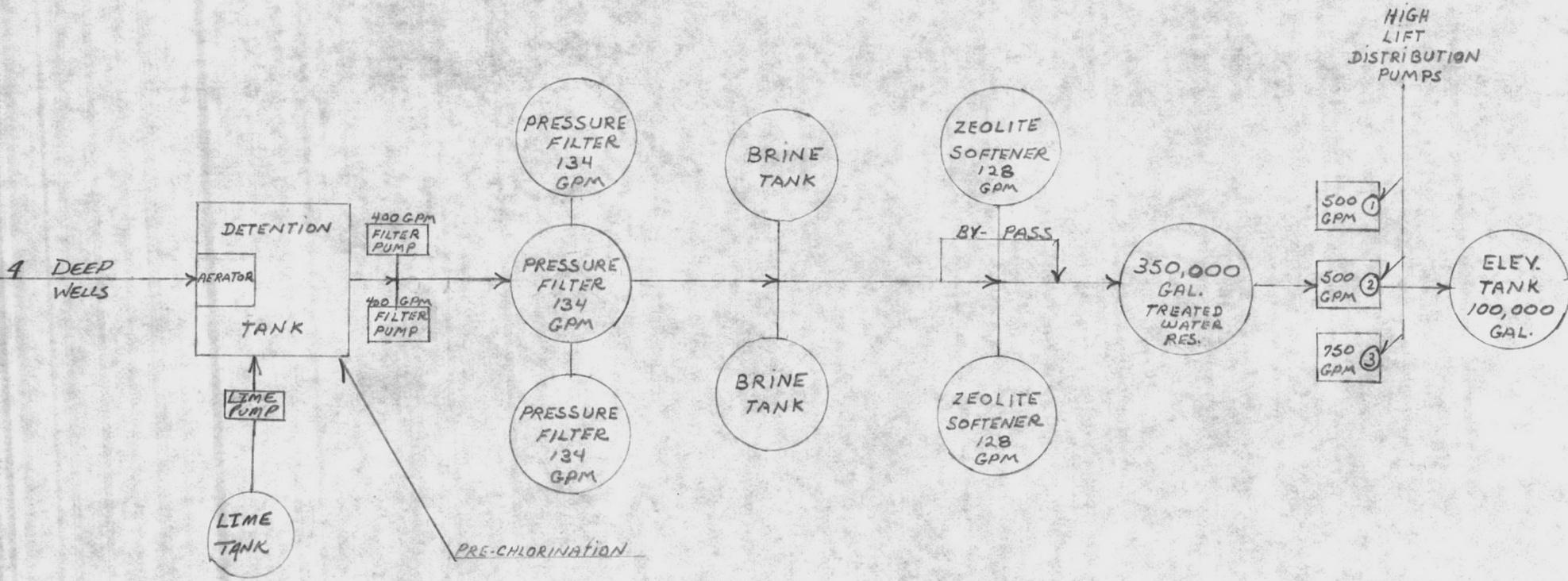


COURTHOUSE BAY BLDG. BB-190

CAPACITY 600,000 GPD

WITH 4 DEEP WELLS

ZEOLITE SOFTENING PLANT



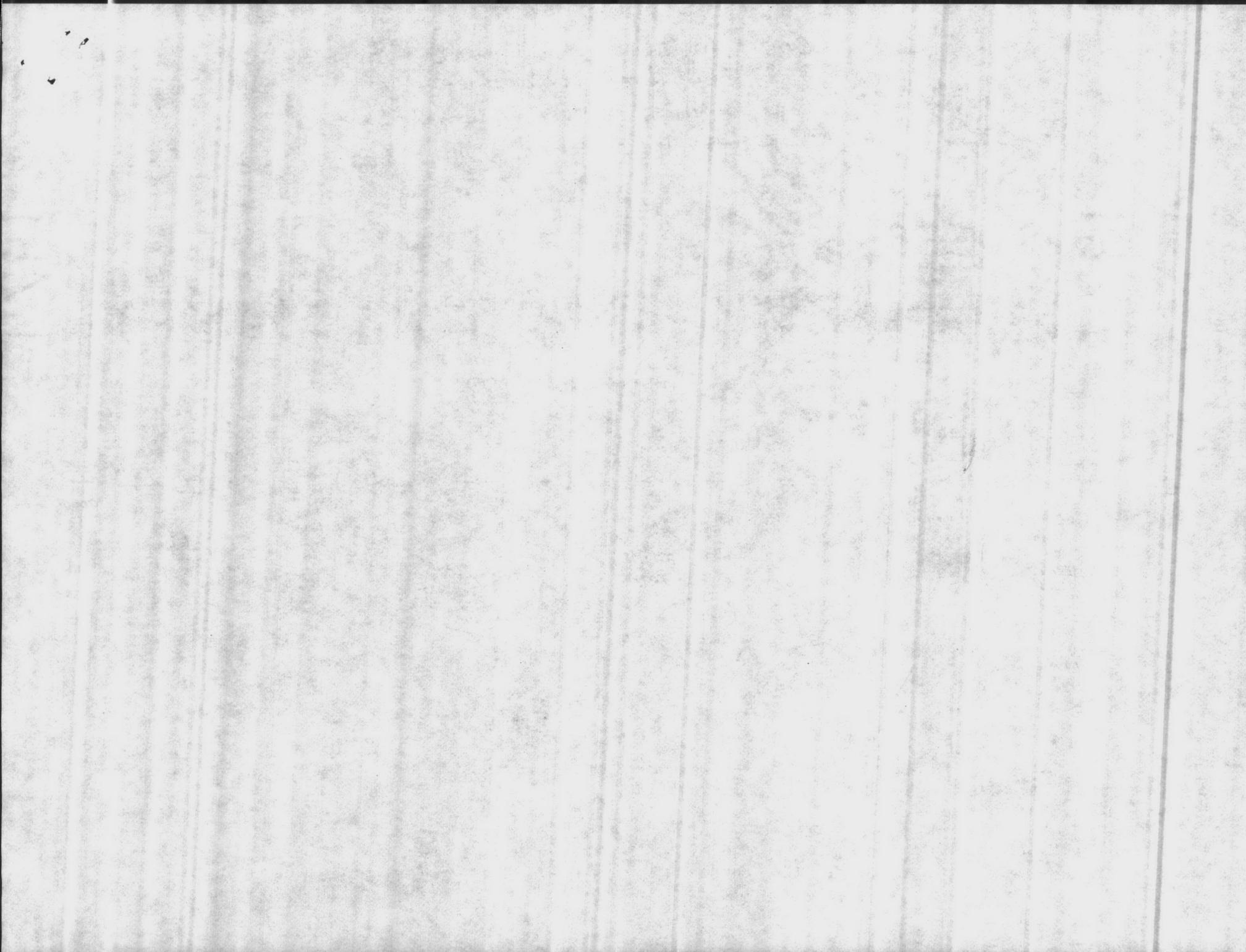


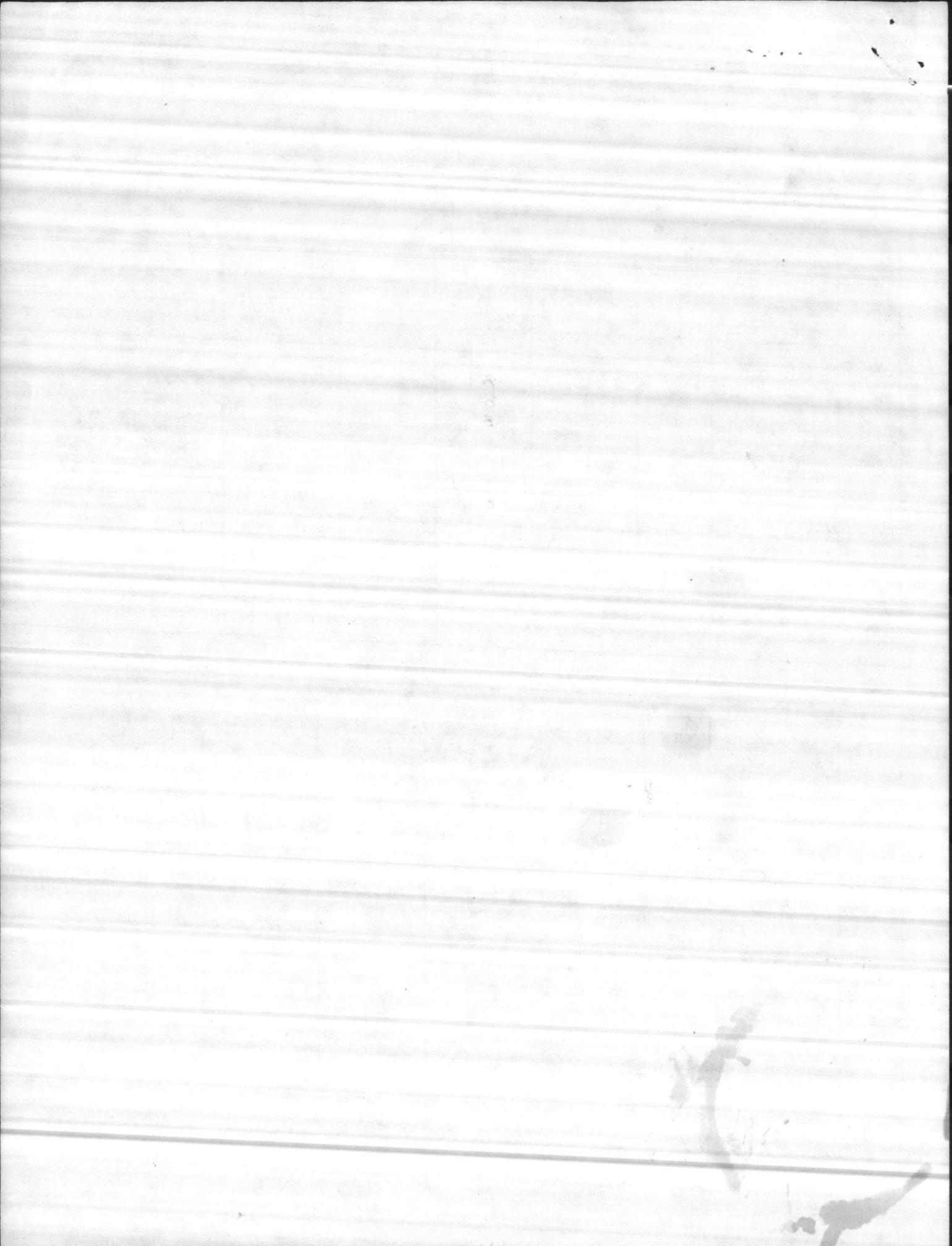
Table III C 3

WELL SURVEY SHEET*

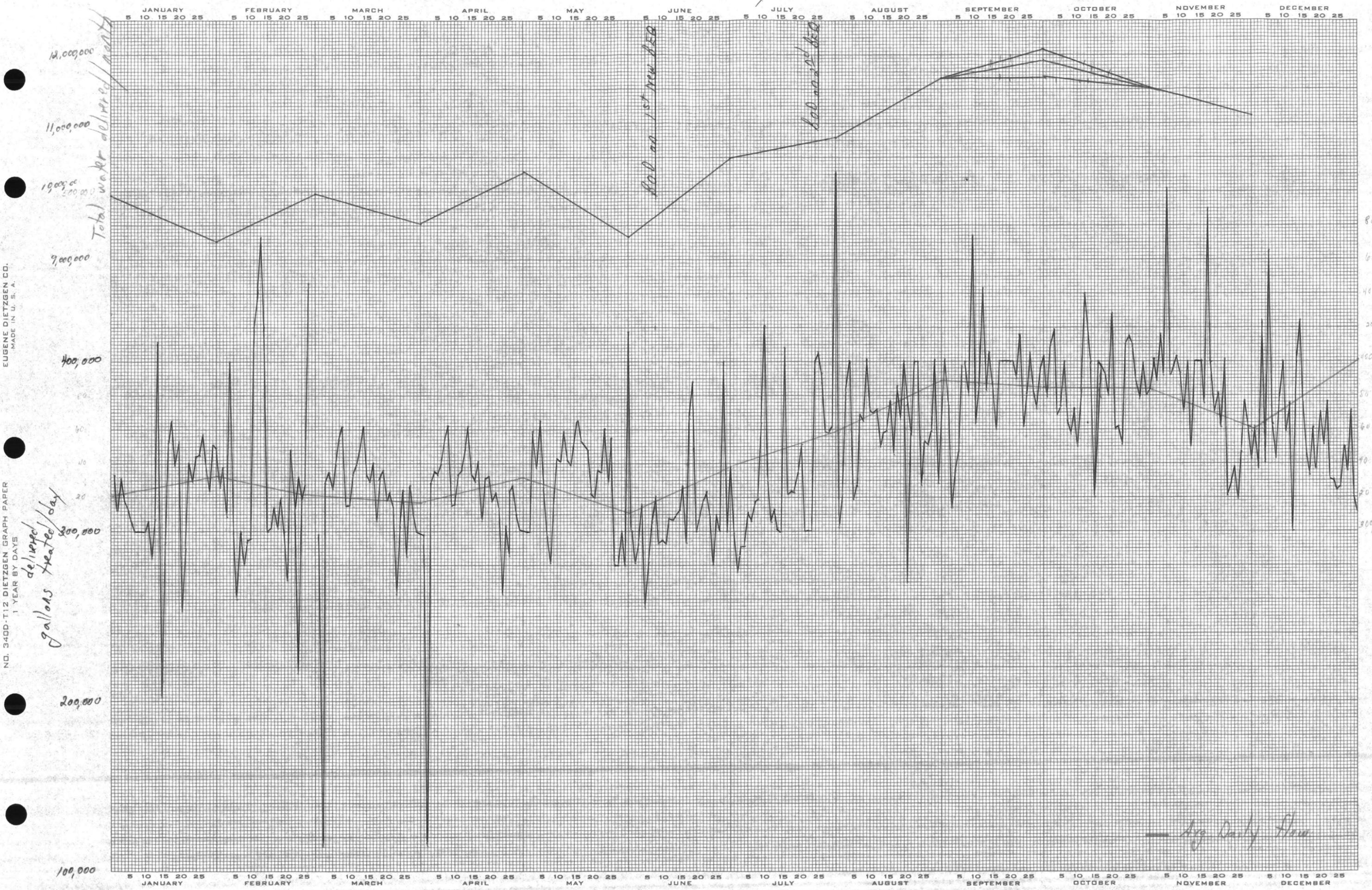
Sheet No. 10DATE: 3-3-77

WELL NO.	WELL TYPE	DRILLED DEPTH ft.	STATIC LEVEL (ft)	CASING SIZE (in.)	STAGES	DRAWDOWN AT RATED CAPACITY (feet)	RATED CAPACITY (gpm)	PRESENT CAPACITY (GPM)
BB-43	DRILLED	54'	18'	8"	4	19'	175	100
BB-44	DRILLED	63'	24'	8"	4	10'	200	100
BB-220	DRILLED	63'	34'	6"	3	6'	150	150
BB-221	DRILLED	65'	35'	6"	3	8'	300	300
A-5	DRILLED	116'	18'	8"	4	14'	250	150
BA-164 <i>New well</i>	DRILLED	61'	17'	8"	8	8'	200 150	175

WELL NO.	SPECIFIC CAPACITY (gpm/ft of drawdown)	PUMP HEAD (ft)	MOTOR H. P.	CHLORINATION (AMOUNT)	RESIDUAL CHLORINE (ppm)	AUXILIARY POWER (type)	DD FORM	
							710	686
BB-43	9.2	63'	5.0			GASOLINE		
BB-44	20.0	60'	5.0					
BB-220	25.0	78'	7.5					
BB-221	37.5	82'	15.0					
A-5	17.9	75'	3.0	5 lbs per day	0.6	GASOLINE		
BA-164	25.0	130'	10.0			GASOLINE		



Courthouse Bay Water Treatment 1977



EUGENE DIETZGEN CO.
MADE IN U. S. A.

NO. 340D-T12 DIETZGEN GRAPH PAPER
1 YEAR BY DAYS

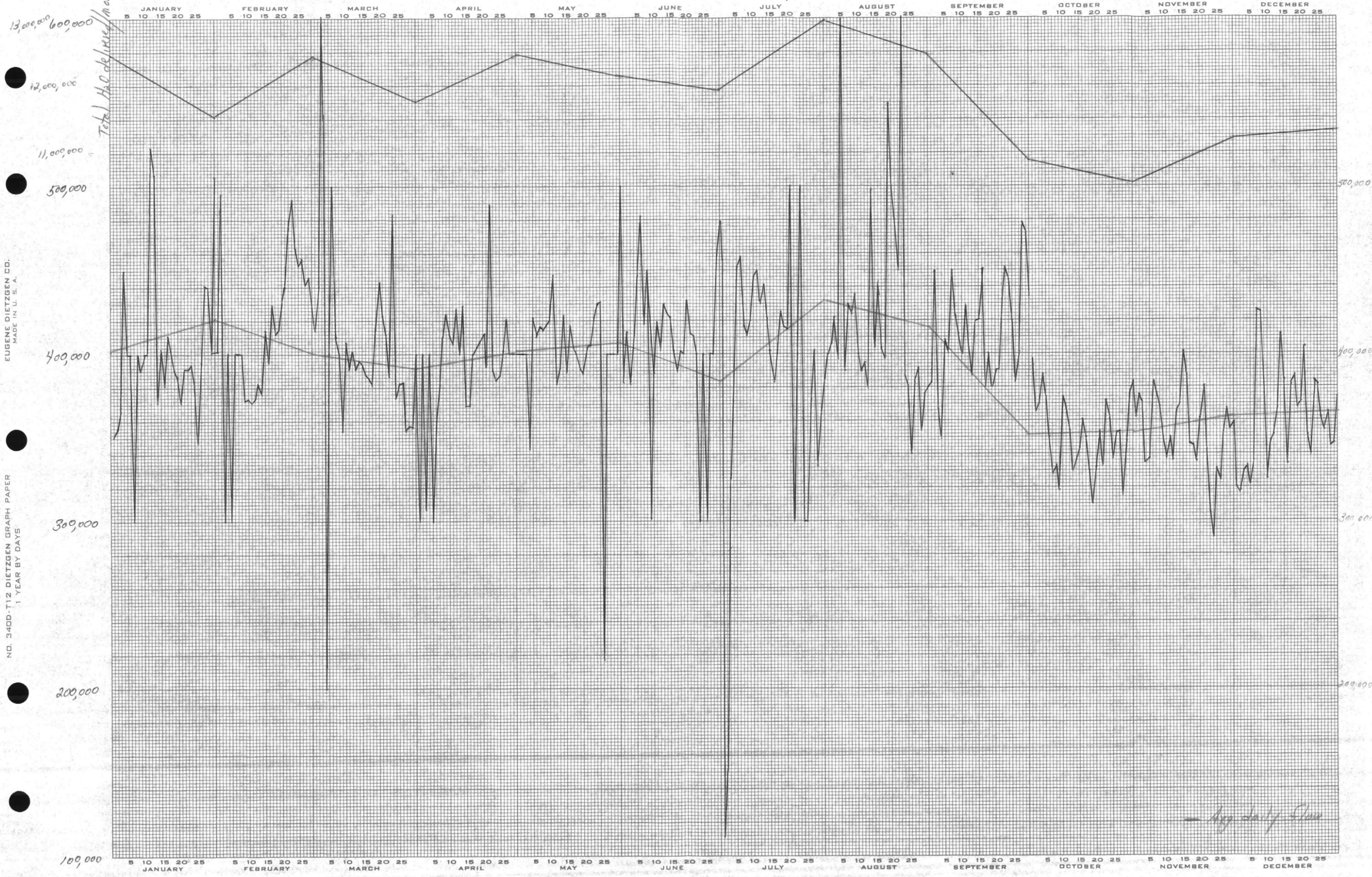
gallons heated/day

Total water delivered

— Avg Daily flow

1977

Courthouse Bay Water Treatment 1978



EUGENE DIETZGEN CO.
MADE IN U. S. A.

ND. 3400-T12 DIETZGEN GRAPH PAPER
1 YEAR BY DAYS

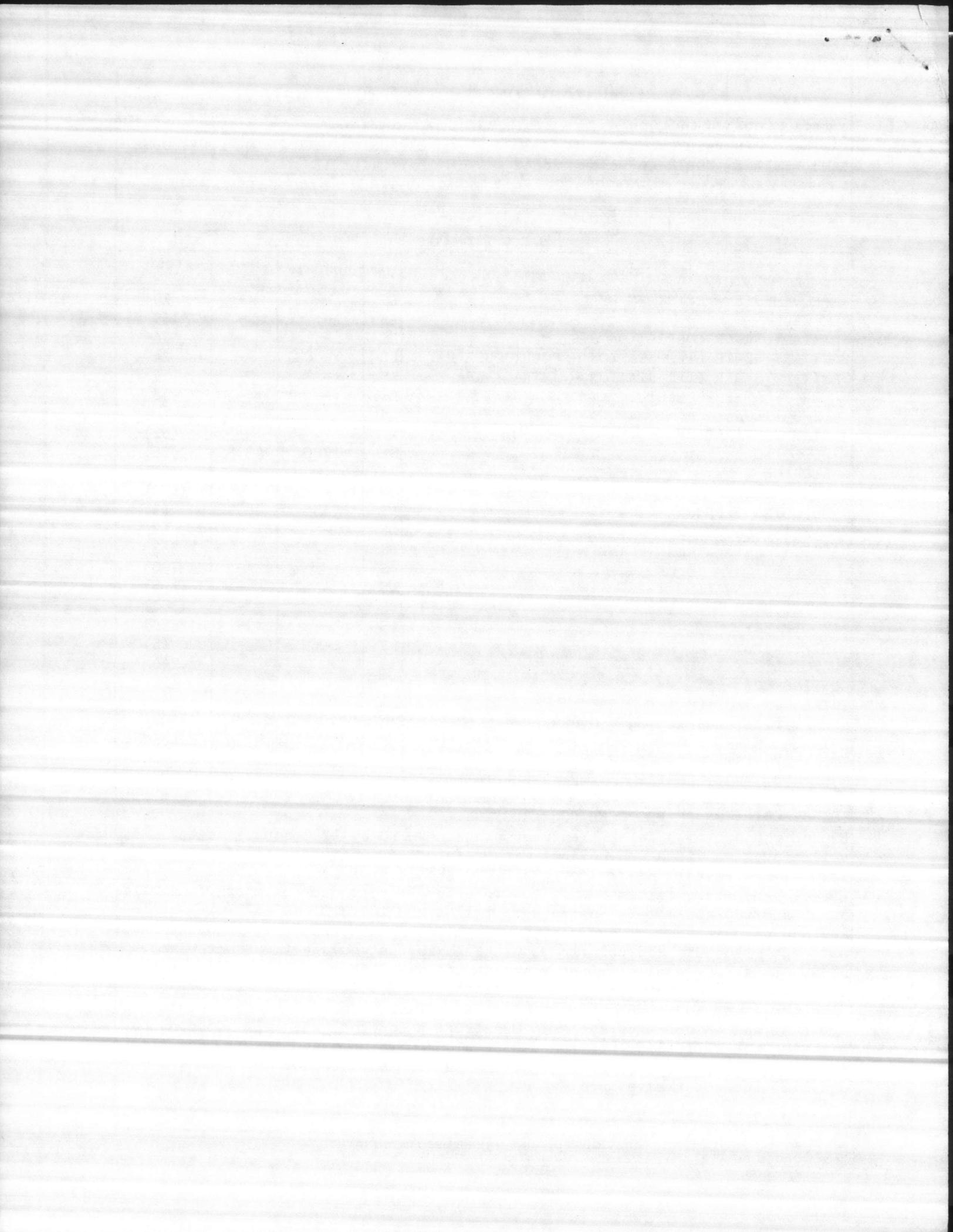
— Avg Daily Flow

1978

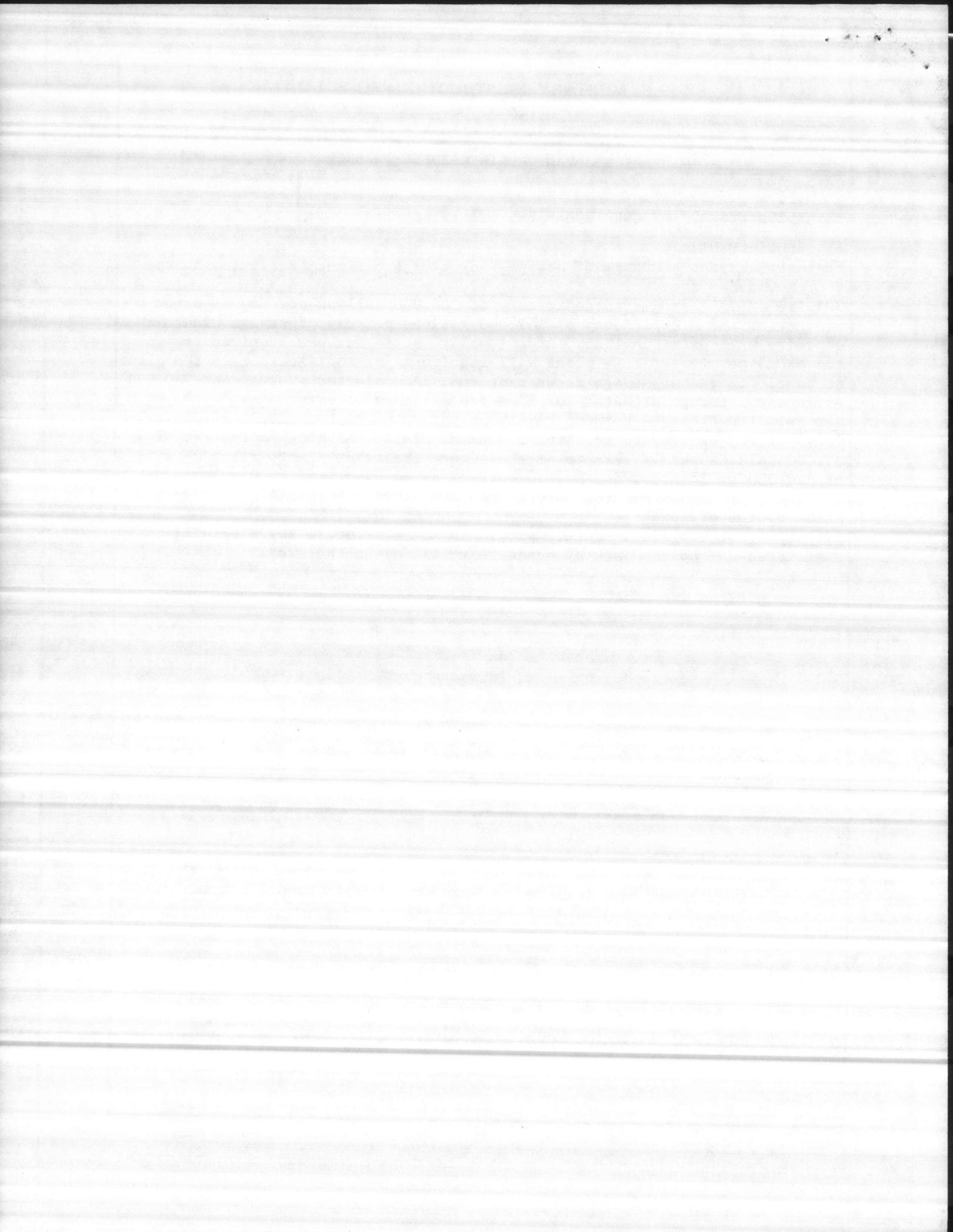
1978

Month	Day	Temperature	Humidity	Wind	Clouds	Notes
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Jan	8					
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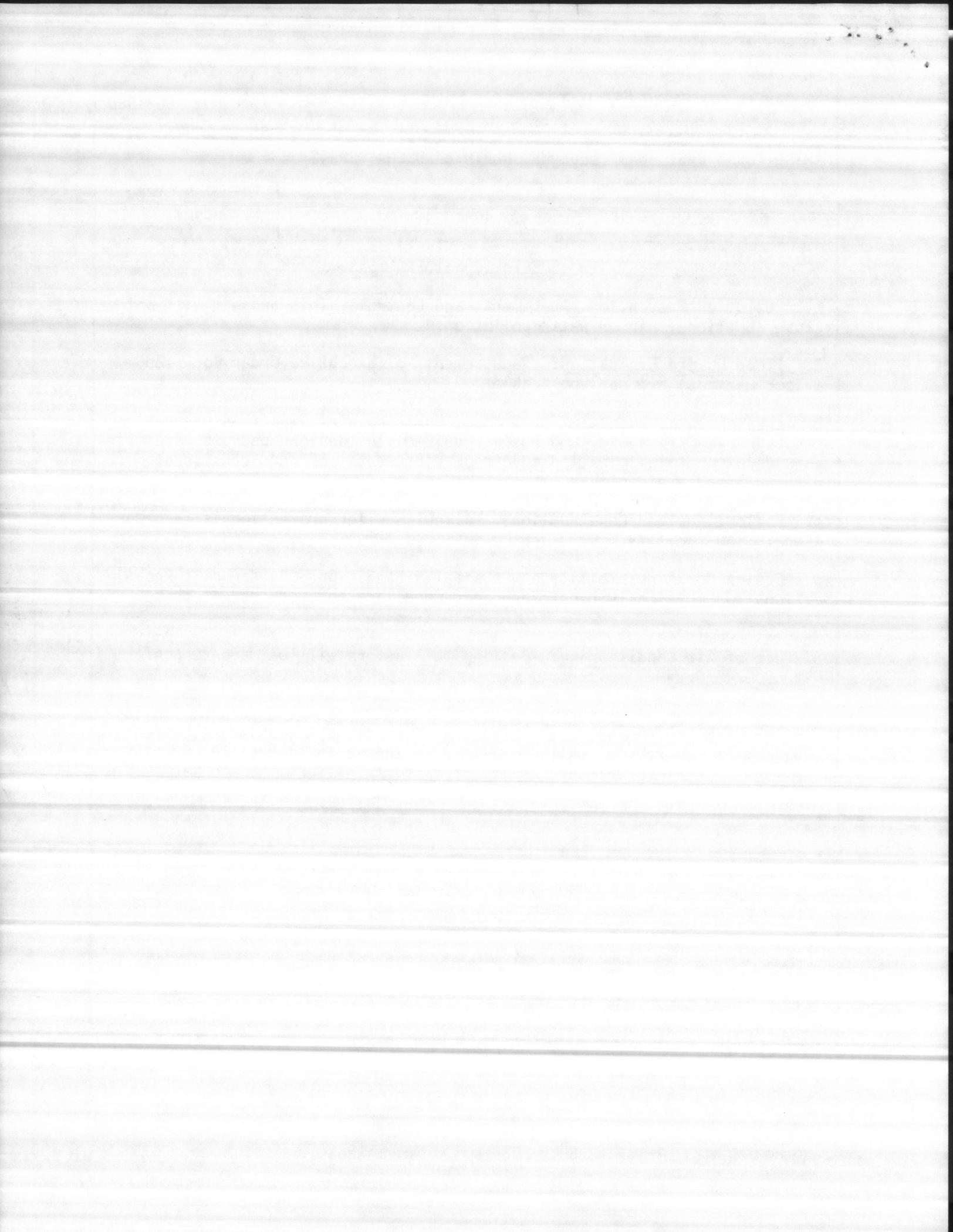
1. COMPONENT NAVY		FY 1984 MILITARY CONSTRUCTION PROJECT DATA		2. DATE 1 AUG 1980	
3. INSTALLATION AND LOCATION MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542			4. PROJECT TITLE EXPANSION/UPGRADE OF COURTHOUSE BAY UTILITIES		
5. PROGRAM ELEMENT		6. CATEGORY CODE 822-12	7. PROJECT NUMBER P-784	8. PROJECT COST (\$000) \$2,490	
9. COST ESTIMATES					
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)
IMPROVEMENTS - EXISTING WELLS		LS	-	-	10
NEW WELL		LS	-	-	169
SANITARY SEWER COLLECTION SYSTEM		LS	-	-	74
SANITARY SEWER LIFT STATION - COURTHOUSE BAY		LS	-	-	24
SANITARY SEWER LIFT STATION - AMTRAC AREA		LS	-	-	7
WATER TREATMENT PLANT		LS	-	-	748
DEMOLITION		LS	-	-	(3)
SITE PREPARATION					(52)
BUILDING		SF	1280	43.89	(56)
STORAGE TANK		GAL	250,000		(95)
EQUIPMENT		LS	-	-	(534)
BUILDING PIPING		LF	155	38.92	(6)
ELECTRICAL		LS	-	-	(2)
WASTEWATER TREATMENT PLANT		LS	-	-	1,212
DEMOLITION		LS	-	-	(90)
SITE PREPARATION		LS	-	-	(135)
STRUCTURES		LS	-	-	(287)
EQUIPMENT		LS	-	-	(695)
ELECTRICAL		LS	-	-	(5)
SUBTOTAL					2,244
CONTINGENCY - 5%					112
TOTAL CONTRACT COST					2,356
SUPERVISION, INSPECTION & OVERHEAD - 5.5%					130
TOTAL REQUEST					2,486
TOTAL REQUEST (ROUNDED)					2,490
EQUIPMENT PROVIDED FROM OTHER APPROPRIATION					-
10. DESCRIPTION OF PROPOSED CONSTRUCTION					
<p>Expand the existing water treatment plant, BB-190 by 1280 square feet, utilizing same width and height, with reinforced concrete/steel frame construction. Install new filters, 250,000 gallon storage tank, softner system diesel generator, filter pumps, controls for filters and softeners. Rebuild pumps and replace motors in two deep wells, and install new well with building and associated pump and piping. Demolish inlet structure, Imhoff tanks, effluent structure and chlorine contact chamber at sewage treatment plant, BB-4. Construct dual barminutor system, flow splitter box, trickling filter two primary clarifiers, a secondary clarifier, gravity thickener, aerobic digester, pump house and pumps, chlorine contact chamber, chlorine storage building and chlorinator system. Construct a concrete wet well adjacent to existing wet well, lift station SA-38, along with pump and motor. Replace pumps and motors at lift station BB-1. Install 656 feet of ten inch V.C.P. and 1110 feet of twelve inch V.C.P..</p> <p>(continued on next page)</p>					



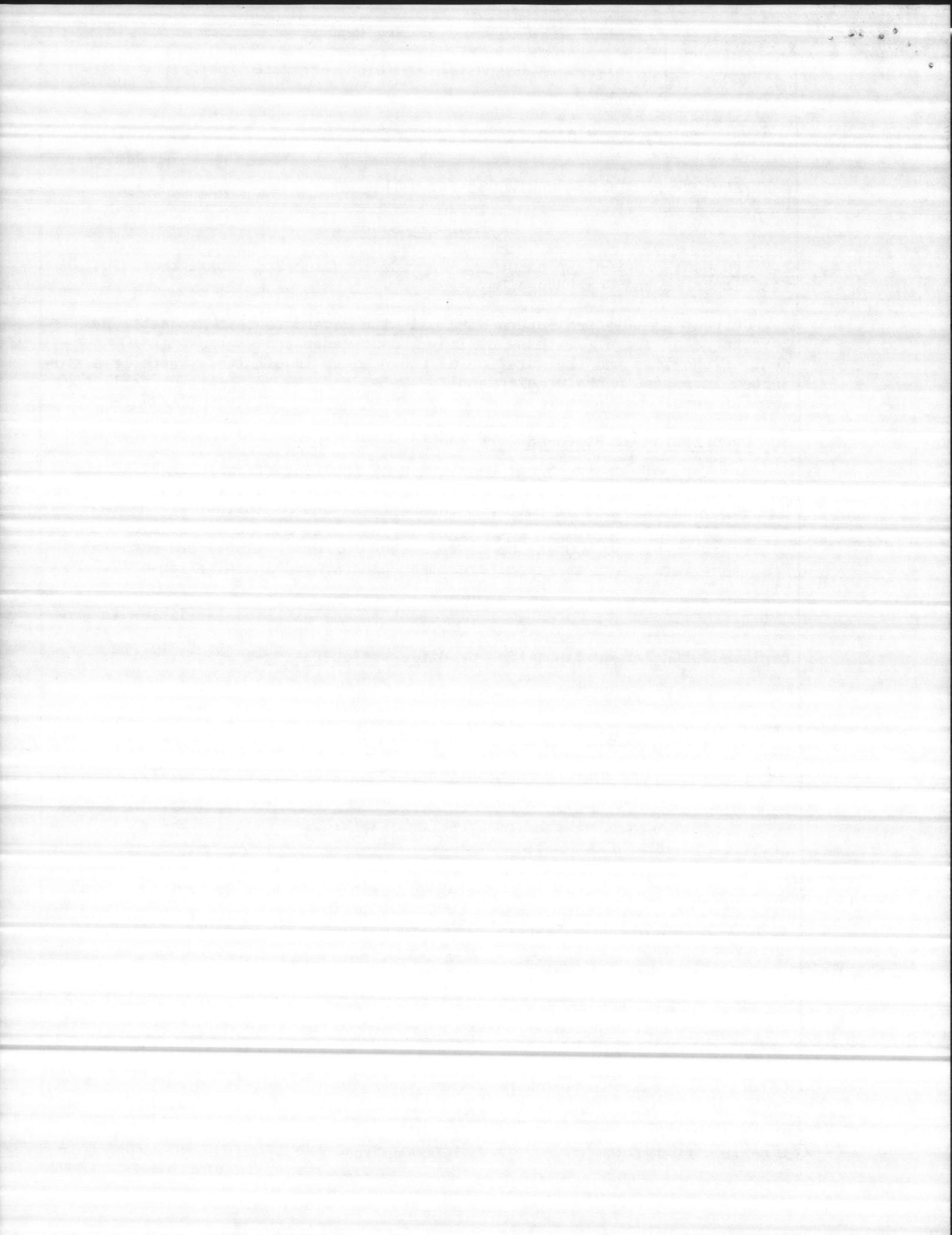
1. COMPONENT NAVY	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 1 AUG 1980
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE EXPANSION/UPGRADE OF COURTHOUSE BAY UTILITIES	5. PROJECT NUMBER P-784	
<p>11. REQUIREMENT:</p> <p><u>Project:</u> Expand and upgrade sewage and water treatment facilities in the Courthouse Bay area.</p> <p><u>Requirement:</u> A projected deficiency of 384,000 gallons per day of water production and a deficiency of 153,000 gallons per day of sewage treatment capacity will exist in 1986. Additionally, stringent new requirements in the NPDES permit for this plant will require major modification to the plant to handle increased sewage flows expected. A projected shortage of 240,000 gallons of storage of water for fire protection will exist.</p> <p><u>Current Situation:</u> A current reserve capacity of approximately 50,000 gallons per day exists at the water treatment plant. Although a reserve of 97,000 gallons per day exists at the sewage treatment plant, flows in excess of 424,000 gallons per day have occurred. Flows above 424,000 gallons per day result in exceeding the recommended overflow rate resulting in deterioration of the effluent.</p> <p><u>Impact if Not Provided:</u> Future growth in the Courthouse Bay area will be restricted due to the lack of adequate utilities in the area.</p>		
TH		



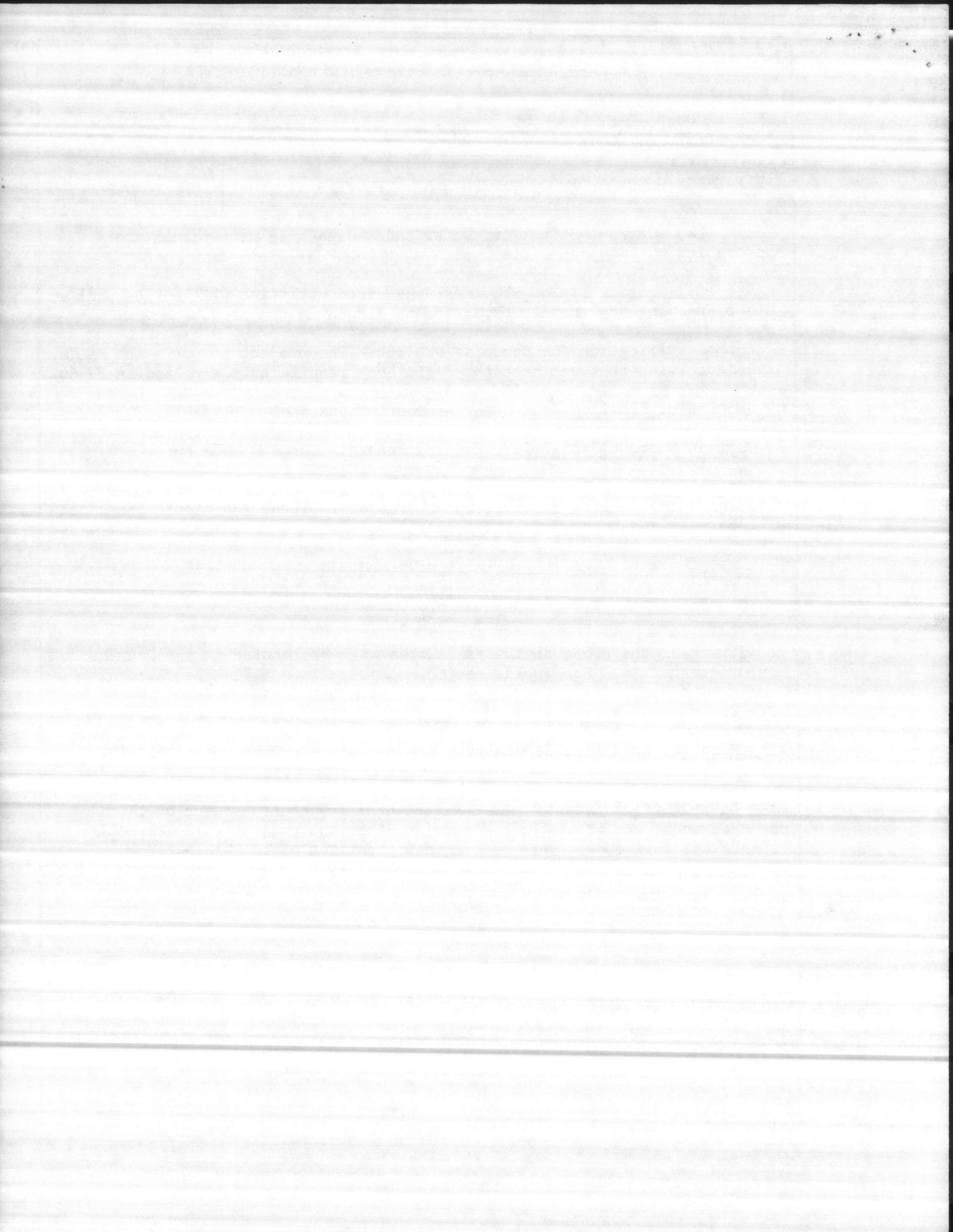
1. COMPONENT NAVY	FY 19 <u>84</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 1 AUG 1980
3. INSTALLATION AND LOCATION MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE EXPANSION/UPGRADE OF COURTHOUSE BAY UTILITIES		5. PROJECT NUMBER P-784
<p style="text-align: center;"><u>SPECIAL CONSIDERATIONS</u></p> <ol style="list-style-type: none"> 1. <u>Pollution Prevention, Abatement, and Control</u>: This project will not cause additional air or water pollution. 2. <u>Flood Hazard Evaluation</u>: Requirements of Executive Order No. 11296 (Flood Hazards) are not applicable. 3. <u>Environmental Impact</u>: The project Environmental Impact Assessment has been made, reviewed, and where required, the design concepts give consideration to eliminating adverse environmental effects consistent with applicable directives. 4. <u>Fallout Shelter Construction</u>: Fallout shelter protection is incorporated in the facility. 5. <u>Design for Accessibility of Physically Handicapped Personnel</u>: Provisions for physically handicapped personnel are not required in this facility. 6. <u>Use of Air Conditioning</u>: Ceiling "U" factors will be made to conform with DOD 4270.1-M. 7. <u>Preservation of Historical Sites and Structures</u>: The project facility does not directly or indirectly affect a district, site, building, structure, object, or setting which is listed in the National Register or otherwise possesses a significant quality of American history. 		

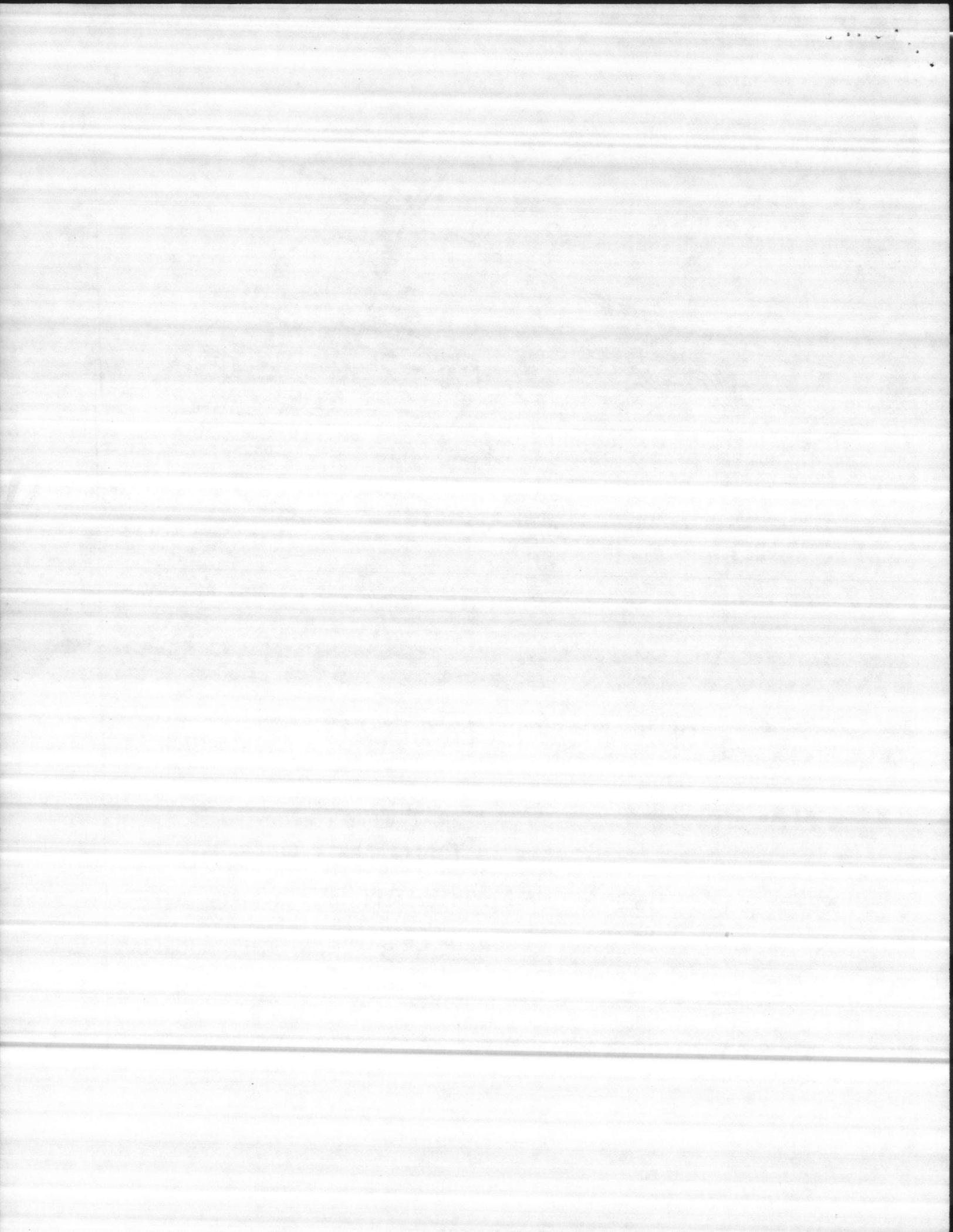


1. COMPONENT NAVY	FY 19 <u>84</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 1 AUG 1980
3. INSTALLATION AND LOCATION MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE EXPANSION/UPGRADE OF COURTHOUSE BAY UTILITIES	5. PROJECT NUMBER P-784	
<u>FACILITY STUDY</u>		
1. <u>Project</u> : Provide expansion and upgrade to water and sewage treatment facilities in the Courthouse Bay area.		
2. <u>Current and Planned Future Workload with Regard to this Project</u> : The percentage of usage for these utility improvements and upgrades is 100 percent of the time and the duration of the need is indefinite. There is a projected increase in the requirement for water and sewage treatment facilities for the area.		
3. <u>Description of Proposed Construction</u> :		
a. <u>Type of Construction</u> : Demolition of portions of existing buildings and structures. Reinforced concrete/frame expansion of water treatment plant BB-190. Installation of pumps, motors, piping and electrical wiring in sewage and water treatment plants, wells, and lift stations. Reinforced construction of 250,000 gallon storage tank for water plant, and exterior treatment facilities at sewage treatment plants, and installation of V.C.P. pipe.		
b. <u>Replacement</u> : No exact replacement of any existing facilities is proposed. However, some existing facilities will be modified, and some will be replaced with larger capacities or different operating characteristics.		
c. <u>Description of Work to be Done</u> :		
(1) <u>Primary Facility</u> : Reinforced concrete/steel masonry structures.		
(a) <u>Support Facilities</u> : Installation of pumps, motors, piping, electrical wiring, controls.		
(2) <u>Energy Conservation</u> : Energy efficient equipment will be utilized.		
4. <u>Cost Estimate</u> : Area cost factor for Camp Lejeune, N.C. is 0.95. Cost data derived from study prepared by J. E. Sirrine Company, A & E Contract N62470-78-C-3678, on 8 January 1979, and escalated to FY-84 to provide for this project.		
5. <u>Justification for Project and for Scope of Project</u> :		
a. <u>Justification for Project</u> :		
(1) <u>Project</u> : Proposed utilities expansion and upgrade is required to provide requirements for near term expansion of facilities in the Courthouse Bay area.		



1. COMPONENT NAVY	FY 19 ⁸⁴ MILITARY CONSTRUCTION PROJECT DATA	2. DATE 1 AUG 1980
3. INSTALLATION AND LOCATION MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542		
4. PROJECT TITLE EXPANSION/UPGRADE OF COURTHOUSE BASE UTILITIES	5. PROJECT NUMBER P-784	
<p>(2) <u>Current Situation</u>: Water and sewage treatment plants are approaching maximum capacities.</p> <p>(3) <u>Impact If Not Provided</u>: Required utilities will not be available, preventing any further expansion or growth in the area.</p> <p>b. <u>Justification for Scope of Project</u>: The project scope is the minimum size facilities that can meet the deficiency requirements expected in FY-86.</p> <p>6. <u>Equipment Provided from Other Appropriations</u>: Not applicable.</p> <p>7. <u>Common Support Facilities</u>: Not applicable.</p> <p>8. <u>Effect on Other Resources</u>: The project will require increased O & M, M.C. funds for utility services and operations. Three additional personnel will be required to operate the facilities.</p> <p style="text-align: center;"><u>UTILITY REQUIREMENTS</u></p> <p>a. <u>Electricity</u>: Consumption - 876,000 KWH/yr Peak Demand - 160 KW</p> <p>9. <u>Siting of the Project</u>: The facilities will be located in the Courthouse Bay - Amtrac area. See enclosure (1).</p> <p>10. <u>Other Graphic Presentation, Including Photographs</u>: None</p> <p>11. <u>Economic Analysis</u>: No analysis has been made. This project is in support of an operational mission located in this area.</p> <p>12. <u>Environmental Impact</u>: An Environmental Impact Assessment of the area has been made, and it has been determined that the project will generally enhance the environment through adequate treatment of potable water and sewage. No highly controversial elements exist.</p>		





1 MAY 1979

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commanding General, Marine Corps Base, Camp Lejeune, NC

Subj: Water Usage - Courthouse Bay Area

Ref: (a) Utility Study of Courthouse Bay - J. E. Serrina

Encl: (1) Graph of water and sewage usage at Courthouse Bay
(2) Graph of sewage flows - weekend
(3) Graph of sewage flows - weekday

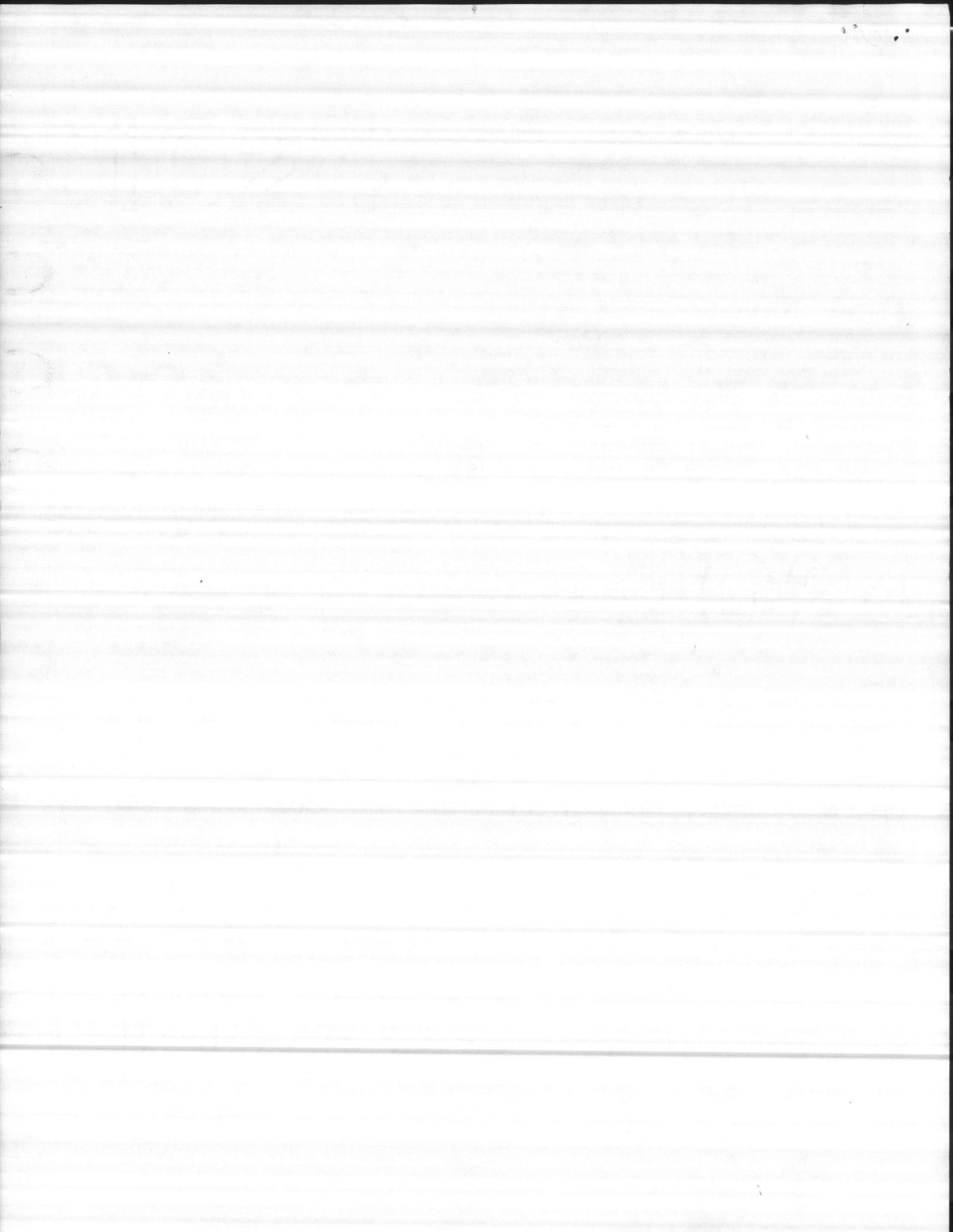
1. Expansion of the water and sewage treatment plants at Courthouse Bay, Camp Lejeune, is recommended in reference (a). These recommendations were based upon an evaluation of sewage treatment data which indicated a dramatic increase in water use when two new type barracks were occupied. Evaluation of the more complete data by this office indicated a much lower usage rate, and a closer look at the water and sewage flows at Courthouse Bay is in order.

2. Enclosure (1) is a graph of the water and sewage consumption at Courthouse Bay from July 1976 to January 1979. The graph indicates that the sewage flows have been less than, and proportional to, the water used; except during February and August 1978, when the sewage exceeded the water. These exceptions may have been due to metering problems, and the personnel who calibrate the meters should be contacted to see if the meters were recalibrated or adjusted during this period.

3. The graph indicates unusual peaks during August 1976, January 1977, August to November 1977, January 1978, March 1978 and May to August 1978. These may have been due to an influx of extra personnel for short training periods and/or changes in training activities. The Commanding Officer of the Engineering School, Camp Lejeune, should be contacted for information of month to month Courthouse Bay training activities during 1976, 1977, and 1978 that could explain these peaks (i.e. fluctuations of personnel loadings, vehicle washings, etc.).

4. The graph also shows an increase in water use of about 1.1 million gallons per month (MG) during May, June, and July 1977, when the two new barracks were occupied. This increase calculates to 110 gallons per capita per day, which is reasonable. When the 110 gallons per

HARWOOD
HULL
4/23/79



capita figure is assumed for all personnel, the graph also indicates about 3.4 million gallons per month of unaccountable water losses, or about 32% of the total produced.

5. Enclosures (2) and (3) are graphs of sewage flows measured at the main sewage lift station at Courthouse Bay. They indicate a sewage flow of about .15 MGD on the weekends, and about .19 MGD (95 GPCD) during the week.
129 142

6. Except for paragraph 5., these observations were brought to the attention of Mr. Dutton of the J. E. Serrine Company, who included in the study a paragraph stating that a leakage survey should be performed and the results analyzed prior to the execution of the other recommendations of the report (Section 100 - Page 13).

7. The survey and analysis must be performed before money is spent on what may be needless construction projects. It is recommended that a contract be let to have the leakage survey made. A firm such as Pitometer Associates, 200 Century Plaza, Columbia, MD 21044, telephone 301-730-0255, can make the survey. The cost should be less than \$5,000.

J. G. Leech
By direction

Copy to:

Mr. Lonnie Dutton
J. E. Serrine Company
P. O. Box 5456
Greenville, SC 29606

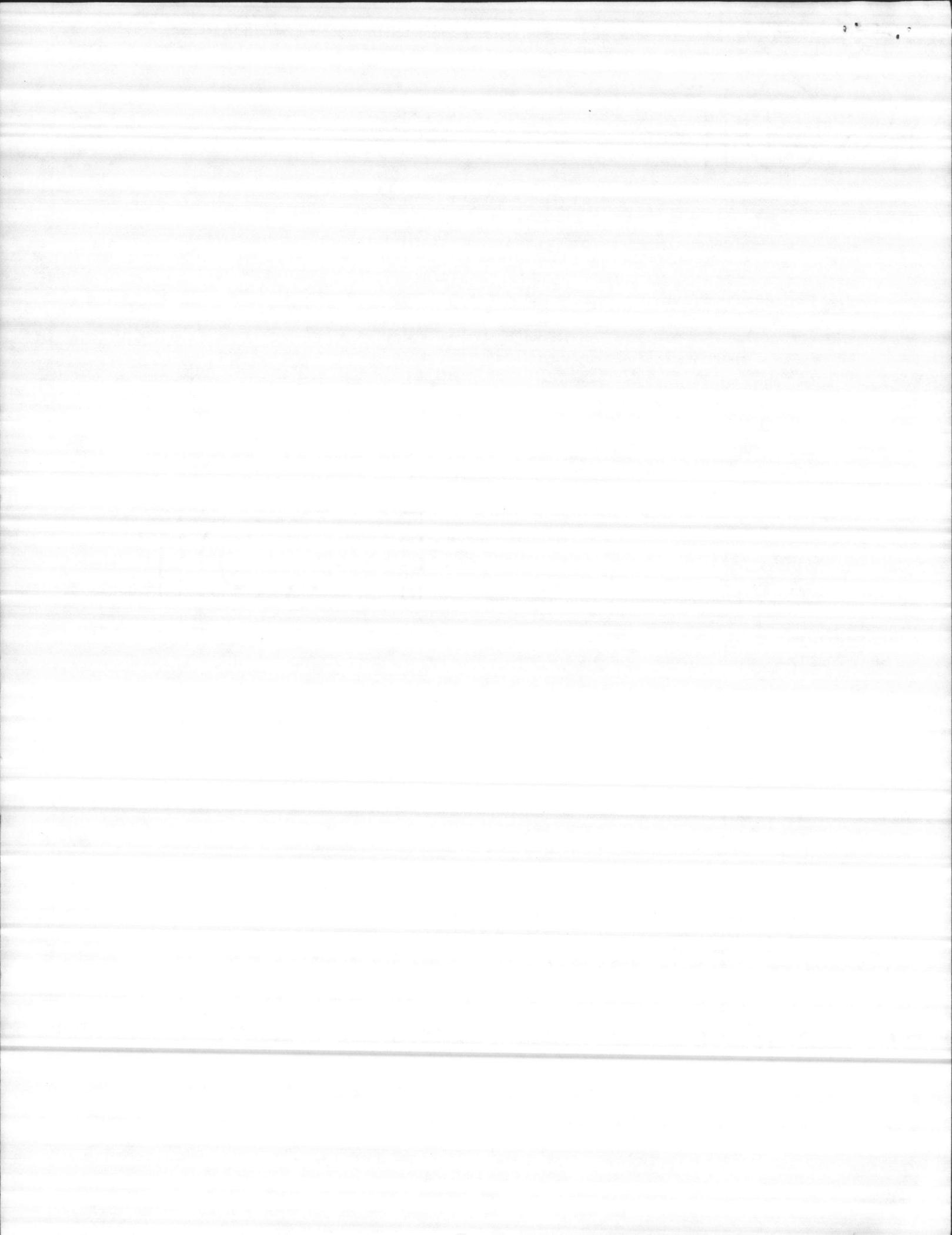
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114S



SHEET NO. OF
 JOB NO.
 SUBJECT CAMP LEJEUNE, AIC
 COURTHOUSE BAY
 DATE DATE
 CHKD. BY

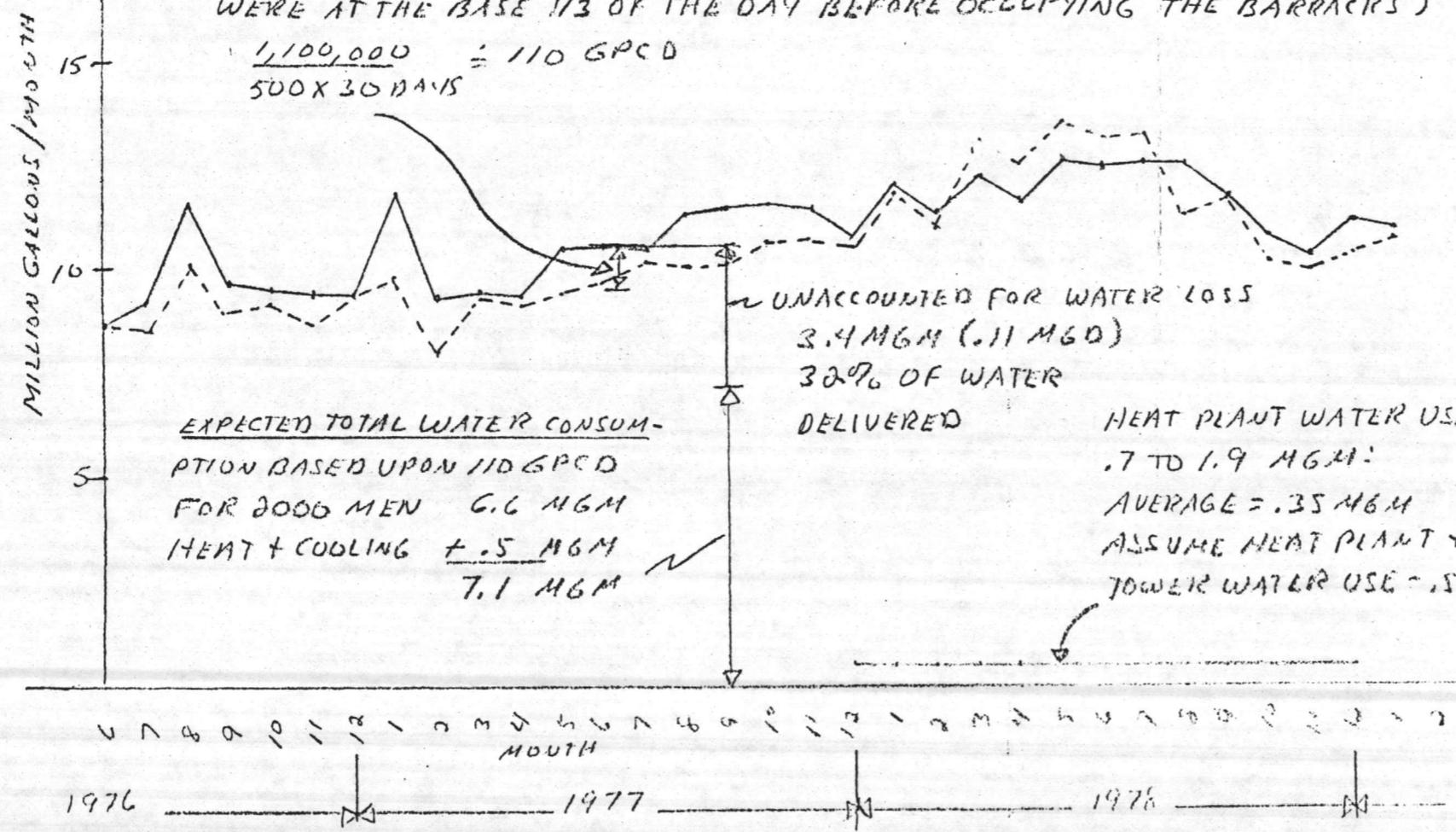
WATER BUDGET

WATER & SEWAGE - COURTHOUSE BAY

— WATER
 - - - SEWAGE

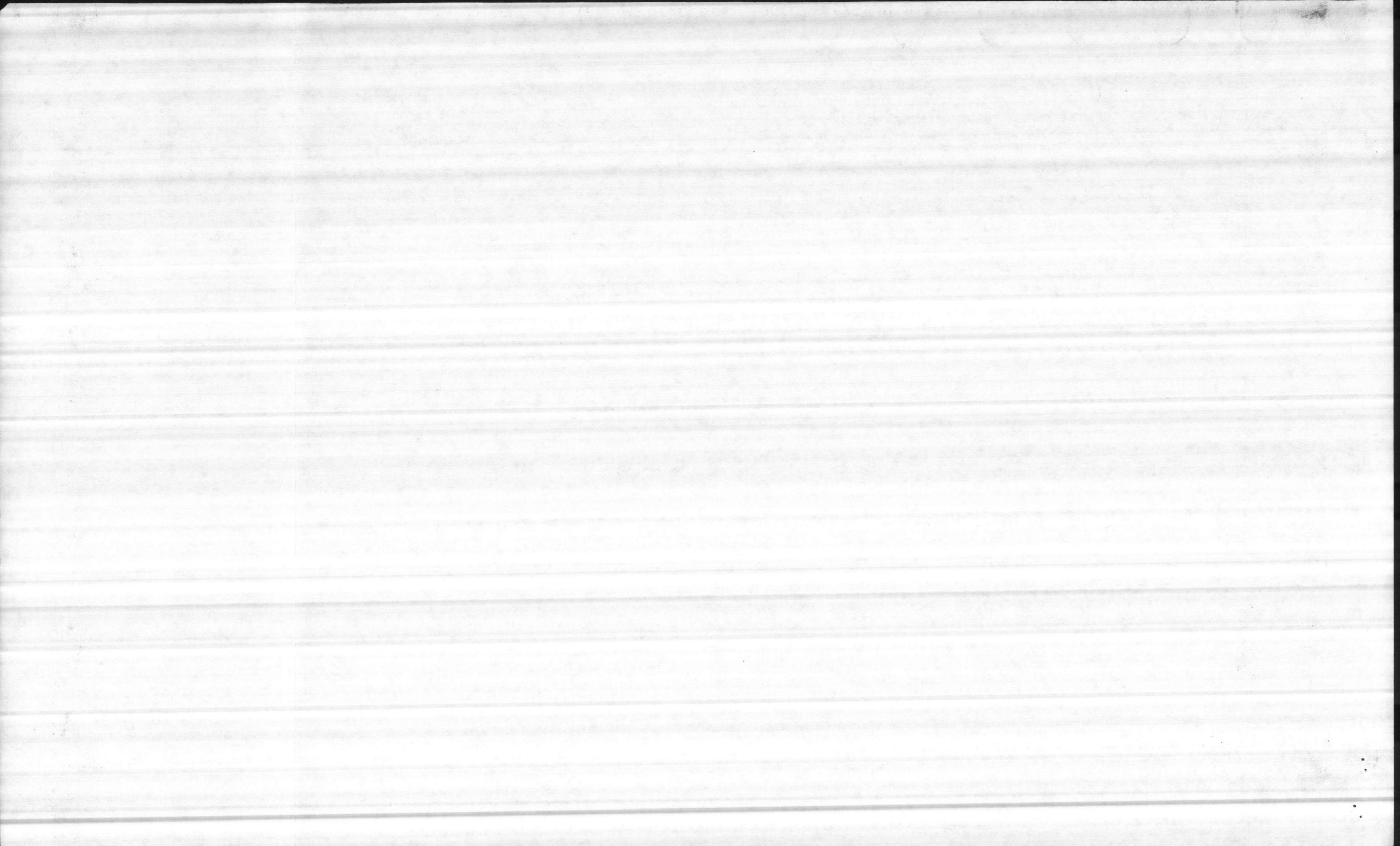
WATER CONSUMPTION INCREASE (10.6 - 9.5 = 1.1 MGM) WHEN 2 NEW BARRACKS WERE OCCUPIED - 500 MEN X 2/3 = 333 EQUIVALENT POPULATION (THE MEN WERE AT THE BASE 1/3 OF THE DAY BEFORE OCCUPYING THE BARRACKS)

$$\frac{1,100,000}{500 \times 30 \text{ DAYS}} = 110 \text{ GPCD}$$



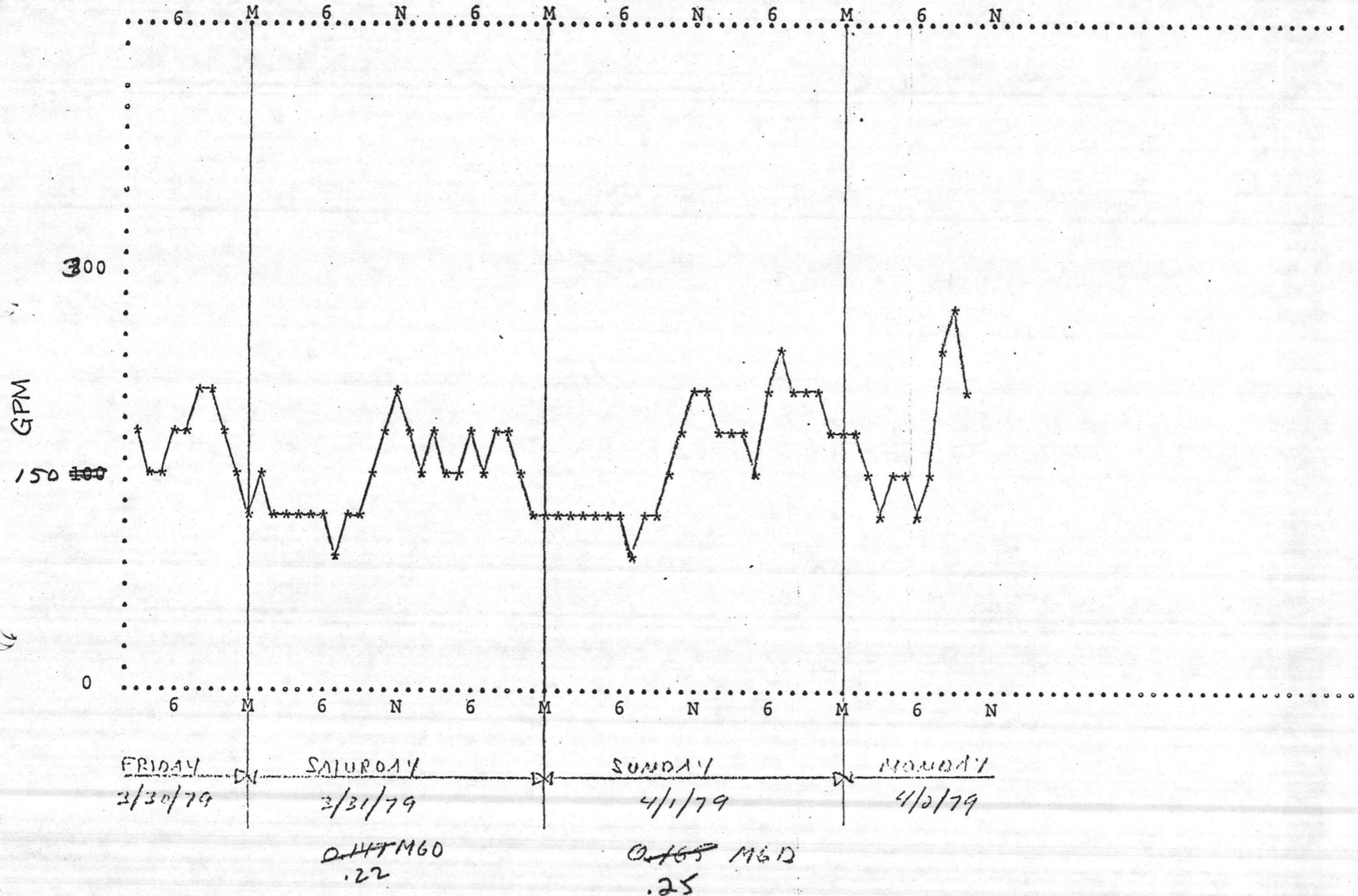
ENCLOSURE (2)

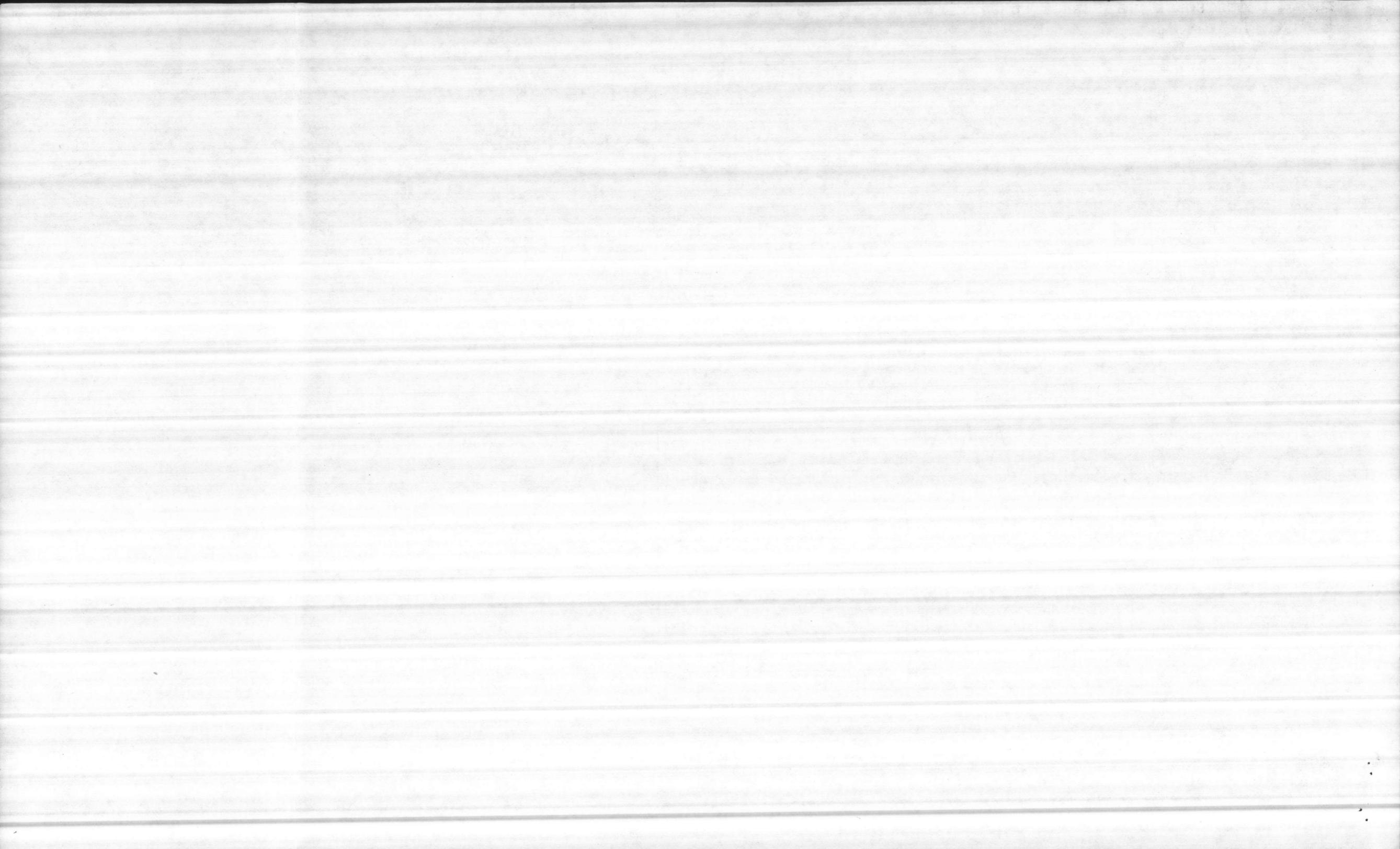
ENCLOSURE (2)



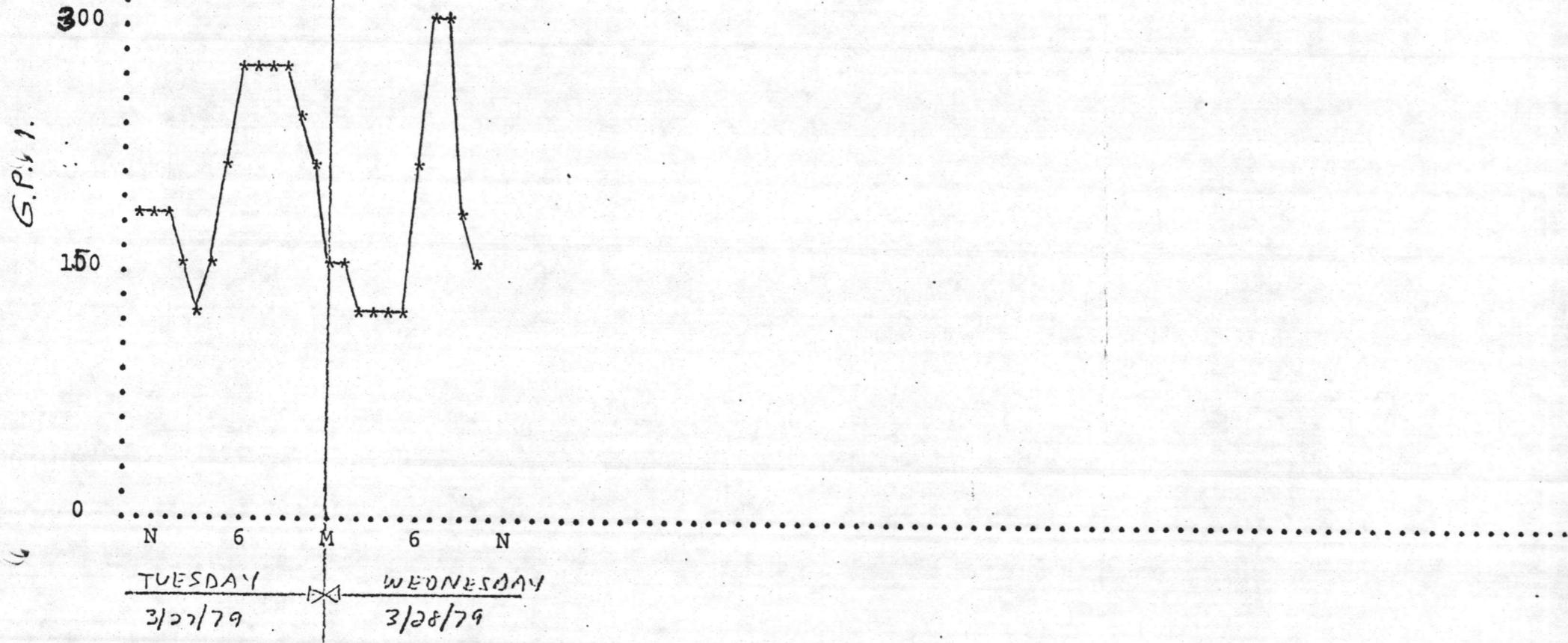
COURTHOUSE BAY SEWAGE PUMP STATION 3/30/79 (1300) to 4/2/79 (0900) FRIDAY to MONDAY MORNING (NO RAIN)

ENCLOSURE (2)





(NO RAIN)



G.P. 1.

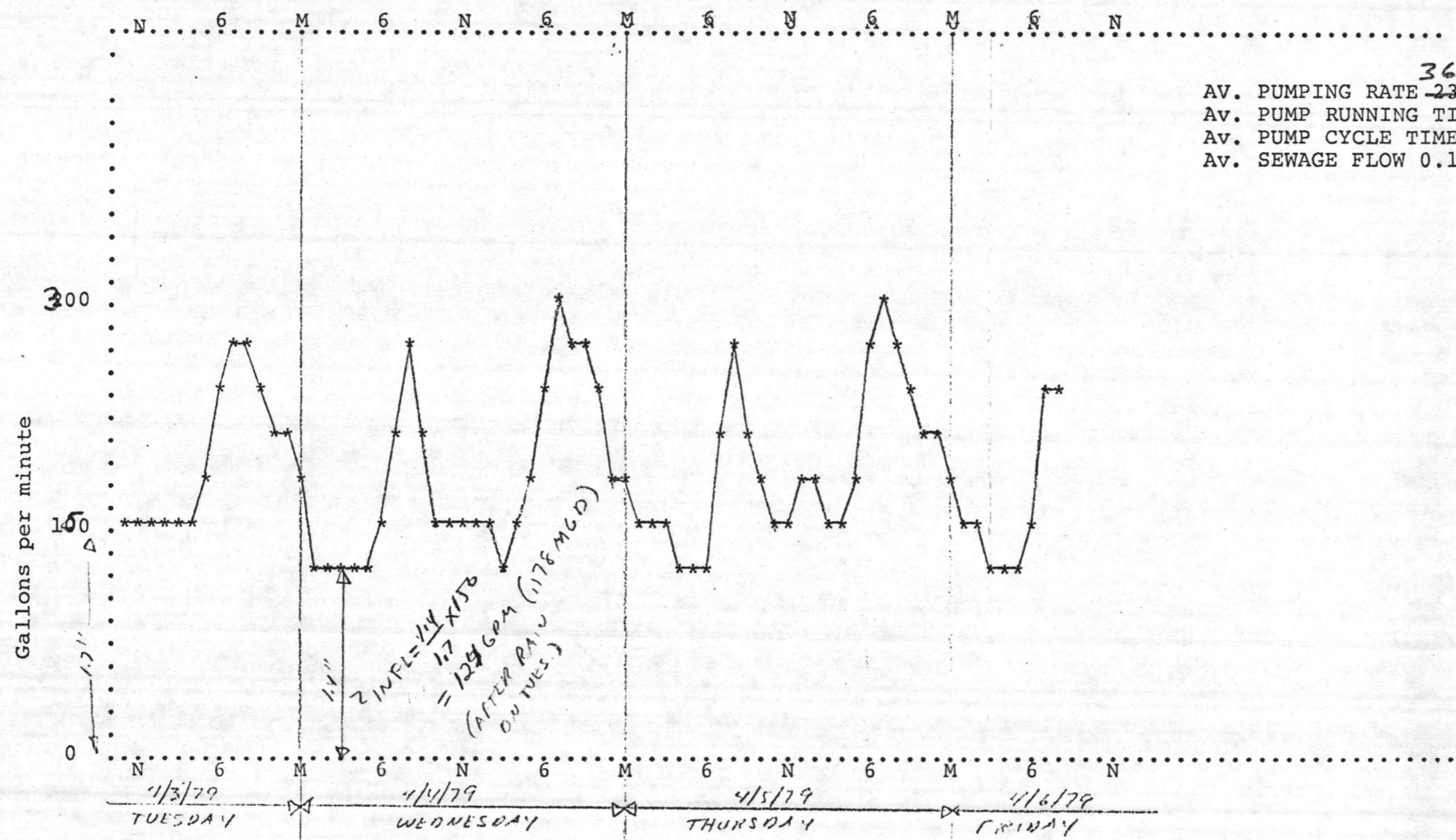
TUESDAY 3/27/79

WEDNESDAY 3/28/79

19M6D
.29

ENCLOSURE (3)

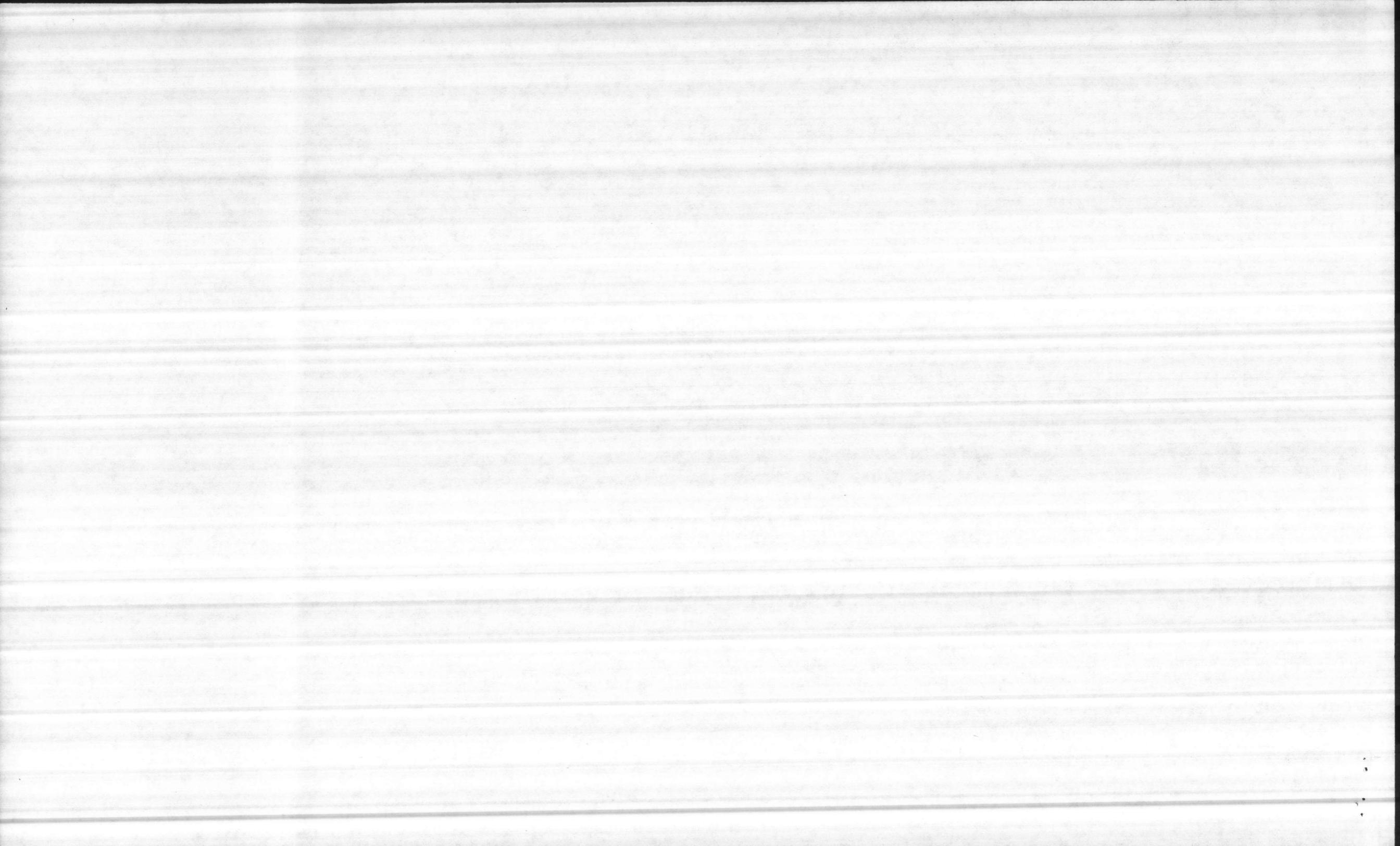




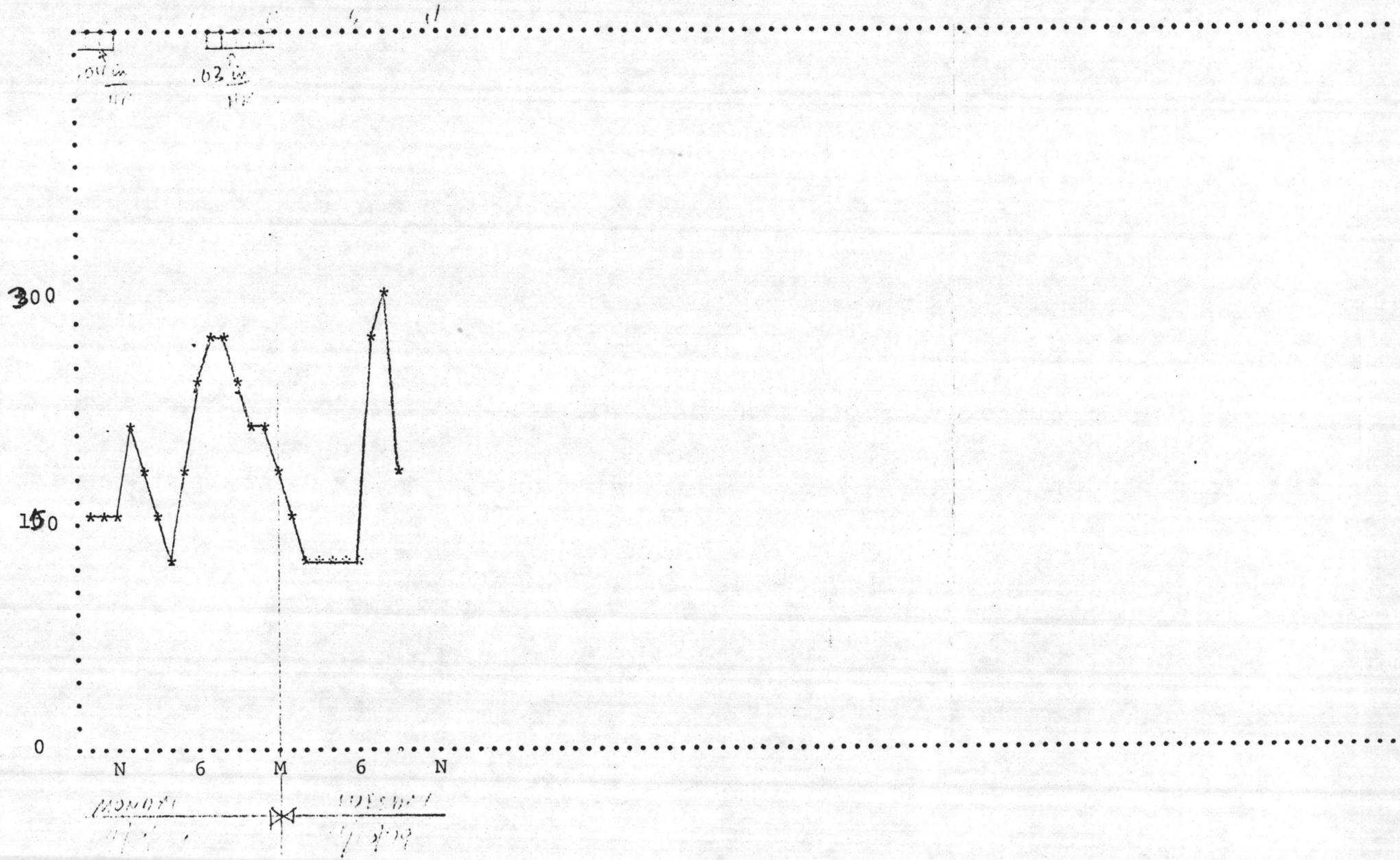
AV. PUMPING RATE ³⁶⁰ ~~238.5~~ G.P.M.
 Av. PUMP RUNNING TIME 11 min, SD 5 min
 Av. PUMP CYCLE TIME 8.8 min, SD 2.8 min
 Av. SEWAGE FLOW 0.18 MGD (128 gpm)

NOTE: Rain was recorded at MCAS New River and may not accurately reflect the actual rainfall at Courthouse Bay.

100-10 (3)

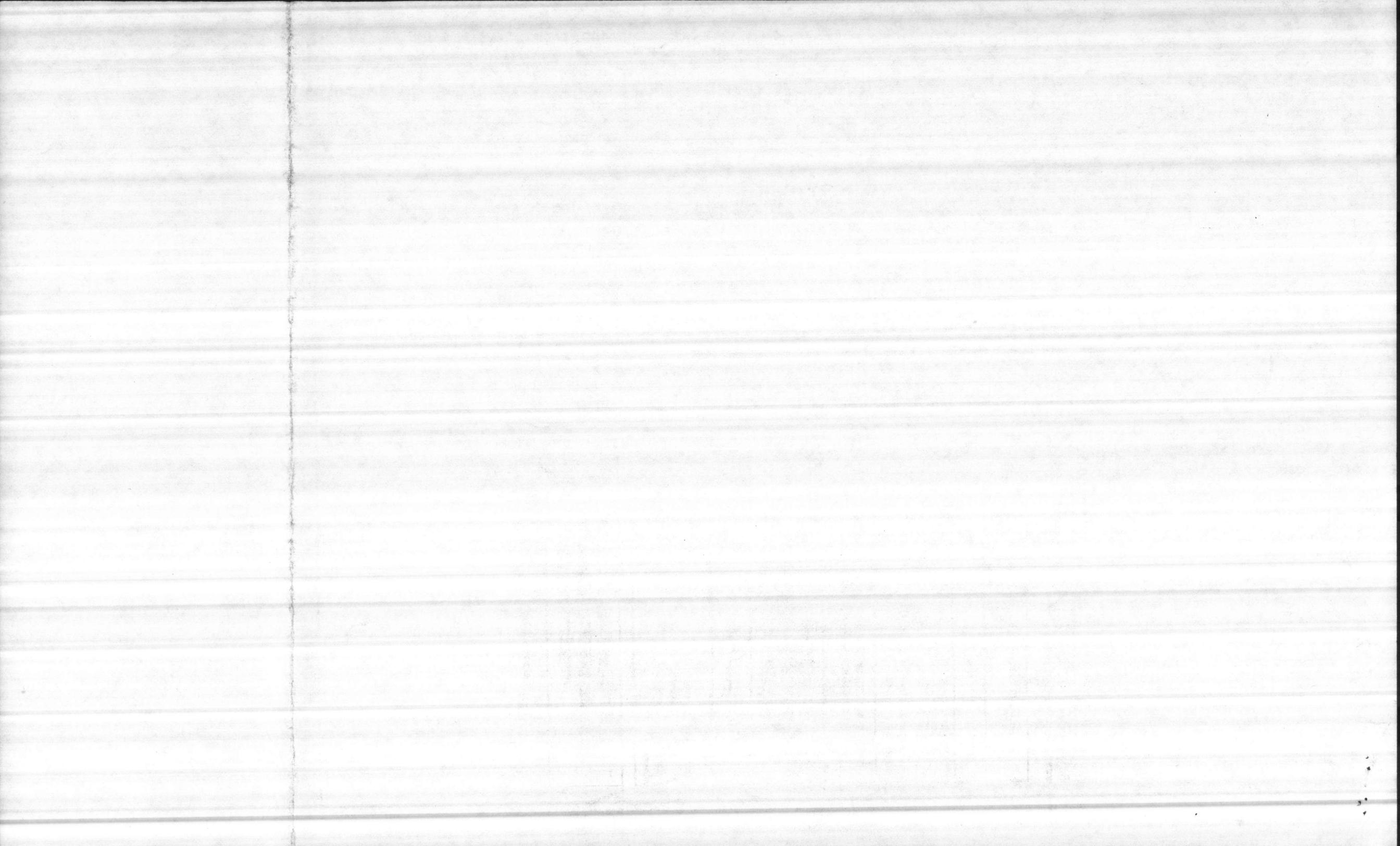


COURTHOUSE BAY SEWAGE PUMP STATION 4/9/79 (0900) to 4/10/79 (0830) MONDAY - TUESDAY
(RAIN)



(~~216~~ MGD)
127

ENCLOSURE (3)



(Taken from Seelye's Civil Engineer Design

Ferry. These values are general (Manual)

design figures. They can vary considerably, depending upon each individual site. I don't think that there are any fast numbers, just general average figures. I hope these help -

Jerry Harwood



WATER SUPPLY — DEMANDS — I

1. **FACTORS AFFECTING DEMAND** are population, per capita consumption, pressure, quality, cost, sewer facilities, climate, air conditioning, and use of meters.
2. **INDUSTRIES** or other special large consumers should be carefully considered.
3. **EXTENSIONS OF SYSTEMS** Field survey of pressures and consumption is best guide to design.
4. **FUTURE** Systems and extensions are generally designed for 30 years hence.
5. **CAPACITY** of system should be sufficient to deliver maximum daily flow simultaneously with required fire flow (see p. 10-03). Fire flow generally governs design of distribution system especially for smaller systems.

TABLE A — AVERAGE DESIGN VALUES FOR MUNICIPAL WATER SYSTEMS

City	Population thousands	Average Consumption gallons per day per capita
Residential		100
Residential, Commercial and Industrial	25-50	148
	50-100	133
	Over 100	151

Based on well-regulated and well-operated system, good plumbing, and good metering. Values include public use, waste and miscellaneous.

TABLE B — FACTORS AFFECTING DEMAND

Factor	Effect in %
Pressure \pm	± 10
Quality \pm	± 5
Costs	± 20
Absence of sewage facilities	-10
Absence of meters	+20 to 100

Above table extremely approximate, to be used only preliminary to complete analysis and investigation.

TABLE D — COMMERCIAL WATER CONSUMPTION IN THE BOROUGH OF MANHATTAN, N. Y. C.

Type of Building	Gallons per day per 1000 sq. ft.
Hotels	600-1100
Office Buildings	100-500
Department Stores	100-400
Apartment Buildings	200-400
Average	300

TABLE E — AVERAGE DESIGN VALUES FOR INSTITUTIONAL AND PRIVATE SYSTEMS

Description	Gals. per cap. per day
Camps	25-40
Small dwellings, farmhouses, etc.	40-60
Large dwellings, boarding schools, etc.	75-100
Institutions (except hospitals)	75-125
Hospitals	150-250
Day Schools	15
Day Schools (with showers)	20
Factories	25

TABLE C — FLUCTUATION OF DEMAND

Maximum Demand	% of Average Annual Demand
Monthly	140
Daily	120-240
Hourly: Without fire demand	150-220
Hourly: With Fire demand	200-500

TABLE E — PLUMBING FIXTURES*

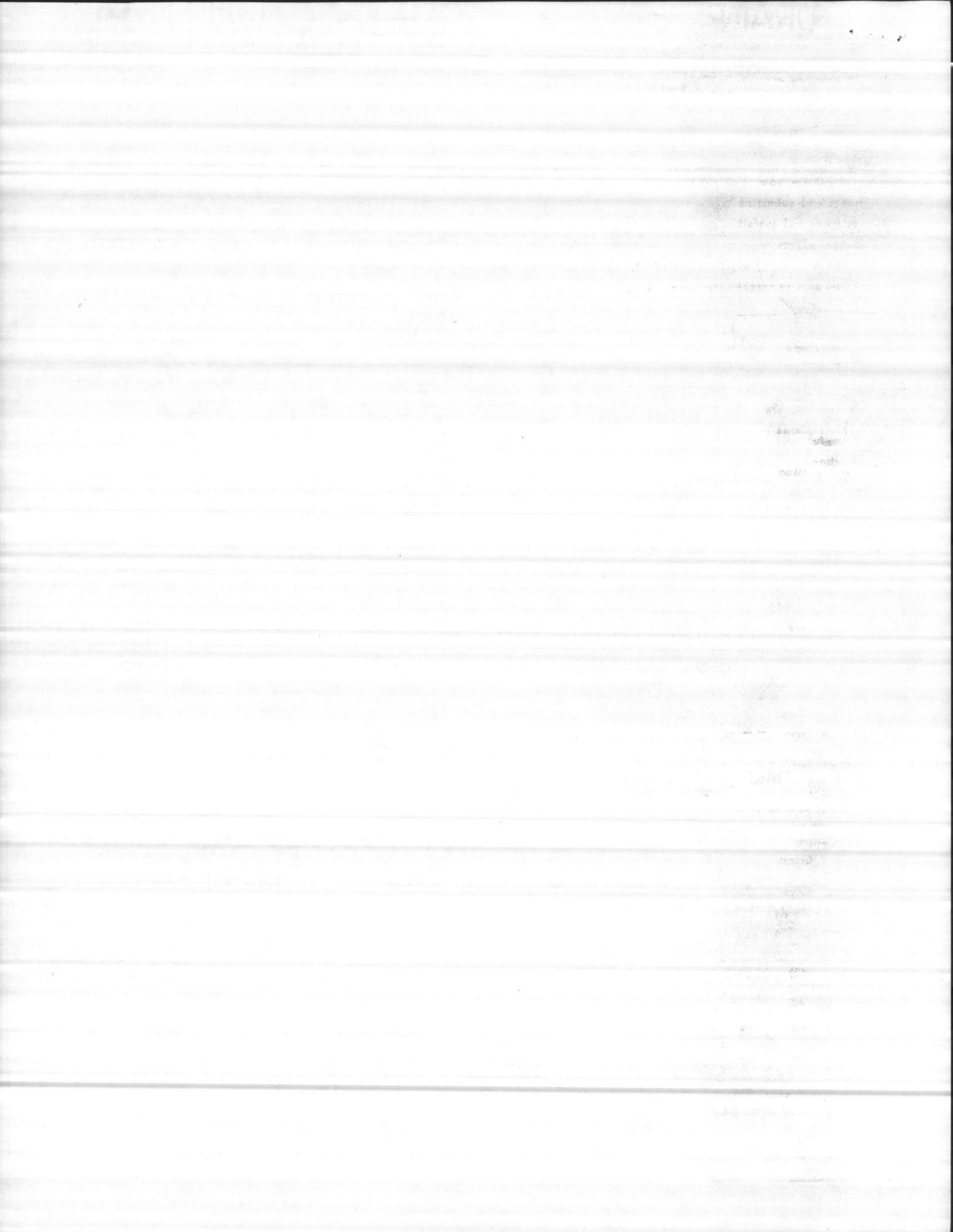
(See Fig. C, p. 22-05 for factors of usage.)

Fixture	Excellent Flow g.p.m.	Pressure at Outlets (Faucets Wide Open), p.s.i.
Lavatory faucets, single	4	4
Bathtub faucets, single	6	5
Combination bathtub faucets	8	5
Sink faucets	6	5
Shower heads	6	3
Shower mixing valves	6	30
Water closets, tank type	5	5
Water closets, flush valves	30	25
Garden hose and nozzle	10	30 at hydrant

TABLE G — MISCELLANEOUS REQUIREMENTS†

Domestic Fixtures:		Gallons
Filling the ordinary lavatory		1½
Filling the average bathtub		30
Flushing water cabinet closet		6
Shower bath		30
Lawn Fixture:		Gal. per hr.
½-inch hose with nozzle		200
¾-inch hose with nozzle		300
Lawn sprinkler		120
Continuous-flowing drinking fountain		90
Farm Animals:		Gal. per day
Each cow or horse		10
Each hog or sheep		5
100 chickens		4

* Data from Davis, *Book of Applied Hydraulics*, McGraw-Hill.
 † Data from Peabody & Plumb, Co.



DRAINAGE & SEWERAGE - BASIS OF DESIGN

STANDARDS FOR DESIGN OF SEWERAGE*

Item	Basis of Design
Design population	Estimated future tributary population up to 50 years hence.
Average daily flow	100 gal. per day per capita (includes normal infiltration).
Laterals and submains (flowing full)	400 gal. per day per capita.
Main, trunk and outfall (flowing full)	250 gal. per day per capita.
Industrial plants	Add for sewage and industrial wastes.
Infiltration	Not to exceed 10,000 gal. per day per mile for pipe up to 15 in. diameter.
Minimum size of street sewer	8-in. diameter.
Minimum slope	Sufficient to give mean velocity of 2 f.p.s. when flowing full or half-full, based on "n" of 0.013 in Kutter's or Manning's formula.
Maximum slope	12 to 15 f.p.s. at average flow. Provide protection against erosion and shock for greater velocity.
Manholes	At end of each line; at all changes in grade, size and alignment. Not more than 400 ft. intervals for sewers up to 15 in. dia. Not more than 500 ft. intervals for sewers 18 to 30 in. dia.
Drop-type manholes	Use where entering sewer is 24 in. dia. or more above manhole invert.
Inverted siphons	Minimum pipe size 6-in. diameter. Minimum number of pipes two. Minimum velocity at average flow 3 f.p.s.
Pumping station	Dry-well type preferable. Wet-well type acceptable for installations serving 50 homes or less. At least 2 pumps; one pump permissible for installations serving not more than 50 homes, provided space is allowed for 1 future pump, and provided overflow is permissible. Protect pumps against clogging by installing bar racks with openings not exceeding 2 in. Provide mechanically cleaned bar screen with grinder or comminutor when size of station warrants. Minimum suction and discharge 4-in. diameter Wet-well capacity not to exceed 10 min. detention at average flow. Power supply from 2 independent sources or emergency power should be provided.

SUGGESTED FORM FOR SANITARY SEWER-DESIGN COMPUTATIONS†

SANITARY COMPUTATIONS

Computed by: _____

"n" = 0.015

Checked by: _____ Location _____

Density of Population = 30/acre

Date: _____

Sheet _____ of _____

Sewer Location			Tributary Area, acres		Maximum Rate of Sewage Flow			Design				Profile				
Street	From	To	in-	Total	Rate per acre, g.p.d.	Total m.g.d.	Total c.f.s.	Diam-eter, in.	Slope, ft./ft.	Capa-city When Full, c.f.s.	Veloc-ity When Full, f.p.s.	Length, ft.	Fall, ft.	Other Losses, ft.	Invert Eleva-tion, Upper End	Invert Eleva-tion, Lower End
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Third	10	11	43.3	43.3	12,000	0.52	0.80	10	.0045	1.12	2.2	325	1.46	0.00	95.33	93.87
Third	11	12	14.2	57.5	12,000	0.69	1.07	10	.0082	1.60	2.8	400	3.28	0.08	93.79	90.51
Chestnut	12	13	10.0	67.5	12,000	0.81	1.25	12	.0036	1.75	2.2	350	1.26	0.21	90.30	89.04

* Upper Mississippi River and Great Lakes Boards of Public Health Engineers, *Standards for Sewage Works*, May 1952.

† Adapted from *Handbook of Applied Hydraulics*, McGraw-Hill.

