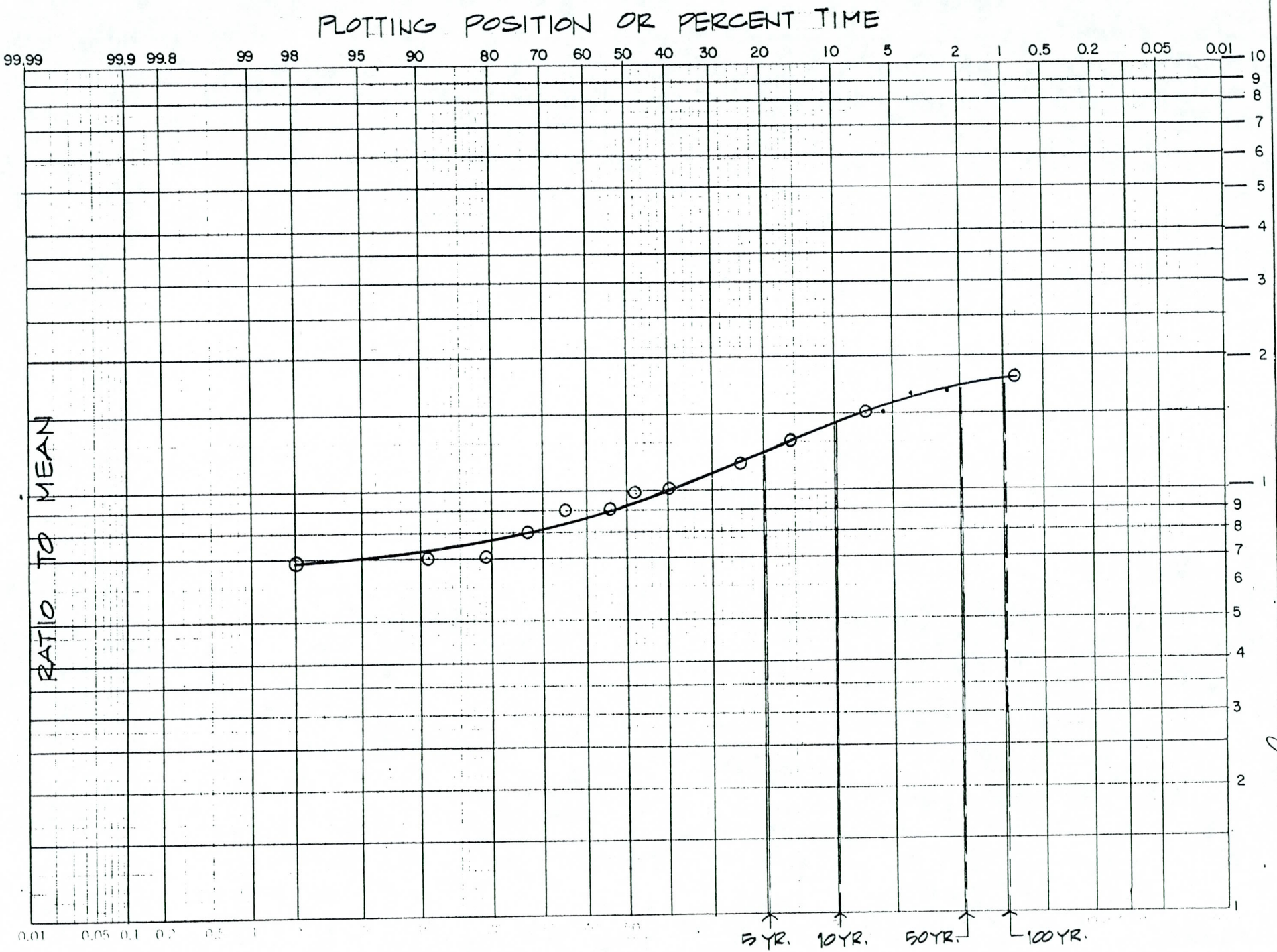
FREQUENCY CURVE

BENSON & GERDIN
DIVISION OF CREEGAN & D'ANGELO
PHONE (602) 258-3175

TEMPE DRAINAGE STUDY

1-MONTH PRECIP.

SHT. NO. A24 OF 25
JOB NO. 888053
BY DKB
DATE 2-21-89
REV'D.
DATE



FREQUENCY CURVE

BENSON & GERDIN
DIVISION OF CREEGAN & D'ANGELO
PHONE (602) 258-3175

TEMPE DRAINAGE STUDY

3-MONTH PRECIP.

SHT. NO. A25 OF 25
JOB NO. 888053
BY
DATE 2-21-89
REVWD
DATE

B. RETENTION

BENSON & GERDIN	DIVISION OF CREEGAN & D'ANGELO	PHONE (602) 258-3175	SHT. NO. B2 OF
TEMPE DRAINAGE STUDY			JOB NO. 888053
			BY DWR DATE 2-24-89
			REVWD. DATE
RETENTION			REVISED

D.A.-2B (CITY OF PHOENIX)

ASSUME 20% OF DRAINAGE AREA IS PROVIDED W/ RETENTION BASINS WHICH CAN HOLD A 10 YR - 2 HR. STORM (1.60").

EVERYTHING ABOVE THAT IS OVERFLOW, AND NOT RETAINED, BUT PROVIDES RUNOFF TO THE PIT.

D.A.-2C (CITY OF TEMPE)

ASSUME THAT FUTURE DEVELOPMENT OF THIS DRAINAGE AREA WILL CONFORM TO CURRENT CITY OF TEMPE REQUIREMENTS, WHICH IS 2.4" OF RAINFALL OVER THE ENTIRE SITE WILL BE RETAINED ON SITE.

EVERYTHING ABOVE THE 2.4" WILL OVERFLOW THE BASINS, AND WILL PROVIDE RUNOFF TO THE PIT.

SINCE THE STORM DRAIN IS AVAILABLE IN 56th ST, SOME OF THE RETENTION BASINS WILL BLEED OFF INTO THE PIT. WE HAVE ASSUMED THAT APPROX 1/2 (1.24") WILL BE RETAINED ON SITE AND NEVER REACH THE PIT.

C. INFLOW

BENSON & GERDIN, INC. CONSULTING ENGINEERS PHONE (602) 258-3175

SHT. NO. C2A OF 17

JOB NO. 888053

BY JB DATE 3-24-89

REVWD. JB DATE 6/89

REV.

TEMPE DRAINAGE STUDY

3 MONTH PRECIPITATION SUMMARY - NO RETENTION

	DAY	5-YEAR		100-YEAR	
		PRECIP. (INCHES)	INFLOW ($CF \times 10^6$)	PRECIP. (INCHES)	INFLOW ($CF \times 10^6$)
PHASE I	1	2.0	2.593	3.85	8.345
A = 1.857 SQ. MI.	16	1.3	1.006	0.95	0.449
1A, 1B	31	0.53	0.110	0.78	0.260
	46	0.53	0.110	0.78	0.260
	61	0.53	0.110	0.78	0.260
	76	0.53	0.110	0.78	0.260
PHASE II	1	2.0	7.550	3.85	22.496
A = 5.448 SQ. MI.	16	1.3	3.163	0.95	1.507
1A, 1B	31	0.53	0.315	0.78	0.897
2A, 2B, 2C	46	0.53	0.315	0.78	0.897
	61	0.53	0.315	0.78	0.897
	76	0.53	0.315	0.78	0.897
PHASE III	1	2.0	10.670	3.85	31.169
A = 7.022 SQ. MI.	16	1.3	4.566	0.95	2.223
1A, 1B	31	0.53	0.476	0.78	1.344
2A, 2B, 2C	46	0.53	0.476	0.78	1.344
3	61	0.53	0.476	0.78	1.344
	76	0.53	0.476	0.78	1.344

ONE YEAR - 24 HR. SUMMARY - NO RETENTION

PHASE III	1	0.98	2.223		

BENSON & GERDIN, INC.	CONSULTING ENGINEERS	PHONE (602) 258-3175	SHT. NO. C 28 OF
TEMPE DRAINAGE STUDY			JOB NO. 888053
			BY JB DATE 2-24-89
			REVWD. JB DATE 6/89
			REV.

1 DAY PRECIPITATION SUMMARY - W/ RETENTION

	DAY	100 - YEAR	
		PRECIP. (INCHES)	INFLOW ($CF \times 10^6$)
PHASE I	1	3.85	8.345
PHASE II	1	3.85	21.288
PHASE III	1	3.85	*29.961

* COMPARING W/ 1ST DAY - 100 YR. PRECIP. FOR PHASE III W/ NO RETENTION (INFLOW = 31.169 $CF \times 10^6$)

$$\frac{31.169 - 29.961}{31.169} < 5\% \text{ DIFFERENCE}$$

∴ RETENTION FROM AREAS 2B AND 2C DOES NOT SIGNIFICANTLY REDUCE THE TOTAL VOLUME OF RUNOFF ENTERING THE PIT.

TEMPE DRAINAGE STUDY

1. COMPUTE RUNOFF (PER SCS METHOD)

WHERE:

CN = RUNOFF CURVE NUMBER

S = POTENTIAL MAX. RETENTION

A = DRAINAGE AREA (SQ. MI.)

P = PRECIPITATION (INCHES)

P_R = RETAINED PRECIP.
TEMPE = 1.24"
PHX. = 1.60"

P_D = DIRECT PRECIP. (INCHES)

F = PERCENTAGE OF DRAINAGE AREA WHERE RETENTION IS PROVIDED

Q_U = UNRETAINED RUNOFF ($CF \times 10^6$)
RUNOFF WHERE NO RETENTION IS PROVIDED

Q_O = OVERFLOW RUNOFF FROM UPSTREAM RETENTION BASINS ($CF \times 10^6$)

Q_T = TOTAL RUNOFF ($CF \times 10^6$)

EQUATIONS:

$$S = \frac{1000}{CN} - 10$$

$$P_D = \frac{(P - 0.2S)^2}{P + 0.8S}$$

$$Q_U = P_D \left[1 - F \right] A$$

$$Q_O = K_1 \left[P_D - P_R \right] F \times A$$

$$Q_T = Q_U + Q_O$$

$$K_1 = \frac{(5280)^2}{12 \times (10)^6} = 2.3232$$

5 YR - DAY 1

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

TOTAL RUNOFF CALCULATION

RIBUTARY AREAS
4 HOUR PRECIP. = 2.00 INCHES

DATE: 2/89
INITIALS: 9S

AREA NO.	AREA SQM	CN	RETENTION IN OF PRECIP.	% OF AREA RETAINED	DIRECT RUNOFF INCHES	RETAINED RUNOFF CF*10^6	UNRETAINED RUNOFF CF*10^6	TOTAL RUNOFF CF*10^6	OVERFLOW FROM UPSTREAM RETENTION BASINS	S COEF.	AREA*CN
1A: 54	0.105	75	0.000	0%	0.381	0.000	0.093	0.093	0.000	3.333	7.88
56	0.673	86	0.000	0%	0.849	0.000	1.327	1.327	0.000	1.628	57.88
58	0.517	72	0.000	0%	0.292	0.000	0.351	0.351	0.000	3.889	37.22
62	0.189	74	0.000	0%	0.350	0.000	0.154	0.154	0.000	3.514	13.99
66	0.080	79	0.000	0%	0.522	0.000	0.097	0.097	0.000	2.658	6.32
68	0.080	82	0.000	0%	0.649	0.000	0.121	0.121	0.000	2.195	6.56
168	0.009	82	0.000	0%	0.649	0.000	0.014	0.014	0.000	2.195	0.74
174	0.014	82	0.000	0%	0.649	0.000	0.021	0.021	0.000	2.195	1.15
180	0.019	82	0.000	0%	0.649	0.000	0.029	0.029	0.000	2.195	1.56
190	0.029	82	0.000	0%	0.649	0.000	0.044	0.044	0.000	2.195	2.38
380	0.057	74	0.000	0%	0.350	0.000	0.046	0.046	0.000	3.514	4.22
1B:208	0.004	98	0.000	0%	1.774	0.000	0.016	0.016	0.000	0.204	0.39
312	0.016	98	0.000	0%	1.774	0.000	0.066	0.066	0.000	0.204	1.57
336	0.034	90	0.000	0%	1.094	0.000	0.086	0.086	0.000	1.111	3.06
344	0.023	98	0.000	0%	1.774	0.000	0.095	0.095	0.000	0.204	2.25
364	0.008	98	0.000	0%	1.774	0.000	0.033	0.033	0.000	0.204	0.78
2A: 36	0.137	75	0.000	0%	0.381	0.000	0.121	0.121	0.000	3.333	10.28
38	0.082	88	0.000	0%	0.965	0.000	0.184	0.184	0.000	1.364	7.22
40	0.192	90	0.000	0%	1.094	0.000	0.488	0.488	0.000	1.111	17.28
42	0.316	75	0.000	0%	0.381	0.000	0.280	0.280	0.000	3.333	23.70
48	0.205	74	0.000	0%	0.350	0.000	0.167	0.167	0.000	3.514	15.17
52	0.034	80	0.000	0%	0.563	0.000	0.044	0.044	0.000	2.500	2.72
150	0.019	82	0.000	0%	0.649	0.000	0.029	0.029	0.000	2.195	1.56
156	0.009	82	0.000	0%	0.649	0.000	0.014	0.014	0.000	2.195	0.74
162	0.019	82	0.000	0%	0.649	0.000	0.029	0.029	0.000	2.195	1.56
2B: 20	0.024	90	0.000	0%	1.094	0.000	0.061	0.061	0.000	1.111	2.16
22	0.138	87	0.000	0%	0.906	0.000	0.290	0.290	0.000	1.494	12.01
26	0.282	90	0.000	0%	1.094	0.000	0.717	0.717	0.000	1.111	25.38
28	0.537	89	0.000	0%	1.028	0.000	1.282	1.282	0.000	1.236	47.79
32	0.220	85	0.000	0%	0.795	0.000	0.406	0.406	0.000	1.765	18.70
34	0.220	87	0.000	0%	0.906	0.000	0.463	0.463	0.000	1.494	19.14
116	0.030	82	0.000	0%	0.649	0.000	0.045	0.045	0.000	2.195	2.46
118	0.126	87	0.000	0%	0.906	0.000	0.265	0.265	0.000	1.494	10.96
128	0.009	82	0.000	0%	0.649	0.000	0.014	0.014	0.000	2.195	0.74
132	0.011	82	0.000	0%	0.649	0.000	0.017	0.017	0.000	2.195	0.90
138	0.015	82	0.000	0%	0.649	0.000	0.023	0.023	0.000	2.195	1.23
146	0.013	82	0.000	0%	0.649	0.000	0.020	0.020	0.000	2.195	1.07
2C:200	0.061	90	0.000	0%	1.094	0.000	0.155	0.155	0.000	1.111	5.49
300	0.089	90	0.000	0%	1.094	0.000	0.226	0.226	0.000	1.111	8.01
302	0.106	90	0.000	0%	1.094	0.000	0.269	0.269	0.000	1.111	9.54
308	0.041	90	0.000	0%	1.094	0.000	0.104	0.104	0.000	1.111	3.69
318	0.120	90	0.000	0%	1.094	0.000	0.305	0.305	0.000	1.111	10.80
324	0.120	90	0.000	0%	1.094	0.000	0.305	0.305	0.000	1.111	10.80
330	0.120	90	0.000	0%	1.094	0.000	0.305	0.305	0.000	1.111	10.80

340	0.120	90	0.000	0%	1.094	0.000	0.305	0.305	0.000	1.111	10.80
354	0.115	90	0.000	0%	1.094	0.000	0.292	0.292	0.000	1.111	10.35
360	0.061	90	0.000	0%	1.094	0.000	0.155	0.155	0.000	1.111	5.49
3: 10	0.176	92	0.000	0%	1.237	0.000	0.506	0.506	0.000	0.870	16.19
30	0.057	84	0.000	0%	0.744	0.000	0.099	0.099	0.000	1.905	4.79
50	0.316	92	0.000	0%	1.237	0.000	0.908	0.908	0.000	0.870	29.07
70	0.070	84	0.000	0%	0.744	0.000	0.121	0.121	0.000	1.905	5.88
110	0.03	84	0.000	0%	0.744	0.000	0.052	0.052	0.000	1.905	2.52
140	0.212	84	0.000	0%	0.744	0.000	0.366	0.366	0.000	1.905	17.81
160	0.22	84	0.000	0%	0.744	0.000	0.380	0.380	0.000	1.905	18.48
220	0.11	74	0.000	0%	0.350	0.000	0.089	0.089	0.000	3.514	8.14
280	0.116	69	0.000	0%	0.217	0.000	0.058	0.058	0.000	4.493	8.00
291	0.063	88	0.000	0%	0.965	0.000	0.141	0.141	0.000	1.364	5.54
300	0.054	84	0.000	0%	0.744	0.000	0.093	0.093	0.000	1.905	4.54
312	0.018	90	0.000	0%	1.094	0.000	0.046	0.046	0.000	1.111	1.62
330	0.132	86	0.000	0%	0.849	0.000	0.260	0.260	0.000	1.628	11.35

RUNOFF SUMMARY

	AREA SQM	AREA*CN	RUNOFF CF*10^6
SUBTOTAL 1A	1.772	139.883	2.296
SUBTOTAL 1B	0.085	8.058	0.297
TOTAL 1	1.857	147.941	2.593
SUBTOTAL 2A	1.013	80.215	1.355
SUBTOTAL 2B	1.625	142.537	3.602
SUBTOTAL 2C	0.953	85.770	2.422
TOTAL 1+2	5.448	456.463	7.550
SUBTOTAL 3	1.574	133.936	3.120
TOTAL 1+2+3	7.022	590.399	10.670

C6917

5 YR - DAY 16

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

TOTAL RUNOFF CALCULATION

TRIBUTARY AREAS
24 HOUR PRECIP. = 1.30 INCHES

DATE: 2/89
INITIALS: 98

AREA NO.	AREA SQM	CN	RETENTION IN OF PRECIP.	RETENTION % OF AREA RETAINED	DIRECT RUNOFF INCHES	RETAINED RUNOFF CF*10^6	UNRETAINED RUNOFF CF*10^6	TOTAL RUNOFF CF*10^6	OVERFLOW FROM UPSTREAM RETENTION BASINS	S COEF.	AREA*CN
1A: 54	0.105	75	0.000	0%	0.101	0.000	0.025	0.025	0.000	3.333	7.88
56	0.673	86	0.000	0%	0.365	0.000	0.570	0.570	0.000	1.628	57.88
58	0.517	72	0.000	0%	0.062	0.000	0.074	0.074	0.000	3.889	37.22
62	0.189	74	0.000	0%	0.087	0.000	0.038	0.038	0.000	3.514	13.99
66	0.080	79	0.000	0%	0.172	0.000	0.032	0.032	0.000	2.658	6.32
68	0.080	82	0.000	0%	0.243	0.000	0.045	0.045	0.000	2.195	6.56
168	0.009	82	0.000	0%	0.243	0.000	0.005	0.005	0.000	2.195	0.74
174	0.014	82	0.000	0%	0.243	0.000	0.008	0.008	0.000	2.195	1.15
180	0.019	82	0.000	0%	0.243	0.000	0.011	0.011	0.000	2.195	1.56
190	0.029	82	0.000	0%	0.243	0.000	0.016	0.016	0.000	2.195	2.38
380	0.057	74	0.000	0%	0.087	0.000	0.011	0.011	0.000	3.514	4.22
1B:208	0.004	98	0.000	0%	1.084	0.000	0.010	0.010	0.000	0.204	0.39
312	0.016	98	0.000	0%	1.084	0.000	0.040	0.040	0.000	0.204	1.57
336	0.034	90	0.000	0%	0.531	0.000	0.042	0.042	0.000	1.111	3.06
344	0.023	98	0.000	0%	1.084	0.000	0.058	0.058	0.000	0.204	2.25
364	0.008	98	0.000	0%	1.084	0.000	0.020	0.020	0.000	0.204	0.78
2A: 36	0.137	75	0.000	0%	0.101	0.000	0.032	0.032	0.000	3.333	10.28
38	0.082	88	0.000	0%	0.441	0.000	0.084	0.084	0.000	1.364	7.22
40	0.192	90	0.000	0%	0.531	0.000	0.237	0.237	0.000	1.111	17.28
42	0.316	75	0.000	0%	0.101	0.000	0.074	0.074	0.000	3.333	23.70
48	0.205	74	0.000	0%	0.087	0.000	0.041	0.041	0.000	3.514	15.17
52	0.034	80	0.000	0%	0.194	0.000	0.015	0.015	0.000	2.500	2.72
150	0.019	82	0.000	0%	0.243	0.000	0.011	0.011	0.000	2.195	1.56
156	0.009	82	0.000	0%	0.243	0.000	0.005	0.005	0.000	2.195	0.74
162	0.019	82	0.000	0%	0.243	0.000	0.011	0.011	0.000	2.195	1.56
2B: 20	0.024	90	0.000	0%	0.531	0.000	0.030	0.030	0.000	1.111	2.16
22	0.138	87	0.000	0%	0.402	0.000	0.129	0.129	0.000	1.494	12.01
26	0.282	90	0.000	0%	0.531	0.000	0.348	0.348	0.000	1.111	25.38
28	0.537	89	0.000	0%	0.484	0.000	0.604	0.604	0.000	1.236	47.79
32	0.220	85	0.000	0%	0.331	0.000	0.169	0.169	0.000	1.765	18.70
34	0.220	87	0.000	0%	0.402	0.000	0.205	0.205	0.000	1.494	19.14
116	0.030	82	0.000	0%	0.243	0.000	0.017	0.017	0.000	2.195	2.46
118	0.126	87	0.000	0%	0.402	0.000	0.118	0.118	0.000	1.494	10.96
128	0.009	82	0.000	0%	0.243	0.000	0.005	0.005	0.000	2.195	0.74
132	0.011	82	0.000	0%	0.243	0.000	0.006	0.006	0.000	2.195	0.90
138	0.015	82	0.000	0%	0.243	0.000	0.008	0.008	0.000	2.195	1.23
146	0.013	82	0.000	0%	0.243	0.000	0.007	0.007	0.000	2.195	1.07
2C:200	0.061	90	0.000	0%	0.531	0.000	0.075	0.075	0.000	1.111	5.49
300	0.089	90	0.000	0%	0.531	0.000	0.110	0.110	0.000	1.111	8.01
302	0.106	90	0.000	0%	0.531	0.000	0.131	0.131	0.000	1.111	9.54
308	0.041	90	0.000	0%	0.531	0.000	0.051	0.051	0.000	1.111	3.69
318	0.120	90	0.000	0%	0.531	0.000	0.148	0.148	0.000	1.111	10.80
324	0.120	90	0.000	0%	0.531	0.000	0.148	0.148	0.000	1.111	10.80
330	0.120	90	0.000	0%	0.531	0.000	0.148	0.148	0.000	1.111	10.80

340	0.120	90	0.000	0%	0.531	0.000	0.148	0.148	0.000	1.111	10.80
354	0.115	90	0.000	0%	0.531	0.000	0.142	0.142	0.000	1.111	10.35
360	0.061	90	0.000	0%	0.531	0.000	0.075	0.075	0.000	1.111	5.49
3: 10	0.176	92	0.000	0%	0.635	0.000	0.260	0.260	0.000	0.870	16.19
30	0.057	84	0.000	0%	0.299	0.000	0.040	0.040	0.000	1.905	4.79
50	0.316	92	0.000	0%	0.635	0.000	0.466	0.466	0.000	0.870	29.07
70	0.070	84	0.000	0%	0.299	0.000	0.049	0.049	0.000	1.905	5.88
110	0.03	84	0.000	0%	0.299	0.000	0.021	0.021	0.000	1.905	2.52
140	0.212	84	0.000	0%	0.299	0.000	0.147	0.147	0.000	1.905	17.81
160	0.22	84	0.000	0%	0.299	0.000	0.153	0.153	0.000	1.905	18.48
220	0.11	74	0.000	0%	0.087	0.000	0.022	0.022	0.000	3.514	8.14
280	0.116	69	0.000	0%	0.033	0.000	0.009	0.009	0.000	4.493	8.00
291	0.063	88	0.000	0%	0.441	0.000	0.065	0.065	0.000	1.364	5.54
300	0.054	84	0.000	0%	0.299	0.000	0.038	0.038	0.000	1.905	4.54
312	0.018	90	0.000	0%	0.531	0.000	0.022	0.022	0.000	1.111	1.62
330	0.132	86	0.000	0%	0.365	0.000	0.112	0.112	0.000	1.628	11.35

RUNOFF SUMMARY

	AREA SQM	AREA*CN	RUNOFF CF*10^6
SUBTOTAL 1A	1.772	139.883	0.836
SUBTOTAL 1B	0.085	8.058	0.170
TOTAL 1	1.857	147.941	1.006
SUBTOTAL 2A	1.013	80.215	0.510
SUBTOTAL 2B	1.625	142.537	1.646
SUBTOTAL 2C	0.953	85.770	1.175
TOTAL 1+2	5.448	456.463	3.163
SUBTOTAL 3	1.574	133.936	1.403
TOTAL 1+2+3	7.022	590.399	4.566

5 YR - DAYS 31 46 61 76

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

TOTAL RUNOFF CALCULATION

TRIBUTARY AREAS
24 HOUR PRECIP. = 0.53 INCHES

DATE: 2-89
INITIALS: GS

AREA NO.	AREA SQM	CN	RETENTION IN OF PRECIP.	RETENTION % OF AREA RETAINED	DIRECT RUNOFF INCHES	RETAINED RUNOFF CF*10^6	UNRETAINED RUNOFF CF*10^6	TOTAL RUNOFF CF*10^6	OVERFLOW FROM UPSTREAM RETENTION BASINS	S COEF.	AREA*CN
1A: 54	0.105	75	0.000	0%	0.006	0.000	0.001	0.001	0.000	3.333	7.88
56	0.673	86	0.000	0%	0.023	0.000	0.036	0.036	0.000	1.628	57.88
58	0.517	72	0.000	0%	0.017	0.000	0.020	0.020	0.000	3.889	37.22
62	0.189	74	0.000	0%	0.009	0.000	0.004	0.004	0.000	3.514	13.99
66	0.080	79	0.000	0%	0.000	0.000	0.000	0.000	0.000	2.658	6.32
68	0.080	82	0.000	0%	0.004	0.000	0.001	0.001	0.000	2.195	6.56
168	0.009	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	0.74
174	0.014	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	1.15
180	0.019	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	1.56
190	0.029	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	2.38
380	0.057	74	0.000	0%	0.009	0.000	0.001	0.001	0.000	3.514	4.22
1B:208	0.004	98	0.000	0%	0.345	0.000	0.003	0.003	0.000	0.204	0.39
312	0.016	98	0.000	0%	0.345	0.000	0.013	0.013	0.000	0.204	1.57
336	0.034	90	0.000	0%	0.067	0.000	0.005	0.005	0.000	1.111	3.06
344	0.023	98	0.000	0%	0.345	0.000	0.018	0.018	0.000	0.204	2.25
364	0.008	98	0.000	0%	0.345	0.000	0.006	0.006	0.000	0.204	0.78
2A: 36	0.137	75	0.000	0%	0.006	0.000	0.002	0.002	0.000	3.333	10.28
38	0.082	88	0.000	0%	0.041	0.000	0.008	0.008	0.000	1.364	7.22
40	0.192	90	0.000	0%	0.067	0.000	0.030	0.030	0.000	1.111	17.28
42	0.316	75	0.000	0%	0.006	0.000	0.004	0.004	0.000	3.333	23.70
48	0.205	74	0.000	0%	0.009	0.000	0.004	0.004	0.000	3.514	15.17
52	0.034	80	0.000	0%	0.000	0.000	0.000	0.000	0.000	2.500	2.72
150	0.019	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	1.56
156	0.009	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	0.74
162	0.019	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	1.56
2B: 20	0.024	90	0.000	0%	0.067	0.000	0.004	0.004	0.000	1.111	2.16
22	0.138	87	0.000	0%	0.031	0.000	0.010	0.010	0.000	1.494	12.01
26	0.282	90	0.000	0%	0.067	0.000	0.044	0.044	0.000	1.111	25.38
28	0.537	89	0.000	0%	0.053	0.000	0.066	0.066	0.000	1.236	47.79
32	0.220	85	0.000	0%	0.016	0.000	0.008	0.008	0.000	1.765	18.70
34	0.220	87	0.000	0%	0.031	0.000	0.016	0.016	0.000	1.494	19.14
116	0.030	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	2.46
118	0.126	87	0.000	0%	0.031	0.000	0.009	0.009	0.000	1.494	10.96
128	0.009	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	0.74
132	0.011	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	0.90
138	0.015	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	1.23
146	0.013	82	0.000	0%	0.004	0.000	0.000	0.000	0.000	2.195	1.07
2C:200	0.061	90	0.000	0%	0.067	0.000	0.009	0.009	0.000	1.111	5.49
300	0.089	90	0.000	0%	0.067	0.000	0.014	0.014	0.000	1.111	8.01
302	0.106	90	0.000	0%	0.067	0.000	0.016	0.016	0.000	1.111	9.54
308	0.041	90	0.000	0%	0.067	0.000	0.006	0.006	0.000	1.111	3.69
318	0.120	90	0.000	0%	0.067	0.000	0.019	0.019	0.000	1.111	10.80
324	0.120	90	0.000	0%	0.067	0.000	0.019	0.019	0.000	1.111	10.80
330	0.120	90	0.000	0%	0.067	0.000	0.019	0.019	0.000	1.111	10.80

340	0.120	90	0.000	0%	0.067	0.000	0.019	0.019	0.000	1.111	10.80
354	0.115	90	0.000	0%	0.067	0.000	0.018	0.018	0.000	1.111	10.35
360	0.061	90	0.000	0%	0.067	0.000	0.009	0.009	0.000	1.111	5.49
3: 10	0.176	92	0.000	0%	0.103	0.000	0.042	0.042	0.000	0.870	16.19
30	0.057	84	0.000	0%	0.011	0.000	0.001	0.001	0.000	1.905	4.79
50	0.316	92	0.000	0%	0.103	0.000	0.076	0.076	0.000	0.870	29.07
70	0.070	84	0.000	0%	0.011	0.000	0.002	0.002	0.000	1.905	5.88
110	0.03	84	0.000	0%	0.011	0.000	0.001	0.001	0.000	1.905	2.52
140	0.212	84	0.000	0%	0.011	0.000	0.005	0.005	0.000	1.905	17.81
160	0.22	84	0.000	0%	0.011	0.000	0.006	0.006	0.000	1.905	18.48
220	0.11	74	0.000	0%	0.009	0.000	0.002	0.002	0.000	3.514	8.14
280	0.116	69	0.000	0%	0.033	0.000	0.009	0.009	0.000	4.493	8.00
291	0.063	88	0.000	0%	0.041	0.000	0.006	0.006	0.000	1.364	5.54
300	0.054	84	0.000	0%	0.011	0.000	0.001	0.001	0.000	1.905	4.54
312	0.018	90	0.000	0%	0.067	0.000	0.003	0.003	0.000	1.111	1.62
330	0.132	86	0.000	0%	0.023	0.000	0.007	0.007	0.000	1.628	11.35

RUNOFF SUMMARY

	AREA SQM	AREA*CN	RUNOFF CF*10^6
SUBTOTAL 1A	1.772	139.883	0.064
SUBTOTAL 1B	0.085	8.058	0.046
TOTAL 1	1.857	147.941	0.110
SUBTOTAL 2A	1.013	80.215	0.048
SUBTOTAL 2B	1.625	142.537	0.157
SUBTOTAL 2C	0.953	85.770	0.148
TOTAL 1+2	5.448	456.463	0.315
SUBTOTAL 3	1.574	133.936	0.161
TOTAL 1+2+3	7.022	590.399	0.476

100 YR - DAY1

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

TOTAL RUNOFF CALCULATION

RIBUTARY AREAS
4 HOUR PRECIP. = 3.85 INCHES

DATE: 2-89
INITIALS: SS

AREA NO.	AREA SQM	CN	RETENTION IN OF PRECIP.	RETENTION % OF AREA RETAINED	DIRECT RUNOFF INCHES	RETAINED RUNOFF CF*10^6	UNRETAINED RUNOFF CF*10^6	TOTAL RUNOFF CF*10^6	OVERFLOW FROM UPSTREAM RETENTION BASINS	S COEF.	AREA*CN
1A: 54	0.105	75	0.000	0%	1.555	0.000	0.379	0.379	0.000	3.333	7.88
56	0.673	86	0.000	0%	2.411	0.000	3.769	3.769	0.000	1.628	57.88
58	0.517	72	0.000	0%	1.356	0.000	1.629	1.629	0.000	3.889	37.22
62	0.189	74	0.000	0%	1.487	0.000	0.653	0.653	0.000	3.514	13.99
66	0.080	79	0.000	0%	1.842	0.000	0.342	0.342	0.000	2.658	6.32
68	0.080	82	0.000	0%	2.075	0.000	0.386	0.386	0.000	2.195	6.56
168	0.009	82	0.000	0%	2.075	0.000	0.043	0.043	0.000	2.195	0.74
174	0.014	82	0.000	0%	2.075	0.000	0.068	0.068	0.000	2.195	1.15
180	0.019	82	0.000	0%	2.075	0.000	0.092	0.092	0.000	2.195	1.56
190	0.029	82	0.000	0%	2.075	0.000	0.140	0.140	0.000	2.195	2.38
380	0.057	74	0.000	0%	1.487	0.000	0.197	0.197	0.000	3.514	4.22
1B:208	0.004	98	0.000	0%	3.615	0.000	0.034	0.034	0.000	0.204	0.39
312	0.016	98	0.000	0%	3.615	0.000	0.134	0.134	0.000	0.204	1.57
336	0.034	90	0.000	0%	2.777	0.000	0.219	0.219	0.000	1.111	3.06
344	0.023	98	0.000	0%	3.615	0.000	0.193	0.193	0.000	0.204	2.25
364	0.008	98	0.000	0%	3.615	0.000	0.067	0.067	0.000	0.204	0.78
2A: 36	0.137	75	0.000	0%	1.555	0.000	0.495	0.495	0.000	3.333	10.28
38	0.082	88	0.000	0%	2.590	0.000	0.493	0.493	0.000	1.364	7.22
40	0.192	90	0.000	0%	2.777	0.000	1.239	1.239	0.000	1.111	17.28
42	0.316	75	0.000	0%	1.555	0.000	1.142	1.142	0.000	3.333	23.70
48	0.205	74	0.000	0%	1.487	0.000	0.708	0.708	0.000	3.514	15.17
52	0.034	80	0.000	0%	1.918	0.000	0.152	0.152	0.000	2.500	2.72
150	0.019	82	0.000	0%	2.075	0.000	0.092	0.092	0.000	2.195	1.56
156	0.009	82	0.000	0%	2.075	0.000	0.043	0.043	0.000	2.195	0.74
162	0.019	82	0.000	0%	2.075	0.000	0.092	0.092	0.000	2.195	1.56
2B: 20	0.024	90	0.000	0%	2.777	0.000	0.155	0.155	0.000	1.111	2.16
22	0.138	87	0.000	0%	2.499	0.000	0.801	0.801	0.000	1.494	12.01
26	0.282	90	0.000	0%	2.777	0.000	1.819	1.819	0.000	1.111	25.38
28	0.537	89	0.000	0%	2.683	0.000	3.347	3.347	0.000	1.236	47.79
32	0.220	85	0.000	0%	2.324	0.000	1.188	1.188	0.000	1.765	18.70
34	0.220	87	0.000	0%	2.499	0.000	1.277	1.277	0.000	1.494	19.14
116	0.030	82	0.000	0%	2.075	0.000	0.145	0.145	0.000	2.195	2.46
118	0.126	87	0.000	0%	2.499	0.000	0.732	0.732	0.000	1.494	10.96
128	0.009	82	0.000	0%	2.075	0.000	0.043	0.043	0.000	2.195	0.74
132	0.011	82	0.000	0%	2.075	0.000	0.053	0.053	0.000	2.195	0.90
138	0.015	82	0.000	0%	2.075	0.000	0.072	0.072	0.000	2.195	1.23
146	0.013	82	0.000	0%	2.075	0.000	0.063	0.063	0.000	2.195	1.07
2C:200	0.061	90	0.000	0%	2.777	0.000	0.394	0.394	0.000	1.111	5.49
300	0.089	90	0.000	0%	2.777	0.000	0.574	0.574	0.000	1.111	8.01
302	0.106	90	0.000	0%	2.777	0.000	0.684	0.684	0.000	1.111	9.54
308	0.041	90	0.000	0%	2.777	0.000	0.265	0.265	0.000	1.111	3.69
318	0.120	90	0.000	0%	2.777	0.000	0.774	0.774	0.000	1.111	10.80
324	0.120	90	0.000	0%	2.777	0.000	0.774	0.774	0.000	1.111	10.80
330	0.120	90	0.000	0%	2.777	0.000	0.774	0.774	0.000	1.111	10.80

340	0.120	90	0.000	0%	2.777	0.000	0.774	0.774	0.000	1.111	10.80
354	0.115	90	0.000	0%	2.777	0.000	0.742	0.742	0.000	1.111	10.35
360	0.061	90	0.000	0%	2.777	0.000	0.394	0.394	0.000	1.111	5.49
3: 10	0.176	92	0.000	0%	2.973	0.000	1.216	1.216	0.000	0.870	16.19
30	0.057	84	0.000	0%	2.239	0.000	0.297	0.297	0.000	1.905	4.79
50	0.316	92	0.000	0%	2.973	0.000	2.182	2.182	0.000	0.870	29.07
70	0.070	84	0.000	0%	2.239	0.000	0.364	0.364	0.000	1.905	5.88
110	0.03	84	0.000	0%	2.239	0.000	0.156	0.156	0.000	1.905	2.52
140	0.212	84	0.000	0%	2.239	0.000	1.103	1.103	0.000	1.905	17.81
160	0.22	84	0.000	0%	2.239	0.000	1.145	1.145	0.000	1.905	18.48
220	0.11	74	0.000	0%	1.487	0.000	0.380	0.380	0.000	3.514	8.14
280	0.116	69	0.000	0%	1.170	0.000	0.315	0.315	0.000	4.493	8.00
291	0.063	88	0.000	0%	2.590	0.000	0.379	0.379	0.000	1.364	5.54
300	0.054	84	0.000	0%	2.239	0.000	0.281	0.281	0.000	1.905	4.54
312	0.018	90	0.000	0%	2.777	0.000	0.116	0.116	0.000	1.111	1.62
330	0.132	86	0.000	0%	2.411	0.000	0.739	0.739	0.000	1.628	11.35

RUNOFF SUMMARY

	AREA SQM	AREA*CN	RUNOFF CF*10^6
SUBTOTAL 1A	1.772	139.883	7.698
SUBTOTAL 1B	0.085	8.058	0.648
TOTAL 1	1.857	147.941	8.345
SUBTOTAL 2A	1.013	80.215	4.455
SUBTOTAL 2B	1.625	142.537	9.695
SUBTOTAL 2C	0.953	85.770	6.149
TOTAL 1+2	5.448	456.463	22.496
SUBTOTAL 3	1.574	133.936	8.673
TOTAL 1+2+3	7.022	590.399	31.169

100 YR - DAY 16

C12 of 17

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

ALSO USED FOR 1-YR 24 HR.
(PRECIP = 0.98")

TOTAL RUNOFF CALCULATION

TRIBUTARY AREAS
24 HOUR PRECIP. = 0.95 INCHES

DATE: 2-89
INITIALS: 9S

AREA NO.	AREA SQM	CN	RETENTION IN OF PRECIP.	RETENTION % OF AREA RETAINED	DIRECT RUNOFF INCHES	RETAINED RUNOFF CF*10^6	UNRETAINED RUNOFF CF*10^6	TOTAL RUNOFF CF*10^6	OVERFLOW FROM UPSTREAM RETENTION BASINS	S COEF.	AREA*CN
1A: 54	0.105	75	0.000	0%	0.022	0.000	0.005	0.005	0.000	3.333	7.88
56	0.673	86	0.000	0%	0.173	0.000	0.271	0.271	0.000	1.628	57.88
58	0.517	72	0.000	0%	0.007	0.000	0.009	0.009	0.000	3.889	37.22
62	0.189	74	0.000	0%	0.016	0.000	0.007	0.007	0.000	3.514	13.99
66	0.080	79	0.000	0%	0.057	0.000	0.011	0.011	0.000	2.658	6.32
68	0.080	82	0.000	0%	0.096	0.000	0.018	0.018	0.000	2.195	6.56
168	0.009	82	0.000	0%	0.096	0.000	0.002	0.002	0.000	2.195	0.74
174	0.014	82	0.000	0%	0.096	0.000	0.003	0.003	0.000	2.195	1.15
180	0.019	82	0.000	0%	0.096	0.000	0.004	0.004	0.000	2.195	1.56
190	0.029	82	0.000	0%	0.096	0.000	0.007	0.007	0.000	2.195	2.38
380	0.057	74	0.000	0%	0.016	0.000	0.002	0.002	0.000	3.514	4.22
1B:208	0.004	98	0.000	0%	0.743	0.000	0.007	0.007	0.000	0.204	0.39
312	0.016	98	0.000	0%	0.743	0.000	0.028	0.028	0.000	0.204	1.57
336	0.034	90	0.000	0%	0.288	0.000	0.023	0.023	0.000	1.111	3.06
344	0.023	98	0.000	0%	0.743	0.000	0.040	0.040	0.000	0.204	2.25
364	0.008	98	0.000	0%	0.743	0.000	0.014	0.014	0.000	0.204	0.78
2A: 36	0.137	75	0.000	0%	0.022	0.000	0.007	0.007	0.000	3.333	10.28
38	0.082	88	0.000	0%	0.225	0.000	0.043	0.043	0.000	1.364	7.22
40	0.192	90	0.000	0%	0.288	0.000	0.128	0.128	0.000	1.111	17.28
42	0.316	75	0.000	0%	0.022	0.000	0.016	0.016	0.000	3.333	23.70
48	0.205	74	0.000	0%	0.016	0.000	0.008	0.008	0.000	3.514	15.17
52	0.034	80	0.000	0%	0.069	0.000	0.005	0.005	0.000	2.500	2.72
150	0.019	82	0.000	0%	0.096	0.000	0.004	0.004	0.000	2.195	1.56
156	0.009	82	0.000	0%	0.096	0.000	0.002	0.002	0.000	2.195	0.74
162	0.019	82	0.000	0%	0.096	0.000	0.004	0.004	0.000	2.195	1.56
2B: 20	0.024	90	0.000	0%	0.288	0.000	0.016	0.016	0.000	1.111	2.16
22	0.138	87	0.000	0%	0.198	0.000	0.063	0.063	0.000	1.494	12.01
26	0.282	90	0.000	0%	0.288	0.000	0.189	0.189	0.000	1.111	25.38
28	0.537	89	0.000	0%	0.255	0.000	0.318	0.318	0.000	1.236	47.79
32	0.220	85	0.000	0%	0.151	0.000	0.077	0.077	0.000	1.765	18.70
34	0.220	87	0.000	0%	0.198	0.000	0.101	0.101	0.000	1.494	19.14
116	0.030	82	0.000	0%	0.096	0.000	0.007	0.007	0.000	2.195	2.46
118	0.126	87	0.000	0%	0.198	0.000	0.058	0.058	0.000	1.494	10.96
128	0.009	82	0.000	0%	0.096	0.000	0.002	0.002	0.000	2.195	0.74
132	0.011	82	0.000	0%	0.096	0.000	0.002	0.002	0.000	2.195	0.90
138	0.015	82	0.000	0%	0.096	0.000	0.003	0.003	0.000	2.195	1.23
146	0.013	82	0.000	0%	0.096	0.000	0.003	0.003	0.000	2.195	1.07
2C:200	0.061	90	0.000	0%	0.288	0.000	0.041	0.041	0.000	1.111	5.49
300	0.089	90	0.000	0%	0.288	0.000	0.060	0.060	0.000	1.111	8.01
302	0.106	90	0.000	0%	0.288	0.000	0.071	0.071	0.000	1.111	9.54
308	0.041	90	0.000	0%	0.288	0.000	0.027	0.027	0.000	1.111	3.69
318	0.120	90	0.000	0%	0.288	0.000	0.080	0.080	0.000	1.111	10.80
324	0.120	90	0.000	0%	0.288	0.000	0.080	0.080	0.000	1.111	10.80
330	0.120	90	0.000	0%	0.288	0.000	0.080	0.080	0.000	1.111	10.80

340	0.120	90	0.000	0%	0.288	0.000	0.080	0.080	0.000	1.111	10.80
354	0.115	90	0.000	0%	0.288	0.000	0.077	0.077	0.000	1.111	10.35
360	0.061	90	0.000	0%	0.288	0.000	0.041	0.041	0.000	1.111	5.49
3: 10	0.176	92	0.000	0%	0.366	0.000	0.150	0.150	0.000	0.870	16.19
30	0.057	84	0.000	0%	0.131	0.000	0.017	0.017	0.000	1.905	4.79
50	0.316	92	0.000	0%	0.366	0.000	0.269	0.269	0.000	0.870	29.07
70	0.070	84	0.000	0%	0.131	0.000	0.021	0.021	0.000	1.905	5.88
110	0.03	84	0.000	0%	0.131	0.000	0.009	0.009	0.000	1.905	2.52
140	0.212	84	0.000	0%	0.131	0.000	0.064	0.064	0.000	1.905	17.81
160	0.22	84	0.000	0%	0.131	0.000	0.067	0.067	0.000	1.905	18.48
220	0.11	74	0.000	0%	0.016	0.000	0.004	0.004	0.000	3.514	8.14
280	0.116	69	0.000	0%	0.001	0.000	0.000	0.000	0.000	4.493	8.00
291	0.063	88	0.000	0%	0.225	0.000	0.033	0.033	0.000	1.364	5.54
300	0.054	84	0.000	0%	0.131	0.000	0.016	0.016	0.000	1.905	4.54
312	0.018	90	0.000	0%	0.288	0.000	0.012	0.012	0.000	1.111	1.62
330	0.132	86	0.000	0%	0.173	0.000	0.053	0.053	0.000	1.628	11.35

RUNOFF SUMMARY

	AREA SQM	AREA*CN	RUNOFF CF*10^6
SUBTOTAL 1A	1.772	139.883	0.339
SUBTOTAL 1B	0.085	8.058	0.111
TOTAL 1	1.857	147.941	0.449
SUBTOTAL 2A	1.013	80.215	0.218
SUBTOTAL 2B	1.625	142.537	0.839
SUBTOTAL 2C	0.953	85.770	0.638
TOTAL 1+2	5.448	456.463	1.507
SUBTOTAL 3	1.574	133.936	0.716
TOTAL 1+2+3	7.022	590.399	2.223

100 YR - DAYS 31
46
61
76

C14 of 17

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

TOTAL RUNOFF CALCULATION

TRIBUTARY AREAS
24 HOUR PRECIP. = 0.78 INCHES

DATE: 2/89
INITIALS: 98

AREA NO.	AREA SQM	CN	RETENTION IN OF PRECIP.	% OF AREA RETAINED	DIRECT RUNOFF INCHES	RETAINED RUNOFF CF*10^6	UNRETAINED RUNOFF CF*10^6	TOTAL RUNOFF CF*10^6	OVERFLOW FROM UPSTREAM RETENTION BASINS	S COEF.	AREA*CN
1A: 54	0.105	75	0.000	0%	0.004	0.000	0.001	0.001	0.000	3.333	7.88
56	0.673	86	0.000	0%	0.099	0.000	0.155	0.155	0.000	1.628	57.88
58	0.517	72	0.000	0%	0.000	0.000	0.000	0.000	0.000	3.889	37.22
62	0.189	74	0.000	0%	0.002	0.000	0.001	0.001	0.000	3.514	13.99
66	0.080	79	0.000	0%	0.021	0.000	0.004	0.004	0.000	2.658	6.32
68	0.080	82	0.000	0%	0.046	0.000	0.009	0.009	0.000	2.195	6.56
168	0.009	82	0.000	0%	0.046	0.000	0.001	0.001	0.000	2.195	0.74
174	0.014	82	0.000	0%	0.046	0.000	0.001	0.001	0.000	2.195	1.15
180	0.019	82	0.000	0%	0.046	0.000	0.002	0.002	0.000	2.195	1.56
190	0.029	82	0.000	0%	0.046	0.000	0.003	0.003	0.000	2.195	2.38
380	0.057	74	0.000	0%	0.002	0.000	0.000	0.000	0.000	3.514	4.22
1B:208	0.004	98	0.000	0%	0.579	0.000	0.005	0.005	0.000	0.204	0.39
312	0.016	98	0.000	0%	0.579	0.000	0.022	0.022	0.000	0.204	1.57
336	0.034	90	0.000	0%	0.186	0.000	0.015	0.015	0.000	1.111	3.06
344	0.023	98	0.000	0%	0.579	0.000	0.031	0.031	0.000	0.204	2.25
364	0.008	98	0.000	0%	0.579	0.000	0.011	0.011	0.000	0.204	0.78
2A: 36	0.137	75	0.000	0%	0.004	0.000	0.001	0.001	0.000	3.333	10.28
38	0.082	88	0.000	0%	0.138	0.000	0.026	0.026	0.000	1.364	7.22
40	0.192	90	0.000	0%	0.186	0.000	0.083	0.083	0.000	1.111	17.28
42	0.316	75	0.000	0%	0.004	0.000	0.003	0.003	0.000	3.333	23.70
48	0.205	74	0.000	0%	0.002	0.000	0.001	0.001	0.000	3.514	15.17
52	0.034	80	0.000	0%	0.028	0.000	0.002	0.002	0.000	2.500	2.72
150	0.019	82	0.000	0%	0.046	0.000	0.002	0.002	0.000	2.195	1.56
156	0.009	82	0.000	0%	0.046	0.000	0.001	0.001	0.000	2.195	0.74
162	0.019	82	0.000	0%	0.046	0.000	0.002	0.002	0.000	2.195	1.56
2B: 20	0.024	90	0.000	0%	0.186	0.000	0.010	0.010	0.000	1.111	2.16
22	0.138	87	0.000	0%	0.117	0.000	0.038	0.038	0.000	1.494	12.01
26	0.282	90	0.000	0%	0.186	0.000	0.122	0.122	0.000	1.111	25.38
28	0.537	89	0.000	0%	0.160	0.000	0.200	0.200	0.000	1.236	47.79
32	0.220	85	0.000	0%	0.083	0.000	0.043	0.043	0.000	1.765	18.70
34	0.220	87	0.000	0%	0.117	0.000	0.060	0.060	0.000	1.494	19.14
116	0.030	82	0.000	0%	0.046	0.000	0.003	0.003	0.000	2.195	2.46
118	0.126	87	0.000	0%	0.117	0.000	0.034	0.034	0.000	1.494	10.96
128	0.009	82	0.000	0%	0.046	0.000	0.001	0.001	0.000	2.195	0.74
132	0.011	82	0.000	0%	0.046	0.000	0.001	0.001	0.000	2.195	0.90
138	0.015	82	0.000	0%	0.046	0.000	0.002	0.002	0.000	2.195	1.23
146	0.013	82	0.000	0%	0.046	0.000	0.001	0.001	0.000	2.195	1.07
2C:200	0.061	90	0.000	0%	0.186	0.000	0.026	0.026	0.000	1.111	5.49
300	0.089	90	0.000	0%	0.186	0.000	0.039	0.039	0.000	1.111	8.01
302	0.106	90	0.000	0%	0.186	0.000	0.046	0.046	0.000	1.111	9.54
308	0.041	90	0.000	0%	0.186	0.000	0.018	0.018	0.000	1.111	3.69
318	0.120	90	0.000	0%	0.186	0.000	0.052	0.052	0.000	1.111	10.80
324	0.120	90	0.000	0%	0.186	0.000	0.052	0.052	0.000	1.111	10.80
330	0.120	90	0.000	0%	0.186	0.000	0.052	0.052	0.000	1.111	10.80

340	0.120	90	0.000	0%	0.186	0.000	0.052	0.052	0.000	1.111	10.80
354	0.115	90	0.000	0%	0.186	0.000	0.050	0.050	0.000	1.111	10.35
360	0.061	90	0.000	0%	0.186	0.000	0.026	0.026	0.000	1.111	5.49
3: 10	0.176	92	0.000	0%	0.249	0.000	0.102	0.102	0.000	0.870	16.19
30	0.057	84	0.000	0%	0.069	0.000	0.009	0.009	0.000	1.905	4.79
50	0.316	92	0.000	0%	0.249	0.000	0.183	0.183	0.000	0.870	29.07
70	0.070	84	0.000	0%	0.069	0.000	0.011	0.011	0.000	1.905	5.88
110	0.03	84	0.000	0%	0.069	0.000	0.005	0.005	0.000	1.905	2.52
140	0.212	84	0.000	0%	0.069	0.000	0.034	0.034	0.000	1.905	17.81
160	0.22	84	0.000	0%	0.069	0.000	0.035	0.035	0.000	1.905	18.48
220	0.11	74	0.000	0%	0.002	0.000	0.000	0.000	0.000	3.514	8.14
280	0.116	69	0.000	0%	0.003	0.000	0.001	0.001	0.000	4.493	8.00
291	0.063	88	0.000	0%	0.138	0.000	0.020	0.020	0.000	1.364	5.54
300	0.054	84	0.000	0%	0.069	0.000	0.009	0.009	0.000	1.905	4.54
312	0.018	90	0.000	0%	0.186	0.000	0.008	0.008	0.000	1.111	1.62
330	0.132	86	0.000	0%	0.099	0.000	0.030	0.030	0.000	1.628	11.35

RUNOFF SUMMARY

	AREA SQM	AREA*CN	RUNOFF CF*10^6
SUBTOTAL 1A	1.772	139.883	0.177
SUBTOTAL 1B	0.085	8.058	0.083
TOTAL 1	1.857	147.941	0.260
SUBTOTAL 2A	1.013	80.215	0.121
SUBTOTAL 2B	1.625	142.537	0.515
SUBTOTAL 2C	0.953	85.770	0.413
TOTAL 1+2	5.448	456.463	0.897
SUBTOTAL 3	1.574	133.936	0.447
TOTAL 1+2+3	7.022	590.399	1.344

C16 of 17

100 YR - DAY 1

RETENTION PROVIDED IN SUBAREAS 2B and 2C

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

TOTAL RUNOFF CALCULATION

TRIBUTARY AREAS
24 HOUR PRECIP. = 3.85 INCHES

DATE: 2-89
INITIALS: SB

AREA NO.	AREA SQM	CN	RETENTION IN OF PRECIP.	% OF AREA RETAINED	DIRECT RUNOFF INCHES	RETAINED RUNOFF CF*10^6	UNRETAINED RUNOFF CF*10^6	TOTAL RUNOFF CF*10^6	OVERFLOW FROM UPSTREAM RETENTION BASINS	S COEF.	AREA*CN
1A: 54	0.105	75	0.000	0%	1.555	0.000	0.379	0.379	0.000	3.333	7.88
56	0.673	86	0.000	0%	2.411	0.000	3.769	3.769	0.000	1.628	57.88
58	0.517	72	0.000	0%	1.356	0.000	1.629	1.629	0.000	3.889	37.22
62	0.189	74	0.000	0%	1.487	0.000	0.653	0.653	0.000	3.514	13.99
66	0.080	79	0.000	0%	1.842	0.000	0.342	0.342	0.000	2.658	6.32
68	0.080	82	0.000	0%	2.075	0.000	0.386	0.386	0.000	2.195	6.56
168	0.009	82	0.000	0%	2.075	0.000	0.043	0.043	0.000	2.195	0.74
174	0.014	82	0.000	0%	2.075	0.000	0.068	0.068	0.000	2.195	1.15
180	0.019	82	0.000	0%	2.075	0.000	0.092	0.092	0.000	2.195	1.56
190	0.029	82	0.000	0%	2.075	0.000	0.140	0.140	0.000	2.195	2.38
380	0.057	74	0.000	0%	1.487	0.000	0.197	0.197	0.000	3.514	4.22
1B:208	0.004	98	0.000	0%	3.615	0.000	0.034	0.034	0.000	0.204	0.39
312	0.016	98	0.000	0%	3.615	0.000	0.134	0.134	0.000	0.204	1.57
336	0.034	90	0.000	0%	2.777	0.000	0.219	0.219	0.000	1.111	3.06
344	0.023	98	0.000	0%	3.615	0.000	0.193	0.193	0.000	0.204	2.25
364	0.008	98	0.000	0%	3.615	0.000	0.067	0.067	0.000	0.204	0.78
2A: 36	0.137	75	0.000	0%	1.555	0.000	0.495	0.495	0.000	3.333	10.28
38	0.082	88	0.000	0%	2.590	0.000	0.493	0.493	0.000	1.364	7.22
40	0.192	90	0.000	0%	2.777	0.000	1.239	1.239	0.000	1.111	17.28
42	0.316	75	0.000	0%	1.555	0.000	1.142	1.142	0.000	3.333	23.70
48	0.205	74	0.000	0%	1.487	0.000	0.708	0.708	0.000	3.514	15.17
52	0.034	80	0.000	0%	1.918	0.000	0.152	0.152	0.000	2.500	2.72
150	0.019	82	0.000	0%	2.075	0.000	0.092	0.092	0.000	2.195	1.56
156	0.009	82	0.000	0%	2.075	0.000	0.043	0.043	0.000	2.195	0.74
162	0.019	82	0.000	0%	2.075	0.000	0.092	0.092	0.000	2.195	1.56
2B: 20	0.024	90	1.600	20%	2.777	0.013	0.124	0.137	0.013	1.111	2.16
22	0.138	87	1.600	20%	2.499	0.058	0.641	0.699	0.058	1.494	12.01
26	0.282	90	1.600	20%	2.777	0.154	1.456	1.610	0.154	1.111	25.38
28	0.537	89	1.600	20%	2.683	0.270	2.677	2.947	0.270	1.236	47.79
32	0.220	85	1.600	20%	2.324	0.074	0.950	1.024	0.074	1.765	18.70
34	0.220	87	1.600	20%	2.499	0.092	1.022	1.114	0.092	1.494	19.14
116	0.030	82	1.600	20%	2.075	0.007	0.116	0.122	0.007	2.195	2.46
118	0.126	87	1.600	20%	2.499	0.053	0.585	0.638	0.053	1.494	10.96
128	0.009	82	1.600	20%	2.075	0.002	0.035	0.037	0.002	2.195	0.74
132	0.011	82	1.600	20%	2.075	0.002	0.042	0.045	0.002	2.195	0.90
138	0.015	82	1.600	20%	2.075	0.003	0.058	0.061	0.003	2.195	1.23
146	0.013	82	1.600	20%	2.075	0.003	0.050	0.053	0.003	2.195	1.07
2C:200	0.061	90	1.240	100%	2.777	0.218	0.000	0.218	0.218	1.111	5.49
300	0.089	90	1.240	100%	2.777	0.318	0.000	0.318	0.318	1.111	8.01
302	0.106	90	1.240	100%	2.777	0.379	0.000	0.379	0.379	1.111	9.54
308	0.041	90	1.240	100%	2.777	0.146	0.000	0.146	0.146	1.111	3.69
318	0.120	90	1.240	100%	2.777	0.429	0.000	0.429	0.429	1.111	10.80
324	0.120	90	1.240	100%	2.777	0.429	0.000	0.429	0.429	1.111	10.80
330	0.120	90	1.240	100%	2.777	0.429	0.000	0.429	0.429	1.111	10.80

340	0.120	90	1.240	100%	2.777	0.429	0.000	0.429	0.429	1.111	10.80
354	0.115	90	1.240	100%	2.777	0.411	0.000	0.411	0.411	1.111	10.35
360	0.061	90	1.240	100%	2.777	0.218	0.000	0.218	0.218	1.111	5.49
3: 10	0.176	92	0.000	0%	2.973	0.000	1.216	1.216	0.000	0.870	16.19
30	0.057	84	0.000	0%	2.239	0.000	0.297	0.297	0.000	1.905	4.79
50	0.316	92	0.000	0%	2.973	0.000	2.182	2.182	0.000	0.870	29.07
70	0.070	84	0.000	0%	2.239	0.000	0.364	0.364	0.000	1.905	5.88
110	0.03	84	0.000	0%	2.239	0.000	0.156	0.156	0.000	1.905	2.52
140	0.212	84	0.000	0%	2.239	0.000	1.103	1.103	0.000	1.905	17.81
160	0.22	84	0.000	0%	2.239	0.000	1.145	1.145	0.000	1.905	18.48
220	0.11	74	0.000	0%	1.487	0.000	0.380	0.380	0.000	3.514	8.14
280	0.116	69	0.000	0%	1.170	0.000	0.315	0.315	0.000	4.493	8.00
291	0.063	88	0.000	0%	2.590	0.000	0.379	0.379	0.000	1.364	5.54
300	0.054	84	0.000	0%	2.239	0.000	0.281	0.281	0.000	1.905	4.54
312	0.018	90	0.000	0%	2.777	0.000	0.116	0.116	0.000	1.111	1.62
330	0.132	86	0.000	0%	2.411	0.000	0.739	0.739	0.000	1.628	11.35

RUNOFF SUMMARY

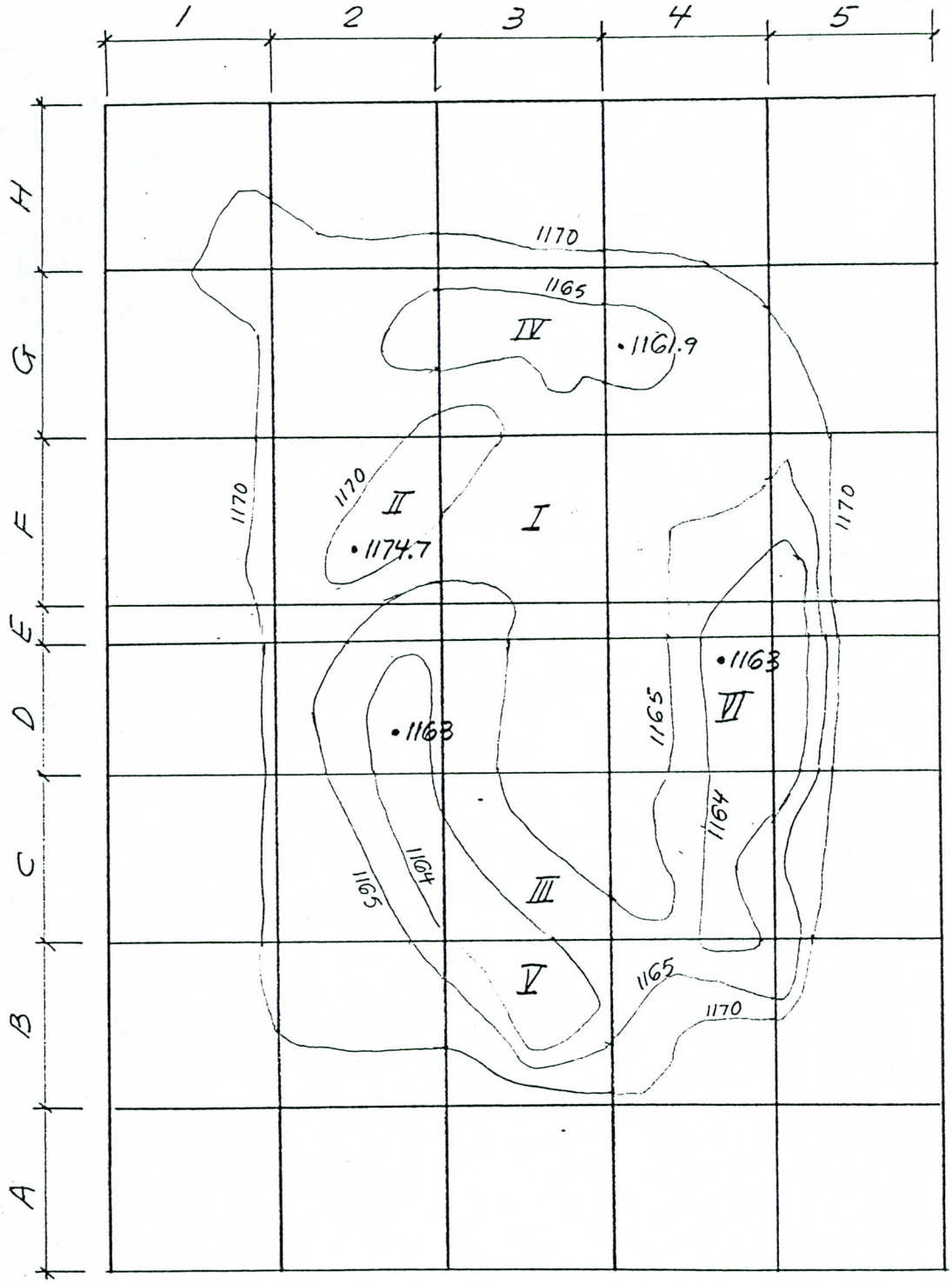
	AREA SQM	AREA*CN	RUNOFF CF*10^6
SUBTOTAL 1A	1.772	139.883	7.698
SUBTOTAL 1B	0.085	8.058	0.648
TOTAL 1	1.857	147.941	8.345
SUBTOTAL 2A	1.013	80.215	4.455
SUBTOTAL 2B	1.625	142.537	8.487
SUBTOTAL 2C	0.953	85.770	3.403
TOTAL 1+2	5.448	456.463	21.288
SUBTOTAL 3	1.574	133.936	8.673
TOTAL 1+2+3	7.022	590.399	29.961

D. EXISTING PIT ANALYSIS

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175

SHT. NO. 02 OF 7
JOB NO. 888053
BY 98 DATE 2-89
REVWD. DATE
REVISED

Tempe Drainage Study
ADOT Pit Diversion Channel (Retension)
Contour Line Areas



Area I = 660 464 FT²
Area II = 26 736
Area III and IV = 229 808 + 31952
Area V and VI = 89 584

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO 03 OF 7

JOB NO. 888053

BY 98 DATE 2-89

REVWD. DATE

REVISED

Tempe Drainage Study

ADOT Pit Diversion Channel (Retension)

Contour Line Areas

	1	2	3	4	5	IN^2	FT^2
H	3.77	6.38	3.84	1.18	-	15.17	24272
G	4.35	25*	25	24.20	5.35	83.90	134240
F	2.71	25*	25*	25	10.20	87.91	140656
E	0.28	5	5	5	2.00	17.28	27648
D	0.70	20	20	20	7.44	68.14	109024
C	1.18	25	25	25	7.65	83.83	134128
B	0.50	15.08	20.87	17.94	2.17	56.56	90496
A	-	-	-	-	-	-	-
			Contour Line 1170		Σ	412.79	660464

	1	2	3	4	5	IN^2	FT^2
H	4.69	7.62	5.46	2.96	-	20.73	33168
G	9.96	25	25	24.96	7.62	92.54	148064
F	8.42	25	25	25	11.30	94.72	151552
E	1.13	5	5	5	2.29	18.42	29472
D	2.88	20	20	20	8.66	71.54	114464
C	3.60	25	25	25	9.20	87.80	140480
B	2.19	17.70	22.75	20.44	3.19	66.27	106032
A	-	-	-	0.04	-	0.04	64
			Contour Line 1175		Σ	452.06	723296

	1	2	3	4	5	IN^2	FT^2
H	5.60	8.85	7.18	6.60	0.60	28.83	46128
G	10.96	25	25	25	9.84	95.80	153280
F	9.24	25	25	25	12.63	96.87	154992
E	1.43	5	5	5	2.53	18.96	30336
D	4.56	20	20	20	9.64	74.20	118720
C	5.95	25	25	25	10.63	91.58	146528
B	3.71	19.45	23.98	24.67	4.63	76.44	122304
A	-	-	0.52	0.68	-	1.20	1920
			Contour Line 1180		Σ	483.88	774208

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. 04 OF 7

JOB NO. 888053

BY 98 DATE 2-89

REVWD. DATE

REVISED

Tempe Drainage Study

ADOT Pit Diversion Channel (Retension)

Contour Line Areas

	1	2	3	4	5	IN^2	FT^2
H	6.70	10.25	8.73	8.53	1.83	36.04	57 664
G	12.37	25	25	25	11.66	99.03	158 448
F	10.00	25	25	25	13.88	98.88	158 208
E	1.73	5	5	5	2.76	19.49	31 184
D	6.34	20	20	20	10.70	77.04	123 264
C	8.93	25	25	25	12.20	96.13	153 808
B	6.05	22.03	24.80	25	6.28	84.16	134 656
A	-	-	1.82	2.31	-	4.13	6 608
			Contour Line 1185		Σ	514.90	823 840

	1	2	3	4	5	IN^2	FT^2
H	7.80	11.64	10.28	10.45	4.16	44.33	70 928
G	13.78	25	25	25	13.48	102.26	163 616
F	10.75	25	25	25	15.13	100.88	161 408
E	2.03	5	5	5	3.00	20.03	32 048
D	8.22	20	20	20	11.34	79.56	127 296
C	10.28	25	25	25	13.98	99.26	158 816
B	8.97	24.28	25	25	8.28	91.53	146 448
A	-	0.02	3.91	4.25	0.34	8.52	13 632
			Contour Line 1190		Σ	546.37	874 192

	1	2	3	4	5	IN^2	FT^2
H	9.08	13.13	12.08	13.71	6.07	54.07	86512
G	15.19	25	25	25	15.38	105.57	168912
F	12.55	25	25	25	16.95	104.50	167 200
E	2.40	5	5	5	3.36	20.76	33 216
D	9.74	20	20	20	13.42	83.16	133 056
C	12.28	25	25	25	15.68	102.96	164 736
B	12.00	25	25	25	10.10	97.10	155 360
A	0.30	1.76	5.46	5.84	0.77	14.13	22 608
			Contour Line 1195		Σ	582.25	931 600

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. 05 OF 7
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Tempe Drainage Study
ADOT Pit Diversion Channel (Retension)
Contour Line Areas

	1	2	3	4	5	IN^2	FT^2
H	10.35	14.62	13.87	16.03	7.86	62.73	100 368
G	16.60	25	25	25	17.30	108.90	174 240
F	14.40	25	25	25	18.73	108.13	173008
E	2.80	5	5	5	3.71	21.51	34 416
D	11.30	20	20	20	14.76	86.06	137 696
C	14.23	25	25	25	17.35	106.58	170 528
B	14.15	25	25	25	11.78	100.93	161 488
A	1.71	4.16	7.48	7.83	1.48	22.66	36 256
			Contour Line 1200		Σ	617.50	988 000

	1	2	3	4	5	IN^2	FT^2
H	11.80	15.98	16.17	17.40	10.09	71.44	114 304
G	17.95	25	25	25	19.20	112.15	179 440
F	16.15	25	25	25	20.43	111.58	178 528
E	3.19	5	5	5	4.06	22.25	35 600
D	12.98	20	20	20	16.10	89.08	142 528
C	16.35	25	25	25	18.98	110.33	176 528
B	16.38	25	25	25	13.45	104.83	167 728
A	3.62	6.58	9.20	9.51	2.31	31.22	49 952
			Contour Line 1205		Σ	652.88	1 044 608

	1	2	3	4	5	IN^2	FT^2
H	13.25	17.34	18.42	18.95	12.67	80.63	129 008
G	19.48	25	25	25	21.18	115.66	185 056
F	18.20	25	25	25	22.05	115.25	184 400
E	3.61	5	5	5	4.39	23.00	36800
D	14.38	20	20	20	17.38	91.76	146 816
C	18.48	25	25	25	20.68	114.16	182 656
B	18.65	25	25	25	14.78	108.43	173 488
A	5.93	8.98	10.90	11.48	3.31	40.60	64 960
			Contour Line 1210		Σ	689.49	1 103 184

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. 06 OF 7
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REVISED

Tempe Drainage Study
ADOT Pit Diversion Channel (Retension)
Contour Line Areas

	1	2	3	4	5	IN^2	FT^2
H	14.72	18.55	19.83	20.35	15.78	89.23	142 768
G	21.03	25	25	25	22.78	118.81	190 096
F	20.10	25	25	25	23.75	118.85	190160
E	4.01	5	5	5	4.72	23.73	37968
D	16.24	20	20	20	18.74	94.98	151968
C	20.53	25	25	25	22.33	117.86	188576
B	20.75	25	25	25	16.53	112.28	179648
A	8.67	11.25	12.47	13.62	5.07	51.08	81728
			Contour Line 1215		Σ	726.82	1162912

	1	2	3	4	5	IN^2	FT^2
H	-	-	-	-	-	-	-
G	- IV	4.00	12.04	3.93	-	19.97	31952
F	-	0.46	1.37	8.10	5.14	15.07	24112
E	-	2.19	2.10	3.00	1.64	8.93	14288
D	- V	14.21	7.20	12.27	6.10	39.78	63648
C	-	12.35	17.13	19.34	4.00	52.82	84512
B	-	0.50	15.78	9.35	1.40	27.03	43248
A	-	-	-	-	-	-	-
Area III and IV			Contour Line 1165		Σ	163.60	261760

	1	2	3	4	5	IN^2	FT^2
H	-	-	-	-	-	-	-
G	-	-	-	-	-	-	-
F	-	-	-	1.45	2.62	4.07	6512
E	-	-	-	1.81	1.21	3.02	4832
D	-	5.94	-	8.08	4.16	18.18	29088
C	-	6.51	5.39	8.57	0.70	21.17	33872
B	-	-	9.27	0.28	-	9.55	15280
A	-	-	-	-	-	-	-
Area V and VI			Contour Line 1164		Σ	55.99	89584

BENSON & GERDIN — DIVISION OF CREEGAN & D'ANGELO — PHONE (602) 258-3175

SHT. NO. 7 OF 7
JOB NO. 888053
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REVWD. DATE
REVISED

Tempe Drainage Study
ADOT Pit Diversion Channel (Retension)

Volumes	CY
$V_{63-64} = \frac{1}{3} 1.00 \frac{89584}{27}$	1106
$V_{64-65} = \frac{1}{3} 3.10 \cdot \frac{31952}{27} + \frac{229808 + 89584}{2} \times \frac{1.0}{27}$	7138
$V_{65-70} = \frac{660464 + 261760}{2} \times \frac{5.00}{27} - \frac{1}{3} \times 26736 \times \frac{4.70}{27}$	83840
$V_{70-75} = \frac{660464 + 723296}{2} \times \frac{5.00}{27}$	128126
$V_{75-80} = \frac{723296 + 774208}{2} \times \frac{5.00}{27}$	138658
$V_{80-85} = \frac{774208 + 823840}{2} \times \frac{5.00}{27}$	147967
$V_{85-90} = \frac{823840 + 874192}{2} \times \frac{5.00}{27}$	157225
$V_{90-95} = \frac{874192 + 931600}{2} \times \frac{5.00}{27}$	167203
$V_{95-00} = \frac{931600 + 988000}{2} \times \frac{5.00}{27}$	177741
$V_{00-05} = \frac{988000 + 1044608}{2} \times \frac{5.00}{27}$	188204
$V_{05-10} = \frac{1044608 + 1103184}{2} \times \frac{5.00}{27}$	198870
$V_{10-15} = \frac{1103184 + 1162912}{2} \times \frac{5.00}{27}$	209824
Σ CY	1,605,902
Σ CF	43,359,400

E. PUMP STATION ANALYSIS

PUMP OFF

LOOKUP TABLE

VOLUME	DEPTH	PUMP RATE	SURFACE AREA
CF*10^6	FT	CFS	SF*10^6
0.000	0	0.000	0.262
0.675	1	0.000	0.342
1.128	2	0.000	0.421
1.581	3	0.000	0.501
2.034	4	0.000	0.581
2.486	5	0.000	0.660
3.178	6	0.000	0.673
3.870	7	0.000	0.686
4.562	8	0.000	0.698
5.254	9	0.000	0.711
5.946	10	0.000	0.723
6.694	11	0.000	0.733
7.443	12	0.000	0.744
8.192	13	0.000	0.754
8.941	14	0.000	0.764
9.689	15	0.000	0.774
10.488	16	0.000	0.784
11.287	17	0.000	0.794
12.086	18	0.000	0.804
12.886	19	0.000	0.814
13.685	20	0.000	0.824
14.534	21	0.000	0.834
15.383	22	0.000	0.844
16.232	23	0.000	0.854
17.081	24	0.000	0.864
17.930	25	0.000	0.874
18.833	26	0.000	0.886
19.735	27	0.000	0.897
20.638	28	0.000	0.909
21.541	29	0.000	0.920
22.444	30	0.000	0.932
23.404	31	0.000	0.943
24.364	32	0.000	0.954
25.323	33	0.000	0.965
26.283	34	0.000	0.977
27.243	35	0.000	0.988
28.259	36	0.000	0.999
29.276	37	0.000	1.011
30.292	38	0.000	1.022
31.308	39	0.000	1.033
32.325	40	0.000	1.045
33.399	41	0.000	1.056
34.472	42	0.000	1.068
35.546	43	0.000	1.080
36.620	44	0.000	1.091
37.694	45	0.000	1.103
38.827	46	0.000	1.115
39.960	47	0.000	1.127
41.093	48	0.000	1.139
42.226	49	0.000	1.151
43.359	50	0.000	1.163
44.492	51	0.000	1.175

PUMP ON

E2 of 9

98
2/89

LOOKUP TABLE

VOLUME	DEPTH	PUMP RATE	SURFACE AREA
CF*10^6	FT	CFS	SF*10^6
0.000	0	7.670	0.262
0.675	1	7.850	0.342
1.128	2	8.030	0.421
1.581	3	8.200	0.501
2.034	4	8.380	0.581
2.486	5	8.560	0.660
3.178	6	8.740	0.673
3.870	7	8.920	0.686
4.562	8	9.110	0.698
5.254	9	9.290	0.711
5.946	10	9.470	0.723
6.694	11	9.620	0.733
7.443	12	9.770	0.744
8.192	13	9.910	0.754
8.941	14	10.060	0.764
9.689	15	10.210	0.774
10.488	16	10.390	0.784
11.287	17	10.570	0.794
12.086	18	10.740	0.804
12.886	19	10.920	0.814
13.685	20	11.100	0.824
14.534	21	11.240	0.834
15.383	22	11.380	0.844
16.232	23	11.530	0.854
17.081	24	11.670	0.864
17.930	25	11.810	0.874
18.833	26	11.940	0.886
19.735	27	12.080	0.897
20.638	28	12.210	0.909
21.541	29	12.350	0.920
22.444	30	12.480	0.932
23.404	31	12.600	0.943
24.364	32	12.710	0.954
25.323	33	12.830	0.965
26.283	34	12.940	0.977
27.243	35	13.060	0.988
28.259	36	13.170	0.999
29.276	37	13.270	1.011
30.292	38	13.380	1.022
31.308	39	13.480	1.033
32.325	40	13.590	1.045
33.399	41	13.680	1.056
34.472	42	13.770	1.068
35.546	43	13.860	1.080
36.620	44	13.950	1.091
37.694	45	14.040	1.103
38.827	46	14.150	1.115
39.960	47	14.260	1.127
41.093	48	14.380	1.139
42.226	49	14.490	1.151
43.359	50	14.600	1.163
44.492	51	14.690	1.175

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175

SHT. NO. E3 OF 9

JOB NO. 888053

BY GS DATE 2-23-89

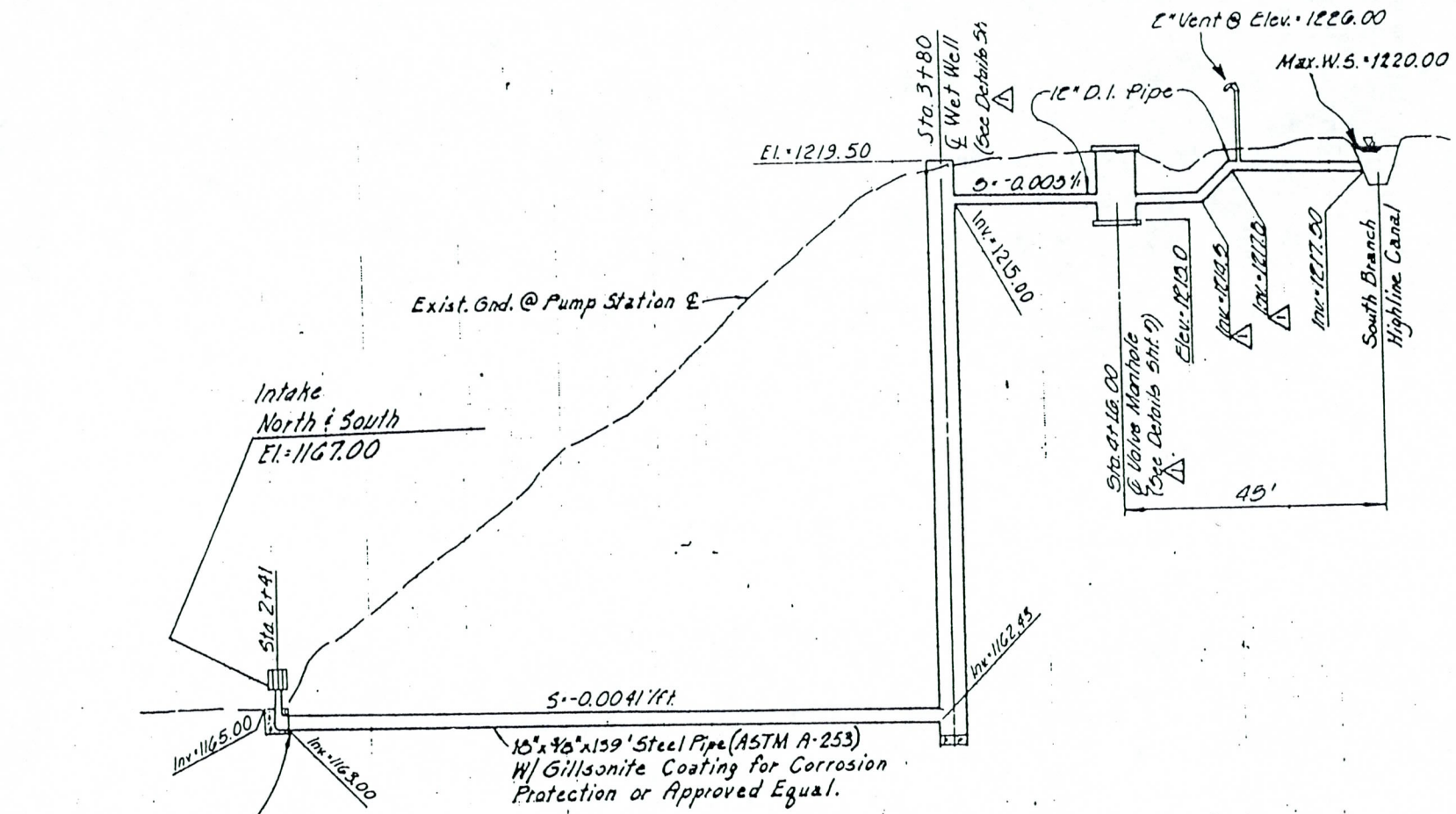
REVWD. DATE

REVISED

TEMPE DRAINAGE STUDY

PUMP ANALYSIS

W.S. ELEV. IN PIT	DEPTH WATER IN PIT	(S.H.L.) STATIC HEAD LOSS	1 PUMP FLOW G.P.M.	2 PUMP FLOW G.P.M.	2 PUMP FLOW C.F.S.
1220	55	0	3375	6750	15.04
1215	50	5	3275	6550	14.60
1210	45	10	3150	6300	14.04
1205	40	15	3050	6100	13.59
1200	35	20	2930	5860	13.06
1195	30	25	2800	5600	12.48
1190	25	30	2650	5300	11.81
1185	20	35	2490	4980	11.10
1180	15	40	2290	4580	10.21
1175	10	45	2125	4250	9.47
1170	5	50	1920	3840	8.56
1165	0	55	1710	3420	7.67



BENSON & GERDIN
DIVISION OF CREEGAN & D'ANGELO
PHONE (602) 258-3175

TEMPE DRAINAGE STUDY

PUMP ANALYSIS

SHT. NO. E4 OF 9

JOB NO. 888053

BY

DATE 2-23-89

REVWD

DATE

REVISED

HEAD LOSS TABULATION SHEET

DESCRIPTION	D SIZE (IN.)	L EQUIV. LENGTH (FT)	Q (CFS)	V (FPS)	f FRICTIONAL FACTOR	$H_f = f \cdot \frac{L}{D} \cdot \frac{V^2}{2g}$ LOSS OF HEAD (FT.)
INLET	18"	25	5	2.8	0.027	0.6
90° EL		45	8	4.5	0.025	1.4
140 LF PIPE		140				
EXIT		45				
		255				
90° EL	8"	21	5	14.3	0.024	3.2
2 LF PIPE		2	8	22.7	0.024	8.0
ENLARGE		5				
		28				
55 LF PIPE	12"	55	5	6.4	0.026	4.0
90° EL		32	8	10.2	0.024	9.4
45 LF PIPE		45				
90° EL		32				
CHECK VALVE		78				
		242				
TOTAL						

HEAD LOSS TABULATION

PUMP ANALYSIS

TEMPE DRAINAGE STUDY

DIVISION OF CREEGAN & D'ANGELO
PHONE (602) 258-3175

SHT. NO. E5 OF 9

JOB NO. 888053

BY [illegible] DATE 2.22.89

REVWD. DATE

REVISED

HEAD LOSS TABULATION SHEET

DESCRIPTION	D SIZE (IN.)	L EQUIV. LENGTH (FT.)	Q (CFS)	V (FPS)	f FRICTIONAL FACTOR	$H_f = f \cdot \frac{L}{D} \cdot \frac{V^2}{2g}$ LOSS OF HEAD (FT.)	
EQUIV. 90° EL	12"	32	10	12.7	0.024	13.2	
45 LF PIPE		45	16	20.4	0.023		32.6
45° EL		15					
45° EL		15					
CHECK VALVE		80					
OUTLET		32					
		219					
TOTAL						21'	52'

DIVISION OF CREEGAN & D'ANGELO
PHONE (602) 258-3175

TEMPE DRAINAGE STUDY

PUMP ANALYSIS

HEAD LOSS TABULATION

SHT. NO. E6 OF 9

JOB NO. 888053

BY [illegible] DATE 2-22-89

REVWD. DATE

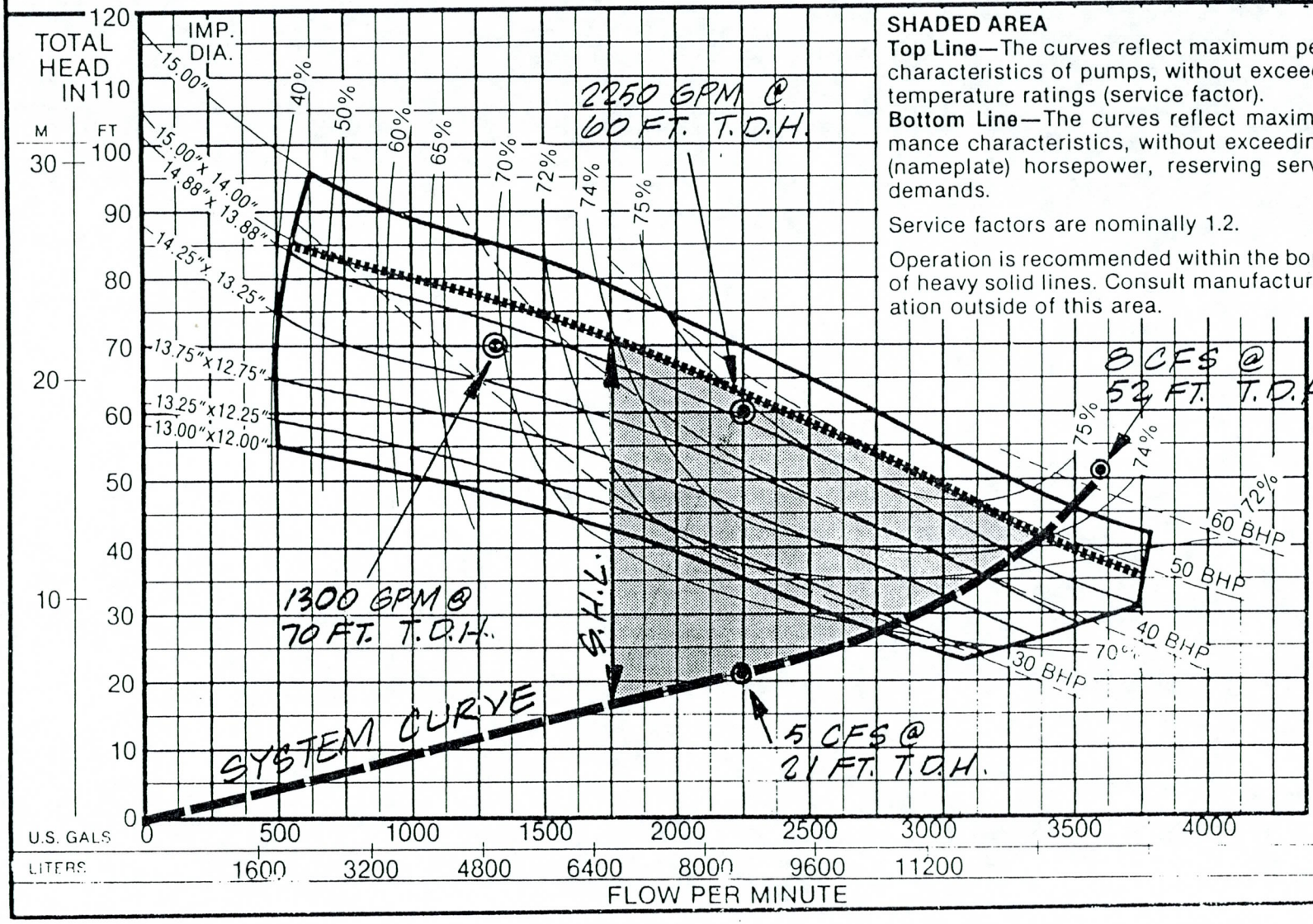
REVISED

Bullentin S-209

DIMENSIONAL DRAWINGS & PERFORMANCE DATA

HYDROMATIC PUMPS

S8L/S8LX—MAX. SOLIDS 4" SPHERE—1150 RPM



SHADED AREA

Top Line—The curves reflect maximum performance characteristics of pumps, without exceeding motor temperature ratings (service factor).

Bottom Line—The curves reflect maximum performance characteristics, without exceeding full load (nameplate) horsepower, reserving service factor demands.

Service factors are nominally 1.2.

Operation is recommended within the bounded area of heavy solid lines. Consult manufacturer for operation outside of this area.

Performance based upon pumping clear water at 70°F and specific gravity of 1.0

#88053
2-22-89

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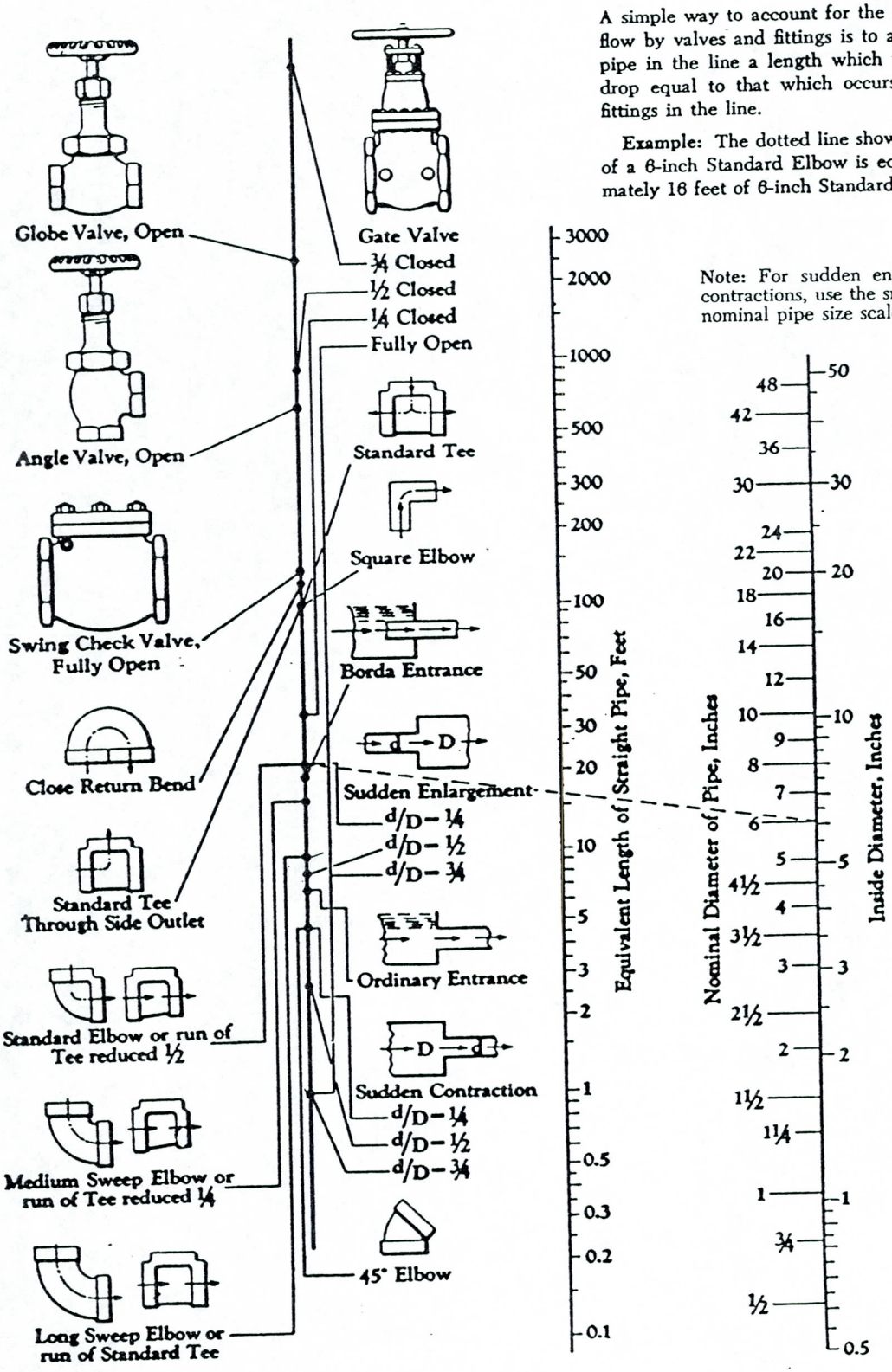
888053
2/89 JB

RESISTANCE OF VALVES AND FITTINGS TO FLOW OF FLUIDS

A simple way to account for the resistance offered to flow by valves and fittings is to add to the length of pipe in the line a length which will give a pressure drop equal to that which occurs in the valves and fittings in the line.

Example: The dotted line shows that the resistance of a 6-inch Standard Elbow is equivalent to approximately 16 feet of 6-inch Standard Steel Pipe.

Note: For sudden enlargements or sudden contractions, use the smaller diameter on the nominal pipe size scale.



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Peerless Pump
An Indian Head Company
1200 Sycamore Street, Montebello, California 90640 (213) 726-1232 TELEX 67-4156
2005 Northwestern Avenue, Indianapolis, Indiana 46206 (317) 925-9661

#888053
2/89 gb

TABLE 3

FRICTIONAL FACTORS f FOR WATER ONLY

(Temperature range about 50°F to 70°F)

For old pipe — approximate range ϵ from .004 ft to .020 ft
For average pipe — approximate range ϵ from .002 ft to .003 ft
For new pipe — approximate range ϵ from .0005 ft to .0010 ft

(f = tabular value $\times 10^{-4}$)

Diameter and Type of Pipe		VELOCITY (ft/sec)										
		1	2	3	4	5	6	8	10	15	20	30
4″	Old, comm.	435	415	410	405	400	395	395	390	385	375	370
	Average, comm.	355	320	310	300	290	285	280	270	260	250	250
	New pipe	300	265	250	240	230	225	220	210	200	190	185
	Very smooth	240	205	190	180	170	165	155	150	140	130	120
6″	Old, comm.	425	410	405	400	395	395	390	385	380	375	365
	Average, comm.	335	310	300	285	280	275	265	260	250	240	235
	New pipe	275	250	240	225	220	210	205	200	190	180	175
	Very smooth	220	190	175	165	160	150	145	140	130	120	115
8″	Old, comm.	420	405	400	395	390	385	380	375	370	365	360
	Average, comm.	320	300	285	280	270	265	260	250	240	235	225
	New pipe	265	240	225	220	210	205	200	190	185	175	170
	Very smooth	205	180	165	155	150	140	135	130	120	115	110
10″	Old, comm.	415	405	400	395	390	385	380	375	370	365	360
	Average, comm.	315	295	280	270	265	260	255	245	240	230	225
	New pipe	260	230	220	210	205	200	190	185	180	170	165
	Very smooth	200	170	160	150	145	135	130	125	115	110	105
12″	Old, comm.	415	400	395	395	390	385	380	375	365	360	355
	Average, comm.	310	285	275	265	260	255	250	240	235	225	220
	New pipe	250	225	210	205	200	195	190	180	175	165	160
	Very smooth	190	165	150	140	140	135	125	120	115	110	105
16″	Old, comm.	405	395	390	385	380	375	370	365	360	350	350
	Average, comm.	300	280	265	260	255	250	240	235	225	215	210
	New pipe	240	220	205	200	195	190	180	175	170	160	155
	Very smooth	180	155	140	135	130	125	120	115	110	105	100
20″	Old, comm.	400	395	390	385	380	375	370	365	360	350	350
	Average, comm.	290	275	265	255	250	245	235	230	220	215	205
	New pipe	230	210	200	195	190	180	175	170	165	160	150
	Very smooth	170	150	135	130	125	120	115	110	105	100	95
24″	Old, comm.	400	395	385	380	375	370	365	360	355	350	345
	Average, comm.	285	265	255	250	245	240	230	225	220	210	200
	New pipe	225	200	195	190	185	180	175	170	165	155	150
	Very smooth	165	140	135	125	120	120	115	110	105	100	95
30″	Old, comm.	400	385	380	375	370	365	360	355	350	350	345
	Average, comm.	280	255	250	245	240	230	225	220	210	205	200
	New pipe	220	195	190	185	180	175	170	165	160	155	150
	Very smooth	160	135	130	120	115	115	110	110	105	100	95
36″	Old, comm.	395	385	375	370	365	360	355	355	350	345	340
	Average, comm.	275	255	245	240	235	230	225	220	210	200	195
	New pipe	215	195	185	180	175	170	165	160	155	150	145
	Very smooth	150	135	125	120	115	110	110	105	100	95	90
48″	Old, comm.	395	385	370	365	360	355	350	350	345	340	335
	Average, comm.	265	250	240	230	225	220	215	210	200	195	190
	New pipe	205	190	180	175	170	165	160	155	150	145	140
	Very smooth	140	125	120	115	110	110	105	100	95	90	90

F. STAGE DURATION

TEMPE DRAINAGE STUDY

STAGE - DURATION SUMMARY
(3-MONTH PRECIPITATION SEQUENCE)

INPUT				OUTPUT					
				5-YEAR			100-YEAR		
PHASE (TRIBUT. AREA)	RETENTION	PERC./EVAP DESIGN IN/DAY	PUMPING DESIGN CFS	MAX DEPTH FT	DAYS OF INUNDATION INITIAL	DAYS OF INUNDATION TOTAL	MAX DEPTH FT	DAYS OF INUNDATION INITIAL	DAYS OF INUNDATION TOTAL
I	-	0.5	—	6	90+	90+	13	90+	90+
		40		3	2	3	12	4	4
II	-	0.5	—	15	90+	90+	32	90+	90+
		40	—	10	4	5	29	9	10
		0.5	10	11	9	13	29	26	27
		40	10	10	2	3	28	6	6
III	-	0.5	—	21	90+	90+	42	90+	90+
		40	—	15	4	6	38	11	12
		0.5	10	15	12	17	38	35	35
		40	10	14	3	4	37	8	9
				1-YEAR					
III	-	0.5	10	1	2	—			

Compute Stage-Duration

where:

O_{PU} - Pump outflow ($CF \times 10^6$/day)
PF - Pump rate (CFS)

O_{PE} - Percolation outflow ($CF \times 10^6$/day)
PR - Percolation rate (in/day)
SA - Surface Area (SF)

Δ_{SV} - Change in storage volume ($CF \times 10^6$/day)
I - Inflow ($CF \times 10^6$/Day)

SV_i - Storage volume ($CF \times 10^6$)
SV_{i-1} - Previous day Storage volume ($CF \times 10^6$)

Equations:

$$O_{PU} = PF \times \frac{86400}{10^6}$$

$$O_{PE} = \frac{\frac{PR}{12} \times SA}{10^6}$$

$$\Delta_{SV} = I - O_{PU} - O_{PE}$$

$$SV_i = SV_{i-1} + \Delta_{SV}$$

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175	SHT. NO. F4 OF 49
TEMPE DRAINAGE STUDY	JOB NO. 888053
STAGE-DURATION COMPUTER OUTPUT	BY GS DATE 3-1-89
	REVWD. DATE
	REVISED

5-YEAR

PHASE I

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2/89

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE I
PRECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP. INCHES	INFLOW CF*10^6	OUTFLOW PUMP CF*10^6	OUTFLOW PERCOL. CF*10^6	CHANGE IN STORAGE VOLUME CF*10^6	STORAGE VOLUME CF*10^6	DEPTH FT
0						0.000	0.00
1	2.00	2.593	0.000	0.011	2.582	2.582	5.00
2			0.000	0.028	-0.028	2.555	5.00
3			0.000	0.028	-0.028	2.527	5.00
4			0.000	0.028	-0.028	2.500	5.00
5			0.000	0.028	-0.028	2.472	4.00
6			0.000	0.024	-0.024	2.448	4.00
7			0.000	0.024	-0.024	2.424	4.00
8			0.000	0.024	-0.024	2.399	4.00
9			0.000	0.024	-0.024	2.375	4.00
10			0.000	0.024	-0.024	2.351	4.00
11			0.000	0.024	-0.024	2.327	4.00
12			0.000	0.024	-0.024	2.303	4.00
13			0.000	0.024	-0.024	2.278	4.00
14			0.000	0.024	-0.024	2.254	4.00
15			0.000	0.024	-0.024	2.230	4.00
16	1.30	1.006	0.000	0.024	0.982	3.212	6.00
17			0.000	0.028	-0.028	3.184	6.00
18			0.000	0.028	-0.028	3.156	5.00
19			0.000	0.028	-0.028	3.128	5.00
20			0.000	0.028	-0.028	3.101	5.00
21			0.000	0.028	-0.028	3.073	5.00
22			0.000	0.028	-0.028	3.046	5.00
23			0.000	0.028	-0.028	3.018	5.00
24			0.000	0.028	-0.028	2.991	5.00
25			0.000	0.028	-0.028	2.963	5.00
26			0.000	0.028	-0.028	2.936	5.00
27			0.000	0.028	-0.028	2.908	5.00
28			0.000	0.028	-0.028	2.881	5.00
29			0.000	0.028	-0.028	2.853	5.00
30			0.000	0.028	-0.028	2.826	5.00
31	0.53	0.110	0.000	0.028	0.082	2.908	5.00
32			0.000	0.028	-0.028	2.880	5.00
33			0.000	0.028	-0.028	2.853	5.00
34			0.000	0.028	-0.028	2.825	5.00
35			0.000	0.028	-0.028	2.798	5.00
36			0.000	0.028	-0.028	2.770	5.00
37			0.000	0.028	-0.028	2.743	5.00
38			0.000	0.028	-0.028	2.715	5.00

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39			0.000	0.028	-0.028	2.688	5.00
40			0.000	0.028	-0.028	2.660	5.00
41			0.000	0.028	-0.028	2.633	5.00
42			0.000	0.028	-0.028	2.605	5.00
43			0.000	0.028	-0.028	2.578	5.00
44			0.000	0.028	-0.028	2.550	5.00
45			0.000	0.028	-0.028	2.523	5.00
46	0.53	0.110	0.000	0.028	0.082	2.605	5.00
47			0.000	0.028	-0.028	2.578	5.00
48			0.000	0.028	-0.028	2.550	5.00
49			0.000	0.028	-0.028	2.523	5.00
50			0.000	0.028	-0.028	2.495	5.00
51			0.000	0.028	-0.028	2.468	4.00
52			0.000	0.024	-0.024	2.443	4.00
53			0.000	0.024	-0.024	2.419	4.00
54			0.000	0.024	-0.024	2.395	4.00
55			0.000	0.024	-0.024	2.371	4.00
56			0.000	0.024	-0.024	2.347	4.00
57			0.000	0.024	-0.024	2.322	4.00
58			0.000	0.024	-0.024	2.298	4.00
59			0.000	0.024	-0.024	2.274	4.00
60			0.000	0.024	-0.024	2.250	4.00
61	0.53	0.110	0.000	0.024	0.086	2.336	4.00
62			0.000	0.024	-0.024	2.311	4.00
63			0.000	0.024	-0.024	2.287	4.00
64			0.000	0.024	-0.024	2.263	4.00
65			0.000	0.024	-0.024	2.239	4.00
66			0.000	0.024	-0.024	2.215	4.00
67			0.000	0.024	-0.024	2.190	4.00
68			0.000	0.024	-0.024	2.166	4.00
69			0.000	0.024	-0.024	2.142	4.00
70			0.000	0.024	-0.024	2.118	4.00
71			0.000	0.024	-0.024	2.094	4.00
72			0.000	0.024	-0.024	2.069	4.00
73			0.000	0.024	-0.024	2.045	4.00
74			0.000	0.024	-0.024	2.021	3.00
75			0.000	0.021	-0.021	2.000	3.00
76	0.53	0.110	0.000	0.021	0.089	2.089	4.00
77			0.000	0.024	-0.024	2.065	4.00
78			0.000	0.024	-0.024	2.041	4.00
79			0.000	0.024	-0.024	2.017	3.00
80			0.000	0.021	-0.021	1.996	3.00
81			0.000	0.021	-0.021	1.975	3.00
82			0.000	0.021	-0.021	1.954	3.00
83			0.000	0.021	-0.021	1.933	3.00
84			0.000	0.021	-0.021	1.912	3.00
85			0.000	0.021	-0.021	1.892	3.00
86			0.000	0.021	-0.021	1.871	3.00
87			0.000	0.021	-0.021	1.850	3.00
88			0.000	0.021	-0.021	1.829	3.00
89			0.000	0.021	-0.021	1.808	3.00
90			0.000	0.021	-0.021	1.787	3.00

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE I
PRECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP. INCHES	INFLOW CF*10^6	OUTFLOW PUMP CF*10^6	OUTFLOW PERCOL. CF*10^6	CHANGE IN STORAGE VOLUME CF*10^6	STORAGE VOLUME CF*10^6	DEPTH FT
0						0.000	0.00
1	2.00	2.593	0.000	0.873	1.720	1.720	3.00
2			0.000	1.670	-1.670	0.051	0.00
3			0.000	0.873	-0.873	0.000	0.00
4			0.000	0.873	-0.873	0.000	0.00
5			0.000	0.873	-0.873	0.000	0.00
6			0.000	0.873	-0.873	0.000	0.00
7			0.000	0.873	-0.873	0.000	0.00
8			0.000	0.873	-0.873	0.000	0.00
9			0.000	0.873	-0.873	0.000	0.00
10			0.000	0.873	-0.873	0.000	0.00
11			0.000	0.873	-0.873	0.000	0.00
12			0.000	0.873	-0.873	0.000	0.00
13			0.000	0.873	-0.873	0.000	0.00
14			0.000	0.873	-0.873	0.000	0.00
15			0.000	0.873	-0.873	0.000	0.00
16	1.30	1.006	0.000	0.873	0.133	0.133	0.00
17			0.000	0.873	-0.873	0.000	0.00
18			0.000	0.873	-0.873	0.000	0.00
19			0.000	0.873	-0.873	0.000	0.00
20			0.000	0.873	-0.873	0.000	0.00
21			0.000	0.873	-0.873	0.000	0.00
22			0.000	0.873	-0.873	0.000	0.00
23			0.000	0.873	-0.873	0.000	0.00
24			0.000	0.873	-0.873	0.000	0.00
25			0.000	0.873	-0.873	0.000	0.00
26			0.000	0.873	-0.873	0.000	0.00
27			0.000	0.873	-0.873	0.000	0.00
28			0.000	0.873	-0.873	0.000	0.00
29			0.000	0.873	-0.873	0.000	0.00
30			0.000	0.873	-0.873	0.000	0.00
31	0.53	0.110	0.000	0.873	-0.763	0.000	0.00
32			0.000	0.873	-0.873	0.000	0.00
33			0.000	0.873	-0.873	0.000	0.00
34			0.000	0.873	-0.873	0.000	0.00
35			0.000	0.873	-0.873	0.000	0.00
36			0.000	0.873	-0.873	0.000	0.00
37			0.000	0.873	-0.873	0.000	0.00
38			0.000	0.873	-0.873	0.000	0.00

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39			0.000	0.873	-0.873	0.000	0.00
40			0.000	0.873	-0.873	0.000	0.00
41			0.000	0.873	-0.873	0.000	0.00
42			0.000	0.873	-0.873	0.000	0.00
43			0.000	0.873	-0.873	0.000	0.00
44			0.000	0.873	-0.873	0.000	0.00
45			0.000	0.873	-0.873	0.000	0.00
46	0.53	0.110	0.000	0.873	-0.763	0.000	0.00
47			0.000	0.873	-0.873	0.000	0.00
48			0.000	0.873	-0.873	0.000	0.00
49			0.000	0.873	-0.873	0.000	0.00
50			0.000	0.873	-0.873	0.000	0.00
51			0.000	0.873	-0.873	0.000	0.00
52			0.000	0.873	-0.873	0.000	0.00
53			0.000	0.873	-0.873	0.000	0.00
54			0.000	0.873	-0.873	0.000	0.00
55			0.000	0.873	-0.873	0.000	0.00
56			0.000	0.873	-0.873	0.000	0.00
57			0.000	0.873	-0.873	0.000	0.00
58			0.000	0.873	-0.873	0.000	0.00
59			0.000	0.873	-0.873	0.000	0.00
60			0.000	0.873	-0.873	0.000	0.00
61	0.53	0.110	0.000	0.873	-0.763	0.000	0.00
62			0.000	0.873	-0.873	0.000	0.00
63			0.000	0.873	-0.873	0.000	0.00
64			0.000	0.873	-0.873	0.000	0.00
65			0.000	0.873	-0.873	0.000	0.00
66			0.000	0.873	-0.873	0.000	0.00
67			0.000	0.873	-0.873	0.000	0.00
68			0.000	0.873	-0.873	0.000	0.00
69			0.000	0.873	-0.873	0.000	0.00
70			0.000	0.873	-0.873	0.000	0.00
71			0.000	0.873	-0.873	0.000	0.00
72			0.000	0.873	-0.873	0.000	0.00
73			0.000	0.873	-0.873	0.000	0.00
74			0.000	0.873	-0.873	0.000	0.00
75			0.000	0.873	-0.873	0.000	0.00
76	0.53	0.110	0.000	0.873	-0.763	0.000	0.00
77			0.000	0.873	-0.873	0.000	0.00
78			0.000	0.873	-0.873	0.000	0.00
79			0.000	0.873	-0.873	0.000	0.00
80			0.000	0.873	-0.873	0.000	0.00
81			0.000	0.873	-0.873	0.000	0.00
82			0.000	0.873	-0.873	0.000	0.00
83			0.000	0.873	-0.873	0.000	0.00
84			0.000	0.873	-0.873	0.000	0.00
85			0.000	0.873	-0.873	0.000	0.00
86			0.000	0.873	-0.873	0.000	0.00
87			0.000	0.873	-0.873	0.000	0.00
88			0.000	0.873	-0.873	0.000	0.00
89			0.000	0.873	-0.873	0.000	0.00
90			0.000	0.873	-0.873	0.000	0.00

TEMPE DRAINAGE STUDY

STAGE-DURATION COMPUTER OUTPUT

5-YEAR
PHASE II

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2/89

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	2.00	7.550	0.000	0.011	7.539	7.539	12.00
2			0.000	0.031	-0.031	7.508	12.00
3			0.000	0.031	-0.031	7.477	12.00
4			0.000	0.031	-0.031	7.446	12.00
5			0.000	0.031	-0.031	7.415	11.00
6			0.000	0.031	-0.031	7.385	11.00
7			0.000	0.031	-0.031	7.354	11.00
8			0.000	0.031	-0.031	7.323	11.00
9			0.000	0.031	-0.031	7.293	11.00
10			0.000	0.031	-0.031	7.262	11.00
11			0.000	0.031	-0.031	7.232	11.00
12			0.000	0.031	-0.031	7.201	11.00
13			0.000	0.031	-0.031	7.171	11.00
14			0.000	0.031	-0.031	7.140	11.00
15			0.000	0.031	-0.031	7.110	11.00
16	1.30	3.163	0.000	0.031	3.132	10.242	15.00
17			0.000	0.032	-0.032	10.210	15.00
18			0.000	0.032	-0.032	10.177	15.00
19			0.000	0.032	-0.032	10.145	15.00
20			0.000	0.032	-0.032	10.113	15.00
21			0.000	0.032	-0.032	10.081	15.00
22			0.000	0.032	-0.032	10.048	15.00
23			0.000	0.032	-0.032	10.016	15.00
24			0.000	0.032	-0.032	9.984	15.00
25			0.000	0.032	-0.032	9.952	15.00
26			0.000	0.032	-0.032	9.919	15.00
27			0.000	0.032	-0.032	9.887	15.00
28			0.000	0.032	-0.032	9.855	15.00
29			0.000	0.032	-0.032	9.823	15.00
30			0.000	0.032	-0.032	9.790	15.00
31	0.53	0.315	0.000	0.032	0.283	10.073	15.00
32			0.000	0.032	-0.032	10.041	15.00
33			0.000	0.032	-0.032	10.009	15.00
34			0.000	0.032	-0.032	9.976	15.00
35			0.000	0.032	-0.032	9.944	15.00
36			0.000	0.032	-0.032	9.912	15.00
37			0.000	0.032	-0.032	9.880	15.00
38			0.000	0.032	-0.032	9.847	15.00

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39			0.000	0.032	-0.032	9.815	15.00
40			0.000	0.032	-0.032	9.783	15.00
41			0.000	0.032	-0.032	9.751	15.00
42			0.000	0.032	-0.032	9.718	15.00
43			0.000	0.032	-0.032	9.686	14.00
44			0.000	0.032	-0.032	9.654	14.00
45			0.000	0.032	-0.032	9.622	14.00
46	0.53	0.315	0.000	0.032	0.283	9.905	15.00
47			0.000	0.032	-0.032	9.873	15.00
48			0.000	0.032	-0.032	9.841	15.00
49			0.000	0.032	-0.032	9.809	15.00
50			0.000	0.032	-0.032	9.776	15.00
51			0.000	0.032	-0.032	9.744	15.00
52			0.000	0.032	-0.032	9.712	15.00
53			0.000	0.032	-0.032	9.680	14.00
54			0.000	0.032	-0.032	9.648	14.00
55			0.000	0.032	-0.032	9.616	14.00
56			0.000	0.032	-0.032	9.584	14.00
57			0.000	0.032	-0.032	9.552	14.00
58			0.000	0.032	-0.032	9.521	14.00
59			0.000	0.032	-0.032	9.489	14.00
60			0.000	0.032	-0.032	9.457	14.00
61	0.53	0.315	0.000	0.032	0.283	9.740	15.00
62			0.000	0.032	-0.032	9.708	15.00
63			0.000	0.032	-0.032	9.675	14.00
64			0.000	0.032	-0.032	9.644	14.00
65			0.000	0.032	-0.032	9.612	14.00
66			0.000	0.032	-0.032	9.580	14.00
67			0.000	0.032	-0.032	9.548	14.00
68			0.000	0.032	-0.032	9.516	14.00
69			0.000	0.032	-0.032	9.484	14.00
70			0.000	0.032	-0.032	9.453	14.00
71			0.000	0.032	-0.032	9.421	14.00
72			0.000	0.032	-0.032	9.389	14.00
73			0.000	0.032	-0.032	9.357	14.00
74			0.000	0.032	-0.032	9.325	14.00
75			0.000	0.032	-0.032	9.293	14.00
76	0.53	0.315	0.000	0.032	0.283	9.577	14.00
77			0.000	0.032	-0.032	9.545	14.00
78			0.000	0.032	-0.032	9.513	14.00
79			0.000	0.032	-0.032	9.481	14.00
80			0.000	0.032	-0.032	9.449	14.00
81			0.000	0.032	-0.032	9.417	14.00
82			0.000	0.032	-0.032	9.386	14.00
83			0.000	0.032	-0.032	9.354	14.00
84			0.000	0.032	-0.032	9.322	14.00
85			0.000	0.032	-0.032	9.290	14.00
86			0.000	0.032	-0.032	9.258	14.00
87			0.000	0.032	-0.032	9.226	14.00
88			0.000	0.032	-0.032	9.195	14.00
89			0.000	0.032	-0.032	9.163	14.00
90			0.000	0.032	-0.032	9.131	14.00

SHT. F12 of 49

#888053
2/89

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP. INCHES	INFLOW CF*10^6	OUTFLOW PUMP CF*10^6	OUTFLOW PERCOL. CF*10^6	CHANGE IN STORAGE VOLUME CF*10^6	STORAGE VOLUME CF*10^6	DEPTH FT
0						0.000	0.00
1	2.00	7.550	0.000	0.873	6.677	6.677	10.00
2			0.000	2.411	-2.411	4.266	7.00
3			0.000	2.285	-2.285	1.981	3.00
4			0.000	1.670	-1.670	0.311	0.00
5			0.000	0.873	-0.873	0.000	0.00
6			0.000	0.873	-0.873	0.000	0.00
7			0.000	0.873	-0.873	0.000	0.00
8			0.000	0.873	-0.873	0.000	0.00
9			0.000	0.873	-0.873	0.000	0.00
10			0.000	0.873	-0.873	0.000	0.00
11			0.000	0.873	-0.873	0.000	0.00
12			0.000	0.873	-0.873	0.000	0.00
13			0.000	0.873	-0.873	0.000	0.00
14			0.000	0.873	-0.873	0.000	0.00
15			0.000	0.873	-0.873	0.000	0.00
16	1.30	3.163	0.000	0.873	2.290	2.290	4.00
17			0.000	1.936	-1.936	0.355	0.00
18			0.000	0.873	-0.873	0.000	0.00
19			0.000	0.873	-0.873	0.000	0.00
20			0.000	0.873	-0.873	0.000	0.00
21			0.000	0.873	-0.873	0.000	0.00
22			0.000	0.873	-0.873	0.000	0.00
23			0.000	0.873	-0.873	0.000	0.00
24			0.000	0.873	-0.873	0.000	0.00
25			0.000	0.873	-0.873	0.000	0.00
26			0.000	0.873	-0.873	0.000	0.00
27			0.000	0.873	-0.873	0.000	0.00
28			0.000	0.873	-0.873	0.000	0.00
29			0.000	0.873	-0.873	0.000	0.00
30			0.000	0.873	-0.873	0.000	0.00
31	0.53	0.315	0.000	0.873	-0.558	0.000	0.00
32			0.000	0.873	-0.873	0.000	0.00
33			0.000	0.873	-0.873	0.000	0.00
34			0.000	0.873	-0.873	0.000	0.00
35			0.000	0.873	-0.873	0.000	0.00
36			0.000	0.873	-0.873	0.000	0.00
37			0.000	0.873	-0.873	0.000	0.00
38			0.000	0.873	-0.873	0.000	0.00

39			0.000	0.873	-0.873	0.000	0.00
40			0.000	0.873	-0.873	0.000	0.00
41			0.000	0.873	-0.873	0.000	0.00
42			0.000	0.873	-0.873	0.000	0.00
43			0.000	0.873	-0.873	0.000	0.00
44			0.000	0.873	-0.873	0.000	0.00
45			0.000	0.873	-0.873	0.000	0.00
46	0.53	0.315	0.000	0.873	-0.558	0.000	0.00
47			0.000	0.873	-0.873	0.000	0.00
48			0.000	0.873	-0.873	0.000	0.00
49			0.000	0.873	-0.873	0.000	0.00
50			0.000	0.873	-0.873	0.000	0.00
51			0.000	0.873	-0.873	0.000	0.00
52			0.000	0.873	-0.873	0.000	0.00
53			0.000	0.873	-0.873	0.000	0.00
54			0.000	0.873	-0.873	0.000	0.00
55			0.000	0.873	-0.873	0.000	0.00
56			0.000	0.873	-0.873	0.000	0.00
57			0.000	0.873	-0.873	0.000	0.00
58			0.000	0.873	-0.873	0.000	0.00
59			0.000	0.873	-0.873	0.000	0.00
60			0.000	0.873	-0.873	0.000	0.00
61	0.53	0.315	0.000	0.873	-0.558	0.000	0.00
62			0.000	0.873	-0.873	0.000	0.00
63			0.000	0.873	-0.873	0.000	0.00
64			0.000	0.873	-0.873	0.000	0.00
65			0.000	0.873	-0.873	0.000	0.00
66			0.000	0.873	-0.873	0.000	0.00
67			0.000	0.873	-0.873	0.000	0.00
68			0.000	0.873	-0.873	0.000	0.00
69			0.000	0.873	-0.873	0.000	0.00
70			0.000	0.873	-0.873	0.000	0.00
71			0.000	0.873	-0.873	0.000	0.00
72			0.000	0.873	-0.873	0.000	0.00
73			0.000	0.873	-0.873	0.000	0.00
74			0.000	0.873	-0.873	0.000	0.00
75			0.000	0.873	-0.873	0.000	0.00
76	0.53	0.315	0.000	0.873	-0.558	0.000	0.00
77			0.000	0.873	-0.873	0.000	0.00
78			0.000	0.873	-0.873	0.000	0.00
79			0.000	0.873	-0.873	0.000	0.00
80			0.000	0.873	-0.873	0.000	0.00
81			0.000	0.873	-0.873	0.000	0.00
82			0.000	0.873	-0.873	0.000	0.00
83			0.000	0.873	-0.873	0.000	0.00
84			0.000	0.873	-0.873	0.000	0.00
85			0.000	0.873	-0.873	0.000	0.00
86			0.000	0.873	-0.873	0.000	0.00
87			0.000	0.873	-0.873	0.000	0.00
88			0.000	0.873	-0.873	0.000	0.00
89			0.000	0.873	-0.873	0.000	0.00
90			0.000	0.873	-0.873	0.000	0.00

#888053
2/89

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	2.00	7.550	0.663	0.011	6.876	6.876	11.00
2			0.831	0.031	-0.862	6.015	10.00
3			0.818	0.030	-0.848	5.166	8.00
4			0.787	0.029	-0.816	4.350	7.00
5			0.771	0.029	-0.799	3.551	6.00
6			0.755	0.028	-0.783	2.768	5.00
7			0.740	0.028	-0.767	2.001	3.00
8			0.708	0.021	-0.729	1.271	2.00
9			0.694	0.018	-0.711	0.560	0.00
10			0.663	0.011	-0.674	0.000	0.00
11			0.663	0.011	-0.674	0.000	0.00
12			0.663	0.011	-0.674	0.000	0.00
13			0.663	0.011	-0.674	0.000	0.00
14			0.663	0.011	-0.674	0.000	0.00
15			0.663	0.011	-0.674	0.000	0.00
16	1.30	3.163	0.663	0.011	2.489	2.489	5.00
17			0.740	0.028	-0.767	1.722	3.00
18			0.708	0.021	-0.729	0.993	1.00
19			0.678	0.014	-0.692	0.300	0.00
20			0.663	0.011	-0.674	0.000	0.00
21			0.663	0.011	-0.674	0.000	0.00
22			0.663	0.011	-0.674	0.000	0.00
23			0.663	0.011	-0.674	0.000	0.00
24			0.663	0.011	-0.674	0.000	0.00
25			0.663	0.011	-0.674	0.000	0.00
26			0.663	0.011	-0.674	0.000	0.00
27			0.663	0.011	-0.674	0.000	0.00
28			0.663	0.011	-0.674	0.000	0.00
29			0.663	0.011	-0.674	0.000	0.00
30			0.663	0.011	-0.674	0.000	0.00
31	0.53	0.315	0.663	0.011	-0.359	0.000	0.00
32			0.663	0.011	-0.674	0.000	0.00
33			0.663	0.011	-0.674	0.000	0.00
34			0.663	0.011	-0.674	0.000	0.00
35			0.663	0.011	-0.674	0.000	0.00
36			0.663	0.011	-0.674	0.000	0.00
37			0.663	0.011	-0.674	0.000	0.00
38			0.663	0.011	-0.674	0.000	0.00

39			0.663	0.011	-0.674	0.000	0.00
40			0.663	0.011	-0.674	0.000	0.00
41			0.663	0.011	-0.674	0.000	0.00
42			0.663	0.011	-0.674	0.000	0.00
43			0.663	0.011	-0.674	0.000	0.00
44			0.663	0.011	-0.674	0.000	0.00
45			0.663	0.011	-0.674	0.000	0.00
46	0.53	0.315	0.663	0.011	-0.359	0.000	0.00
47			0.663	0.011	-0.674	0.000	0.00
48			0.663	0.011	-0.674	0.000	0.00
49			0.663	0.011	-0.674	0.000	0.00
50			0.663	0.011	-0.674	0.000	0.00
51			0.663	0.011	-0.674	0.000	0.00
52			0.663	0.011	-0.674	0.000	0.00
53			0.663	0.011	-0.674	0.000	0.00
54			0.663	0.011	-0.674	0.000	0.00
55			0.663	0.011	-0.674	0.000	0.00
56			0.663	0.011	-0.674	0.000	0.00
57			0.663	0.011	-0.674	0.000	0.00
58			0.663	0.011	-0.674	0.000	0.00
59			0.663	0.011	-0.674	0.000	0.00
60			0.663	0.011	-0.674	0.000	0.00
61	0.53	0.315	0.663	0.011	-0.359	0.000	0.00
62			0.663	0.011	-0.674	0.000	0.00
63			0.663	0.011	-0.674	0.000	0.00
64			0.663	0.011	-0.674	0.000	0.00
65			0.663	0.011	-0.674	0.000	0.00
66			0.663	0.011	-0.674	0.000	0.00
67			0.663	0.011	-0.674	0.000	0.00
68			0.663	0.011	-0.674	0.000	0.00
69			0.663	0.011	-0.674	0.000	0.00
70			0.663	0.011	-0.674	0.000	0.00
71			0.663	0.011	-0.674	0.000	0.00
72			0.663	0.011	-0.674	0.000	0.00
73			0.663	0.011	-0.674	0.000	0.00
74			0.663	0.011	-0.674	0.000	0.00
75			0.663	0.011	-0.674	0.000	0.00
76	0.53	0.315	0.663	0.011	-0.359	0.000	0.00
77			0.663	0.011	-0.674	0.000	0.00
78			0.663	0.011	-0.674	0.000	0.00
79			0.663	0.011	-0.674	0.000	0.00
80			0.663	0.011	-0.674	0.000	0.00
81			0.663	0.011	-0.674	0.000	0.00
82			0.663	0.011	-0.674	0.000	0.00
83			0.663	0.011	-0.674	0.000	0.00
84			0.663	0.011	-0.674	0.000	0.00
85			0.663	0.011	-0.674	0.000	0.00
86			0.663	0.011	-0.674	0.000	0.00
87			0.663	0.011	-0.674	0.000	0.00
88			0.663	0.011	-0.674	0.000	0.00
89			0.663	0.011	-0.674	0.000	0.00
90			0.663	0.011	-0.674	0.000	0.00

#888053
2/89

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	2.00	7.550	0.663	0.873	6.015	6.015	10.00
2			0.818	2.411	-3.229	2.786	5.00
3			0.740	2.202	-2.941	0.000	0.00
4			0.663	0.873	-1.535	0.000	0.00
5			0.663	0.873	-1.535	0.000	0.00
6			0.663	0.873	-1.535	0.000	0.00
7			0.663	0.873	-1.535	0.000	0.00
8			0.663	0.873	-1.535	0.000	0.00
9			0.663	0.873	-1.535	0.000	0.00
10			0.663	0.873	-1.535	0.000	0.00
11			0.663	0.873	-1.535	0.000	0.00
12			0.663	0.873	-1.535	0.000	0.00
13			0.663	0.873	-1.535	0.000	0.00
14			0.663	0.873	-1.535	0.000	0.00
15			0.663	0.873	-1.535	0.000	0.00
16	1.30	3.163	0.663	0.873	1.628	1.628	3.00
17			0.708	1.670	-2.378	0.000	0.00
18			0.663	0.873	-1.535	0.000	0.00
19			0.663	0.873	-1.535	0.000	0.00
20			0.663	0.873	-1.535	0.000	0.00
21			0.663	0.873	-1.535	0.000	0.00
22			0.663	0.873	-1.535	0.000	0.00
23			0.663	0.873	-1.535	0.000	0.00
24			0.663	0.873	-1.535	0.000	0.00
25			0.663	0.873	-1.535	0.000	0.00
26			0.663	0.873	-1.535	0.000	0.00
27			0.663	0.873	-1.535	0.000	0.00
28			0.663	0.873	-1.535	0.000	0.00
29			0.663	0.873	-1.535	0.000	0.00
30			0.663	0.873	-1.535	0.000	0.00
31	0.53	0.315	0.663	0.873	-1.220	0.000	0.00
32			0.663	0.873	-1.535	0.000	0.00
33			0.663	0.873	-1.535	0.000	0.00
34			0.663	0.873	-1.535	0.000	0.00
35			0.663	0.873	-1.535	0.000	0.00
36			0.663	0.873	-1.535	0.000	0.00
37			0.663	0.873	-1.535	0.000	0.00
38			0.663	0.873	-1.535	0.000	0.00

39			0.663	0.873	-1.535	0.000	0.00
40			0.663	0.873	-1.535	0.000	0.00
41			0.663	0.873	-1.535	0.000	0.00
42			0.663	0.873	-1.535	0.000	0.00
43			0.663	0.873	-1.535	0.000	0.00
44			0.663	0.873	-1.535	0.000	0.00
45			0.663	0.873	-1.535	0.000	0.00
46	0.53	0.315	0.663	0.873	-1.220	0.000	0.00
47			0.663	0.873	-1.535	0.000	0.00
48			0.663	0.873	-1.535	0.000	0.00
49			0.663	0.873	-1.535	0.000	0.00
50			0.663	0.873	-1.535	0.000	0.00
51			0.663	0.873	-1.535	0.000	0.00
52			0.663	0.873	-1.535	0.000	0.00
53			0.663	0.873	-1.535	0.000	0.00
54			0.663	0.873	-1.535	0.000	0.00
55			0.663	0.873	-1.535	0.000	0.00
56			0.663	0.873	-1.535	0.000	0.00
57			0.663	0.873	-1.535	0.000	0.00
58			0.663	0.873	-1.535	0.000	0.00
59			0.663	0.873	-1.535	0.000	0.00
60			0.663	0.873	-1.535	0.000	0.00
61	0.53	0.315	0.663	0.873	-1.220	0.000	0.00
62			0.663	0.873	-1.535	0.000	0.00
63			0.663	0.873	-1.535	0.000	0.00
64			0.663	0.873	-1.535	0.000	0.00
65			0.663	0.873	-1.535	0.000	0.00
66			0.663	0.873	-1.535	0.000	0.00
67			0.663	0.873	-1.535	0.000	0.00
68			0.663	0.873	-1.535	0.000	0.00
69			0.663	0.873	-1.535	0.000	0.00
70			0.663	0.873	-1.535	0.000	0.00
71			0.663	0.873	-1.535	0.000	0.00
72			0.663	0.873	-1.535	0.000	0.00
73			0.663	0.873	-1.535	0.000	0.00
74			0.663	0.873	-1.535	0.000	0.00
75			0.663	0.873	-1.535	0.000	0.00
76	0.53	0.315	0.663	0.873	-1.220	0.000	0.00
77			0.663	0.873	-1.535	0.000	0.00
78			0.663	0.873	-1.535	0.000	0.00
79			0.663	0.873	-1.535	0.000	0.00
80			0.663	0.873	-1.535	0.000	0.00
81			0.663	0.873	-1.535	0.000	0.00
82			0.663	0.873	-1.535	0.000	0.00
83			0.663	0.873	-1.535	0.000	0.00
84			0.663	0.873	-1.535	0.000	0.00
85			0.663	0.873	-1.535	0.000	0.00
86			0.663	0.873	-1.535	0.000	0.00
87			0.663	0.873	-1.535	0.000	0.00
88			0.663	0.873	-1.535	0.000	0.00
89			0.663	0.873	-1.535	0.000	0.00
90			0.663	0.873	-1.535	0.000	0.00

TEMPE DRAINAGE STUDY

STAGE-DURATION COMPUTER OUTPUT

5-YEAR
PHASE III

SHT. F19 of 49

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

RIBUT. AREA - PHASE III
PRECIP. FREQ. - 5-YEAR
PRECIP. SEQ. - 3 MONTH
ERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 6-27-89
INITIALS: JB

DAY	PRECIP. INCHES	INFLOW CF*10^6	OUTFLOW PUMP CF*10^6	OUTFLOW PERCOL. CF*10^6	CHANGE IN STORAGE VOLUME CF*10^6	STORAGE VOLUME CF*10^6	DEPTH FT	ACTUAL STORAGE VOLUME CF*10^6	PUMP RATE CFS	SURFACE AREA SF*10^6
0						0.000	0.00			
1	2.00	10.670	0.000	0.011	10.659	10.659	16.00	10.659	0.000	0.262
2			0.000	0.033	-0.033	10.626	16.00	10.626	0.000	0.784
3			0.000	0.033	-0.033	10.594	16.00	10.594	0.000	0.784
4			0.000	0.033	-0.033	10.561	16.00	10.561	0.000	0.784
5			0.000	0.033	-0.033	10.528	16.00	10.528	0.000	0.784
6			0.000	0.033	-0.033	10.496	16.00	10.496	0.000	0.784
7			0.000	0.033	-0.033	10.463	15.00	10.463	0.000	0.784
8			0.000	0.032	-0.032	10.431	15.00	10.431	0.000	0.774
9			0.000	0.032	-0.032	10.399	15.00	10.399	0.000	0.774
10			0.000	0.032	-0.032	10.366	15.00	10.366	0.000	0.774
11			0.000	0.032	-0.032	10.334	15.00	10.334	0.000	0.774
12			0.000	0.032	-0.032	10.302	15.00	10.302	0.000	0.774
13			0.000	0.032	-0.032	10.270	15.00	10.270	0.000	0.774
14			0.000	0.032	-0.032	10.237	15.00	10.237	0.000	0.774
15			0.000	0.032	-0.032	10.205	15.00	10.205	0.000	0.774
16	1.30	4.566	0.000	0.032	4.534	14.739	21.00	14.739	0.000	0.774
17			0.000	0.035	-0.035	14.704	21.00	14.704	0.000	0.834
18			0.000	0.035	-0.035	14.669	21.00	14.669	0.000	0.834
19			0.000	0.035	-0.035	14.634	21.00	14.634	0.000	0.834
20			0.000	0.035	-0.035	14.600	21.00	14.600	0.000	0.834
21			0.000	0.035	-0.035	14.565	21.00	14.565	0.000	0.834
22			0.000	0.035	-0.035	14.530	20.00	14.530	0.000	0.834
23			0.000	0.034	-0.034	14.496	20.00	14.496	0.000	0.824
24			0.000	0.034	-0.034	14.462	20.00	14.462	0.000	0.824
25			0.000	0.034	-0.034	14.427	20.00	14.427	0.000	0.824
26			0.000	0.034	-0.034	14.393	20.00	14.393	0.000	0.824
27			0.000	0.034	-0.034	14.359	20.00	14.359	0.000	0.824
28			0.000	0.034	-0.034	14.324	20.00	14.324	0.000	0.824
29			0.000	0.034	-0.034	14.290	20.00	14.290	0.000	0.824
30			0.000	0.034	-0.034	14.256	20.00	14.256	0.000	0.824
31	0.53	0.476	0.000	0.034	0.442	14.697	21.00	14.697	0.000	0.824
32			0.000	0.035	-0.035	14.663	21.00	14.663	0.000	0.834
33			0.000	0.035	-0.035	14.628	21.00	14.628	0.000	0.834
34			0.000	0.035	-0.035	14.593	21.00	14.593	0.000	0.834
35			0.000	0.035	-0.035	14.558	21.00	14.558	0.000	0.834
36			0.000	0.035	-0.035	14.524	20.00	14.524	0.000	0.834
37			0.000	0.034	-0.034	14.489	20.00	14.489	0.000	0.824
38			0.000	0.034	-0.034	14.455	20.00	14.455	0.000	0.824

39			0.000	0.034	-0.034	14.421	20.00		14.421	0.000	0.824
40			0.000	0.034	-0.034	14.386	20.00		14.386	0.000	0.824
41			0.000	0.034	-0.034	14.352	20.00		14.352	0.000	0.824
42			0.000	0.034	-0.034	14.318	20.00		14.318	0.000	0.824
43			0.000	0.034	-0.034	14.283	20.00		14.283	0.000	0.824
44			0.000	0.034	-0.034	14.249	20.00		14.249	0.000	0.824
45			0.000	0.034	-0.034	14.215	20.00		14.215	0.000	0.824
46	0.53	0.476	0.000	0.034	0.442	14.656	21.00		14.656	0.000	0.824
47			0.000	0.035	-0.035	14.622	21.00		14.622	0.000	0.834
48			0.000	0.035	-0.035	14.587	21.00		14.587	0.000	0.834
49			0.000	0.035	-0.035	14.552	21.00		14.552	0.000	0.834
50			0.000	0.035	-0.035	14.517	20.00		14.517	0.000	0.834
51			0.000	0.034	-0.034	14.483	20.00		14.483	0.000	0.824
52			0.000	0.034	-0.034	14.449	20.00		14.449	0.000	0.824
53			0.000	0.034	-0.034	14.414	20.00		14.414	0.000	0.824
54			0.000	0.034	-0.034	14.380	20.00		14.380	0.000	0.824
55			0.000	0.034	-0.034	14.346	20.00		14.346	0.000	0.824
56			0.000	0.034	-0.034	14.311	20.00		14.311	0.000	0.824
57			0.000	0.034	-0.034	14.277	20.00		14.277	0.000	0.824
58			0.000	0.034	-0.034	14.243	20.00		14.243	0.000	0.824
59			0.000	0.034	-0.034	14.208	20.00		14.208	0.000	0.824
60			0.000	0.034	-0.034	14.174	20.00		14.174	0.000	0.824
61	0.53	0.476	0.000	0.034	0.442	14.616	21.00		14.616	0.000	0.824
62			0.000	0.035	-0.035	14.581	21.00		14.581	0.000	0.834
63			0.000	0.035	-0.035	14.546	21.00		14.546	0.000	0.834
64			0.000	0.035	-0.035	14.511	20.00		14.511	0.000	0.834
65			0.000	0.034	-0.034	14.477	20.00		14.477	0.000	0.824
66			0.000	0.034	-0.034	14.443	20.00		14.443	0.000	0.824
67			0.000	0.034	-0.034	14.409	20.00		14.409	0.000	0.824
68			0.000	0.034	-0.034	14.374	20.00		14.374	0.000	0.824
69			0.000	0.034	-0.034	14.340	20.00		14.340	0.000	0.824
70			0.000	0.034	-0.034	14.306	20.00		14.306	0.000	0.824
71			0.000	0.034	-0.034	14.271	20.00		14.271	0.000	0.824
72			0.000	0.034	-0.034	14.237	20.00		14.237	0.000	0.824
73			0.000	0.034	-0.034	14.203	20.00		14.203	0.000	0.824
74			0.000	0.034	-0.034	14.168	20.00		14.168	0.000	0.824
75			0.000	0.034	-0.034	14.134	20.00		14.134	0.000	0.824
76	0.53	0.476	0.000	0.034	0.442	14.576	21.00		14.576	0.000	0.824
77			0.000	0.035	-0.035	14.541	21.00		14.541	0.000	0.834
78			0.000	0.035	-0.035	14.506	20.00		14.506	0.000	0.834
79			0.000	0.034	-0.034	14.472	20.00		14.472	0.000	0.824
80			0.000	0.034	-0.034	14.437	20.00		14.437	0.000	0.824
81			0.000	0.034	-0.034	14.403	20.00		14.403	0.000	0.824
82			0.000	0.034	-0.034	14.369	20.00		14.369	0.000	0.824
83			0.000	0.034	-0.034	14.334	20.00		14.334	0.000	0.824
84			0.000	0.034	-0.034	14.300	20.00		14.300	0.000	0.824
85			0.000	0.034	-0.034	14.266	20.00		14.266	0.000	0.824
86			0.000	0.034	-0.034	14.231	20.00		14.231	0.000	0.824
87			0.000	0.034	-0.034	14.197	20.00		14.197	0.000	0.824
88			0.000	0.034	-0.034	14.163	20.00		14.163	0.000	0.824
89			0.000	0.034	-0.034	14.128	20.00		14.128	0.000	0.824
90			0.000	0.034	-0.034	14.094	20.00		14.094	0.000	0.824

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

IBUT. AREA - PHASE III
PRECIP. FREQ. - 5-YEAR
PRECIP. SEQ. - 3 MONTH
ERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 6-27-89
INITIALS: JB

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH	ACTUAL STORAGE VOLUME	PUMP RATE	SURFACE AREA
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT	CF*10^6	CFS	SF*10^6
0						0.000	0.00			
1	2.00	10.670	0.000	0.873	9.797	9.797	15.00	9.797	0.000	0.262
2			0.000	2.581	-2.581	7.217	11.00	7.217	0.000	0.774
3			0.000	2.445	-2.445	4.772	8.00	4.772	0.000	0.733
4			0.000	2.327	-2.327	2.445	4.00	2.445	0.000	0.698
5			0.000	1.936	-1.936	0.509	0.00	0.509	0.000	0.581
6			0.000	0.873	-0.873	0.000	0.00	-0.364	0.000	0.262
7			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
8			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
9			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
10			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
11			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
12			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
13			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
14			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
15			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
16	1.30	4.566	0.000	0.873	3.693	3.693	6.00	3.693	0.000	0.262
17			0.000	2.243	-2.243	1.450	2.00	1.450	0.000	0.673
18			0.000	1.404	-1.404	0.046	0.00	0.046	0.000	0.421
19			0.000	0.873	-0.873	0.000	0.00	-0.827	0.000	0.262
20			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
21			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
22			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
23			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
24			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
25			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
26			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
27			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
28			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
29			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
30			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
31	0.53	0.476	0.000	0.873	-0.397	0.000	0.00	-0.397	0.000	0.262
32			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
33			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
34			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
35			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
36			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
37			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
38			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262

39			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
40			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
41			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
42			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
43			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
44			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
45			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
46	0.53	0.476	0.000	0.873	-0.397	0.000	0.00	-0.397	0.000	0.262
47			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
48			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
49			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
50			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
51			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
52			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
53			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
54			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
55			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
56			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
57			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
58			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
59			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
60			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
61	0.53	0.476	0.000	0.873	-0.397	0.000	0.00	-0.397	0.000	0.262
62			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
63			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
64			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
65			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
66			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
67			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
68			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
69			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
70			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
71			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
72			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
73			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
74			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
75			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
76	0.53	0.476	0.000	0.873	-0.397	0.000	0.00	-0.397	0.000	0.262
77			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
78			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
79			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
80			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
81			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
82			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
83			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
84			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
85			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
86			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
87			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
88			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
89			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
90			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE III
PRECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 6-27-89
INITIALS: JB

DAY	PRECIP. INCHES	INFLOW CF*10^6	OUTFLOW PUMP CF*10^6	OUTFLOW PERCOL. CF*10^6	CHANGE IN STORAGE VOLUME CF*10^6	STORAGE VOLUME CF*10^6	DEPTH FT	ACTUAL STORAGE VOLUME CF*10^6	PUMP RATE CFS	SURFACE AREA SF*10^6
0						0.000	0.00			
1	2.00	10.670	0.663	0.011	9.996	9.996	15.00	9.996	7.670	0.262
2			0.882	0.032	-0.914	9.082	14.00	9.082	10.210	0.774
3			0.869	0.032	-0.901	8.181	12.00	8.181	10.060	0.764
4			0.844	0.031	-0.875	7.306	11.00	7.306	9.770	0.744
5			0.831	0.031	-0.862	6.444	10.00	6.444	9.620	0.733
6			0.818	0.030	-0.848	5.596	9.00	5.596	9.470	0.723
7			0.803	0.030	-0.832	4.764	8.00	4.764	9.290	0.711
8			0.787	0.029	-0.816	3.947	7.00	3.947	9.110	0.698
9			0.771	0.029	-0.799	3.148	5.00	3.148	8.920	0.686
10			0.740	0.028	-0.767	2.381	4.00	2.381	8.560	0.660
11			0.724	0.024	-0.748	1.633	3.00	1.633	8.380	0.581
12			0.708	0.021	-0.729	0.903	1.00	0.903	8.200	0.501
13			0.678	0.014	-0.692	0.211	0.00	0.211	7.850	0.342
14			0.663	0.011	-0.674	0.000	0.00	-0.463	7.670	0.262
15			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
16	1.30	4.566	0.663	0.011	3.892	3.892	7.00	3.892	7.670	0.262
17			0.771	0.029	-0.799	3.093	5.00	3.093	8.920	0.686
18			0.740	0.028	-0.767	2.326	4.00	2.326	8.560	0.660
19			0.724	0.024	-0.748	1.578	2.00	1.578	8.380	0.581
20			0.694	0.018	-0.711	0.866	1.00	0.866	8.030	0.421
21			0.678	0.014	-0.692	0.174	0.00	0.174	7.850	0.342
22			0.663	0.011	-0.674	0.000	0.00	-0.500	7.670	0.262
23			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
24			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
25			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
26			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
27			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
28			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
29			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
30			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
31	0.53	0.476	0.663	0.011	-0.198	0.000	0.00	-0.198	7.670	0.262
32			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
33			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
34			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
35			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
36			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
37			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
38			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262

39			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
40			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
41			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
42			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
43			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
44			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
45			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
46	0.53	0.476	0.663	0.011	-0.198	0.000	0.00	-0.198	7.670	0.262
47			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
48			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
49			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
50			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
51			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
52			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
53			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
54			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
55			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
56			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
57			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
58			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
59			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
60			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
61	0.53	0.476	0.663	0.011	-0.198	0.000	0.00	-0.198	7.670	0.262
62			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
63			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
64			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
65			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
66			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
67			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
68			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
69			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
70			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
71			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
72			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
73			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
74			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
75			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
76	0.53	0.476	0.663	0.011	-0.198	0.000	0.00	-0.198	7.670	0.262
77			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
78			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
79			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
80			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
81			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
82			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
83			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
84			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
85			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
86			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
87			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
88			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
89			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
90			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

IBUT. AREA - PHASE III
RECIP. FREQ. - 5- YEAR
PRECIP. SEQ. - 3 MONTH
RCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 6-27-89
INITIALS: JB

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH	ACTUAL STORAGE VOLUME	PUMP RATE	SURFACE AREA
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT	CF*10^6	CFS	SF*10^6
0						0.000	0.00			
1	2.00	10.670	0.663	0.873	9.135	9.135	14.00	9.135	7.670	0.262
2			0.869	2.547	-3.416	5.719	9.00	5.719	10.060	0.764
3			0.803	2.369	-3.172	2.547	5.00	2.547	9.290	0.711
4			0.740	2.202	-2.941	0.000	0.00	-0.394	8.560	0.660
5			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
6			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
7			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
8			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
9			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
10			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
11			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
12			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
13			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
14			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
15			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
16	1.30	4.566	0.663	0.873	3.031	3.031	5.00	3.031	7.670	0.262
17			0.740	2.202	-2.941	0.090	0.00	0.090	8.560	0.660
18			0.663	0.873	-1.535	0.000	0.00	-1.446	7.670	0.262
19			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
20			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
21			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
22			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
23			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
24			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
25			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
26			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
27			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
28			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
29			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
30			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
31	0.53	0.476	0.663	0.873	-1.059	0.000	0.00	-1.059	7.670	0.262
32			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
33			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
34			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
35			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
36			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
37			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
38			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262

39			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
40			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
41			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
42			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
43			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
44			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
45			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
46	0.53	0.476	0.663	0.873	-1.059	0.000	0.00	-1.059	7.670	0.262
47			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
48			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
49			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
50			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
51			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
52			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
53			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
54			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
55			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
56			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
57			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
58			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
59			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
60			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
61	0.53	0.476	0.663	0.873	-1.059	0.000	0.00	-1.059	7.670	0.262
62			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
63			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
64			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
65			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
66			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
67			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
68			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
69			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
70			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
71			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
72			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
73			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
74			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
75			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
76	0.53	0.476	0.663	0.873	-1.059	0.000	0.00	-1.059	7.670	0.262
77			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
78			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
79			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
80			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
81			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
82			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
83			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
84			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
85			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
86			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
87			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
88			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
89			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
90			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262

TEMPE DRAINAGE STUDY

STAGE-DURATION COMPUTER OUTPUT

100-YEAR
PHASE I

SHT. F28 OF 49

#888053

2/89

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE I
PRECIP. FREQ. - 100- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	3.85	8.345	0.000	0.011	8.334	8.334	13.00
2			0.000	0.031	-0.031	8.303	13.00
3			0.000	0.031	-0.031	8.271	13.00
4			0.000	0.031	-0.031	8.240	13.00
5			0.000	0.031	-0.031	8.208	13.00
6			0.000	0.031	-0.031	8.177	12.00
7			0.000	0.031	-0.031	8.146	12.00
8			0.000	0.031	-0.031	8.115	12.00
9			0.000	0.031	-0.031	8.084	12.00
10			0.000	0.031	-0.031	8.053	12.00
11			0.000	0.031	-0.031	8.022	12.00
12			0.000	0.031	-0.031	7.991	12.00
13			0.000	0.031	-0.031	7.960	12.00
14			0.000	0.031	-0.031	7.929	12.00
15			0.000	0.031	-0.031	7.898	12.00
16	0.95	0.449	0.000	0.031	0.418	8.316	13.00
17			0.000	0.031	-0.031	8.285	13.00
18			0.000	0.031	-0.031	8.253	13.00
19			0.000	0.031	-0.031	8.222	13.00
20			0.000	0.031	-0.031	8.191	12.00
21			0.000	0.031	-0.031	8.160	12.00
22			0.000	0.031	-0.031	8.129	12.00
23			0.000	0.031	-0.031	8.098	12.00
24			0.000	0.031	-0.031	8.067	12.00
25			0.000	0.031	-0.031	8.036	12.00
26			0.000	0.031	-0.031	8.005	12.00
27			0.000	0.031	-0.031	7.974	12.00
28			0.000	0.031	-0.031	7.943	12.00
29			0.000	0.031	-0.031	7.912	12.00
30			0.000	0.031	-0.031	7.881	12.00
31	0.78	0.260	0.000	0.031	0.229	8.110	12.00
32			0.000	0.031	-0.031	8.079	12.00
33			0.000	0.031	-0.031	8.048	12.00
34			0.000	0.031	-0.031	8.017	12.00
35			0.000	0.031	-0.031	7.986	12.00
36			0.000	0.031	-0.031	7.955	12.00
37			0.000	0.031	-0.031	7.924	12.00
38			0.000	0.031	-0.031	7.893	12.00

39			0.000	0.031	-0.031	7.862	12.00
40			0.000	0.031	-0.031	7.831	12.00
41			0.000	0.031	-0.031	7.800	12.00
42			0.000	0.031	-0.031	7.769	12.00
43			0.000	0.031	-0.031	7.738	12.00
44			0.000	0.031	-0.031	7.707	12.00
45			0.000	0.031	-0.031	7.676	12.00
46	0.78	0.260	0.000	0.031	0.229	7.905	12.00
47			0.000	0.031	-0.031	7.874	12.00
48			0.000	0.031	-0.031	7.843	12.00
49			0.000	0.031	-0.031	7.812	12.00
50			0.000	0.031	-0.031	7.781	12.00
51			0.000	0.031	-0.031	7.750	12.00
52			0.000	0.031	-0.031	7.719	12.00
53			0.000	0.031	-0.031	7.688	12.00
54			0.000	0.031	-0.031	7.657	12.00
55			0.000	0.031	-0.031	7.626	12.00
56			0.000	0.031	-0.031	7.595	12.00
57			0.000	0.031	-0.031	7.564	12.00
58			0.000	0.031	-0.031	7.533	12.00
59			0.000	0.031	-0.031	7.502	12.00
60			0.000	0.031	-0.031	7.471	12.00
61	0.78	0.260	0.000	0.031	0.229	7.700	12.00
62			0.000	0.031	-0.031	7.669	12.00
63			0.000	0.031	-0.031	7.638	12.00
64			0.000	0.031	-0.031	7.607	12.00
65			0.000	0.031	-0.031	7.576	12.00
66			0.000	0.031	-0.031	7.545	12.00
67			0.000	0.031	-0.031	7.514	12.00
68			0.000	0.031	-0.031	7.483	12.00
69			0.000	0.031	-0.031	7.452	12.00
70			0.000	0.031	-0.031	7.421	11.00
71			0.000	0.031	-0.031	7.391	11.00
72			0.000	0.031	-0.031	7.360	11.00
73			0.000	0.031	-0.031	7.330	11.00
74			0.000	0.031	-0.031	7.299	11.00
75			0.000	0.031	-0.031	7.268	11.00
76	0.78	0.260	0.000	0.031	0.229	7.498	12.00
77			0.000	0.031	-0.031	7.467	12.00
78			0.000	0.031	-0.031	7.436	11.00
79			0.000	0.031	-0.031	7.405	11.00
80			0.000	0.031	-0.031	7.375	11.00
81			0.000	0.031	-0.031	7.344	11.00
82			0.000	0.031	-0.031	7.314	11.00
83			0.000	0.031	-0.031	7.283	11.00
84			0.000	0.031	-0.031	7.253	11.00
85			0.000	0.031	-0.031	7.222	11.00
86			0.000	0.031	-0.031	7.191	11.00
87			0.000	0.031	-0.031	7.161	11.00
88			0.000	0.031	-0.031	7.130	11.00
89			0.000	0.031	-0.031	7.100	11.00
90			0.000	0.031	-0.031	7.069	11.00

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CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE I
PRECIP. FREQ. - 100- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	3.85	8.345	0.000	0.873	7.472	7.472	12.00
2			0.000	2.479	-2.479	4.994	8.00
3			0.000	2.327	-2.327	2.666	5.00
4			0.000	2.202	-2.202	0.465	0.00
5			0.000	0.873	-0.873	0.000	0.00
6			0.000	0.873	-0.873	0.000	0.00
7			0.000	0.873	-0.873	0.000	0.00
8			0.000	0.873	-0.873	0.000	0.00
9			0.000	0.873	-0.873	0.000	0.00
10			0.000	0.873	-0.873	0.000	0.00
11			0.000	0.873	-0.873	0.000	0.00
12			0.000	0.873	-0.873	0.000	0.00
13			0.000	0.873	-0.873	0.000	0.00
14			0.000	0.873	-0.873	0.000	0.00
15			0.000	0.873	-0.873	0.000	0.00
16	0.95	0.449	0.000	0.873	-0.424	0.000	0.00
17			0.000	0.873	-0.873	0.000	0.00
18			0.000	0.873	-0.873	0.000	0.00
19			0.000	0.873	-0.873	0.000	0.00
20			0.000	0.873	-0.873	0.000	0.00
21			0.000	0.873	-0.873	0.000	0.00
22			0.000	0.873	-0.873	0.000	0.00
23			0.000	0.873	-0.873	0.000	0.00
24			0.000	0.873	-0.873	0.000	0.00
25			0.000	0.873	-0.873	0.000	0.00
26			0.000	0.873	-0.873	0.000	0.00
27			0.000	0.873	-0.873	0.000	0.00
28			0.000	0.873	-0.873	0.000	0.00
29			0.000	0.873	-0.873	0.000	0.00
30			0.000	0.873	-0.873	0.000	0.00
31	0.78	0.260	0.000	0.873	-0.613	0.000	0.00
32			0.000	0.873	-0.873	0.000	0.00
33			0.000	0.873	-0.873	0.000	0.00
34			0.000	0.873	-0.873	0.000	0.00
35			0.000	0.873	-0.873	0.000	0.00
36			0.000	0.873	-0.873	0.000	0.00
37			0.000	0.873	-0.873	0.000	0.00
38			0.000	0.873	-0.873	0.000	0.00

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39			0.000	0.873	-0.873	0.000	0.00
40			0.000	0.873	-0.873	0.000	0.00
41			0.000	0.873	-0.873	0.000	0.00
42			0.000	0.873	-0.873	0.000	0.00
43			0.000	0.873	-0.873	0.000	0.00
44			0.000	0.873	-0.873	0.000	0.00
45			0.000	0.873	-0.873	0.000	0.00
46	0.78	0.260	0.000	0.873	-0.613	0.000	0.00
47			0.000	0.873	-0.873	0.000	0.00
48			0.000	0.873	-0.873	0.000	0.00
49			0.000	0.873	-0.873	0.000	0.00
50			0.000	0.873	-0.873	0.000	0.00
51			0.000	0.873	-0.873	0.000	0.00
52			0.000	0.873	-0.873	0.000	0.00
53			0.000	0.873	-0.873	0.000	0.00
54			0.000	0.873	-0.873	0.000	0.00
55			0.000	0.873	-0.873	0.000	0.00
56			0.000	0.873	-0.873	0.000	0.00
57			0.000	0.873	-0.873	0.000	0.00
58			0.000	0.873	-0.873	0.000	0.00
59			0.000	0.873	-0.873	0.000	0.00
60			0.000	0.873	-0.873	0.000	0.00
61	0.78	0.260	0.000	0.873	-0.613	0.000	0.00
62			0.000	0.873	-0.873	0.000	0.00
63			0.000	0.873	-0.873	0.000	0.00
64			0.000	0.873	-0.873	0.000	0.00
65			0.000	0.873	-0.873	0.000	0.00
66			0.000	0.873	-0.873	0.000	0.00
67			0.000	0.873	-0.873	0.000	0.00
68			0.000	0.873	-0.873	0.000	0.00
69			0.000	0.873	-0.873	0.000	0.00
70			0.000	0.873	-0.873	0.000	0.00
71			0.000	0.873	-0.873	0.000	0.00
72			0.000	0.873	-0.873	0.000	0.00
73			0.000	0.873	-0.873	0.000	0.00
74			0.000	0.873	-0.873	0.000	0.00
75			0.000	0.873	-0.873	0.000	0.00
76	0.78	0.260	0.000	0.873	-0.613	0.000	0.00
77			0.000	0.873	-0.873	0.000	0.00
78			0.000	0.873	-0.873	0.000	0.00
79			0.000	0.873	-0.873	0.000	0.00
80			0.000	0.873	-0.873	0.000	0.00
81			0.000	0.873	-0.873	0.000	0.00
82			0.000	0.873	-0.873	0.000	0.00
83			0.000	0.873	-0.873	0.000	0.00
84			0.000	0.873	-0.873	0.000	0.00
85			0.000	0.873	-0.873	0.000	0.00
86			0.000	0.873	-0.873	0.000	0.00
87			0.000	0.873	-0.873	0.000	0.00
88			0.000	0.873	-0.873	0.000	0.00
89			0.000	0.873	-0.873	0.000	0.00
90			0.000	0.873	-0.873	0.000	0.00

TEMPE DRAINAGE STUDY

STAGE-DURATION COMPUTER OUTPUT

100-YEAR
PHASE II

SHT. F33 OF 49
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CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 100- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	3.85	22.496	0.000	0.011	22.485	22.485	30.00
2			0.000	0.039	-0.039	22.446	30.00
3			0.000	0.039	-0.039	22.407	29.00
4			0.000	0.038	-0.038	22.369	29.00
5			0.000	0.038	-0.038	22.331	29.00
6			0.000	0.038	-0.038	22.292	29.00
7			0.000	0.038	-0.038	22.254	29.00
8			0.000	0.038	-0.038	22.216	29.00
9			0.000	0.038	-0.038	22.177	29.00
10			0.000	0.038	-0.038	22.139	29.00
11			0.000	0.038	-0.038	22.101	29.00
12			0.000	0.038	-0.038	22.062	29.00
13			0.000	0.038	-0.038	22.024	29.00
14			0.000	0.038	-0.038	21.986	29.00
15			0.000	0.038	-0.038	21.947	29.00
16	0.95	1.507	0.000	0.038	1.469	23.416	31.00
17			0.000	0.039	-0.039	23.377	30.00
18			0.000	0.039	-0.039	23.338	30.00
19			0.000	0.039	-0.039	23.299	30.00
20			0.000	0.039	-0.039	23.260	30.00
21			0.000	0.039	-0.039	23.222	30.00
22			0.000	0.039	-0.039	23.183	30.00
23			0.000	0.039	-0.039	23.144	30.00
24			0.000	0.039	-0.039	23.105	30.00
25			0.000	0.039	-0.039	23.066	30.00
26			0.000	0.039	-0.039	23.027	30.00
27			0.000	0.039	-0.039	22.989	30.00
28			0.000	0.039	-0.039	22.950	30.00
29			0.000	0.039	-0.039	22.911	30.00
30			0.000	0.039	-0.039	22.872	30.00
31	0.78	0.897	0.000	0.039	0.858	23.730	31.00
32			0.000	0.039	-0.039	23.691	31.00
33			0.000	0.039	-0.039	23.652	31.00
34			0.000	0.039	-0.039	23.612	31.00
35			0.000	0.039	-0.039	23.573	31.00
36			0.000	0.039	-0.039	23.534	31.00
37			0.000	0.039	-0.039	23.495	31.00
38			0.000	0.039	-0.039	23.455	31.00

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39			0.000	0.039	-0.039	23.416	31.00
40			0.000	0.039	-0.039	23.377	30.00
41			0.000	0.039	-0.039	23.338	30.00
42			0.000	0.039	-0.039	23.299	30.00
43			0.000	0.039	-0.039	23.260	30.00
44			0.000	0.039	-0.039	23.221	30.00
45			0.000	0.039	-0.039	23.183	30.00
46	0.78	0.897	0.000	0.039	0.858	24.041	31.00
47			0.000	0.039	-0.039	24.002	31.00
48			0.000	0.039	-0.039	23.962	31.00
49			0.000	0.039	-0.039	23.923	31.00
50			0.000	0.039	-0.039	23.884	31.00
51			0.000	0.039	-0.039	23.844	31.00
52			0.000	0.039	-0.039	23.805	31.00
53			0.000	0.039	-0.039	23.766	31.00
54			0.000	0.039	-0.039	23.727	31.00
55			0.000	0.039	-0.039	23.687	31.00
56			0.000	0.039	-0.039	23.648	31.00
57			0.000	0.039	-0.039	23.609	31.00
58			0.000	0.039	-0.039	23.569	31.00
59			0.000	0.039	-0.039	23.530	31.00
60			0.000	0.039	-0.039	23.491	31.00
61	0.78	0.897	0.000	0.039	0.858	24.349	31.00
62			0.000	0.039	-0.039	24.309	31.00
63			0.000	0.039	-0.039	24.270	31.00
64			0.000	0.039	-0.039	24.231	31.00
65			0.000	0.039	-0.039	24.191	31.00
66			0.000	0.039	-0.039	24.152	31.00
67			0.000	0.039	-0.039	24.113	31.00
68			0.000	0.039	-0.039	24.074	31.00
69			0.000	0.039	-0.039	24.034	31.00
70			0.000	0.039	-0.039	23.995	31.00
71			0.000	0.039	-0.039	23.956	31.00
72			0.000	0.039	-0.039	23.916	31.00
73			0.000	0.039	-0.039	23.877	31.00
74			0.000	0.039	-0.039	23.838	31.00
75			0.000	0.039	-0.039	23.799	31.00
76	0.78	0.897	0.000	0.039	0.858	24.656	32.00
77			0.000	0.040	-0.040	24.617	32.00
78			0.000	0.040	-0.040	24.577	32.00
79			0.000	0.040	-0.040	24.537	32.00
80			0.000	0.040	-0.040	24.497	32.00
81			0.000	0.040	-0.040	24.457	32.00
82			0.000	0.040	-0.040	24.418	32.00
83			0.000	0.040	-0.040	24.378	32.00
84			0.000	0.040	-0.040	24.338	31.00
85			0.000	0.039	-0.039	24.299	31.00
86			0.000	0.039	-0.039	24.260	31.00
87			0.000	0.039	-0.039	24.220	31.00
88			0.000	0.039	-0.039	24.181	31.00
89			0.000	0.039	-0.039	24.142	31.00
90			0.000	0.039	-0.039	24.102	31.00

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CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 100- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	3.85	22.496	0.000	0.873	21.623	21.623	29.00
2			0.000	3.067	-3.067	18.556	25.00
3			0.000	2.914	-2.914	15.642	22.00
4			0.000	2.813	-2.813	12.829	18.00
5			0.000	2.680	-2.680	10.149	15.00
6			0.000	2.581	-2.581	7.569	12.00
7			0.000	2.479	-2.479	5.090	8.00
8			0.000	2.327	-2.327	2.762	5.00
9			0.000	2.202	-2.202	0.561	0.00
10			0.000	0.873	-0.873	0.000	0.00
11			0.000	0.873	-0.873	0.000	0.00
12			0.000	0.873	-0.873	0.000	0.00
13			0.000	0.873	-0.873	0.000	0.00
14			0.000	0.873	-0.873	0.000	0.00
15			0.000	0.873	-0.873	0.000	0.00
16	0.95	1.507	0.000	0.873	0.634	0.634	0.00
17			0.000	0.873	-0.873	0.000	0.00
18			0.000	0.873	-0.873	0.000	0.00
19			0.000	0.873	-0.873	0.000	0.00
20			0.000	0.873	-0.873	0.000	0.00
21			0.000	0.873	-0.873	0.000	0.00
22			0.000	0.873	-0.873	0.000	0.00
23			0.000	0.873	-0.873	0.000	0.00
24			0.000	0.873	-0.873	0.000	0.00
25			0.000	0.873	-0.873	0.000	0.00
26			0.000	0.873	-0.873	0.000	0.00
27			0.000	0.873	-0.873	0.000	0.00
28			0.000	0.873	-0.873	0.000	0.00
29			0.000	0.873	-0.873	0.000	0.00
30			0.000	0.873	-0.873	0.000	0.00
31	0.78	0.897	0.000	0.873	0.024	0.024	0.00
32			0.000	0.873	-0.873	0.000	0.00
33			0.000	0.873	-0.873	0.000	0.00
34			0.000	0.873	-0.873	0.000	0.00
35			0.000	0.873	-0.873	0.000	0.00
36			0.000	0.873	-0.873	0.000	0.00
37			0.000	0.873	-0.873	0.000	0.00
38			0.000	0.873	-0.873	0.000	0.00

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39			0.000	0.873	-0.873	0.000	0.00
40			0.000	0.873	-0.873	0.000	0.00
41			0.000	0.873	-0.873	0.000	0.00
42			0.000	0.873	-0.873	0.000	0.00
43			0.000	0.873	-0.873	0.000	0.00
44			0.000	0.873	-0.873	0.000	0.00
45			0.000	0.873	-0.873	0.000	0.00
46	0.78	0.897	0.000	0.873	0.024	0.024	0.00
47			0.000	0.873	-0.873	0.000	0.00
48			0.000	0.873	-0.873	0.000	0.00
49			0.000	0.873	-0.873	0.000	0.00
50			0.000	0.873	-0.873	0.000	0.00
51			0.000	0.873	-0.873	0.000	0.00
52			0.000	0.873	-0.873	0.000	0.00
53			0.000	0.873	-0.873	0.000	0.00
54			0.000	0.873	-0.873	0.000	0.00
55			0.000	0.873	-0.873	0.000	0.00
56			0.000	0.873	-0.873	0.000	0.00
57			0.000	0.873	-0.873	0.000	0.00
58			0.000	0.873	-0.873	0.000	0.00
59			0.000	0.873	-0.873	0.000	0.00
60			0.000	0.873	-0.873	0.000	0.00
61	0.78	0.897	0.000	0.873	0.024	0.024	0.00
62			0.000	0.873	-0.873	0.000	0.00
63			0.000	0.873	-0.873	0.000	0.00
64			0.000	0.873	-0.873	0.000	0.00
65			0.000	0.873	-0.873	0.000	0.00
66			0.000	0.873	-0.873	0.000	0.00
67			0.000	0.873	-0.873	0.000	0.00
68			0.000	0.873	-0.873	0.000	0.00
69			0.000	0.873	-0.873	0.000	0.00
70			0.000	0.873	-0.873	0.000	0.00
71			0.000	0.873	-0.873	0.000	0.00
72			0.000	0.873	-0.873	0.000	0.00
73			0.000	0.873	-0.873	0.000	0.00
74			0.000	0.873	-0.873	0.000	0.00
75			0.000	0.873	-0.873	0.000	0.00
76	0.78	0.897	0.000	0.873	0.024	0.024	0.00
77			0.000	0.873	-0.873	0.000	0.00
78			0.000	0.873	-0.873	0.000	0.00
79			0.000	0.873	-0.873	0.000	0.00
80			0.000	0.873	-0.873	0.000	0.00
81			0.000	0.873	-0.873	0.000	0.00
82			0.000	0.873	-0.873	0.000	0.00
83			0.000	0.873	-0.873	0.000	0.00
84			0.000	0.873	-0.873	0.000	0.00
85			0.000	0.873	-0.873	0.000	0.00
86			0.000	0.873	-0.873	0.000	0.00
87			0.000	0.873	-0.873	0.000	0.00
88			0.000	0.873	-0.873	0.000	0.00
89			0.000	0.873	-0.873	0.000	0.00
90			0.000	0.873	-0.873	0.000	0.00

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 100- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	3.85	22.496	0.663	0.011	21.822	21.822	29.00
2			1.067	0.038	-1.105	20.717	28.00
3			1.055	0.038	-1.093	19.624	26.00
4			1.032	0.037	-1.069	18.556	25.00
5			1.020	0.036	-1.057	17.499	24.00
6			1.008	0.036	-1.044	16.455	23.00
7			0.996	0.036	-1.032	15.423	22.00
8			0.983	0.035	-1.018	14.404	20.00
9			0.959	0.034	-0.993	13.411	19.00
10			0.943	0.034	-0.977	12.434	18.00
11			0.928	0.033	-0.961	11.472	17.00
12			0.913	0.033	-0.946	10.526	16.00
13			0.898	0.033	-0.930	9.596	14.00
14			0.869	0.032	-0.901	8.695	13.00
15			0.856	0.031	-0.888	7.807	12.00
16	0.95	1.507	0.844	0.031	0.632	8.439	13.00
17			0.856	0.031	-0.888	7.551	12.00
18			0.844	0.031	-0.875	6.676	10.00
19			0.818	0.030	-0.848	5.828	9.00
20			0.803	0.030	-0.832	4.995	8.00
21			0.787	0.029	-0.816	4.179	7.00
22			0.771	0.029	-0.799	3.380	6.00
23			0.755	0.028	-0.783	2.597	5.00
24			0.740	0.028	-0.767	1.830	3.00
25			0.708	0.021	-0.729	1.100	1.00
26			0.678	0.014	-0.692	0.408	0.00
27			0.663	0.011	-0.674	0.000	0.00
28			0.663	0.011	-0.674	0.000	0.00
29			0.663	0.011	-0.674	0.000	0.00
30			0.663	0.011	-0.674	0.000	0.00
31	0.78	0.897	0.663	0.011	0.223	0.223	0.00
32			0.663	0.011	-0.674	0.000	0.00
33			0.663	0.011	-0.674	0.000	0.00
34			0.663	0.011	-0.674	0.000	0.00
35			0.663	0.011	-0.674	0.000	0.00
36			0.663	0.011	-0.674	0.000	0.00
37			0.663	0.011	-0.674	0.000	0.00
38			0.663	0.011	-0.674	0.000	0.00

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39			0.663	0.011	-0.674	0.000	0.00
40			0.663	0.011	-0.674	0.000	0.00
41			0.663	0.011	-0.674	0.000	0.00
42			0.663	0.011	-0.674	0.000	0.00
43			0.663	0.011	-0.674	0.000	0.00
44			0.663	0.011	-0.674	0.000	0.00
45			0.663	0.011	-0.674	0.000	0.00
46	0.78	0.897	0.663	0.011	0.223	0.223	0.00
47			0.663	0.011	-0.674	0.000	0.00
48			0.663	0.011	-0.674	0.000	0.00
49			0.663	0.011	-0.674	0.000	0.00
50			0.663	0.011	-0.674	0.000	0.00
51			0.663	0.011	-0.674	0.000	0.00
52			0.663	0.011	-0.674	0.000	0.00
53			0.663	0.011	-0.674	0.000	0.00
54			0.663	0.011	-0.674	0.000	0.00
55			0.663	0.011	-0.674	0.000	0.00
56			0.663	0.011	-0.674	0.000	0.00
57			0.663	0.011	-0.674	0.000	0.00
58			0.663	0.011	-0.674	0.000	0.00
59			0.663	0.011	-0.674	0.000	0.00
60			0.663	0.011	-0.674	0.000	0.00
61	0.78	0.897	0.663	0.011	0.223	0.223	0.00
62			0.663	0.011	-0.674	0.000	0.00
63			0.663	0.011	-0.674	0.000	0.00
64			0.663	0.011	-0.674	0.000	0.00
65			0.663	0.011	-0.674	0.000	0.00
66			0.663	0.011	-0.674	0.000	0.00
67			0.663	0.011	-0.674	0.000	0.00
68			0.663	0.011	-0.674	0.000	0.00
69			0.663	0.011	-0.674	0.000	0.00
70			0.663	0.011	-0.674	0.000	0.00
71			0.663	0.011	-0.674	0.000	0.00
72			0.663	0.011	-0.674	0.000	0.00
73			0.663	0.011	-0.674	0.000	0.00
74			0.663	0.011	-0.674	0.000	0.00
75			0.663	0.011	-0.674	0.000	0.00
76	0.78	0.897	0.663	0.011	0.223	0.223	0.00
77			0.663	0.011	-0.674	0.000	0.00
78			0.663	0.011	-0.674	0.000	0.00
79			0.663	0.011	-0.674	0.000	0.00
80			0.663	0.011	-0.674	0.000	0.00
81			0.663	0.011	-0.674	0.000	0.00
82			0.663	0.011	-0.674	0.000	0.00
83			0.663	0.011	-0.674	0.000	0.00
84			0.663	0.011	-0.674	0.000	0.00
85			0.663	0.011	-0.674	0.000	0.00
86			0.663	0.011	-0.674	0.000	0.00
87			0.663	0.011	-0.674	0.000	0.00
88			0.663	0.011	-0.674	0.000	0.00
89			0.663	0.011	-0.674	0.000	0.00
90			0.663	0.011	-0.674	0.000	0.00

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CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE II
PRECIP. FREQ. - 100- YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 2-24-89
INITIALS: GS

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT
0						0.000	0.00
1	3.85	22.496	0.663	0.873	20.961	20.961	28.00
2			1.055	3.029	-4.084	16.877	23.00
3			0.996	2.847	-3.843	13.034	19.00
4			0.943	2.713	-3.657	9.377	14.00
5			0.869	2.547	-3.416	5.962	10.00
6			0.818	2.411	-3.229	2.732	5.00
7			0.740	2.202	-2.941	0.000	0.00
8			0.663	0.873	-1.535	0.000	0.00
9			0.663	0.873	-1.535	0.000	0.00
10			0.663	0.873	-1.535	0.000	0.00
11			0.663	0.873	-1.535	0.000	0.00
12			0.663	0.873	-1.535	0.000	0.00
13			0.663	0.873	-1.535	0.000	0.00
14			0.663	0.873	-1.535	0.000	0.00
15			0.663	0.873	-1.535	0.000	0.00
16	0.95	1.507	0.663	0.873	-0.028	0.000	0.00
17			0.663	0.873	-1.535	0.000	0.00
18			0.663	0.873	-1.535	0.000	0.00
19			0.663	0.873	-1.535	0.000	0.00
20			0.663	0.873	-1.535	0.000	0.00
21			0.663	0.873	-1.535	0.000	0.00
22			0.663	0.873	-1.535	0.000	0.00
23			0.663	0.873	-1.535	0.000	0.00
24			0.663	0.873	-1.535	0.000	0.00
25			0.663	0.873	-1.535	0.000	0.00
26			0.663	0.873	-1.535	0.000	0.00
27			0.663	0.873	-1.535	0.000	0.00
28			0.663	0.873	-1.535	0.000	0.00
29			0.663	0.873	-1.535	0.000	0.00
30			0.663	0.873	-1.535	0.000	0.00
31	0.78	0.897	0.663	0.873	-0.638	0.000	0.00
32			0.663	0.873	-1.535	0.000	0.00
33			0.663	0.873	-1.535	0.000	0.00
34			0.663	0.873	-1.535	0.000	0.00
35			0.663	0.873	-1.535	0.000	0.00
36			0.663	0.873	-1.535	0.000	0.00
37			0.663	0.873	-1.535	0.000	0.00
38			0.663	0.873	-1.535	0.000	0.00

39			0.663	0.873	-1.535	0.000	0.00
40			0.663	0.873	-1.535	0.000	0.00
41			0.663	0.873	-1.535	0.000	0.00
42			0.663	0.873	-1.535	0.000	0.00
43			0.663	0.873	-1.535	0.000	0.00
44			0.663	0.873	-1.535	0.000	0.00
45			0.663	0.873	-1.535	0.000	0.00
46	0.78	0.897	0.663	0.873	-0.638	0.000	0.00
47			0.663	0.873	-1.535	0.000	0.00
48			0.663	0.873	-1.535	0.000	0.00
49			0.663	0.873	-1.535	0.000	0.00
50			0.663	0.873	-1.535	0.000	0.00
51			0.663	0.873	-1.535	0.000	0.00
52			0.663	0.873	-1.535	0.000	0.00
53			0.663	0.873	-1.535	0.000	0.00
54			0.663	0.873	-1.535	0.000	0.00
55			0.663	0.873	-1.535	0.000	0.00
56			0.663	0.873	-1.535	0.000	0.00
57			0.663	0.873	-1.535	0.000	0.00
58			0.663	0.873	-1.535	0.000	0.00
59			0.663	0.873	-1.535	0.000	0.00
60			0.663	0.873	-1.535	0.000	0.00
61	0.78	0.897	0.663	0.873	-0.638	0.000	0.00
62			0.663	0.873	-1.535	0.000	0.00
63			0.663	0.873	-1.535	0.000	0.00
64			0.663	0.873	-1.535	0.000	0.00
65			0.663	0.873	-1.535	0.000	0.00
66			0.663	0.873	-1.535	0.000	0.00
67			0.663	0.873	-1.535	0.000	0.00
68			0.663	0.873	-1.535	0.000	0.00
69			0.663	0.873	-1.535	0.000	0.00
70			0.663	0.873	-1.535	0.000	0.00
71			0.663	0.873	-1.535	0.000	0.00
72			0.663	0.873	-1.535	0.000	0.00
73			0.663	0.873	-1.535	0.000	0.00
74			0.663	0.873	-1.535	0.000	0.00
75			0.663	0.873	-1.535	0.000	0.00
76	0.78	0.897	0.663	0.873	-0.638	0.000	0.00
77			0.663	0.873	-1.535	0.000	0.00
78			0.663	0.873	-1.535	0.000	0.00
79			0.663	0.873	-1.535	0.000	0.00
80			0.663	0.873	-1.535	0.000	0.00
81			0.663	0.873	-1.535	0.000	0.00
82			0.663	0.873	-1.535	0.000	0.00
83			0.663	0.873	-1.535	0.000	0.00
84			0.663	0.873	-1.535	0.000	0.00
85			0.663	0.873	-1.535	0.000	0.00
86			0.663	0.873	-1.535	0.000	0.00
87			0.663	0.873	-1.535	0.000	0.00
88			0.663	0.873	-1.535	0.000	0.00
89			0.663	0.873	-1.535	0.000	0.00
90			0.663	0.873	-1.535	0.000	0.00

BENSON & GERDIN DIVISION OF CREEGAN & D'ANGELO PHONE (602) 258-3175	SHT. NO. F41 OF 49
TEMPE DRAINAGE STUDY	JOB NO. 888053
STAGE-DURATION COMPUTER OUTPUT	BY GS DATE 3-1-89
	REVWD. DATE
	REVISED

100-YEAR
PHASE III

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE III
PRECIP. FREQ. - 100-YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 6-28-89
INITIALS: JB

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH	ACTUAL STORAGE VOLUME	PUMP RATE	SURFACE AREA
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT	CF*10^6	CFS	SF*10^6
0						0.000	0.00			
1	3.85	31.169	0.000	0.011	31.158	31.158	38.00	31.158	0.000	0.262
2			0.000	0.043	-0.043	31.116	38.00	31.116	0.000	1.022
3			0.000	0.043	-0.043	31.073	38.00	31.073	0.000	1.022
4			0.000	0.043	-0.043	31.030	38.00	31.030	0.000	1.022
5			0.000	0.043	-0.043	30.988	38.00	30.988	0.000	1.022
6			0.000	0.043	-0.043	30.945	38.00	30.945	0.000	1.022
7			0.000	0.043	-0.043	30.903	38.00	30.903	0.000	1.022
8			0.000	0.043	-0.043	30.860	38.00	30.860	0.000	1.022
9			0.000	0.043	-0.043	30.817	38.00	30.817	0.000	1.022
10			0.000	0.043	-0.043	30.775	38.00	30.775	0.000	1.022
11			0.000	0.043	-0.043	30.732	38.00	30.732	0.000	1.022
12			0.000	0.043	-0.043	30.690	38.00	30.690	0.000	1.022
13			0.000	0.043	-0.043	30.647	38.00	30.647	0.000	1.022
14			0.000	0.043	-0.043	30.605	38.00	30.605	0.000	1.022
15			0.000	0.043	-0.043	30.562	38.00	30.562	0.000	1.022
16	0.95	2.223	0.000	0.043	2.180	32.742	40.00	32.742	0.000	1.022
17			0.000	0.044	-0.044	32.699	40.00	32.699	0.000	1.045
18			0.000	0.044	-0.044	32.655	40.00	32.655	0.000	1.045
19			0.000	0.044	-0.044	32.612	40.00	32.612	0.000	1.045
20			0.000	0.044	-0.044	32.568	40.00	32.568	0.000	1.045
21			0.000	0.044	-0.044	32.525	40.00	32.525	0.000	1.045
22			0.000	0.044	-0.044	32.481	40.00	32.481	0.000	1.045
23			0.000	0.044	-0.044	32.438	40.00	32.438	0.000	1.045
24			0.000	0.044	-0.044	32.394	40.00	32.394	0.000	1.045
25			0.000	0.044	-0.044	32.351	40.00	32.351	0.000	1.045
26			0.000	0.044	-0.044	32.307	39.00	32.307	0.000	1.045
27			0.000	0.043	-0.043	32.264	39.00	32.264	0.000	1.033
28			0.000	0.043	-0.043	32.221	39.00	32.221	0.000	1.033
29			0.000	0.043	-0.043	32.178	39.00	32.178	0.000	1.033
30			0.000	0.043	-0.043	32.135	39.00	32.135	0.000	1.033
31	0.78	1.344	0.000	0.043	1.301	33.436	41.00	33.436	0.000	1.033
32			0.000	0.044	-0.044	33.392	40.00	33.392	0.000	1.056
33			0.000	0.044	-0.044	33.348	40.00	33.348	0.000	1.045
34			0.000	0.044	-0.044	33.305	40.00	33.305	0.000	1.045
35			0.000	0.044	-0.044	33.261	40.00	33.261	0.000	1.045
36			0.000	0.044	-0.044	33.218	40.00	33.218	0.000	1.045
37			0.000	0.044	-0.044	33.174	40.00	33.174	0.000	1.045
38			0.000	0.044	-0.044	33.131	40.00	33.131	0.000	1.045

39			0.000	0.044	-0.044	33.087	40.00	33.087	0.000	1.045
40			0.000	0.044	-0.044	33.044	40.00	33.044	0.000	1.045
41			0.000	0.044	-0.044	33.000	40.00	33.000	0.000	1.045
42			0.000	0.044	-0.044	32.957	40.00	32.957	0.000	1.045
43			0.000	0.044	-0.044	32.913	40.00	32.913	0.000	1.045
44			0.000	0.044	-0.044	32.870	40.00	32.870	0.000	1.045
45			0.000	0.044	-0.044	32.826	40.00	32.826	0.000	1.045
46	0.78	1.344	0.000	0.044	1.300	34.126	41.00	34.126	0.000	1.045
47			0.000	0.044	-0.044	34.082	41.00	34.082	0.000	1.056
48			0.000	0.044	-0.044	34.038	41.00	34.038	0.000	1.056
49			0.000	0.044	-0.044	33.994	41.00	33.994	0.000	1.056
50			0.000	0.044	-0.044	33.950	41.00	33.950	0.000	1.056
51			0.000	0.044	-0.044	33.906	41.00	33.906	0.000	1.056
52			0.000	0.044	-0.044	33.862	41.00	33.862	0.000	1.056
53			0.000	0.044	-0.044	33.818	41.00	33.818	0.000	1.056
54			0.000	0.044	-0.044	33.774	41.00	33.774	0.000	1.056
55			0.000	0.044	-0.044	33.730	41.00	33.730	0.000	1.056
56			0.000	0.044	-0.044	33.686	41.00	33.686	0.000	1.056
57			0.000	0.044	-0.044	33.642	41.00	33.642	0.000	1.056
58			0.000	0.044	-0.044	33.598	41.00	33.598	0.000	1.056
59			0.000	0.044	-0.044	33.554	41.00	33.554	0.000	1.056
60			0.000	0.044	-0.044	33.510	41.00	33.510	0.000	1.056
61	0.78	1.344	0.000	0.044	1.300	34.810	42.00	34.810	0.000	1.056
62			0.000	0.045	-0.045	34.766	42.00	34.766	0.000	1.068
63			0.000	0.045	-0.045	34.721	42.00	34.721	0.000	1.068
64			0.000	0.045	-0.045	34.677	42.00	34.677	0.000	1.068
65			0.000	0.045	-0.045	34.632	42.00	34.632	0.000	1.068
66			0.000	0.045	-0.045	34.588	42.00	34.588	0.000	1.068
67			0.000	0.045	-0.045	34.543	42.00	34.543	0.000	1.068
68			0.000	0.045	-0.045	34.499	42.00	34.499	0.000	1.068
69			0.000	0.045	-0.045	34.454	41.00	34.454	0.000	1.068
70			0.000	0.044	-0.044	34.410	41.00	34.410	0.000	1.056
71			0.000	0.044	-0.044	34.366	41.00	34.366	0.000	1.056
72			0.000	0.044	-0.044	34.322	41.00	34.322	0.000	1.056
73			0.000	0.044	-0.044	34.278	41.00	34.278	0.000	1.056
74			0.000	0.044	-0.044	34.234	41.00	34.234	0.000	1.056
75			0.000	0.044	-0.044	34.190	41.00	34.190	0.000	1.056
76	0.78	1.344	0.000	0.044	1.300	35.490	42.00	35.490	0.000	1.056
77			0.000	0.045	-0.045	35.446	42.00	35.446	0.000	1.068
78			0.000	0.045	-0.045	35.401	42.00	35.401	0.000	1.068
79			0.000	0.045	-0.045	35.357	42.00	35.357	0.000	1.068
80			0.000	0.045	-0.045	35.312	42.00	35.312	0.000	1.068
81			0.000	0.045	-0.045	35.268	42.00	35.268	0.000	1.068
82			0.000	0.045	-0.045	35.223	42.00	35.223	0.000	1.068
83			0.000	0.045	-0.045	35.179	42.00	35.179	0.000	1.068
84			0.000	0.045	-0.045	35.134	42.00	35.134	0.000	1.068
85			0.000	0.045	-0.045	35.090	42.00	35.090	0.000	1.068
86			0.000	0.045	-0.045	35.045	42.00	35.045	0.000	1.068
87			0.000	0.045	-0.045	35.001	42.00	35.001	0.000	1.068
88			0.000	0.045	-0.045	34.956	42.00	34.956	0.000	1.068
89			0.000	0.045	-0.045	34.912	42.00	34.912	0.000	1.068
90			0.000	0.045	-0.045	34.867	42.00	34.867	0.000	1.068

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE III
PRECIP. FREQ. - 100-YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 0 CFS
UPSTREAM RETENTION - NO
DATE: 6-28-89
INITIALS: JB

DAY	PRECIP. INCHES	INFLOW CF*10^6	OUTFLOW PUMP CF*10^6	OUTFLOW PERCOL. CF*10^6	CHANGE IN STORAGE VOLUME CF*10^6	STORAGE VOLUME CF*10^6	DEPTH FT	ACTUAL STORAGE VOLUME CF*10^6	PUMP RATE CFS	SURFACE AREA SF*10^6
0						0.000	0.00			
1	3.85	31.169	0.000	0.873	30.296	30.296	38.00	30.296	0.000	0.262
2			0.000	3.407	-3.407	26.890	34.00	26.890	0.000	1.022
3			0.000	3.256	-3.256	23.634	31.00	23.634	0.000	0.977
4			0.000	3.143	-3.143	20.491	27.00	20.491	0.000	0.943
5			0.000	2.991	-2.991	17.501	24.00	17.501	0.000	0.897
6			0.000	2.880	-2.880	14.620	21.00	14.620	0.000	0.864
7			0.000	2.780	-2.780	11.841	17.00	11.841	0.000	0.834
8			0.000	2.647	-2.647	9.194	14.00	9.194	0.000	0.794
9			0.000	2.547	-2.547	6.647	10.00	6.647	0.000	0.764
10			0.000	2.411	-2.411	4.236	7.00	4.236	0.000	0.723
11			0.000	2.285	-2.285	1.951	3.00	1.951	0.000	0.686
12			0.000	1.670	-1.670	0.281	0.00	0.281	0.000	0.501
13			0.000	0.873	-0.873	0.000	0.00	-0.592	0.000	0.262
14			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
15			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
16	0.95	2.223	0.000	0.873	1.350	1.350	2.00	1.350	0.000	0.262
17			0.000	1.404	-1.404	0.000	0.00	-0.054	0.000	0.421
18			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
19			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
20			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
21			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
22			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
23			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
24			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
25			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
26			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
27			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
28			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
29			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
30			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
31	0.78	1.344	0.000	0.873	0.471	0.471	0.00	0.471	0.000	0.262
32			0.000	0.873	-0.873	0.000	0.00	-0.401	0.000	0.262
33			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
34			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
35			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
36			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
37			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
38			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262

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39			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
40			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
41			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
42			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
43			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
44			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
45			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
46	0.78	1.344	0.000	0.873	0.471	0.471	0.00	0.471	0.000	0.262
47			0.000	0.873	-0.873	0.000	0.00	-0.401	0.000	0.262
48			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
49			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
50			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
51			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
52			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
53			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
54			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
55			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
56			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
57			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
58			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
59			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
60			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
61	0.78	1.344	0.000	0.873	0.471	0.471	0.00	0.471	0.000	0.262
62			0.000	0.873	-0.873	0.000	0.00	-0.401	0.000	0.262
63			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
64			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
65			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
66			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
67			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
68			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
69			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
70			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
71			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
72			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
73			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
74			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
75			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
76	0.78	1.344	0.000	0.873	0.471	0.471	0.00	0.471	0.000	0.262
77			0.000	0.873	-0.873	0.000	0.00	-0.401	0.000	0.262
78			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
79			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
80			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
81			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
82			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
83			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
84			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
85			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
86			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
87			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
88			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
89			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262
90			0.000	0.873	-0.873	0.000	0.00	-0.873	0.000	0.262

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CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE III
PRECIP. FREQ. - 100-YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 0.50 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 6-28-89
INITIALS: JB

DAY	PRECIP.	INFLOW	OUTFLOW PUMP	OUTFLOW PERCOL.	CHANGE IN STORAGE VOLUME	STORAGE VOLUME	DEPTH	ACTUAL STORAGE VOLUME	PUMP RATE	SURFACE AREA
	INCHES	CF*10^6	CF*10^6	CF*10^6	CF*10^6	CF*10^6	FT	CF*10^6	CFS	SF*10^6
0						0.000	0.00			
1	3.85	31.169	0.663	0.011	30.495	30.495	38.00	30.495	7.670	0.262
2			1.156	0.043	-1.199	29.297	37.00	29.297	13.380	1.022
3			1.147	0.042	-1.189	28.108	35.00	28.108	13.270	1.011
4			1.128	0.041	-1.170	26.939	34.00	26.939	13.060	0.988
5			1.118	0.041	-1.159	25.780	33.00	25.780	12.940	0.977
6			1.109	0.040	-1.149	24.631	32.00	24.631	12.830	0.965
7			1.098	0.040	-1.138	23.493	31.00	23.493	12.710	0.954
8			1.089	0.039	-1.128	22.365	29.00	22.365	12.600	0.943
9			1.067	0.038	-1.105	21.260	28.00	21.260	12.350	0.920
10			1.055	0.038	-1.093	20.167	27.00	20.167	12.210	0.909
11			1.044	0.037	-1.081	19.086	26.00	19.086	12.080	0.897
12			1.032	0.037	-1.069	18.018	25.00	18.018	11.940	0.886
13			1.020	0.036	-1.057	16.961	23.00	16.961	11.810	0.874
14			0.996	0.036	-1.032	15.929	22.00	15.929	11.530	0.854
15			0.983	0.035	-1.018	14.911	21.00	14.911	11.380	0.844
16	0.95	2.223	0.971	0.035	1.217	16.128	22.00	16.128	11.240	0.834
17			0.983	0.035	-1.018	15.109	21.00	15.109	11.380	0.844
18			0.971	0.035	-1.006	14.103	20.00	14.103	11.240	0.834
19			0.959	0.034	-0.993	13.110	19.00	13.110	11.100	0.824
20			0.943	0.034	-0.977	12.133	18.00	12.133	10.920	0.814
21			0.928	0.033	-0.961	11.171	16.00	11.171	10.740	0.804
22			0.898	0.033	-0.930	10.241	15.00	10.241	10.390	0.784
23			0.882	0.032	-0.914	9.326	14.00	9.326	10.210	0.774
24			0.869	0.032	-0.901	8.425	13.00	8.425	10.060	0.764
25			0.856	0.031	-0.888	7.538	12.00	7.538	9.910	0.754
26			0.844	0.031	-0.875	6.663	10.00	6.663	9.770	0.744
27			0.818	0.030	-0.848	5.814	9.00	5.814	9.470	0.723
28			0.803	0.030	-0.832	4.982	8.00	4.982	9.290	0.711
29			0.787	0.029	-0.816	4.166	7.00	4.166	9.110	0.698
30			0.771	0.029	-0.799	3.367	6.00	3.367	8.920	0.686
31	0.78	1.344	0.755	0.028	0.561	3.927	7.00	3.927	8.740	0.673
32			0.771	0.029	-0.799	3.128	5.00	3.128	8.920	0.686
33			0.740	0.028	-0.767	2.361	4.00	2.361	8.560	0.660
34			0.724	0.024	-0.748	1.613	3.00	1.613	8.380	0.581
35			0.708	0.021	-0.729	0.883	1.00	0.883	8.200	0.501
36			0.678	0.014	-0.692	0.191	0.00	0.191	7.850	0.342
37			0.663	0.011	-0.674	0.000	0.00	-0.483	7.670	0.262
38			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262

39			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
40			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
41			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
42			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
43			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
44			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
45			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
46	0.78	1.344	0.663	0.011	0.670	0.670	0.00	0.670	7.670	0.262
47			0.663	0.011	-0.674	0.000	0.00	-0.003	7.670	0.262
48			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
49			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
50			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
51			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
52			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
53			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
54			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
55			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
56			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
57			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
58			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
59			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
60			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
61	0.78	1.344	0.663	0.011	0.670	0.670	0.00	0.670	7.670	0.262
62			0.663	0.011	-0.674	0.000	0.00	-0.003	7.670	0.262
63			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
64			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
65			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
66			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
67			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
68			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
69			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
70			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
71			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
72			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
73			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
74			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
75			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
76	0.78	1.344	0.663	0.011	0.670	0.670	0.00	0.670	7.670	0.262
77			0.663	0.011	-0.674	0.000	0.00	-0.003	7.670	0.262
78			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
79			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
80			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
81			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
82			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
83			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
84			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
85			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
86			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
87			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
88			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
89			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262
90			0.663	0.011	-0.674	0.000	0.00	-0.674	7.670	0.262

CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
DETENTION BASIN

STAGE - DURATION CALCULATION

TRIBUT. AREA - PHASE III
PRECIP. FREQ. - 100-YEAR
PRECIP. SEQ. - 3 MONTH
PERCOLATION P= 40.00 IN/DAY

DESIGN PUMP RATE - 10 CFS
UPSTREAM RETENTION - NO
DATE: 6-28-89
INITIALS: JB

DAY	PRECIP. INCHES	INFLOW CF*10^6	OUTFLOW PUMP CF*10^6	OUTFLOW PERCOL. CF*10^6	CHANGE IN STORAGE VOLUME CF*10^6	STORAGE VOLUME CF*10^6	DEPTH FT	ACTUAL STORAGE VOLUME CF*10^6	PUMP RATE CFS	SURFACE AREA SF*10^6
0						0.000	0.00			
1	3.85	31.169	0.663	0.873	29.634	29.634	37.00	29.634	7.670	0.262
2			1.147	3.369	-4.515	25.118	32.00	25.118	13.270	1.011
3			1.098	3.181	-4.279	20.840	28.00	20.840	12.710	0.954
4			1.055	3.029	-4.084	16.756	23.00	16.756	12.210	0.909
5			0.996	2.847	-3.843	12.913	19.00	12.913	11.530	0.854
6			0.943	2.713	-3.657	9.256	14.00	9.256	10.920	0.814
7			0.869	2.547	-3.416	5.841	9.00	5.841	10.060	0.764
8			0.803	2.369	-3.172	2.669	5.00	2.669	9.290	0.711
9			0.740	2.202	-2.941	0.000	0.00	-0.272	8.560	0.660
10			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
11			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
12			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
13			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
14			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
15			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
16	0.95	2.223	0.663	0.873	0.688	0.688	1.00	0.688	7.670	0.262
17			0.678	1.138	-1.817	0.000	0.00	-1.129	7.850	0.342
18			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
19			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
20			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
21			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
22			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
23			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
24			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
25			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
26			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
27			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
28			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
29			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
30			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
31	0.78	1.344	0.663	0.873	-0.191	0.000	0.00	-0.191	7.670	0.262
32			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
33			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
34			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
35			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
36			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
37			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
38			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262

39			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
40			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
41			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
42			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
43			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
44			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
45			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
46	0.78	1.344	0.663	0.873	-0.191	0.000	0.00	-0.191	7.670	0.262
47			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
48			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
49			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
50			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
51			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
52			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
53			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
54			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
55			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
56			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
57			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
58			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
59			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
60			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
61	0.78	1.344	0.663	0.873	-0.191	0.000	0.00	-0.191	7.670	0.262
62			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
63			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
64			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
65			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
66			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
67			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
68			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
69			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
70			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
71			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
72			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
73			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
74			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
75			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
76	0.78	1.344	0.663	0.873	-0.191	0.000	0.00	-0.191	7.670	0.262
77			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
78			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
79			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
80			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
81			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
82			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
83			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
84			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
85			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
86			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
87			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
88			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
89			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262
90			0.663	0.873	-1.535	0.000	0.00	-1.535	7.670	0.262

G. COMPUTER DOCUMENTATION

SHT. G2 OF 7
888053
2/89
JS

RUNOFF

```
C1: [W7] '     CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
E2: [W10] '   DETENTION BASIN
D4: [W10] '          TOTAL RUNOFF CALCULATION
A6: [W9] 'TRIBUTARY AREAS
F6: [W10] '  DATE:
A7: [W9] '24 HOUR PRECIP. =
B7: [W8] 'RECIP. =
C7: (F2) [W7] 3.85
D7: [W10] 'INCHES
E7: [W10] '
F7: [W10] '  INITIALS:
J7: [W10] ^OVERFLOW
J8: [W10] ^FROM
A9: [W9] ^AREA
B9: [W8] ^AREA
C9: [W7] ^CN
D9: [W10] '     RETENTION
F9: [W10] ^DIRECT
G9: [W10] ^RETAINED
H9: [W10] ^UNRETAINED
I9: [W10] ^TOTAL
J9: [W10] ^UPSTREAM
K9: [W10] ^S
L9: ^AREA*CN
D10: [W10] ^IN OF
E10: [W10] ^% OF AREA
F10: [W10] ^RUNOFF
G10: [W10] ^RUNOFF
H10: [W10] ^RUNOFF
I10: [W10] ^RUNOFF
J10: [W10] ^RETENTION
K10: [W10] ^COEF.
A11: [W9] '  NO.
B11: [W8] ^SQM
D11: [W10] ^PRECIP.
E11: [W10] ^RETAINED
F11: [W10] ^INCHES
G11: [W10] ^CF*10^6
H11: [W10] ^CF*10^6
I11: [W10] ^CF*10^6
J11: [W10] ^BASINS
A12: [W9] \-
B12: [W8] \-
C12: [W7] \-
D12: [W10] \-
E12: [W10] \-
F12: [W10] \-
G12: [W10] \-
H12: [W10] \-
I12: [W10] \-
A13: (F0) [W9] ' 1A: 54
B13: (F3) [W8] 0.105
C13: (F0) [W7] 75
D13: (F3) [W10] 0
E13: (P0) [W10] 0
F13: (F3) [W10] ($C$7-0.2*K13)^2/($C$7+0.8*K13)
```

SHT. G3 OF 7
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```
G13: (F3) [W10] @IF(J13>0,J13,0)
H13: (F3) [W10] 2.3232*F13*(1-E13)*B13
I13: (F3) [W10] +G13+H13
J13: (F3) [W10] 2.3232*(F13-D13)*E13*B13
K13: (F3) [W10] 1000/C13-10
L13: (F2) +B13*C13
A14: (F0) [W9] '     56
B14: (F3) [W8] 0.673
C14: (F0) [W7] 86
D14: (F3) [W10] 0
E14: (P0) [W10] 0
F14: (F3) [W10] ($C$7-0.2*K14)^2/($C$7+0.8*K14)
G14: (F3) [W10] @IF(J14>0,J14,0)
H14: (F3) [W10] 2.3232*F14*(1-E14)*B14
I14: (F3) [W10] +G14+H14
J14: (F3) [W10] 2.3232*(F14-D14)*E14*B14
K14: (F3) [W10] 1000/C14-10
L14: (F2) +B14*C14
A15: (F0) [W9] '     58
B15: (F3) [W8] 0.517
C15: (F0) [W7] 72
D15: (F3) [W10] 0
E15: (P0) [W10] 0
F15: (F3) [W10] ($C$7-0.2*K15)^2/($C$7+0.8*K15)
G15: (F3) [W10] @IF(J15>0,J15,0)
H15: (F3) [W10] 2.3232*F15*(1-E15)*B15
I15: (F3) [W10] +G15+H15
J15: (F3) [W10] 2.3232*(F15-D15)*E15*B15
K15: (F3) [W10] 1000/C15-10
L15: (F2) +B15*C15
A16: (F0) [W9] '     62
B16: (F3) [W8] 0.189
C16: (F0) [W7] 74
D16: (F3) [W10] 0
E16: (P0) [W10] 0
F16: (F3) [W10] ($C$7-0.2*K16)^2/($C$7+0.8*K16)
G16: (F3) [W10] @IF(J16>0,J16,0)
H16: (F3) [W10] 2.3232*F16*(1-E16)*B16
I16: (F3) [W10] +G16+H16
J16: (F3) [W10] 2.3232*(F16-D16)*E16*B16
K16: (F3) [W10] 1000/C16-10
L16: (F2) +B16*C16
A17: (F0) [W9] '     66
B17: (F3) [W8] 0.08
C17: (F0) [W7] 79
D17: (F3) [W10] 0
E17: (P0) [W10] 0
F17: (F3) [W10] ($C$7-0.2*K17)^2/($C$7+0.8*K17)
G17: (F3) [W10] @IF(J17>0,J17,0)
H17: (F3) [W10] 2.3232*F17*(1-E17)*B17
I17: (F3) [W10] +G17+H17
J17: (F3) [W10] 2.3232*(F17-D17)*E17*B17
K17: (F3) [W10] 1000/C17-10
L17: (F2) +B17*C17
```

STAGE-DURATION

SHT. G4 of 7
#888053
2/89
gs

```
C1: [W11] 'CITY OF TEMPE - ADOT PIT DIVERSION PROJECT
D2: [W11] '   DETENTION BASIN
C4: [W11] '         STAGE - DURATION CALCULATION
C5: [W11] '        ---
D5: [W11] \-
E5: [W11] \-
F5: [W11] '-----
A7: [W7] 'TRIBUT. AREA
B7: [W9] ' AREA  -
C7: (F2) [W11] '  PHASE II
D7: [W11] '
E7: [W11] 'DESIGN PUMP RATE   -
G7: [W11] '0 CFS
H7: (D1) [W8] '
A8: [W7] 'PRECIP. FREQUENCY
B8: [W9] ' FREQ. -
C8: (F2) [W11] '  5- YEAR
E8: [W11] 'UPSTREAM RETENTION -
G8: [W11] 'NO
A9: [W7] 'PRECIP.
B9: [W9] ' SEQ.  -
C9: (F2) [W11] '  3 MONTH
D9: [W11] '
E9: [W11] 'DATE:
F9: [W11] '2-24-89
A10: [W7] 'PERCOLATION   P=
C10: (F2) [W11] 0.5
D10: [W11] 'IN/DAY
E10: [W11] 'INITIALS:
F10: [W11] 'GS
N10: [W11] '
O10: [W7] '   LOOKUP TABLE
Q10: [W11] '
F12: [W11] ' CHANGE IN
J12: [W11] ^ACTUAL
O12: [W7] '
A13: [W7] ^DAY
B13: [W9] ^PRECIP.
C13: [W11] '   INFLOW
D13: [W11] ^OUTFLOW
E13: [W11] ^OUTFLOW
F13: [W11] ^STORAGE
G13: [W11] ^STORAGE
H13: [W8] ^DEPTH
J13: [W11] ^STORAGE
K13: [W11] ^PUMP
L13: [W11] ^SURFACE
N13: [W11] ^VOLUME
O13: [W7] ^DEPTH
P13: [W11] ^PUMP
Q13: [W11] ^SURFACE
D14: [W11] ^PUMP
E14: [W11] ^PERCOL.
F14: [W11] ^VOLUME
G14: [W11] ^VOLUME
J14: [W11] ^VOLUME
```

SHT. G5 OF 7
#888053
2/89
gs

```
Q19: (F3) [W11] 0.341501
A20: (F0) [W7] 1+A19
B20: (F2) [W9] '
C20: (F3) [W11] '
D20: (F3) [W11] +K20*0.0864
E20: (F3) [W11] +L20*$C$10/12
F20: (F3) [W11] +C20-D20-E20
G20: (F3) [W11] @IF(J20<0,0,J20)
H20: (F2) [W8] @VLOOKUP(G20,$N$18..$O$69,1)
J20: (F3) [W11] +G19+F20
K20: (F3) [W11] @VLOOKUP(H19,$O$18..$Q$69,1)
L20: (F3) [W11] @VLOOKUP(H19,$O$18..$Q$69,2)
N20: (F3) [W11] 1.128
O20: (F0) [W7] +O19+1
P20: (F3) [W11] 8.03
Q20: (F3) [W11] 0.421242
A21: (F0) [W7] 1+A20
B21: (F2) [W9] '
C21: (F3) [W11] '
D21: (F3) [W11] +K21*0.0864
E21: (F3) [W11] +L21*$C$10/12
F21: (F3) [W11] +C21-D21-E21
G21: (F3) [W11] @IF(J21<0,0,J21)
H21: (F2) [W8] @VLOOKUP(G21,$N$18..$O$69,1)
J21: (F3) [W11] +G20+F21
K21: (F3) [W11] @VLOOKUP(H20,$O$18..$Q$69,1)
L21: (F3) [W11] @VLOOKUP(H20,$O$18..$Q$69,2)
N21: (F3) [W11] 1.581
O21: (F0) [W7] +O20+1
P21: (F3) [W11] 8.2
Q21: (F3) [W11] 0.500982
A22: (F0) [W7] 1+A21
B22: (F2) [W9] '
C22: (F3) [W11] '
D22: (F3) [W11] +K22*0.0864
E22: (F3) [W11] +L22*$C$10/12
F22: (F3) [W11] +C22-D22-E22
G22: (F3) [W11] @IF(J22<0,0,J22)
H22: (F2) [W8] @VLOOKUP(G22,$N$18..$O$69,1)
J22: (F3) [W11] +G21+F22
K22: (F3) [W11] @VLOOKUP(H21,$O$18..$Q$69,1)
L22: (F3) [W11] @VLOOKUP(H21,$O$18..$Q$69,2)
N22: (F3) [W11] 2.034
O22: (F0) [W7] +O21+1
P22: (F3) [W11] 8.38
Q22: (F3) [W11] 0.580723
A23: (F0) [W7] 1+A22
B23: (F2) [W9] '
C23: (F3) [W11] '
D23: (F3) [W11] +K23*0.0864
E23: (F3) [W11] +L23*$C$10/12
F23: (F3) [W11] +C23-D23-E23
G23: (F3) [W11] @IF(J23<0,0,J23)
H23: (F2) [W8] @VLOOKUP(G23,$N$18..$O$69,1)
J23: (F3) [W11] +G22+F23
K23: (F3) [W11] @VLOOKUP(H22,$O$18..$Q$69,1)
```

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JS

```
K14: [W11] ^RATE
L14: [W11] ^AREA
P14: [W11] ^RATE
Q14: [W11] ^AREA
B16: [W9] ^INCHES
C16: [W11] ^CF*10^6
D16: [W11] ^CF*10^6
E16: [W11] ^CF*10^6
F16: [W11] ^CF*10^6
G16: [W11] ^CF*10^6
H16: [W8] ^FT
J16: [W11] ^CF*10^6
K16: [W11] ^CFS
L16: [W11] ^SF*10^6
N16: [W11] ^CF*10^6
O16: [W7] ^FT
P16: [W11] ^CFS
Q16: [W11] ^SF*10^6
A17: [W7] \-
B17: [W9] \-
C17: [W11] \-
D17: [W11] \-
E17: [W11] \-
F17: [W11] \-
G17: [W11] \-
H17: [W8] \-
J17: [W11] \-
K17: [W11] \-
L17: [W11] \-
N17: [W11] \-
O17: [W7] \-
P17: [W11] \-
Q17: [W11] \-
A18: (F0) [W7] 0
B18: (F2) [W9] '
C18: (F3) [W11] '
G18: (F3) [W11] 0
H18: (F2) [W8] 0
N18: (F3) [W11] 0
O18: (F0) [W7] 0
P18: (F3) [W11] 7.67
Q18: (F3) [W11] 0.26176
A19: (F0) [W7] 1+A18
B19: (F2) [W9] 2
C19: (F3) [W11] 7.55
D19: (F3) [W11] +K19*0.0864
E19: (F3) [W11] +L19*$C$10/12
F19: (F3) [W11] +C19-D19-E19
G19: (F3) [W11] @IF(J19<0,0,J19)
H19: (F2) [W8] @VLOOKUP(G19,$N$18..$O$69,1)
J19: (F3) [W11] +G18+F19
K19: (F3) [W11] @VLOOKUP(H18,$O$18..$Q$69,1)
L19: (F3) [W11] @VLOOKUP(H18,$O$18..$Q$69,2)
N19: (F3) [W11] 0.675
O19: (F0) [W7] 1
P19: (F3) [W11] 7.85
```

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L23: (F3) [W11] @VLOOKUP(H22,$O$18..$Q$69,2)
N23: (F3) [W11] 2.486
O23: (F0) [W7] +O22+1
P23: (F3) [W11] 8.56
Q23: (F3) [W11] 0.660464