file Eng Studies

ENGINEERING SERVICE REQUEST (ESR)
NAVFAC 11000/7 (4-78)
Supersedes NAVDOCKS 2038
S/N 0105-LF-010-0035

Instructions on Reverse — Copy No.

To:
From:

1. ~~From~~ (Activity and location)
Commanding General, Marine Corps Base Camp Lejeune, NC 28542
~~To~~ Commander, Atlantic Division, Naval Facilities Engineering Command Norfolk, VA 23511 (Attn: 09A21B3/M. Bryant.)

3. REFERENCE(S)

4. ESR IDENTIFICATION NUMBER (*if applicable*): 9E84

SECTION A — FOR USE BY REQUESTER

5. ENCLOSURE(S) (*check*)
☐ NAVCOMPT 140 ☐ OTHER (*specify*)
☐ NAVCOMPT 2038
☐ NAVCOMPT 372

6. TYPE OF FUNDING (*check*)
☐ O&MN ☒ OTHER (*specify*) O&MMC
☐ NIF
☐ NAF

7. TYPE OF SERVICES REQUESTED
Engineering Study to investigate Water Distribution System at Marine Corps Air Station (Helicopter)

8. DESIRED COMPLETION DATE: January 1985

9. DESCRIPTION OF WORK

I. GENERAL: Provide an engineering study to investigate the Water Distribution System at Marine Corps Air Station (Helicopter), New River, Jacksonville, NC.

II. BACKGROUND:

a. Presently, the MOQ area is served by an 8-inch dead end distribution line. This creates stagnant water and low water pressure. MOQ 2003 is an

10. FOR INFORMATION CONSULT (*Name and phone*)
G. S. JOHNSON, JR.
AV: 484-5161

11. OFFICIAL REPRESENTATIVE (*Signature*)
C. R. JOHANNESMEYER
By direction

12. DATE: 26 JUN 1984

SECTION B — FOR USE BY EFD

1. SCOPE OF SERVICES
72-919-451-
676-5141

2. DATE RECEIVED: 16 July 1984

3. ESR NUMBER: N-4063

SECTION C — INTERIM ENDORSEMENT

1. REMARKS Present workload precludes starting in-house study before spring or summer 1985. If earlier date is desired, it should be done by A&E Contract. Cost of study will be between $50K and $100K. Upon receipt of notification of a choice for an A&E Contract and availability of funds, this office will prepare a scope of work and initiate contract proceedings.

2. EST. COMPLETION DATE: 31 DEC 1986

3. AUTHORIZED REPRESENTATIVE (*Signature*)
J. R. BAILEY
By direction

4. DATE

SECTION D — FINAL ENDORSEMENT

1. ENCLOSURE(S)
☐ DRAWINGS AND MAPS ☐ SPECIFICATIONS ☐ REPORT
☐ OTHER (*specify*)

2. EST. COST (*if applicable*)
$

3. AUTHORIZED REPRESENTATIVE (*Signature*)

4. DATE OF COMPLETION

COPY TO
FAC; COMP: MAIN

18101

FILE - ESR

UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

PRE-PROPOSAL CONFERENCE

HAZARDOUS MATERIAL/USED OIL MANAGEMENT STUDY

by

Environmental Safety & Designs, Inc.

and

Atlantic Division, Naval Facilities Engineering Command

26 June 1985

1000-1010	Introduction and Purpose	Mr. Alexander, Facilities Dept.
1010-1130	Orientation of Current Issues	
	- Hazardous Material/Waste Inventory	LtCol Barone, Logistics Dept.
	- Turn-in and Disposal Operations	Ms. Nadine Hipp, Defense Reutilization and Marketing Office
	- Battery Acid Storage and Treatment	Mr. Junior Johnson, Base Maintenance Div.
	- Used Oil Handling and Storage	Mr. Fred Cone, Dep Base Maintenance Officer
	- Oily Waste Cleanup and Disposal	Mr. Danny Sharpe, Natural Resources
1130-1230	Lunch, MCB Steakhouse, Dutch Treat	
	Tour of Facilities and Operations	
1230-1300	Bldg 1011, Receiving and Distribution	
1300-1330	Bldg TP-457, 2d FSSG HM Storage	
1330-1400	Bldg 901, 2d Maint Bn, 2d FSSG	
1400-1600	MCAS, New River and return to Bldg 1	
1600-1630	Outbrief with Col Tiebout, AC/S, Facilities	

ATTENDEES - HAZARDOUS MATERIAL/USED OIL MANAGEMENT STUDY

PRE-PROPOSAL CONFERENCE

NAME	REPRESENTING
Mr. Paul Parker	LANTDIV, Code 114 (Envir Office)
Mr. Mike Hammersly	LANTDIV, Code 09A (Proj Mgt)
Mr. Jim Speakman	ENSAFE, Memphis
Mr. Phil Combs	ENSAFE, Memphis
LtCol Barone	AC/S, Logistics, MCB
Ms. Nadine Hipp	Defense Reutilization and Marketing Office, CLNC
Mr. Fred Cone	Deputy Base Maintenance Officer
Mr. Junior Johnson	Utilities Director, MCB
Mrs. Mary Wheat	Safety Manager, MCAS, New River
Mr. Danny Sharpe	Natural Resources and Environmental Affairs, MCB
Mr. Bob Alexander	Environmental Engineer, MCB

SCOPE OF WORK
FOR HAZARDOUS WASTE/MATERIALS AND USED OIL MANAGEMENT STUDY

I. INTRODUCTION

Objective

The purpose of this contract is to provide for an engineering study of hazardous material/waste (HM/HW) and used oil management practices at Marine Corps Base Camp Lejeune. The study will recommend facilities and management procedures for ensuring compliance with oil pollution and HM/HW regulations and maximum beneficial utilization of recoverable used oils and HM/HW. As used in this scope, the term "used oil" is meant to include all lubricants, fuel oils and other petroleum-based wastes. HW as used in this scope is defined as in 40 CFR 261. HM are chemicals that pose a health hazard in their use, storage, or transportation or are HW which are being reused or recycled. The contractor shall be required to provide an evaluation of feasible alternatives for the collection, treatment, and disposal or utilization of HM/HW and used oils; develop separate HM/HW and used oil management plans; documentation for a military construction project to build recommended facilities; and an interim plan for managing HM/HW and used oils until required facilities can be built and/or management procedures implemented.

Background

Various local, state, and Federal regulations, most notably the Resource Conservation and Recovery Act and the Clean Water Act, have placed severe restrictions on the discharge of HM/HW and oils to the environment. In compliance with these requirements, the Marine Corps is modifying facilities to abate HM/HW and oil discharges and to provide source separation, processing and storage of these wastes prior to reuse or disposal. Facilities are required to receive, treat, and store or dispose of these wastes. It is intended that these facilities, together with modifications to existing management procedures, will provide a comprehensive program for cost-effective compliance with environmental regulations.

Contract Requirements and Scope of Work

The Contractor shall be required to:

a. Review previous studies on HM/HW and used oil handling at MCB, Camp Lejeune and outlying fields and evaluate the current applicability of study findings and recommendations. Copies of previous reports will be furnished by the Government. (e.g. ESR U5020)

b. Identify sources and points of generation of HM/HW and used oil, and document volumes, frequency of generation, and characteristics by updating existing inventories. Field visits must be made to all sources. Waste streams must be sampled, and generation rates measured where necessary to provide information on waste stream composition. The government will provide data on generation rates and characteristics of HM/HW sales records. Study results shall be presented in both graphical and narrative form for each major waste stream.

c. Document Federal, state, and local regulations and Department of Defense instructions governing the handling, disposal, and reuse of HM/HW and used oil. The government will furnish copies of applicable DOD/ Navy Department instructions and policy statements.

d. Review and document existing facilities and practices for the management of HM/HW and used oils. Facilities under construction or in the planning stage must be reviewed and documented. Reviews must include, but not be limited to, an evaluation of:

1. Waste reduction, segregation, and reuse practices.

2. Plans and process flow diagrams of all collection, treatment, and disposal systems.

3. Operations and maintenance procedures.

4. Personnel staffing and training.

5. System costs and revenue generated by the sales of recovered used oils and HM/HW.

6. Management responsibilities.

7. Minimization of the various types of HM (particulary solvents) used for the same operations.

8. Review Plans and Specs and identify modifications, if any, on N62470-84-C-7804, Disposal of Waste Oil, Bldg. BB-9 and N62470-81-B-1464, Replace Boilers and Fuel Storage Tanks. Provide recommendations for firing rates and blending (e.g., need for second burner). If waste oil burning is a selected option, delineate all required equipment, O/M procedures, testing, and training.

e. Determine the most feasible and economical system for the collection, treatment, and disposal or reuse of HM/HW and used oil from activity operation considerations:

1. Compliance with applicable Federal, state, and local regulations.

2. Impact on present and future operations.

3. Capital, recurring operations and maintenance, and life cycle costs.

4. Beneficial utilization of recovered HM/HW and used oils, with emphasis on use of waste fuel oils as fuel supplements and the re-refining of used lube oils for reuse as lube oils, and the reuse of HW as HM.

5. Joint ventures with other Federal or commercial organizations.

f. All assumptions made in evaluating alternatives must be fully documented. A sensitivity analysis must be conducted to determine the continued attractiveness of the selected system with changes in factors influencing the decision. Examples of the factors to be included in the sensitivity analysis are future variations in the price of recoverable HM and oils and virgin petroleum products, and possible errors in the estimation of HM/HW, and used oil generation rates.

g. Prepare project documentation for facilities required by the selected system. The emphasis shall be on optimal utilization of existing facilities. New facilities will be funded by USMC O&M pollution abatement, MILCON, or minor local construction funds. Construction options shall be presented in various combinations of funding categories for budgeting flexibility. All local construction alternatives should provide the minimum of new facilities construction. Documentation shall be submitted on DD Form 1391. This shall be in accordance with: (1) MCO P11000.5E or OPNAVINST 11010.1C for minor construction projects, or (2) NAVFACINST 11010.32E, "Preparation of Supporting Document for Proposed Military Construction Program Projects." Economic analyses shall conform to NAVFAC P-422, "Economical Analysis Manual." Submittals must emphasize, but need not be limited to:

1. Project life cycle costs, including capital and recurring operations and maintenance costs.

2. Conceptual plans, design flows, effluent quality, schematic drawings, and related flow diagrams for all collection, treatment, and disposal or reuse systems, including existing facilities. These plans should be segregated into individual units by building and/or shop organization as well as master collection systems.

3. Required modifications to existing facilities.

4. Descriptions of major collection, treatment, and disposal or reuse components (i.e., pumps, separators, piping systems, etc.), to include useful life projections and efficiencies of existing facilities.

5. Operating and maintenance requirements, including number and qualifications of personnel required to operate and maintain the systems comparative to existing provisions.

6. Collaterial equipment required (i.e., trucks, portable tanks, etc.) and their functions.

7. Methods for disposing of treated wastewater, used oils, HM/HW, and treated residues.

h. Develop separate used oil and HM/HW managemnt plans. The plans shall establish procedures and responsibilities for ensuring compliance with oil pollution and HM/HW regulations and maximum beneficial utilization of recovered oils, fuels and HM. Plans must include, but not be limited to:

1. Regulatory compliance requirements.

2. Existing collection, treatment, and disposal or reuse practices, with a description of command responsibilities for each step.

3. Facilities, equipment, personnel, and procedures required for comprehensive HM/HW and used oil management programs, including command responsiblities and logistical support.

4. Implementation plans and schedules for instituting the recommended management programs, as well as interim practices to be utilized until the recommended program can be fully implemented and the required facilities can be constructed.

5. Revised oil spill prevention control and countermeasures (SPCC) and HM/HW/oil spill contingency plans.

Contract Scheduling

Prestudy meeting	30 days after contract award
Submittal of work plan and schedule	15 days after ~~contract award~~ preproposal meeting
Preliminary Reports	180 days after contract award
Final report	30 days after approval of draft report

I. Submittals

7 Copies of the Preliminary Report
5 to Marine Corps Base, Camp Lejeune
2 to LANTNAVFACENGCOM Code 114

Same Distribution For Final Report

Atlantic Division, Naval Facilities Engineering Command Points of Contact

Project Manager - ~~M. Bryant, P.E.~~ M.L. Hammersley, Code 09A21B6 (804) 444-9701
Waste Oils - Mr. Paul B. Parker, Code 114 (804) 444-9559
HM/HW - ~~Mr. Steve A. Brewer, Code 114~~

II. ACTIVITY POINTS OF CONTACT

A. Oily Waste Study

Mr. Thomas H. Hankins, P.E.
Manager, Mechanical Section, Design Branch
Public Works Division

Marine Corps Base
Camp Lejeune, NC 28542-5001
A/V 484-3238 or COMM (919) 451-3228

B. HM/HW Study

Mr. Robert Alexander, Envrionmental Engineer
Office of Assistant Chief of Staff, Facilities
Marine Corps Base
Camp Lejeune, NC 28542-5001
A/V 484-3034, COMM (919) 451-3034

Mr. Carl Baker, Manager
Civil Section, Public Works Division
Marine Corps Base
Camp Lejeune, NC 28542-5001
A/V 484-3238, COMM (919) 451-3238

Name	Organization	Telephone
Mike Hammersley	Lant.div (Project Management)	A/V564-9701 (804) 444-9701
LT Col BARONE	AC/S LOGISTICS	(919) 451-2535
BOB ALEXANDER	Env Engr, AC/S FAC, CLNC	919-451-3034 AV 484
CAPT. CERVENY	2nd FSSG ENGR/SAFETY OFF	919 451-3456-104
MARY WHEAT	MCAS, NEW RIVER	919-451-6068/65
GEORGE EGGERS	DPDO	919-451-5613
NADINE HIPP	DRMO	919 451-5653
ELMER PADGETT	FIRE DEPT.	919. 451-5815
DANNY SHARPE	NAT. RES. & ENV AFF. DIV	919 451-5003,20
Paul Parker	LANTDIV (Code 114)	(804) 444-9559 A/V 564-9559
JIM SPEAKMAN	ENSAFE	(901) 372-7962
GEORGE MATHER	DELTA PRODUCTS	(901) 398-5151
G.S. JOHNSON JR.	BASE MAINT.	(919) 451-5164
F.E. CONE	" "	(919) 451-2511
Greg Winters	NAVAL HOSP./Indus Hyg	451-5707

II-R-7

(804) 444-9558

6280
1142WLC

16 MAY 1985

MEMORANDUM FOR CODE 09A21B

Subj: INFILTRATION/INFLOW STUDY FOR THE CAMP GEIGER SEWER SYSTEM

Ref: (a) MCB CAMP LEJEUNE ESR Number 7E85 of 27 May 85 (LANTNAVFACENGCOM ESR U-5033)
(b) PHONCON MCB CAMP Lejeune (Mr. B. Alexander)/LANTNAVFACENGCOM (Mr. W. Carter) of 15 May 1985

Encl: (1) Infiltration/Inflow (I/I) Study Scope of Work

1. Enclosure (1) is forwarded pursuant to reference (a). Reference (b) advised of the availability of FY-85 funds in the amount of $50K to perform the subject I/I Study. Hence, reference (b) also confirmed that the Activity will make all necessary arrangements for an on-site prenegotiation meeting upon request.

2. Advertisement for an A/E Firm is, therefore, being requested for enclosure (1). All stages of the A/E Firm submittals are to be sent to MCB Camp Lejeune for review.

3. LANTNAVFACENGCOM point of contact is Mr. Wallace Carter, Code 1142, telephone 4-9558.

J. R. BAILEY, P.E.
Head, Environmental Quality Branch
Utilities, Energy and Environmental Division

Copy to:
MCB Camp Lejeune

File ESR

Copy for MAIN (UTIL + 1)
PWO
NREA
Env Engr
+ file 6280/4

INFILTRATION/INFLOW STUDY
FOR THE
CAMP GEIGER SEWER SYSTEM

I. Introduction:

A. A/E to determine wastewater collection system capacity and project scope/cost for any recommended sewer line repair/replacement to economically reduce infiltration/inflow.

NOTE: Determination of capacity includes estimating the ability of each section of the main sewer lines (interceptors) to convey flow (i.e., not just the pump station or end-of-pipe capacity, but also upstream flow).

II. Methodology:

A. A/E to divide the wastewater collection system into sections and determine the capacity of each section. One of those sections shall include the Main Pump Station, Building AS-629, which discharges from the MCAS (H) area into the Camp Geiger Sewer System for Study.

B. A/E to determine the estimated load from each building group on each section from population/industrial use information (e.g., by reviewing/discussing Activity and LANTNAVFACENGCOM files and using DM-5 criteria: 60 GPCPD for 8-hour population, 120 GPCPD for 24-hour population).

C. A/E to measure dry weather, wet weather, and nighttime flows at wastewater pump stations (e.g., using pump run timers).

D. A/E to select critical manholes and measure the dry weather, wet weather, and nighttime flows (e.g., by chalking manholes).

NOTE: A/E can use rainfall data from nearest available, existing rain gauge.

E. A/E to review the water/sewage flow records to assist in determining the approximate extent of any infiltration/inflow.

III. Phase I Report:

A. A/E to provide schematics of each section showing the main load points (e.g., groups of buildings, critical manholes and pump stations).

B. A/E to provide the above flow data.

C. A/E to estimate amounts and locations of the infiltration/inflow.

D. A/E to estimate wastewater collection system capacity listed by section.

E. A/E to make recommendations for further study, listed by section.

Enclosure (1)

F. A/E to provide preliminary project scope/cost for sewer line repair/replacement.

IV. Phase II

A. Report to include the following:

1. After obtaining LANTNAVFACENGCOM comments/approval, the A/E will perform the following further studies, as directed by the LANTNAVFACENGCOM at the negotiated unit prices:

a. Smoke testing.

b. Dye testing (going upstream) of roof drains, curb inlets, storm drains, parking lots, "abandoned" sewer lines, etc.

c. TV inspection.

NOTE: If wet weather TV inspection is required, A/E to obtain LANTNAVFACENGCOM approval prior to proceeding.

V. For negotiations, A/E to provide the following unit costs:

A. Smoke testing (per site plus mobilization)

B. Dye testing (per site plus mobilization)

C. TV inspections/grouting (per site plus mobilization)

D. Project scope/costs (per foot/pump station)

E. Wet weather TV inspection

NOTE: Cost estimates shall be provided in sufficient detail to allow commencement of design by another A/E (e.g., Cost Estimates should be thoroughly broken down on NAVDOCKS form 2417).

VI. Design Option. LANTNAVFACENGCOM shall have the option of negotiating a design contract as a change order to this study contract.

VII. Milestones:

Draft Phase I Report*: 120 days from Notice-to-Proceed with Phase I Study
Final Phase I Report*: 60 days after return of the Draft Phase I Report
Draft Phase II Report*: 120 days from Notice-to-Proceed with Phase II Study
Final Phase II Report*: 60 days after return of the Draft Phase II Report

* Five copies (MCB Camp Lejeune, LANTNAVFACENGCOM Code 09A, 114, 405, 20)

GJN
10/5

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511-6287

TELEPHONE NO.
(804) 444-9558

IN REPLY REFER TO:
6280
1142WLC

24 JUN 1985

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

Subj: INFILTRATION/INFLOW STUDY FOR THE CAMP GEIGER SEWER SYSTEM

Encl: (1) ESR U-5033
(2) LANTNAVFACENGCOM memo 6280 1142WLC of 16 May 85
(3) LANTNAVFACENGCOM ltr 09A21B6:MLH of 20 May 85

1. As a completion of the enclosure (1) ESR:

a. Enclosure (2) provided the Scope of Work and requested advertisement for an A/E firm to perform subject study,

b. Enclosure (3) forwarded the advertisement for the CBD,

c. The study will be performed as a continuing action item (vs. an ESR) and

d. Funds will be requested for the final negotiated costs.

2. Questions regarding this matter may be directed to Mr. W. Carter, LANTNAVFACENGCOM, Code 1142 at FTS 954-9558 or AUTOVON 564-9558.

J. R. Bailey
J. R. BAILEY
By direction

048

ENGINEERING SERVICE REQUEST (ESR)
NAVFAC 11000/7 (4-78)
Supersedes NAVDOCKS 2038
S/N 0105-LF-010-0035

Instructions on Reverse

Copy No.

SECTION A FOR USE BY REQUESTER

1. FROM (*Activity and location*)
Commanding General, Marine Corps Base, Camp Lejeune, NC 28542-5001

2. TO
Commander, Atlantic Division, Naval Facilities Engineering Command
Norfolk, VA 23511-6287

3. REFERENCE(S)

4. ESR IDENTIFICATION NUMBER (*if applicable*)
7E85

5. ENCLOSURE(S) (*check*)
☐ NAVCOMPT 140
☐ NAVCOMPT 2038
☐ NAVCOMPT 372
☐ OTHER (*specify*)

6. TYPE OF FUNDING (*check*)
☐ O&MN
☐ NIF
☐ NAF
☒ OTHER (*specify*) O&M

7. TYPE OF SERVICES REQUESTED
Engineering Study is required to locate the sources of storm water infiltration into the Camp Geiger Water Treatment System.

8. DESIRED COMPLETION DATE
31 July 1985

9. DESCRIPTION OF WORK
I. GENERAL: Provide an engineering study to locate sources of storm water infiltration into the Camp Geiger Wastewater Treatment System and provide recommendations for eliminating infiltration.

II. BACKGROUND:
a. The Camp Geiger Wastewater Treatment System serves Camp Geiger and Marine Corps Air Station (Helicopter), New River. The design capacity

10. FOR INFORMATION CONSULT (*Name and phone*)
G. S. JOHNSON
AV: 484-5161/FTS: 676-5161

11. OFFICIAL REPRESENTATIVE (*Signature*)
C. A. JOHANNESMEYER
By direction

12. DATE
27 MAR 1985

SECTION B FOR USE BY EFD

1. SCOPE OF SERVICES

2. DATE RECEIVED
5 April 1985

3. ESR NUMBER
4-5033

SECTION C INTERIM ENDORSEMENT

1. REMARKS

2. EST. COMPLETION DATE
31 JUL 1985

3. AUTHORIZED REPRESENTATIVE (*Signature*)
J. R. BAILEY
By direction

4. DATE
12 APR 1985

SECTION D FINAL ENDORSEMENT

1. ENCLOSURE(S)
☐ DRAWINGS AND MAPS
☐ SPECIFICATIONS
☐ REPORT
☒ OTHER (*specify*) Hr Tends of 6286 1142 WICof 24 Jun 85

2. EST. COST (*if applicable*)
$

3. AUTHORIZED REPRESENTATIVE (*Signature*)
J. R. Bailey

4. DATE OF COMPLETION
24 JUN 1985

COPY TO FAC; COMP; MAIN

R/S 26354

of the plant is sufficient for present needs, provided excess storm water infiltration can be abated.

b. During periods of rain, the volume of sewage entering the treatment plant exceeds the design capacity and causes overflow conditions at various points of treatment in the system. The large volume of flow into the plant is the result of storm water entering the sewer system during periods of rain.

III. Details of Work:

a. Evaluate sewage flows recorded at the Camp Geiger Treatment Plant for calendar years 1982, 1983, and 1984. Determine base flow and population served by the plant. Relate the base flow to the population served and wet weather peak flows.

b. Conduct manhole flow measurements in selected manholes prior to and during rainfall. Inspections of manholes should start at the upper locations and proceed downstream.

c. The pipe sections suspected of having storm water infiltration should be examined for cracks, displacements, and connections to storm water collecting areas, utilizing maps and physical site inspections. Suspected areas may be smoke and dye tested. Where smoke tests may be inadequate to indicate storm connections due to water traps, TV inspections may be done during rainstorms to locate and evaluate inflow points for grouting and/or reconstruction.

d. Provide recommended corrective measures and a cost estimate for correction.

IV. FUNDS AVAILABLE: Funds for these services will be provided upon request.

V. POINT OF CONTACT: Mr. G. S. Johnson or Mr. David Sutherland, Base Maintenance Division, AV 484-5161/FTS: 676-5161.

(804) 444-9558

6280
1142WLC
16 MAY 1985

MEMORANDUM FOR CODE 09A21B

Subj: INFILTRATION/INFLOW STUDY FOR THE CAMP GEIGER SEWER SYSTEM

Ref: (a) MCB CAMP LEJEUNE ESR Number 7E85 of 27 May 85 (LANTNAVFACENGCOM ESR U-5033)
(b) PHONCON MCB CAMP Lejeune (Mr. B. Alexander)/LANTNAVFACENGCOM (Mr. W. Carter) of 15 May 1985

Encl: (1) Infiltration/Inflow (I/I) Study Scope of Work

1. Enclosure (1) is forwarded pursuant to reference (a). Reference (b) advised of the availability of FY-85 funds in the amount of $50K to perform the subject I/I Study. Hence, reference (b) also confirmed that the Activity will make all necessary arrangements for an on-site prenegotiation meeting upon request.

2. Advertisement for an A/E Firm is, therefore, being requested for enclosure (1). All stages of the A/E Firm submittals are to be sent to MCB Camp Lejeune for review.

3. LANTNAVFACENGCOM point of contact is Mr. Wallace Carter, Code 1142, telephone 4-9558.

J. R. BAILEY, P.E.
Head, Environmental Quality Branch
Utilities, Energy and Environmental Division

Copy to:
MCB Camp Lejeune

Blind Copy to:
1142
114S
Doc #3898A/pkk

Enclosure (2)

INFILTRATION/INFLOW STUDY
FOR THE
CAMP GEIGER SEWER SYSTEM

I. Introduction:

A. A/E to determine wastewater collection system capacity and project scope/cost for any recommended sewer line repair/replacement to economically reduce infiltration/inflow.

NOTE: Determination of capacity includes estimating the ability of each section of the main sewer lines (interceptors) to convey flow (i.e., not just the pump station or end-of-pipe capacity, but also upstream flow).

II. Methodology:

A. A/E to divide the wastewater collection system into sections and determine the capacity of each section. One of those sections shall include the Main Pump Station, Building AS-629, which discharges from the MCAS (H) area into the Camp Geiger Sewer System for Study.

B. A/E to determine the estimated load from each building group on each section from population/industrial use information (e.g., by reviewing/discussing Activity and LANTNAVFACENGCOM files and using DM-5 criteria: 60 GPCPD for 8-hour population, 120 GPCPD for 24-hour population).

C. A/E to measure dry weather, wet weather, and nighttime flows at wastewater pump stations (e.g., using pump run timers).

D. A/E to select critical manholes and measure the dry weather, wet weather, and nighttime flows (e.g., by chalking manholes).

NOTE: A/E can use rainfall data from nearest available, existing rain gauge.

E. A/E to review the water/sewage flow records to assist in determining the approximate extent of any infiltration/inflow.

III. Phase I Report:

A. A/E to provide schematics of each section showing the main load points (e.g., groups of buildings, critical manholes and pump stations).

B. A/E to provide the above flow data.

C. A/E to estimate amounts and locations of the infiltration/inflow.

D. A/E to estimate wastewater collection system capacity listed by section.

E. A/E to make recommendations for further study, listed by section.

F. A/E to provide preliminary project scope/cost for sewer line repair/replacement.

IV. Phase II

A. Report to include the following:

1. After obtaining LANTNAVFACENGCOM comments/approval, the A/E will perform the following further studies, as directed by the LANTNAVFACENGCOM at the negotiated unit prices:

a. Smoke testing.

b. Dye testing (going upstream) of roof drains, curb inlets, storm drains, parking lots, "abandoned" sewer lines, etc.

c. TV inspection.

NOTE: If wet weather TV inspection is required, A/E to obtain LANTNAVFACENGCOM approval prior to proceeding.

V. For negotiations, A/E to provide the following unit costs:

A. Smoke testing (per site plus mobilization)

B. Dye testing (per site plus mobilization)

C. TV inspections/grouting (per site plus mobilization)

D. Project scope/costs (per foot/pump station)

E. Wet weather TV inspection

NOTE: Cost estimates shall be provided in sufficient detail to allow commencement of design by another A/E (e.g., Cost Estimates should be thoroughly broken down on NAVDOCKS form 2417).

VI. Design Option. LANTNAVFACENGCOM shall have the option of negotiating a design contract as a change order to this study contract.

VII. Milestones:

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Final Phase I Report*: 60 days after return of the Draft Phase I Report

Draft Phase II Report*: 120 days from Notice-to-Proceed with Phase II Study

Final Phase II Report*: 60 days after return of the Draft Phase II Report

* Five copies (MCB Camp Lejeune, LANTNAVFACENGCOM Code 09A, 114, 405, 20)

2106

SYNOPSIS OF PROPOSED A-E OR ES SERVICES

U. S. DEPARTMENT OF COMMERCE
COMMERCE BUSINESS DAILY
433 W. VAN BUREN, ROOM 1304
CHICAGO, ILLINOIS 60607

09A21B6:MLH
20 May 1985

SYNOPSIS NO.: E81-85

ATLANTIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND
GILBERT STREET, BUILDING N-26, NORFOLK, VIRGINIA 23511-6287
ATTENTION CODE 09A2A/E, MISS MACK, Contract Specialist (Telephone 804-444-9676)

R. ENGINEERING SERVICES ARE REQUIRED FOR: Preparation of an Infiltration/Inflow Study of the Sewage Collection System, Camp Geiger, Marine Corps Base, Camp Lejeune, North Carolina. Additional project related work, including preparation of plans and specifications to implement study recommendations, may be added to the contract without further advertisement.

THE PROJECT INCLUDES: Flow monitoring in dry weather, wet weather and night time conditions at various load points, critical manholes and pump stations for each section of the wastewater collection system. Make recommendations with cost estimates for cleaning, repairing, replacing or expanding various sections of the wastewater system in order to reduce infilatration and inflow.

Significant specific evaluation factors in relative order of importance include: (1) Recent experience of the firm and its consultants (if proposed) in the preparation of similar studies - Specialized experience is required in evaluating and correcting infiltration problems in wastewater systems; (2) Quality of performance of DOD work, especially past performance in projects with this Command; (3) Geographic proximity to the project site; (4) Present and future workload and capability to complete the services within one year of contract award; and (5) Volume of work previously awarded to the firm by the Atlantic Division and other DOD agencies with the objective of effecting equitable distribution of contracts among qualified A/E firms including disadvantaged business firms and firms that have had no prior Atlantic Division contracts.

Firms responding to this advertisement are requested to submit only one copy of qualification statements. The qualification statements should clearly indicate the office location where the work will be performed and the qualifications of the individuals anticipated to work on the contract and their geographical location.

CONTRACT NO.: N62470-85-B-8011

Architect-Engineer firms which meet the requirements described in this announcement are invited to submit completed Standard Forms 254 (unless already on file) and 255, U. S. Government Architect-Engineer Qualifications, to the office shown above. Firms having a current SF 254 on file with this office and those responding to the announcement within 30 calendar days after publication will be considered. This procurement will be set-aside for small business. For this purpose, a small business concern is a business concern, including its affiliates which (a) is independently owned and operated, (b) is not dominant in the field of

Enclosure (3)

operation in which it is bidding on Government contracts, and (c) had average annual receipts for the preceding 3 fiscal years not exceeding $7,500,000. Firms must indicate in response whether small business or not. See Note 62. This is not a request for proposals.

Inquiries concerning this project should mention location and contract number.

A. G. BRYANT, JR., P. E.
Head, CONUS Branch
Acquisition Project
Management Office
By direction of the Commander

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

TELEPHONE NO.
444-9701

IN REPLY REFER TO:
4330
09A21B6

20 May 1985

MEMORANDUM FOR CONTRACT FILE

Via: (1) Code 09A21
(2) Code 09A2
(3) Code 11

Subj: BOARD COMPOSITION FOR CONTRACT N62470-85-B-8011, INFILTRATION/INFLOW STUDY OF THE SEWAGE COLLECTION SYSTEM, CAMP GEIGER, MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

1. The following Boards are hereby established for the subject contract:

Slating Board:	A. G. Bryant, Jr., P. E., Senior Member P. A. Rakowski, P. E. B. I. Azar, P. E. J. E. Butler, P. E., Alternate
Selection Board:	R. D. Crowson, P. E., Senior Member D. P. Goodwin, P. E. J. R. Bailey, P. E. D. R. Phelps, P. E. J. T. Harrison, P. E., Alternate
Negotiation Board:	R. D. Crowson, P. E., Senior Member Contract Representative D. P. Goodwin, P. E. J. R. Bailey, P. E. D. R. Phelps, P. E. J. T. Harrison, P. E., Alternate

The estimated A&E fee for this contract is $50,000.

M. L. HAMMERSLEY
Assistant Project Manager

APPROVED: _____ DATE: _____

ROUTING SLIP 26 JUL 1985

	ACTION	INFO	INITIAL
BMO		✓	
ABMO		✓	FEC
ADMIN			
F&A			
MAINT NCO			
M&R			
OPNS	✓		
PROP			
UMACS			
UTIL	✓		
SECRETARY			

COMMENTS: Ops - negative

Suspense

7 Aug

Copy to Ops & Util

Provide nominations by

6 August.

OPNAV 5216.44A (Rev. 8-81)
S/N 0107-LF-052-2320

full copy

DEPARTMENT OF THE NAVY

Memorandum

11000
FAC

DATE: 26 JUL 1985

FROM: Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune

TO:

SUBJ: FY-86 OTHER ENGINEERING SUPPORT (OES) STUDY REQUIREMENTS/FUNDS

Encl: (1) CMC 171432Z Jul 1985

1. In the enclosure, HQMC requested candidates for FY-86 OES.

2. This office will provide a consolidated response to HQMC.

3. Request you provide nominations for studies to this office by 7 August 1985. Your response should include:

   a. Title

   b. Priority

   c. Current Working Estimate

   d. Scope of Work

   e. Justification

4. Point of contact for this office is Mr. Al Austin, ext. 3034.

for R. A. TIEBOUT

DISTRIBUTION:
MAIN
PWO
FIRE
NREA
EnvEngr
FacUtilOff

Hand Carried Two Projects to Al Austin 12 Aug. 63-1

* U.S. GOVERNMENT PRINTING OFFICE: 1983-605-010:8484

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

HOT

Al Austin & Bob Alexander, Lets think hard on this requirement so we have our head in the pile. Thanks Jim

ROUTINE

R 171432Z JUL 85

FM CMC WASHINGTON DC

TO AIG EIGHT

XMT CG FOURTH MARDIV CG FOURTH MAW
MARFINCEN KANSAS CITY MO

UNCLAS //N11019//

CMC//CODEXLFF-2/
SUBJ: FY86 OTHER ENGINEERING SUPPORT (OES) STUDY REQUIREMENTS/ FUNDS

1. AS OCCURRED IN FY85, THIS HQ HAS ESTABLISHED A LIMITED FUND TO SUPPORT OES STUDY REQUIREMENTS. THIS MSG SOLICITS ACTIVITY NOMINATIONS OF PROJECTS. REQ CANDIDATE PROJECTS BE PROVIDED THIS HQ (LFF-2) BY 19 AUG 85. FOL GUIDANCE IS OFFERED:

A. ALTHOUGH ANY OES STUDY CAN BE NOMINATED, SOUND DISCRETION MUST BE APPLIED SINCE ADDRESSEES MAY HAVF INCLUDED IN THEIR OPBUD BASE RESOURCES (F/SF P-1) WHICH COULD SUPPORT REQUIREMENTS LOCALLY.

B. PROVIDE SCOPE OF STUDY AND INDICATE YOUR RANK ORDERING OF PRIORITIZATION TO INDIC MOST URGENT PROJECTS.

C. PLEASE PROVIDE INFO RELATING TO PROJECT CURRENT WORK ESTIMATE (CWE). IN PARTICULAR, INDIC IF CWE IS BASED ON NAVFAC RESPONSE TO ESR OR OTHER REPUTABLE MEANS.

D. INTENT THIS HQ TO REVIEW RESPONSES AND PROVIDE FUNDING DURING 1ST QTR FY86.

BT

JUL 23 1985

FAC ROUTING	ACTION	INFO	INT
FACO			
4A			
4B			
4C			
[illegible]			
[illegible]			
[illegible]			
4LC			
SEC			
CLK			

BFAC(2)...ACT FOR CG MCB CAMP LEJEUNE(11) 17000/ 2/0369
BADJ(4) BCOS(1) BMAO(1) BSDO(1) CEOB(1) DICB(1)

RTD:000-000/COPIES:0011

062903/201 1 OF 1 MATA0099 201/01:57Z 171432Z JUL 85
CSN:AUIA00162 CMC WASHINGTON

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U

11330
MAIN

30 July 1985

Base Maintenance Officer

Public Works Officer

REQUEST FOR ENGINEERING SERVICES

1. It is requested that a study be conducted on the water distribution system for the Paradise Point Golf Course. Presently, potable water is being used to water the tees and greens. The following should be accomplished:

a. Provide an updated distribution drawing (See Public Works' Drawing No. 415).

b. Provide recommendations for utilizing non-potable water for irrigation.

c. Provide recommendations on how the various drinking fountains should be supplied.

d. Provide recommendations on how to supply non-potable water to the existing ponds.

e. Provide recommendations on how to prevent ponds from becoming stagnant.

2. Since the Golf Course's inception, many modifications were accomplished by contract and by the engineers at Courthouse Bay.

3. Point of contact for additional information is Mr. G. S. Johnson, Jr., extension 5161.

F. E. CONE
Acting

FILE ESR

651

26 Aug 85

SCOPE OF WORK

Feasibility Study of Water/Wastewater Systems Monitoring, MCB CAMP LEJEUNE.
A/E Contract N62470-85-B-8010

1. Executive summary of recommendations

2. System types - study pros, cons, and costs of the following:

   a) Dedicated computer system
   b) Use of existing EMCS
   c) Use of existing UMACS
   d) ? (Other possibilities)

3. Signal transmission: dedicated phone lines vs. radio

4. Point types = Feasibility and cost of those listed below. Enclosure (1) describes the points at each facility. (Note: 1 = monitor; 2 = control, 3 = run-time totalization; 4 = alarm point)

   a) Raw water booster pumps - 1, 2, 3
   b) High 1 ft. pumps - 1, 2, 3
   c) Generator status - 1, 3
   d) Power failure - 1, 4
   e) Intrusion detection (all tanks, plants, pumping stations, lift stations, reservoirs, swimming pools) - 1, 4
   f) Chlorine alarm - 1, 4
   g) Distribution pressure (at various points throughout system) - 1
   h) Filter Flow - 1, 3
   i) Wells - 1, 2, 3
   j) Raw water flow - 1
   k) Treated water flow - 1
   l) Water distribution (various flows) - 1
   m) Tank, reservoir levels - 1
   n) High and/or low alarms (tanks, water/oil separators, reservoirs, lift stations, wells) 1, 4
   o) Softner controller - 1, 3
   p) Swimming pool filter pump- 1, 2, 3
   q) Swimming pool turbidity each filter - 1, 3
   r) Swimming pool temperature - 1
   s) Swimming pool chlorine - 1
   t) Swimming pool P.H. - 1
   u) Swimming pool stability - 1
   v) Swimming pool flow - 1
   w) Digestor area for presence of methane, hydrogen sulfide gas, oxygen content - 1, 4
   x) Chlorinator room for presence of chlorine gas - 1, 4
   y) Wastewater system - all pumps - 1
   z) Digester temperature - 1
   aa) Lift station - all pumps - 1
   bb) Lift station - methane, hydrogen sulfide gas, and oxygen content 1, 4

cc) Water/oil separator - all pumps - 1

5. Work phases, brief interview:
    a) Initial meeting
    b) Field work
    c) Report preparation and submittals (preliminary and final)

FILE: ENG. STUDIES

Main Utilities

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511-6287

TELEPHONE NO.
444-9670
IN REPLY REFER TO:
N62470-85-B-8010
09A21B3
05 SEP 1985

Bob Aletushy

McCall-Thomas Engineering Co., Inc.
P. O. Drawer 670
941 Broughton Street
Orangeburg, South Carolina 29115

Re: A/E Contract N62470-85-B-8010, Study for Monitoring of Water and Sewage Treatment Systems and Related Equipment, Marine Corps Base, Camp Lejeune, North Carolina and Marine Corps Air Station (Helicopter) New River, North Carolina

Gentlemen:

Your firm has been tentatively selected to accomplish the referenced study. Enclosure (1) defines the scope of work and is forwarded to assist you in the preparation of a fee proposal. Enclosure (2), Guide for Architect-Engineer Firms, outlines the procedures, instructions and responsibilities for firms providing services under contract. All facets of project administration, payment of fees, design, estimating and shop drawing review are discussed within the text of the Guide for Architect-Engineer Firms; e.g., your responsibilities as designer of record and liability are discussed in Section 2; development of a schedule of construction sequence with activity personnel is also discussed in Section 2; cost estimating requirements including format and preparation are discussed in Section 7; submittal requirements are set forth in Section 3; progress payment submittal requirements are outlined in Section 1.10. IT IS ESSENTIAL THAT YOU BECOME ACQUAINTED WITH ALL PROCEDURES AND RESPONSIBILITIES PRIOR TO YOUR FEE PREPARATION. Any questions you may have with regard to the Guide for Architect-Engineer Firms should be addressed to the Project Manager.

A preproposal conference will be arranged by the Project Manager to discuss the project's scope. Following this conference, conference notes and wage and overhead rates shall be submitted within seven days. It is anticipated that your fee proposal will be submitted within 14 days after the proposal conference. Enclosure (3) provides the format for your fee proposal.

Enclosure (4) provides submittal distribution requirements and addresses for the referenced project. You shall make direct distribution of each submittal as indicated by this enclosure. A brief checklist, enclosure (5) is forwarded to assist you in fee preparation and project execution.

In submitting your proposal, milestones must be established for the study submittals. These milestones should include 30 days for review of each submittal.

Enclosure (6), certificate of current cost or pricing data, should be submitted upon completion of fee negotiations.

N62470-85-B-8010
09A21B3
05 SEP 1985

It is requested that you complete enclosure (7) and return it with your fee proposal. Completion of this form will provide accurate information for contract award and payment. No contract will be awarded without this information.

For further information, please contact Mr. M. L. Bryant, P.E., Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia, telephone 444-9670, area code 804.

This letter is not intended as a commitment by the Government, and any expense incurred in preparation of the fee proposal is your responsibility. A contract award will await successful completion of fee negotiations.

All information contained in this letter is for "Official Use Only" and must not be divulged to persons other than those having a definite "Need to Know" without prior approval in writing from this Command.

Sincerely,

[redacted]

Encl:
(1) Scope of Work
(2) LANTNAVFACENGCOM 4-4330/89C (Revised 10/84)
(3) A/E Fee Proposal Submittal
(4) Project Submittal Distribution
(5) Brief Checklist
(6) Certificate of Current Cost or Pricing Data (5 copies)
(7) Representations and Certifications Form

Blind copy to: (w/o encls.)
[redacted]
MCAS (H) NEW RIVER

26 Aug 85

SCOPE OF WORK

Feasibility Study of Water/Wastewater Systems Monitoring, MCB CAMP LEJEUNE.
A/E Contract N62470-85-B-8010

1. Executive summary of recommendations

2. System types - study pros, cons, and costs of the following:

   a) Dedicated computer system
   b) Use of existing EMCS
   c) Use of existing UMACS
   d) ? (Other possibilities)

3. Signal transmission: dedicated phone lines vs. radio

4. Point types = Feasibility and cost of those listed below. Enclosure (1) describes the points at each facility. (Note: 1 = monitor; 2 = control, 3 = run-time totalization; 4 = alarm point)

   a) Raw water booster pumps - 1, 2, 3
   b) High 1 ft. pumps - 1, 2, 3
   c) Generator status - 1, 3
   d) Power failure - 1, 4
   e) Intrusion detection (all tanks, plants, pumping stations, lift stations, reservoirs, swimming pools) - 1, 4
   f) Chlorine alarm - 1, 4
   g) Distribution pressure (at various points throughout system) - 1
   h) Filter Flow - 1, 3
   i) Wells - 1, 2, 3
   j) Raw water flow - 1
   k) Treated water flow - 1
   l) Water distribution (various flows) - 1
   m) Tank, reservoir levels - 1
   n) High and/or low alarms (tanks, water/oil separators, reservoirs, lift stations, wells) 1, 4
   o) Softner controller - 1, 3
   p) Swimming pool filter pump- 1, 2, 3
   q) Swimming pool turbidity each filter - 1, 3
   r) Swimming pool temperature - 1
   s) Swimming pool chlorine - 1
   t) Swimming pool P.H. - 1
   u) Swimming pool stability - 1
   v) Swimming pool flow - 1
   w) Digestor area for presence of methane, hydrogen sulfide gas, oxygen content - 1, 4
   x) Chlorinator room for presence of chlorine gas - 1, 4
   y) Wastewater system - all pumps - 1
   z) Digester temperature - 1
   aa) Lift station - all pumps - 1
   bb) Lift station - methane, hydrogen sulfide gas, and oxygen content 1, 4

cc) Water/oil separator - all pumps - 1

5. Work phases, brief interview:
   a) Initial meeting
   b) Field work
   c) Report preparation and submittals (preliminary and final)

Monitoring Requirement

Marine Corps Air Station Water Treatment Plant

MCAS - 110

1. Raw Water Booster Pumps on and off and hours run plus control.
2. High lift pumps on and off and total hours run and control.
3. Generator status.
4. Power failure.
5. Intrusion alarm for all tanks, plant and reservoirs.
6. Chlorine alarm.
7. Distribution pressure - 4 points throughout distribution system.
8. Filter flow and total hours run for filters and turbidity each filter.
9. All wells status on and off and ability to cut on and off and total hours run. (each well)

FLOW

1. Raw water in g. p. m.
2. Treated water in g.p.m.
3. Distribution water in g.p.m. divided to MCAS and Camp Geiger (Flow to each area).

LEVELS

1. AS-108
2. AS-107 Treated water levels - low and high level alarm and foot levels (intrusion).

ELEVATED TANKS

1. AS-310
2. AS4130 Low and high level alarms and foot levels (Intrusion alarm).

CHLORINE LEVELS

Raw

1. Fluoride
2. Hardness
3. p.H
4. Iron

Treated

1. Chlorine
2. Turbidity each filter
3. Hardness
4. p.H.
5. Stability
6. Iron

Delivered

1. Hardness
2. p.H.
3. Turbidity
4. Chlorine
5. Fluoride
6. Iron
7. Stability

MOQ - 2002

Reservoir level, low and high level and foot level - intrusion alarm

Pumping station intrusion alarm MOQ-2003

Pumps on and off and status and control and total hours run

Chlorine, hardness, p.H., turbidity, fluoride, iron and stability monitored at this pump station

Distribution pressure

Encl 4

Power Failure

STC-501 Pumping Station

1. Power failure (alarm)
2. Chlorine alarm.
3. Plant intrusion (alarm).
4. Highlift pumps on and off and control and total hours run.
5. Distribution pressure - 4 points throughout distribution system.

FLOW

1. Delivered water flow in g.p.m.

LEVELS

1. STC-500
2. STC-509 Low and high levels alarms and foot levels, intrusion.

ELEVATED TANKS

1. STC-616
2. STC-1070 Low and high levels alarms and foot levels, intrusion.

Chlorine residuals, pH, turbidity, fluoride, pump and station.

Monitoring Requirement

Holcomb Boulevard Water Treatment Plant

Plant, Bldg. 670

1. Power failure alarm.
2. All well status on or off and control and total hours run (each well)
3. High lift pumps status on or off and control and total hours run.
4. Filter flow and total hours run.
5. Generator status.
6. Chlorine alarm.
7. Plant intrusion alarm.
8. Distribution pressure - 4 points throughout distribution system.

FLOW

1. Raw water influent in g.p.m.
2. Treated water in g.p.m.
3. Distribution water in g.p.m.

LEVELS

1. S-671 Treated water reservoir low and high level alarms and foot level plus intrusion alarm.

ELEVATED TANKS

1. S-830
2. S-2323 Low and high level alarm and foot levels (Instrusion alarms)
3. SLCH-4004

CHEMICAL ANALYSIS

RAW

1. Chlorine
2. Hardness
3. Iron
4. p.H.

TREATED

1. Turbidity each filter
2. Hardness
3. p.H.
4. Chlorine
5. Iron

DELIVERED

1. Hardness
2. p.H.
3. Turbidity
4. Chlorine
5. Fluoride
6. Iron

Monitoring Requirement

Hadnot Point Water Treatment Plant

Plant, Bldg. 20

1. Power failure alarm.
2. All wells status on and off and ability to cut on and off and total hours run. (each well)
3. High lift pumps status on or off and control and total hours run.
4. Raw water booster pumps, on or off and control and total hours run.
5. Filter flow and total hours run.
6. Generator status.
7. Chlorine alarm.
8. Plant intrusion alarm.
9. Distribution pressure - 4 points throughout distribution system.

FLOW

1. Raw water influent g.p.m.
2. Treated water flow in g.p.m.
3. Delivered water flow in g.p.m.

LEVELS

1. Raw water reservoir, B-20, low and high level alarm and foot reading (intrusion alarm)
2. Treated water reservoirs, S-735 low and high level alarm and foot reading (intrusion alarm).
3. Treated water reservoir S-736 low and high level alarm and foot reading (intrusion alarm).

ELEVATED TANKS

1. S-5
2. S-29 Low and high level alarm and foot levels (Intrusion alarm)
3. S-1000
4. SFC-314

CHEMICAL ANALYSIS

RAW

1. Chlorine
2. Hardness
3. Iron
4. p.H.

TREATED

1. Turbidity each filter
2. Hardness
3. p.H.
4. Chlorine
5. Iron

DELIVERED

1. Hardness
2. p.H.
3. Fluoride
4. Iron
5. Chlorine
6. Turbidity

Monitoring Requirement

Rifle Range Water Treatment Plant

Plant, Bldg. RR-85

1. High lift pumps on and off and control and total hours run.
2. Filter pumps on and off and control and total hours run.
3. All well status on and off and control and total hours run. (each well)
4. Power failure.
5. Intrusion alarm all reservoirs, tanks and plant.
6. Chlorine alarm.
7. Distribution pressure - 4 points throughout distribution system.
8. Filter flow and turbidity each filter plus total hours run.
9. Softner hardness plus total hours run.

FLOW

1. Raw water in g.p.m.
2. Treated water in g.p.m.
3. Delivered water in g.p.m.

LEVELS

1. SRR-86 Treated water levels - low and high level and foot levels (Intrusion alarm)
2. Detention tank - low and high level and foot levels and alarm.

ELEVATED TANK

1. SRR-44 Low and high level and alarms and foot levels, intrusion alarm.

CHEMICAL ANALYSIS

RAW

1. Hardness
2. Iron

TREATED

1. Chlorine
2. Iron
3. Turbidity each filter
4. p.H
5. Chloride
6. Hardness

DELIVERED

1. Hardness
2. Iron
3. Chlorine
4. Turbidity
5. Chloride
6. p.H.

Monitoring Requirement

Courthouse Bay Water Treatment Plant

Plant, Bldg. 33-190

1. High lift pumps on and off and control and total hours run.
2. Filter pumps on and off and control and total hours run.
3. All well status on and off and control and total hours run (each well).
4. Power failure.
5. Intrusion alarm.
6. Chlorine alarm
7. Distribution pressure - 4 points throughout distribution system (A-5 one area)
8. Filter flow and turbidity each filter plus total hours run.
9. Softner hardness plus total hours run

FLOW

1. Raw water in g.p.m.
2. Treated water flow in g.p.m.
3. Delivered water in g.p.m.

LEVELS

1. S33-191 Treated water level, low and high level alarm and foot levels, intrusion.
2. Detention tank - low and high level alarm and foot levels.

ELEVATED TANK

1. S33-25 Low and high level and foot levels and intrusion alarm.

CHEMICAL ANALYSIS

RAW

1. Hardness
2. Iron
3. p.H.

TREATED

1. Chlorine
2. Iron
3. Turbidity each filter
4. p.H.
5. Chloride
6. Hardness

DELIVERED

1. Chlorine
2. Iron
3. Turbidity
4. p.H.
5. Chloride
6. Hardness

Monitoring Requirement

Onslow Beach Water Treatment Plant

Plant, Bldg. 8A-138

1. High lift pumps on and off and control and total hours run.
2. All wells on and off and control and total hours run.
3. Power failure.
4. Intrusion alarm.
5. Chlorine alarm.
6. Distribution pressure - 4 points throughout distribution system.
7. Filter flow and turbidity each filter and total hours run.
8. Softner hardness and total hours run.

FLOW

1. Raw water in g.p.m.
2. Treated water in g.p.m.
3. Delivered water in g.p.m.

LEVELS

1. SBA-139 Water level in feet and high and low level alarm and intrusion.

ELEVATED TANK

1. SBA-108 Water level in feet and high and low alarm and intrusion.

CHEMICAL ANALYSIS

RAW

1. Hardness
2. Iron
3. p.H.

TREATED

1. Chlorine
2. Iron
3. Turbidity each filter
4. p.H.
5. Chloride
6. Hardness

DELIVERED

1. Chlorine
2. Iron
3. Turbidity
4. p.H.
5. Chloride
6. Hardness

Monitoring Requirement

Tarawa Terrace Water Treatment Plant

Plant, Bldg. TT-38

1. Power failure alarm.
2. All wells on or off status and control and total hours run (each well).
3. High lift pumps on or off status and control and total hours run.
4. Chlorine alarm.
5. Plant intrusion alarm.
6. Distribution pressure - 4 points throughout distribution system.
7. Filter flow and total hours run each filter.

FLOW

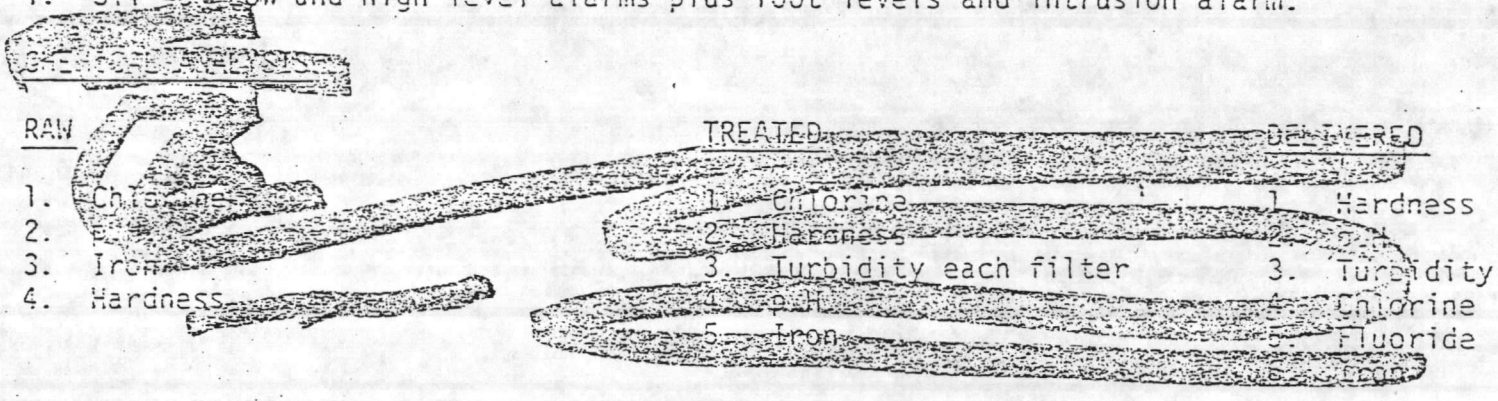
1. Raw water influent in g.p.m.
2. Treated water in g.p.m.
3. Distribution water in g.p.m.

LEVELS

1. STT-39 Treated water reservoir low and high level alarm plus foot levels and intrusion alarm.

ELEVATED TANKS

1. STT-40 Low and high level alarms plus foot levels and intrusion alarm.



Monitoring Requirement

Montford Point Water Treatment Plant

Plant, Bldg. M-178

1. Power alarm for failure.
2. All wells on or off status and control and total hours run (each well)
3. High lift pumps on or off status and control and total hours run.
4. Chlorine alarm.
5. Plant intrusion alarm.
6. Distribution pressure - 4 point throughout distribution system.
7. Softner control and hardness and total hours run.

FLOW

1. Raw water in g.p.m.
2. Treated water in g.p.m.
3. Delivered water in g.p.m.

LEVELS

1. SM-179 Treated water reservoir low and high level alarm and foot levels and intrusion alarm.

-TANKS

1. SM-624 - low and high level alarm and foot levels and intrusion alarm.

CHEMICAL ANALYSIS

RAW

1. Iron
2. P.H.
3. Hardness

TREATED

1. Chlorine
2. Iron
3. Turbidity
4. P.H.
5. Chloride
6. Hardness

DELIVERED

1. Hardness
2. Iron
3. Chlorine
4. Turbidity
5. Chloride
6. P.H.

Monitoring Requirements

Swimming Pools

Bldgs. 236, 540, PP-2615, M-139, TT-20, AS-204, AS-709

ALL SWIMMING POOLS WILL BE MONITORED FOR THE FOLLOWING

1. Intrusion
2. Power failure
3. Filter pump on and off and control and total hours run
4. Turbidity each filter and total hours run.
5. Temperature
6. Chlorine
7. p.H.
8. Stability
9. Flow

Monitoring Requirement

Hadnot Point Wastewater System

Plant, BLDG #22

A. Digestor area for presence of Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)

B. Chlorinator room for presence of Chlorine gas. (Alarm)

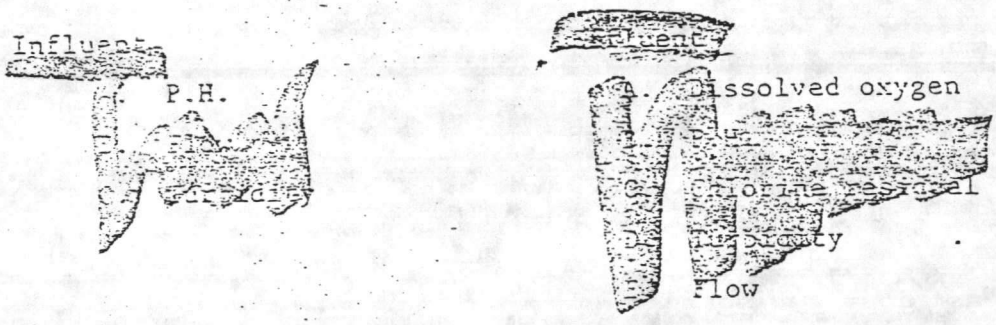
C. Pump on/off status (4) pumping stations Bldg #21, (4) Bldg #680 and (2) secondary return pumps, (2) filter pumps.

D. Intrusion (Alarm)

E. Power failure (Alarm)

F. Generator failure (Alarm)

G. Digester temperature (6)



Lift Station, BLDG # S-1761, S-1776, S-1855, S-1055, S-702, S-PT-41, S-34, S-85, H-29, S-47, S-47A, S-1943, S-2633, S-2100, NH-110, S-865 H. Schl, S-46, S-672, LCH-4005, SFC-116, SFC-315, SFC-599, SFC-260, SFC-203, GP-22, S--1455, No number Ord. Pk.

A. Power failure (Alarm)

B. Generator failure (Alarm) BLDG # S-1761, S-1776, S-85, H-29, S-47A, S-1948, S-2633, S-2100, S-46, S-672, LCH-4005, SFC-315, SFC-203

C. Pump on/off status, two pumps in each building.

D. High level (Alarm)

E. Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)

F. Intrusion (Alarm)

(Continued)

Water/Oil Separator Structure # S-1854, S-918, S-1450, S-1747, S-1456, no number-near S-1808, no number-near S-1739, SFC-117, no number-near SGP-17

A. Power failure (Alarm)

B. Pump on/off status, two pumps each

C. High level (Alarm)

Monitoring Requirement

Tarawa Terrace Wastewater System

Plant, BLDG TT-35

A. Digestor area for presence of Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)

B. Chlorine room for presence of Chlorine gas. (Alarm)

C. Pump on/off status, (3) influent pumping stations, (2) secondary return pumps, (2) filter pumps.

D. Intrusion (Alarm)

E. Power failure (Alarm)

F. Generator failure (Alarm)

G. Digestor temperature (2)

Influent

A. P.H

B. [illegible]

C. Turbidity

Effluent

A. Dissolved oxygen

B. P.H

C. Chlorine residual

D. Turbidity

E. Flow

Lift Station, BLDG # TT-32, TT-33, TT-34

A. Power failure (Alarm)

B. Generator failure (Alarm)

C. Pump on/off status, two pumps in each building

D. High level (Alarm)

E. Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)

F. Intrusion (Alarm)

Monitoring Requirement

Camp Johnson Wastewater System

Plant, BLDG M-136

A. Chlorine room for presence of Chlorine gas (Alarm)

B. Pump on/off statue (2) filter pumps and (2) return pumps.

C. Power failure (Alarm)

D. Generator failure (Alarm)

E. Intrusion (Alarm)

Influent

A. P.H.

B. Turibidity

C. Flow

Effluent

A. Dissolved oxygen

B. P.H.

C. Chlorine residual

D. Turbidity

E. Flow

Lift Station, BLDG # M-SE-23, M-SE-241

A. Power failure (Alarm)

B. Generator failure (Alarm)

C. Pump on/off status, two pumps in each building.

D. High level (Alarm)

E. Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)

F. Intrusion (Alarm)

Water/Oil Seperator Structure # SM-187

A. Power failure (Alarm)

B. Pump on/off status, two pumps each

C. High level (Alarm)

Monitoring Requirement

Camp Geiger Wastewater System

Plant, BLDG TC-563

A. Digestor rooms for presence of Methane, Hydrogen Sulfide gas and Oxygen content.

B. Chlorine room for the presence of Chlorine gas.

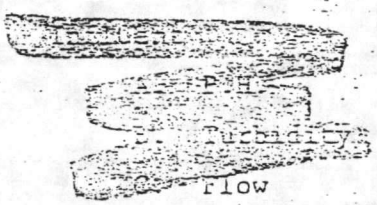
C. Pump on/off status on (2) pond pumps, (2) filter pumps, (2) return pumps, tertiary effluent pumps (2), plant discharge pumps (2).

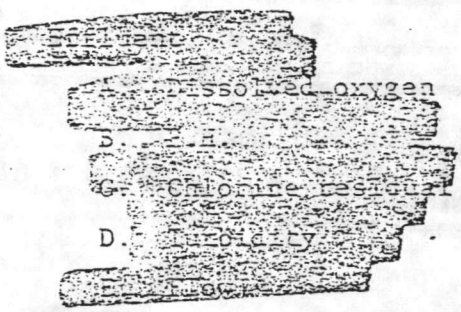
D. Power failure (Alarm)

E. Generator failure (Alarm)

F. Digestor temperature (2)

G. Intrusion (Alarm)





Lift Station, BLDG # AS-4040, AS-1001, AS-517, AS-426, AS-230, AS-629, AS-606, AS-850, AS-902, AS-2001, AS-2808, AS-4125, AS-4147, AS-206, SAS-3526

A. Power failure (Alarm)

B. Generator failure (Alarm) BLDG # AS-1001, AS-230, AS-629, AS-606, AS-850, AS-2001, AS-4125, AS-206.

C. High level (Alarm)

D. Pump on/off status two pumps in each building.

E. Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)

Water/Oil Seperator

A. Power failure (Alarm)

B. Pump on/off status

C. High level (Alarm)

Monitoring Requirement

Rifle Range Wastewater System

Plant, BLDG # RR-92

A. Chlorine room for presence of Chlorine gas. (Alarm)

B. Pump on/off status, (2) filter pumps and (2) return pumps.

C. Power failure (Alarm)

D. Generator failure (Alarm)

E. Intrusion (Alarm)

Lift Station, BLDG # RR-52, SRR-60

A. Power failure (Alarm)

B. Generator failure (Alarm) BLDG RR-52

C. High level (Alarm)

D. Pump on/off status, two pumps in each building

E. Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)

F. Intrusion (Alarm)

Monitoring Requirement

Courthouse Bay Wasterwater System

Plant, BLDG #BB-4

A. Chlorine room for presence of Chlorine gas. (Alarm)
B. Pump, on/off status, 3 filter pumps, 2 return pumps.
C. Equalization pond pumps (2) compressors, (2).
D. Power failure (Alarm)
E. Generator failure (Alarm)
F. Intrusion (Alarm)

Influent

A. Dissolved Oxygen
B. pH
C. Turbidity
D. Flow

Effluent

A. Dissolved Oxygen
B. pH
C. Chlorine Residual
D. Turbidity
E.

Lift Stations, BLDG #BB-1, SA-38

A. Power failure (Alarm)
B. Generator failure (Alarm)
C. High level (Alarm)
D. Pump on/off status two pumps each building.
E. Methane, Hydrogen Sulfide gas and Oxygen content. (Alarm)
F. Intrusion (Alarm)

Water/Oil seperator BLDG #S-6-A, S-6-3

A. Power failure
B. Pump on/off status
C. High level (Alarm)

Monitoring Requirement

Onslow Beach Wastewater System

Plant, BLDG SBA-127

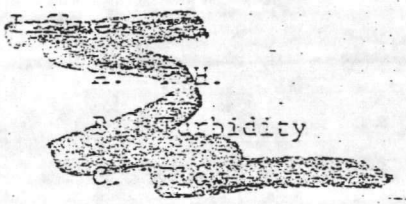
A. Chlorine room for presence of Chlorine gas (Alarm)

B. Pump on/off status on (2) filter pumps, (2) return pumps.

C. Power failure (Alarm)

D. Generator failure (Alarm)-

E. Intrusion (Alarm)

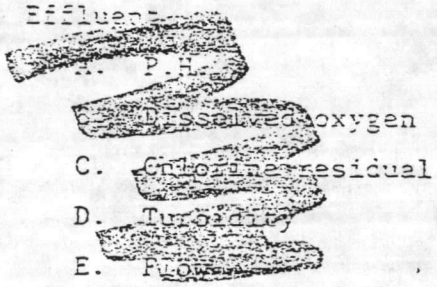


Effluent

A. P.H.

B. Turbidity

C. [illegible]



Effluent

A. P.H.

B. Dissolved oxygen

C. Chlorine residual

D. Turbidity

E. Flow

Lift Stations BLDG # SBA-116, SBA-197, SBA-198, SBA-160

A. Power failure (Alarm)

B. Generator failure (Alarm)

C. Pump on/off status, two pumps in each building.

D. High level (Alarm)

E. Methane, Hydrogen Sulfide gas and Oxygen content (Alarm)

F. Intrusion (Alarm)

FILE - ENG. STUDIES

18Sep1985

Junior,

Attached received in reference to ESR 7E85.

Sue Jarman
Public Works

FRR 7E85 dtd 27 Mar 85 & sure BMO got copy. 10 Sep 04

OPNAV 5216/145 (Rev. 3-78)
S N 0107 LF 052-1625
USE FOR URGENT LETTERS. ONLY

Naval Speedletter

DO NOT CLEAR THROUGH COMMUNICATIONS OFFICE

CHECK TYPE OF MAIL	CLASSIFICATION	DATE
[X] REGULAR [ ] REGISTERED [ ] AIR [ ] CERTIFIED [ ] SPECIAL DELIVERY	Unclassified	10 SEP 1985
	IN REPLY REFER TO (ADDRESS & PHONE NO.)	
	1142:WLC:vmh 6280 444-9558	

INSTRUCTIONS

1. Message type phraseology is permissible.

2. Both addresses must be appropriate for window envelope or bulk mailing, as intended. Include attention codes, when known. Use dots and brackets as guides for window envelope addresses.

3. Give priority to processing, routing, and action required. Avoid time-consuming controls.

4. In order to speed processing, a readily identifiable, special window envelope, OPNAV 5216/145A, Speedletter Envelope, is provided for unclassified speedletters where bulk mailing is not used. Other window envelopes also may be used. In bulk mail, speedletters should be placed on top of regular correspondence.

To:
Commanding General
Marine Corps Base
Camp Lejeune, North Carolina 28542

Fold

STANDARD REFERENCES AND ENCLOSURES, IF ANY; TEXT AND SIGNATURE BLOCK

Subj: Contract N62470-85-B-8011, Infiltration/Inflow Study of the Camp Geiger Sewer System

Ref: (a) LANTNAVFACENGCOM Norfolk VA 101243Z Sep 85

Encl: (1) Scope of Work - Modification Number 1

1. Enclosure (1) is forwarded pursuant to reference (a).

2. LANTNAVFACENGCOM point of contact is Mr. Wallace Carter, Code 1142, AUTOVON 564-9558.

J. R. Bailey
J. R. BAILEY
By direction

Fold

COPY TO

From:
Commander
Atlantic Division
Naval Facilities Engineering Command
Norfolk, VA 23511

← ADDRESS REPLY AS SHOWN AT LEFT, OR RE-PLY HEREON AND RETURN

CLASSIFICATION

INFILTRATION/INFLOW STUDY
FOR THE
CAMP GEIGER SEWER SYSTEM
MODIFICATION NUMBER 1

I. Introduction:

A. A/E to determine wastewater collection system capacity and project scope/cost for any recommended sewer line repair/replacement to economically reduce infiltration/inflow.

NOTE: Determination of capacity includes estimating the ability of each section of the main sewer lines (interceptors) to convey flow (i.e., not just the pump station or end-of-pipe capacity, but also upstream flow).

II. Methodology:

A. A/E to divide the wastewater collection system into seven sections and determine the capacity of each section. One of those sections shall include the Main Pump Station, Building AS-629 and another the MCAS WTP holding lagoon with an associated pump station, which discharge from the MCAS (H) area into the Camp Geiger Sewer System for Study.

B. A/E to determine the estimated load from each building group on each section from population/industrial use information (e.g., by reviewing/discussing Activity and LANTNAVFACENGCOM files and using DM-5 criteria: 60 GPCPD for 8-hour population, 120 GPCPD for 24-hour population).

C. A/E to measure dry weather, wet weather, and nighttime flows at wastewater pump stations (e.g., continuous flow monitoring).

D. A/E to select critical manholes and measure the dry weather, wet weather, and nighttime flows (e.g., using continuous flow monitoring meters).

NOTE: A/E can use rainfall data from nearest available, existing rain gauge.

E. A/E to review the water/sewage flow records to assist in determining the approximate extent of any infiltration/inflow.

III. Phase I Report:

A. A/E to provide schematics of each section showing the main load points (e.g., groups of buildings, critical manholes and pump stations).

B. A/E to provide the above flow data.

C. A/E to estimate amounts and locations of the infiltration/inflow.

D. A/E to estimate wastewater collection system capacity listed by section.

E. A/E to make recommendations for further study, listed by section and provide preliminary project scope/cost.

IV. Phase II

A. Report to include the following:

1. After obtaining LANTNAVFACENGCOM comments/approval, the A/E will perform the following further studies, as directed by the LANTNAVFACENGCOM at the negotiated unit prices:*

a. Smoke testing.

b. Dye testing (going upstream) of roof drains, curb inlets, storm drains, parking lots, "abandoned" sewer lines, etc.

c. TV inspection.

V. For negotiations, A/E to provide the following unit costs:

A. Smoke testing (per site plus mobilization)

B. Dye testing (per site plus mobilization)

C. TV inspections (per site plus mobilization)

NOTE: Cost estimates for rehabilitation work shall be provided in sufficient detail to allow commencement of design by another A/E (e.g., Cost Estimates should be thoroughly broken down on NAVDOCKS form 2417).

VI. Design Option. LANTNAVFACENGCOM shall have the option of negotiating a design contract as a change order to this study contract.

VII. Milestones:

Draft Phase I Report**: 120 days from Notice-to-Proceed with Phase I Study
Final Phase I Report**: 60 days after return of the Draft Phase I Report
Draft Phase II Report**: 120 days from Notice-to-Proceed with Phase II Study
Final Phase II Report**: 60 days after return of the Draft Phase II Report

* Four dye tests and approximately 18,973 LF of smoke testing have been included in the Phase I study.

** Six copies (MCB Camp Lejeune-(2), LANTNAVFACENGCOM Code 09A, 114, 405, 20).

03 FEB 1986

ROUTING SLIP

	ACTION	INFO	INITIAL
BMO			
ABMO		✓	
ADMIN			
F&A			
MAINT NCO			
M&R			
OPNS			
PROP			
UMACS			
UTIL	✓		6J
SECRETARY			

COMMENTS:

Ja.
can file
in (ESR)
R

II R7

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511-6287

TELEPHONE NO.
(804) 444-7221

IN REPLY REFER TO:
6280
1141JJH

29 JAN 1986

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

Subj: STUDY TO UPGRADE THE POTABLE WATER DISTRIBUTION SYSTEM AT MCAS NEW RIVER AND CAMP GEIGER

Ref: (a) PHONCON between MARCORB Camp Lejeune (Mr. G. S. Johnson, Jr.)/ LANTNAVFACENGCOM (Mr. J. J. Harwood) of 21 Jan 86

Encl: (1) Copy of ESR U-4063 with New Estimated Completion Date (ECD)
(2) Water Pipe Rehabilitation Guide

1. In accordance with reference (a), a study of the complete potable water system as requested by enclosure (1) is scheduled to start with a site visit in April. The study and upgrading of the water system will be done in accordance with the Navy "Water Pipe Rehabilitation Guide," enclosure (2).

2. LANTNAVFACENGCOM study will perform paragraph 6 of enclosure (2) and make a report with the scope and costs for paragraph 7 to be done with an activity funded A&E testing contract. The A&E report will contain recommendations and costs for a subsequent construction contract to make the necessary system improvements. Milestone for completion of paragraph 6 is August 1986; six months will be required for paragraph 7 A&E study following the funding and contract award.

3. To perform LANTNAVFACENGCOM study, the following information for MCAS New River and Camp Geiger will be needed and should be gathered prior to the April site visit:

a. Set of water maps showing buildings, pipe locations, pipe sizes, valves, hydrants, pumps, reservoirs, elevated towers, etc.

b. Contour map of the station from which pipe elevations can be determined.

c. Pipe material, dates of installation, records of leakage, breakage, or other problems. Save any system pipes or fittings that were replaced because of breakage, leakage, etc., so they may be inspected during the site visit.

d. Pump makes, model numbers, serial numbers, sizes, horsepower, RPM, and characteristic curves if available.

e. Drawings of pump stations, ground level elevations, and records of problems.

f. Drawings of reservoirs and elevated towers with high and low water elevations, ground level elevations, and capacities.

g. List of buildings with sprinkler systems and types of occupancy (office, warehouse, hangar, etc.).

h. List of planned (programmed and unprogrammed) projects with types of occupancy, expected building populations, any extraordinary water usages, and if fire protection is by sprinklers. Locate projects on a station map.

i. Population figures:

- Number of persons on station 24 hours/day (military and dependents, civilians living on base).

- Number of persons living off station and working on station 8 hours/day.

j. Projected growth increases in population and water usages.

k. Water records of total station consumption and single facilities with significant consumption (i.e., golf course, etc.)

l. Personnel assistance for preliminary water system tests will also be needed.

4. Please review the enclosures and advise of any suggestions or recommendations. Point of contact at this Command is Mr. J. J. Harwood, at AUTOVON 564-7221.

J. R. Bailey
J. R. BAILEY
By direction

Copy to: (w/o encls)
CINCLANTFLT

115

ENGINEERING SERVICE REQUEST (ESR)
NAVFAC 11000/7 (4-78)
Supersedes NAVDOCKS 2038
S/N 0105-LF-010-0035

Instructions on Reverse Copy No.

SECTION A FOR USE BY REQUESTER

1. FROM (*Activity and location*)
Commanding General, Marine Corps Base Camp Lejeune, NC 28542

2. TO Commander, Atlantic Division, Naval Facilities Engineering Command Norfolk, VA 23511 (Attn: 09A21B3/M. Bryant.)

3. REFERENCE(S)

4. ESR IDENTIFICATION NUMBER (*if applicable*)
9E84

5. ENCLOSURE(S) (*check*)
☐ NAVCOMPT 140 ☐ OTHER (*specify*)
☐ NAVCOMPT 2038
☐ NAVCOMPT 372

6. TYPE OF FUNDING (*check*)
☐ O&MN ☒ OTHER (*specify*)
☐ NIF O&MMC
☐ NAF

7. TYPE OF SERVICES REQUESTED
Engineering Study to investigate Water Distribution System at Marine Corps Air Station (Helicopter)

8. DESIRED COMPLETION DATE
January 1985

9. DESCRIPTION OF WORK

I. GENERAL: Provide an engineering study to investigate the Water Distribution System at Marine Corps Air Station (Helicopter), New River, Jacksonville, NC.

II. BACKGROUND:

a. Presently, the MOQ area is served by an 8-inch dead end distribution line. This creates stagnant water and low water pressure. MOQ 2003 is an

10. FOR INFORMATION CONSULT (*Name and phone*)
G. S. JOHNSON, JR.
AV- 484-5161

11. OFFICIAL REPRESENTATIVE (*Signature*)
C. R. JOHANNESMEYER
By direction

12. DATE
26 JUN 1984

SECTION B FOR USE BY EFD

1. SCOPE OF SERVICES
-(919) 451-

2. DATE RECEIVED
16 July 1984

3. ESR NUMBER
11-4063

SECTION C INTERIM ENDORSEMENT

1. REMARKS Present workload precludes starting in-house study before spring or summer 1985. If earlier date is desired, it should be done by A&E Contract. Cost of study will be between $50K and $100K. Upon receipt of notification of a choice for an A&E Contract and availability of funds, this office will prepare a scope of work and initiate contract proceedings.

2. EST. COMPLETION DATE
31 JAN 1986

3. AUTHORIZED REPRESENTATIVE (*Signature*)
J. R. BAILEY
By direction

4. DATE
24 SEP 1985

SECTION D FINAL ENDORSEMENT

1. ENCLOSURE(S)
☐ DRAWINGS AND MAPS ☐ SPECIFICATIONS ☐ REPORT
☐ OTHER (*specify*)

2. EST. COST (*if applicable*)
$

3. AUTHORIZED REPRESENTATIVE (*Signature*)

4. DATE OF COMPLETION

COPY TO
FAC; COMP: MAIN

18101
ENCL (1)

WATER PIPE REHABILITATION GUIDANCE

ATTACHMENTS:

A - Condensed Guide
B - Hazen Williams "C" Factor Flow Test
C - Laboratory Analysis Form
D - Pipe Costs, Water Treatment Information and Economic Analysis

INTRODUCTION:

1. Rehabilitation of water pipe lines is expensive, and is becoming more of a problem because of the age of the Naval Systems. Many were installed in the 40's and 50's, and have deteriorated to the point where they are no longer adequate to meet current or future demands, and pipe rehabilitation may be needed. This guidance is provided to assist in determining where and what type of rehabilitation is appropriate.

2. Prior to beginning a pipe rehabilitation project, the scope of the rehabilitation should be developed through a study of the system needs, and tests made to determine existing conditions. Typically a complete study should include:

a. If needed, updating the system maps showing piping sizes, elevations, and valve locations.

b. Estimation of current and future water usage and fire flow rates in each section of the system.

c. Hydraulic analysis to determine required pipe sizing and friction flow factors.

d. Flow testing to determine actual friction flow factors.

e. Leakage survey.

f. Pressure testing.

g. Interior and exterior corrosion inspection.

h. Recommendations regarding cleaning, relining, repairs, or replacement.

3. Some of the above items may not be applicable or can be quickly assessed for a particular system or problem. The information contained in this guidance should help to determine if a separate study is needed or to select which items to be included as part of the design effort. A study can be done in-house by public works engineering, by the EFD, or by a separate contract.

4. This Guidance also provides information for conducting the study. Attachment A is a condensed reference guide; Attachment B contains methods

for performing flow tests to compute the Hazen Williams "C" factor and evaluate the interior condition of a pipe; Attachment C is a laboratory analysis form showing the parameters to be determined from water samples to compute the Langelier Index and indicate the silica content; and Attachment D contains water treatment information, pipe cleaning/replacement costs, and economic analysis. LANTNAVFACENGCOM Code 114 can provide assistance for in-house studies or for obtaining a contract. Point of contact is Mr. J. Harwood at this office, commercial (804) 444-[illegible], AUTOVON 564-[illegible].
7221 7221

DISCUSSION

5. The most common problems which lead to water pipe rehabilitation are: (1) insufficient pipe flow capacity; (2) excessive pipe breaks and leaks; (3) red water problems; and (4) a combination of the above. Where corrosive (aggressive) water exists, red water, loss of capacity, and excessive breaks are common occurrences. The rusting of the pipe interiors which causes red water, also results in flow inhibiting tubercles and a weakening of the pipe wall. Scale forming water deposits a calcium carbonate layer on the pipe walls and protects it from rusting. However, excessive deposits will reduce the smoothness of the pipe wall, and cause excessive friction resistance to flow. More importantly, deposits will reduce the internal diameter of the pipe, resulting in a greater impediment to the flow. Sometimes, both rusting and scaling exist is the same system due to a change in the chemical makeup of the water from location to location, or to a change in the water source or treatment. Rehabilitation can include restoring the flow capacity of existing pipes by cleaning "pigging", cleaning followed by cement-mortar lining, or pipe replacement/addition.

PROCEDURE

6. Unless the system is known to be hydraulically adequate, the basis for flow capacity decisions should be the results of a hydraulic analysis to determine what sizes and what "C" factors are required for the pipes to provide adequate flows. These analyses can range from knowledge of adequacy or simple pipe flow calculations to full scale computer modeling They can be performed by the activity engineering office, by LANTNAVFACENGCOM via ESR, or by an A&E contract. Comparing the required pipe sizes with the existing sizes determines the replacement decision. Except for unusual circumstances (large sizes or locations where replacement is very expensive), it is more economical to replace the pipe with a larger pipe than to clean it and add a second pipe to provide the additional capacity.

7. Testing prior to Rehabilitation (Select those which are compatible with the existing system/problem).

a. Flow Tests

Prior to cleaning a water-pipe, the pipe should be flow tested for a Hazen Williams "C" factor as prescribed in Attachment B. The results will be compared with the required "C" factor from the hydraulic analysis of paragraph (6) to decide if present conditions are adequate or cleaning is desired. Replace any leaking valves that may affect the validity of the test. A

sufficient supply of replacement valves should be available to prevent undue delays. Take a sample of the water from the system where the pipe is located and measure the temperature. Have the water analyzed and the Langelier index computed. The lab analysis forms are shown in Attachment C.

b. Pressure and Leakage Tests

Prior to cleaning a water pipe selected from 7a for cleaning, make pressure and leakage tests according to AWWA C600-44, Section 4.1 and 4.2, and repair any incurred ruptures. The rupture and maximum pressure, prior to rupture (corrected to the elevation of the rupture point) will be the basis for deciding if the pipe is to be cleaned or replaced. If the pressure test causes a break in a pipe length (not in the joint), and the break can be attributed to a weakening of the pipe wall because of rusting, the pipe should be replaced. If the break is a result of a joint failure (not pipe strength), restoration should be considered. The rupture pressure should also be considered. If the elevation corrected pressure is substantially above the maximum pressure determined for that location from the hydraulic analysis, replacement would not be indicated based upon pressure test results alone, especially for an older pipe. In the absence of a surge or water hammer analysis, a rupture pressure double the expected maximum should be acceptable. The decision to replace or restore the pipe should then be based upon economics. The economic analysis should include the cost of repairing leaks identified by the leakage survey, and the cost savings associated with reduced water leakage. Bear in mind that cleaning and cement-mortar lining will reduce leaks, but cleaning (pigging) alone will not.

c. Pipe Examination (exterior)

Prior to cleaning a water pipe selected from 7b, electrical resistivity tests as specified in U.S. Navy Corrosion Prevention and Control Manual (NAVDOCKS MO 306, Section 2) should be made along pipes selected for cleaning. Excavate the pipes where the tests indicate corrosive soils, and examine the exterior for deterioration. Rust, pits, soft spots will be noted. Striking suspicious looking places with a hammer will often reveal soft or deteriorated pipe. Note pieces flaking off when struck. If a pipe is fairly new and is found to be badly deteriorated on the outside, replacement with an exterior protected pipe is indicated. If the pipe is old, and the exterior deterioration is minimal, it can be assumed that there are many more years of useful life remaining for the pipe, and restoration should be considered. Repeat exterior examination for other parts of the system which have adequate "C" factors from (7a), but are exposed to groundwater.

d. Pipe Examination (interior)

Prior to cleaning a water pipe selected from 7c, remove a section of the pipe and examine the pipe interior for lining (cement), and type of interior buildup. Examine the interior of the insitu pipe, as well as the removed spool. Determine the type of incrustation (Rust tuberculation, scale), its thickness, hardness, color, and adherance to pipe walls.

The method of pipe cleaning will depend upon the type of material to be removed. If the water analysis indicates a low (less than 5 ppm) silica content and the pipe interior inspection reveals that the material inside the pipe is a soft and loosely bonded calcium scale (positive Langelier index), polly pigs can be used. If the water analysis indicates high silica content (above 5 ppm), and the corrosion or scale material is hard and/or firmly bonded to the pipe walls, then cleaning should be done by either mechanical pigs or rodding.

Unlined pipes with rust tuberculation (negative Langelier index) are to be mechanically cleaned and cement lined as specified in AWWA Standard C602-76. An alternative to cement lining (which is expensive) is cleaning followed by water treatment. The treatment is to raise the Langelier Index to a slightly positive value, followed by the addition of sodium hexametaphosphate for corrosion control. The equipment needed for treatment is listed in Attachment D.

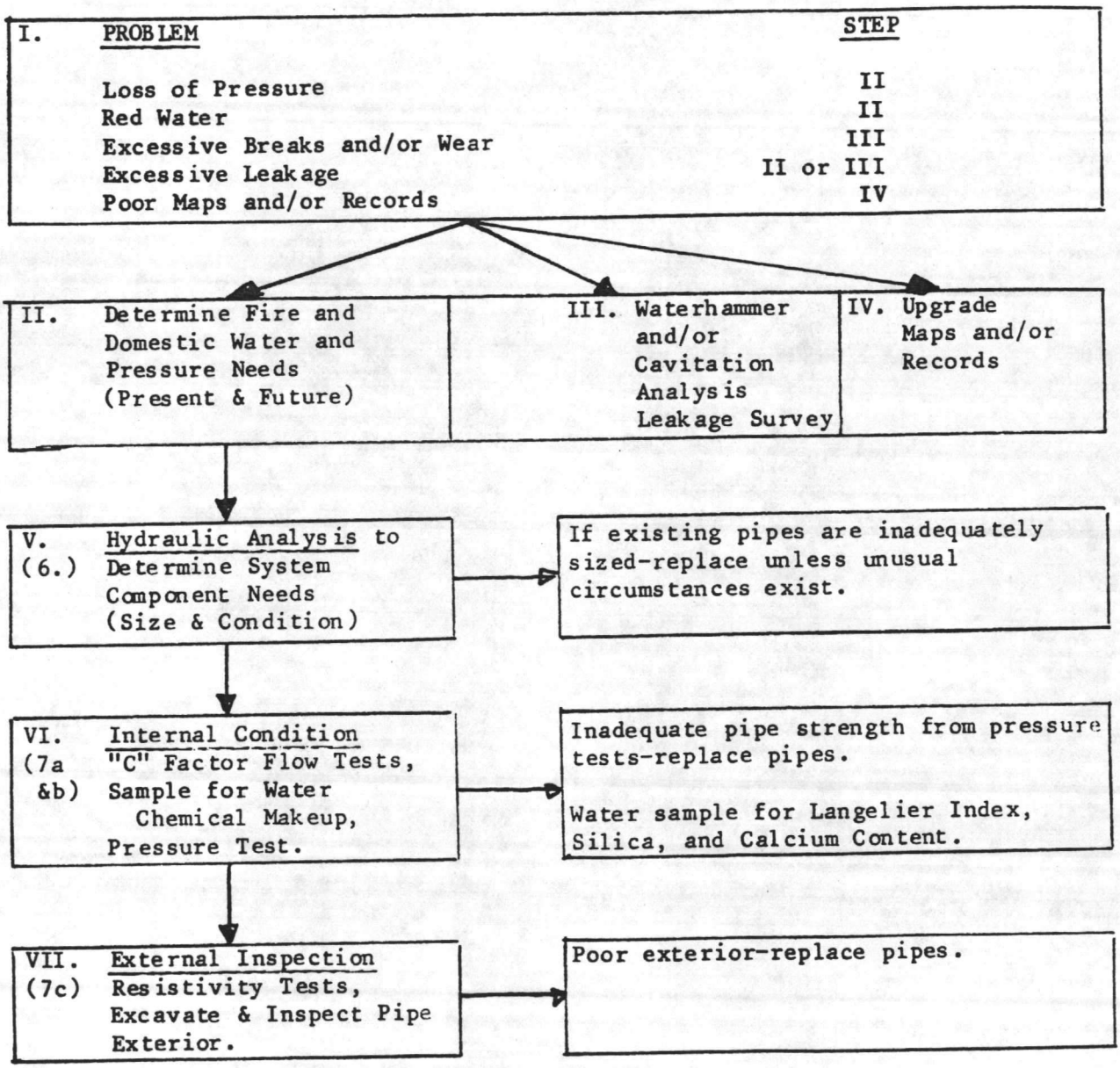
8. Each system decision is site specific and should be considered in light of its own test data. Under normal circumstances, it will be found that rehabilitation cost increases can be expected as follows: Lowest in cost is pigging, then cleaning and lining, and the most expensive is pipe replacement. Also, replacement will be indicated in more cases for the smaller size pipes (less than 10") than the larger pipes. Water treatment items to consider, cleaning/lining costs for pipes, and an economic analysis guide are listed in Attachment D.

9. Excessive breaks can be the result of pipe deterioration caused by corrosion or cavitation, excessive pressures caused by system surges, or water hammer. Surging can be seen on a pressure gage connected to the system. Corrosion can be noted by the color of water (red water) from a fire hydrant at the start of a flow test. Cavitation generally occurs at pumps, pipe diameter changes, valves, fittings, etc., and can be identified by sound. Cavitation sounds like gravel or popping at or near the fittings or pump Water hammer can be noted by banging or thumping noises in the system, especially when a pump stops or a valve or hydrant is suddenly closed. Rust (red water) problems were addressed in paragraph (5). When warranted, water hammer and/or cavitation analyses should be made to determine their magnitude and suitable corrective actions. These analyses are specialized and should be performed via ESR or contract.

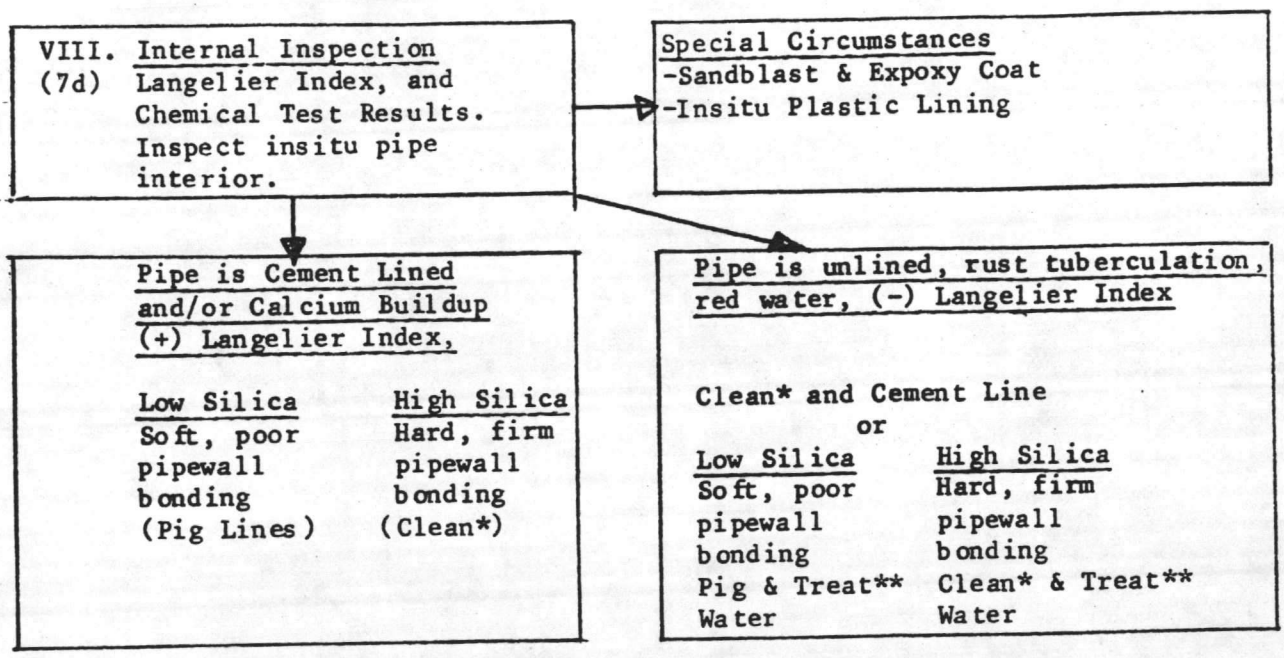
10. Operation Plan: Before any testing work begins, a complete operation plan showing the valves and hydrants to be used and all access points for testing should be made and reviewed by all the parties involved in the tests. The plan should be submitted enough in advance so that an adequate supply of equipment (especially valves) can be stocked, water users can be advised of interruptions in service, and arrangements can be made for traffic, or other problems that may occur.

CONDENSED GUIDE

This condensed guide is a quick reference to be used as a supplement for the "Pipe Rehabilitation Guide". The arrows indicate a probable sequence of steps, and use of condensed guide should be tailored to site specific conditions.



Attachment A



*Mechanically Clean.
**Treat to raise Langelier index and add sodium hexametaphosphates.

()paragraphs in "Water Pipe Rehabilitation Guidance"

ATTACHMENT C
HAZEN WILLIAMS "C" FACTOR
BY FLOW TEST

This flow test is to evaluate the internal condition of a pipe in regard to its resistance (friction) to water flow for a given pipe size (i.e., increased roughness or decreased diameter because of internal pipe buildup).

Energy in the form of pressure is needed to overcome the friction resistance. As the flow increases, the friction increases and there is a pressure (energy) loss to overcome the friction and maintain the flow.

This flow test measures the pressure (energy) loss between two pressure gages on a pipe line for a given hydrant flow. The flow is related to the pressure loss and the friction factor "C" by the Hazen Williams formula (Figure 1a).

Figure 1a

Hazen Williams Formula: $V = 1.318\ C\ R^{0.63}\ S^{0.54}$

Where V is the water velocity in feet/second, C is the Hazen Williams factor, R is the hydraulic radius equal to one fourth of the pipe diameter in feet (D/4) for a pipe flowing full, and S is the hydraulic gradient in feet/foot.

The line is valved so that all the measured water that is discharged through the flow hydrant passes both gages.

The "C" values are computed on Form 1 using a modification of the Hazen Williams formula (Figure 1b), where again C is the Hazen Williams factor, Δp is the pressure loss in (psig), d is the internal pipe diameter in inches, "L" is the pipe length between gages in feet, and Q is the flow hydrant discharge in gpm. The graphs solve the equation for the flow with C=100 from $L/\Delta p$ and d values. The pipe C factor is then calculated by dividing graph flow into the actual flow. An example is shown following Form 1.

Figure 1b (modified Hazen Williams)

$$Q_{c=100} = \left[\frac{4.52 \times L}{p}\right]^{.54} \times \frac{100}{d^{4.87}}$$

NOTES:

(1) STATIC PRESSURES (STAT) are pressures taken prior to opening a hydrant and flowing water (little or no flow of water). If the pressure gage fluctuates, it is the average of the fluctuations.
RESIDUAL PRESSURES (RESID) are pressures taken after a hydrant is opened (large flow of water).

(2) Three calibrated (0 to 100) psig pressure gages with fittings to connect them to hydrant nozzles or hose bibs are required.

3. The test is most accurate when performed during the hours of low water use (night time). In most cases, the error caused by water usage during the day is not great. The "C" value calculated during the day can be used because water usage flow is generally much less than the fire hydrant test flow. (Exception - if a gage is mounted on a building hose bib, water usage to the building through the relatively small building connection can seriously affect the results.)

4. Pipeline length "L" can be scaled from water system maps in feet.

5. This method has been used many times and the form is easy to fill out and use in the field.

6. All inoperative and leaky valves should be replaced prior to flow testing.

7. Be sure to open all line valves and close hydrants when the tests are completed.

8. The test may be made while the line is set up for cleaning. Figure 2 is a typical "pigging" set up. If a valve (VD) is attached to the downstream end of the pipe, it can be closed between pig runs, and the upstream valve (VU) opened to pressurize the line. The test can then be made in the normal manner from a hydrant between the upstream gage mounted on the launcher, and the downstream gage near the retrieval "T".

9. The parallel pipe method of testing the internal condition of a water pipe to measure its Hazen Williams "C" factor may be used in lieu of three gages (Figure 3). It should be used for larger diameter pipes (10-inch and above). The method requires laying hose between hydrants, but is more precise and a smaller head loss can be accurately measured (see Method 2 for details). A differential pressure gage is used to measure the pressure drop. This is an advantage for larger pipes because it avoids the immense discharge of water that is required to produce the head loss needed if the three gage method is used on larger pipes.

Note:
The differential gage should be a Dwyer Model 4205B or equivalent. Cost is under $200.

METHOD I - THREE GAGE
PROCEDURE - USE FORM 1

A. Fill in heading information (1) through (7).
B. Complete sketch.
C. Enter the upstream (furthest from the flow hydrant) and downstream (closest to the flow hydrant) static pressures on line (9). Enter the larger of the two on line (8). Subtract lines (9) from (8) on line (10). One column should be "0", and the other column should contain a pressure difference that compensates for ground surface elevation differences between the two gages.
D. Open the flow hydrant and when the gages steady, read all three gages. The residual pressures, are entered on line (11). The upgage, downgage and flow hydrant pressures in their respective places. Add lines (10) and (11) for upgage and downgage totals (line 12)), then subtract the downgage total from the upgage total for Δp Line (13). Multiply Δp by 1,000 and divide by line length L Line (14).
E. Enter Figure 4 with flow hydrant residual pressure (line (11-flow)). Cross to appropriate hydrant nozzle curve then down to hydrant flow (GPM). Enter hydrant flow in numerator, line (15). Enter Figure 5 with 1,000 x $\Delta p/L$ from line (14). Draw straight line from 1,000 $\Delta p/L$ through pipe diameter to C=100 flow (GPM). Enter this flow in denominator of line (15). Solve line (15) for "C" factor.

(1) TEST# _____ (2) LOCATION _____ (3) DATE _____ (4) TIME _____

FORM 1

C=100 FLOW IN GALLONS PER MINUTE

FIG 5

50 60 70 80 90 100 200 300 400 500 600 700 800 900 1000 2000 3000 4000 5000 6000 7000 8000 9000

2 3 4 5 6 7 8 9 10 12 14 16 18 20 24 30 36 42 48 54 60 66 72

DIAMETER OF PIPE (INSIDE)

(5) UP GAGE LOCATION (HYD#) _____

(6) DOWN GAGE LOCATION (HYD#) _____

(7) FLOW GAGE LOCATION (HYD#) _____

1000 ΔP / L

500 300 200 100 50 40 30 20 10 5.0 4.0 3.0 2.0 1.0 .9 .8 .7 .6 .5 .4 .3 .2 .1 .09 .08 .07 .06 .05 .03

FIG 4

HYDRANT P

30 20 10

1-2½" NOZZLE

2-2½" NOZZLES

3-2½" NOZZLES

500 1000 1500 2000

HYDRANT FLOW GPM

SKETCH

UP DN FLOW

(8) HIGH STAT P = _____

(9) STAT P = _____

(10) _____

(11) RESID P = + _____

(12) _____

(13) ΔP = _____

(14) 1000 x ΔP / L = _____

(15) C = FIG 4 / FIG 5 X 100 = _____

TO FIG 4

TO FIG

TEST BY _____ FIRM _____

ADDRESS _____ PHONE _____

(1) TEST# 6 (2) LOCATION NAUSTA NORVA (3) DATE 10/17/85 (4) TIME 14:50

EXAMPLE - METHOD "L"

C=100 FLOW IN GALLONS PER MINUTE

50 60 70 80 90 100 200 300 400 500 600 700 800 900 1000 2000 3000 4000 5000 6000 7000 8000 9000

910 GPM

FIG 5

2 3 4 5 6 7 8 9 10 12 14 16 18 20 24 30 36 42 48 54 60 66 72

DIAMETER OF PIPE (INSIDE)

(5) UP GAGE LOCATION (HYD#) D-48
(6) DOWN GAGE LOCATION (HYD#) D-47
(7) FLOW GAGE LOCATION (HYD#) D-46

10.8

1000 ΔP / L

400 300 200 100 50 40 30 20 10 5.0 4.0 3.0 2.0 1.0 .9 .8 .7 .6 .5 .4 .3 .2 .1 .09 .08 .07 .06 .05 .03

FIG 4

STATIC PRESSURE (PSI)

30 20 10

1-2½" NOZZLE

2-2½" NOZZLE

3-2½" NOZZLE

815 GPM

500 1000 1500 2000

HYDRANT FLOW (GPM)

SKETCH

7½'-6" (UP to DN)

UP DN

#43

FLOW VALVE CLOSED

#3 (TO FIG 4)

(8) HIGH STAT P = 70
(9) STAT P = 65
(10) 70 − 65 = 5
(11) RESID P = + 55
(12) 60 − 55 = 5
(13) ΔP = 5
(14) 1000 × ΔP/L = 5000/545 = 10.8 (TO FIG 5)
(15) C = FIG 4 / FIG 5 × 100 = 815/910 = 90

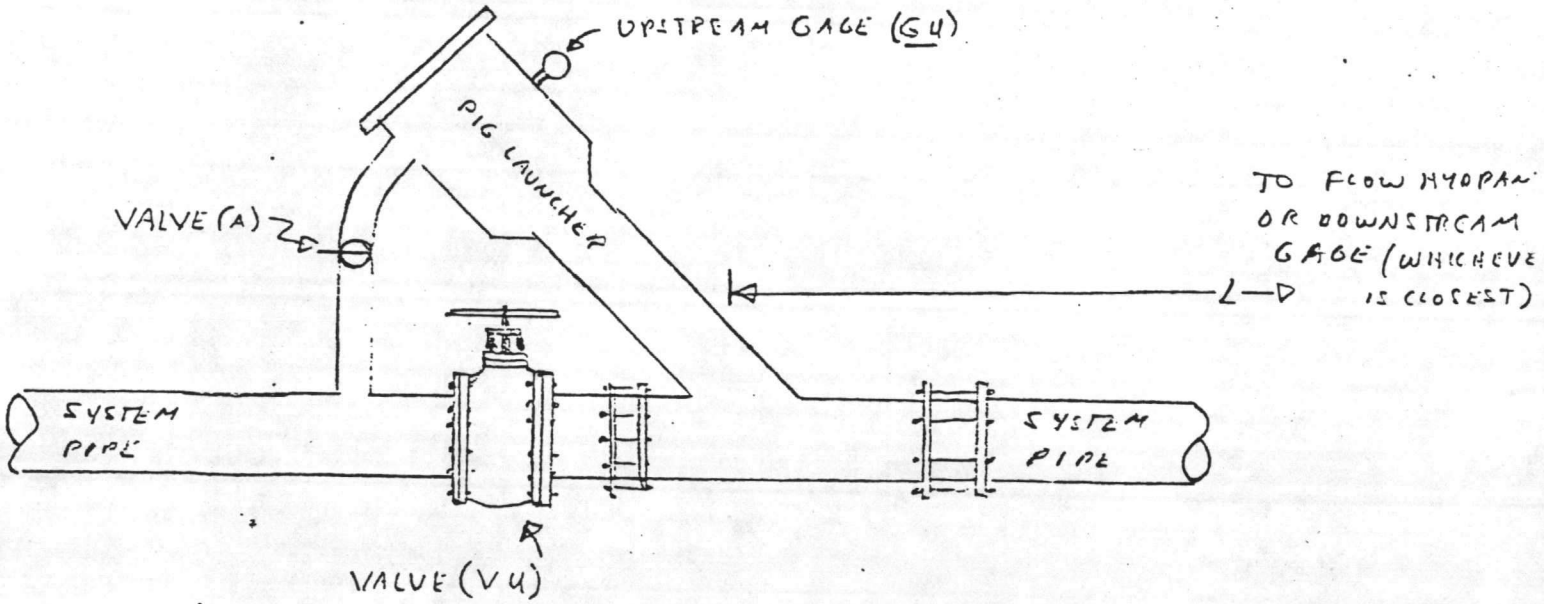
TEST BY M. Hawood FIRM NAVFAC, COMELF

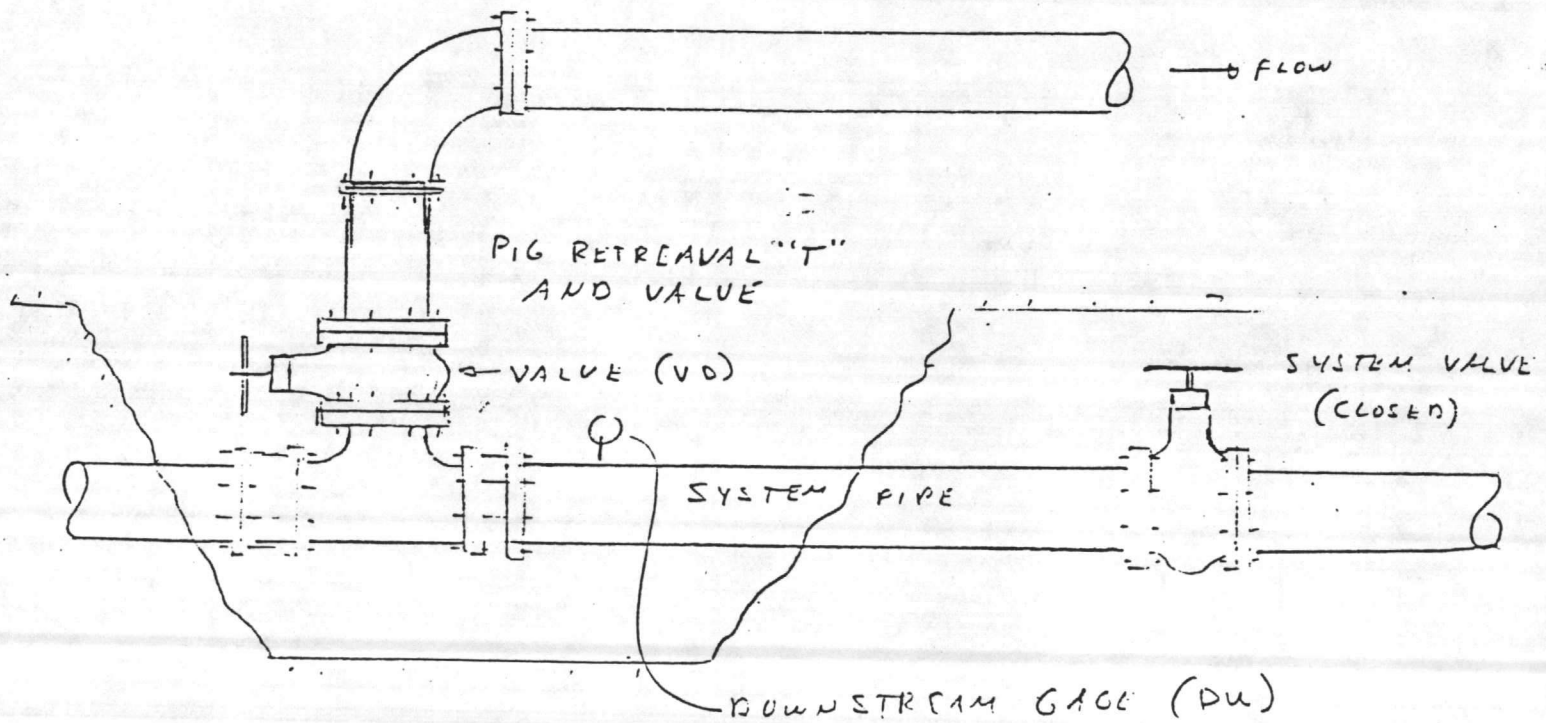
ADDRESS NAVAL STA., NORFOLK, VA. 23511 PHONE (804) 444-7201

BY ... DATE ... SUBJECT ... SHEET NO ... OF ...

CHKD BY ... DATE ... JOB NO ...

FIGURE 2 (METHOD 1)





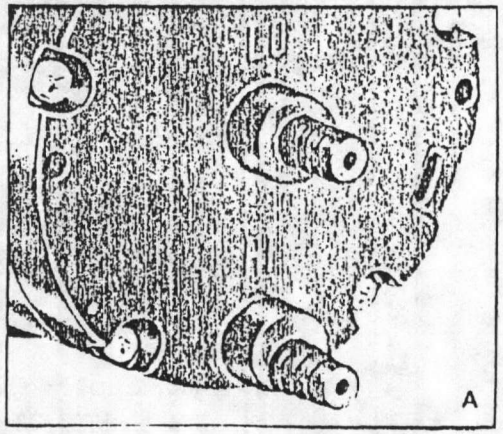
METHOD 2
FORM 1
HAZEN WILLIAMS "C"
FACTOR BY HYDRANT FLOW TEST FORM
PARALLEL PIPE METHOD

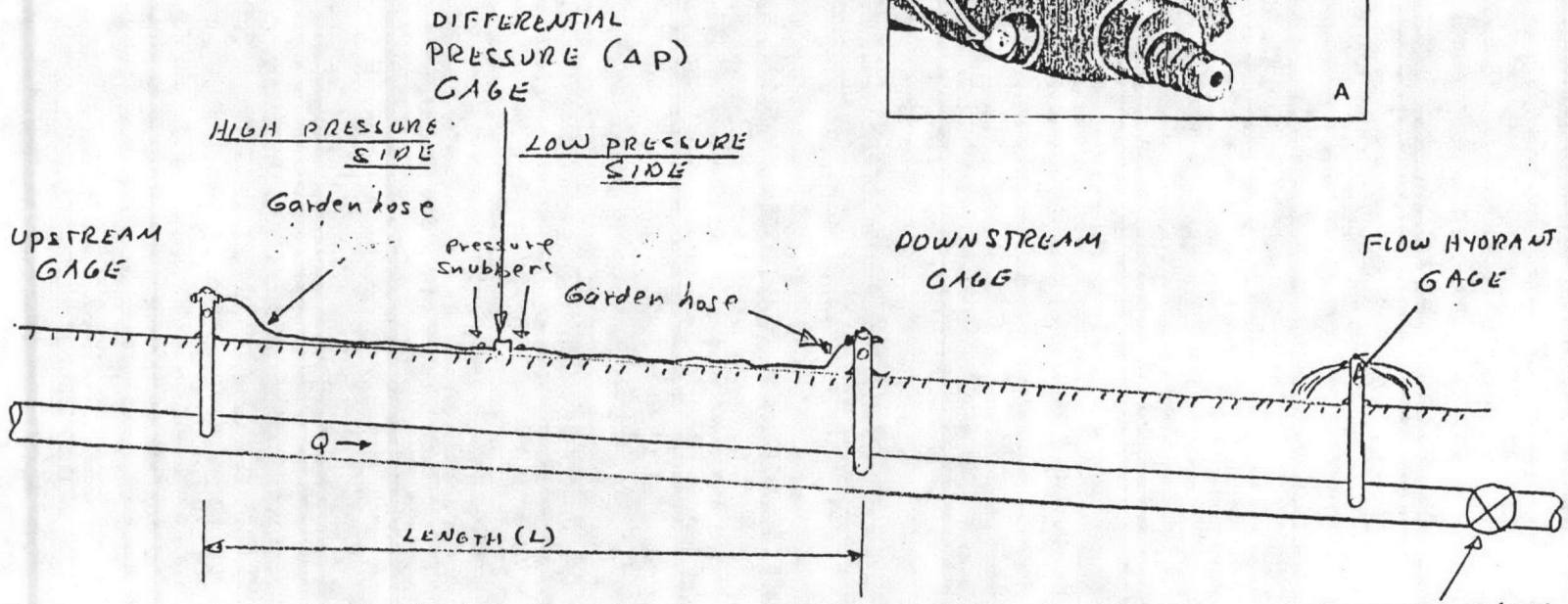
PROCEDURE - USE FORM 1

A. Fill in heading info (1) through (6).
B. Complete sketch.
C. Connect garden hose from hydrants to differential pressure gage (upstream hydrant to high pressure). Open upstream and downstream hydrants and bleed air from hose.
D. Note any initial pressure before flowing hydrant. Enter on line (12 DN).
E. Open the flow hydrant, read differential pressure again and enter on line (12 up). If differential pressure is greater than 5 psig, reduce flow hydrant discharge. If differential pressure is less than 0.5 psig, increase flow by using two hydrant nozzles, the 4-1/2 inch pumper connection, or flow two hydrants and use two flow hydrant gages. Correct by substracting initial pressure (12 DN) from final pressure (12 up) and enter as Δp on line (13). Multiply Δp by 1,00 and divide by length (L) Line (14). Continue the same as Method 1 - i.e.,look up hydrant flow (Figure 4), flow for C=100 (Figure 5), and calculate C from Line 15.

FLOW TEST - PARALLEL PIPE METHOD

PRESSURE CONNECTIONS





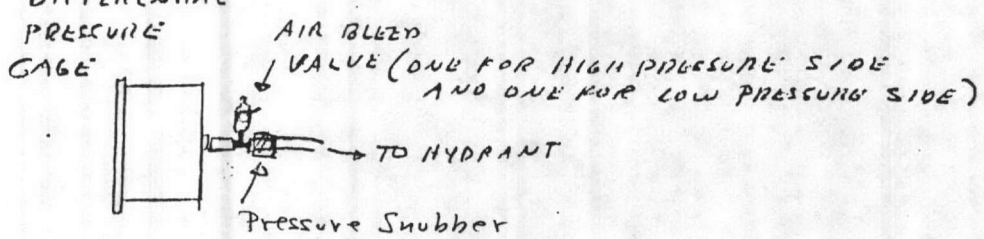


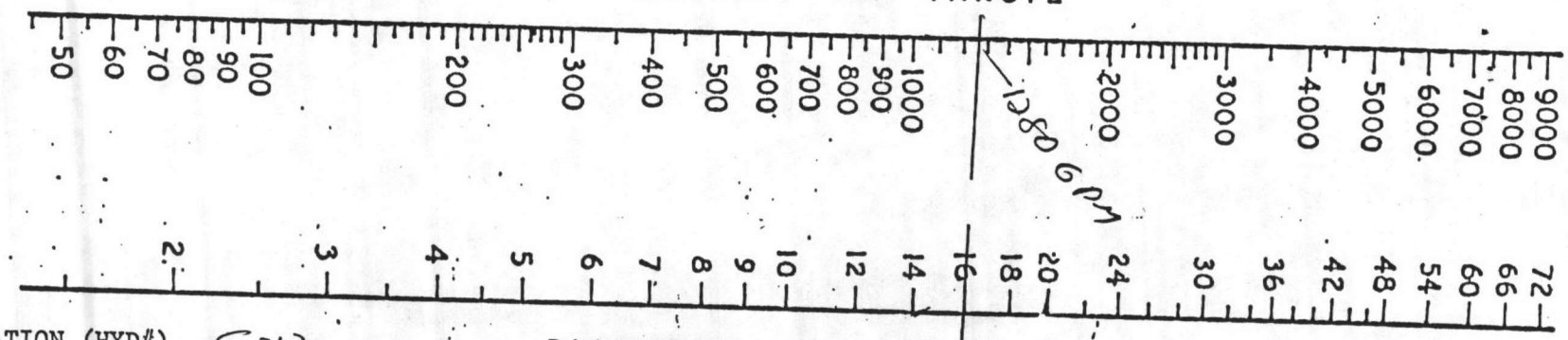
FIGURE 1
PARALLEL PIPE METHOD

SHEET NO ... OF ...
JOB NO ...
SUBJECT ...
DATE ...
BY ... DATE ...
CHKD. BY ...

(1) TEST# 7 (2) LOCATION NAVSTA NORVA (3) DATE 10/17/85 (4) TIME 1610

FIG 5

C=100 FLOW IN GALLONS PER MINUTE



(5) UP GAGE LOCATION (HYD#) G-12
(6) DOWN GAGE LOCATION (HYD#) G-16
(7) FLOW GAGE LOCATION (HYD#) G-14

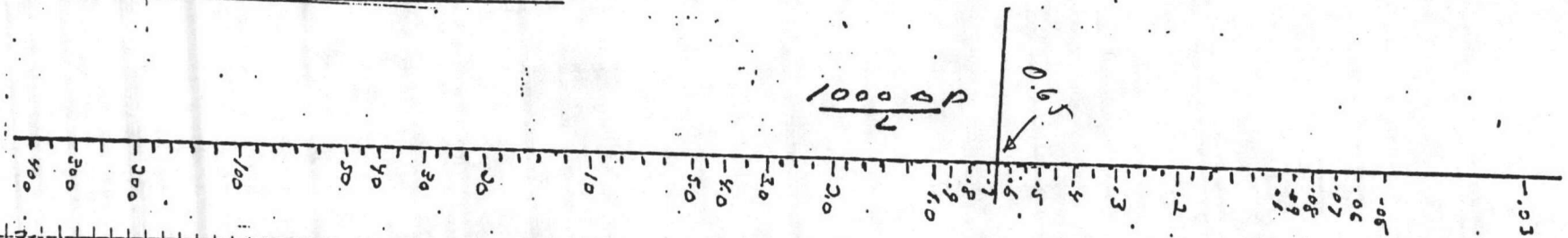
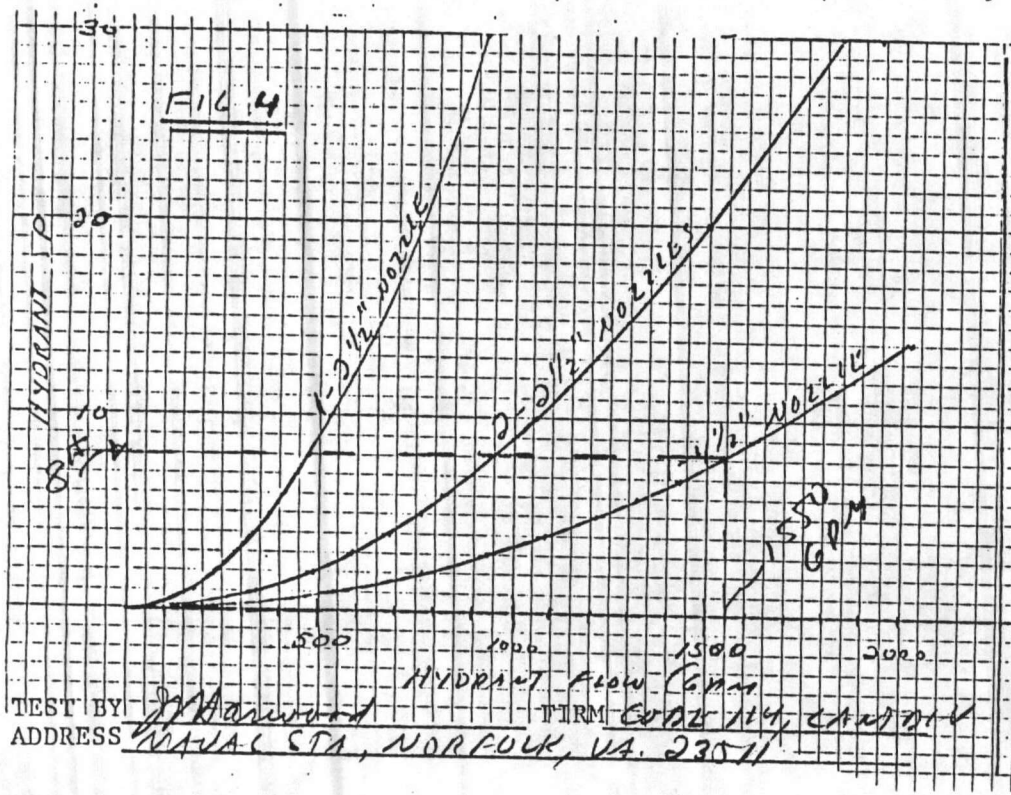
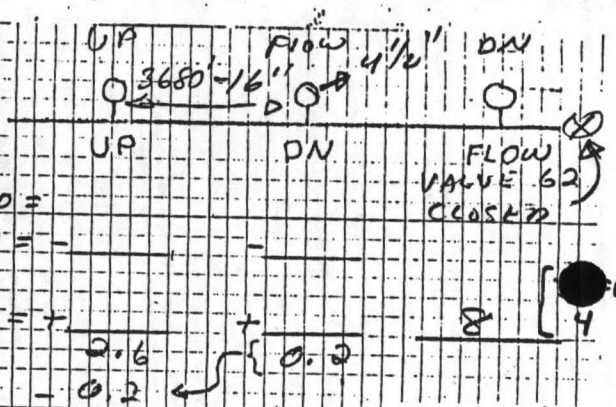


FIG 4



SKETCH



(8) HIGH STAT P =
(9) STAT P = -
(10)
(11) RESID P = + 0.6 + 0.9
(12) - 0.2
(13) ΔP = 2.4
(14) 1000 x ΔP / L = 2400 / 3680 = 0.65 (TO FIG 5)
(15) C = FIG 4 / FIG 5 X100 = 1550 / 1280 X100 = 121

TEST BY J. Harward FIRM Code 114, CAMD
ADDRESS NAVAL STA, NORFOLK, VA. 23511 PHONE (804) 444 7021

EXAMPLE - METHOD 2

PHYSICAL AND CHEMICAL ANALYSIS OF WATER

SAMPLE NO.

FROM: (Station or unit)

DATE

TO: (Name and location of laboratory)

SAMPLE FROM (Location of sampling point)

COLLECTED BY	DATE	HOUR	SOURCE (Designate ground, surface, raw, treated)

REASON FOR EXAMINATION	EXAMINATION REQUESTED BY

NOTE: All results reported in parts per million unless otherwise noted except for pH, temperature, and specific conductance. One liter of potable water is assumed to weigh one kilogram.

I. FIELD ANALYSIS

1. pH ✓	TEMPERATURE °F	TEMPERATURE °C ✓

ITEM	PPM
2. CARBON DIOXIDE (CO_2)	
3. DISSOLVED OXYGEN (O_2)	
4. HYDROGEN SULFIDE (H_2S)	
5. CHLORINE DEMAND (Cl_2)	

FIELD ANALYSIS BY

DATE OF ANALYSIS ✓

II. SPECIAL LABORATORY ANALYSES

Check (X) individual items to be included in the Special Analyses. Request determination only of those substances suspected of being present in significant amounts.

(X)	ITEM	PPM
	1. As	
	2. Se	
	3. Pb	
	4. B	
	5. Cu	
	6. Zn	
	7. Cr (Hexavalent)	
	8. PO	
	9. Cd	
	10. CN	
	11. Phenolic Compounds (PPB)	
	12. Others (Specify)	
	13.	
	14.	
	15.	
	16.	

III. ROUTINE LABORATORY ANALYSIS

(CHECK ONE)

	REQUESTED		NOT REQUESTED

ITEM	PPM
1. COLOR	
2. TURBIDITY	
3. ALKALINITY ($CaCO_3$)	
P ✓	MO ✓
4. TOTAL HARDNESS ($CaCO_3$) ✓	
5. NON-CARBONATE HARDNESS ($CaCO_3$) (By Computation) ✓	
6. CARBONATE HARDNESS ($CaCO_3$) (By Computation) ✓	
7. TOTAL DISSOLVED SOLIDS ✓	
8. SPECIFIC CONDUCTANCE (Micromhos)	
9. CALCIUM (Ca)	✓
10. MAGNESIUM (Mg)	
11. SODIUM (Na) AND POTASSIUM (K)	
12. HYDROXIDE (OH)*	
13. BICARBONATE (HCO_3)*	✓
14. CARBONATE (CO_3)*	
15. SULFATE (SO_4)	✓
16. CHLORIDE (Cl)	
17. NITRATE (NO_3)	
18. IRON (Fe) TOTAL	
19. MAGANESE (Mn)	
20. SILICA (SiO_2)	✓
21. FLUORIDE (F)	

*State whether determined or computed from P and MO alkalinity.

REMARKS (Such as unusual appearance, taste, odor, etc.)

LABORATORY ANALYSIS BY	DATE OF ANALYSIS

DD FORM 1 APR 53 710 REPLACES WD AGO FORM 8-125, 1 APR 45, WHICH MAY BE USED.

GPO 912375

Approximate Costs for Cleaning (1983)
(From Potable Water Main Rehabilitation - NEESA 1-036 Sep 1983)

Cleaning Methods:

1.	Cable Pulled Scrapers	$ 1.00 - $ 2.00 per lineal ft.
+2.	Polyurethane Pigs	$ .90 - $ 2.00 per lineal ft.
3.	Hydromechanical Scrapers	$ 4.00 - $ 6.00 per lineal ft.

+Costs of $ .90 or less are possible if the work is not done by a contractor.

Approximate Costs for Relining (1983)

Pipe Diameter	(1983) Cement-Mortar Lining *Relining Cost ($/LF)	(1983) *Insituform Relining Cost ($/LF)
2"	N/A	N/A
3"	N/A	N/A
4"	N/A	N/A
6"	$18.00	$ 9.50 - $ 13.50
8"	$20.00	$21.00 - $ 30.00
10"	$23.00	$26.00 - $ 37.00
12"	$26.57	$38.00 - $ 53.00
14"	$30.00	$51.00 - $ 72.00
16"	$35.00	$67.00 - $ 94.00
18"	$35.00	$84.00 - $120.00

*Costs include cleaning with cable pulled scrapper
*Costs do not include repaving, line bypassing, or curb reconstruction

Pipe replacement costs per linear foot (1983 Means) includes material, installation, O&P. Does not include excavation, backfill, bypassing, thrust blocks, etc.

Size	Ductile Iron Class (250) Tyron Joint	PVC Class 150 (S.D.R. - 18)
4"	9.20	5.80
6"	10.40	7.00
8"	15.15	11.05
10"	19.25	13.45
12"	24.00	19.80
14"	31.00	
16"	35.00	
18"	44.00	
20"	48.00	
24"	56.00	

Note: Use above if better costs are not available.

Attachment D

WATER TREATMENT INFORMATION

When the costs of replacement or cleaning and cement lining are compared with cleaning and water treatment, the following costs should be added to the latter.

1. Present value of treatment equipment (20 year life)

   a. To raise langelier index (pH & alkalinity)

      Small Systems: (< 2 MGD) Soda ash feeders & solution tank.

      Large Systems: (> 2 MGD) Lime feeders, slaking tanks, sedimentation tanks, filters, CO_2 addition.

   b. For corrosion control - (small & large)

      Chemical feeders - Sodium Hexametaphosphate.

2. Present Value (20 years) of annual

   a. Operation & maintenance costs,

   b. Energy costs,

   c. Chemical costs.

3. Present value (20 years) estimation of annual water cost savings in leakage reduction that would result from cement lining or pipe replacement.

ECONOMIC ANALYSIS

I. Cost of New Pipe _____ I

II. Cost of Cleaning and Cement Lining _____ II

III. Cost of Pigging or Cleaning without Lining _____

If water is aggressive (negative Langelier Index), add to III.

a. Cost of treatment equipment (1) _____

b. Annual costs

O&M _____

Power _____

Chemicals _____

Leakage (2) _____

Total _____ X 8.933 (3) = _____

Total = _____ _____ III

Select most cost effective I, II, or III.

Note: Power escalation rate is ommitted above but should be considered on a case by case basis (unusually high power costs/large repair projects (710 MD)).

(1) From equipment venders.

(2) Cost of estimated leakage reduction expected from new pipes or cement lining.

(3) Discount rate for 20 years at 10 percent.